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111th Congress, 1st Session – – – – – – – – – – – – House Document 111–34

THE PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS), THE DEPARTMENT OF THE ARMY

TRANSMITTING

THE FEASIBIITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT ON THE PEORIA RIVERFRONT DEVELOPMENT IN ILLINOIS

APRIL 23, 2009.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

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111th Congress, 1st Session – – – – – – – – – – – – House Document 111–34

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U.S. GOVERNMENT PRINTING OFFICE

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DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

DEC 0 8 2008

Honorable Nancy Pelosi
Speaker of the House
of Representatives
U.S. Capitol Building, Room H-232
Washington, D.C. 20515-0001

2008 DEC 15 AM 9:38

Dear Madam Speaker:

In partial response to a resolution by the House Committee on Transportation and Infrastructure, adopted May 9, 1996, the U.S Army Corps of Engineers (Corps) prepared a feasibility report to document the development of a project for the Illinois River between Henry and Naples with particular reference to the non-Federal Peoria River Front Development project. The proposal is described in the report of the Chief of Engineers, dated July 28, 2003. Copies of the report, including other pertinent documents, are enclosed. The views of the State of Illinois and the Department of the Interior are set forth in the enclosed report. The project was authorized in Section 1001(19) of the Water Resources Development Act (WRDA) 2007.

The Corps evaluated four alternatives to restore aquatic habitat in Peoria Lake. The alternatives consisted of various combinations of dredging to increase aquatic habitat, and island creation to dispose of the material while also providing wetland habitat. Cost effectiveness and incremental cost analyses were used to evaluate each alternative. The recommended project would restore aquatic habitat in Peoria Lake on the Illinois River in the vicinity of Peoria, Illinois, by providing habitat for fish, wildlife, and waterfowl. The project includes dredging 55 acres in Peoria Lake to restore aquatic habitat and using the dredged material to create a 21-acre island to be located above the McClugage Bridge; and dredging 144 acres to restore aquatic habitat and using the dredged material to create 2 islands totaling 54 acres, to be located below the McClugage Bridge. Rock jetties, which would protect the islands against erosion and provide structure for aquatic habitat, would surround the islands. The recommended plan also includes cost shared post-construction monitoring to measure project performance. No compensatory mitigation is required for the proposed plan.

As part of the review of this project, several revisions were incorporated into the recommended plan to reflect the Corps national ecosystem restoration (NER) planning process. By performing maintenance dredging in about project

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year 26, the project can provide benefits for twice as long as originally proposed. The estimated cost of the non-Federal sponsor's average annual operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) cost would be increased from $11,000 to about $187,000. In addition, the time period for cost shared project monitoring was revised from a 25-year period to a 5-year period, with a limit of 1 percent of first cost, to comply with Corps policy. This resulted in a decrease in total project cost of about $125,000. Any monitoring that exceeds these parameters would be a non-Federal responsibility. With these modifications, the recommended plan is the NER plan and is in compliance with Corps policy.

Based on October 2007 price levels, the Army Corps of Engineers estimates the first cost of the project at about $18,600,000. All costs are for ecosystem restoration. Following the cost sharing provisions of the Water Resources Development Act of 1986, as amended, the Federal share of total project cost would be about $12,090,000, and the non-Federal share would be about $6,510,000. Benefits would accrue to a total of 274 acres of aquatic and wetland habitat that would provide an estimated 800 average annual habitat units (AAHU) over a 50-year period of analysis. While the 675 AAHUs of aquatic habitat would be available upon completion of the dredging, the 125 AAHUs of wetland habitat is an equivalent value that takes into account that it will take about five years for the wetland habitat to develop to its full potential. The State of Illinois Department of Natural Resources would be the non-Federal project sponsor. The non-Federal sponsor has acknowledged the modifications to the proposed plan made in this report, and the Corps has informed me that they agree to them.

In September of 2004, I determined that a separable element of the plan recommended in the report of the Chief of Engineers could be implemented under the authorization provided in Section 519 (c) of the WRDA 2000, which pertains to the Illinois River Basin. The projected cost of that part of the Peoria Riverfront Development project that is being funded under Section 519 authority is about $7,691,000; the Federal share of this work cannot exceed $20,000,000 at FY 2007 price levels. The 55 acres of dredging and the 21 acre island could be constructed under this authority. Remaining funding of about $10,909,000 would be needed to construct the remaining portion of the project located below the McClugage Bridge.

The Administration review of this project concluded that the proposed plan does not represent an appropriate level of investment from the national perspective and is not consistent with the policy and programs of the President; however, the Office of Management and Budget (OMB) advises that there is no objection to the submission of the report to Congress. A copy of its

December 3, 2008 letter is enclosed. I am providing a copy of this transmittal and the OMB letter to the House Subcommittees on Energy and Water Development, and Water Resources and Environment.

Very truly yours,

John Paul Woodley, Jr.

John Paul Woodley, Jr.
Assistant Secretary of the Army
(Civil Works)

Enclosures

5 Enclosures

1. Report of the Chief of Engineers, Jul 28, 2003
2. State of Illinois letter Jun 05, 2003
3. DOI Letter, Jul 09, 2003
4. OMB Letter, Dec 3, 2008
5. Peoria Riverfront Development, Illinois (Ecosystem Restoration) Feasibility Study with Integrated Environmental Assessment - March 2003

Illinois Department of
Natural Resources
One Natural Resources Way • Springfield, Illinois 62702-1271
http://dnr.state.il.us

Rod R. Blagojevich, Governor
Joel Brunsvold, Director

June 5, 2003

Deputy Commanding General for Civil Works
ATTN: CECW-P
Headquarters, U.S. Army Corps of Engineers
7701 Telegraph Road
Alexandria, VA 22315-3860

Dear General:

The Illinois Department of Natural Resources received a copy of your agency's April 21, 2003 Notice of Final Report and Integrated Environmental Statement, Peoria Riverfront, Illinois. The District Engineer of the Rock Island District, Colonel William Bayles, has recommended the construction of features in Peoria Lake on the Illinois River consisting of an upper island and two lower islands with a flowing side channel. The proposed action will create 75 acres of terrestrial habitat in the three islands, and will restore depth diversity to nearly 200 acres of Peoria Lake.

The Department is participating with the Rock Island District as a cost-share sponsor, and is pleased to extend its full support to the project subject to IDNR, Office of Water Resources permit requirements. We believe the proposed construction can be implemented without significant adverse impacts to fish and wildlife resources, including threatened or endangered species, and that it will provide major long term benefits to the environmental and recreational values of Peoria Lake.

We invite you to contact Jim Mick, Illinois River Basin Coordinator (309-543-3316) or Dennis Kennedy, Office of Water Resources (217-782-3863) if the Department can be of assistance.

Sincerely,

Tom Flattery

Tom Flattery, Director
Office of Realty and Environmental Planning

TF:RWS:rs

cc: Colonel William J. Bayles
IDNR/OREP (Steve Davis, Robert Schanzle)
IDNR/ORC (Brian Anderson, Jim Mick)
IDNR/OWR (Gary Clark, Dennis Kennedy)

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United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

ER 03/494

JUL 0 9 2003

Dr. James Johnson, Chief
Planning and Policy Division
Directorate of Civil Works
U.S. Army Corps of Engineers
CECW-P (SA)
7701 Telegraph Road
Alexandria, VA 22315-3860

Dear Dr. Johnson:

The U.S. Department of the Interior has reviewed the Chief of Engineers Proposed Report, Feasibility Study with Integrated Environmental Assessment for the Peoria Riverfront Development (Ecosystem Restoration), Peoria and Tazewell Counties, Illinois.

The Fish and Wildlife Service's Rock Island Field Office in Illinois has provided input to the Study, including two letters which are included in Technical Appendix A.

Therefore we do not object to the proposed project and have no additional comments. Thank you for the opportunity to review these materials.

Sincerely,

Willie R. Taylor, Director
Office of Environmental
Policy and Compliance

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

THE DIRECTOR

December 3, 2008

The Honorable John P. Woodley, Jr.
Assistant Secretary of the Army (Civil Works)
108 Army Pentagon
Washington, D.C. 20310-0108

Dear Mr. Woodley:

As required by Executive Order 12322, the Office of Management and Budget has completed its review of your recommendation concerning the proposed Peoria Riverfront Development near Peoria, Illinois.

As you know, the Administration's performance-based construction guidelines for Corps of Engineers aquatic ecosystem restoration ranks each project based on whether it cost effectively restores a nationally or regionally significant aquatic ecosystem that has been degraded by a Corps project or is a restoration effort for which the Corps is uniquely well suited. Based on our review of this project we have concluded that the Lower Peoria Lake project does not represent an appropriate level of investment from the national perspective.

The Office of Management and Budget does not object to your submitting this report to the Congress. However, when you do, please advise the Congress that the project is not consistent with the policy and programs of the President.

Sincerely,

Richard A. Mertens
Deputy Associate Director
Energy, Science and Water Division

NOTICE

Peoria Riverfront Development, Illinois

Since Congress has authorized the project, the Army Corps of Engineers does not request that the report be printed. If there are any questions about this, please call (Zoltan Montvai) at Corps Headquarters. You can reach Mr. Montvai at (202) 761-4495.

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS (ECOSYSTEM RESTORATION)

FEASIBILITY STUDY

WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

MAIN REPORT

MARCH 2003

US Army Corps
of Engineers ®
Rock Island District

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20310-2600

REPLY TO
ATTENTION OF

CECW-PM (1105-2-10a)

28 JUL 2003

SUBJECT: Peoria Riverfront Development, Illinois

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on ecosystem restoration in the vicinity of Peoria, Illinois. It is accompanied by the report of the Rock Island District Engineer and the Mississippi Valley Division Engineer. These reports are in final response to a resolution by the Committee on Transportation and Infrastructure of the House of Representatives, adopted on 9 May 1996. The study resolution requested a review of "the report of the Chief of Engineers on the Peoria Lake and LaGrange Pool, Illinois River, Henry to Naples, Illinois, and other pertinent reports, with a view to determining whether the recommendations contained therein should be modified at this time, with particular reference to that portion of the Illinois River between Henry and Naples that flows next to, or directly impacts, the downtown Peoria Riverfront Development project, to determine potential flood control or other water resources impacts, if any, that may affect the development efforts, to include but not be limited to a study of the siltation problem caused by sediment deposition from Farm Creek into the Illinois River, as well as the potential use of suitable dredged material for development of a public beach." Preconstruction engineering and design activities for the Peoria Riverfront Development, Illinois, project will be continued under this authority.

2. The reporting officers recommend authorization of a plan to restore the ecosystem in Peoria Lake on the Illinois River in the vicinity of Peoria, Illinois, by improving habitat for fish, wildlife and waterfowl. The recommended plan consists of dredging 55 acres to create aquatic habitat and using the dredged material to create an island with 21 acres of terrestrial habitat in Peoria Lake above McClugage Bridge, and dredging 144 acres to create aquatic habitat and using the dredged material to create two islands with a total of 54 acres of terrestrial habitat in Peoria Lake below McClugage Bridge. The recommended plan also includes post-construction monitoring to help ensure project performance. All features are in Illinois. Since the recommended plan would not have any significant adverse effects, no mitigation measures (beyond management practices and avoidance) or compensation measures would be required. The recommended plan is the national ecosystem restoration plan.

3. Based on October 2002 price levels, the total first cost of the plan is estimated at $15,182,000, all for ecosystem restoration. In accordance with the cost sharing provisions of the Water Resources Development Act (WRDA) of 1986, as amended by Section 210 of WRDA 1996, the

Federal share of total project cost would be about $9,868,000 (65 percent) and the non-Federal share would be about $5,314,000 (35 percent). The Illinois Department of Natural Resources (IDNR) is the non-Federal cost sharing sponsor for all features of the plan. The IDNR would also be responsible for the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project after construction, a cost currently estimated at $11,000 per year. Average annual costs, including initial construction, monitoring and OMRR&R, are $1,060,000 based on an interest rate of 5.875 percent and a 25-year period of analysis.

4. To ensure that an efficient ecosystem restoration plan was recommended, cost effectiveness and incremental cost analysis techniques were used to evaluate the alternative plans. The cost of the recommended features is justified by restoring 675 average annual habitat units of aquatic habitat, and 125 average annual habitat units of shoreline and terrestrial habitat on the three new islands. Aquatic habitat losses due to sedimentation are the greatest threat to the health of the Illinois River basin and specifically Peoria Lake. The restored aquatic habitat would be especially valuable for helping to reestablish the health of the Illinois River, once a nationally renowned fishery. The Illinois River valley is part of the internationally significant Mississippi Flyway, a major migration route for waterfowl, shorebirds, and neotropical migrant birds. The restored shoreline and terrestrial habitats would be especially valuable as resting, nesting, and feeding areas for these migratory birds.

5. Washington level review indicates that the plan recommended by the reporting officers is environmentally justified, technically sound, cost effective and socially acceptable. The plan conforms with essential elements of the U.S. Water Resources Council's Economic and Environmental Principles for Water and Related Land Resources Implementation studies and complies with other administration and legislative policies and guidelines. Also, the views of interested parties, including Federal, State, and local agencies have been considered.

6. I concur in the findings, conclusions and recommendations of the reporting officers. Accordingly, I recommend that the plan described herein for ecosystem restoration be authorized for implementation as a Federal project, with such modifications as in the discretion of the Chief of Engineers may be advisable, and subject to cost sharing, financing, and other applicable requirements of Federal and State laws and policies, including WRDA 1986, as amended by Section 210 of WRDA 1996, and in accordance with the following requirements which the non-Federal sponsor must agree to prior to project implementation:

a. Provide 35 percent of the separable project costs allocated to environmental restoration as further specified below:

(1) Enter into an agreement that provides, prior to execution of a project cooperation agreement for the project, 25 percent of design costs;

(2) Provide, during construction, any additional funds needed to cover the non-Federal share of design costs;

(3) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or ensure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

(4) Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(5) Provide, during construction, any additional costs as necessary to make its total contribution equal to 35 percent of the separable project costs allocated to environmental restoration.

b. For so long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project, or functional portion of the project, at no cost to the Government, in accordance with applicable Federal and State laws and any specific directions prescribed by the Government.

c. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

d. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provide that the Secretary of the Army shall not commence the construction of any water resources project, or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

e. Hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

f. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect

total project costs for a minimum of three years after completion of the accounting for which such books, records, documents, and other evidence are required.

g. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

h. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA-regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

i. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

j. Prevent obstructions of, or encroachments on, the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) that might reduce the ecosystem restoration, hinder its operation and maintenance, or interfere with its proper function, such as any new development on project lands or the addition of facilities that would degrade the benefits of the project.

k. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

l. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and all applicable Federal labor standards and requirements, including but not limited to 40 U.S.C. 3141-3148 and 40 U.S.C. 3708 (revising, codifying and enacting without substantial change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a et seq.), the

Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 et seq.) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c).

m. Provide the non-Federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation that are in excess of 1 percent of the total amount authorized to be appropriated for the project, in accordance with the cost-sharing provisions of the agreement.

n. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

7. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the State of Illinois as sponsor, interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded the opportunity to comment further.

ROBERT B. FLOWERS
Lieutenant General, U.S. Army
Chief of Engineers

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS (ECOSYSTEM RESTORATION)

FEASIBILITY STUDY

WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

MAIN REPORT

MARCH 2003

US Army Corps
of Engineers ®
Rock Island District

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

http://www.mvr.usace.army.mil

CEMVR-PM-M

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS (ECOSYSTEM RESTORATION)

FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

MAIN REPORT

MARCH 2003

Executive Summary

The Peoria Riverfront Development (Ecosystem Restoration) Project area includes Lower Peoria Lake. The area lies within Peoria and Tazewell Counties, Illinois, and includes Illinois River Miles 162-167. The project is related to the Peoria Riverfront Development Project, a public and private cooperative effort that also includes revitalization of the City's downtown area. Development includes a visitor's center, city park, residential redevelopment, community center, riverboat landing, sports complex, entertainment centers, and retail development. The region has begun to reclaim its abandoned industrial riverfront, with the understanding that a healthy, attractive, and sustainable environment must be present.

The Illinois River is a symbol of the region's economic, social, and cultural history, as well as its future. Therefore, ecosystem restoration in Peoria Lake is a vital component to an overall effort and vision to develop the Peoria Riverfront in an ecologically, economically, and socially sustainable manner. This Ecosystem Restoration Feasibility Study was conducted by the U.S. Army Corps of Engineers and the Illinois Department of Natural Resources (Non-Federal Sponsor) to investigate the Federal and State interest in ecosystem restoration within Peoria Lake. In support of this resource vision, several regulatory efforts on the part of the cities and counties to address the sedimentation issue affecting the Illinois River have been adopted. Further, intergovernmental coordination among cities, counties, and non-governmental organizations related to the Illinois River ecosystem has resulted in several ongoing efforts to protect, restore, and enhance the resources present in Peoria Lake and its tributaries.

Specific authority to conduct the Peoria Riverfront Development Study is contained in Resolution 2500 of the Committee on Transportation and Infrastructure, adopted May 9, 1996. Additional authority is contained in Section 216 of the 1970 Flood Control Act and Section 519 of the Water Resources Development Act (WRDA) 2000, which authorized restoration of the Illinois River Basin.

The principal goal of the Recommended Plan is to enhance aquatic habitat through the restoration of depth diversity in Peoria Lake, with ancillary benefits to recreational boating and fishing. Peoria Lake, the largest bottomland lake in the Illinois River Valley, exhibits loss of depth similar to other Illinois River backwater lakes. The 60 backwater lakes along the Illinois River have average volumetric losses of 70% since 1903. Loss of aquatic habitat due to sedimentation is the greatest threat to the healthy function of the Illinois River, and Peoria Lake specifically.

Opportunities were explored to address these conditions, especially those that relate to the downtown Peoria Riverfront Development Project. Goals to achieve aquatic habitat restoration include: (1) restored depth diversity; (2) increased structure for aquatic organisms; (3) increased

habitat diversity; (4) improved habitat value for migratory waterfowl and shorebirds; (5) improved water quality; (6) sustainable project features; (7) reduced sediment delivery to Peoria Lake from tributary streams; and (8) riparian and wetland habitat restoration along tributary streams. Of these goals, the recommended plan does not substantially address project goals (7) and (8). Further study efforts are warranted to address the significant sedimentation delivery problem to the Illinois River at Peoria Lake.

MEASURES FOR PEORIA LAKE

The following restoration measures for Peoria Lake were considered in detail to achieve project goals and objectives:

1. No Federal action.
2. Dredging to create aquatic habitat and a small island (9-acre island and 17 acres dredged) upstream of the McClugage Bridge (U.S. Highways 24 and 150).
3. Dredging to create aquatic habitat and a mid-sized island (21-acre island and 55 acres dredged) upstream of the McClugage Bridge (U.S. Highways 24 and 150).
4. Dredging to create aquatic habitat and two islands with a flowing side channel (17- and 37-acre islands and 144 acres dredged) downstream of the McClugage Bridge (U.S. Highways 24 and 150).
5. Dredging to create aquatic habitat and a large island (46-acre island and 99 acres dredged) downstream of the McClugage Bridge (U.S. Highways 24 and 150).

MEASURES FOR FARM CREEK

Efforts were also undertaken to plan and evaluate upland restoration measures that could address the goals of sediment delivery to Peoria Lake and restoration of riparian and wetland habitats. Evaluations were conducted as part of this study that identified a site near Washington, Illinois in the Farm Creek Watershed. Alternatives were developed and analyses leading to selection of a recommended plan were completed. Following release of the public review draft of this report, results from a Hazardous, Toxic and Radioactive Waste (HTRW) Phase IIA Environmental Site Assessment (ESA) concluded that the project site for the recommended plan for tributary watershed restoration had contamination issues. Therefore, consistent with Corps of Engineers policy, the study team, in consultation with the Sponsor, decided to eliminate this element from the study's overall recommended plan. However, all data, plan formulation, design, and cost information have been included in Appendix (K) for the tributary watershed restoration portion of the project. Information originally included in the other appendices regarding tributary watershed restoration is included in additional sub-appendices to Appendix K. Cleanup of the project site by the City of Washington, Illinois, could allow for project completion under Section 206 and or Section 519 authorities.

RECOMMENDATION

It is recommended that the Secretary of the Army for Civil Works approve the proposed project to include constructing in Peoria Lake the mid-sized upper island and two lower islands with a flowing side channel. The recommended plan will create 75 acres of terrestrial habitat (islands) and restore depth diversity to nearly 200 acres of Peoria Lake.

The current working estimated cost of the Recommended Plan is $15,182,000. This total estimated project cost includes construction of the project features; planning, engineering, and design; construction management; real estate; and monitoring. Implementation would be cost shared 65% by the Federal Government and 35% by the Illinois Department of Natural Resources (ILDNR), the Non-Federal Sponsor. The Federal contribution is estimated at $9,867,774 and the non-Federal contribution is estimated at $5,313,417. It is the ILDNR's responsibility to provide the real estate and conduct operation and maintenance. The operation and maintenance of these features is estimated to cost $11,340 annually.

Contents

Section 1 - Introduction

Authority 1-1
Study Purpose and Scope 1-2
Organization of Feasibility Report and Environmental Assessment 1-3
Study Area 1-4
Background and History 1-5
Reconnaissance Study 1-8
Concise Discussion of Studies, Reports, and Existing Water Projects 1-9

Section 2 - Plan Formulation

Description of the Study Process 2-1
Peoria Lake Restoration 2-2
*Inventory of Resource Conditions 2-2
Existing Conditions 2-2
Future Without-Project Conditions 2-17
Tributary Watershed Restoration 2-18
Assessment of Problems, Opportunities, and Constraints 2-19
Problem 2-19
Goals and Opportunities 2-19
Objectives 2-20
Constraints 2-21
Identify Measures and Formulate Alternative Plans for Peoria Lake 2-22
Formulation Criteria 2-23
Potential Project Measures for Peoria Lake 2-23
Description of Alternatives 2-24
*Evaluate and Compare Plans for Peoria Lake 2-26
Incremental Cost/Cost Effectiveness Analysis Process 2-31
Habitat Evaluation 2-31
Cost Estimates for Habitat Improvement Measures 2-35
Summary of Alternative Plans 2-35
Results of Incremental Cost/Cost Effectiveness Analysis 2-36
Other Factors 2-37
Resource Significance 2-37
Hydrological/Sustainability 2-38
Public Acceptability 2-38
Recreation 2-38
Hazardous, Toxic, and Radioactive Waste (HTRW) 2-38
Real Estate 2-38
Select Recommended Plan 2-39

Section 3 - Description of Selected Plan

Lower Peoria Lake Islands 3-1
Plan Components 3-1

General Description 3-1
Project Data Summary 3-2
Project Location 3-5
Utility Relocations 3-6
Deepwater and Island Configuration/Geometry 3-6
Hydraulic Assessment 3-6
Bank Stabilization/Erosion Protection 3-7
Fish Jetties 3-7
Emergent Closing Structure 3-7
Final Island Configuration 3-7
Design and Construction Considerations 3-8
Project Site 3-8
Dredging Depths 3-8
Construction Equipment 3-8
Island Foundation 3-8
Construction Method – Embankment/Containment Facility 3-9
Construction Method – Embankment Interior 3-10
Borrow and Construction Materials 3-12
Construction Contracting 3-12
Construction Sequence 3-12
Value Engineering 3-14
Water Quality Impacts 3-14
Test Island Construction 3-16
Permits 3-17
Operation, Maintenance, and Rehabilitation Considerations 3-17
Operation 3-17
Maintenance 3-17
Project Performance Assessment 3-17
Project Cost Estimate 3-21
Plan Accomplishments 3-24

***Section 4 - Environmental Impacts/Effects**

Peoria Lake 4-1
Environmental Impacts of the No Action Plan 4-1
Environmental Impacts of the Selected Plan 4-1
Natural Resources 4-1
Endangered Species 4-2
Water Quality 4-3
Air Quality 4-3
Historic Properties 4-3
Created Resources 4-4
Farm Displacement 4-4
Noise Levels 4-4
Aesthetics 4-4
Community and Regional Growth 4-4
Displacement of People 4-4
Community Cohesion 4-5
Property Values and Tax Revenues 4-5
Public Facilities and Resources 4-5

Life, Health, and Safety 4-5
Employment and Labor Force 4-6
Business and Industrial Growth 4-6
Environmental Impacts of Non-preferred Alternatives 4-6
Any Irreversible or Irretrievable Commitments of Resources Which Would Occur if the Proposed Action Were Implemented 4-6
Relationship of the Project to Land-Use Plans 4-6
Cumulative Impacts 4-7
Past Actions 4-8
Present Actions 4-8
Reasonably Foreseeable Future Actions 4-8
Reasonably Foreseeable Future Actions in La Grange and Peoria Pools 4-9
Associated Actions in La Grange and Peoria Pools 4-9

Section 5 - Plan Implementation

Division of Plan Responsibility 5-1
Recommended Plan Cost Sharing 5-1
Federal Responsibilities 5-2
Non-Federal Responsibilities 5-2
Institutional Requirements 5-4
Sponsorship Agreement 5-4
Financial Analysis and Capability 5-4
Local Cooperation 5-7
Project Management Plan 5-7
Procedures for Project Implementation 5-7
Project Implementation Schedule 5-8
Views of Non-Federal Sponsor(s) and Any Other Agencies with Implementation Responsibilities 5-8
*Compliance with Environmental Requirements 5-9

***Section 6 - Summary of Coordination, Public Views, and Comments**

Coordination 6-1
Public Views and Comments - June 2000 Open House 6-2
Public Views and Comments - November 2000 Open House 6-3
Public Views and Comments - Summer 2002 Public Meeting 6-4
Summary 6-5

Section 7 - Recommendation

***Section 8 - Finding of No Significant Impact**

References

*** Sections and/or elements that serve as National Environmental Policy Act compliance documentation.**

Tables:

2-1 Peoria Lake Sedimentation Summary 2-7
2-2 Population Trends 2-11
2-3 Employment Trends 2-11
2-4 Potential Measures to Address Study Goals and Objectives 2-21
2-5 Environmental Output and Costs of Each Measure 2-35
2-6 Peoria Lake Alternative Evaluation 2-36
2-7 Incremental Cost Analysis of Best Buy Alternative Plans for Peoria Lake 2-37
3-1 Island Summary Table 3-2
3-2 Island 1 – Project Summary 3-3
3-3 Islands 2 and 3 – Project Summary 3-4
3-4 Construction Alternatives for Embankments Constructed in Water on Soft Foundations 3-10
3-5 Construction Alternatives to Fill Embankments 3-11
3-6 Proposed Construction Timeline 3-13
3-7 Monitoring and Performance Evaluation Matrix 3-18
3-8 Summary of Physical and Chemical Monitoring 3-19
3-9 Summary of Biological Monitoring 3-19
3-10 Post-Construction Evaluation Plan 3-20
3-11 Lower Peoria Lake – Aquatic Restoration and Island Project Cost Summary 3-21
3-12 Lower Peoria Lake – Aquatic Restoration and Island Construction Cost Estimate 3-22
3-13 Estimated Annual Operation and Maintenance Costs 3-24
3-14 Estimated Post-Construction Annual Monitoring Costs 3-24
4-1 HNA Land Cover Classes 4-7
4-2 Regulatory Actions in and Adjacent to Peoria and La Grange Pools Since 1960 4-10

Figures:

2-1 Peoria Pool EMP Projects 2-4
2-2 Peoria Lake 1-Foot Water Depth Contours 2-8
2-3 Typical Cross Sections of Upper and Lower Peoria Lakes 2-9
2-4 Alternative A1 - Dredging to Create Aquatic Habitat and a Small Island 2-27
2-5 Alternative A2 - Dredging to Create Aquatic Habitat and a Mid-Sized Island 2-28
2-6 Alternative B1 - Dredging to Create Aquatic Habitat and Two Islands with a Flowing Side Channel 2-29
2-7 Alternative B2 - Dredging to Create Aquatic Habitat and a Large Island 2-30
2-8 Peoria Lake – Selected Plan 2-40
2-9 Lower Peoria Lake Present and with Proposed Project 2-41
3-1 Typical Island Section 3-1

Plates:

1 Location Maps
2 Restoration Sites
3 Selected Plan
4 Island 1
5 Islands 2 and 3

6 Rock Work Typical Section
7 Typical Island Sections
8 Island Construction Sequence
9 Typical Dredge Cuts
10 Monitoring Plan Island 1
11 Monitoring Plan Islands 2 and 3
12 Biological Monitoring Plan Island 1
13 Biological Monitoring Plan Islands 2 and 3
14 Alternative 1 - Small Island
15 Alternative 2 - Large Island
16 Proposed Test Islands

Appendices: (contained in two separately bound volumes)

A General
A-1 Correspondence
A-2 Design Agreement
A-3 Section 404(b)(1) Analysis
B Hazardous, Toxic, and Radioactive Waste Phase I Environmental Site Assessment
C Geotechnical Considerations
D Hydrology and Hydraulics
D-1 Peoria Lake Hydrologic Data
D-2 Peoria Lake Micro Model Analysis
D-3 Hydrodynamic Modeling for Artificial Island Construction within the Lower Peoria Lake
D-4 Peoria Lake Island Flood Height Impacts Analysis
E Water Quality and Sedimentation
E-1 Sedimentation Rate Analysis
E-2 Historical Sedimentation at the Mouths of Five Deltas on Peoria Lake
E-3 Sediment Contaminant Analysis Report
E-4 Peoria Lake Water Quality Analysis
F Cost Engineering
G Environmental - Habitat Evaluation and Quantification
H Real Estate Plan
I Project Performance Assessment and Monitoring Plan
J Value Engineering Study
K Tributary Watershed Restoration
A General
A-1 Correspondence
B Hazardous, Toxic, and Radioactive Waste Phase I & IIA Environmental Site Assessments
D Hydrology and Hydraulics
D-5 Farm Creek Watershed Hydrology and Hydraulics Analysis
F Cost Engineering
G Habitat Evaluation and Quantification (Farm Creek)
L Distribution List

Introduction

AUTHORITY

Prior to initiating Federal involvement in addressing water resources problems, the Corps of Engineers must have authority to investigate the problem. Specific authority for conducting the Peoria Riverfront Development (Ecosystem Restoration) Study is contained in Resolution 2500 of the Committee on Transportation and Infrastructure, adopted May 9, 1996, which states:

> "Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, the Secretary of the Army is hereby requested to review the report of the Chief of Engineers on the Peoria Lake and LaGrange Pool, Illinois River, Henry to Naples, Illinois, and other pertinent reports, with a view to determining whether the recommendations contained therein should be modified at this time, with particular reference to that portion of the Illinois River between Henry and Naples that flows next to, or directly impacts, the downtown Peoria Riverfront Development project, to determine potential flood control or other water resources impacts, if any, that may affect the development efforts, to include but not be limited to a study of the siltation problem caused by sediment deposition from Farm Creek into the Illinois River, as well as the potential use of suitable dredged material for nearby development of a public beach."

Additional authority for conducting this investigation is contained in Section 216 of the 1970 Flood Control Act and Section 519 of the Water Resources Development Act (WRDA) 2000. These additional authorities provide the opportunity to evaluate the entire Illinois River Basin and to further evaluate the Peoria Lake area. The Illinois River Ecosystem Restoration Study initiated in October of 2000 is being conducted under Section 216, which authorizes the U.S. Army Corps of Engineers to make modifications to completed projects, i.e., the Illinois Waterway, which states:

> "The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to significant changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest."

Section 519 of the Water Resources Development Act (WRDA) 2000, which authorized restoration of the Illinois River Basin, states:

> "If the Secretary, in cooperation with appropriate Federal agencies and the State of Illinois, determines that a restoration project for the Illinois River Basin will produce independent, immediate, and substantial restoration, preservation, and protection benefits, the Secretary shall proceed expeditiously with the implementation of the project."

This report was conducted under the authority of HR 2500. However, additional restoration efforts for Peoria Lake and its tributaries may be evaluated under Section 519.

STUDY PURPOSE AND SCOPE

The purpose of ecosystem restoration activities is to restore significant ecosystem function, structure, and dynamic processes that have been degraded. Ecosystem restoration planning involves a comprehensive examination of the problems contributing to the system degradation and the development of alternative solutions. The intent of ecosystem restoration is to partially or fully re-establish the attributes of a naturalistic, functioning, and self-regulating system.

The Feasibility Study evaluates Federal and State interest in creating and restoring aquatic habitat and reducing sediment delivery and deposition within Peoria Lake. Ancillary benefits to recreational boating and fishing are also probable. The focus of the study is addressing the major problem—sedimentation of the lakes that has resulted in the loss of lake depth and volume. Tributary streams that deliver large amounts of sediment to Peoria Lake were also investigated. Opportunities were explored to address restoration of both the tributaries and lakes as they relate to the Peoria Riverfront Development Project, a public and private effort to revitalize downtown Peoria.

The study followed the Corps of Engineers' six-step planning process. This process included the: (1) identification of problems and opportunities; (2) inventory and forecast of resource conditions; (3) formulation; (4) evaluation; (5) comparison of alternative plans; and (6) selection of a recommended plan. Specific investigations included: (1) a review of past studies; (2) compilation and analysis of all complete bathymetric surveys of Peoria Lake to estimate historic sedimentation rates over time; (3) evaluation of the growth of tributary deltas; (4) numerical and physical hydraulic models to assess alternatives; (5) evaluation of sediment quality; (6) preparation and use of modified habitat evaluation procedure (HEP) models; and (7) cost effectiveness and incremental cost analyses. The Corps of Engineers and the Illinois Department of Natural Resources (ILDNR)

collaborated on the study, with both organizations conducting some of the study tasks individually while jointly working on the overall study effort.

ORGANIZATION OF FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

The study presented in this Feasibility Report has an integrated Environmental Assessment (EA) and separately bound supporting appendices. The purpose of the main report is to concisely summarize the multidisciplinary efforts of the Corps of Engineers and the ILDNR and the agency and public input that led to the final study recommendations.

This report is organized into eight sections: (1) Introduction, which highlights the study authority, purpose and scope, study area, background and history, and prior studies, reports, and existing water projects; (2) Plan Formulation, which covers a description of the study process, an assessment of problems, opportunities, and constraints, and separate summaries of the formulation and evaluation of alternatives; (3) a Description of the Selected Plan, which details various components and considerations; (4) Environmental Impacts/Effects; (5) Plan Implementation, which includes institutional requirements, division of plan responsibility, views of non-Federal sponsor(s) and any other agencies with implementation responsibilities, and compliance with environmental requirements; (6) a Summary of Coordination, Public Views, and Comments; (7) a Recommendation; and (8) concluding with the Finding of No Significant Impact.

This report has 12 appendices, as follows:

- A General
- B Hazardous, Toxic, and Radioactive Waste Phase I Environmental Assessment
- C Geotechnical Considerations
- D Hydrology and Hydraulics
- E Water Quality and Sedimentation
- F Cost Engineering
- G Environmental
- H Real Estate Plan
- I Project Performance Assessment and Monitoring Plan
- J Value Engineering Study
- K Tributary Watershed Restoration
- L Distribution List

The General Appendix includes correspondence received during the study, the Design Agreement, the draft agreement that needs to be executed by the Corps of Engineers and ILDNR if the study is to continue into the design phase, and the Section 404(b)(1) Analysis. The other appendices are Hazardous, Toxic, and Radioactive Waste (HTRW); Geotechnical Considerations, which covers physical geography, geology, subsurface explorations, material considerations, and erosion protection; Hydrology and Hydraulics, which addresses hydrology, hydraulics, climate, river hydrographs, elevation levels/frequency, project measure analyses, and erosion protection; Water Quality and Sedimentation, which addresses water quality, baseline water quality data, sediment contaminant analysis report, and sediment rate analysis; Cost Engineering, which covers cost estimates; the Environmental appendix, which details habitat evaluation species and analyses and cost effectiveness/incremental cost analyses; a Real Estate Plan appendix; and a Project Performance Assessment and Monitoring Plan appendix; a Value Engineering Study; and

Tributary Watershed Restoration, which deals exclusively with the planning, evaluation, selection and design of the Farm Creek portion of the study. The last appendix is the Distribution List.

STUDY AREA

The authorization included the Illinois River between Henry and Naples, Illinois, and the tributaries in this portion of the river. Based on the wording of the authorization, the desires of the ILDNR (sponsor), and local interest, the focus for this feasibility study was narrowed to Peoria Lake, a riverine lake encompassing nearly 14,400 acres between river mile 181.0 near Chillicothe, Illinois, to Peoria Lock and Dam at river mile 157.7. This process is more fully described in the discussion concerning the Reconnaissance Phase in the next section (Background and History).

During the Feasibility Study Phase, the decision was made to further narrow the study area to Lower Peoria Lake (river miles 162-167) and the Farm Creek Watershed (see plate 1). The decision was based upon prior studies that identified promising restoration opportunities, the close link to the authorization and the Peoria Riverfront, time and funding constraints, and the fact that the ILDNR and the Corps of Engineers were beginning work on the Illinois River Ecosystem Restoration Study, a separate study evaluating restoration options for the entire Illinois River Basin.

The lake is subdivided into Upper and Lower Peoria Lakes by a natural constriction occurring at approximate river mile 166.5. Lower Peoria Lake extends from the northern border of Tazewell County, on the east side of the Illinois River, downstream, to the City of Peoria Riverfront. The Riverfront and the southernmost boundary of Lower Peoria Lake can be generally defined by the river crossing of Interstate 74 from east to west. The City of Peoria lies to the west, while the City of East Peoria is on the east side of the Illinois River. The outlets of the Farm Creek Watershed are also located at this southern portion of the Lower Peoria Lake. Farther downstream is the Peoria Lock and Dam. The Illinois Waterway, Illinois and Indiana 9-Foot Channel was authorized by the River and Harbor Committee (January 21, 1927) and Senate Document 126, 71st Congress, 2nd session (July 3, 1930). House Document 184, 73rd Congress, authorized construction of a lock and dam at Peoria. Peoria Lock and Dam is located 4.1 miles below Peoria, Illinois. It has a width of 110 feet and a length of 600 feet. Impoundment is achieved through wicket and timber type control structures. The wicket structures allow open navigation during high flow on the river, which occurs during approximately 40% of the navigation season per year.

There are 10 direct tributaries to Peoria Lake. However, once the focus of the in-lake alternatives was determined to be Lower Peoria Lake, the tributaries draining to this area became the logical place for tributary alternatives to be investigated. In addition, fewer watershed planning activities were ongoing in the Upper Peoria Lake tributaries. Farm Creek, on the other hand, had a locally led planning effort underway, funded by the Illinois Environmental Protection Agency. This planning effort had generated a comprehensive basin inventory, agency support—both financial and technical—and a consensus on watershed restoration and management goals, objectives, and actions. These activities were occurring concurrently with the Feasibility Study. Tenmile Creek has a large grade control structure at the Caterpillar Proving Ground within the basin, helping to address sediment delivery. In addition, opportunities for the local sponsor to provide lands, easements, rights-of-way, relocations and disposal areas (LERRD) from willing landowners were not present. Therefore, the study team felt that the focus should be on Farm Creek. Further investigations and discussions with the Sponsor and the Farm Creek Watershed Planning Committee identified the upper portion of Farm Creek as having the highest level of interest from

the public. Following detailed investigation at one site, tributary restoration alternatives were dropped due to Hazardous, Toxic, and Radioactive Waste (HTRW) issues.

BACKGROUND AND HISTORY

The Illinois River has long been an important environmental and economic resource. This importance led Congress to recognize the Illinois River as part of the Upper Mississippi River System as a unique, nationally significant ecosystem and a nationally significant commercial navigation system in Section 1103 of the Water Resources Development Act of 1986 (WRDA 86).

The State of Illinois recognizes the important resource that the Illinois River represents. The Offices of the Governor and Lieutenant Governor have led efforts to focus attention on the Illinois River, including completing the *Integrated Management Plan for the Illinois River Watershed* and proposing Illinois Rivers 2020, a $2.5 billion, 20-year State and Federal initiative to restore the Illinois River. Local groups along the river basin have been very active in pursuing river restoration. In the Peoria area, the Peoria Lakes Basin Alliance is working to develop a common vision for future restoration and to increase public awareness of problems.

The National Research Council considers large floodplain-river ecosystems to be the highest priority for aquatic restoration and identified the Illinois River as one of three of these ecosystems in the United States with sufficient ecological integrity to recover. At the turn of the century, the Illinois River Valley was famous for its hunting and fishing areas, supporting over 2,000 commercial operations. Islands, backwaters, side channels, lakes, and bottomland forests allowed fish and game to flourish. In fact, in 1908, the U.S. Department of Commerce and Labor reported that the Illinois River provided 10% of all freshwater fish caught in the United States (Talkington 1991). The Illinois Valley also has international significance as a part of the Mississippi Flyway, a major migration route for hundreds of thousands of waterfowl, shorebirds, and neotropical migrants.

The Upper Mississippi River - Illinois Waterway (UMR-IWW) system is a vital part of the national economy. The navigable portions of these rivers and the locks and dams that allow waterway traffic to move from one pool to another are integral parts of a regional, national, and international transportation network. The system is significant for certain key exports and the Nation's balance of trade. For example, in 2000, approximately 52% of the Nation's corn and 41% of the Nation's soybean exports were carried on the UMR-IWW. Corn and soybeans are shipped via the waterway at roughly 60% to 70% of the cost of shipping over the same distance by rail. Other commodities shipped on the system include coal, chemicals, petroleum, crude materials (sand, gravel, iron ore, steel, and scrap), and manufactured goods. The system provides full or part time employment for over 400,000 individuals in the basin, including 40,000 manufacturing jobs.

The importance of the Upper Mississippi River-Illinois Waterway as a shipping artery is underscored by the increases in tonnage shipped on the system. Waterborne commerce on the Upper Mississippi River has more than tripled over the past 40 years—growing from about 27 million tons in 1960 to 83 million tons in 2000. On the Middle Mississippi River over the period 1960 to 2000, tonnage has grown from 30 million tons to 122 million tons. On the Illinois Waterway, the nearly 23 million tons shipped in 1960 roughly doubled over that same timeframe, growing to 44 million tons in 2000.

The Illinois River also serves as the source for public water supply systems throughout a vast region of the state. Peoria is the largest user, but the cities of Elgin, Kankakee, Pontiac, Streator, Decatur, Taylorville, Springfield, Jacksonville, and Canton also use water from tributaries of the Illinois River. Moreover, the Commonwealth Edison Company uses Illinois River water for cooling purposes.

The Peoria Riverfront Development Project is a public and private cooperative effort to revitalize the City's downtown area. Plans include a visitor's center, city park, community center, riverboat landing, sports complex, entertainment centers, and retail development. Since 1995, $75 million in public and private funds has been invested in riverfront development and another $100 million investment is planned.

The Illinois River formerly contained the flows of the much larger Mississippi River, but redirection of the Mississippi River by glaciers left the Lower Illinois River with a wide river valley. The lower reach of the Illinois, below Starved Rock, has a very gradual slope of approximately 0.1 foot per mile. The numerous bottomland lakes, side channels, and sloughs, which were slowly filling with sediment under natural conditions, have been heavily impacted by sedimentation related to changes in the watershed and along the waterway.

Peoria Lake, the largest bottomland lake in the valley, reflects changes similar to other lakes. There are 60 backwater lakes along the Illinois River. The Illinois State Water Survey has estimated that average volumetric loss of all lakes since 1903 is 70%, with several approaching 100% loss (Bellrose 1983). The oldest complete survey of the river system was done in 1903 by the Corps of Engineers. The loss of aquatic habitat due to sedimentation is viewed as the greatest threat to the Illinois River. This conclusion was reached because of the statewide planning process that resulted in the *Integrated Management Plan.* Further, the Habitat Needs Assessment conducted as part of the Upper Mississippi River System - Environmental Management Program found that the most critical need along the Illinois River was the restoration of backwater lakes and side channels to increase depth diversity. This report called for the restoration of backwaters on the Illinois River so that 25% of the backwater lakes (19,000 acres) would have an average depth of at least 6 feet. Since 1903, the volume of Peoria Lake below elevation 440 feet NGVD has decreased by approximately 61%. Elevation 440 is considered "flat pool" for Peoria Lake. The elevation is a function of the height of Peoria Lock and Dam. Areas outside of the navigation channel have experienced sedimentation that is even more rapid. The loss of backwater lake depth and volume has severely impacted off-channel overwintering, spawning, and nursery habitats for fish. Shallow water areas are subject to wave action that resuspends sediment, further limiting fish, aquatic vegetation, macroinvertebrate, and mussel production.

Demissie and Bhowmik (1986) best described the process by which Peoria Lake was formed as follows:

> "The alluvial fan from Farm Creek created the constricted stretch of the Illinois River just downstream of Farm Creek, forming Peoria Lake. Farther upstream at river mile 166.5, another alluvial fan deposited by Tenmile Creek divides the lake into two segments: Lower Peoria Lake and Upper Peoria Lake. This constricted segment of the Illinois River is referred to as the Narrow.
>
> Prior to the late 1800's, the Illinois River and thus Peoria Lake were not impacted significantly by man. The river and the lakes in the river valley were under near-natural conditions and had very few problems resulting from human activities.

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The major changes on the Illinois River started on January 1, 1900, when significant amounts of water started to be diverted from Lake Michigan to the Illinois River through the Chicago Sanitary Ship Canal. This allowed the City of Chicago to flush untreated domestic sewage and industrial wastes away from Lake Michigan, which was the city's source of water supply, and into the Illinois River. From 1900 through 1938, the average amount of diversion into the Illinois River was approximately 7,200 cubic feet per second (cfs). Starting in 1939, the amount of diversion was reduced to an average of 3,200 cfs. Since the early 1970's, the quality of water diverted into the Illinois River has been improved because of more stringent water quality standards.

The diversion of water, combined with the discharge of domestic and industrial waste into the Illinois River, significantly changed the nature of the Illinois River and the bottomland lakes along its valley. Low water levels were increased, water quality degraded rapidly, and as a result fish and other aquatic organisms were either eliminated or reduced significantly in numbers.

Another major event that permanently changed the nature and character of the Illinois River and its bottomland lakes was the construction of navigation dams. Initially four low dams were built on the Illinois River to provide a 7-foot navigation channel for large steamboats from the Mississippi River to LaSalle, Illinois. The dams were built at Henry in 1872, Copperas Creek in 1877, LaGrange in 1883, and Kampsville in 1893. In 1919, construction started on the Illinois Waterway, a project designed to provide a navigation channel with a minimum depth of 9 feet and a minimum width of 300 feet from the Mississippi River to Lake Michigan. This project required the construction of five major locks and dams along the Illinois River in the 1930's.

The navigation lock and dam system on the Illinois River includes the Dresden Island Lock and Dam, the Marseilles Lock and Dam, the Starved Rock Lock and Dam, the Peoria Lock and Dam, and the LaGrange Lock and Dam...The Illinois River ceased to be a natural river all the way from its starting point at the junction of the Des Plaines and Kankakee Rivers to its mouth at the Mississippi River. It now consists of a series of six navigation pools with five locks and dams used to facilitate navigation. Under these conditions, the low flow water levels (Peoria Pool is maintained at 440 ft msl), decreased velocities, and thus increased sedimentation rates. During high flows, the dams at Peoria and LaGrange are lowered to the river bottom and thus do not have any impact on the river flow at those times."

Peoria Lake is subject to high rates of sediment delivery from its 10 direct tributaries. This high sedimentation rate is related to the geology of the Peoria Lake region, which is surrounded by highly erodible loess bluffs and moraine deposits. In addition, alternation of the tributary watersheds has resulted in degradation of riparian habitat along stream corridors. Typically, this is the result of agricultural practices. The results are increased sheet and rill erosion in formerly riparian areas that had trapped sediments before entering tributary waters.

Statewide, Illinois has lost approximately 99% of the original tall grass prairie and over 85% of pre-settlement wetlands (Noss, LaRoe and Scott 1995). Restoration of prairie and wetlands presents opportunities to restore significant habitat types that were formerly abundant in the state,

but that have been greatly reduced. This change in land cover from diverse vegetation to mostly row crop agriculture has significantly increased sheet and rill erosion and surface runoff in local tributaries.

At several locations throughout the watershed, reduced sedimentation rates suggest that a state of equilibrium is being reached in portions of the watershed and at several scales. However, from a systems function perspective, the watershed is unstable and degrading. Peoria Lake may indeed be reaching a state of equilibrium; however, no data or methodology exists to date to support such an assumption. Further, assuming the lake is approaching equilibrium does not diminish or mitigate the need for measures to address degraded or nonexistent ecosystem functions.

RECONNAISANCE STUDY

As stated in the study authority, opportunities were explored to address sediment deposition, reduce flood damages, and restore environmental conditions, especially those that relate to the Peoria Riverfront Development Project. Under the reconnaissance phase (1997), a task force composed of representatives from the following organizations was convened on several occasions to formulate the study plan and overall study direction:

- Congressional and State representatives
- Elected and appointed county officials
- City of Peoria officials
- Peoria Riverfront Development Sponsors
- Heartland Water Resources Council
- Illinois Department of Natural Resources
- Natural Resources Conservation Service
- Environmental Protection Agency
- Riverfront Action Forum
- The Nature Conservancy
- Tri-County Regional Planning Commission
- Illinois Office of Resource Conservation
- Waste Management and Research Center
- Illinois State Water Survey
- University of Illinois Cooperative Extension Service
- U.S. Army Corps of Engineers, Rock Island District

In evaluating the alternatives, consideration was given to providing solutions using existing Corps of Engineers authorities, those that are considered the responsibility of participating agencies involved with the problems, and measures preferred by local legislators and interest groups. Four broad categories of measures were considered to be most important as they affect riverfront development at Peoria: (1) measures to reduce existing sedimentation in the Upper and Lower Peoria Lakes in order to create and restore aquatic habitat; (2) measures to reduce future sediment deposition in the Farm Creek Delta and Lower Peoria Lake; (3) measures that include restoration of the aquatic and terrestrial conditions within Peoria Lake to a less degraded condition; and (4) initiatives that provide flood protection along the Downtown Peoria Riverfront.

Regarding the authorization calling for evaluating alternatives for a public beach using dredged materials, the material to be dredged was not suitable for use as beach material. Recreation is not

currently a major mission objective for the Corps of Engineers consistent with Administration Policy. Finally, the alternative identification process undertaken during the reconnaissance phase produced no interest on the part of local representatives or the sponsor to construct a public beach. Regarding flood damage reduction at the Peoria Riverfront, the issue was resolved before the execution of the Project Study Plan in November of 1998. In June 1970, the Chicago District of the U.S. Army Corps of Engineers conducted a study of local flood protection at Peoria, Illinois. At that time, the benefit-to-cost ratio of the Recommended Plan was estimated to be 1.3 to 1.0. The project was not initiated, although the City of Peoria indicated a renewed interest in a portion of the original plan in a letter dated November 20, 1997. The letter requested initiating a Section 205 reconnaissance study and not pursuing flood damage reduction measures under HR 2500, adopted May 9, 1996. The Rock Island District concurred with the City of Peoria's recommendation of proceeding under Section 205 and stated such intent in a letter sent to the City of Peoria on January 29, 1998. However, no formal request from the City of Peoria has been submitted to the Rock Island District.

It is clear that the authority for this Feasibility Study is broad in scope. However, the decision to focus the study efforts on Peoria Lake and its tributaries has its foundation in an open and inclusive process undertaken in the reconnaissance phase. At the completion of the reconnaissance study, it was determined that the ILDNR would cost share further study to address sediment deposition and ecosystem restoration.

CONCISE DISCUSSION OF STUDIES, REPORTS, AND EXISTING WATER PROJECTS

The most notable documents reviewed during this study are summarized below (listed in chronological order):

- *Sediment Yield of Streams in Northern and Central Illinois*, Adams, J. Roger, et al., Illinois State Water Survey, December 1984. This report quantifies sediment yields in Illinois streams.

- *Peoria Lake Sediment Investigation*, prepared for the U.S. Army Corps of Engineers by the Illinois Department of Energy and Natural Resources, State Water Survey Division, January 1986. This report includes bathymetric profiles, results of core samples, and impacts of human activities on sedimentation. Recommended solutions to sedimentation of Peoria Lake include controlling sediment input, managing in-lake sediment, hydraulically manipulating the Illinois River through Peoria Lake, creating artificial islands, selective dredging, and creating marshy areas.

- U.S. Army Corps of Engineers Reconnaissance Study, *Illinois River from Henry to Naples, Illinois, Peoria Lake and La Grange Pool, Illinois River Basin*, March 1987. This study, authorized in Section 109 of Section 1304 of the Supplemental Appropriations Act, made a determination of the advisability of the preservation, enhancement, and rehabilitation of Peoria Lake in the vicinity of Peoria, Illinois. No feasibility study was initiated to follow up the reconnaissance study.

- U.S. Army Corps of Engineers report, *Inventory and Analysis of Urban Water Damage Problems, City of Washington, Tazewell County, Illinois,* published August 1987. This study, conducted under Section 22 of Public Law 93-251, inventoried and analyzed urban

water damage problems in the City of Washington. This document detailed the flood problems and their underlying causes, undersized bridge openings, accumulated debris, and siltation. Recommendations included removing debris and woody vegetation from the channel and bridge structures, clearing sediment buildup within the bridge structure, removing the deck of an abandoned bridge, and increasing bridge openings as part of any future bridgework. To date, no measures have been implemented. However, in the 2003 construction season, one of the constricting bridge decks is scheduled to be replaced.

- *Hydraulic Investigation for the Construction of Artificial Islands in Peoria Lake*, July 1988, Illinois Department of Energy and Natural Resources, State Water Survey Division, Champaign, Illinois. This report investigates the best location for building islands in Upper and Lower Peoria Lakes. Modeling determined effects of islands upon water surface elevations, sedimentation patterns, and current velocities.

- U.S. Army Corps of Engineers report, *Upper Mississippi River System Environmental Management Program, Peoria Lake Enhancement,* published in July 1990. This technical publication, complete with National Environmental Policy Act documentation and engineering plans, was the authorizing document for a 16-acre barrier island in Upper Peoria Lake to enhance migratory waterfowl habitat, fish spawning, and mussel communities. Project monitoring indicates that there was an increase in the number of individuals and diversity of waterbird species using the project site.

- Daily & Associates, Engineers, Inc. report, *Preliminary Storm Water Management Study for Detention Basin Feasibility, City of Washington, Illinois*, published in November 1990. The City Council for Washington, Illinois, authorized this particular study on the feasibility of constructing up to six stormwater detention basins on creeks tributary to the city for reducing flood stages within the city. Their report indicated that five of the six sites were suitable, with varying degrees of benefits to flood reduction. No elements have been implemented to date.

- *The Illinois River: Working for Our State*, Talkington, Laurie McCarthy, Illinois State Water Survey, January 1991. This document includes descriptions of the past, current, and projected future conditions of the Illinois River. Specific portions related to this study include flora and fauna descriptions, the significance of its working role, and the many functions of the river.

- *Erosion and Sedimentation in the Illinois River Basin*, Demissie, Misganaw, et al., Illinois State Water Survey, June 1992. This report performed sediment yield calculations for Illinois River tributaries and used those relationships to construct a sediment budget for the Illinois River Valley. The report also discusses the effect of farming practices on sediment loads.

- *Source Monitoring and Evaluation of Sediment Inputs for Peoria Lake*, Bhowmik, Nani G., et al., Illinois State Water Survey, February 1993. The objectives of this report were to determine the sediment sources to Peoria Lake and to evaluate sediment loads from local tributaries to determine best management practices for the tributaries. This report also estimated the sources of sediment in Peoria Lake and what percentages of sediment in the lake are from local tributaries or the Peoria Lake. Several watershed planning efforts have been initiated on local tributary streams to address sedimentation and other issues. These

include the completion of the Farm Creek Watershed Management Plan and efforts on Tenmile, Partridge, Senachwine, Kickapoo, Mossville, and Ackerman Creeks.

- *Heartland Riverfront Master Plan*, Phillips Swager Associates, Architects; EDAW, Inc., Planners; Hammer, Siler, George Associates, Economists; and Farnsworth and Wylie, Engineers, April 1994. This document describes existing and planned development of the riverfront and central business district in downtown Peoria, Illinois.

- *Section 216 Initial Appraisal, Illinois Waterway System Ecosystem Restoration and Sedimentation, Illinois*, U.S. Army Corps of Engineers, Rock Island District, August 1996. This document recommends further study of the Illinois Waterway Ecosystem in light of changed physical and economic conditions since the 9-foot navigation channel was constructed.

- *Integrated Management Plan for the Illinois River Watershed*, prepared by the Illinois River Strategy Team in cooperation with nearly 150 participants, chaired by Lt. Governor Bob Kustra, January 1997. The plan contains 34 recommendations divided into 6 sections: In the Corridor, Soil and Water Movement, Agricultural Practices, Economic Development, Local Action, and Education. Recommendations relevant to this Feasibility Study are as follows:

  1. Encourage beneficial use of sediment through three options for use of dredged materials. Create islands or increase the topographic diversity of existing islands using dredged material in support of native floodplain plant communities.
  2. Implement backwater and side channel management measures at selected locations.
  3. Build wetlands and other water retention capacity in urban and rural areas in the Illinois Basin, in collaboration with appropriate landowners and volunteering private landowners.
  4. Reduce runoff rates throughout the watershed during the next 15 years through remedial and preventative efforts.
  5. Implement regional strategies to protect, restore, and expand critical habitats in key high-quality tributaries throughout the watershed.
  6. Promote reestablishing riparian corridors along tributary streams with permanent vegetation.

- *Conservation Reserve Enhancement Program.* On March 30, 1998, Mr. Dan Glickman, U.S. Secretary of Agriculture, came to Peoria, Illinois, to announce a $400 million plus effort to improve the Illinois River with a Conservation Reserve Enhancement Program (CREP). The CREP initiative will help preserve up to 132,000 acres of sensitive land surrounding the Illinois River and its tributaries, including upland areas. As of January 4, 2002, 98,352 acres were enrolled in the Illinois River Basin. An additional 29,011 acres of land is pending contract signing.

- *Storm Water Management of the City of Washington,* City of Washington, 2000. This summary document provides facts about Washington stormwater, benefits from stormwater detention basins, the City's project plans, and the financial expenditures by the City dedicated to management of the detention basins.

- *Upper Mississippi River System Habitat Needs Assessment, Technical Report 2000.* The Habitat Needs Assessment (HNA) is an evaluation of existing habitat conditions throughout the UMRS, forecasting future habitat conditions and quantifying ecologically sustaining and socially desired future habitat conditions. The HNA addresses the system-wide, river reach, and pool levels of spatial scale and includes the bluff-to-bluff extent of the floodplain. The primary purpose of the HNA is to help guide selection, design, and evaluation of Habitat Rehabilitation and Enhancement Projects under a reauthorized Environmental Management Program. The assessment was a cooperative effort involving the U.S. Army Corps of Engineers, United States Geological Survey, U.S. Fish and Wildlife Service, Minnesota Department of Natural Resources, Wisconsin Department of Natural Resources, Iowa Department of Natural Resources, Illinois Department of Natural Resources, and Missouri Conservation Department.

- *Farm Creek Erosion and Sediment Investigation*, Windhorn, R. D., Natural Resources Conservation Service, February 2001. This report estimated total sediment load to the mouth of Farm Creek at the Illinois River in East Peoria. An estimate was also made as to sediment delivery within the individual stream reaches.

- *Farm Creek Watershed Implementation Plan,* October 15, 2001. This document, prepared by the Farm Creek Watershed Planning and Technical Committees, summarizes information on the watershed and its problems. It also details goals and objectives for the watershed. Areas of interest include flooding, erosion and sediment, habitat loss, and water quality.

- *Illinois River Ecosystem Restoration Feasibility Study.* The Illinois River Ecosystem Restoration Feasibility Study is a 3-1/2 year, $5.24 million effort being conducted under the authority of Section 216 of the Flood Control Act of 1970 in partnership with the State of Illinois Department of Natural Resources.

  The study will identify the Federal and State interest in addressing problems within the entire Illinois River Watershed. System problems and a draft set of goals and objectives have been developed through numerous meetings with agency representatives, local sponsors, and other stakeholders. The principal habitat problems in the Illinois River Basin are the result of sedimentation of backwaters and side channels, degradation of tributary streams, water level fluctuations, loss of floodplain and tributary connectivity, and other adverse impacts caused by human activities. Two efforts currently underway in the study: (1) a system evaluation focused on assessing overall watershed needs and general locations for restoration, and (2) identification and assessment of site-specific projects.

  A major focus of the system assessment is to conduct a Restoration Needs Assessment (RNA). The RNA will evaluate the need for restoration in the entire basin with a focus on the tributaries and subwatersheds feeding into the mainstem of the Illinois River. The RNA will provide a practical and scientific basis for assessing the large study area and identifying potential restoration project types and locations for the Illinois River and its tributaries. The RNA will define those critical assumptions controlling the ability to determine habitat needs and focus the study, planning, and construction efforts on the areas of critical need. The RNA will provide a comprehensive, basin-wide assessment of historic ecological change, existing conditions, predicted future conditions, and desired future conditions. Using selection criteria and a formulation framework developed as part of the

feasibility study, the final report may recommend a multi-year program to address a larger list of projects.

A number of evaluations to develop detailed project plans for specific sites are underway. At the request of the State, the Corps has initiated assessments for six site-specific projects in the basin. The six site-specific investigations are Iroquois River, McKee Creek, Kankakee River - Mainstem, Pekin Lake, Waubonsie Creek, and Blackberry Creek.

Plan Formulation

DESCRIPTION OF THE STUDY PROCESS

The Peoria Riverfront Development Study follows the Corps of Engineers' six-step planning process specified in Engineering Regulation (ER) 1105-2-100. The process identifies and responds to problems and opportunities associated with the Federal objective and specified State and local concerns. The process provides a flexible, systematic, and rational framework to make determinations and decisions at each step so that the interested public and decision makers are fully aware of the basic assumptions employed, the data and information analyzed, the areas of risk and uncertainty, and the significant implications of each alternative plan.

If a Federal and State interest is identified, the process culminates in the selection of a plan to be recommended to Congress for implementation. As part of identifying the selected plan, a number of alternative plans are developed and compared with the no action alternative, allowing for the ultimate identification of the National Ecosystem Restoration (NER) Plan.

The NER Plan reasonably maximizes ecosystem restoration benefits compared to costs, considering the cost effectiveness and incremental cost of implementing other restoration options. In addition to considering the system benefits and costs, it will also consider information that cannot be quantified, such as environmental significance and scarcity, socioeconomic impacts, and historic properties information.

The steps used in the plan formulation process include:

1. Identify Problems and Opportunities: The specific problems and opportunities are identified, and the causes of the problems discussed and documented. Planning goals are set, objectives established, and constraints identified.

2. Inventory and Forecast Resource Conditions: This step characterizes and assesses conditions in Peoria Lake and the tributaries as they currently exist and forecasts the most probable without-project condition (or no action alternative) over the period of analysis. This assessment gives the basis by which to compare various alternative plans and their impacts. The without-project condition is what the river and its uses are anticipated to be like over the 25-year planning period without any restoration implemented as part of the study. The with-

project condition is what the river and its uses are anticipated to be like if restoration measures are implemented.

3. Formulate Alternative Plans: Alternative plans are developed in a systematic manner to ensure that reasonable alternatives are evaluated. In addition to the no action alternative, restoration alternatives in the lakes and tributaries were considered.

4. Evaluate Alternative Plans: The evaluation of each alternative consists of measuring or estimating the environmental benefits (habitat units), costs, technical limitations, and social effects of each plan, and determining the difference between the without- and with-project conditions. A key measure of the evaluation of alternative plans is a cost effectiveness-incremental cost analysis and evaluation of significance.

5. Compare Alternative Plans: Alternative plans are compared, focusing on the differences among the plans identified in the evaluation phase and public comment. As part of the evaluations, the best buy plans are identified—those plans that provide the greatest increase in benefits for the least increase in costs.

6. Select Recommended Plan: A Recommended Plan is selected and justification for plan selection is prepared. If a viable alternative is not identified, the Recommended Plan will be the no action alternative. In most cases, the NER plan will be selected from among the best buy plans.

The first section deals with the existing resource conditions for Peoria Lake. It is followed by a description of the Problems, Goals and Opportunities, Objectives, and Constraints pertaining to the study area as a whole. The following sections will walk through each of these remaining plan formulation steps for the alternatives in Peoria Lake. While these steps do follow a progression, they are iterative, i.e., as additional information was learned in subsequent steps, it was often necessary to back up and repeat portions of a previous step(s).

PEORIA LAKE RESTORATION

INVENTORY OF RESOURCE CONDITIONS

Existing Conditions

Peoria Lake is a roughly 14,400-acre body of water, averaging 1 mile wide by approximately 20 miles long (river miles 158 to 181), with an average depth of 16.7 feet in the navigation channel and 2.5 feet in the off-channel areas. It is the largest bottomland lake in the Illinois River Valley. Historically, the lake had a diversity of depths, habitat types, plants, and aquatic species. The lake can now be characterized as having a narrow navigation channel, with depths greater than 9 feet, running through a relatively shallow lake basin. Tributary deltas and alluvial fans are apparent along Peoria Lake. The large alluvial fan from Farm Creek (river mile 162) constricts the Illinois River, thereby creating Peoria Lake. The lake is now influenced by the operation of Peoria Lock and Dam at river mile 158. An alluvial fan at the mouth of Tenmile Creek (river miles 166-167) separates the larger Upper Peoria Lake (11,900 acres) from Lower Peoria Lake (2,500 acres).

Environmental Management Program (EMP) - Peoria Lake Project

In 1994, as part of the Upper Mississippi River - Environmental Management Program (EMP), a habitat restoration project was constructed in the upstream end of Upper Peoria Lake (see Figure 2-1). An approximately 1-mile-long, 16-acre barrier island was created to enhance migratory waterfowl habitat value and provide for more ideal fish spawning environment and establishment of mussel communities. Other measures included restoration of a 9,500-foot flowing side channel and a 168-acre forested wetland management area.

Information from post-monitoring efforts of the Upper Peoria Lake EMP project indicates that the constructed measures of that project (islands and deepwater habitat) have become an attractant to area wildlife. Pre- and post-waterfowl monitoring have shown that there are currently 14 times the number of waterfowl utilizing that area than there were before the islands were constructed. Where only a few thousand waterfowl had gathered before, now tens of thousands are utilizing that project area. The monitoring results showed that there were also twice as many waterfowl species utilizing the area. Early monitoring efforts listed 8-9 species present, whereas now 18-20 species have been documented using the Peoria EMP site.

The deepwater habitat provided by dredging the river channel and constructing the EMP islands has shown similar improvements for fish species. Monitoring efforts were conducted at nearby control sites and at project sites. Comparison with pre- and post-project construction showed greater numbers of species as well as an increased total number of fish collected during post-construction monitoring. In addition, a greater diversity of species was collected, and more unique species were found after project construction. The results of the monitoring effort for this previous project suggest that it has had a positive effect on fisheries for that section of the lake. This increase in species diversity, along with the increase in numbers of individuals, shows a success that can be anticipated for a similar project in the Lower Lake.

Hydraulic/Hydrologic

The Corps of Engineers maintains a system of locks and dams on the Illinois Waterway to facilitate inland navigation. The Corps also maintains a 9-foot channel in the Peoria navigation pool, although no dredging has been required in the main channel due to scouring caused by the hydraulic/hydrologic conditions of the channel at Peoria and high levels of barge traffic keeping sediments suspended. This is a 100% Federal responsibility as part of the operation and maintenance commitment to the 9-Foot Channel Navigation Project on the Illinois River.

The Illinois River can be divided into two sections—the upper river from Chicago, Illinois, to the town of Hennepin, Illinois, and the lower river from Hennepin to Grafton, Illinois. The hydraulic characteristics of the Illinois River downstream of Starved Rock (river mile 231.0) are complex because the river gradient is very flat, leaving it more susceptible to backwater effects and sedimentation. The river elevation drops 38 feet between Joliet (river mile 287) and Hennepin (river mile 207), Illinois; the bed slopes down only 21 more feet in the remaining 207 river miles. This equates to a slope of approximately 0.5 foot per mile in the upper river and 0.1 foot

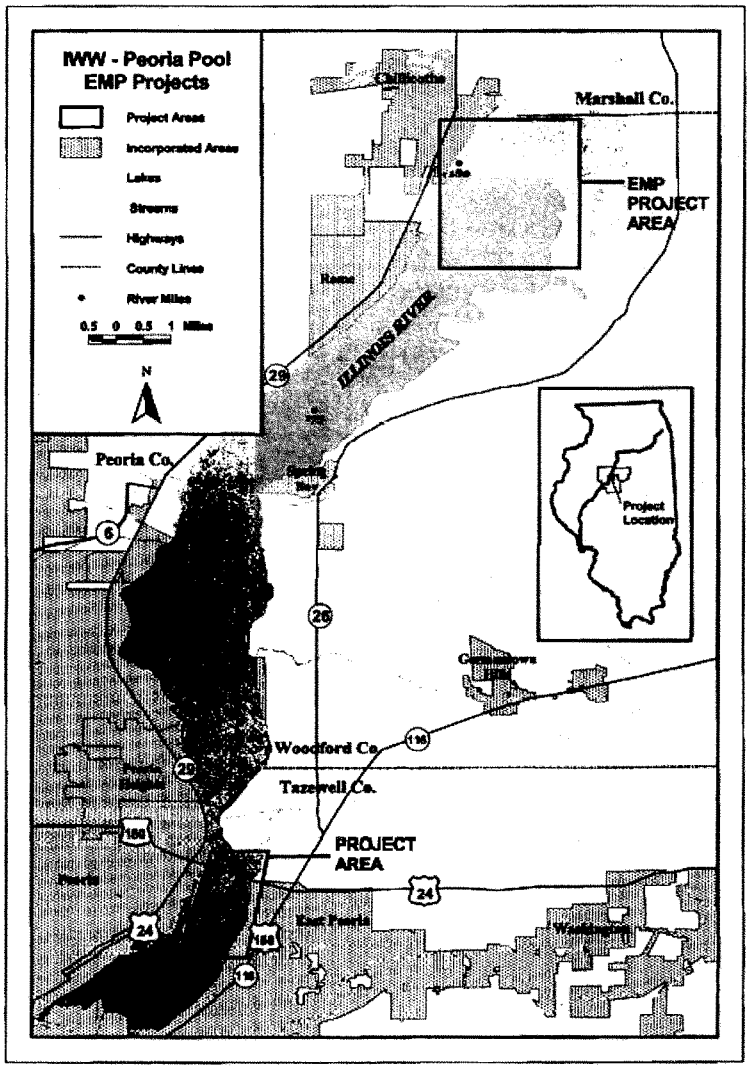

FIGURE 2-1. Peoria Pool EMP Projects

per mile in the lower river section. Despite a drainage area increase of 3,500 square miles, flood peak flows decrease between Starved Rock Lock and Dam and Peoria Lake due to large increases in storage area which attenuate flood peaks.

The stage recurrence data for Lower Lake Peoria are listed below. A flood with a 50-year recurrence interval, for instance, has a 2% chance of occurring in any given year.

Recurrence Interval	Probability of Occurrence	Elevation (ft MSL)
2-year	50%	448.2
5-year	20%	451.9
10-year	10%	454.2
25-year	4%	456.2
50-year	2%	457.6
100-year	1%	458.9
200-year	0.5%	460.0
500-year	0.2%	461.6

Duration information gives a historical representation of the percentage of time that a particular water surface elevation or flow has been equaled or exceeded. Flat or normal control pool elevation in Peoria Pool is 440.0 feet MSL.

% of Time Equaled or Exceeded	Elevation (feet)	Flow (cfs)
5%	447.3	47,990
10%	445.3	42,670
25%	441.7	29,910
50%	440.5	16,470
75%	440.2	8,950
90%	439.9	6,620
95%	439.7	5,960

The river has been significantly impacted by the diversion of water from the Chicago River, combined with the discharge of domestic and industrial waste into the Illinois River, construction of levees, agricultural practices, urbanization, and the introduction of navigation structures.

The attenuation of flood hydrographs through the Peoria reach is complicated by timing of tributary inflows as well as the flat gradient and Peoria Lake storage, as previously mentioned. The flood of December 1982 was a large flood, which illustrates the attenuation resulting in peak flows of 138,500 cfs at La Salle, 108,000 cfs at Henry, and 88,800 cfs at Kingston Mines. This attenuation and the

current fluvial geomorphologic and hydrologic conditions are not attributable to the Peoria Lock and Dam or its operation.

The dam at Peoria is a wicket structure, which during higher flows, approximately 40% of the time, is lowered so that there is no dam. The dam only maintains a pool elevation above the normal flow depth for low-flow conditions. This may contribute slightly to increased sediment entrapment, but since the majority of sediment movement is during high flows, most of the sediment accumulation is a natural phenomenon associated with a natural lake such as Peoria Lake and would have occurred even without the dam. The loss of storage due to sedimentation is very significant from an aesthetic perspective, but not significant from a peak flood discharge view. The loss of storage occurs primarily below elevation 440. Large floods above this elevation still must fill huge areas of overbank storage in the Peoria reach. These floods will continue to experience essentially the same significant attenuation of flood peaks as would have occurred historically, prior to the dam construction. The accumulation of sediment has also not significantly impacted navigation through the Peoria pool, as evidenced by the lack of required dredging. This is explained by two factors. First, hydraulically, a channel for the conveyance of normal flows tends to be naturally maintained. Secondly, the regular passage of towboats in the channel tends to maintain the depth and alignment.

Sedimentation

Resource managers on the Illinois River agree that sedimentation in Peoria Lake and other off-channel areas along the river is a major problem (Bellrose 1983). The Illinois State Water Survey (ISWS) estimates that nearly 14 million tons of sediment is transported from the watershed each year. Of this, more than one-half, 8.2 million tons, remains in the Illinois River Valley. They further estimate that Peoria Lake traps roughly 2 million tons of sediment per year.

Since 1903, the volume of Peoria Lake below elevation 440 feet NGVD has decreased by approximately 61% (see Table 2-1). Off-channel areas have experienced the most rapid sedimentation. According to an ISWS report (Bhowmik et al. 1993), this is one of the highest sedimentation rates among all the large lakes and reservoirs in Illinois. Figure 2-2 shows that deeper off-channel areas generally experienced greater rates of sedimentation than did shallow areas. The original deeper parts of Peoria Lake are becoming shallower, resulting in a very flat and uniform lake bed. Figure 2-3 shows how typical cross sections of Upper and Lower Peoria Lakes have changed between 1903 and 1999.

Small tributary streams contribute significant sediment loads into Peoria Lake. Deltas have formed where these and other streams enter the Illinois River and have grown quite large over the years (Bhowmik et al. 1993).

TABLE 2-1. Peoria Lake Sedimentation Summary

Sedimentation Accumulated*	Entire Lake	Upper Lake	Lower Lake
1903 area with depth greater than 9 feet	13.5%	9.3%	29.7%
1903 off-channel area with depth greater than 9 feet	8.4%	4.7%	23.5%
1999 area with depth greater than 9 feet	7.6%	5.9%	16%
1999 off-channel area with depth greater than 9 feet	3.0%	1.5%	10.3%
Volume of accumulated sediment since 1903 – acre-feet	72,700 ac-ft	57,900 ac-ft	12,900 ac-ft
Mass of accumulated sediment since 1903 – tons	154,000,000	126,000,000	28,000,000

* **Note:** 1903 data were calculated using the 1903 low water surface (LWS). The current LWS was used for 1999 data. For the approximated mass of accumulated sediment, the density of the sediment was assumed to be 100 pounds per cubic foot.

The causes of high tributary sediment loads are varied. In all watersheds, some degree of channelization has occurred. The highest degree of channelization occurs in Farm Creek, which includes agricultural channelization as well as flood control. A type of channelization that is particular to this region and others with similar topography is that caused by transportation infrastructure. In this region, many roadways and railroad grades occupy the same or parallel corridors as streams. The result is often a straightened stream channel contained between the hardened transportation facility embankment and the more sensitive (in terms of sediment delivery) bluff areas. The erosion results in higher sediment transport by the stream.

Agricultural practices that dominate the land are another cause. Most local watersheds have achieved a tolerable rate of soil loss in terms of soil regeneration, but the agricultural uses continue to produce large quantities of sediment.

Urban development and resulting impervious surface generate substantial increases in surface water runoff rates and volumes. Due to topography and soil types, this runoff is forced exclusively onto highly erosive soils of severe slope. Again, sediment transport is immediate.

Finally, large areas of the tributary watersheds are forested. However, little or no management is underway, resulting in dense canopy with very little ground cover. During rain events, rainfall cannot infiltrate and becomes sheet flow. This surface runoff carries dislodged sediments and, due to topography, ends up in gullies or rills, further dislodging sediments.

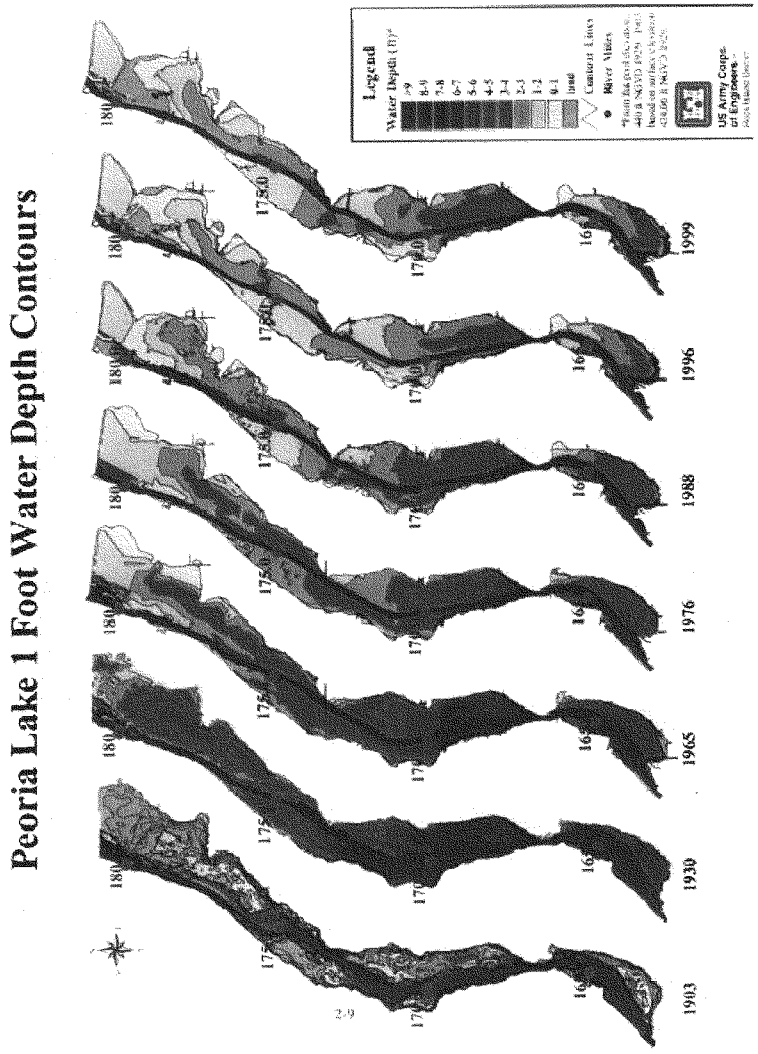

FIGURE 2-2. Peoria Lake 1-Foot Water Depth Contours

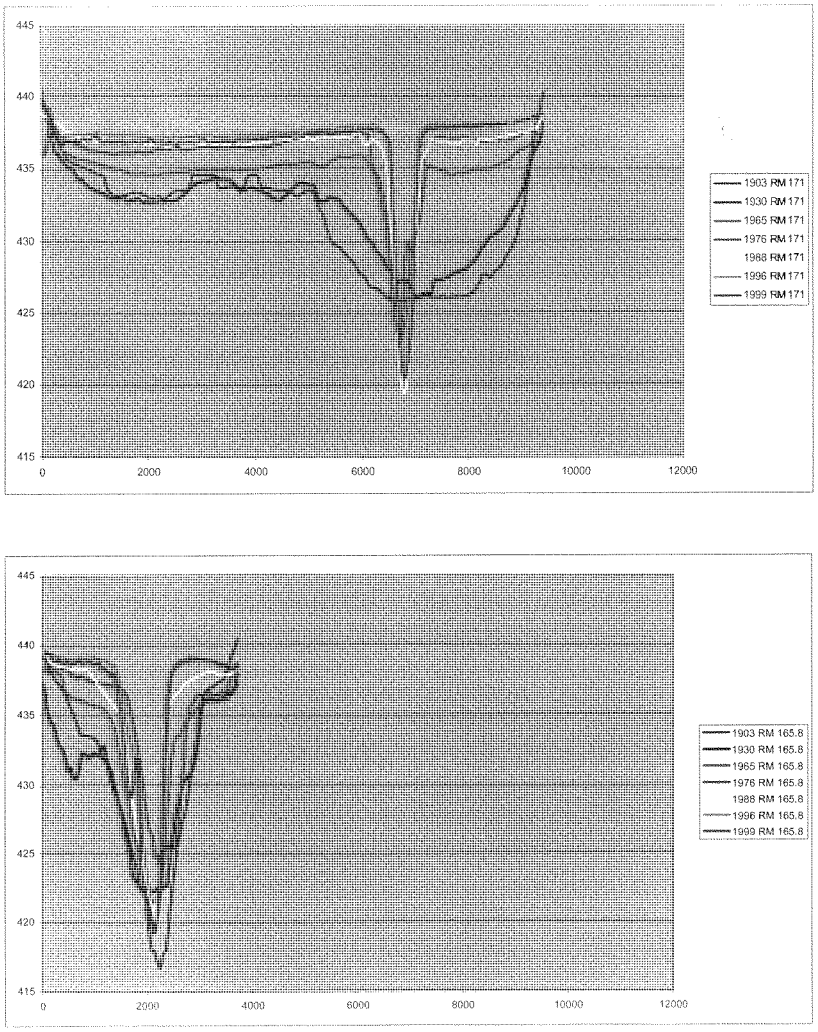

FIGURE 2-3. Typical Cross Sections of Upper and Lower Peoria Lakes

Sediment Quality. Overall, sediment quality in the project area is good. Only one chlorinated pesticide was detected; otherwise, no polychlorinated biphenyls (PCBs) or chlorinated pesticides were found. The presence of that one chlorinated pesticide, MCPP, was not confirmed by subsequent testing. Metals of regulatory concern such as chromium, copper, mercury, and zinc were above background soil levels but below the levels required for cleanup at industrial sites. Heavy metals were below the U.S. EPA regulatory limits for application of sewage biosolids to farmland. Levels of compounds in the Polycyclic Aromatic Hydrocarbons (PAH) group varied between laboratories, but in most cases were below screening values and levels of concern.

Sediment cores of varying lengths were collected and analyzed for a variety of chemicals in the project area during 1999 and 2000. Sediment removed from the project area as part of a separate access channel dredging project was also analyzed after spending 9 months weathering in a gravel pit. The results are reported in "Assessment of Sediment Quality for the Peoria Riverfront Environmental Restoration Project" by the Illinois State Geological Survey (Appendix E-3). Several laboratories analyzed the various samples and, in most cases, the lab results were in close agreement. A University of Illinois researcher conducted an agronomic evaluation of the sediment. The results are reported in "Sediments and Sediment Derived Soils in Illinois: Pedological and Agronomic Evaluation and Characterization."

There is no regulatory standard applicable for the beneficial use of river sediments. However, there are some guidelines for determining when contaminants are elevated. Some standards also exist for purposes such as cleanup, to protect human health at former industrial sites. Background levels for some chemicals in typical Illinois soils are also known.

Sediment and soil derived from several central Illinois reservoirs and Peoria Lake were evaluated to determine their potential value for use as soil or a soil amendment. The sediments are generally rich in plant nutrients and tend to be fine textured with silt and clay-sized particles dominating. Water stable aggregation data indicated the sediments have potential to develop good, stable soil structure after weathering by freezing, thawing, wetting, and drying. The physical characteristics of the evaluated dredged sediments were similar to naturally productive agricultural soils in Illinois. There was no indication that these sediments would present a problem for agricultural use given proper handling, tillage, and fertilization. The pH of the Peoria Lake samples was elevated (alkaline). This would tend to bind metals, making them less available for uptake by plants. The vegetative cover on the Illinois River islands indicates that the chemical quality of the soil is not inhibiting plant growth.

Researchers also conducted plant growth experiments with Peoria Lake sediment and Champaign County, Illinois, topsoil in a greenhouse (Darmody et al. 2000). Five garden vegetables grew equally well in the sediment and soil.

Demographic

Ninety percent of the State of Illinois population lives in the Illinois River Watershed, which meanders through 54 of the 102 counties in Illinois. The Peoria Riverfront Development Study area is located in Peoria County, Illinois, within the Peoria-Pekin Metropolitan Statistical Area (MSA). Population declined over the past two decades; however, recent census data indicate that the area has experienced a slight rebound in population (Table 2-2). Employment was historically dominated by manufacturing, but is now more balanced, primarily among manufacturing, wholesale/retail trade, and service sectors (Table 2-3).

TABLE 2-2. Population Trends*

Area	1970	1980	1990	2000
Peoria	126,963	124,160	113,822	112,936
East Peoria	18,455	22,385	22,629	22,638
Washington	6,790	10,364	10,099	10,841
Peoria County	195,318	200,466	182,827	183,433
Tazewell County	118,649	132,078	123,692	128,485
State of Illinois	11,113,976	11,427,409	11,430,602	12,419,293

* Source: U.S. Census Bureau

TABLE 2-3. Employment Trends*

	1980	1990	Projected 2000
Employment:			
Farming & Agricultural Services	5,900	5,800	6,000
Mining & Construction	9,600	10,700	11,700
Manufacturing	52,200	34,700	32,200
Transportation & Utilities	7,900	8,000	10,300
Wholesale/Retail Trade	40,200	40,400	46,300
Finance, Insurance, Real Estate	12,900	11,900	12,800
Services	37,300	54,400	68,200
Federal Government	3,100	3,400	3,300
State & Local Government	15,400	15,600	16,400
Total Employment	184,500	184,900	207,200

* Woods & Poole Economics, Inc., 1995

Environmental Resources

For much of the 20th (1900-1970's) century, water quality was in decline on the Illinois Waterway. A combination of changing agricultural practices, urbanization and industrialization along the river, and the opening of the Chicago Sanitary and Ship Canal all combined to increase sedimentation and industrial/chemical pollution on the Illinois Waterway. The increase in chemical pollution resulted in a decline of water quality in the upper reaches of the river that virtually wiped out fisheries or caused them to seek other, more agreeable habitat. Of the fish that were found, many had lesions or cancerous tumors and/or were species more tolerant of the extremely poor habitat conditions. This situation soon created pollution problems that adversely impacted fisheries downstream as well.

Mussels in the river fared no better. In the late 1800's up to the turn of the century, the Illinois River supported at least 49 mussel species and was renowned as the most productive mussel stream (per river mile) in the country. A comprehensive mussel survey on the Illinois River, conducted from 1966-69 by Starrett, found that over one-half of the unionid species once found in the Illinois River had been extirpated. Starrett attributed this decline and elimination of numerous mussel species to intense commercial harvesting, degraded water quality from various forms of pollution, and widespread degradation and destruction of mussel habitat (Whitney et al. 1997).

With the establishment of the Environmental Protection Agency and the passage of the Clean Water Act, the situation regarding chemical pollutants began to reverse. It has taken many years, but improved water quality on the river concerning pollution has begun to be noticed, along with a return of some aquatic resources. More recent mussel surveys of Whitney, Blodgett, and Sparks conducted in 1993-95 found that while species richness was still in decline in Alton, La Grange, and Peoria reaches, there was significant improvement in the Starved Rock and Marseilles reaches. In fact, some mussel species that had been eliminated from the upper reaches are starting to make a return (Whitney et al. 1997). Additionally, fish surveys in recent years have shown healthier fish (no lesions or cancerous tumors) and increased species diversity for several reaches of the Illinois Waterway based on the report by the EMP – Long Term Resource Monitoring Program.

However, while chemical and industrial pollution is being brought under control, sedimentation is still a major issue on the Illinois Waterway. Most of the project area is only 1 to 2 feet deep and the substrate in the project area is extremely soft (silt and clay). Wave action maintains turbidity in excess of levels tolerant to aquatic plant germination and growth. These problems are common throughout Illinois River backwater lakes.

The Habitat Needs Assessment conducted as part of the Upper Mississippi River - Environmental Management Program found that the most critical need along the Illinois River was the restoration of backwater lakes and side channels to increase depth diversity. This report called for the restoration of backwaters on the Illinois River so that 25% of the backwater lakes (19,000 acres) would have an average depth of at least 6 feet.

As part of the study, some biological sampling was conducted and other recent sampling efforts documented. The results of the sampling in the project area of Lower Peoria Lake, whether it was fisheries, waterfowl, mussels, or invertebrates, were indicative of poor quality habitat. The uniform, shallow depth (18 to 24 inches) silt bottom of the area does not provide much in the way of conditions suitable to a wide range of species. In fact, most of what was sampled would be considered highly tolerant species, and given the more than reasonable conditions during sampling, one would expect that few, if any, species would be present during the more extreme times of the year. For instance, during low water, high temperature conditions during summer, or in winter when ice forms and reduces water volume, there would probably be few or no fish in the area. Under current conditions, the majority of the deepwater overwintering habitat is in the main navigation channel.

However, Peoria Lake continues to support diverse aquatic and terrestrial vegetation communities in marshes and mudflats and on the margin of the pool. Wildlife species include common furbearers such as muskrat, beaver, raccoon, and mink. Many small mammals and birds, including owls, woodpeckers, pheasants, and songbirds, inhabit bottomland hardwoods in the area. Other birds of interest that can be found there include shorebirds, gulls, terns, herons, egrets, and cormorants.

Woodford County State Fish and Wildlife Area. The project site is located on the southern edge of the Woodford State Fish and Wildlife Area. The Fish and Wildlife Area is along the east side of the Illinois River near Peoria. Among the features present north of the project site in Upper Peoria Lake are many artesian wells, which make the manmade channels an excellent winter fishing area. The 2,900-acre site, of which 2,462 acres is water, is a favorite stopping point for waterfowl during migration.

The area comprises bottomland forest and backwater lakes of the Illinois River and features a wide variety of fauna and flora. Cottonwood, silver maple, and willow cover much of the low-lying land. Deer, raccoon, muskrat, mink, and beaver find this habitat to their liking and sometimes can be observed at dawn and dusk. Tall and stately great blue herons also are found in large numbers on the backwaters, and during winter, it is not unusual to see a bald eagle soaring above the frozen lakes or perched atop a snag.

A major waterfowl refuge of 1,400 acres exists on the area. While less attractive to wildlife due to heavy siltation in recent years, backwater lakes still attract large flights of waterfowl during migration. However, only wood ducks and Canada geese commonly nest and raise their young here. Hawks and owls, especially barred owls, are common to the area, as are an assortment of songbirds and woodpeckers (www.idnr.il.us.gov).

Endangered Species. Three federally threatened or endangered species are present in the Peoria Lake area: the threatened bald eagle (*Haliaeetus leucocephalus*), the threatened floodplain species decurrent false aster (*Boltonia decurrens*), and the threatened lakeside daisy (*Hymenoxys herbacea*). The Indiana bat (*Myotis sodalis*), while a federally endangered species, is not federally listed as currently found in the

counties surrounding the project site. However, it is listed by Illinois as potentially occurring throughout the State of Illinois.

The bald eagle was listed in 1978 as an endangered species in 43 states and threatened in 5. In recent years, bald eagle numbers have increased dramatically. The bald eagle has expanded its distribution throughout the United States, and its protected status was changed in 1995 from endangered to threatened throughout the lower 48 states. In July 1999, the U.S. Fish and Wildlife Service announced the proposed rule to remove the bald eagle from the Federal List of Endangered and Threatened Wildlife. The bald eagle is still listed as threatened as of this writing.

The bald eagle normally migrates south to overwinter along major river systems, such as the Mississippi and Illinois Rivers. Eagles usually begin arriving in the area around late November or early December. They forage for fish where they can find open water, such as the tailwaters below the locks and dams. The eagles rest and loaf in the larger trees and snags along the shoreline. These trees provide excellent vantage points for fishing. In the evening, the eagles seek shelter in roost trees that provide protection from winter weather.

The decurrent false aster occurs along approximately 250 miles of the Illinois River and nearby parts of the Mississippi River. Decurrent false aster is an early successional species that requires either natural or human disturbance to create and maintain suitable habitat. Its natural habitat was wet prairies, shallow marshes, and shores of open rivers, creeks, and lakes. In the past, annual flood/drought cycles of the Illinois River floodplain provided the natural disturbance required by this species. Annual spring flooding created open, high-light habitat and reduced competition by killing other less tolerant, early successional species. The decurrent false aster is known to occur in Tazewell and Woodford Counties in the floodplain areas around Peoria Lake where it occupies disturbed alluvial soils. It is known to be found at the west end of McClugage Bridge and on the east side of the Lower Lake at Cooper Park. Cooper Park North is an Illinois Natural Areas Inventory (INAI) site.

The lakeside daisy is known to occur in Tazewell County, where it has been introduced. It is a perennial herb with flowering stalks, 2-10 inches tall, arising from basal tufts of leaves. When the plants are not in bloom, the small tufts of leaves are easily overlooked, but in bloom (late April-June), the plants are extremely showy, with populations simultaneously producing masses of large (1- to 1-1/2 inch in diameter) yellow flower heads. It requires full sun and can be found in dry calcareous sites, specifically in thin soils over limestone or dolomite outcrops/exposures and in dry limestone prairies.

The Indiana bat is a migratory species that occurs throughout much of the eastern United States, including Illinois. It may forage for insects along river and stream corridors in floodplain, riparian, and upland forests, old fields, crop borders, and along wooded fencerows. They have been found to forage from between 6 to 100 feet above the ground and over streams greater than 6 feet wide. The Indiana bat prefers habitat containing dead trees with loose bark to establish nursing sites. Caves are utilized in winter for hibernation.

Fish. Peoria Lake has a diverse fish population that is dominated by carp, gizzard shad, buffalo, carpsuckers, sunfish, largemouth bass, freshwater drum, and white and black crappie. More recently, with the improvement in water quality, game fish species like sauger, walleye, and smallmouth bass have been able to reestablish and even make population gains during high river flow. However, additional population gains are limited by the lack of suitable off-channel habitat and overwintering areas.

Fish sampling was conducted in the project area utilizing standard gill nets, trap nets, and electrofishing. These sampling efforts covered large areas above and below the McClugage Bridge during September 2000. Only 278 total fish representing 17 species were collected with all methods combined. Sampling conditions were considered to be optimal—water temperature was 76 degrees and air temperature was 78 degrees. Winds were light, and the river was at elevation 442 feet MSL, the normal summer pool.

Gizzard shad (*Dorosoma cepedianum*) outnumbered all species with a count of 187. Also collected were 23 white bass (*Morone chrysops*), 15 freshwater drum (*Aplodinotus grunniens*), 11 carp (*Cyprinus carpio*), and 11 skipjack herring (*Alosa chrysochloris*). Twelve additional species comprised the remaining 31 fish captured. Of the total fish collected, 67% were gizzard shad. Few sport fish other than white bass were taken. No black bass or bluegill were sampled.

Those results are in contrast to the number of fish collected with just 1 hour of electrofishing across and upriver from the sampling area when a total of 1,198 fish representing 27 species were collected in 1995. The Narrows contain different types of habitat, including riprap, rock, stable substrate and close proximity to deep water. The sampling area in Lower Peoria Lake was shallow (18 to 24 inches) with a silt substrate.

Restoration efforts can result in dramatic improvements in fish habitat and usage as demonstrated by monitoring at the Peoria Lake EMP project. Comparisons of pre- and post-construction fish community monitoring results at the Barrier Island complex experimental sites show an increase in the number of fish species collected as well as an increase in the number of fish collected during post-construction monitoring. The comparison of pre- and post-construction results at the control sites did not show a similar increase. In addition, a greater diversity of species, as well as more unique species, was collected in post-construction sampling at sites within the Barrier Island complex.

Mussels. Professional biologists recognize that mussels (unionids) are particularly sensitive to the influence of humans on the environment and therefore make good indicators of water quality and health of aquatic ecosystems. Juveniles, once settled after their larval (glochidia) stage, are slow to grow and immobile for the duration of their (up to 100 years or more) adult lifespan. Since they are sedentary filter feeders of particulate matter from the water column, they are also susceptible to sedimentation and pollution. Therefore, sedimentation is also considered to be a factor in the decline of the mussel population in Peoria Lake. Currently, 23 species of mussels occur in Peoria Lake, with the most common being three-ridge (*Amblema*

plicata), maple-leaf (*Quadrula quadrula*), pimple-back (*Quadrula pustulosa*), and floater (*Pyganodon grandis*).

Some mussels were collected at two transects in the study area as part of a different study effort concerning dredging an access channel to Spindler Marina (Bob Shanzle, letter dated June 4, 1999). In the main sampling transect (11 sites), only three live mussels were collected. All were three-ridge (*Amblema plicata*). In the second transect (four sites), only six mussels were collected—four three-ridge and two maple-leafs (*Quadrula quadrula*).

Macroinvertebrates. Loss of aquatic vegetation and sedimentation over the past hundred years, as well as pollution, have led to reduced abundance and diversity of the invertebrate fauna in the Peoria Lake area.

In November 1998, Illinois Natural History Survey (INHS) staff collected 3 replicate samples from 30 sites in both Upper and Lower Peoria Lakes (Stephenson and Koel 1999). Six of those sites were within the study area. Substrates were entirely silt/clay. Midges, fingernail clams, and burrowing mayflies comprised 97% of all organisms collected in Peoria Lake. The lower section had an overall density of 108.93 organisms/square meter with midges (81.70 per square meter) and fingernail clams (19.61 per square meter) accounting for 93% of all organisms collected. The authors considered these catches to be low and attributed the lower densities of these organisms to the "higher sediment loads and continuous re-suspension of the sediments."

Waterfowl. The Illinois River Valley is part of the Upper Mississippi River Flyway, a critical migration corridor for waterfowl and other migratory birds. Waterfowl such as ducks and geese are most abundant in the spring and fall, but they can be found on the lakes year round. The Illinois River Valley is also considered to be an important breeding ground for the wood duck.

Waterfowl usage of Peoria Lake area was documented from data collected by the INHS aerial waterfowl census program. INHS staff fly transects at various times of the year, and waterfowl are counted from historic locations. For this study, data were taken from the Illinois Waterfowl Surveys and Investigations and include data from the fall of 1999 and again from the spring of 2000. Aerial inventories were conducted weekly from September 1, 1999, through January 5, 2000, and again from February 7 through April 6, 2000.

Of the 21 separate aerial counts taken in Lower Peoria Lake, only 6 had notations of waterfowl usage, and then the numbers were very low compared to other areas in the Illinois River census area. For example, on February 28, 2000, while the areas sampled contained as many as 290,935 total ducks and 3,795 total geese, there were no waterfowl found in Upper or Lower Peoria Lakes on that particular day.

Information from post-monitoring efforts of the Upper Peoria Lake EMP project has shown that the construction of islands and deepwater habitat has dramatically increased species diversity and number of individuals using that area. Four years after island construction, waterfowl use of that area has increased 14-fold.

Monitoring of spring and fall waterfowl usage of the EMP project in the Upper Lake varies somewhat; however, the total annual counts show a steady increase over the 4-year span of the post-project monitoring. Results of the aerial census, combined with numerous observations of waterbirds at the site during spring and summer months by ILDNR site managers, INHS staff and Corps of Engineers staff, provide evidence that the EMP island measures are enhancing aquatic habitat. The same dramatic increases hold true for fish usage of the aquatic habitat created by dredging to construct the islands and placement of riprap for the closing structure.

The results of the monitoring efforts at the Upper Lake EMP sites illustrate the success of the natural resource enhancement aspects of that project. Also, because the EMP islands are still relatively new, waterfowl and fish counts over the next several years could very likely increase to even greater numbers. These results suggest that similar success in the Lower Lake is possible if islands and channels are constructed.

Historic Properties

The Rock Island District queried the most updated Illinois Geographic Information Systems (GIS) site file database and reviewed the reports: (1) *An Investigation of Submerged Historic Properties in the Upper Mississippi River and Illinois Waterway* (Custer and Custer 1997); (2) *Landform Sediment Assemblage (LSA) Units in the Illinois River Valley and the Lower Des Plaines River Valley* (Hajic 2000); and (3) *The Historic Properties Management Plan for the Illinois Waterway System, Rock Island District, Corps of Engineers: Volumes I and II* (Roberts et al. 1999). No previously reported or recorded underwater or submerged historic properties were reported or recorded.

The District sent letters dated November 7, 2000, and October 5, 2001, concerning the absence of documented historic properties and the Corps' determination of No Historic Properties Affected by the proposed island creation. The Illinois Historic Preservation Agency (IHPA) concurred with the District by letters dated December 4, 2000, and October 30, 2001, that no historic properties are affected by the proposed island creation element of the project, including the rock jetties and closing structures (IHPA Log No. 0011090020K-P, Appendix A-1).

Future Without-Project Conditions

It has generally been accepted that outside of the 9-foot navigation channel on the Illinois River, continued sedimentation in the Peoria Lake area will continue to reduce lake depths, deteriorate the aquatic resources in the area, and increase the potential for maintenance dredging of the navigation channel. Analysis of recent survey information indicates possible trends toward sedimentation rate reduction in this river reach. Whether sedimentation continues at historic rates or even if relative equilibrium is established, it is very unlikely that the existing degraded habitat would see measurable improvements in the near future.

The result of sedimentation has been the loss of deeper, off-channel parts of the lake from an estimated maximum of 8 feet to 1-2 feet in recent years. While currently the channel is

self sustaining, it is uncertain if navigation flows will be adequate to transport sediment in the future. In particular, sediment deposition into the Farm Creek and Tenmile Creek deltas is likely to continue to expand the deltas into the navigation channel. At these delta locations, it is possible that some maintenance dredging will be required in the future of no changes are made. Off-channel areas will remain shallow and subject to resuspension of sediment by waves. This transformation of Peoria Lake into a narrow navigation channel with bordering shallow, wind-swept areas will negatively impact fish and wildlife habitat and also reduce aesthetic values and recreation opportunities.

Regarding the expected future environmental condition of Peoria Lake, continued limitations or potential further decline in fish and wildlife populations is likely. The Illinois River's sediment load, diminished water quality, resuspension of sediment, and resultant elevated turbidity levels will likely lead to continued limited habitat values and could ultimately cause a more drastic decline in important fish and wildlife populations and aquatic vegetation. The exact future condition of the lake is somewhat unclear. The lake may continue filling, with associated conversion to mudflats and land, or experience reduced sedimentation rates, helping to maintain its current shallow depths. In either case, a highly degraded state of aquatic habitat quality exists in the project area. This poor aquatic habitat condition will not improve in the near future due to continued lack of depth and diversity, and potential conversion from aquatic to terrestrial habitat types.

TRIBUTARY WATERSHED RESTORATION

Similar to the alternatives considered in Peoria Lake, the first step was to identify the general locations and broad categories of potential improvement. There are 10 direct tributaries to Peoria Lake. However, once the focus of the in-lake alternatives was determined to be Lower Peoria Lake, the tributaries draining to this area or a relatively short distance upstream became the logical place for tributary alternatives to be investigated. This narrowed the focus to Farm Creek and Tenmile Creek. Since Tenmile Creek has a large grade control structure at the Caterpillar Proving Ground within the basin, which helps to address sediment delivery, the study team felt that Farm Creek should be the focus. Further investigations and discussions with the Sponsor identified the upper portion of Farm Creek as having the highest level of interest from public involvement.

Following release of the public review draft of this report, results from an HTRW Phase II analysis concluded that the project site for the recommended plan for tributary watershed restoration had contamination issues. Therefore, consistent with Corps of Engineers policy, the study team, in consultation with the Sponsor, decided to eliminate this element of the study's overall recommended plan. However, all data, plan formulation, design, and cost information have been included in Appendix K for this portion of the project. Information originally included in the other appendices regarding tributary watershed restoration can also be found in Appendix K. If the site is cleaned to meet applicable standards, it could be considered for restoration efforts at a future date.

ASSESSMENT OF PROBLEMS, OPPORTUNITIES, AND CONSTRAINTS

PROBLEM

The primary resource problem in Peoria Lake is sedimentation and the resulting loss of water depth, which has reduced aquatic habitat value and diversity. Recreational opportunities have been diminished. Many Peoria Lake tributary streams have been altered through channelization and land use practices and are now conveying high sediment loads, thereby aggravating the sedimentation problem in Peoria Lake. The causes of high tributary sediment loads are varied. In all watersheds, some degree of channelization has occurred. In some watersheds, Farm Creek being one, urban development and resulting impervious surface generate substantial increases in surface water runoff rates and volumes. Finally, large areas of the tributary watersheds are forested. However, little or no management is underway, resulting in dense canopy with very little ground cover.

Peoria Lake is subject to high rates of sediment delivery from its 10 direct tributaries. This high sedimentation rate is related to the geology of the Peoria Lake region, which is surrounded by highly erodible loess bluffs and moraine deposits. In addition, alternation of the tributary watersheds has degraded riparian habitat along stream corridors. Typically, this is the result of agricultural practices. The results are increased sheet and rill erosion in formerly riparian areas that had trapped sediments before entering tributary waters. Statewide, Illinois has lost approximately 99% of the original tall grass prairie and over 85% of pre-settlement wetlands (Noss, LaRoe and Scott 1995). Restoration of prairie and wetlands present opportunities to restore significant habitat types that were formerly abundant in the state, but that have been greatly reduced. This change in land cover from diverse vegetation to mostly row crop agriculture has significantly increased sheet and rill erosion and surface runoff in local tributaries.

GOALS AND OPPORTUNITIES

The principal goal of ecosystem restoration in Peoria Lake is to create, restore, or improve aquatic habitat by restoring depth diversity and reducing sediment delivery and deposition in Peoria Lake, with ancillary benefits to recreation. Opportunities were explored to address these conditions. The Peoria Riverfront Development Project is a public and private cooperative effort to revitalize the City's downtown area. It is fundamental to the success of the development project that the Illinois River at Peoria and Peoria Lake are healthy, functioning, and sustainable resources. Historically, the riverfront area on both sides of the river developed as a function of the transportation and aquatic resources of the Illinois River. While these same needs exist today, the need for more diversified housing, business, and industry exists along the riverfront. Much as aquatic and terrestrial habitat diversity attracts greater numbers and types of aquatic and terrestrial species, people are attracted to an area that is healthy and diverse. The goal of restoring and protecting the Illinois River at Peoria is as much in the State and local interest as it is in the Federal interest. It is supported locally by regional efforts to reduce sediment delivery, control stormwater runoff, and improve tributary water quality entering the Illinois River at Peoria. Therefore, opportunities to enhance the health, function, and sustainability of the Illinois River and Peoria Lake are by definition consistent with local efforts and vital to the success of the Peoria Riverfront Development Project. The study objectives and constraints are summarized below.

OBJECTIVES

The following objectives for the Feasibility Study were developed by an interagency study team to address the specified problems, goals, and opportunities. Following the objectives, Table 2-4 relates the study goals and objectives with potential measures. These measures were further developed and investigated as part of the Feasibility Study and are addressed in the following sections of this chapter in greater detail.

- **Restore depth diversity** - Sedimentation has resulted in the loss of lake depth and volume while filling the lake to a nearly uniform shallow depth outside of the navigation channel. These changes have severely impacted a number of historic habitat types, including off-channel overwintering, spawning, and nursery habitat for fish. Increasing overall depth and variability of depth would restore fish habitat.

- **Provide structure for aquatic organisms** - Much of the lake bottom has a uniform shallow depth with a silt substrate due to excessive sedimentation and water level stabilization by the lock and dam. The introduction of additional structures (e.g., rock jetties/reefs, woody debris, etc.) would provide valuable refuge, feeding, spawning, and nursery areas for aquatic organisms.

- **Increase habitat diversity** - As part of any restoration efforts, features should be made to restore the overall habitat diversity within Peoria Lake. Providing deepwater channels and holes through shallower areas and creating islands to increase shoreline area and provide additional terrestrial habitat would restore some of the former diversity that was historically present in the lake.

- **Improve habitat value for migratory waterfowl and shorebirds** - While the Illinois River Valley is part of the Mississippi River flyway, a migration route for hundreds of thousands of waterfowl, shorebirds, and neotropical migrant birds, the study area has not been well utilized in recent times. Additional areas for waterbird resting, nesting, and feeding would improve waterfowl habitat conditions.

- **Improve water quality** - Due to the extensive lake size and shallow water depths, Peoria Lake is highly susceptible to wind-generated wave action that results in the resuspension of sediments and high turbidity, further limiting fish, aquatic vegetation, macroinvertebrate, and mussel productivity. Reducing sediment resuspension, and therefore turbidity, would provide considerable improvements to water quality.

- **Maximize sustainability of project features** - If restorative measures are implemented, considerable effort should be directed to making project features sustainable (e.g., bank protection to stabilize islands, sufficient flow to minimize sedimentation, or deflection of sediment from dredged areas).

- **Reduce sediment delivery to Peoria Lake from tributary streams** - The direct tributaries to Peoria Lake compose 3% of the total drainage area at Peoria and deliver 40% or more of the sediment deposited in the lake. Reducing sediment transport from this relatively small area would result in considerable reductions in total sediment rates in the lake (see Appendix K).

- **Create riparian and wetland habitat along tributary streams** - Restoration of prairie and wetlands along tributaries presents opportunities to restore significant habitat types that were formerly abundant in the state, but that have been greatly reduced (see Appendix K).

TABLE 2-4. Potential Measures to Address Study Goals and Objectives

Goals	Objectives	Measures
Restore aquatic habitat	Restore depth diversity	Areas with water depth of >6 feet for overwintering fish
		Areas with water depth of ~4 feet for fish spawning and nursery habitat
		Flowing side channel
	Provide structure for aquatic organisms	Rock jetties/reefs, riprap, and root wads
	Increase habitat diversity	Create islands within Peoria Lake to provide additional shoreline and terrestrial habitat
	Improve habitat value for migratory waterfowl and shorebirds	Provide areas for waterbird resting, nesting, and feeding
	Improve water quality	Provide flow and depth necessary to maintain dissolved oxygen levels of 5 mg/l
		Create islands or breakwaters to lower turbidity levels by reducing wind-/wake-generated waves
		Create sediment traps, retention ponds, and wetland areas to filter and trap sediments before they enter Farm Creek
	Maximize sustainability of project features	Align islands to minimize deposition and increase potential for depth sustaining scour
		Bank protection to reduce island erosion
		Closing structures to minimize sediment delivery to restored deepwater areas
Reduce sediment delivery and deposition *	Reduce sediment delivery to Peoria Lake from tributary streams	Sediment traps and retention ponds on tributaries
		Streambank and bed stabilization
	Create riparian and wetland habitat along tributary streams	Create wetlands and improve riparian buffers

* The goals to reduce sediment delivery and deposition were not met. See Appendix K for information regarding study investigations.

CONSTRAINTS

The following constraints were identified during the study process:

- **No impacts on flood elevations as required by Illinois law** - Illinois state law specifies that any action in the floodplain that increases flood heights is not allowable or must be accompanied by mitigation of adverse effects. Due to the potential high cost associated with these actions, efforts were made to avoid this threshold.

- **No significant impact on navigation channel flows** - The Corps of Engineers currently operates and maintains the 9-Foot Channel Navigation Project on the Illinois Waterway. At the present time, dredging is not required to maintain the existing navigation channel in the project area. The project should avoid any changes that would result in the potential for increased sedimentation in the main channel or require main channel maintenance dredging.

- **No impacts to the foundation of the McClugage Bridge (U.S. Highways 24 and 150)** - The Illinois Department of Transportation (IDOT) requested that there be no impacts to the foundation of the McClugage Bridge and that islands and dredging do not approach the bridge due to safety concerns and the potential for increased maintenance costs.

- **Uncertainty regarding future sedimentation rate** - The rate of sedimentation in the Lakes since 1903 has averaged 1.5 inches per year. While it is possible to over dredge to a certain extent to maintain the desired project depth over a 25-year project life, it is not feasible to over dredge to allow for a 50-year project life. To over dredge sufficiently for a 50-year project life would require excavation of lake bottom parent material. Finally, to have a 50-year project life without sufficient initial over dredging would require the local sponsor to maintenance dredge, an activity they do not support.

- **Sponsor limitations – funding, land ownership/or ability to acquire, and desire for limited Operation and Maintenance** - As the Non-Federal Sponsor, the ability of the State of Illinois to afford various features or acquire the lands, easements and rights-of-way represented potential limiting factors. At this time, a final legal determination has not been made as to ownership of submerged lands in the Illinois River Basin. In addition, the Sponsor desires more natural and sustainable alternatives that avoid high operation and maintenance costs.

IDENTIFY MEASURES AND FORMULATE ALTERNATIVE PLANS FOR PEORIA LAKE

Before specific measures or alternative plans were formulated, the first step was to identify general locations and broad categories of potential improvement. The study area stretches roughly 130 miles from Henry to Naples, Illinois. As part of the study, various locations within the study area, including both Upper and Lower Peoria Lakes, were considered. Early in the study process, the interagency study team agreed that due to degradation of the lakes and loss of depth and diversity, restoration in either Upper or Lower Peoria Lake would provide very similar benefits. It was then decided that restoration alternatives would focus on Peoria Lake, based on the study authority (which specifically references the Peoria Riverfront), previous studies identifying suitable locations within the Lower Peoria Lake, and sponsor and local interest.

The potential categories of actions to provide off-channel depth diversity are listed below and followed by the results of initial evaluation.

1. **Dredging to create aquatic habitat and islands** - The reconnaissance study, 905(b) analysis, discussed the potential for dredging aquatic habitat and using the material to restore historic islands. However, based on initial evaluations of the historic locations and prior studies, it was determined that more sustainable locations would be located farther upstream. The Illinois State Water Survey identified the most promising areas

within Lower Peoria Lake as part of their report, *Hydraulic Investigation for the Construction of Artificial Islands in Peoria Lake* (1988). These areas were in the upper portion of Lower Peoria Lake where current velocities are higher through the Narrows. Their study highlighted the potential for these flows to help maintain deepwater habitat. In addition, the State of Illinois currently owns a refuge in the upper portion of Peoria Lake, which is part of the Woodford County State Fish and Wildlife Area.

2. **Dredging to create aquatic habitat with sediment placement outside of the lake** - Dredging with the removal of material from the lakes for placement on adjacent uplands, transport to brownfields, or other beneficial uses outside the immediate study area was also evaluated.

   Early analysis showed that transporting dredged material longer distances was considerably more costly than island construction, while placement on adjacent uplands could be accomplished at a similar cost to island construction. However, real estate acquisition costs are significantly higher in the upland areas and the availability of willing landowners is limited. Hydrodynamic modeling (see Appendix D-3) demonstrated that construction of islands adjacent to deepwater dredging aided in the sustainability of the deepwater habitat by increasing current velocities and limiting flows and sediment movements into the created deepwater areas. As a result of the higher costs of the upland placement and greater habitat benefits of island creation, detailed evaluations focused on dredging with island alternatives.

FORMULATION CRITERIA

Prior to developing the specific alternatives, the study team developed the formulation criteria listed below. Consideration was also given to the specific constraints listed previously (no impacts to flood elevations, sponsor funding limits, land issues, no significant impacts on navigation channel flows, and no impacts on the foundation of the McClugage Bridge).

- The measures should be designed to meet identified biological goals – primarily focused on creating aquatic habitat for fish (overwintering, spawning, nursery, and feeding), while maximizing habitat diversity to benefit waterfowl, shorebirds, invertebrates, and plants.
  - o Overwintering habitat – depth of greater than 6 feet optimal
  - o Spawning and nursery habitat – varies by species; however, firm substrate preferred
- Measures must be acceptable to the wide range of interested local and state parties (acceptability – effects on views, recreational use potential).

POTENTIAL PROJECT MEASURES FOR PEORIA LAKE

The following project measures to achieve the project goals and objectives and to meet the stated formulation criteria were considered in detail:

- **Dredge off-channel areas to greater than 6 feet to serve as overwintering fish habitat** - The average depths of off-channel areas, outside of the navigation channel, in much of Peoria Lake are only 1-2 feet. The proposed restoration measure includes creating areas greater than 6 feet deep by dredging. This is proposed to be done as a

series of potholes and connecting channels. Potholes are simply areas of deep water that vary the overall depth characteristics and habitat of the dredged area. Due to relatively high historic sedimentation rates, some level of over dredging is necessary to maintain the project through the 25-year project life. The amount is the anticipated annual sedimentation rate (2.0-2.5 inches per year) plus the desired depth for habitat. Therefore, the total depth will be approximately 10-11 feet.

- **Dredge areas to at least 4 feet to increase diversity of aquatic habitat** - Due to relatively high historic sedimentation rates, some level of over dredging is necessary. This shallow depth will roughly follow historical lake contours and acreage to roughly 6 feet to allow for sedimentation rates.

- **Dredge with island construction to create flowing side channel habitat adjacent to island placement - create flowing habitat for riverine aquatic species, separated from navigation channel** - The flow within a created side channel also has the potential to minimize sedimentation and creates the potential for continuous scouring, helping to maintain the deepwater habitat created.

- **Island Creation** - The construction of islands would increase habitat diversity by providing shoreline and terrestrial habitat for migratory birds. Islands can serve as a low-cost placement area for dredged materials from other project features, as well as wind and wave breaks to reduce the resuspension of sediments, thereby improving water quality.

- **Aquatic Structure** - Much of the lake currently is a uniform shallow depth with a soft substrate. The addition of firm structure, such as rock jetties/reefs, rock riprap, or root wads, would provide additional habitat diversity.

- **Closing Structures** - In areas where there is little potential for higher current velocities to maintain water depth, deepwater habitat created by dredging has the potential to fill rapidly with sediments. Closing structures can help to minimize flow into these deepwater areas, reducing sediment delivery and increasing sustainability. Rock closing structures also provide aquatic structure.

- **Bank Protection** - In order to maximize sediment removal, it is preferable to construct the entire islands out of the river substrate. The fine silt clay that composes this material would require some bank protection to reduce the potential for island erosion due to wind- and wake-generated waves. Rock riprap was chosen as a preferred material due to the additional aquatic structure it provides.

DESCRIPTION OF ALTERNATIVES

All of the measures listed above met the goals and objectives of this project. They were evaluated in various combinations to achieve project goals. A wide range of dredging areas and island sizes and shapes was evaluated, but preliminary technical evaluations reduced the number of viable options to the four alternatives listed below. At a series of public meetings in November 2000, one additional alternative of even larger islands was presented. This alternative was subsequently dropped due to the high cost and lack of sponsor interest. During the preliminary evaluations, it also become apparent that most of the measures were required as part of any alternative and were

not optional increments. For example, the dredged volume had to match the island volume. Due to the focus on aquatic habitat, all of the alternatives included the overwintering habitat, spawning and nursery habitat, and aquatic structure. Closing structures and bank protection also were included to maximize the life of the project features.

Figures 2-4 through 2-7 show the plan form changes proposed by the various alternatives. The area being considered for dredging and island construction is in the vicinity of the McClugage Bridge (U.S. Highways 24 and 150) in the upper northeastern portion of Lower Peoria Lake. The island (or islands) would be created within an area owned by the ILDNR. Most of the area considered for island creation has water only 1 to 2 feet deep with a substrate of 4 feet (or greater in some areas) of soft mud and silt. Biological investigations of this area show that it has only marginal habitat value for most aquatic species.

Dredging to construct the island(s) would range from 6 to 16 feet below flat pool and incorporate side channels and deep holes to provide depth diversity, overwintering habitat, and "edge" for fish species. The islands would be constructed to approximately 10 feet above flat pool at their highest (elevation 450 feet MSL). Additional structures, such as riprap along the island shore and jetties out into the water, would stabilize the islands and add additional habitat value.

Alternatives A2 and B1 were reformulated to reduce costs and reduce construction time. These adjustments include: (1) reduce dredging depths; (2) reduce riprap layer thickness and use Corps riprap gradation; (3) build islands in lifts similar to stepped mounds; (4) reduce the widths of the lower islands; and (5) use a design build type contract. The adjustments were relatively minor in terms of habitat and sustainability. Therefore, the habitat evaluation and hydraulic analysis was not re-done.

A1. Dredging to create aquatic habitat and a small island - This alternative consists of converting 27 acres of shallow, open water upstream of the McClugage Bridge (U.S. Highways 24 and 150). Sediments would be dredged over a 17-acre area to construct an island with 9 acres of terrestrial habitat. In order to create a diverse aquatic habitat, dredge depths would vary from 6 feet to 16 feet, including holes and connecting channels. Rock riprap would be placed along the channel side of the island to provide erosion control. Rock jetties would be placed every 250 feet around the island to provide additional structure and edge habitat. An emergent closure structure would be constructed at the upstream end to minimize sediment movements to the non-channel side of the island.

A2. Dredging to create aquatic habitat and a mid-sized island - This alternative consists of converting 76 acres of shallow, open water upstream of the McClugage Bridge (U.S. Highways 24 and 150). Sediments would be dredged over a 55-acre area to construct an island with 21 acres of terrestrial habitat. In order to create a diverse aquatic habitat, dredge depths would vary from 6 feet to 16 feet, including holes and connecting channels. Rock riprap would be placed along the channel side of the island to provide erosion control. Rock jetties would be placed every approximately 250 feet around the island to provide additional structure and edge habitat. An emergent closure structure would be constructed at the upstream end to minimize sediment movements to the non-channel side of the island.

B1. Dredging to create aquatic habitat and two islands with a flowing side channel - This alternative consists of converting 198 acres of shallow, open water just downstream of the McClugage Bridge (U.S. Highways 24 and 150). Sediments would be dredged over a 144-acre area to construct a pair of islands with 54 acres of terrestrial habitat (37 and 17 acres, respectively). A 3,650-foot flowing side channel would be created between the two islands. In order to create a diverse aquatic habitat, dredge depths would vary from 6 feet to 16 feet, including holes and connecting channels. Rock riprap would be placed along the channel side of the island to provide erosion control. Rock jetties would be placed approximately every 250 feet around the islands to provide additional structure and edge habitat. An emergent closure structure would be constructed on the east side of the east island to minimize sediment movements in that area.

B2. Dredging to create aquatic habitat and a large island - This alternative consists of converting 145 acres of shallow, open water just downstream of the McClugage Bridge (U.S. Highways 24 and 150). Sediments would be dredged over a 99-acre area to construct an island with 46 acres of terrestrial habitat. In order to create a diverse aquatic habitat, dredge depths would vary from 6 feet to 16 feet including holes and connecting channels. Rock riprap would be placed along the channel side of the island to provide erosion control. Rock jetties would be placed every 250 feet around the islands to provide additional structure and edge habitat. An emergent closure structure would be constructed on the east side of the island to minimize sediment movements in that area.

EVALUATE AND COMPARE PLANS FOR PEORIA LAKE

The alternatives and process used to determine the potential cost, habitat benefits, incremental cost/cost effectiveness, significance, hydrologic/sustainability, and public acceptability are outlined below. Due to uncertainties regarding the long-term sustainability of the projects in an aggrading river reach, a 25-year project life was used for the analysis of habitat benefits.

The proposed 25-year period of analysis meets Corps of Engineers requirements outlined in ER 1105-2-100. The project is being designed to primarily provide overwintering habitat for fisheries benefits for 25 years (maintain depths greater than 6 feet). The 25-year period is the period, over which ecosystem benefits were calculated, construction costs annualized, and operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) estimated. The sponsor will be responsible for OMRR&R of the project and the associated costs during that 25-year period. At the end of 25 years, the project is estimated to begin having diminished benefits as sedimentation begins to reduce depths below 6 feet and the sponsor will not be required to maintain the minimum design depths.

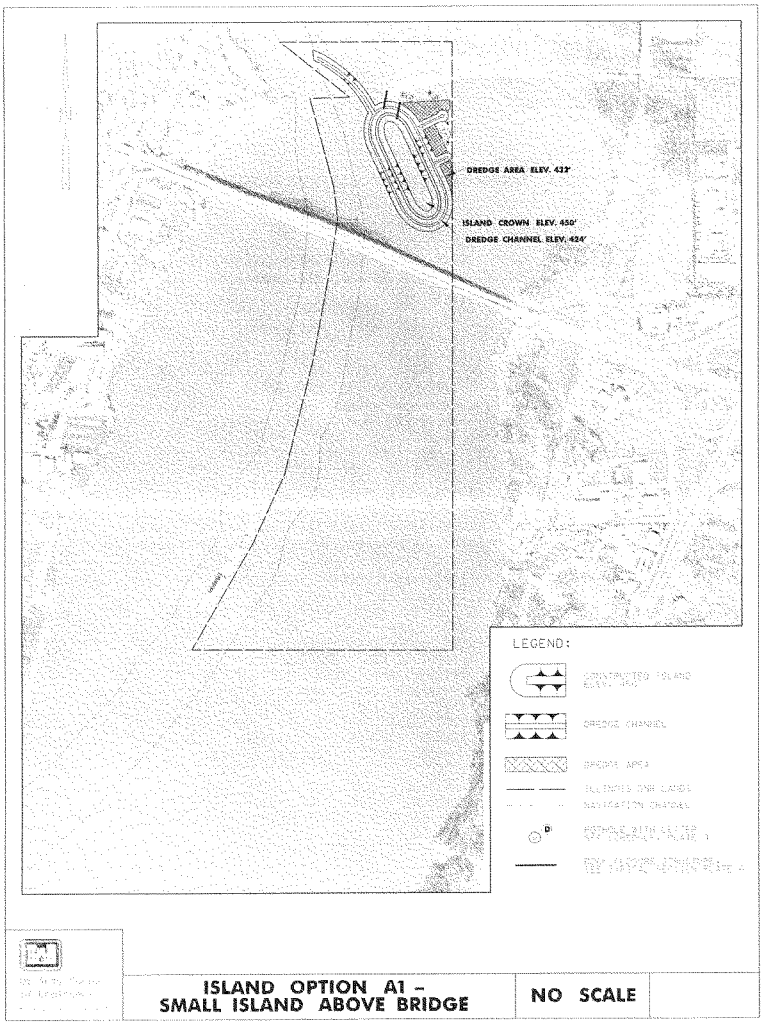

FIGURE 2-4. Alternative A1 - Dredging to create aquatic habitat and a small island

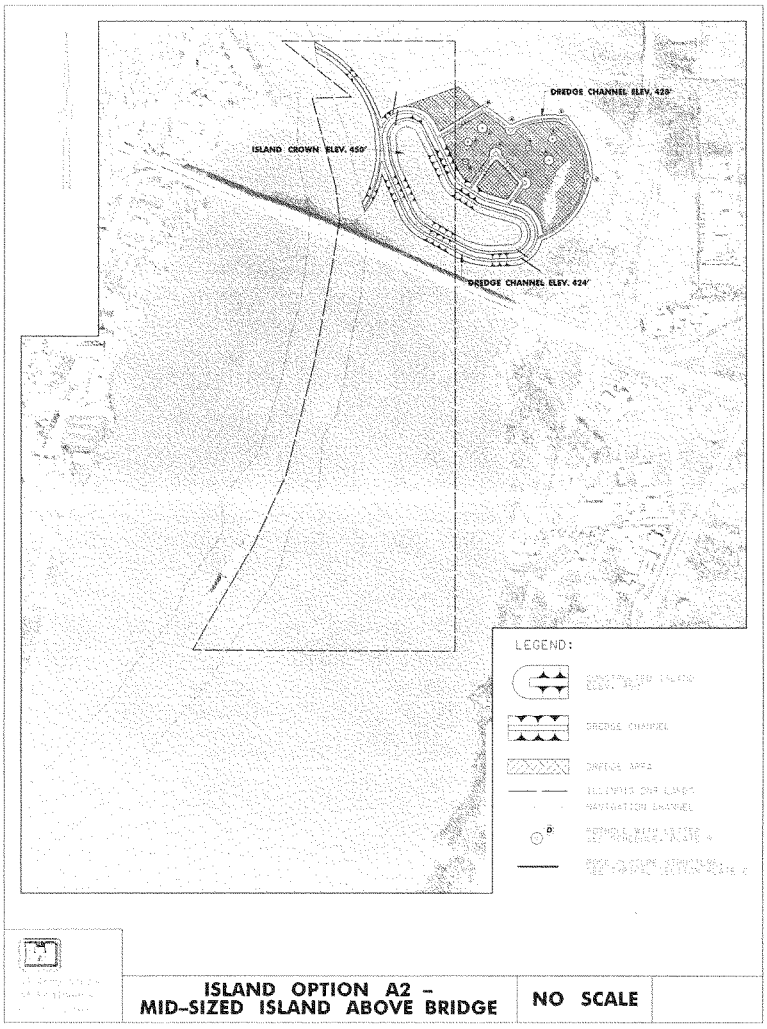

FIGURE 2-5. Alternative A2 - Dredging to create aquatic habitat and a mid-sized island

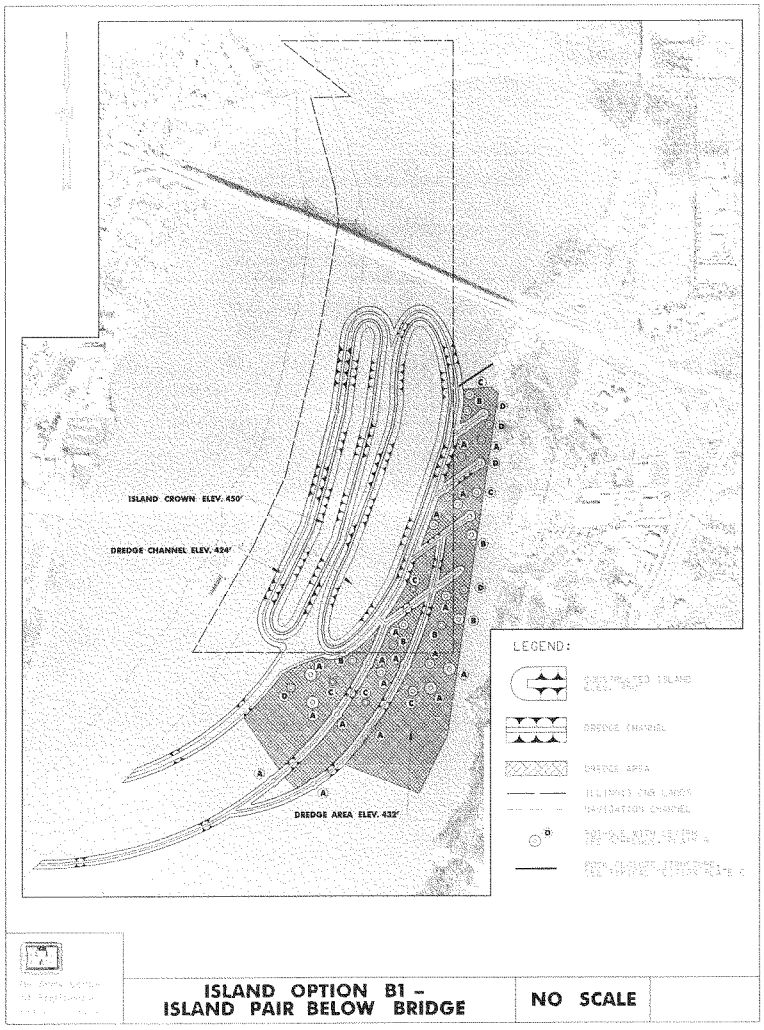

FIGURE 2-6. Alternative B1 - Dredging to create aquatic habitat and two islands with a flowing side channel

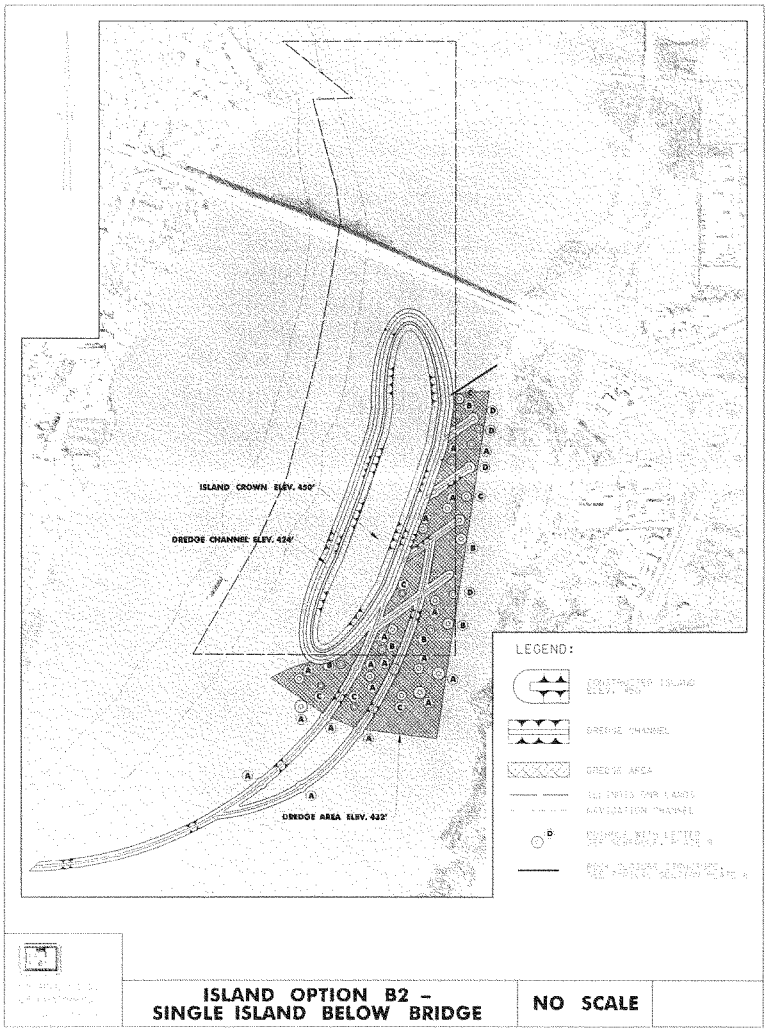

FIGURE 2-7. Alternative B2 - Dredging to create aquatic habitat and a large island

INCREMENTAL COST/COST EFFECTIVENESS ANALYSIS PROCESS

Cost effectiveness analysis was used to determine what project features should be built based on habitat benefits (outputs) that meet the goals and objectives of the project and at the same time are the most cost effective. The Corps of Engineers has incorporated cost effectiveness analysis into its planning process for all ecosystem restoration planning efforts. A cost effectiveness analysis is conducted to ensure that least-cost alternatives are identified for various levels of output. After the cost effectiveness of the alternatives has been established, incremental cost analysis is conducted to reveal and evaluate changes in cost for increasing levels of environmental output.

Cost effectiveness and incremental analysis is a three-step procedure: (1) calculate the environmental outputs of each feature; (2) determine a cost estimate for each feature; and (3) combine the features to evaluate the best overall project alternative based on habitat benefits and cost. While cost and environmental output are necessary factors, other factors such as the ability to construct, significance of the resources, sustainability of the project, and acceptability to the sponsor are very important in deciding on the preferred alternative.

Environmental outputs were calculated as average annual habitat units (AAHUs). The annualized costs were calculated by applying a 6-3/8% annual interest rate to the construction costs over the 25-year life of the project. The incremental analysis for each feature was accomplished using the Corps of Engineers Institute for Water Resources methodology described in Robinson et al. (1995). Further information on the analysis can be found in Appendix G of this report.

The outputs, costs, and average cost per AAHU are presented in Table 2-5 on page 2-35 for the island restoration. The incremental analysis for restoration evaluated island alternatives A0, A1, A2, B0, B1, B2 and various other combinations of project features.

HABITAT EVALUATION

Habitat analyses were completed for the in-lake alternatives to assess their likelihood to achieve the goal of enhancing aquatic, wetland, and terrestrial habitat. These analyses employed a multi-agency team approach with representatives from the Corps of Engineers and the ILDNR. The U.S. Fish and Wildlife Service was supplied with copies of all related documentation and reviewed the analysis after it was completed.

The benefits to be derived from habitat restoration projects are not readily convertible to actual monetary units as is customarily required for traditional projects utilizing benefit-cost analyses. A method of quantification is needed to adequately evaluate project features. Quantification of habitat restoration project outputs can then be utilized as a project performance evaluation tool, a project ranking tool, and/or a project planning tool. This application for project output quantification was used as a project planning tool.

Analysis of existing study area conditions, future conditions without the project, and impacts of several proposed measures and alternatives was completed using the Wildlife Habitat Appraisal Guide (WHAG) procedures developed by the Missouri Department of Conservation and the USDA Natural Resources Conservation Service. The WHAG is a numerical habitat appraisal methodology based on USFWS Habitat Evaluation Procedures (HEP).

The WHAG procedures evaluate the quality and quantity of particular habitats for animal species selected by the WHAG team members. The qualitative component of the analysis is known as the

Habitat Suitability Index (HSI) and is rated on a 0.1 to 1.0 scale. The quantitative component of the WHAG analysis is the measure of acres of habitat that are available for the selected evaluation species. From the qualitative and quantitative determinations, the standard unit of measure, the Habitat Unit (HU), is calculated using the formula (HSI x Acres = HUs).

Changes in the quality and/or quantity of HUs will occur as a habitat matures naturally or is influenced by development. These changes influence the cumulative HU derived over the life of the project. Cumulative HUs are annualized and averaged. This determines what is known as the Average Annual Habitat Units (AAHUs). AAHUs are used as an output measurement to compare all the measures and project as a whole.

Although a set list of species is used within the WHAG program, each species represents a guild of other similar species that utilize the same habitat in similar ways. In essence, each species represents an array of habitat variables for the species being evaluated. These species represent key goals and objectives for the proposed project.

Seven fish species were used to evaluate the aquatic habitat (dredging) improvements proposed by the project. Project designs for Lower Peoria Lake would produce a wide diversity of aquatic habitat that currently does not exist. Channel catfish (*Ictalurus punctatus)* and gizzard shad (*Dorosoma cepedianum)* are fish that commonly inhabit main channel and channel border habitats. Largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and crappie (*Pomoxis spp*) are centrarchids that inhabit side channels and backwaters, and are important sport fish species. Carp (*Cyprinus carpio*) and black bullhead (*Ameiurus melas*) are common and abundant in backwater habitats. All seven species utilize backwater areas as spawning habitat.

Five wildlife species were used to evaluate the terrestrial component (island construction) of the project. Mallard (*Anas platyrhynchos*) is a migratory waterfowl that utilizes early successional wetland habitat and has socioeconomic importance as a game species. Lesser yellowlegs (*Tringa flavipes*) is a wading bird found in initial successional wetland habitat. King rail (*Rallus elegans*) is a rare species of wading bird that prefers permanent sedge dominant wetland habitat. Green-backed heron (*Butorides striatus*) is a wading bird found in mid-successional herbaceous and shrub-dominated wetland habitat. The muskrat (*Ondatra zibethicus*) is a resident furbearing mammal that utilizes mid-successional herbaceous wetland habitat.

Because the WHAG is evaluating future conditions with and without the project, assumptions must be made about what, in the opinion of the team, is likely to happen under anticipated conditions. Discussions weighing various factors and project components are undertaken and potential future conditions are documented as being likely to occur. These assumptions deal with current conditions, model performance, changes in habitat conditions over time, and anything else judged to be important that would be considered to help direct the evaluation to the most likely conclusion.

In the case of Peoria Lake, the water level within the lake frequently fluctuates. An elevation for differentiating terrestrial and aquatic components needed to be established. Therefore, since flat pool is 440 feet MSL (mean sea level) and is the lowest regulated water level that Peoria Lake would be allowed to reach, that elevation was selected as the dividing line between the terrestrial and aquatic habitat components proposed by the project.

Another assumption that was made concerned current habitat value of the lake. Current conditions within most areas of Peoria Lake provide limited habitat value for most species associated with

open-water habitats. The majority of the area is covered in 12-18 inches of water with a substrate of up to 4 feet that is best described as "pudding." There is essentially no aquatic plant life supported by this substrate. Wind and wave action keep the bottom stirred up and any plants that might start to root are uprooted by water currents. Water quality in the lake is frequently poor and has high turbidity. Even with the generally poor habitat quality of the proposed project area, there is still some minor habitat value, and some species can be found to survive under the minimal conditions provided. However, for the purposes of the evaluation, the team determined that the lowest habitat value of 0.1 (in essence a "0" value) should be used as the baseline, or current existing condition of habitat for the project area.

Another area that needed consideration was sedimentation. Recent Corps studies indicate that a trend toward reduced sedimentation rates or even equilibrium may be developing within Peoria Lake. If such is the case, the prospect for dramatic changes or naturally occurring habitat improvements within the lake over the next 25 years is very low. It was therefore assumed that after 25 years "without-project" conditions would not appreciably improve, so habitat value within the project area was still likely to be at or near "0".

The WHAG was designed to be applied to many different types of habitat. In order to evaluate potential project aquatic benefits, a field data sheet was prepared using the aquatic (MOFISH) matrix for overflow water habitat. The non-forested wetland field data sheet was used in order to evaluate the island construction or wetland component of the project. It was felt that the questions asked by these types of habitat evaluation field sheets would best cover the range of habitat characteristics proposed by the project.

Some questions on the field sheets did not precisely address changes proposed by the project. However, because habitat benefits of a similar nature would be provided by the project, the values of those benefits were considered and counted (i.e., considering riprap as comparable to natural bank structure). In addition, because of the broad nature of the model, it is not sensitive enough in some instances to account for natural resource benefits that the project is anticipated to provide. Therefore, a few of the answers on the field sheets were weighted to show benefits from project features that would not have otherwise shown up in the WHAG analysis.

In addition, there were some project changes that would provide habitat benefits but that the WHAG evaluation was too broad to pick up. An example would be large areas that the project proposes to dredge 4 to 6 feet. Since the model looks for overwintering habitat for fish, it only addresses depths of 8 feet or greater. To account for other habitat benefits provided by dredging over larger areas but not to 8 feet of depth, an adjustment to the model data was made. That adjustment allowed a 10-acre area dredged 4 to 6 feet to be considered to have a similar value of 5 acres dredged to 8 feet. In other words, 4 to 6 feet of dredging would produce at least one-half the habitat value of the same area dredged to 8 feet.

Generally speaking, habitat conditions are not usually static over time. (Our assumption about Peoria Lake over the next 25 years being an exception.) Either through natural processes or through human activity, habitat generally evolves and may change in quality and/or quantity. Imbedded in each cover type evaluation, change was added to the model. To assess the change over the period of analysis, target years were defined. Target years of 0 (baseline condition), 1, 5, and 25 (future "without-project" and future "with-project" conditions) are sufficient to analyze HUs and characterize habitat changes over the estimated project life. Hydrologic flow models and sedimentation rate models were run to indicate sustainability of project features and provide support for the project assumptions.

Four alternatives were considered feasible for this project. These alternatives are: A1, a small island above the bridge with minor dredging; A2, a mid-sized island above the bridge with larger scale dredging; B1, two larger islands below the bridge with large-scale dredging; and B2, a single large island below the bridge with large-scale dredging. (For more description on these alternatives, see Section 3, Plan Components.)

The results of the habitat analysis for individual species are expressed in total AAHUs. Those AAHUs were calculated using the WHAG and for each alternative were determined to be:

- Project Alternative A1 39.8 AAHUs
- Project Alternative A2 134.8 AAHUs
- Project Alternative B1 665.1 AAHUs
- Project Alternative B2 341.1 AAHUs

It is anticipated that the natural characteristics, and thus the habitat, of the project islands would change over time. This would occur as vegetation establishes itself and gradually develops into a forestry component on the island(s). This change would be most noticeable with the largest islands construction or Alternative B1. This is understandable, as the development of trees on the islands would reduce the habitat requisites for some of the target species used by the WHAG model.

Changes over time in the aquatic reaches of the project were also considered in the WHAG model. Sedimentation in the lake is not going to stop. However, island orientation and configuration were considered to provide the most sustainable channel options with the most favorable aquatic habitat for the life of the project. Over dredging of the deep and shallow water areas was incorporated to maintain these areas so that there would still be 4 to 8 feet of water depth at the end of the 25-year project life. Because of this, HSI values for target species changed very little or not at all.

After the AAHUs for the selected alternatives were determined, a comparison of those alternative designs or combinations of features was accomplished through cost effectiveness evaluation and incremental analysis. Cost effectiveness evaluation is used to identify the least costly solution to achieve a range of project benefits. Incremental cost analysis is a tool that can be used to scale the size of the project or of individual features by determining changes in cost associated with increasing levels of benefits.

The specific numbers generated by this process are less important than the relative relationships among potential solutions provided by the analyses; which one will produce the greater output or which one is more likely to be more costly. While these analyses do not usually lead (nor are they intended to lead) to a single best solution, they help improve the quality of the decision making by ensuring that a rational, supportable, focused, and traceable approach is used for considering and selecting alternative methods to produce environmental outputs.

COST ESTIMATES FOR HABITAT IMPROVEMENT MEASURES

Rough cost estimates were developed to conduct the cost effectiveness and incremental cost analysis of the various alternatives. These cost estimates were only done for the cost of construction for dredging and island construction. Based on preliminary analysis, features such as rock riprap bank protection, jetties, and closing structures, operations and maintenance, and real estate costs were comparable for the various alternatives, and as a result were not necessary to include for the evaluation. Table 2-5 summarizes the outputs and costs associated with each proposed measure.

TABLE 2-5. Environmental Output and Costs of Each Measure

Proposed Measures	Symbol	Output*	First Cost Construction**	Annualized Cost***
Above the McClugage Bridge	**A**			
No Action	A0	0	$0	$0
Small Island (9-acre island, 17 acres increased depth diversity)	A1	39.8	$2,102,000	$170,300
Mid-Sized Island (21-acre island, 55 acres increased depth diversity)	A2	134.8	$3,750,000	$303,900
Below the McClugage Bridge	**B**			
No Action	B0	0	$0	$0
Two Islands with Side Channel (17- and 37-acre islands, 144 acres increased depth diversity)	B1	665.1	$9,957,000	$806,800
Large Island (46-acre island, 99 acres increased depth diversity)	B2	341.1	$6,252,000	$506,700

* Outputs are calculated as Average Annual Habitat Units (AAHUs).
** Represents initial construction costs for dredging islands and Real Estate, but does not include rock structures, etc.
*** Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.

SUMMARY OF ALTERNATIVE PLANS

Nine alternative plans were formed from all possible combinations of the four proposed island alternatives. The number of options was limited because only one island alternative each could be picked above or below the bridge. For example, both the small upper island and mid-sized upper island would occupy the same location and, as a result, only one could be selected. Table 2-6 summarizes the outputs and costs associated with the nine alternative plans.

TABLE 2-6. Peoria Lake Alternative Evaluation

No.	Peoria Lake Alternatives	Symbol	Output (AAHUs) *	First Cost Construction **	Annualized Cost ***	Annualized Cost/AAHU
1	No Action	A0+B0	0	$0	$0	$0
2	Small Upper Island – No Lower Island	A1+B0	40	$2,102,000	$170,300	$4,260
3	Mid-Sized Upper Island – No Lower Island	A2+B0	135	$3,750,000	$303,900	$2,250
4	No Upper Island – Large Lower Island	A0+B2	341	$6,252,000	$506,700	$1,485
5	Small Upper Island – Large Lower Island	A1+B2	381	$8,354,000	$676,700	$1,775
6	Mid-Sized Upper Island – Large Lower Island	A2+B2	476	$10,003,000	$810,600	$1,705
7	No Upper Island – Two Lower Islands with Side Channel	A0+B1	665	$9,957,000	$806,800	$1,215
8	Small Upper Island – Two Lower Islands with Side Channel	A1+B1	705	$12,059,000	$976,900	$1,385
9	Mid-Sized Upper Island – Two Lower Islands with Side Channel	A2+B1	800	$13,707,000	$1,110,700	$1,390

* Outputs are calculated as Average Annual Habitat Units (AAHUs).
** Represents initial construction costs for dredging and islands plus Real Estate, but does not include rock structures, etc.
*** Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.

RESULTS OF INCREMENTAL COST/COST EFFECTIVENESS ANALYSIS

The results of the incremental analyses shown in this section were considered with other factors, including site topography, management objectives of the resource agencies, critical needs of the region, and ecosystem needs of the Illinois River System.

The results of the cost effectiveness analysis for island/dredging alternatives showed that Alternative 7 (No Upper Island - Two Lower Islands) exhibited the lowest cost per unit of all alternatives, $1,215 per AAHU. Of the alternatives above the McClugage Bridge, the incremental analysis showed that Alternative 3 (Mid-Sized Upper Island) had the lowest cost per unit, $2,250 per AAHU. Alternative 9 (Mid-Sized Upper Island - Two Lower Islands), the most extensive plan, has an annual cost of $1,390 per AAHU. Cost effectiveness means no plan can provide the same benefits for less cost or more benefits for the same cost. Since Alternative 7 provides more benefits for the least cost, it makes Alternative 6 not cost effective.

Alternatives 7 and 9 were considered best buy plans. These plans provide the greatest increase in benefits for the least increase in costs. Alternative 7 provides 665 AAHUs at an incremental cost of $1,215 per AAHU (Table 2-7). Alternative 9 provides an additional 135 AAHUs at an incremental cost of $2,250 per AAHU. Both of these incremental costs were considered reasonable and the alternatives represented are consistent with agency goals. Further, Alternative 9 provides the opportunity to develop two distinet habitat types in Peoria Lake—the flowing side channel concept in the lower portion of the lake and a more traditional backwater area

east of the upper island. The study team viewed the combination of these two major habitat types along with the other habitat improvements of the project as a major factor in the selection of a recommended plan.

TABLE 2-7. Incremental Cost Analysis of Best Buy Alternative Plans for Peoria Lake

No.	Alternative Plans	Symbol	Annual Cost ($) *	Output AAHUs **	Average Cost/AAHU	Inc. Cost	Inc. Output	Inc. $/AAHU
1	No Action	A0+B0	0	0	0	0	0	0
7	No Upper Island – Two Lower Islands with Side Channel	A0+B1	806,000	665	$1,215	$806,800	665	$1,215
9	Mid-Sized Upper Island – Two Lower Islands with Side Channel	A2+B1	1,110,700	800	$1,390	$303,900	135	$2,250

* Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.
** Outputs are calculated as Average Annual Habitat Units (AAHUs).

OTHER FACTORS

The study team also considered resource significance, hydrology and hydraulics, public acceptability, recreation, and real estate in selecting an environmental plan.

Resource Significance

The Illinois River has long been an important environmental and economic resource. Congress recognized the Illinois River, as part of the Upper Mississippi River System, as a unique, nationally significant ecosystem and a nationally significant commercial navigation system in Section 1103 of the Water Resources Development Act of 1986 (WRDA 86). The National Research Council considers large floodplain-river ecosystems to be the highest priority for aquatic restoration and identified the Illinois River as one of three in the United States with sufficient ecological integrity to recover. The Illinois Valley also has international significance as a part of the Mississippi Flyway, a major migration route for hundreds of thousands of waterfowl, shorebirds, and neotropical migrant birds.

The types of deepwater off-channel habitat included in Peoria Lake restoration alternatives are limited on the entire Illinois River. The Habitat Needs Assessment conducted as part of the Upper Mississippi River System - Environmental Management Program found that the most critical need along the Illinois River was the restoration of backwater lakes and side channels to increase depth diversity. This report called for the restoration of backwaters on the Illinois River so that 25% of the backwater lakes (19,000 acres) would have an average depth of at least 6 feet.

Hydrological/Sustainability

The Illinois State Water Survey conducted numerical modeling of the alternative. The results indicate that the proposed alternative would have insignificant impacts on the navigation channel and sedimentation rates on adjacent privately held lands.

The Corps of Engineers conducted a Micro Model study (see Appendix D-2) which was used for this study to compare alternatives to one another as well as to the base condition to predict sediment deposition trends. No predictions were made for the length of time that channels would maintain their depths. The sediment deposition analysis was more qualitative than quantitative. Comparing the two single island alternatives above the bridge, the mid-sized upper island experienced less sediment deposition than the small upper island. Comparing the large island versus the two islands with side channel alternatives below the bridge, both options experienced similar sediment deposition patterns.

Separate river stage numeric modeling efforts confirmed that the proposed alternatives would not impact flood heights (see Appendix D-4).

Public Acceptability

At the public workshops, members of the public expressed strong support for in-lake dredging and island construction. In general, these comments supported the larger island options above and below the bridge. In addition, the Peoria Lakes Basin Alliance, a local group focused on restoration of the lakes, has developed recommendations for the eventual restoration of much larger areas of the lakes. This group strongly supports the recommendations of the study.

Recreation

Peoria Lake has a long history of recreation use, including sailing, sport fishing, waterskiing, and other similar activities. The local sponsor may choose, at a future date, to add recreational features to the islands, such as trails, beaches and recreational boat docking facilities. Most, if not all, of these activities have ceased on the lake at low river stages because of the uniform shallow depth currently present. Any attempt to restore some depth diversity to the lakes will allow for a resumption of the activities listed above. With the exception of the No Action alternative, any implemented project elements will produce recreation benefits.

Hazardous, Toxic, and Radioactive Waste (HTRW)

A Phase 1 Environmental Site Assessment (ESA) was conducted for the proposed project location in Peoria Lake (see Appendix B). The review discovered no known potential HTRW issues at the proposed site.

Real Estate

Most of the land for the proposed alternatives is currently in public ownership (see Appendix H). The State of Illinois and the Fondulac Park District own most of the property. Both groups are interested in participating in restoration.

SELECT RECOMMENDED PLAN

The interagency team recommends Alternative 9 (Mid-Sized Upper Island - Two Lower Islands with Side Channel) in consideration of the cost effectiveness/incremental cost analysis, significance of the habitat, comments received during public reviews, etc. (Figures 2-8 and 2-9). Appendix G contains additional information on the results of the habitat analysis.

This alternative best meets the study objectives. It would result in the greatest restoration of depth diversity of any of the plans proposed, including dredging over approximately 200 acres with connecting channels and deeper holes. Overall, lake habitat diversity would increase through the addition of shoreline and terrestrial habitats associated with the three islands and aquatic structures. The dredged area behind the upper island would provide slackwater backwater habitat, while the area around the lower islands would provide flowing side channel habitat. The islands would provide resting, nesting, and feeding areas for waterfowl and shorebirds. In addition, the islands would reduce wind- and wake-generated waves in the study area, helping to improve water quality by lowering turbidity levels.

In cooperation with the USFWS and ILDNR, the Corps of Engineers has planned and designed a project that serves the needs of the resources and the resource managers, while being cost conscious. The preferred alternative has an overall output of 800 AAHUs for a total first cost of approximately $15,182,000. These costs are higher that those shown in the preceding tables, since once this option was selected additional efforts were undertaken to incorporate the cost for bank protection, fish jetties, and closing structures. These costs also include the implementation costs associated with planning, engineering, and design; construction management; real estate; and monitoring discussed in greater detail in Section 3.

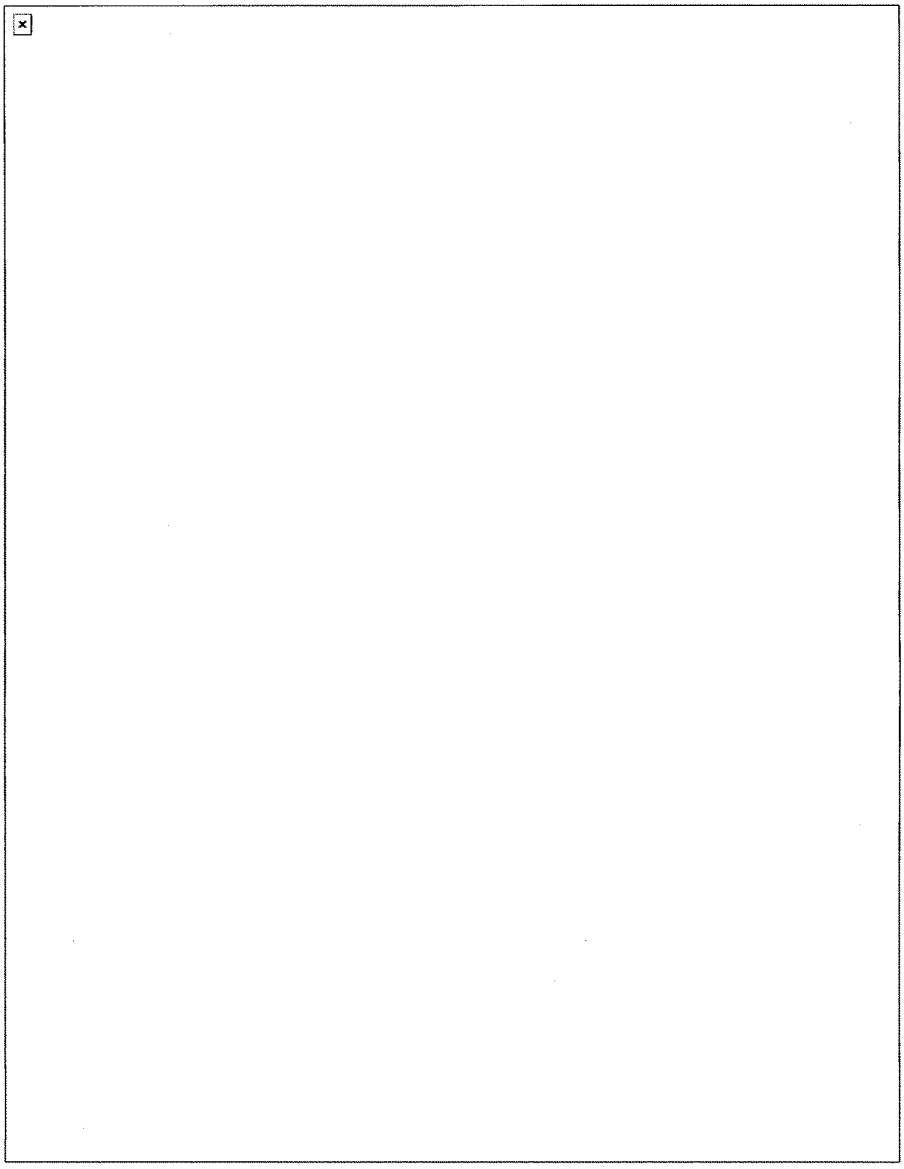

FIGURE 2-8. Peoria Lake – Selected Plan

Lower Peoria Lake
Present and with Proposed Project

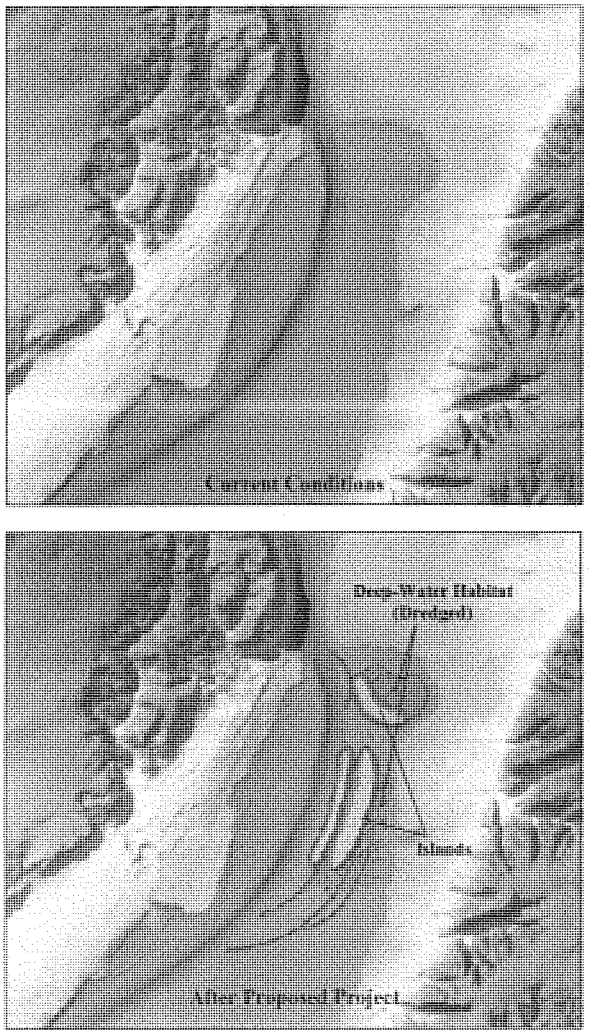

FIGURE 2-9.

Description of Selected Plan

LOWER PEORIA LAKE ISLANDS

PLAN COMPONENTS

General Description

The selected aquatic restoration plan in Lower Peoria Lake is the off-channel dredging and middle-sized island creation above the McClugage Bridge (A2) and the off-channel dredging and construction of two islands below the McClugage Bridge (B1). Details of the alternative listed in the selected plan are shown on plates 2 through 4 and listed in Table 3-1. Each island would have a top elevation of 450 feet MSL, the side slopes from lake bottom to elevation 444 feet MSL would be no steeper than 6H:1V, at elevation 444 feet MSL there is a flat area 20 to 40 feet in width, and the side slope from elevation 444 feet MSL to 450 feet MSL would be no steeper than 5H:1V(Figure 3-1).

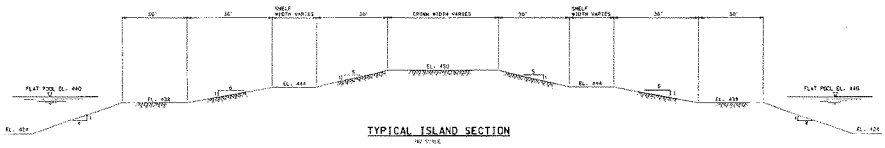

FIGURE 3-1. Typical Island Section

The outer embankment would be dredged lake bottom with side slopes no steeper than 6H:1V, top elevation of 450 feet MSL, and a 5-foot top width. Each island center would be constructed of dredged lake bottom material to an approximate elevation of 450 feet MSL.

The islands would be protected, as conditions prove necessary, against wind, wave, and current erosion with an 18-inch-thick layer of 400-pound riprap underlain with a 6-inch

layer of bedding stone. Underwater fish habitat structures would be created around each island, spaced every 250 feet (for design, see plate 5). The fish jetties would be 20 feet long, 2 feet tall, and constructed of 400-pound riprap. Rock closing structures (for location, see plates 3 and 4) would be constructed of 400-pound riprap to protect the deepwater from excessive sedimentation (for design, see plate 5).

Mid-Sized Island Above Bridge (A2)

This alternative would deepen a 53.4-acre protected backwater off the main channel (see plates 3, 6, and 8). The protected backwater bottom elevation would be 434 feet MSL with channels at elevation 430 feet MSL, and around the islands, there would be deep channels at elevation 424 feet MSL. The off-channel habitat is located east of the island to protect the area from wind and wave action. The island is approximately 2,210 feet long and 520 feet wide, creating 21 acres of terrestrial habitat. There would be one closing structure on the upstream end of the island.

Two Islands Below Bridge (B1)

This alternative would create 149.4 acres of off-channel deepwater aquatic habitat with varying depths (see plates 4, 6, and 8). The off-channel habitat would be bottom elevation 434 feet MSL, with channels at elevation 430 feet MSL and deeper channels around the islands at elevation 424 feet MSL. The off-channel habitat is located east of the east island to protect the area from wind and wave action. The east island is approximately 3,850 feet long and 590 feet wide, creating 37 acres of terrestrial habitat. The west island is approximately 3,650 feet long and 150 feet wide, creating 17 acres of terrestrial habitat. There would be a closing structure on the east side at the upstream end of the east island.

TABLE 3-1. Island Summary Table

Alternative	Island Top Elev. (ft MSL)	Average Island Width (ft)	Island Length (ft)	Aquatic Habitat (acre)	Terrestrial Habitat (acre)
A2 - Upper Island	450	485	2210	54.9	21
B1 - East Island	450	475	3850	144	37
B1 - West Island	450	235	3650	*	17

* The aquatic habitat for B1 - West Island is included with B1 - East Island.

Project Data Summary

Tables 3-2 and 3-3 summarize the project data. Measurements are based on the best available data at the time. The quantities for dredging and island construction include displacement, consolidation, and desiccation.

TABLE 3-2. Island 1 - Project Summary

Measure	Measurement	Unit of Measure
Island 1 – Island Above McClugage Bridge		
Total:		
Length	2,210	feet
Width (avg.)	485	feet
Surface Area @ EL 438 feet MSL	22.5	acre
Surface Area @ EL 440 feet MSL	21.0	acre
Crown:		
Length	2,000	feet
Width (avg.)	275	feet
Elevation	450	feet MSL
Surface Area @ EL 450 feet MSL	11.5	acre
Area @ EL 444 feet MSL	4.0	acre
Avg. River Bottom Elevation	438	feet MSL
Island Side Slopes		
Side Slopes from EL 438 to EL 444 feet MSL	6:1	H:V
Side Slopes from EL 444 to EL 450 feet MSL	5:1	H:V
Erosion Protection -		
Riprap (Corps 400 lbs.)	9,000	tons
Thickness	18	inches
Top Elevation	443	feet MSL
Approx. Length Protected	2,500	feet
Bedding Stone	3,000	tons
Thickness	6	inches
Width	46	feet
Top Elevation	443	feet MSL
Approx. Length Protected	2,500	feet
Fish Jetties		
Riprap (Corps 400 lbs.)	1,200	tons
Approximate Spacing	250	feet
Height	2	feet
Length	20	feet
Top Width	0	feet
Slopes	2:1	H:V
Number	18	
Closing Structure		
Riprap (Corps 400 lbs.)	3,200	tons
Height	5	feet
Length	210	feet
Top Width	10	feet
Top Elevation	443	feet MSL
Slopes	3:1	H:V
Number	1	
Dredging for Deep Channels (used to construct embankment)		
Volume	225,000	cubic yards
Average Depth (below average river bottom)	12	feet
Bottom width	70	feet
Side Slopes	4:1	H:V
Approx. Surface Area @ EL 438 feet MSL	24.9	acres
Dredging Borrow for Fish Habitat/Channels (used to fill embankment)		
Volume	240,000	cubic yards
Average Depth (below average river bottom)	5	feet
Side Slopes	4:1	H:V
Approx. Surface Area @ EL 438 feet MSL	30.0	acres

TABLE 3-3. Islands 2 and 3 - Project Summary

Measure	Measurement	Unit of Measure
Island 2 - East Island below McClugage Bridge		
Total:		
Length	3,960	feet
Average Width	475	feet
Surface Area @ EL 438 feet MSL	39.0	acre
Surface Area @ EL 440 feet MSL	37.0	acre
Crown:		
Length	3,750	feet
Average Width	265	feet
Elevation	450	feet MSL
Surface Area @ EL 450 feet MSL	21.0	acre
Avg. River Bottom Elevation	438	feet MSL
Area @ EL 444 feet MSL	7.0	acre
Island Side Slopes		
Side Slopes from EL 438 to EL 444 feet MSL	6:1	H:V
Side Slopes from EL 444 to EL 450 feet MSL	5:1	H:V
Erosion Protection -		
Riprap (Corps 400 lbs.)	9,000	tons
Thickness	18	inches
Top Elevation	443	feet MSL
Approx. Length Protected	2,500	feet
Bedding Stone	3,000	tons
Thickness	6	inches
Top Elevation	443	feet MSL
Approx. Length Protected	2,500	feet
Fish Jetties		
Riprap (Corps 400 lbs.)	2,200	tons
Approximate Spacing	250	feet
Height	2	feet
Length	20	feet
Top Width	0	feet
Slopes	2:1	H:V
Number	34	
Closing Structure		
Riprap (Corps 400 lbs.)	3,900	tons
Height	5	feet
Length	500	feet
Top Width	10	feet
Top Elevation	443	feet MSL
Slopes	3:1	H:V
Number	1	
Dredging for Deep Channels (used to construct embankment)		
Volume	415,000	cubic yards
Average Depth (below average river bottom)	14	feet
Bottom width	70	feet
Side Slopes	4:1	H:V
Approx. Surface Area @ EL 438 feet MSL	33.5	acres
Dredging for Fish Habitat/Channels (used to fill embankment)		
Volume	400,000	cubic yards
Average Depth (below average river bottom)	5	feet
Side Slopes	4:1	H:V
Approx. Surface Area @ EL 438 feet MSL	65.0	acres

TABLE 3-3 (Continued)

Measure	Measurement	Unit of Measure
Island 3 - West Island below McClugage Bridge		
Total:		
Length	3,775	feet
Width	235	feet
Surface Area @ EL 438 feet MSL	19.0	acre
Surface Area @ EL 440 feet MSL	17.0	acre
Crown:		
Length	3,560	feet
Width	20	feet
Elevation	450	feet MSL
Surface Area @ EL 450 feet MSL	1.25	acre
Avg. River Bottom Elevation	438	feet MSL
Island Side Slopes		
Side Slopes from EL 438 to EL 444 feet MSL	6:1	H:V
Side Slopes from EL 444 to EL 450 feet MSL	5:1	H:V
Erosion Protection		
Riprap (Corps 400 lbs.)	17,000	tons
Thickness	18	inches
Top Elevation	443	feet MSL
Approx. Length Protected	4,700	feet
Bedding Stone	5,500	tons
Thickness	18	inches
Top Elevation	443	feet MSL
Approx. Length Protected	4,700	feet
Fish Jetties		
Riprap (Corps 400 lbs.)	2,200	tons
Approximate Spacing	250	feet
Height	2	feet
Length	20	feet
Top Width	0	feet
Slopes	2:1	H:V
Number	34	
Dredging for Channels (used to build embankment)		
Volume	140,000	cubic yards
Average Depth (below average river bottom)	14	feet
Bottom width	25	feet
Side Slopes	4:1	H:V
Approx. Surface Area @ EL 438 feet MSL	27.6	acres
Dredging for Channels/Fish Habitat (used to fill embankment)		
Volume	135,00	cubic yards
Average Depth (below average river bottom)	5	feet
Side Slopes	4:1	H:V
Approx. Surface Area @ EL 438 feet MSL	17.0	acres

Project Location

The projects were located in the upper portion of Lower Peoria Lake below a constriction formed by the Tenmile Creek delta. Construction in the wider portion of the river ensures that flood heights are not increased. In addition, as water velocities increase near the constructed islands, the sedimentation rate should decrease, resulting in a longer project life.

A2 - Upper Island project would be constructed on approximately 95 acres of lake bottom in the northeast corner of Lower Peoria Lake in Tazewell County, Township 26N, Range 4W.

The project would be on the east side of the navigation channel from river mile 165.6 to river mile 166.0.

B2 - Two Islands project would be constructed on approximately 287 acres of lake bottom in the middle of Lower Peoria Lake in Tazewell County, Township 26N, Range 4W. The project would be on the east side of the navigation channel from river mile 164.5 to river mile 165.5.

For more information on the real estate plan, refer to Appendix H.

Utility Relocations

The project involves no known utility relocations.

Deepwater and Island Configuration/Geometry

After geotechnical and hydraulic considerations were established, natural resources considerations were incorporated to ensure greatest habitat enhancement and sustainability. The present alignment is shown on plates 3 and 4. The off-channel deepwater habitat at elevation 432 feet MSL was located on the east side of the respective island to protect these areas from sedimentation and degradation. In Lower Peoria Lake, the dominant wind direction is from the southwest, so the islands would break the wind fetch and reduce sediment resuspension. The islands would also protect emergent plants from wind-generated waves. The islands would protect the off-channel area from waves generated from boat traffic in the navigation channel. Hydraulic modeling was used to evaluate island designs "streamlined" to minimize the potential for erosion.

Hydraulic Assessment

The Illinois State Water Survey, using the Surface Water Modeling System (SMS), conducted two-dimensional numerical hydraulic modeling for the proposed islands and flowing side channels. The presence of the island(s) and excavation of side channel(s) had insignificant impacts on the current flow and sediment transport patterns and magnitudes in the navigation channel. The modeling also concluded that the islands would not cause any significant change in sediment patterns on adjacent privately owned lands. See Appendix D-3 for more information.

The Corps of Engineers conducted a micro modeling study of Lower Peoria Lake. This is a small-scale physical model that assesses flow and sediment patterns and the impacts of alternatives upon those patterns. The model showed that sediment and flow patterns in the navigation channel should not be impacted by island construction. See Appendix D-2 for more information.

A UNET computer model analysis was conducted by the Corps of Engineers to determine the impacts of the various island/side channel combinations upon flood profiles. It was concluded that the island(s) would not raise water elevations during flood conditions. The model results indicate that the minimal effects on flood heights are within State guidelines for issuing a State Flood Plain permit. See Appendix D-4 for more information.

Bank Stabilization/Erosion Protection

Several alternatives for bank stabilization were evaluated. Bank protection is required subsequent to placement to minimize erosion from wind-driven waves, flood currents, and boat-generated waves. The standard alternative is to use 18 inches of 400-pound riprap over 6 inches of bedding stone. The second alternative consists of planting vegetation on the flattened slopes to prevent erosion. The vegetative alternative costs less than the standard alternative, but is not as effective. The vegetation planted for bank stabilization on the Peoria Lake EMP island never became established and subsequently died, leaving the island without erosion protection. Another alternative is to place a breakwater approximately 20 feet from the island. The breakwater could be constructed of rock or a geotextile fabric tube (geotube) could be filled with lake bottom sediments. The breakwater would dissipate the energy of the incoming waves and thereby reduce erosion. Lastly, a geotube could be filled with lake bottom sediments and placed along the island shoreline.

Riprap along the island is recommended because of the reliable protection provided. Riprap would only be placed in areas of expected erosion. Bank stabilization is recommended up to 443 feet MSL based on a hydrographic analysis and wave height calculation. Protection at 443 feet MSL would provide protection for approximately 80% of the hydrograph. The rock would be placed after the completion of island construction when required to prevent island failure/excessive erosion. It is anticipated that island erosion will occur, but riprap will not be placed until the island slope has eroded to near an unstable angle. Riprapping at this point would save costs because less material would be required due to the slope difference and only those areas needing material would be riprapped.

Fish Jetties

To increase the fisheries habitat diversity, rock would be placed underwater. The fish jetties would be spaced approximately 250 feet apart around all islands. The structures would be 2 feet tall (approximately to elevation 440 feet MSL) with side slopes no steeper than 2H:1V and be constructed of 400-pound riprap. Marking for navigation and boating will be further evaluated during development of plans and specifications.

Emergent Closing Structure

To minimize bedload transport into dredged areas, emergent rock closing structures would be constructed. The upper island (A2) would have closing structure at the upper end of the island. The east island below the bridge (B1) would have one closing structure on the east side of the island. The structures would have a top elevation of 443 feet MSL, 5 feet top width, and side slopes no steeper than 2H:1V. The structures would be constructed of 400-pound riprap. Each closing structure would have two offset portions. One section would be connected to the island and the other to the nearby lakeshore. The closing structure would continue up onto the lakeshore until elevation 443 feet MSL (see plates 3 and 4). The closing structures would not be marked for navigation since they are emergent structures.

Final Island Configuration

After the construction is complete, it is anticipated that the island would be naturally vegetated. The island in some areas could become perched wetlands, while in other areas would have positive slope to allow for drainage.

The Dry DREdge was jointly tested and developed by the U.S. Army Corps of Engineers - Engineering Research Development Center - Waterways Experiment Center and DRE was jointly developed and tested by DRE under the Corps of Engineers Construction Productivity Research Program (CPAR). The advantages and disadvantages of the two construction methods are presented in Table 3-5.

DESIGN AND CONSTRUCTION CONSIDERATIONS

Project Site

The Peoria Riverfront islands project is located on the Illinois Waterway Peoria Pool between river miles 164.5 and 166.0 in an area known as Lower Peoria Lake. Flat Pool elevation is 440 feet MSL. The river bottom elevation in the project area (not including the navigation channel) is approximately 438 feet MSL.

Dredging Depths

The dredging depths have been based on the biological requirements and a review of the historical sedimentation rates (see Appendix E-1). The dredging depth also considered the sponsor's need to minimize future maintenance to ensure minimum depths.

The sedimentation analysis showed that the sedimentation rate in Peoria Lake was highly variable. Since the 1930's, Upper and Lower Peoria Lakes have averaged 1.5 inches of sedimentation per year. During some periods, the lakes filled in at rates as high as 3 inches per year. Further, an analysis of two significantly deeper areas revealed that the average sedimentation rate since the 1930's has been 1.5 inches per year. However, from 1965 to 1976, one hole averaged 4.3 inches per year.

Based on the sedimentation analysis, the sedimentation rate was estimated to be 2.0 to 2.5 inches per year or 4 to 5 feet over the 25-year project life. The sedimentation rate will vary due to many factors (weather, surrounding land use, flooding, etc.) over the project life with higher rates in the earlier years. The minimum required depth for fisheries overwintering benefits is 6 feet. Therefore, the minimum construction depth for overwintering fisheries is assumed to be 10 feet.

Construction Equipment

Both land-based and floating plant equipment would be required for this project. Because of geotechnical considerations presented in Appendix C - Geotechnical Considerations, a minimum clamshell bucket size of 7 cubic yards would be required. The boom length of this clamshell must be approximately 180 feet. The estimated production rate of this equipment would be 6,000 cubic yards per day, based on a 20-hour operating day. Approximate water draft required for this equipment would be 7 feet.

Island Foundation

A review of the soil strength data indicated that the island could be constructed by the soil displacement method without the benefit of geotechnical fabrics. Soil displacement is a method of foundation or levee construction where volumes of material are simply dumped

or placed on soft soils until the weaker soil has been displaced to the depth where the soil beneath the fill becomes stable. Estimated displacement is 3 feet. Soil displacement is the least costly alternative if the volume of material displaced is not excessive and if the material could be placed to design heights. Using the soil displacement method, fill is gently placed on the site and spread progressively beginning from one end of the embankment. For more information, refer to Appendix C.

Construction Method - Embankment/Containment Facility

The island would be constructed in multiple stages. The first step would be to construct an embankment or containment facility. Three principal embankment construction methods were evaluated. A mechanical excavation alternative would consist of mechanically excavating adjacent soft sediments with gentle placement on adjacent sites using multiple passes to ensure stability. The second method considered was hydraulic dredging. This method would consist of hydraulically dredging adjacent or nearby sand borrow sources to form a confined material placement facility in Peoria Lake with subsequent soft sediment hydraulic dredging to fill the interior of the island. The third method of embankment construction that was considered was hydraulically filling Geotubes with adjacent or nearby sand borrow to form a confined material placement facility with subsequent soft sediment hydraulic dredging to fill the interior. The sand borrow would be taken from potential sources within the lake. However, the potential sand source is near the Farm Creek delta, approximately 3 miles away and the cost of hydraulic dredging sand is expected to be higher than mechanically dredging adjacent sediments. The advantages and disadvantages of the three construction methods are presented in Table 3-4.

The mechanically excavated embankment method was selected for several reasons. First and foremost, it will utilize the adjacent sediment as a borrow source rather than importing sand for embankment. This method will use the greatest amount of sediments for island construction and therefore have the greatest habitat benefits because a wider area would be dredged. Second, this method has recent application in that a similar island was constructed in Upper Peoria Lake as part of the Environmental Management Program (EMP) Peoria Lake Enhancement project. Side slopes of these islands were approximately 6:1. These islands were constructed with a 7-cubic-yard clamshell at a cost of $2.35 per cubic yard in 1994. The constructed islands were about 6-8 feet (up to elevation 446 feet MSL) above water and were formed in 3 to 4 passes. This method of excavation was successful due to the use of a large bucket with bucket loads placed gently, as opposed to high drops or sidecasting.

TABLE 3-4. Construction Alternatives for Embankments Constructed in Water on Soft Foundations

Construction Alternative	Advantages	Disadvantages
Mechanical excavation using only adjacent sediments	• More cost-effective method • More use of adjacent sediments than other methods • Excavated sediment material greatly promotes reestablishment of vegetation for habitat enhancement due to high nutrients • Material at/near in-situ moisture content • Material maintains cohesive strength because of minor disturbance • Probably minor water quality issues	• Limited reach of existing equipment • Requires erosion protection in vulnerable areas
Hydraulic dredging using sand as a containment facility with subsequent sediment hydraulic dredging for inner island fill	• Conventional design and construction approach • Probably minor water quality issues	• More expensive method because cost involved with pumping sand • Smaller quantity of adjacent sediments would be used than other methods • Sand embankments would support less vegetation than an embankment constructed of adjacent sediments • Requires erosion protection in vulnerable areas
Hydraulic dredging using sand in a Geotube as a containment facility with subsequent soft sediment hydraulic dredging or inner island fill	• Innovative approach • Probably minor water quality issues • Geotube will provide erosion protection	• More expensive method due to cost of Geotube and cost of dredging sand • Smaller amount of soft sediment would be used than mechanical methods • Vegetation will not grow well on Geotube • Extremely costly to build to design height

Construction Method - Embankment Interior

After the embankment is constructed, the interior area would be filled. To fill the interior, it is preferable that the material has the lowest water content possible to decrease the drying, consolidation, and desiccation time. Lower water content will increase cycling time and therefore decrease construction time and costs. Conventional hydraulic dredging is approximately 10% to 15% solids contents. Currently, several new dredging technologies are being developed/tested that promise lower water content than conventional hydraulic dredging, like the Dry DREdge. This report assumes that the embankment interior would be

constructed by a high solid dredging method which would deliver a material with greater than 45% solids content. During the final design phase, the embankment interior construction method will be reviewed to ensure the feasibility. Since the contracting method will be a negotiated type contract, contractors will be able to propose the use of an alternative dredging technology.

In this report, two methods to fill the embankment interior were evaluated. One option would use a conventional hydraulic dredge to fill the confined facility using nearby soft sediment. A second option would involve the use of an alternative dredging technology such as the Dre-Dredge, which is a combination of mechanical and hydraulic dredging. The material is excavated from the river bottom by a clamshell mounted on a rigid, extensible boom. The open clamshell is driven into the sediments at low speed to minimize the potential of sediment disturbance and resuspension. The clamshell is closed, thereby excavating the bottom sediment near its in-situ moisture content. The sediment is deposited in the hopper of a positive displacement pump, similar to a concrete pump, and is then pumped through a pipeline to the placement location. The sediment discharge has the consistency of toothpaste.

TABLE 3-5. Construction Alternatives to Fill Embankments

Construction Alternative	Advantages	Disadvantages
Conventional and high solids hydraulic excavation using nearby soft lake bottom sediments	• More cost-effective method • More conventional design and construction approach • Flexible placement location with pipe	• High water content will increase construction time to allow for sediment consolidation • Sediment loses strength and cohesiveness • Longer cycling time to allow sediments to dry and consolidate • Potential water quality impacts during construction • Unable to fill the embankment interior to top of embankment (containment) because of freeboard required
Dry DREdge or similar high solids methods	• Near in-situ moisture content will decrease construction time • Flexible placement location with pipe • Probably minor water quality impact • Fill the embankment interior to the top • Requires less containment area than hydraulic dredging	• Likely to be a more expensive method per cubic yard • Lower production rate than hydraulic dredging • Sediment loses strength and cohesiveness due to pumping • Unique piece of equipment

Borrow and Construction Materials

Lake bottom borrow locations would be precisely delineated prior to construction. The contractor would be able to vary the lift thickness based on material conditions. Near Island 1 (above the McClugage Bridge), shallow water would dictate that construction by floating plant begin in the navigation channel at the upstream end of the project. The dredge would begin by digging a channel to the proposed island location while sidecasting the material. Near Island 2 (west island below the bridge), the construction would start at the navigation channel. The top 3 feet of lake bottom has been determined to be unsuitable for embankment construction of each island. This material would be placed on either side of the embankment toe, on either side of the excavated channel, and along the lake shoreline. This material would provide an early breakwater and minimize embankment erosion.

Construction Contracting

The construction of the habitat restoration features is a complex and interconnected activity, and there are multiple potential methods to accomplish the dredging and island construction. At this time, many innovative high solids hydraulic dredging technologies are being developed and tested. To minimize the construction time, it is essential to minimize or eliminate the amount of water added to dredged material to fill the interior area created by the embankment. Therefore, to construct this project it is proposed that a negotiated contracting method be employed, similar to best value because of multiple benefits. A negotiated contracting method would allow a contractor to submit a proposal that would be evaluated on technical and cost merits. First and foremost, one contractor would be responsible for the entire project. Second, this contractor, based on the project scale, could utilize an innovative dredging technology.

Construction Sequence

Construction activities should not occur during unfavorable weather conditions due to flooding or ice flow. Typically, this occurs from January 1 to June 1; however, the contractor would be permitted to work during this period if weather is favorable.

The dredging and island construction would have multiple stages. The timing of each stage would be determined by field measurements to ensure that material has sufficient strength to proceed. The estimated schedule is found in Table 3-6. A construction sequence, based on soil strength data for the islands, is shown on plate 6. The time intervals shown are estimates of when the project could be completed. It is noted that soft soil construction is difficult and that the soil strength increases with time as it is allowed to consolidate. Time between passes must be field monitored with soil testing between passes to assure that minimum stability requirements are met. The contractor should not be allowed to throw the material from the clamshell, but must place the clamshell and then release the material to retain maximum strength from the borrow material. This strength is essential because placement of the succeeding layers for the island would be on previously placed borrow material. Further consideration would be given to time between passes as a contractual requirement. Operating distances from the barge (or borrow area) to the toe of the island should be strictly maintained to avoid stability failures.

TABLE 3-6. Proposed Construction Timeline

Stage	Activity	Anticipated Start Time *	Est. Length (months)
1	Construct Island Embankment – Lift 1 to EL 444 feet MSL	Summer 2005 – Year 1	18
2	Fill Embankment Interior to EL 444 feet MSL	Summer 2006 – Year 2	6
3	Construct Island Embankment – Lift 2 to EL 450 feet MSL	Summer 2008 – Year 4	18
4	Fill Embankment Interior to EL 450 feet MSL	Summer 2009 – Year 5	6
5	Rock Placement (Fish Jetties and Closing Structures)	Summer 2010 – Year 6	3
6	Erosion Protection	When required by project conditions	3

* This schedule assumes project authorization in 2003 and construction funding in FY 04.

Stage 1 - Construct Island Embankment – Lift 1 to EL 444 feet MSL

The contractor would construct an embankment 6 feet high and approximately 150 feet wide through the incremental placement of lake bottom material. The slope of the material would not be less than 6H:1V for the exterior and 5H:1V for the interior. The first lift would be placed until the material is out of the water. The second lift would be up to 6 feet above the bottom. A summary of this stage is as follows: (A) The contractor would start at the navigation channel at the north end of the project site and excavate (while sidecasting the material) a 1,200-foot channel to the upper island location; (B) then would begin the first pass on the upper island; (C) then would move downstream and begin the first pass on the west island; (D) then the first pass on the east island; and (E) the contractor would continue to cycle between the three sites until completed.

Stage 2 - Fill Embankment Interior to EL 444 feet MSL

The actual start of this stage would be determined by the consolidation and strength of the material placed during stage 1. The contractor would fill the embankment constructed in stage 1.

Stage 3 - Construct Island Embankment – Lift 2 to EL 450 feet MSL

The actual start of this stage would be determined by the consolidation and strength of the material placed during stages 1 and 2. The contractor would raise the existing embankment by mechanical dredging up to a 450 feet MSL elevation (approximately 12 feet above lake bottom) and approximately 5 feet wide through the incremental placement of lake bottom material. Each lift of material would be no more than 3 feet tall. The contractor would cycle between the three islands before starting a new lift. The embankment slope would not exceed 5H:1V.

Stage 4 - Fill Embankment Interior to EL 450 feet MSL

The actual start of this stage would be determined by the consolidation and strength of the material placed during stages 1, 2, and 3. The contractor would fill by the embankment constructed in stages 1 and 3 on top of the material placed in stage 2.

Stage 5 - Rock Placement for Fish Jetties and Closing Structures

The contractor would place the rock to construct the closing structures and fish jetties during this stage, as specified on plates 3 and 4.

Stage 6 - Rock Placement for Erosion Protection

The contractor would place rock to protect the islands from erosion in the locations on plates 3 and 4. Erosion protection may be required based on field conditions during any prior stage. If the erosion is severe in other locations, rock would be placed to prevent further erosion.

Value Engineering

A value engineering study was conducted and is included in Appendix J.

Water Quality Impacts

Water quality impacts associated with island construction activities may result from the mechanical placement of material to construct ring levees, which would form the perimeter of the islands, and from the filling of the interior of the islands by hydraulic dredging. In order to assess the water quality impacts of these actions, two numerical models were used—STFATE and EFQUAL. Both models are modules of the Automated Dredging and Disposal Alternatives Management System (ADDAMS).

Mechanical Placement

Material used to construct the ring levees would contain some percentage of fine-grained material. Associated with this fine-grained material would likely be contaminants. Since the placement of dredged material would be in open water, it is likely that contaminants would be released to the water column, requiring some limited mixing zone where water quality standards may be exceeded. The size of this mixing zone would depend on a number of factors, including the contaminant concentration in the dredged material, concentrations in the receiving water, the applicable water quality standards of the receiving water, and receiving flow rate and turbulence. STFATE is capable of estimating near-field contaminant dilution and dispersion processes.

Based on previous island construction performed in Peoria pool (Peoria Island EMP project), and for purposes of estimating the water quality impacts resulting from the proposed action, it is assumed that a large clamshell bucket dredge would be used to construct the levees. Often sediments dredged by clamshell remain in fairly large consolidated clumps and reach the bottom in this form. Whatever its form, the dredged material descends rapidly through the water column to the bottom and only a

small amount of the material remains suspended. The behavior of the material during placement is assumed to be separated into three phases: convective descent, during which the material cloud falls under the influence of gravity; dynamic collapse, occurring when the descending cloud impacts the bottom; and passive transport-dispersion, commencing when the material transport and spreading are determined more by ambient currents and turbulence than by the dynamics of the disposal operation.

Model Input

Estimation of ambient conditions includes current velocity and water depths over a computational grid. The dredged material is assumed to consist of a number of solid fractions, a fluid component, and conservative dissolved contaminants. Each solid fraction has a volumetric concentration, a specific gravity, a settling velocity, and a void ratio for bottom deposition, critical shear stress, and information on whether the fraction is cohesive and/or strippable. Table E-4-1 in Appendix E-4 lists the input parameters utilized for this model.

Model Output

The output starts by echoing the input data and then optionally presenting the time history of the descent and collapse phases. In recent history, the location and velocity of the cloud centroid, the conservative constituent concentration, and the total volume and concentration of each solid fraction are provided as functions of time since release of the material. Figure E-4-1 (Appendix E-4) shows the maximum concentration of zinc predicted to occur at any point downstream from the placement site. Figure E-4-2 (Appendix E-4) shows the discharge plume size and shape, as well as the concentration of zinc throughout the plume.

Hydraulic Placement

Because hydraulic dredging is the most efficient means of moving large quantities of material, it is likely that a form of dredging would be used to perform the majority of deepwater habitat formation. The quality of water discharged from confined disposal areas is also a concern that must be addressed. The predicted concentrations of the effluent can be used with appropriate water quality standards to determine the mixing zone required to meet respective water quality standards. EFQUAL is capable of computing predicted dissolved and total contaminant concentrations in the effluent from a confined disposal site, comparing predicted effluent concentrations with specified water quality standards, and computing required dilution of effluent to meet specified water quality standards considering contaminant concentrations in the receiving water.

Model Input

The main data requirements for EFQUAL are modified elutriate test conditions and result, background receiving water concentrations, and water quality standards for contaminants of concern. Table E-4-2 (Appendix E-4) lists the input parameters used for this model.

Conclusions

Results of the analysis suggested that two parameters that commonly occur in elevated concentrations in the sediment and water column of the Illinois Waterway will exceed water quality standards in a small area immediately downstream from the placement site during mechanical dredging. It is not likely that this action will have a substantial or long-term impact to the water quality of the river.

Test Island Construction

The Corps proposes to construct a test island or islands within the same vicinity of the recommended plan in order to test the material suitability and to better determine important design parameters. The goals and objectives of this test are:

- Minimum and maximum angle of repose
- Rate and extent of foundation consolidation
- Rate of erosion
- Time required between "lifts"
- Desiccation

The testing location would be near Illinois Waterway River Mile 165.3 on the left descending side of the channel in the vicinity of the Avery Daymark. The test island(s) would be covered by the recommended island during later construction. The test island would be approximately 250 feet in length, 150 feet wide, and 12 feet tall. The required material to construct the test island is an estimated 9,000 cubic yards. The test island might be divided into two sections to investigate the locational differences in the lake. In this case, each island would be 125 feet in length, 150 feet wide, and 12 feet tall. Both islands together would total an estimated 9,000 cubic yards. To construct the test island, it is proposed that a clamshell mechanical dredge would be used. However, this dredge would be smaller than the dredge proposed for the restoration project.

The required borrow location would be adjacent to the island and would be 250 feet in length, 75 feet wide, and 12 feet deep. It is anticipated that the top 3 feet of material, an estimated 4,000 cubic yards, would be unsuitable for use in the test and would be sidecast to both sides of the borrow location. See plate 2 for more information.

The proposed testing sequence would be based on the behavior of the dredged material, weather conditions, river water elevations, and available funding. The island would be extensively monitored between stages. It is desirable that the testing start in early 2003 at the latest following this schedule:

- **1st lift.** March Year 1 – dredge and build 1st lift from EL 438 feet to EL 441 feet
- Monitor island
- **2nd lift.** July Year 1 (60-90 days after 1st lift) – dredge and build 2nd lift from EL 441 feet to EL 444 feet
- Monitor island
- **3rd lift.** December Year 1 (150-180 days after 2nd lift) – dredge and build 3rd lift from EL 444 feet to EL 447 feet
- Monitor island

- **4th lift.** June Year 2 (60-90 days after 1st lift) – dredge and build 4th lift from EL 447 feet to EL 450 feet
- Monitor island

Any potential environmental impacts associated with the construction of a test island are covered by and would be similar to, those addressed for the larger islands in **Section 4, Environmental Impacts/Effects**, but on a much smaller scale. Since this document already addresses the area of potential impact, a separate environmental assessment will not be written and distributed for the test island as indicated in earlier correspondence. Therefore, any comments received during the public review period regarding the larger islands should also include comments for the test island.

Permits

A public notice, as required by Section 404 of the Clean Water Act, was made prior to submission of this report for final approval. A Section 401 water quality certificate from the State of Illinois and a Section 404(b)(1) Evaluation is included in this report. An additional permit from the ILDNR, Division of Water Resources for floodplain construction also will be completed prior to final submission of this report. A Peoria Lake Island Flood Height Impact Analysis was conducted as part of the Feasibility Study (Appendix D-4). The analysis concluded that construction of the proposed islands in Peoria Lake will not significantly impact flood levels.

OPERATION, MAINTENANCE, AND REHABILITATION CONSIDERATIONS

The Site Manager will take action to correct adverse conditions. To ensure feature serviceability, the Site Manager will schedule regular maintenance repair measures for accomplishment during the appropriate season. Appropriate advance measures will be taken to ensure the availability of adequate labor and materials to meet contingencies.

Operation

This project has no general operating requirements.

Maintenance

The project measures have been designed to require only minimal annual maintenance. Estimated annual maintenance costs are listed in Table 3-13.

PROJECT PERFORMANCE ASSESSMENT

The primary project objectives were summarized in Section 2 of this document. The performance assessment is intended to gauge progress towards meeting these objectives. In particular, the project will be evaluated for changes to the physical footprint (sedimentation rates, erosion, etc.), water quality, and biological response.

Tables 3-7 through 3-10 present an overall description of the project phases, the activities that are to take place during certain phases, agency responsibilities, and monitoring data collection summaries. The detailed monitoring description is in Appendix I.

TABLE 3-7. Monitoring and Performance Evaluation Matrix

Project Phase	Type of Activity	Purpose	Responsible Agency	Implementing Agency	Funding Source	Implementation Instructions
Pre-Project	Sedimentation Problem Analysis	Define system-wide problem. Evaluate planning assumptions.	Corps	Corps	Corps	--
	Pre-Project Monitoring	Identify and define problems at site. Establish need of proposed project features.	Sponsor	Sponsor	Sponsor	--
	Baseline Monitoring	Establish baseline for performance evaluation.	Corps	Sponsor through Cooperative Agreements, or Corps	Corps/ Sponsor	See Tables 3-8 and 3-9
Design	Data Collection for Design	Include quantification of project objectives, design of project and development of performance evaluation plan.	Corps	Corps	Corps	See Tables 3-8 and 3-9
Construction	Construction Monitoring	Assess construction impacts. Assure permit conditions are met.	Corps	Corps	Corps	See State Section 401 Stipulations
Post-Construction	Performance Evaluation Monitoring	Determine success of project as related to objectives.	Corps (quantitative) Sponsor (field observations)	Sponsor through O&M, or Corps	Corps/ Sponsor	See Table 3-9

TABLE 3-8. Summary of Physical and Chemical Monitoring

	Pre-Project	Design	Construction	Post-Construction*	Comments
Water Quality					
Field		1	Annual	Y, 3Y, 5Y	
Lab		1	Annual	Y, 3Y, 5Y	
Survey					
Sedimentation Ranges		1		Y, 3Y, 5Y	
Survey Ranges		1		Y, 3Y, 5Y	
Velocity Discharge		1		Y, 3Y, 5Y	
Sediment Quality		1	Annual	Y, 3Y, 5Y	
Geotechnical		1		Y, 3Y, 5Y	

* See Appendix I for details.

TABLE 3-9. Summary of Biological Monitoring

Parameter	Pre-Project	Design	Construction	Post-Construction*	Comments
Fish Surveys:					
Electrofishing	1	0	0	Y, 5Y	
Trap net	1	0	0	Y, 5Y	
Gill net	1	0	0	Y, 5Y	
Minnow seine	1	0	0	Y, 5Y	
Mussel survey	1	0	0	5Y	
Macroinvertebrate	1	0	0	Y, 5Y	
Vegetation	0	0	0	Y, 5Y	
Waterfowl	Y	0	0	Y	

* See Appendix I for details.

Y- yearly
#Y - every # years

TABLE 3-10. Post-Construction Evaluation Plan

Enhancement Potential									
Goal	**Objective**	**Enhancement Measure**	**Unit**	**Year 0 Without Alternative**	**Year 1 With Alternative**	**Year 25 Target With Alternative**	**Year 50 With Alternative**	**Feature Measurement**	**Annual Field Observations by Site Manager**
Restore and Protect Backwater Habitat **Restore and Protect Aquatic Habitat**	Create off-channel deepwater areas to provide year-round habitat for fisheries and associated species	Excavate channels in backwater areas	Winter water temperature (°F)	32	34	34	34		
			Water depth (acres > 8 ft)						
			Above bridge	0	53.4	53.4	53.4		
			Below bridge	0	149.9	149.9	149.9		
			Dissolved oxygen mg/L	3.0-5.0	≥ 5.0	≥ 5.0	≥5.0	Perform water quality tests at stations listed above	
	Reduce sedimentation in backwaters	Construct flowing side channel between islands below bridge	Current velocity (ft/sec)	<1.0	>1.0	>1.0	>1.0		
		Construct closing structure	Current velocity (cm/sec)	>1.0	0	0	0		

PROJECT COST ESTIMATE

Detailed cost estimates of project design and construction costs are presented in Tables 3-11 and 3-12. MCASES construction estimates are found in Appendix F. A detailed estimate of operation, maintenance, and rehabilitation costs is presented in Table 3-13. Table 3-14 shows the estimated annual monitoring costs as described in Appendix I. Quantities may vary during final design. The cost estimate below reflects the changes implemented as part of the Value Engineering Study.

TABLE 3-11. Lower Peoria Lake – Aquatic Restoration and Island Project Cost Summary December 2002 Price Levels

Account	Feature	Current Working Estimate (CWE)	Fully Funded Estimate (FFE)
1	Lands and Damages	$605,000	$605,000
2	Relocations	$0	$0
6	Fish and Wildlife Facilities	$11,510,000	$13,254,106
30	Planning, Engineering and Design	$1,738,000	$1,723,034
31	Construction Management	$1,174,000	$1,325,411
	Post-Construction Monitoring	$155,000	$155,000
	Total Project Costs	$15,182,000	$17,062,550
	Federal Costs (65%)	$9,867,775	$11,090,658
	State Cost (35%)	$5,313,417	$5,971,893

* Lands and Damages include an estimated $575,000 in non-Federal Costs and $30,000 in Federal expenses.

TABLE 3-12. Lower Peoria Lake – Aquatic Restoration and Island Construction Cost Estimate

Acct Code	Item	Quantity	Unit	Unit Price	Amount	Contingency	Cont. %
06	**FISH AND WILDLIFE FACILITIES**						
06	**UPPER ISLAND**						
	Stage 1 Mob/demob	1	LS	$101,176	$101,176	$20,235	20%
	Stage 1 Mechanical Dredging to Construct Island Embankment	172,000	CY	$4.10	$705,301	$141,060	20%
	Stage 2 Mob/demob	1	LS	$101,176	$101,176	$20,235	20%
	Stage 2 Dredging to Fill Embankment interior	116,000	CY	$4.05	$470,238	$94,048	20%
	Stage 3 Mob/demob	1	LS	$101,176	$101,176	$20,235	20%
	Stage 3 Mechanical Dredging to Construct Island Embankment	51,000	CY	$4.10	$209,130	$41,826	20%
	Stage 4 Mob/demob	1	LS	$101,176	$101,176	$20,235	20%
	Stage 4 Dredging to Fill Embankment interior	122,000	CY	$4.05	$494,561	$98,912	20%
	Stage 5 Rock Placement - Fish Structure Jetties	1,000	TON	$37.95	$37,949	$3,795	10%
	Stage 5 Rock Placement – Closing Structure	3,000	TON	$37.95	$113,846	$11,385	10%
	Stage 6 Erosion Protection - Bedding Stone	3,000	TON	$28.28	$84,825	$8,483	10%
	Stage 6 Erosion Protection – Riprap	9,000	TON	$37.95	$341,539	$34,154	10%
	SUBTOTAL - UPPER ISLAND				**$2,862,093**	**$514,603**	
06	**LOWER ISLANDS**						
	Stage 1 Mob/demob	1	LS	$101,176	$101,176	$20,235	20%
	Stage 1 Mechanical Dredging to Construct Island Embankment	501,000	CY	$4.10	$2,054,394	$410,879	20%
	Stage 2 Mob/demob	1	LS	$101,176	$101,176	$20,235	20%
	Stage 2 Dredging to Fill Embankment interior	236,000	CY	$4.05	$956,691	$191,338	20%
	Stage 3 Mob/demob	1	LS	$101,176	$101,176	$20,235	20%
	Stage 3 Mechanical Dredging to Construct Island Embankment	176,000	CY	$4.10	$721,703	$144,341	20%
	Stage 4 Mob/demob	1	LS	$101,176	$101,176	$20,235	20%
	Stage 4 Dredging to Fill Embankment interior	302,000	CY	$4.05	$1,224,240	$244,848	20%

TABLE 3-12 (Continued)

Acct Code	Item	Quantity	Unit	Unit Price	Amount	Contingency	Cont. %
	Stage 5 Rock Placement - Fish Structure Jetties	4,000	TON	$37.95	$151,795	$15,180	10%
	Stage 5 Rock Placement - Closing Structure	4,000	TON	$37.95	$151,795	$15,180	10%
	Stage 6 Erosion Protection - Bedding Stone	9,000	TON	$28.28	$254,476	$25,448	10%
	Stage 6 Erosion Protection - Riprap	26,000	TON	$37.95	$986,667	$98,667	10%
	SUBTOTAL - LOWER ISLANDS				**$6,906,465**	**$1,226,820**	
	FISH AND WILDLIFE FACILITIES COST SUBTOTAL				$9,768,600	$1,741,400	
06	**FISH AND WILDLIFE FACILITIES COST TOTAL**				**$11,510,000**		
30	**PLANNING, ENGINEERING AND DESIGN**						
	Plans and Specifications				$1,496,300		
	Engineering During Construction				$241,700		
	SUBTOTAL				**$1,738,000**		
31	**CONSTRUCTION MANAGEMENT**						
	Contract Administration				$230,200		
	Shop Drawing Review				$115,100		
	Inspection and Quality Assurance				$828,700		
	SUBTOTAL				**$1,174,000**		
	TOTAL				**$14,422,000**		

TABLE 3-13. Estimated Annual Operation and Maintenance Costs, April 2002 Price Levels

	Quantity	Unit	Unit Price ($)	Total Cost ($)
Operation				0
Maintenance				
Island Inspection	20	Hr	30	600
Riprap	150	Ton	35	5,250
Erosion Control	80	Hr	30	2,400
Debris Removal	40	Hr	30	1,200
Rehabilitation *				0
			Subtotal	9,450
			Contingencies (20%)	1,890
		TOTAL		**$11,340**

* Rehabilitation cannot be accurately estimated. Rehabilitation is reconstructive work that significantly exceeds the annual operation and maintenance requirements identified above and which is needed as a result of major storms or flood events.

TABLE 3-14. Estimated Post-Construction Annual Monitoring Costs April 2002 Price Levels

Item	Annual Cost ($)
Engineering Data [1]	2,000
Natural Resources Data [1]	2,000
Subtotal	4,000
Contingency (20%)	800
Subtotal	4,800
Planning, Engineering, Design [2]	1,400
ANNUAL TOTAL	**6,200**
25-YEAR TOTAL	**155,000**

[1] Reference Appendix I.
[2] Includes cost of evaluation report.

PLAN ACCOMPLISHMENTS

The dredging and construction of islands in Peoria Lake would provide positive habitat benefits in both the aquatic and terrestrial environment. Ancillary recreational and water quality benefits would likely be realized and the local population supports the project.

Environmental Impacts/Effects

PEORIA LAKE

ENVIRONMENTAL IMPACTS OF THE NO ACTION PLAN

The no action plan would preclude Federal involvement in dredging and construction of islands in Lower Peoria Lake. The lake would most likely continue as a shallow, highly turbid body of water with little habitat.

ENVIRONMENTAL IMPACTS OF THE SELECTED PLAN

Natural Resources

In contrast to the industrial, commercial, and urban nature of the Peoria area, a considerable amount of natural resources is associated with Peoria Lake and surrounding environs. A large variety of wetland or water-tolerant forbs, grasses, sedges, and rushes are common to the Peoria Lake bankline and floodplain, particularly on the east and northeast sides. Lands along the lake and its tributaries contain stands of this vegetative mixture that includes wild millet (*Echinochloa muricata*), fowl manna grass (*Glyceria striata*), cord grass (*Spartina petinata*), straw-colored sedge (*Cyperus strigosus*), river bulrush (*Scirpus fluviatilis*), smartweed (*Polygonum spp.*), cattail (*Typha latifolia*), milkweed (*Asclepias spp.*), dock (*Rumex spp.*), and many other species beneficial to area wildlife.

There is also a significant woody component in some areas around the lake. The majority of the species are comprised of silver maple (*Acer sacharinum*), cottonwood (*Populus deltoides*), and green ash (*Fraxinus pennsylvanica*). Other species found in the area include black willow (*Salix nigra*), box elder (*Acer negundo*), American elm (*Ulmus americana*), button bush (*Cephalanthus occidentalis*), and wild grape (*Vitis spp.*).

Many of these herbaceous and woody plant species produce seeds that are carried into Peoria Lake, sink to the bottom, and are buried in the sediment on the lake bottom. Some species seeds survive and lie dormant in this condition for several years, forming a ready-made seed bank in the event that the water recedes or when lake bottom material is brought

to the surface for whatever reason. If and when the proper conditions are met, these seeds germinate and develop into mature plants or trees.

This ready bank of local seed, when brought to the surface during construction of the proposed islands, would provide some of the vegetation likely to grow on the islands. Other vegetation would be brought to the islands by area wildlife or by wind transporting seeds or plant material there. Additionally, seeds could arrive by floating on the water surface during high water events and be deposited on the islands to germinate after the water recedes. Because of this ready-made seed source and the success of volunteer vegetation growing on the previously constructed islands in the Upper Lake, the team concluded that a plan to vegetate the islands (other than planting some type of erosion control shortly after construction) was not necessary. There is also a strong possibility that decurrent false aster (*B. decurrens)* could potentially colonize portions of the newly created islands because there is a known stand of that species located near the lakeshore.

The dredging activities in the lake to build the proposed islands would produce approximately 75 acres of terrestrial habitat. Herbaceous vegetation would develop over the islands from the previously mentioned seed sources, and after some time the larger islands would develop a bottomland hardwood forest component. This would most likely consist of silver maple, green ash, and cottonwood. With the development of vegetation on the islands, it is anticipated that they would become an attractant for nesting, loafing, and feeding of many species of waterfowl, shorebirds, and neotropical migratory birds.

The proposed project would result in short-term decreases in water quality due to localized dredging and construction activities. Silt curtains and/or other appropriate technologies would be used to minimize the majority of adverse water quality impacts to downstream areas of the lake. After construction, the natural resource value of the aquatic environment of Lower Peoria Lake would soar dramatically from its existing condition. Dredging would create approximately 200 acres of improved aquatic habitat that would include deepwater habitat for fish overwintering and constructed backwater and side channel habitat. Interconnected channels and jetties would provide structure or "edge" habitat to increase diversity of the area.

While a number of factors have prevented emergent vegetation from developing at the previously constructed islands in the Upper Lake, historically pondweeds (*Potomogetom spp.),* wild celery (*Valisnoria ammericana*), and coontail (*Certophylum demerson*) were part of this river reach's local flora and could possibly redevelop, given the right conditions.

Endangered Species

Section 2 under "Environmental Resources" addresses federally listed threatened or endangered species that might be found within the general vicinity of Peoria Lake. This is mainly because of the natural resources found in the general area around the lake. However, because the natural resources are so limited at the proposed project site located within the lake, there are no listed species to be found on the project site or any area that would be affected by the extraction of material to build the proposed islands. The work would be performed from barges located in the lake, and any activity requiring access of construction personnel or staff to or from the dredging and construction operation would be from area boat ramps or marinas. Staging areas, if required, would be existing ramp or launch

facilities. No additional shoreline of the lake would be impacted for this project, other than small areas for tying in the closing structure at elevation 443 feet MSL or lower.

Therefore, it is our biological assessment that dredging and construction of the islands would not adversely impact any state or federally listed threatened or endangered species, nor would it adversely impact any critical habitat for any of the listed species. If, after reviewing this document, the USFWS concurs with this assessment, they will respond by letter stating so and the requirements of the Endangered Species Act will have been met.

Water Quality

Water quality conditions throughout Peoria Lake are dominated by the shallow nature of the lake and the soft, unconsolidated sediments found throughout the lake. Siltation over the years has severely impaired several beneficial uses of the lake. The primary water quality problems at Peoria Lake are related to high concentrations of suspended solids. High turbidity is a result of agricultural non-point runoff and resuspension of sediments by the waves. High turbidity and suspended solids values have contributed to a lack of rooted aquatic vegetation throughout the lake.

The majority of water quality information available for the Illinois River is from samples collected from the channel, not backwater areas. In a 1988 publication, the Illinois Environmental Protection Agency rated the Illinois River (255 river miles) as "partially supporting aquatic life uses with minor impairment." This rating was primarily a result of elevated turbidity values and, to a lesser degree, high nutrient concentrations.

In order to predict the impact of proposed construction activities on water quality, sediment data gathered by the Illinois Geological Survey were evaluated. In addition, column-settling tests were performed on samples taken in the vicinity of the areas proposed for dredging. Results indicate that ammonia, nitrogen, zinc, and suspended solids would be the parameters of concern during construction. However, should the proper dredging and dredged material placement management techniques be utilized, impacts on water quality of Peoria Lake can be minimized. Any impacts seen would be temporary in nature. Additional discussion of testing and results is presented in Appendix E-3. Further discussion of modeling efforts to predict water quality during construction is presented in Appendix E-4.

Air Quality

Limited air pollution effects would be produced from machinery exhaust from the dredge itself. The immediate area surrounding the island construction sites is somewhat isolated so impacts should be negligible.

Historic Properties

The Illinois Historic Preservation Agency concurred by letters dated December 4, 2001, and October 30, 2001 (IHPA Log #0011090020k-P, Appendix A-1) with the District's opinion that the proposed dredging, island creation, and rock jetty and closing structures in the Lower Peoria Lake would not affect any submerged historic properties. No comments were received by consulting with societies, agencies, Native American Tribes, and other interested parties; therefore, there were no considerations promulgated under 36 CFR Part 800.5(c)(3) and 800.5(f)(3) of the National Historic Preservation Act.

Created Resources

The dredging and island construction would affect what are considered to be created resources. The Illinois Waterway, with its shoreline, islands, and backwaters, is a natural resource modified by humans to facilitate waterborne commerce on the Upper Mississippi River System. The river channel is essential to commercial navigation on the Illinois Waterway, and the construction of the island in the lake has been oriented so that no impacts to the navigation channel would occur.

The series of pools and the channel were created and are controlled by the operation of the locks and dams in conjunction with other components of the Upper Mississippi River 9-Foot Channel Navigation Project. Completion of this project would help to counteract the effects of sediment accretion in the Peoria Lake area.

Farm Displacement

No farm or farmsteads would be affected by the island alternatives.

Noise Levels

Heavy construction equipment would generate a temporary increase in noise levels during island construction. The surrounding area is primarily industrial in nature and contains no sensitive receptors (schools, hospitals, etc.). No long-term noise impacts would result following project construction.

Aesthetics

Impacts to the aesthetic resources of the area would be a matter of perspective. The proposed plan would construct the islands to be approximately 10 feet above the water surface. Views from across the lake and from the shore would change to some degree. Although this is not particularly high, some may feel that it would inhibit their view across the lake and would create negative visual impacts from the shoreline. Others may find an island that offers diverse vegetation and attracts a variety of wildlife quite appealing, and that blocking the view of an industrial area across the lake is a benefit.

Community and Regional Growth

The Peoria Pool (commonly referred to as Peoria Lake) is a 14,400-acre body of water used primarily for commercial navigation, recreational boating, fishing, hunting, and wildlife refuge. No significant impacts to community or regional growth would result from the proposed project; however, the proposed island alternatives could lead to a small increase in tourism for the Peoria Pool area.

Displacement of People

The proposed project would not result in any residential displacements.

Community Cohesion

The island alternatives could create minor, positive impacts for community cohesion as recreational islands provide entertainment and gathering sites. There also is the potential for the project and the islands to unify the cities surrounding the lake as they work together toward developing beneficial uses for the riverfront areas.

Regional, state, and local agencies have been involved in the coordination efforts for the proposed project and support the study efforts. Two public open houses provided opportunities for the public to learn about the proposed project and the study process and to provide feedback on the study goals and alternatives. Overall, public response indicated agreement with the study goals of creating habitat diversity and reducing sediment delivery. Island creation in Lower Peoria Lake was the favored method of achieving those goals.

Property Values and Tax Revenues

It is expected that the proposed island alternatives would have an insignificant effect on property values. Enhanced boating opportunities in Peoria Lake could be followed by a small increase in boat ownership and purchases; tax revenues would rise as a result of increased sales tax and boat license fee revenues, plus increased spending by recreationists using the lake.

Public Facilities and Resources

Peoria Lake has become a popular tourist and recreation destination, as evidenced by the many marinas, boat clubs, parks, picnic areas, and camping sites along the shoreline.

The proposed island alternatives would provide recreational islands in the Peoria Pool, enhancing recreational boating opportunities in the area and resulting in a more enjoyable leisure experience for users. The beaching areas provided by the islands, as well as the dredged areas for waterskiing, would help to fulfill a portion of the recreational needs of the general public within Peoria and Tazewell Counties and outlying areas.

The entrance to Spindler Marina is located approximately 1,000 feet east of the proposed island pair below McClugage Bridge. It is not anticipated that island construction would have a negative impact on this public facility. The marina owner expressed support of this project in that the dredging would be beneficial for keeping the inlet open to the marina and would also improve fishing and boating in the area.

Life, Health, and Safety

Sedimentation has caused a loss of water depth, resulting in reduced habitat value and diversity and reduction of lake area available to recreational boaters. The net result of this sedimentation pattern is the shrinking of the deep parts of the lake, which could eventually increase the potential for groundings of commercial and recreation craft. The proposed islands would be created from sediment dredged from the lakebed, thus removing sediment from the lake bottom and improving safety conditions for watercraft and operators. The islands could also serve as harbors of refuge in case of inclement weather or mechanical failures when a pleasure boater could not make it to the main shore.

Employment and Labor Force

Construction of the proposed project would temporarily increase short-term employment in the project area. There would be no permanent impacts to employment or labor force in Peoria or Tazewell Counties.

Business and Industrial Growth

Adverse changes in business and industrial activity would be minimal. No business relocations would be required. Access to the river would not be obstructed for any of the industrial properties located along the shoreline and would not interfere with business activity.

Enhancing recreational opportunities through island creation could result in the establishment of new businesses that would serve the recreationists. Local spending by recreational users of Peoria Lake would generate additional economic activity/output throughout the surrounding area.

ENVIRONMENTAL IMPACTS OF NONPREFERRED ALTERNATIVES

With the selection of the "No Action" alternative, there would essentially be no change in the condition of the lake.

The other alternatives considered were basically variations of the preferred alternative at differing sizes or number of islands. The analysis evaluation showed that many of the same habitat benefits would result with these other alternatives, except that the habitat benefits gained were directly proportional to the size of the area dredged and island created. Therefore, the larger the area dredged and island created, the greater the overall habitat benefits gained. The largest proposed project was selected to maximize project habitat benefits.

ANY IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD OCCUR IF THE PROPOSED ACTION WERE IMPLEMENTED

Fuel consumed, manpower expended, and the commitment of construction materials are considered to be irretrievable.

RELATIONSHIP OF THE PROJECT TO LAND-USE PLANS

The proposed project would not conflict with any known land-use plans for the Peoria Lake area.

CUMULATIVE IMPACTS

The District identified island creation and backwater aquatic habitat as the primary resources for improvement by this ecosystem restoration project. The habitat that this project represents was quantified by a query of land cover/use from 1989 landsat thematic mapper data using the United States Geological Survey's *Habitat Needs Assessment* (HNA) query tool. Systemic changes have been discussed in the *Ecological Status and Trends of the Upper Mississippi River System 1998* and the *Habitat Needs Assessment for the Upper Mississippi River System Technical Report*, dated October 2000. The HNA was conducted to: "describe historical and existing conditions, identify objectives for future habitat conditions, define habitat needs at system-wide, reach, and pool scales, address a variety of habitat requirements including physical, chemical, and biological parameters, address the unique habitat needs of distinct river reaches, pools, and the system, and be a collaborative, technically sound and consensus based effort."

Table 4-1 shows HNA land cover classes found in Peoria and La Grange Pools within the floodplain and covers approximately 75 miles of river in either direction of the proposed project. Of the 17 classes identified, only 7 were found to occur within the 2 pools, with the majority being agriculture (51%), open water (21%), and wet mesic forest (16%). The other 4 categories found are: grassland and developed (both around 4%), permanent flooded emergent perennial (3%), and sand/mud (>1%).

TABLE 4-1. HNA Land Cover Classes

HNA Land Cover Class (in acres)	Peoria Pool	La Grange Pool	Total
Open Water	40,070	34,660	74,730
Submersed Aquatic Vegetation	0	0	0
Floating-Leaved Aquatic Bed	0	0	0
Permanent Flooded Emergent Annual	0	0	0
Permanent Flooded Emergent Perennial	5,416	4,806	10,222
Seasonally Flooded Emergent Annual	0	0	0
Seasonally Flooded Emergent Perennial	0	0	0
Wet Medow	0	0	0
Grassland	7,292	8,294	15,586
Scrub/Shrub Wetland	0	0	0
Salix Community	0	0	0
Populus Community	0	0	0
Wet Mesic Forest	19,501	38,097	57,598
Mesic Bottomland Hardwood Forest	0	0	0
Agriculture	49,153	131,803	180,956
Developed	9,832	3,511	13,343
Sand/Mud	52	55	107
No Photo Coverage	0	1	1
Totals:	**131,316**	**221,227**	**352,543**

Past Actions

Environmental restoration projects on the Upper Mississippi River System (UMRS) have been undertaken through a variety of private local and regional clubs and organizations, State governmental agencies, the USFWS, and the Corps of Engineers in partnership with State agencies through the Environmental Management Program (EMP) and the Section 1135 and Section 206 programs. While Sections 1135 and 206 are relatively new authorizations under which the Corps performs environmental restoration, the majority of our restoration efforts have been done under the EMP. All EMP projects have taken place on the mainstem of the Mississippi or the Illinois Rivers. Under the EMP, 28 habitat projects have been completed and 12 are currently under construction. Only five EMP projects have been constructed on the Illinois branch of the UMRS and a sixth is in the planning stages. A seventh area (Alton Lake) is proposed as a "Future Opportunity." Twenty-four of the completed EMP projects affect approximately 28,000 acres of aquatic and floodplain habitat.

Section 1135 and 206 generally provide ecosystem restoration on a much smaller scale. Five restoration projects have been completed or are near completion under Section 1135. All were done on the Mississippi River and affected approximately 5,000 acres. No Section 206 projects have been constructed at this time.

Present Actions

Approximately 13 EMP projects are currently in various stages of planning and design. These additional projects under construction will increase the area affected by EMP to about 97,000 acres, which is approximately 11% of the total UMRS floodplain and aquatic habitat area, not counting agricultural and urban areas. About 20 Section 206 projects are currently in various stages of feasibility, but none are ready to go to construction at this time. The total area impacted by those 5 to 6 proposed Section 206 projects that are farthest along would be less than 1,000 acres. While a majority of the current Section 206 projects are located in Illinois, they are not located on the mainstem of the Illinois River.

If the proposed Peoria Riverfront Development (Ecosystem Restoration) Study is approved, plans and specifications would be developed over the next year and the project would then be ready to go to construction. The proposed project would construct 3 islands for a total of approximately 75 acres and create approximately 200 acres of 4- to 8-foot-deep aquatic habitat within lower Peoria Pool.

Reasonably Foreseeable Future Actions

With the authorization of the Illinois River Basin Restoration Feasibility Study, it is anticipated that more projects like the restoration project proposed for Peoria Lake would be developed and pursued. The overall goal of these restoration projects is to enhance the environment by rehabilitating declining habitat and/or also work to reduce the sediment input into the Illinois Waterway, thereby improving the ecosystem as a whole. The size and number of projects developed would depend on congressional funding and willing non-Federal cost-share sponsors.

Reasonably Foreseeable Future Actions in La Grange and Peoria Pools

These and other future restoration projects may increase island structures and backwater aquatic habitat within the La Grange and Peoria Pools. Investigations are ongoing to develop potential projects within the general watershed of the Peoria and La Grange Pools; however, there are no specific projects proposed or being considered at this time (other than those already specifically mentioned) that would take place within the Peoria and La Grange Pools.

Associated Actions in La Grange and Peoria Pools

Dredging of the navigation channel by the Corps would continue to take place with 18 Dredged Material Management Plans (DMMPs) active or proposed for the 77.4 miles of the La Grange Pool and 9 DMMPs active or proposed for the 73 miles of the Peoria Pool. Dredging also would take place for the island construction proposed in the upper portion of Lower Peoria Lake. Because of high sedimentation rates on the Illinois Waterway, there also would be a large amount of private dredging to remove sediments from harbors and barge docking areas.

Approximately 2% of these actions have related to ecosystem restoration, while a total of 47% percent related directly to dredging. Only 3% have been Federal dredging projects, (generally main channel dredging) and the other 44% were non-Federal dredging projects (mostly harbor maintenance). Table 4-2 displays the regulatory actions that have occurred in and adjacent to Peoria and La Grange Pools since 1960. These include Section 10 (construction of structures in navigable waters, not involving dredged or fill material) and Section 404 (construction projects that affect the waters of the United States) regulatory actions. The District evaluates the impact of these regulatory actions on a continuous and ongoing basis, actively soliciting responses to these actions from the public, State and other Federal agencies through the Clean Water Act permit process.

The District continues to identify practical methods for the quantitative assessment of the cumulative impacts of dredging through impact analysis studies of mussels, plants, sedimentation, invertebrates, and fish pursuant to Section 404 of the Clean Water Act. Findings from these studies will be used in the future consideration of cumulative impacts of dredged material placement on many types of habitat.

The proposed project has identified and taken into account cumulative impacts, considered alternative actions that could lessen such adverse impacts, and is, to the extent practicable, compatible with state, unit of local government, and private programs and policies to protect floodplain agricultural field habitat and bankline habitats. The proposed project would not cumulatively exceed any known biological or social thresholds.

TABLE 4-2. Regulatory Actions in and Adjacent to Peoria and La Grange Pools Since 1960

Regulatory Permits Issued Between 1960-Present	La Grange Pool 1960's	Peoria Pool 1960's	La Grange Pool 1970's	Peoria Pool 1970's	La Grange Pool 1980's	Peoria Pool 1980's	La Grange Pool 1990's	Peoria Pool 1990's	La Grange Pool 2000's	Peoria Pool 2000's	TOTAL
TOTAL*	**46**	**58**	**46**	**98**	**68**	**125**	**73**	**130**	**22**	**1**	**667**
Ecosystem Restoration	0	0	0	0	1	2	2	6	2	0	**13**
Dredging (Federal)	0	0	0	0	3	3	9	3	0	0	**18**
Dredging (Non-Federal)	30	20	30	63	25	45	32	52	0	0	**297**
Bank Stabilization (Federal)	0	0	0	0	4	2	0	1	4	0	**11**
Bank Stabilization (Non-Federal)	2	17	0	9	11	23	11	23	11	0	**107**
Structures (Control)	0	0	0	0	0	0	0	0	0	0	**0**
Structures (Docks)	0	3	2	2	1	12	3	13	3	0	**39**
Structures (Levee)	0	0	0	0	0	0	3	4	0	0	**7**
Structures (Boat Ramp)	1	5	7	6	5	8	4	5	1	1	**43**
Structures (Intake)	2	2	4	1	1	2	0	1	0	0	**13**
Utilities	0	0	0	0	0	0	1	3	0	0	**4**
Bridge Repair	0	0	0	1	2	3	0	0	0	0	**6**
Excavation Clearing	0	0	0	0	1	2	0	7	0	0	**10**
Fill	11	11	2	13	12	21	7	12	0	0	**89**
Other	0	0	1	3	2	2	1	0	1	0	**10**

* Prior to 1980, the District did not issue itself a permit for channel maintenance dredging. These numbers reflect individual dredging events.

Plan Implementation

This chapter presents the requirements for implementing the Recommended Plan, including Federal and non-Federal cost sharing, and the division of responsibilities between the Federal Government and the Non-Federal Sponsor, the Illinois Department of Natural Resources. It also lists the major milestones necessary for project approval, and a schedule of milestones associated with designing and constructing the Recommended Plan.

DIVISION OF PLAN RESPONSIBILITY

RECOMMENDED PLAN COST SHARING

Federal and non-Federal cost sharing for the Recommended Plan is in accordance with Section 210 of the Water Resources Development Act of 1996, which establishes the cost-sharing rules for projects authorized after October 12, 1996. Ecosystem restoration projects require that the non-Federal share of the first cost of the project or the separable element be 35%. Non-Federal Sponsors will provide 100% of any lands, easements, rights-of-way, relocations of utilities or other existing structures, and disposal areas (LERRD). The value of LERRD will be included in the non-Federal 35% share. Where the LERRD exceed the Non-Federal Sponsor's 35% share, the sponsor will be reimbursed for the value of the LERRD that exceeds the 35% non-Federal share. The Non-Federal Sponsor is also responsible for 100% of the costs for operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) of project features. The following table breaks out these costs.

Peoria Lake					
		Non-Federal		Federal	
Project Feature	First Cost	%	Cost	%	Cost
First Cost of Construction	$15,182,000	35%	$5,313,417	65%	$9,867,774
LERRD Credit		100%	$ 575,000	0%	
Cash			$4,738,417		$9,867,774
OMRR&R (average annual)	$11,340	100%		0%	

FEDERAL RESPONSIBILITIES

The Federal Government would provide 65% of the First Cost of implementing the Recommended Plan including Preconstruction Engineering and Design (PED), construction and construction management, which is estimated to total $9,867,774. In addition to its financial responsibility, the Federal Government would:

1. Design and prepare plans and specifications for construction of the Recommended Plan; and

2. Administer and manage contracts for construction and supervision of the project after authorization, funding, and execution of a Project Cooperation Agreement with the ILDNR.

NON-FEDERAL RESPONSIBILITIES

The ILDNR would be responsible for providing 35% of the First Cost of implementing the Recommended Plan. The 35% share of the project cost includes the ILDNR's responsibility for providing all lands, easements, rights-of-way, relocations and disposal areas (LERRD). The estimated costs are $5,313,417 in cash with $575,000 in LERRD credit.

The ILDNR would also be responsible for operations, maintenance, repairs, replacements, and rehabilitation (OMRR&R) of project features. This includes future monitoring of sediment deposition within the project area, and maintenance dredging of the in-lake restoration feature if required. The operations and maintenance costs are anticipated to be minimal over the 25-year project life at an average annual cost of $11,340.

The ILDNR also would be required to provide certain local cooperation items based on Federal law and policies. The items of local cooperation are:

1. Provide 35% of the separable project costs allocated to environmental restoration as further specified below:

   (a) Enter into an agreement that provides, prior to execution of a Project Cooperation Agreement for the project, 25% of design costs;

   (b) Provide, during construction, any additional funds needed to cover the non-Federal share of design costs;

   (c) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

   (d) Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(e) Provide, during construction, any additional costs as necessary to make its total contribution equal to 35% of the separable project costs allocated to environmental restoration.

2. For so long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project, or functional portion of the project, at no cost to the Government, in accordance with applicable Federal and State laws and any specific directions prescribed by the Government.

3. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

4. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating (OMRR&R) the project or completed functional portions of the project, including mitigation features without cost to the Government, in a manner compatible with the project authorized purpose and in accordance with applicable Federal and State laws and specific directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the Non-Federal Sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

5. Hold and save the Government free from all damages arising for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

6. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

7. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the Non-Federal Sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

8. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

9. Prevent future encroachments on project lands, easements, and rights-of-way that might interfere with the proper functioning of the project.

10. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled, "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

11. Provide 35% of that portion of total cultural resource preservation mitigation and data recovery costs attributable to environmental restoration that are in excess of 1% of the total amount authorized to be appropriated for environmental restoration.

12. Not use Federal funds to meet the Non-Federal Sponsor share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

INSTITUTIONAL REQUIREMENTS

SPONSORSHIP AGREEMENT

Prior to the start of construction, the ILDNR will be required to enter into a Project Cooperation Agreement (PCA) with the Federal Government and satisfy state laws and all applicable regulations. In general, the items included in the Agreement have been outlined in the previous paragraphs.

FINANCIAL ANALYSIS AND CAPABILITY

Financial information on the Non-Federal Sponsor's ability to fund their share of the plan is required to establish implementation of the project as required by the *Principles and Guidelines*. The information includes a preliminary financing plan outlining the costs, schedule of expenditures, and a statement of financial capability by the Non-Federal Sponsor, including funds. The ILDNR has expressed their financial capability in their letter of intent.

Illinois
Department of
Natural Resources
http://dnr.state.il.us
One Natural Resources Way • Springfield, Illinois 62702-1271 George H. Ryan, Governor • Brent Manning, Director

October 31, 2002

Colonel William J. Bayles
U.S. Army Engineer District
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

RE: STATEMENT OF FINANCIAL CAPABILITY, Section 216 Environmental Restoration Project, Peoria Riverfront Development, Illinois River

Dear Colonel Bayles:

The State of Illinois, Department of Natural Resources (DNR) has the legal authority to enter into the Project Cooperation Agreement and to fulfill all financial obligations for completion of the project. The DNR understands that the current cost estimate for the entire project is $15,181,192. Of this, the DNR share is $5,313,417($4,738,417 cash and $575,000 for rights-of-way and relocation costs).

It is the DNR intention to finance its share of project costs through State budget appropriations. As with the federal annual appropriations, the State of Illinois commitment to funding each year of the planned project construction cost is dependent upon the DNR receiving an annual appropriation from the Illinois General Assembly to do so. Enclosed also is a copy of State (DNR) budget documents, indicating scheduled specific funding planned by year for this project.

The Illinois DNR has reviewed the *draft* Project Cooperation Agreement (PCA) and has found its provisions acceptable. The DNR strongly desires to proceed with this habitat restoration project. If further information is needed, please do not hesitate to contact our office.

Sincerely,

Brent Manning
Director

Enclosures

Cc: Kirby Cottrell
Debbie Bruce
Scott Stuewe
Jim Mick

Peoria Riverfront Development
Section 216 Environmental Restoration Project
Schedule of Project Costs - Peoria Lake Component
Current Working Estimate (April 2002 Price Level)

CWE (April 2002)

Year	TOTAL Project	Federal Costs	Sponsor Cash	Sponsor LERRD
2002	$193,500	$193,500	$0	
2003	$850,100	$850,100	$0	
2004	$1,967,500	$1,291,900	$120,600	$ 575,000
2005	$4,888,000	$3,030,600	$1,857,400	
2006	$204,900	$127,000	$77,900	
2007	$554,200	$343,600	$210,600	
2008	$3,615,200	$2,241,400	$1,373,800	
2009	$2,587,100	$1,604,000	$983,100	
2010	$165,800	$102,800	$63,000	
TOTAL	$15,026,300	$9,784,900	$4,686,400	$ 575,000
		65.03%	34.968%	

Notes:

1 Fiscal year refers to U.S. Government Fiscal year 1 October thru 30 September.

2 LERRD refers to lands, easements, relocations, rights-of-way, and damages.

3. An additional $155,000 in Post-Construction Monitoring is not reflected in this table but is part of the total project cost.

4. Numbers were round to the nearest $100.

LOCAL COOPERATION

Subsequent to public review of the draft report, the ILDNR will be requested to provide a letter of intent indicating their support for the Recommended Plan and its willingness and intent to execute the PCA including providing the non-Federal required assurances.

PROJECT MANAGEMENT PLAN

A Project Management Plan (PMP) for implementation of the Recommended Plan will be prepared for the final report. The PMP will describe activities, responsibilities, schedules and costs required for the PED phase and construction of the project. The PED phase will last for an estimated 3 years at a total cost of $1,738,000.

PROCEDURES FOR PROJECT IMPLEMENTATION

Future actions necessary for project approval and implementation are summarized as follows:

1. The Corps of Engineers Mississippi Valley Division Commander will review the final report and then issue a public notice announcing completion of the final report. This is referred to as the Division Engineer's Notice, or DE's Notice.

2. The report will then be submitted to Headquarters, U.S. Army Corps of Engineers (HQUSACE), and the Office of the Assistant Secretary of the Army for Civil Works (ASA (CW)) for concurrent Washington level review.

3. The 30-day state and agency review and coordination of the Environmental Assessment will be ongoing concurrently during the HQUSACE review.

4. Concurrent Washington level review by HQUSACE and ASA(CW) will conclude with a HQUSACE staff assessment, the 30-day state and agency review, review input by the ASA(CW), HQUSACE final assessment, a field visit and meeting, if necessary, and the documentation of report review prepared by HQUSACE.

5. The Washington level decision-making process will follow the decision-making sequence of HQUSACE and ASA(CW), once the documentation of report review has been completed. There will be a briefing, if necessary, for the Designated Senior Representatives of Decision-Makers to resolve any outstanding issues. The Chief of Engineers will provide his recommendations on the report to the ASA(CW), who will provide the report and proposed recommendations to the Office of Management and Budget (OMB) to obtain their views and comments on whether the proposed recommendations are consistent with Administrative policies. Prior to the transmittal of the report to the Congress, the Non-Federal Sponsor, the State of Illinois, interested Federal agencies, and other parties will be advised of any significant modifications made to the recommendations and will be afforded an opportunity to comment further.

6. The report will then be transmitted to Congress for project authorization with the Chief of Engineers report, ASA(CW) report, state and agency comments, and Office of Management and Budget comments.

7. Congress will be required to authorize the project for implementation, generally as part of a Water Resources Development Act.

8. Funds could be provided, when appropriated in the budget, for Preconstruction Engineering and Design (PED) upon issuance of the Division Engineer's public notice, announcing the completion of the final report and pending project funding authorization. A Design Cooperation Agreement will need to be developed and executed between the Federal Government and the ILDNR, whereby the sponsor will provide 25% of the cost of PED studies.

9. The Corps of Engineers will complete final design and plans and specifications for project construction.

10. Subsequent to appropriation of construction funds by Congress, formal assurances of local cooperation in the form of a Project Cooperation Agreement (PCA) will be required from the ILDNR.

11. The ILDNR will be required to provide all real estate requirements for project implementation.

12. Bids for construction will be advertised and contracts awarded.

13. Upon completion of construction, the project will be turned over to the ILDNR, who will be responsible for OMRR&R in accordance with guidelines provided by the Corps of Engineers.

PROJECT IMPLEMENTATION SCHEDULE

The schedule for the feasibility study is for the final report to be forwarded to CEMVD in January 2003 and for the Division Engineer's Public Notice of the completion of the feasibility report to be issued in February/March 2003. Execution of the PED agreement for the next phase of study is expected in March 2003. The PED phase is scheduled to begin in March/April 2003 and will continue for approximately 3 years, until 2006. The PED phase includes refinements to the design of the recommended plan, detailed bathymetric and topographic surveys, habitat and species surveys, bioassay surveys, and chemical, grain size, and density tests of the material to be dredged. Completion will be dependent on annual funding and the timing of construction authorization. Once initiated, construction will last about 6 years.

VIEWS OF NON-FEDERAL SPONSOR(S) AND ANY OTHER AGENCIES WITH IMPLEMENTATION RESPONSIBILITIES

The State of Illinois, through the Department of Natural Resources, acting as the local sponsor, supports the recommended plan. Further, the Fon du Lac Park District, East Peoria, Illinois, owns lands to be used for project implementation. The Park District has agreed to support the recommended plan through use of property.

COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

A. Endangered Species Act of 1973, as amended. The project would not adversely impact any threatened or endangered species or their critical habitats. The U.S. Fish and Wildlife Service (USFWS) was coordinated with concerning federally endangered species, as required by the Endangered Species Act of 1973, as amended. Their letter, dated July 25, 2002, responds to both the ESA and the Fish and Wildlife Coordination Act and can be found in Appendix A-1.

B. National Historic Preservation Act of 1966, as amended. Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) establishes a program for the preservation of additional historic properties throughout the Nation, and for other purposes, approved October 15, 1966 (Public Law 89-665; 80 Stat. 915; 16 U.S.C. 470) as amended. The NHPA and its implementing regulations 36 CFR Part 800: "Protection of Historic Properties," establishes the primary policy, authority for preservation activities, and compliance procedures. The NHPA ensures early consideration of historic properties preservation in Federal undertakings and the integration of these values into each agency's mission and declares Federal policy to protect historic sites and values in cooperation with other nations, states, and local governments.

Allowing for tribal and interested/consulting party review and comment contributes to fulfilling obligations as set forth in the National Historic Preservation Act (PL 89-665), as amended; the National Environmental Policy Act of 1969 (PL 91-190); Executive Order (EO) 11593 for the "Protection and Enhancement of the Cultural Environment" (Federal Register, May 13, 1971); the Archaeological and Historical Preservation Act of 1974 (PL 93-291); the ACHP "Regulations for the Protection of Historic and Cultural Properties" (36 CFR Part 800); and the applicable National Park Service and Corps regulations.

Responses were received from the IHPA by letters dated December 4, 2000, and October 30, 2001 (IHPA Log #0011090020k-P), which concurred with the Corps' opinions and a determination of ***No Historic Properties Affected,*** as defined in 36 CFR Part 800.3(a)(1) for the project as proposed. Compliance with the NHPA has been met.

C. Federal Water Project Recreation Act. Opportunities for recreational development were considered during the planning of this project. While the project is not specifically intended for recreational purposes, it is recognized that recreational opportunities would be an ancillary benefit of the project.

D. Fish and Wildlife Coordination Act. Project plans have been coordinated with the USFWS, the U.S. EPA, and the ILDNR. The USFWS and ILDNR have also been involved concerning formulation of alternatives for the project and their opinions considered in its development regarding endangered species, critical habitats, and other sensitive areas of concern. The USFWS coordination letter, dated July 15, 2002, provides comments under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); and the Endangered Species Act of 1973, as amended. All coordination responses can be found in Appendix A-1.

E. Wild and Scenic Rivers Act of 1968, as amended. This portion of the Illinois Waterway is not listed as a component of the National Wild and Scenic River System.

F. Executive Order 11988 (Flood Plain Management). Executive Order 11988 directs Federal agencies to: (1) avoid development in the floodplain unless it is the only practical alternative; (2) reduce the hazards and risks associated with floods; (3) minimize the impact of floods on human safety, health, and welfare; and (4) restore and preserve the natural and beneficial values of the floodplain. After an extensive alternatives evaluation, the placement of dredged material to construct islands in Peoria Lake is deemed to be the only practicable alternative for this project. As such, the proposed action is in accordance with Executive Order 11988 and is judged to be in full compliance.

G. Executive Order 11990 (Protection of Wetlands). The proposed alternatives for this project propose construction activities that would directly promote the development of wetlands. Since the results of the construction activities promote the development of wetland habitat, the project is deemed to be in full compliance.

H. Clean Water Act (Sections 401 and 404), as amended. A Section 404(b)(1) Evaluation for the selected plan can be found in Appendix A-3.

I. Clean Air Act, as amended. No aspect of the proposed project has been identified that would result in violations to air quality standards.

J. Farmland Protection Policy Act of 1981. No farmland is impacted by the recommended plan.

K. National Environmental Policy Act of 1970, as amended. The completion and public coordination of this EA fulfills NEPA compliance.

L. National Economic Development (NED) Plan. The NED Plan is the plan that best satisfies the Federal planning objectives of increasing the Nation's output of goods and services and produces the most improvement to the national economy. Dollars and non-monetary outputs (average annual habitat units) were used to quantify all possible plans and alternatives for this project. The proposed plan is therefore considered the best to fulfill the NED objective.

Summary of Coordination, Public Views, and Comments

COORDINATION

Throughout a feasibility study, the Corps of Engineers strives to inform, educate, and involve the many groups who may have an interest in the study. This coordination is paramount to assuring that all interested parties have the opportunity to be part of the study process.

One process used for coordination is the public involvement process. Public involvement is the exchange of information with various segments of the public. It attempts to reduce unnecessary conflict and achieve consensus. The goal of public involvement and coordination is to open and maintain channels of communication with the public in order to give full consideration to public views and information in the planning process (Engineering Regulation 1105-2-100, Appendix B - Public Involvement, Collaboration and Coordination).

An effective public involvement program must identify and respond to as many affected publics as possible throughout the study and consider their input in the study's decision-making process. Content analysis is the method employed to identify public opinion, study concerns, and potential controversy. It ensures that the public involvement plan is responsive to the level of interest and concern expressed by the public, and it assesses the effectiveness of the public involvement techniques.

The main forum for receiving feedback during the Illinois River, Peoria Riverfront at Peoria, Illinois, Environmental Restoration Feasibility Study was through the study's newsletters and open houses. As discussed below, newsletters provided points of contact for the publics' questions/comments. The open house attendees were offered comment sheets to express their concerns and provide comments. Following each open house, a content analysis report was prepared to document the proceedings and public comments, and to analyze the information that was submitted. The reports described the dominant tones and themes of the feedback generated by the public participation program. A copy of each report was distributed to all study team members for use in the plan formulation process.

During the study, the Corps of Engineers coordinated not only with its cost-sharing partner, the ILDNR, but also with numerous groups including elected congressional representatives; Federal,

State, county, and city agencies; environmental groups/organizations; farm bureaus; businesses; media; and the unaffiliated general public.

PUBLIC VIEWS AND COMMENTS - JUNE 2000 OPEN HOUSE

In May 2000, a study newsletter was mailed to a distribution list of nearly 700 addresses notifying them of the study's initiation and an upcoming cost-sharing signing ceremony and public open house. The newsletter also provided information about the study area, study background, coordination efforts, and Corps of Engineers and ILDNR points of contact for comments/questions. A copy of the newsletter is included in Appendix A-1, Correspondence. A news release also was issued to media (television, radio, and newspaper) sources in the study area.

The cost-sharing signing ceremony and open house were held in Peoria, Illinois, on June 5, 2000. The ceremony, sponsored by Congressman Ray LaHood (IL-18), formally signified the partnership formed by the Rock Island District of the U.S. Army Corps of Engineers and the Illinois Department of Natural Resources to execute this study. The purpose of the open house was to meet with the public to discuss on a one-to-one basis information on the range of alternatives for restoring the environment in the Illinois River along the Peoria Riverfront, and to gather comments on the alternatives and problems in the area.

Approximately 70 members of the public attended the open house, viewed the displays, and met with study members (represented by Corps of Engineers, ILDNR, Illinois Department of Natural Resources Watershed Management, Illinois Department of Agriculture, Illinois State Water Survey, Cooperative Extension Service, and Natural Resources Conservation Service). A comment sheet was offered to the public for feedback, and approximately 27% (19) were returned.

Overall, comments were very favorable regarding the open house format, displays, and the goals of the study. A strong majority of attendees agreed:

- That the open house provided an opportunity to gain information and a better understanding of the study, that the materials and displays were informative, and that they had a chance to talk to a study team member and offer comments about the study.
- That the goal of the study should be to create and maximize habitat diversity, reduce sediment delivery from tributaries, and provide ancillary recreation benefits.
- That island creation and/or sediment removal through dredging are appropriate methods of reaching the above-stated goals.

Other responses revealed that, overall, the public considers the general placement of the island and dredged areas acceptable, that tributary restoration is viewed as the most important means of addressing sediment delivery to Peoria Lake, and that water quality is also an important issue.

The comments received at the open house were provided to the study team members for consideration and use in the analysis of the array of potential alternatives.

PUBLIC VIEWS AND COMMENTS - NOVEMBER 2000 OPEN HOUSE

In November 2000, a second newsletter was mailed to over 700 addresses. (Note that the mailing list grew to include new names added from the June 2000 open house attendees.) The newsletter provided the study background, purpose, and a study update; summarized the June 2000 open house; announced a November 29, 2000, open house; stated that another open house would be held before the study's conclusion; and listed points of contact for comments/questions. (The open house was held in conjunction with an Illinois River Ecosystem Restoration Study cost-sharing signing ceremony and open house; however, the summary of comments provided below pertains to the Peoria Riverfront Development Study only.) A copy of the newsletter is included in Appendix A-1. A news release also was issued to media (television, radio, and newspaper) sources in the study area.

The November 2000 open house was held in Peoria, Illinois. The purpose of the open house was to provide information on the study status and on the alternatives being considered for restoring the environment within the Illinois River watershed along the Peoria Riverfront and to gather comments on the alternatives. Corps of Engineers, Illinois Department of Natural Resources, and Illinois State Water Survey representatives were present at the open house to discuss the study with the public on a one-to-one basis and to receive the public's comments.

A total of 72 people attended the open house. Of those, 42% (39) returned comment sheets. The following paragraphs summarize questions asked and responding comments.

For the alternative that includes dredging to create islands, the "large island above the bridge (renamed mid-sized island above the bridge)" alternative was selected as the most acceptable by over half of those responding. About one-third of the respondents supported the "large island pair below bridge alternative (subsequently screened due to high cost and lack of sponsor interest)," and the remaining island alternatives of "small island above bridge," "single island below bridge (renamed large island below the bridge)," and "island pair below bridge" were supported fairly equally.

Additional comments received pertaining to this alternative included the need to determine a purpose for any island creation, a suggestion to move the silt in the river into a large island, and the concern for islands for wildlife and habitat restoration. Although most respondents agreed with the dredging to create islands alternative, a comment was made that this alternative is not the long-term answer to the river's problems.

The stream restoration alternatives on Farm Creek were supported by 86% of those in attendance. Additional comments about this alternative included concerns about erosion, sediment reduction, the importance of wildlife habitat, wetland restoration, and increased biodiversity.

The comments received at the open house were provided to the study team members for consideration and use in the analysis of the array of potential alternatives.

PUBLIC VIEWS AND COMMENTS – SUMMER 2002 PUBLIC MEETING

The third public meeting was held at the study's conclusion. The May newsletter announced the public meeting schedule and was mailed to each of the 800+ names on the study's mailing list prior to the meeting. A copy of the newsletter is included in Appendix A-1. A news release also was issued to media (television, radio, and newspaper) sources in the study area.

The June 2002 public meeting was held in Peoria, Illinois. The purpose of the meeting was to address the public during the public review phase and to explain the alternatives that the study team had selected to enhance the Peoria Lake and Farm Creek environment. The meeting also served as a forum for gathering comments on the recommended plans. Two sessions of the meeting were held with an open house session for the first one-half hour, followed by the public meeting portion. Representatives from the Illinois Department of Natural Resources and the Corps of Engineers met with the public on a one-to-one basis during the open house portion to discuss the displays and to receive public comments. The public meeting sessions began with a formal presentation explaining the selected alternatives, followed by a question and answer and comment/statement period.

A total of 77 people attended. Meeting attendees were asked to fill out a comment sheet after each session. A total of 35 comment sheets were returned. Four statements were entered for the record at the meeting and one statement was sent through the mail. Tributary restoration and sediment delivery remain major concerns expressed by the public both at this set of meetings and at the June 2000 open houses. Another recurring comment reiterates that the public wants to get the project moving as soon as possible.

The majority of responses (74%) regarding Peoria Lake agree that the plan would enhance aquatic habitats and restore depth diversity; however, less than half of the responders (49%) agree that the plan would address sediment delivery and deposits, and an equal number either disagreed (29%) or were neutral (20%) about whether this problem would be successfully addressed by the recommended plan. Additional comments regarding the Peoria plan reflect the concern that scouring and erosion of the islands will create other problems, that the Plan is a temporary fix and does not address the real problems causing river sedimentation.

For Farm Creek, 66% agreed that the recommended plan would maximize habitat creation, and 60% agreed that the plan would reduce sediment delivery and improve water quality. The larger number of responders that were either neutral or disagreed with the plan could indicate that many of them were not convinced that the recommended plan would meet the needs for restoring Farm Creek. This is also reiterated in the additional comments received citing that the project, as stated, only prevents flooding, not sediment reduction.

The majority of questions asked during both question and answer sessions were directed at how the project would affect riverfront property owners, boating, water supply, water quality, flood heights, bankline erosion, and downstream area. Statements entered into the record by the Peoria Area Chamber of Commerce, Heartland Water Resources Council, Nature Conservancy, Peoria Lakes Basin Alliance, and Peoria Audubon Society all support the recommended plans for this study.

The information received at the public meeting was distributed to the study team members.

SUMMARY

Various publics were identified as target audiences for public involvement and coordination, including elected congressional representatives; Federal, State, county, and city agencies; environmental groups/organizations; farm bureaus; businesses; media; and the unaffiliated general public. These publics made up the 800+ addresses on our mailing list that was used to inform, educate, and involve the public.

The goals of the coordination process were to inform, educate, and involve the public and solicit feedback through open communication and to include in the plan formulation process all publics interested in and affected by the study recommendation(s).

The newsletters and public open houses provided the public with opportunities to become informed and educated about the study and involved in the study by providing feedback to the study team. The feedback was gathered into content analysis reports and used by the study team to shape the plan formulation process and to develop the recommended plan. The study plans that are included in this report have been influenced by the public involvement process.

Recommendation

I have weighed the outputs to be obtained from the full implementation of this ecosystem restoration project against its estimated cost and have considered the various alternatives proposed, impacts identified, and overall scope. In my judgment, this project, as proposed, justifies expenditure of Federal funds. I recommend that the Secretary of the Army for Civil Works approve the proposed project to include constructing in Peoria Lake the mid-sized upper island of 21 acres and two lower islands of 17 and 37 acres, respectively, with a flowing side channel. The total area to be dredged for construction of the project would be approximately 200 acres.

The current estimated first cost of the recommended plan is $15,182,000 (December 2002 price levels). This total estimated project cost includes construction of the project features; planning, engineering, and design; construction management; real estate; and monitoring. Implementation would be cost shared 65% by the Federal Government and 35% by the Illinois Department of Natural Resources (ILDNR), the Non-Federal Sponsor. The Federal contribution is estimated at $9,867,774 and the non-Federal contribution is estimated at $5,313,417. It is the ILDNR's responsibility to provide the real estate and conduct operation and maintenance. The operation and maintenance of these features is estimated to cost $11,340 annually.

The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of the national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and implementation funding.

William J. Bayles
Colonel, U.S. Army
District Engineer

Finding of No Significant Impact

I have reviewed the information provided by this Feasibility Study with integrated Environmental Assessment, along with data obtained from Federal and State agencies having jurisdiction by law or special expertise, and from the interested public. I find that the proposed Peoria Riverfront Development (Ecosystem Restoration) Project would not significantly affect the quality of the human environment. Therefore, it is my determination that an Environmental Impact Statement is not required. This determination may be reevaluated if warranted by further developments.

An array of features and alternatives was considered for the Peoria Riverfront Development (Ecosystem Restoration) Project. Alternatives considered were:

Alternatives for Peoria Lake:

1. No Federal Action
2. Dredging to create aquatic habitat and a small island (9-acre island and 17 acres increased depth diversity) – Upstream of the McClugage Bridge (U.S. Highways 24 and 150)
3. Dredging to create aquatic habitat and a mid-sized island (21-acre island and 55 acres increased depth diversity) – Upstream of the McClugage Bridge (U.S. Highways 24 and 150)
4. Dredging to create aquatic habitat and two islands with a flowing side channel (17- and 37-acre islands and 144 acres increased depth diversity) – Downstream of the McClugage Bridge (U.S. Highways 24 and 150)
5. Dredging to create aquatic habitat and a large island (46-acre island and 99 acres increased depth diversity) – Downstream of the McClugage Bridge (U.S. Highways 24 and 150)

The preferred alternative consists of:

- Dredging in Peoria Lake with construction of the mid-sized island above and two islands with a flowing side channel below the McClugage Bridge (U.S. Highways 24 and 150). We also anticipate construction of one or two test islands within the same area prior to construction of the two larger islands below the bridge.

Factors considered in making a determination that an Environmental Impact Statement was not required were as follows:

- The project is anticipated to improve the value of Peoria Lake for migratory and resident birds, fish, and wildlife species.
- Aside from temporary disturbance during construction periods, no long-term adverse effects to natural resources or historic properties are anticipated. No State or Federal endangered or threatened species would be affected by the proposed action.
- The project is in compliance with Section 404 of the Clean Water Act. Section 401 certification from the State of Illinois will be received prior to project construction.
- No significant economic impacts are expected to occur in the project area.

20 Dec 02
(Date)

William F. Bayles
Colonel, U.S. Army
District Engineer

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PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS (ECOSYSTEM RESTORATION)

FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

TECHNICAL APPENDICES A THROUGH J

MARCH 2003

US Army Corps
of Engineers ®
Rock Island District

APPENDIX A-1

CORRESPONDENCE

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX A-1
CORRESPONDENCE

CONTENTS

Item	Page
Feasibility Study Newsletter, Notice of Study Initiation, May 2000, prepared by the Rock Island District, U.S. Army Corps of Engineers	A-1-1
Feasibility Study Newsletter, Open House Scheduled, November 2000, prepared by the Rock Island District, U.S. Army Corps of Engineers	A-1-3
Letter from Ms. Anne E. Haaker, Deputy State Historic Preservation Officer, Illinois Historic Preservation Agency, dated December 4, 2000	A-1-6
Letter from the Rock Island District, U.S. Army Corps of Engineers, to Distribution List, dated June 7, 2001, requesting preliminary comments on the proposed Peoria Lake project	A-1-7
Letter from Mr. Richard C. Nelson, U.S. Fish and Wildlife Service, Rock Island Field Office, dated June 27, 2001	A-1-19
Letter from Mr. Robert W. Schanzle, Illinois Department of Natural Resources, dated July 18, 2001	A-1-22
Fax from Mr. Mike Diedrichsen, Illinois Department of Natural Resources, Office of Water Resources, providing comments on the project, dated September 28, 2001	A-1-27
Letter from Ms. Anne E. Haaker, Deputy State Historic Preservation Officer, Illinois Historic Preservation Agency, dated October 30, 2001	A-1-29
Letter from Mr. Steve Frank, Bureau of Land and Water Resources, Illinois Department of Agriculture, providing Form AD-1006, dated November 8, 2001	A-1-30
Feasibility Study Newsletter, Public Meetings Scheduled, May 2002, prepared by the Rock Island District, U.S. Army Corps of Engineers	A-1-33
Letter from Mr. Richard C. Nelson, U.S. Fish and Wildlife Service, Rock Island Field Office, dated July 15, 2002	A-1-37

US Army Corps of Engineers
Rock Island District

ILLINOIS RIVER, RIVERFRONT DEVELOPMENT AT PEORIA, ILLINOIS ENVIRONMENTAL RESTORATION FEASIBILITY STUDY NEWSLETTER

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Notice of Study Initiation

May 2000

CORPS OF ENGINEERS/DEPARTMENT OF NATURAL RESOURCES COST-SHARING SIGNING CEREMONY PLANNED

The U.S. Army Corps of Engineers, Rock Island District, and the Illinois Department of Natural Resources entered into a feasibility study cost-sharing agreement in October 1999 and became "partners" in a combined effort to restore the environment in the Illinois River along the Peoria Riverfront.

The public is invited to attend a 9 a.m. ceremony on June 5 as COL James V. Mudd, Rock Island District Commander, and Mr. Brent Manning, Illinois Department of Natural Resources Director, formally initiate the study and their agencies' partnership throughout the feasibility study. The ceremony is sponsored by Congressman Ray LaHood, who was instrumental in getting congressional authorization for the study. The ceremony will be held at the Gateway Center, 200 North East Water Street, Peoria, Illinois. The study is scheduled for completion in the fall of 2001.

OPEN HOUSE TO FOLLOW

blic open house will be held after the ceremony. Corps of Engineers and Department of Natural Resources representatives will be available at any time between the hours of 10:30 a.m. to 12:30 p.m. and 5:00 p.m. to 8:00 p.m. to meet with the public to discuss on a one-on-one basis information on the range of alternatives for restoring the environment in the Illinois River along the Peoria Riverfront and to gather comments on the alternatives and problems in the area. A continuously running stand-alone presentation and several displays will be available for viewing to further explain the study. All interested members of the public are encouraged to attend the open house, visit the displays, talk to the agency representatives, and to provide comments. The comments received at this open house will be considered during the study and will be part of the official NEPA scoping process.

STUDY AREA

The study area includes the Illinois River between Henry and Naples, Illinois, with a specific focus on Peoria Lake from Illinois River Mile 181.0 near Chillicothe, Illinois, to River Mile 158.0 at Peoria Lock and Dam. A total of 12 tributary streams drain directly into Peoria Lake, including Richland, Partridge, Blue, Tenmile, and Farm Creeks. Studies have indicated that these tributaries have contributed significantly to sediment delivery to Peoria Lake.

STUDY BACKGROUND

In 1998, the Corps of Engineers completed a reconnaissance study that identified problems, opportunities, and potential solutions (alternatives) to address the problems in the study area. The study results indicated that further study was warranted. This more detailed feasibility study will continue to develop and investigate alternatives to enhance aquatic habitat and reduce sediment delivery/deposition in the Peoria Lake area, with ancillary benefits to recreational boating fishing. These efforts will help address the major problem, sedimentation of the lake that has resulted in the loss of th resulting in reduced habitat value and diversity and reductions in the lake area available to recreational boaters. dition, degraded tributary streams are delivering high levels of sediment to Peoria Lake. Opportunities will be explored to address these conditions, especially those that relate to the downtown Peoria Riverfront Development Project.

Alternatives identified to date to be considered in the feasibility study fit into two broad categories:

(1) River restoration measures to address sediments deposited in the lakes and improve aquatic habitats. These options fall into two general categories:

(a) Dredging to create islands and side channels that would address the loss of habitat diversity within Upper and Lower Peoria Lakes, and

(b) Dredging with placement of sediment removed outside of the lakes, such as on brownfields or former mined lands, that would address historic sedimentation and restore some of the aquatic and terrestrial conditions to a less degraded condition.

(2) Watershed restoration measures to address current and future sediment delivery to the lakes. Options include implementing stream restoration on tributaries to Peoria Lake. Possible actions include reducing stream bed and stream bank erosion, slowing runoff rates, and providing land treatments (buffers, grass waterways, etc.).

COORDINATION

Throughout the study period, the Corps of Engineers will coordinate not only with our cost-sharing partner, the Illinois Department of Natural Resources, but also with Federal, State, and local governmental agencies. These agencies include the U.S. Department of Agriculture, U.S. Department of Transportation, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Geological Survey, Peoria Riverfront Development Commission, Tri-County Regional Planning Commission, Soil and Water Conservation Districts, and county and city officials.

Coordination also will be maintained with members of the general public and non-governmental organizations. Newsletters providing study updates will be produced approximately four times during the study period. Two additional meetings with the public are planned (tentatively for the fall of 2000 and the summer of 2001). Meetings will be announced in the study newsletters.

COMMENTS?

Your comments are important to us. If you have technical comments or questions about the study, please contact Mr. Brad Thompson, Project Coordinator, at 309/794-5256 (bradlev.e.thompson@usace.army.mil) or Ms. Teresa Kincaid, Project Manager, at 309/794-5227 (teresa.a.kincaid@usace.army.mil). You also may write to them at the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: CEMVR-PM-M (Thompson or Kincaid)
Clock Tower Building – P.O. Box 2004
Rock Island, Illinois 61204-2004

The contact for the Illinois Department of Natural Resources is Mr. Jim Mick. Mr. Mick can be reached at 309/543-3316 (jmick@dnrmail.state.il). You may write to Mr. Mick at the following address:

Mr. Jim Mick
Illinois River Watershed Coordinator
Office of Resource Conservation
700 South 10th Street
Havana, Illinois 62644

If you are aware of someone who may wish to be added to the study's mailing list to receive newsletters and future stud mailings, please ask him/her to contact Ms. Sue Simmons at 309/794-5573 (suzanne.r.simmons@usace.army.mil).

Your comments are important to us.

A-1-2

US Army Corps of Engineers
Rock Island District

PEORIA RIVERFRONT DEVELOPMENT ENVIRONMENTAL RESTORATION FEASIBILITY STUDY NEWSLETTER

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Newsletter No. 2 November 2000

Open House Scheduled

The purpose of this newsletter is to summarize study progress to date and to announce a second open house, which will be held on November 29, 2000, in Peoria. Please see page 3 for details.

Study Background

The U.S. Army Corps of Engineers, Rock Island District, and the Illinois Department of Natural Resources entered into a feasibility study cost-sharing agreement in October 1999 and became "partners" in a combined effort to restore the environment in the Illinois River along the Peoria riverfront. On June 5, 2000, Colonel James V. Mudd, Rock Island District Commander, and Mr. Brent Manning, Illinois Department of Natural Resources Director, formally initiated the study and their agencies' partnership throughout the feasibility study at a cost-sharing signing ceremony sponsored by Congressman Ray LaHood. The study is scheduled for completion in the fall of 2001.

The study focuses on Peoria Lake from Illinois River Mile 181.0 near Chillicothe, Illinois, to River Mile 158.0 at Peoria Lock and Dam. A total of 12 tributary streams drain directly into Peoria Lake, including Richland, Partridge, Blue, Tenmile, and Farm Creeks. Studies have indicated that these tributaries have contributed significantly to sediment delivery to Peoria Lake.

Study Purpose

The major problem in the Peoria Lake area is sedimentation. Degraded tributary streams deliver high levels of sediment to Peoria Lake that has resulted in loss of depth in the lake. The lake condition has resulted in reduced habitat value and diversity, and reduced areas in the lake available to recreational boaters.

The study team is concentrating on opportunities to address these problems, especially those that relate to the downtown Peoria Riverfront Development Project.

Study Update

Study team members continue to look at alternatives which would enhance aquatic habitat and reduce sediment delivery/deposition in the Peoria Lake area, with ancillary benefits to recreational boating and fishing. Issues to be considered in evaluating various alternatives include: Is this the most cost-effective way to improve fish and wildlife habitat? Are the improvements sustainable? Are there willing landowners? Can impacts to flood heights, the navigation channel, and other infrastructure be avoided?

Alternatives that have been identified to date that address these issues include:

(1) River restoration measures to address sediments deposited in the lakes and create deep water aquatic habitats. These options fall into two general categories:

(a) Dredging to create islands and side channels/backwaters. A number of potential island locations have been evaluated. The most

promising locations to date have been in the upstream end of Lower Peoria Lake. Concepts are being explored to create deep water (>6-foot) backwater and flowing side channel habitats for fisheries benefits.

(b) Dredging with placement of sediment removed outside of the lakes. In combination with islands, additional dredging with placement in uplands areas is being evaluated. Potential placement areas include the Tenmile Creek delta, brownfields or mine lands in the Peoria area, or loading material on barges for placement on brownfields in the Chicago area.

(2) Watershed restoration measures to address current and future sediment delivery to the lakes. Farm Creek was selected as the tributary focus area based on the study authority and local interest. The study team is looking at watershed stabilization options, including buffers, water and sediment control basins, riparian habitat restoration, and stream bed and bank stabilization.

Other study efforts have included fish sampling in lower Peoria Lake. The results of this sampling confirmed that relatively few fish are able to use the existing shallow water lake reaches. This sampling helps set the baseline against which various restoration options are compared.

SUMMARY OF JUNE 5, 2000, OPEN HOUSE

Two public open house sessions were held after the signing ceremony on June 5, 2000: one in the morning and one in the late afternoon/evening. Displays were provided by the Rock Island District, Corps of Engineers; Illinois Department of Natural Resources; Illinois Department of Natural Resources Watershed Management; Illinois Department of Agriculture; Illinois State Water Survey; Cooperative Extension Service; and the Natural Resource Conservation Service. Representatives from these agencies were present to meet with the public to discuss on a one-to-one basis information on the range of alternatives for restoring the environment in the Illinois River along the Peoria Riverfront and to gather comments on the alternatives and problems.

Approximately 70 people attended the open house sessions. Although attendance was less than anticipated, those who attended spent considerable time looking at the displays and talking to agency representatives. A comment sheet was offered to the attendees. Comments from those who completed a comment sheet include the following:

- 95% of the attendees agreed that the open house provided an opportunity to gain information and a better understanding of the Peoria Riverfront Development Study.
- 74% agreed that the open house provided an opportunity for everyone to offer comments about the study.
- 95% agreed that the displays and display materials provided were informative.
- 79% said that they had the chance to talk to a study team member.
- 89% agreed that the goal of the study should be to create and maximize habitat diversity, reduce sediment delivery from tributaries, and provide ancillary recreation benefits. Other comments included: improve water quality and promote tourism, dredge the entire lake, make more citizens aware of Peoria Riverfront conditions; and prevent Peoria Lakes from becoming a marsh full of mosquitoes.
- 84% also agreed that island creation and/or sediment removal through dredging are appropriate methods of achieving these goals. Other comments included: this is an expensive way to deal with sediment problems caused by siltation that should be corrected upstream; it has been in talks for years – just do it; and need to meet with Peoria Lakes Basin Alliance regarding island creation, placement, and sequencing.
- 84% of the respondents agreed that tributary restoration is important to address sediment delivery to Peoria Lake.
- There were few specific comments and no consensus on the proposed general locations of islands and dredged areas.

The comments received are being considered by the study team as they refine the alternatives.

JOINT OPEN HOUSE WITH ILLINOIS RIVER ECOSYSTEM STUDY PLANNED

An open house will be held on November 29, 2000, at the Gateway Center, 200 North East Water Street, Peoria, Illinois. The purpose of the open house is to provide information on the study status and on the alternatives now being considered for restoring the environment within the Illinois River watershed along the Peoria Riverfront and to gather comments on the alternatives.

Representatives from the Corps of Engineers and the Department of Natural Resources, as well as other participating State agencies, will be available *at any time* from 9:30 a.m. to noon and 4 p.m. to 7 p.m. to meet with the public to discuss on a one-to-one basis updated information on the alternatives. All interested members of the public are encouraged to attend the open house, visit updated displays, talk to agency representatives, and provide comments.

An open house to discuss the Illinois River Ecosystem Restoration Study also will be held at the Gateway Center on November 29th. Since many people in the Peoria area are interested in both studies, these open houses are being held concurrently for the public's convenience.

WHAT'S NEXT?

The study team will continue to refine the alternatives. Additional site survey and evaluation will be required for the most promising options. Based on the additional evaluations and comments from the public workshop an initial study team recommendation will be made and a draft report prepared.

One more meeting with the public will be held before the study's conclusion. The meeting will be scheduled after the draft report is released to provide an opportunity for public comment on the initial recommended plan and draft report. This meeting is tentatively planned for summer 2001. A study newsletter will announce the meeting and will provide a study update. A final newsletter will be released at the end of the study.

COMMENTS?

Your comments are important to us. If you have technical comments or questions about the study, please contact Mr. Brad Thompson, Project Manager, at 309/794-5256 or by email at bradley.e.thompson@usace.army.mil

You may write to Mr. Thompson at the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: CEMVR-PM-M (Thompson)
Clock Tower Building – P.O. Box 2004
Rock Island, Illinois 61204-2004

The contact for the Illinois Department of Natural Resources is Mr. Jim Mick. Mr. Mick can be reached at 309/543-3316 or by email at jmick@dnrmail.state.il.

You may write to Mr. Mick at the following address:

Mr. Jim Mick
Illinois River Basin Coordinator
Region III Fisheries Administrator
Illinois Department of Natural Resources
700 South 10th Street
Havana, Illinois 62644

If you are aware of someone who may wish to be added to the study's mailing list to receive newsletters and future study mailings, please ask him/her to contact Ms. Sue Simmons at 309/794-5573 (suzanne.r.simmons@usace.army.mil).

Your Comments Are Important To Us!

A-1-5

Illinois Historic
Preservation Agency

1 Old State Capitol Plaza • Springfield, Illinois 62701-1507 • (217) 782-4836 • TTY (217) 524-7128

Peoria County Please refer to: IHPA LOG #0011090020K-P
Lower Peoria Lake, Peoria & Tazewell Counties, IWW RM 163-167
Potential Island Creation/Dredging & Stream or Watershed Restoration
Feasibility Study - Peoria Riverfront Development (Ecosystem Restoration) Project

December 4, 2000

Mr. Kenneth A. Barr
U.S. Army Corps of Engineers, Rock Island District
Chief, Environmental Analysis Branch
Clock Tower Building/P.O. Box 2004
Rock Island, IL 61204-2004

Dear Sir:

Thank you for requesting comments from our office concerning the possible effects of the project referenced above on cultural resources. Our comments are required by Section 106 of the National Historic Preservation Act of 1966 (16 USC 470), as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

We concur with the Corps' proposal to conduct a Phase I archaeological survey for the ar[redacted]of potential effect (APE) located in the floodplain and upland areas of this project, and t[redacted] deep testing for buried properties is appropriate for floodplain locales that comprise the APE. We also concur with the Corps' opinion that no historic properties are affected by the proposed island creation element of the Project, but understand that the Corps will resume consultation with our Office should undocumented historic properties be identified during dredging and island creation.

THE IHPA LOG NUMBER OR A COPY OF THIS LETTER SHOULD BE PROVIDED TO THE SELECTED PROFESSIONAL ARCHAEOLOGICAL CONTRACTOR TO ENSURE THAT THE SURVEY RESULTS ARE CONNECTED TO YOUR PROJECT PAPERWORK. If you have any questions, please contact Frances R. Knight at 217/782-9345.

Sincerely,

Anne E. Haaker
Deputy State Historic
Preservation Officer

AEH:FRK:bb

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

June 7, 2001

Planning, Programs, and
Project Management Division (10-1-7c)

SEE DISTRIBUTION LIST

The Rock Island District of the U.S. Army Corps of Engineers (Corps) is conducting a feasibility study to investigate enhancing aquatic habitat in Peoria Lake on the Illinois River, as well as various options that might help to reduce sediment delivery and deposition within the Peoria Lake area. This study is being conducted with our cost-share sponsor, the Illinois Department of Natural Resources (DNR). It is anticipated that the feasibility report will be completed later this year and will include an integrated Environmental Assessment (EA).

This early coordination letter serves to provide you with a brief description of the proposed projects being considered within the larger feasibility study and to ask for your agency's early comments within your area of expertise for that study. Additionally, we ask that you include comments on the proposed construction of a small-scale trial, or test island that would have a separate EA completed and distributed for public review within the next few months.

The study alternatives being considered within the larger feasibility report fall into two broad categories, as follows:

a. River restoration measures to address sediments already deposited in the lake and improve aquatic habitat. These options fall into two general categories, as follows:

(1) Dredging to create island and side channels/backwaters, and

(2) Dredging with placement of sediments removed outside of the lake, such as on brownfields or former mined lands.

b. Watershed restoration measures to address current and future sediment delivery to the lake. Options include implementing stream restoration on Farm Creek with possible actions or construction to reduce streambed and streambank erosion, slowing runoff rates, and providing land treatments (buffers, grass waterways, etc). We are also looking at an option on the Blue Creek watershed that would redirect the downstream end of Blue Creek into a nearby quarry pit that would act as a large sediment trap.

Sedimentation within Peoria Lake has resulted in the loss of depth, causing a reduction of aquatic habitat and diversity within the lake. The proposal to dredge portions of the lake to provide deep-water aquatic habitat requires that the dredged material be placed somewhere in a cost-effective manner. Using the material to create islands provides a place to put the material while also providing the opportunity to provide a more diverse ecosystem to the lake.

The area being considered for dredging and island construction is in the vicinity of the McCluggage Bridge in the upper northeast portion of Lower Peoria Lake. The island (or islands) would be created within an area owned by the Illinois DNR. Most of the area being considered for island creation has water only 1-2 feet deep with a substrate of 4 feet (or greater in some areas) of soft mud and silt the consistency of pudding. Early investigation of this area shows that it has only marginal, if any, habitat value for most aquatic species.

Dredging to construct the island(s) would range from 6-14 feet below flat pool and incorporate side channels and deep holes to provide over-wintering habitat and "edge" for fish species. The islands would be constructed to approximately 10 feet above flat pool at their highest. Additional structures, such as riprap along island shoreline and jetties out into the water, are also being considered. Various island designs and sizes are being hydraulically modeled for suitability, stability, and sustainability. Enclosures 1-4 show the various dredging and island construction options being considered at this time.

Techniques similar to those used to construct the Peoria Environmental Management Program islands would likely be utilized for this project, although others are being considered. It is anticipated that the proposed project would have a success similar to that which the upper lake island construction has had. However, recent Corps survey information shows that the substrate where the proposed island(s) in the lower lake would be constructed, while similar, may be less suitable than anticipated. For this reason, the Corps would like to pursue construction of a small test island in the same location proposed for the larger island project. This test island would allow the Corps to better determine if a larger island could be constructed in the same area. The test island's proposed dimensions would be approximately 100 feet by 50 feet and use approximately 560 cubic yards of dredged material (See Enclosure 5). An EA for the test island will be written and distributed as soon as possible. If no objections are received, construction could take place later this calendar year. Any early comments that you might have on this smaller island project would be appreciated.

Another option being considered to restore Peoria Lake is dredging of sediments with placement to a location outside of the lake. The dredging would likely take place within the same general area, but could conceivably include a larger area too. This would be determined by discussion with the Illinois DNR, project costs, and logistics for the amount of material removed.

Conversations between the Corps and the City of Chicago determined that Chicago would like to have the material transported up river for potential use in covering brownfields within the Chicago area. Other similar possibilities more locally accessible have not been identified at this time, but would be considered if your agency has any suggestions to offer.

Watershed restoration measures in Farm Creek are being considered in several places along the creek. Far up in the watershed, the City of Washington, Illinois, in northeast Tazewell County has purchased some parcels of property upstream of Washington on Farm Creek (See Enclosure 6). They are willing to work with the Corps and the Illinois DNR to develop detention basins on this land to create wetland habitat and slow water flows into and in Farm Creek. Two of the sites being considered for this work would have low earthen dikes constructed in what is currently farmed agricultural field. One site would have an earthen weir constructed across the creek and the other site would have an earthen dike constructed out of the creek and higher up in the watershed to retard runoff coming into the creek. Both areas would be planted with wetland and prairie vegetation and be allowed to develop wetland habitat behind the dikes.

Farm Creek behind the Farmdale Dam in the City of East Peoria is also being looked at for possible scenarios that might help restore portions of the creek (Enclosure 6). All proposed work would be done on Corps land within the dry reservoir. Some of the things being considered are rock weir structures in a tributary leading into the creek, reconnection of an oxbow to the creek, instream structures to reduce stream energy, bank stabilization in highly eroded areas and/or redirecting the creek to an area to form a shallow pond.

Ackerman Creek is another tributary to Peoria Lake that is being investigated for this project. Possible stream restoration within a small reach (Enclosure 6) would include bank stabilization and/or structures to form riffles and pools in the creek.

Even though Blue Creek is an intermittent stream that flows into upper Peoria Lake (See Enclosure 7), when it flows, it carries a fairly high sediment load. This is shown by the large delta that has grown into Peoria Lake. An alternative being evaluated for the feasibility report is to divert the stream into a nearby quarry. The quarry would then act as a sediment trap for the stream. The quarry is privately owned, but the owner has expressed interest in this effort.

Corps staff have researched current literature and made preliminary on-site investigations. We do not anticipate that the proposed project would adversely impact any state or federally listed, or proposed for listing, threatened or endangered species. We do not anticipate that the proposed project would jeopardize the continued existence of any species or critical habitat of any fish, wildlife, or plant that is designated as endangered or threatened. If you have any information that would alter that determination, please include it in your response to us so it can be evaluated and included in the EA.

The information provided should allow you to make preliminary comments on the proposed project. A timely review of this information and a written response for inclusion into both EAs would be greatly appreciated. Please provide your written recommendations, comments, and concerns relative to resources in your area of expertise no later than 30 days from the date of this letter.

In addition, we request that you provide us with any potential environmental restoration concepts that may fall under Section 1135 or Section 204 program authorities. These programs are authorized by the Water Resources Development Act (as amended) and require a non-Federal sponsor to cost share a percentage of project costs (details of the cost share vary between these programs). The Section 1135 program focuses on environmental quality improvement at water resources projects constructed by the Corps, which are feasible and consistent with authorized project purposes. The Section 204 program authorizes the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging activities at an authorized Federal navigation project. We are interested in pursuing restoration ideas relative to these programs as we execute our channel maintenance responsibilities. Your ideas are appreciated.

If you have any questions, please call Mr. Randy Kraciun of our Economic and Environmental Analysis Branch, telephone 309/794-5174, or write to our address above, ATTN: Planning, Programs, and Project Management Division (Randy Kraciun).

Sincerely,

ORIGINAL SIGNED BY

Kenneth A. Barr
Chief, Economic and Environmental
Analysis Branch

Enclosures

DISTRIBUTION LIST

Mr. Rick Nelson
Field Supervisor
U.S. Fish and Wildlife Service
4469 - 48th Avenue Court
Rock Island, IL 61201

Mr. Francis Lyons
Regional Administrator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Director
Western Rivers Operations (OB)
U.S. Coast Guard, Eighth District
1222 Spruce Street
St. Louis, MO 63103-2832

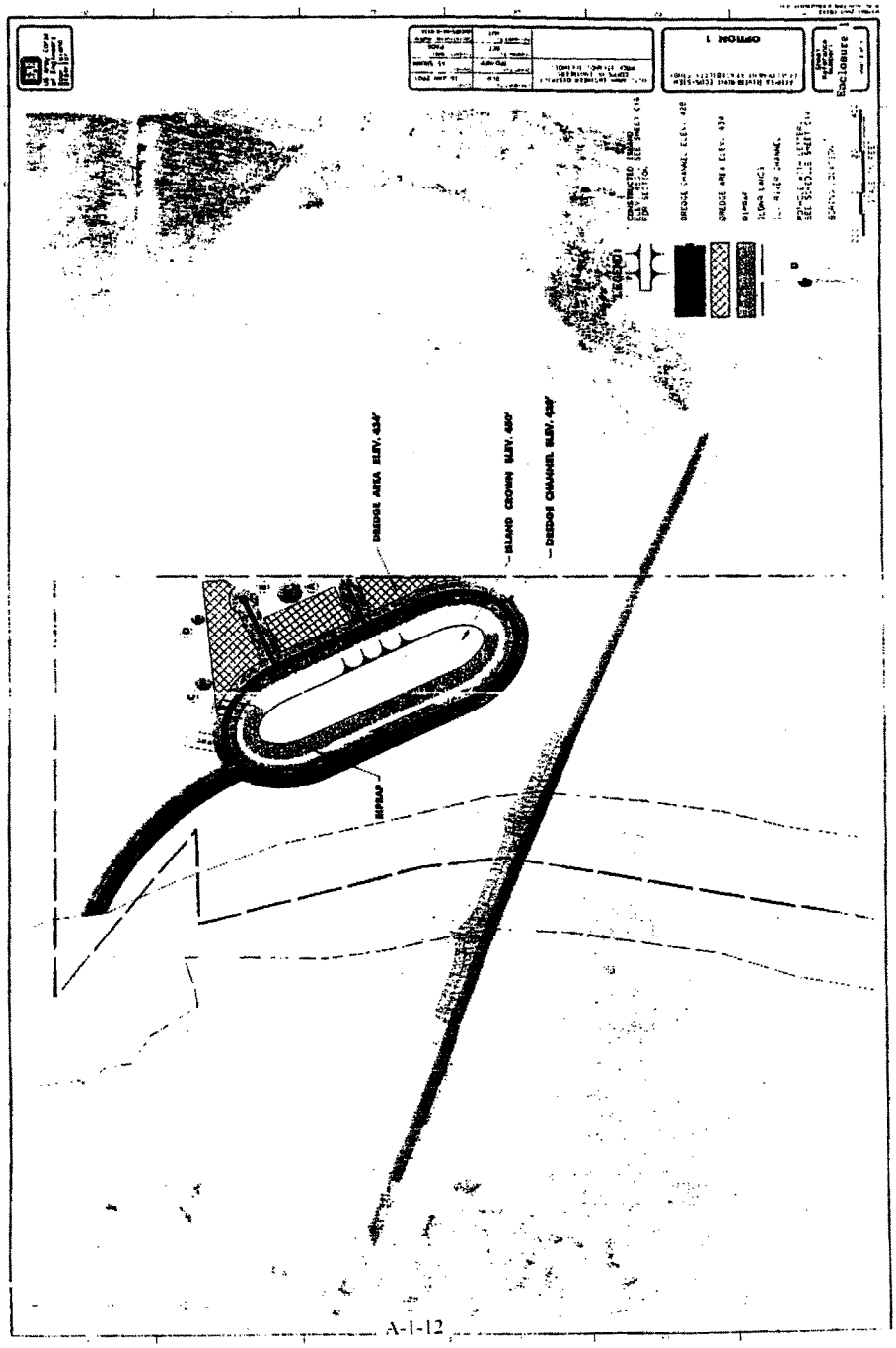
Mr. Dennis Kennedy
Senior Water Resources Engineer
Office of Water Resources
Illinois Department of Natural Resources
524 South 2nd Street
Springfield, IL 62701-1787

Mr. Bruce Yurdin
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, IL 62794

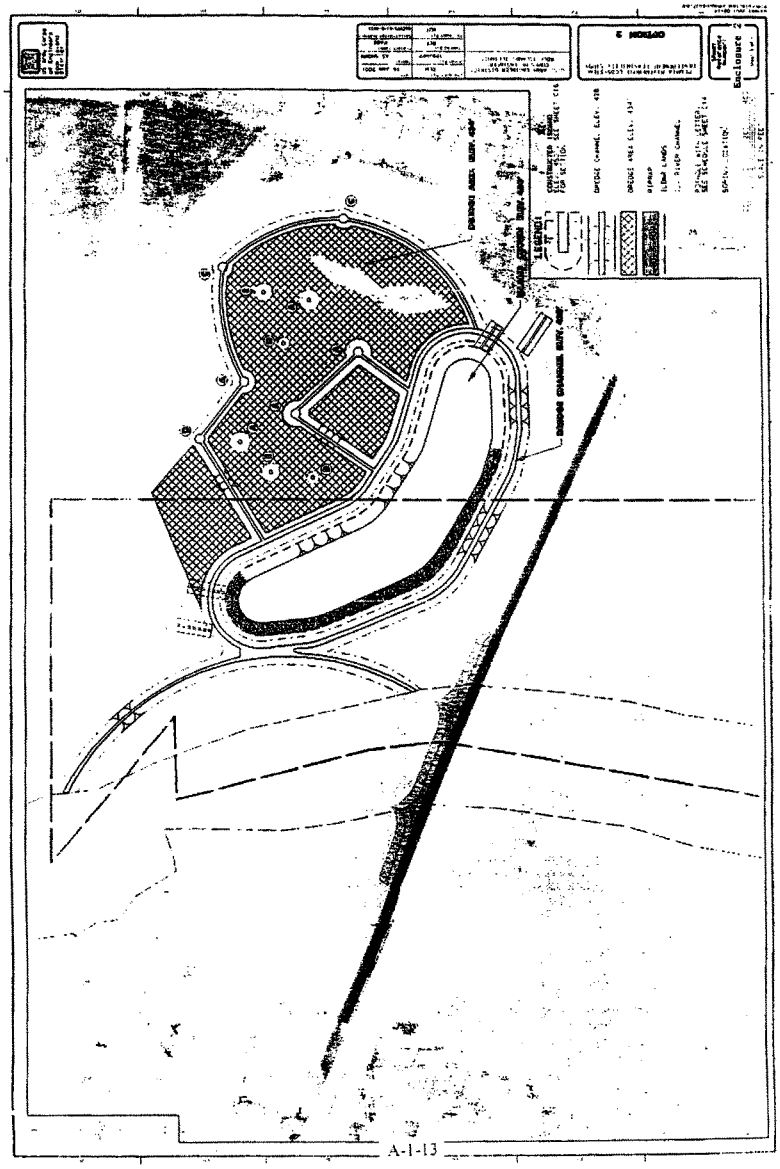
Mr. Robert Schanzle
Illinois Department of Natural Resources
Lincoln Tower Plaza
524 South 2nd Street
Springfield, IL 62701-1787

Mr. Mike Cochran
Illinois Department of Natural Resources
700 South 10th Street
Havana, IL 61231

Mr. Vern Kleen
Natural Heritage Division
Illinois Department of Natural Resources
524 South 2nd Street
Springfield, IL 62701-1787


OPTION 1
Enclosure 1
DREDGE AREA ELEV. 434'
ISLAND CROWN ELEV. 450'
DREDGE CHANNEL ELEV. 428'
RIPRAP

A-1-12



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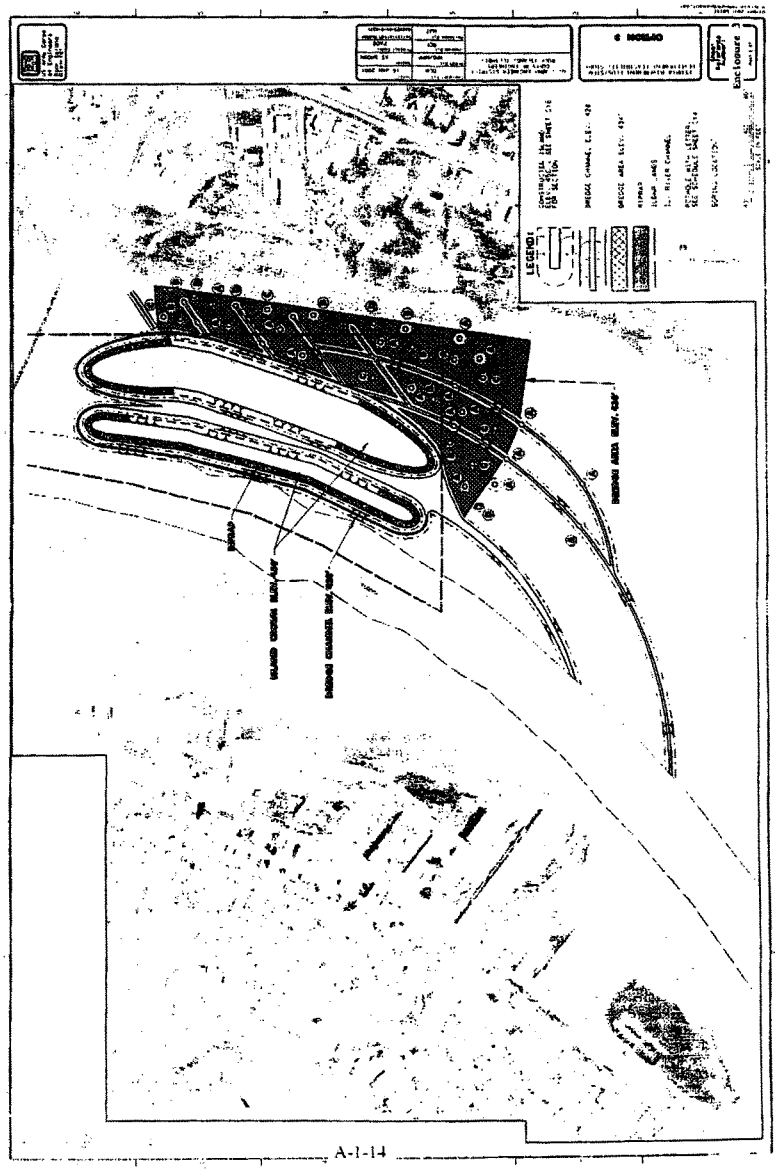
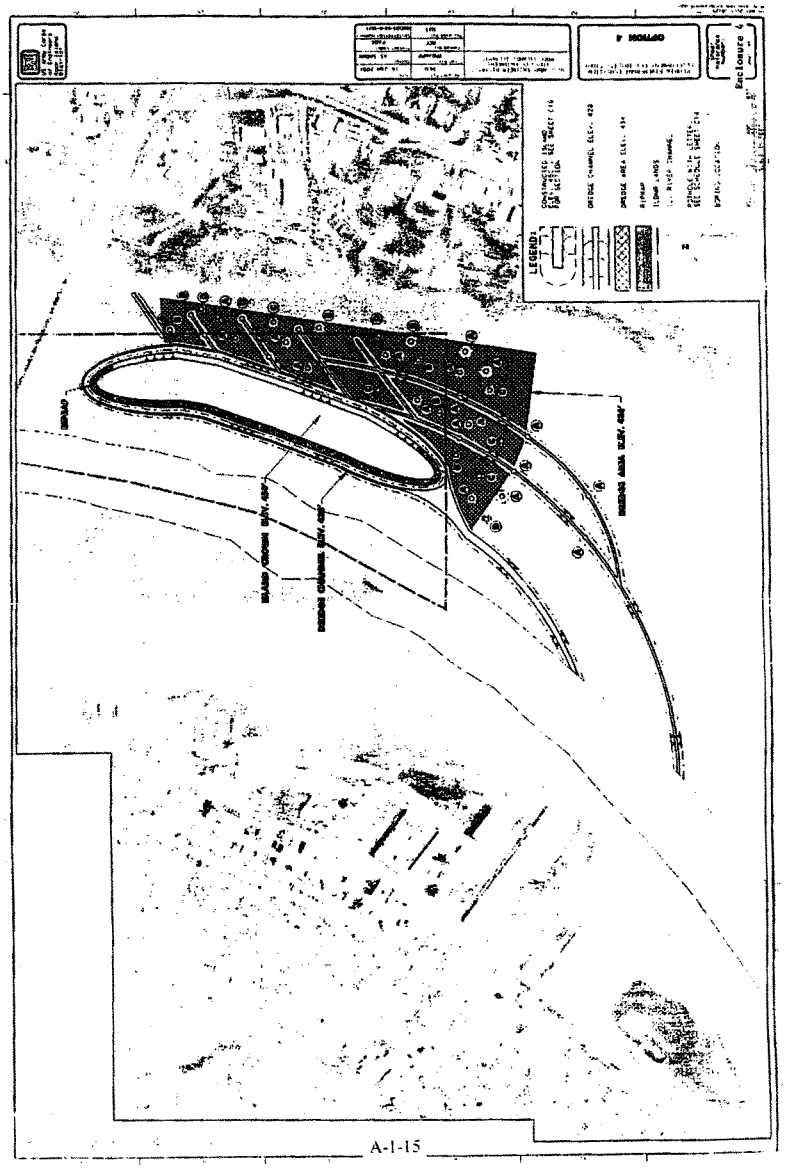
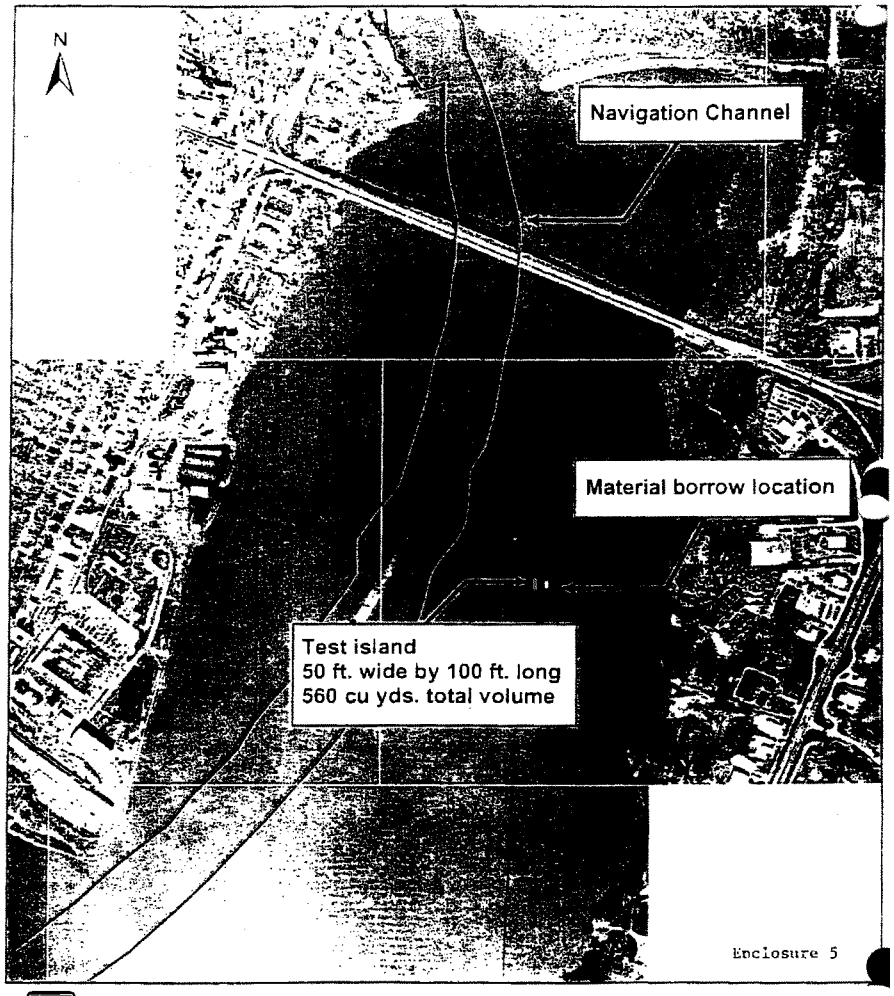

LEGEND
A-1-14


LEGEND
A-1-15

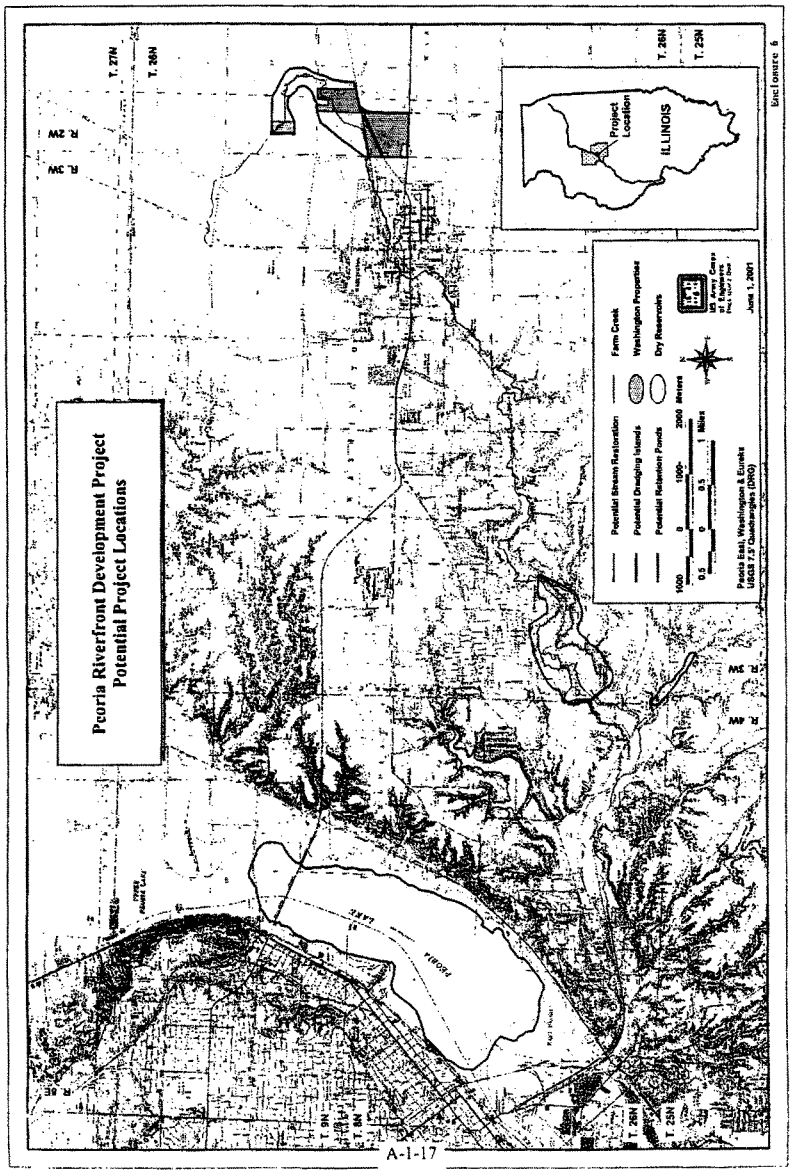
Proposed Materials Testing Island



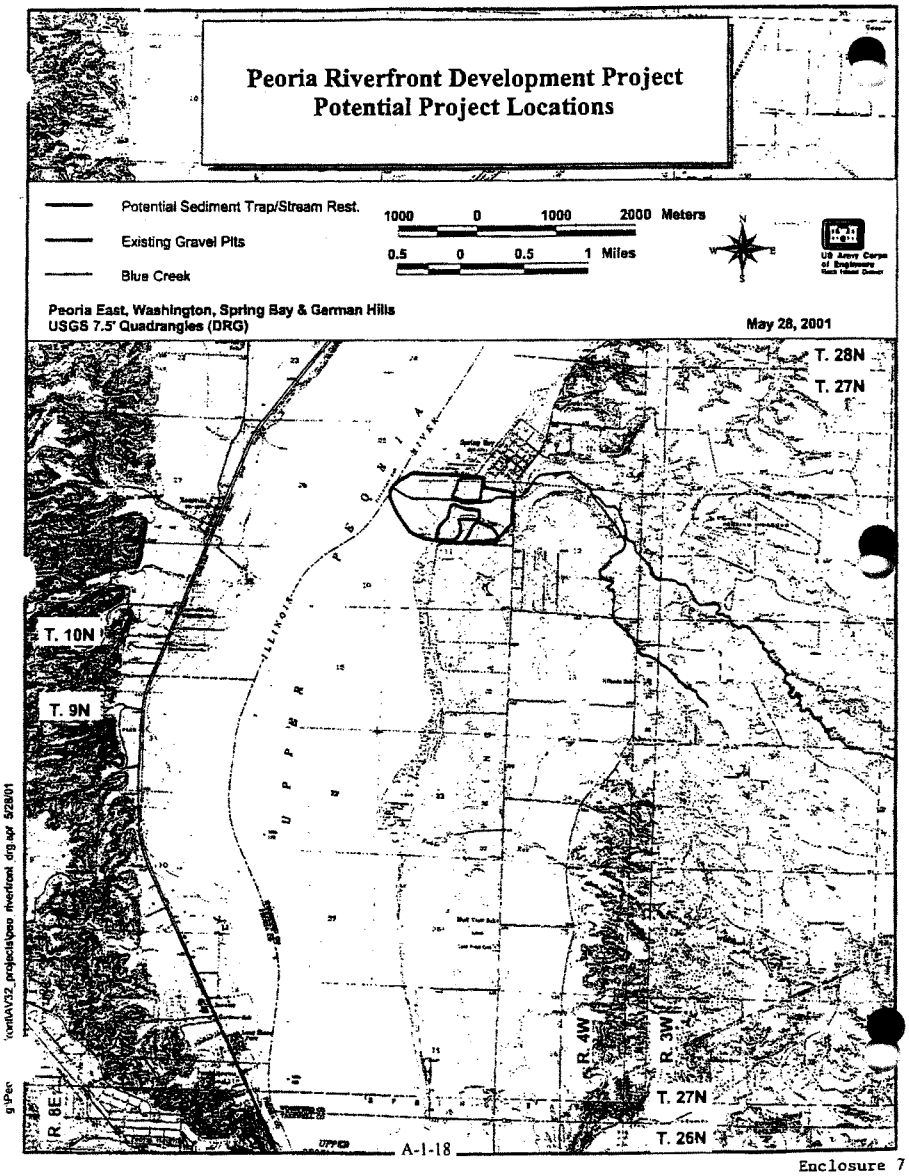
U.S. Army Corps of Engineers

For More Information contact:
Michael Tarpey, P.E.
CEMVR-ED-DN

A-1-16


Peoria Riverfront Development Project
Potential Project Locations
Project Location
ILLINOIS
Potential Stream Restoration
Potential Dredging Islands
Potential Retention Ponds
Farm Creek
Washington Properties
Dry Reservoirs
Enclosure 6

A-1-17


Peoria Riverfront Development Project
Potential Project Locations
Potential Sediment Trap/Stream Rest.
Existing Gravel Pits
Blue Creek
1000 0 1000 2000 Meters
0.5 0 0.5 1 Miles
US Army Corps of Engineers
Peoria East, Washington, Spring Bay & German Hills
USGS 7.5' Quadrangles (DRG)
May 28, 2001
T. 28N
T. 27N
T. 10N
T. 9N
R. 8E
R. 4W
R. 3W
T. 27N
T. 26N
A-1-18

Enclosure 7

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
4469 48th Avenue Court
Rock Island, Illinois 61201
Phone: (309) 793-5800 Fax: (309) 793-5804

IN REPLY REFER TO

FWS/RIFO

June 27, 2001

Colonel William. J. Bayles
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Bayles:

This responds to your request for early comments concerning the Peoria Lake feasibility study. These comments are provided for consideration during future project planning and for completion of the required Environmental Assessments.

The study area includes portions of Peoria Lake in Peoria Pool on the Illinois River and several of its tributaries (Farm Creek, Ackerman Creek, and Blue Creek) in Tazewell and Woodford Counties, Illinois. The purpose of the project is to restore deep water aquatic habitat within Peoria Lake and to reduce future sediment delivery into the lake.

To facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies are required to obtain from the Fish and Wildlife Service information concerning any species, listed or proposed to be listed, which may be present in the area of a proposed action. Therefore, we are furnishing you with a list of species which may be present in Tazewell and Woodford Counties.

The threatened bald eagle (*Haliaeetus leucocephalus*) is known to winter in Tazewell and Woodford Counties. Eagles utilize Peoria Lake habitats for behaviors including perching and roosting in large shoreline trees as well as hunting for fish in open water areas. We do not have any records of eagles nesting in the project area. The eagle may not be harassed, harmed, or disturbed when present, and clearing of large shoreline trees and potential nest trees should be avoided.

The threatened decurrent false aster (*Boltonia decurrens*) is known to occur in Tazewell and Woodford Counties in the Illinois River floodplain, where it occupies disturbed alluvial soils. This species has recently been recorded at several locations along Peoria Lake, including the vicinity of the proposed activities on Blue Creek. Prior to construction, a survey for the

species will be required to determine whether any individuals are in the project area. The result of the survey should be shared with this office so that an appropriate course of action can be identified. Formal consultation under the Endangered Species Act may be required if this species is present in the immediate project area. Federal regulations prohibit any commercial activity involving this species or the malicious damage or removal of this species from Federal land or any other lands in knowing violation of state law or regulation, including state criminal trespass law.

The threatened lakeside daisy (*Hymenoxys herbacea*) is known to occur in Tazewell County, where it has been introduced. However, it does not occur in the study area and will not be affected by the proposed project.

Peoria Lake Islands and Dredging

Potential activities within Peoria Lake include dredging and island construction in the upper portion of Lower Peoria Lake near the McClugage Bridge (US Hwy 150). Alternatives with various dredging and island configurations, ranging in size from approximately 22 acres to 288 acres, remain open to consideration. To compare habitat benefits of various alternatives, Wildlife Habitat Appraisal Guide (WHAG) analyses were completed by a team with representatives from the Corps of Engineers, Illinois Department of Natural Resources, Illinois Natural History Survey, and Nature Conservancy. As expected, the results showed that habitat benefits are positively correlated with the size of the project areas.

All alternatives evaluated by the WHAG team included both dredging and island construction components. Since the current array of alternatives has been expanded to include dredging with off-site disposal (i.e., no island construction), the WHAG results should not be considered valid for any alternatives which do not include island construction. In particular, sedimentation rates for alternatives involving island construction versus alternatives with no island construction should not be assumed to be equal for any future analyses.

We understand that substrate conditions in the project area have recently brought into question the likelihood of success for island construction. This is unfortunate because a project combining dredging and island features would clearly provide greater habitat diversity and value when compared to a dredging project lacking island construction. Thus, if island construction is deemed not possible, then the merits of dredging alone are questionable due to the excessive sedimentation problem in the lake. Any alternatives involving dredging in the absence of island construction should be pursued only if it is demonstrated that beneficial depths can be sustained over time. If dredged materials are removed from the lake for off-site disposal, we support efforts to find beneficial uses for the material.

A 100-ft x 50-ft test island comprised of approximately 560 cubic yards of dredged material is proposed for construction prior to implementation of a full-scale project in order to determine substrate suitability for island construction. We support the construction of a test island. This would provide an opportunity to check the likelihood of success for the proposed full-scale project and to determine whether or not the assumptions, particularly the estimated sedimentation rates, used in the WHAG analysis are valid. If actual sedimentation rates differ

significantly from those assumed in the analysis, the results should be revised accordingly.

With respect to both the full-scale and test projects, potential water quality problems resulting from sediment disturbances during construction are of concern. Measures to ensure compliance with water quality standards should be implemented for both projects.

Farm Creek
Potential activities on Farm Creek include bank stabilization, construction of detention basins, and restoration of an old oxbow. We have no objection to the proposed actions along Farm Creek. However, a combination of features is preferable and would provide greater overall habitat benefits.

Ackerman Creek
Possible restoration activities on Ackerman Creek include bank stabilization and/or riffle/pool structures. While we do not object to the implementation of either bank stabilization measures or construction of riffle/pool structures, we strongly prefer that such features be used in combination with each other as opposed to one feature being used in lieu of the other. Combined features will provide greater improvements in stream stability and habitat conditions.

Blue Creek
Potential activities on Blue Creek include diverting the stream into a gravel pit, which would act as sediment trap. As stated previously, the threatened decurrent false aster has been recorded in the vicinity of the proposed work on Blue Creek. A survey for the species will be required to determine whether any individuals are in the immediate project area so that appropriate conservation measures can be identified and implemented as needed.

Thank you for the opportunity to provide comments on this project. This letter provides comments under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); and the Endangered Species Act of 1973, as amended. If you have any questions concerning these comments, please contact Lauri Walters of my staff at 309/793-5800, ext 513.

Sincerely,

/s/ Wayne A. Rucker
for Richard C. Nelson
Supervisor

cc: ILDNR (Schanzle)
ILDNR (Cochran)
ILEPA (Yurdin)

G:\WP_Docs\LAURI\peoria.wpd

Illinois
Department of
Natural Resources
http://dnr.state.il.us
524 South Second Street, Springfield, Illinois 62701-1787
George H. Ryan, Governor • Brent Manning, Director

July 18, 2001

Mr. Kenneth A. Barr, Chief
Economic and Environmental Analysis Branch
Department of the Army
Rock Island District, Corps of Engineers
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

ATTN: Randy Kraciun
Environmental Analysis Section

Dear Mr. Barr:

Reference is made to your letter of June 7, 2001 concerning the Rock Island District's ongoing feasibility study to investigate enhancing aquatic habitat in Peoria Lake on the Illinois River, including options to reduce sediment delivery and deposition to Peoria Lake. The subject letter requests early comments on the various projects being considered within the overall feasibility study, as well as specific comments concerning the proposed construction of a small-scale trial, or test island, that will be covered by a separate Environmental Assessment.

We have compared the various project sites to the Illinois Natural Heritage Database and wish to offer the following site specific comments:

Dredging and Island Construction - the sites being considered for dredging and island construction are located in the upper northeast portion of Lower Peoria Lake near the McClugage Bridge, in Township 26 North, Range 4 West, sections 10 and 15, respectively. The database contains a 1998 record of the federally listed decurrent false aster, *Boltonia decurrens*, at the west end of McClugage Bridge, and a 2000 record on the east side of the river at Cooper Park (Attachment 1). Given the known presence of *Boltonia* in the vicinity, we recommend that surveys be conducted for the species at any shoreline or upland areas that might be disturbed by equipment staging or other construction-related disturbances, and that steps be taken to avoid adverse impacts. Additionally, the downstream island, if constructed, will lie immediately riverward of the Cooper Park North Illinois Natural Areas Inventory (INAI) site, and the potential for adverse impacts associated with its construction should be addressed in the Environmental Assessment.

Test Island - the proposed test island is located in the same general area as the downstream-most of the larger island projects: Township 26 North, Range 4 West, Section 15. We would again call to your attention the presence of *Boltonia* in the general vicinity as well as the Cooper Park North INAI site nearby.

Farm Creek near Washington - The City of Washington has purchased parcels along Farm Creek which they propose to develop into detention basins, both to create wetland habitat and to slow flows

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into and within Farm Creek. These parcels are located in Township 26 North, Range 2 West, sections 7 and 18. The database indicates no records of endangered/threatened species or natural areas in their vicinity.

Farm Creek behind the Farmdale Dam - this area, located in Township 26 North, Range 3 West, sections 29 and 30, is being considered for possible stream restoration within the existing dry reservoir. Restoration activities might include such things as rock weir structures, re-connection of an oxbow, bank stabilization, etc. While no threatened/endangered species are reported from the project area, an Illinois Natural Areas Inventory (INAI) site, the Farm Creek Geological Area, is located in the southeast quarter of Section 30 (Attachment 2). Provided construction activities are restricted to the stream channel, adverse impacts to the INAI site appear unlikely.

Ackerman Creek - a short reach of the creek located mostly in Township 26 North, Range 3 West, Section 31 and Township 25 North, Range 3 West, Section 6 is being considered for restoration with bank stabilization and/or pool and riffle structures. The database contains no records of endangered/threatened species or natural areas in the vicinity.

Blue Creek - this is an intermittent stream which carries a large sediment load into upper Peoria Lake during flow periods. An alternative being considered is to divert the stream into an existing quarry located in Township 27 North, Range 4 West, Section 11, which would act as a sediment trap. The database contains a 1995 record of *Boltonia decurrens* in the northwest quarter of Section 11 (Attachment 3). As with the island creation sites discussed above, we recommend that a survey be conducted for this species in any areas that might be subject to construction-related disturbances and that steps be taken to avoid impacts.

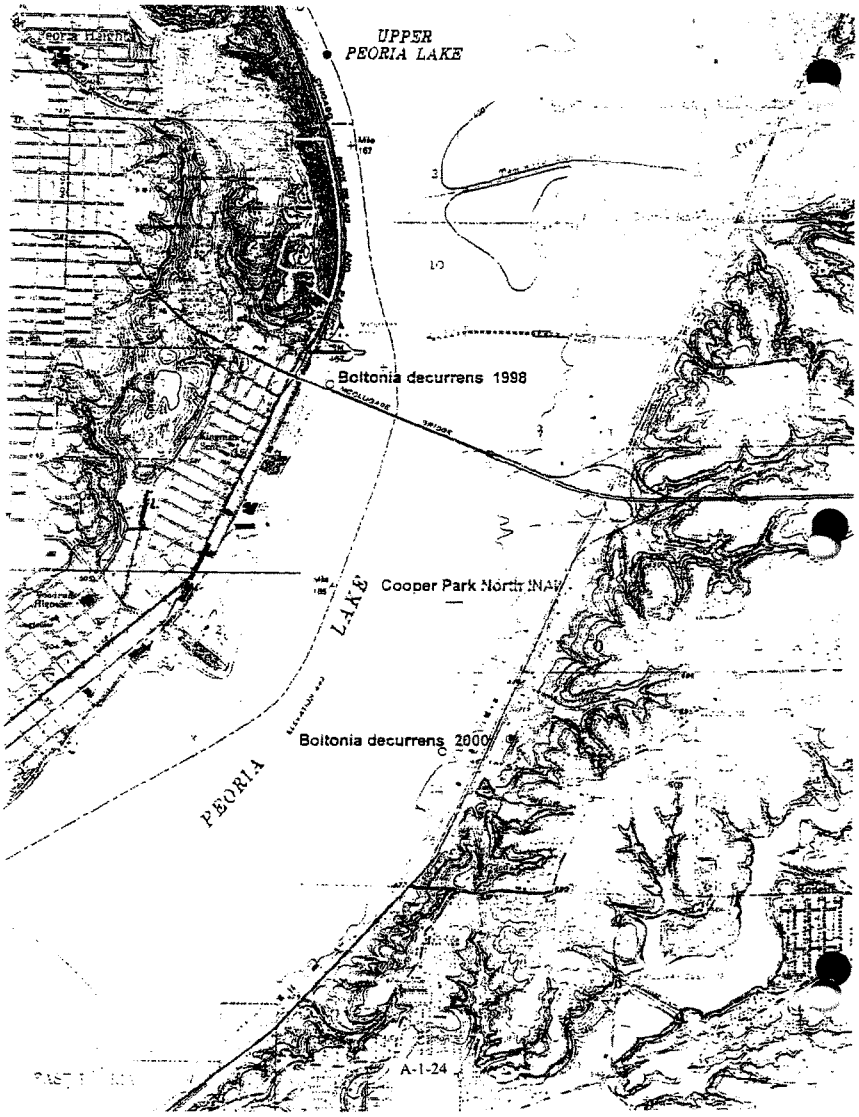
The Illinois Department of Natural Resources is participating with the Rock Island District in the Peoria Lake studies as a cost-share sponsor. We look forward to continued close coordination with your agency as the feasibility report and integrated Environmental Assessment are finalized. Please contact Jim Mick, Illinois River Basin Coordinator, at 309-543-3316 if we can be of any assistance at this time. Questions about the contents of this letter can be directed to me at 217-785-4863.

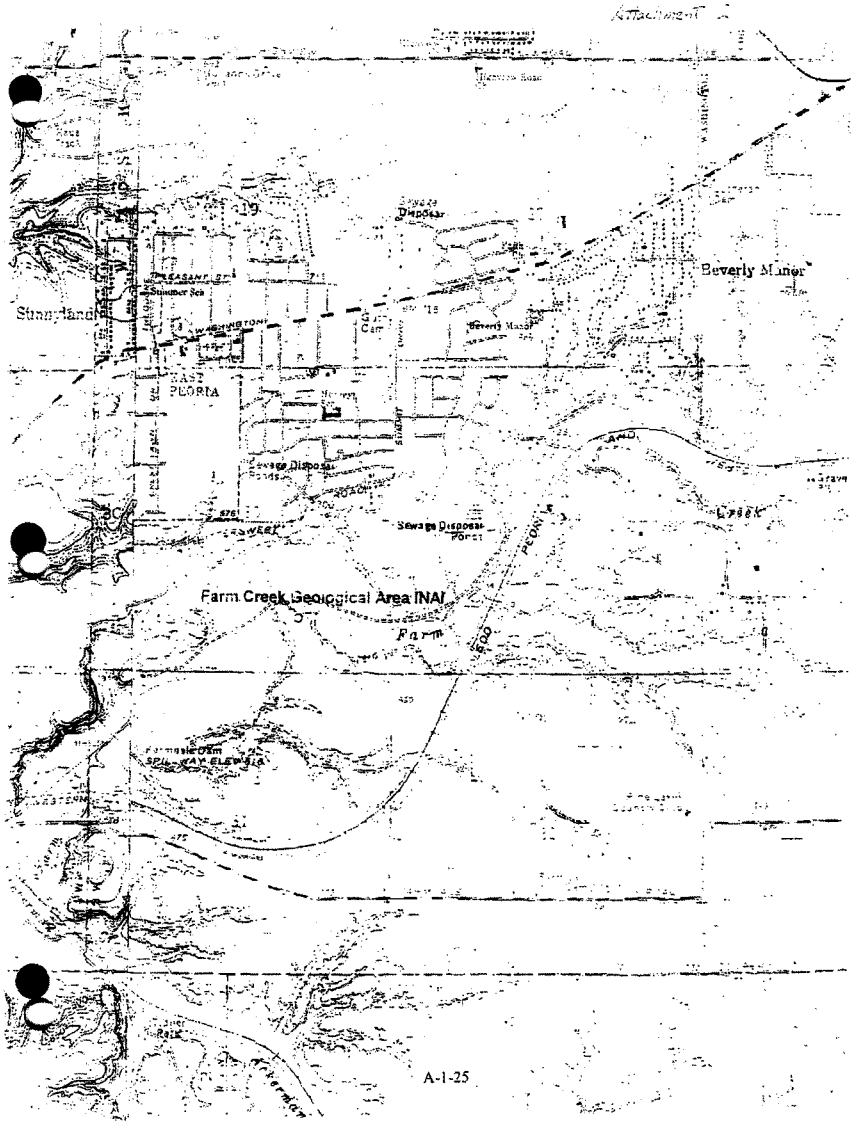
Sincerely,

Robert W. Schanzle
Permit Program Manager
Office of Realty and Environmental Planning

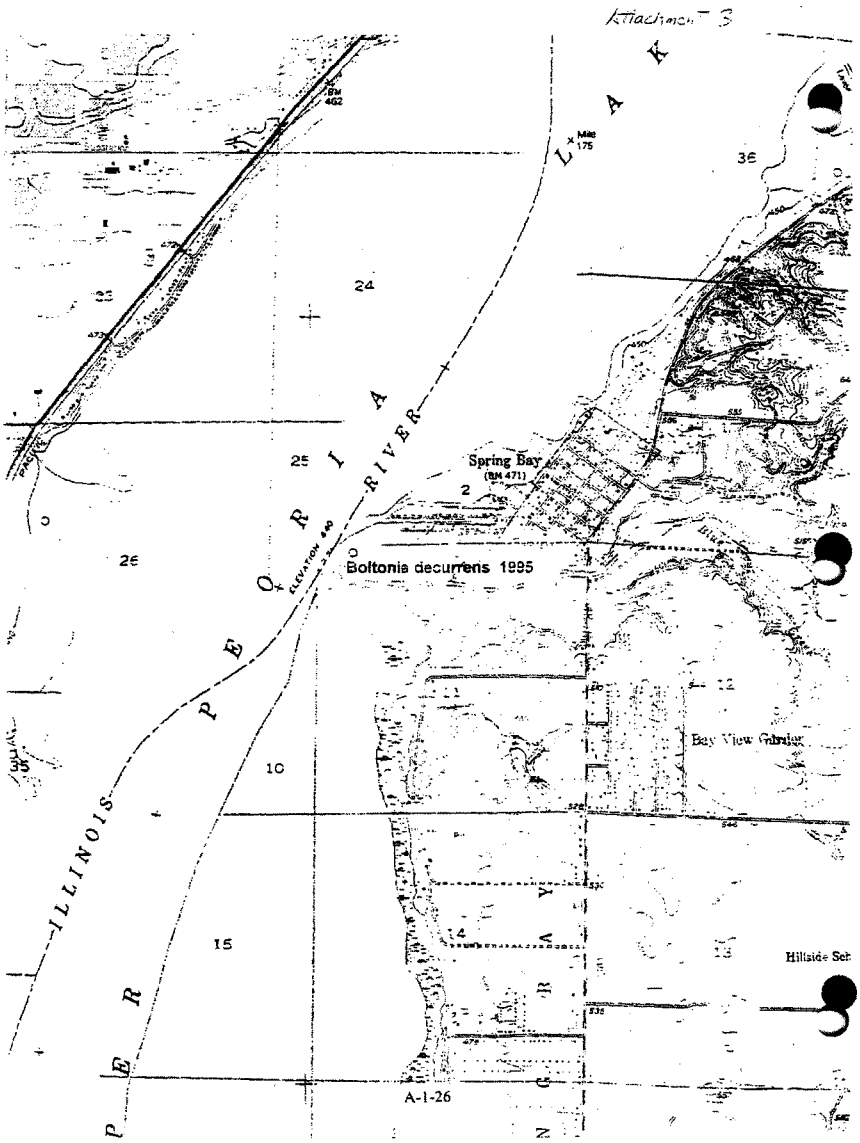
RWS:rs
Attachments

cc: IDNR/ORC (Mick), IDNR/OWR (Kennedy), IEPA (Yurdin), USFWS (Nelson), USEPA (Pierard)


UPPER
PEORIA LAKE
Boltonia decurrens 1998
Cooper Park North INAI
Boltonia decurrens 2000
PEORIA
LAKE
A-1-24


Attachment
Beverly Manor
Sunnyland
EAST PEORIA
Sewage Disposal
Farm Creek Geological Area INAI
A-1-25

Attachment 3



ILLINOIS
DEPARTMENT OF
NATURAL RESOURCES
Office of Water Resources
524 South Second Street, Springfield 62701-1787

FAX

Date: Sept 28, 2001
Number of pages including cover sheet: 2

To: Randy Kracjun
Phone:
Fax phone: 309/794-5157
CC:

From: Mike Diedrichsen
Phone: 217/782-3862/3863
Fax phone: 217/524-1454

REMARKS: ☒ FYI ☐ Urgent ☐ Reply ASAP ☐ Please review & comment ☐ As Requested

Re: Peoria Riverfront Ecosystem Development

Randy,

Copies of the rules and statewide permits referred to in the memo can be seen on the internet at:

http://dnr.state.il.us/waterresources/index.htm

A-1-27

intraoffice memorandum

to: File

from: Mike Diedrichsen MLD

date: September 28, 2001

subject: Inquiry; U.S. Army Corps of Engineers; Peoria Riverfront Ecosystem Development; Tazewell & Woodford Counties

I am just now getting to the Corps' June 7, 2001 request for input on the subject proposed work. My brief comments on the various aspects of the project are as follow:

1. **Dredging and Island Construction** - Bob Dalton has been working with the Corps on the hydraulic modeling of the islands to ensure compliance with our Floodway Construction rules. This portion of the project would also need to comply with our Public Waters rules which require that any impairment of the public's interests in the water be minimized and mitigated to the fullest practicable extent and that there be a public benefit to offset the impairment impacts.

2. **Test Island** - Requirements for the test island would be the same, but on a smaller scale, as for the other proposed islands.

3. **Farm Creek Detention Basins near Washington** - I have recently been contacted by Dave Martin of the Corps about the design of these basins. He indicated an awareness that, depending on hazard classification and size, OWR permits may be required in accordance with our Dam Safety rules.

4. **Farm Creek Stabilization behind the Farmdale Dam** - Depending, in part, on the length of stream channel to be affected, this work may be authorized by Statewide Permit No. 9.

5. **Ackerman Creek Stabilization** - Depending, in part, on the length of stream channel to be affected, this work may be authorized by Statewide Permit No. 9.

6. **Diversion of Blue Creek into a Quarry to Serve as a Sediment Trap** - This would require OWR authorization under our Floodway Construction rules but would likely be permittable if designed to prevent headcutting of the Blue Creek channel upstream of the quarry.

MLD
cc: Randy Kraciun

Rec'd 9/28/01

A-1-28

Illinois Historic
Preservation Agency

1 Old State Capitol Plaza • Springfield, Illinois 62701-1507 • (217) 782-4836 • TTY (217) 524-7128

Peoria County Please refer to: IHPA LOG #001109C020K-P
Lower Peoria Lake, Peoria & Tazewell Counties, IWW RM 163-167
Potential Island Creation/Dredging & Stream or Watershed Restoration
Feasibility Study - Peoria Riverfront Development (Ecosystem Restoration) Project

October 30, 2001

Mr. Kenneth A. Barr
U.S. Army Corps of Engineers, Rock Island District
Chief, Environmental Analysis Branch
Clock Tower Building/P.O. Box 2004
Rock Island, IL 61204-2004

Dear Sir:

Re: Results of Phase I Survey - Acres: 176.00; Sites: 1; Contractor: ARG #1137

Thank you for submitting the draft results of the archaeological Phase I reconnaissance survey for the project referenced above. Our comments are required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

Our staff has reviewed the draft archaeological Phase I reconnaissance report that you submitted for this project. We understand that the area that was surveyed constitutes the actual project locations selected from the potential project locations depicted in your correspondence dated 7 November 2000. The Phase I survey and assessment of the archaeological resources within the chosen project locations appear to be adequate.

We concur that archaeological site 11-T-410 is potentially significant and, consequently, may be eligible for listing on the National Register of Historic Places under Criterion "D". As the watershed restoration project boundaries have been redesigned to avoid 11-T-410, we concur that no historic properties are affected by the restoration project.

We also concur that no historic properties are affected by the proposed rock jetties and rock closing structures, which are new elements of the island creation component of the proposed project.

We look forward to receiving two copies of the final survey report for our files. Please retain this letter as evidence for SHPO consultation in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. Please resume consultation with our office should there be unanticipated discovery of historic properties during construction.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

AEH:FRK

Mr. Ron Deiss, COERI

Illinois Department of Agriculture George H. Ryan, Governor • Joe Hampton, Director

Bureau of Land and Water Resources

State Fairgrounds • P.O. Box 19281 • Springfield, IL 62794-9281 • 217/782-6297 • TDD 217/524-6858 • Fax 217/557-0993

November 8, 2001

Mr. Randy Kraciun
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Re: Peoria Riverfront Development
City of Washington
USDA NRCS Form AD-1006

Dear Mr. Kraciun:

In response to your October 1, 2001 letter to James Johnson requesting initiation of the USDA NRCS Form AD-1006 for the above referenced project, enclosed is the completed form. Also included is a copy of the revised Illinois LESA System for your reference.

The Illinois Department of Agriculture (IDA) looks forward to providing comments for the draft environmental assessment in order to determine its compliance with the federal Farmland Protection Policy Act (7 USC 4201 et seq.) and, thus, the Illinois Farmland Preservation Act (505 ILCS 75/1 et seq.).

Should you have any questions about the Form AD-1006 form, please contact Terry Savko of my staff at 217-785-4458.

Sincerely,

Steve Frank, Chief
Bureau of Land and Water Resources

SF:TS

Enclosures -3

cc: Director Joe Hampton, IDA
Joan Messina, IDA
Mike Williams, IDA
Anita Kratochvil, IDA
John Herath, IDA
Warren Goetsch, IDA

(4)

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request
Name Of Project: Peoria Riverfront Develop./Washington	Federal Agency Involved: U.S. Army CORPS
Proposed Land Use: Wetland/Prairie Restoration	County And State: Tazewell, IL.
PART II *(To be completed by SCS)*	Date Request Received By SCS: 10-12-01

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply – do not complete additional parts of this form).*	Yes: X	No: ☐	Acres Irrigated: — / Average Farm Size: 372
Major Crop(s): Corn, Soybeans, Wheat, Hay	Farmable Land In Govt. Jurisdiction: Acres: 29,633,500 % 97		Amount Of Farmland As Defined in FPPA: Acres: 27,695,900 % 91
Name Of Land Evaluation System Used: Illinois	Name Of Local Site Assessment System: Statewide		Date Land Evaluation Returned By SCS: 10-25-01

PART III *(To be completed by Federal Agency)*	Site #3	Alternative Site Rating: Site B	Site C	Site D
A. Total Acres To Be Converted Directly	135			
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	135			
PART IV *(To be completed by SCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	110			
B. Total Acres Statewide And Local Important Farmland	25			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.0005			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	72.8			
PART V *(To be completed by SCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	91			

PART VI *(To be completed by Federal Agency)* Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points		
1. Area In Nonurban Use			See attached Illinois LESA System factors
2. Perimeter In Nonurban Use			
3. Percent Of Site Being Farmed			
4. Protection Provided By State And Local Government			
5. Distance From Urban Builtup Area			
6. Distance To Urban Support Services			
7. Size Of Present Farm Unit Compared To Average			
8. Creation Of Nonfarmable Farmland			
9. Availability Of Farm Support Services			
10. On-Farm Investments			
11. Effects Of Conversion On Farm Support Services			
12. Compatibility With Existing Agricultural Use			
TOTAL SITE ASSESSMENT POINTS * 200	~~160~~	126	
PART VII *(To be completed by Federal Agency)*			
Relative Value Of Farmland *(From Part V)*	100	91	
Total Site Assessment *(From Part VI above or a local site assessment)* * 200	~~160~~	126	
TOTAL POINTS *(Total of above 2 lines.* * 300	~~260~~	217	

Site Selected: — Date Of Selection — (Was A Local Site Assessment Used?) Yes — No X

Reason For Selection:

When using the Illinois Site Assessment Factors, 200 points are ~~received~~ assigned to the Site Assessment Section of the LESA system for a maximum score of 300 points.

A-I-31

Peoria Riverfront Development
City of Washington, Tazewell County, Illinois
US Army Corps of Engineers, Rock Island District Funds

PART VI-A Illinois Site Assessment Criteria	Maximum Points	Site A
1. Land Use on the Site	20	20
2. Adjacent Land Use	20	16
3. General Character of Area Within 1½ Miles of Site	20	16
4. Distance to City	20	0
5. Zoned Use of Proposed Site	20	20
6. Zoned Use of Land Adjacent to Proposed Site	20	16
7. Planned Land Use of Proposed Site	20	20
8. Compatibility of Proposed Use with Surrounding Land Uses	20	0
9. Alternative Sites Proposed on Less Productive Land	10	10
10. Availability of Central Water System	10	2
11. Availability of Central Waste Disposal System (Sewer)	10	2
12. Transportation	10	4
TOTAL SITE ASSESSMENT POINTS	**200**	**126**
PART VII		
Relative Value of Farmland	100	91
Total Site Assessment	200	126
TOTAL ILLINOIS LESA POINTS	**300**	**217**

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US Army Corps of Engineers
Rock Island District

PEORIA RIVERFRONT DEVELOPMENT ENVIRONMENTAL RESTORATION FEASIBILITY STUDY NEWSLETTER

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Newsletter No. 3

May 2002

JUNE 19, 2002, PUBLIC MEETINGS SCHEDULED

The Illinois Department of Natural Resources and the U.S. Army Corps of Engineers, Rock Island District are nearing the completion of the Peoria Riverfront Development Environmental Restoration Feasibility Study. The study is now in the public review phase. A draft report containing the study team's proposed recommendations is available for public review at the Peoria Public Library, 107 Northeast Monroe Street, and at the East Peoria Public Library, 406 Illinois Street. The draft report also is available for review at the following website address: http://www.mvr.usace.army.mil/Peoria/. The public review phase will end on June 28, 2002.

During this review period, the Department of Natural Resources and the Corps of Engineers will host afternoon and evening public meetings on June 19, 2002. The purpose of the meetings is to explain to the public the alternatives that the study team has selected to enhance the Peoria Lake and Farm Creek environment. Details about the location, times, and format of the public meetings are provided on page 4 of this newsletter.

STUDY BACKGROUND

The U.S. Army Corps of Engineers, Rock Island District, and the Illinois Department of Natural Resources entered into a feasibility study cost-sharing agreement in October 1999 and became "partners" in a combined effort to restore the environment in the Illinois River along the Peoria Riverfront. The study area includes Lower Peoria Lake and the Farm Creek Watershed.

The Peoria Lake study area is approximately 130 miles long, from Henry, Illinois, to Naples, Illinois. Various locations were looked at within the study area, including both Upper and Lower Peoria Lakes. Early in the study process, the Corps of Engineers – Department of Natural Resources study team agreed that due to degradation of the lakes and loss of depth and diversity, restoration in either Upper or Lower Peoria Lake would provide very similar benefits. Therefore, based on study authority which specifically references the Peoria Riverfront, previous studies identifying suitable locations within the Lower Peoria Lake, and sponsor and local interest, the study team determined that restoration alternatives would focus on the Lower Peoria Lake.

Once it was determined that the focus of the alternatives would be Lower Peoria Lake, the tributaries draining to this area became the logical place for tributary alternatives to be investigated. The Farm Creek watershed has a locally led planning effort underway, funded by the Illinois Environmental Protection Agency (EPA). This planning effort has generated a comprehensive basin inventory, agency support – both financial and technical, and a consensus on watershed restoration and management goals, objectives, and actions. These activities were occurring concurrently with the Feasibility Study.

STUDY GOAL AND OBJECTIVES

The main goal of the study was to enhance aquatic habitats by restoring depth diversity and reducing sediment delivery and deposits in Peoria Lake, with secondary benefits to recreational boating and fishing.

Objectives to address this goal were to:

- **Restore depth diversity** – Sedimentation has resulted in the loss of lake depth and volume while filling the lake to a nearly uniform shallow depth outside of the navigation channel. These changes have severely impacted a number of historic habitat types including off-channel overwintering, spawning, and nursery habitat for fish. Increasing overall depth and variability of depth would restore currently limited habitat to the lake area.
- **Provide structure for aquatic organisms** – Due to sedimentation, much of the lake bottom has a uniform shallow depth with a silt substrate. Introducing additional structure (e.g., rock jetties/reefs, woody debris, etc.) would provide valuable refuge, feeding, spawning, and nursery areas for aquatic organisms.
- **Increase habitat diversity** – As part of any restoration features, efforts should be made to restore the overall habitat diversity within Peoria Lake. Providing deepwater channels and holes through shallower areas and creating islands to increase shoreline area and provide additional terrestrial

habitat would restore some of the former diversity which was historically present in the lake.

- **Improve habitat value for migratory waterfowl and shorebirds** – The Illinois River Valley is part of the Mississippi River flyway, a migration route for hundreds of thousands of waterfowl, shorebirds, and neotropical migrants. However, the study area has not been well utilized in recent times. Additional areas for waterbird resting, nesting, and feeding should be evaluated.
- **Improve water quality** – Due to the extensive lake size and shallow water depths, Peoria Lake is highly susceptible to wind and wave action that result in the resuspension of sediments, further limiting fish, aquatic vegetation, macro-intertebrates, and mussels. Reducing sediment resuspension would provide considerable benefits to aquatic species. Further, impaired water quality due to sedimentation has resulted in Farm Creek being placed on the EPA 303(d) list of impaired waters. Reduced sediment delivery to Farm Creek from its tributaries will improve water quality in the stream upstream of Farmdale Dam.
- **Maximize sustainability of project features** – If restorative measures are implemented, considerable effort should be directed to making project features sustainable (e.g., bank protection to stabilize islands, sufficient flow to minimize sedimentation, or deflection of sediment from dredged areas).
- **Reduce sediment delivery to Peoria Lake from tributary streams** – The direct tributaries to Peoria Lake compose 3% of the total drainage area at Peoria, and deliver 40% or more of the sediment deposited in the lake. Reducing sediment transport from this relatively small area would result in considerable reductions in total sediment rates in the lake.
- **Create riparian and wetland habitat along tributary streams** – Restoring prairie and wetlands along tributaries presents opportunities to restore significant habitat types that were formerly abundant in the state, but that have been greatly reduced.

STUDY CRITERIA FOR PEORIA LAKE

Several alternatives were considered to meet the objectives listed above. Criteria used to weigh the alternatives were:

- The measures should be designed to meet identified biological goals – primarily focused on creating aquatic habitat for fish (overwintering, spawning, nursery, and feeding), while maximizing habitat diversity to benefit waterfowl, shorebirds, invertebrates, and plants.
  - o Overwintering habitat – depth of greater than 6 feet optimal.
  - o Spawning and nursery habitat – varies by species, however firm substrate preferred.
- Minimal Operations and Maintenance to maintain measures (sustainability).
- Measures must be acceptable to the wide range of interested local and State parties (acceptability – effects on views, recreational use potential).

Along with the criteria listed above, the study team also considered cost effectiveness, resource significance, hydrology and hydraulics, public acceptability, and real estate considerations.

POTENTIAL MEASURES FOR PEORIA LAKE

The following measures were considered in the study to achieve the study's goal and objectives and to meet the formulation criteria discussed above.

- **Dredge off-channel areas to greater than 6 feet to serve as overwintering fish habitat** – The average depths of off-channel areas in much of Peoria Lake, outside of the navigation channel, are only 1-2 feet. The proposed restoration measure includes dredging areas to greater than 6 feet of depth. This is proposed to be done as a series of holes and connecting channels. Due to relatively high historic sedimentation rates, some level of overdredging is necessary. The average lake bottom elevation in these areas will be 11 feet or greater.
- **Dredge areas to at least 4 feet to increase diversity of aquatic habitat** – Due to relatively high historic sedimentation rates, some level of overdredging is necessary. This shallow depth will roughly follow historical lake contours and acreage to roughly 6 feet to allow for sedimentation rates.
- **Dredge with island construction to create flowing side channel habitat** – Create flowing habitat for riverine aquatic species, separated from navigation channel. The flow within a created side channel also has the potential to minimize sedimentation and creates the potential for periodic scouring, helping to maintain the deepwater habitat created.
- **Island creation** – The construction of islands would increase habitat diversity by providing shoreline and terrestrial habitat and areas for migratory birds. They can serve as a low-cost placement area for dredged materials from other project measures. Islands also serve as wind and wave breaks to reduce the resuspension of sediments, thereby improving water quality.
- **Aquatic structure** – Much of the lake currently is a uniform depth with a soft substrate. The addition of firm structure, such as rock jetties/reefs, rock riprap,

or root wads, would provide additional habitat diversity.

- **Closing structures** – In areas where there is little potential for higher current velocities to maintain water depth, deepwater habitat created by dredging has the potential to fill rapidly with sediments. Closing structures can help to minimize flow into these deepwater areas, reducing sediment delivery and increasing sustainability. Rock closing structures also provide aquatic structure.
- **Bank protection** – To maximize sediment removal, it is preferable to construct the entire islands out of the river substrate. The fine silt clay that composes this material would require some bank protection to reduce the potential for island erosion due to wind- and wake-generated waves. Rock riprap was chosen as a preferred material due to the additional aquatic structure it provides.

SELECTED RECOMMENDED PLAN PEORIA LAKE

The measures listed above were combined to make various alternative plans. The alternative plans were evaluated and one was found to best meet the criteria for Peoria Lake.

The alternative selected by the study team as the recommended plan is the "Mid-Sized Upper Island – Two Lower Islands with Side Channel" alternative. This alternative best meets the study objectives and would result in the greatest restoration of depth diversity of any of the plans proposed. The overall lake habitat diversity would be increased by adding shoreline and terrestrial habitats associated with the three islands and aquatic structures. The upper and lower features would increase diversity by incorporating different types of deepwater habitat. The dredged area behind the upper island would provide primarily backwater habitat, while the area around the lower islands would provide flowing side channel habitat. The islands would provide valuable resting, nesting, and feeding areas for waterfowl and shorebirds. The islands also would reduce wind- and wake-generated waves in the study area, helping to improve water quality by lowering turbidity levels.

STUDY CRITERIA FOR FARM CREEK

Several alternatives were studied to meet the objectives listed on pages 1 and 2 of this newsletter. Criteria used to weigh the alternatives were:

- Ability to create aquatic habitat (maximize area with 1- to 2-foot depth for wetland benefits).
- Address sediment contribution/instability.
- Proximity/relationship to any project in Peoria Lake.
- No/limited impact on flooding along tributary.
- Willing landowners/potential for partnerships.

POTENTIAL MEASURES FOR FARM CREEK

The following measures were considered in the study to achieve the study's goal and objectives and to meet the formulation criteria discussed above.

- **Wetland Impoundments** – Consideration was given to constructing wetland detention ponds. The site is suitable for either one or two wetland ponds. The measures would be designed to maximize the water surface area with a depth of 18 inches. Also, Pool 1 was designed to contain a 50-year rainfall within elevation 748 feet mean sea level.
- **Wetland plantings** – In combination with watershed wetland impoundments, planting shoreline and terrestrial vegetation would help to increase habitat values in the initial years. This would decrease the time for native plants to become established through natural succession. The selected species for wetland plantings include Prairie Cord Grass, Black Willow, and Button Bush.
- **Prairie plantings** – This site is currently in row crop agriculture. Converting some or all of the site to prairie would provide habitat value to many wetland and grassland species. The selected prairie seed mixture is a combination of grasses and forbs resembling a Native Illinois Ecotype.

SELECTED RECOMMENDED PLAN FARM CREEK

The measures listed above were combined to make various alternative plans. The alternative plans were evaluated and one was found to best meet the criteria for Farm Creek.

The alternative selected by the study team as the recommended plan includes a 4-acre and a 3-acre wetland impoundment, with 6 rows of wetland plantings and 35 acres of prairie plantings. This alternative maximizes creating wetland and riparian habitat in the project area, given the constraints over land availability for project features. Although this alternative is not anticipated to have a significant effect on sediment delivery to Peoria Lake due to its size, it will reduce sediment delivery to Farm Creek itself and improve water quality. Implementing additional similar projects throughout the watershed could ultimately result in reductions in overall sediment delivery.

PUBLIC MEETING INFORMATION

Two public meetings will take place on June 19, 2002, at the Gateway Center, 200 North East Water Street, Peoria, Illinois.

The meetings will be held at the following times:

- 2:00 p.m. – 2:30 p.m. – open session
- 2:30 p.m. – 4:00 p.m. – public meeting
- 6:00 p.m. – 6:30 p.m. – open session
- 6:30 p.m. – 8:00 p.m. – public meeting

The format for both meetings will be identical. An open session will be held for the first one-half hour of each meeting. During that period, the public is invited to view study displays. Representatives from the Department of Natural Resources and the Corps of Engineers will be on hand to meet with the public to explain the selected alternatives and to receive public comments.

The public meetings will begin at 2:30 p.m. and 6:30 p.m. The meetings will begin with a formal presentation explaining the selected alternatives and will be followed by a question and answer and comment/statement period.

All persons with an interest in the Peoria Riverfront Development Environmental Restoration Study are encouraged to attend a public meeting.

The results of the public meetings will be summarized in a final newsletter, which will be released at the end of the study.

COMMENTS?

Your comments are important to us. If you have technical comments or questions about the study, please contact Mr. Brad Thompson, Project Manager. Mr. Thompson can be reached by telephone at 309/794-5256 or by email at bradley.e.thompson@usace.army.mil.

You may write to Mr. Thompson at the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: CEMVR-PM-M (Thompson)
Clock Tower Building – P.O. Box 2004
Rock Island, Illinois 61204-2004

The contact for the Illinois Department of Natural Resources is Mr. Jim Mick. Mr. Mick can be reached by telephone at 309/543-3316 or by email at jmick@dnrmail.state.il.

You may write to Mr. Mick at the following address:

Mr. Jim Mick
Illinois River Basin Coordinator
Region III Fisheries Administrator
Illinois Department of Natural Resources
700 South 10th Street
Havana, Illinois 62644

If you are aware persons who may wish to be added to the study's mailing list to receive newsletters and future study mailings, please ask them to contact Ms. Sue Simmons, Corps of Engineers, by telephone at 309/794-5573, or by email at suzanne.r.simmons@usace.army.mil.

Your Comments Are Important To Us

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
4469 48th Avenue Court
Rock Island, Illinois 61201
Phone: (309) 793-5800 Fax: (309) 793-5804

IN REPLY REFER TO:

FWS/RIFO

July 15, 2002

Marshall Plumley
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Mr. Plumley:

This provides our review comments on the Public Review Draft of the *Peoria Riverfront Development (Ecosystem Restoration) Study, Illinois, Feasibility Report with Integrated Environmental Assessment* dated May 2002.

Technical Comments
The third sentence in the Endangered Species section on page 5-7, which begins with "Their review of," is inaccurate and should be removed from the final report.

Endangered Species Act Comments
We concur with your findings that the proposed project will have no effect on federally listed endangered species. This conclusion is based upon the following:

1. As stated in the Endangered Species section beginning on page 4-2, staging and access activities associated with the Peoria Lake dredging and island construction will take place on existing boat ramp or marina facilities and will not impact any additional areas in the Illinois River floodplain.

2. Forested habitats will not be impacted by the project.

Provided the above statements are true, this precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should the project be modified, or if new information indicates listed or proposed species may be affected, consultation or additional coordination with this office, as appropriate, should be initiated.

This letter provides comments under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); and the Endangered Species Act of 1973, as amended.

Sincerely,

Richard C. Nelson
Supervisor

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DRAFT AGREEMENT FOR DESIGN
IN ACCORDANCE WITH SECTION 105(c) OF PUBLIC LAW 99-662

DESIGN AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
THE STATE OF ILLINOIS, DEPARTMENT OF NATURAL RESOURCES
FOR DESIGN OF THE
PEORIA, ILLINOIS, RIVERFRONT DEVELOPMENT
(ECOSYSTEM RESTORATION) PROJECT

THIS AGREEMENT entered into this _____ day of _____, _____, by and between the Department of the Army (hereinafter the "Government") represented by the District Engineer executing this Agreement, and the Illinois Department of Natural Resources (hereinafter the "Non-Federal Sponsor") represented by the Director of the Illinois Department of Natural Resources.

WITNESSETH, THAT:

WHEREAS, the Energy and Water Development Appropriations Act for Fiscal Year 2002, Public Law 107-66, included funds for the Government to initiate design (as defined in Article I.B. of this Agreement) of the PEORIA, ILLINOIS, RIVERFRONT DEVELOPMENT (ECOSYSTEM RESTORATION) PROJECT (hereinafter the "Project" as defined in Article I.A. of this Agreement) at Peoria, Illinois; and

WHEREAS, Section 105(c) of Public Law 99-662 (33 U.S.C. Section 2215) [100 Stat 4089] provides that the costs of design of a water resources project shall be cost shared in the same percentage as the purposes of the project; and

WHEREAS, the Government and the Non-Federal Sponsor agree that the Non-Federal Sponsor shall contribute 25 percent of the financial obligations for design of the Project; and

WHEREAS, the Government and Non-Federal Sponsor have the full authority and capability to perform as hereinafter set forth and intend to cooperate in paying for design in accordance with the terms of this Agreement.

NOW, THEREFORE, the Government and the Non-Federal Sponsor agree as follows:

ARTICLE I - DEFINITIONS AND GENERAL PROVISIONS

For purposes of this Agreement:

A. The term "Project" shall mean as generally described in the *Peoria Riverfront Development (Ecosystem Restoration) Study, Illinois – Feasibility Report with Integrated Environmental Assessment*, dated December, 2002 and concurred in by the Commander, Mississippi Valley Division in the Division Commander's Public Notice, dated _____, _____.

B. The term "design" shall mean all activities directly related to planning, engineering and design of the Project for which financial obligations are made during the period of design in accordance with the terms of this Agreement; the final accounting in accordance with Article IV.D. of this Agreement; any audit in accordance with Article VII of this Agreement; and the Government's activities conducted as part of negotiating this Agreement. The term shall not include any activities performed as part of reconnaissance or feasibility studies; activities conducted as part of negotiation of a project cooperation agreement for the Project or separable element thereof; or the Non-Federal Sponsor's activities conducted as part of negotiating this Agreement.

C. The term "total design costs" shall mean all costs incurred by the Non-Federal Sponsor and the Government as a consequence of financial obligations for design. The term includes but is not necessarily limited to, the Government's costs of negotiating this Agreement; applicable planning and evaluation; applicable engineering and design; environmental assessment and documentation; the identification, survey, and evaluation of historic properties; participation in the Design Coordination Team in accordance with Article III of this Agreement; costs of the final accounting in accordance with Article IV.D. of this Agreement; and costs of audit in accordance with Article VII of this Agreement. The term does not include any costs related to betterments; any costs of dispute resolution under Article V of this Agreement; any costs incurred as part of reconnaissance studies or feasibility studies; any costs (other than audit) resulting from financial obligations after the period of design; any costs of negotiating a project cooperation agreement for the Project or separable element thereof; or the Non-Federal Sponsor's costs of negotiating this Agreement.

D. The term "period of design" shall mean the time period commencing when Federal General Investigations appropriations for Preconstruction Engineering and Design of the Project are allocated to the U.S. Army Engineer District, Rock Island, and ending when a project cooperation agreement for the Project, or a separable element thereof, is executed between the Government and a non-Federal entity or entities.

E. The term "District Engineer" shall mean the U.S. Army Engineer for the Rock Island District.

F. The term "fiscal year" shall mean one fiscal year of the Government. The Government fiscal year begins on October 1 and ends on September 30.

G. The term "betterment" shall mean a change in the design of an element of the Project resulting from the application of standards that the Government determines exceed those that the Government would otherwise apply for accomplishing the design and construction of that element, or the addition of an element of the Project that the Government would not otherwise accomplish.

H. The term "financial obligations for design" shall mean a financial obligation of the Government that results or would result in a cost that is or would be included in total design costs.

I. The term "non-Federal proportionate share" shall mean the ratio of the Non-Federal Sponsor's total cash contribution required in accordance with Article II.B. of this Agreement to total financial obligations for design, as projected by the Government.

ARTICLE II - OBLIGATIONS OF THE GOVERNMENT AND THE NON-FEDERAL SPONSOR

A. The Government, subject to receiving funds appropriated by the Congress and using those funds and funds provided by the Non-Federal Sponsor, shall expeditiously design the Project, applying those procedures usually applied to the engineering and design of Federal projects, pursuant to Federal laws, regulations, and policies.

1. To the maximum extent possible, the Government shall design the Project in accordance with the Project Management Plan for the Project and, if applicable, a Project Study Plan for any reevaluation during design, developed and updated as required by the Government after consultation with the Non-Federal Sponsor.

2. The Government shall afford the Non-Federal Sponsor the opportunity to review and comment on the solicitations for all contracts, including relevant scopes of work, prior to the Government's issuance of such solicitations. To the extent possible, the Government shall afford the Non-Federal Sponsor the opportunity to review and comment on all contracts modifications, including change orders, prior to the issuance to the contractor of a Notice to Proceed. In any instance where providing the Non-Federal Sponsor with notification of a contract modification or change order is not possible prior to issuance of the Notice to Proceed, the Government shall provide such notification in writing at the earliest date possible. To the extent possible, the Government also shall afford the Non-Federal Sponsor the opportunity to review and comment on all contract claims prior to resolution thereof. The Government shall consider in good faith the comments of the Non-Federal Sponsor, but the contents of solicitations, award of

contracts, execution of contract modifications, issuance of change orders, resolution of contract claims, and performance of all design (whether the work is performed under contract or by Government personnel), shall be exclusively within the control of the Government.

3. As of the effective date of this Agreement, $ 60,000 of Federal funds have been appropriated for design of the Project. This amount is less than the Federal share of projected total design costs, and the Government makes no commitment to budget for additional funds for the Federal share of total design costs. Notwithstanding any other provision of this Agreement, the Government's financial participation in design of the Project is limited to this amount together with any additional funds that the Congress may appropriate for design of the Project. In the event that the Congress does not appropriate funds sufficient to meet the Federal share of funds required to continue design in the then-current or upcoming fiscal year, the Government shall notify the Non-Federal Sponsor of the insufficiency of funds and the parties, within the Federal and Non-Federal funds available for the project, shall suspend design or terminate this Agreement in accordance with Article IX.B. of this Agreement. To provide for this eventuality, the Government may reserve a percentage of total Federal funds available for design and an equal percentage of the total funds contributed by the Non-Federal Sponsor pursuant to Article II.B. of this Agreement as a contingency to pay costs of termination, including any costs of contract claims and contract modifications.

B. The Non-Federal Sponsor shall provide, during the period of design a contribution equal to 25 percent of total design costs. If the Government projects that the value of the Non-Federal Sponsor's contributions under Articles III and VII will be less than 25 percent of total design costs, the Non-Federal Sponsor shall provide a contribution, in accordance with Article IV.B. of this Agreement, in the amount necessary to meet its 25 percent share of total design costs.

C. The Government shall perform a final accounting in accordance with Article IV.D. of this Agreement to determine the contributions provided by the Non-Federal Sponsor in accordance with paragraphs B. and E. of this Article and Articles III and VII of this Agreement and to determine whether the Non-Federal Sponsor has met its obligations under paragraphs B. and E. of this Article.

D. The Non-Federal Sponsor shall not use Federal funds to meet the Non-Federal Sponsor's share of total design costs under this Agreement unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

E. The Non-Federal Sponsor may request the Government to design betterments. Such requests shall be in writing and shall describe the betterments requested to be designed. If the Government in its sole discretion elects to design the requested betterments or any portion thereof, it shall so notify the Non-Federal Sponsor in a writing that sets forth any applicable

terms and conditions, which must be consistent with this Agreement. In the event of conflict between such writing and this Agreement, this Agreement shall control. The Non-Federal Sponsor shall be solely responsible for all costs due to the requested design of betterments and shall pay all such costs in accordance with Article IV.C. of this Agreement.

F. In accordance with Article IV.E. of this Agreement, the Government shall afford credit, toward the share of total project costs for the Project that is required of the non-Federal entity or entities executing the Project Cooperation Agreement or Agreements for the Project or separable element thereof, for the Non-Federal Sponsor's 25 percent share of total design costs required under paragraph B. of this Article.

G. This Agreement shall not be construed as obligating either party to seek funds for, or to participate in, construction or implementation of the Project or a separable element thereof or as relieving the Non-Federal Sponsor of any future obligation under the terms of any Project Cooperation Agreement.

ARTICLE III - DESIGN COORDINATION TEAM

A. To provide for consistent and effective communication, the Non-Federal Sponsor and the Government, not later than 30 days after the effective date of this Agreement, shall appoint named senior representatives to a Design Coordination Team. Thereafter, the Design Coordination Team shall meet regularly until the end of the period of design. The Government's Project Manager and a counterpart named by the Non-Federal Sponsor shall co-chair the Design Coordination Team.

B. The Government's Project Manager and the Non-Federal Sponsor's counterpart shall keep the Design Coordination Team informed of the progress of the design and of significant pending issues and actions, and shall seek the views of the Design Coordination Team on matters that the Design Coordination Team generally oversees.

C. Until the end of the period of design, the Design Coordination Team shall generally oversee issues related to design, including scheduling of reports and work products; development of plans and specifications; anticipated real property and relocation requirements for construction or implementation of the Project; contract awards and modifications; contract costs; the Government's cost projections; anticipated requirements and needed capabilities for performance of operation, maintenance, repair, replacement and rehabilitation of the Project; and other related matters.

D. The Design Coordination Team may make recommendations that it deems warranted to the District Engineer on matters that the Design Coordination Team generally oversees, including suggestions to avoid potential sources of dispute. The Government in good faith shall

consider the recommendations of the Design Coordination Team. The Government, having the legal authority and responsibility for design, has the discretion to accept, reject, or modify the Design Coordination Team's recommendations.

E. The costs of participation in the Design Coordination Team during the period of design shall be included in total design costs and cost shared in accordance with the provisions of this Agreement.

ARTICLE IV - METHOD OF PAYMENT

A. Until the Government furnishes the Non-Federal Sponsor with the results of the final accounting, the Government shall maintain current records of contributions provided by the parties and current projections of total design costs and costs due to additional work under Article II.E. of this Agreement. At least quarterly, the Government shall provide the Non-Federal Sponsor with a report setting forth all contributions provided to date and the current projections of total design costs, of total costs due to additional work under Article II.E. of this Agreement, of each party's share of total design costs, of the non-Federal proportionate share, of the Non-Federal Sponsor's total contributions required in accordance with Articles II.B. and II.E. of this Agreement, and of the funds the Government projects to be required from the Non-Federal Sponsor in accordance with Articles II.B. and II.E. of this Agreement for the upcoming fiscal year. On the effective date of this Agreement, total design costs are projected to be $1,780,000, and the Non-Federal Sponsor's contribution required under Article II.B. of this Agreement is projected to be $445,000. Such amounts are estimates subject to adjustment by the Government and are not to be construed as the total financial responsibilities of the Government and the Non-Federal Sponsor.

B. The Non-Federal Sponsor shall provide the contribution required under Article II.B. of this Agreement in accordance with the provisions of this paragraph.

1. Not later than 30 calendar days after execution of this Agreement, the Government shall notify the Non-Federal Sponsor in writing of the funds the Government determines to be required from the Non-Federal Sponsor to meet the non-Federal proportionate share of projected financial obligations for design through the first fiscal year of design, including the non-Federal proportionate share of financial obligations for design incurred prior to such payment. Not later than 30 calendar days after such notice the Non-Federal Sponsor shall provide the Government with the full amount of the required funds by delivering a check payable to "FAO, USAED, Rock Island District" to the District Engineer, or verify to the satisfaction of the Government that the Non-Federal Sponsor has deposited the required funds in an escrow or other account acceptable to the Government, with interest accruing to the Non-Federal Sponsor, or present the Government with an irrevocable letter of credit acceptable to the Government for the required funds, or provide an Electronic Funds Transfer in accordance with procedures

established by the Government.

2. For the second and subsequent fiscal years of design, the Government shall notify the Non-Federal Sponsor in writing, no later than 60 calendar days prior to the beginning of that fiscal year, of the funds the Government determines to be required from the Non-Federal Sponsor to meet the non-Federal proportionate share of projected financial obligations for design for that fiscal year. No later than 30 calendar days prior to the beginning of the fiscal year, the Non-Federal Sponsor shall make the full amount of the required funds for that fiscal year available to the Government through the funding mechanisms specified in paragraph B.1. of this Article.

3. The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary to cover: (a) the non-Federal proportionate share of financial obligations for design incurred prior to the payment made under paragraph B.1 of this Article; and (b) the non-Federal proportionate share of financial obligations for design as they are incurred during the remainder of the period of design.

4. If at any time during the period of design the Government determines that additional funds will be needed from the Non-Federal Sponsor to cover the non-Federal proportionate share of projected financial obligations for design for the current fiscal year, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required together with an explanation of why additional funds are required, and the Non-Federal Sponsor, no later than 30 calendar days from receipt of such notice, shall make the additional required funds available through the payment mechanisms specified in paragraph B.1. of this Article.

C. In advance of the Government incurring any financial obligation associated with additional work under Article II.E. of this Agreement, the Non-Federal Sponsor shall provide the Government with the full amount of the funds required to pay for such additional work by delivering a check payable to "FAO, USAED, Rock Island District" to the District Engineer, or verify to the satisfaction of the Government that the Non-Federal Sponsor has deposited the full amount of the funds required to pay for such additional work in an escrow or other account acceptable to the Government, with interest accruing to the Non-Federal Sponsor, or present the Government with an irrevocable letter of credit acceptable to the Government for the required funds, or provide an Electronic Funds Transfer in accordance with procedures established by the Government. The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary to cover the Government's financial obligations for such additional work as they are incurred. In the event the Government determines that the Non-Federal Sponsor must provide additional funds to pay for such additional work, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required. Within 30 calendar days thereafter, the Non-Federal Sponsor shall provide the Government with the full amount of the additional required funds through the funding mechanisms specified

above.

D. Upon completion of design or termination of this Agreement, and upon resolution of all relevant proceedings, claims and appeals, the Government shall conduct a final accounting and furnish the Non-Federal Sponsor with the results of the final accounting. The final accounting shall determine total design costs, each party's contribution provided thereto, and each parties required share thereof. The final accounting also shall determine total costs due to additional work under Article II.E. of this Agreement and the Non-Federal Sponsor's contribution provided pursuant to Article II.E. of this Agreement.

1. In the event the final accounting shows that the total contribution provided by the Non-Federal Sponsor under Articles II.B., II.E., III and VII of this Agreement is less than its required 25 percent share of total design costs plus costs due to additional work under Article II.E. of this Agreement, the Non-Federal Sponsor shall, no later than 90 calendar days after receipt of written notice, make a payment to the Government of whatever sum is required to meet the Non-Federal Sponsor's required 25 percent share of total design costs plus costs due to additional work under Article II.E. of this Agreement.

2. In the event the final accounting shows that the total contribution provided by the Non-Federal Sponsor under Articles II.B., II.E., III and VII of this Agreement exceeds its required 25 percent share of total design costs plus costs due to additional work under Article II.E. of this Agreement, the Government shall afford credit to the Non-Federal Sponsor during the construction or implementation of the Project (other than the 5 percent cash share for structural flood control), or the Government shall, subject to the availability of funds, refund the excess to the Non-Federal Sponsor no later than 90 calendar days after the final accounting is complete. In the event existing funds are not available to refund the excess to the Non-Federal Sponsor, the Government shall seek such appropriations as are necessary to make the refund.

E. The Government shall afford credit for the Non-Federal Sponsor's 25 percent share of total design costs required under Article II.B. of this Agreement, in accordance with this paragraph. The Government shall afford such credit only after any payment to the Government or refund to the Non-Federal Sponsor required by paragraph D. of this Article has been made. To afford such credit, the Government shall apply the amount credited toward the share that non-Federal entities are required to provide toward total project costs for the Project.

1. If Federal funds are appropriated for construction or implementation of the Project, and if the Government and a non-Federal entity enter into a Project Cooperation Agreement for construction or implementation of the entire Project, then the Government shall afford credit for the entire 25 percent share.

2. If Federal funds are appropriated for construction or implementation of the Project or a separable element thereof, and if the Government and a non-Federal entity enter into a Project Cooperation Agreement for construction or implementation of such

separable element, then the Government shall afford credit for such portion of the 25 percent share as is allocable to such separable element.

3. If no Federal funds are appropriated for construction or implementation of the Project or a separable element thereof, or if the Government and a non-Federal entity do not enter into a Project Cooperation Agreement for construction or implementation of the Project or a separable element, then the Government shall not afford any credit for such 25 percent share.

ARTICLE V - DISPUTE RESOLUTION

As a condition precedent to a party bringing any suit for breach of this Agreement, that party must first notify the other party in writing of the nature of the purported breach and seek in good faith to resolve the dispute through negotiation. If the parties cannot resolve the dispute through negotiation, they may agree to a mutually acceptable method of non-binding alternative dispute resolution with a qualified third party acceptable to both parties. The parties shall each pay 50 percent of any costs for the services provided by such a third party as such costs are incurred. The existence of a dispute shall not excuse the parties from performance pursuant to this Agreement.

ARTICLE VI - HOLD AND SAVE

The Non-Federal Sponsor shall hold and save the Government free from all damages arising from design for the Project and design for any Project-related betterments, except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE VII - MAINTENANCE OF RECORDS AND AUDIT

A. Not later than 60 calendar days after the effective date of this Agreement, the Government and the Non-Federal Sponsor shall develop procedures for keeping books, records, documents, or other evidence pertaining to costs and expenses incurred pursuant to this Agreement. These procedures shall incorporate, and apply as appropriate, the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 C.F.R. Section 33.20. The Government and the Non-Federal Sponsor shall maintain such books, records, documents, or other evidence in accordance with these procedures and for a minimum of three years after completion of the accounting for which such books, records, documents, or other evidence were required. To the extent permitted under applicable Federal laws and regulations, the Government and the Non-Federal Sponsor shall each allow the other to inspect such books, documents, records, or other evidence.

B. Pursuant to 32 C.F.R. Section 33.26, the Non-Federal Sponsor is responsible for complying with the Single Audit Act of 1984, 31 U.S.C. Sections 7501-7507, as implemented by Office of Management and Budget (OMB) Circular No. A-133 and Department of Defense Directive 7600.10. Upon request of the Non-Federal Sponsor and to the extent permitted under applicable Federal laws and regulations, the Government shall provide to the Non-Federal Sponsor and independent auditors any information necessary to enable an audit of the Non-Federal Sponsor's activities under this Agreement. The costs of any non-Federal audits performed in accordance with this paragraph before the Government furnishes the Non-Federal Sponsor with the results of the final accounting shall be allocated in accordance with the provisions of OMB Circulars A-87 and A-133, and such costs as are allocated to the Project shall be included in total design costs and cost shared in accordance with the provisions of this Agreement.

C. In accordance with 31 U.S.C. Section 7503, the Government may conduct audits in addition to any audit that the Non-Federal Sponsor is required to conduct under the Single Audit Act. Any such Government audits shall be conducted in accordance with Government Auditing Standards and the cost principles in OMB Circular No. A-87 and other applicable cost principles and regulations. The costs of Government audits performed in accordance with this paragraph before the Government furnishes the Non-Federal Sponsor with the results of the final accounting shall be included in total design costs and cost shared in accordance with the provisions of this Agreement.

ARTICLE VIII - FEDERAL AND STATE LAWS

In the exercise of their respective rights and obligations under this Agreement, the Non-Federal Sponsor and the Government agree to comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulations 600-7, entitled *Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army.*

ARTICLE IX - RELATIONSHIP OF PARTIES

A. In the exercise of their respective rights and obligations under this Agreement, the Government and the Non-Federal Sponsor each act in an independent capacity, and neither is to be considered the officer, agent, or employee of the other.

B. In the exercise of its rights and obligations under this Agreement, neither party shall provide, without the consent of the other party, any contractor with a release that waives or purports to waive any rights such other party may have to seek relief or redress against such contractor either pursuant to any cause of action that such other party may have or for violation

of any law.

ARTICLE X - OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, nor any resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

ARTICLE XI - TERMINATION OR SUSPENSION

A. If at any time the Non-Federal Sponsor fails to fulfill its obligations under Articles II.B., II.E. or IV of this Agreement, the Assistant Secretary of the Army (Civil Works) shall terminate this Agreement or suspend future performance under this Agreement unless he determines that continuation of work on design of the Project is in the interest of the United States or is necessary in order to satisfy agreements with any other non-Federal interests in connection with the Project.

B. If the Government fails to receive annual appropriations in amounts sufficient to meet its share of scheduled expenditures for design for the then-current or upcoming fiscal year, the Government shall so notify the Non-Federal Sponsor in writing, and 60 calendar days thereafter either party may elect without penalty to terminate this Agreement or to suspend future performance under this Agreement. In the event that either party elects to suspend future performance under this Agreement pursuant to this paragraph, such suspension shall remain in effect until such time as the Government receives sufficient appropriations or until either the Government or the Non-Federal Sponsor elects to terminate this Agreement, whichever occurs first.

C. In the event that either party elects to terminate this Agreement pursuant to this Article, both parties shall conclude their activities relating to design of the Project and proceed to a final accounting in accordance with Article IV.D. of this Agreement.

D. Any termination of this Agreement or suspension of future performance under this Agreement in accordance with this Article shall not relieve the parties of liability for any obligation previously incurred. Any delinquent payment from the Non-Federal Sponsor shall be charged interest at a rate, to be determined by the Secretary of the Treasury, equal to 150 per centum of the average bond equivalent rate of the 13-week Treasury bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3-month period if the period of delinquency exceeds 3 months.

ARTICLE XII - NOTICES

A. Any notice, request, demand, or other communication required or permitted to be

given under this Agreement shall be deemed to have been duly given if in writing and either delivered personally or by telegram or mailed by first-class, registered, or certified mail, as follows:

If to the Non-Federal Sponsor:

Mr. G. Brent Manning
Director
Illinois Department of Natural Resources
Lincoln Tower Plaza
524 South Second Street
Springfield, Illinois 62701-1787

If to the Government:

District Engineer
US Army Engineer District, Rock Island
Clock Tower Building
PO Box 2004
Rock Island, Illinois 61204-2004

B. A party may change the address to which such communications are to be directed by giving written notice to the other party in the manner provided in this Article.

C. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at the earlier of such time as it is actually received or seven calendar days after it is mailed.

ARTICLE XIII - CONFIDENTIALITY

To the extent permitted by the laws governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

ARTICLE XIV - OBLIGATIONS OF FUTURE APPROPRIATIONS

A. Nothing herein shall constitute, nor be deemed to constitute, an obligation of future appropriations by the Legislature of the State of Illinois.

B. The Non-Federal Sponsor intends to satisfy its obligations under this Agreement. The Non-Federal Sponsor shall include in its budget request or otherwise propose, for each fiscal period, appropriations sufficient to cover the Non-Federal Sponsor's obligations under this

Agreement for each year [biennium], and will use all reasonable and lawful means to secure the appropriations for that year [biennium] sufficient to make the payments necessary to fulfill its obligations hereunder. The Non-Federal Sponsor reasonably believes that funds in amounts sufficient to discharge these obligations can and will lawfully be appropriated and made available for this purpose. In the event the budget or other means of appropriations does not provide funds in sufficient amounts to discharge these obligations, the Non-Federal sponsor shall use its best efforts to satisfy any requirements for payments under this Agreement from any other source of funds legally available for this purpose. Further, if the Non-Federal Sponsor is unable to satisfy its obligations hereunder, the Government may exercise any legal rights it has to protect the Government's interests related to this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the District Engineer for the U.S. Army Corps of Engineers, Rock Island District.

THE DEPARTMENT OF THE ARMY

BY: _____
William A. Bayles
Colonel, Corps of Engineers
District Engineer
Rock Island District

DATE: _____

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

BY: _____
Brent Manning
Director

DATE: _____

APPROVED:

_____
John Bandy
Chief Financial Offices

_____
Robert Lawley
Chief Legal Counsel

CERTIFICATE OF AUTHORITY

I, _____, do hereby certify that I am the principal legal officer of the Illinois Department of Natural Resources, that the Illinois Department of Natural Reaources is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army and the Illinois Department of Natural Resources in connection with design of the Peoria, Illinois, Riverfront Development (Ecosystem Restoration) project, and that the persons who have executed this Agreement on behalf of the Illinois Department of Natural Resources have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this _____ day of _____.

_____
Brent Manning
Director

CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____

Brent Manning
Director

DATE: _____

APPENDIX A-3

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)

MAY 2002

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX A-3
CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION

CONTENTS

Subject	Page
SECTION 1 - PROJECT DESCRIPTION	
Location	A-3-1
Authority and Purpose	A-3-1
General Description of Dredged and Fill Material	A-3-1
Description of Proposed Discharge Sites	A-3-2
Description of Placement Method	A-3-2
SECTION 2 - FACTUAL DETERMINATIONS	
Physical Substrate Determinations	A-3-4
Water Circulation, Fluctuation, and Salinity Determinations	A-3-5
Suspended Particulate/Turbidity Determinations	A-3-6
Contaminant Determinations	A-3-6
Aquatic Ecosystem and Organism Determinations	A-3-7
Proposed Placement Site Determinations	A-3-8
Determination of Cumulative Effects on the Aquatic Ecosystem	A-3-8
Determination of Secondary Effects on the Aquatic Ecosystem	A-3-8
SECTION 3 - FINDINGS OF COMPLIANCE OR NONCOMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE	

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX A-3
CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION

SECTION 1 - PROJECT DESCRIPTION

LOCATION

The proposed project is dredging to create deepwater aquatic habitat with island construction in Peoria Lake and create wetland habitat in the Farm Creek watershed. Peoria Lake is located at the City of Peoria, Illinois, on the Illinois Waterway. The Peoria Lake project is located in the upper east quadrant of Lower Peoria Lake in the vicinity of the McCluggage Bridge (U.S. Routes 24 and 150). The Farm Creek project is located in a farm field east of Washington, Illinois.

AUTHORITY AND PURPOSE

Specific authority for conducting the Peoria Riverfront Development study is contained in Resolution 2500 of the Committee on Transportation and Infrastructure, adopted May 9, 1996. Additional authority for conducting this investigation is contained in Section 216 of the 1970 Flood Control Act, which authorizes the U.S. Army Corps of Engineers to make modifications to completed projects, i.e., the 9-foot channel navigation project on the Illinois River, and Section 519 of the Water Resources Development Act (WRDA) 2000, which authorized restoration of the Illinois River Basin.

The purpose of the evaluation portion of this document is to comply with Section 404 of the Clean Water Act pertaining to guidelines for the placement of dredged material into waters of the United States. This evaluation, in conjunction with the *Peoria Riverfront Development (Ecosystem Restoration) Study, Illinois, Feasibility Report with Integrated Environmental Assessment*, will assist in analysis of alternatives for the proposed project, resulting in a designated Base Plan. Further, this evaluation will provide information and data to the state water quality certifying agency demonstrating compliance with state water quality standards.

GENERAL DESCRIPTION OF DREDGED AND FILL MATERIAL

The Rock Island District's Geotechnical Branch staff took borings from the lake bottom in June/July of 2001. The clay/silt passing the No. 200 sieve for all samples from borings taken in sediment to depths of 25 feet was 89%. This shows the material to be clay sediment with almost no sand. If material with higher sand content were required for construction of the islands, that borrow material would be taken from the lakebed below the water line where nearby deltas are forming within the lake.

The Tazewell County, Illinois soil survey shows the farm field site to contain Ipava silt loam, Tama silt loam, Sable silty clay loam, Birkbeck silt loam and Birkbeck silty clay loam.

DESCRIPTION OF PROPOSED DISCHARGE SITES

The proposed project would use material dredged from the bottom of Peoria Lake for construction of islands within the upper east quadrant of the lake itself and outside of the main navigation channel. The area of placement has a water depth of 1-2 feet with a substrate of unconsolidated sediment that has been described as "pudding." This material is kept in suspension from wave action over the broad expanse of the shallow part of the lake.

The largest construction effort would be for a total of three islands. One smaller island constructed above the bridge at approximate Illinois Waterway River Mile (RM) 166.0 and two larger, parallel islands constructed below the bridge near the Avery Light and Daymark at RM 165.3.

The smaller island above the bridge would be approximately 2,210 feet long and 485 feet wide, creating approximately 44 acres of terrestrial habitat. The dredging would create deepwater channels around the island and a 36-acre protected backwater off the main channel behind the island (see plate 3). Approximately 2,500 feet of riprap (approximately 11,500 tons) would be placed as shoreline protection at the upper end and along the channel side of the island. Eighteen rock jetties, approximately 8 feet wide by 20 feet long and placed approximately 250 feet apart (approximately 610 tons of riprap), would be placed as additional fish structure. One offset rock jettie (one-half from the mainland and one-half from the island) approximately 450 feet long (approximately 3,200 tons of riprap) would be placed at the upper end of the island to help reduce sediment from moving into the backwater area. The rock tie-in would be placed on the mainland shoreline for a length of approximately 25 feet and would be at (or below) the ordinary high water line and would also be placed below any shoreline vegetation.

The pair of islands below the bridge would be built in the same area as the Avery Light and Daymark. This would require relocation of the light and daymark to a new location, probably on the west (channel) side of the newly constructed island pair.

The east island would be approximately 3,960 feet long and 475 feet wide, creating approximately 76 acres of terrestrial habitat. The west island would be approximately 3,775 feet long and 235 feet wide, creating approximately 36 acres of terrestrial habitat. The dredging would create deepwater channels around the islands and a 56-acre protected backwater off the main channel between and behind the island pair (see plate 4). Approximately 7,200 feet of riprap (approximately 34,100 tons) would be placed as shoreline protection at the upper and lower ends of each island. Sixty-eight rock jetties, approximately 8 feet wide by 20 feet long (approximately 2,200 CY of riprap) and placed approximately 250 feet apart, would be placed as additional fish structure along the length of the islands. A rock closing structure approximately 500 feet long (approximately 1,900 CY of riprap) would be placed at the upper end of the east island to the mainland shoreline to help reduce sedimentation. The rock tie-in placed on the mainland shoreline for a length of approximately 25 feet would be at (or below) the ordinary high water line and would also be placed below any shoreline vegetation.

The field site east of the City of Washington, Illinois, is in the upper watershed of Farm Creek. While the field site is generally dry and there are no wetlands located there, USGS maps show that the drainageways within the field are considered waters of the U.S. Our project proposes to construct berms using material from the field to provide wetland habitat using the runoff water that would normally pass through the field. The project also proposes to plant a variety of native wetland and prairie plant species to enhance habitat on the site.

DESCRIPTION OF PLACEMENT METHOD

The islands in Peoria Lake would be constructed using a floating plant with large capacity clamshell bucket and/or a hydraulic dredge. The mechanical dredge would remove adjacent soft lake bottom sediment and place the material nearby to form an embankment, which would be filled by hydraulic dredge. Hydraulic dredging utilizes a cutterhead in combination with a centrifugal pump to entrain dredged solid materials in high velocity water where the material can then be pumped through pipes and placed where needed.

The general scenario for construction of the islands would be to first construct sediment confinement structures. The sediment confinement structures would be built by placing mechanically dredged fine sediments to form a confinement embankment. After construction of the sediment confinement structures, fine sediments would be hydraulically dredged into the confinement structures to form the islands. Detailed drawings of all sediment confinement options are found in the main report.

Project construction is proposed to be done in stages to allow time for dredged material consolidation. Riprap for all the project features would be placed from a barge with a clamshell, or boulders would be pushed off the barges using an endloader.

Construction of the berms in the farm field would be done using standard earth moving equipment.

SECTION 2 - FACTUAL DETERMINATIONS

PHYSICAL SUBSTRATE DETERMINATIONS

a. Substrate Elevation and Slope. Normal pool elevation for Peoria lake is 440.0 feet National Geodetic Vertical Datum (NGVD). The islands are proposed to be constructed to an elevation of 450.0 feet NGVD. The bottom of the lake is at approximately 438 feet NGVD. The elevation of the farm field is approximately 750 feet NGVD, which is approximately 10 feet above Farm Creek.

b. Sediment Type. Dredging and placement in Peoria Lake to construct the project would disturb extremely fine unconsolidated bottom sediments that are kept in suspension by wave action on the lake. Personnel from the Rock Island District's Geotechnical Branch performed subsurface exploration during three different time periods as the project feature scope evolved. Six offshore borings were taken in July 2000, three offshore borings were taken in March 2001, and seven hand auger borings were taken on two separate days in May 2001. Sediment borings taken in Peoria Lake at or near the proposed island construction sites indicate an average surface elevation of 438.0 IL State Plane Coordinate System (NAD 83). The upper 25 feet of sediment generally consists of soft clayey silts and silty clays.

More detailed information can be found in Appendix C, Geotechnical Considerations.

The material found in the farm field is generally silty clay loam.

c. Dredged/Fill Material Movement. Use of the clamshell dredge to form the island perimeter would limit the movement of the dredged material and would act as a berm to help confine the placement of the hydraulically dredged material.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

d. Physical Effects on Benthos. Dredging and island construction would temporarily disrupt the aquatic environment. However, the benefits gained from improved aquatic habitat and water quality would far out weigh any loss during that time.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

e. Actions Taken to Minimize Impacts. During the initial stages of island construction, mechanical dredging would be utilized to reduce water quality impacts. Early construction of the island perimeter ring structures would minimize impacts from hydraulic placement for later phases of island construction by acting as berms to hold the dredged material at the interior of the island. The excavated material would be allowed to consolidate and form a crust between passes of the floating plant to improve the overall stability of the island.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

WATER CIRCULATION, FLUCTUATION, AND SALINITY DETERMINATIONS

a. Water. Water quality conditions throughout Peoria Lake are dominated by the shallow nature of the lake and the soft unconsolidated sediments found throughout the lake. The majority of the lake's water quality problems are related to high turbidity values and suspended solids concentrations. These elevated values are a result of agricultural non-point runoff and re-suspension of sediments due to wave action from wind and barge traffic. A secondary impact of high turbidity values and soft unconsolidated sediments is the virtual absence of rooted aquatic plants throughout the lake.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

b. Current Patterns and Circulation. Only minor changes in current patterns or flows would result from construction of the islands.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

c. Normal Water Level Fluctuations. The Illinois River is typified by wide fluctuations in water levels during flood events. A model of the Illinois River was run using the UNET program to obtain the peak water surface profile for the Illinois River for various frequency events. The data generated by the model showed that the addition of the islands would have minimal effect on the water surface elevation of the Illinois River. (Complete details of this information can be found in Appendix D.)

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

d. Salinity Gradients. The proposed action would take place in and around an inland freshwater stream system. Therefore, no consideration of salinity gradients is warranted for these actions.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

e. Actions Taken to Minimize Impacts. During the initial stages of island construction, mechanical dredging would be utilized to reduce water quality impacts by confining the dredged material. Early construction of the island perimeter ring structures would minimize impacts from hydraulic placement for later phases of island construction by acting as berms to hold the dredged material at the interior of the island. The excavated material would be allowed to consolidate and form a crust between passes of the floating plant to improve the overall stability of the island.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

SUSPENDED PARTICULATE/TURBIDITY DETERMINATIONS

a. Effects on Physical and Chemical Properties of the Water Column. Use of mechanical dredging to contain hydraulically dredged material to act as berms eliminates most impacts to the water column.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

b. Effects on Biota. The aquatic biota of Peoria Lake is marginal at best. Impacts from the project would virtually wipe out what little there is. However, the advantages to be gained by the improved habitat after project completion far outweigh any disadvantages occurring during project construction.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

c. Actions Taken to Minimize Impacts. Several measures to minimize the impacts of the project features will be implemented in the design, and during and after construction. The configuration of the island is designed with shallow slopes to minimize erosional impacts from wind and wave action. The excavated material would be allowed to consolidate and form a crust between passes of the floating plant to improve the overall stability of the island. After island construction is completed, riprap would be placed to further reduce any erosion. It is also expected that the islands will become vegetated by the seed bank contained in the lake bottom that was used to construct the island.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

CONTAMINANT DETERMINATIONS

Sediment cores of varying lengths were collected and analyzed for a variety of chemicals in the project area during 1999 and 2000. Sediment removed from the project area as part of a separate access channel dredging project was also analyzed after spending 9 months weathering in a gravel pit. The results are reported in *Assessment of Sediment Quality for the Peoria Riverfront Environmental Restoration Project*, dated June 29, 2001, by the Illinois State Geological Survey (see Appendix E-3). Several laboratories analyzed the various samples and in most cases the lab results were in agreement. A University of Illinois researcher conducted an agronomic evaluation of the sediment. The results are reported in *Sediments and Sediment Derived Soils in Illinois: Pedological and Agronomic Evaluation and Characterization.*

There is no general regulatory standard applicable to the chemical quality of river sediments. There are some guidelines for determining when contaminants are elevated. Some standards exist for purposes such as cleanup, to protect human health at former industrial sites. Background levels for some chemicals in typical Illinois soils are also known.

Overall sediment quality in the project area is good. PCBs and all but one chlorinated pesticide were not detected. The presence of that chlorinated pesticide, MCPP, was not confirmed by

subsequent testing. Metals of regulatory concern, such as chromium, copper, mercury, and zinc, were above background soil levels but below the levels required for cleanup at industrial sites. Heavy metals were below the U.S. EPA regulatory limits for application of sewage biosolids to farmland. Levels of compounds in the PAH group varied between laboratories, but in most cases were below screening values and levels of concern.

Sediment and soil derived from sediment from several central Illinois reservoirs and Lake Peoria were evaluated to determine their potential value for use as soil or a soil amendment. The sediments are generally rich in plant nutrients and could potentially make good agricultural soil. The sediments tend to be fine textured, with silt and clay-sized particles dominating. The physical characteristics of the evaluated dredged sediments were similar to naturally productive agricultural soils in Illinois. Water stable aggregation data indicated the sediments have potential to develop good, stable soil structure after weathering by freezing, thawing, wetting, and drying. There is no indication in the physical data that these sediments should present a problem for agricultural utilization given proper handling, tillage, and fertility treatments. The pH of the Lake Peoria samples was elevated. This would tend to bind metals, making them less available for uptake by plants. General vegetative cover on Illinois River islands indicates that the chemical quality of the soil is not inhibiting plant growth.

Construction of the berms in the terrestrial environment of the farm field would not remove any fill from its present general environment. Therefore, the project is not anticipated to have any negative impacts to the aquatic environment.

AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS

a. Effects on Plankton, Nekton, and Benthos. The project is anticipated to improve the quality of the aquatic habitat in Peoria Lake.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

b. Effects on Aquatic Food Web. Dredging to provide deepwater and overwintering aquatic habitat would improve the overall health and food web of the lake. Fisheries would increase as well as benthic organisms as water quality and habitat diversity are improved by the project.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

c. Effects on Special Aquatic Sites. Effects on special aquatic sites, such as mussel beds and/or fish spawning habitat located in the vicinity, would be improved. No mudflats, vegetated shallows, coral reefs, or riffle and pool complexes would be affected by the proposed actions.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

d. Threatened and Endangered Species. There would be no impacts to threatened and/or endangered species in the project area.

e. **Other Wildlife.** Other fish and wildlife associated with the aquatic ecosystem are expected to be positively impacted by increased habitat benefits as a result of this project.

f. **Actions Taken to Minimize Impacts.** Early and open coordination with state and Federal resource agencies helps to minimize potential adverse impacts to aquatic, wetland, and terrestrial ecosystems.

PROPOSED PLACEMENT SITE DETERMINATIONS

a. **Mixing Zone Determinations.** A mixing zone is that volume of water at a placement site or discharge site required to dilute contaminant concentrations associated with a discharge of dredged material to an acceptable level. Since the mechanically dredged material would mostly confine the hydraulically dredged material, no violation of any standard would result during placement of dredged material.

Construction of the berms in the terrestrial environment of the farm field is not anticipated to have any negative impacts to the aquatic environment.

b. **Determination of Compliance with Applicable Water Quality Standards.** This Clean Water Act Section 404(b)(1) provides the necessary compliance required by law. Section 401 Water Quality certification in compliance with the Clean Water Act, and all other permits necessary for the completion of the project, would be obtained prior to project construction.

c. **Potential Effects on Human-Use Characteristics.** Implementation of the proposed project would have no effect on municipal or private water supplies; parks; national monuments or other similar preserves. The project is anticipated to improve commercial or recreational fishery in the lake area.

DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM

The project is designed for a minimum life of 25 years, and island construction within the lake using material dredged from the lake bottom is anticipated to produce improvements on the aquatic ecosystem over the life of the project. The project would improve long-term water quality within the lake by increasing deepwater habitat as well as improving fisheries within the lake. The project would provide overwintering areas for fisheries as well as spawning areas during its life. Additional recreational benefits would also be provided for boaters and fishermen. Improved habitat could potentially promote improved mussel resources for the area as well over the long term.

DETERMINATION OF SECONDARY EFFECTS ON THE AQUATIC ECOSYSTEM

No adverse secondary effects on the aquatic ecosystem are anticipated. Improved water quality; as well as improved fisheries, waterfowl and mussel habitat; and the reduction of lake sediments are the goals of this ecosystem restoration project. Flood heights have been evaluated, and construction is designed to meet state requirements. This determination is subject to reevaluation, if warranted by Federal, state, or local agency comment, as well as input from the general public.

SECTION 3 - FINDINGS OF COMPLIANCE OR NONCOMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

PEORIA RIVERFRONT DEVELOPMENT (ECOSYSTEM RESTORATION) STUDY, ILLINOIS

1. No significant adaptations of the 404(b)(1) guidelines were made relative to this evaluation.

2. Evaluation of Practicable Alternatives. Refer to Section 2 - Plan Formulation of the main report.

a. **No Federal Action.** This alternative was not selected because sedimentation within Peoria Lake has reduced it to a state of deterioration that is currently unacceptable.

b. **Proposed Action.** The proposed action is considered environmentally and economically acceptable and operationally feasible as planned. The construction of islands using geotextile tubes and berms to contain dredged material from the lake bottom has been selected to reduce water quality impacts as well as impacts to the riverine system. Materials discharged would be contained and have been evaluated for chemical and physical properties and have been determined to be acceptable for the environment.

3. Section 401 certification of the Clean Water Act will be obtained prior to project implementation. The project will be in compliance with water quality requirements of the State of Illinois.

4. The project is not anticipated to induce toxic substances into nearby waters or result in appreciable increases in existing levels of toxic materials.

5. No adverse impact to Federal or state-listed endangered species would result from the proposed actions. No marine sanctuaries would be impacted.

6. No municipal or private water supplies would be affected by the proposed actions, and no degradation of waters of the United States is anticipated.

7. Removal of sediments to construct islands and deepwater channels as well as shallow water areas would provide improved water quality and habitat diversity to Peoria Lake and is deemed beneficial for the environment.

8. No other practical alternatives have been identified. The proposed actions are in compliance with Section 404(b)(1) of the Clean Water Act, as amended. The proposed actions would not adversely impact water quality and would improve habitat diversity in Peoria Lake.

20 Dec 02
Date

William T. Bayles
Colonel, U.S. Army
District Engineer

CEMVR-ED-DN

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE
PHASE I ENVIRONMENTAL SITE ASSESSMENT

FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT
FOR
PEORIA RIVERFRONT DEVELOPMENT STUDY

ILLINOIS WATERWAY – RIVER MILES 164.2 – 166.5
PEORIA POOL

PEORIA LAKE ISLANDS

Thursday, January 31, 2002

Peoria Riverfront Development Study:
Peoria Lake Islands
Phase I ESA – 31 January 2002

Executive Summary

A Phase I Environmental Site Assessment (ESA) was performed in general conformance with ASTM Practices E 1527-00 and E 1528-00, ER 1165-2-132, and MVD DIVR 1165-2-9 for the following Peoria Riverfront Development Study project study areas.

- Peoria Lake Islands proposed dredging areas.
- Peoria Lake Islands proposed island construction areas.

The Phase I ESA, dated 31 January 2002, is on file for review at Rock Island District Headquarters. Any exceptions to, or deletions from, this practice are described in Section 1 of the report.

This assessment has revealed no evidence of hazardous substances, HTRW, or other regulated contaminants in connection with the dredging and island construction areas.

No ESA can wholly eliminate uncertainty regarding the existence for recognized environmental conditions concerning a property. This assessment is intended to reduce, but not eliminate, uncertainty regarding the existence of recognized environmental conditions in connection with a property with reasonable limits of time and cost. Continuing the Environmental Due Diligence Audit process beyond this Phase I ESA to a Phase II ESA may not necessarily reduce uncertainty, or reveal unidentified environmental liabilities. If any previously unaddressed recognized environmental condition should arise, this Phase I ESA will be revisited.

TABLE OF CONTENTS

1. INTRODUCTION 1

A. PURPOSE 1
B. AUTHORITY 1
C. REGULATORY SUMMARY 1
D. SCOPE OF WORK 1
E. SIGNIFICANT ASSUMPTIONS 2
F. LIMITATIONS 3
G. EXCLUSIONS 3
H. SPECIAL TERMINOLOGY 3

2. SITE DESCRIPTION 3

A. LOCATION AND LEGAL DESCRIPTION 3
B. SITE AND VICINITY CHARACTERISTICS 4
C. CURRENT USES OF TARGET AND ADJOINING PROPERTIES 4
D. DESCRIPTIONS OF STRUCTURES, ROADS, AND OTHER IMPROVEMENTS ON TARGET PROPERTIES 4

3. PRELIMINARY INFORMATION REVIEW 5

A. TITLE RECORDS 5
B. ENVIRONMENTAL LEINS OR ACTIVITY AND USE LIMITATIONS 5
C. SPECIALIZED KNOWLEDGE REVIEW 5
D. VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES 5
E. OWNER, PROPERTY MANAGER, AND OCCUPANT INFORMATION 6

4. RECORDS REVIEW 6

A. STANDARD ENVIRONMENTAL RECORD SOURCES 7
B. ADDITIONAL ENVIRONMENTAL RECORD SOURCES 7
C. PHYSICAL SETTING SOURCE(S) 8
D. HISTORICAL USE INFORMATION ON THE PROPERTY AND ADJOINING PROPERTIES 9

5. SITE RECONNAISSANCE 11

A. SITE SAFETY 11
B. METHODOLOGY AND LIMITING CONDITIONS 11
C. GENERAL SITE SETTING 11
D. EXTERIOR OBSERVATIONS 12
E. INTERIOR OBSERVATIONS 13

6. INTERVIEWS 13

A. INTERVIEWS WITH OWNERS 13
B. INTERVIEWS WITH SITE MANAGERS 13

C. INTERVIEWS WITH OCCUPANTS 13
D. INTERVIEWS WITH LOCAL GOVERNMENT OFFICIALS 13
E. INTERVIEWS WITH OTHERS 13

7. FINDINGS 13

8. OPINIONS 15

9. CONCLUSIONS 17

10. RECOMMENDATIONS 18

11. ADDITIONAL SERVICES 18

TABLE OF APPENDICIES

APPENDIX A	**ENVIRONMENTAL LIABILITY, SPECIAL TERMINOLOGY, AND ACRONYMS**
APPENDIX B	**REFERENCES AND ABSTRACTS**
APPENDIX C	**VICINITY MAP AND SITE PLANS**
APPENDIX D	**SITE RECONNAISANCE: NOTES, PHOTOGRAPHS, AND SAFETY AND HEALTH PLAN**
APPENDIX E	**HISTORICAL RESEARCH DOCUMENTATION**
APPENDIX F	**REGULATORY RECORDS DOCUMENTATION**
APPENDIX G	**INTERVIEW DOCUMENTATION**

Peoria Riverfront Development Study:
Peoria Lake Islands
Phase I ESA – 31 January 2002

1. Introduction

a. Purpose. The purpose of a Phase I Environmental Site Assessment (ESA) is to adequately document an appropriate inquiry into identifying recognized environmental conditions on target properties. This report documents the initial reconnaissance liability assessment for the Feasibility Report and Environmental Assessment for the Peoria Riverfront Development Study Peoria Lake Islands project. This inquiry is required in order to aid in minimizing Federal liability under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), and to reduce any threats to project workers and avoid costly delays associated with environmental abatement activities. A list of acronyms used in this report is contained in Appendix A. A list of documents and records reviewed or referenced is contained in Appendix B.

b. Authority. The U.S. Army Corps of Engineers (Corps) is authorized to conduct the Peoria Riverfront Development Study in the lower part of Peoria Pool of the Illinois Waterway as stated in Resolution 2500 of the Committee on Transportation and Infrastructure, adopted 9 May 1996, and Section 216 of the 1970 Flood Control Act (91-611).

c. Environmental Liability. A discussion of Corps Hazardous, Toxic, and Radioactive Waste (HTRW) guidance, environmental liability, Federal environmental laws and regulations, and the Environmental Due Diligence Audit process is available in ER 1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects; DIVR 1165-2-9, Lower Mississippi Valley Division HTRW Policy for Civil Works Projects; and ER 405-1-12, Real Estate Handbook.

d. Scope of Work. This inquiry is guided by the level appropriate for each type of property, information developed in the course of the inquiry, project requirements, regulatory agency requirements, and potential risks. The screening methods used to prepare the Phase I ESA have been selected based on the location, physical setting, surrounding land uses, and particular nature of dredged material placement sites. Intrusive field sampling and lab analyses are not used for the Phase I ESA, but are reserved for further ESA phases when required. The following documented resources were used to evaluate the existence of recognized environmental conditions within target properties as well as any recognized environmental conditions on properties within an approximate minimum search distance from the target properties:

(1) Site Specific Information.
(2) Preliminary Information Review.
(3) Records Review.
(4) Site Reconnaissance.
(5) Interviews.

e. Significant Assumptions. This subsection describes all assumptions made during this environmental site assessment.

(1) **Federal and State NPDES permitted releases to water and NAAQS permitted releases to air, if found, are assumed to be *de minimus* recognized environmental conditions.** Federal and State National Pollutant Discharge (NPDES) permitted releases to water and National Ambient Air Quality Standard (NAAQS) permitted releases to air are not considered recognized environmental conditions as long as all reported released hazardous substances, HTRW, and other regulated contaminants were permitted or corrected in accordance with applicable or relevant and appropriate requirements. These permitted releases are assumed to be *de minimus* since permits and corrective action levels are designed by law to minimize material risk of harm to human health and the environment to an acceptable level. NPDES permitted biosludge application to land and uncorrected discharges to water and air in excess of permits are not assumed to be *de minimus*.

(2) **Fertilizer, pesticide, and herbicide soil residues from normal agricultural activities, if found or suspected, are assumed to be *de minimus* recognized environmental conditions.** Fertilizers, pesticides, and herbicides applied to lands during the course of normal agricultural activities, not including mixing and cleaning activities, are exempt from CERCLA and RCRA regulations. Additionally, contamination of soil from normal agricultural activities is generally not the subject of government enforcement action, therefore a *de minimus* environmental condition. Contamination associated with fertilizer, pesticide, and herbicide mixing/cleaning platforms is a recognized environmental condition.

(3) **Unless it is made known by interview or record search or it is obvious during a site inspection, contamination related to transportation and utility features are not suspected.** The release of hazardous substances, HTRW, or other regulated contaminants from utilities or transportation features is possible. Petroleum spills occur with vehicle accidents, hazardous substances are released with railway disasters, and oil slicks occur with navigational tragedies. However, the discovery of such contamination by means other than interviews, record searches, and visual site inspection would require exhaustive site characterization measures to reduce uncertainty. At this time, reducing this uncertainty is not reasonably ascertainable within time and cost constraints, nor is the threat of a release necessarily preventable under the Peoria Riverfront Development Study.

f. Limitations. This subsection describes limitations discovered during this site assessment.

(1) **Site Reconnaissance Limitations.** The Peoria Riverfront Development Study Peoria Lake Islands project involves work on permanently inundated private and public land within Peoria Lake. Therefore, site reconnaissance was limited to bankline visual inspections.

(2) **Records Review Limitations.** Historical and regulatory record reviews are limited by the level of data collected by the recording agency, availability of record coverage, and by data transparency. If provided by the recording agency, statements regarding database limitations were included with a copy of the findings. Record coverage research was limited to records on the Corps' Rock Island District (CEMVR) Intranet, State and Federal regulatory agency websites, and popular mapping websites. Data was considered transparent only if it could easily be geospacially referenced to a target property.

g. Exclusions. This subsection describes reasons why a project site would be excluded from being a target property in this environmental site assessment. No project sites were excluded from inquiry.

h. Special Terminology. ER 1165-2-132, DIVR 1165-2-9, and ASTM Standards E 1527 and E 1528 provids definitions and descriptions of terms used in this Phase I ESA that are critical for the understanding of this document.

2. Site Description

a. Location and Legal Description. The target study area is a single contiguous corridor, of area 1-2 mi^2, contained entirely within Peoria Pool, Illinois Waterway RM 164.2 – 166.5 (Peoria Lake), near Peoria, IL. The area is contained within parts of sections 10, 11, 14, 15, 21, and 22 of T26N R4W of Tazwell County, IL and parts of Section 35 of T9N R8E and section 2 of T8N R8E of Peoria County, IL. Vicinity maps and site plans are located in Appendix C.

(1) **Dredging Area.** Approximately 203 acres will be dredged to a depth of 6 to 12 feet below flat pool by mechanical and hydraulic dredging. The dredged material is predominately material that has deposit in the last one hundred years.

(2) **Island Building Area.** Three island totaling 95 acres will be created with the dredged material.

b. Site and Vicinity Characteristics. Inspection of the most recent (1996) United States Geological Survey (USGS) Quadrangle map (Figure E19) and recent (1995) aerial photographs (Figures E13-E18) indicate that the project study area is highly developed. The vicinity is characterized by urban communities of Peoria and East Peoria and their respective riverfront and upland suburbs as well as their heavy industrial centers and technology parks. However, actual dredging and island construction sites exist on undeveloped lake bottom.

c. Current Uses of Target and Adjoining Properties. Information was collected using the most recent (1996) USGS Quadrangle map (Figure E19), 1998 Corps Illinois Waterway Navigation Charts (Figures E20-E22), and recent (1995) aerial photographs (Figures E13-E18) to determine the current uses of each target property and each adjoining property to the north, south, east, and west.

Dredging and Island Building Areas: Target property is currently inundated by the open water of Peoria Lake. The adjoining properties to the north are open water with the timbered banks of the Illinois River State Fish and Wildlife Area. McClugage Bridge crosses Peoria Lake near this wildlife area. The adjoining property to the south is open water and the East Peoria Riverfront, which has businesses, light industry, a gambling boat, boat clubs, and public recreation facilities. The adjoining property to the east is the East Peoria Riverfront, as described above. The adjoining property to the west is the Peoria Riverfront, which has businesses, industry, warehouses, marinas, barge terminals, and sewage outfalls.

d. Descriptions of Structures, Roads, and Other Improvements on Target Properties. Below is a summary of improvements observed on target properties. Information was collected using the most recent (1996) USGS Quadrangle map (Figure E19), 1998 Corps Illinois Waterway Navigation Charts (Figures E20-E22), recent (1995) aerial photographs (Figures E13-E18), a 2001 Corps Peoria Riverfront Land Use Study (Figure E23), and the 2001 U. S. Fish and Wildlife Service Environmental Conservation Online System Land Use Information (Figure E24).

Dredging and Island Building Areas: The target property resides in Peoria Lake adjacent to the navigation channel, therefore significant commercial barge and recreational boating traffic is expected. U. S. Routes 24 and 150 cross the target property on McClugage Bridge. Land use maps indicate that the target property is open water, with no other uses identified. No other structures, roads, or other improvements exist on target properties.

General Surrounding Area: The general surrounding area would best be classified as urban due to the population and industry associated with the Peoria/East Peoria

metropolitan area. Large industrial developments, including a power plant and manufacturing facilities, exist in this area. Various warehouses, industries, and buildings are found along the Peoria Riverfront. Peoria Waterworks Park, a drinking water filtration and wastewater treatment facility, is located along the northwest lakeshore. The Chicago, Rock Island, and Pacific (CRI & P) Railroad runs along the entire western lakeshore.

3. Preliminary Information Review.

a. Title Records. After reviewing project site locations, physical setting, surrounding land uses, and particular nature of the Peoria Islands project, a chain-of-title search to determine historical land title records was considered unnecessary. Target properties are permanently inundated and fall below the ordinary high water mark, therefore fall under navigational servitude authority.

b. Environmental Liens or Activity and Use Limitations. The existence of environmental liens or activity limitations was not examined at this time. If environmental liens or activity limitations are discovered during the real estate acquisition phase, this Phase I ESA will be revisited

c. Specialized Knowledge Review. The following Project Engineer and Project Team Members were interviewed for any specialized knowledge regarding the existence of hazardous substances, HTRW, or other regulated contaminants on target properties. No one interviewed recalled any actual or specialized knowledge indicating the existence of recognized environmental conditions on the target properties. A copy of each conversation record is found Appendix G.

Project Engineer(s):

Name	Interview Date	Phone
Michael Tarpey (ED-DN)	3/7/2001	(309) 794-5179

Other Project Team Members:

Name	Interview Date	Phone
Brad Thompson (PM-M)	3/2/2001	(309) 794-5256
Debra Vanopdorp (RE-A)	3/21/2001	(309) 794-5243
Clint Beckert (ED-HQ)	4/25/2001	(309) 794-5412
Ron Deiss (PM-AR)	4/4/2001	(309) 794-5185
Mike Cox (OD-T)	7/19/2001	(309) 794-5558

d. Valuation Reduction for Environmental Issues. At this time, there is no knowledge of a reduction in any target property's valuation due to environmental issues.

If a reduction in value is discovered prior to real estate acquisition, this Phase I ESA will be revisited.

e. Owner, Property Manager, and Occupant Information. The following information is was provided by a conversation with Ms. Debra Vanopdorp (see Appendix G.) Ms. Vanopdorp provided a tract ownership map (Figure C3). The target property proposed for the dredging and island construction consists of one contiguous project site from one real estate tract owned by Christie Real Estate (301 Southwest Adams Street, Peoria, IL); two real estate tracts owned by The State of Illinois Department of Conservation (524 South 2nd Street, Springfield, IL); four real estate tracts owned by the Fondulac Park District (201 Bloomington Road, East Peoria, IL); one real estate tract owned by Miller, Martin, and Trabue (150 4th Avenue North, Nashville, TN); and one real estate tract owned by the Illinois American Water Company (123 Southwest Washington Street, Peoria, IL).

4. Records Review

The purpose of a records review is to obtain and review records that will help identify recognized environmental conditions on target properties. Some of the records reviewed pertain not just to the property, but also to properties within an approximate minimum search distance, in order to help assess the likelihood of problems from migrating hazardous substances or other regulated contaminants. Factors considered in determining the approximate minimum search distance (Table 1) include ASTM Standards E 1527-00 and E 1528-00, the density of the setting, the distance that hazardous substances or other regulated contaminants are likely to migrate, local geologic or hydrogeologic conditions, and other observable factors (Figure F1). This review included querying several environmental databases and reviewing historical and current maps and photos (see Appendices C, D, E, F). A list of references reviewed or referred to in this report is contained in Appendix B.

Table 1. Approximate Minimum Search Distance. Adapted from ASTM E 1527

Property	Minimum Search Distance miles (kilometers)
Federal and State-equivalent NPL Site	1 (1.6)
Federal and State-equivalent CERCLA Site	0.5 (0.8)
Federal RCRA Treatment, Storage, or Disposal Facility	1 (1.6)
Federal RCRA Generator	property and adjoining properties
Federal Emergency Response Notification Site	property only
Landfill and/or Solid Waste Disposal Site	0.5 (0.8)
Leaking Underground Storage Tank	0.5 (0.8)
State Registered Underground Storage Tank	property and adjoining properties

a. Standard Environmental Record Sources. Table F1 in Appendix F describes the standard environmental record sources reviewed, the provider of the source, and the date the source was reviewed. Copies of standard environmental record sources are available in Appendix F.

Standard environmental records, provided by Environmental Data Resources, Inc. (EDR), indicated the existence of several recognized environmental conditions within the approximate minimum search distance of target properties, as described in Table 1. Table F2 in Appendix F shows a list of potential recognized environmental conditions that, due to topographic and hydrologic location, are listed as findings in this report. Shaded items in Table F2 are potential recognized environmental conditions within these findings because the sites are associated with persistent, bioaccumulative, and toxic (PBT) contaminants (Table F3), which are more likely to threaten human health and the environment. Details regarding these PBT potential recognized environmental conditions follow.

(1) **EDR Site #22: Illinois Department of Transportation (ILDOT) Bridge 090 0070, McClugage Bridge RCRIS-LQS Site.** In February 1995, the ILDOT acquired a RCRA large quantity generator permit to dispose over 1000 kilograms of hazardous waste. This hazardous waste was likely generated by lead-based paint abatement activities.

(2) **EDR Site #27: Bemis Company Inc. Superfund Site.** The Bemis Superfund Site was identified in August 1980 because of dioxin contamination from on-site burning of coatings off copper wire and paper production. The severity of dioxin contamination at the Bemis Superfund Site was assessed in February 1985, but did not qualify as a National Priority List candidate. Consequently, the site is under state-lead cleanup efforts.

(3) **EDR Site #41: Komatsu Dresser Company RCRA Large Quantity Generator Site.** Komatsu Dresser manufactures industrial and commercial construction machinery equipment, such as motor graders, crawler dozers, wheel loaders, mobile crushers, excavators, and dump trucks. The USEPA cited 21 low priority violations against Komatsu Dresser between 1986 - 1999 in the area of treatment, storage and disposal requirements; generator requirements; and land ban requirements. Corrective actions occurred for each violation.

b. Additional Environmental Record Sources. Five additional environmental record sources were reviewed. They include a copy of a letter that the Corps wrote to the Illinois Historic Preservation Agency (see Appendix G), and data from the Illinois Waste Management and Research Center (see Appendix F).

Corps Letter to Illinois Historic Preservation Agency. On 7 November 2000, Kenneth Bar (PM-AR) sent a letter (see Appendix G) to the Illinois Historic Preservation Agency regarding an archival search for historic properties within the Peoria Riverfront Development Peoria Lake Islands project study area. The letter stated that "no submerged historic properties are documented within the areas of proposed dredging and island creation in Peoria Lake."

The Waste Management and Research Center (WMRC). The WMRC is a division of the Illinois Department of Natural Resources (ILDNR), contains a database of permitted landfills, NPDES sites, TRI reporters, Superfund sites, surface impoundment sites, and historical hazard sites. A print of all data specific to the Peoria Lake Island study area was provided by John C. Marlin, Assistant to the WMRC Director. The database provided over 250 pages of information regarding recognized environmental conditions around Upper Peoria Lake, Lower Peoria Lake, East Peoria, and Peoria, IL. The information was reviewed to identify specific environmental conditions that, due to topographic and hydrologic location, should be listed as findings in this report.

(1) **Dixon Fisheries Landfill.** Located at 1807 Main Street in East Peoria, IL, this closed and covered 4-acre concrete and demolition debris landfill exists along the southeastern shoreline of Lower Peoria Lake.

(2) **East Peoria Sewage Treatment Plant Land Application Field #3.** Located at 3601 N. Main St in East Peoria, IL, this field is used for the land application of municipal biosolids from East Peoria's municipal wastewater treatment plant (WWTP). The field is located near the WWTP sewage disposal ponds and the Cooper Park marina. The Peoria Lake Island proposed dredge area is adjacent to the Cooper Park marina. Several measurement-based violations have occurred.

c. Physical Setting Source(s). Physical setting information for the target properties and the general surrounding area was collected using the most recent (1996) USGS Quadrangle map (Figure E19), recent (1995) aerial photographs (Figures E13-E18), the 2001 U. S. Fish and Wildlife Service Environmental Conservation Online System Land Use Information (Figure E24), ISGS Illinois Coal Mines maps for Peoria and Tazwell Counties (ISGS, 2000b; ISGS, 2000c), ISGS Illinois stratigraphy guides (ISGS, 1975; ISGS, 2000a), and geomophology guides for the Illinois River Valley (Hajic, 2000; Bettis et. al., 1996).

Below is a summary of site-specific geologic, hydrogeologic, hydraulic, and topographic features observed on target properties:

Dredging and Island Building Areas: The site is a permanently inundated floodway with deposits associated with the catastrophic glacial outburst flood, or jökulhlaup, known as the Kankakee Torrent; vertical accretion and lacustrine sedimentation associated with the underfit Illinois River; and multiple encroaching valley margin alluvial fans depositing substantial amounts of upland-derived diamicton and loess-like material into the oversized flood basin which narrows where the valley enters the terminal Bloomington Moraine.

ISGS Illinois Coal Mines maps (ISGS, 2000b; ISGS, 2000c) indicate that mining of the Springfield (No. 5) coal seam occurred in the general surrounding area from 1861 to 1969. No coal mining occurs in the project study area today. The Springfield coal seam is Pennsylvanian in age and a member of the Carbondale Formation. On the right descending bank, the Springfield coal outcrops along the base of Illinois River Valley walls west of Peoria near W. H. Sommer County Park and along the valley walls of Kickapoo Creek southwest of Peoria in Bartonville and Bellevue suburbs. On the right descending bank, the Springfield coal outcrops along the base of the Illinois River Valley walls south of East Peoria near the suburbs of Creve Coeur and Marquette Heights as well as in Pekin Heights. The coal was mined using shaft, slope, and drift mining techniques. As late as the 1950s, the coal seam was strip mined from the catastrophic flood erosional surface in Peoria near Bradley Park.

d. Historical Use Information on the Property and Adjoining Properties. Table E1 in Appendix E describes the available historical coverage for the project study area. A copy of all historical documents reviewed is located in Appendix E.

1900-1905. The proposed dredging and island building area is inundated by the open water of Peoria Lake. The area to the north (upstream) is open water, followed by timber and brush on the shoreline, with a trestle bridge crossing the lake near Peoria Water Works. The shore east of the project study area is timber and brush mixed with cultivated land. The shore west of the project study area is urban (Averyville and Peoria) with freight depots, breweries, steamboat landings, Chicago Rock Island and Pacific (CRI & P) depot and railroad, grain elevators, CRI & P roundhouse, icehouses, the Peoria Correctional Facility, Lake View Park, and several manufacturing facilities.

1930-1935. A "Wagon" Bridge is built, crossing the lake near Peoria Water Works. The shore west of the project study area is still urban (Averyville and Peoria) with industrial buildings, warehouses, railyards, a U.S. boatyard, and a sewage outlet.

1945-1950. The Old "Wagon" Bridge has been removed and replaced by the McClugage Bridge, which crosses the lake near an undeveloped timbered area. The shore east of the project study area is now timber and brush mixed with the addition of East Peoria homes and Cooper Park where the land was once cultivated. To the west of the project study area, the growing village of Peoria has engulfed Averyville and continues to add industry, warehouses, and a CRI & P railyard to its shores.

1960-1965. The shore west of the project study area is developing clearly delineated industrial and urban areas.

1970-1975. Industrialization of the East Peoria Riverfront, with its buildings, warehouses, and marinas continues east of the project study area. Construction of East Peoria suburban homes continues on the bluffs east of the project study area. Industrial expansion continues on the Peoria shorefront west of the project study area.

1975-1980. North of the project study area, the land remains undeveloped as open water with timbered banks, with the McClugage Bridge crossing the lake near Peoria Water Works, now known as the Peoria Water Filtration Plant. On the shore east of the project study area, office buildings and warehouses have now replaced most of the timber and brush; the Dixon Fish Ponds and the Pendola Boating and Fishing Harbor were constructed. Along the shore west of the project study area the urban community of Peoria continues to grow with the addition of oil and gas companies, concrete mixing plants, municipal barge terminals, and sewer outfalls.

1995-2000. The proposed dredging and island building area remains inundated by the open water of Peoria Lake. North of the project study area, the land remains undeveloped as open water with the timbered banks of the Illinois River State Fish and Wildlife Area and McClugage Bridge crossing the lake near Peoria's drinking water filtration plant and wastewater lagoon facilities. South of the project study area is open water and the East Peoria Riverfront, which has seen the addition of several businesses, light industry, a gambling boat, boat clubs, and public recreation facilities. The Franklin Street Bridge is renamed Michel Bridge. Along the shore east of the project study area, the Eastport and Carl Spindler Marinas have been added to the East Peoria Riverfront; East Peoria has constructed a wastewater treatment plant and sewage disposal ponds on the floodplain; and the Dixon Fish Ponds have now become Eastport Marina and East Peoria Boat Club. West of the project study area is open water and Peoria Riverfront, to which the Wharf Harbor Marina and the Railyard Riverside Parkway have been added.

5. Site Reconnaissance

a. Site Safety. A formal Site Specific Safety and Health Plan (SSHP) for this report is contained in Appendix D. Investigators followed all generic requirements of the Corps Safety and Health Requirements Manual (EM 385-1-1) and the Safety and Occupational Health Requirements for HTRW Activities (ER 385-1-92). Site safety information was obtained from current aerial photographs and informal interviews with members of the Peoria Riverfront Development Study team. Assessment methods did not involve intrusive techniques, such as collecting and analyzing soil samples at the placement sites for this report.

Site reconnaissance information was obtained by project team members by way of onsite visitation, telephone conversations, and informal interviews.

b. Methodology and Limiting Conditions. The Peoria Riverfront Development Study Peoria Lake Islands project involves work on permanently inundated private and public land within Peoria Lake. Site reconnaissance is limited to bankline visual inspections. Site reconnaissance methodology consisted of a visual inspection of the project study area from the shoreline at Cooper's Park in East Peoria, IL. Photographs and field notes taken during the site reconnaissance are located in Appendix D.

c. General Site Setting. The Peoria Lake Island project location is predominately inundated by Peoria Lake, part of the Illinois Waterway. The surrounding area is flat, with little topographic relief, gently sloping toward the shoreline. The lake of topographic relief is broken by Illinois River Valley bluffs, indicating the extreme width of the river valley in this area. Mass wasting of the eastern bluffs by fluvial process into alluvial fans is likely the primary surficial process occurring along the left descending bank of this Illinois Waterway reach. Storm runoff in the general surrounding area is likely to flow to Peoria Lake by way of direct overland flow, ditches, or storm sewers.

The valley is a metropolitan area, with many urban, commercial, and industrial centers. Nonetheless, no buildings or other structures, other than the McClugage Bridge, were visually identified on the target property. However, powerlines running along the eastern shore, near the project study area, were identified. Along the eastern side of the lake, several access roads lead to the shoreline, providing recreational and commercial access. Cooper's Park provided such an access for site reconnaissance.

(1) **Hazardous Substances in Connection with Identified Uses.** Public recreation is not considered a meaningful source of hazardous substance, HTRW, or other regulated materials.

(2) **Hazardous Substance Containers, Drums, Sacks, and Unidentified Substance Containers.** No hazardous substance containers, drums, sacks, or other unidentified substance containers were identified on the target property.

d. Exterior Observations.

(1) **Storage Tanks, Vent and Fill Pipes.** No vent or fill pipes, vacant concrete pads, or decrepit pumps were discovered on the target property.

(2) **Solid Waste Disposal and Fill Dirt.** Site reconnaissance did not reveal any indications of fill dirt, soil piles, disturbed soil surfaces, construction debris, or demolition debris on the target property. There was no indication of illegal dumping of household trash or refuse, recreational litter, appliances, automotive batteries, automotive parts or debris, tires, drums, or other forms of solid waste on the target property. There was no indication of solid waste incineration or burning activities on the target property. However, conditions were not pristine on all adjacent properties. Large amounts of commercial and industrial activity occur on Peoria Lake's shore.

(3) **Stained Soil and Pavement.** Site reconnaissance did not reveal any indications of stained soil, leaks, or spills associated with leaks, spills, discharge, or dumping.

(4) **Stressed Vegetation.** No superficial indications of contamination, such as unexplainable stresses to the ecosystem, were noted.

(5) **Wells.** No indications of the property being served by private well or non-public water systems were observed. Site reconnaissance did not indicate the existence or suspected existence of dry wells, irrigation wells, injection wells, abandoned wells, or other forms of wells.

(6) **Pits, Ponds, and Lagoons.** No pits, ponds, or lagoons were observed on the target property. No evidence indicating the past presence of pits, ponds, or lagoons on the target property was observed. No evidence indicating the past or present existence of pits, ponds, or lagoons on adjacent properties were observed.

(7) **Industrial Waste Discharge.** No discharge points or drainage systems other than storm water drainage were observed on the target property.

(8) **Septic Systems.** Site reconnaissance did not reveal any reason to suspect the existence of septic systems on the target property.

(9) **Lead-Based Paint.** No structures or improvements, other than the McClugage Bridge were visually observed on the target properties. The McClugage Bridge is a potential source of historic and present-day lead-based paint.

(10) **Polychlorinated Biphenyls (PCBs).** No indications of PCBs were identified on or adjacent to the target property. No PCB "boneyards" or suspicious pits where PCB-containing materials could be dumped were seen on or adjacent to the target property.

e. Interior Observations. No buildings or structures, other than the McClugage Bridge, were visually identified on the target properties.

6. Interviews

a. Interviews with Owners. Because the target property is permanently inundated and subject to navigational servitude, landowners were not interviewed.

b. Interviews with Site Managers. Because target property is permanently inundated, no site manager was interviewed.

c. Interviews with Occupants. Because target property is permanently inundated, property is not inhabited.

d. Interviews with Local Government Officials. Although mandatory to meet or exceed ASTM standards, interviews with local fire departments and local health/environmental departments were not considered applicable. There are no buildings or other improvements on the target property.

e. Interviews with Others. No additional interviews occurred.

7. Findings.

This section summarizes known or suspect environmental conditions associated with the property, and may include current recognized environmental conditions, historical recognized environmental conditions, *de minimus* environmental conditions, and other environmental conditions.

(1) **Peoria/East Peoria Metropolitan and Industrial Area.** As indicated in the site-specific information, records review, and site reconnaissance, the Peoria Lake Island project site exists in an extensively developed area. Since the early 1900s, property adjoining the project site has slowly developed into land used for industry, urban development, vehicular transportation, railroads, barge traffic, commerce, utilities, and recreation. (See Appendix D; Photos D010-D019; and Figures E1-E24.) Specific findings include:

   (a) **Commercial Navigation and Boating in Peoria Lake.** As indicated in the site-specific information and records review, commercial navigation and recreational boating has occurred in the Peoria Lake Islands project study area. (See Figures E10, E11, E13-E18, and E20-E22; and Appendix G.)

   (b) **Bemis Company Inc. Superfund Site.** As indicated in the records review, a Superfund site exists within the approximate minimum search distance to the Peoria Lake Islands project site. (See Appendix F.)

   (c) **Komatsu Dresser Company RCRA Large Quantity Generator Site.** As indicated in the records review, a large quantity generator with several violations exists within the approximate minimum search distance to the Peoria Lake Islands project site. (See Appendix F.)

   (d) **Dixon Fisheries Landfill.** As indicated in the records review, an old demolition debris landfill exists within the approximate minimum search distance to the Peoria Lake Islands project site. (See Appendix F.)

   (e) **East Peoria Sewage Treatment Plant Land Application Field #3.** As indicated in the records review, a municipal biosolids application field exists within the approximate minimum search distance to the Peoria Lake Islands project site. (See Appendix F).

(2) **McClugage Bridge.** As indicated in the site-specific information, records review, and site reconnaissance, the McClugage Bridge passes over (adjoins) the Peoria Lake Islands project site. (See Appendix D, Figures E1-E24, and Appendix F.)

(3) **Coal Mining**. As indicated in the records review, extensive coal mining has occurred in the Peoria Lake Islands project study area. Coal mining activity occurred between the early 1860s to the late 1960s along the southern parts of

Peoria Lake.

(4) **Agriculture and Crop Production Fields.** As indicated in the site-specific information, the Peoria Lake Islands project study area exists in a region that prior to 1945 contained crop production fields. (See Figures E1-E7.)

8. Opinions.

This section shall include the environmental professional's opinion(s) of the impact on the property of known or suspect environmental conditions identified in the findings section. The logic and reasoning used by the environmental professional in evaluating information collected during the course of the investigation related to known or suspect environmental conditions shall be discussed. The opinion shall specifically include the environmental professional's rationale for concluding that a known or suspect environmental condition is or is not currently a recognized environmental condition. Known or suspect environmental conditions identified by the environmental professional as recognized environmental conditions currently shall be listed in the conclusions section of the report.

(1) **Peoria/East Peoria Metropolitan and Industrial Area.** Since the early 1900s, the general surrounding area around the Peoria Lake Islands project has become increasingly industrial and metropolitan in nature. Many of these activities are typically associated with hazardous substances, HTRW, and other regulated contaminants. The release of hazardous substances, HTRW, or other regulated contaminants from industries, commercial businesses, utilities, and transportation features is possible. However, the discovery of such contamination by means other than interviews, record searches, and visual site inspection would require exhaustive site characterization measures to reduce uncertainty. At this time, reducing this uncertainty is not reasonably ascertainable within time and cost constraints, nor is the threat of a release necessarily preventable under the Peoria Riverfront Development Study.

(a) **Commercial Navigation and Recreational Boating in Peoria Lake.** An investigation of submerged historic properties in the project study area did not indicate the existence of any immersed hazards within the Peoria Lake Islands project study area. In addition, public recreation is not considered a meaningful source of hazardous substance, HTRW, or other regulated materials. Therefore, commercial navigation and recreational boating in Peoria Lake is a *de minimus* environmental condition.

(b) **Bemis Company Inc. Superfund Site.** This non-NPL Superfund site, located approximately ½ -mile from the project site, is under state-lead cleanup efforts. Interviews, record searches, and a visual site inspection did not indicate that the state-lead cleanup involved the target properties of the Peoria Riverfornt Devleopment Study. Therefore, the Bemis Company Superfund Site is a *de minimus* environmental condition.

(c) **Komatsu Dresser Company RCRA Large Quantity Generator Site.** This hazardous waste generator is located approximately ½ - mile from the project site. The USEPA cited 21 low priority violations against Komatsu Dresser between 1986 - 1999 in the area of treatment, storage and disposal requirements; generator requirements; and land ban requirements. Corrective actions occurred for each violation. Violations did not require any remedial actions, indicating that hazardous substances were not released into the environment. Therefore, the Komatsu Dresser Company RCRA Large Quantity Generator Site is a *de minimus* environmental condition with respect to the Peoria Lake Islands project.

(d) **Dixon Fisheries Landfill.** If found on a target property, demolition debris is a significant environmental condition. However, since this landfill is located approximately 0.8-miles downstream from the project site, it is a *de minimus* environmental condition.

(e) **East Peoria Sewage Treatment Plant Land Application Field #3.** This biosolids application field is located approximately ½ -mile from the project site. As part of the permitting process, runoff controls are required to prevent biosolids from entering any waters of the United States. Some common runoff controls include slope restrictions, buffer zones/filter strips, tillage to create a roughened soil surface, crop residue or vegetation requirements, berms, dikes, silt fences, diversions, sediment basins and terraces. Since only measurement-based violations have occurred, the biosolids land application field is considered a *de minimus* environmental condition with respect to the Peoria Lake Island project site.

(2) **McClugage Bridge.** Since the bridge was constructed before 1945, it is likely that some form of lead-based paint was used on the bridge. Because lead-based exterior coatings were designed to "chalk," it is not unreasonable to assume that sediments under the bridge, and on the project site, are contaminated with lead. Nonetheless, dilution of this chalk over time is likely to minimize the contamination. Therefore, historic lead-based paint chalking

on McClugage Bridge is a *de minimus* environmental condition.

(3) **Coal Mining.** Contamination from coal resource mining is not expected to be a concern for the Peoria Lake Island project since contaminant transport from the mined areas is likely to enter the Illinois Waterway downstream of all Peoria Lake Island project features. Therefore, historic coal mining in the Peoria Lake Island project study area is a *de minimus* environmental condition.

(4) **Agriculture and Crop Production Fields.** Historical records indicate that agricultural cultivation in the Peoria Lake Islands project study area ended by 1945. Fertilizers, pesticides, and herbicides applied to lands during the course of normal agricultural activities, not including mixing and cleaning activities, are exempt from CERCLA and RCRA regulations. Additionally, application of pesticides and fertilizer for normal agricultural activities is generally not the subject of government enforcement action, therefore a *de minimus* environmental condition.

9. Conclusions.

A Phase I Environmental Site Assessment (ESA) was performed in general conformance with the scope and limitations of ASTM Practices E 1527-00 and E 1528-00 for the following Peoria Riverfront Development Study Peoria Lake Islands project study areas: the proposed dredging and island construction areas. The Phase I ESA is on file for review at Rock Island District Headquarters. Any exceptions to, or deletions from, this practice are described in Section 1 of the report.

This assessment has revealed no evidence of hazardous substances, HTRW, or other regulated contaminants in connection with the dredging and island construction areas except for: Peoria Lake sediments within and around the Peoria Lake Islands project site.

No ESA can wholly eliminate uncertainty regarding the existence for recognized environmental conditions concerning a property. This assessment is intended to reduce, but not eliminate, uncertainty regarding the existence of recognized environmental conditions in connection with a property with reasonable limits of time and cost. Continuing the Environmental Due Diligence Audit process beyond this Phase I ESA to a Phase II ESA may not necessarily reduce uncertainty, or reveal unidentified environmental liabilities. If any previously unaddressed recognized environmental condition should arise, this Phase I ESA will be revisited.

10. Recommendations.

There are currently no recommendations. If at any time during the planning or construction phases any previously unaddressed recognized environmental condition should arise, this Phase I ESA will be revisited.

11. Additional Services.

Non-scope considerations were not included within this report. Other environmental issues or conditions in the project study area may be required as part of the Environmental Due Diligence Process. These issues, such as radon and asbestos, are outside of the standard Phase I ESA practice, and therefore not included in this assessment

APPENDIX A
ACRONYMS

ASTM	American Society for Testing and Materials
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	CERCLA Information System
CEMVR	Corps of Engineers, Mississippi Valley Division, Rock Island District
CFR	Code of Federal Regulations
CORRACTS	RCRA facility required at one time to complete a corrective action
CWA	Clean Water Act
ED-DN	Engineering Division – Design Branch, Environmental Engineering Section
ED-HQ	Engineering Division – Hydraulics Branch, Water Quality Section
EDR	Environmental Data Resources, Inc.
EM	Engineering Manual
ER	Engineering Regulation
ERNS	Emergency Response Notification System
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Environmental Site Assessment
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FR	Federal Register
FTTS	FIFRA/TSCA Tracking System
FWPCA	Federal Water Pollution Control Act Amendment
HMTUSA	Hazardous Materials Transportation Uniform Safety Act
HSWA	Hazardous Sold Waste Amendments
HTRW	Hazardous, Toxic, and Radioactive Waste
ILDNR	Illinois Department of Natural Resources
ILDOT	Illinois Department of Transportation
L	Left Descending Bank
LLL	Lender Liability Law
LUST	Leaking Underground Storage Tanks
LQG	Large Quantity Generator
MPRSA	Marine Protection, Research, and Sanctuaries Act
NAAQS	National Ambient Air Quality Standard
NFRAP	No Further Remedial Action Planned
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRC	National Response Center
OD-T	Operations Division – Technical Branch
OPA	Oil Pollution Act

PBT	Persistent Bioaccumulative and Toxic
PCB	Polychlorinated Biphenyl
PCS	Permit Compliance System
PM-AR	Programs and Project Management Division – Economic and Environmental Analysis Branch
PM-M	Programs and Project Management Division – Program Management
PPA	Pollution Prevention Act
R	Right Descending Bank
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RE-A	Real Estate Division – Acquisitions Branch
RM	River Mile
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SQG	Small Quantity Generator
SRP	Site Remediation Program
SSHP	Site Specific Safety and Health Plan
TACO	Tiered Approach to Cleanup Objectives
TRI	Toxic Release Inventory
TRIS	Toxic Release Inventory System
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, or Disposal Facility
USC	United States Code
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
WWW	World Wide Web

APPENDIX B
REFERENCES AND ABSTRACTS

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APPENDIX C
VICINITY MAPS AND SITE PLANS

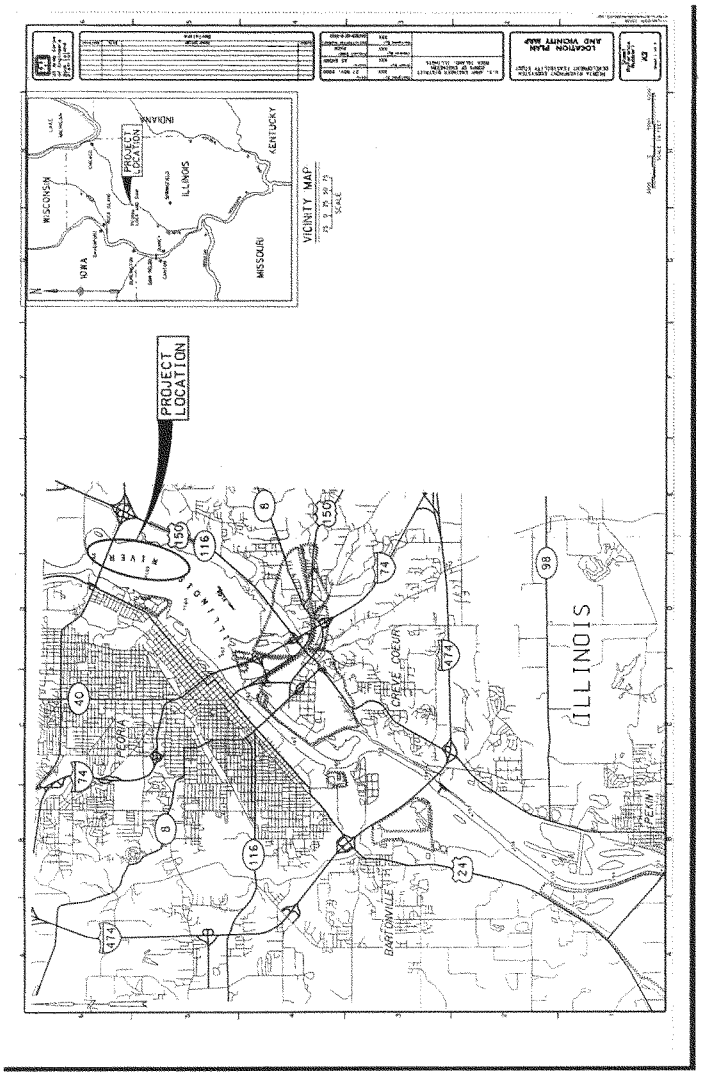


Figure C1. Peoria Lake Islands Project location and vicinity.

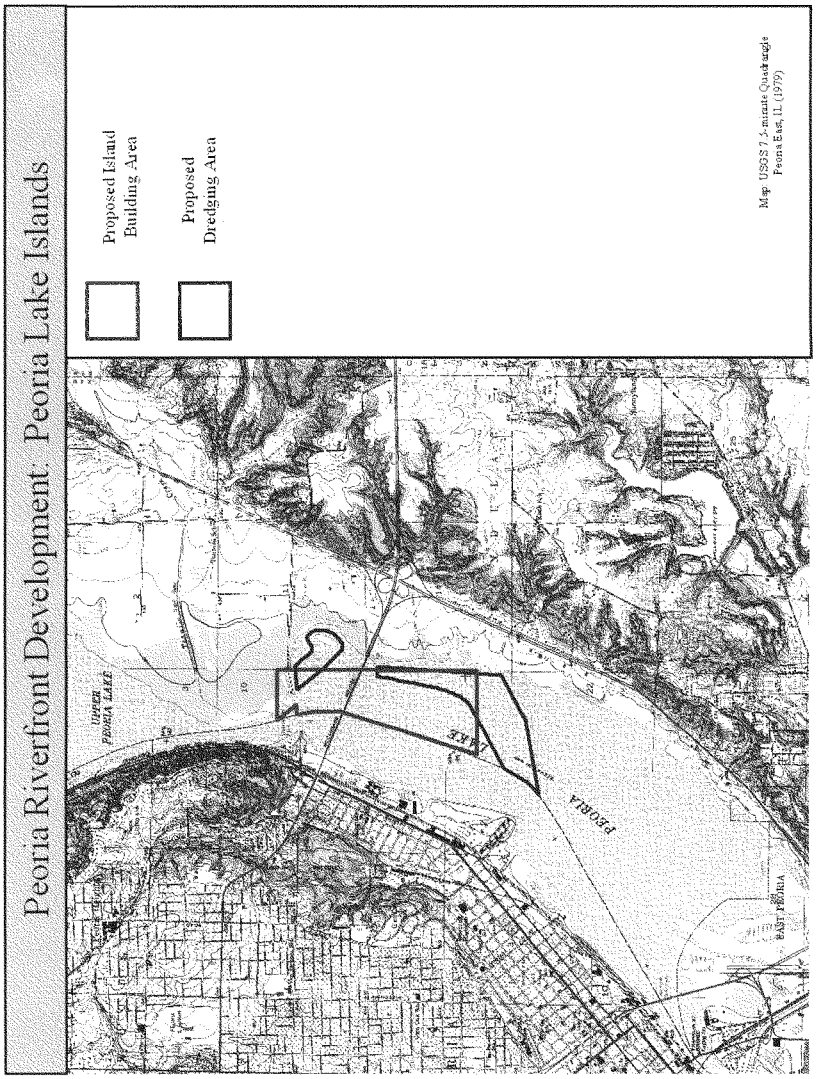


Figure C2. Site plan for propsed island building area and proposed dredging area.

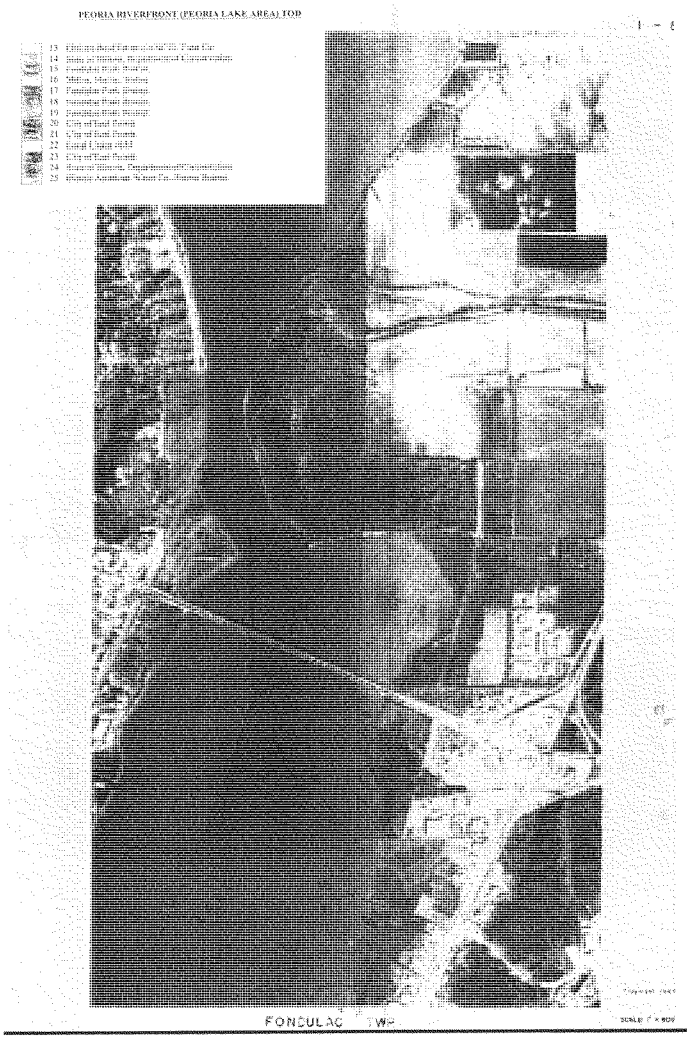


Figure C3. Peoria Lake Islands Project Tract Ownership Data (TOD) map for project area.

APPENDIX D
SITE RECONNAISANCE: NOTES, PHOTOGRAPHS, AND SAFTEY PLAN

NOTES AND PHOTOGRAPHS. Site reconnaissance notes and photographs are included in this appendix following the informal SSHP.

SITE SPECIFIC SAFETY AND HEALTH PLAN. A formal Site Specific Safety and Health Plan (SSHP) was prepared for this report and included in this appendix. Investigators followed all generic requirements of the Corps Safety and Health Requirements Manual (EM 385-1-1) and the Safety and Occupational Health Requirements for HTRW Activities (ER 385-1-92). Site safety information was obtained from current aerial photographs, onsite reconnaissance, and informal interviews with members of the project team. Assessment methods did not involve intrusive techniques, such as collecting and analyzing soil samples at the placement sites for this report.

SITE SPECIFIC SAFETY AND HEALTH PLAN TITLE PAGE Rock Island District Corps of Engineers	This SSHP is a part of the Rock Island District HTRW Program, which includes EM 385-1-1 and ER 385-1-92.
PROJECT NAME: Peoria Riverfront Development Peoria Islands	REQUEST FOR SERVICES NO.:
JOBSITE ADDRESS: Peoria Lake, Peoria, IL	COST CODE:
PROJECT MANAGER: Brad Thompson	PHONE NO.: (309) 794-5342
SITE CONTACT: Michael Tarpey	PHONE NO.: (309) 794-5265
( ) AMENDMENT NO. _____ TO EXISTING APPROVED SSHP. DATE EXISTING APPROVED SSHP:	
OBJECTIVES OF FIELD WORK: Environmental Site Assessment for the dredged material placement site. A site visit of the project study area will be made. Environmental concerns will be documented. No intrusive investigations (soil samples, etc.) will be conducted.	SITE TYPE: Check as many as applicable: ( ) Active ( ) Landfill (X) Natural ( ) Inactive ( ) Uncontrolled ( ) Military ( ) Secure (X) Industrial ( ) Other specify: Agricultural Field ( ) Unsecure ( ) Residential ( ) Enclosed space ( ) Well Field
DESCRIPTION AND FEATURES: Summarize below. Include principal operations and unusual features (containers, buildings, dikes, power lines, hills, slopes, river, etc.). Inundated area in Peoria Lake proposed for dredging and island construction	
SURROUNDING POPULATION: ( ) Residential (X) Industrial ( ) Rural (X) Urban (X) Commercial: ( ) Other:	

SITE SPECIFIC SAFETY AND HEALTH PLAN EMERGENCY CONTACTS & APPROVAL PAGE Rock Island District Corps of Engineers	This SSHP is a part of the Rock Island District HTRW Program, which includes EM 385-1-1 and ER 385-1-92.

EMERGENCY CONTACTS	**EMERGENCY CONTACTS**	**NAME**	**PHONE**

Water Supply	N/A		Project Manager	Brad Thompson	309-794-5256
Site Telephone	N/A		Safety and Health Manager	Dean Magee	309-794-5280
EPA Release Report No.	800-424-8802		Industrial Hygienist		
			Environmental Agency	Illinois EPA	309-693-5460
			State Spill Number	National Response Cntr	800-424-8802
CONTINGENCY PLANS Read and Refer to **DM 385-1-2, Appendix H.** Enter any additional Site Specific Information and clarifications below:			Fire Department		911
			Police Department		911
1. Evacuation Routes will be to the roads that lead away from the site and perpendicular to the alignment.			Poison Control Center		
2. Personnel will evacuate if there appears to be any conditions that could expose any of the site visitors to an environmental or safety hazard.			Occupational Health Unit		
3. All accidents will be reported in accordance with **DM 385-1-1, Appendix B**, including preparing an accident report form ENG 3394, as required by the appendix.			MEDICAL EMERGENCY		
4. The overall plan is to evacuate the site in case of an emergency. In case of a medical emergency, the local EMS will be contacted from the nearest available telephone (resident or business).			Hospital Name:		
			Hospital Address:		
HEALTH AND SAFETY PLAN APPROVALS			Name of Contact at Hospital:		
Prepared by: Alaena A. Ensey		Date: 3 May 2000	Name of 24-Hour Ambulance:		
Reviewed by: Kara Mitvalsky		Date: 3 May 2000	Route to Hospital (Provide description below and attach map with route to hospital on the following page). A route map was not prepared, since the emergency plan is to call 911 from the nearest telephone should there be an emergency.		

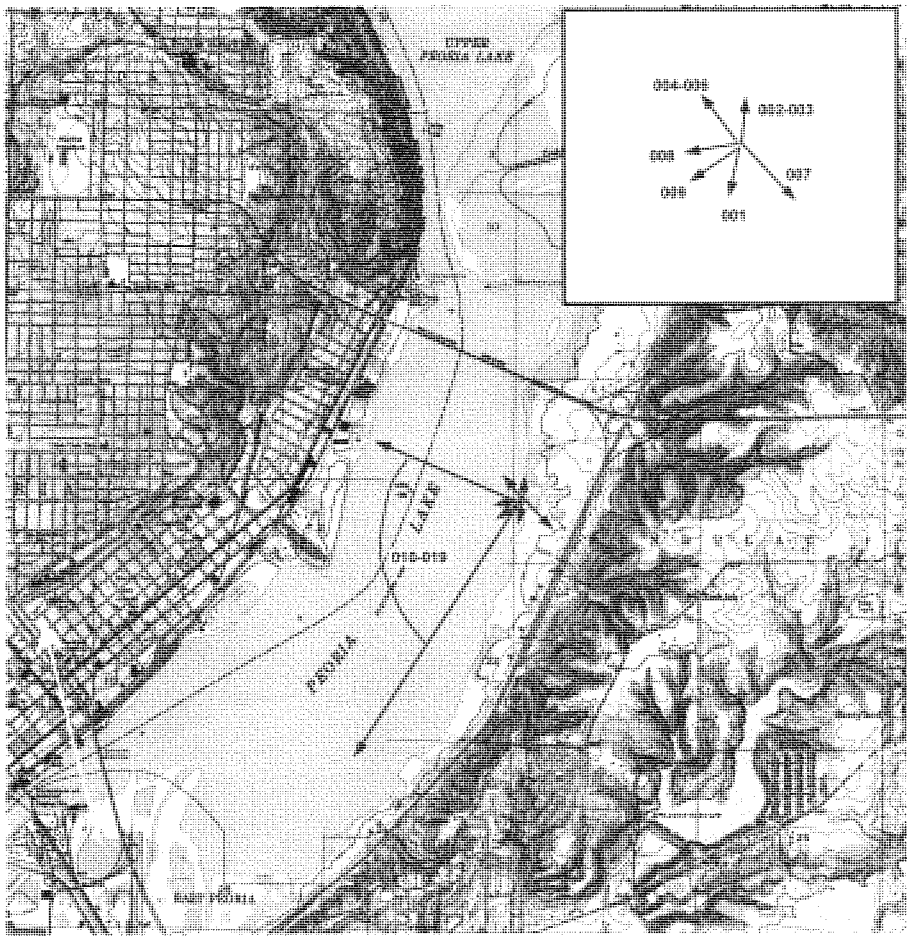
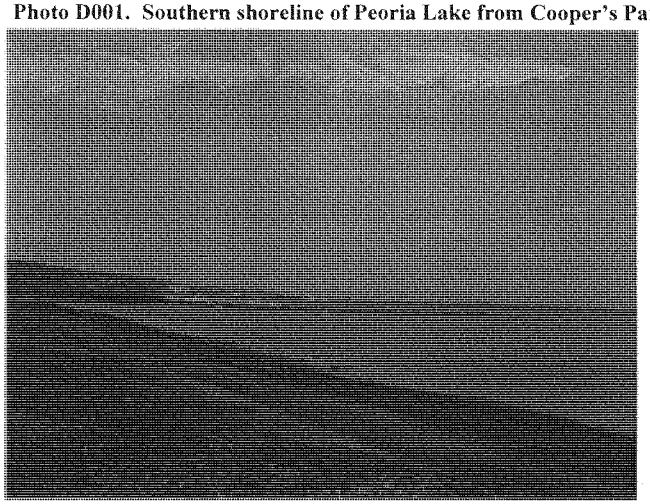


Figure D1. Index of photos taken around Peoria Lake.

Photo D001. Southern shoreline of Peoria Lake from Cooper's Park.



Photos D002-D003. Typical boat dock along Peoria Lake. Note power lines along eastern shore.

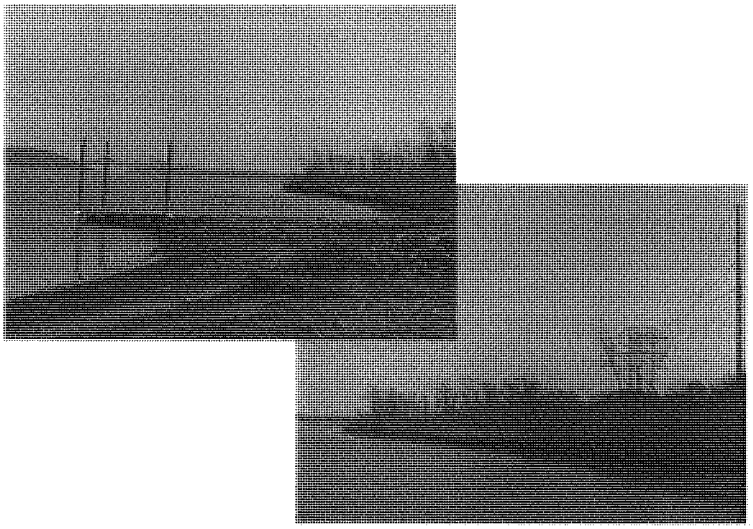


Photo D004. McCulgage Bridge (U.S. Highway 24/180) viewed from Cooper's Park.

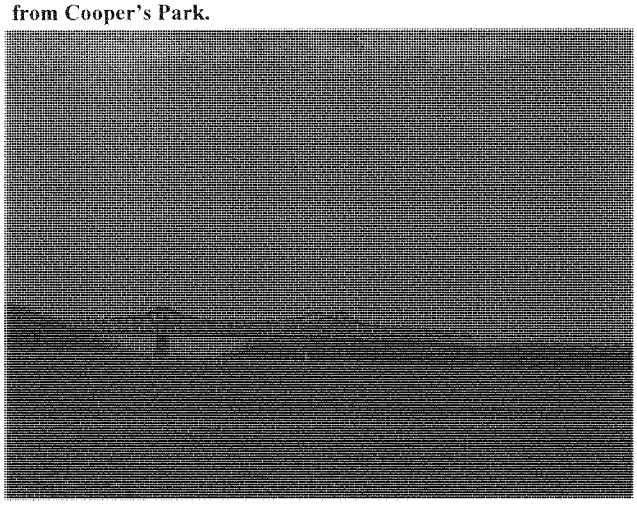


Photo D005. McCulgage Bridge viewed from Cooper's Park.

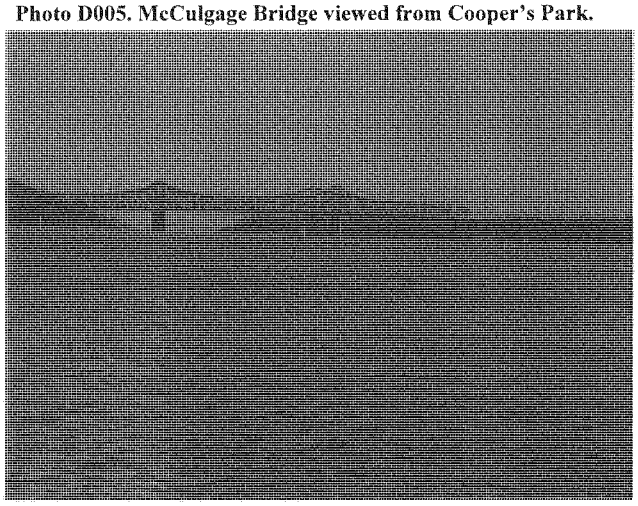


Photo D006. Close-up of McCulgage Bridge and navigation marker

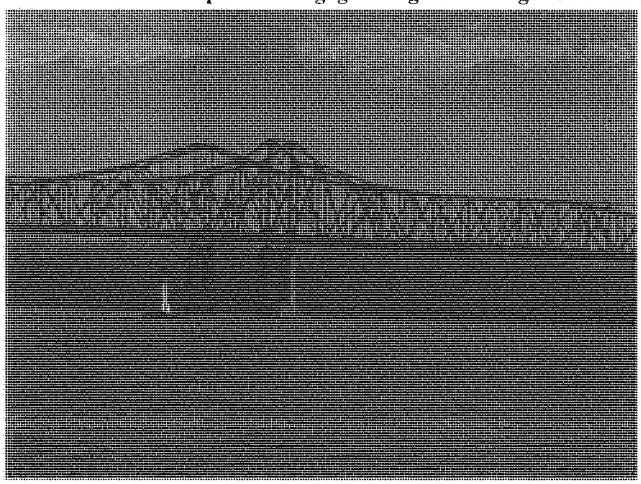
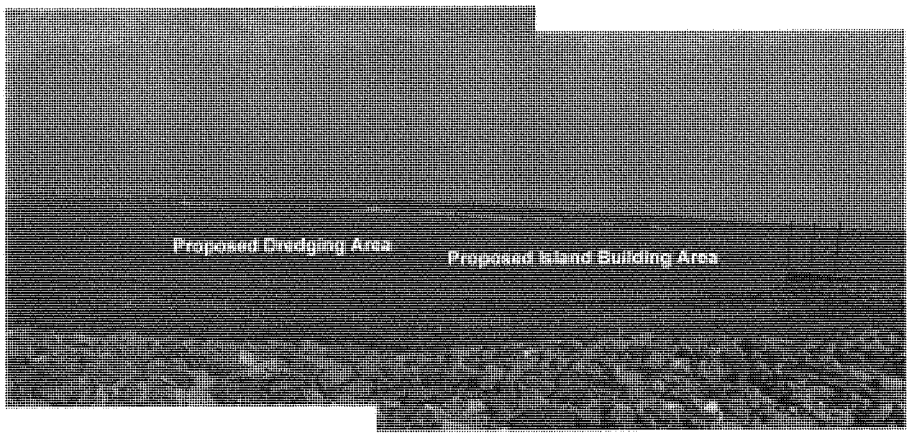
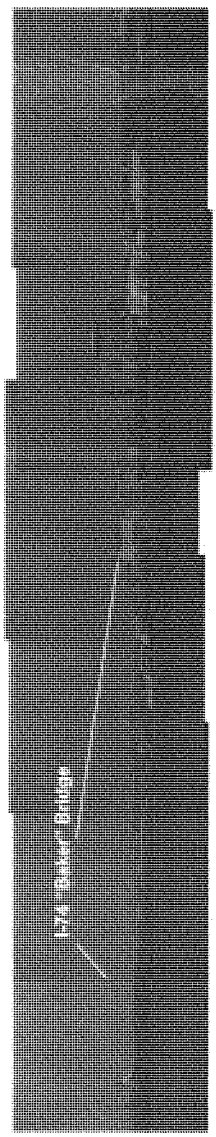


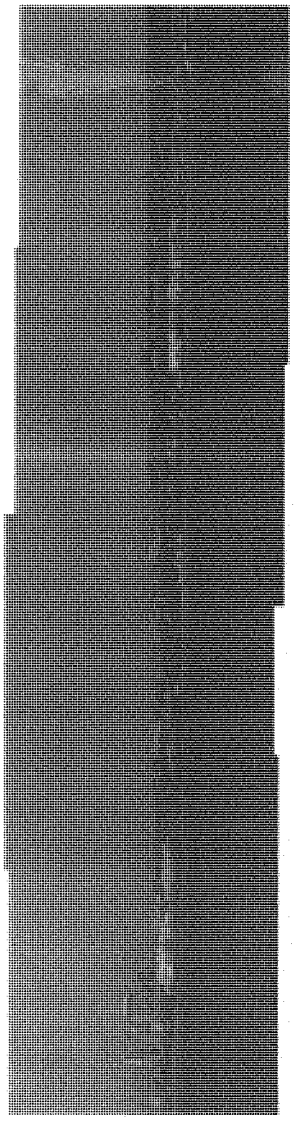
Photo D007. Typical commercial/industrial area on eastern shore of Peoria Lake.

Photos D008-D009. Shoreline and boat dock at Cooper's Park.





Photos D010-D015. Southern shore of Peoria Lake.



Photos D016-D019. Western shore of Peoria Lake.

APPENDIX E
HISTORICAL RESEARCH DOCUMENTATION

Table E1. Historical Use Records Coverage

Years		Document(s)
2000	2005	USACE Peoria Lake Land Use Study, 2001. USFWS ECOS Land Use Information, 2001.
1995	2000	USACE Charts of the Illinois Waterway, Charts 63-64, 1998. USGS 7.5-minute Peoria East Quadrangle, Illinois, 1996. USACE Illinois River Orthophotos, Peoria Pool, IL RM 163-166, 1995.
1990	1995	
1985	1990	
1980	1985	
1975	1980	USGS 7.5-minute Peoria East Quadrangle, Illinois, 1979.
1970	1975	USACE Charts of the Illinois Waterway, Charts 34-35, 1974. USGS 7.5-minute Peoria East Quadrangle, Illinois, 1972.
1965	1970	
1960	1965	USGS 7.5-minute Peoria East Quadrangle, Illinois, 1967.
1955	1960	
1950	1955	
1945	1950	USGS 7.5-minute Peoria East Quadrangle, Illinois, 1950.
1940	1945	
1935	1940	
1930	1935	USACE Illinois River Aerial Photos and Maps 26-27, 1934.
1925	1930	
1920	1925	
1915	1920	
1910	1915	
1905	1910	
1900	1905	USACE Illinois River Woermann Maps 39-40, 1904.

Figure E1. U.S. Corps of Engineers 1904 Illinois River Woermann Map #39.

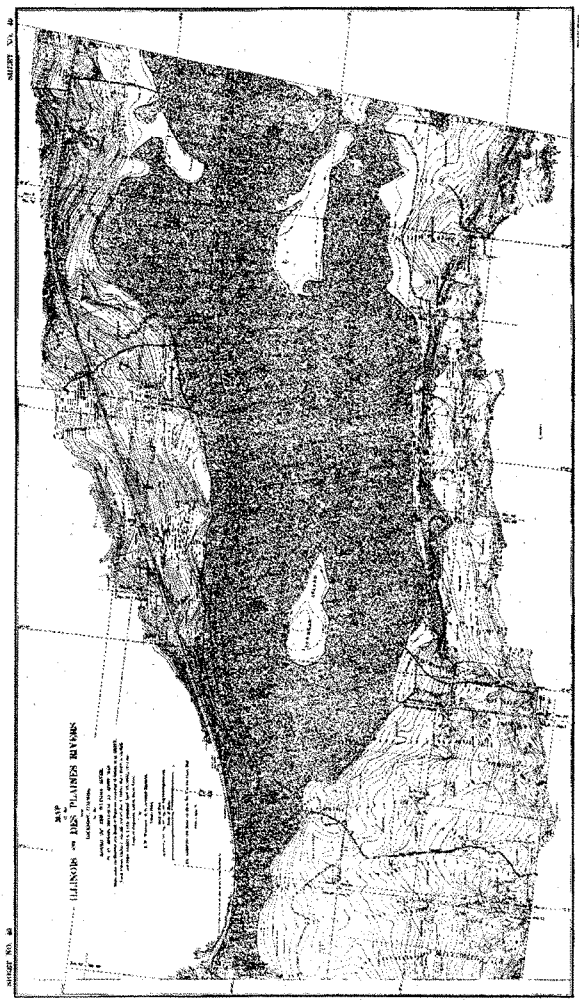


Figure E2. U.S. Corps of Engineers 1904 Illinois River Woermann Map #40.

Figure E3. U.S. Corps of Engineers 1934 aerial photograph of the Illinois Waterway, Photo #26.

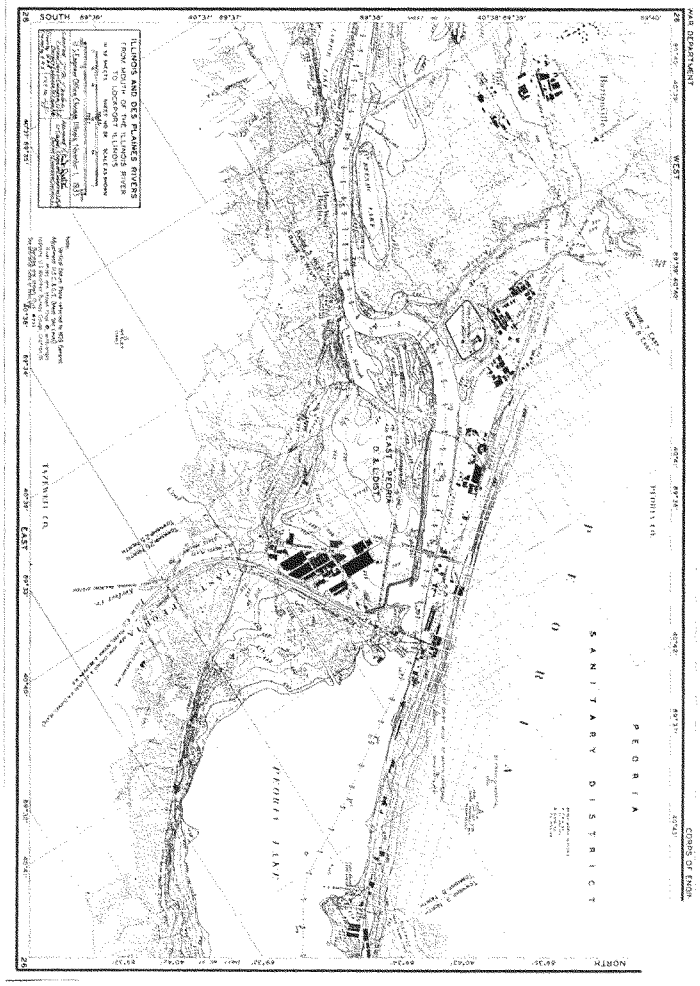


Figure E4. U.S. Corps of Engineers 1934 topographic map of Illinois Waterway, Map #26.

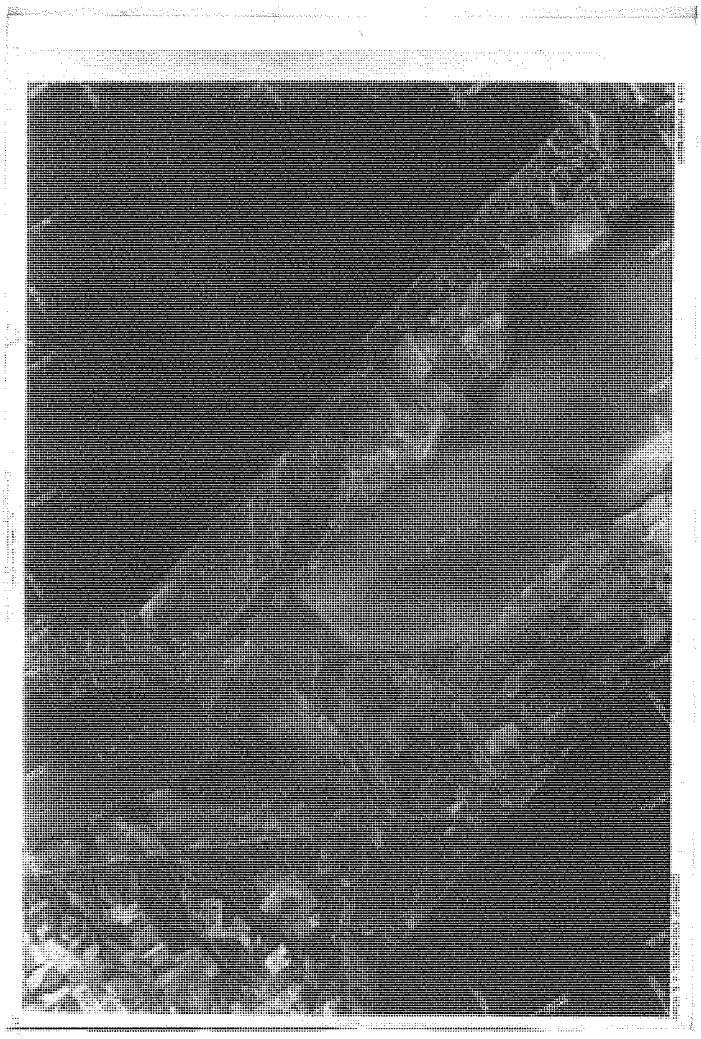


Figure E5. U.S. Corps of Engineers 1934 aerial photograph of the Illinois Waterway, Photo #27.

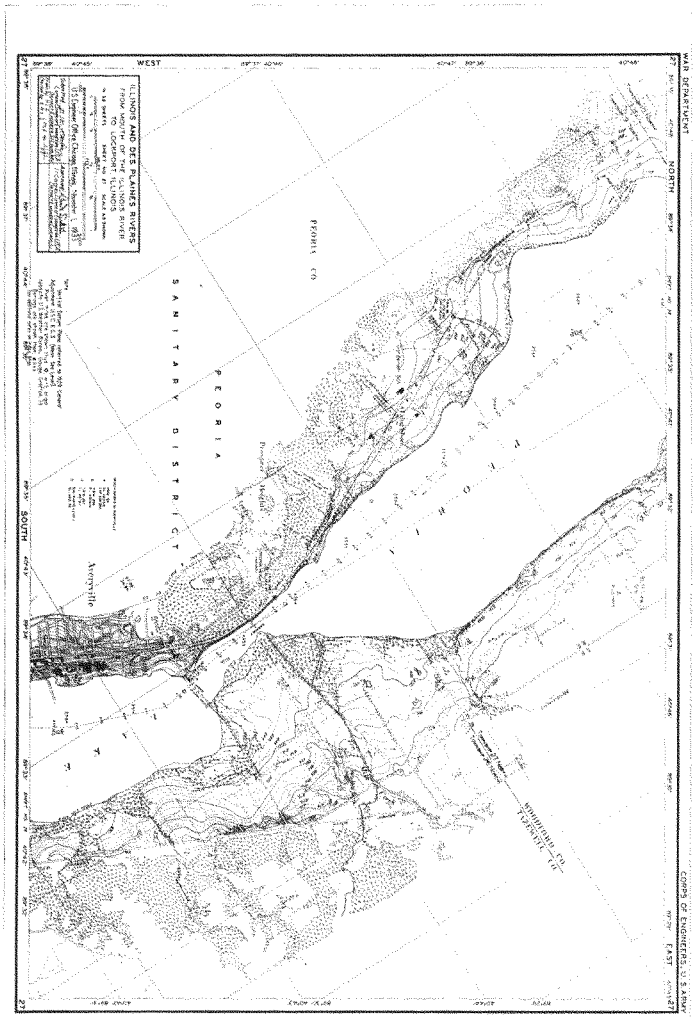


Figure E6. U.S. Corps of Engineers 1934 topographic map of the Illinois Waterway, Map #27.

Figure E7. U. S. Geological Survey Peoria East, IL 1950 7.5-minute quadrangle.

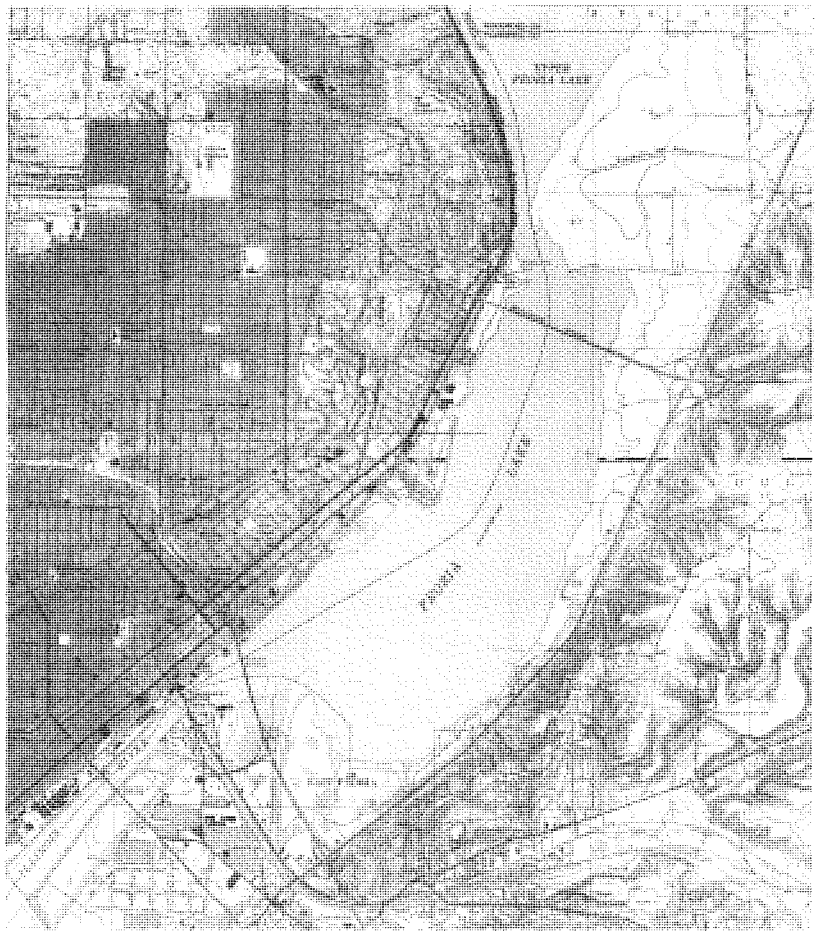


Figure E8. U. S. Geological Survey Peoria East, IL 1967 7.5-minute quadrangle.

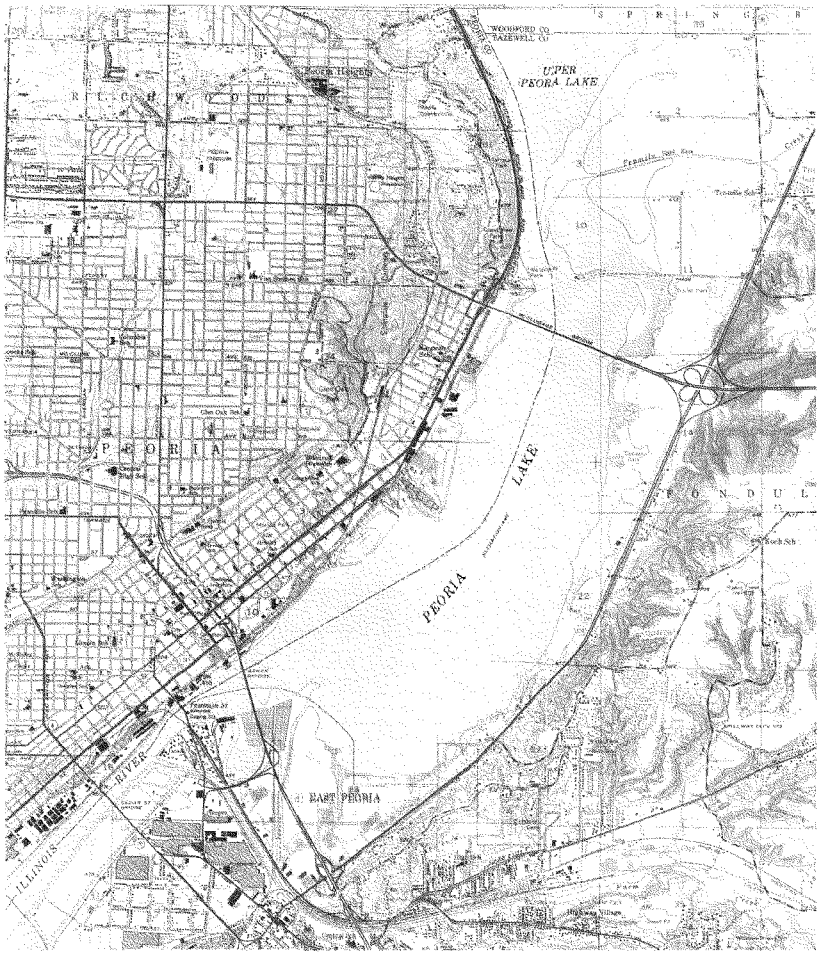


Figure E9. U. S. Geological Survey Peoria East, IL 1972 7.5-minute quadrangle.

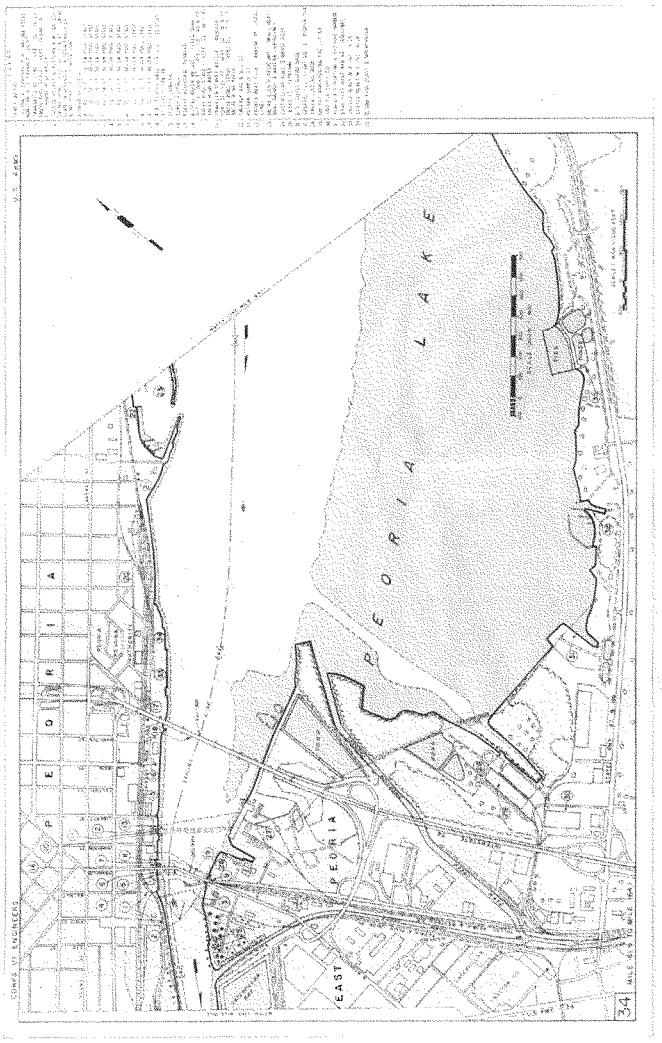


Figure E10. U.S. Corps of Engineers 1974 Illinois Waterway Navigation Chart #34.

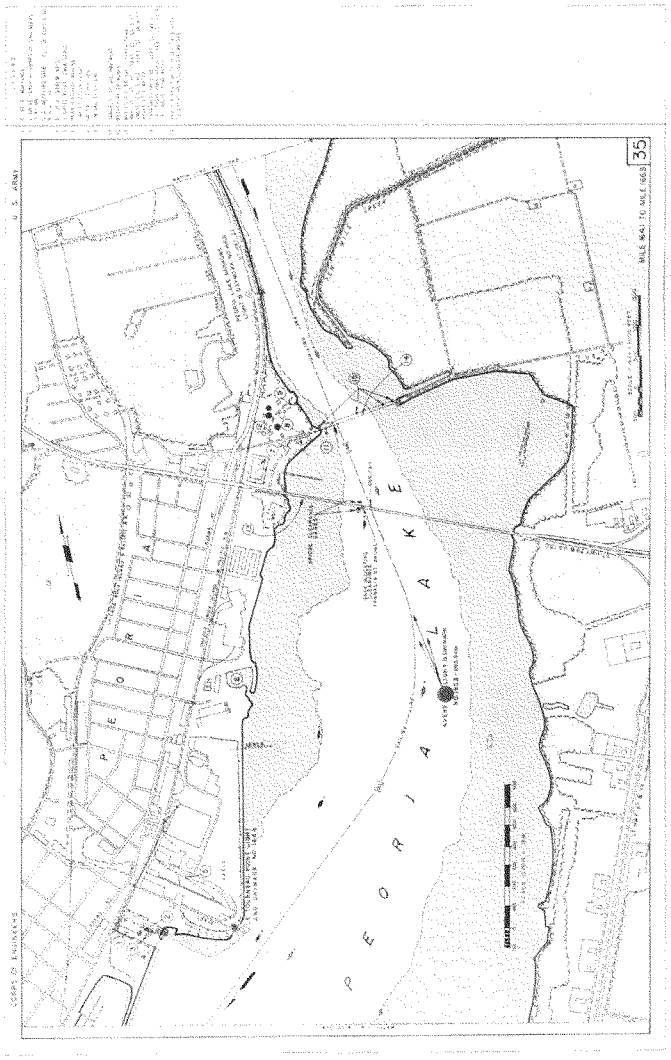


Figure E11. U.S. Corps of Engineers 1974 Illinois Waterway Navigation Chart #35.

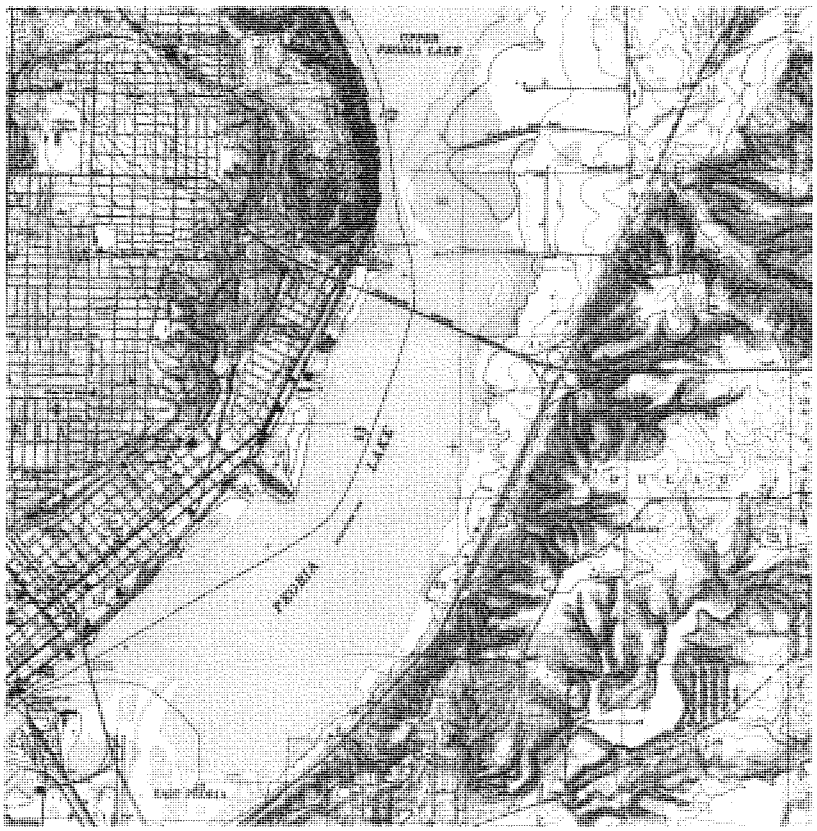


Figure E12. U. S. Geological Survey Peoria East, IL 1979 7.5-minute quadrangle.

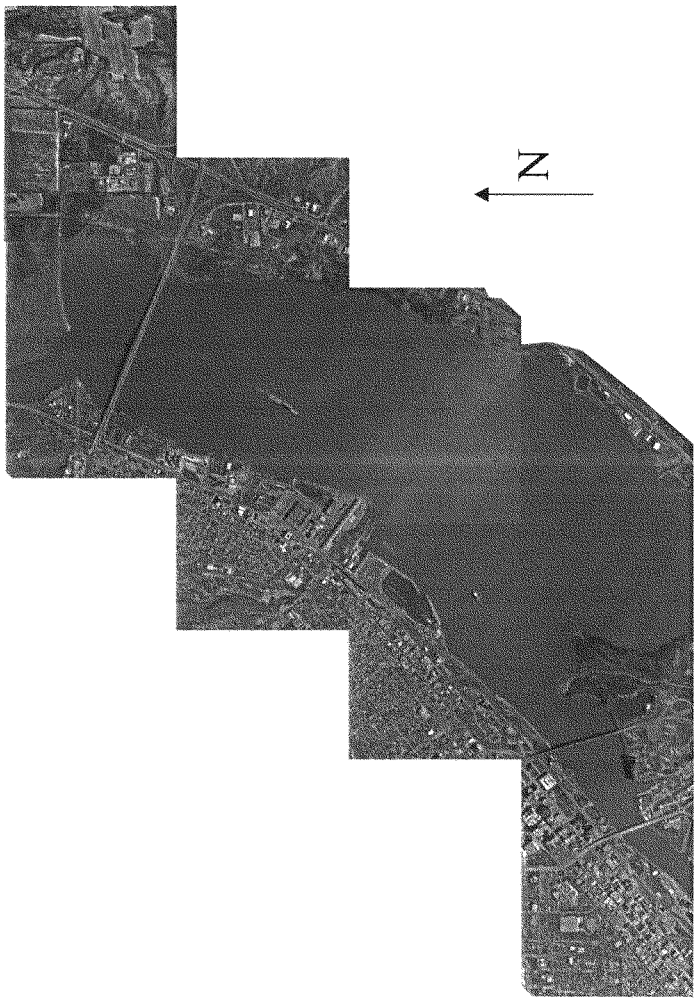


Figure E13. U.S. Corps of Engineers 1995 Illinois Waterway Orthophoto Montage of Study Area.

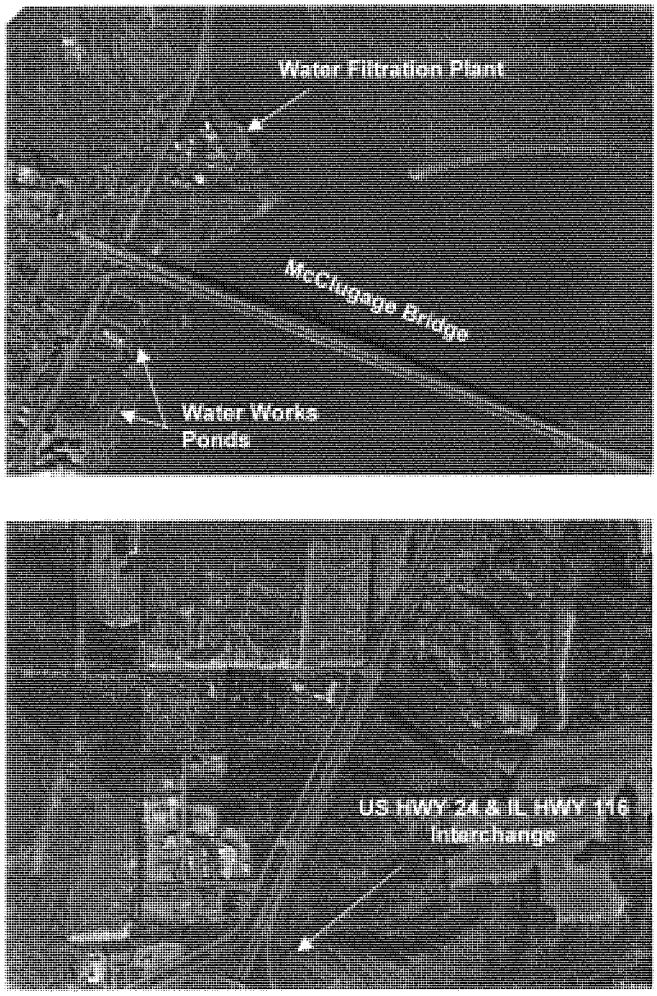


Figure E14. U.S. Corps of Engineers 1995 Illinois Waterway Orthophotos, Peoria Pool, RM 166.

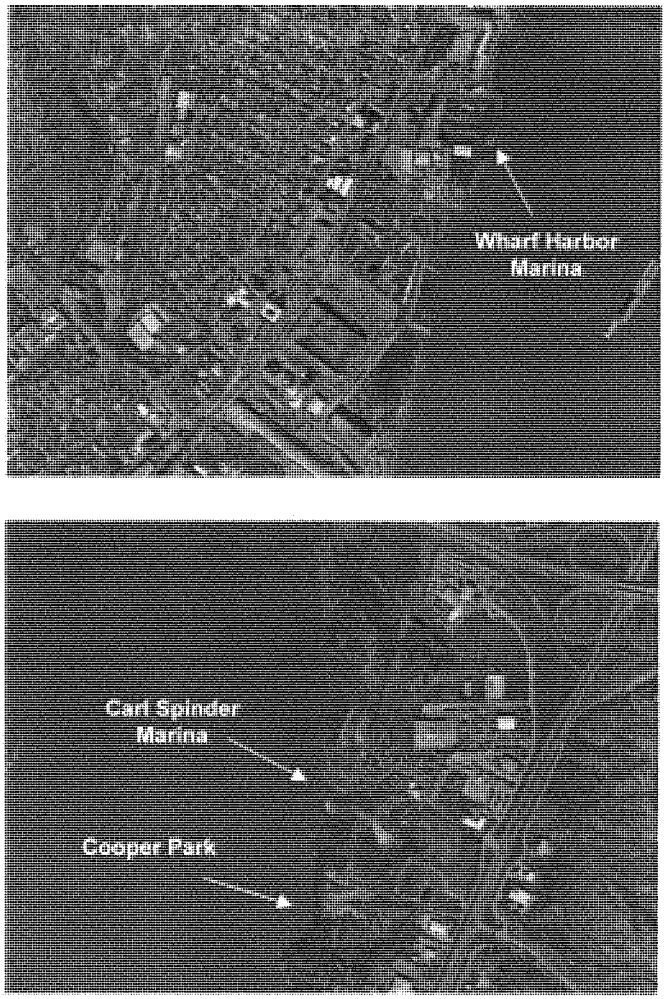


Figure E15. U.S. Corps of Engineers 1995 Illinois Waterway Orthophotos, Peoria Pool, RM 165.

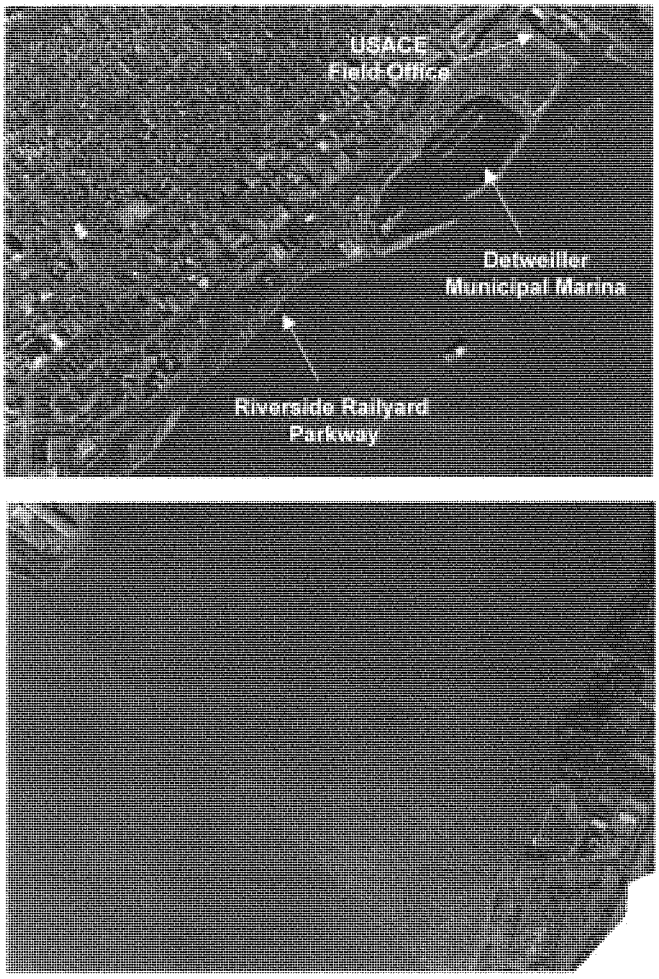


Figure E16. U.S. Corps of Engineers 1995 Illinois Waterway Orthophotos, Peoria Pool, RM 164.

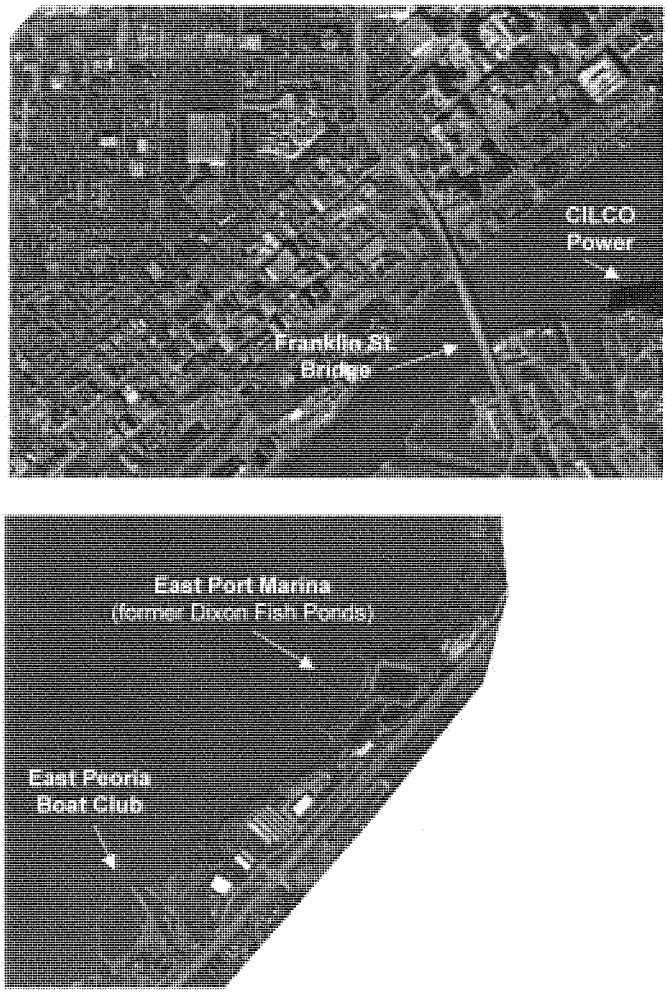


Figure E17. U.S. Corps of Engineers 1995 Illinois Waterway Orthophotos, Peoria Pool, RM 163.

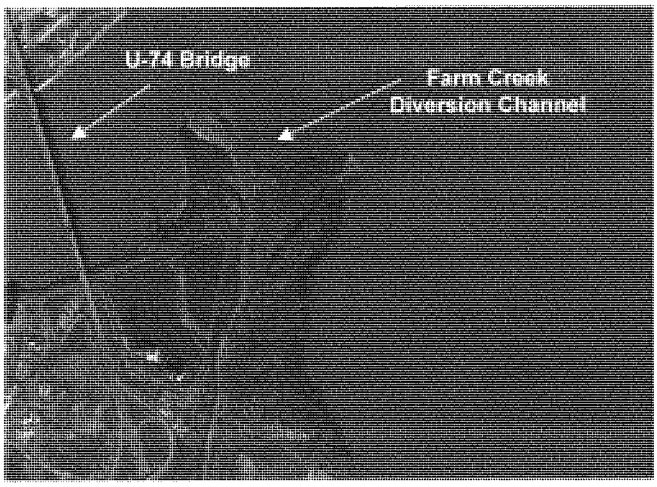


Figure E18. U.S. Corps of Engineers 1995 Illinois Waterway Orthophotos, Peoria Pool, RM 163.

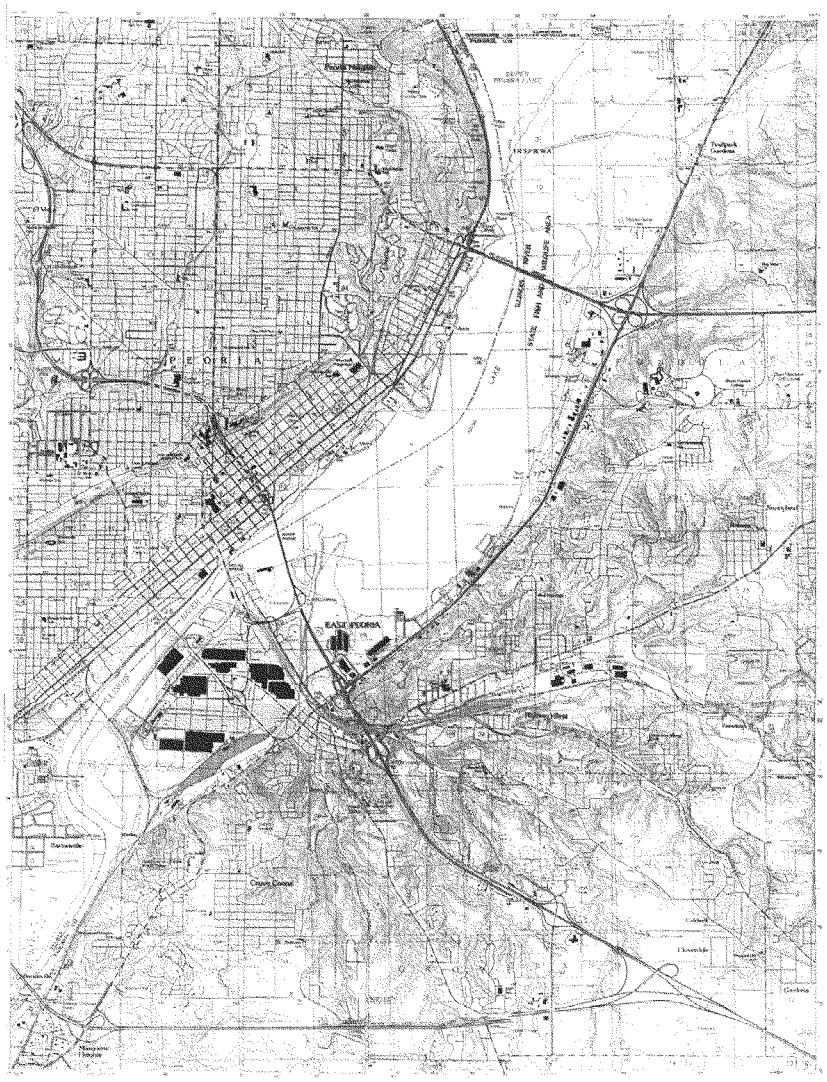


Figure E19. U. S. Geological Survey Peoria East, IL 1996 7.5-minute quadrangle.

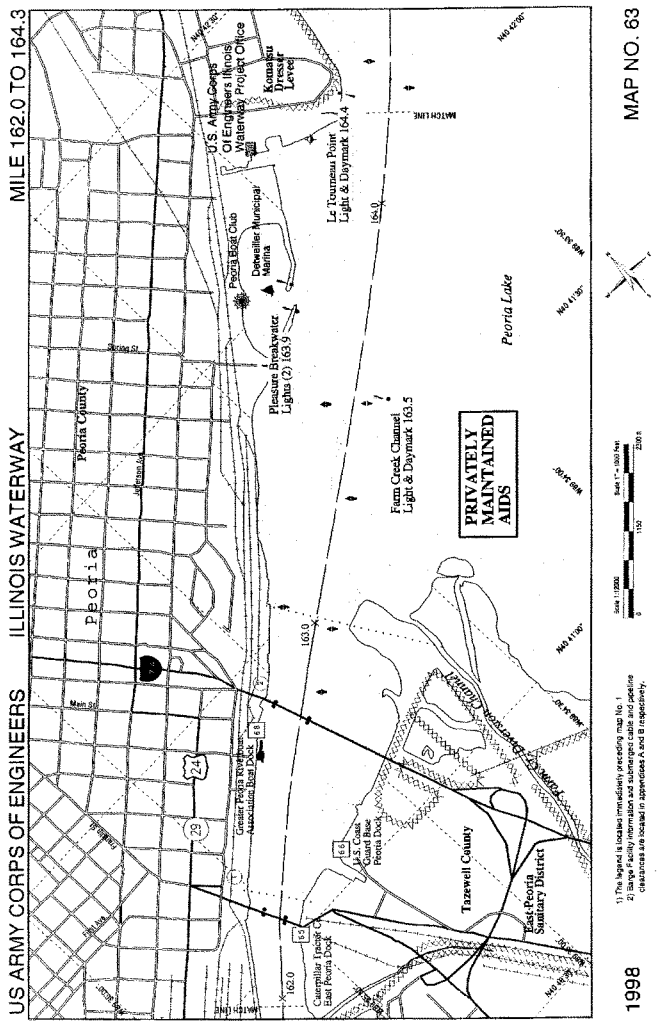


Figure E20. U.S. Corps of Engineers 1998 Illinois Waterway Navigation Chart #63.

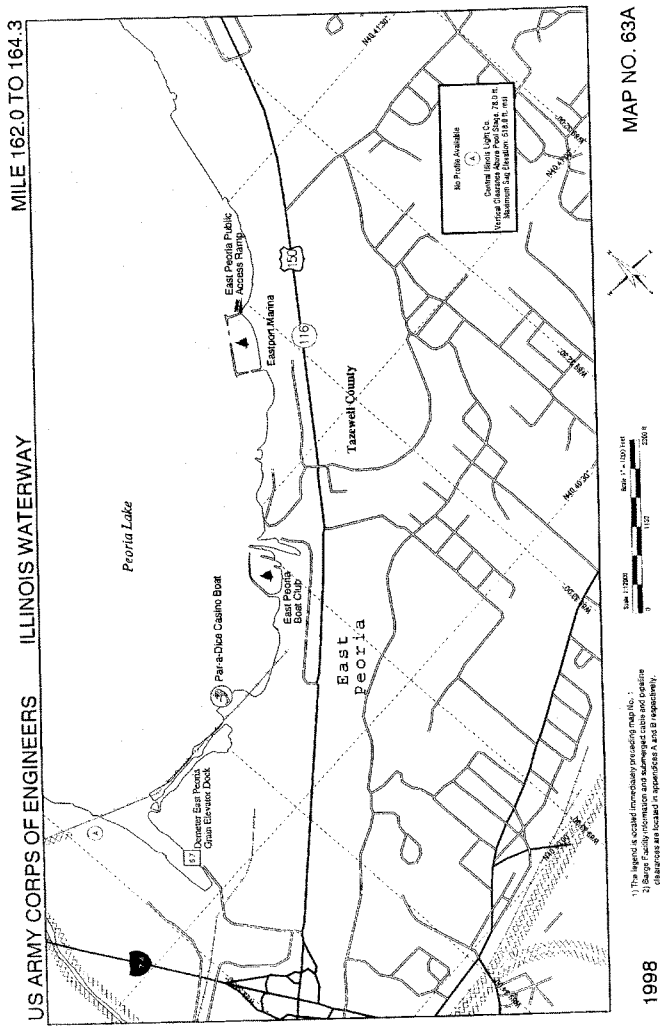


Figure E21. U.S. Corps of Engineers 1998 Illinois Waterway Navigation Chart #63A.

Figure E22. U.S. Corps of Engineers 1998 Illinois Waterway Navigation Chart #64.

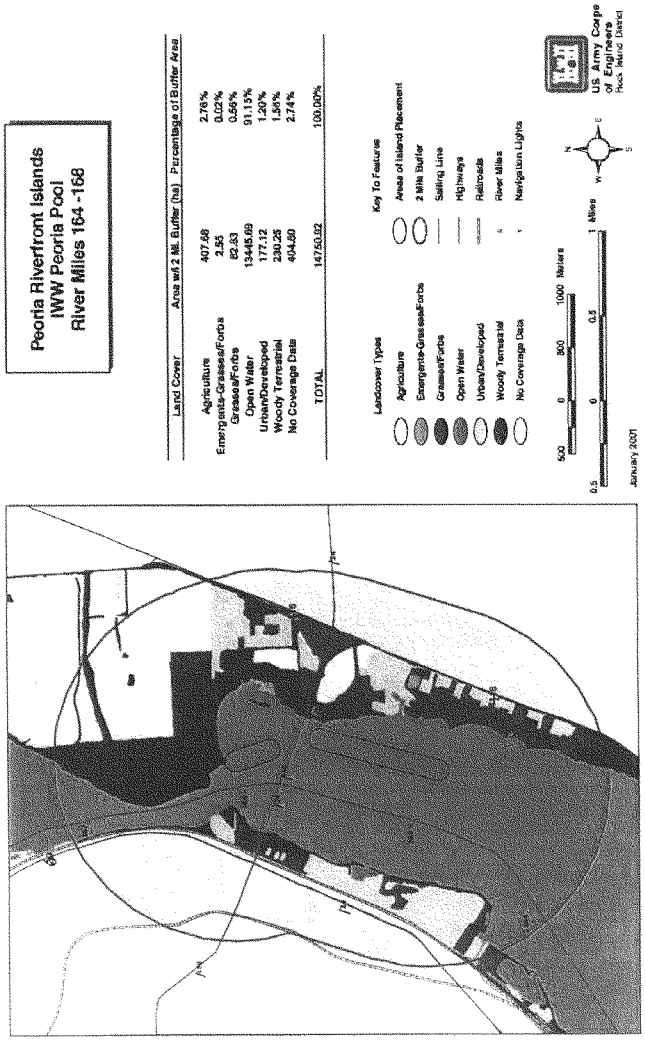


Figure E23. U.S. Corps of Engineers Peoria Riverfront Land Use Study (USACE, 2001).

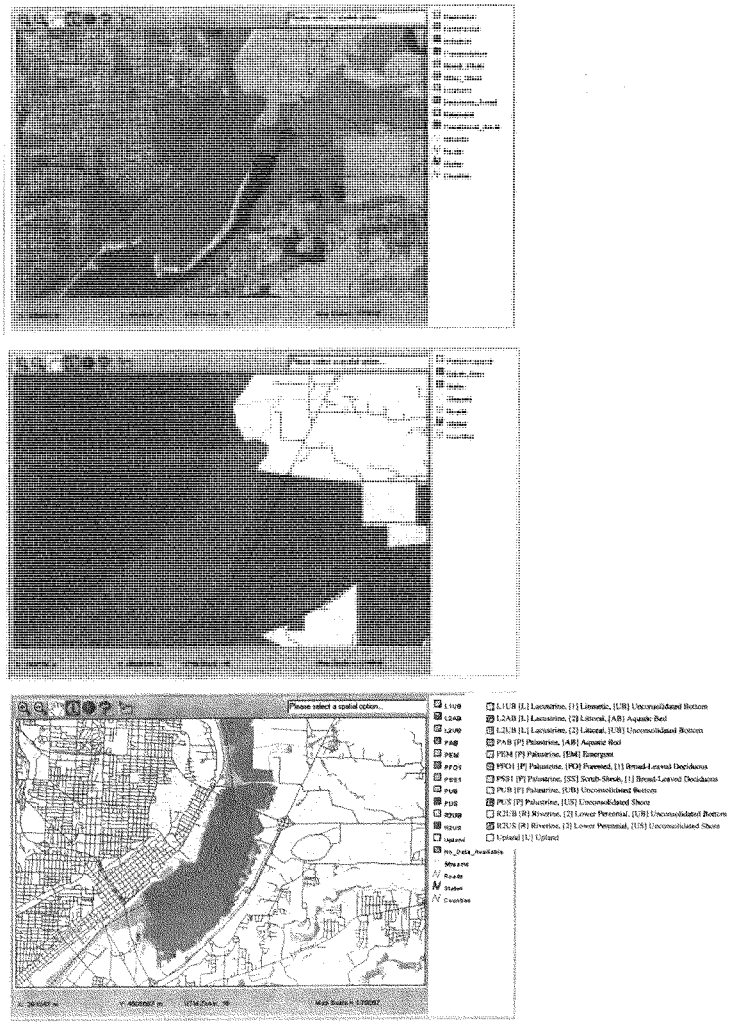


Figure E24. U. S. Fish and Wildlife 2001 Environmental Conservation Online System (ECOS) Land Use Information (USFWS, 2001).

APPENDIX F
REGULATORY RECORDS DOCUMENTATION

The following regulatory records are documented in this appendix.

(1) Executive Summary of Environmental Data Resources, Inc. Area Report Inquiry 614831.3s.
(2) Environmental Data Resources, Inc. Area Report supporting documents from U. S. Environmental Protection Agency and National Response Center.
(3) Excerpt of Illinois Waste Management and Resource Center Database Search Results.

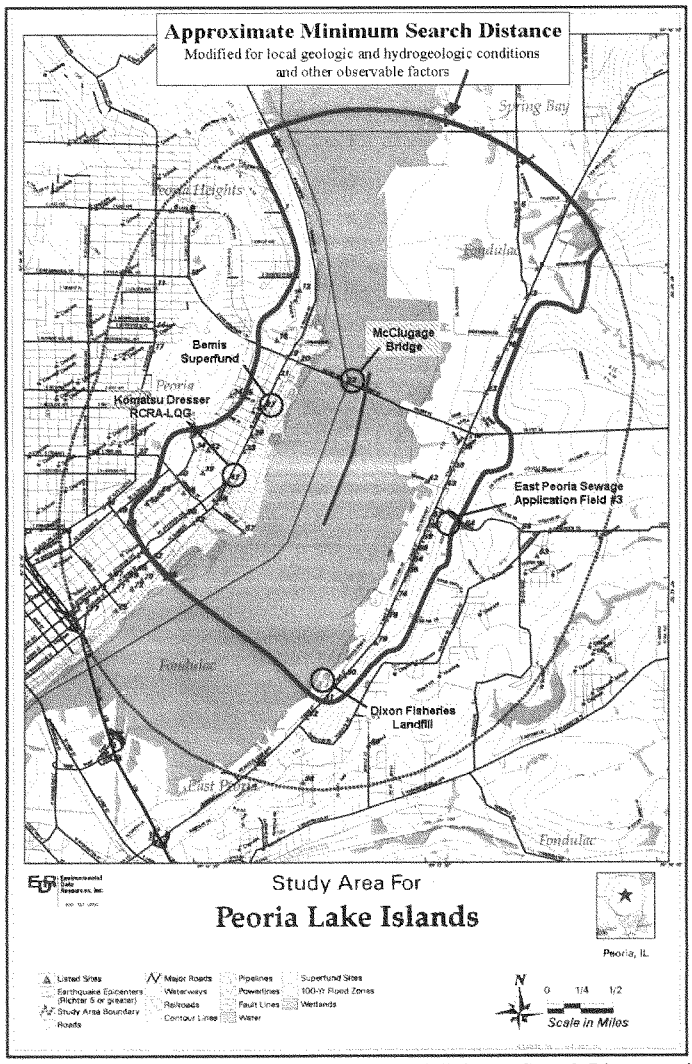


Figure F1. Modified (Site-Specific) Approximate Minimum Search Distance with Record Review Findings.

EXECUTIVE SUMMARY OF

ENVRIONMENTAL DATA RESOURCES, INC.

AREA REPORT

INQUIRY 614831.3S

Table F1. Standard Environmental Record Sources.

Reviewed	Provider	Database
5/1/2001	EDR	Federal NPL site
5/1/2001	EDR	Federal CERCLIS site
5/1/2001	EDR	Federal CERCLIS NFRAP site
5/1/2001	EDR	Federal RCRA CORRACTS TSD facility
5/1/2001	EDR	Federal RCRA non-CORRACTS TSD facility
5/1/2001	EDR	Federal RCRA generator
5/1/2001	EDR	Federal ERNS list
5/1/2001	EDR	State-equivalent NPL
5/1/2001	EDR	State-equivalent CERCLIS
5/1/2001	EDR	State landfill and/or solid waste disposal site
5/1/2001	EDR	State LUST site

Table F2. Potential Recognized Environmental Conditions Identified by Standard Environmental Records Review.

EDR ID	Site	Address	Database	Medium Affected	Contaminant	Notes
1	CADY OIL CO	5903 W GALENA RD	LUST	LAND	GASOLINE AND DIESEL FUEL	
15	MONARCH ENGINEERING AND MANUF.	5601 N MAIN ST.	LUST	LAND	GASOLINE	No Further Action Letter Issued
18	BESSLER WELDING INC	5313 NORTH MAIN ST.	LUST	LAND	GASOLINE	Corrective Action Required
21	AMOCO OIL CO. #5343	5534 NORTHEAST ADAMS	LUST	LAND	NON-PETROLEUM	Corrective Action Required
22	ILDOT BRIDGE 000 0306	MCCLUGAGE BRIDGE	RCRIS-LQG	SURFACE WATER	LEAD	
23	MCCANN POWER AND EQUIPMENT CO	4301 N MAIN ST	RCRIS-SQG	LAND	UNKNOWN	2 Violations
	JOLLIFF TRANSPORTATION, INC.	407-405 TRUCK HAVEN ROA	PCS	SURFACE WATER	UNKNOWN	
	ROADWAY EXPRESS-EAST PEORIA	408 NORTH TRUCK HAVEN RD	PCS	SURFACE WATER	UNKNOWN	
			ERNS	UNKNOWN	UNKNOWN	
			LUST	LAND	DIESEL	Corrective Action Required
	ROADWAY PACKAGE SYSTEM, INC	4309 N MAIN ST	PCS	SURFACE WATER	UNKNOWN	
			ERNS	UNKNOWN	UNKNOWN	
	ABF FREIGHT SYSTEMS	4303 NORTH MAIN ST.	LUST	LAND	GASOLINE AND DIESEL FUEL	No Further Action Letter Issued
27	BEMIS CO INC	5STH MILE E. OF SLOAN	CERCLIS	LAND	TETRACHLOROETHYLENE, DIOXIN	Not on NPL
			RCRIS-SQG	LAND	UNKNOWN	1 Violation
			PCS	SURFACE WATER	UNKNOWN	
29	TRI-STAR MARKETING	2900 NORTHEAST ADAMS	LUST	LAND	GASOLINE	No Further Action Letter Issued
32	J & M TIRE AND TOWING	720 PARK AVENUE	SPP	LAND	UNKNOWN	
33	PEORIA CHARTER COACH CO.	2600 NE ADAMS	PCS	SURFACE WATER	UNKNOWN	
	DALY OIL CO.	2700 NORTHEAST ADAMS	LUST	LAND	GASOLINE	No Further Action Letter Issued
38	EMBO MARKETING NO 7274	3124 NORTH PROSPECT	LUST	LAND	GASOLINE	Corrective Action Required
39	STALEY'S INTERSTATE READY MIX CONCRETE	600 VAN BUREN ST.	PCS	SURFACE WATER	UNKNOWN	
39	CHUCK'S 66 SERVICE	3217 NORTH PROSPECT	LUST	LAND	GASOLINE	Corrective Action Required
41	KOMATSU DRESSER CO	2301 NORTH EAST ADAMS	RCRIS-LQG	LAND	CHROMIUM, NON-HALOGENATED SOLVENTS, ELECTROPLATING, LEAD	21 Violations
			PCS	SURFACE WATER	NON-HAZARDOUS	
			ERNS	ILLINOIS RIVER	UNKNOWN OIL	Dried area around tank
			LUST	LAND	WASTE OIL	
42	SUMMIT AUTO SERVICES INC	SUMMIT DR.	RCRIS-SQG	LAND	UNKNOWN	2 Violations
	CATERPILLAR TRACTOR CO. PEORIA PROVING GROUNDS	SPRING CREEK RD	RCRIS-SQG	LAND	UNKNOWN	1 Violation
44	ILLINOIS INDUSTRIAL PLATING	503 ARINGTON ST	RCRIS-LQG	LAND	UNKNOWN	2 Violations
46	GREATER PEORIA MASS TRANSIT	2135 N JEFFERSON ST	PCS	SURFACE WATER	UNKNOWN	
			LUST	LAND	DIESEL	
51	EAST PEORIA #3 STP	3601 NORTH MAIN ST.	PCS	SURFACE WATER	UNKNOWN	
53	STRUBE'S PHILLIPS 66	700 SPRING ST	LUST	LAND	GASOLINE	
55	SPINDLER, SLEANOR, ESTATE OF	3301 NORTH MAIN ST	LUST	LAND	GASOLINE, FUEL OIL	No Further Action Letter Issued
57	U.S. ARMY CORPS OF ENGINEERS	FOOT OF GRANT ST	RCRIS-LQG	LAND	UNKNOWN	1 Violation
64	BENEDICT JR INC	3211 MAIN ST.	RCRIS-LQG	LAND	UNKNOWN	3 Violations
74	TAYLOR AND SONS INC	2901 N JEFFERSON ST	PCS	SURFACE WATER	UNKNOWN	

Table F3.

USEPA's First Priority PBT Pollutants (1999)			
aldrin/dieldrin	toxaphene	octachlorostyrene	mercury & compounds
DDT, DDD, and DDE	hexachlorobenzene	benzo(a)pyrene	PCBs
mirex	chlordane	alkyl-lead	dioxins & furans

USEPA's Draft RCRA PBT List (1998)			
1,1-Dichloroethane	Benzo(g,h,i)perylene	Furans (PCDF)	Pentachlorophenol
1,1,1-Trichloroethane	Beryllium	Heptachlor	Phenanthrene
1,2-Dichlorobenzene	Bis(2-ethylhexyl	Heptachlor epoxide	Phenol, 2,4,6-tris (1,1-dimethylethyl)-
1,2,4-Trichlorobenzene	Butyl benzyl phthalate	Hexachlorobenzene	Phenol
1,2,4,5-Tetrachlorobenzene	Cadmium	Hexachlorobutadiene	Polycyclic aromatic compounds
1,3-Dichlorobenzene	Chloroform	Hexachlorocyclohexane, gamma-	Pyrene
1,4-Dichlorobenzene	Chromium	Lead	Selenium
2-Methylnaphthalene	Copper	Mercury	Zinc
2,4,5-Trichlorophenol	Cyanide	Methoxychlor	
4-Bromophenyl phenyl	Dibutyl phthalate	Naphthalene	
Acenaphthene	Dioxins (PCDD)	Nickel	
Acenaphthylene	Endosulfan, alpha-	Nitrobenzene	
Anthracene	Endosulfan, beta-	Octachlorostyrene	
Antimony	Fluoranthene	Pentachlorobenzene	
Arsenic	Fluorene	Pentachloronitrobenzene	

The EDR Area Study Report

Study Area
Peoria Lake Islands
Peoria, IL 61611

April 04, 2001

Inquiry number 614831.3s

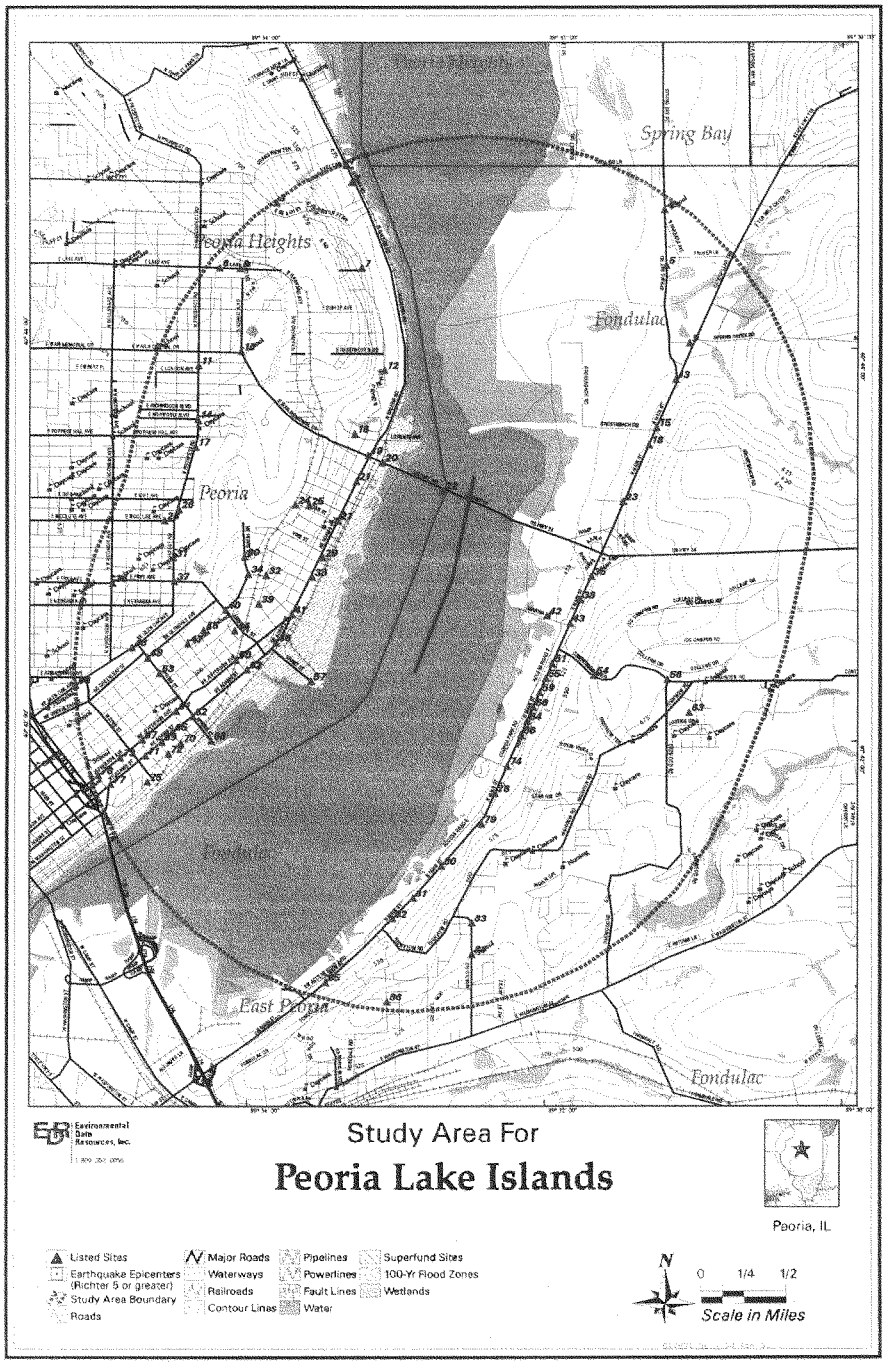
Environmental Data Resources, Inc.

The Source For Environmental Risk Management Data

3530 Post Road
Southport, Connecticut 06490

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com


Spring Bay
Peoria Heights
Fondulac
Peoria
East Peoria
Fondulac
Environmental Data Resources, Inc.
Study Area For
Peoria Lake Islands
Peoria, IL
Listed Sites
Earthquake Epicenters (Richter 5 or greater)
Study Area Boundary
Roads
Major Roads
Waterways
Railroads
Contour Lines
Pipelines
Powerlines
Fault Lines
Water
Superfund Sites
100-Yr Flood Zones
Wetlands
N
0 1/4 1/2
Scale in Miles

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR).

TARGET PROPERTY INFORMATION

ADDRESS

PEORIA LAKE ISLANDS
PEORIA, IL 61611

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL ASTM STANDARD

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
CERC-NFRAP..... CERCLIS No Further Remedial Action Planned
CORRACTS..... Corrective Action Report
RCRIS-TSD..... Resource Conservation and Recovery Information System

STATE ASTM STANDARD

SHWS..... State Oversight List
SWF/LF..... Available Disposal for Solid Waste in Illinois - Solid Waste Landfills Subject to State Surcharge
CAT..... Category List

FEDERAL ASTM SUPPLEMENTAL

CONSENT..... Superfund (CERCLA) Consent Decrees
ROD..... Records Of Decision
Delisted NPL..... National Priority List Deletions
MLTS..... Material Licensing Tracking System
MINES..... Mines Master Index File
NPL Liens..... Federal Superfund Liens
PADS..... PCB Activity Database System
RAATS..... RCRA Administrative Action Tracking System

STATE OR LOCAL ASTM SUPPLEMENTAL

IL NIPC..... Solid Waste Landfill Inventory

EDR PROPRIETARY DATABASES

Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

EXECUTIVE SUMMARY

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL ASTM STANDARD

CERCLIS: The Comprehensive Environmental Response, Compensation and Liability Information System contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).
CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the CERCLIS list, as provided by EDR, and dated 12/28/2000 has revealed that there is 1 CERCLIS site within the searched area.

Site	Address	Map ID	Page
BEMIS CO INC	***1 8TH MI E OF SLOAN AND***	*27*	*73*

RCRIS: The Resource Conservation and Recovery Act database includes selected information on sites that generate, store, treat, or dispose of hazardous waste as defined by the Act. The source of this database is the U.S. EPA.

A review of the RCRIS-LQG list, as provided by EDR, and dated 06/21/2000 has revealed that there are 15 RCRIS-LQG sites within the searched area.

Site	Address	Map ID	Page
PEORIA JOURNAL STAR INC	***1 NEWS PLAZA***	*16*	*45*
CAPITOL MACHINERY CO	***2319 E WAR MEMORIAL DR***	*20*	*51*
ILDOT BRG 090 0070	***MCCLUGAGE BRIDGE OVER I***	*22*	*56*
BOARDS AUTO BODY INC	***3228 N E ADAMS ST***	*27*	*74*
PEORIA CHARTER COACH CO	***2600 NE ADAMS***	*33*	*93*
KOMATSU DRESSER CO	***2301 NORTH EAST ADAMS***	*41*	*108*
USDOT-CG SANGAMON WLR 65506	***FOOT-OF-WASHINGTON / CA***	*42*	*112*
ILDOT BRG 090 0091	***PINECREST DR OVER I74***	*42*	*113*
ILDOT BRG 090 0035	***IL8 IL29 IL116 OVER IL1***	*42*	*113*
IL EPA RPMS HARMON AUTO SAL	***RTE 26 N***	*42*	*115*
ILLINOIS INDUSTRIAL PLATING	***503 ABINGTON ST***	*44*	*116*
CAPITOL MACHINERY CO	***3501 N MAIN ST***	*55*	*139*
US ARMY CORPS OF ENGINEERS	***FOOT OF GRANT ST***	*57*	*141*
BENEDICT JH INC	***3211 MAIN ST***	*64*	*153*
WEISE PLANNING AND ENGINEERING	***1200 N MAIN ST***	*85*	*185*

EXECUTIVE SUMMARY

RCRIS: The Resource Conservation and Recovery Act database includes selected information on sites that generate, store, treat, or dispose of hazardous waste as defined by the Act. The source of this database is the U.S. EPA.

A review of the RCRIS-SQG list, as provided by EDR, and dated 06/21/2000 has revealed that there are 38 RCRIS-SQG sites within the searched area.

Site	Address	Map ID	Page
PEKIN SUPER STORE	*621 ST HWY RT 29*	*2*	*18*
PHILLIPS AUTO BODY	*1435 E LAKE ST*	*6*	*21*
PEORIA HEIGHTS AUTO BODY	*1507 E LAKE ST*	*8*	*21*
EMRO MARKETING NO 7274	*3124 N PROSPECT*	*14*	*38*
MONARCH ENGINEERING & MANUF	*5601 N MAIN ST*	*15*	*44*
MCCANN POWER & EQUIPMENT CO	*4301 N MAIN ST*	*23*	*57*
IVEX OF PEORIA INC	*FOOT OF SLOAN*	*25*	*67*
IL EPA PEORIA HHW SITE	*2218 N PROSPECT B*	*26*	*67*
HARCO SCREEN GRAPHICS INC	*3121 NE ADAMS ST*	*27*	*72*
BEMIS CO INC	*1 8TH MI E OF SLOAN AND*	*27*	*73*
MURRAY INDUSTRIAL INC	*122 LAKEVIEW*	*30*	*85*
PEORIA PARK DISTRICT	*2218 N PROSPECT RD*	*31*	*87*
M H EQUIPMENT CORP	*309 NE ROCK ISLAND AVE*	*32*	*90*
HAWK JIM TRUCK AND TRAILER INC	*4001 N MAIN ST*	*35*	*98*
TRUCK CENTERS INC	*3901 N MAIN ST*	*38*	*105*
SPEED COLOR	*2000 NE PERRY*	*40*	*106*
AT&T LONG LINES DELEVAN IL	*RR 5*	*42*	*113*
ILLINOIS CENTRAL COLLEGE	*RTE 24*	*42*	*114*
SUMMIT AUTO SERVICES INC	*SUMMIT DR*	*42*	*114*
CATERPILLAR TRACTOR CO PEORIA	*SPRING CREEK RD*	*42*	*115*
ILLINOIS ENGRAVING CO	*1904 N E MONROE*	*44*	*117*
LIQUID AIR CORP OF NORTH AMERI	*2110 N ADAMS ST*	*46*	*121*
GREATER PEORIA MASS TRANSIT	*2105 N E JEFFERSON ST*	*46*	*123*
S AND K AIR POWER TOOL AND SUP	*3301 N MAIN*	*60*	*142*
FOTOULA KRAKOS	*1221 NE JEFFERSON*	*61*	*146*
PEPSI COLA GENERAL BOTTLERS	*1215 NE ADAMS*	*62*	*147*
BEARCE JOHN FORD INC	*500 FAIRLANE DR*	*63*	*152*
CILCO ADAMS SUBSTATION	*ADAMS / MORTON STS*	*65*	*155*
HAWKEYE RUBBER MFG CO	*1 SPRING ST*	*68*	*157*
HINE EDWARD CO	*201 MORTON ST*	*70*	*165*
TAFT HOMES	*N ADAMS AND WAYNE ST*	*71*	*165*
MID ILLINOIS CO	*905 NE ADAMS*	*71*	*166*
IDEAL TROY CO	*711 NE JEFFERSON ST*	*73*	*167*
PMP FERMENTATION PRODUCTS INC	*121 WAYNE ST*	*75*	*170*
PMP FERMENTATION PRODUCTS INC	*121 WAYNE ST*	*75*	*170*
RED CARPET CAR WASH INC	*505 NE JEFFERSON ST*	*76*	*175*
PEORIA OMS	*523 NE ADAMS ST*	*77*	*175*
PAR A DICE GAMING CORP	*2430 N MAIN*	*79*	*177*

ERNS: The Emergency Response Notification System records and stores information on reported releases of oil and hazardous substances. The source of this database is the U.S. EPA.

A review of the ERNS list, as provided by EDR, and dated 08/08/2000 has revealed that there are 3 ERNS sites within the searched area.

Site	Address	Map ID	Page
4307 GRAND VIEW DR.	4307 GRAND VIEW DR.	7	21

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
407 NE ROCK ISLAND	407 NE ROCK ISLAND	32	92
121 WAYNE ST	121 WAYNE ST	75	171

STATE ASTM STANDARD

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Illinois Environmental Protection Agency's LUST Incident Report.

A review of the LUST list, as provided by EDR, and dated 11/24/2000 has revealed that there are 31 LUST sites within the searched area.

Site	Address	Map ID	Page
CADY OIL CO.	5021 NORTH GALENA RD.	1	10
CADY OIL CO.	5023 WEST GALENA RD.	1	17
COUNTRY CLUB OF PEORIA	4700 GRAND VIEW DR.	3	19
PROSPECT ASSOC.	3514 NORTH PROSPECT	11	26
CLARK OIL & REFINING	3606 PROSPECT RD.	11	28
EMRO MARKETING NO 7274	***3124 N PROSPECT***	***14***	***38***
CHUCK'S 66 SERVICE	3217 NORTH PROSPECT AVE	14	39
MONARCH ENGINEERING & MANUF	***5601 N MAIN ST***	***15***	***44***
TEXACO REFINING & MARKETING	3037 NORTH PROSPECT RD.	17	45
BESSLER WELDING INC.	5313 NORTH MAIN ST.	18	46
AMOCO OIL CO. #9543	3534 NORTHEAST ADAMS	21	51
ABF FREIGHT SYSTEMS	4303 NORTH MAIN ST.	23	57
ROADWAY EXPRESS	408 NORTH TRUCK HAVEN R	23	64
JAY BELL'S 66	1213 EAST MCCLURE	28	75
TRI-STAR MARKETING	2900 NORTHEAST ADAMS	29	84
PEORIA PARK DISTRICT	***2218 N PROSPECT RD***	***31***	***87***
DALY OIL CO.	2700 NORTHEAST ADAMS	33	96
SCOTT SUPER SERVICE INC.	2022 NORTH WISCONSIN	36	99
SHELL OIL CO.	1302-1308 EAST FRYE	37	104
KOMATSU DRESSER	2300 NORTHEAST ADAMS	41	107
GREATER PEORIA MASS TRANSIT	***2105 N E JEFFERSON ST***	***46***	***123***
STRUBE'S PHILLIPS 66	700 SPRING ST.	53	135
SPINDLER, ELEANOR ESTATE OF	3501 NORTH MAIN ST.	55	139
ILLINOIS CENTRAL COLLEGE	1229 CENTENNIAL DR.	56	140
KRAKOS, FOTOULA	1219 NORTHEAST JEFFERSO	61	143
PEPSI-COLA GENERAL BOTTLERS	1230 NORTHEAST JEFFERSO	61	146
PEORIA, CITY OF	600 NORTHEAST WATER ST.	75	168
PMP FERMENTATION PRODUCTS INC	***121 WAYNE ST***	***75***	***170***
RED CARPET CAR WASH	505 NORTHEAST JEFFERSON	76	175
OVERLANDER ELECTRIC CO.	2101 NORTH MAIN	80	178
AGGREGATE CONSTRUCTION EQUIP.	1601 NORTH MAIN	82	183

EXECUTIVE SUMMARY

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Illinois State Fire Marshal's STC Facility List.

A review of the UST list, as provided by EDR, and dated 09/06/2000 has revealed that there are 106 UST sites within the searched area.

Site	Address	Map ID	Page
GALENA ROAD 66	5021 N GALENA RD	1	11
CADY OIL CO	5023 N GALENA RD	1	13
COUNTRY CLUB OF PEORIA	4700 GRANDVIEW DR	3	16
RIVERVIEW ELEMENTARY SCHOOL DI	1421 SPRING BAY RD	4	20
PROTOW CUSSTOM TRAILERS	116 SPRING CREEK RD	9	22
PROSPECT ASSOCIATES LLC	3514 N PROSPECT	11	24
CLARK OIL STORE 1407	3606 N PROSPECT	11	28
EMERGENCY SER & DISASTER AGENC	3615 N GRANDVIEW DR	12	30
G B OIL	RT 116 & 26	13	31
SPEEDWAY #7274	3124 N PROSPECT	14	35
PHILLIPS 66 CO #005249	3217 PROSPECT	14	40
CHUCK'S 66	NORTH PROSPECT	14	42
MONARCH ENG & MFG CO	5601 N MAIN	15	43
SPRINGDALE CEMETERY	3014 N PROSPECT RD	17	45
BESSLER WELDING INC	5313 N MAIN ST	18	47
IL DEPT OF TRANSPORATION	IL 29 & US 150	19	48
CAPITOL MACHINERY CO	2319 E WAR MEMORIAL DR	20	49
LW THOMAS ROOFING COINC	3508 NE ADAMS	21	51
AMOCO CLOSED STA	3534 NE ADAMS	21	53
AMOCO CLOSED STATION	3534 NE ADAMS	21	54
NORCO FUELS	3535 N E ADAMS	21	55
ABF FREIGHT SYSTEM INC	4303 N MAIN ST	23	58
JOLLIFF TRANSPORTATION INC	405 TRUCK HAVEN RD	23	58
JOLLIFF TRANSPORTATION INC	405 TRUCK HAVEN RD	23	59
AMERICAN FREIGHT SYSTEM INC	405 TRUCK HAVEN	23	60
JOLIFF TRANSPORTATION	407 TRUCK HAVEN RD	23	60
IND PROCESSING & PKGG INC	4307 N MAIN ST	23	61
IND PROCESSING-PACKAGING INC	4307 N MAIN ST	23	62
PATTON-RING TRUCK/ENGINE SPECI	409 TRUCK HAVEN RD	23	63
ROADWAY EXPRESS INC	408 N TRUCK HAVEN RD	23	63
IVEX OF PEORIA INC	FOOT OF SLOAN ST	24	66
UNKNOWN	3100 N ADAMS ST	27	67
KOERNER DALLAS	3100 NE ADAMS	27	68
SPECIALY CARS	3116 NE ADAMS	27	69
0176 CLARK SER STATION	3116 N ADAMS ST	27	70
SPECIALITY CARS	3116 NE ADAMS	27	71
FRIETSCH ROY G	3204 NE ADAMS	27	72
ROY G FRIETSCH	3204 NE ADAMS	27	73
ILLINOIS VALLEY GALSS & MIRROR	3300 NE ADAMS ST	27	75
MANN PATIDAR	1213 E MCCLURE	28	76
MID-WEST SALES CO	301 ALEXANDER ST	29	80
SUPER PANTRY 28	2900 N E ADAMS	29	81
PEORIA PARK DISTRICT	2218 N PROSPECT RD	31	85
HEF T MANUFACTURING	720 PARK ST	32	89
BLACK JAMES R	309 N E ROCK ISLAND AVE	32	89
M&H EQUIPMENT INC	309 NE ROCK ISLAND AVE	32	91
MILLER CHEMICAL CO	407 NE ROCK ISLAND	32	92
PEORIA CHARTER COACH CO	2600 N ADAMS ST	33	93
DALY OIL CO.	2700 NE ADAMS	33	94
TERMINAL MAINTENANCE INC	2400 NE PERRY	34	97

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
PHILLIPS 66 CO #040268	2022 N WISCONSIN	36	100
SCOTTS SUPER SER	2022 N WISCONSIN AVE	36	101
VIDEO SER CO NILE PRATT	2103 N WISCONSIN AVE	36	103
VIDEO SER CO NILE PRATT	2103 N WISCONSIN AVE	36	103
NYLE STALEY READY MIX	600 VAN BUREN	39	105
SPEEDY DELIVERY SER INC	2010 NE PERRY AVE	40	106
SPEEDY DELIVERY SER INC	2010 NE PERRY AVE	40	107
BRAD RAGAN INC	3805 N MAIN ST	43	116
BUD RUFF ELECTRIC	519 N ABINGTON	44	117
IL WATERWAY PROJECT OFFICE	257 GRANT ST	46	118
LIQUID AIR CORP	2110 E ADAMS ST	46	119
HARRIS AUTO SALES & TOWING	2000 NE JEFFERSON ST	46	121
DONALD HAMMONTREE	2000 NE JEFFERSON ST	46	121
PEORIA ROOFING CO INC	303 TROTH ST	46	123
GREATER PEORIA MASS TRANSIT DI	2105 NE JEFFERSON AVE	46	124
GREATER PEORIA MASS TRANSIT DI	2105 NE JEFFERSON AVE	46	125
ST AUGUSTINE MANOR	1301 N E GLENDALE	49	128
CLARK SERVICE 0712	1801 N JEFFERSON AVE	50	129
OBRIEN STEEL SER CO	1700 N E ADAMS ST	52	130
PARAMOUNT PRINTING CO INC	619 SPRING ST	53	131
PARAMOUNT PRINTING CO	619 SPRING ST	53	132
FRED STRUBE/FRED STRUBE 66 SER	700 SPRING ST	53	133
FORMER YELLOW CAB CO	1300 N E PERRY	53	135
BEVERLY ENTERPRISES	500 CENTENNIAL DR	54	137
PEORIA TRACTOR & EQUIP CO	3501 N MAIN ST	55	138
CORPORATE OFFICE	800 NE GLEN OAK AVE	58	141
LUMBERYARD SUPPLIERS INC	3405 NORTH MAIN ST	59	142
KRAKOS PROPERTY	1221 N E JEFFERSON	61	144
LEADLOW CONSTRUCTION	1327 N E BOND	62	146
PEPSI-COLA GENERAL BOTTLERS IN	1215 NE ADAMS	62	148
PEORIA CITY OF	1324 N E ADAMS ST	62	151
BAKER HAUSER CO	1330 N E ADAMS	62	151
DONALD O. STEPHENS	1327 N.E. ADAMS STREET	62	151
DEHATER ENTERPRISE	3201 N MAIN ST	64	152
BAKER CLASSIC CARS	3212 N MAIN ST	64	154
SPRINKLER IRRIGATION CO	3105 N MAIN ST	66	155
SHORT LEON TRUST	3116 N MAIN ST	66	156
GREELEY MIDDLE SCHOOL	919 NE JEFFERSON ST	67	156
GREELEY MIDDLE SCHOOL	919 NE JEFFERSON ST	67	157
J A FRITCH & SONS INC	1016 NE ADAMS ST	69	164
FORMER MASTER DYDEE	817 N ADAMS ST	71	165
PMP FERMENTATION	201 EVANS ST	72	166
DANZ WARREN E	710 N E JEFFERSON	73	167
GH BEMIS FREIGHT SER INC	2901 N MAIN	74	168
PMP FERMENTATION PRODUCTS INC	709 NE WATER ST	75	169
PMP FERMENTATION PROD	821 NE BOND ST	75	171
RED CARPET CAR WASH INC	505 N E JEFFERSON ST	76	172
PEORIA OMS 6	523 N E ADAMS	77	176
AURORA FAST FREIGHT TERMINAL	2711 N MAIN STREET	78	176
CGH PETROLEUM LLC DBA FAST BRE	2519 N MAIN ST	79	177
OBERLANDER ELECTRIC	2101 N MAIN	80	179
DIXON FISHERIES INC	1807 N MAIN ST	81	180
AGGREGATE EQUIPMENT & SUPPLY C	1601 N MAIN ST	82	181
BOLIN ELEMENTARY SCHOOL	428 ARNOLD RD	84	183
WIESE PLANNING & ENGEERING	1200 N MAIN	85	184
BD OF ED SCH DIST 51 OF TAZEWE	307 EAGLE AVE	86	185

EXECUTIVE SUMMARY

FEDERAL ASTM SUPPLEMENTAL

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 07/07/2000 has revealed that there are 75 FINDS sites within the searched area.

Site	Address	Map ID	Page
CADY OIL COMPANY	5023 NORTH GALENA ROAD	1	13
PEKIN SUPER STORE	***621 ST HWY RT 29***	***2***	***18***
SENECA PETROLEUM CO.-WASH PLAN	1509 SPRING BAY ROAD	5	20
PHILLIPS AUTO BODY	***1435 E LAKE ST***	***6***	***21***
PEORIA HEIGHTS AUTO BODY	***1507 E LAKE ST***	***8***	***21***
WASHINGTON SCHOOL-DIST 150	3706 N GRAND BLVD	10	24
EMRO MARKETING NO 7274	***3124 N PROSPECT***	***14***	***38***
MONARCH ENGINEERING & MANUF	***5601 N MAIN ST***	***15***	***44***
PEORIA JOURNAL STAR INC	***1 NEWS PLAZA***	***16***	***45***
CAPITOL MACHINERY CO	***2319 E WAR MEMORIAL DR***	***20***	***51***
ILDOT BRG 090 0070	***MCCLUGAGE BRIDGE OVER I***	***22***	***56***
MCCANN POWER & EQUIPMENT CO	***4301 N MAIN ST***	***23***	***57***
JOLLIFF TRANSPORTATION, INC.	407-405 TRUCK HAVEN ROA	23	60
ROADWAY EXPRESS-EAST PEORIA	408 NORTH TRUCK HAVEN R	23	63
ROADWAY PACKAGE SYSTEM, INC.	4309 NORTH MAIN STREET	23	65
IVEX OF PEORIA INC	***FOOT OF SLOAN***	***25***	***67***
IL EPA PEORIA HHW SITE	***2218 N PROSPECT B***	***26***	***67***
HARCO SCREEN GRAPHICS INC	***3121 NE ADAMS ST***	***27***	***72***
KINGMAN SCHOOL-DIST 150	3129 NE MADISON	27	72
BEMIS CO INC	***1 8TH MI E OF SLOAN AND***	***27***	***73***
BOARDS AUTO BODY INC	***3228 N E ADAMS ST***	***27***	***74***
MURRAY INDUSTRIAL INC	***122 LAKEVIEW***	***30***	***85***
PEORIA ANIMAL WELFARE SHELTER	2600 NE PERRY	30	85
PEORIA PARK DISTRICT	***2218 N PROSPECT RD***	***31***	***87***
M H EQUIPMENT CORP	***309 NE ROCK ISLAND AVE***	***32***	***90***
PEORIA CHARTER COACH CO	***2600 NE ADAMS***	***33***	***93***
HAWK JIM TRUCK AND TRAILER INC	***4001 N MAIN ST***	***35***	***98***
GLEN OAK SCHOOL-DIST. 150	808 EAST FRYE	36	103
TRUCK CENTERS INC	***3901 N MAIN ST***	***38***	***105***
STALEYS INTERSTATE READY-MIX C	600 VAN BUREN STREET	39	106
SPEED COLOR	***2000 NE PERRY***	***40***	***106***
KOMATSU DRESSER CO	***2301 NORTH EAST ADAMS***	***41***	***108***
USDOT-CG SANGAMON WLR 65506	***FOOT-OF-WASHINGTON / CA***	***42***	***112***
ILDOT BRG 090 0091	***PINECREST DR OVER I74***	***42***	***113***
ILDOT BRG 090 0035	***IL8 IL29 IL116 OVER IL1***	***42***	***113***
AT&T LONG LINES DELEVAN IL	***RR 5***	***42***	***113***
ILLINOIS CENTRAL COLLEGE	***RTE 24***	***42***	***114***
SUMMIT AUTO SERVICES INC	***SUMMIT DR***	***42***	***114***
IL EPA RPMS HARMON AUTO SAL	***RTE 26 N***	***42***	***115***
CATERPILLAR TRACTOR CO PEORIA	***SPRING CREEK RD***	***42***	***115***

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
ILLINOIS INDUSTRIAL PLATING	***503 ABINGTON ST***	***44***	***116***
ILLINOIS ENGRAVING CO	***1904 N E MONROE***	***44***	***117***
WOODRUFF SCHOOL	1800 NE PERRY AVE	45	118
U S ARMY CORPS OF ENGINEERS	257 GRANT STREET	46	119
LIQUID AIR CORP OF NORTH AMERI	***2110 N ADAMS ST***	***46***	***121***
GREATER PEORIA MASS TRANSIT	***2105 N E JEFFERSON ST***	***46***	***123***
LONGFELLOW SCHOOL-DIST 150	1600 NE PERRY	47	128
ROGY'S GINGERBREAD HOUSE	1221 NE GLEN OAK	48	128
EAST PEORIA #3 STP	3601 NORTH MAIN STREET	51	130
HYSTER CO	1800 N ADAMS ST	52	130
PEORIA COLONIAL BAKING CO.	1825 N.ADAMS ST	52	130
CAPITOL MACHINERY CO	***3501 N MAIN ST***	***55***	***139***
US ARMY CORPS OF ENGINEERS	***FOOT OF GRANT ST***	***57***	***141***
S AND K AIR POWER TOOL AND SUP	***3301 N MAIN***	***60***	***142***
LAHOOD CONSTRUCTION INC.	3305 N. MAIN	60	143
FOTOULA KRAKOS	***1221 NE JEFFERSON***	***61***	***146***
PEPSI COLA GENERAL BOTTLERS	***1215 NE ADAMS***	***62***	***147***
BEARCE JOHN FORD INC	***500 FAIRLANE DR***	***63***	***152***
BENEDICT JH INC	***3211 MAIN ST***	***64***	***153***
CILCO ADAMS SUBSTATION	***ADAMS / MORTON STS***	***65***	***155***
HAWKEYE RUBBER MFG CO	***1 SPRING ST***	***68***	***157***
HINE EDWARD CO	***201 MORTON ST***	***70***	***165***
I-V DIE MOLD COMPANY	204 MORTON STREET	70	165
TAFT HOMES	***N ADAMS AND WAYNE ST***	***71***	***165***
MID ILLINOIS CO	***905 NE ADAMS***	***71***	***166***
IDEAL TROY CO	***711 NE JEFFERSON ST***	***73***	***167***
TAYLOR & SONS, INC.?DON	2901 N. MAIN STREET	74	168
APOLLO OIL CO	101 IRVING ST	75	169
PMP FERMENTATION PRODUCTS INC	***121 WAYNE ST***	***75***	***170***
ILLINOIS BLUEPRINT CORP.	821 BOND STREET	75	172
RED CARPET CAR WASH INC	***505 NE JEFFERSON ST***	***76***	***175***
PEORIA OMS	***523 NE ADAMS ST***	***77***	***175***
PAR A DICE GAMING CORP	***2430 N MAIN***	***79***	***177***
CHURCH OF CHRIST SCHOOL	520 ARNOLD RD	83	183
WEISE PLANNING AND ENGINEERING	***1200 N MAIN ST***	***85***	***185***

HMIRS: The Hazardous Materials Incident Report System contains hazardous material spill incidents reported to the Department of Transportation. The source of this database is the U.S. EPA.

A review of the HMIRS list, as provided by EDR, and dated 05/31/2000 has revealed that there are 17 HMIRS sites within the searched area.

Site	Address	Map ID	Page
Not reported	408 TRUCK HAVEN RD	23	64
Not reported	4309 N MAIN STREET	23	64
Not reported	4309 NORTH MAIN ST	23	64
Not reported	4309 N. MAIN ST.	23	65
Not reported	4309 N MAIN	23	65
Not reported	4309 NORTH MAIN ST	23	65
Not reported	4309 N MAIN STREET	23	65
Not reported	4309 N MAIN	23	65
Not reported	4309 N MAIN	23	65
Not reported	4309 NORTH MAIN STREET	23	65

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
Not reported	4309 N MAIN ST	23	65
Not reported	4309 N MAIN	23	65
Not reported	4309 N MAIN	23	65
Not reported	4309 N MAIN	23	66
Not reported	4309 N MAIN ST	23	66
Not reported	4309 N MAIN	23	66
Not reported	4309 NORTH MAIN	23	66

TRIS: The Toxic Chemical Release Inventory System identifies facilities that release toxic chemicals to the air, water, and land in reportable quantities under SARA Title III, Section 313. The source of this database is the U.S. EPA.

A review of the TRIS list, as provided by EDR, and dated 12/31/1997 has revealed that there are 2 TRIS sites within the searched area.

Site	Address	Map ID	Page
KOMATSU DRESSER CO	***2301 NORTH EAST ADAMS***	***41***	***108***
PMP FERMENTATION PRODUCTS INC	***121 WAYNE ST***	***75***	***170***

TSCA: The Toxic Substences Control Act identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site. The United States Environmental Protection Agency has no current plan to update and/or re-issue this database.

A review of the TSCA list, as provided by EDR, and dated 12/31/1998 has revealed that there are 2 TSCA sites within the searched area.

Site	Address	Map ID	Page
PMP FERMENTATION PRODUCTS INC	***121 WAYNE ST***	***75***	***170***
PMP FERMENTATION PRODUCTS INC	***121 WAYNE ST***	***75***	***170***

FTTS: FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act) over the previous five years. To maintain currency, EDR contacts the Agency on a quarterly basis.

A review of the FTTS list, as provided by EDR, and dated 08/30/2000 has revealed that there is 1 FTTS site within the searched area.

Site	Address	Map ID	Page
PMP FERMENTATION PRODUCTS	121 WAYNE ST	75	171

EXECUTIVE SUMMARY

STATE OR LOCAL ASTM SUPPLEMENTAL

A review of the SRP list, as provided by EDR, and dated 11/08/2000 has revealed that there are 2 SRP sites within the searched area.

Site	Address	Map ID	Page
BLACKSTONE GROUP	3603 NORTH PROSPECT ROA	11	27
J & M TIRE AND TOWING	720 PARK AVENUE	32	88

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

ENVRIONMENTAL DATA RESOURCES, INC.

AREA REPORT

SUPPORTING DOCUMENTS FROM U. S. ENVIRONMENTAL PROTECTION AGENCY & NATIONAL RESPONSE CENTER

EPA United States Environmental Protection Agency

Envirofacts Warehouse | Queries | Report Error | EF Overview | Query | Model | Feedback | EF Home

ENVIROFACTS REPORT ON BEMIS COMPANY INCORPORATED

1 SLOAN STREET
PEORIA, IL 61603

Map this facility

Map this facility using one of Envirofact's mapping utilities.

EPA Facility Information

This query was executed on JUL-23-2001

Superfund Information (CERCLIS)

SUPERFUND SITE ID: 0500220 **SITE SMSA:** 6120
OWNERSHIP STATUS: Other **FEDERAL FACILITY:** N
NPL STATUS: Not on the NPL **SITE INCIDENT TYPE:**

Additional Information can be obtained from the Superfund CERCLIS Query.

Additional Superfund Site information may be obtained through EPA's Superfund web site. Their query pages provide an alternative method for retrieving Superfund Site information.

Toxic Releases for Reporting Year 1987

TRI FACILITY ID: 61603BMSCMFOOTO

SIC Codes for 1987

SIC CODE	SIC CODE DESCRIPTION
2643	

Chemicals Transferred to other Sites

CHEMICAL NAME	TRI CHEM ID	DOCUMENT	RELEASE AMOUNTS LBS/YR	RELEASE BASIS CODE	TYPE OF WASTE MANAGEMENT	TRANSFER SITE NAME	TRANSFER SITE CITY
TETRACHLOROETHYLENE	000127184	1387010293658	47000	OTHER	OTHER TREATMENT		

Chemicals Released to Air

CHEMICAL NAME	TRI CHEM ID	DOCUMENT	RELEASE AMOUNTS LBS/YR	RELEASE BASIS CODE	FUGITIVE OR STACK INDICATOR
TETRACHLOROETHYLENE	000127184	1387010293658	250	OTHER	FUGITIVE OR NON-POINT EMISSIONS
TETRACHLOROETHYLENE	000127184	1387010293658	250	OTHER	STACK OR POINT EMISSIONS

Chemicals Released via Underground Injection

There was no data of this type reported for this facility.

Chemicals Released to Land

There was no data of this type reported for this facility.

Chemicals Released to Surface Water

There was no data of this type reported for this facility.

Additional Information can be obtained from the Toxics Release Inventory System TRIS Query.

Water Discharge Permit Information (PCS)

NPDES: ILR001034 NPDES:

SIC CODE: **SIC DESCRIPTION:**

The current PCS database does not have permitted discharge data for this facility.

Additional Information can be obtained from Water Discharge Permit Infomation PCS Query.

AIRS / AFS Information

PLANT NAME:	BEMIS CO INC-PAPER DIVISION	**COMPLIANCE SYSTEM PLANT ID:**	00097
AFS PLANT ID:	143065APY	**NATIONAL EMISSIONS DATA SYSTEM PLANT ID:**	0097
LATITUDE:	404246	**LONGITUDE:**	893325
DUNS NUMBER:	006215727	**PRINCIPAL PRODUCT:**	PRINTING
INVENTORY YEAR:	98	**EMERGENCY CONTROL:**	
CLASS CODE:	POT EMISSIONS BELOW MAJR SOURCE THRESHOLDS IF COMPLIES WITH FED REGS/LIMITS	**COMPLIANCE STATUS:**	UNKNOWN COMPLIANCE STATUS

List of Pollutant Information

POLLUTANT DESCRIPTION	POLLUTANT CODE	CAS NUMBER	ALLOWABLE EMISSIONS		ESTIMATED W/ RULE EFFECTIVENESS		ESTIMATED W/O RULE EFFECTIVENESS	
			VALUE	UNIT	VALUE	UNIT	VALUE	UNIT
VOLATILE ORG COMPNDS	VOC		103.1402	TY				

RCRAInfo

HANDLER ID: ILD006215727

Standard Industrial Classification:

There were no SIC Codes reported to EPA for this facility.

Handler/Facility Classification:

HANDLER TYPE	LAND DISPOSAL	INCINERATOR	BOILER AND/OR INDUSTRIAL FURNACE	STORAGE	TREATMENT
Small Generator					

Additional Information can be obtained from Resource Conservation and Recovery Information System RCRAINFO Query.

EPA United States Environmental Protection Agency

Envirofacts Warehouse | Superfund | Report Error

Overview | Law | EXIT EPA | Query | Model | Feedback | EF Home

CERCLIS Query Results

SITE ID: Equal To: **ILD006215727**
Results are based on data extracted on JUL-19-2001
Note: Click on the underlined CORPORATE LINK value for links to that company's environmental web pages. Click on the underlined MAPPING INFO value to obtain mapping information for the facility. Click on the underlined RECORD OF DECISION value for a RODS Site Report. Click on the underlined "View Facility Information" link to view EPA Facility information for the facility.

Go To Bottom Of The Page

SITE EPA ID:	ILD006215727	**SITE NAME:**	BEMIS CO INC
STREET ADDRESS:	1/8MI E OF SLOAN & ADAMS	**FACILITY INFORMATION**	View facility information
CITY NAME:	PEORIA	**OWNERSHIP STATUS:**	Other
STATE ABBR:	IL	**FEDERAL FACILITY:**	N
ZIP CODE:	61603	**NPL STATUS:**	Not on the NPL
COUNTY NAME:	PEORIA	**SITE INCIDENT TYPE:**	
CORPORATE LINK:	No	**RECORD OF DECISION (ROD) INFO:**	No
LATITUDE:		**EPA REGIONAL LINK:**	No
LONGITUDE:		**MAPPING INFO:**	MAP
SITE SMSA:	6120		

Enforcement and Cleanup Actions

Action	Action ID	Planned Start Date	Planned End Date	Actual Start Date	Actual End Date	Responsibility	Planned Outcome	Urgency
SITE INSPECTION	001				10/06/1989	EPA Fund-Financed	High	
PRELIMINARY ASSESSMENT	001				02/01/1985	State, Fund Financed	Low	
DISCOVERY	001				08/01/1980	EPA Fund-Financed		

Site Description

There were no Site Descriptions reported for this site.

Go To Top Of The Page

Total Number of Facilities Displayed: 1

EPA United States Environmental Protection Agency

Superfund

Topics | Publications | Search | Contact Us

CERCLIS
Archive (NPRAP)
RODS
ESD
Order Products
Site Info Home

CERCLIS Hazardous Waste Sites

Customized CERCLIS Report
Disclaimer

BEMIS CO INC

Site Information

Actions | Aliases | Financial | Op Units | RODs

Site Name: BEMIS CO INC
Street: 1/8MI E OF SLOAN & ADAMS
City / State / Zip: PEORIA, IL 61603

EPA ID: ILD006215727
EPA Region: 05
County: PEORIA

NPL Status: Not on the NPL
Non-NPL Status: Other Cleanup Activity: State-Lead Cleanup
Federal Facility Flag: Not a Federal Facility
Incident Category:

[Back to TOP]

EPA Home | Search EPA | OSWER Home | Superfund Home

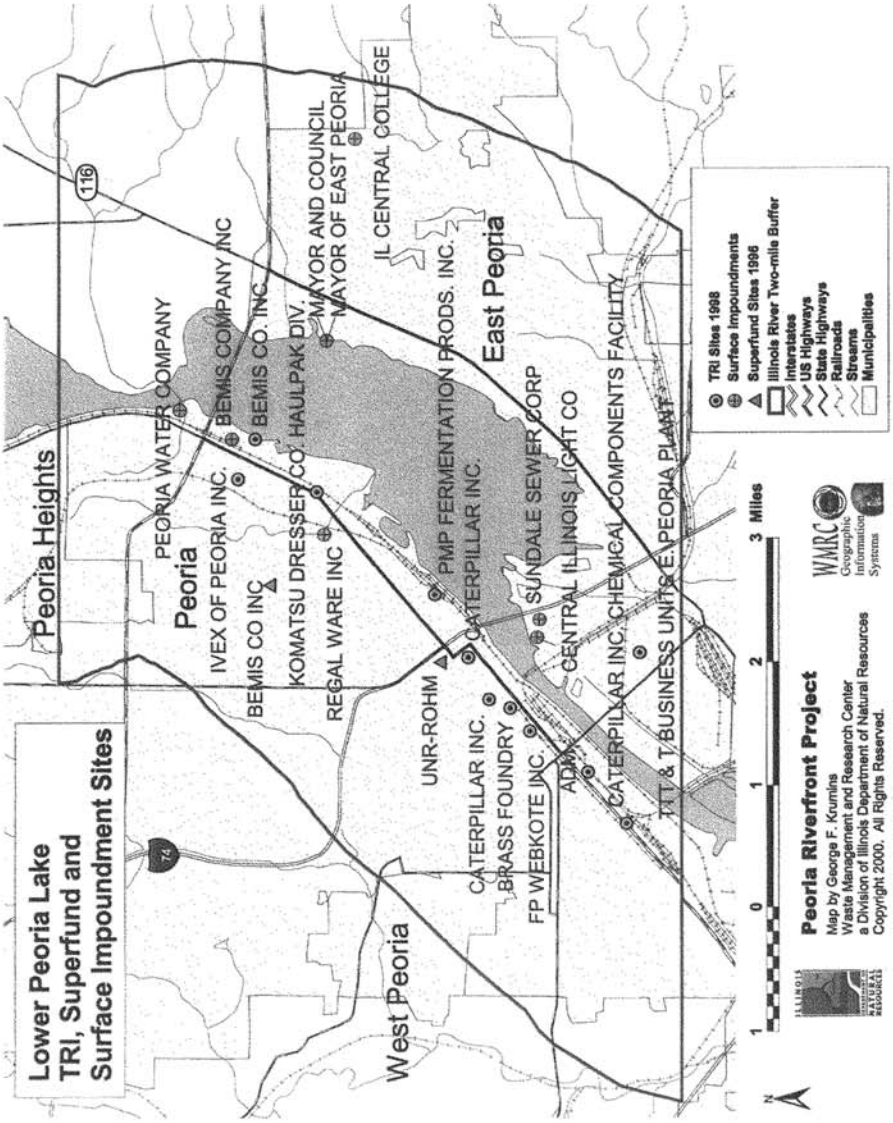
URL: http://www.epa.gov/superfund/sites/cursites/c3il/s0500220.htm
This page was last updated on: June 13, 2001
Site maintained by: Office of Emergency and Remedial Response
brown.margret@epa.gov

Peoria Riverfront Development Study:
Peoria Lake Islands
Phase I ESA – 31 January 2002

EXCERPT OF

ILLINOIS WASTE MANAGEMENT AND RESOURCE CENTER

DATABASE SEARCH RESULTS


Lower Peoria Lake
TRI, Superfund and
Surface Impoundment Sites
Peoria Heights
Peoria
West Peoria
East Peoria
PEORIA WATER COMPANY
IVEX OF PEORIA INC.
BEMIS CO INC
BEMIS COMPANY INC
BEMIS CO. INC.
KOMATSU DRESSER CO.
HAULPAK DIV.
REGAL WARE INC
MAYOR AND COUNCIL
MAYOR OF EAST PEORIA
IL CENTRAL COLLEGE
PMP FERMENTATION PRODS. INC.
UNR-ROHM
CATERPILLAR INC.
SUNDALE SEWER CORP
CENTRAL ILLINOIS LIGHT CO
CATERPILLAR INC. CHEMICAL COMPONENTS FACILITY
CATERPILLAR INC.
BRASS FOUNDRY
FP WEBKOTE INC.
ADM
T.T.T. & T. BUSINESS UNITS E. PEORIA PLANT
74
116
N
1 0 1 2 3 Miles
Peoria Riverfront Project
Map by George F. Krumins
Waste Management and Research Center
a Division of Illinois Department of Natural Resources
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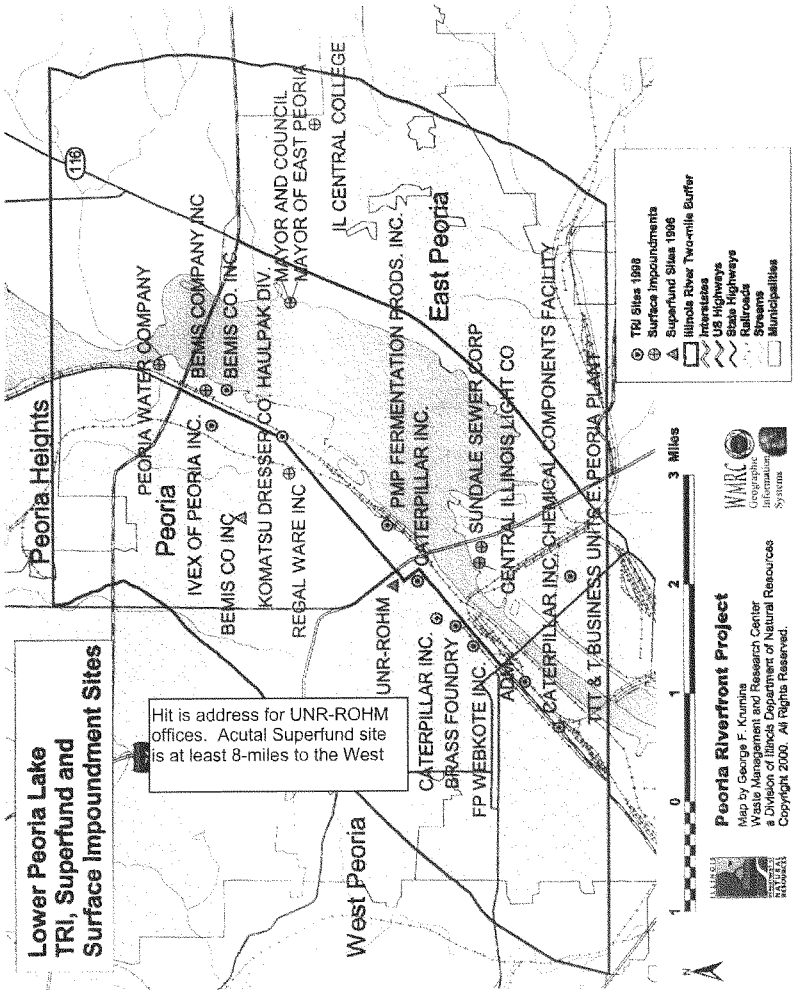
WMRC
Geographic Information Systems
TRI Sites 1998
Surface Impoundments
Superfund Sites 1998
Illinois River Two-mile Buffer
Interstates
US Highways
State Highways
Railroads
Streams
Municipalities


Lower Peoria Lake
TRI, Superfund and
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Peoria
West Peoria
East Peoria
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MAYOR OF EAST PEORIA
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CENTRAL ILLINOIS LIGHT CO
CATERPILLAR INC. CHEMICAL COMPONENTS FACILITY
TTT & T BUSINESS UNITS E\ PEORIA PLANT
Hit is address for UNR-ROHM offices. Acutal Superfund site is at least 8-miles to the West
116
TRI Sites 1998
Surface Impoundments
Superfund Sites 1996
Illinois River Two-mile Buffer
Interstates
US Highways
State Highways
Railroads
Streams
Municipalities
0 1 2 3 Miles
Peoria Riverfront Project
Map by George F. Krumins
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WARC
Geographic Information Systems

USEPA 1996 CERCLIS/Superfund Sites from List 9

Source: 1996 USEPA Superfund List 9, formatted by WMRC

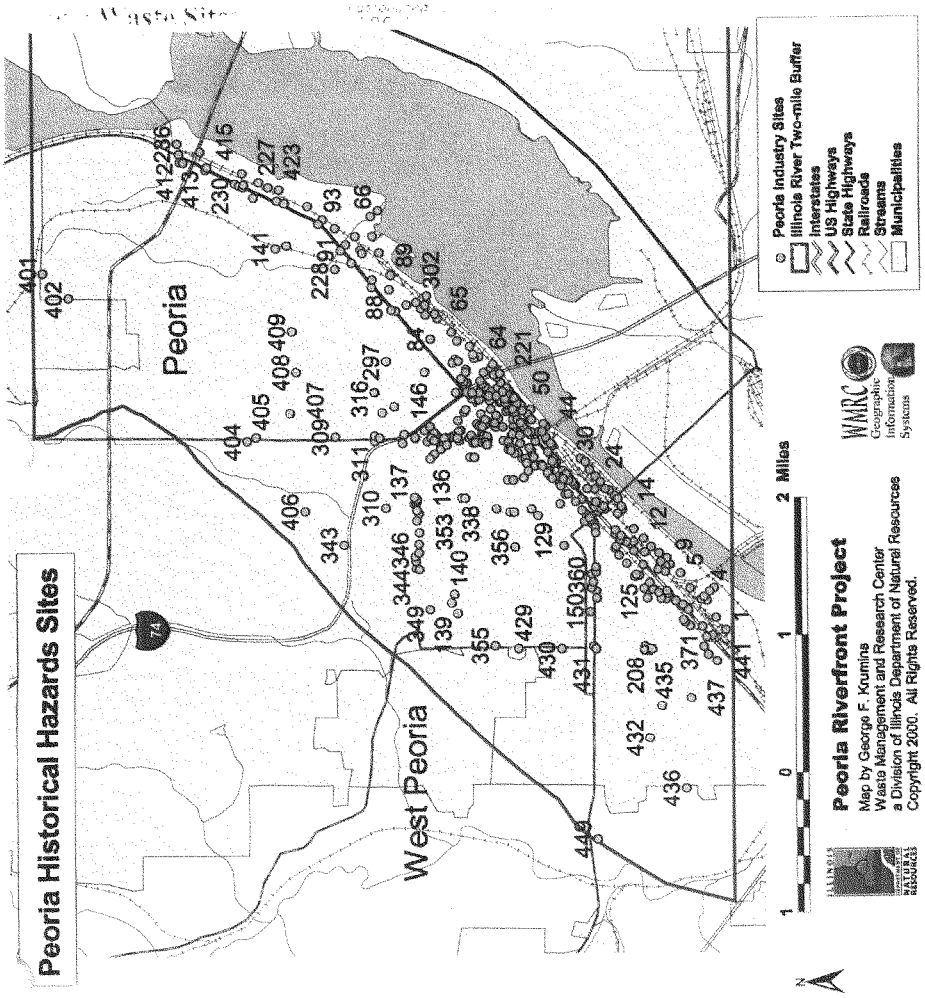
USEPA ID	ILD006215727
Site Name	BEMIS CO INC
Address	1/8MI E OF SLOAN & ADAMS
City	PEORIA
ZIP Code	61603
County	
Latitude	40.715
Longitude	89.578
Source	GEOGRAPH
SMSA	6120
Hydrologic Unit	07130001
Congressional Distric	
Ownership	OH
Federal Facility?	
NPL Status	N
NPL Update Number	

Aliases:

Description

DIOXIN TIER-FOUR SITE-INCINERATOR(S) ON-SITE USED TO BURN COATINGS OFF COPPER W

Operable Unit	Event Type	Actual Start Date	Actual Completion Date	Event Lead
00	RV1	4/24/87	6/15/87	RESP. PARTY
00	RV2	12/3/87		RESP. PARTY
00	DS1		4/21/87	EPA (FUND)
00	PA1		9/26/88	STATE(FUND)
00	AR1			EPA (FUND)
01	CO1			RESP. PARTY


Peoria Historical Hazards Sites
Peoria
West Peoria
Peoria Industry Sites
Illinois River Two-mile Buffer
Interstates
US Highways
State Highways
Railroads
Streams
Municipalities
0
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2 Miles
Peoria Riverfront Project
Map by George F. Krumins
Waste Management and Research Center
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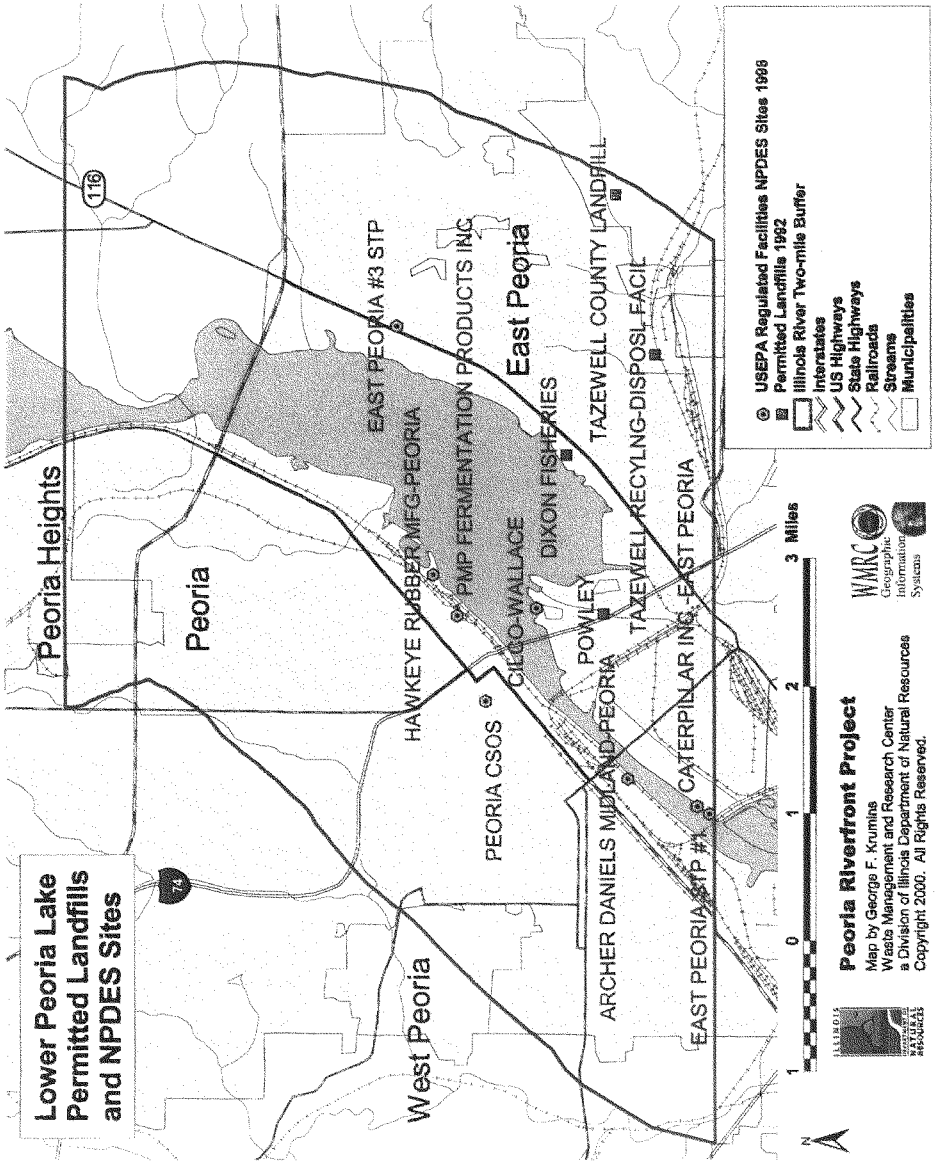
WMRC
Geographic Information Systems


Lower Peoria Lake
Permitted Landfills
and NPDES Sites
Peoria Heights
Peoria
West Peoria
East Peoria
EAST PEORIA #3 STP
PMP FERMENTATION PRODUCTS INC
HAWKEYE RUBBER MFG-PEORIA
CILCO-WALLACE
DIXON FISHERIES
POWLEY
TAZEWELL COUNTY LANDFILL
TAZEWELL RECYLNG-DISPOSL FACIL
TAZEWELL-EAST PEORIA
CATERPILLAR INC-EAST PEORIA
MIDLAND-PEORIA
ARCHER DANIELS
EAST PEORIA STP #1
PEORIA CSOS
USEPA Regulated Facilities NPDES Sites 1996
Permitted Landfills 1992
Illinois River Two-mile Buffer
Interstates
US Highways
State Highways
Railroads
Streams
Municipalities
0 1 2 3 Miles
Peoria Riverfront Project
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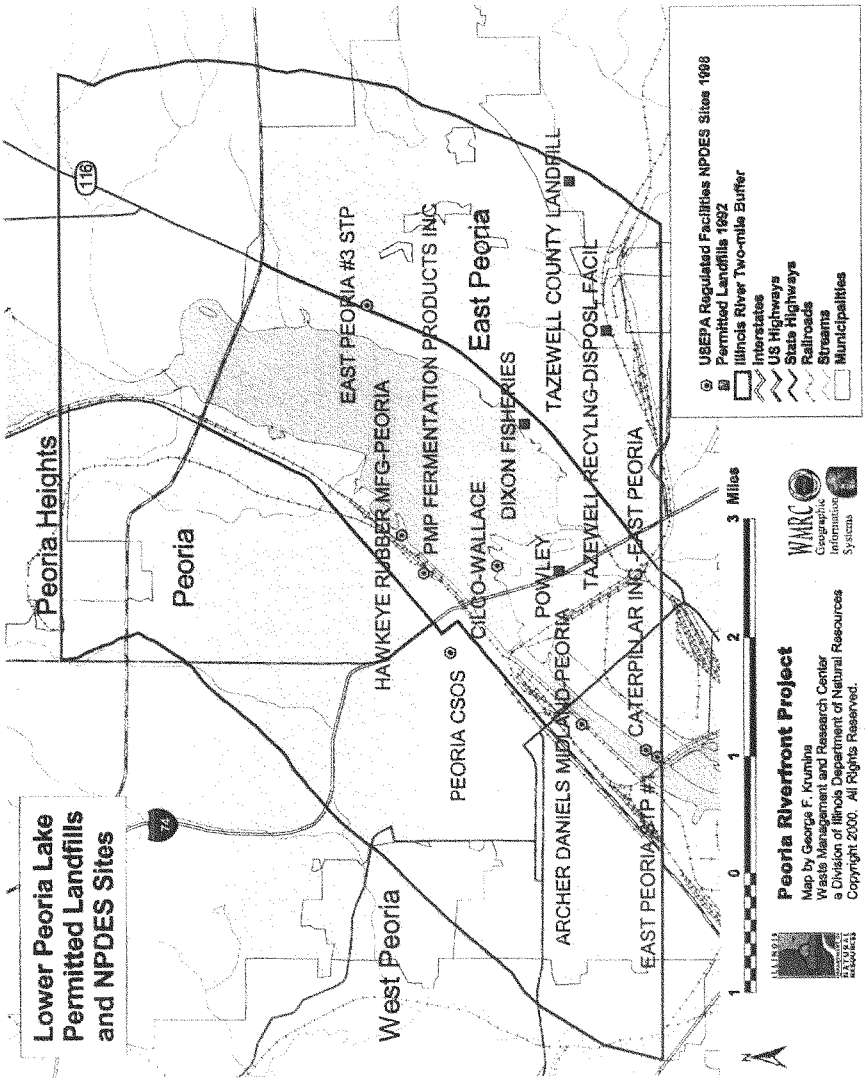
WMRC
Geographic Information Systems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116
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PMP FERMENTATION PRODUCTS INC
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0 1 2 3 Miles
N
Peoria Riverfront Project
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Geographic Information Systems

Sites Found in Search of Land-based Disposal Database (Landfills)

Source : WMRC Inventory of Land-based Disposal Sites 1997

General Site Information

Landfill ID	2777		
IEPA ID	1790200010		
Site Name	DIXON FISHERIES		
Owner	DIXON FISHERIES		
Operator	DIXON JOHN		
Address	1807 MAIN STREET		
P. O. Box			
City	EAST PEORIA		
ZIP Code	61611		IL
County	TAZEWELL		
Latitude	404100		
Longitude	893320		
Prime Meridian	3	Quarter Section	NW
Township	26N	Quarter Section	N
Range	04W	Quarter Section	
Section	27	Quarter Section	

Operational Details

Operational Status	CLOSED FINAL COVER
Permit Status	PERMITTED
IEPA Permit Date	10172
Open Date	
Close Date	111974
Remedial Action?	
RCRA Facility?	
Ground Water Monitoring?	NO
Former Disposal Site?	
Offsite Waste Accepted?	
Landfill Size (Acres)	4
Size Fill (Acres)	4
Leachate Collected?	

Type of Disposal

Open Dump	
Secured Containers	
Landfill	X
Incineration	
Surface Impoundment	
Land Application	

Liner Material

Recompacted Clay	
In-situ Clay	
Combination	
None	
Other	

Waste Type

General	
Municipal Sewage	
Septic	
Animal	
Pathological	
Industrial	
Foundry Sand	
Incinerator Ash	
Slag	
Hazardous	
Hazardous Liquid	
Radiation	
Demolition Debris	X
Concrete	X
Landscaping	
Oil Field Brine	
Special	
Other	
Unknown	

Sources of Information

IEPA	X
ISGS	
PCB	
IDM&M	
DPH	
Local Agency	
Agency	
Other	

Details for Illegal Sites

Date Discovered	
Date Cleaned	

Type of Dump

Random Dump	
Open Dump	
Abandonment	
Other	

1989 Comments

DISPOSAL SITE IS A BREAKWATER FOR THE ILLINOIS RIVER.

EPA United States Environmental Protection Agency

Envirofacts Warehouse — Facility Information

Overview | EZ Query | Query | Model | Feedback | EF Home

Facility Detail Report

Facility Name:	EAST PEORIA NUMBER 3 STP CITY OF
Location Address:	3601 NORTH MAIN STREET
Supplemental Address:	
City Name:	EAST PEORIA
State:	IL
County Name:	TAZEWELL
ZIP/Postal Code:	61611
EPA Region:	05
Congressional District Number:	
Legislative District Number:	
HUC Code:	
Federal Facility:	
Tribal Land :	NO
DUNS Company Number:	
Latitude:	40.702418
Longitude:	-89.536272
Method:	ADDRESS MATCHING-HOUSE NUMBER
Accuracy (meters):	150
Reference Point Description:	PLANT ENTRANCE (GENERAL)

Report Facility Discrepancy

Map this facility

Map this facility using one of Envirofact's mapping utilities.

Environmental Interests

Information System	Information System ID	Environmental Interest Type	Data Source	Last Updated Date
PCS	IL0046213	NPDES MAJOR	PCS	09/16/2000
PCS	ILL046213			

Facility Mailing Addresses

Affiliation Type	Delivery Point	City Name	State	Postal Code	Information System
ALTERNATE MAILING ADDRESS	100 SOUTH MAIN STREET	EAST PEORIA	IL	61611	PCS
PRIMARY MAILING ADDRESS	100 SOUTH MAIN STREET	EAST PEORIA	IL	61611	PCS
PRIMARY MAILING ADDRESS	100 SOUTH MAIN STREET	EAST PEORIA	IL	61611	PCS

NAIC Codes

No NAIC Codes returned.

SIC Codes

Data Source	SIC Code	Description	Primary	Report Discrepancy
PCS	4952	SEWERAGE SYSTEMS		Report
PCS	4952	SEWERAGE SYSTEMS		Report

Contacts

Affiliation Type	Full Name	Office Phone	Information System	Mailing Address	Report Discrepancy
COGNIZANT OFFICIAL	RICK JEREMIAH	[illegible]	PCS		Report
COGNIZANT OFFICIAL	RICK JEREMIAH	[illegible]	PCS		Report

Organizations

No Organizations returned.

Alternative Names

Alternative Name	Alternative Name Type	Data Source	Date Reported
EAST PEORIA STP NUMBER 3	LEGAL NAME	NPDES PERMIT APPLICATION	13-NOV-91
EAST PEORIA #3 STP		PCS	
EAST PEORIA STP #3		PCS	

Query executed on: APR-26-2001

EPA United States Environmental Protection Agency

Envirofacts Warehouse Queries

EF Overview | Query | Model | Feedback

ENVIROFACTS REPORT ON EAST PEORIA NUMBER 3 STP CITY OF

3601 NORTH MAIN STREET
EAST PEORIA, IL 61611

Map this facility using one of Envirofact's mapping utilities.

This query was executed on APR-26-2001

Water Discharge Permit Information (PCS)

NPDES: ILL046213
SIC CODE: 4952 **SIC DESCRIPTION:** SEWERAGE SYSTEMS

This facility has permits to discharge the following chemical/substances through the points (pipes) listed in the table below:

PARAMETER CODE	PARAMETER DESCRIPTION	NUMBER OF DISCHARGE POINTS
01003	ARSENIC IN BOTTOM DEPOSITS (DRY WGT)	1
01148	SELENIUM IN BOTTOM DEPOSITS (DRY WGT)	1
46394	COPPER, TOTAL SLUDGE	1
46395	CADIUM, TOTAL SLUDGE	1
49017	ANN. AMT SLUDGE DISPOSED BY OTHER METHOD	1
49018	ANNUAL AMT OF SLUDGEINCINERATED	1
49019	ANNUAL SLUDGE PRODUCTION, TOTAL	1
49020	ANNUAL AMOUNT OF SLUDGE LAND APPLIED	1
49021	ANNUAL AMT. SLUDGE DISPOSED SURFACE UNIT	1
49022	ANNUAL AMT SLUDGE DISPOSED IN LANDFILL	1
49023	ANNUAL AMT SLUDGE TRANSPORTED INTERSTATE	1
78465	MOLYBDENUM, SLUDGE, TOT, DRY WT. (AS MO)	1
78467	ZINC, SLUDGE, TOTAL, DRY WEIGHT, (AS ZN)	1
78468	LEAD, SLUDGE, TOTAL, DRY WEIGHT (AS PB)	1
78469	NICKEL, SLUDGE, TOT, DRY WEIGHT (AS NI)	1
78471	MERCURY, SLUDGE, TOT DRY WEIGHT (AS HG)	1
78473	CHROMIUM, SLUDGE, TOT, DRY WT. (AS CR)	1
84367	POLLUTANT TABLE FROM 503.13	1
84368	LEVEL OF PATHOGEN REQUIREMENTS ACHIEVED	1
84369	DESCRIPTION OF PATHOGEN OPTION USED	1
84370	VECTOR ATTRACTION REDUCTION ALTERN USED	1

Additional Information can be obtained from Water Discharge Permit Infomation PCS Query.

Water Discharge Permit Information (PCS)

NPDES: IL0046213
SIC CODE: 4952 **SIC DESCRIPTION:** SEWERAGE SYSTEMS

This facility has permits to discharge the following chemical/substances through the points (pipes) listed in the table below:

PARAMETER CODE	PARAMETER DESCRIPTION	NUMBER OF DISCHARGE POINTS
00310	BOD, 5-DAY (20 DEG. C)	1
00400	PH	1
00530	SOLIDS, TOTAL SUSPENDED	2
00556	OIL AND GREASE FREON EXTR-GRAV METH	1
00610	NITROGEN, AMMONIA TOTAL (AS N)	1
00718	CYANIDE, WEAK ACID, DISSOCIABLE	1
00720	CYANIDE, TOTAL (AS CN)	1
00951	FLUORIDE, TOTAL (AS F)	1
01002	ARSENIC, TOTAL (AS AS)	1
01007	BARIUM, TOTAL (AS BA)	1
01027	CADMIUM, TOTAL (AS CD)	1
01032	CHROMIUM, HEXAVALENT (AS CR)	1
01034	CHROMIUM, TOTAL (AS CR)	1
01042	COPPER, TOTAL (AS CU)	1
01045	IRON, TOTAL (AS FE)	1
01046	IRON, DISSOLVED (AS FE)	1
01051	LEAD, TOTAL (AS PB)	1
01055	MANGANESE, TOTAL (AS MN)	1
01067	NICKEL, TOTAL (AS NI)	1
01077	SILVER, TOTAL (AS AG)	1
01092	ZINC, TOTAL (AS ZN)	1
01147	SELENIUM, TOTAL (AS SE)	1
32730	PHENOLICS, TOTAL RECOVERABLE	1
50050	FLOW, IN CONDUIT OR THRU TREATMENT PLANT	2
50060	CHLORINE, TOTAL RESIDUAL	1
71900	MERCURY, TOTAL (AS HG)	1
74055	COLIFORM, FECAL GENERAL	1
80082	BOD, CARBONACEOUS 05 DAY, 20C	1

Additional Information can be obtained from Water Discharge Permit Infomation PCS Query.

APPENDIX G
INTERVIEW DOCUMENTATION

CONVERSATION RECORD	TIME 3:30 PM	DATE 3/2/01

TYPE: [X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

Location of Visit/Conference: Brad Thompson's desk (PM-M)

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Brad Thompson	CEMVR-PM-M	x5256

ROUTINE: NAME/SYMBO | INI

SUBJECT

Peoria River Front Development: Brad is the Project Manager

SUMMARY

Brad provided me the overall synopsis of the Peoria Riverfront Development project. Although no draft of the feasibility study exists, Brad provided me a map showing potential project locations as well as assisted me in preparing a simple map of main project locations on a copy of a Illinois gazetteer map.

Currently, congressional authority allows us to dredge Peoria Lake (part of the Peoria Pool of the Illinois Waterway) for navigational purposes. Congress has recently allowed funding to study the feasibility of constructing holistic solutions to the sedimentation problems in Peoria Pool. Part of that solution includes building islands in Peoria Lake as well as managing and constructing sediment traps in the upland portions of the lake's tributaries (Blue Creek, Farm Creek, Farmdale Reservoir, and Ackerman Creek)

Currently, Brad is looking at having only two project areas in the feasibility study: Peoria Lake Islands & City of Washington Upland Ponds. ED-DN will complete two separate HTRW assessments, one for each project area. Brad, as the senior author of the feasibility report, will ensure proper integration of the HTRW assessments into the feasibility study. If deemed necessary, ED-DN will provide federal & state searches for future planning around the accessory project areas (Blue Creek, Farmdale Reservoir, and Ackerman Creek). This additional HTRW information will likely occur between the "Draft" and "Final" versions of Brad's feasibility study.

Although Brad did not have any specialized knowledge or experience regarding HTRW or other regulated contaminants in the study areas, he did provide me the following information:

Person's who may have specialized knowledge for all project areas:

Mike Cochran, IL DNR, (309) 543-3316
John Marlan, IL DNR Waste Management, (217) 333-8956

Person's who may have specialized knowledge for Peoria Lake Islands:

Michael Tarpey, ED-DN, x5179

Person's who may have specialized knowledge for City of Washington Upland Ponds:

Kenneth Newman, City of Washington Engineer, (309) 444-3196
Rachel Fellmen, ED-DG, x5788
Debbie Vanopdorp, RE-A, x5243

Other information:
Farmdale Reservoir: Rachel Fellmen, Corps owned reservoir what would be managed differently, no new land acquisition
Ackerman Creek: non-Corps (IL DNR) would restore stream with village of Morton as co-sponsor
Bloe Creek: Clint Beckert (x5412), making sediment traps with old holding ponds

ACTION REQUIRED

1-6. Contact listed people and interview for specialized knowledge or experience with HTRW or other regulated contaminants in the project areas

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		3/5/01

ACTION TAKEN

(1) Will not contact Mike Cochran. (2) Will not contact John Marlan. (3) Tarpey contacted on 3/7/01. (4) Kenneth contacted on 4/5/01. (5) Rachel contacted on 3/6/01. (6) Debbie contacted on 3/6/01.

SIGNATURE	TITLE	DATE
Mikael S. Brown	Civil Engineering, Co-Op	7/23/01

CONVERSATION RECORD — OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

CONVERSATION RECORD	TIME 2:30 PM	DATE 3/7/01

TYPE: [X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

Location of Visit/Conference: Michael Tarpey's Desk (ED-DN)

ROUTINE: NAME/SYMBO | INI

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Michael Tarpey	CEMVR-ED-DN	X5179

SUBJECT

Peoria River Front Development: Michael is Project Engineer for Peoria Lake Islands

SUMMARY

Michael confirmed that the Peoria Lake project would only involve dredging and constructing island within the lake itself. No shoreline or real estate will be required for the project. The locations of proposed dredging and island construction are fixed and Tarpey provided me site maps.

Tarpey had the sediment testing data and said he would have Kristy Keemle scan the information in to make available on the CEMVR intranet.

The only specialized knowledge Michael could add is that to his knowledge, the area has historically been inundated so there is little chance of structures or landfills existing under the lake's surface. This does not exclude the possibility of dumping occurring by barge/boat into the lake. To the best of his knowledge, Michael believes that the sediments proposed for dredging are at most 70 years old and younger.

UPDATE 4/4/01
Specific name for study: Peoria Riverfront Development Study
Specific name for report: Feasibility Report and Environmental Assessment
Project area names: Peoria Lake Islands & City of Washington Upland Tributary Uplands Restoration
Specific authority: The specific authority for conducting the Peoria Riverfront Development Study is contained in Resolution 2500 of the Committee on Transportation and Infrastructure, adopted 9 May 1996, and Section 216 of the 1970 Flood Control Act, which authorizes the Corps to make modifications to completed projects.

ACTION REQUIRED

1. Wait for Kristy to scan in the sediment testing report.

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		3/8/01

ACTION TAKEN

1. Kristy scanned in the material and it was provided to me on 3/9/01.

SIGNATURE	TITLE	DATE
Mikael S. Brown	Engineering Co-Op	3/8/01

CONVERSATION RECORD — OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

CONVERSATION RECORD	TIME 10:30 AM	DATE 3/21/01

TYPE: [X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

Location of Visit/Conference: Vanopdorp (RE-A)

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Vanopdorp	CEMVR-RE-A	X5243

ROUTINE: NAME/SYMBO | INI

SUBJECT

Peoria River Front Development: Vanopdorn is real estate contact for Peoria Lake Islands

SUMMARY

I asked Ms. Vanopdorp for a copy of a TOD map and owner contact information for target properties in Lake Peoria.

1. Christie Real Estate, 301 SW Adams St., Peoria, IL 61601

2. State of IL., Dept. of Conservation, 524 S. 2nd Street, Springfield, IL 62701

3. Fondulac Park District, 201 Bloomington RD., E. Peoria, IL 61611

4. Miller, Martin, Trabue, 1200 First Union Tower, 150 4th Ave N., Nashville, TN 37219

5. Illinois American Water Company, 123 SW Washington St., Peoria, IL 61601

ACTION REQUIRED

1. Wait for real estate information

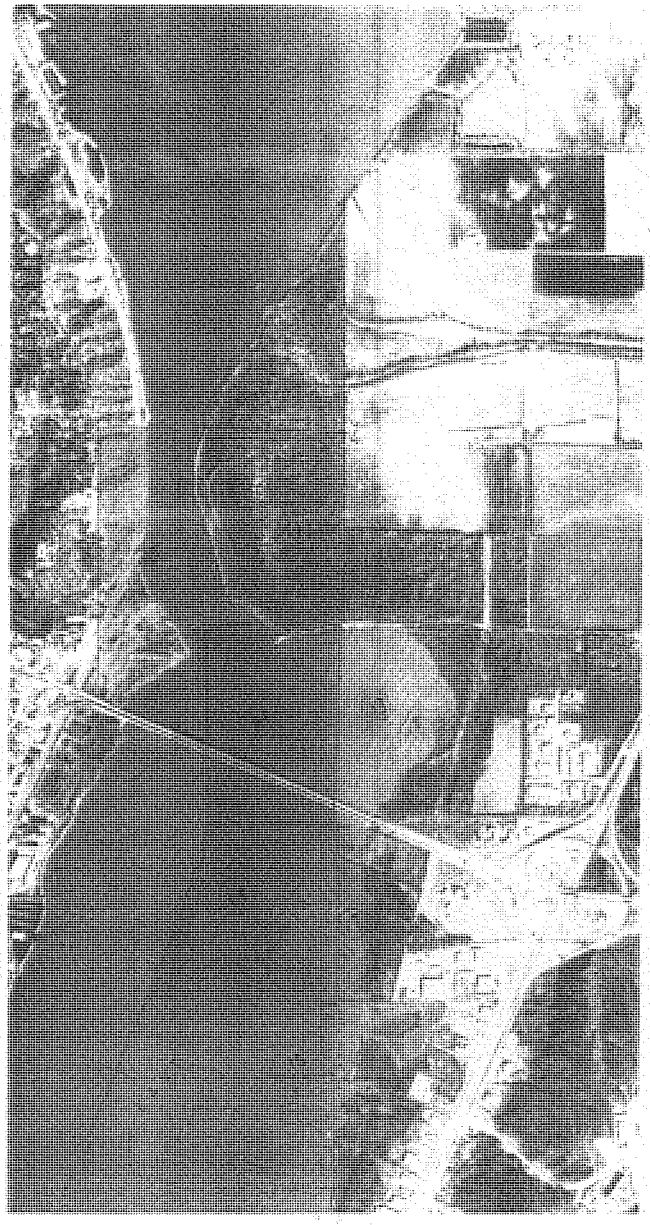
NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		3/22/01

ACTION TAKEN

1. Provided TOD map 03/21/01
2. Waiting oo ownership cootact info. Giving up wait. Not important. 4/27/01

SIGNATURE	TITLE	DATE
Mikael S. Brown	Engineering Co-Op	4/27/01

CONVERSATION RECORD — OPTIONAL FORM 271 (12-76)



FONDULAC TWP

PEORIA RIVERFRONT (UPPER FARM CREEK) TOD

1 Burlington Northern & Santa Fe Railway Company
2 City of Washington, IL
3 Blickenstaff Farming Corporation
4 City of Washington, IL
5 Arnold A. Danz
6 City of Washington, IL
7 Raymond L. & Janice M. Keil
8 Blickenstaff Farming Corporation
9 Alice M. Hoffer Farms, L.L.C.
10 Daniel W. & Angela C. Wissel
11 James E. & Ilaisaane T. Chapman
12 Craig V. Doerr

PEORIA RIVERFRONT (PEORIA LAKE AREA) TOD

13 Christie Real Estate c/o NC IL Trust Co.
14 State of Illinois, Department of Conservation
15 Fondulac Park District
16 Miller, Martin, Trabue
17 Fondulac Park District
18 Fondulac Park District
19 Fondulac Park District
20 City of East Peoria
21 City of East Peoria
22 Local Union #183
23 City of East Peoria
24 State of Illinois, Department of Conservation
25 Illinois American Water Co., Peoria District

CONVERSATION RECORD	TIME 2:00 PM	DATE 4/4/01

TYPE: [X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

Location of Visit/Conference: Ron Deiss' Desk (PM-AR)

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Ron Deiss	CEMVR-PM-AR	x5185

ROUTINE: NAME/SYMBO | INI

SUBJECT
Peoria River Front Development: Ron is archeology contact for Peoria Lake Islands

SUMMARY

Ron provided me a copy of a letter to the Illinois Historic Preservation Agency regarding a Corps archival search for historic properties, an Oct 1997 report entitled "An Investigation of Submerged Historic Properties in the Upper Mississippi River and Illinois Waterway", and the two volume "Landform Sediment Assemblage Units in the Illinois River Valley and the Lower Des Plaines River Valley."

These documents can be used to describe the physical site setting as well as locating submerged structures.

Statement from letter:

> The Corps conducted an archival search for historic properties following the Policy and Procedures for the Conduct of Underwater Historic Resource Surveys and Maintenance Dredging and Corps Activities (DGL-89-01, March 1989). The Corps queried the most updated Illinois Geographic Information Systems site file database and reviewed the reports entitled An Investigation of the Submerged Historic Properties in the Uppers Mississippi River and Illinois Waterway, dated October 1997 (Contract Number DACW25-93-D-0-012, Order No. 27) and The Historic Properties Management Plan for the Illinois Waterway System, Rock Island District, Corps of Engineers, Volumes I and II, dated February 1999 (Contract Number DACW25-93-D-0014, Order No. 0021) for historic properties potentially affected by this Project. No submerged historic properties are documented within the areas of proposed dredging and island creation in Peoria Lake.

ACTION REQUIRED
none

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		4/26/01

ACTION TAKEN
None

SIGNATURE	TITLE	DATE
Mikael S. Brown	Environmental Engineering, Co-Op	4/26/01

CONVERSATION RECORD — OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

CONVERSATION RECORD	TIME	DATE
	2:30 PM	7/19/01

TYPE: [X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

Location of Visit/Conference: Mike Cox's Desk (OD-T)

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Mike Cox	CEMVR-OD-T	X5558

ROUTINE: NAME/SYMBO | INI

SUBJECT

Peoria River Front Development: Contamination associated with dredged sediments

SUMMARY

Spoke with Mike Cox regarding any significant contamination of Peoria Lake Sediments. Mike provided me a document entitled, "Pre-Dredging Grain Size and Chemical Analysis Results from Peoria Lake Sediment Samples (RM 172.1-172.5)." The report discusses sediment quality sampling of sediment from the Upper Peoria Lake (significantly north of Peoria Riverfront Development islands) that was taken off-channel (from the side of the channel.) Mike expressed that off-channel material is significantly finer than channel material. Sediment quality data (two samples analyzing arsenic, chromium, copper, lead, mercury, zinc, and PCBs) was compared to State of Washington Sediment Quality Standards (WQS), USEPA sludge application ceiling concentrations (40 CFR 503), and the Lowest Apparent Effects Threshold (LAET) concentrations (Barrick et al., 1988). Except for mercury, concentrations of all analytes were below the set of three of criteria. Mercury slightly exceeded WQS and LEAT criteria. If dredged, this material would not be offered for beneficial use.

This information should not be used to interpret the level of contaminants to be expected with the Peoria Lake Island dredging/islanding, but only give a hint to upstream conditions. Of 70 samples analyzed in 1986, only 7 had concentrations greater than 0.4 mg/kg, exceeding WQS and LAET criteria.

ACTION REQUIRED

1. none

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		7/23/01

ACTION TAKEN

1. None

SIGNATURE	TITLE	DATE
	Engineering Co-Op	7/23/01

CONVERSATION RECORD — OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

CONVERSATION RECORD	TIME	DATE
	2:00 PM	4/25/01

TYPE: [X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

Location of Visit/Conference: Clint Beckert's Desk (ED-HQ

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Clint Beckert	CEMVR-ED-HQ	x5412

ROUTINE: NAME/SYMBO | INI

SUBJECT
Peoria River Front Development: Clint is water/sediment quality for Peoria Lake Islands

SUMMARY

Sat down with Clint and discussed my analysis of the data presented by Richard Cahill, Illinois State Geological Survey, "Draft Final Report. Assessment of Sediment Quality in Peoria Lake: Results from the Chemical Analysis of Sediment Core Samples Collected in 1998, 1999, and 2000." 14 Feb 2001.

My analysis of the data concluded that contaminant levels of sediments within the proposed Peoria Lake Islands dredge cut statistically exceed ($P<0.1$) background and ecosystem protection guidelines. Contaminant levels of sediments within the proposed Peoria Lake Islands dredge cut are not statistically above ($P<0.1$) human protection guidelines. Potentially adverse biologic effects may occur.

Clint said he would use these conclusions to assist his water/sediment quality analysis.

ACTION REQUIRED
none

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		4/26/01

ACTION TAKEN
None

SIGNATURE	TITLE	DATE
Mikael S. Brown	Civil Engineering, Co-Op	4/26/01

CONVERSATION RECORD — OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

**PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS (ECOSYSTEM RESTORATION)
FEASIBILITY REPORT WITH INTEGRATEDENVIRONMENTAL ASSESSMENT**

**APPENDIX C
GEOTECHNICAL CONSIDERATIONS**

CONTENTS

Subject	Page
PURPOSE	C-1
LOCATION	C-1
PROJECT FEATURES	C-1
PHYSIOGRAPHY	C-1
GEOLOGY	C-2
Bedrock Geology	C-2
Glacial Geology	C-3
SOILS	C-3
SUBSURFACE EXPLORATION	C-4
LABORATORY TESTING	C-4
Peoria Riverfront	C-5
STRATIGRAPHY/SITE CHARACTERIZATION	C-7
Peoria Riverfront	C-7
PROJECT FEATURES DESIGN	C-9
Peoria Riverfront	C-9
General	C-9
Deepwater Habitat	C-10
General	C-10
Slope Stability	C-10
Sediment Confinement Structures	C-11
General	C-11
Sediment Embankments	C-11
Sand Embankments	C-16
Geotextile Containers	C-17
Sediment Confinement Structure Capacity	C-19
REFERENCES	C-22

CONTENTS (Continued)

Tables

No.	Title	Page
C-1	Peoria Riverfront Atterberg Limit Data	C-5
C-2	Grain Size Analysis of Sediment Samples	C-6
C-3	Peoria Riverfront Vane Shear Data	C-7
C-4	Sediment Embankment Bearing Capacity	C-13
C-5	Peoria Riverfront Settlement Analysis	C-14

Figures

No.	Title	Page
C-1	Water Content Versus Undrained Shear Strength	C-9
C-2	Geotextile Container Design	C-18

Plates

C-1 Boring Locations
C-2 Boring Logs I
C-3 Boring Logs II
C-4 Boring Locations II
C-5 Boring Logs III
C-6 Boring Logs IV
C-7 Gradation Curve, Boring PL-01-04
C-8 Gradation Curve, Boring PL-01-05
C-9 Gradation Curve, Boring PL-01-06
C-10 Dredge Cut Slope Stability Analysis
C-11 Sediment Embankment Slope Stability Analysis
C-12 Sediment Embankment Slope Stability Analysis
C-13 Erosion Protection Design
C-14 Erosion Protection Design
C-15 Sand Embankment Slope Stability Analysis

PEORIA RIVERFRONT DEVELOPMENT
(ECOSYSTEM RESTORATION) STUDY, ILLINOIS
FEASIBILITY REPORT WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX C
GEOTECHNICAL CONSIDERATIONS

PURPOSE

The study purpose is to evaluate the Federal and State interest in enhancing aquatic habitat and reducing sediment delivery and deposition within the Peoria Lakes. This appendix presents site geology and specific geotechnical analyses relevant to the study. To support the preparation of this appendix, Rock Island District, Engineering Division, Geotechnical Branch personnel reviewed literature, obtained soil borings, performed laboratory analysis and interpretation, and provided geotechnical analyses and recommendations.

LOCATION

The project study area is located in Peoria Lakes between Illinois River Mile 181.0 near Chillicothe, Illinois, and Peoria Lock and Dam at approximate River Mile 158.0.

PROJECT FEATURES

The proposed project features include the following:

Peoria Riverfront: Dredging and island construction upstream and downstream of McClugage Bridge.

PHYSIOGRAPHY

In central Illinois, glacial features are the major landforms of the flat topography of the lower Illinois River basin, generally that area below the city of Hennepin. Geologic evidence indicates that four glacial advances have occurred over what is now the State of Illinois. In order of occurrence, they were the Nebraskan, Kansan, Illinoian, and Wisconsinan glacial epochs. The two most recent glacial advances, the Illinoian and the Wisconsinan, are largely responsible for the uniform flatness that now characterizes much of the state. The basin is located in the Till Plains section of the Central Lowland physiographic province. The Galesburg Plain, Springfield Plain, and Bloomington Ridged Plain are subsections within the Till Plain. Peoria lies along the southwestern edge of the Bloomington Ridge Plain. This Plain includes the Wisconsinan glacial moraines and associated glacial topography. The altitude of land surface in the basin is generally from 600 to 800 feet above sea level. The area of greatest topographic relief is along the river valley, where elevation changes can range from 200 to as much as 400 feet near the confluence of the Illinois and Mississippi Rivers. The majority of the rest of the basin is extremely flat with less than 20 feet of relief. The distinctions in topography between the older Illinoian drift (Galesburg and Springfield Plains) and the Wisconsinan drift (Bloomington Ridged Plain) are the morainic ridges in the Wisconsinan drift areas. The morainic ridges are generally from 50 to 100 feet high, 1 to 2 miles wide, and 100 to 500 miles long. The moraines are separated by areas with more subdued, undulating or "rolling" topography. The type of bedrock divides the pre-glacial

physiographic provinces. Subsequent glacial deposits also are controlled by bedrock lithology and structure. The Illinois Basin is underlain by Pennsylvanian age deposits of carbonates, sandstones and shales with interbedded coals. In the areas where the Pennsylvanian Upland and Lowland are covered by the Illinoian drift, the surface topography reflects bedrock surface. The area covered by Wisconsinan drift reflects glacial depositional features. The various glacial advances were responsible for numerous drainage changes, which can be related in part to features of the bedrock topography. The lowlands are areas where the bedrock surface has been eroded below the surrounding area. The broad Havana Lowland was developed at the junction of three important ancient drainage ways, one of which was the ancient Illinois Valley where the project site lies. This pre-glacial valley was carved by the ancient Mississippi River before advancing glaciers to its more western present day course diverted it. This accounts for a valley that is too large for the present day river. This, in turn, results in many bottomland lakes along the lower valley.

GEOLOGY

Many geologic processes have shaped the drainage pattern of the Illinois basin. The bedrock distribution and topography affected subsequent glacial depositional processes, and glacial processes have strongly affected the hydrology of the basin. For example, at the beginning of the Pleistocene Epoch (approximately 1.7 million years ago, or 1.7 MYBP), the rivers and streams in Illinois were not deeply entrenched in bedrock, but Pleistocene glaciation diverted the Mississippi River to its present position and scoured the bedrock surface. In the Peoria area, the present Illinois River occupies the valley of the Ancient Mississippi River, and above Peoria the Illinois River became established in its present position during the later Wisconsinan glaciation.

BEDROCK GEOLOGY

The uppermost bedrock is mostly carbonate rock of Mississippian (325-360 MYBP) and Pennsylvanian age (280-325 MYBP). Mississippian and Pennsylvanian bedrock are present throughout Illinois, but in most areas it is concealed by recent unconsolidated deposits up to 500 feet thick. Many of the Mississippian- and Pennsylvanian-aged formations are made of cyclic beds of sandstone, siltstone, shale, limestone, coal, and clay. These rocks contain 1% to 2% of coal by volume. There are 75 identified coal beds in Illinois. The Herrin (Number 6) Coal Member of the Pennsylvanian Carbondale Formation, mined at two active underground mines in Illinois, ranges from 200 feet below land surface in the northern and western part of the basin to 800 feet in Shelby County (southeastern part of the basin) and is mostly from 28 to 42 inches thick. Coal beds range from 0 to 150 feet thick. The Mississippian bedrock is mostly shale and limestone. The altitude of the bedrock surface changes as much as 600 feet across the basin. Erosion, prior to and during glaciation, from large rivers and tributaries cut two major bedrock valleys that dominate the bedrock topography—the Mahomet system from the east and the Ancient Mississippi system from the north. The pre-glacial Illinois Valley was part of the ancient Mississippi River. The Princeton Buried Bedrock Valley is a large bedrock valley that connects to the Illinois River Valley in the northern part of the area in and near Bureau County. The bedrock valleys are filled by overlying glacial drift. The time of formation of the bedrock valleys is not well defined. The glacial materials in these valleys are some of the most productive aquifers in the basin. The Illinois and Mackinaw Buried Bedrock Valleys underlie the present Illinois River.

GLACIAL GEOLOGY

About 15,000 years ago, the ice from the Wisconsinan glaciation covered most of the northern and east-central parts of the state. It is this glaciation that was responsible for the system of moraines in east-central and northeastern Illinois. The area occupied by the Wisconsinan ice sheet corresponds to what would later become the Grand Prairie. This was the first major expanse of grassland encountered by the settlers after leaving the heavily forested areas of the eastern states. About 12,000 years ago, the climate became warmer and the glaciers began to melt and retreat, forming very large glacial lakes; moraines near the present site of the City of Kankakee contained several of these. As the glaciers continued to melt, the water eventually cut through the moraines and cascaded down what is now the upper Illinois River Valley, resulting in a huge flood known today as the Kankakee Torrent. The waters of the Kankakee Torrent carried tremendous volumes of sand and gravel downstream to the "Big Bend" at Hennepin where the river channel is narrow and entrenched in bedrock. Below Hennepin, where the river valley widens, the water lost its velocity and the sand and gravel was deposited. Moraines are the dominant landform in the northeastern part of the area. The glacial deposits range from 50 to 500 feet thick and are thickest in buried bedrock valleys. The sands and gravels deposited by glacial streams are thick aquifers near the bottom of the valley. The stratigraphic relation of glacial deposits is complex because of different modes of deposition, multiple sources, and lack of regional continuity. Areal distribution of formations and members within formations is generalized because boundaries are inter-tongued and often indistinct. The Wedron Group is the most extensive till unit of Wisconsinan age in the basin, and the type section is largely till with numerous interbedded deposits of outwash gravel, sand, and silt. Other formations with type sections within the area include the Morton and Peoria Loess, which are silty and sandy formations of Wisconsinan age. Major deposits of loess were formed during Wisconsinan glaciations as silt and fine sand was blown from the bottomlands and deposited on adjacent bluffs and uplands. On the bluffs, southeast of the broad lowlands in the Havana area, loess accumulated to nearly 100 feet thick, but elsewhere it is not as thick.

SOILS

Parent materials, climate, plants and animals, topographic relief, and time determine the development of soils. The soils in the Illinois Basin developed mostly in thick loess with some thicknesses greater than 60 inches. Thinner loess (10-40 inches) soil is found in the northeastern part of the basin. Soils developed on sandy to clayey alluvial sediments are found near major streams. The humid, temperate climate of Illinois is conducive to the weathering of soil, formation of clay, and movement of leached chemical constituents downward in the soil profile. Tills commonly weather to depths of 5 feet and sometimes to a maximum depth of 15 feet along soil discontinuities. Most soils in the basin are mollisols, which are dark-colored soils formed under grass vegetation. Mollisols average more than 1% organic matter. The native prairie vegetation under which soils form contributed to the high accumulation of organic materials, which is valuable to agriculture because of the capacity to store water and nutrients. The areas that are not mollisols are along stream valleys where the light-colored alfisols formed under forest vegetation.

Soil type and distribution are two factors that affect the amount of soil erosion that results in sedimentation of lakes and reservoirs. Rates of soil erosion of up to 2% per year of farmland soil have been measured. Sedimentation from soil erosion is particularly serious in Illinois for three reasons: (1) The loess materials blanketing a large part of the state are highly erodible by water, even on the gently sloping land that covers most of the state; (2) under conventional tillage practices for corn and soybeans, the primary crops leave little residue on the surface for much of the year; and (3) rainfall in Illinois is fairly high in the spring when little vegetative cover is present on cropland. Variations in precipitation and temperature may occur in any year because the basin

is far from large physical features, such as oceans or mountain ranges, that modify regional weather patterns. Precipitation is normally 35-38 in/yr. In 1993, many Midwestern states set records for annual precipitation, which resulted in massive flooding. Heavy, sustained precipitation in early spring through October contributed to the wettest year on record for Illinois with 50 inches as the state-wide average precipitation for the year. The previous record was 49.5 inches, which was set in 1927. Precipitation ranged from 50% to 70% above the long-term average across the state. The major sources of sediment are watershed, streambank, and bluff erosion, which result, in part, from agricultural land-use practices. Bluff erosion has produced major deltaic intrusions into the valley such that in some places the river has been pinched into a very narrow channel. Deltas produced by Ten Mile Creek and Farm Creek are two such examples of relatively small bluff streams producing sufficient sediment to virtually block the entire valley. These deltas are composed of the relatively coarser fraction of the till and loess source material and are thus mostly sands and gravels. These deltas are responsible for the formation of Upper and Lower Peoria Lakes.

SUBSURFACE EXPLORATION

Subsurface exploration was done to obtain foundation and borrow material samples for determination of their engineering characteristics. All subsurface exploration was done in accordance with Engineer Manual 1110-1-1804.

Personnel from the Rock Island District's Geotechnical Branch performed subsurface exploration during three different time periods as the project feature scope evolved. Six offshore borings were taken in July 2000, three offshore borings were taken in March 2001, and seven hand auger borings were taken on two separate days in May 2001. The hand augers were taken with a 4-inch Iwan auger. The offshore borings were taken with a CME-55 mounted aboard a Rock Island District work barge. These borings were advanced with a 3.5-inch hollow stem auger and a 2-inch split spoon sampler. The boring locations are shown on plate C-1 and the logs are shown on plates C-2 and C-3.

In the event that sand borrow is needed for this project, it would likely be taken from the Ten Mile Creek delta, which lies an average of 1,500 feet upstream of the northern end of the project (see PL-01-5 and PL-01-6). Hydraulic dredging of sands underlying the immediate project area is unlikely due to the amount of fine sediment overlying these sands in the area that was explored.

McClugage Bridge (U.S. 150) transects the Peoria Riverfront project area. Illinois Department of Transportation contract drillers performed the pier foundation exploration for McClugage Bridge. Locations and logs of these borings are shown on plates C-4 through C-6.

The exploration of proposed Peoria Riverfront dredging areas lying nearer to shore was not accomplished due to water depths of only 2 to 3 feet at "normal" river stages. The borings done for McClugage Bridge indicate that the thickness of the fine sediment lying on the surface may be less near the shoreline than that found in the borings taken near the navigation channel (PL-00-1 through 6 and PL-01-01 through 3). Additional subsurface exploration of these "near-shore" areas is anticipated during mid 2002.

LABORATORY TESTING

The results of the laboratory testing are listed with each individual boring log. All laboratory testing on samples taken from the borings located and shown on plates C-1 through C-3 was done in accordance with Engineer Manual 1110-2-1906.

PEORIA RIVERFRONT

Samples taken from borings PL-00-1 through 6 and PL-01-1 through 3 (Lower Peoria Lakes sediment) consisted largely of organic clays (CH-OH and CH). These borings were taken from the sediment surface to depths of approximately 25 feet. The sediment in this upper layer may be used to build sediment confinement embankment and it will form the immediate foundation of all sediment confinement structure options. Atterberg limit testing done on samples from these borings generally plotted very near the "A" line. The average of nine liquid limit and plastic limit tests done on these borings is shown below in Table C-1.

TABLE C-1 Peoria Riverfront Atterberg Limit Data

Boring	w(%)	LL	PL	PI
PL-00-1	44	56	23	33
PL-00-2	73	72	33	39
PL-00-2	79	70	33	37
PL-00-3	78	72	32	40
PL-00-3	49	62	24	38
PL-00-5	73	69	31	38
PL-01-1	89	65	32	33
PL-01-1	54	71	31	40
PL-01-2	83	88	35	53
Averages	**69**	**69**	**30**	**39**

The average water content of all samples taken from these borings was 69% and the average coarse fraction was 11%. The soils were very soft when handled in the lab, and blow counts ranged between 0 and 3 throughout the depths of these borings.

Bucket samples taken from borings PL-01-1 and PL-01-2 were sent to an independent laboratory for column settling analyses. Results of these analyses will be used to estimate the various sediment confinement structure option capacities in the event that hydraulic dredging is chosen as the most cost-effective method to move fine sediment.

The borings taken for McClugage Bridge (plates C-5 and C-6) range in depth between 65 and 75 feet. The upper 70 feet generally consist of various sediment layers. The layers vary between soft, silty clays, organic silts, organic clays, silty sand, sand, and gravel. Soft organic clays and silts dominate the upper 25 feet, which is consistent with the soil characteristics found in borings PL-00-1 through 6 and PL-01-1 through 3. The lower 45-foot-deep layer consists of approximately 50% soft silty clays and clayey silts and 50% sands and gravels. Dense shale bedrock is generally found at a depth below 65 feet from the surface. The average moisture contents of the organic silts and clays found in the upper 25 feet of the McClugage Bridge borings are in general agreement with those derived from the more recent sampling done by Rock Island District personnel (69%). Atterberg limit testing was not done on the McClugage Bridge samples. Q_u testing done on samples taken from the upper 25 feet of these borings indicates an average unconfined compressive strength of 1,250 psf (ranging between 600 and 2,000 psf).

Samples taken from borings PL-01-4 through 6 (Farm Creek delta borrow and Ten Mile Creek delta borrow) were identified as coarse to fine sands (see Table C-2).

TABLE C-2 Grain Size Analysis of Sediment Samples

Percent Finer by Weight

	SAMPLE NUMBERS:	PL-01-4	PL-01-5	PL-01-6
	1 1/2"			
S	3/4"	100.0%		
I	3/8"	99.9%	100.0%	100.0%
E	#4	99.2%	99.6%	95.3%
V	#10	97.8%	98.5%	82.6%
E	#16	96.1%	98.1%	71.2%
	#30	90.5%	95.6%	54.1%
S	#40	79.6%	83.1%	42.8%
I	#50	42.8%	42.8%	27.9%
Z	#70	11.8%	12.8%	14.6%
E	#100	3.2%	3.4%	7.2%
S	#200	0.2%	0.7%	1.5%
	CLASSIFICATION:	SP, MEDIUM TO FINE SAND	SP, MEDIUM TO FINE SAND	SP, COARSE TO FINE SAND, TRACE GRAVEL

Grain size analyses done on samples from these borings indicate a D_{10} size ranging between 0.18 and 0.20 (see plates C-7 through C-9). Blow counts were not recorded in these borings due to the drilling method employed. However, at the time of sampling, these soils were observed to be of generally medium density.

STRATIGRAPHY/SITE CHARACTERIZATION

PEORIA RIVERFRONT

The borings taken in the Peoria Riverfront sediment indicate an average surface elevation of 438.0 IL State Plane Coordinate System (NAD 83). The upper 15 feet of sediment generally consists of soft clayey silts and silty clay (CH-OH and CH). Clay, silt, sand, and gravel layers of varying thickness comprise the underlying sediments to approximate elevation 370, where shale bedrock is encountered.

The calculated in situ saturated density and void ratio of the upper 25 feet of sediment, based on the average in situ water content, was 98 pounds per cubic foot (pcf) and 1.86, respectively.

Vane shear tests were taken on the sediments at the time borings PL-01-1 through 3 were taken. The vane shear testing was done on the sediments ranging in depth between 5 and 9 feet in accordance with procedures outlined in ASTM D2573 - Standard Method for Field Vane Shear Test in Cohesive Soil. The testing was done on the sediment at these depths since the project features will be excavated in, built on, and may be built using this surficial material. The test results are shown below in Table C-3, and indicate an average undrained strength of 219 pounds per square foot (psf). To provide a value of undisturbed shear strength comparable to that provided by laboratory tests on undisturbed samples, a correction factor can be applied as outlined by Duncan (page 58). Application of this factor results in a corrected undrained shear strength of 200 psf. For purposes of the sediment embankment stability, sediment foundation stability, and sediment foundation bearing capacity analyses performed in this appendix, the undrained shear strength of the Peoria Lakes sediments is taken as 200 psf. This is considerably lower than the unconfined strengths found for the samples taken from the upper 25 feet of the McClugage Bridge borings (1250 psf). However, the analyses for this appendix are done using the most conservative sediment characteristics.

TABLE C-3. Peoria Riverfront Vane Shear Data

ASTM D2573 **S=3T/28pir^3**

					Remolded
Boring	**Depth (ft)**	**T**	**Su (psf)**	**T**	**Su (psf)**
PL-01-01	5	250	153	175	107
PL-01-01	9	525	322	220	135
PL-01-02	5	230	141	110	68
PL-01-02	7.5	400	246	180	110
PL-01-03	5	300	184	150	92
PL-01-03	7.5	440	270	220	135
		AVG=	**219**	**AVG=**	**108**

Characteristic residual shear strength was obtained using Bovis' correlation between plasticity index and residual angle of internal friction shown in Duncan, page 89. The residual shear strength of the sediments is taken as 15 degrees.

The Illinois River water surface typically lies 2 feet above the top of the sediments, or elevation 440.0.

Additional discussion of soil strength relevant to specific project features will be provided below under the *Project Features Design* sections of this appendix.

Based on borings taken for McClugage Bridge, the sediments will be taken as 70 feet thick. For purposes of settlement design, the 70-foot-thick sediment layer will be considered to consist entirely of soft silty clay and doubly drained (due to the presence of porous layers throughout).

The sand borrow is characterized with a density of 120 pcf and an angle of internal friction of 34 degrees when placed as sediment confinement embankment.

Additional discussion of soil strength relevant to specific project features will be provided below under *Project Features Design* sections of this appendix.

PROJECT FEATURES DESIGN

PEORIA RIVERFRONT

General

Several alternatives were considered for construction of the project features at the Peoria Riverfront site. Deepwater habitat construction will be accomplished by a combination of mechanical, hydraulic, and/or "high solids" dredging techniques. Detailed drawings of proposed deepwater habitat are found in the main report. The sediments removed by dredging will be used to construct islands near the deepwater habitat sites.

The general scenario for construction of the islands will be to first construct sediment confinement structures. The sediment confinement structures will be built by: (1) placing mechanically dredged fine sediments to form a confinement embankment; (2) placing hydraulically dredged coarse sediments taken from nearby sand deltas to form a confinement embankment; and (3) placing geotextile containers filled with dredged sediments to form a sediment confinement structure. Detailed drawings of all sediment confinement options are found in the main report.

After construction of the sediment confinement structures, fine sediments will be placed within the confinement structures to form the islands. The purpose of the main report is to evaluate the relative benefits of varying the number and sizes of islands and the quantities of dredging and the habitat benefits gained with each scenario. The purpose of this appendix section is to evaluate the feasibility of deepwater habitat dredging and the various methods of sediment confinement structure and island construction.

Deepwater Habitat

General

As previously noted, deepwater habitat will be constructed by hydraulic, mechanical, and/or "high solids" dredging. If mechanically dredged fine sediment is the preferred alternative for construction of sediment confinement embankments, then the excavation of these sediments will create part of the deepwater habitat. Regardless of the method chosen to construct sediment confinement, deepwater habitat will be created by dredging of fine sediments into sediment confinement structure(s). The main geotechnical concerns for construction of deepwater habitat are the slope stability of these excavations in fine sediment and the proximity of the excavations to sediment confinement structures.

Slope Stability

The stratigraphy at the Peoria Riverfront site was characterized previously in this appendix. The fine sediment undrained shear strength was taken as 200 psf. Selection of undrained strength is considered appropriate for this application, since the sediment is normally consolidated. Normally, consolidated clays develop positive pore water pressures upon unloading, as opposed to over-consolidated clays, where the opposite is true. Increased pore water pressure induces a decrease in effective strength, and the undrained strength is the most critical for this analysis. An idealized dredge cut section was developed to determine stability using the UTexas4 slope stability package. The dredge-excavated slope was analyzed in accordance with Engineer Manual 1110-2-1902 and will not be subjected to pool fluctuation, seepage, or earthquake forces. The stability analysis resulted in a factor of safety against sliding for the 4H:1V cut slopes of 1.42. The UTexas4 program was run in the search mode, and numerous other surfaces were calculated, but only the model scenario depicted on plate C-10 and is considered relevant.

Non-uniform, or "stepped," dredge cuts and associated minor surface sloughing is expected to occur during dredging of the deepwater habitat. However, "stepped" dredge cuts are not expected to affect the overall stability of the deepwater habitat slopes.

The top of the excavated slope should be placed no closer than 30 feet from the outer toe of the sediment confinement structure(s) in order to avoid influence on both the confinement structure(s) and the dredge cut stability.

Sediment Confinement Structures

General

As discussed above, sediment confinement structures will be constructed by placement of mechanically dredged fine sediment, hydraulically dredged sand, or sediment-filled geotextile containers. The geotechnical feasibility of the alternatives is evaluated by addressing the stability, bearing capacity, settlement, and erosion protection characteristics of each alternative. Selection of the preferred sediment confinement structure alternative will be made based on overall cost and benefit analyses for each alternative.

Sediment Embankments

General. Sediment embankments will be constructed to heights of up to 12 feet by mechanical dredging fine sediment using large clamshell (7 cu yd or greater) excavation. Clamshell dredging is the best way to construct embankment with soft sediments in the river in order to maintain what little strength already exists in the soil. However, constructing embankment in the river with soft sediments and placing the material in the water is very difficult and not an ideal situation.

None of the embankment will be compacted by conventional construction techniques. Sediment embankment strengths were difficult to estimate due to the nature of the proposed placement method. Shear strengths may vary between residual and unconsolidated-undrained. The undrained sediment shear strengths described above in the *Stratigraphy/Site Characterization* section are considered applicable for sediment embankment design since generally undisturbed foundation soils would be used to build the embankment. Residual shear strengths for sediment embankment design were also considered, since the soil would be at least partially disturbed and remolded by the dredging operations, and failure could potentially occur between clamshell sediment placements.

Placement of sediment embankments by large clamshell has been accomplished at the Peoria Lake Enhancement project site, located approximately 13 miles upstream of the Peoria Riverfront site. The geotechnical design for the project is included in the *References* section of this appendix. It is considered useful here to discuss the design and construction of the Peoria Lake project as a model for the design of the Peoria Riverfront sediment embankments. The foundation sediments at the Peoria Lake site were characterized as a three-layer system using vane shear data—the upper 5-foot-thick layer ("fluff") assigned a 50 psf undrained strength, the second 15-foot-thick layer assigned a 320 psf undrained strength, and the foundation assigned a 600 psf undrained strength. The upper weak 5-foot-thick layer was excavated and sidecast prior to placement of the 12-foot-high embankment on the lower 320-psf material (the lower 320 psf material was also used to build the embankment). Construction of the majority of the 6H:1V-sloped embankment was completed successfully in three passes (contrary to original design, which recommended two passes based on bearing capacity). The contract also required a 30-day minimum wait between passes to enable consolidation and strength gain. The average liquid limit of the 320 psf material was 54%, and the average water content was 41%.

In contrast, the sediments at the Peoria Riverfront site are weaker (as previously characterized in this appendix). Peoria Riverfront sediment is uniformly characterized with average liquid limit of 69% and average water content very near the liquid limit.

Peoria Riverfront will be built by first removing the upper 2 to 3 feet of weak "fluff" type sediment from the deepwater habitat excavation areas and sidecasting it to a position approximately 20 feet from either side of the excavation. The underlying material will then be excavated from the deepwater habitat areas and used to build the sediment embankment. The embankment will be placed during two separate construction seasons, with at least 30 days between the two 3-foot-tall lifts planned for each season. The material that was sidecast at Peoria Lake was expected to erode. However, it has not eroded as badly as expected, and has served as wave protection

for the embankment that was eventually built. The sidecast material at Peoria Riverfront is expected to behave in much the same way.

Stability. The slope stability package UTexas4 was used to determine sliding factors of safety of the Peoria Riverfront sediment embankment and foundation. Two soil strength scenarios were modeled: (1) undrained strength of 200 psf for both the foundation and embankment, and (2) undrained strength of 200 psf for the foundation and residual strength of 15 degrees for the embankment. These strengths are consistent with those described in the *Stratigraphy/Site Characterization* section of this appendix. The UTexas4 program was run in the search mode and numerous failure surfaces were examined, but the model scenarios depicted on plates C-11 and C-12 are considered the most critical. These scenarios both resulted in a sliding factor of safety of 1.07. The tiered embankment cross section shown in the main report plates is expected to result in a more conservative safety factor.

The overall embankment strength can be preserved by various construction techniques. The contractor will not be allowed to "throw" the material from the clamshell, but must "place" the clamshell and then release the material in order to preserve the maximum strength of the sediment. The 3-foot-tall embankment lifts should be built starting at the inside of the embankment footprint and working outward. In this way the embankment load will be applied as uniformly as possible, and soft "fluff"-type soils will be progressively pushed outward from beneath the embankment. Instantaneous isolated embankment and shallow foundation failures can be expected due to the unpredictable nature of the sediment strength and placement method. Embankment and foundation soils should gain strength and greater stability with time as the cohesive soils are allowed to consolidate and drain.

As discussed previously, sediment embankments should be placed no closer than 30 feet from deepwater habitat dredge cuts to avoid stability failures both features.

Bearing Capacity. The bearing capacity of the entire maximum 12-foot-high sediment embankment placed on the sediment foundation is approximately modeled by the previous stability analysis. In accordance with Engineer Manual 1110-2-1905, hand calculation of the 12-foot-high sediment embankment load spread over the embankment footprint results in a bearing capacity safety factor in excess of 1.5 for the embankment foundation. As the embankment is built, the upper 3 feet of soft material ("fluff") is expected to be pushed laterally from beneath the embankment to form a small mud wave on either side of the embankment. The "fluff" displacement will end once the lower portion of the embankment founds on competent foundation sediment (at least 200 psf unconfined strength). However, whether or not the lower portions of the sediment embankment can support the additional loading required to build the embankment to its maximum height requires additional analysis. Taking 100 psf as the sediment embankment strength (remolded), Table C-4 shows bearing capacity safety factors for sediment placed at different heights. It is seen that at heights of between 5 and 6 feet, bearing capacity failure can be expected within the lower portions of the embankment. Accordingly, it is recommended that the sediment embankment be built in two passes over two construction seasons. In this way, the lower one half of the embankment will have time to regain some of the strength it lost due to the placement process, to dewater, and to gain more strength due to consolidation.

TABLE C-4 Sediment Embankment Bearing Capacity

Depth (ft)	qallow	FS
1	98	5.24
2	196	2.62
3	294	1.75
4	392	1.31
5	490	1.05
6	588	0.87

cohesion (psf)=	100
qult=(5.14)*(cohesion)=	514

Settlement. The 70-foot-thick sediment layer was previously characterized as a homogeneous layer of soft silty clay for purposes of settling characteristics. The layer is modeled with double-drainage at 10-foot-thick increments since porous layers are found consistently throughout the entire layer. The settlement analysis was done in accordance with Engineer Manual 1110-1-1904, and is shown below in Table C-5. Table C-5 shows that 75% of the 4-foot total settlement will occur in less than a year under a 12-foot-high sediment embankment load. Since the soils in the sediment layer vary widely, some differential settlement can be expected. Also, since approximately 25% of the entire layer consists of porous material, a reasonable estimate of 12-foot-high embankment load settlement is 2 feet within the first year and an additional 1 foot during the next 12 to 15 years. In addition to embankment foundation settlement, the quantity of material required for sediment embankment construction should include consideration of the displaced 3-foot-thick "fluff" layer mentioned previously and desiccation and consolidation of the embankment itself. Sediment embankment desiccation and consolidation is estimated at 10%.

It should be noted that this analysis applies only to settlement beneath the sediment confinement structure embankment. The settlement and desiccation of hydraulically dredged material placed within the sediment confinement structure will be addressed separately under the *Sediment Confinement Structure Capacity* section of this appendix.

Settlement plates placed at various locations along and within the sediment confinement structures will be required as part of the construction contract so that short-term and overall foundation settlement can be monitored.

TABLE C-5

Peoria Riverfront Settlement Analysis

Hc(ft)	po(psf)	S(ft)	Stot(ft)	t (days)	St (ft)
10	177	1.54	1.54	199	1.16
20	531	0.83	2.37	199	1.78
30	885	0.55	2.92	199	2.19
40	1239	0.39	3.31	199	2.48
50	1593	0.30	3.60	199	2.70
60	1947	0.20	3.81	199	2.86
70	2301	0.16	3.97	199	2.98

z (ft)	a/z	b/z	I	2I	2Ip (psf)
5	14.40	1.00	0.5	1	1049
15	4.80	0.33	0.46	0.92	965
25	2.88	0.20	0.42	0.84	881
35	2.06	0.14	0.37	0.74	776
45	1.60	0.11	0.34	0.68	713
55	1.31	0.09	0.27	0.54	566
65	1.11	0.08	0.25	0.5	524

INPUT

			Ccavg= 0.518027743
U(%)= 75	Tv= 0.478	Cv (ft^2/day)= 0.06	
e0= 1.82	LL (%)= 69	Cc= 0.518	
wn (%)= 70	Gs= 2.6	PI (%)= 39	
ht (ft)= 12	density (pcf)= 98	dp (psf)= 1049	
a (ft)= 72	b (ft)= 5	h2o depth (ft)= 2	

NOTES

vertical stress influence value calculation from NAVFAC, 1986, Design Manual 7.01, p.170)
initial void ratio and density calculated from insitu water content and SG (sat'd condition)
coefficient of consolidation estimated from LL correlation (NAVFAC Design Manual 7.01, p.144)
compression index taken as average of eight correlations (Das, 1995, Prin of Fdn Engr, p. 41)
pressure increase calculated from insitu density and confined disposal facility height
time/settlement calcs based on 1-D, single drainage (Das, 1995, Prin of Fdn Engr, pp. 42-50)
calculations checked by Sibte Zaidi, P.E., CEMVR-ED-G

Protection. Erosion protection will be required for the sediment embankments in select areas where wind- and vessel-generated waves are present. Whether or not the sidecast material placed on the sediment embankment foreshore is effective as wave erosion protection will be immediately apparent as construction of the sediment embankment proceeds. The construction contract can include an option for rock embankment protection if the need arises. Erosion due to river current is also expected, but current protection design is not addressed in this appendix (refer to the Hydraulics Appendix). The Automated Coastal Engineering System (ACES) design and analysis system was developed by the Coastal Engineering Research Center at the USACE Waterways Experiment Station. Its wave growth and rubble-mound revetment design applications were used to select a rock gradation and embankment slope able to resist the expected wave attack.

The Wind Adjustment and Wave Growth program calculated a wave height of 2.36 feet and a wave period of 2.86 seconds, as shown on plate C-13. Assumptions used in this analysis included a maximum observed wind speed of 80 mph, fetch depth of 8 feet, and a measured fetch length of 2 miles. Rock Island District's Geotechnical Branch personnel have previously experienced waves of this height at the project site. Using this wave height and period input, along with assumptions of 6H on 1V

embankment slope, toe depth of 2.7 feet, and a low damage tolerance level of 2, the Rubble Mound Revetment Design program calculated a suggested 0.85-foot-thick riprap layer with a top size of approximately 100 lbs. This is shown on plate C-14 and represents the minimum acceptable protection requirement. Illinois Department of Transportation (ILDOT) Gradation #4 erosion protection stone is the most commonly produced protection stone having a gradation that approximates the ACES output (ILDOT Gradation #4 has top size of 150 pounds). Since commercial and recreational vessels are also expected to generate waves, especially where the sediment embankments lie close to the channel, ILDOT Gradation #5 (top size 400 pounds) is recommended for use as wave erosion protection for the sediment embankments. ILDOT Gradation #5 has been used successfully in numerous similar Rock Island District projects on both the Mississippi and Illinois Rivers. The size distribution of ILDOT Gradation #5 dictates placement of a 24-inch-thick layer to ensure competent protection. A layer of geotextile fabric will be placed between the 6H:1V embankment and stone protection to prevent migration of material in either direction.

Final selection of embankment riprap gradation and thickness will be based on cost/benefit analysis, as well as the evaluation of the effect of the sidecast material as a breakwater, degree of embankment stabilization through natural vegetation, and degree of embankment stabilization through consolidation.

A 3-foot-high stone breakwater placed approximately 15 feet offshore is an alternative to protection stone placed directly on the sediment embankment. This alternative would also be built using ILDOT Gradation #5, and may provide economic and/or additional habitat benefit. Geotextile fabric would also be placed beneath the breakwater.

Another erosion protection option is to allow the sediment embankment to vegetate naturally. This method may not be as reliable as stone protection, but is worth consideration. The purpose of the project is to establish deepwater habitat. Some degree of sediment containment structure erosion may be acceptable once the structure has served its purpose of containing sediment.

Stone protection incorporated into the design should be constructed of materials with a prolonged service life. The District's Quarry File database was screened for possible suppliers of riprap or other rock products. There are no quarries in the Peoria vicinity that can produce riprap from rock units of acceptable durability. The nearest acceptable quarries are in Logan, La Salle, Scott, and Pike Counties. Material from the last three counties may possibly be shipped by barge on the Illinois River.

Selection of the recommended erosion protection alternative will depend largely on cost/benefit considerations.

Sand Embankments

General. Sediment confinement structures built using hydraulically dredged sand are an alternative to those built with mechanically dredged sediment. The strength characteristics of hydraulically dredged sands are more predictable than the weaker fine sediments for use in embankment construction. However, the sand embankment would similarly be founded on weak in situ fine sediment, and the deepwater habitat benefit gained by using the fine sediment found in the project area for embankment

construction would not be realized. The sand embankments will be built to heights of up to 12 feet. Sand sources for this type of construction are located nearby, at the mouths of Farm and Ten Mile Creeks.

Stability. The hydraulically dredged sand embankments that form the perimeter of the sediment confinement structure(s) will be built with 4H:1V interior slopes and 5H:1V exterior slopes. This configuration has proven effective in its resistance to both wave and through-seepage erosion in numerous Rock Island District applications. The slope stability package UTexas4 was used to determine sliding factors of safety for the sand embankment and foundation. Again, 200 psf undrained strength was taken as the foundation strength, and a friction angle of 34 degrees was taken as the sand embankment strength. The UTexas4 program was run in the search mode and numerous failure surfaces were examined, but the model scenario depicted on plate C-15 is considered to be the most critical. This scenario resulted in a sliding factor of safety of 1.265—slightly higher than that calculated for the sediment embankment.

Settlement. Although sediment confinement embankments built using sands will have slightly higher unit weights than those built with fine sediment, they will also be built on slightly steeper slopes. Manipulation of these variables shown in the Table C-5 spreadsheet resulted in slightly less settlement beneath sand embankments than beneath sediment embankments. It should again be noted that this analysis applies only to settlement beneath the sediment confinement structure embankment, and not the island interior.

In addition to embankment foundation settlement, the quantity of material required for sand embankment construction should include consideration of the displaced 3- to 4-foot-thick "fluff" layer mentioned previously.

The settlement and desiccation of hydraulically dredged material placed within the sediment confinement structure will be addressed separately under the *Sediment Confinement Structure Capacity* section of this appendix.

Protection. The ACES analysis discussed previously for the sediment embankments results in essentially the same wind- and vessel-generated wave protection requirements. ILDOT Gradation #5 protection stone and geotextile fabric will be used.

Rock groins are an alternative to protection stone placed directly on the sand embankment. Groins have proven to be an effective methodology for protection of sand embankments at the Pool 8 Islands project in U.S. Army Corps of Engineers St. Paul District. The groins are essentially breakwaters placed perpendicular to, and extending 30 to 40 feet from, the sand embankment. They are typically spaced at five times their length. This alternative would also be built using ILDOT Gradation #5, and may provide economic and/or additional habitat benefit. Geotextile fabric would also be placed beneath the groins.

Vegetative erosion protection will not establish in sand as readily as in fine sediment, and is therefore not an option for sand embankment erosion protection.

Selection of the recommended erosion protection alternative will depend largely on cost/benefit considerations.

Geotextile Containers

General. The use of geotextile containers as a third alternative for sediment confinement is also considered. Geotextile containers have been similarly applied elsewhere as described by Fowler (1994) for shoreline protection, dredged material disposal containment, breakwaters, scour protection, sedimentation prevention, and river training. The containers proposed for Peoria Riverfront would be approximately 7 feet high and 19 feet wide. They would be built by placing either hydraulically dredged sand or "high solids"-dredged fines into each individual container, and each container would be sequentially connected to form a sediment confinement structure. The geotextile selection is made based on the desired height of the structure and the forces exerted by the material placed in the container.

After placement of the geotextile container as a sediment confinement structure, adjacent fine sediments can be mechanically dredged to raise the confinement to a maximum height of 12 feet, depending on the required hydraulic dredging storage requirements. Stacked geotextile containers are not considered here due to a variety of factors, including foundation instability, internal container instability, and geotextile container "rolling" resistance.

A geotextile container design typical to what is proposed for Peoria Riverfront is shown in Figure C-2.

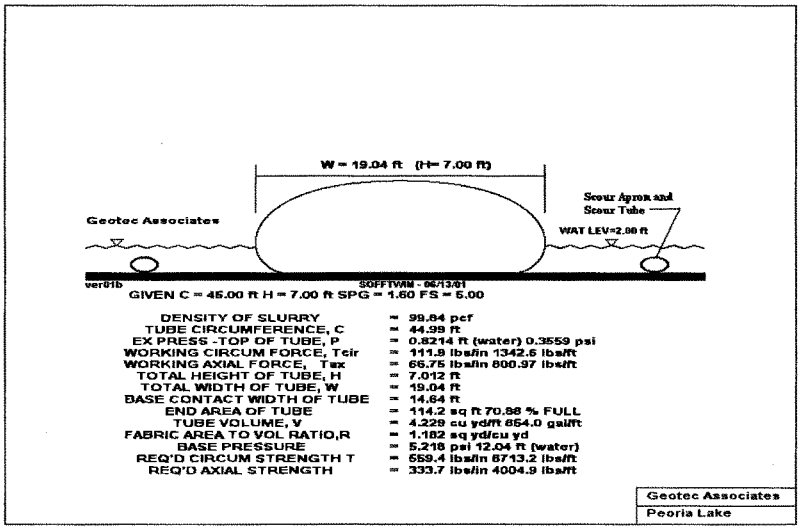


FIGURE C-2. Geotextile Container Design (Courtesy of Jack Fowler, Geotec Associates)

Bearing Capacity. As shown in Figure C-2, the base pressure (or allowable bearing pressure) of the geotextile container is 5.218 psi, or 751.4 psf. The ultimate bearing capacity of the sediment foundation is expressed as:

qult = cNc = (200)(5.14) = 1028 psf

The factor of safety for bearing failure of the geotextile container is expressed as:

FS = qult/qallow = 1028/751.4 = 1.37

Protection. The geotextile system selected to withstand the forces listed in Figure C-2 will be extremely durable. These types of systems have resisted waves, current, ultraviolet light attack, and vandalism for 10 or more years in a variety of harsh environments. The T. C. Mirafi-manufactured GC1000 *Geotube*, or its equivalent, is an appropriate product for this application. In the event that the geotextile containers will be covered by mechanically dredged sediment or otherwise protected, the less durable T. C. Mirafi GC500 *Geotube* (or equivalent) would be an appropriate choice. The selected geotextile container will be fabricated with a scour apron on both sides, as shown in Figure C-2. The scour apron will serve to protect the foundation from undermining due to wave and current erosion.

Sediment Confinement Structure Capacity

The outer perimeters of all sediment confinement structure alternatives were established by hydraulic analyses. However, the sediment confinement structures considered in this appendix will enclose areas of differing size since the structures have dissimilar cross-sectional geometry. Twelve-foot-high sediment confinement has been considered previously in this appendix due to the critical nature of this loading. However, a smaller confinement structure height may prove to be preferred due to cost/benefit analyses. Typical confinement design is accomplished by inputting a known volume of material to be dredged. The purpose of this study is to maximize the cost/benefit ratio. Therefore, the various confinement structure options are analyzed for final dredged material capacities (or quantity of deepwater habitat) so that a cost/benefit relationship can be established using this information.

Sediment confinement design is done using techniques described in EM 1110-2-5027, "Confined Disposal of Dredged Material." Hydraulically dredged sediment confinement design depends on many factors, including the previously described in situ sediment characteristics at Peoria Riverfront. The design methods described in EM 1110-2-5027, however, require additional input that is either unavailable or unknown at this time. Column settling analyses on bucket samples taken from borings in the project area were not complete at the time this appendix was written. Column settling test data are required to accurately design confinement options for the discrete, zone, and flocculent settling characteristics of the sediment. Also, at this feasibility stage of design, confinement height and dredging events and volumes (presumably contracted over the course of several years) have not been defined, and therefore cannot be incorporated into a final confinement design. The level and sequence of funding is unknown. Without this type of information, estimation of primary consolidation, secondary compression, and desiccation of sediment placed within the confinement during an undefined period of time is not practical. Detailed confinement design will be performed as final project scope and timing information is more specific.

A preliminary design factor of 1.10 will be used to describe the ratio of the volume dredged to the volume placed in confinement. This factor was obtained by weight/volume relationships assuming that the sediment will settle and desiccate to a final void ratio of 1.5 after it is hydraulically dredged into the confinement area. This factor is considered reasonably conservative and appropriate for this stage of design.

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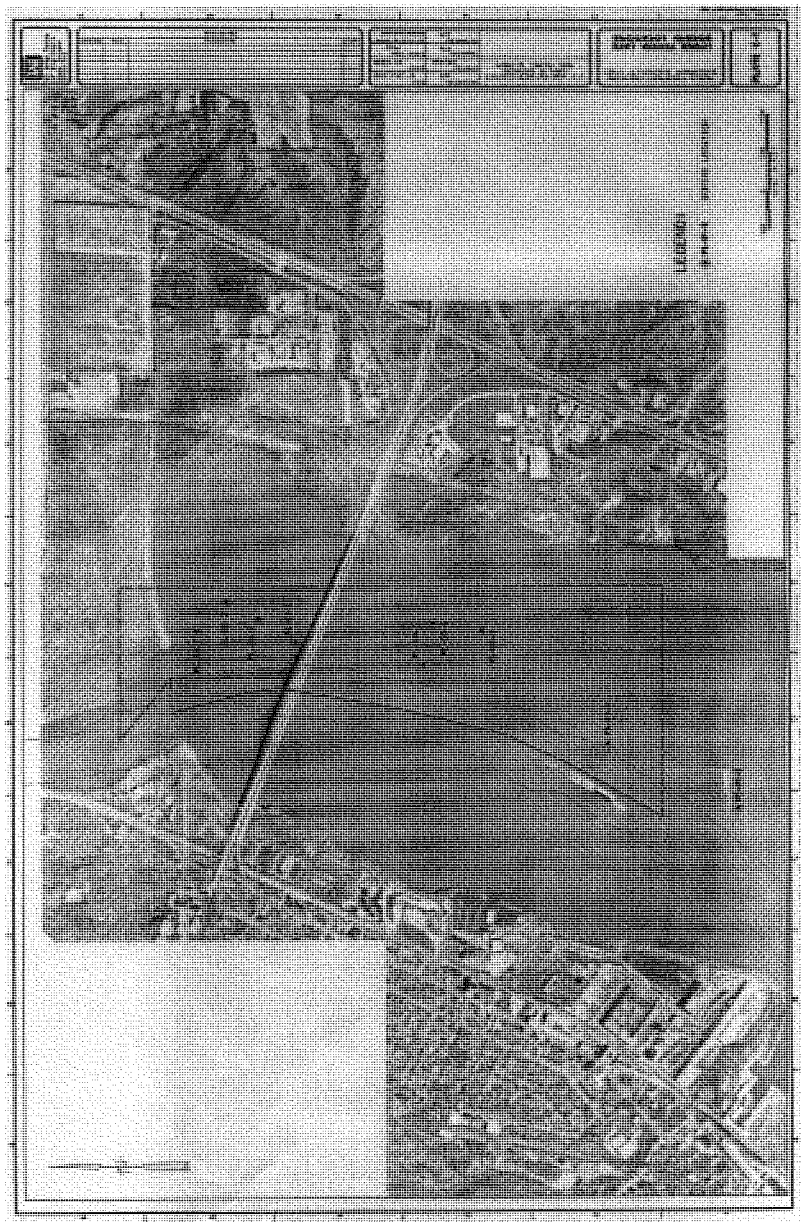
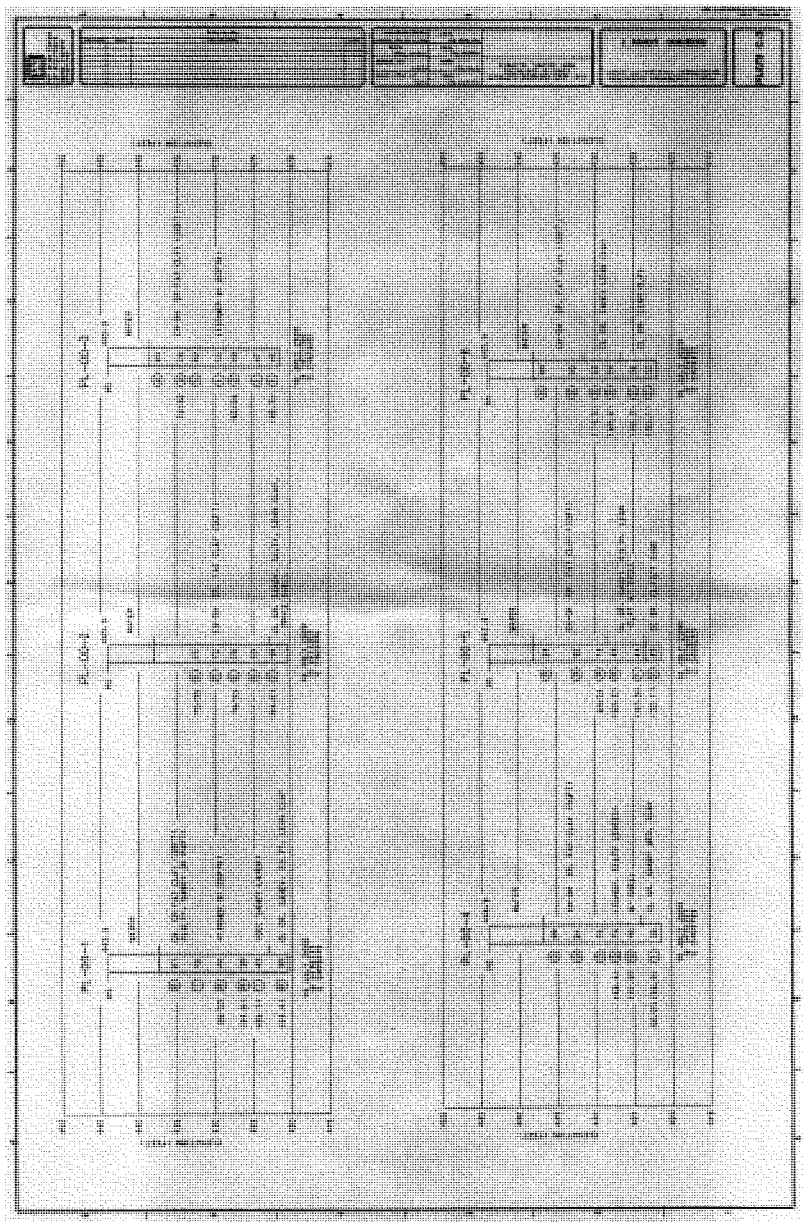
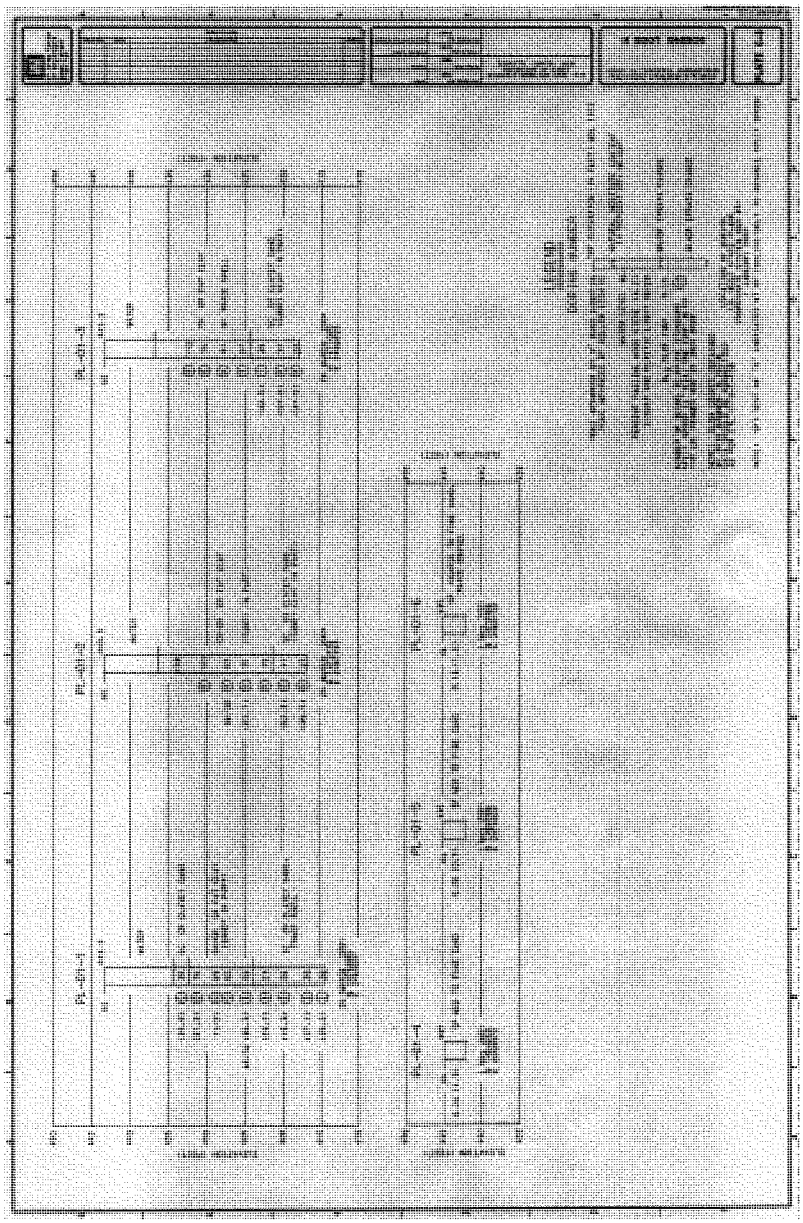
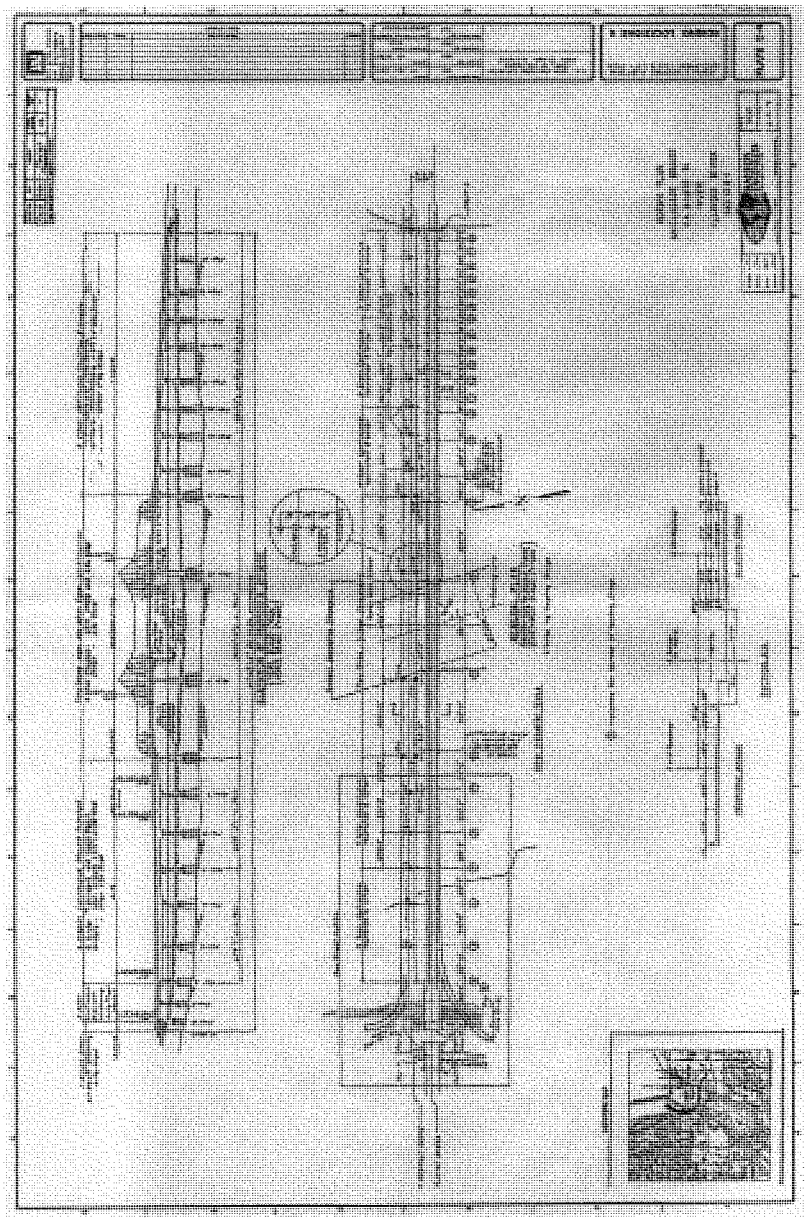
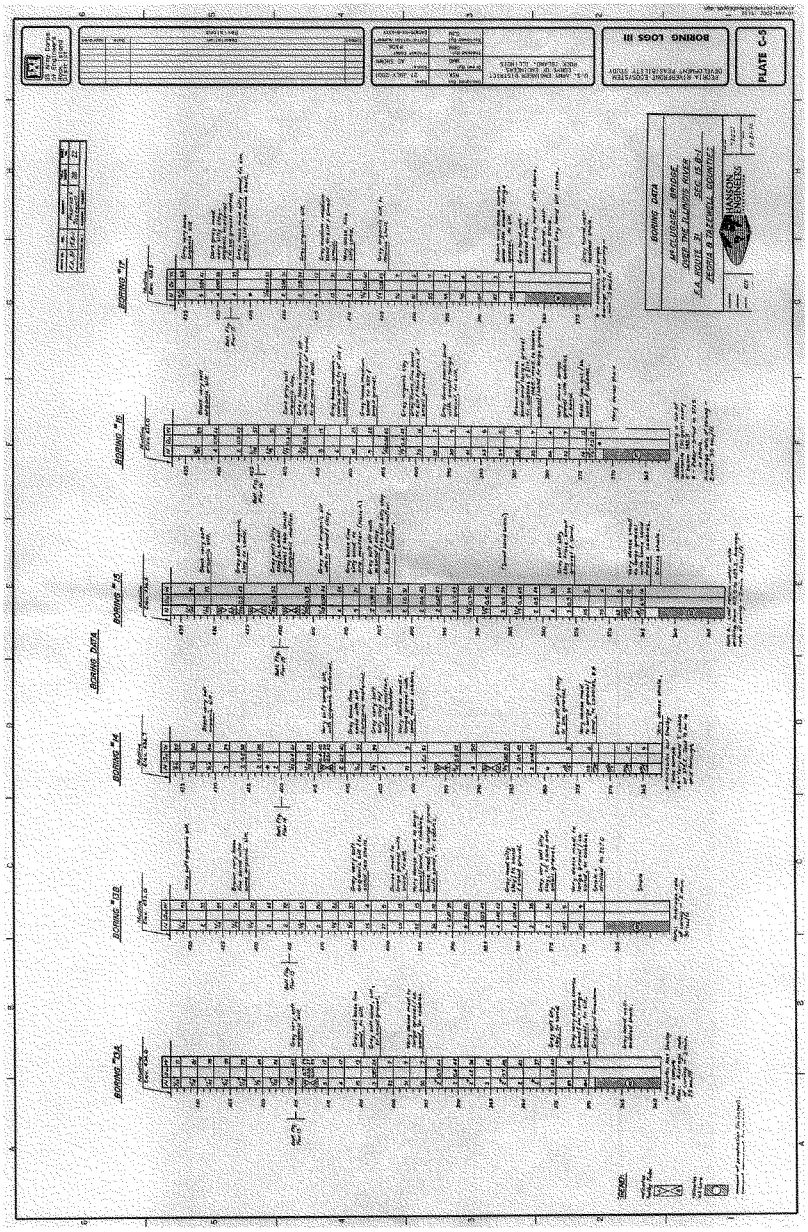
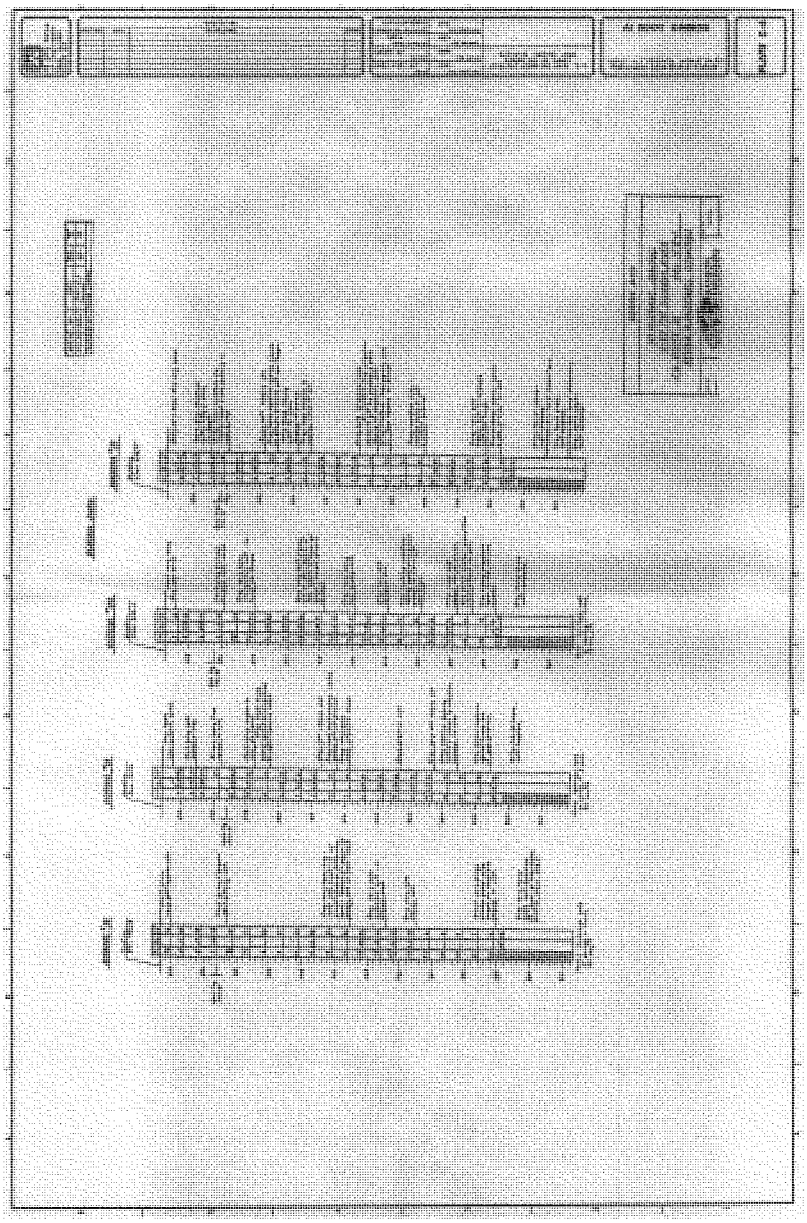












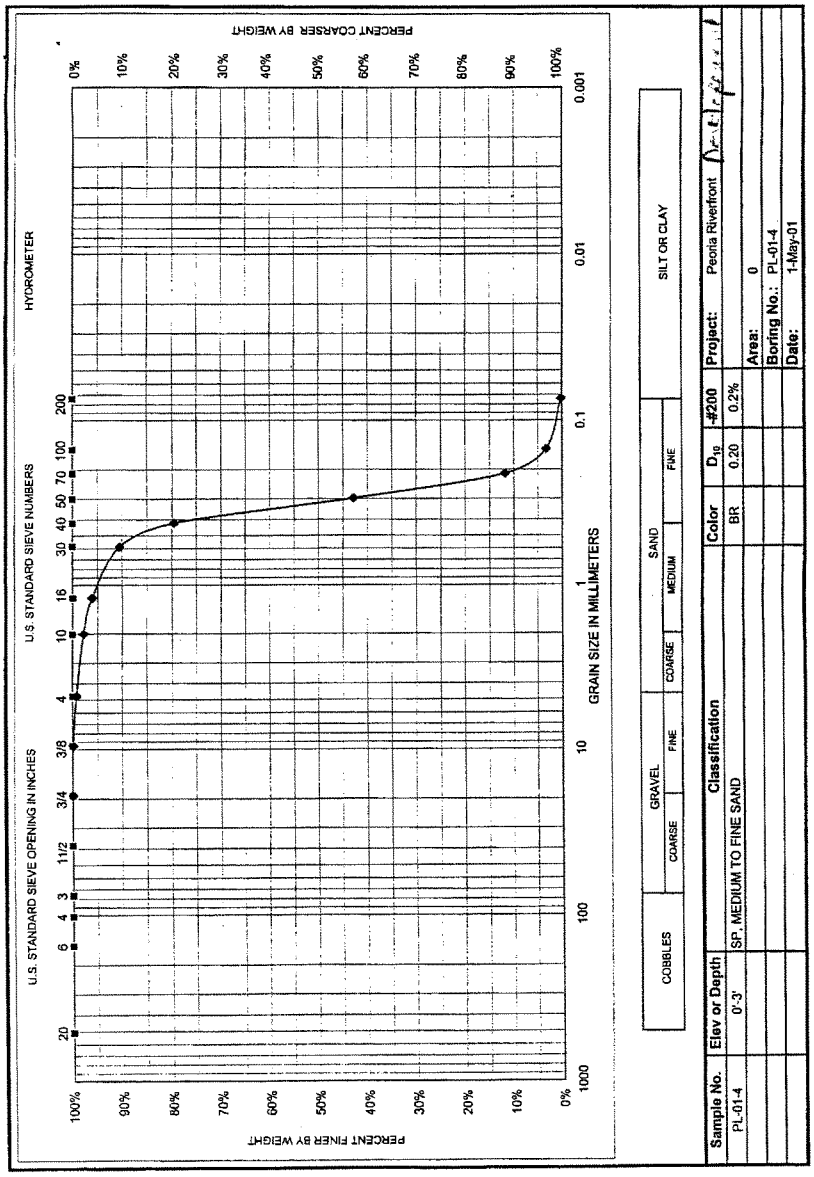
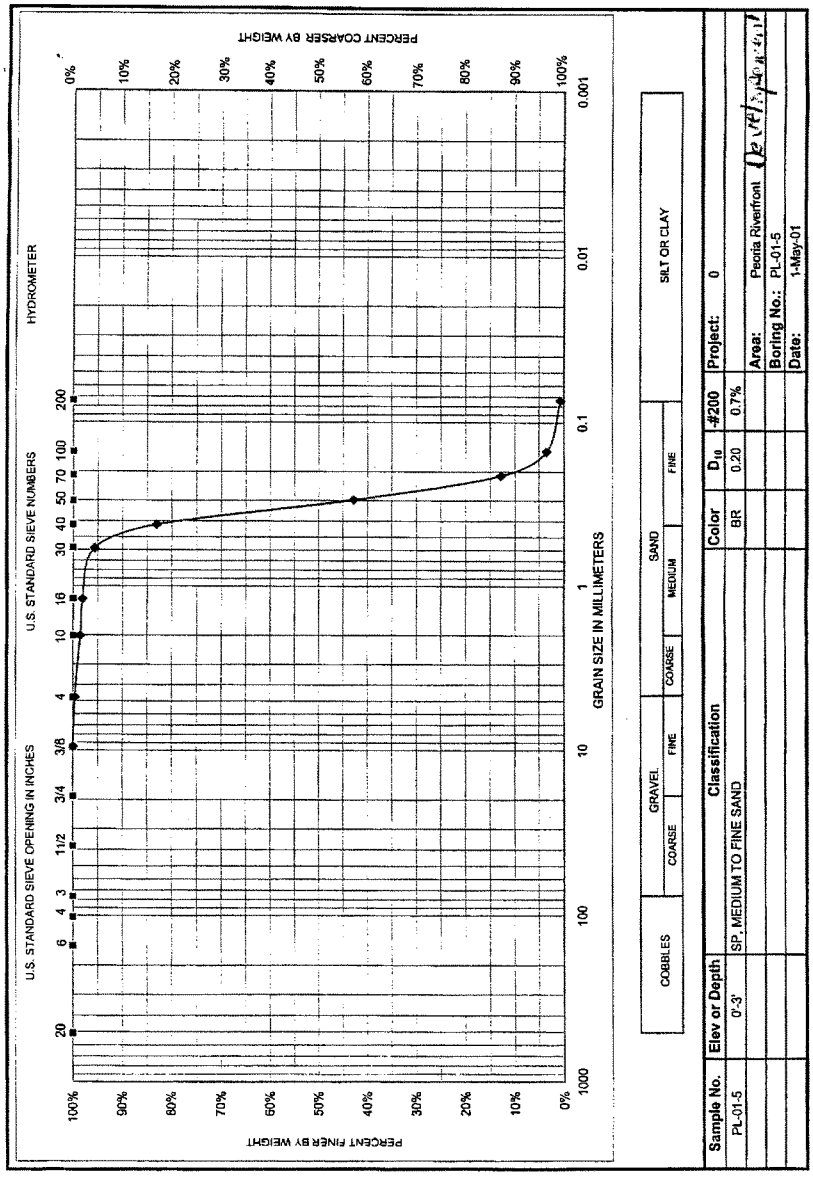
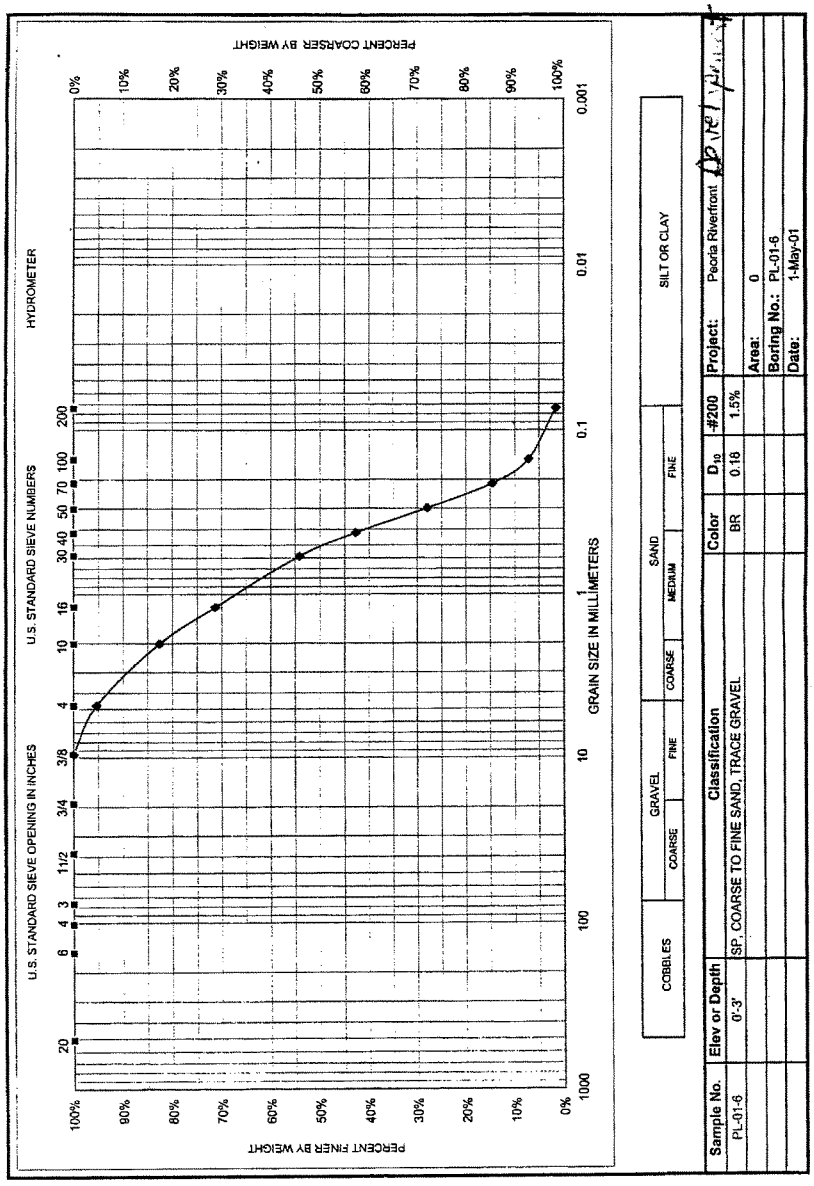

U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Color
D_{10}
-#200
PL-01-4
0'-3'
SP, MEDIUM TO FINE SAND
BR
0.20
0.2%
Project: Peoria Riverfront
Area: 0
Boring No.: PL-01-4
Date: 1-May-01

PLATE C-7



Sample No.	Elev or Depth	Classification	Color	D_{10}	#200	Project: 0
PL-01-5	0'-3'	SP, MEDIUM TO FINE SAND	BR	0.20	0.7%	Area: Peoria Riverfront
						Boring No.: PL-01-5
						Date: 1-May-01

PLATE C-8



Sample No.	Elev or Depth	Classification	Color	D_{10}	#200
PL-01-6	0'-3'	SP, COARSE TO FINE SAND, TRACE GRAVEL	BR	0.18	1.5%

Project: Peoria Riverfront
Area: 0
Boring No.: PL-01-6
Date: 1-May-01

PLATE C-9

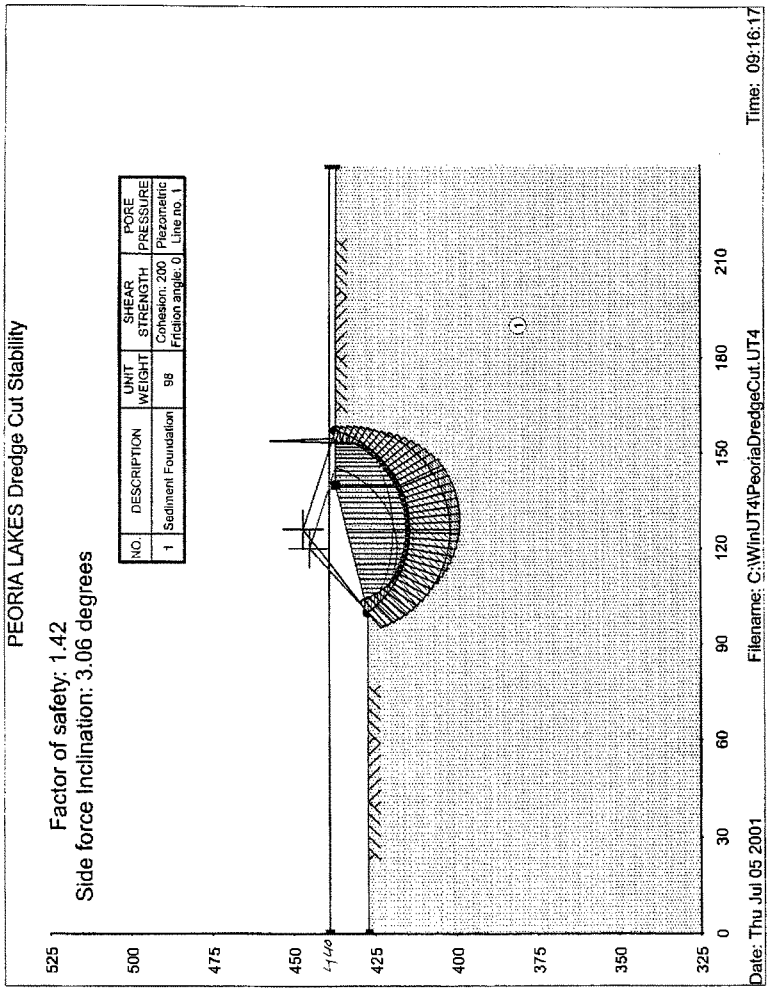

PEORIA LAKES Dredge Cut Stability
Factor of safety: 1.42
Side force Inclination: 3.06 degrees
NO.
DESCRIPTION
UNIT WEIGHT
SHEAR STRENGTH
PORE PRESSURE
1
Sediment Foundation
98
Cohesion: 200
Friction angle: 0
Piezometric Line no. 1
525
500
475
450
425
400
375
350
325
0
30
60
90
120
150
180
210
Date: Thu Jul 05 2001
Filename: C:\WinUT4\PeoriaDredgeCut.UT4
Time: 09:16:17

PLATE C-10

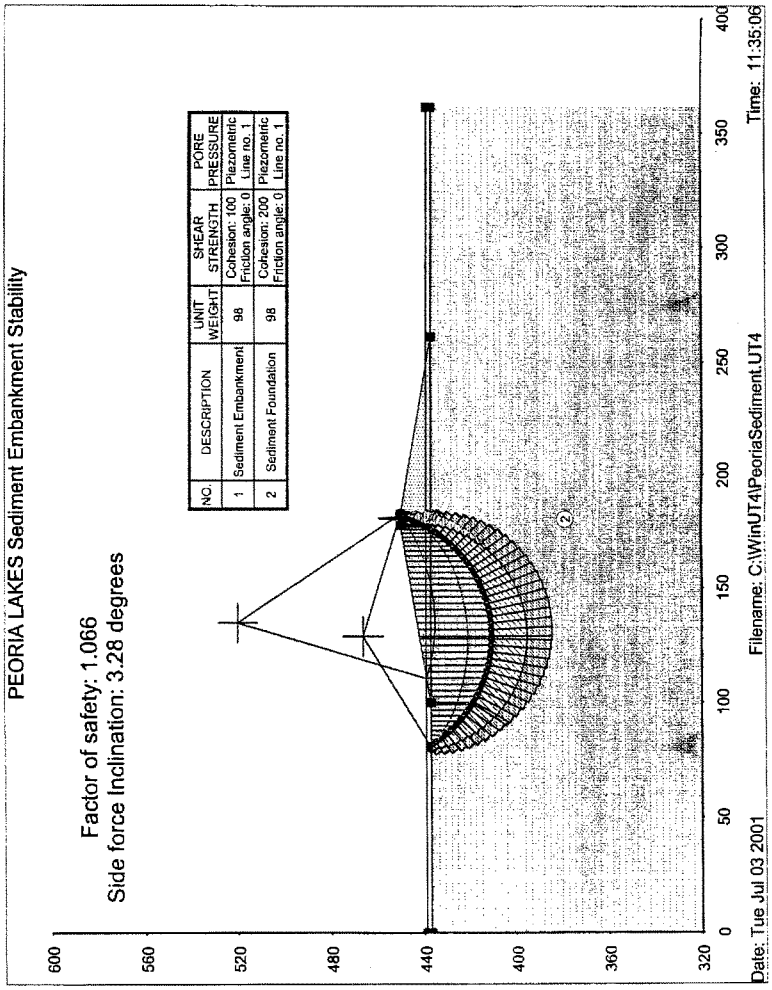

PEORIA LAKES Sediment Embankment Stability
Factor of safety: 1.066
Side force Inclination: 3.28 degrees
NO. | DESCRIPTION | UNIT WEIGHT | SHEAR STRENGTH | PORE PRESSURE
1 | Sediment Embankment | 98 | Cohesion: 100 Friction angle: 0 | Piezometric Line no. 1
2 | Sediment Foundation | 98 | Cohesion: 200 Friction angle: 0 | Piezometric Line no. 1
600
560
520
480
440
400
360
320
0
50
100
150
200
250
300
350
400
Date: Tue Jul 03 2001
Filename: C:\WinUT4\PeoriaSediment.UT4
Time: 11:35:06

PLATE C-11

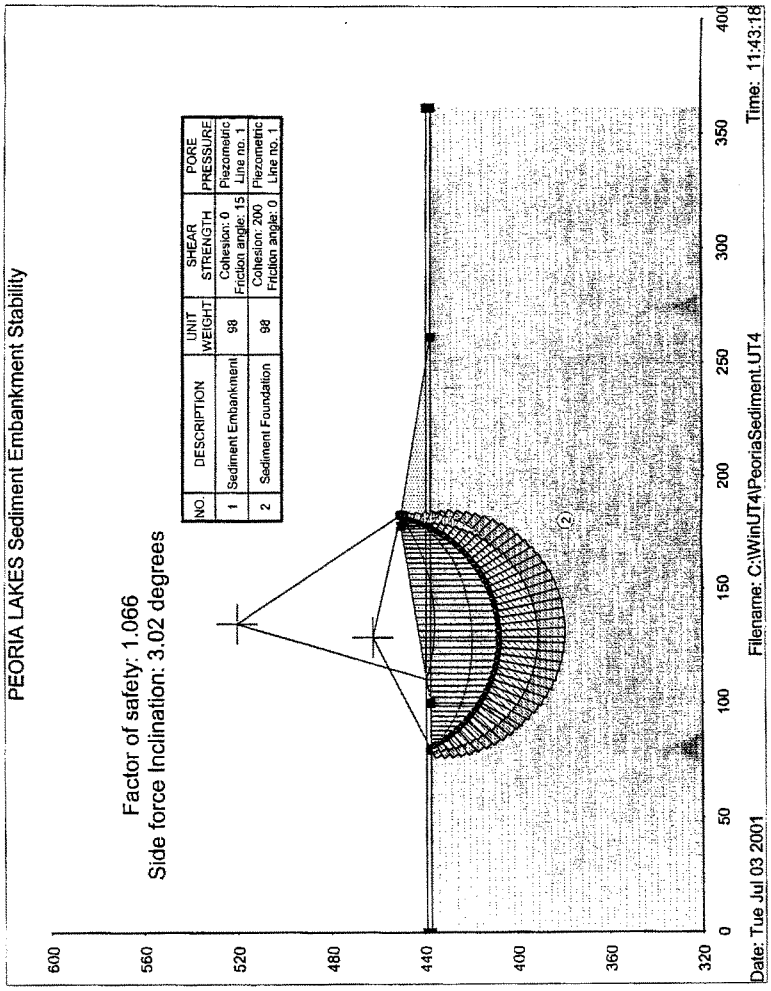

PEORIA LAKES Sediment Embankment Stability
Factor of safety: 1.066
Side force Inclination: 3.02 degrees
NO. DESCRIPTION UNIT WEIGHT SHEAR STRENGTH PORE PRESSURE
1 Sediment Embankment 98 Cohesion: 0 Friction angle: 15 Piezometric Line no. 1
2 Sediment Foundation 98 Cohesion: 200 Friction angle: 0 Piezometric Line no. 1
600
560
520
480
440
400
360
320
0
50
100
150
200
250
300
350
400
Date: Tue Jul 03 2001
Filename: C:\WinUT4\PeoriaSediment.UT4
Time: 11:43:18

PLATE C-12

WIND ADJUSTMENT and WAVE GROWTH

Elevation of Observed Wind	Zobs:	33.00	ft	Wind Observation Type
Observed Wind Speed	Uobs:	80.00	mph	----------
Air-Sea Temp. Difference	delT:	0.00	deg C	Inland
Duration of Observed Wind	DurO:	45.00	sec	
Duration of Final Wind	DurF:	1.00	hr	
Latitude of Observation	LAT:	40.70	deg	
Average Depth of Fetch	d:	8.00	ft	
Length of Wind Fetch	F:	2.00	mi	Wave Growth Equations
Equiv. Neutral Wind Speed	Ue:	50.62	mph	----------
Adjusted Wind Speed	Ua:	76.20	mph	Restricted Fetch
Wave Height	Hm0:	2.36	ft	Shallow-water
Wave Period	Tp:	2.86	sec	Fetch-limited
Wind Direction	Wdir:	0.00	deg	
Mean Wave Direction	Theta:	360.00	deg	

PLATE C-13

RUBBLE MOUND REVETMENT DESIGN

Significant Wave Height	Hs:	2.00	ft
Significant Wave Period	Ts:	2.50	sec
Cotangent of Nearshore Slope	COT(phi):	100.00	
Water Depth at Toe of Revetment	ds:	2.70	ft
Cotangent of Structure Slope	COT(theta):	5.00	
Unit Weight of Rock	wr:	165.00	lbs/ft3
Permeability Coefficient	P:	0.10	
Damage Level	S:	2.00	

STONE SIZE GRADATION

ARMOR LAYER
Layer Thickness = 0.85 ft

PERCENT LESS THAN BY WEIGHT	WEIGHT (lbs)	DIMENSION (ft)
0.00	1.61	0.21
15.00	5.15	0.31
50.00	12.88	0.43
85.00	25.25	0.53
100.00	51.53	0.68

FILTER LAYER
Layer Thickness = 1.00 ft

PERCENT LESS THAN BY WEIGHT	WEIGHT (lbs)	DIMENSION (ft)
0.00	0.00	0.03
15.00	0.01	0.04
50.00	0.02	0.05
85.00	0.08	0.08
100.00	0.14	0.09

IRREGULAR WAVE RUNUP

EXPECTED MAXIMUM = 1.38 ft
CONSERVATIVE = 1.74 ft

SURF PARAMETER = 0.6700
CERC STABILITY NUMBER = 1.4907
DUTCH STABILITY NUMBER = 2.8460

PLATE C-14

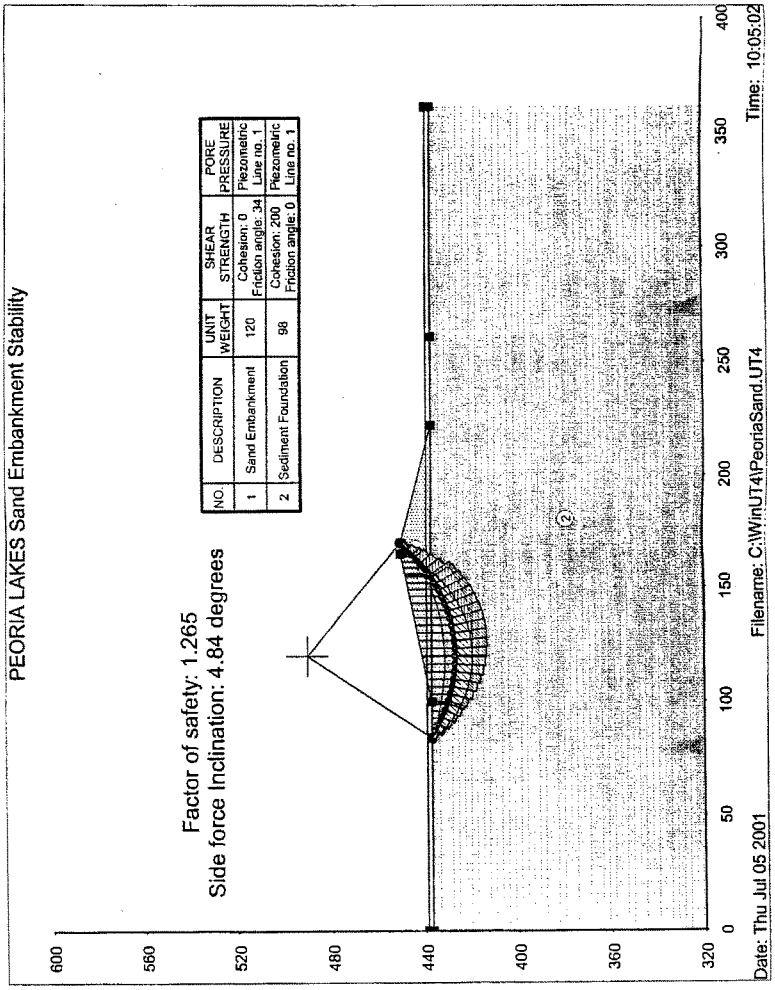

PEORIA LAKES Sand Embankment Stability
Factor of safety: 1.265
Side force Inclination: 4.84 degrees
NO. | DESCRIPTION | UNIT WEIGHT | SHEAR STRENGTH | PORE PRESSURE
1 | Sand Embankment | 120 | Cohesion: 0 Friction angle: 34 | Piezometric Line no. 1
2 | Sediment Foundation | 98 | Cohesion: 200 Friction angle: 0 | Piezometric Line no. 1
600
560
520
480
440
400
360
320
0
50
100
150
200
250
300
350
400
Date: Thu Jul 05 2001
Filename: C:\WinUT4\PeoriaSand.UT4
Time: 10:05:02

PLATE C-15

D-1

LOWER PEORIA LAKE - ILLINOIS RIVER
RIVER MILES 162.2 - 166.0
PEORIA POOL

PEORIA LAKE HYDROLOGIC DATA

By
Thomas A. Kirkeeng

U.S. Army Corps of Engineers
Rock Island District
Hydraulics Branch - Hydrologic Engineering Section
Clock Tower Building
P.O. Box 2004
Rock Island, IL 61204-2004

October 2001

CONTENTS

Hydrology D-1-1
Flood Profiles D-1-1
Elevation Duration D-1-1
Flow Duration D-1-1
Climate D-1-1
Precipitation D-1-1
Temperature D-1-2

Bibliography D-1-3
List of Plates D-1-4

PEORIA LAKE HYDROLOGIC DATA

HYDROLOGY

FLOOD PROFILES

Flood profiles for the Illinois River were published in 1993 (Reference 1). The portion of the profiles that apply to Peoria Lakes are plotted and shown on plate D-1-1. The floods plotted include the 5-, 10-, 25-, 50-, 100-, 200-, and 500-year floods.

ELEVATION DURATION

Elevation duration curves for year-round, March-September, and each month are shown on plates D-1-2 through D-1-15. This information is for the gage at the Peoria Boatyard, River Mile 164.6. This data well represents stages at the project site because of the flat slope of the water surface between the two sites. Duration curves give an historical representation of the percentage of time a particular water surface elevation has been equaled or exceeded.

FLOW DURATION

The year-round flow duration curve is shown on plate D-1-16. This information is for Peoria Lock and Dam, River Mile 157.6. Duration curves give an historical representation of the percentage of time that a particular flow has been equaled or exceeded.

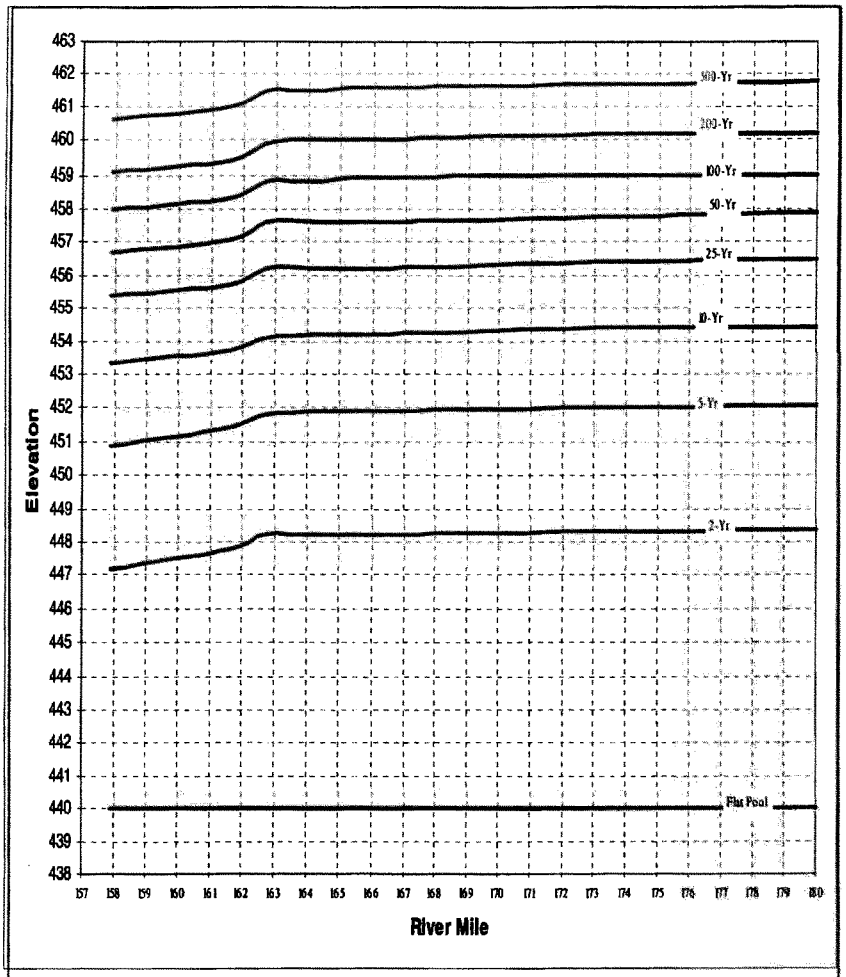
CLIMATE

PRECIPITATION

Data are based on observations recorded at the Moline, Illinois Airport by the National Weather Service. The average annual precipitation is 34.1 inches. Table D-1-1 portrays average monthly precipitation.

BIBLIOGRAPHY

1. U.S. Army Corps of Engineers, Rock Island District "Illinois River Water Surface Profiles – River Mile 80 to River Mile 290", September 1993.



U.S ARMY ENGINEER DISTRICT, ROCK ISLAND
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ROCK ISLAND, ILLINOIS

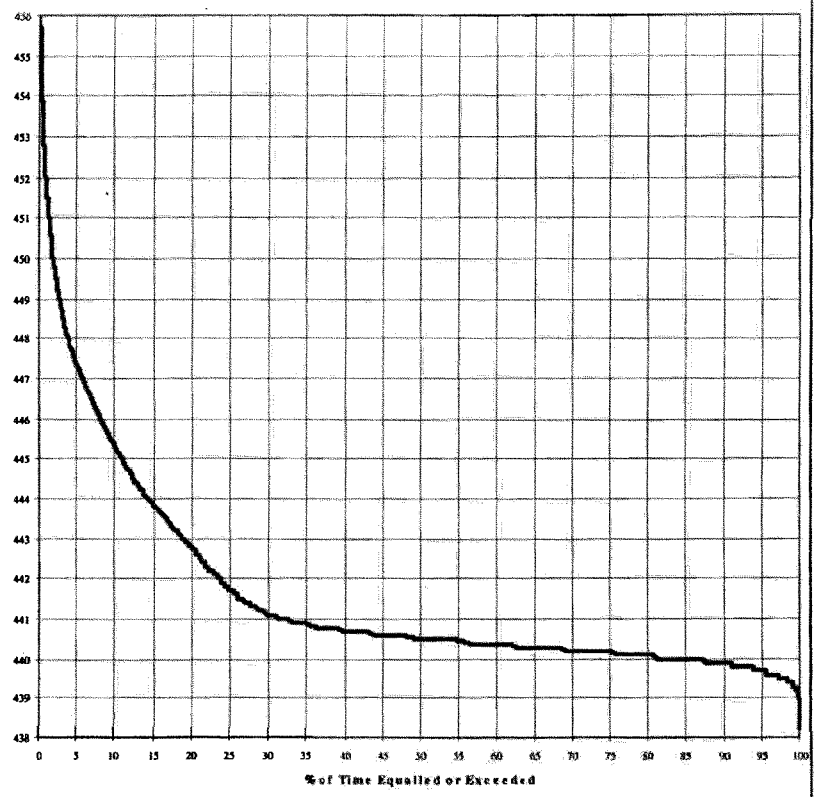
PREPARED BY:
T. Kirkwang

CHECKED BY:
M. Martens

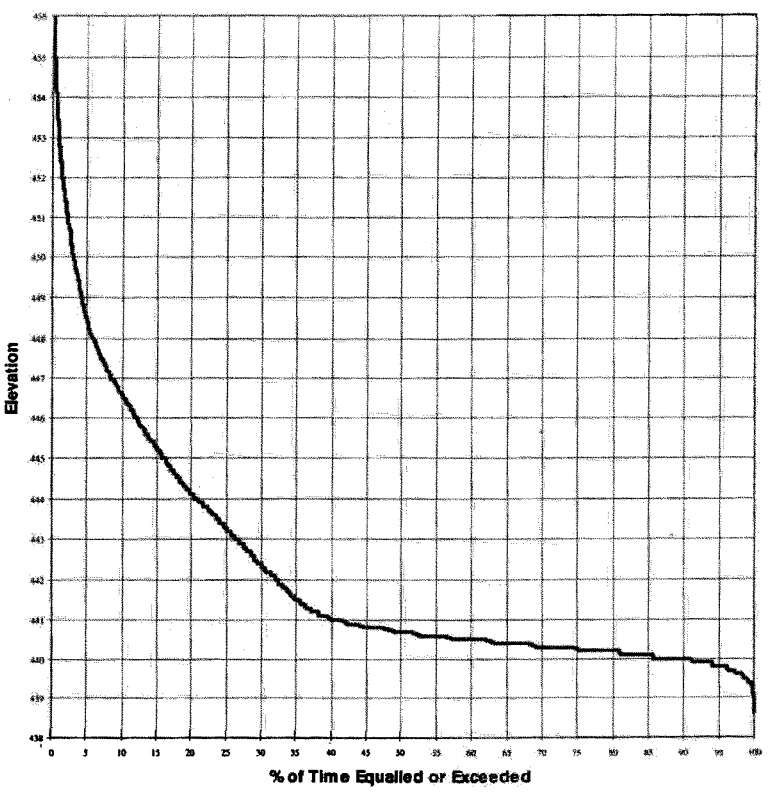
PEORIA RIVERFRONT DEVELOPMENT STUDY

Lower Peoria Lake Flood Profiles

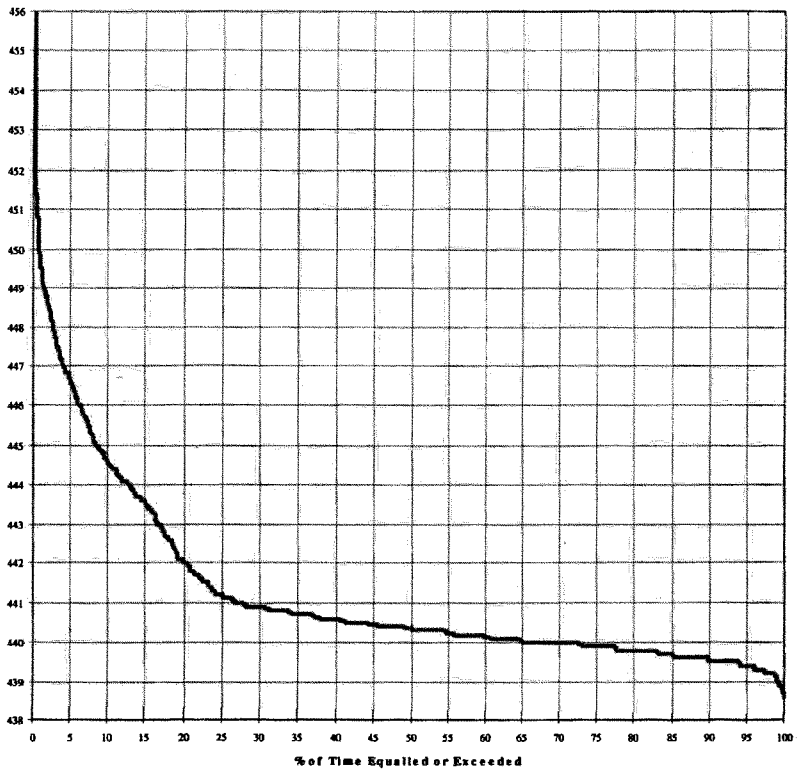
PLATE NO
D-1-1



	U.S ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS
PREPARED BY: T. Kirkeeng CHECKED BY: M. Markovs	PEORIA RIVERFRONT DEVELOPMENT STUDY Year Round Elevation - Duration At Peoria Boatyard RM 164.6 Data from 1942 to 2000
	PLATE NO. D-1-2



	U.S ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS
PREPARED BY: T. Kirkseng CHECKED BY: M. Martens	PEORIA RIVERFRONT DEVELOPMENT STUDY March – September Elevation - Duration At Peoria Boatyard RM 164.6 Data from 1942 to 2000
	PLATE NO. D-1-3



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PREPARED BY:
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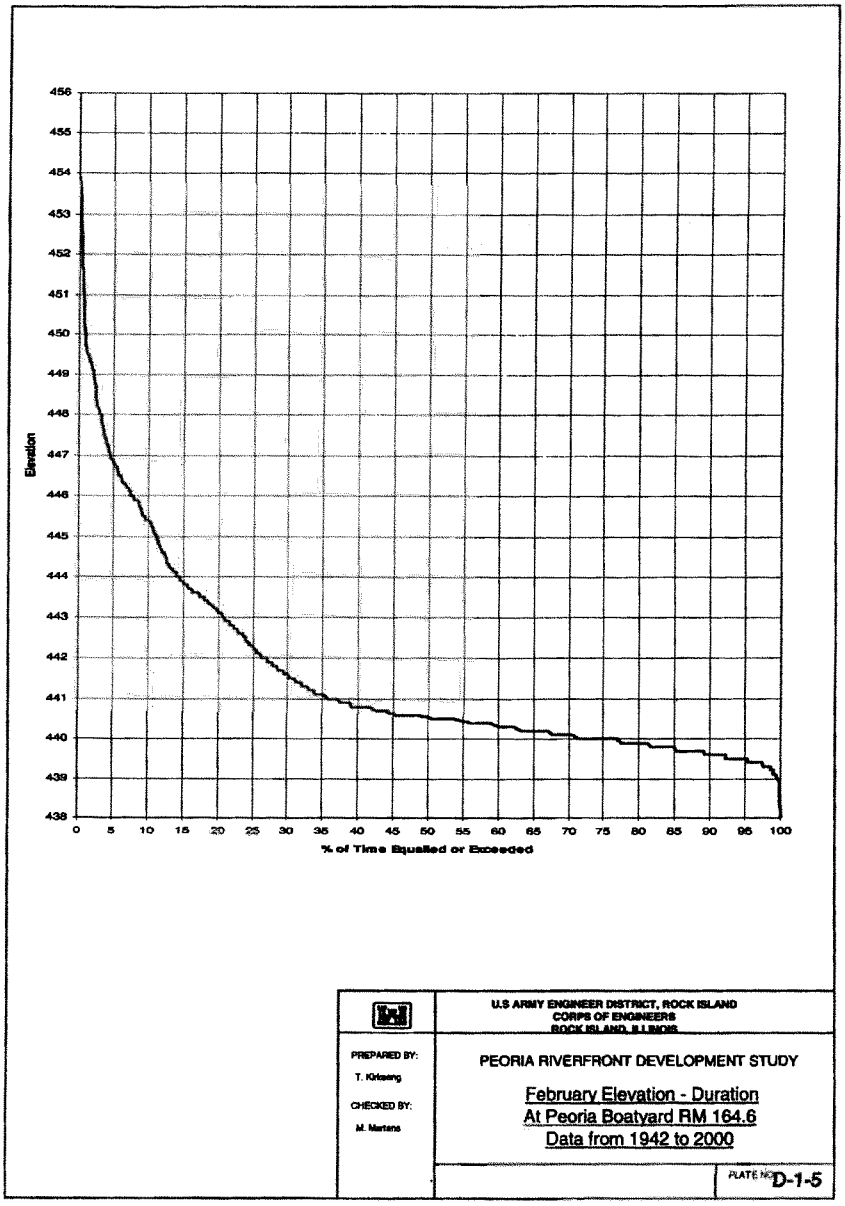
CHECKED BY:
M. Martens

PEORIA RIVERFRONT DEVELOPMENT STUDY

January Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000

PLATE NO. D-1-4



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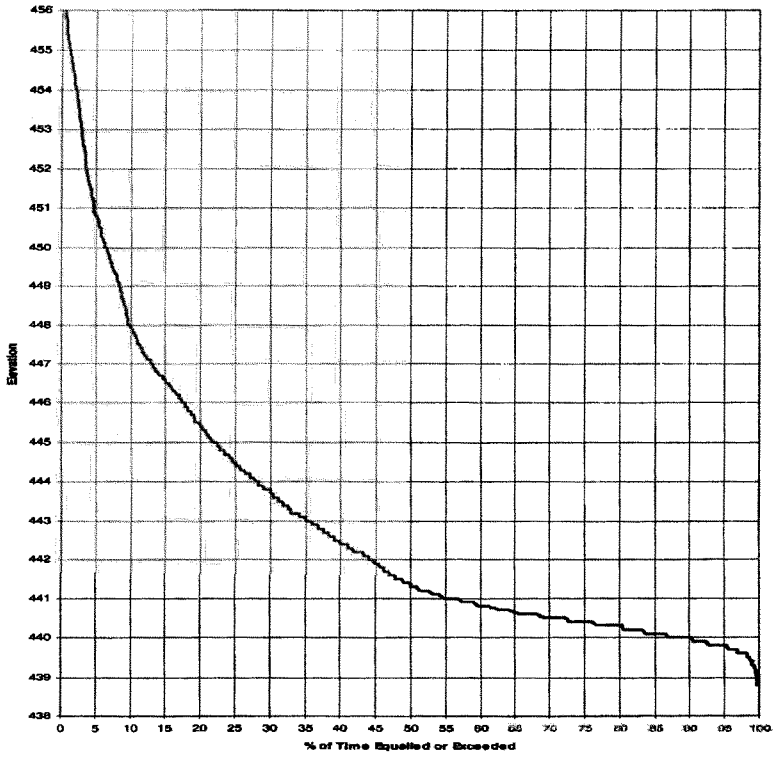
CHECKED BY:
M. Martens

PEORIA RIVERFRONT DEVELOPMENT STUDY

February Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000

PLATE NO. D-1-5



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PREPARED BY:
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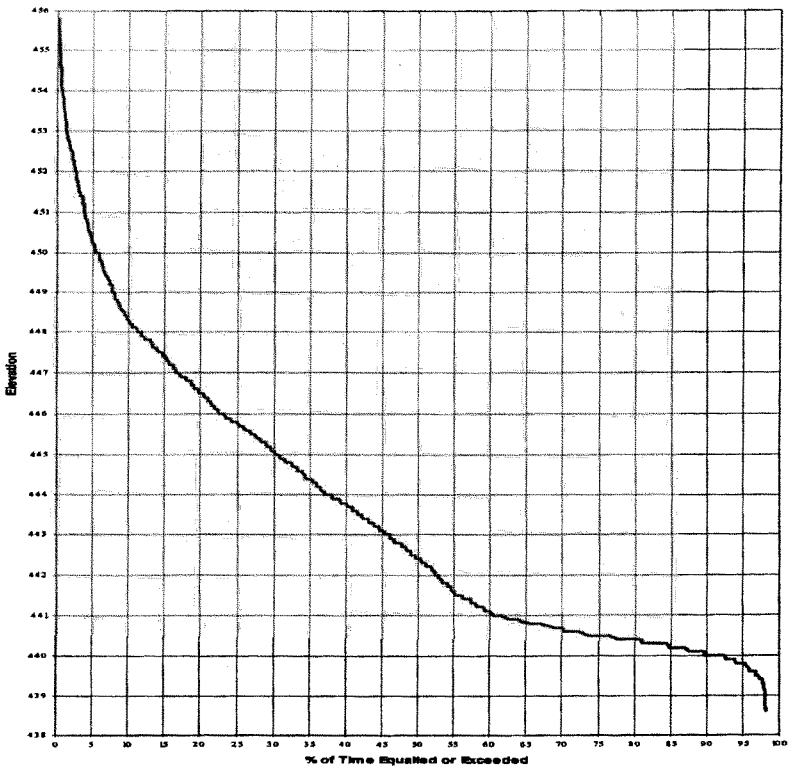
CHECKED BY:
M. Mariana

PEORIA RIVERFRONT DEVELOPMENT STUDY

March Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000

PLATE NO. D-1-6



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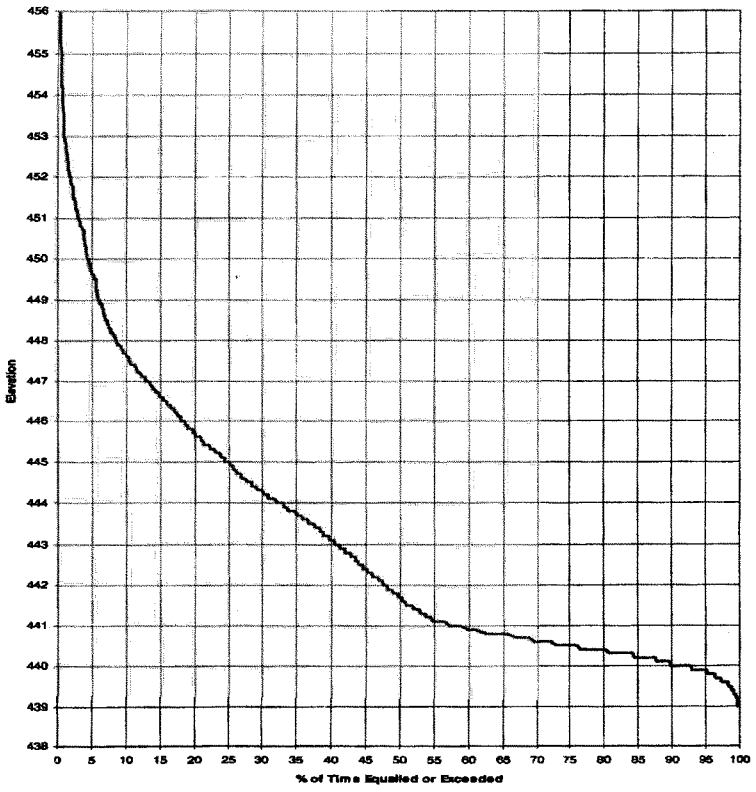
PEORIA RIVERFRONT DEVELOPMENT STUDY

April Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000

PLATE NO. D-1-7



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ROCK ISLAND, ILLINOIS

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CHECKED BY:
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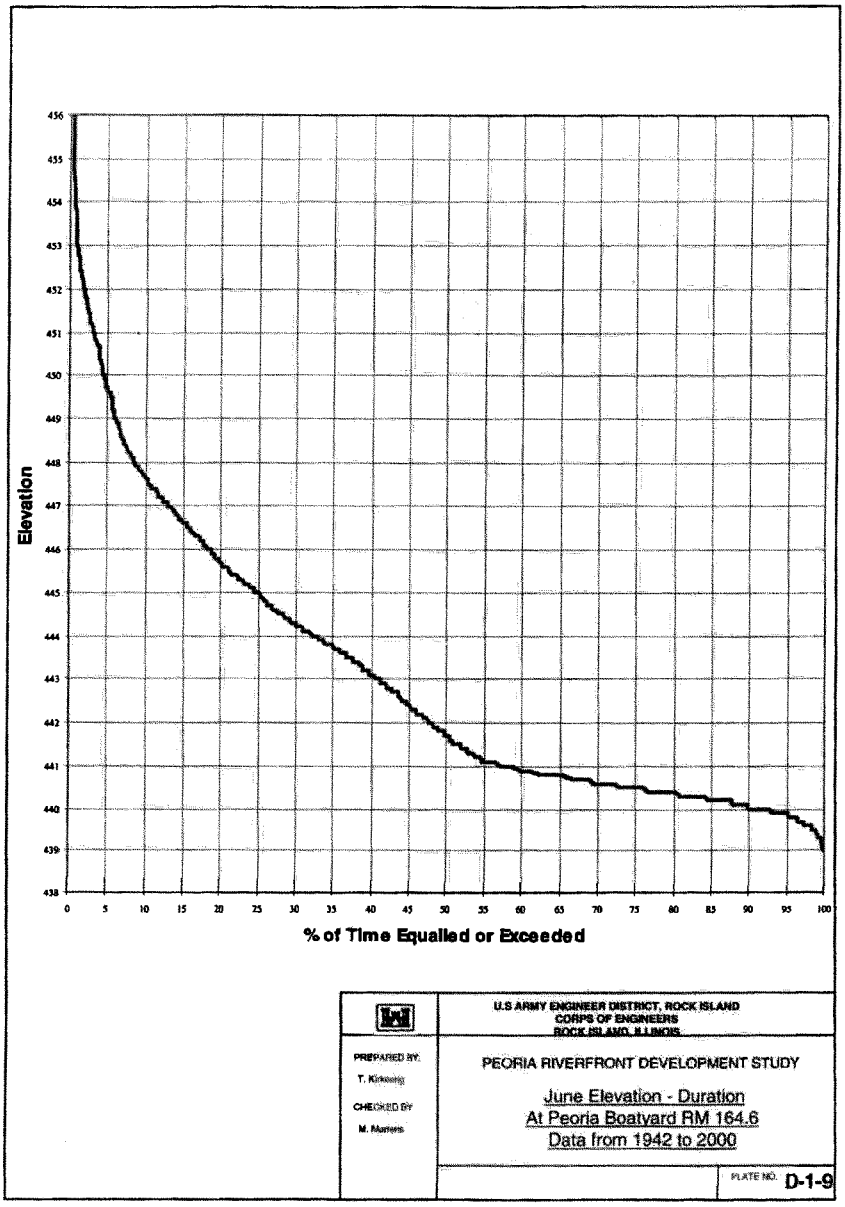
PEORIA RIVERFRONT DEVELOPMENT STUDY

May Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000

PLATE NO. D-1-8


Elevation
456
455
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453
452
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450
449
448
447
446
445
444
443
442
441
440
439
438
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
% of Time Equalled or Exceeded
U.S ARMY ENGINEER DISTRICT, ROCK ISLAND
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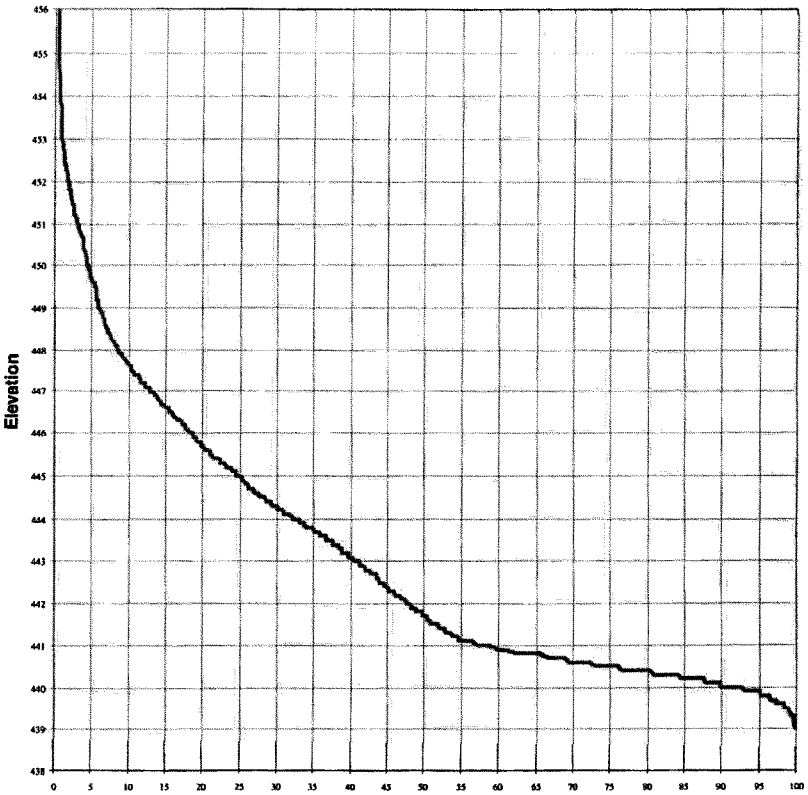
PREPARED BY:
T. Kirkwood
CHECKED BY
M. Martens
PEORIA RIVERFRONT DEVELOPMENT STUDY
June Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000
PLATE NO. D-1-9



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PREPARED BY:
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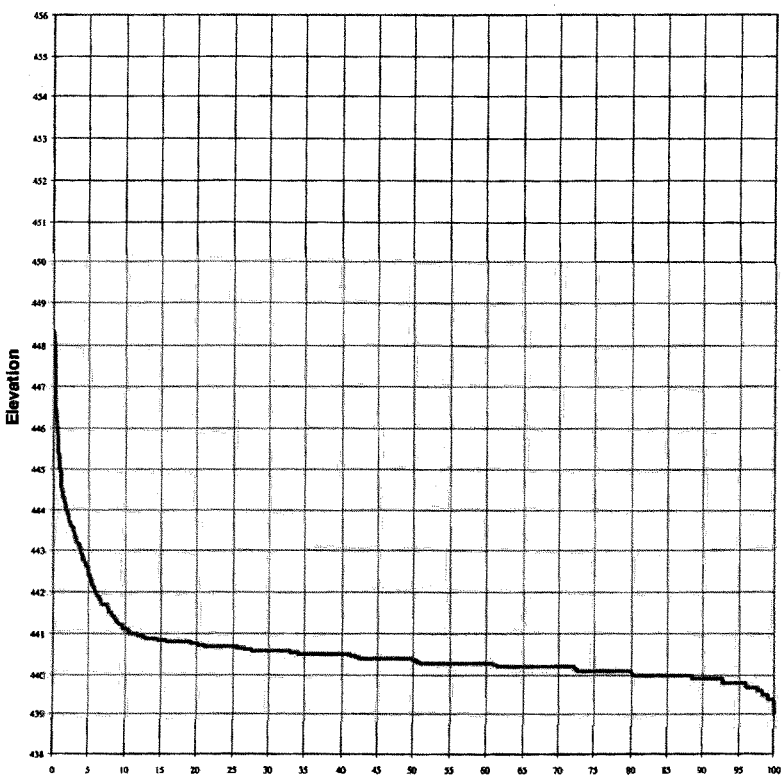
CHECKED BY:
M. Newman

PEORIA RIVERFRONT DEVELOPMENT STUDY

July Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000

PLATE NO. D-1-10



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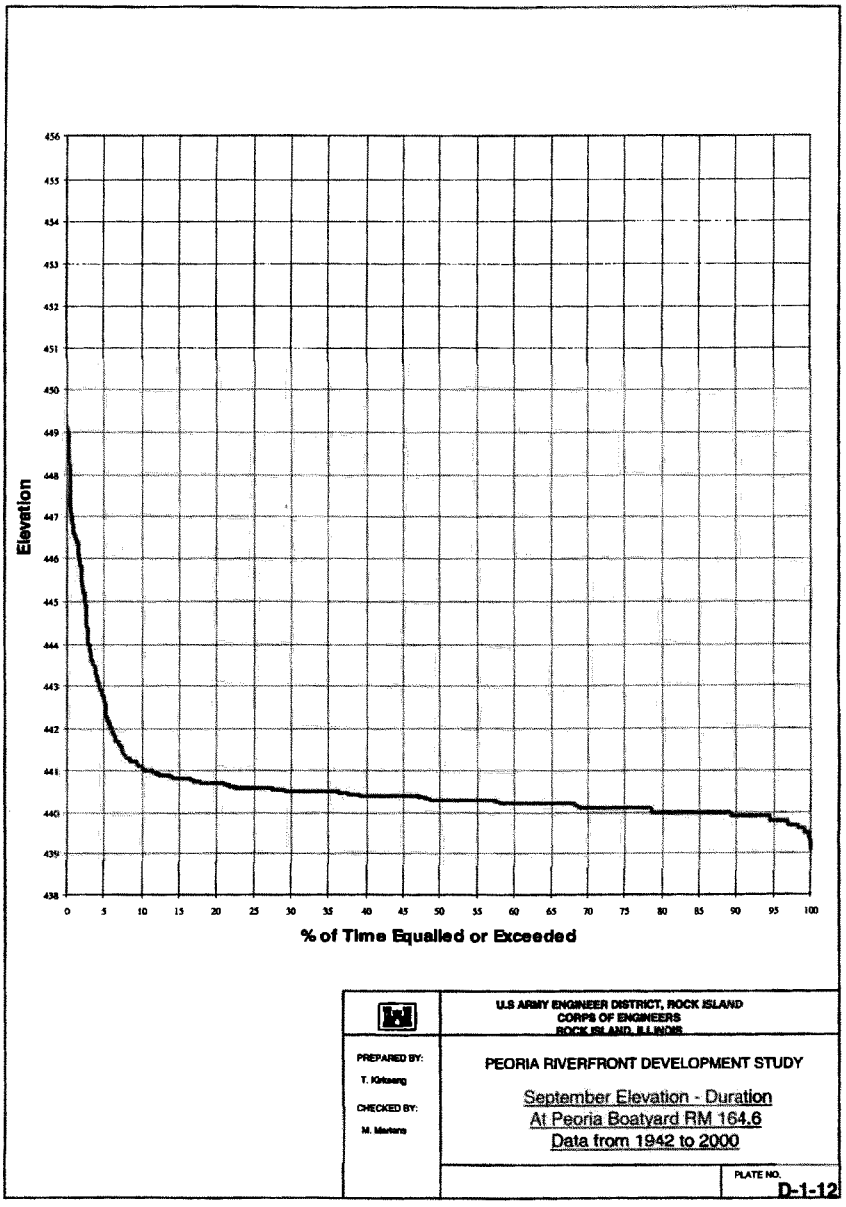
T. Kimseng

CHECKED BY:
M. Mathews

PEORIA RIVERFRONT DEVELOPMENT STUDY

August Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000

PLATE NO.
D-1-11



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PREPARED BY:
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CHECKED BY:
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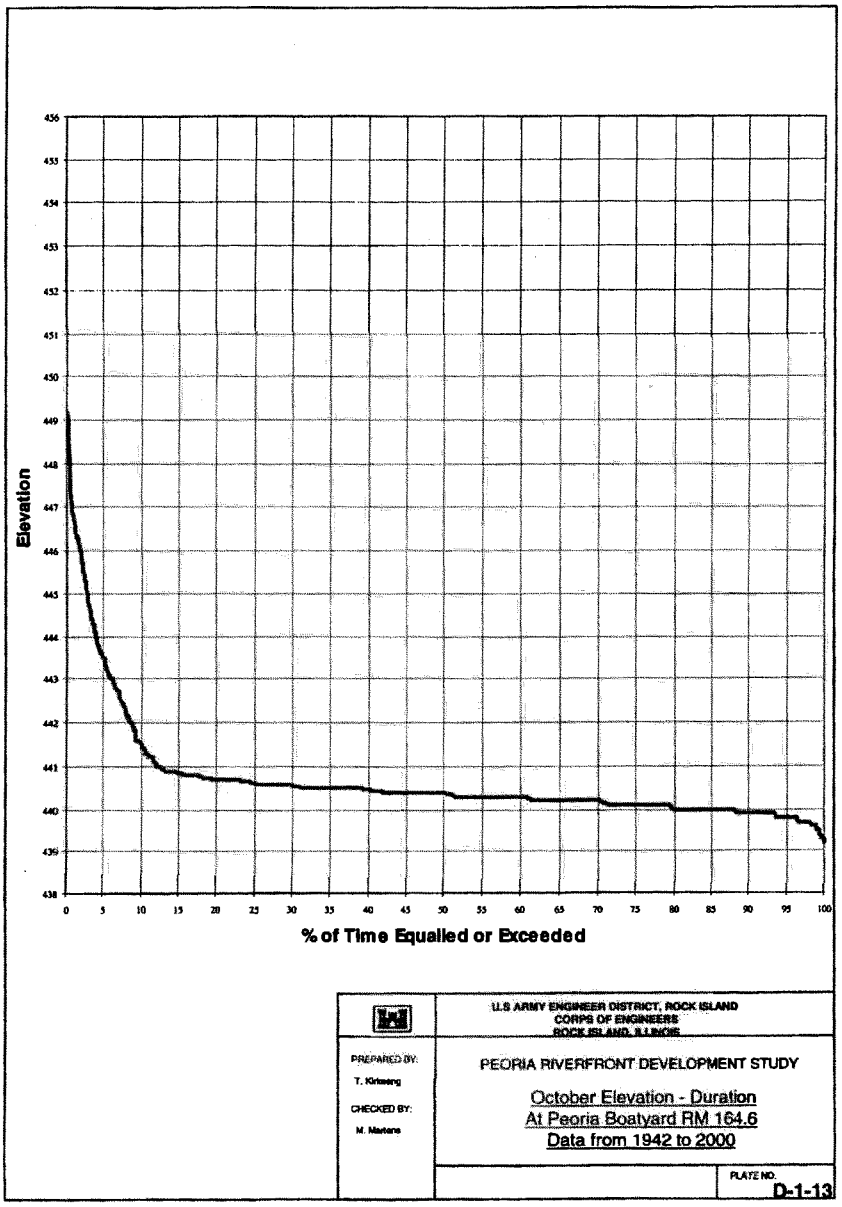
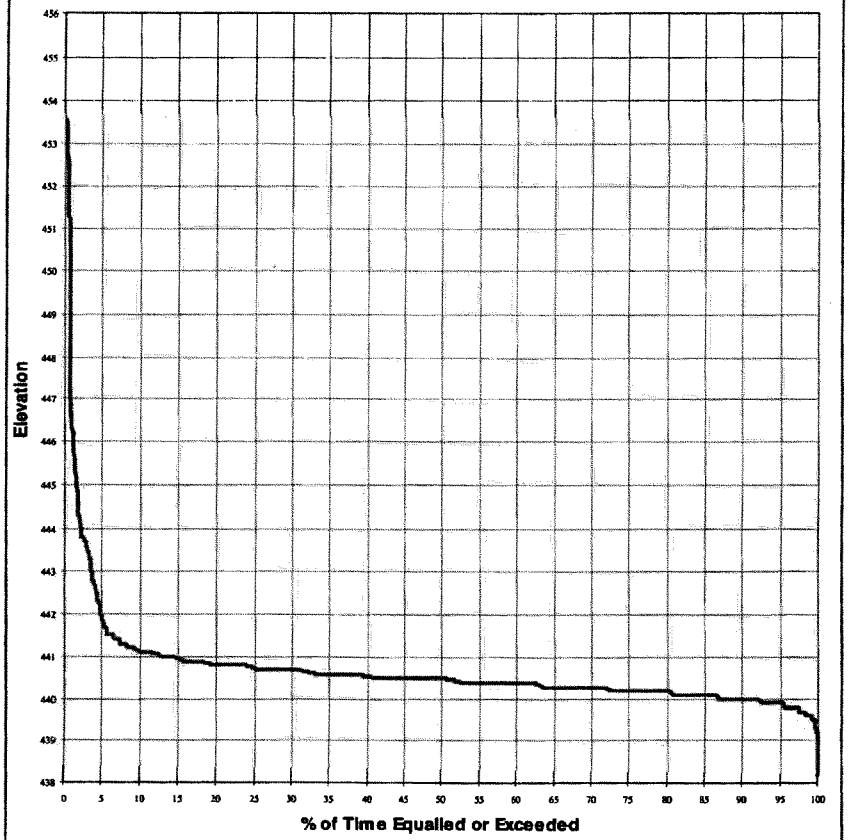
PEORIA RIVERFRONT DEVELOPMENT STUDY

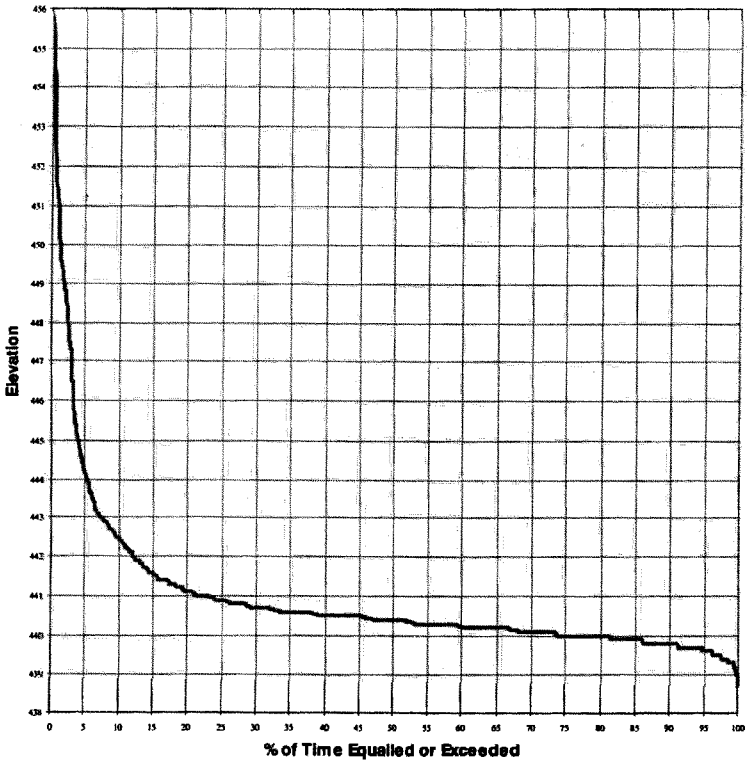
September Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000

PLATE NO.
D-1-12


Elevation
% of Time Equalled or Exceeded
U.S ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS
PREPARED BY:
T. Kirkseng
CHECKED BY:
M. Martens
PEORIA RIVERFRONT DEVELOPMENT STUDY
October Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000
PLATE NO.
D-1-13



	U.S ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS
PREPARED BY: T. Kirkeeng CHECKED BY: M. Martens	PEORIA RIVERFRONT DEVELOPMENT STUDY November Elevation - Duration At Peoria Boatyard RM 164.6 Data from 1942 to 2000
	PLATE NO. D-1-14



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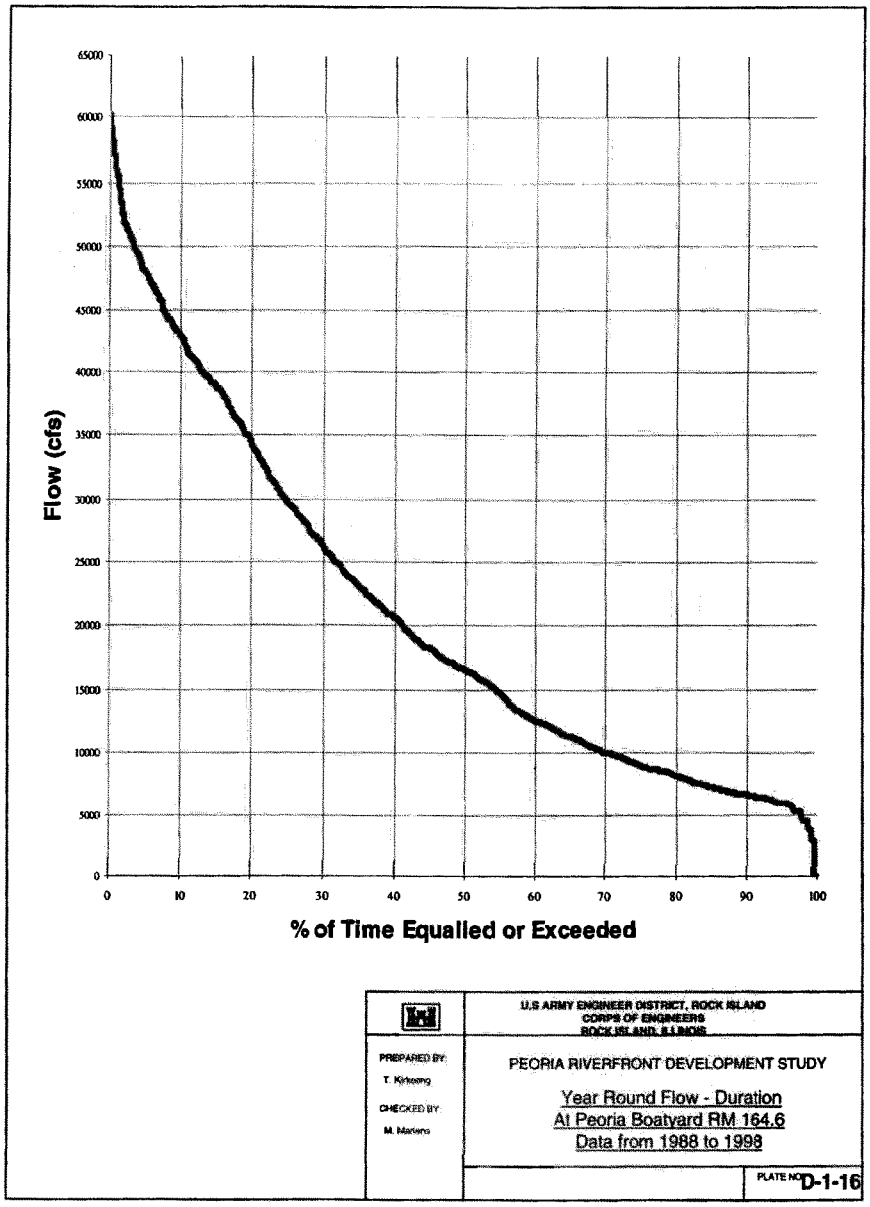
PREPARED BY:
T. Kirkseng

CHECKED BY:
M. Martens

PEORIA RIVERFRONT DEVELOPMENT STUDY

December Elevation - Duration
At Peoria Boatyard RM 164.6
Data from 1942 to 2000

PLATE NO.
D-1-15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60000
55000
50000
45000
40000
35000
30000
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15000
10000
5000
0
Flow (cfs)
0
10
20
30
40
50
60
70
80
90
100
% of Time Equalled or Exceeded
U.S ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS
PREPARED BY:
T. Kirkeeng
CHECKED BY:
M. Martens
PEORIA RIVERFRONT DEVELOPMENT STUDY
Year Round Flow - Duration
At Peoria Boatyard RM 164.6
Data from 1988 to 1998
PLATE NO D-1-16

APPENDIX D-2

PEORIA LAKE MICRO MODEL ANALYSIS

D-2

LOWER PEORIA LAKE

ILLINOIS RIVER
RIVER MILES 162.2–166.0
PEORIA POOL

HYDRAULIC MICRO MODEL STUDY

CONTENTS

Introduction D-2-i
Background D-2-1
Location D-2-1
History D-2-1
Sediment Characteristics of the Reach D-2-1
Dredging D-2-1
Bank Characterization D-2-2
Study Purpose and Goals D-2-2
Micro Model Description D-2-3
Scales and Bed Materials D-2-3
Appurtenances D-2-3
Micro Model Tests D-2-3
Calibration D-2-3
Prototype Surveys D-2-4
Base Test D-2-4
Alternative Tests D-2-4
Alternative 1 ..... D-2-4
Alternative 2 ..... D-2-4
Alternative 3 ..... D-2-5
Alternative 4 ..... D-2-5
Results and Conclusions D-2-5
Summary of Results D-2-5
Interpretation of Model Test Results D-2-6
Bibliography D-2-8
List of Plates D-2-9

INTRODUCTION

A micro model river engineering study was conducted of Lower Peoria Lake of the Illinois River upstream of Peoria Lock and Dam, River Miles 162.2 to 166.4. The purpose of the study was to evaluate various combinations of island construction/channel dredging alternatives for the purpose of restoring the Lake Peoria ecosystem. Micro modeling was used to evaluate both the sediment transport trends and general flow conditions in the reach.

The micro model study was conducted at the U.S. Army Corps of Engineers Rock Island District's Le Claire Base. The model insert was constructed by Mr. Tom Kirkeeng, Hydraulic Engineer. Mr. Kirkeeng operated the micro model and prepared this report. Mr. Marvin Martens, Chief, Hydrologic Engineering Section, provided supervision. The micro model portion of the study was conducted under the guidance of the Applied River Engineering Center, St. Louis District, U.S. Army Corps of Engineers (AREC). Mr. Rob Davinroy and Mr. Dave Gordon of AREC provided this guidance. AREC approved the study proposal and reviewed and approved calibration and alternative runs.

HYDRAULIC MICRO MODEL STUDY

BACKGROUND

LOCATION

Lower Peoria Lake is located on the Illinois River upstream from Peoria Lock and Dam (plate D-2-1 between River Miles 163.0 to 166.4 (plates D-2-2 to D-2-4). A USGS Quadrangle Map of the study area is shown on plate D-2-6.

HISTORY

Though depths in Lower Peoria Lake have changed over the last 100 years, the plan view of the lake has not. Aerial views of the lake from 1903, 1930, and 1995 are presented in plates D-2-7, D-2-8, and D-2-9, respectively.

SEDIMENT CHARACTERISTICS OF THE REACH

Dredging

While the off-channel areas have filled in over the years, the navigation channel in Lower Peoria Lake has been essentially self-maintaining. Dredging has not occurred frequently. The table below shows where dredging has occurred historically since inundation in 1938.

Dredging Reach (River Mile)	Year Dredged	Amount Dredged (yd^3)
161.0-163.0	1942	45,930
	1944	70,640
	1948	32,685
	1950	48,279
	1953	17,800
	1977	64,079
	1979	34,551
166.0-168.4	1946	187,863
	1948	31,041
	1969	41,217

Bank Characterization

The 1988 Illinois Waterway Bank Erosion Study (Reference 1) included an examination of bank conditions throughout the Illinois Waterway system.

Excerpts from 1988 bank erosion study are as follows:

> *Aerial reconnaissance*
> "The Illinois widened appreciably just upriver from Peoria Locks and Dam. Trees as much as 24 inches in diameter were growing within two to three feet of the water surface on the day of the inspection. Aquatic vegetation was seen growing within near bank shallow water areas. Banks within this downriver reach of the Peoria Pool had a very stable appearance and this stable appearance was very characteristic of the downstream portion of longer pools on the Illinois Waterway. A number of partially submerged barges were seen on the riverbank at approximately mile 159.3.
>
> Waterway location within Peoria Lake varied, with the channel located near the west side of the lake for some reaches and near the east side of the lake for other reaches. Rooted aquatic vegetation was established within many areas of the lake. The water in the lake appeared to be quite shallow and passage of pleasure craft and water skiers resuspend sediments. No appreciable reaches of failed or eroded lake shoreline or banks were observed during this inspection. There was no evidence of significant erosion on the many deltas that extended out into the lake. A number of tributary streams which entered the lake from the east have deposited deltas out into the lake. Typically these deltaic sediments were light-colored and appeared to be composed of granular alluvium. The delta at the mouth of Blue Creek, approximately mile 173.2, was typical of deltas formed by tributary streams. Wide areas of low relief were noted within these deltas. Exposed sediments appeared to be areas of recent coarse sand deposition."

STUDY PURPOSE AND GOALS

The purpose of this study was to use a physical hydraulic micro model to define sedimentation trends and general flow impacts that could be expected to occur from various island construction configurations in Lower Peoria Lake. Four different island alternatives were tested in the model and compared to the base condition as well as to each other. The goal of the study was to determine the impact of island construction upon the flow and sediment transport characteristics in the upper portion of Lower Peoria Lake. Stability of constructed islands was not evaluated in the micro model portion of the feasibility study.

The area being considered for dredging and island construction is in vicinity of the McClugage Bridge in the upper northeastern portion of Lower Peoria Lake. The island (or islands) would be created within an area owned by the Illinois Department of Natural Resources. Most of the area being considered for island creation has water only 1 to 2 feet deep with a substrate of 4 feet (or greater in some areas) of soft mud and silt the consistency of pudding. Biological investigations of this area show that it has only marginal, if any, habitat value for most aquatic species.

Dredging to construct the island(s) would range from 8 to 16 feet below flat pool and incorporate side channels and deep holes to provide depth diversity, overwintering habitat, and "edge" for fish

species. The islands would be constructed to approximately 10 feet above flat pool at their highest (elevation 450 MSL). Additional structures, such as riprap along the island shore and jetties out into the water, will stabilize the islands and add additional habitat value.

MICRO MODEL DESCRIPTION

SCALES AND BED MATERIALS

Plate D-2-5 is a photograph of the Peoria hydraulic micro model that was used for this study. The model encompassed the Illinois River between River Miles 162.5 to 166.0. After entrance and exit conditions in the model were adjusted, the actual study reach was between River Miles 164.0 to 166.0. The model employed a horizontal scale of 1 inch = 300 feet, or 1:3600, and a vertical scale of 1 inch = 20 feet, or 1:240, for a 15:1 distortion ratio. This distortion supplied the necessary forces required to approximate sediment transport conditions in the prototype. The bed material was granular plastic urea, Type II, with a specific gravity of 1.4.

APPURTENANCES

The model was constructed using 1995 aerial photographs of the Illinois Waterway (plate D-2-9). The photograph's coordinate system was State Plane Zone Illinois West, NAD 83, feet. The model was then placed in a standard micro model hydraulic flume. The riverbanks of the model were constructed from dense polystyrene foam. Rotational jacks located within the hydraulic flume controlled the slope of the model.

The model flow was simulated by a submersible pump and was monitored by an electromagnetic flow meter. An electronic valve was used to regulate a steady state discharge that was used for all model runs. Water stages were manually checked with a mechanical three-dimensional point digitizer. Resultant bed configurations were measured and recorded with a 3-D laser digitizer. Surface current patterns were captured and recorded using time exposure photography.

MICRO MODEL TESTS

CALIBRATION

The first step in testing alternatives in the model is to calibrate the model. The goal of model calibration is to match the bed forms of the model to the bed forms of the river. When the model is calibrated, then alternatives can be reliably tested.

The reach of the model that was considered to be calibrated extended from River Miles 163.5 to 166.0 (plate D-2-6).

The calibration of the micro model involved the adjustment of water discharge, sediment load, slope, entrance condition, and physical modifications to nonerodible portions of the channel.

The slope of the model that was used was 0.1 inch over the 75-foot length of the model insert.

A constant flow of 1.60 gallons per minute (gpm) was used for all model simulations.

PROTOTYPE SURVEYS

Bathymetric data from 1998-1999 is shown on plate D-2-10. This information was used to calibrate the micro model.

BASE TEST

Plate D-2-11 shows the resultant bed configuration of the micro model base test. Plate D-2-12 shows the flow visualization of the micro model base test. This base test was developed from the simulation of a steady state flow in the micro model until bed stability was reached and a similar bed response was achieved as compared to the surveys of the river.

Once the favorable comparison of model tests and prototype survey was made, the model was considered calibrated. Alternatives were then modeled in the micro model to examine the impacts upon the bed forms and flow field.

ALTERNATIVE TESTS

Four alternative designs were simulated in the micro model. The model was used to evaluate the general flow response and impact to bed forms in the study reach from implementing each alternative. The two primary focuses to evaluate with each alternative were:

- Flow visualization was used to evaluate general flow trends
- Sediment filling trends of the dredged channels

Bathymetric survey data were collected at the end of each alternative test. Flow visualization photos were also taken of each alternative of the micro model working to estimate the general effect upon the flow field.

Alternative 1. Small Single Island Upstream of Bridge A photograph of this alternative as it was implemented in the micro model is shown on plate D-2-13. The micro model bathymetry for Alternative 1 is shown on plate D-2-14. Sediment deposition trends as compared to the micro model base condition are shown on plate D-2-16. The flow visualization for Alternative 1 is shown on plate D-2-15. Results indicated the following trends:

Flow visualization shows that the impacted area extends downstream of the island and over to the left bank. No changes were noted in the right bank.

The majority of sediment that was deposited was located in the dredged channel on the main channel side of the constructed island as well as downstream of the island.

Alternative 2. Larger Single Island Upstream of Bridge A photograph of this alternative as it was implemented in the micro model is shown on plate D-2-17. The micro model bathymetry for

Alternative 2 is shown on plate D-2-18. Sediment deposition trends as compared to the micro model base condition are shown on plate D-2-20. The flow visualization for Alternative 2 is shown on plate D-2-19. Results indicated the following trends:

Flow visualization was similar to Alternative 1. The impacted area extends downstream of the island and over to the left bank. No changes were noted in the right bank.

The majority of sediment that was deposited was located in the dredged channel on the main channel side of the constructed island as well as downstream of the island. Sediment deposition was less than that for Alternative 1.

Alternative 3. Two Large Islands Downstream of Bridge A photograph of this alternative as it was implemented in the micro model is shown on plate D-2-21. The micro model bathymetry for Alternative 3 is shown on plate D-2-22. Sediment deposition trends as compared to the micro model base condition are shown on plate D-2-24. The flow visualization for Alternative 3 is shown on plate D-2-23. Results indicated the following trends:

The flow visualization showed that the impacted area extended from an area upstream of the island pair to an area downstream of the island pair. The right side of the navigation channel experienced an increase in flow directly across from the island pair.

Sediment deposition was evident at the upstream and downstream ends of the island pair. All dredged channels experienced some deposition and the greatest deposition appeared to be in the channel between the islands.

Alternative 4. Single Large Island Downstream of Bridge A photograph of this alternative as it was implemented in the micro model is shown on plate D-2-25. The micro model bathymetry for Alternative 4 is shown on plate D-2-26. Sediment deposition trends as compared to the micro model base condition are shown on plate D-2-28. The flow visualization for Alternative 4 is shown on plate D-2-27. Results indicated the following trends:

The flow visualization shows that slack water exists upstream of the island but less than for the island pair. Slack water area exists downstream of the island as well, but again, less than for the island pair. The right side of the navigation channel experienced an increase in flow directly across from the island.

Sediment deposition was evident at the upstream end of the island, but less than that for the island pair. All dredged channels experienced some deposition. Some minor deposition was evident downstream of the island but less than for the island pair.

RESULTS AND CONCLUSIONS

SUMMARY OF RESULTS

- Flow visualization trends:
  For this study, the flow visualization analysis was used for strictly qualitative purposes. Rather than predicting the aerial extent of the impacted area (quantitative), the flow visualization analysis consisted of comparing the

alternatives to one another as well as to the base condition to predict trends (qualitative).

Alternatives 1 and 2 had similar impacts to the flow field as compared to the base condition. Alternative 1 appeared to have a slightly larger impact, possibly because the Alternative 2 islands had a more streamlined shape. One would expect Alternative 1 to experience more sediment deposition than Alternative 2 for this reason.

Alternatives 3 and 4 also had similar impacts to the flow field. Both showed areas of reduced velocities upstream and downstream of the island(s). Alternative 3 had the greater impact of the two. This was expected because the two islands occupy a greater area than the single island. It was expected that Alternative 3 would experience more sediment deposition than Alternative 4 because of this larger impact.

Alternatives 2 and 3 have a greater impact to the flow field and therefore would accomplish study objectives more than Alternatives 1 and 4. The four alternatives all had similar impacts to the navigation channel.

- Sediment deposition trends

  As with the flow visualization analysis, the sediment deposition analysis was also used for strictly qualitative purposes. Rather than using the results to predict depths and rates of sediment deposition (quantitative), the sediment deposition analysis consisted of comparing the alternatives to one another as well as to the base condition to predict trends (qualitative).

  Alternatives 1 and 2 have similar attributes. Alternative 2 experienced less sediment deposition than in the constructed channels as compared to Alternative 1, especially in the riverward channel. As discussed in the flow visualization analysis, Alternative 2 consists of a more streamlined shape and provides for less change to the flow field. This may be a factor in the sedimentation deposition difference.

  Alternatives 3 and 4 are located in the same area in Lower Peoria Lake. The constructed channel on the landward side of the island(s) experienced similar patterns for both alternatives. The riverward channels had less deposition under the two island alternative. Alternative 4 had more sediment deposition at the upstream end of the island(s). Deposition amounts downstream of the island(s) were also similar for Alternatives 3 and 4.

  The recommendations based on the trend analysis for sediment deposition are that Alternative 2 will experience less deposition than Alternative 1. Alternatives 3 and 4 showed similar deposition patterns and would both satisfy project objectives.

INTERPRETATION OF MODEL TEST RESULTS

In the interpretation and evaluation of the results of the tests conducted, it should be remembered that the results of these model tests were qualitative in nature. Any hydraulic model, whether

physical or numerical, is subject to biases introduced as a result of the inherent complexities that exist in the prototype. Anomalies in actual hydrographic events, such as prolonged periods of high or low flows, are not reflected in these results, nor are complex physical phenomena, such as the existence of underlying rock formations or other nonerodible variables.

The model study was intended to serve as a tool to the river engineer to guide in studying the general trends that could be expected to occur in the actual river from a variety of imposed alternatives. Measures for final design may be modified based upon engineering knowledge and experience, real estate and construction considerations, economic and environmental impacts, and any other special requirements.

BIBLIOGRAPHY

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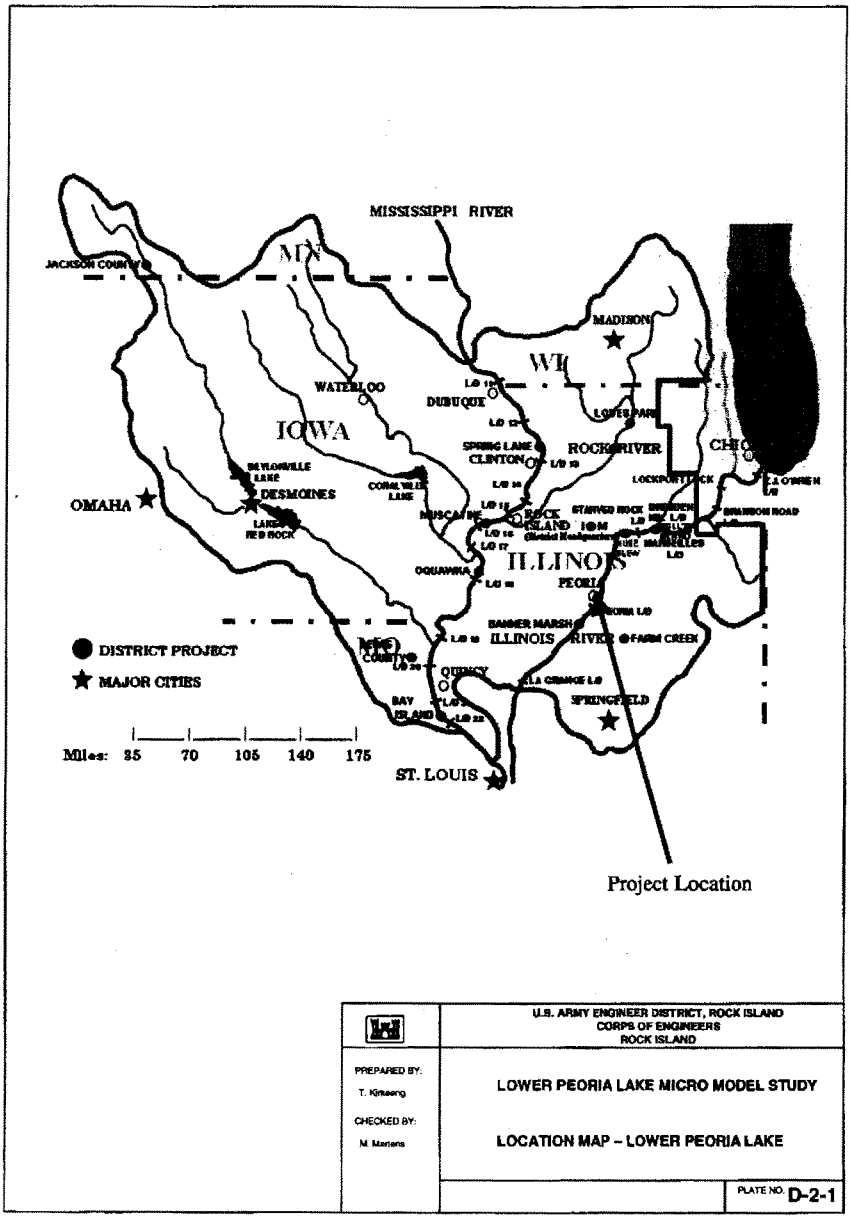
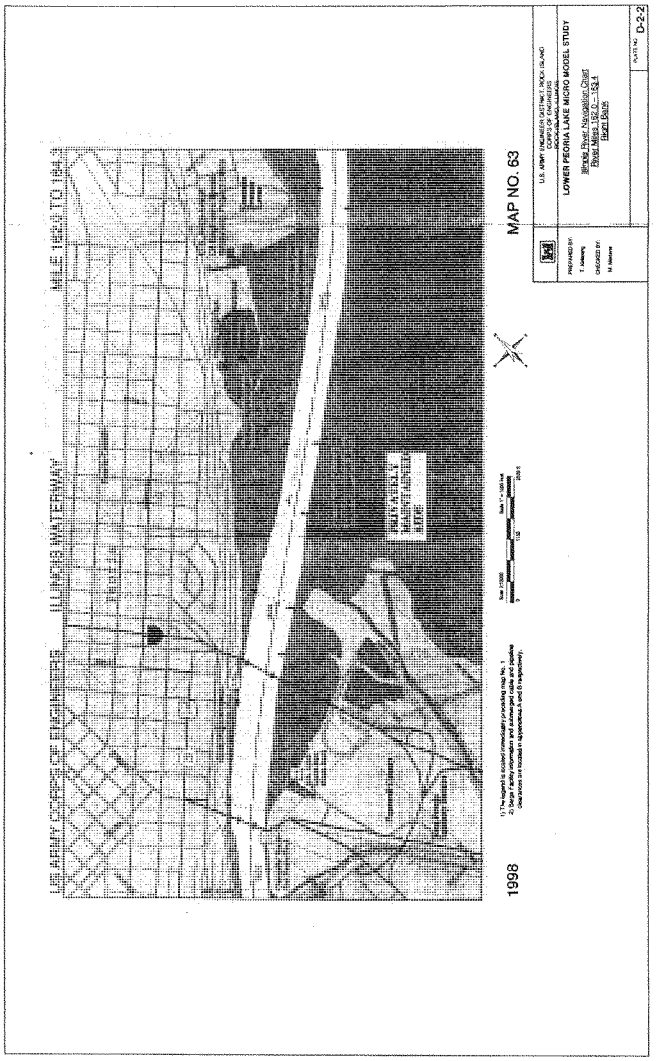
LIST OF PLATES

D-2-1	Location Map - Lower Peoria Lake
D-2-2	Illinois River Navigation Chart - River Miles 162.0 - 163.4 Right Bank
D-2-3	Illinois River Navigation Chart - River Miles 162.0 - 163.4 Left Bank
D-2-4	Illinois River Navigation Chart - River Miles 163.4 - 166.9 Left Bank
D-2-5	Photograph of Lower Peoria Lake Micro Model
D-2-6	USGS Quadrangle Map of Lower Peoria Lake - Calibrated Reach
D-2-7	1903 Map of Lower Peoria Lake
D-2-8	1930 Aerial Photography
D-2-9	1995 Aerial Photography
D-2-10	Prototype Bathymetry 1998 - 1999
D-2-11	Micro Model Base Test Bathymetry
D-2-12	Micro Model Base Test Flow Visualization
D-2-13	Photographs of Alternative 1 in the Micro Model
D-2-14	Micro Model Bathymetry - Alternative 1
D-2-15	Micro Model Flow Visualization - Alternative 1
D-2-16	Depositional Trends - Alternative 1
D-2-17	Photographs of Alternative 2 in the Micro Model
D-2-18	Micro Model Bathymetry - Alternative 2
D-2-19	Micro Model Flow Visualization - Alternative 2
D-2-20	Depositional Trends - Alternative 2
D-2-21	Photographs of Alternative 3 in the Micro Model
D-2-22	Micro Model Bathymetry - Alternative 3
D-2-23	Micro Model Flow Visualization - Alternative 3
D-2-24	Depositional Trends - Alternative 3
D-2-25	Photographs of Alternative 4 in the Micro Model
D-2-26	Micro Model Bathymetry - Alternative 4
D-2-27	Micro Model Flow Visualization - Alternative 4
D-2-28	Depositional Trends - Alternative 4


MISSISSIPPI RIVER
MN
WI
IOWA
ILLINOIS
MADISON
WATERLOO
DUBUQUE
ROCK RIVER
OMAHA
DES MOINES
ROCK ISLAND
QUAD CITIES
PEORIA
QUINCY
SPRINGFIELD
ILLINOIS RIVER @ FARM CREEK
ST. LOUIS
DISTRICT PROJECT
MAJOR CITIES
Miles: 35 70 105 140 175
Project Location
U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND
PREPARED BY:
T. Kinseng
CHECKED BY:
M. Martens
LOWER PEORIA LAKE MICRO MODEL STUDY
LOCATION MAP – LOWER PEORIA LAKE
PLATE NO. D-2-1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ILLINOIS WATERWAY
MILE 162.0 TO 164.0
MAP NO. 63
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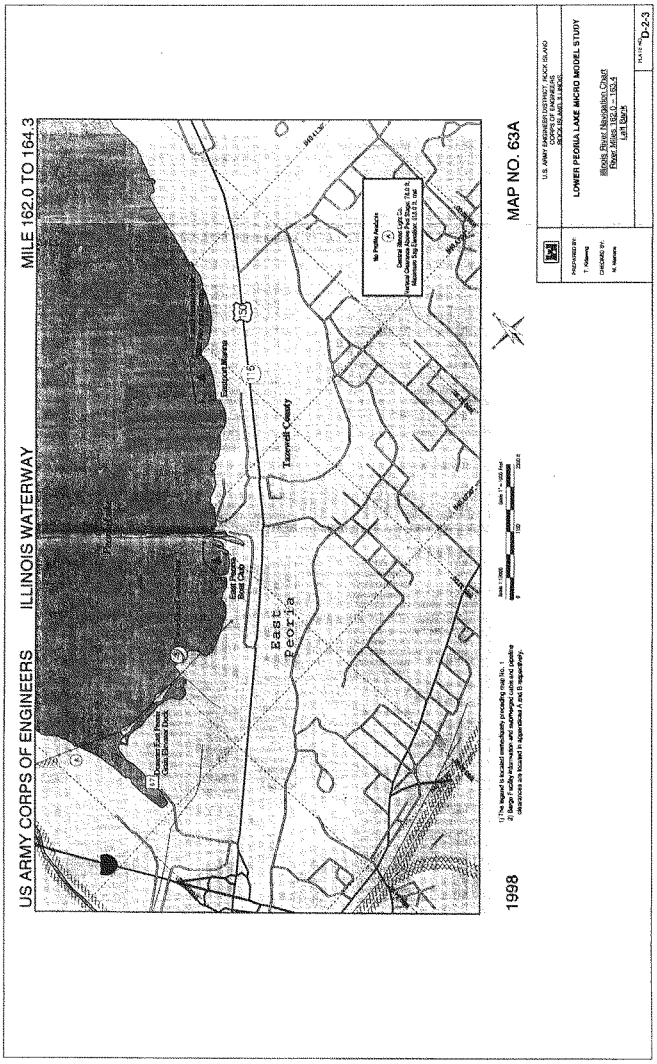
LOWER PEORIA LAKE MICRO MODEL STUDY
Illinois River Navigation Chart
River Miles 162.0 - 164.1
Upper Reach
D-2-2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ILLINOIS WATERWAY
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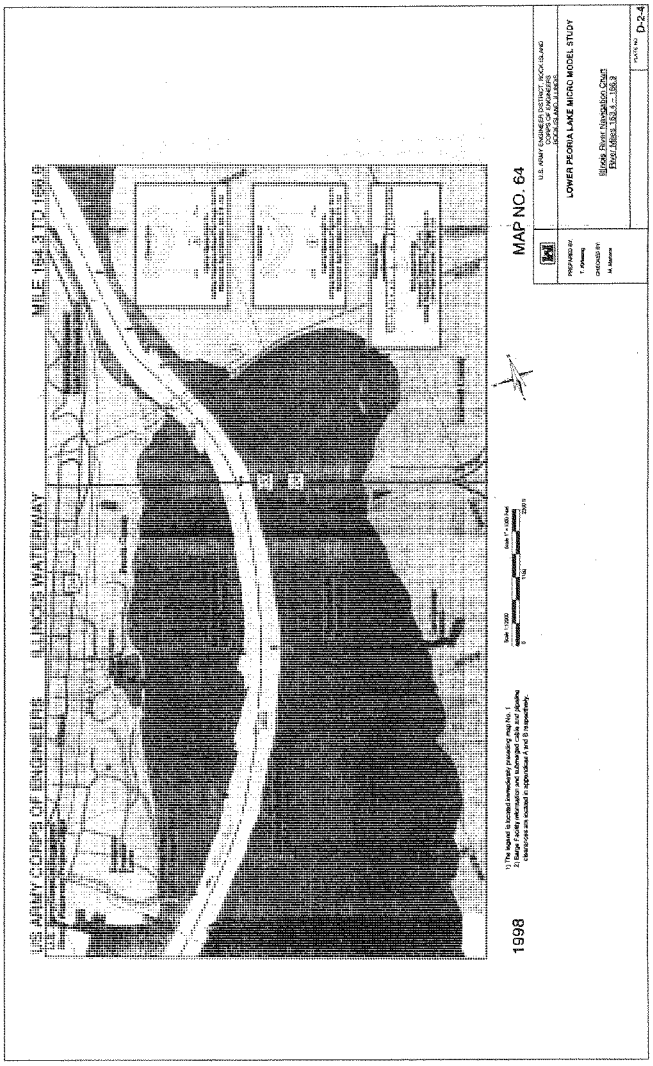
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS
LOWER PEORIA LAKE MICRO MODEL STUDY
Illinois River Navigation Chart
River Miles 162.0 – 163.4
Left Bank
D-2-3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Illinois River Navigation Chart
River Miles 154.4 – 156.9
PLATE NO. D-2-4

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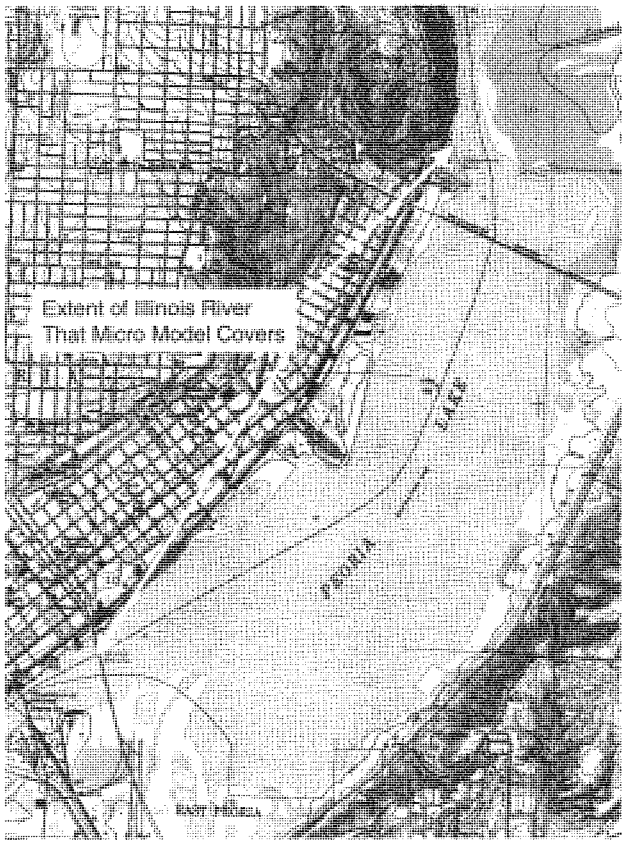
PREPARED BY T Wheeling
CHECKED BY M Martens

Lower Peoria Lake Micro Model Study

Photograph of Peoria Micro Model

PLATE NO
D-2-5



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ROCK ISLAND

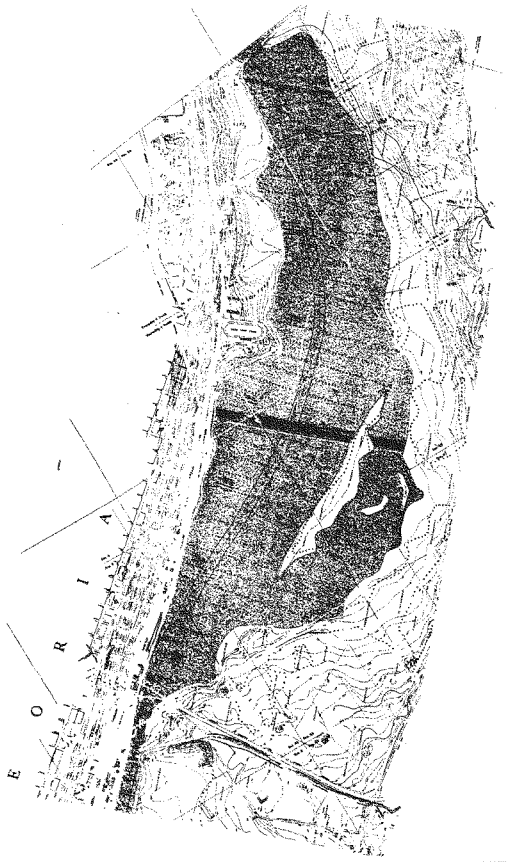
PREPARED BY:
T. Kirkpatrick

CHECKED BY:
M. Martens

LOWER PEORIA LAKE MICRO MODEL STUDY

USGS Quadrangle Map of Lower
Peoria Lake – Calibrated Reach

PLATE NO. D-2-6



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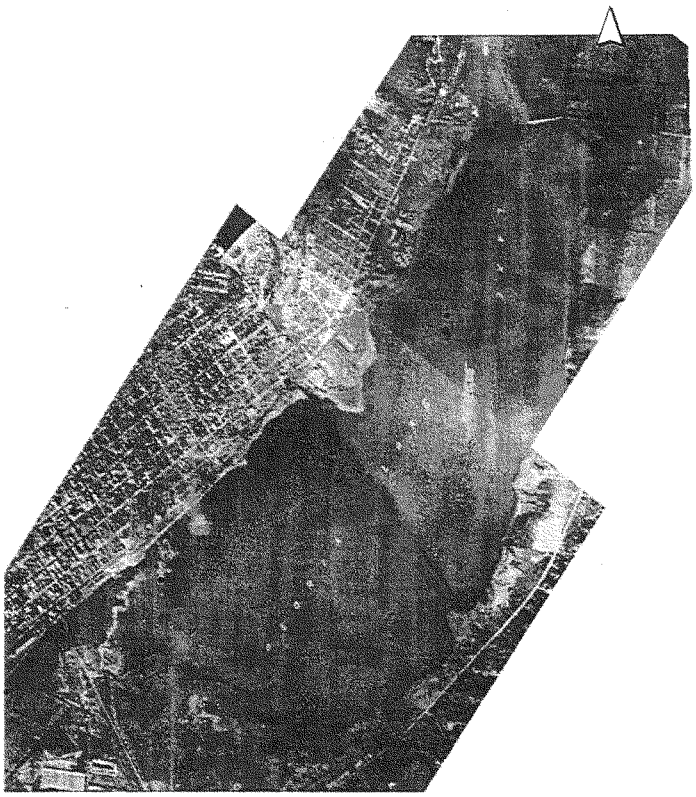
CHECKED BY M. Martens

Lower Peoria Lake Micro Model Study

1903 Map of Lower Peoria Lake

PLATE NO
D-2-7



1 0 1 2 Miles

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T. Kirkeeng
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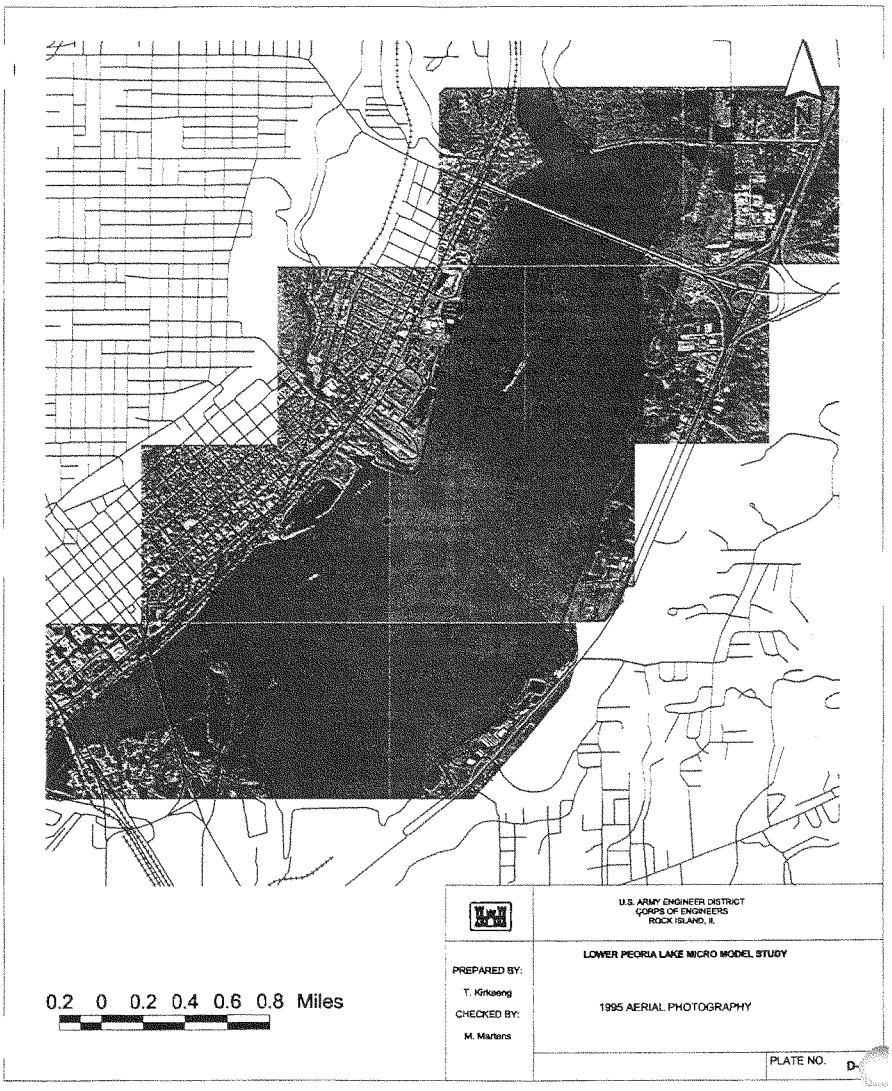
M. Martens

LOWER PEORIA LAKE MICRO MODEL STUDY

1930 AERIAL PHOTOGRAPHY

PLATE NO. D-2-8


0.2 0 0.2 0.4 0.6 0.8 Miles
U.S. ARMY ENGINEER DISTRICT
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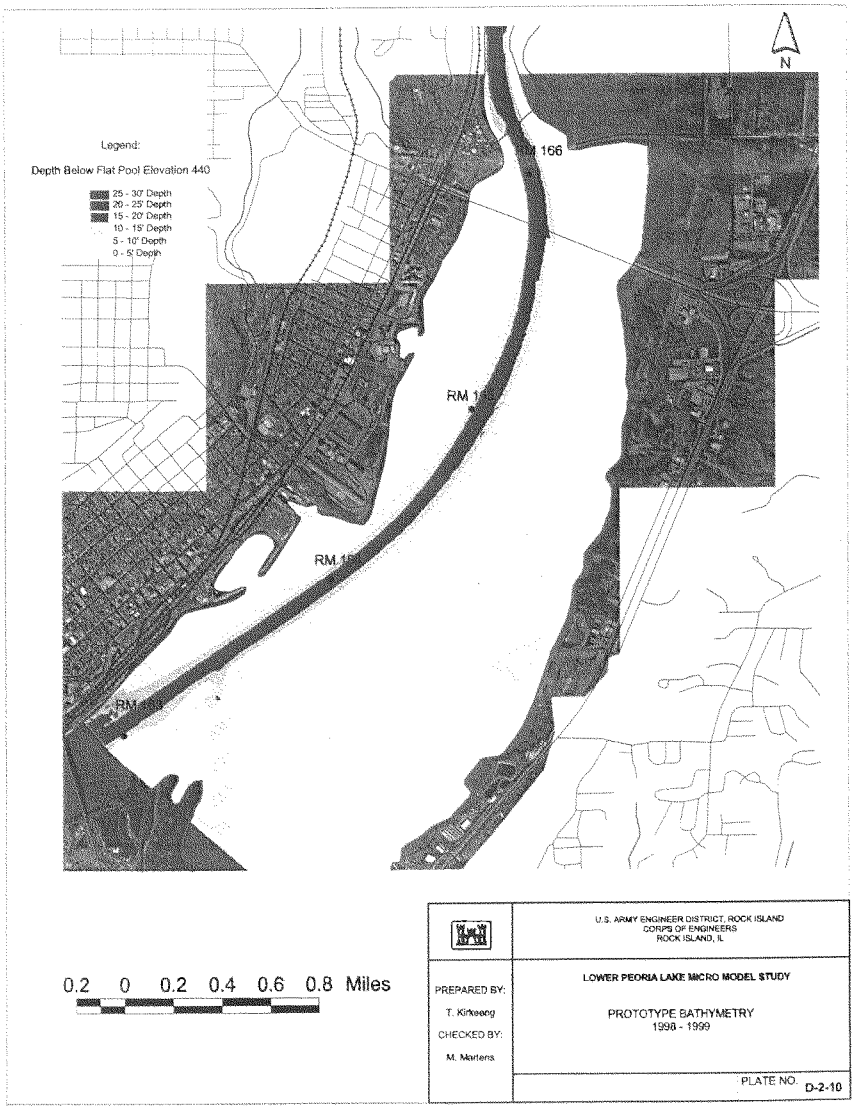
ROCK ISLAND, IL
LOWER PEORIA LAKE MICRO MODEL STUDY
PREPARED BY:
T. Kirkeeng
CHECKED BY:
M. Martens
1995 AERIAL PHOTOGRAPHY
PLATE NO. D-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25 - 30' Depth
20 - 25' Depth
15 - 20' Depth
10 - 15' Depth
5 - 10' Depth
0 - 5' Depth
RM 166
RM 1
RM 1
RM
0.2 0 0.2 0.4 0.6 0.8 Miles
U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
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LOWER PEORIA LAKE MICRO MODEL STUDY
PREPARED BY:
T. Kirkeeng
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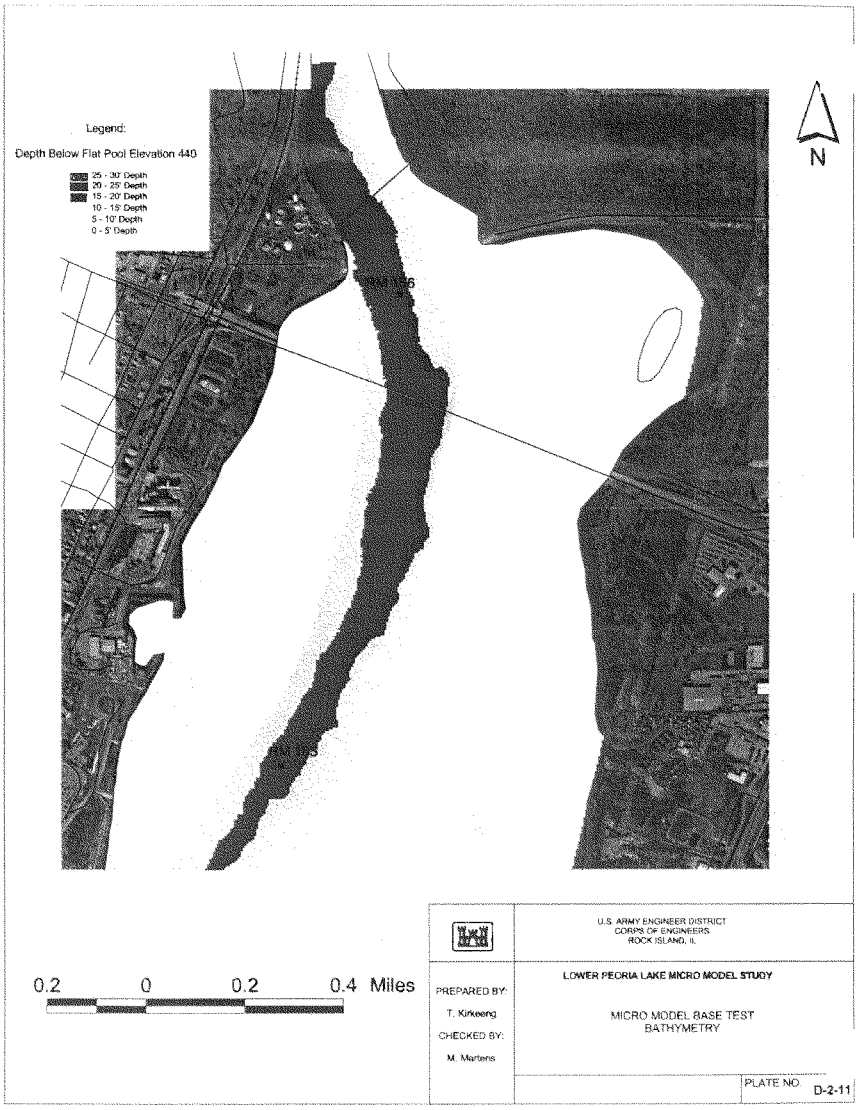
M. Martens
PROTOTYPE BATHYMETRY
1998 - 1999
PLATE NO. D-2-10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Depth Below Flat Pool Elevation 440
25 - 30' Depth
20 - 25' Depth
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5 - 10' Depth
0 - 5' Depth
N
0.2 0 0.2 0.4 Miles
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ROCK ISLAND, IL
LOWER PEORIA LAKE MICRO MODEL STUDY
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M. Martens
MICRO MODEL BASE TEST
BATHYMETRY
PLATE NO.
D-2-11

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ROCK ISLAND, IL

LOWER PEORIA LAKE MICRO MODEL STUDY

PREPARED BY:
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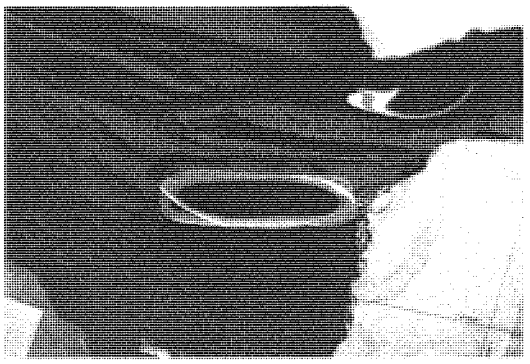
CHECKED BY:
M. Martens

MICRO MODEL BASE CONDITION
FLOW VISUALIZATION

PLATE NO. D-2-12



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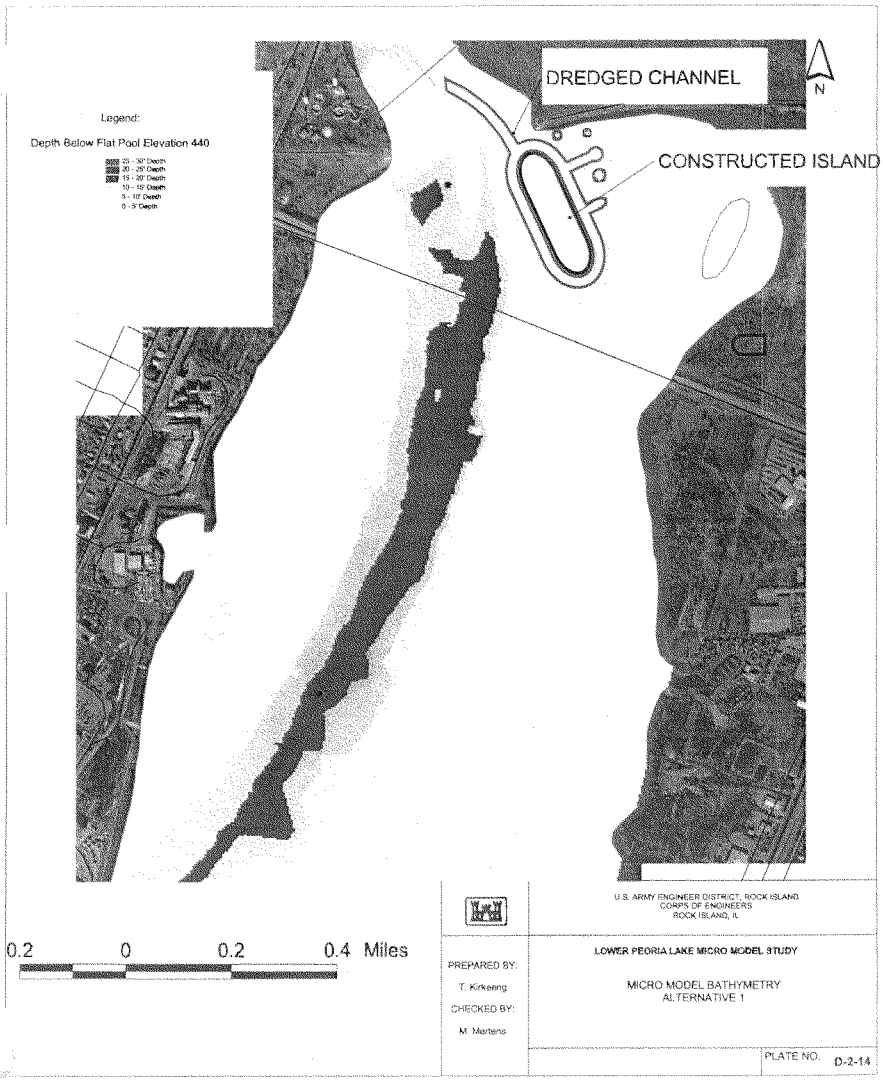
ROCK ISLAND, ILLINOIS

PREPARED BY: T. Kinsberg
CHECKED BY: M. Medeiros

Lower Peoria Lake Micro Model Study

Photographs of Alternative
One in the Micro Model

PLATE NO.
D-2-13


DREDGED CHANNEL
N
CONSTRUCTED ISLAND
Legend:
Depth Below Flat Pool Elevation 440
25 - 30' Depth
20 - 25' Depth
15 - 20' Depth
10 - 15' Depth
5 - 10' Depth
0 - 5' Depth
0.2 0 0.2 0.4 Miles
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ROCK ISLAND, IL
LOWER PEORIA LAKE MICRO MODEL STUDY
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CHECKED BY:
M. Martens
MICRO MODEL BATHYMETRY
ALTERNATIVE 1
PLATE NO. D-2-14

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LOWER PEORIA LAKE MICRO MODEL STUDY

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M. Martens

ALTERNATIVE 1
FLOW VISUALIZATION

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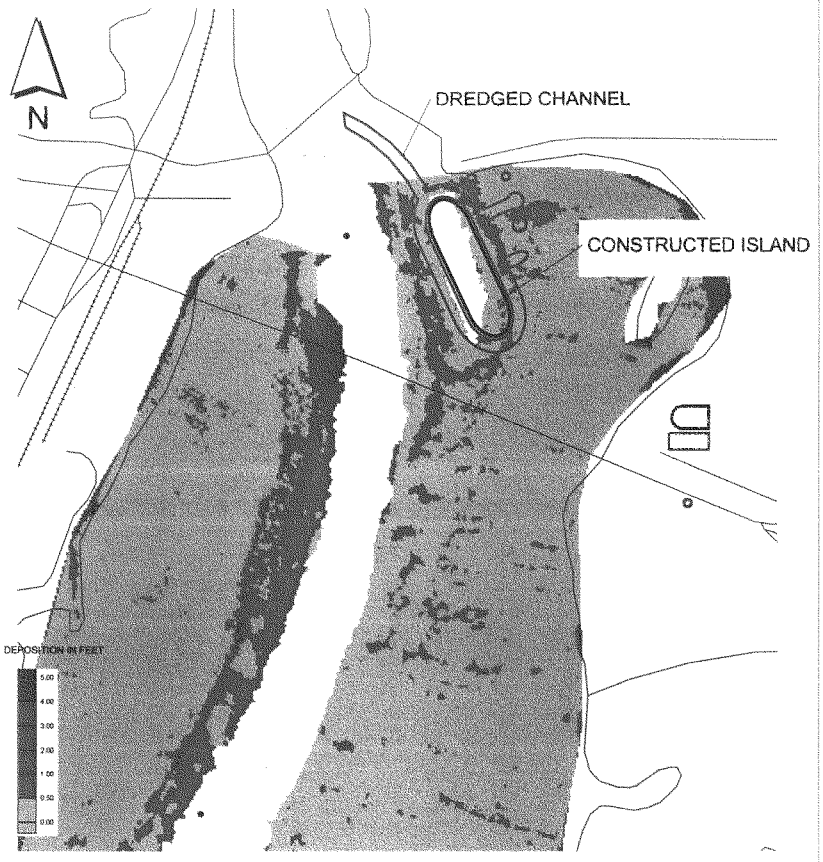


Constructed Island and Dredged Channels installed in model. Flow and suspended material introduced in model. Deposition measured and plotted.

U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, IL

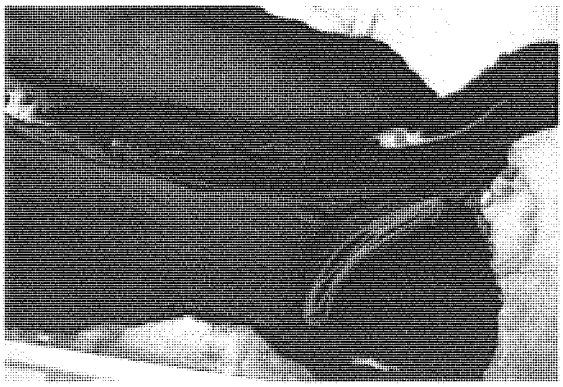
LOWER PEORIA LAKE MICRO MODEL STUDY

PREPARED BY: T. Kirkseng

CHECKED BY: M. Martens

DEPOSTIONAL TRENDS
ALTERNATIVE 1

PLATE NO. D-2-16



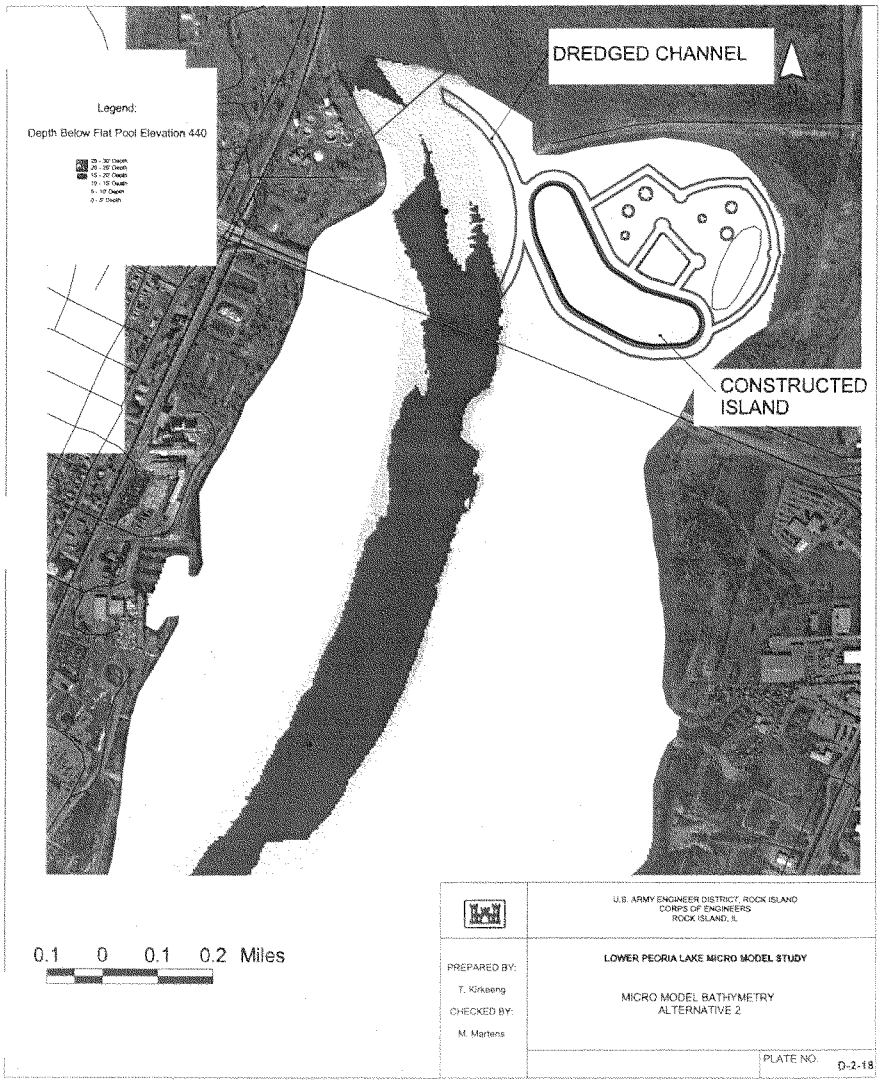
U.S ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

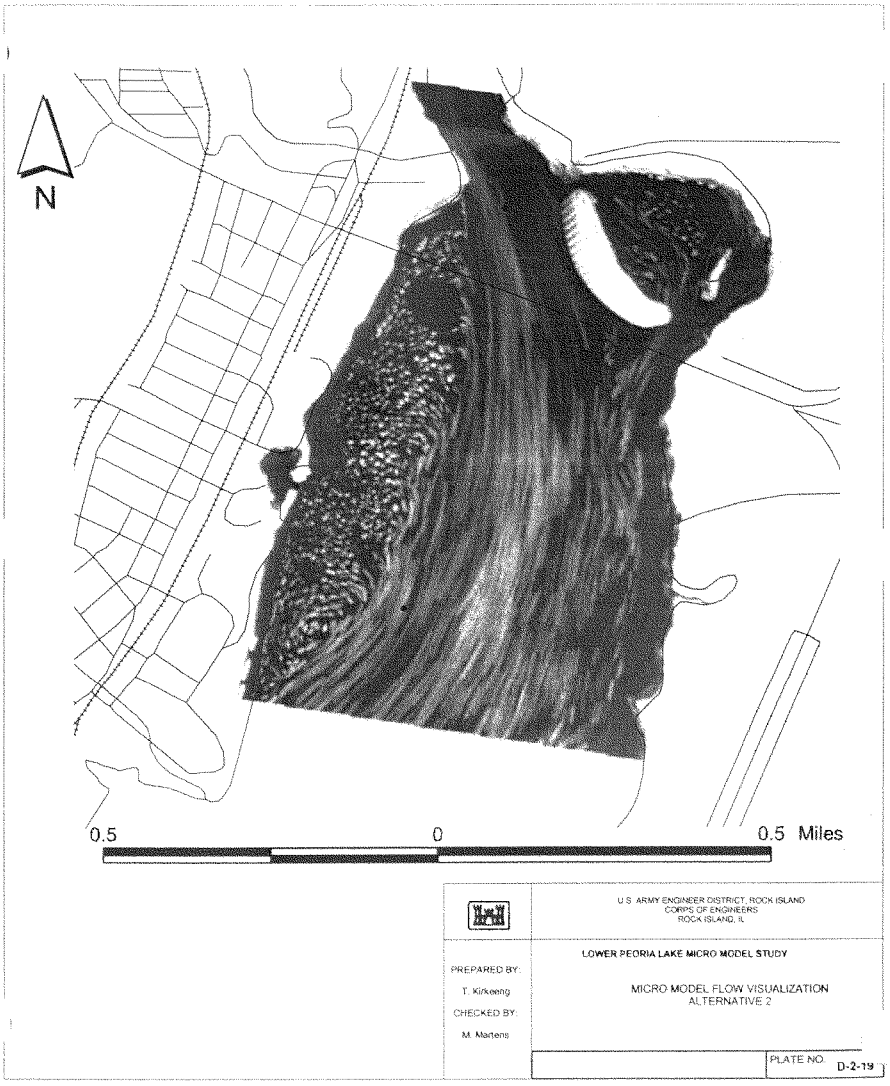
PREPARED BY: T. Kirkeeng
CHECKED BY: M. Markert

Lower Peoria Lake Micro Model Study

Photographs of Alternative
Two in the Micro Model

PLATE NO
D-2-17


DREDGED CHANNEL
Legend:
Depth Below Flat Pool Elevation 440
CONSTRUCTED ISLAND
0.1 0 0.1 0.2 Miles
U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, IL
LOWER PEORIA LAKE MICRO MODEL STUDY
PREPARED BY:
T. Kirkeeng
CHECKED BY:
M. Martens
MICRO MODEL BATHYMETRY
ALTERNATIVE 2
PLATE NO.
D-2-18



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CORPS OF ENGINEERS
ROCK ISLAND, IL

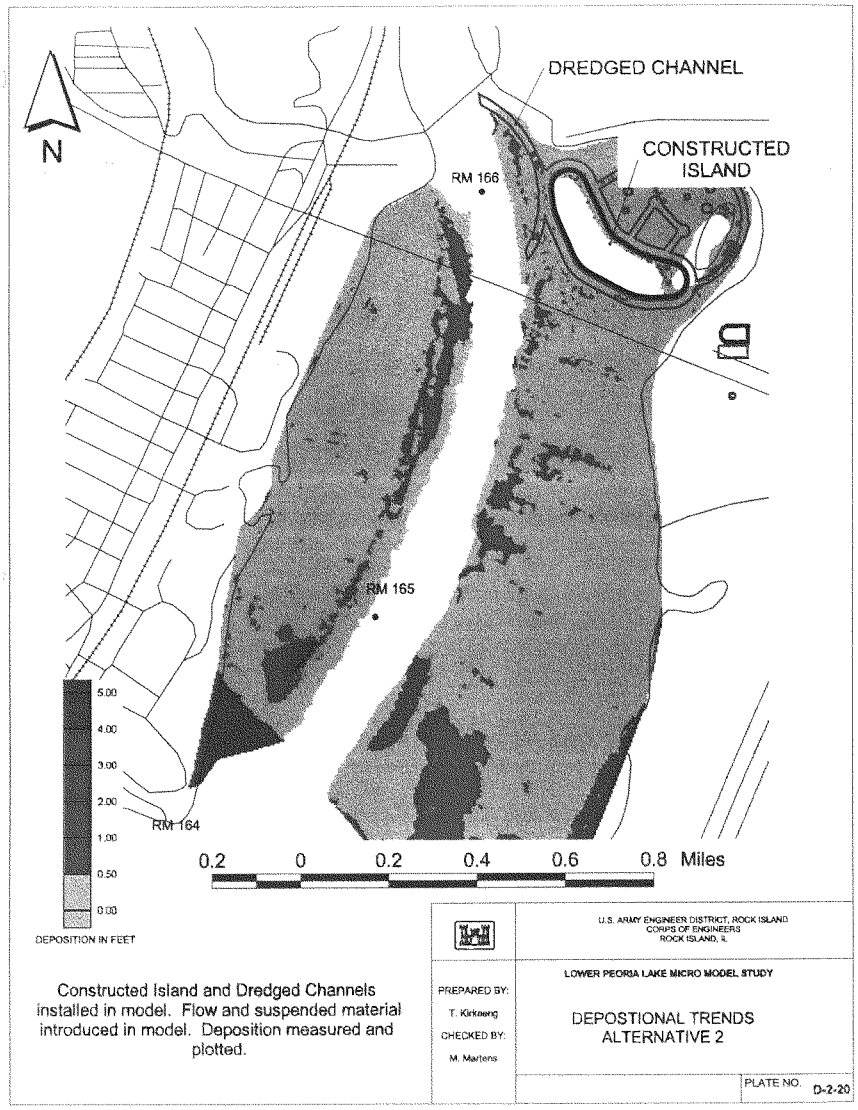
LOWER PEORIA LAKE MICRO MODEL STUDY

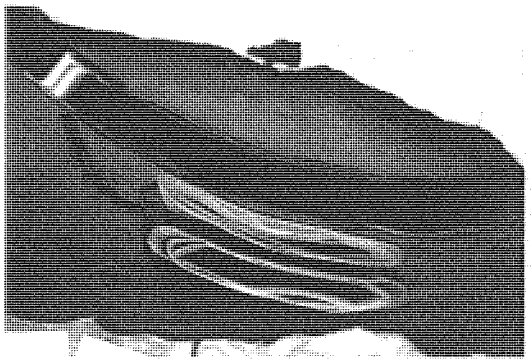
PREPARED BY:
T. Kirkeeng

CHECKED BY:
M. Martens

MICRO MODEL FLOW VISUALIZATION
ALTERNATIVE 2

PLATE NO. D-2-19


N
DREDGED CHANNEL
CONSTRUCTED ISLAND
RM 166
RM 165
RM 164
5.00
4.00
3.00
2.00
1.00
0.50
0.00
DEPOSITION IN FEET
0.2 0 0.2 0.4 0.6 0.8 Miles
Constructed Island and Dredged Channels installed in model. Flow and suspended material introduced in model. Deposition measured and plotted.
U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, IL
LOWER PEORIA LAKE MICRO MODEL STUDY
PREPARED BY:
T. Kirkeeng
CHECKED BY:
M. Martens
DEPOSTIONAL TRENDS
ALTERNATIVE 2
PLATE NO. D-2-20



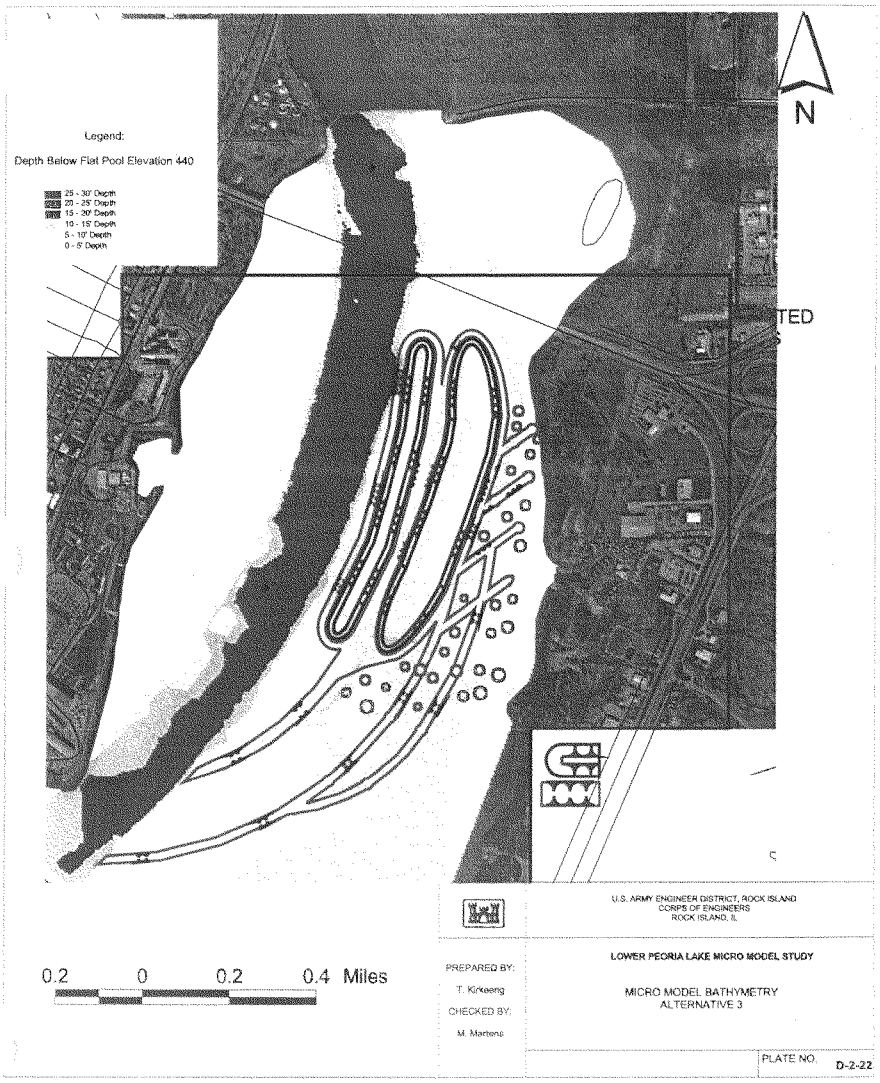
U.S ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

PREPARED BY: J. Kohlberg
CHECKED BY: M. Martens

Lower Peoria Lake Micro Model Study

Photographs of Alternative
Three in the Micro Model

PLATE NO.
D-2-21


Legend:
Depth Below Flat Pool Elevation 440
25 - 30' Depth
20 - 25' Depth
15 - 20' Depth
10 - 15' Depth
5 - 10' Depth
0 - 5' Depth
N
TED
0.2 0 0.2 0.4 Miles
U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, IL
PREPARED BY:
T. Kirkeeng
CHECKED BY:
M. Martens
LOWER PEORIA LAKE MICRO MODEL STUDY
MICRO MODEL BATHYMETRY
ALTERNATIVE 3
PLATE NO.
D-2-22

U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, IL

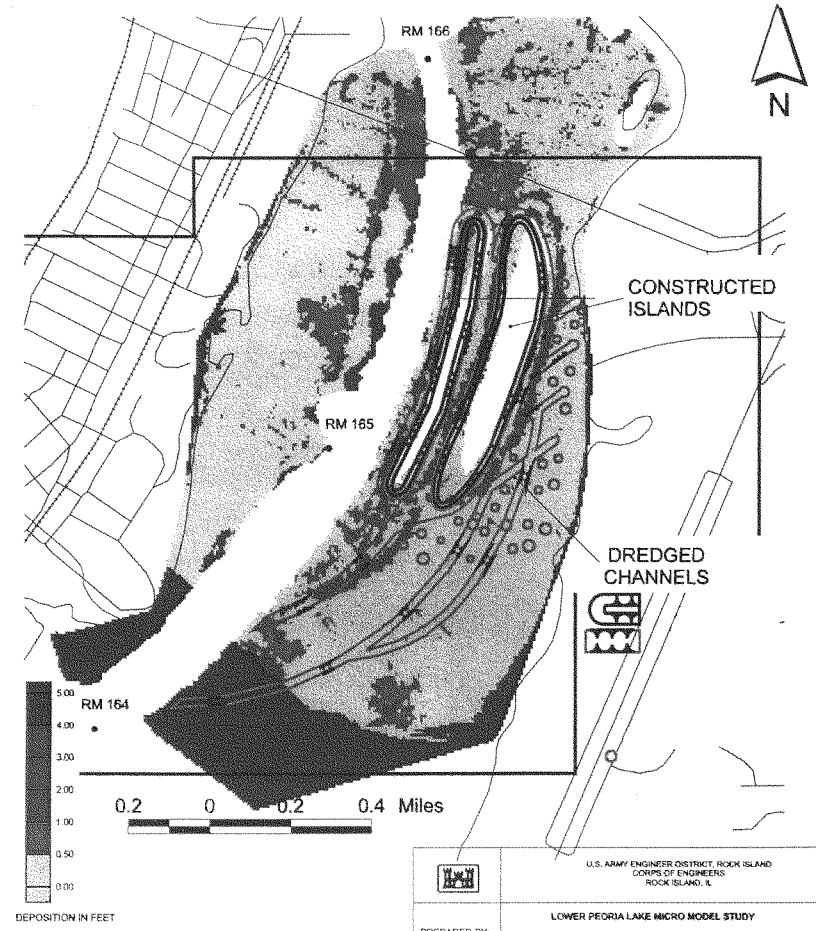
LOWER PEORIA LAKE MICRO MODEL STUDY

PREPARED BY:
T. Kirkeeng

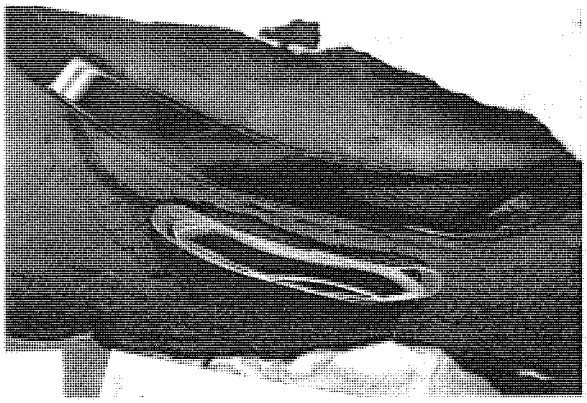
CHECKED BY:
M. Martens

MICRO MODEL FLOW VISUALIZATION
ALTERNATIVE 3

PLATE NO. D-2-23



Constructed Islands and Dredged Channels installed in model. Flow and suspended material introduced in model. Deposition measured and plotted.

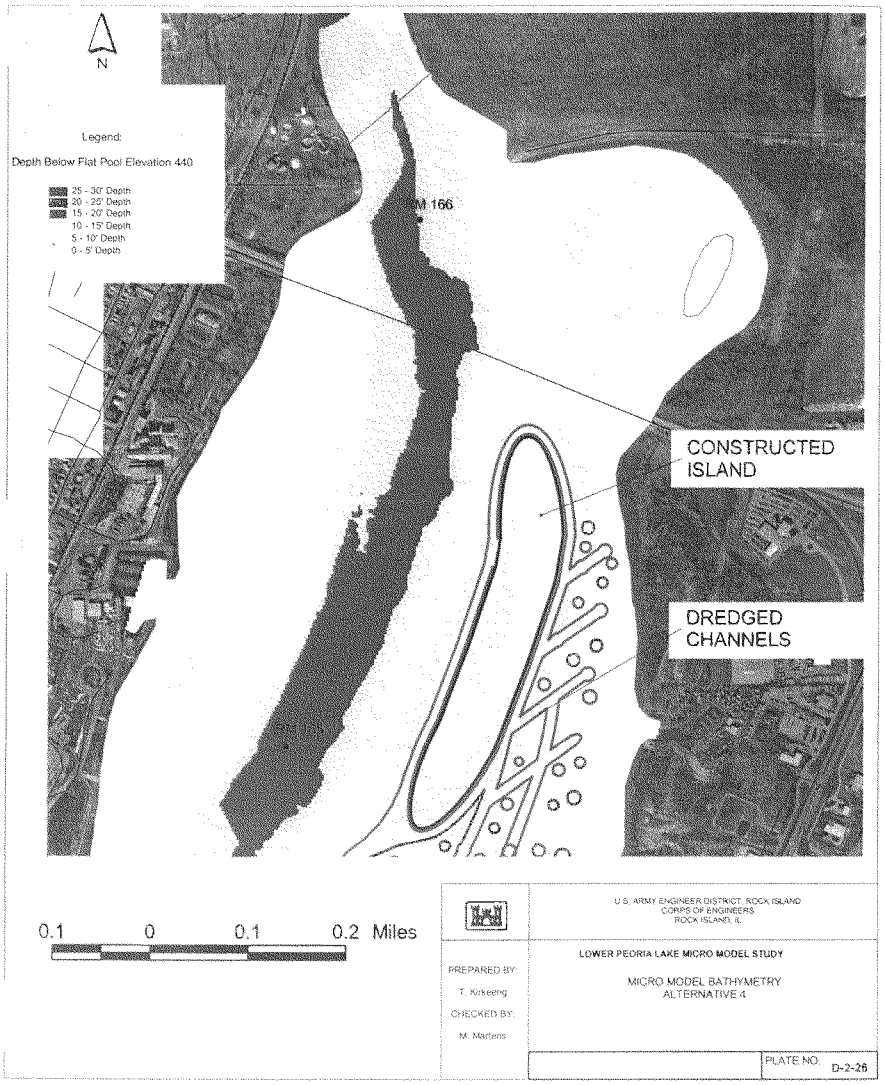


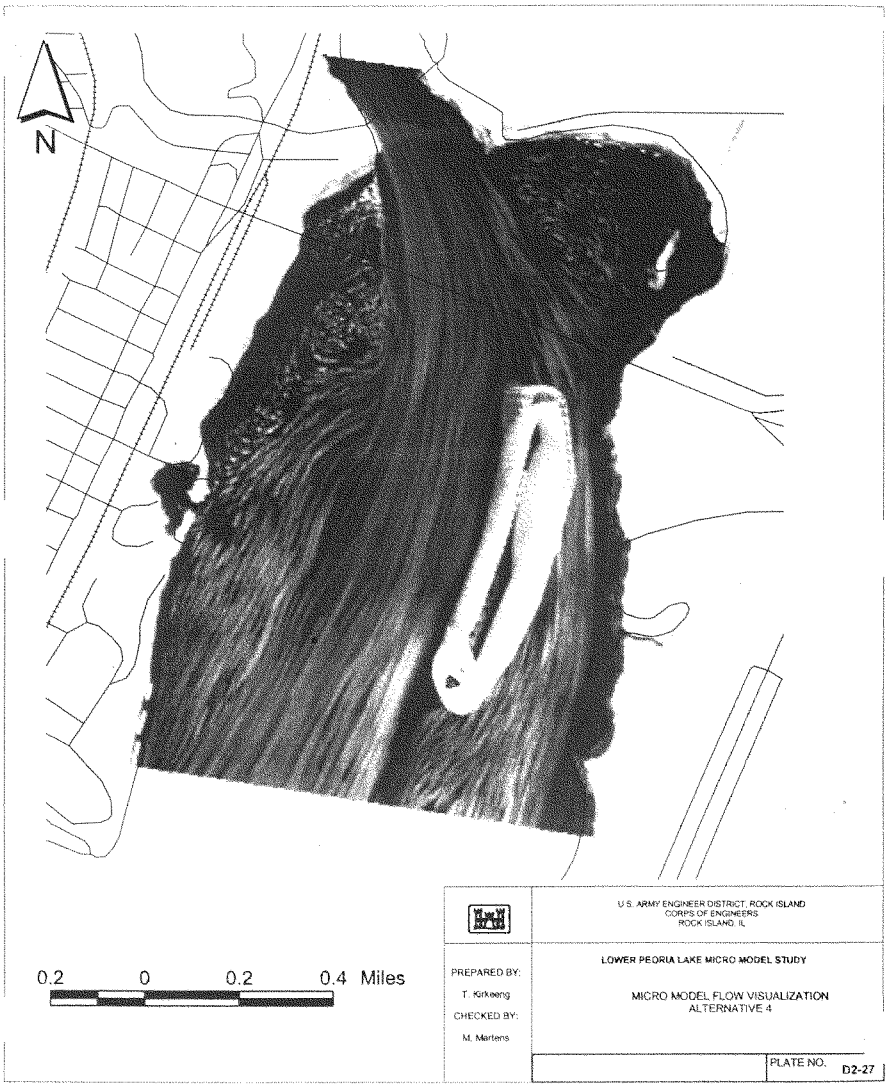
U.S ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

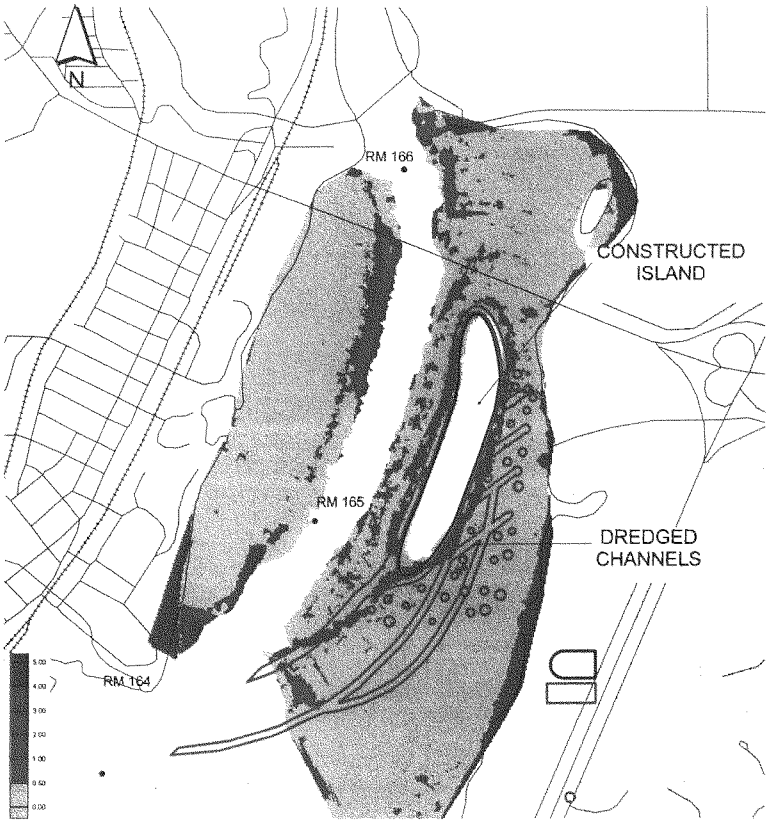
Lower Peoria Lake Micro Model Study

Photographs of Alternative
Four in the Micro Model

PLATE NO.
D-2-25


N
Legend:
Depth Below Flat Pool Elevation 440
25 - 30' Depth
20 - 25' Depth
15 - 20' Depth
10 - 15' Depth
5 - 10' Depth
0 - 5' Depth
RM 166
CONSTRUCTED ISLAND
DREDGED CHANNELS
0.1 0 0.1 0.2 Miles
U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, IL
LOWER PEORIA LAKE MICRO MODEL STUDY
PREPARED BY:
T. Kirkeeng
CHECKED BY:
M. Martens
MICRO MODEL BATHYMETRY
ALTERNATIVE 4
PLATE NO. D-2-26


N
0.2 0 0.2 0.4 Miles
U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, IL
LOWER PEORIA LAKE MICRO MODEL STUDY
PREPARED BY:
T. Kirkeeng
CHECKED BY:
M. Martens
MICRO MODEL FLOW VISUALIZATION
ALTERNATIVE 4
PLATE NO. D2-27



DEPOSITION IN FEET

Constructed Island and Dredged Channels installed in model. Flow and suspended material introduced in model. Deposition measured and plotted.

U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, IL

LOWER PEORIA LAKE MICRO MODEL STUDY

PREPARED BY:
T. Kirkeeng
CHECKED BY:
M. Martens

DEPOSITIONAL TRENDS
ALTERNATIVE 4

PLATE NO. D-2-28

APPENDIX D-3

HYDRODYNAMIC MODELING FOR ARTIFICIAL ISLAND CONSTRUCTION WITHIN THE LOWER PEORIA LAKE

Hydrodynamic Modeling for Artificial Island Construction Within the Lower Peoria Lake

by

Nani G. Bhowmik, Principal Scientist
Mike Demissie, Principal Scientist and Head
Watershed Science Section
Illinois State Water Survey
Champaign, Illinois

Introduction

This letter report summarizes the work conducted by the Illinois State Water Survey in support of the potential artificial island construction within the Lower Peoria Lake by utilizing the dredged lake bed sediments. As part of the Peoria lakefront study, the state of Illinois, Department of Natural Resources and the U.S. Army Corps of Engineers (USACOE), Rock Island District are jointly working to develop feasible alternatives to place dredged sediment from the Peoria Lake. It was decided that the feasibility of constructing artificial island with dredged materials within the Lower Peoria Lake will be one of the major emphasis in the immediate future.

Lower Peoria Lake offers an opportunity and option to locate, build and maintain artificial islands with dredged materials. Moreover, not only the location or locations are suitable from a hydrodynamic and hydraulic point of view, but they also could be constructed on a lakebed that is owned by the state of Illinois.

Construction of artificial islands with dredged materials within Peoria Lake is neither new nor novel. The USACOE with direct support from the state of Illinois, have already constructed two barrier islands within the Upper Peoria Lake near Chilliocothe on the east side of the river. The barrier island closer to the main navigation channel was constructed by clem-shell type dredging operation using only the top soft sediment layer. It was assumed that this barrier island would be washed away by the Illinois River flow. Since its construction, the island did not get washed away and is still in existence providing important terrestrial and shoreline habitats.

The other barrier island constructed parallel to the barrier island closer to the main channel, was constructed on the east side of the island with soft sediment. This island was constructed by relatively hard sediment that was also dredged by clem-shell type dredging. These sediments were dredged from the Lake below the top soft sediments. This barrier island on the east side has stayed very stable, and vegetation, etc. have grown heavily and presently is an important Illinois River migratory bird habitat. The dredged channel from where the sediments were taken, are still in very good shape after being left alone for five to six years.

These two examples from the Upper Peoria Lake illustrate the viability and the sustainability of constructing artificial islands with dredged materials. It is quite clear that the Peoria Lake sediment can and should be able to sustain itself within the lake environment if those are used to construct artificial island or islands. The sustainability of the dredged channel as a deep-water habitat if properly oriented, sized and built next to the artificial island could also be sustained.

The work being reported here was undertaken to determine the appropriate location or locations of artificial islands within the lower Peoria Lake.

Historical Sedimentation Problems

The Peoria Lake is located upstream of the Peoria Lock and Dam at RM 157.6 and extends approximately up to Chillicothe, RM 180. Peoria Lake is also called the bottomland lake of the Illinois River and has been subjected to extensive sediment deposition. The profile of the Illinois River shown in Figure 1 indicates that the river also changes its slope to a much flatter gradient within the Peoria Pool. This flatter slope within the Peoria Lake also accelerated the deposition of sediments over the years.

Many researchers worked on the Illinois River and the problems associated with the excessive sediment deposition. Some of the original research on the sedimentation problems of the Peoria lake and Illinois River and the backwater lakes can be found in Demissie and Bhowmik (1985), Bhowmik et. al (1993), Demissie et. al (1992), Bhowmik and Demissie (1989). Initial research on mathematical modeling for the construction of artificial islands within the Peoria Lake was also done in 1988 by Demissie et. al (1988). Recently Bhowmik and Demissie (2001) completed a project on the historical sediment deposition at or near the mouths of five tributary deltas of the Peoria Lake. These are: Richland Creek, Partridge Creek, Blue Creek, Dickison Run and Farm Creek.

Management of excessive sediment load within the Peoria Lake must be done at two geographical locations. These are: a) at the watershed level, and b) within the lake environment. Just a pure control of the sediment input from the watershed will not show any substantial sediment reduction to the lake for many years to come. At the same time, trying to manage the sediment within the lake environment without controlling the input of the sediments from the watershed will also not be a very successful operation.

As part of the Peoria Lakefront Development project of the State of Illinois and the USACOE, it was agreed that one option for sediment placement would be to build artificial island or islands within the Lower Peoria Lake by utilizing the sediment that have already been deposited within the lake environment. As previously mentioned this is not a new concept. The original conceptual idea and mathematical modeling work was done by Demissie et. al (1988). After the publication of that report several artificial islands of various shapes and sizes with a varied degree of objectives have been built within the Upper Mississippi River. The barrier islands near Chillicothe were also built within the Upper Peoria Lake.

There are numerous benefits of constructing artificial islands with dredged materials. Some of these benefits were enumerated by Demissie et al. (1988). There have been several artificial islands constructed in various parts of the country. The following materials essentially came from the publication by Demissie et al. (1988).

Construction of artificial island(s) within the Peoria Lake will:

1. ***Provide improved and diversified aquatic, riparian, and terrestrial habitats.*** The dredging of lake sediment at selected areas would create variable water depth habitats in areas that are presently very shallow. The dredged areas and the shoreline of the islands can be contoured so that they provide the desired water depth at selected locations during different water stages in the Illinois River. Such an arrangement should provide improved and diversified aquatic habitat for fish and other animals.

   Because of the variable stages of the river, different parts of the islands would be inundated at different times. Some of these areas would behave like natural wetland areas and provide a different form of habitat that would enhance the aquatic habitat. Further up at higher elevations on the islands there would be areas that would not be inundated by water every year. These areas could be designed to provide riparian and terrestrial habitats to supplement the aquatic and wetland habitats. This should benefit both waterfowl and shore birds that are found in the Illinois River valley. In addition, the island habitat could provide a refuge to migratory and nesting birds.

2. ***Serve as dredged material disposal sites for selective dredging.*** At present, frequent dredging is not required in the Peoria Lake area to maintain the navigation channel. However, that may not be the situation in the future as the deeper portion of the lake keeps shrinking due to the continuous sedimentation in the lake. In some locations where the tributary deltas are very close to the navigation channel, as in the case of the Tenmile and Blue Creek Deltas, navigation channel dredging may be needed sooner than in other areas. Therefore, it would be to the long-term benefit of navigation interests to have sites to dispose of dredged material in Peoria Lake.

   A large part of Peoria Lake needs to be dredged if it is going to provide deep water for fish and wildlife habitat and for recreation. If no dredging is performed, a large part of the lake will be transformed to mud flats and wetlands. However, dredging a large part of the lake would be expensive and will not likely happen. Therefore, with the limited financial resources available for lake rehabilitation, only selected areas could be dredged. If some selected areas are going to be dredged, then there is a need to find a disposal site for the dredged material. It is very unlikely that the necessary state and federal permits could be obtained for disposing of dredged material in the river channel and flushing it downstream, as is popularly believed. Thus islands would be an advantageous addition to the proposals for dredging in Peoria Lake. This will enable the management agencies to dispose the dredged sediment within the lake environment but not harming the present habitats.

3. ***Reduce wind- and navigation-induced resuspension of sediment and turbidity.*** One of the major environmental problems in Peoria Lake is the resuspension of fine sediment due to wind- and navigation-induced waves. The problem is aggravated by the shallowness of a large part of the lake and fine unconsolidated sediment at the bottom of the lake. Peoria Lake is over a mile to as much as two miles wide (west to east) at many places. Lower Peoria Lake is about 4 miles long, and Upper Peoria Lake is over 14 miles long in a south-to-north orientation. These dimensions and the prevailing wind direction in the area, which is southwesterly, provide long fetches for wind to generate waves sufficient to resuspend the sediment in the lake frequently. Navigation and recreational boating also generate significant waves that resuspend sediment in the lake. Therefore the construction of islands that reduce the fetch of the wind would reduce the generation of waves in the protected areas and the resuspension of bottom sediment into the water column. At the same time, constructing islands between the navigation channel and some parts of the lake would shelter the area on the opposite side of the navigation channel from waves generated by tows and pleasure crafts. This would reduce the negative impacts of navigation and recreational boating in some areas of the lake.

4. ***Reduce sedimentation rates in the areas where islands are constructed.*** Constructing islands in Peoria Lake should create slightly reduced flow areas, thus increasing the flow velocity through the area. In Peoria Lake, the flow areas are so large that the velocities under existing conditions are very small, resulting in high sedimentation rates. Increasing the flow velocity could reduce the sedimentation rate in the areas where the islands are built.

5. ***Provide more suitable water-based recreational sites in Peoria Lake.*** At the present time only a small part of the lake is used for recreation. These areas are limited to Lower Peoria Lake and lower part of Upper Peoria Lake. The availability of suitable recreational areas will continuously diminish as the lake fills up with sediment. At the same time the need for water-based recreation is expected to increase. Selective dredging and island construction would provide some relief to the shrinking recreational areas in the lake by increasing areas for water-based activities such as boating, sailing, and water skiing.

6. ***Provide a side channel away from the navigation channel for safe recreational boating.*** One of the concepts developed in this project is the inclusion of winter fish habitat and side channels along the island. The side channel, in addition to providing an improved winter aquatic habitat to that provided by the shallow channel border areas, would provide a safe recreational boating and sailing channel away from the navigation channel and its large commercial navigation crafts.

The concept of constructing artificial islands in Peoria Lake has been developed as part of a comprehensive lake management program. After exhaustive analysis of the different alternatives available to rehabilitate Peoria Lake, selective dredging and creation of artificial islands with the dredged material appear to be the most promising alternatives to deal with the sediment already in the lake. Indiscriminate dredging of the whole or even just part of the lake is not feasible for many reasons. The major reason is the cost of dredging and, most importantly,

the cost of disposing of the sediment. Therefore, a sound alternative will include dredging selected areas of the lake and using the dredge material to construct islands, which will improve the aquatic and terrestrial habitat in the lake.

The selection of the dredge sites and the location of islands is an important consideration in implementing a long-term lake rehabilitation and management program. The dredge sites and the islands have to be located such that the new environment created can be integrated into the river and lake environment and sustained for a long period of time. The best method for achieving such an environment in Peoria Lake is to establish side channels by dredging and use the dredged material to partially build the islands as will be illustrated subsequently. If properly designed and constructed, this arrangement of islands and side channels should maintain and sustain itself and blend in with the natural environment very well. In fact, the presence of a side channel and an island or groups of islands is a common feature in the Illinois River valley in areas where the river does not flow in constructed reaches. Therefore, the selection of island and side channel locations in Peoria Lake should be based on establishing an environment that functions and looks like a natural environment and that improves the overall quality of the lake for fish and wildlife habitat and for recreation.

Study Purpose, Goals, and Rationale

After extensive discussions between the State of Illinois, USACOE, and local interested citizens, agency representatives and others it was decided that:

- Attempts will be made to build one or more artificial islands within the Peoria Lake,
- Before any such island is built, a thorough hydrodynamic analysis supported by the state-of-the-art modeling work will be done,
- The modeling work will be conducted for the Lower Peoria Lake below the narrows where higher potential exist to build one or two islands in the immediate future.
- The results from the hydrodynamic model will be used as a guide to determine the size, shape, orientation and locations of potential island or islands,
- The modeling results will be used to identify the zones or areas of the island(s) where protective blankets may be needed to withstand the erosive forces of the water or the potential effects of high wave activities, and
- The final selection of the islands will be made by joint deliberation of the state, federal, and interested parties,
- The modeling results will also be used as a guide to determine the viability of the deep water channels that will be created to remove the sediments from the lake bed.

Mathematical models are great tools if used properly to postulate what could happen if an action such as building of artificial islands within the Peoria Lake is completed. It provides an opportunity to test various sizes and shapes of islands with a multitude of orientation, top elevation and also at numerous locations. Mathematical modeling work can also be done within a relatively shorter period of time initially to eliminate various options, which are not feasible

because of a variety of constraints and/or reasons. Some of these are: hydraulic instability, impracticability due to excessive generations of high velocities, significant changes in the water surface elevations during flood, potential of river bank erosion, significant modifications of the flows away from the main navigation channel, and simple impracticability of building island or islands at certain locations.

Initially, various island options were discussed, rough sketches drawn, debated based on the expert knowledge of the river and then either rejected or accepted for modeling purposes. It was also decided that the Surface Water Modeling System, RMA-2 will be used to test the hydraulic viability of building island or islands within the Lower Peoria Lake.

SMS Model Description

The model used for this project is the Surface Water Modeling System (SMS) which is a two-dimensional finite element model in plane coordinates. It was developed by the Engineering Computer Graphics Laboratory at the Brigham Young University in close cooperation with U.S. Army Waterways Experiment Station (WES) and the U.S. Federal Highway Administration (FHWA).

For the Peoria Lake, the hydrographic data collected by the USACOE from the Rock Island District in 1998-99 were used in the creation of the finite element grid. Where overbank elevation data were not collected, those gaps were filled by utilizing the contour elevations from the U.S. Geological Survey 1:24,000 Quad maps. The Manning roughness values were assigned for six different zones along the cross section which included main channel, channel border, shallow areas and areas near the one percent flood elevations. Other parameters were assigned based on hydrodynamic properties of an alluvial river. The model was calibrated utilizing stage data collected at the Peoria Lock and Dam, Boatyard and Chillicothe. Calibration and verification was also done for three flow events, one high flow event in February 1997, two medium flow events one each in February-March of 1997, and another one in May-June of 1996, and two low flow events once each in August 1996, and November 1995.

The USACOE from the Rock Island District (Personal Communications) made available to the Water Survey the 2-dimensional Acoustic Doppler Current Profiler (ADCP) velocity measurements data at several locations within the Lower Peoria Lake. The measured velocity data were provided in vector forms across the width of the river. The flow for which these velocity data were collected varied from about 23,000 cfs to 25,000 cfs. Several sets of the lateral velocity data collected from about the same location do not match with one another. One cross section, designated here as Cross-Section 1 is located at approximately River Mile (RM) 163.7 provided a very good lateral velocity distribution, which was used to test the model results to those measured in the field.

The model was ran for a flow of 25,000 cfs and lateral velocity distribution at RM 163.7 was plotted. The simulated lateral velocity distribution and the measured velocity distribution at

Cross-Section 1 is plotted in Figure 2. A visual comparison will show that the simulated and measured velocities are quite close indicating an excellent fit.

Flows Modeled

The flow data available at various locations and analysed by the USACOE (1992) for RM 80 to 290 along the Illinois River was used to determine the flows and stages along the Peoria Lake. For example, a flow having a frequency of occurrence of one percent (1%) is also termed as 100 year flood or flow. The flow frequencies and corresponding flows and stages at Peoria Lock and Dam, and Chillicothe based on the USACOE (1992) are shown in Tables 1and 2. These values were used to run the RMA-2 model for various flows.

Normally all open channel hydraulic geometries are analyzed and/or determined based on a flow having a frequency of occurrence of about 2.33 years which is also termed as bankful discharge or dominant discharge. However, when the Illinois River flows through the Peoria Lake it is not flowing through an ordinary and normal river channel. The Peoria Lake is quite unique, it is very broad and wide and has a tremendous amount of storage capacity. This uniqueness of the Peoria Lake makes it extremely difficult to categorize it into a standard river geometrical pattern. This is quite amply illustrated in Tables 1 and 2.

Table 1 shows the flows at various frequencies at Chillicothe, which is upstream of the Peoria Lake. Table 2 shows similar values at Peoria Lock and Dam which is downstream of Chillicothe. Consequently, drainage areas at Peoria Lock and Dam are slightly higher than those at Chillicothe. However, the flows for various frequency of occurrences at Chillicothe is higher than those at Peoria Lock and Dam. This amply illustrates the fact that the storage of the Peoria Lake is quite significant and it plays a dominant role in the estimation of flows between the upstream and downstream cross sections of the Peoria Lake.

Subsequent sections will illustrate the results obtained after the RMA 2 model was ran for various flows and several island options. It should be pointed out here that the readers should keep in mind that the Peoria Lake has a tremendous amount of storage and as such the measured flows from the upstream to downstream sections may vary within the same day depending upon whether or not the stages are increasing or falling at any particular time.

Two flows were selected by the USACOE, Rock Island District (Personal Communications, 2001) to show what would happen to the velocity structure with and without any islands. One of the flows is low flow and the other has a frequency occurrence of 2 years. Results from these two flows, 15,000 cfs and 45,000 cfs, will now be illustrated. The 45,000 cfs is the 2-year flow at Chillicothe (Table 1). This was used as a surrogate for the bankful discharge, which normally has a frequency of occurrence of 2 years. The decision to use 2-year flow as the design flow was made by the Interagency Committee based on the concept of "bankful discharge."

Selection of 15,000 cfs for flow modeling was done based on analyses by the Rock Island District USACOE on suspended sediment loads at Chillicothe (Personal Communications, 2001).

The Rock Island District USACOE found that the greatest amount of suspended sediment moved during a flow in and around 15,000 cfs even though flood flows would move more sediments. However, flows near 15,000 cfs occurred more often than larger flows.

Alternatives Modeled

Results from four (4) separate island shape, orientation and locations are given below. These possible islands sites are either located upstream or downstream of the McClugge Bridge. As mentioned previously, these sites are suitable for island construction because of the hydraulics of the flows and the availability of deposited sediments. Several alternatives were tested, altered, changed, modeled and discussed before the four final alternatives were selected. The fundamental and basic considerations behind these alternatives are their suitability and sustainability against 2-year flow events. Also, considerations were given whether or not excessive scour or sediment are expected because of the flows around these islands.

All the islands were somewhat stream lined. Figures 3 and 4 show these four alternatives within the Lower Peoria Lake. Alternatives 1 and 2 are located upstream of the McClugge Bridge and Alternatives 3 and 4 are located below McClugge Bridge. Modeling results to be included in the next section will show how these islands, if constructed, would alter the flow patterns for a flow of 15,000 cfs and 45,000 cfs.

Table 1 and 2 showed that at both the Chillicothe and Peoria Lock and Dam, the stages for a 2-year flow is 448.4 ft-msl and 447.2 ft-msl, respectively. In order to assure that the islands would not be completely flooded for 2-year flow, the interagency committee recommended the top elevations of all the islands to be kept at 450 ft-msl. With this height, the terrestrial plants and animals will survive a 2-year flood. All subsequent model runs were completed assuming all the islands have a top elevation of 450 ft-msl.

Modeling Results

The modeling results to be shown are for islands that are suggested for final consideration. Engineering design or geotechnical analyses are neither included nor completed for this specific component of the project. Because an extensive amount of plots and figures are included with this letter report, all the figures are given at the end of the report.

Flows Modeled

The modeling work was completed for flows of 15,000 cfs, 25,000 cfs and 45,000 cfs. As mentioned previously, detailed modeling work was done only for flows of 15,000 cfs and 45,000 cfs.

No Island

SMS was initially run for the entire Peoria Lake without any island at any location to determine the undisturbed flow conditions. Results from this modeling work were used to

determine the initial boundary conditions for that segment of the river from the constriction at about RM 166.3 through RM 165.2. This spatial extent of the model covered the areal extent of the four island options that have been selected for further analyses. The elevation variations for the modeled area are shown in Figure 5.

Twenty-Five Thousand Cubic Feet per Second (25,000 cfs)

The spatial velocity distribution for a flow of 25,000 cfs is shown in Figure 6. Again the maximum velocity is near the constriction between the upper and lower Peoria Lake, which approaches a value of about 2.6 fps. Again, the majority of the flow is confined within the main channel with some spreading as the water moves in the downstream direction. This velocity structure generated based on this flow was used to calibrate the model results with the measured velocity data provided by the USACOE, Rock Island District (Personal Communications 2001), see Figure 2. The lateral measured velocity data that were used for calibration is at a cross section shown in this figure.

Forty-Five Thousand Cubic Feet per Second (45,000 cfs)

The spatial velocity distribution without any island and also for a flow of 45,000 cfs are shown in Figure 7. The maximum velocity near the constriction is about 3.50 fps. The flow does spread out even though most of the flow is confined within the navigation channel.

Alternative 1

Figure 8 shows the Elevation Map or Topographic Map of the Lower Peoria Lake with the proposed Alternative 1 island. The top elevation of the island is 450 ft-msl. The normal pool elevation of the Peoria Lake is 440 ft-msl. The flow in this figure is from top to bottom. The main channel is on the right side or west side of the river. Left and right sides are determined based on an observer standing on the middle of the river and looking downstream. The lightly shaded areas around the proposed island are the zones where dredging will be performed to create deep-water habitats. The lines shown in light colors are the proposed deep water channel. This illustration also shows the three lateral cross sections where lateral velocity distributions will be analyzed subsequently. In this illustration, cross sections are identified from upstream to downstream direction. This will be true for all subsequent illustrations. Flow is again from top to bottom.

The SMS model was run for a flow of 45,000 cfs. The lateral depth integrated velocities thus obtained are depicted in Figure 9. Some general observations from this figure are :

- As suspected, because of the semicircular shape of the island at the leading and tail ends, flow velocities at these locations become close to zero.
- The velocity at this zone is either negligible or very low.
- At the upper top right hand edge (looking downstream), it is quite possible that additional sediment will be deposited in the future making this end of the island elongated. A

portion of this elongated stretch will stay below normal pool level and apportion very close to the proposed island may extend above normal pool level in the future.

- The middle portion of the tail end of the island may also experience similar fate in the future because of the existence of extremely low velocities. It is suspected that ultimately and also in the long run, the tail end of the island may be elongated assuming a shape similar to an air foil.

The velocity structure has further been analyzed by constructing lateral velocity profiles at three cross sections as shown in Figured 8 and 9, and these are shown in Figures 10, 11 and 12. The locations of these cross sections are given in Figures 8 and 9.

All the cross-sectional velocity distributions for all the alternatives have been plotted looking downstream (i.e. for the Peoria Lake), the left hand side of the plots are on the east side of the navigation channel. At all the cross sections, the depth integrated average velocities at the verticals at the dredged channel next to the main channel and on the west side of the island, do increase as a result of the construction of the island.

These changes in velocities are given in Table 3. All the points (such as 1, 2, etc.) shown in Table 3 are also identified in Figures 10, 11 and 12. Points 1, 3 and 5 are associated with the constructed island and points 2, 4 and 6 are associated with the ambient flow conditions.

A close examination of Table 3 and Figures 10, 11, and 12 will show that velocities do increase next to the island for this flow of 45,000 cfs. This increase in velocities at the deep channel next to the island is obviously desirable for the future maintenance of these newly created deep-water channels. The maximum increase is for Cross-Section 2, on the main channel side, i.e. right side (looking downstream) of the island where the velocities increased from about 0.44 fps to 0.52 fps.

Figures 13, 14, and 15 show the lateral vertical velocity distributions and the river cross-sections at Cross-Sections 1, 2, and 3, respectively for Alternative 1.

It must be pointed out that the lateral velocities shown in all the figures are the depth integrated average velocities at each vertical in the lateral direction.

Alternative 2

For Alternative 2, again an island above the McClugge Bridge is proposed. The plan form of this proposed island including the sediment removal area and the deep-water channels are shown in Figure 16. Figure 17 shows the depth integrated spatial vertical velocity distribution around this island. Again, the top of the island is at 450 ft-msl and the normal pool elevation of the lake is 440 ft-msl. The flow is from top to bottom.

An examination of this figure will show that:

- There is a very low velocity zone at the tip of the island on the right hand side

(looking down-stream). This indicates that there is a good probability that sediment may accumulate at this zone elongating the island somewhat in the upstream direction.

- The velocities on the inside of the island (left hand side) are either negligible or close to zero.
- The velocities near the upstream edge on the navigation channel side (right side of the island) may be somewhat high indicating that some protective measures may be needed.
- The velocities near the lower right hand side of the island are quite low. This may enhance the sediment deposition at this location extending the island in the downstream side. This indicates that the deep water channel at this location (lower right side of the island) may silt up at a higher rate than at other locations.
- The final shape of the island with time, especially the lower right side may be different than the constructed one.
- The changes in velocities are given in the next several illustrations.

Figures 16 and 17 also show the locations of three cross sections where the lateral velocity distributions with and without the island have been determined. Figures 18, 19 and 20 show the velocity distributions at these three cross sections. A close examination of Figures 18, 19 and 20 will show that the velocities do not change significantly on both sides of the island after the construction of the island. The velocities with and without the island are given in Table 4.

An examination of Figures 18, 19, 20 and Table 4 will show:

- Velocities do not change significantly next to the island except at Cross-Section 3 where an increase in velocities on the east side of the island is observed.
- This increase in velocities would enhance the relative maintenance of the deep water area.
- Velocities within navigation channel at Cross-Section 3 increase as a result of the construction of the island.

Figures 21, 22 and 23 show the lateral velocity distributions and the river profiles at the three cross sections shown in Figures 16 and 17 for Alternative 2.

During recent discussion with the USACOE, Rock Island District, it was felt that it would be appropriate to determine the changes in velocities if any in the downstream region once an island alternative such as Alternative 2 is in place. In order to determine such changes, lateral velocity distributions at Cross-Sections 4 and 5, Figure 24 was plotted with and without the island in place. Cross-Sections 4 and 5 are located below McClugge Bridge. These two plots of the lateral velocity distributions are given in Figure 25 and 26. An examination of these figures will show that very little or no changes do occur in velocities downstream of the McClugge Bridge if an island as shown in Alternative 2 is built above the McClugge Bridge.

Alternative 3

Figure 27 shows Alternative 3 with a pair of islands below the McClugge Bridge. This illustration also shows the sediment removal areas where deep-water habitats are to be created. These areas are shown with a geometric patterns with light shades. This illustration also shows the variations in elevations at various locations.

Figure 28 shows the spatial distribution of the depth-integrated velocities for a flow of 45,000 cfs. Areas shaded dark red are the areas where the velocities are computed to be very low. An examination of this illustration will show:

- Velocities are very low at the tips and tail ends of both the islands.
- These low velocities may enhance the sediment deposition at these locations.
- However, the extension of the island due to sediment deposition next to the navigation channel will be smaller compared to the larger island.
- The tail end of the larger island may extend in the downstream direction within the areas shown in dark red.
- The velocities along the right side (next to the navigation channel) of the smaller island will be relatively higher.
- The velocities between both the islands are expected to be higher than the ambient flow condition.
- There is an area on the left side of the larger island near the upstream zones where velocities are also going to be relatively high.
- Higher velocities on both sides of both the islands indicate that the newly created deep water channel may be relatively stable.
- Subsequent illustrations will show that the maximum velocities within the main channel do increase after the construction of the islands.

Figures 27 and 28 showed the locations of the three cross sections where the lateral velocity distributions have been determined with and without any islands. The three plots for three cross sections are given in Figures 29, 30 and 31. Examination of these three illustrations will substantiate the observations made previously. The velocities at different locations with and without islands are given in Table 5. In all locations, the velocities within the navigation channel increase with the islands in place compared to the pre-island conditions.

The lateral velocity distributions and the lateral river cross-sections at those three cross sections shown in Figures 27 and 28 are given in Figures 32, 33 and 34.

Alternative 4

The last alternative tested is Alternative 4, which is shown in Figure 35. For this option a single island is proposed below the McClugge's Bridge. The elevations, the island, proposed

deep-water habitat areas, and the three cross section locations are also shown also shown in this figure.

Figure 36 shows the spatial velocity distributions for a flow of 45,000 cfs with the island in place. An examination of this illustration will show that:

- There are low velocity zones at the tip and tail end of the island. Thus these areas are expected to have some sediment deposition in the future. The areas of expected sediment deposition at the tail end would be larger than at the tip of the island.
- The velocities are expected to be higher on both sides of the island and also for most of its length compared to ambient flow conditions and also at the same location.
- The inside shore (next to the navigation channel) is also expected to be subjected to higher velocities compared to the ambient flow conditions. This is especially true near the upstream inside shore of the island.

Lateral velocity distributions were computed at three different cross sections. These cross-sectional plots with and without islands are given in Figures 37, 38 and 39. Table 6 shows the velocities at selected six locations with and without the islands. An examination of these three illustrations and Table 6 will again substantiate the observations made previously. In almost all cases, the velocities next to the island increase somewhat compared to the ambient flow conditions. The velocity in the navigation channel also shows either no change or some increase in magnitudes.

The last three illustrations for Alternative 4, Figures 40, 41 and 42 show the lateral velocity profiles and the river cross sections at those three cross sections

Low Flows

Model was also run for a flow of 15,000 cfs. The following discussions are based on the results obtained for a flow of 15,000 cfs.

Base Condition: No Island

The RMA-2 model was ran for 15,000 cfs without any island in place. Figure 43 shows the depth integrated lateral velocity distribution for this flow. The velocity ranges from negligible to about 1.9 fps or a little higher. The higher velocities are located within the main channel and close to the constriction between the upper and lower Peoria Lake.

Alternative 1

For this alternative, the spatial velocity distribution for a flow of 15,000 cfs is given in Figure 44. An examination of this figure will show that there is a small zone of very low velocity at the upper river side edge and also at the downstream edge of the island. These areas again could experience sediment deposition in the long term. The river side areas of the island

do have slightly elevated velocities compared to the ambient conditions. This is amply illustrated in the next three illustrations.

Figures 45, 46 and 47 show the lateral velocity distributions at the three cross sections shown in Figure 44 starting at the upstream area. At all three cross sections, velocities on the river side of the island increase compared to the ambient conditions. The maximum velocities within the main channel remains essentially unchanged on at least two cross sections and at the upstream section, it drops slightly.

Alternative 2

The spatial velocity distribution for Option 2 for a flow of 15,000 cfs is shown in Figure 48. Again the velocity ranged from negligible to about 1.9 fps. There are some areas close to the river especially on the upper tip and lower one-third to one-half of the island, where velocities are extremely low. Again, these are the areas where sediment deposition is expected to occur in the future.

The lateral velocity distribution at all three cross sections is given in Figures 49, 50 and 1.

Alternative 3

The spatial velocity distribution for Alternative 3 and also for a flow of 15,000 cfs is shown in Figure 52. An examination of this figure will show that except for a zone near the upstream end of the wider island, and the downstream tip of the narrow island, the velocities do not change significantly next to the islands. In general, velocities are extremely low on the east side (left hand side looking downstream) of the larger island, which is expected for this area.

Figures 53, 54 and 55 show the lateral velocity distribution for Cross-Sections 1, 2 and 3 respectively, for Alternative 3 and a flow of 15,000 cfs. An examination of all these figures will show that the velocities between the two islands do increase compared to the ambient velocities. This was found to be true for a flow of 45,000 cfs. This indicates that the rate of sediment deposition in between these two islands may be lower compared to the ambient conditions.

Alternative 4

Modeling results for Alternative 4 and also for 15,000 cfs are shown in Figure 56. The spatial velocity distribution is given here. In general and also for this flow, the velocities do not approach zero on the west side of the island indicating that at this low flow period, the velocities may be high enough to keep this area relatively clean from the deposition of fine sediments. The maximum velocity is within the mail channel also in the upper most area of the main channel.

The lateral distributions of the velocities at Cross-Sections 1,2, and 3 are shown in Figure 57, 58 and 59, respectively. At all three cross sections, there is a very small decrease in the maximum velocities within the main channel. However, these minor changes should not impact in the scour and deposition of the sediments.

At Section 1, Figure 57, it is quite clear that the velocities on the east side of the island, or left hand side looking downstream do increase substantially from about 0.22 fps to about 0.57 fps. This is a substantial increase, which probably was caused by the constricted flow area between the island and the east shore of the lake (Figure 56). As the flow areas between the island and the east shore increase in the downstream direction, the velocities between the island and the east shore decrease, Figure 56.

Remarks

The velocity distributions shown above for flows of 45,000 cfs and 15,000 cfs can be used to estimate the stability of these islands against potential scour at those two flows. Evaluation of all the alternatives with associated velocity distributions indicates that all of these alternatives are feasible for construction. Interagency Committee members agreed with the environmental scientists that a combination of Alternatives 2 and 3 will provide the maximum benefits as far as the habitats are concerned.

Sediment Modeling

Initially it was felt that some sediment modeling work may be needed to determine the future potential sediment deposition at or near the islands. The model that was tried is called SED2D. SED2D is coupled with the SMS. A brief description of this model is as follows.

SMS includes a general computer program (SED2D) for two-dimensional, vertically averaged sediment transport in open channel flows. The initial code development was accomplished by Ariathurai (1974), then the two-dimensional model in the horizontal plane was extended to included the vertical plane by Ariathurai, MacArthur, and Krone (1977).

SED2D can be applied to clay or sand bed where flow velocities can be considered two-dimensional in the horizontal plane. It is useful for both deposition and erosion studies. SED2D treats two categories of sediment: (1) noncohesive referred to as sand, and (2) cohesive referred to as clay.

Both clay and sand may be analyzed, but he model considers a single, effective grain size during each run. Therefore, a separate run is required for each effective grain size. Fall velocity must be prescribed along with the water surface elevation, x-velocity, y-velocity, diffusion coefficients, bed density, critical shear stress for erosion, erosion rate constants, and critical shear stress for deposition.

SED2D does not compute water surface elevations or velocities; these data must be provided from RMA2. An implicit assumption of the SED2D is that the changes in the bed elevation due to erosion and /or deposition do not significantly affect the flow field. When the bed change calculated by SED2D does become significant, the flow field calculated by RMA2 is no longer valid. Thus, the SED2D run should be stopped, a new flow field calculation should be

made using the new channel bathymetry generated by SED2D, and the SED2D run should be restarted with the new flow field as input. This is a major limitation of SED2D, especially for the Peoria Lake where long term variation in bed is expected due to sediment deposition. These bed changes will alter the flow-field thus making the SED2D results essentially invalid.

SED2D can only be run after having initially run RMA2. As mentioned above, this is because SED2D uses the flow solutions computed by RMA2 to compute suspended sediment concentration in kilograms per cubic meters at the nodes, and the total bed change in meter form the start of the run. After SMS successfully reads in the boundary condition file, the SED2D menu will be enabled. To prepare for a SED2D run, the first is to define the bed type of the mesh. Either a sand or clay bed can be specified, but not both at the same time.

Attempts were made to run the SED2D for a flow having a probability of occurrence of 1%. This flow of 105,000 cfs with an initial input of sediment concentration equal to 0.5 kg/m^3 was used in the model run. All computations in SED2D are performed with metric units.

Results of these runs showed how a certain sediment concentration when introduced at the upstream end will distribute and dissipate over the lake after a certain time period. This type of analyses does not portray the changes in the bed elevation over a period of 10, 15, or 20 years when the inflow sediment transport of any river consists of suspended load and bed load. Moreover, the particle size distribution of these particles could and would vary from sand to silt or clay. Illinois River at Peoria Lake is not an exception to this normal sediment transport characteristic of an alluvial river.

Long-term goal of any sediment transport modeling within the Peoria Lake would be to estimate the spatial distribution of the sediment deposition patterns with and without the presence of the proposed island. These types of modeling exercise will require a constant input of suspended sediment loads whose concentration and particle size distributions would vary with time and also spatially. The model also had to run for a period of 10, 15, or 20 years. The SED2D model as it is formulated presently does not have that capability.

The simplest method to estimate the sediment deposition would be to review the old hydrographic data including the recent data collected by the Rock Island District of the USACOE. Once this analysis is done, then the rate of past sediment deposition can be extrapolated to make an estimate of the future sedimentation rate. This type of specific analysis is being done now by the Rock Island District of the USACOE.

Another model that could be used is the HEC-6 model of the USACOE. The HEC-6 model is a one dimensional steady flow model, which will give an estimate of the sediment deposition and scour over a time period. This type of modeling work would not provide any kind of quantification of the lateral variabilities in the sediment deposition patterns.

Shear Stress

Even though SED2D did not provide the necessary tools to estimate the long term bed changes in two dimensions due to sediment scour and or deposition, still this modeling exercise was utilized to estimate the spatial distribution of shear stresses for a flow of 45,000 cfs. The spatial shear stresses thus obtained for the ambient conditions and also for all four alternatives are given in Figures 60 through 64, respectively. The shear stress values shown are in SI units and they are given in Kg force per square meter. The conversion factor from Kg force/square meter to pounds per square feet (# force/ft^2) is 0.205.

An examination of all of these figures will show that the shear stresses at or near the two underwater banks of the navigation channel are relatively higher. Theoretically, this is what is expected for an open channel flow field where with a change in bank slope, a relative increase in shear stress in expected.

Islands: Bankline Stabilization

The modeling work performed so far can be used to make an estimate of the potential shoreline erosion of the island(s) due to the movement of the water after the islands are built. This type of analysis will only show the potential of erosion due to water movement only. In order to arrive at an estimated area or zones of the island shores where bank stabilization would be needed, the concept of the critical shear or tractive force as it is called or the concept of permissible velocities can be used. There are many textbooks where these values for different particle sizes are given. Table 7 shows some of these values (after Chow 1959). There are other analyses where the critical shear stresses are normally related to the median particle diameter of the bed materials. One such relationship is given by Equation 1 (after Highway Research Board, 1970).

$$\tau_c = 4d_{50} \qquad (1)$$

where τ_c is the critical shear stress in #/ft^2, and d_{50} is in ft.

In engineering design, normally a factor of safety is used to estimate the stable particle size. Factors such as gradation, maximum and minimum sizes, and need of a fitter blanket must also be considered in the design of riprap particles.

The maximum velocities computed for 45,000 cfs next to the islands are in the range of 3 fps. This shows that at some locations, some bank protection work will be needed especially to the side of the island next to the main channel and upstream ends of the island. However, effects of the waves generated by the wind or navigation traffic could finally dictate the need of bank protection work (Bhowmik et. al 1982, Bhowmik 1976, and Bhowmik et. al 1981). Bhowmik et at (1982) computed wind generated wave heights for a sustained wind duration of 6 hours having a frequency of occurrence of 50 years. That analysis for four sites on the Illinois and Mississippi Rivers showed that highest significant wave heights occurred in the month of March and ranged about 0.9 ft for 2-yr wind frequency and 1.6 ft for 50 year wind frequency. Therefore, it is suspected that similar wind waves can be expected also for the Peoria Lake.

Based on this analysis and a knowledge of the expected waves created by commercial and recreational boats, it is almost certain that the right hand side of the islands looking downstream will be subjected to high wave activities either generated by wind or river traffic. In order to protect against such wave activities and also against the zones of high velocities, it is suggested that protective bank stabilization work be installed on all four options at the locations shown in Figures 65, 66, 67, and 68, respectively. These areas or zones of potential protection were agreed on by the USACOE Rock Island District and the Water Survey Scientists based on a telephone discussion. In order to determine the approximate height for which the bank stabilization work along the island shores should be installed, an examination of the long-term water surface changes within the Peoria Lake was performed by the USACOE, Rock Island District (Personal Communication). The USACOE provided the frequency distribution plots of the water surface elevations for the period 1942 through 2000. These frequency plots were developed on a monthly basis and for the 12-month period. The yearly and the Period of Record (POR) frequency plot is shown in Figure 69.

An examination of Figure 69 will show that if the shore lines of the islands as shown in Figures 65 to 68, are stabilized from an elevation of about 439 ft-msl to 443 ft-msl, then the shore lines will be stable against a water surface variation for up to about 82 percent of the time. This means that for about 18 percent of the time, the shorelines will be subjected to water surface activities, which will not have any kind of artificial protective works. It is suggested that the protective works be installed for this zone between elevation variations of 439 ft-msl to 443 ft-msl.

There are numerous techniques that could be used to stabilize the lakeshores, which would be applicable for these islands. These could vary from structural techniques such as rock riprap, gabions, inter-locking blocks, geotubes and others. Non-structural techniques employing Bioengineering should also be suitable for some zones of the island shores. The USACOE will perform the engineering design for the shore stabilization work.

It would be worthwhile to repeat here that in almost all cases, it is expected that the stability of the islands, whether it is at the front ends, or on the west side, will depend on the wave activities whether from wind or river traffic.

Velocities Near McClugge Bridge

Construction of any of these alternatives either upstream or downstream of the McClugge Bridge could alter the flow patterns at or near the bridge. In order to determine the relative changes due to the potential construction of any one of these alternatives, the hydrodynamic modeling results were plotted at a cross section just upstream of the bridge (Figure 70). This illustration shows this cross section, termed Cross Section 7, and the other six cross sections used for island alternatives upstream and downstream of the bridge. The elevations at various locations for this segment of the river are also shown in this figure.

Figures 71 through 74 shows the lateral velocity distributions at this location for all four alternatives for a flow of 45,000 cfs. Each figure shows two velocity distributions, one associated with the ambient condition and one associated with the selected alternative. An examination of these figures will show that except for Alternatives 2, 3, and 4, the changes in velocities are negligible. However, for the Alternatives 2, 3, and 4, the velocity within the navigation channel does increase somewhat with an associated decrease in velocities outside of the navigation channels where most of the bridge piers are located. Therefore, it appears that construction of anyone of these islands should not impact the navigation channel as far as the sedimentation is concerned. At the same time, the altered flow structures due to the island construction would not enhance any scouring at or near the bridge pier.

The model was also ran for a flow of 15,000 cfs. The resulting lateral velocity distributions with and without the island(s) are given in Figures 75 through 78 for Alternatives 1 through 4, respectively. The comparative changes in lateral velocities with and without the islands are similar to those found for a flow of 45,000 cfs, however, with much reduced magnitudes.

This analysis has shown that the velocity structure near the bridge does not change significantly due to the construction of the island except for some increased velocities within the navigation channel and as associated decrease in velocities within the channel border areas.

Combined Alternatives

Based on the environmental and hydrodynamic modeling work, it was decided by the Interagency Committee, that a combination of Alternatives 2 and 3 would provide the maximum habitat benefits. In order to determine the hydrodynamic variabilities when these two alternatives are implemented, hydrodynamic modeling work has been completed for the combined alternatives. The modeling work was completed for 45,000 cfs and 15,000 cfs. The results are given in the following subsections.

Alternatives 2 and 3

These two alternatives were combined assuming that both sets of artificial islands will be built either together or in some type of sequential order. With this set up, the elevations for these two alternatives are depicted in Figure 79. The lateral cross-sections where velocity distributions have been computed are shown in Figure 70. Figure 80 shows the spatial velocity distribution for these two alternatives for a flow of 45,000 cfs. An examination of this figure will show that because of the presence of Alternative 3 in the downstream area, velocities next to Alternative 2 especially on the right (looking downstream) downstream side, do increase somewhat. This slight increase may keep this area relatively clear of sediments. Velocities are quite low at the tips of Alternative 2, right tip of the large island for Alternative 3, and downstream extreme tips of the smaller and larger islands for Alternative 3. It is expected that in the future some sediment accumulation may take place at these locations. Velocities between the two islands for

Alternative 3 are in the range of 0.50 fps to about 1 fps. No low velocities are observed at this area.

The next 7 figures, Figures 81 through 87, show the lateral velocity distributions at cross-sections 1 through 7 (see Figure 70 for cross-section locations) for a flow of 45,000 cfs for combined Alternatives of 2 and 3.

An examination of Figures 81-84 will show that with the combined alternatives, the velocity structures around Alternative 2 changes somewhat to those associated with Alternative 2 only, Figures 19, 20, and 21. The velocities do not increase and or decrease measurably within the main channel. At all three cross-sections there is an increase in velocities next to the island close to the navigation channel. This increase is higher than those observed with Alternative 2 only, Figures 19, 20 and 21.

Figures 84, 85 and 86 show the lateral velocity distributions at cross-sections 4, 5, and 6 (see Figure 70 for cross-section locations). These three cross-sections show the lateral velocity distributions for three cross-sections that pass through Alternative 3. An examination of these three cross-sections will show that the peak velocities within the main channel do increase with the construction of Alternative 2 and 3. This shows that the patterns of sediment deposition within the main channel will not be more than those present for the ambient condition. Except for this slight increase in velocities within the main channel, the lateral velocity structure for this combination and also around Alternative 3 is similar to those observed for Alternative 3 only, Figures 29-31, without the presence of Alternative 2.

The last illustrations for this flow and also for the combined alternatives is Figure 87 which shows the lateral velocity distributions at cross-section 7. Cross-section 7 is located just upstream of the McClugge's Bridge (see Figure 70 for cross-section locations). An examination of this figure and figures 72 and 73 associated individual Alternatives 2 and 3, respectively, will show that the lateral velocity distributions upstream of McClugge's Bridge associated with Alternatives 2 and 3, are similar to those associated with Alternative 3 only. Similar to Figure 73, there is a slight increase in velocities within the main channel and a slight decrease outside of the main channel on the left hand side (east side). This indicates that most of the bridge piers on the east side of the navigation channel will not be subjected to excessive velocities due to the possible construction of these two alternatives.

Figure 88 shows the spatial distributions of shear stresses for a flow of 45,000 cfs for Alternatives 2 and 3. The shear stresses shown are in Kg force per square meter. A comparison of the shear stresses for this combined alternatives to those present with individual alternatives, Figures 62 and 63 for Alternatives 2 and 3, respectively, will show that the patterns of shear stresses are similar even though some enhanced shear stresses are present with the combined alternatives. In all three illustrations, Figures 62, 63, and 88, higher shear stresses associated with the sides of the underwater banks of the navigation channel is quite evident. Theoretically those are the areas where higher shear stresses are expected.

The next seven (7) illustrations, Figures 89-95, show the lateral velocity distributions for a flow of 15,000 cfs at cross-section 1 through 7 (see Figure 70 for cross-section locations), respectively.

Figures 89-91 show the velocities at cross-section 1-3, respectively associated with the zone where Alternative 2 is located. These lateral velocity distributions are similar to those associated with a flow of 45,000 cfs (Figure 81-83). In general, main channel velocity do not change much with the construction of the alternatives and that at cross-section 2, Figure 90, there is a slight increase in velocity next the island near the main channel. Otherwise, the lateral distributions are quite similar to those present with a flow of 45,000 cfs except of course the absolute magnitudes of the velocities for 15,000 cfs are lower than those associated with a flow of 45,000 cfs.

Figures 92-94 show the lateral velocity distributions at cross-sections 4, 5, and 6 respectively (see Figure 70) within the areas where Alternative 3 is located. These lateral distributions of velocities are almost identical to those present for Alternative 3 alone for a flow of 15,000 cfs, see Figures 53, 54 and 55. Of course, the magnitude of the velocities associated with 15,000 cfs are obviously smaller than those associated with a flow of 45,000 cfs.

The last illustration in this series is the lateral velocity distribution at cross-section 7 (see Figure 70) just upstream of the McClugge's Bridge for a flow of 15,000 cfs for these combined alternatives. Again, the distribution of velocities are similar to those present with Alternative 3 alone, Figure 77.

This analysis of the velocities and shear stresses for a flow of 45,000 cfs and 15,000 cfs for the combined Alternatives of 2 and 3 has shown that the:

- Spatial and lateral velocities for the combined alternatives are similar to those present with the individual alternative,
- presence of the islands could slightly increase the velocities within the main channel indicating that sediment deposition and/or scour within the main channel will be similar to those present for the ambient flow conditions.
- velocities upstream of the McClugge's Bridge do not change measurable due to the construction of the islands, thus these islands should not impact the scour and sediment deposition at this location compared to that associated with the ambient flow condition, and
- these two alternatives as well as the individual alternatives could be built without measurably changing the flow patterns within the main channel.

Hydrodynamically, Alternatives 2 and 3 can be built without impacting the river hydraulics measurably. Some areas of the shores of these islands need to be protected as shown in Figures 66 and 67.

Summary

This letter report has summarized the hydrodynamic modeling work performed by the Illinois State Water Survey in support of the selection of Proposed Artificial Island Construction Sites within the Lower Peoria Lake. Previous studies and new hydrographic data collected by the USACOE have shown that the Peoria Lake has lost a significant amount of its capacity due to sediment deposition. There are several alternatives for the creation of deep-water habitats including the removal of the deposited sediments and placing them at appropriate locations. One of the alternatives is to create artificial islands with the sediments removed from the lakebed. This technique will not only create the needed deep-water habitats outside of the navigation channel, but it will also assist in the placement of dredged materials. Moreover, creation of artificial islands will also recreate terrestrial habitats and zones of lake surface with minimum wave activities which could enhance the reduction of turbidity in those protected areas.

The Illinois State Water Survey in close consultation of the USACOE, Illinois Department of Natural Resources (IDNR) conducted this mathematical hydrodynamic modeling work. The model selected is the two dimensional hydrodynamic unsteady modeling system called RMA 2. This model was calibrated and applied for the entire Peoria Lake with a special emphasis on the Lower Peoria Lake. The Interagency Committee selected the Lower Peoria Lake in and around the McClugge Bridge and on the east side of the navigation channel to be the site where the initial set or sets of islands could be built.

The modeling work was done for two flows, one having a frequency of occurrence of 2-years with a flow of 45,000 cfs. The other was a low flow condition of 15,000 cfs. All model runs were completed for 2-year flow, various alternatives were tested and a final selection of four (4) alternatives were made. Two of these alternatives had islands just upstream of the McClugge Bridge and two below the McClugge Bridge. All proposed islands are located on the east side of the navigation channel.

Modeling work was also completed for a flow of 15,000 cfs with each individual island in place. For all the runs, both for the flows of 45,000 cfs and 15,000 cfs, spatial velocity distributions in two dimensions have been developed and included in this report. A comparative analysis of the lateral velocity distributions at three cross sections, with and without the islands in place, has also been done and the plots included with this report. It was observes that in general, there is some increase in velocities next to the islands along the newly created deep-water channel. The maximum velocities within the main navigation channel do increase in most cases when the island or islands are in place. In one case, some decreases in the velocities were observed when the island was in place.

The height of all the islands was selected to be 450 ft-msl. This will allow top of the islands to be about 3 ft above a 2-year flow. However, for a one percent flow, all the islands will be submerged.

The spatial velocity distributions with the islands in place were reviewed to determine the zones of higher velocities which may require artificial shoreline stabilization work. A review of

the wind generated and river traffic generated waves showed that the bank stabilization work will be needed in some areas essentially against the waves rather than the island induced velocities. Based on a review of the historical water surface variations analyzed by the USACOE, it is suggested that the stabilization work be extended from about 439 ft-msl to 443 ft-msl.

It is suggested that a combination of structural and nonstructural means be considered for stabilizing the selected shore lines against wind and or river traffic generated wave activities and in some cases against the flow induced velocities. The four selected alternatives with deep water channels should enhance aquatic habitats and terrestrial habitats by having a portion of the island(s) above the 2-year stage. Anyone of these islands, if built should also enhance the overall aquatic habitat within the Lower Peoria Lake.

Analyses of the lateral velocity distributions were also performed to determine the changes in velocities that could occur upstream of the McClugge's Bridge due to the construction of anyone of these alternatives. This analysis has shown that if anyone of these islands are built, the velocities within the navigation channel would increase slightly with an associated decrease in velocities within the channel border areas. Thus the bridge piers located within the channel border areas should not be subjected to excess velocities than those expected to be present for the flow conditions without any islands(s).

The last alternative tested is a combined Alternative where alternatives 2 and 3 were jointly modeled. Modeling was done for both flows of 45,000 cfs and 15,000 cfs. Modeling results indicated that construction of these two alternatives, either jointly or sequentially, do not measurably change the spatial or lateral velocity structure around this area of the Lower Peoria Lake compared to those present individually with those alternatives. Thus, Alternatives 2 and 3 can be built without impacting the main channel and the areas just upstream of the McClugge's Bridge.

Acknowledgements

The research results shown here have been completed by the authors and their colleagues at the Illinois State Water Survey as their regular duties. The project is being done as part of the match by the State of Illinois, Department of Natural Resources, to the USACOE. Partial funding for the project was provided by IDNR with John Marlin of the WMRC serving as the Project Coordinator. An extensive amount of support and help was provided by Jim Mick of IDNR. Others who worked as a team and provided a tremendous amount of input are: Brad Thomson, Terresa Kinkaid, Mike Tarpey, Tom Kirkeeng, Mike Schwar of the USACOE. Many Water Survey staff also worked on this project. They are: Pami Parmar, David Soong, Yanging Lian, Bill Bogner, Jim Slowikowski, Susan Shaw, and others. To all of them, the authors express a sincere thank you. The camera-ready copy of this report was prepared by Patti Hill, Becky Howard, and Jenna Dingman.

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Table 1. Flow Frequencies, Flows and Stages at Chillicothe, After USACOE (1992) RM180

Flow Frequencies		*Flow*	*Stages*
Percent time	*Years*	*(cfs)*	*(ft-msl)*
0.2	500	125,000	461.8
0.5	200	114,000	460.2
1.0	100	105,000	459.0
2.0	50	100,000	457.8
4.0	25	85,000	456.4
10.0	10	75,000	454.4
20.0	5	65,000	452.1
50.0	2	45,000	448.4

Table 2. Flow Frequencies, Flows and Stages at Peoria Lock and Dam; After USACOE (1992)

Flow Frequency		*Flow*	*Stages*
Percent time	*Years*	*(cfs)*	*(ft-msl)*
0.2%	500	103,000	460.4
0.5%	200	92,000	459.0
1.0%	100	85,000	457.8
2.0%	50	80,000	456.6
4.0%	25	72,000	455.3
10.0%	10	63,000	453.2
20.0%	5	54,000	451.0
50.0%	2	40,000	447.2

Table 3. Velocity Changes Due to the Construction of the Island, Alternative 1, Q=45,000 cfs

	Velocities, fps					
	With Island	*Without Island*	*With Island*	*Without Island*	*With Island*	*Without Island*
Locations	*1*	*2*	*3*	*4*	*5*	*6*
Cross-section 1	0.08	0.1	0.22	0.21	3.25	3.26
Cross-section 2	0.19	0.19	0.52	0.44	2.77	2.81
Cross-section 3	0.12	0.15	0.32	0.24	2.5	2.51

Table 4. Velocity Changes Due to the Construction of the Island, Alternative 2, Q=45,000 cfs

	Velocities, fps					
	With Island	*Without Island*	*With Island*	*Without Island*	*With Island*	*Without Island*
Locations	*1*	*2*	*3*	*4*	*5*	*6*
Cross-section 1	0.09	0.14	0.42	0.58	2.77	2.8
Cross-section 2	0.08	0.09	0.36	0.32	2.5	2.51
Cross-section 3	0.16	0.09	0.2	0.21	2.45	2.42

Table 5. Velocity Changes Due to the Construction of the Islands, Alternative 3, Q=45,000 cfs

	Velocities, fps					
	With Island	*Without Island*	*With Island*	*Without Island*	*With Island*	*Without Island*
Locations	*1*	*2*	*3*	*4*	*5*	*6*
Cross-section 1	0.77	0.43	0.65	0.55	0.6	0.76
Cross-section 2	0.5	0.47	0.73	0.5	0.77	0.61
Cross-section 3	0.34	0.44	0.75	0.47	0.67	0.54

	With Island	*Without Island*	*With Island*	*Without Island*
Locations	*7*	*8*	*9*	*10*
Cross-section 1	1.48	1.47	2.15	2.09
Cross-section 2	0.97	1.01	1.79	1.77
Cross-section 3	1	0.81	1.68	1.59

Table 6. Velocity Changes Due to Construction of An Island, Alternative 4, Q=45,000 cfs

	Velocities, fps					
	With Island	*Without Island*	*With Island*	*Without Island*	*With Island*	*Without Island*
Locations	*1*	*2*	*3*	*4*	*5*	*6*
Cross-section 1	0.85	0.45	0.72	0.66	2.05	2.09
Cross-section 2	0.50	0.47	0.68	0.54	1.80	1.77
Cross-section 3	0.32	0.44	0.79	0.49	1.67	1.59

Table 7. Maximum Permissible Velocities Recommended by Fortier and Scobey and the Corresponding Unit-Tractive-Force Values Converted by the U.S. Bureau of Reclamation (For straight channels of small slope, after aging), See Chow (1959)

Material	*Clear Water*		*Water transporting colloidal silts*	
	V, fps	*τ_0, lb/ft²*	*V, fps*	*τ_0, lb/ft²*
Fine sand, colloidal	1.50	0.027	2.50	0.075
Sandy loam, noncolloidal	1.75	0.037	2.50	0.075
Silt loam, noncolloidal	2.00	0.048	3.00	0.11
Alluvial silts, noncolloidal	2.00	0.048	3.50	0.15
Ordinary firm loam	2.50	0.075	3.50	0.15
Volcanic ash	2.50	0.075	3.50	0.15
Stiff clay, very colloidal	3.75	0.26	5.00	0.46
Alluvial silts, colloidal	3.75	0.26	5.00	0.46
Shales and hardpans	6.00	0.67	6.00	0.67
Fine gravel	2.50	0.075	5.00	0.32
Graded loam to cobbles when noncolloidal	3.75	0.38	5.00	0.66
Graded silts to cobbles when colloidal	4.00	0.43	5.50	0.80
Coarse gravel, noncolloidal	4.00	0.30	6.00	0.67
Cobbles and shingles	5.00	0.91	5.50	1.10

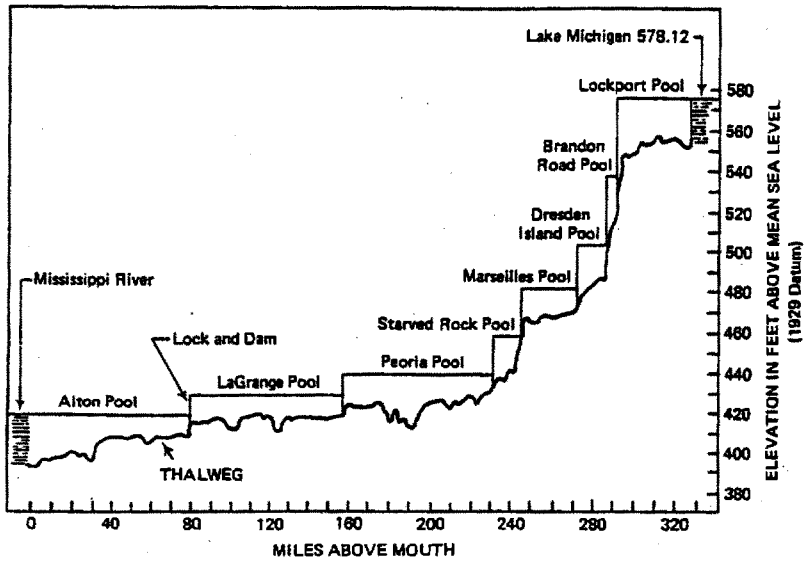


Figure 1. Profile of Illinois River Waterway

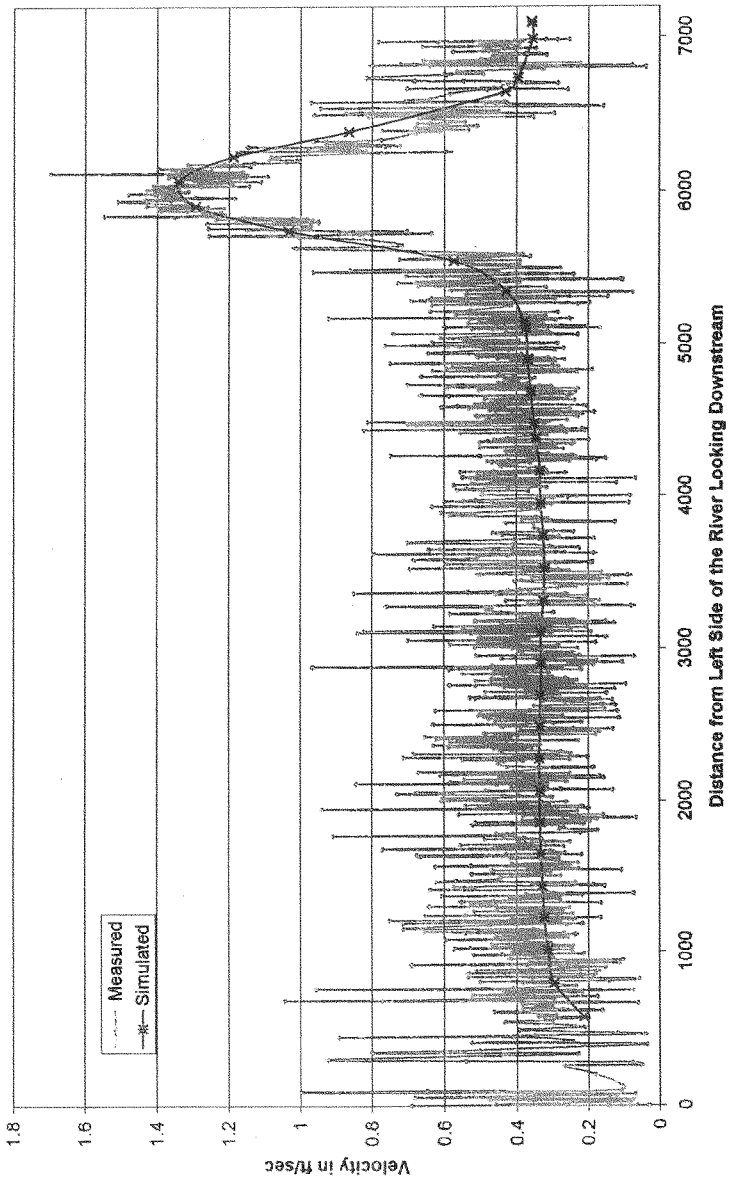


Figure 2. Comparison of the measured and simulated lateral velocity distributions at RM 163.7 (about) for a flow of 25,000 cfs

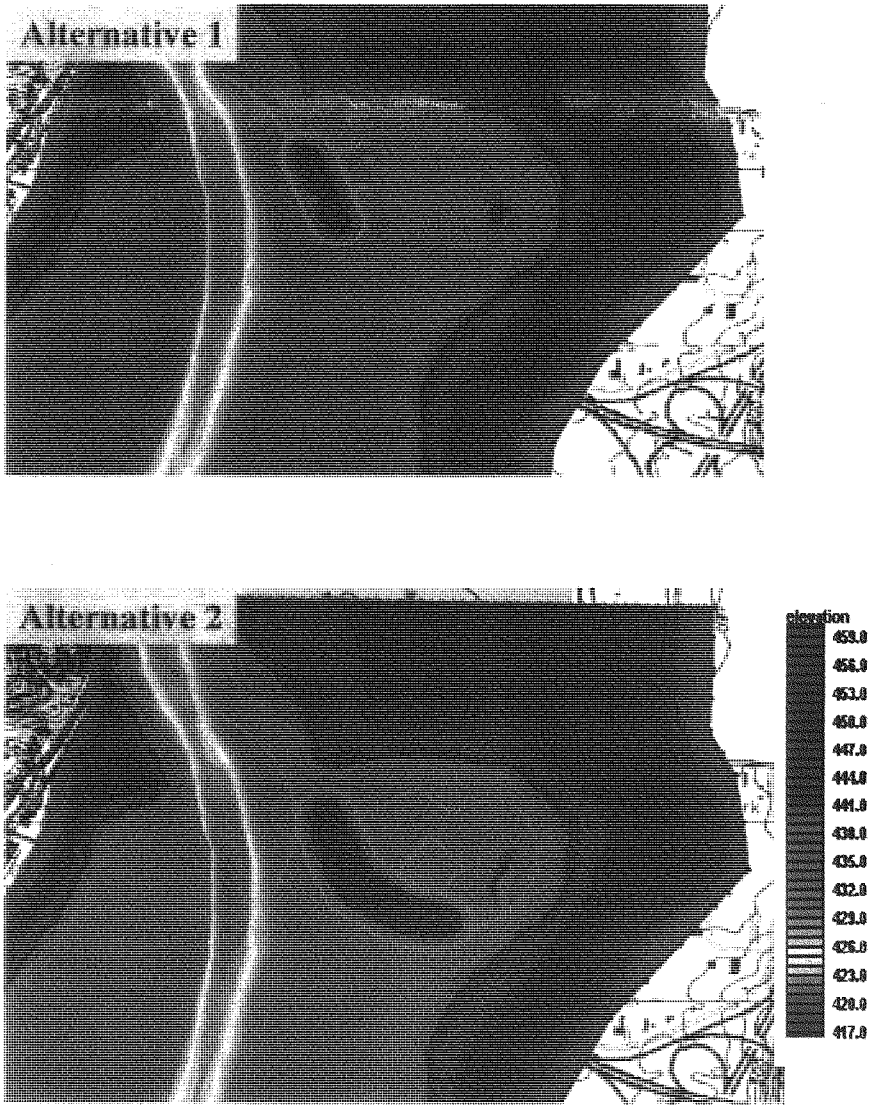


Figure 3. Plan View of Artificial Island Alternatives 1 and 2

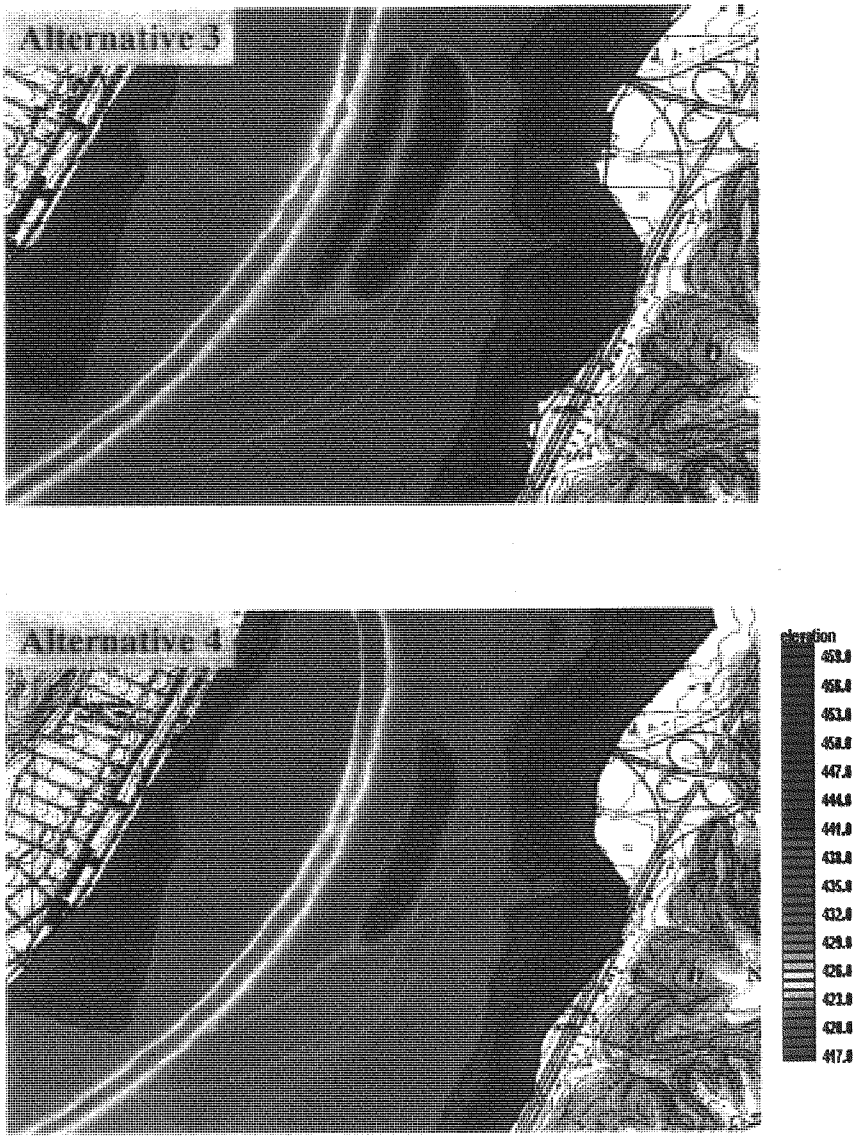


Figure 4. Plan View of Artificial Island Alternatives 3 and 4

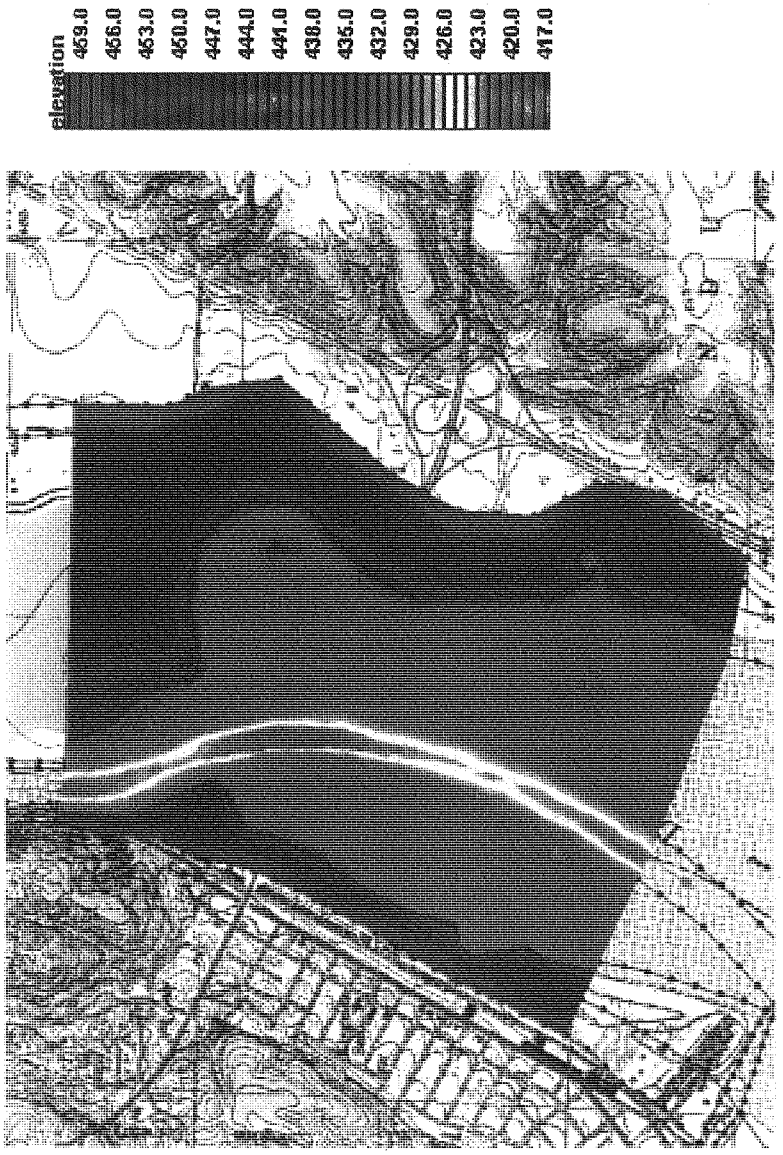


Figure 5. Elevation Variations of the Modeled Area

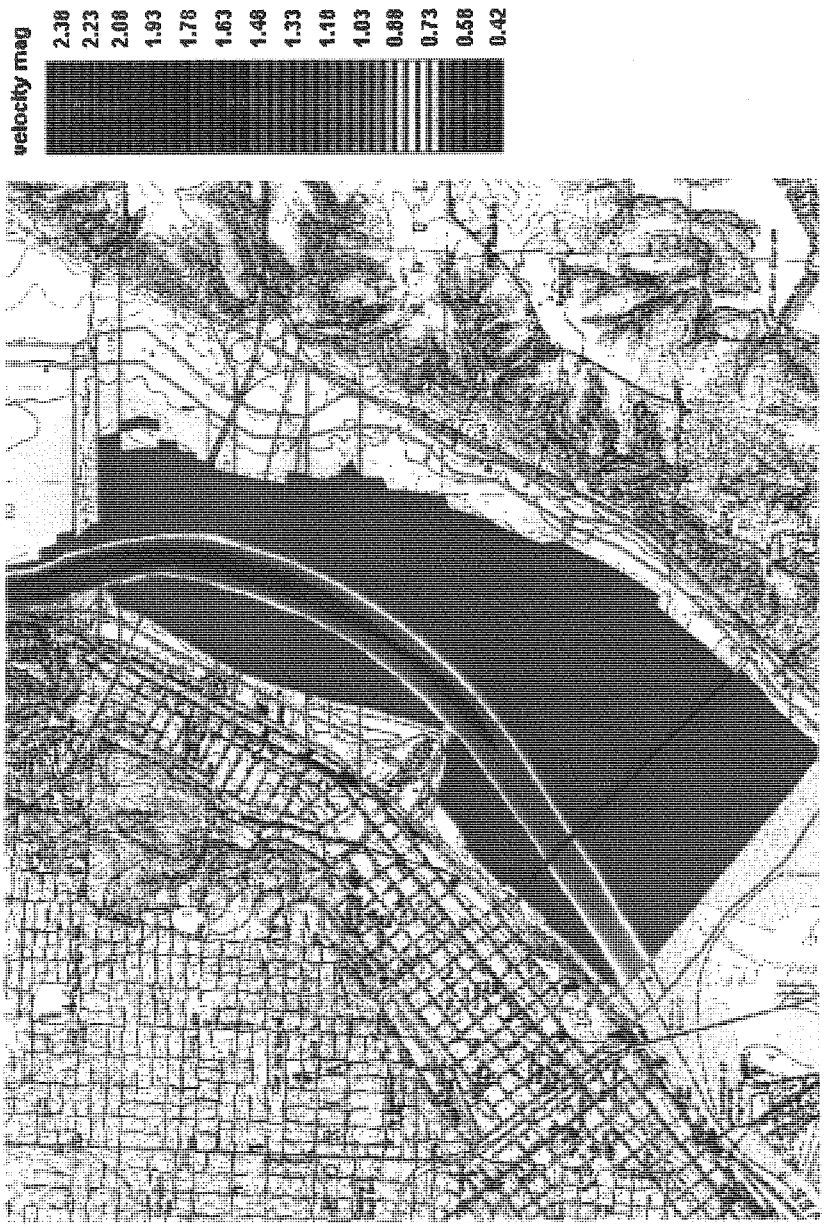


Figure 6. Spatial Velocity Distributions for a flow of 25,000 cfs (Velocity values are in *fps*)

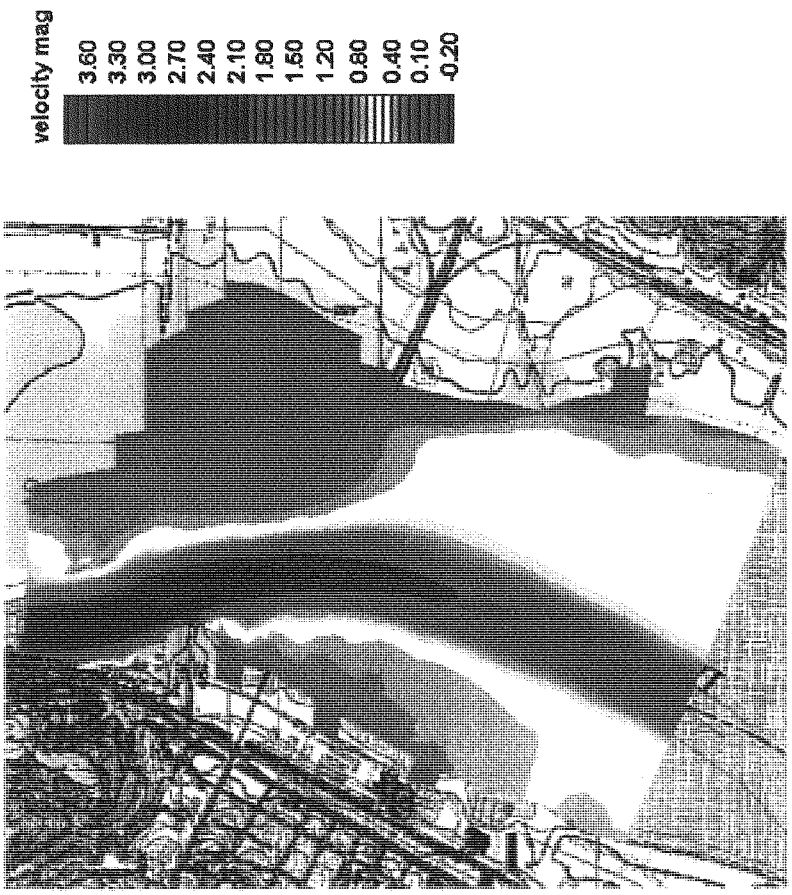


Figure 7. Spatial Velocity Distribution for a flow of 45,000 cfs (Velocities are in fps.)

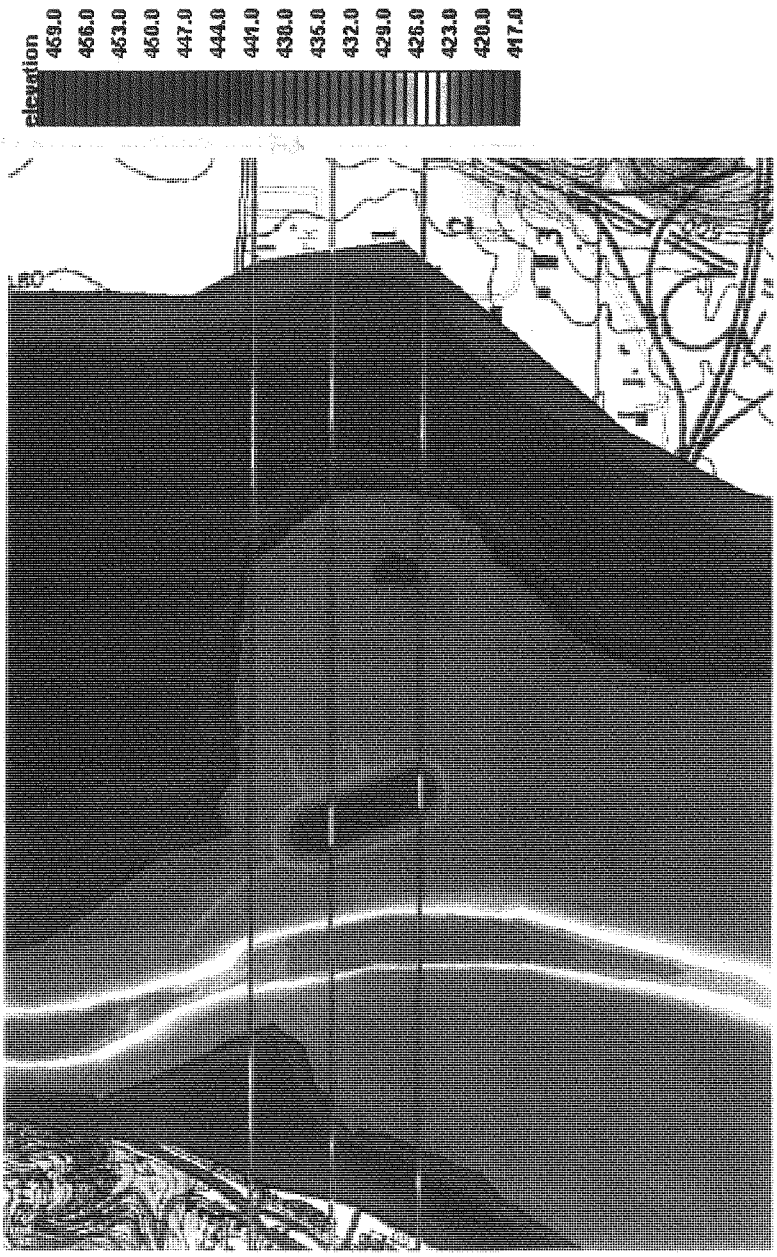


Figure 8. Elevation Map of the Lake with Alternative 1 and Newly Created Deep Water Area

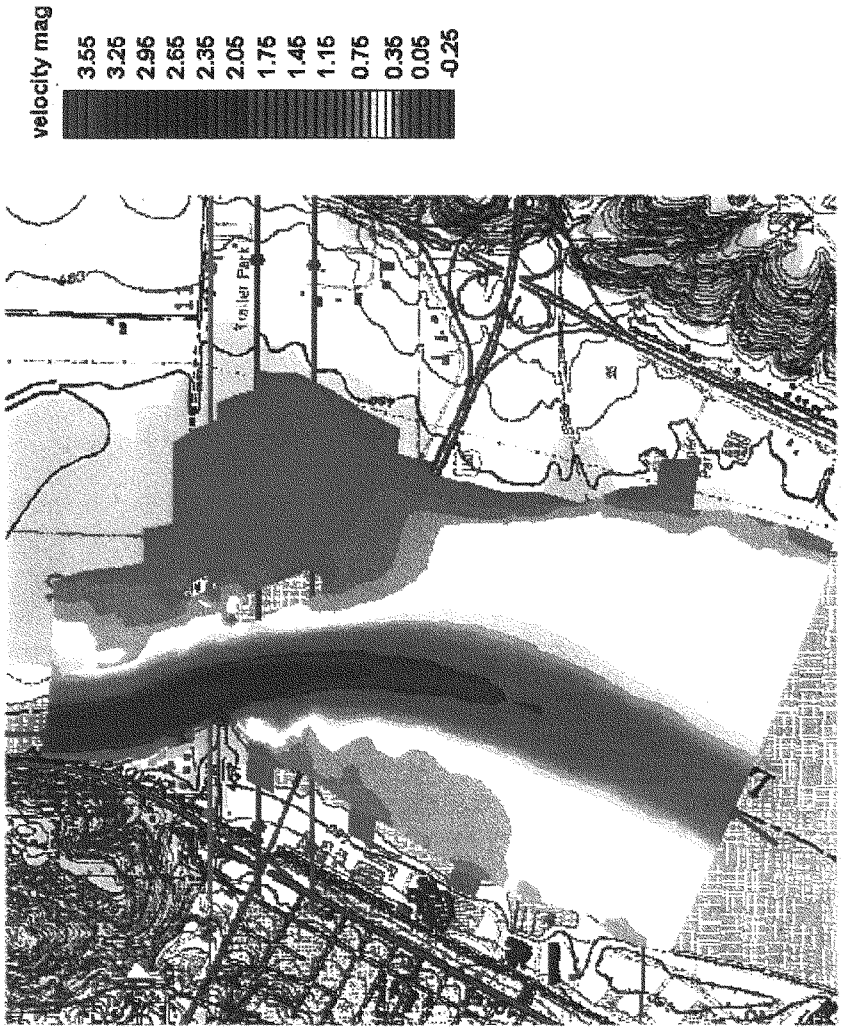


Figure 9. Spatial Velocity Distribution for a flow of 45,000 cfs for Alternative 1
(Velocities are in fps)

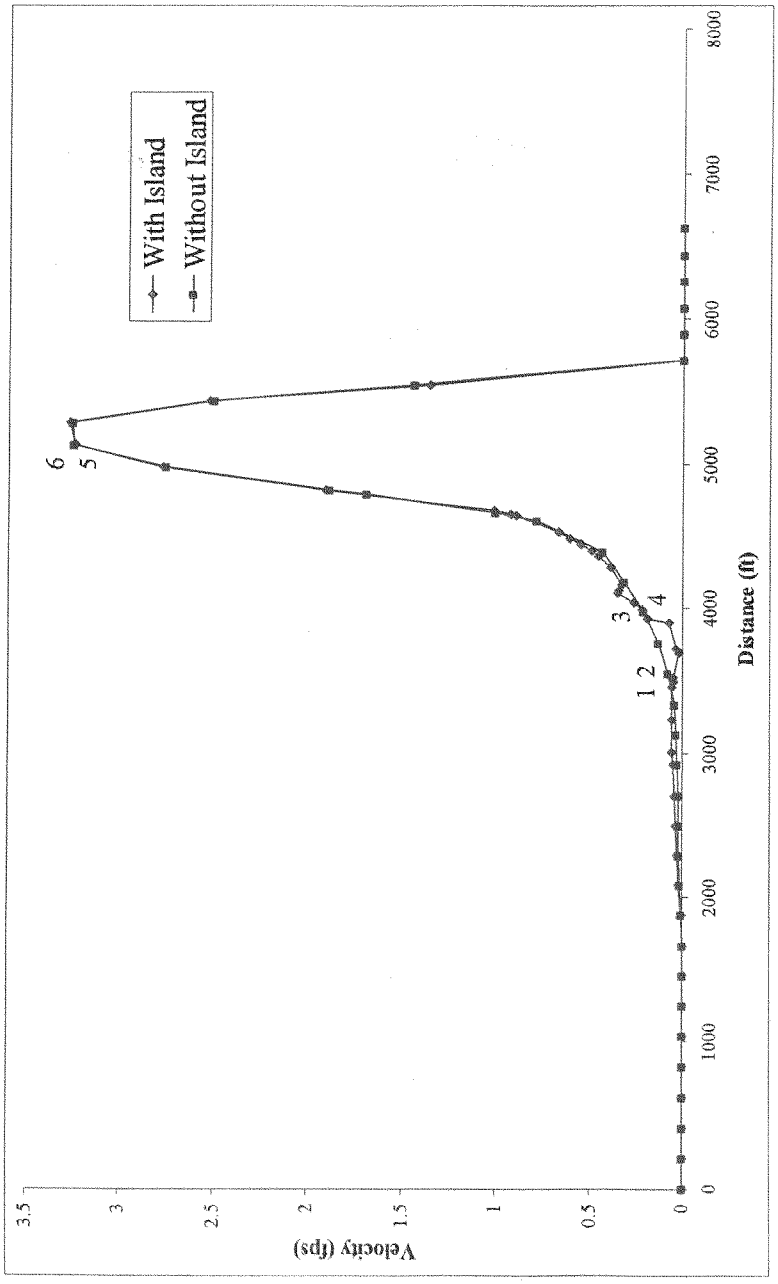


Figure 10. Lateral Velocity Distribution at Cross-Section 1, Alternative 1, for a flow of 45,000 cfs

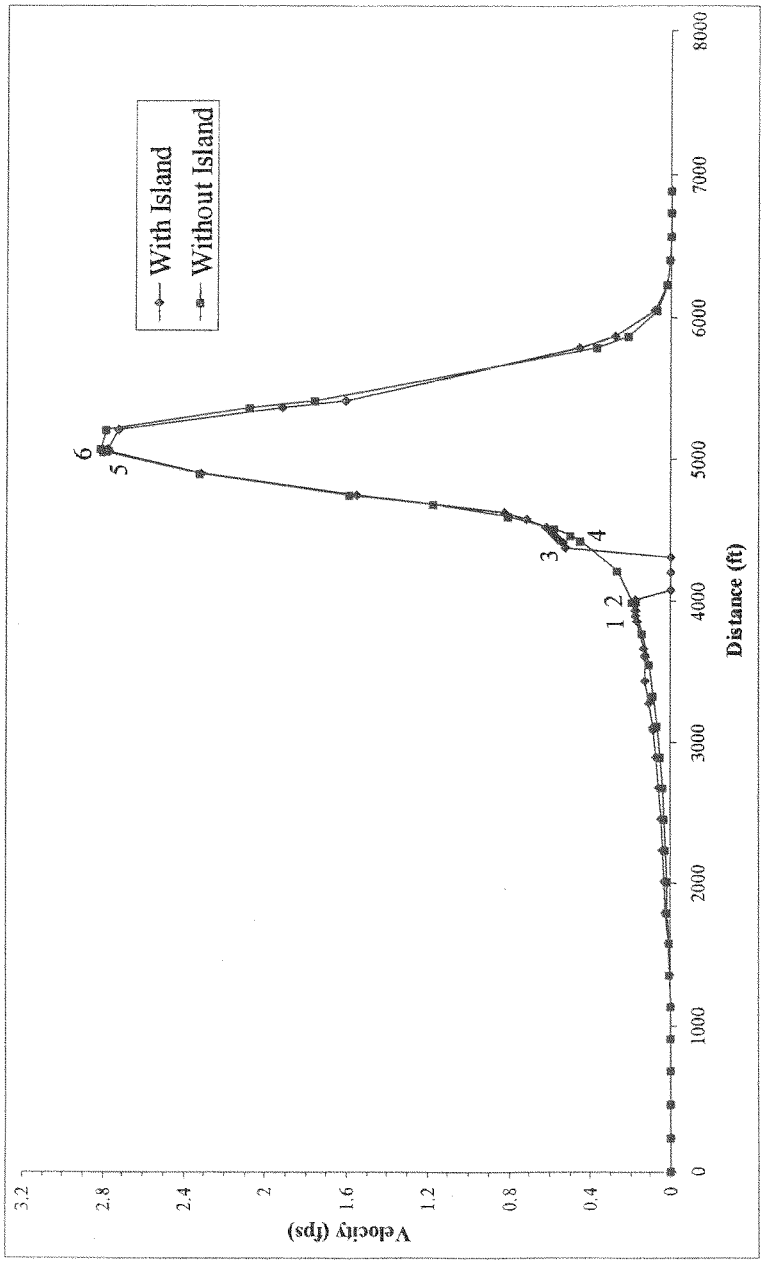


Figure 11. Lateral Velocity Distribution at Cross-Section 2, Alternative 1, for a flow of 45,000 cfs

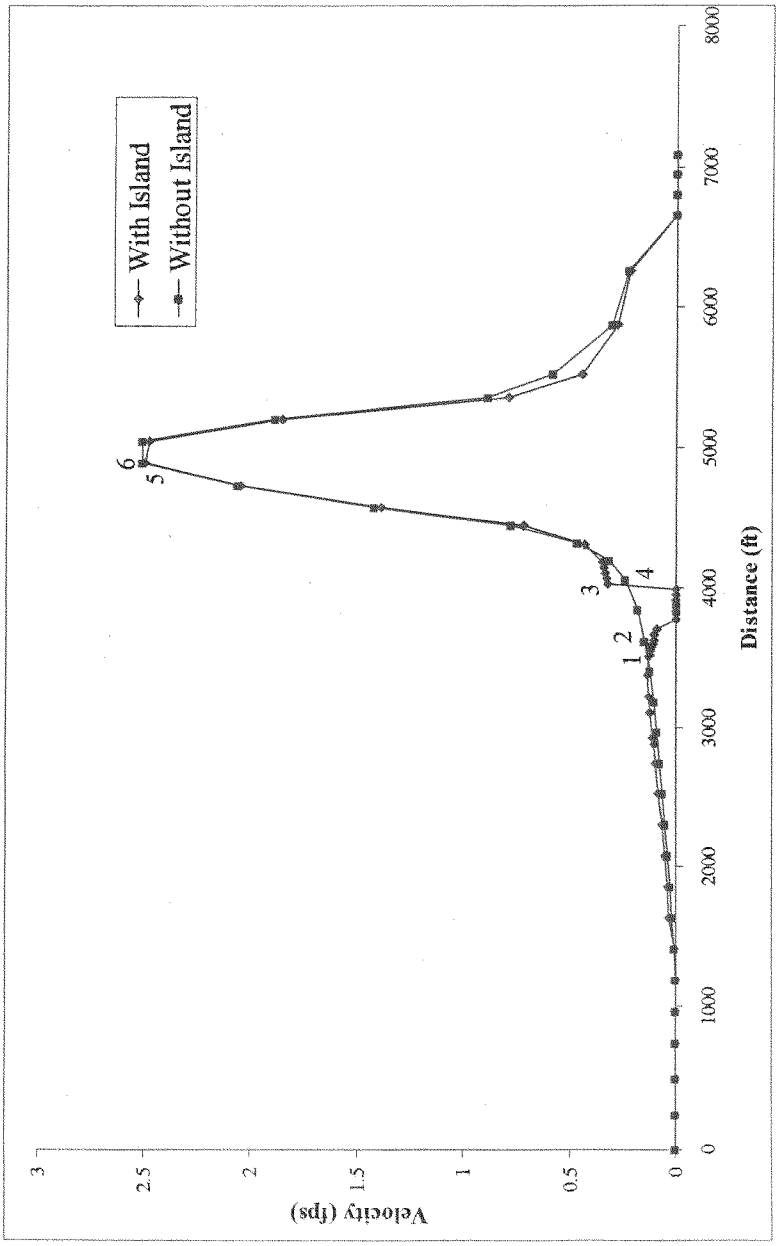


Figure 12. Lateral Velocity Distribution at Cross-Section 3, Alternative 1, for a flow of 45,000 cfs

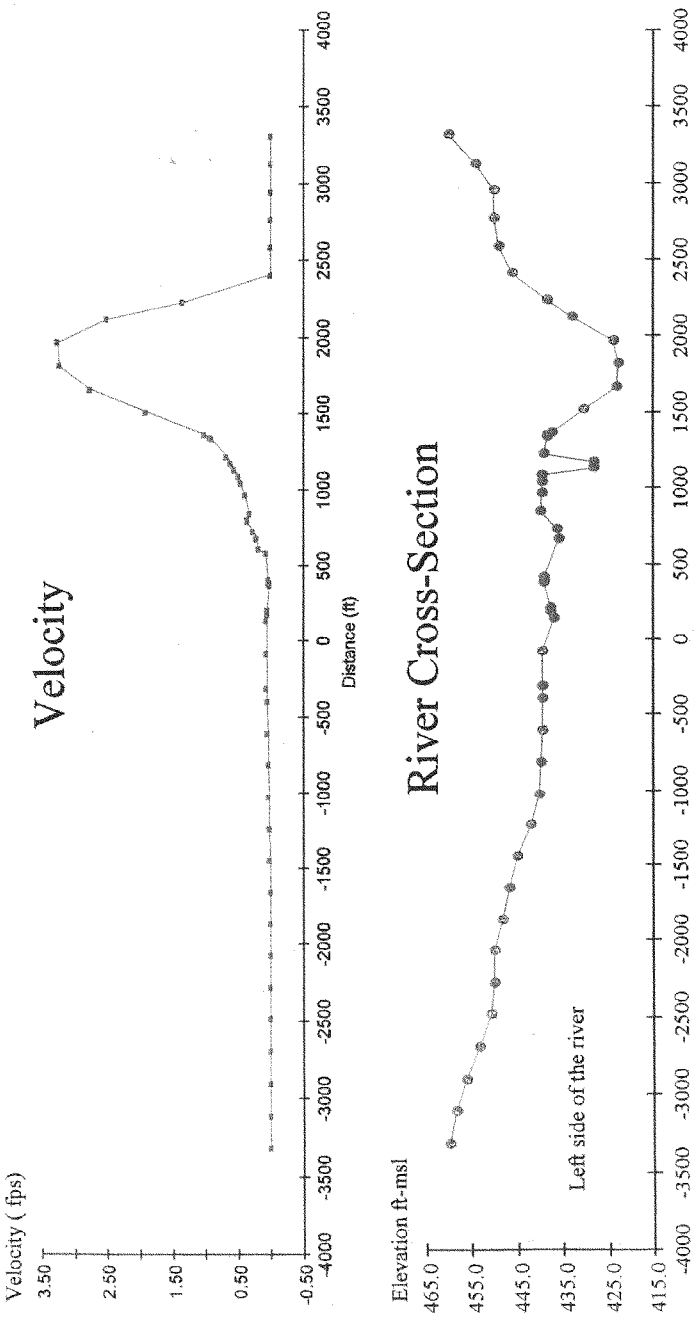


Figure 13. Lateral Velocity Distribution and River Cross-Section at Cross-Section 1, Alternative 1, for a flow of 45,000 cfs

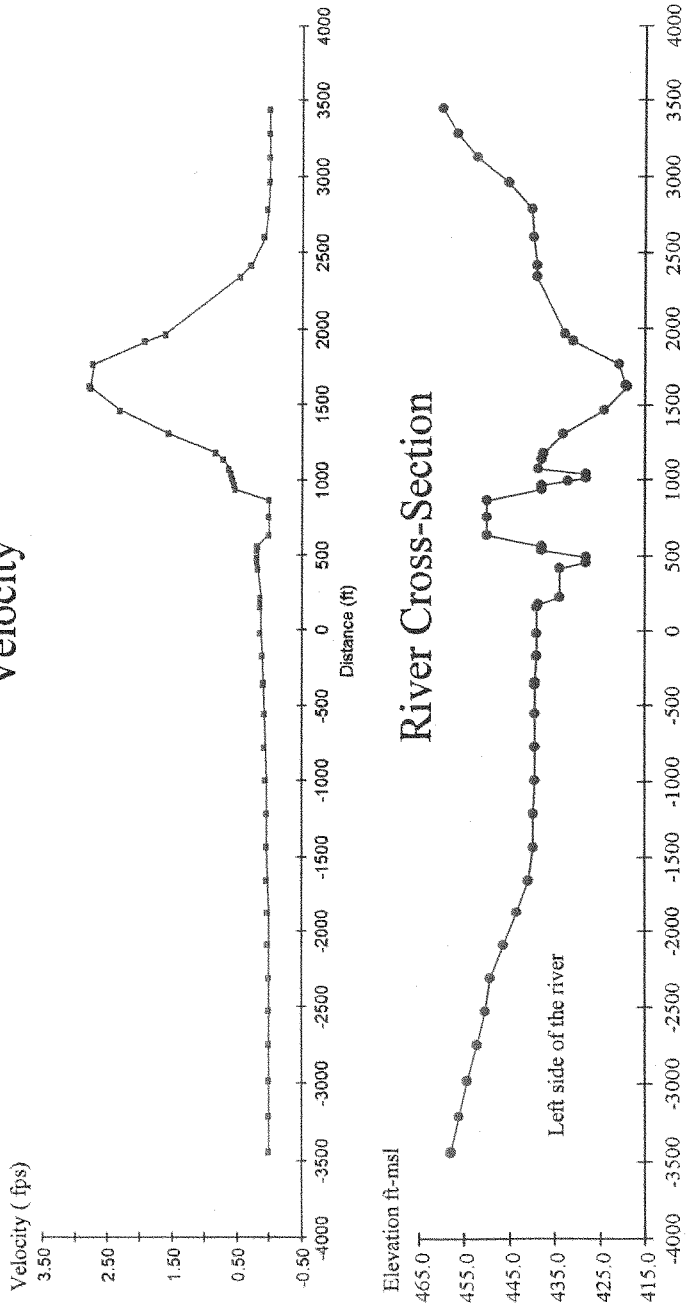


Figure 14. Lateral Velocity Distribution and River Cross-Section at Cross-Section 2, Alternative 1, for a flow of 45,000 cfs

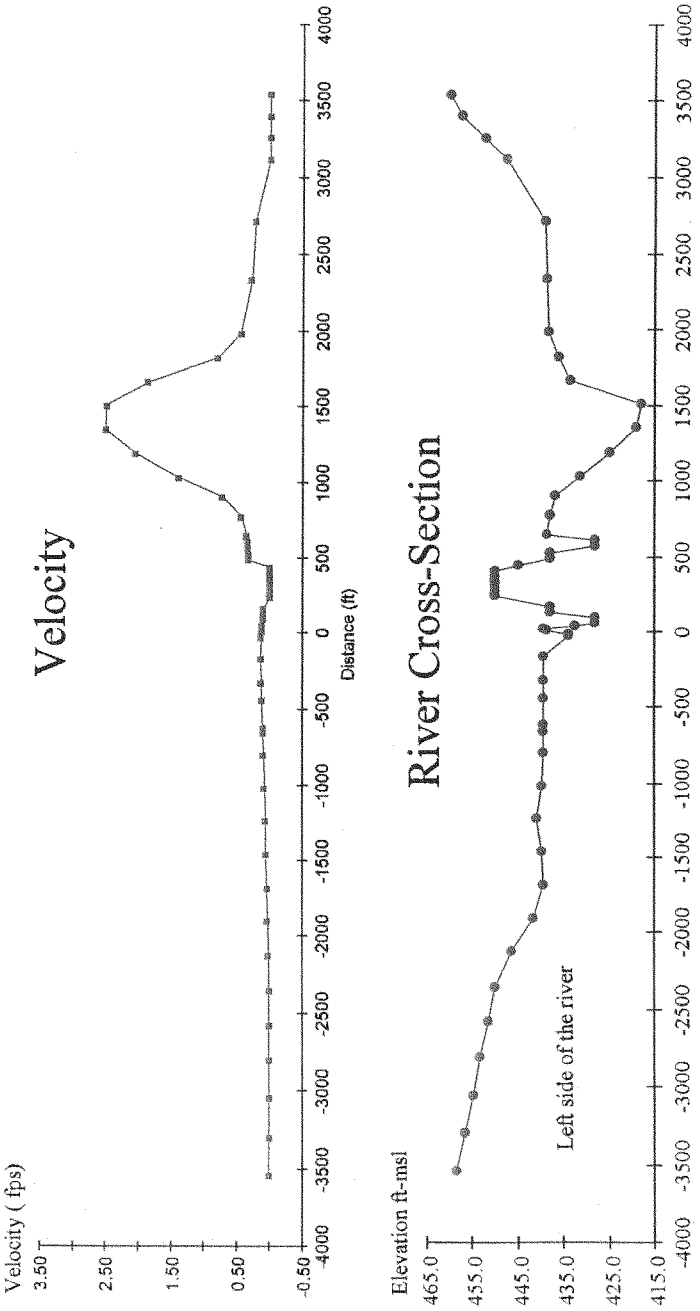


Figure 15. Lateral Velocity Distribution and River Cross-Section at Cross-Section 3, Alternative 1, for a flow of 45,000 cfs

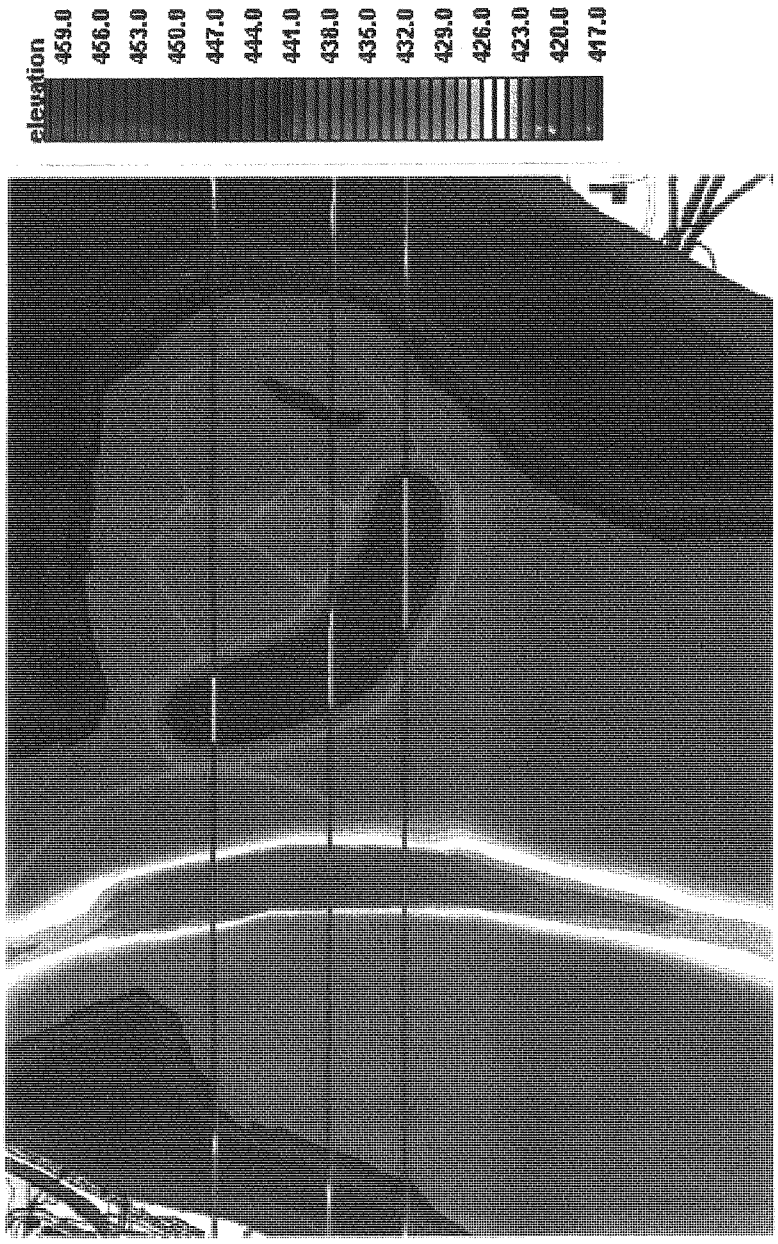


Figure 16. Planform and the Depth Variations for Alternative 2

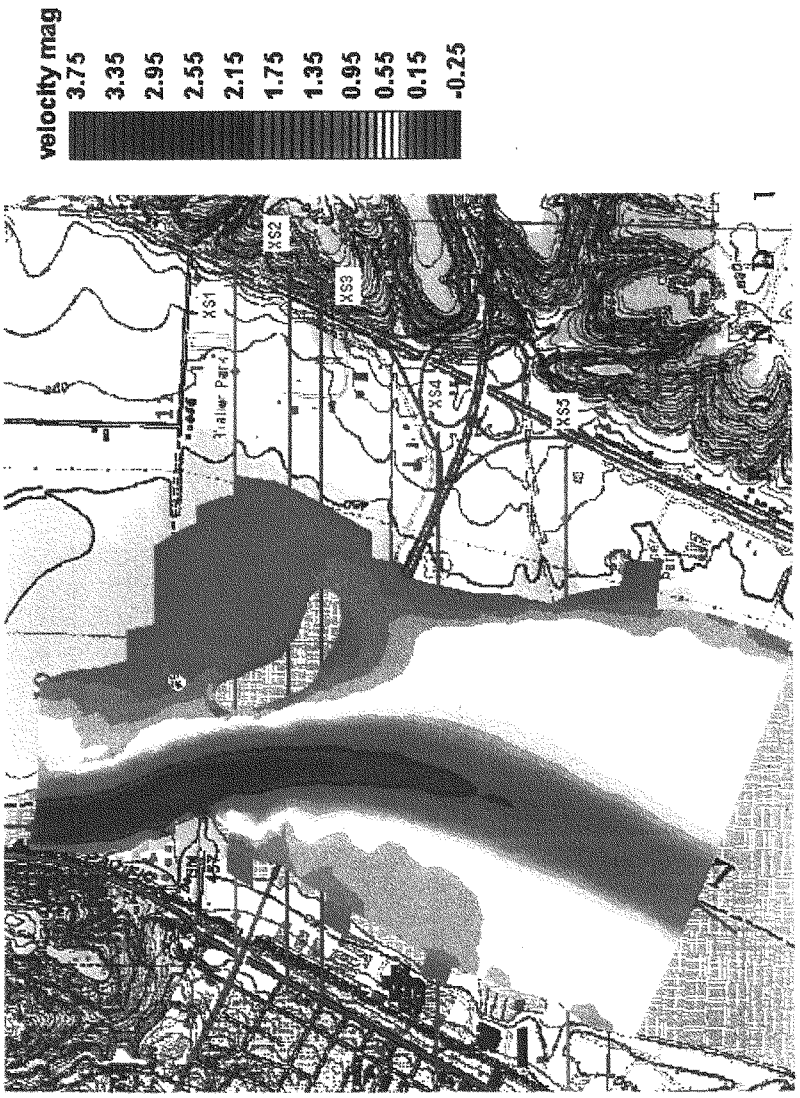


Figure 17. Spatial Velocity Distribution for Alternative 2, for a flow of 45,000 cfs

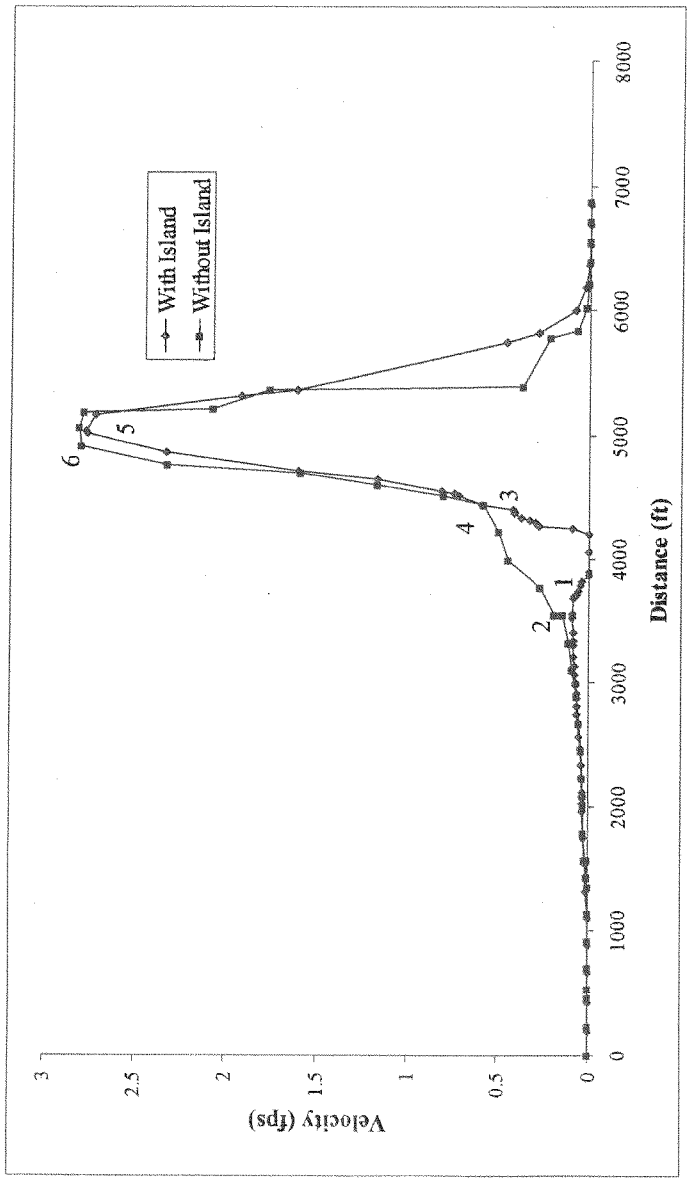


Figure 18. Lateral Velocity Distribution at Cross-Section 1 for Alternative 2, for a flow of 45,000 cfs

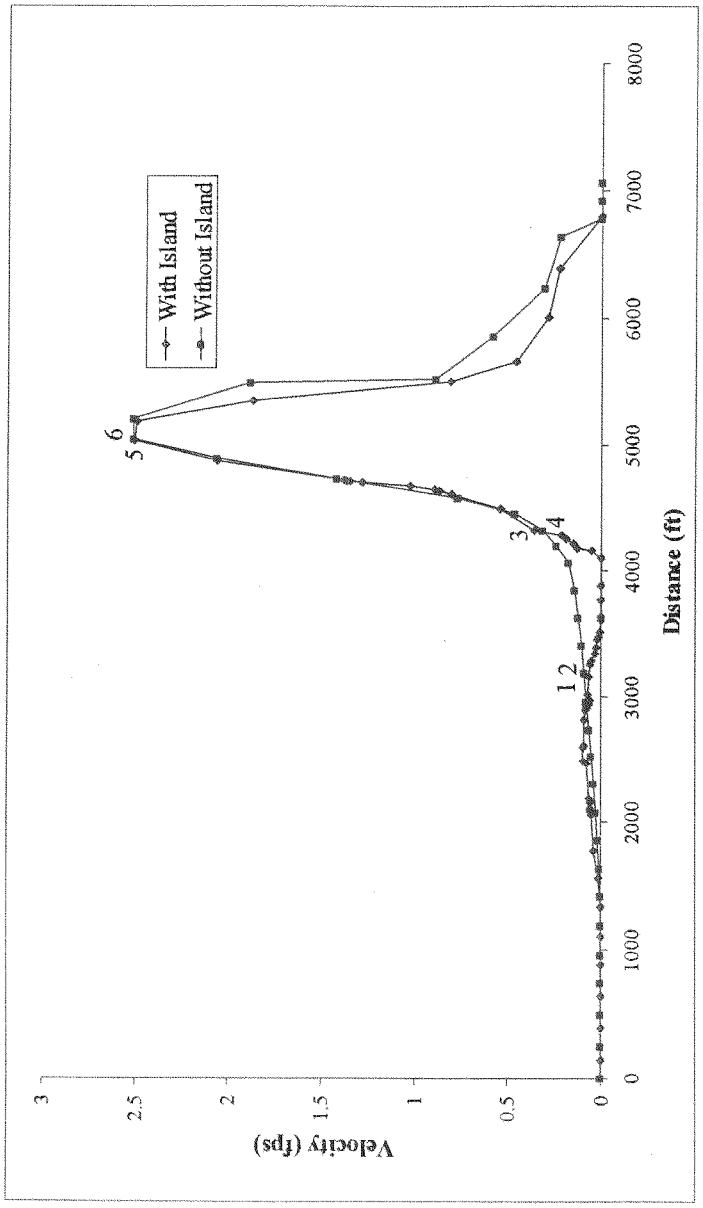


Figure 19. Lateral Velocity Distribution at Cross-Section 2 for Alternative 2, for a flow of 45,000 cfs

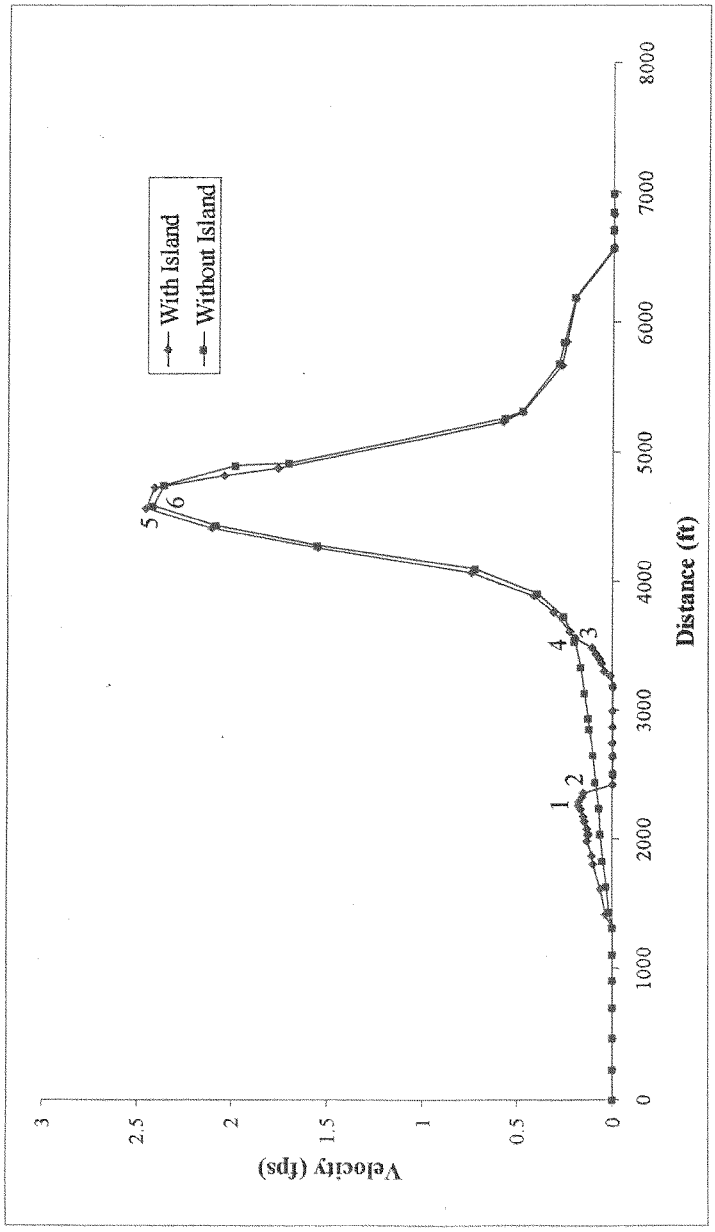


Figure 20. Lateral Velocity Distribution at Cross-Section 3 for Alternative 2, for a flow of 45,000 cfs

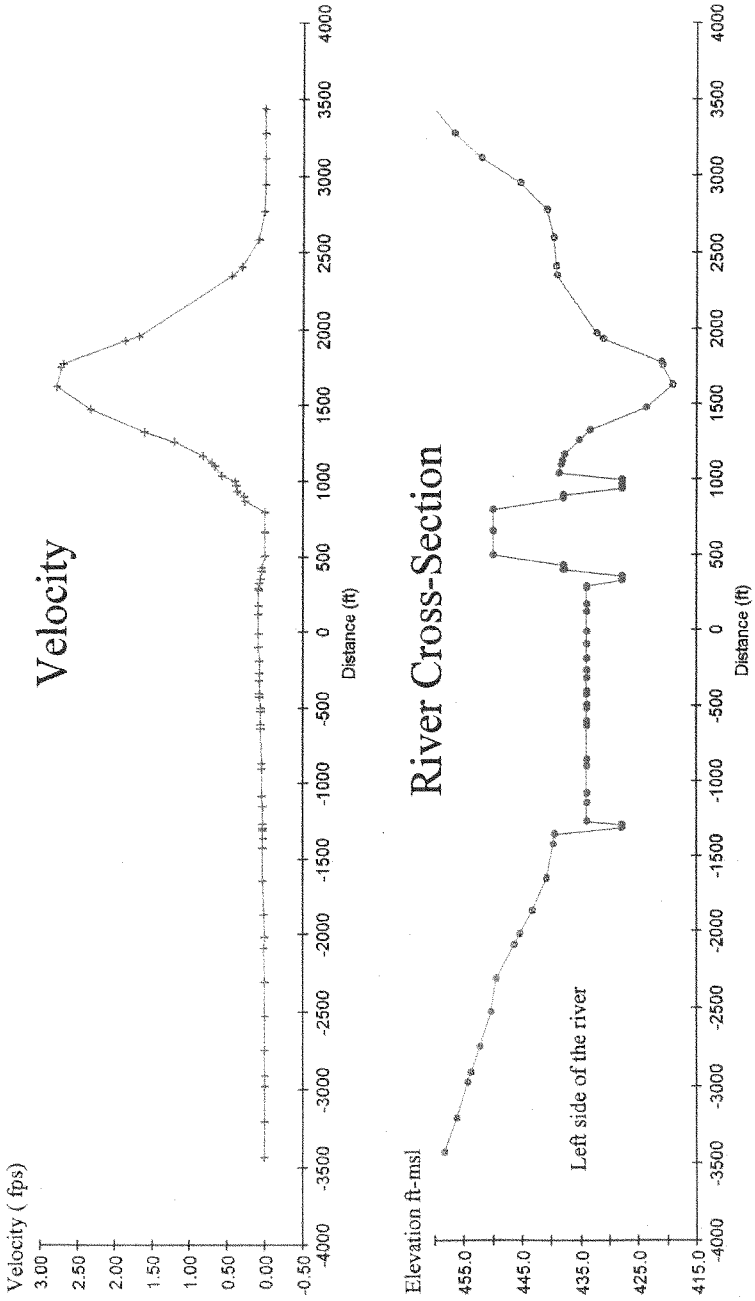


Figure 21. Lateral Velocity Distribution and River Cross-Section at Cross-Section 1 for Alternative 2, for a flow of 45,000 cfs

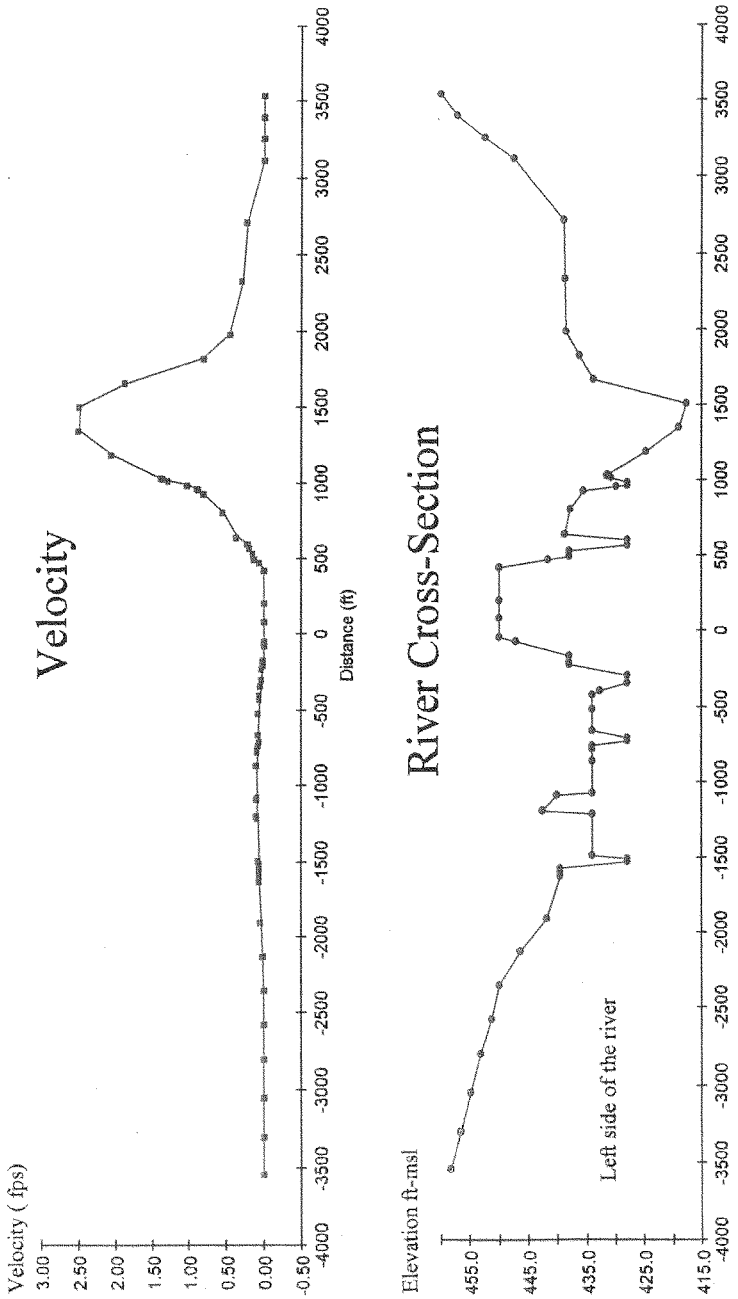


Figure 22. Lateral Velocity Distribution and River Cross-Section at Cross-Section 2 for Alternative 2, for a flow of 45,000 cfs

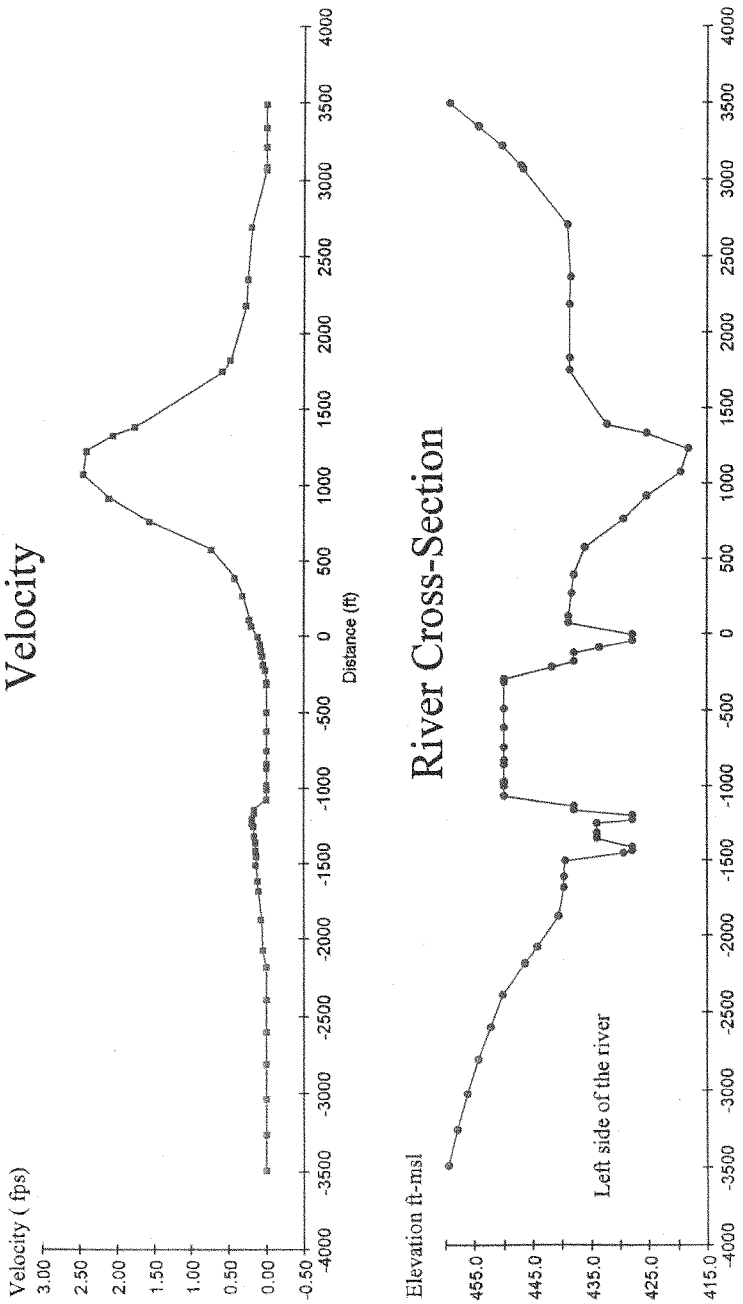


Figure 23. Lateral Velocity Distribution and River Cross-Section at Cross-Section 3 for Alternative 2, for a flow of 45,000 cfs

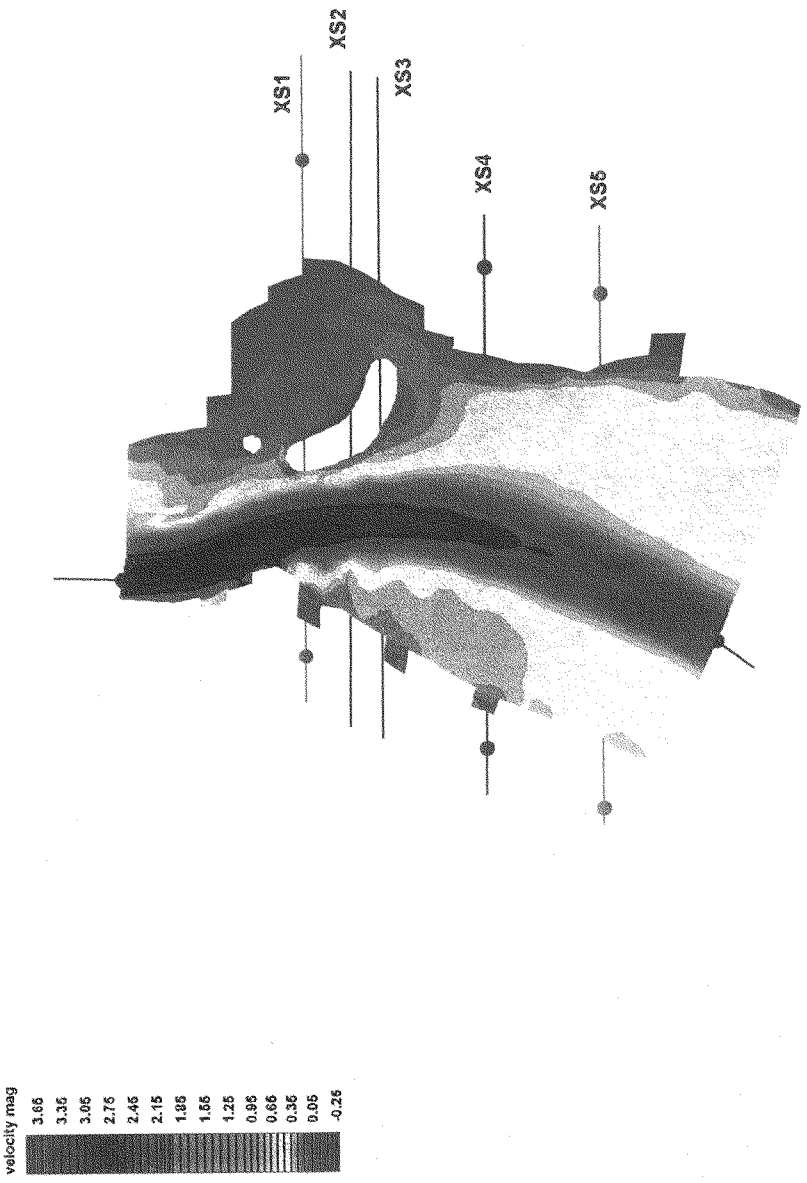


Figure 24. Location of Cross-Sections for Alternative 2

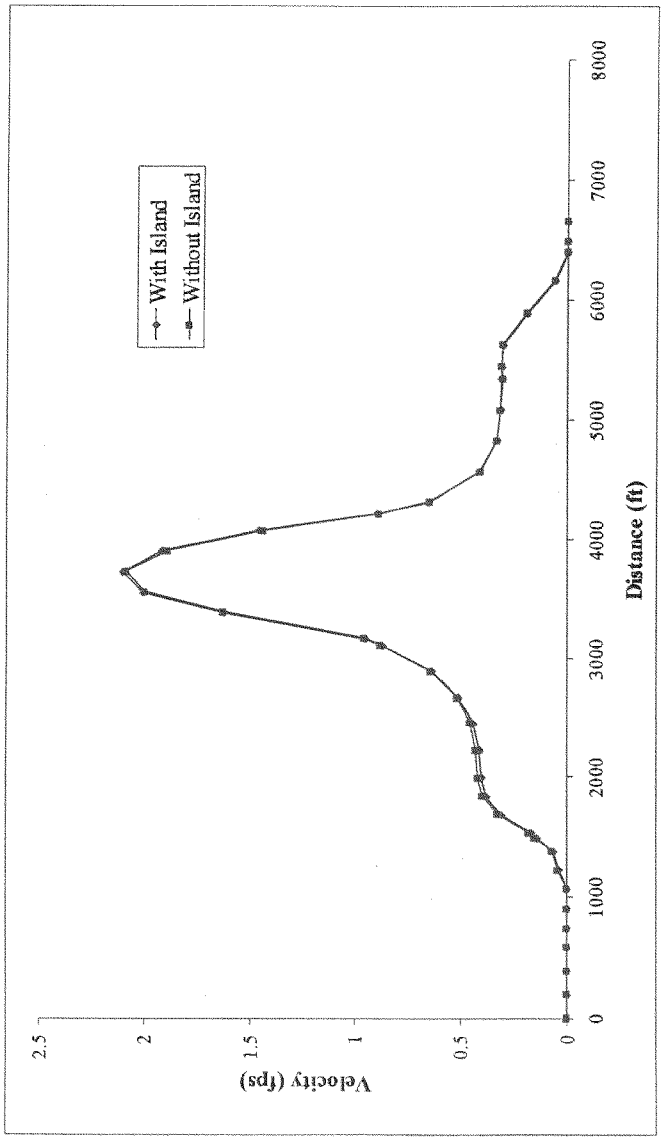


Figure 25. Lateral Velocity Distribution at Cross-Section 4 Below McClugge Bridge for Alternative 2, for a flow of 45,000 cfs

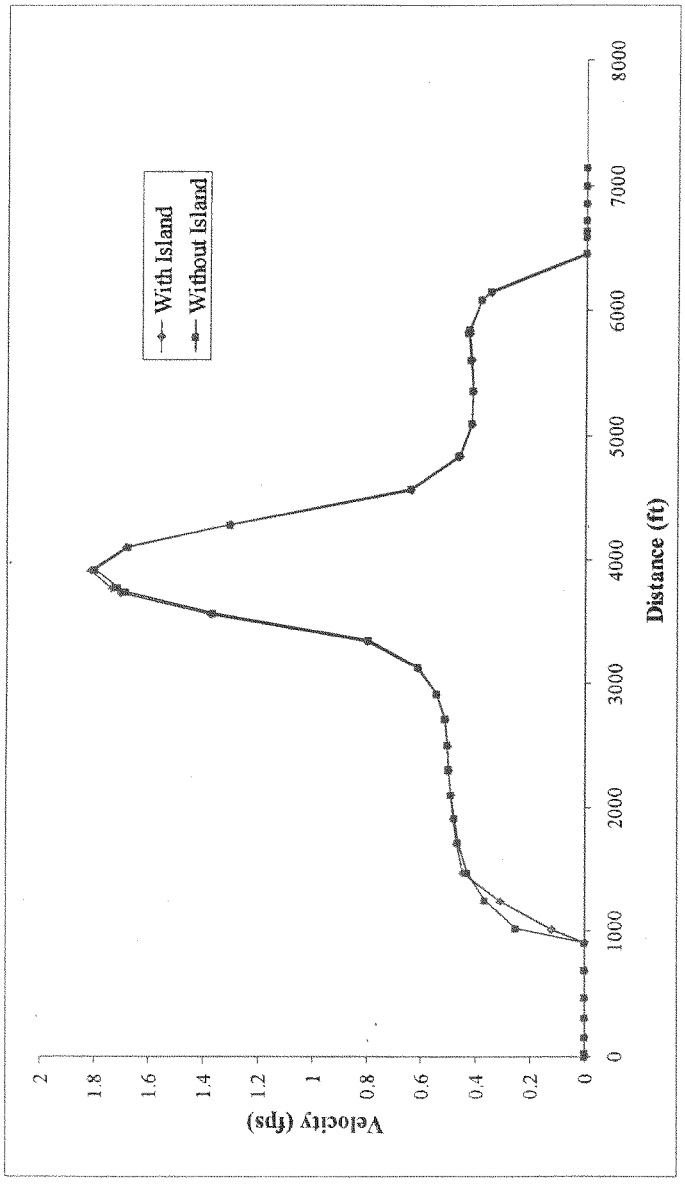


Figure 26. Lateral Velocity Distribution at Cross-Section 5 Below McClugge Bridge for Alternative 2, for a flow of 45,000 cfs

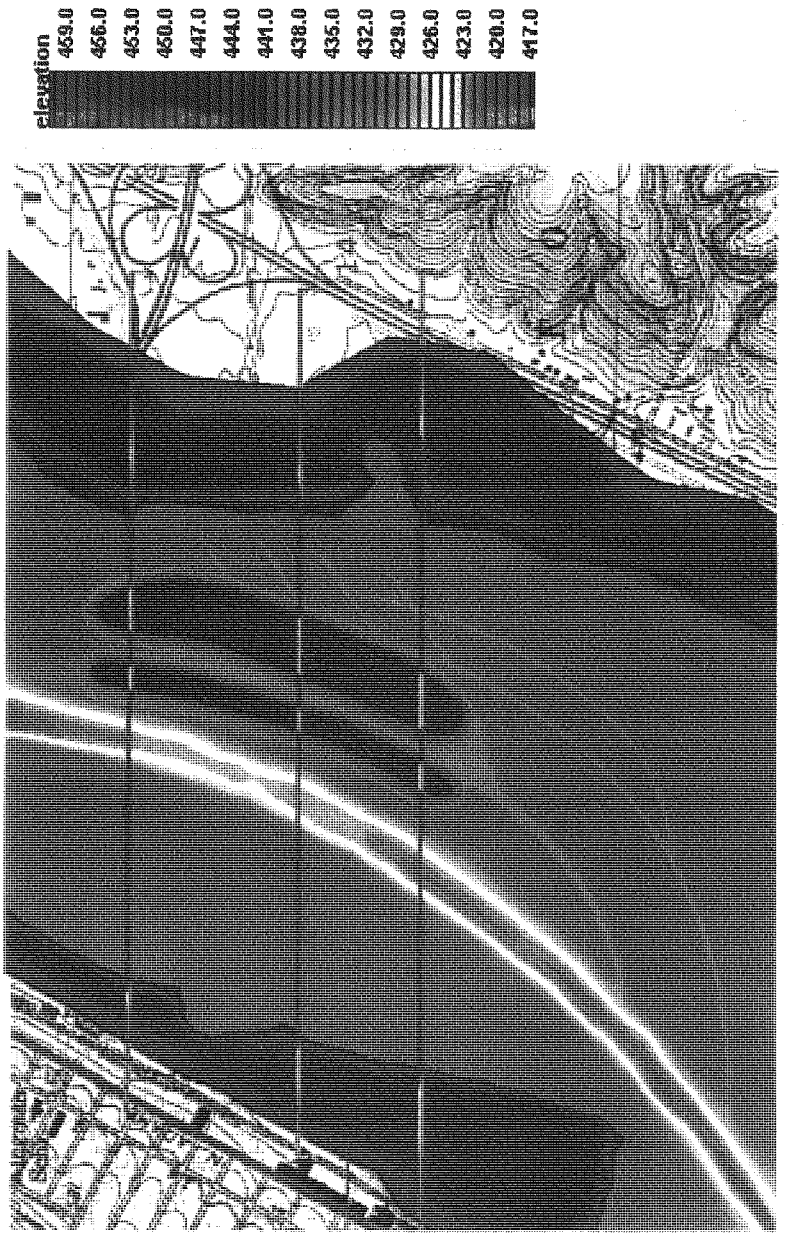


Figure 27. Depth Variations for Alternative 3 Including the Locations of the Potential Dredged Channels

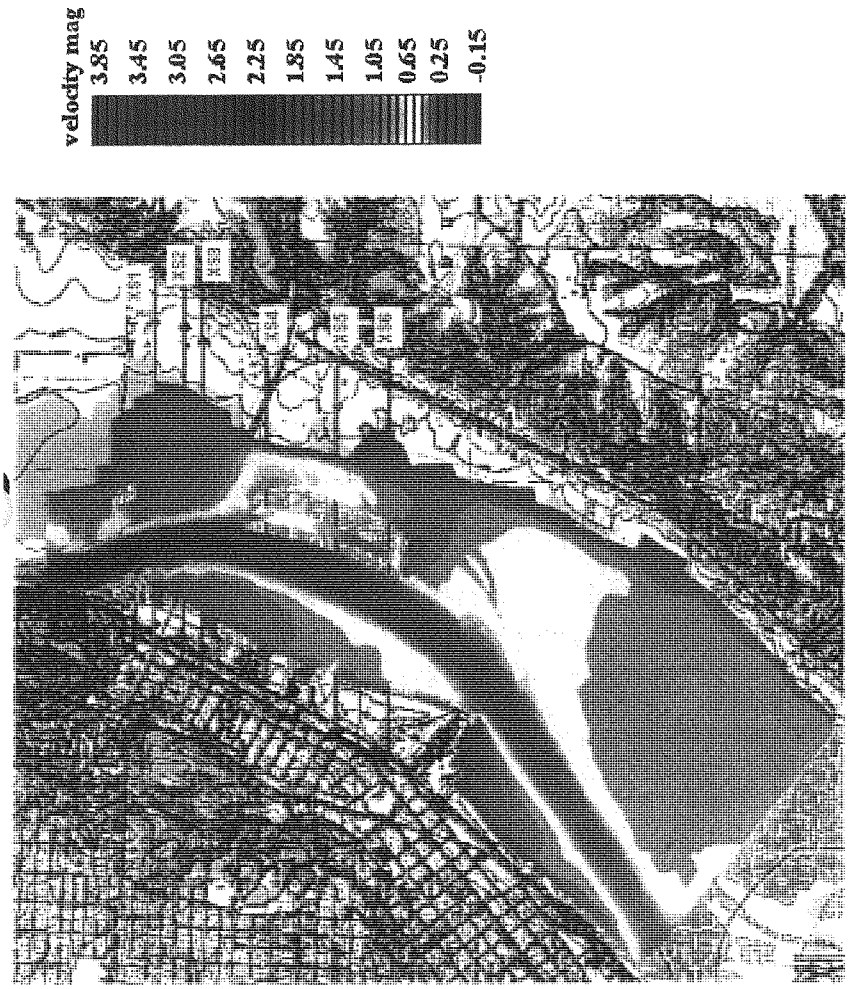


Figure 28. Spatial Velocity Distribution for Alternative 3, for a flow of 45,000 cfs

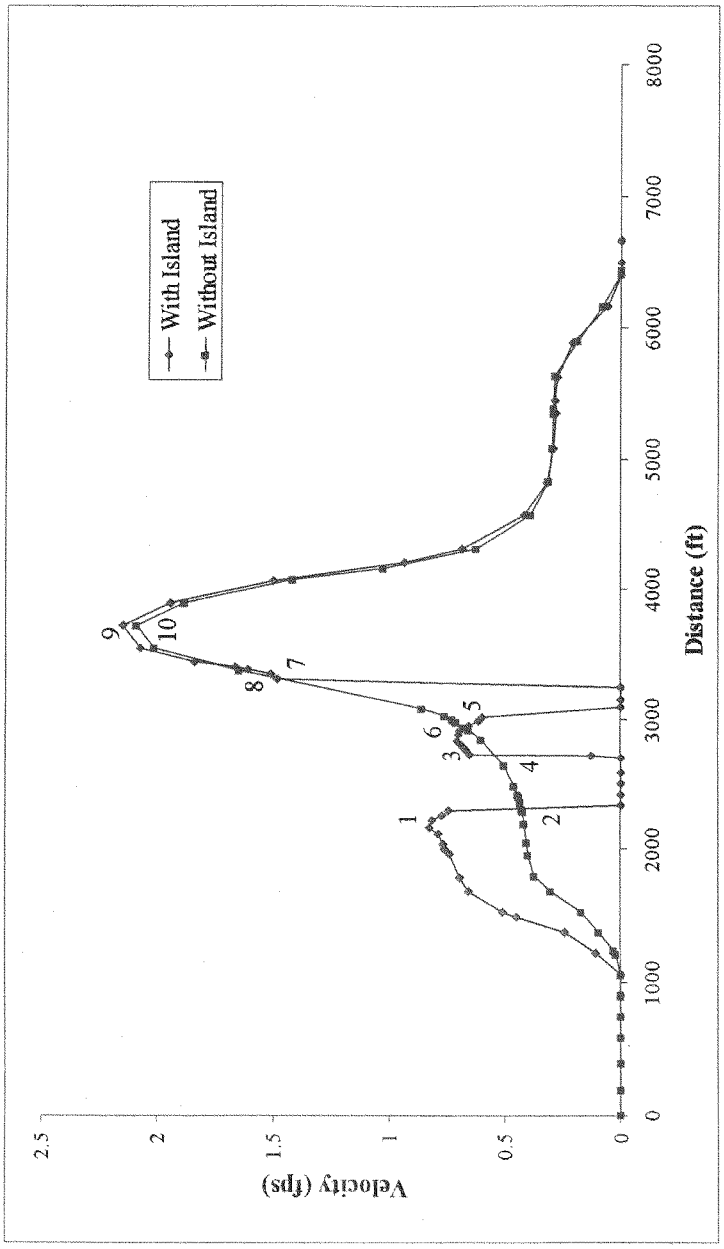


Figure 29. Lateral Velocity Distributinos at Cross-Section 1 for Alternative 3 for a flow of 45,000 cfs

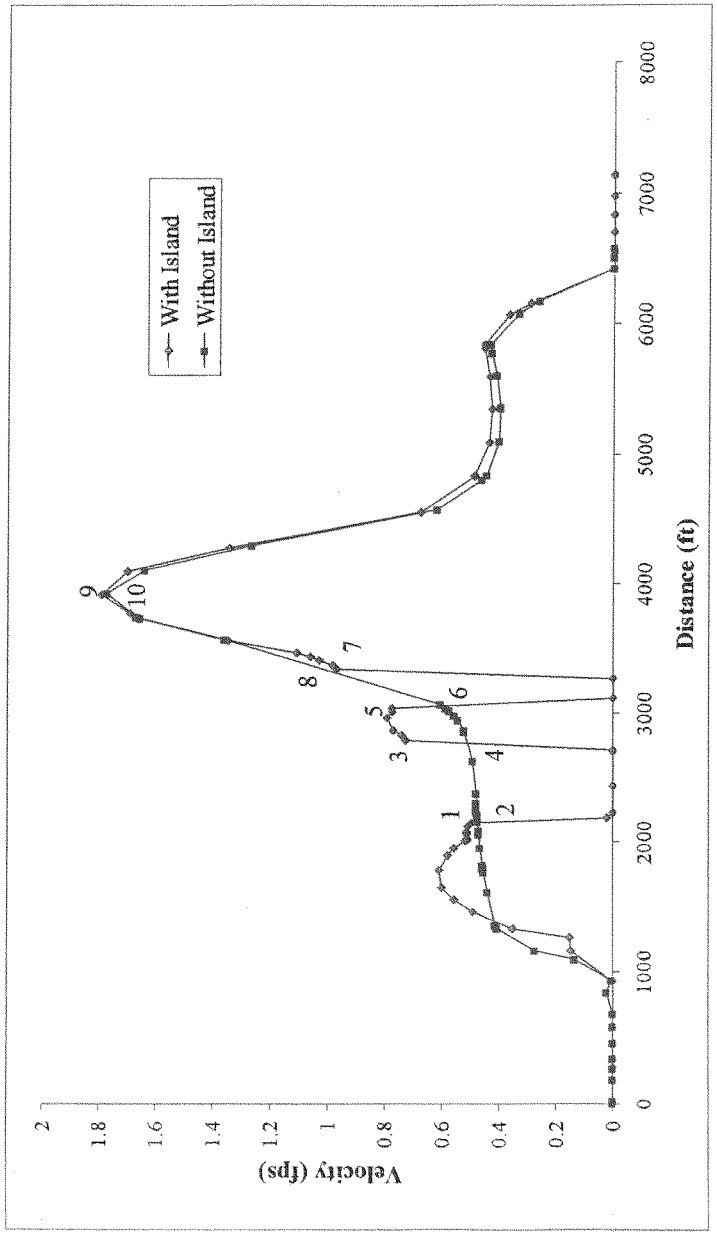


Figure 30. Lateral Velocity Distributinos at Cross-Section 2 for Alternative 3 for a flow of 45,000 cfs

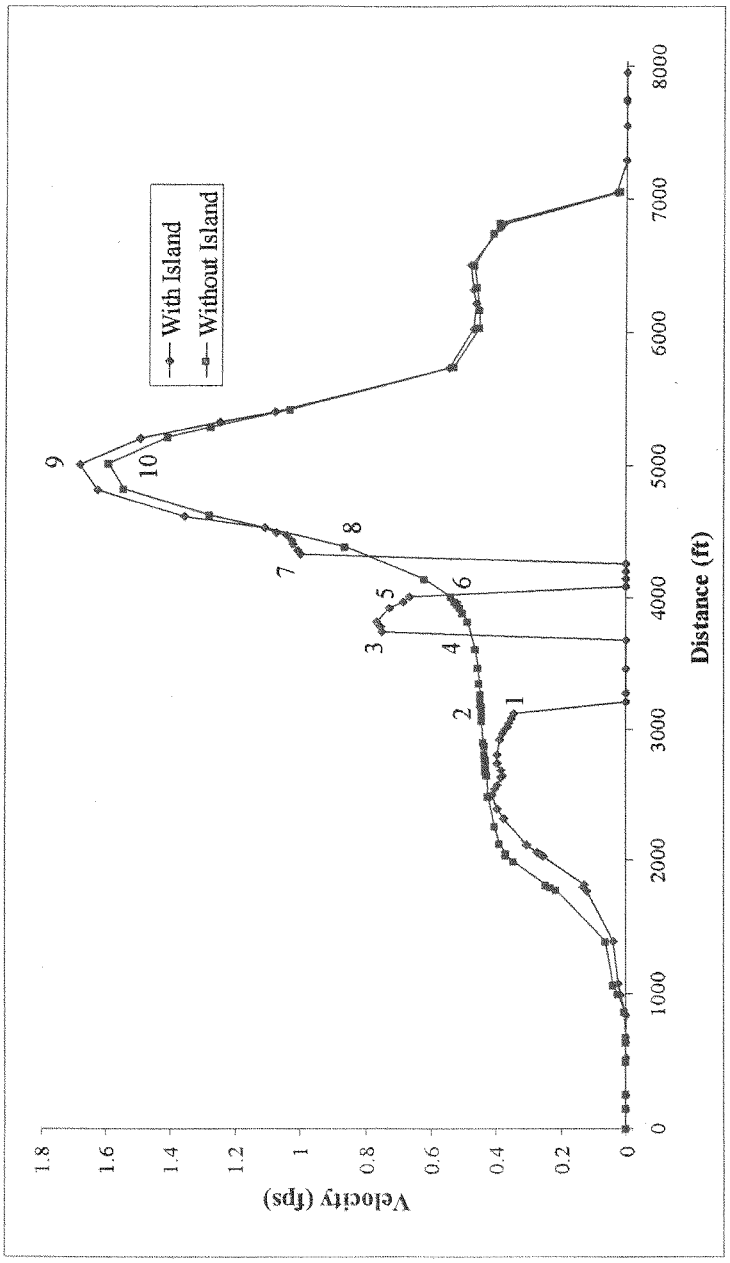


Figure 31. Lateral Velocity Distributinos at Cross-Section 3 for Alternative 3 for a flow of 45,000 cfs

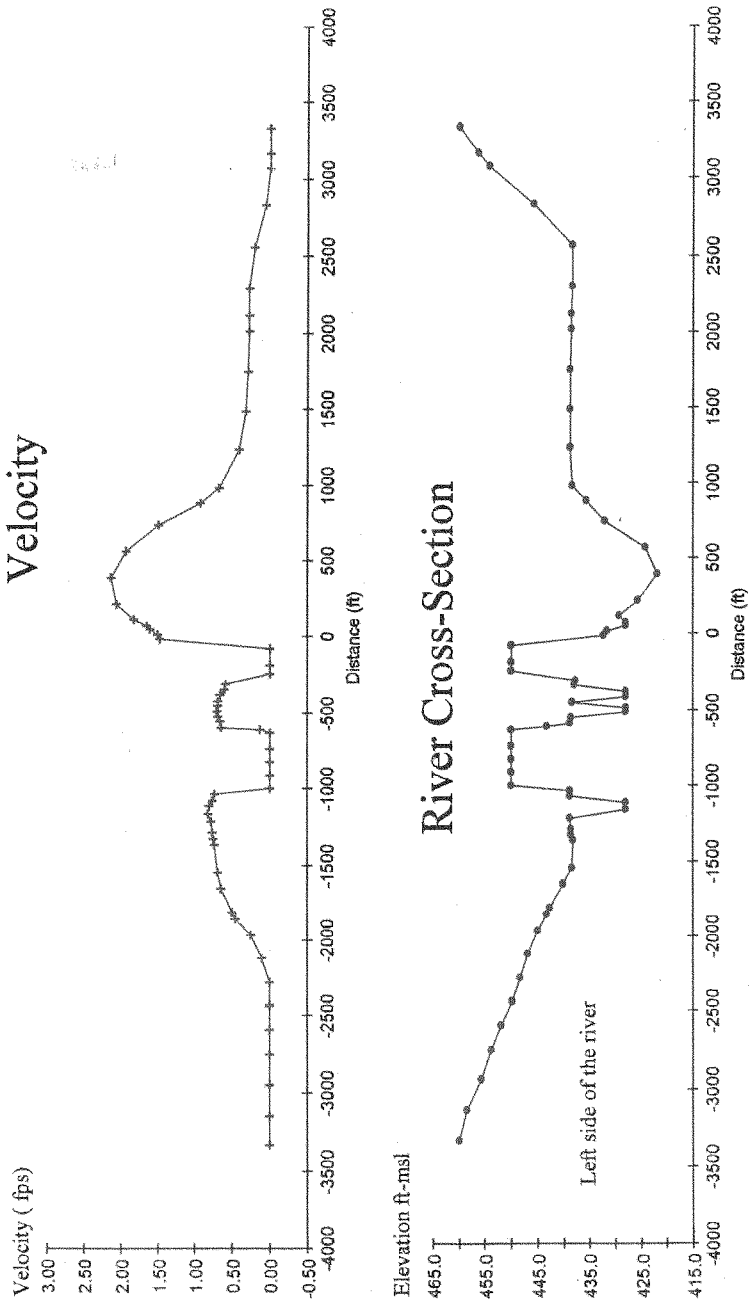


Figure 32. Lateral Velocity Distribution and River Section at Cross-Section 1 for Alternative 3 for a flow of 45,000 cfs

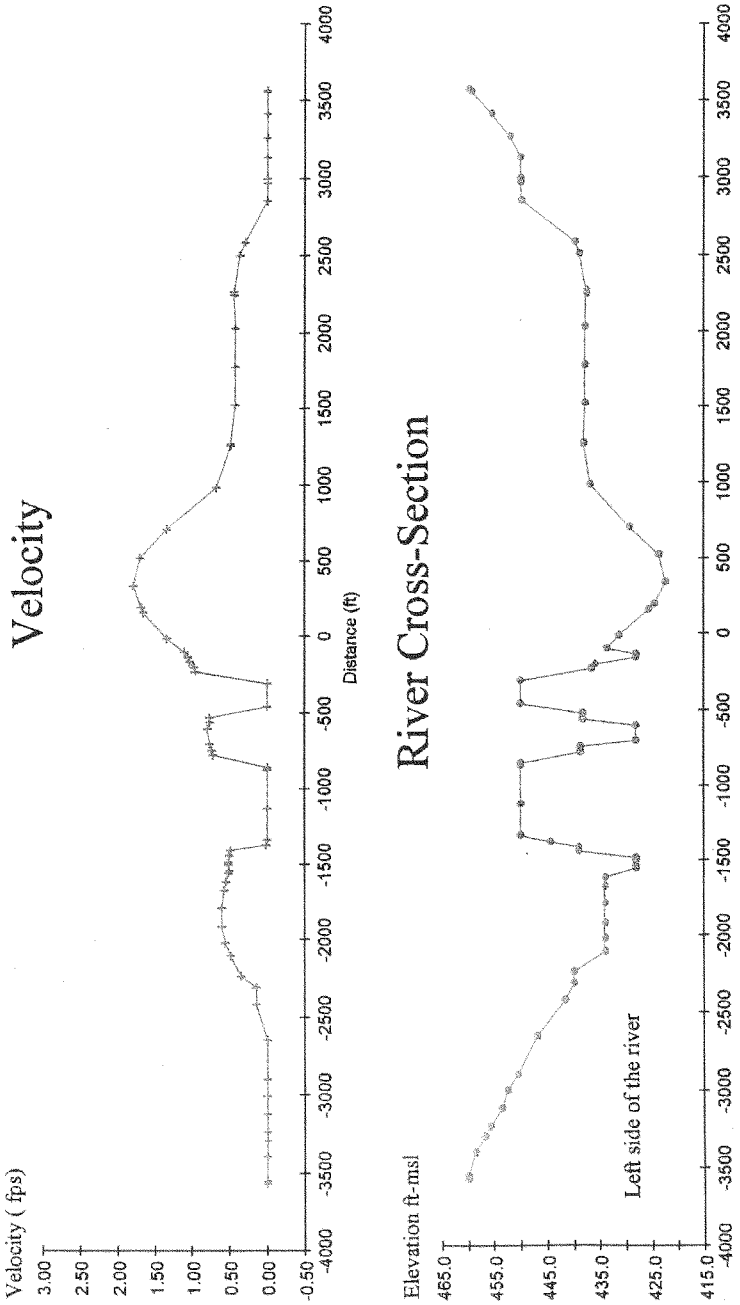


Figure 33. Lateral Velocity Distribution and River Section at Cross-Section 2 for Alternative 3 for a flow of 45,000 cfs

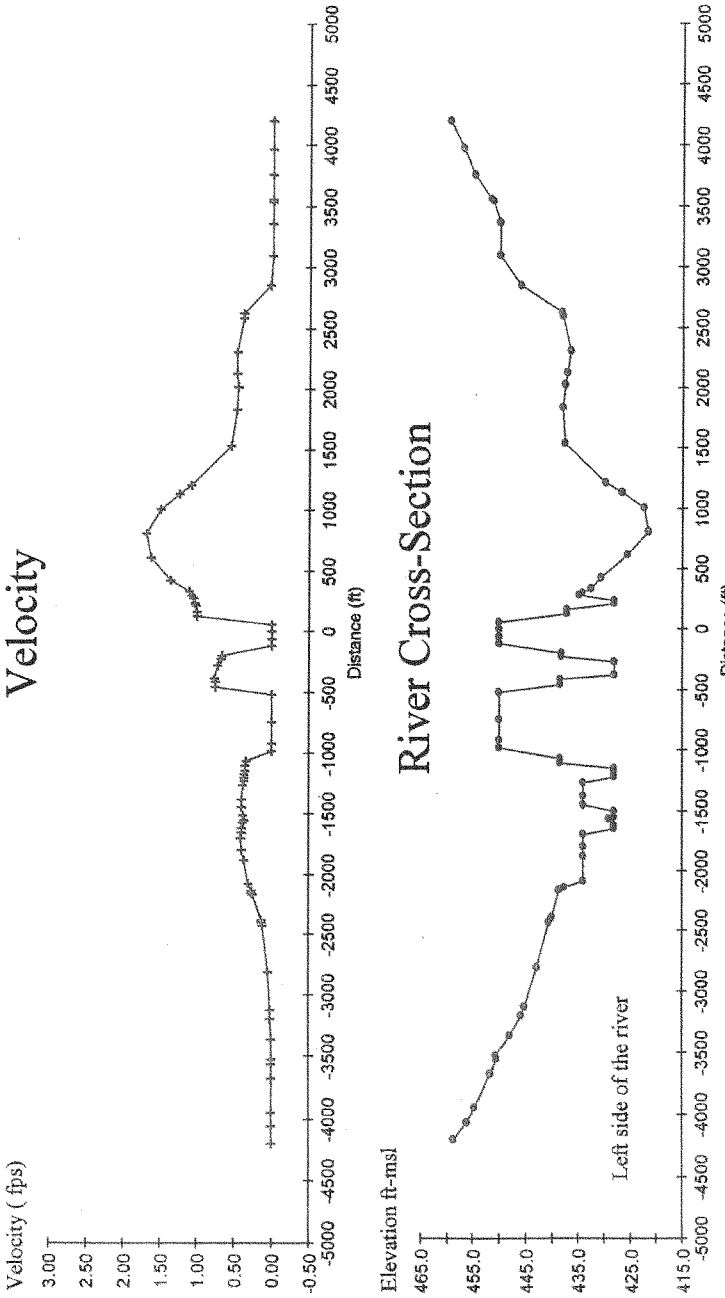


Figure 34. Lateral Velocity Distribution and River Section at Cross-Section 3 for Alternative 3 for a flow of 45,000 cfs

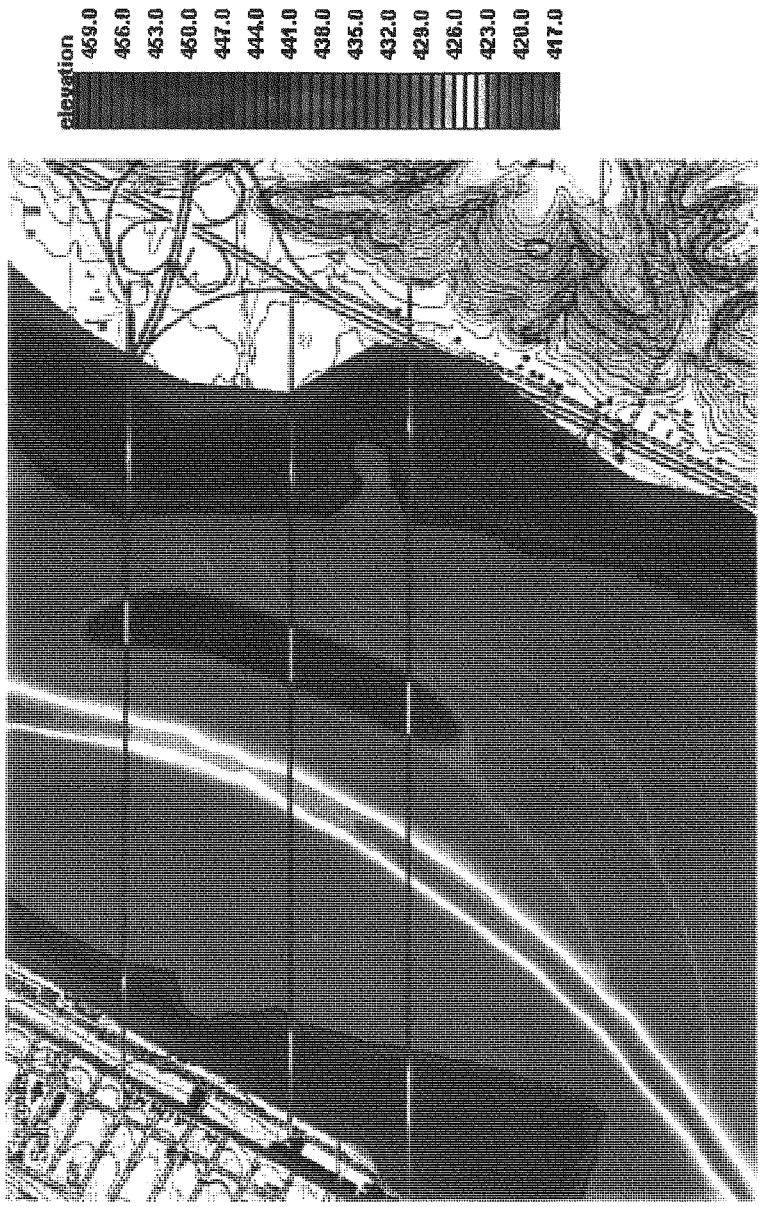


Figure 35. Depth Variations and Dredged Channel Locations for Alternative 4

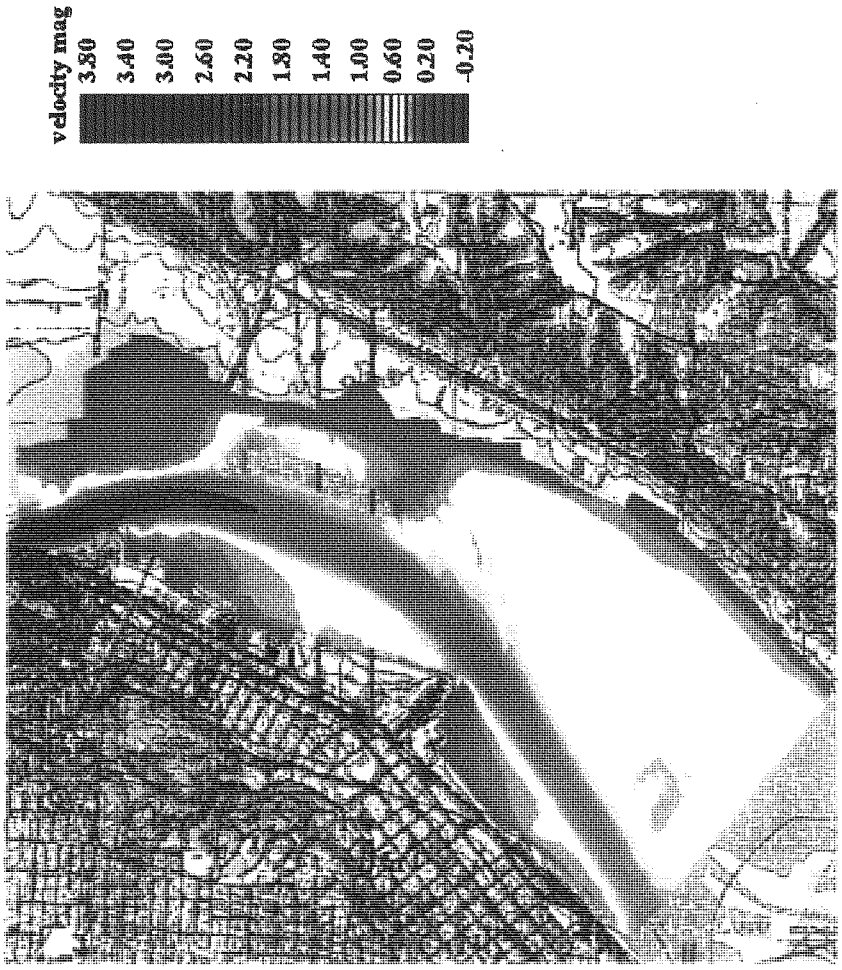


Figure 36. Spatial Velocity Distribution for Alternative 4 for a flow of 45,000 cfs

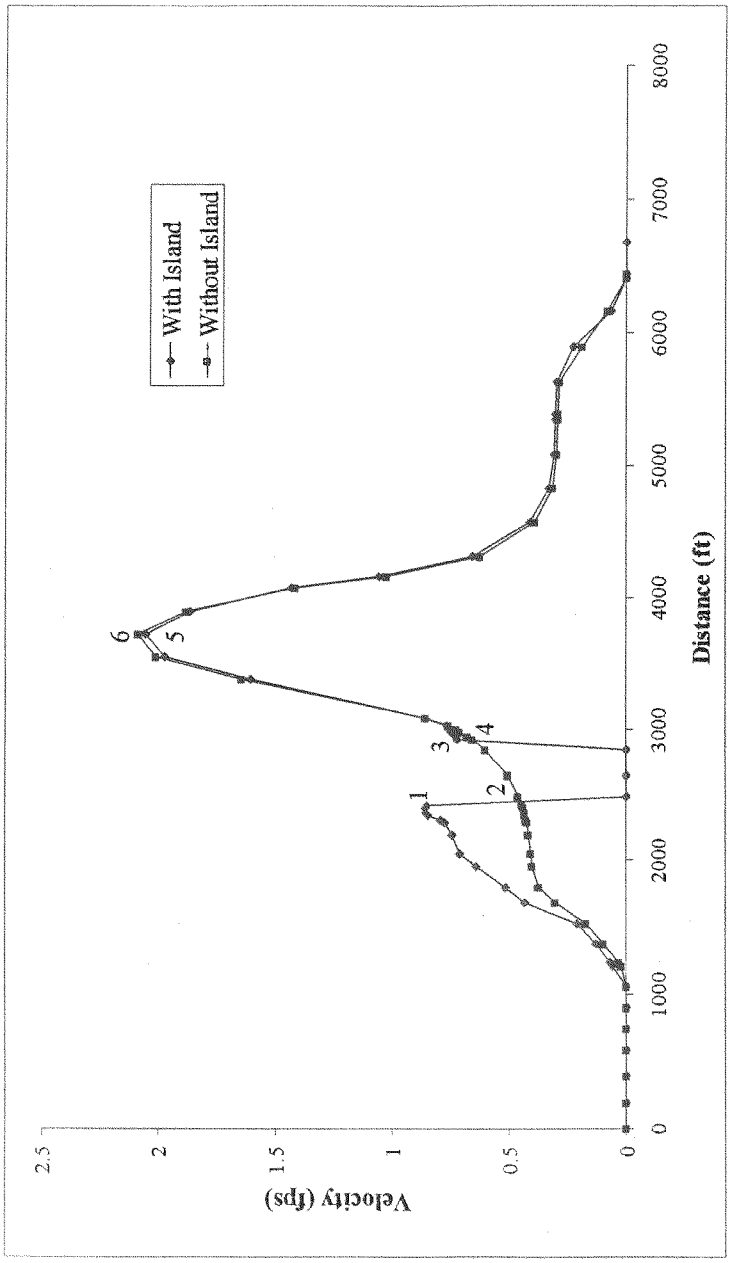


Figure 37. Lateral Velocity Distribution at Cross-Section 1 for Alternative 4 for a flow of 45,000 cfs

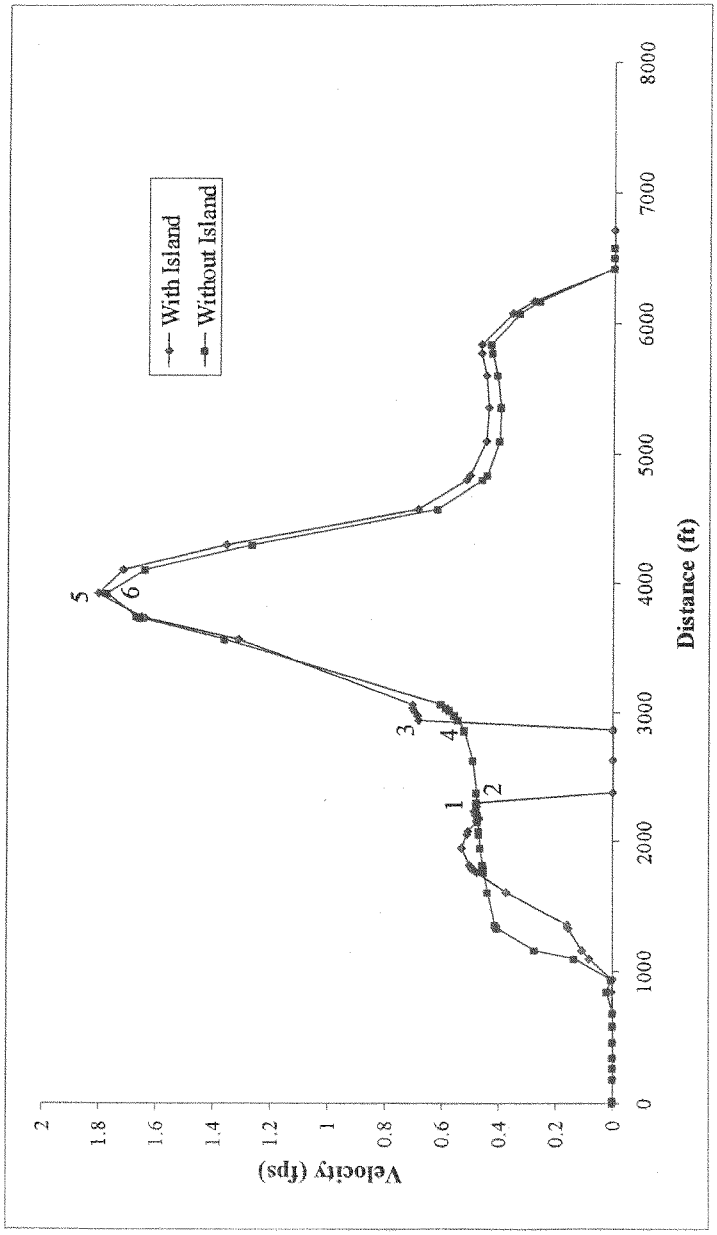


Figure 38. Lateral Velocity Distribution at Cross-Section 2 for Alternative 4 for a flow of 45,000 cfs

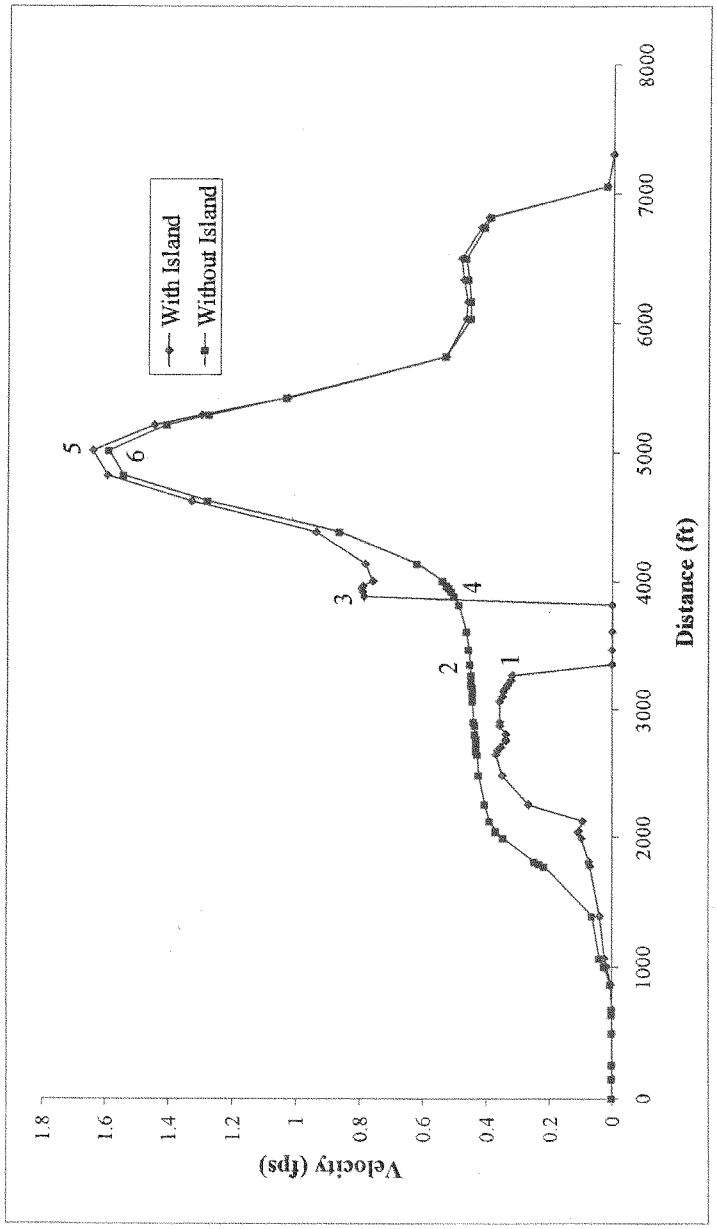


Figure 39. Lateral Velocity Distribution at Cross-Section 3 for Alternative 4 for a flow of 45,000 cfs

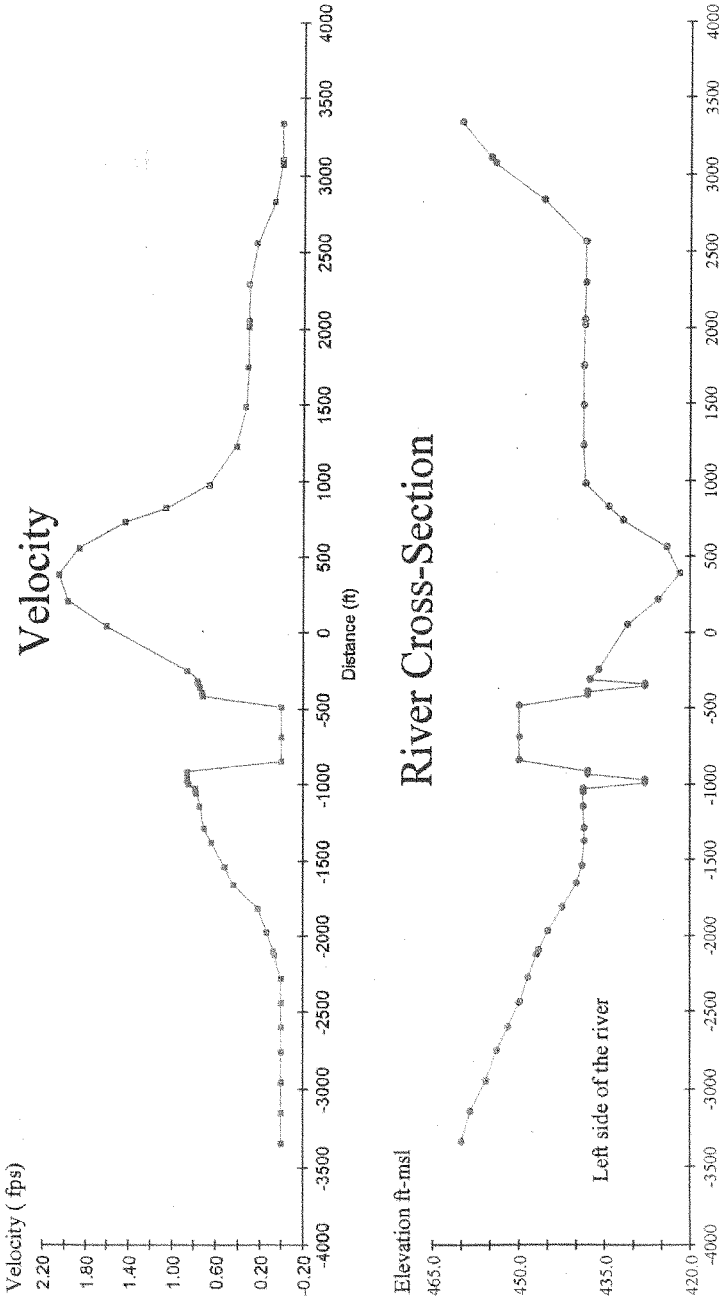


Figure 40. Lateral Velocity Distribution and River Cross-Sections at Cross-Section 1 for Alternative 4 for a flow of 45,000 cfs

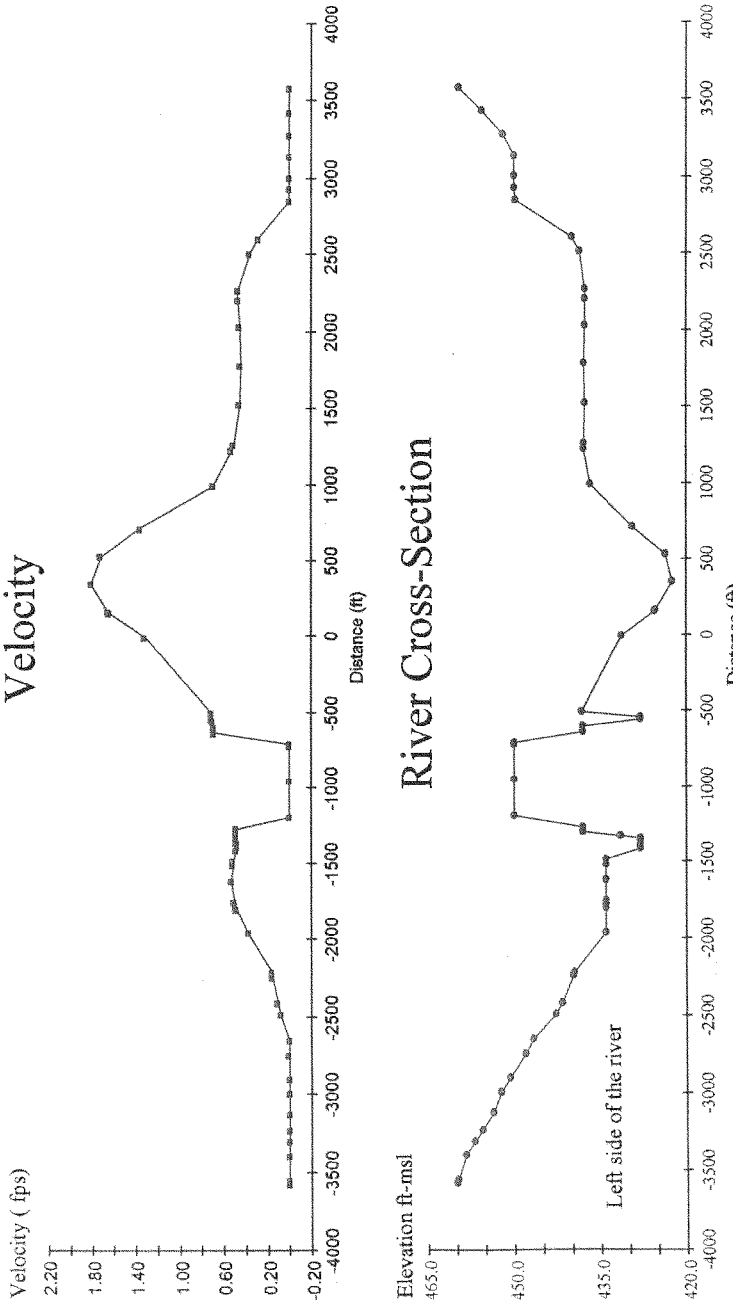


Figure 41. Lateral Velocity Distribution and River Cross-Sections at Cross-Section 2 for Alternative 4 for a flow of 45,000 cfs

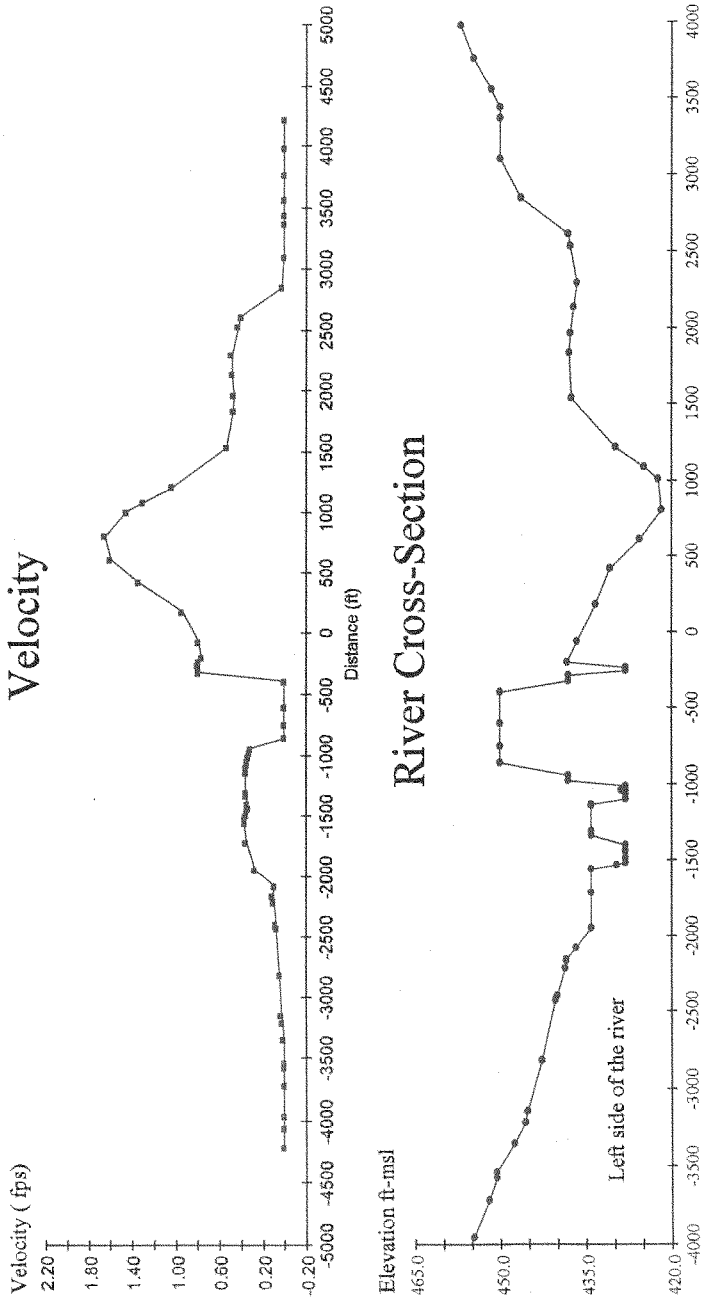


Figure 42. Lateral Velocity Distribution and River Cross-Sections at Cross-Section 3 for Alternative 4 for a flow of 45,000 cfs

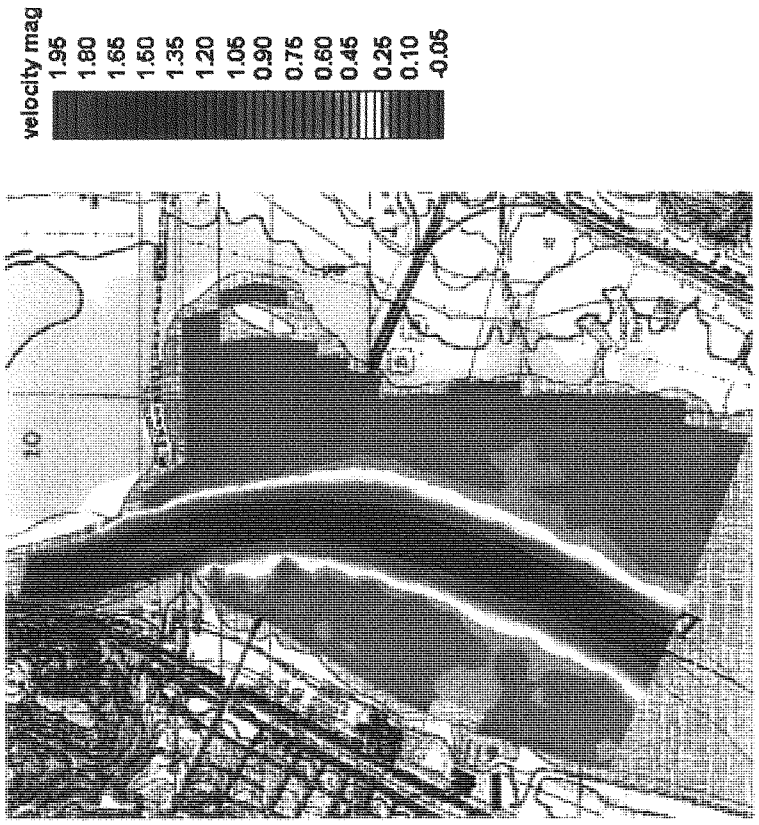


Figure 43. Velocity Variations for a flow of 15,000 cfs

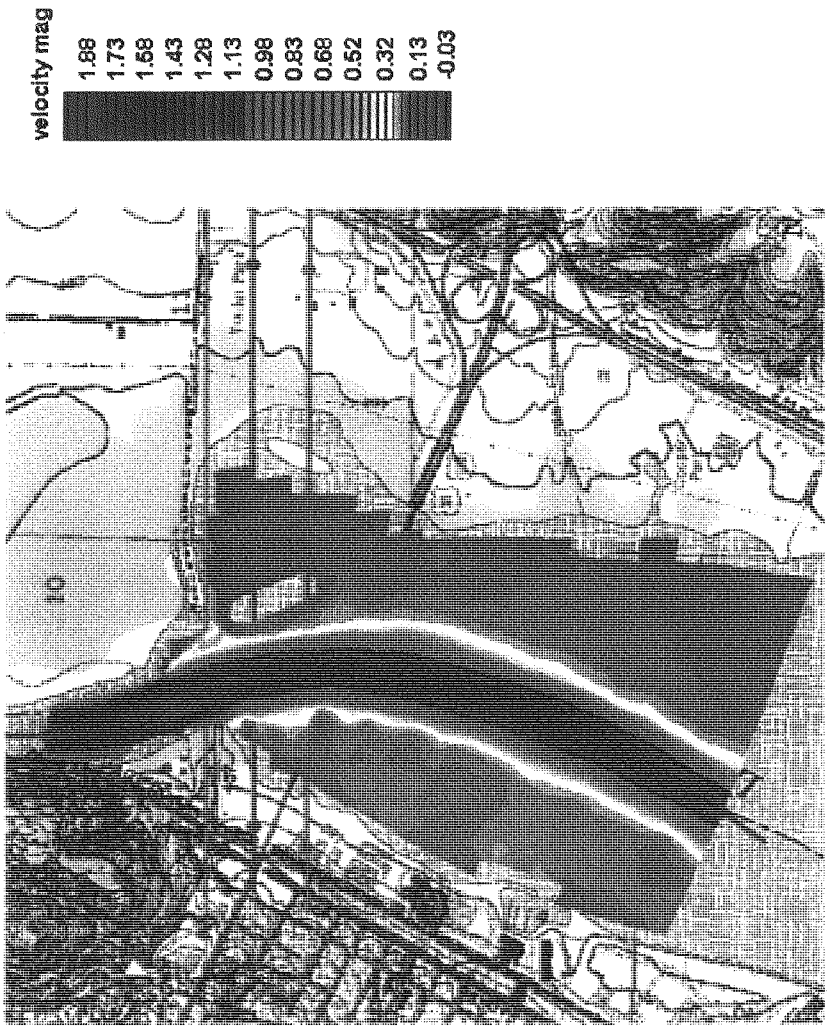


Figure 44. The Spatial Velocity Distribution for Alternative 1 for a flow of 15,000 cfs

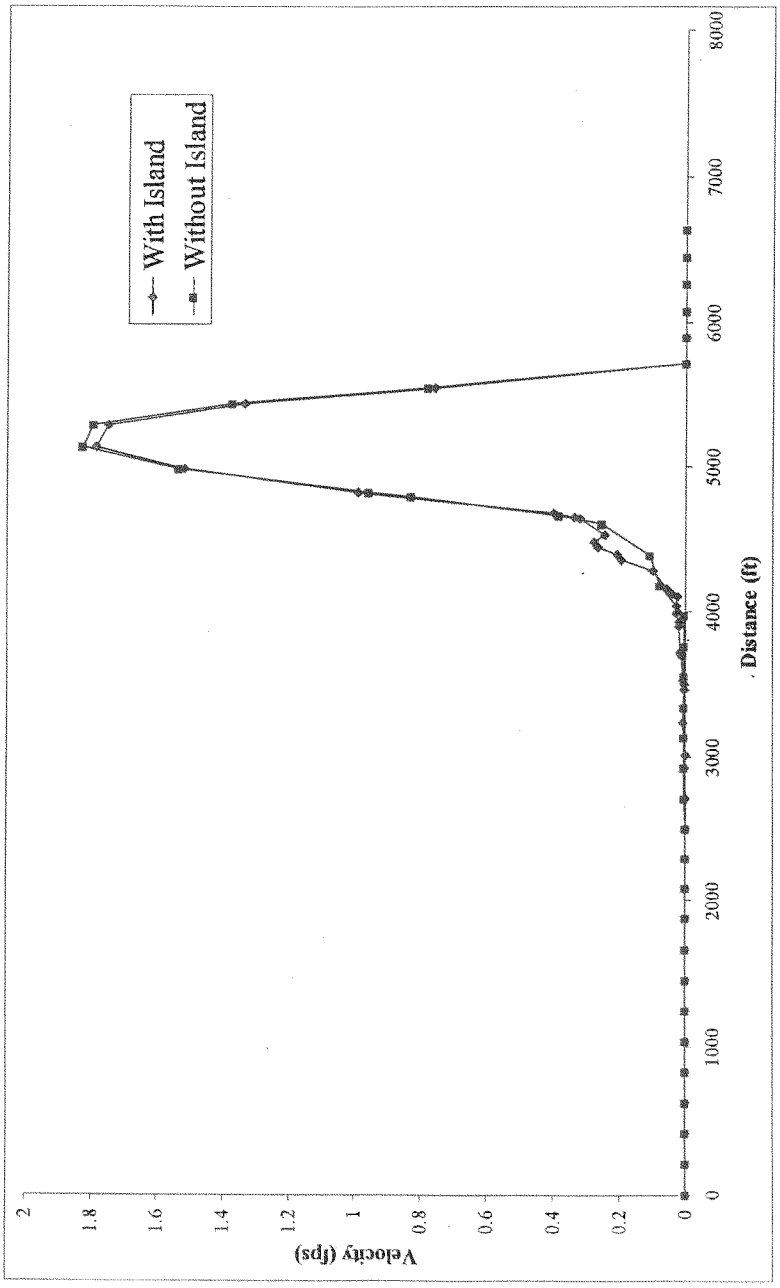
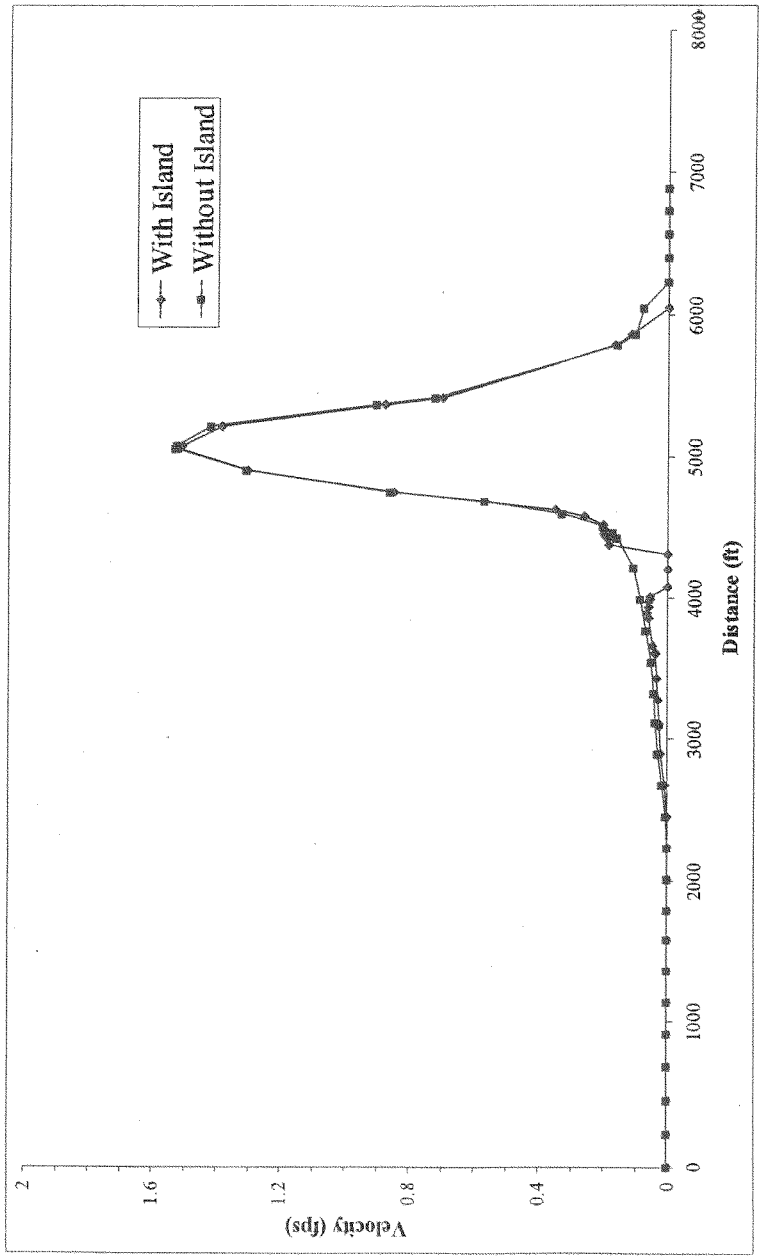


Figure 45. Lateral Velocity Distribution at Cross-Section 1, Qw = 15,000 cfs, Alternative 1



→ 46. Lateral Velocity Distribution at Cross-Section 2, Qw = 15,000 cfs, Alternative 1

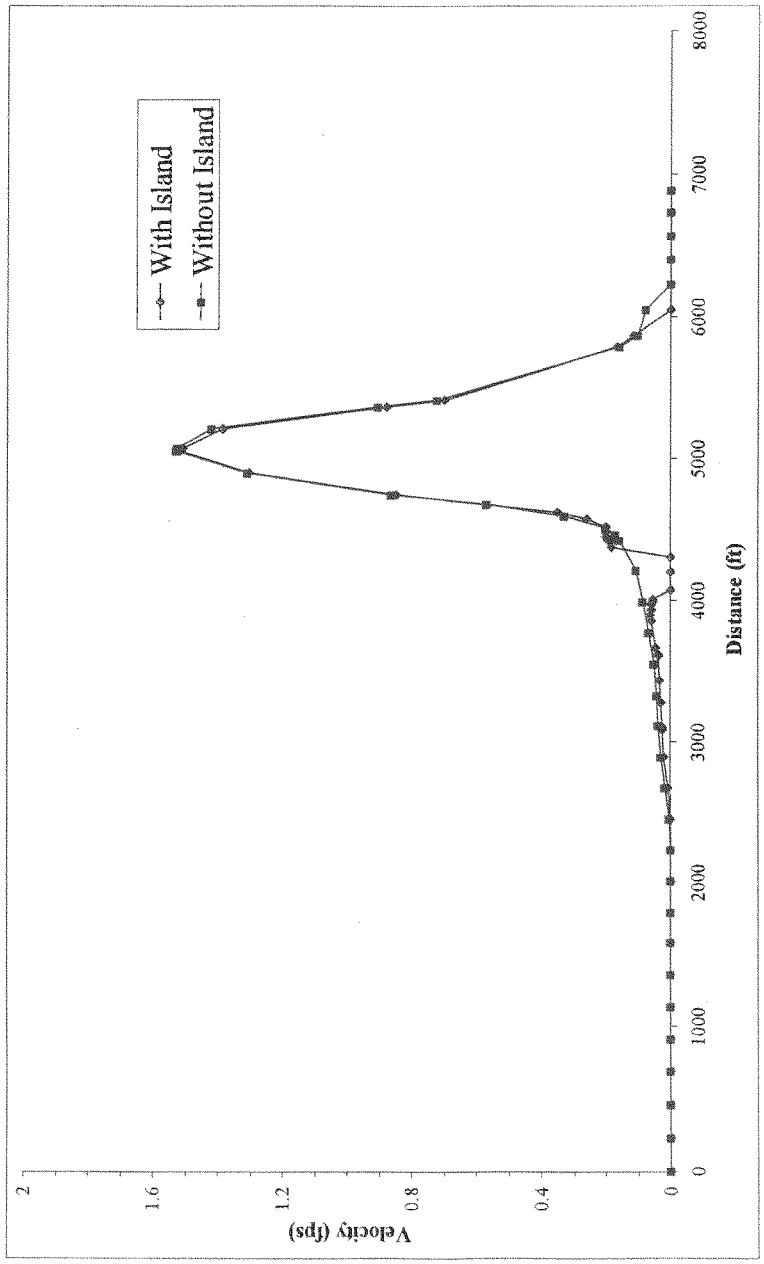


Figure 47. Lateral Velocity Distribution at Cross-Section 3, Qw = 15,000 cfs, Alternative 1

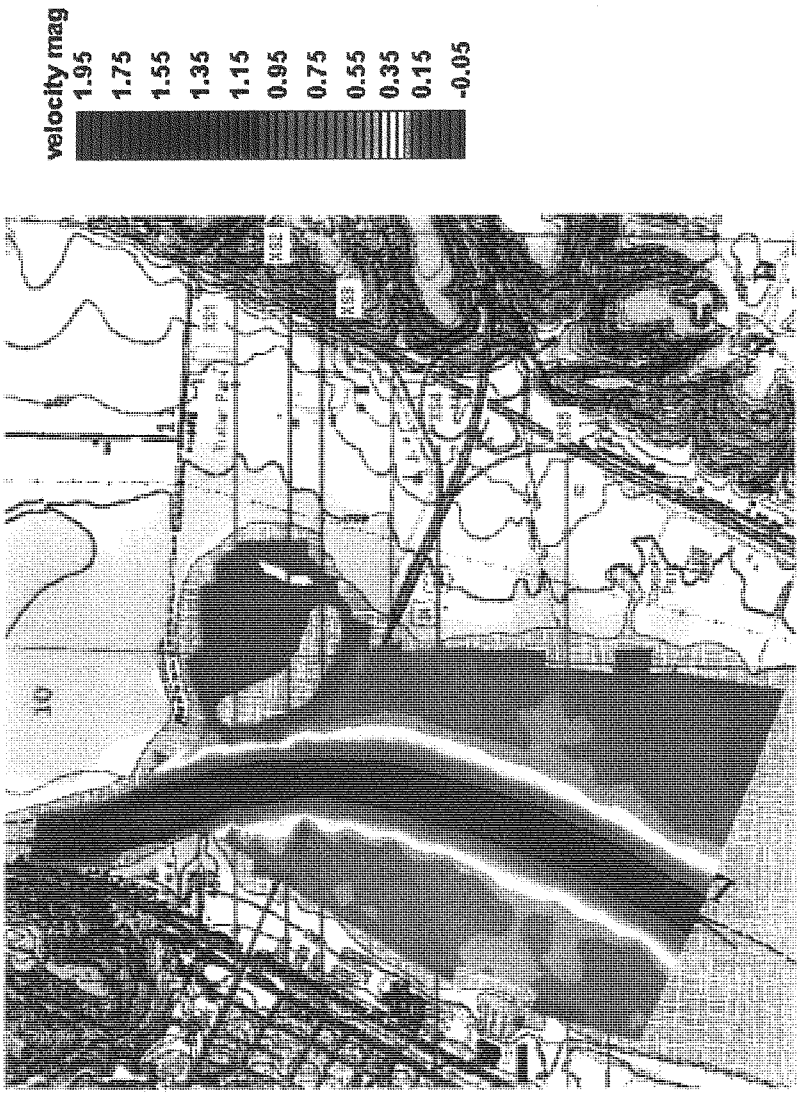


Figure 48. Spatial Velocity Distribution, Qw = 15,000 cfs, Alternative 2

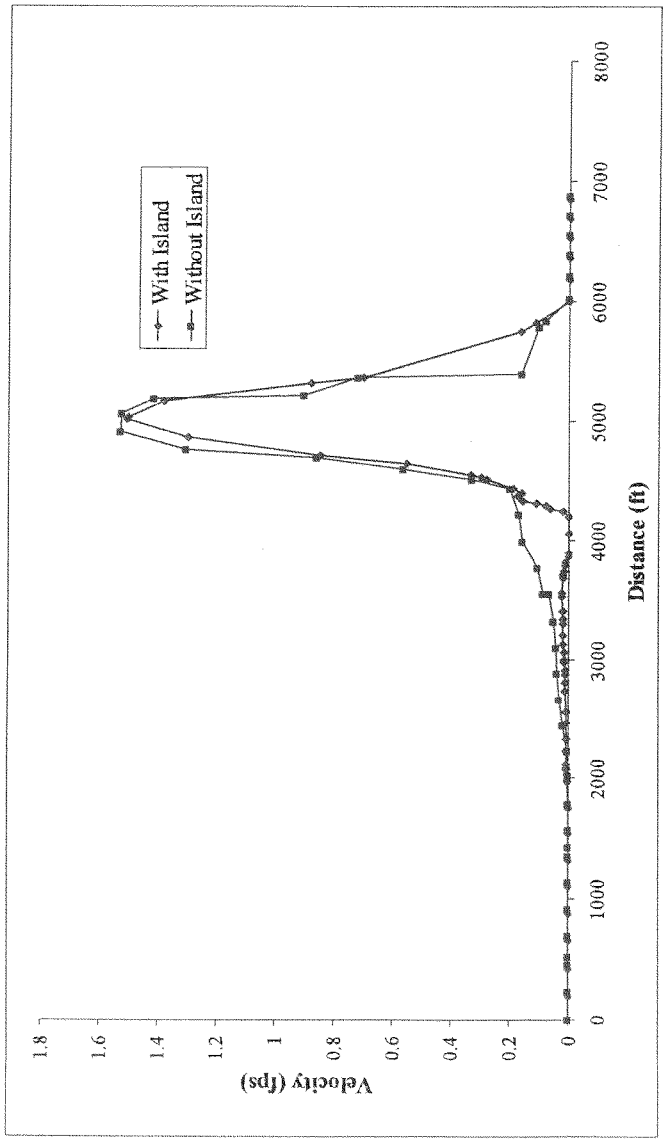


Figure 49. Lateral Velocity Distribution at Cross-Section 1, Qw = 15,000, Alternative 2

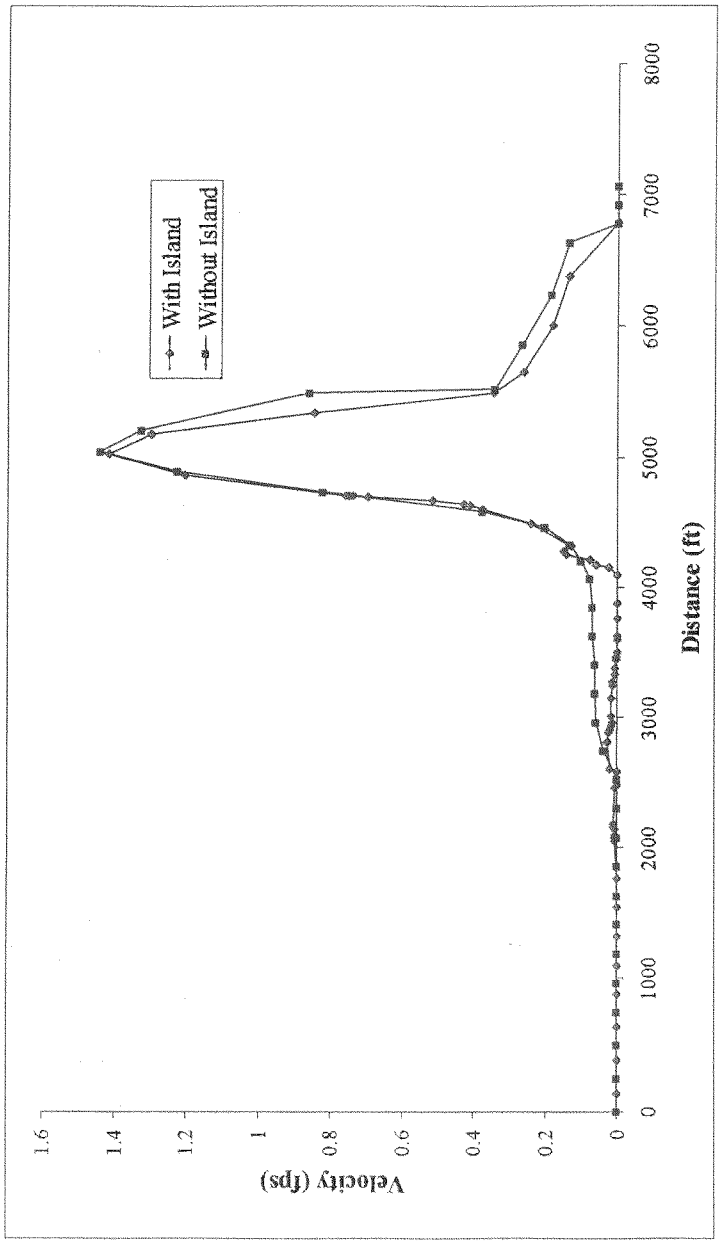


Figure 50. Lateral Velocity Distribution at Cross-Section 2, Qw = 15,000, Alternative 2

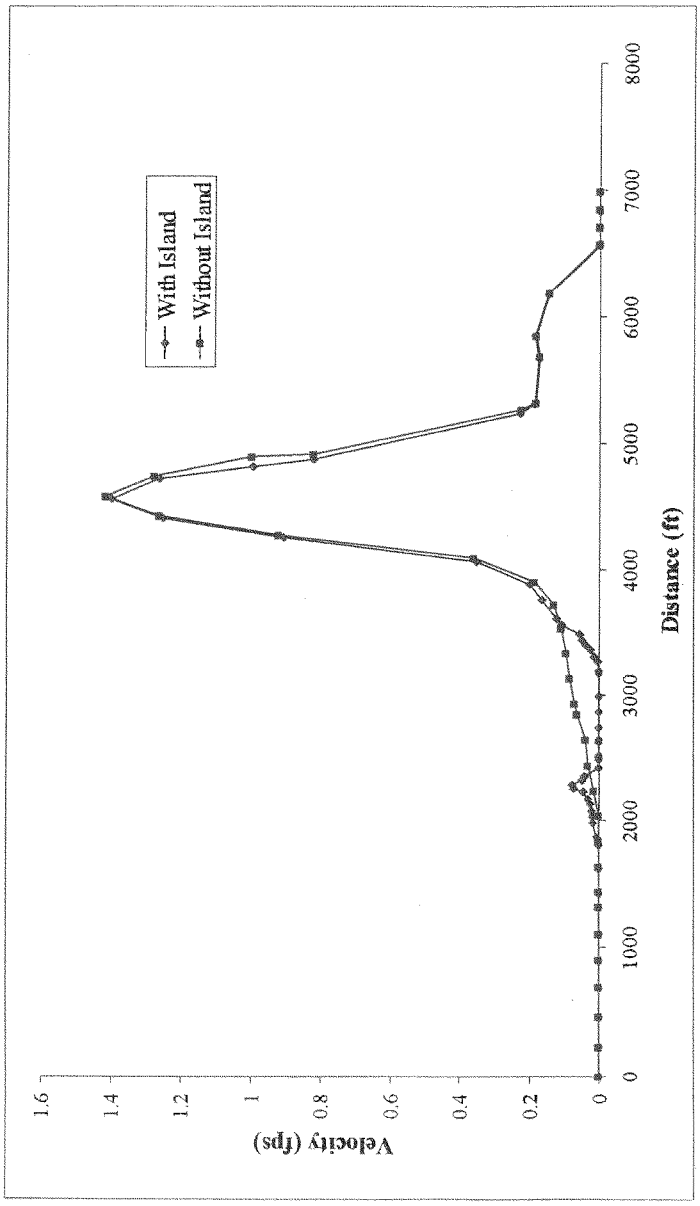


Figure 51. Lateral Velocity Distribution at Cross-Section 3, Qw = 15,000, Alternative 2

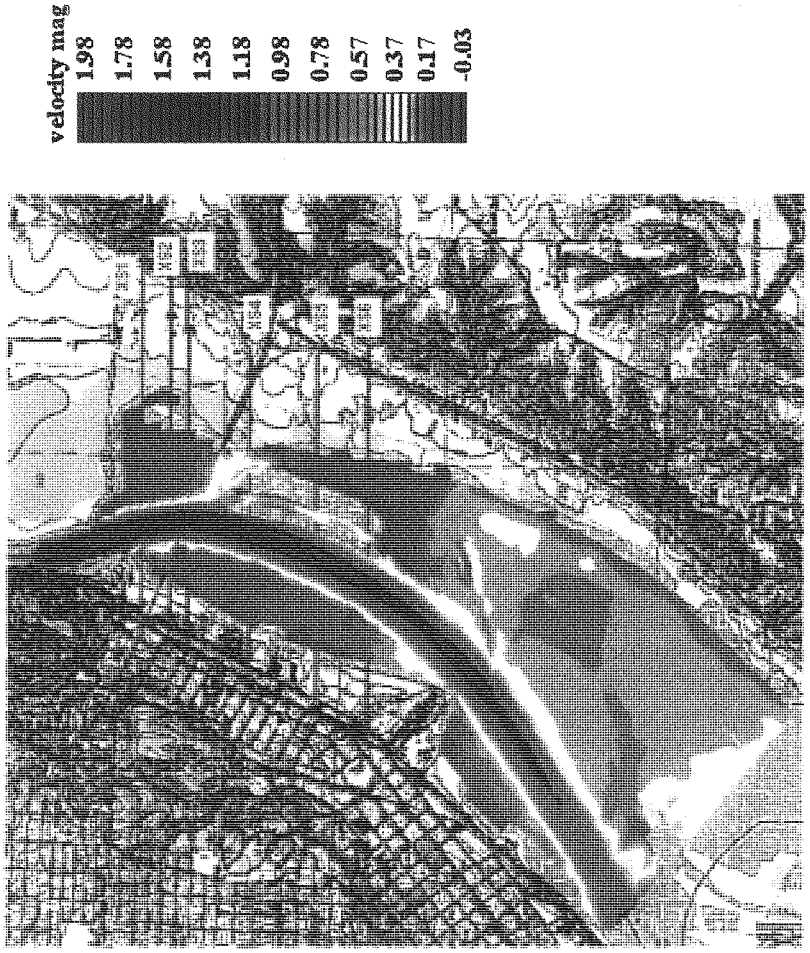


Figure 52. Spatial Velocity Distribution, Qw = 15,000 cfs, Alternative 3

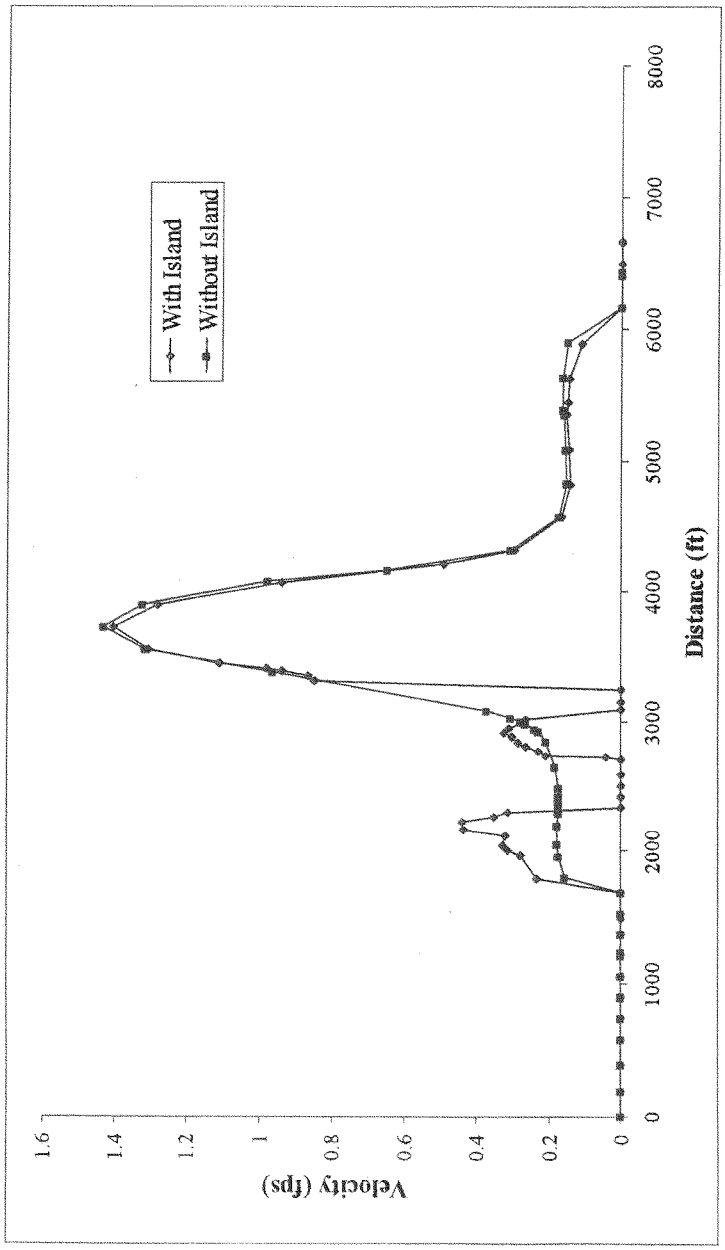


Figure 53. Lateral Velocity Distribution at Cross-Section 1, Qw = 15,000, Alternative 3

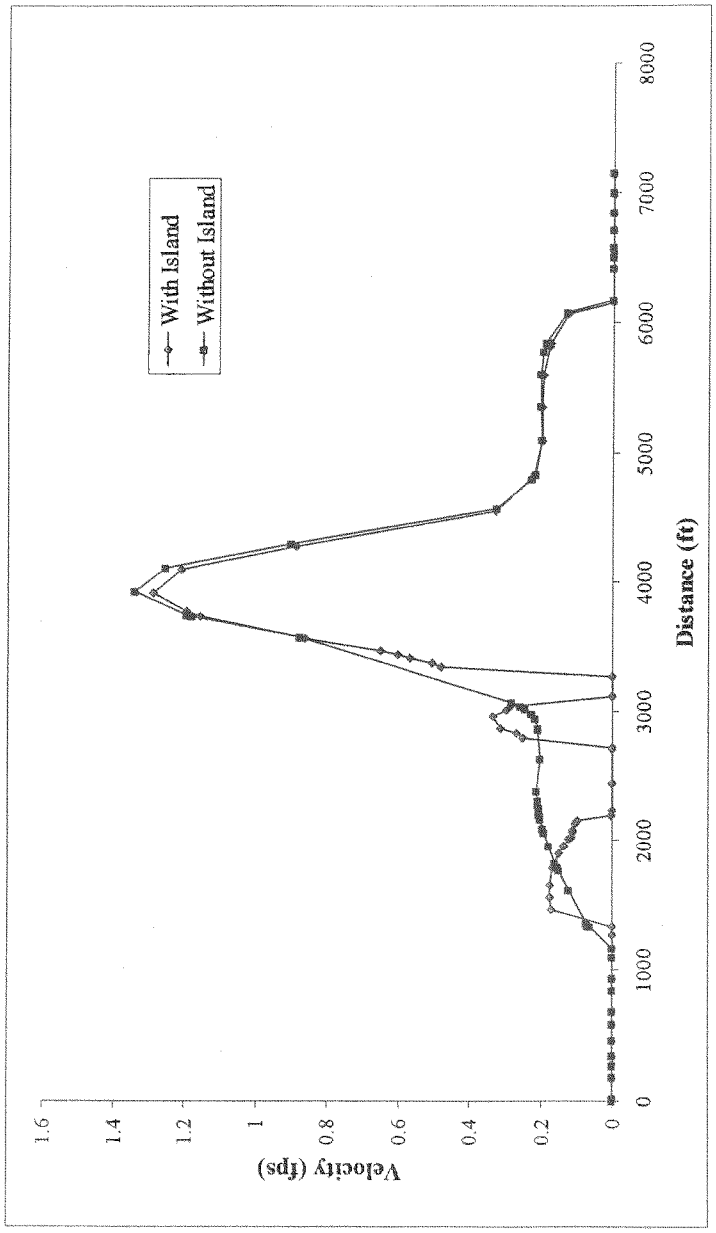


Figure 54. Lateral Velocity Distribution at Cross-Section 2, Qw = 15,000, Alternative 3

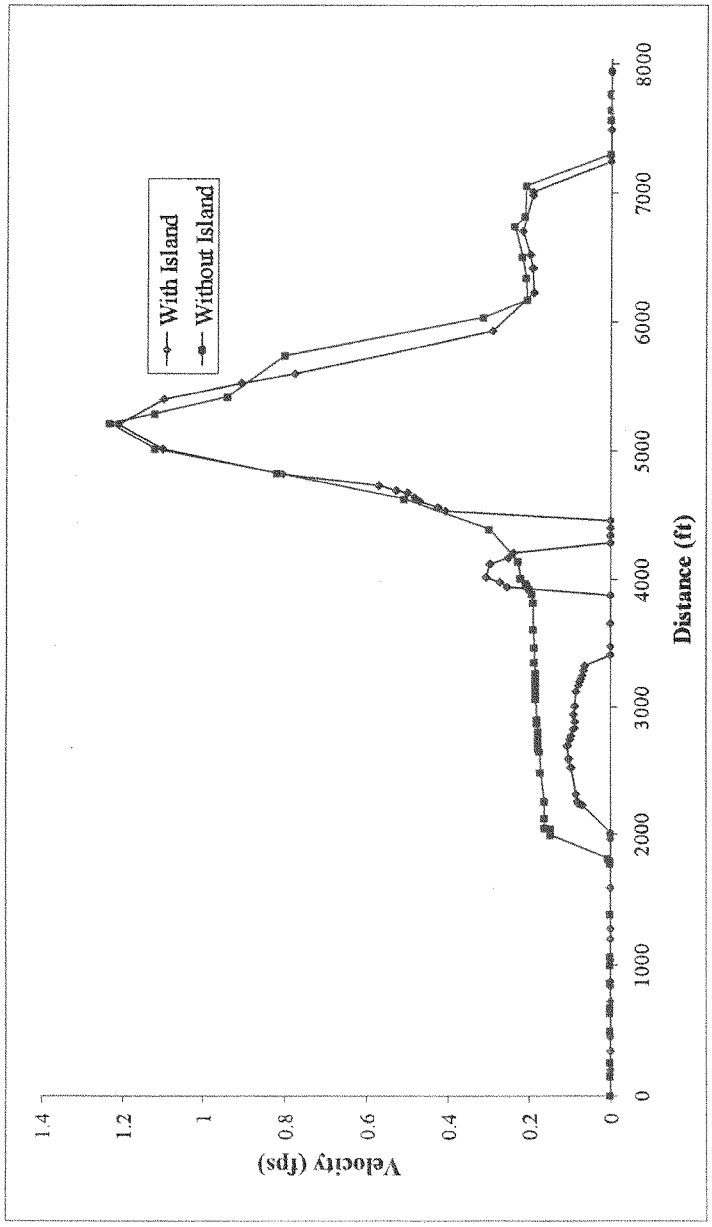


Figure 55. Lateral Velocity Distribution at Cross-Section 3, Qw = 15,000, Alternative 3

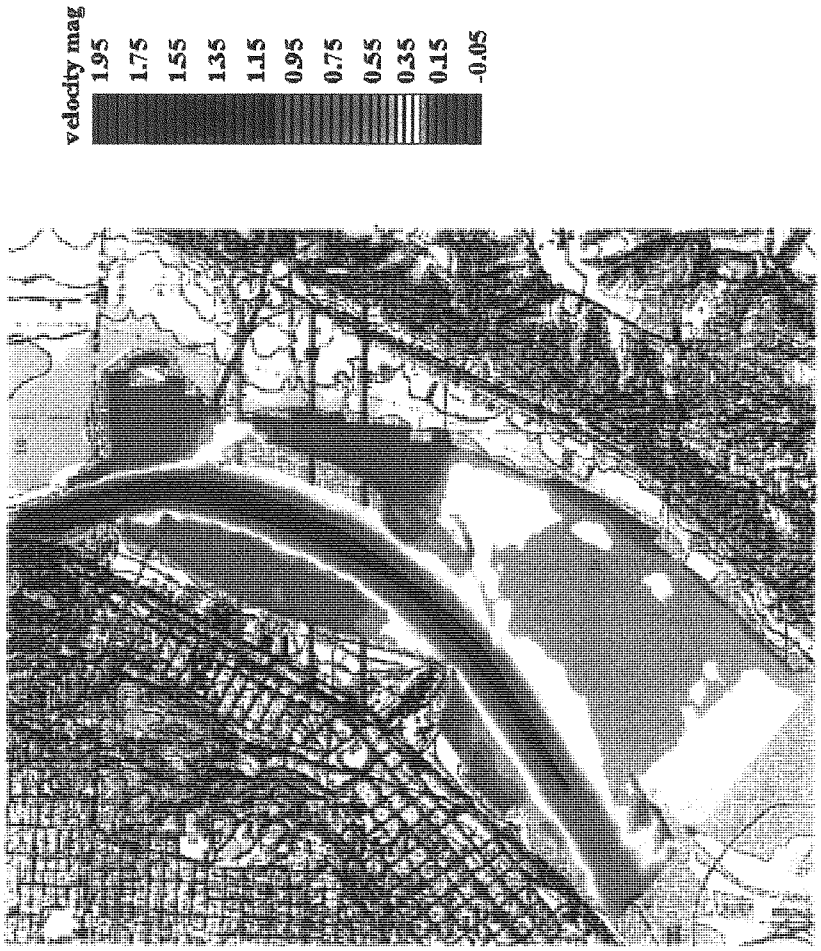


Figure 56. Spatial Velocity Distribution , Qw = 15,000, Alternative 4

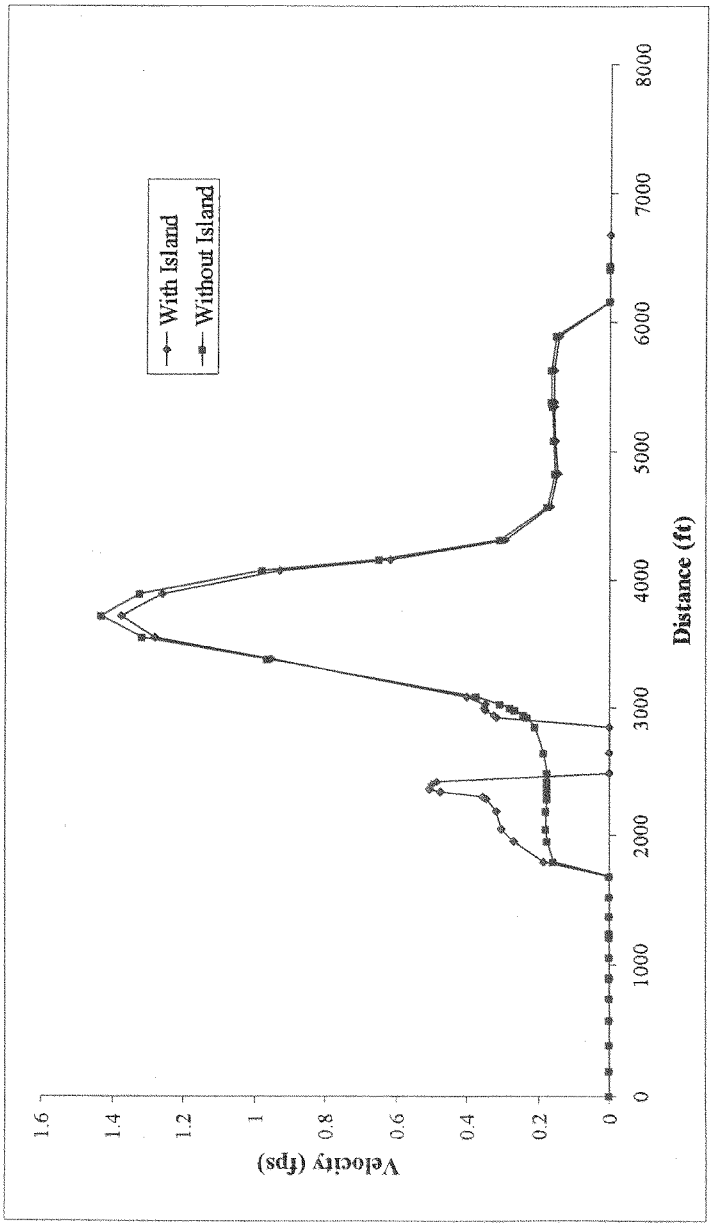


Figure 57. Lateral Velocity Distribution at Cross-Section 1, Qw = 15,000, Alternative 4

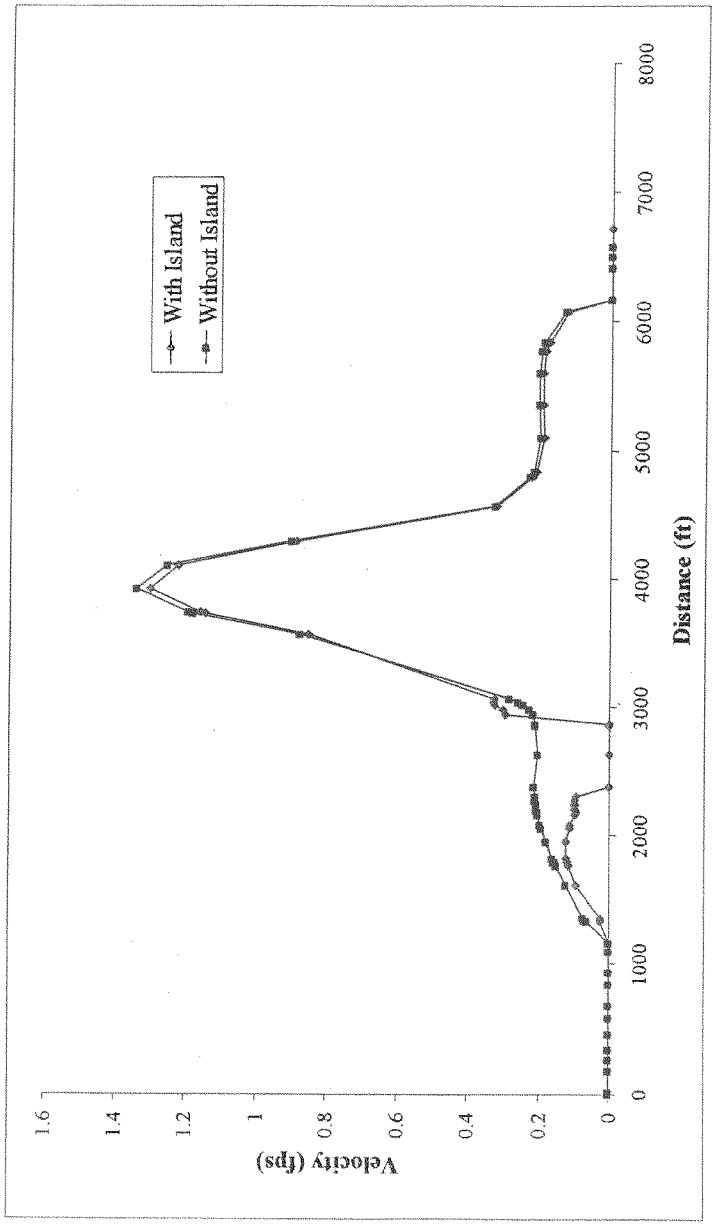


Figure 58. Lateral Velocity Distribution at Cross-Section 2, Qw = 15,000, Alternative 4

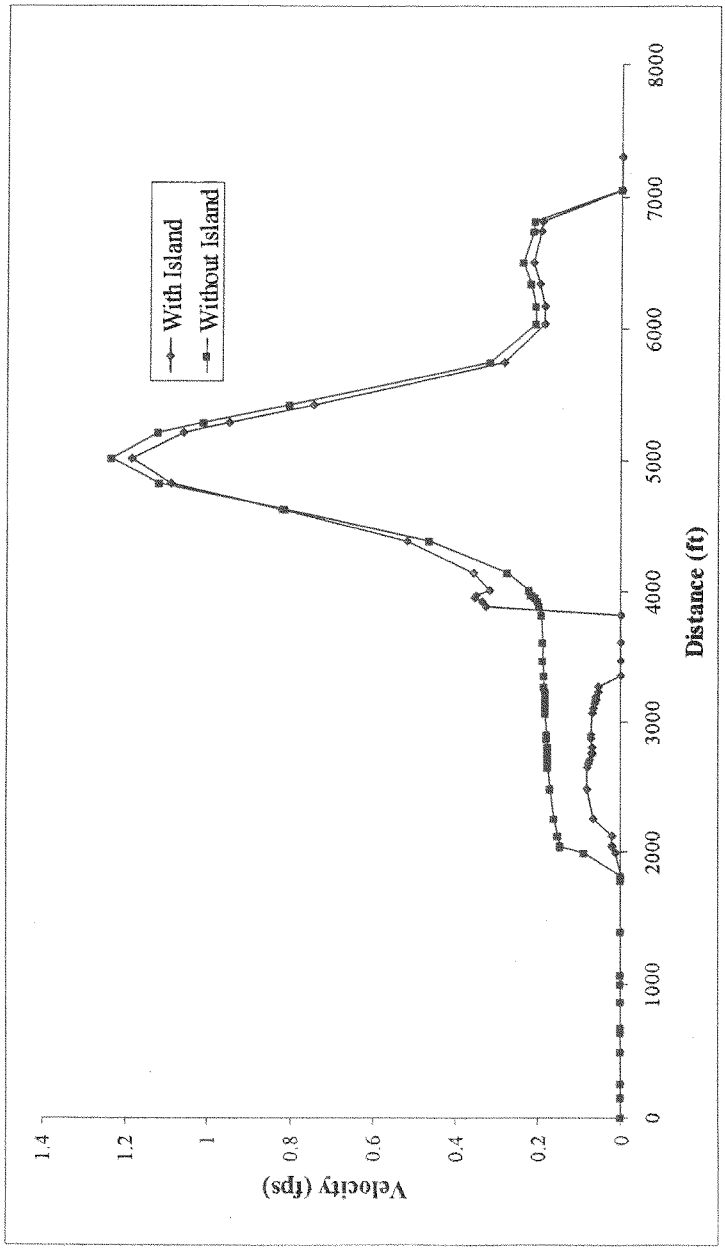


Figure 59. Lateral Velocity Distribution at Cross-Section 3, Qw = 15,000, Alternative 4

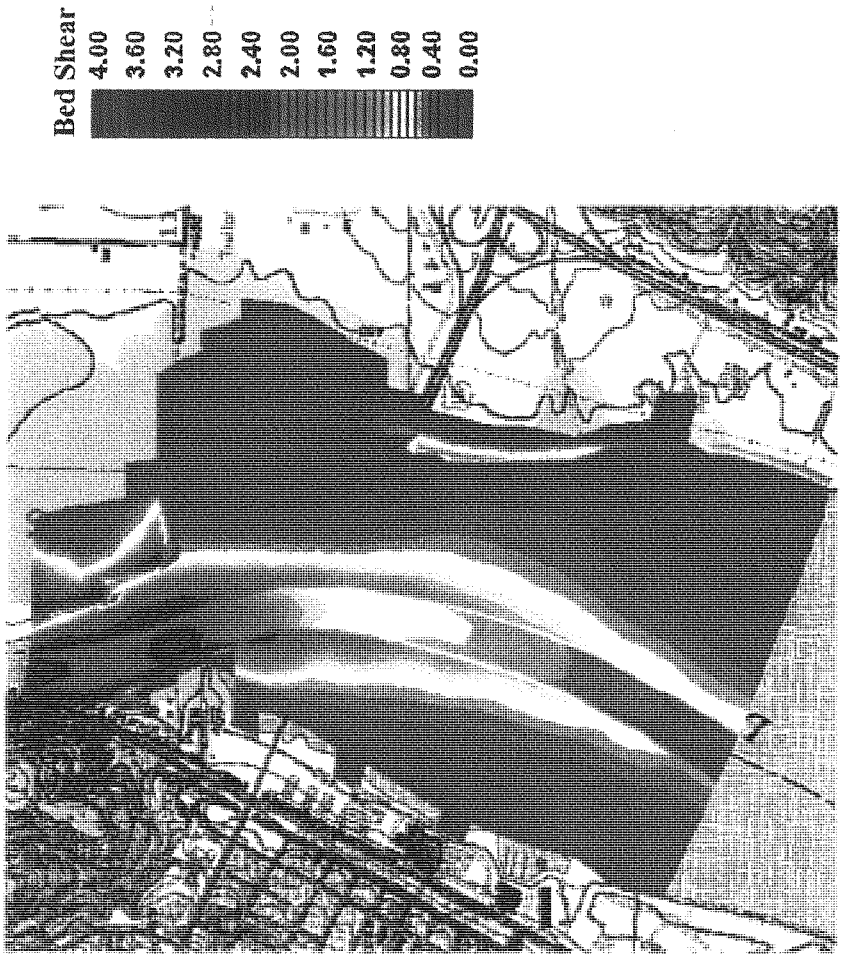


Figure 60. Spatial Shear Stress Distribution for Ambient Conclition for a flow of 45,000 cfs

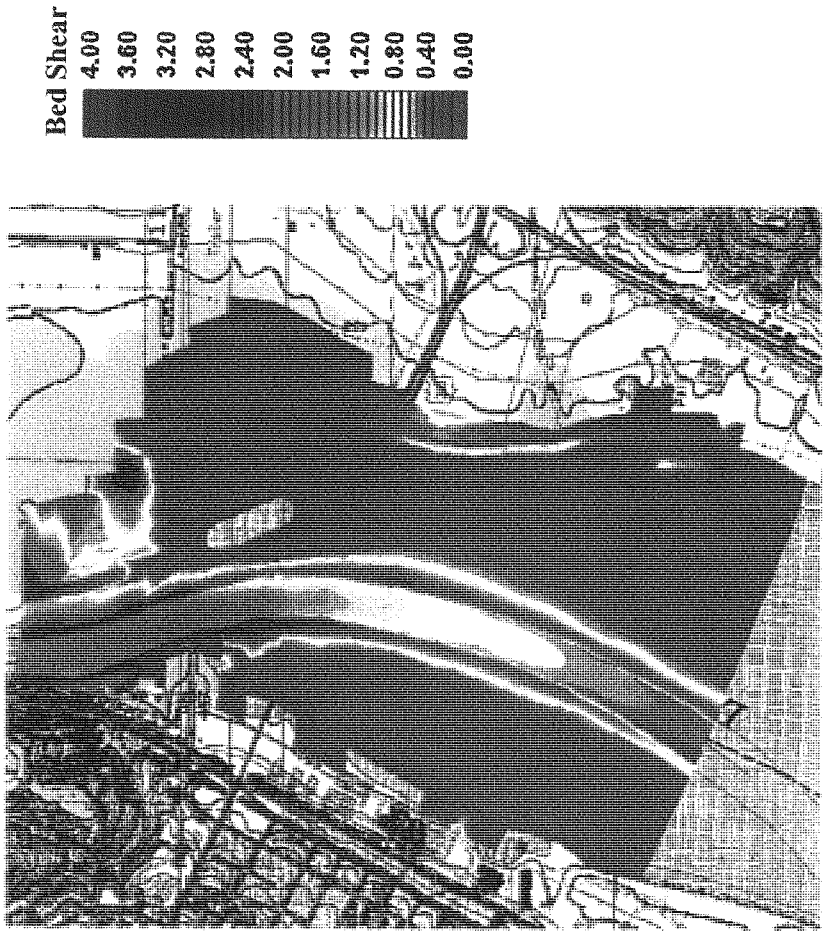


Figure 61. Spatial Shear Stress Distribution for Alternative 1 for a flow of 45,000 cfs

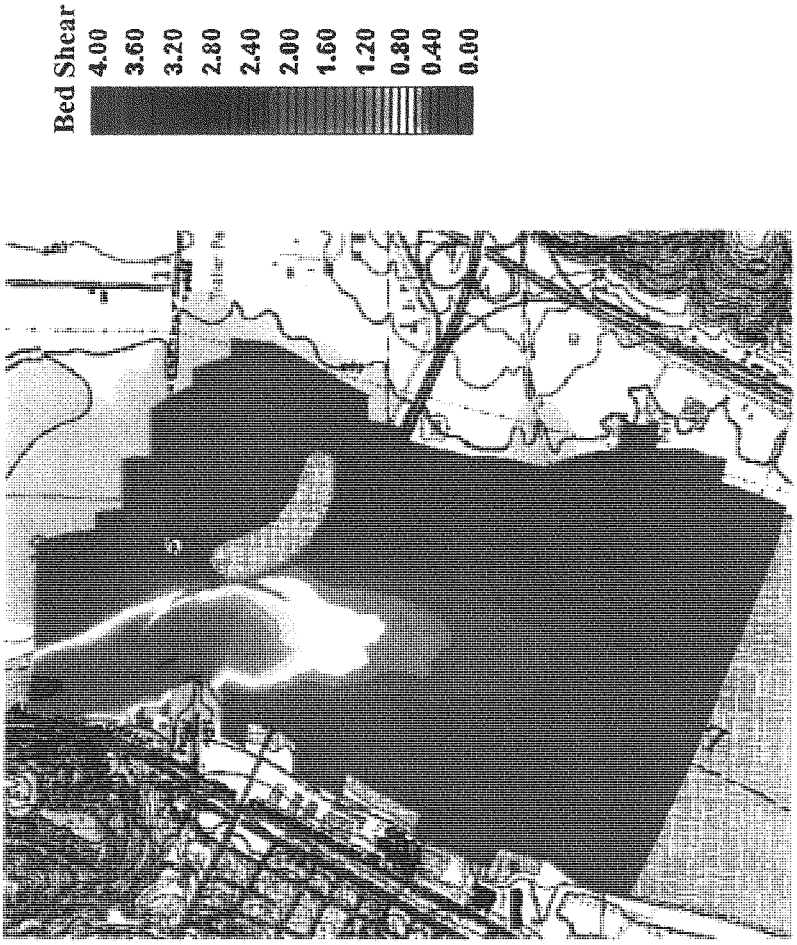


Figure 62. Spatial Shear Stress Distribution for Alternative 2 for a flow of 45,000 cfs

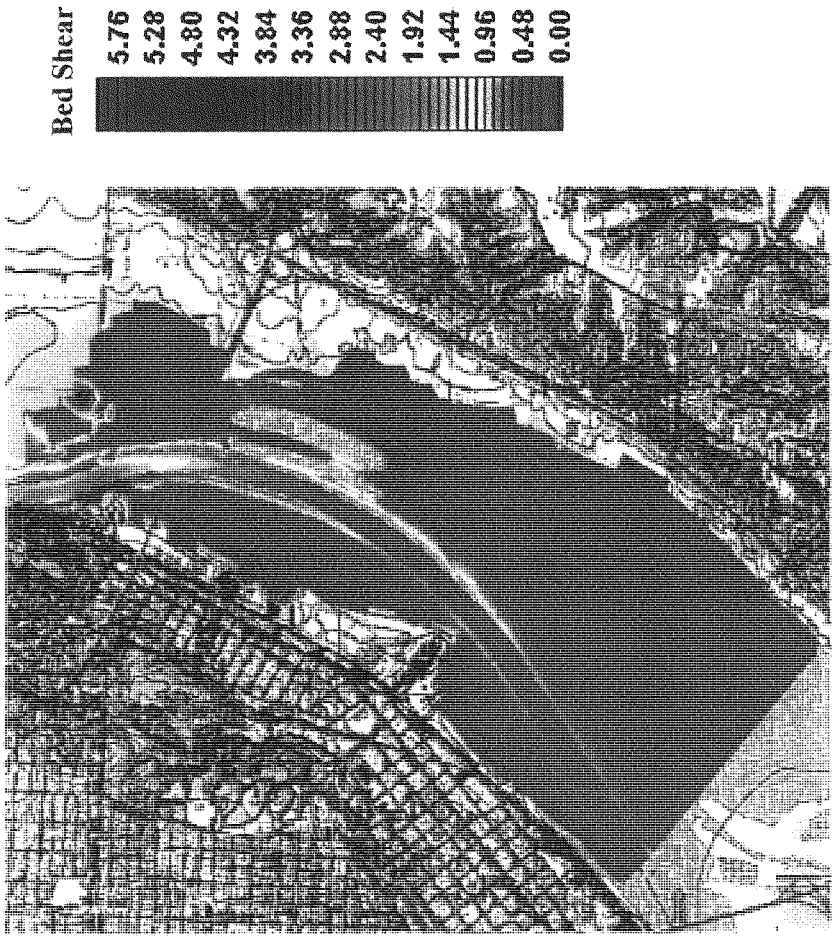


Figure 63. Spatial Shear Stress Distribution for Alternative 3 for a flow of 45,000 cfs

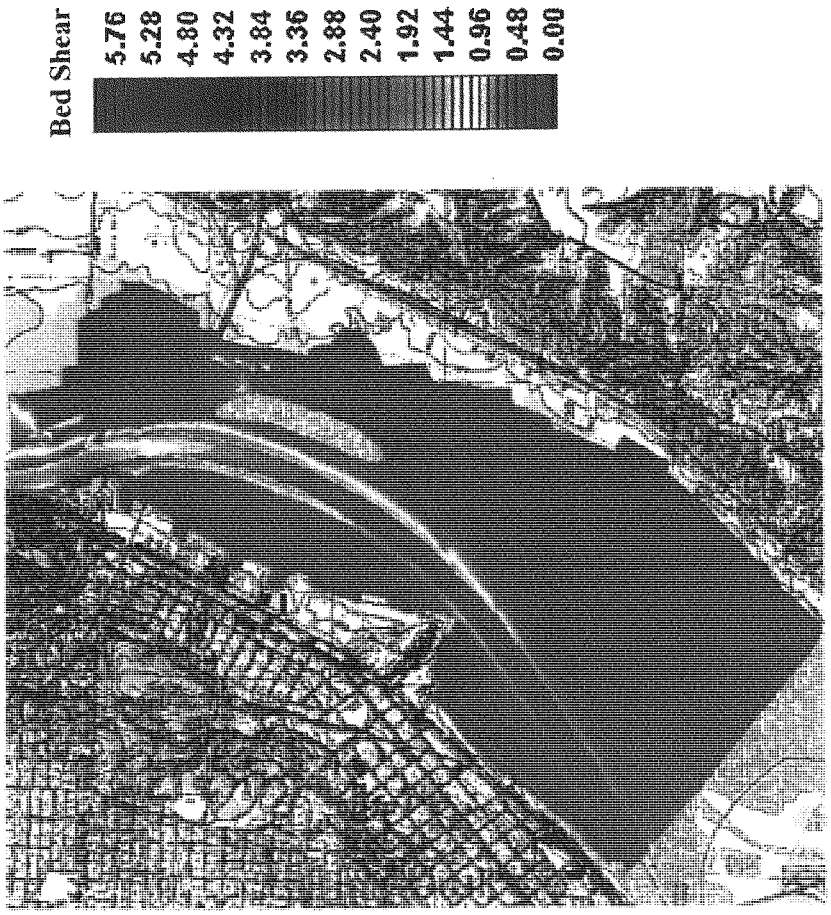


Figure 64. Spatial Shear Stress Distribution for Alternative 4 for a flow of 45,000 cfs

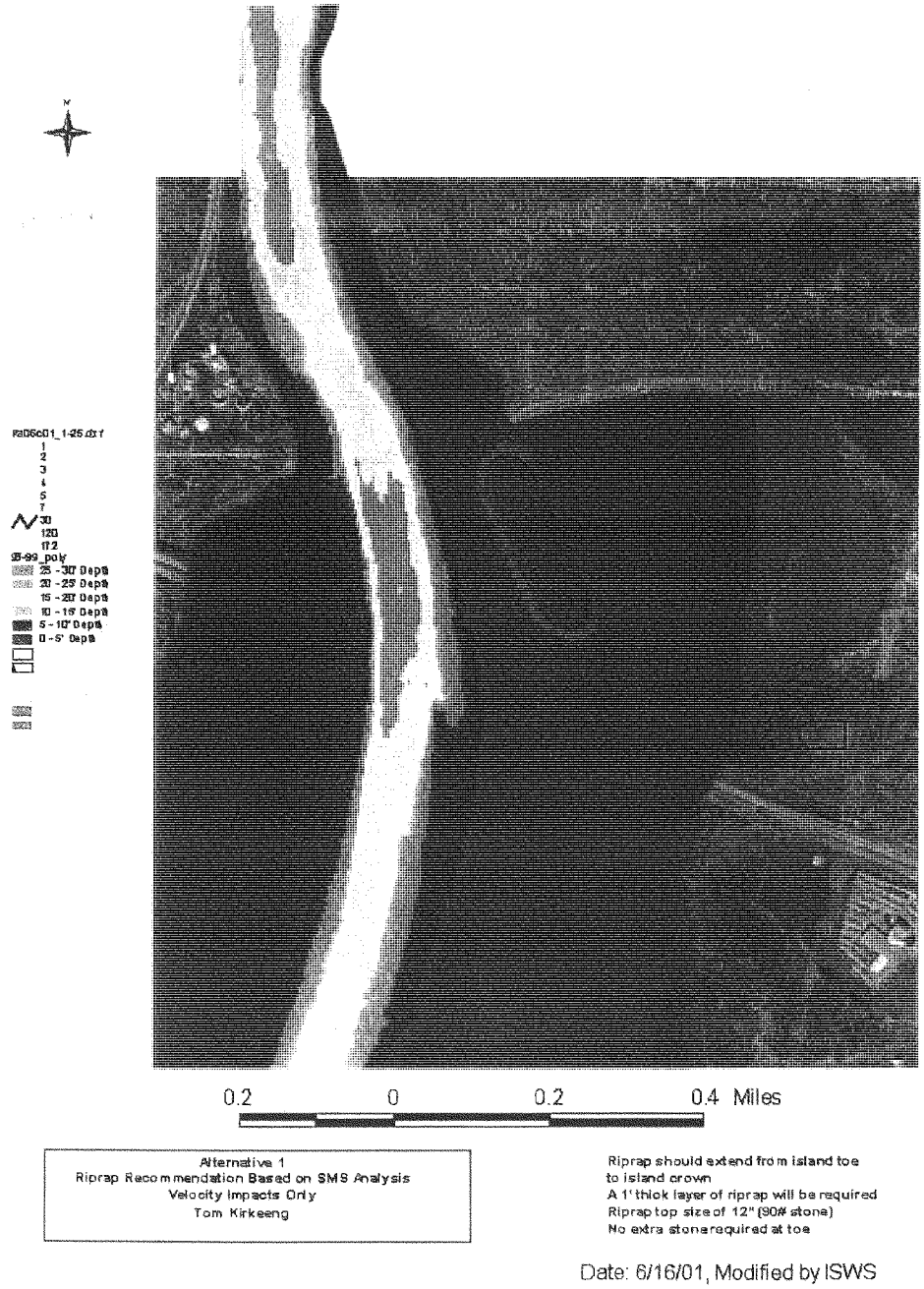


Figure 65. Alternative 1, Zones of Suggested Bank Stabilization Work

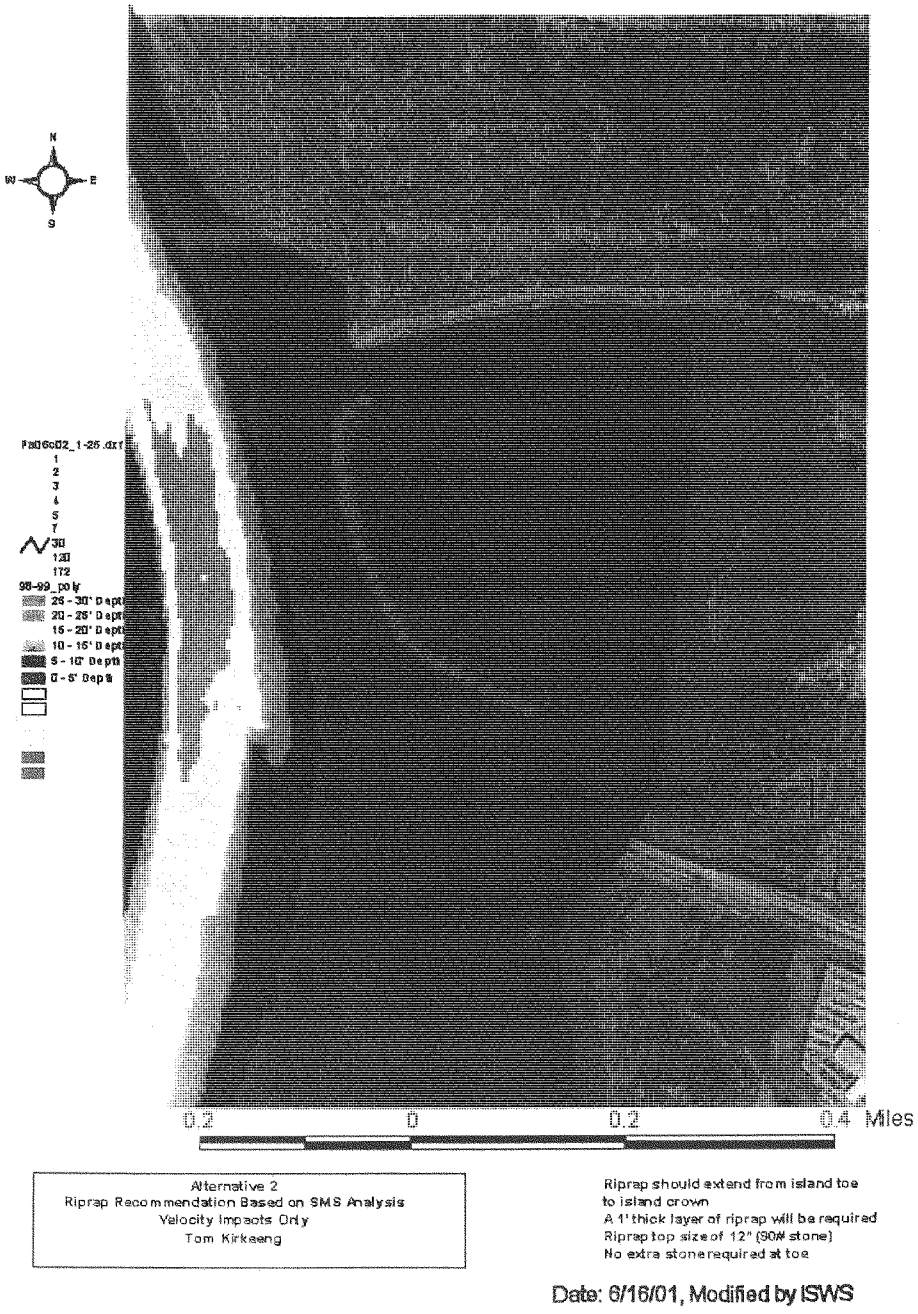


Figure 66. Alternative 2, Zones of Suggested Bank Stabilization Work

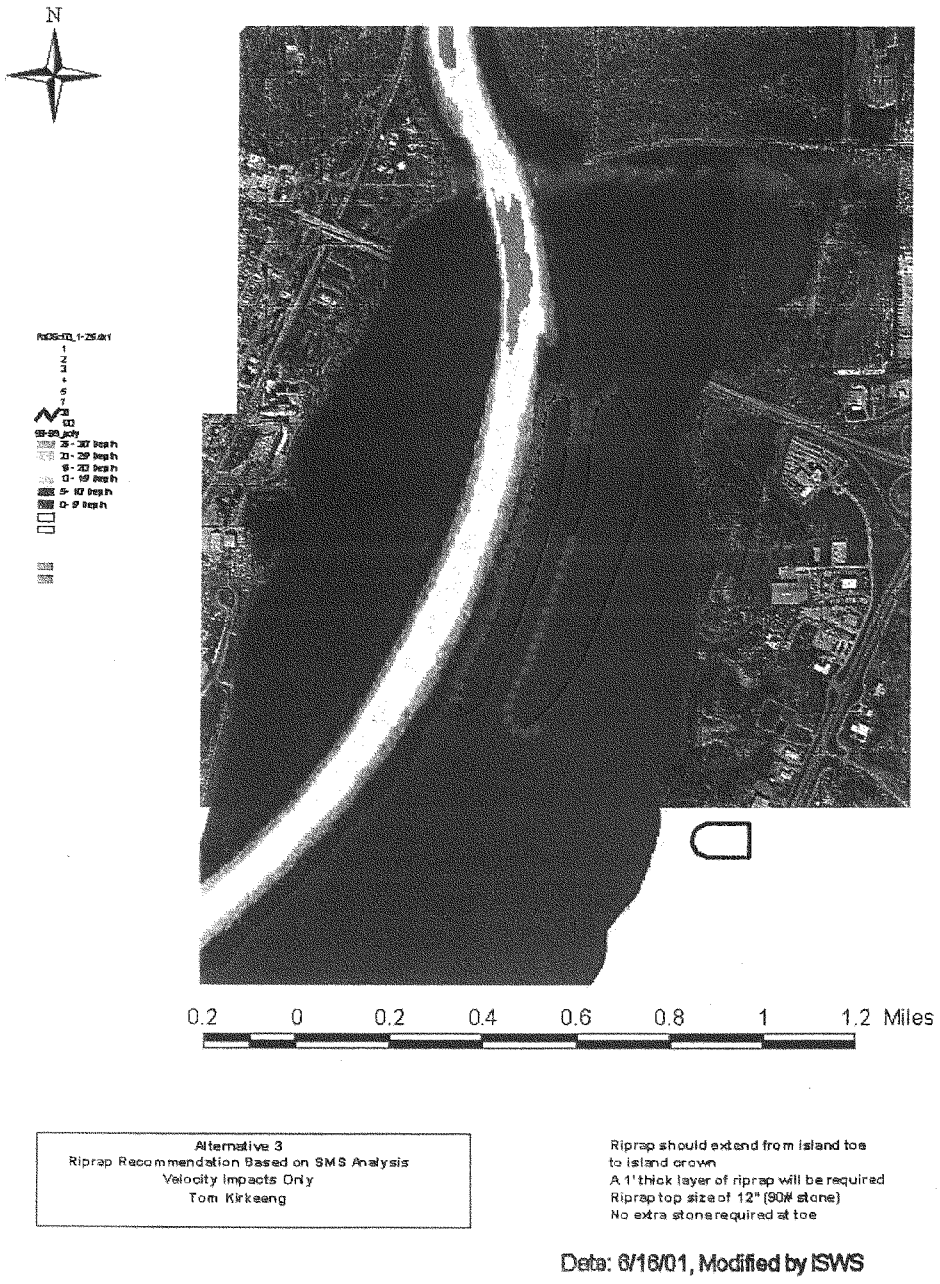


Figure 67. Alternative 3, Zones of Suggested Bank Stabilization Work

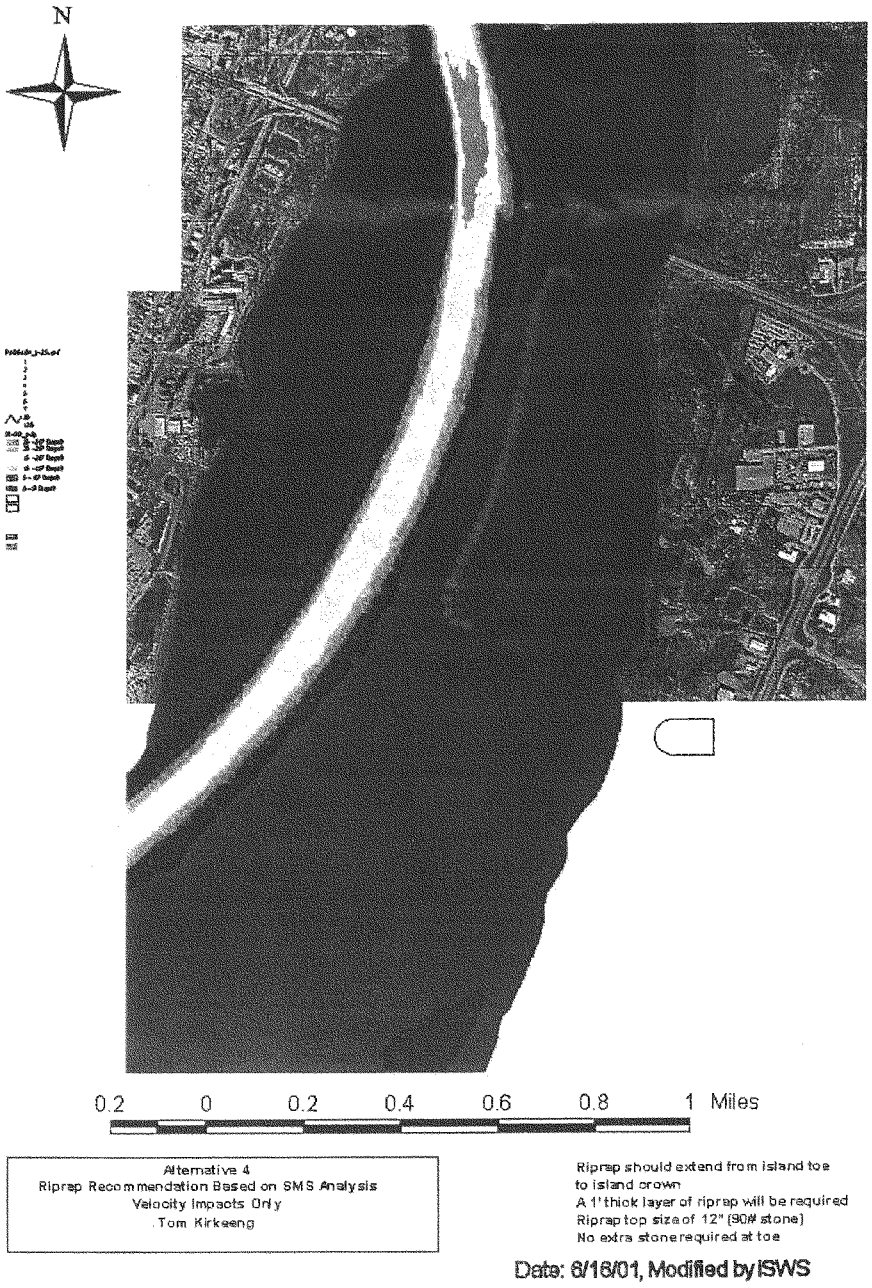


Figure 68. Alternative 4, Zones of Suggested Bank Stabilization Work

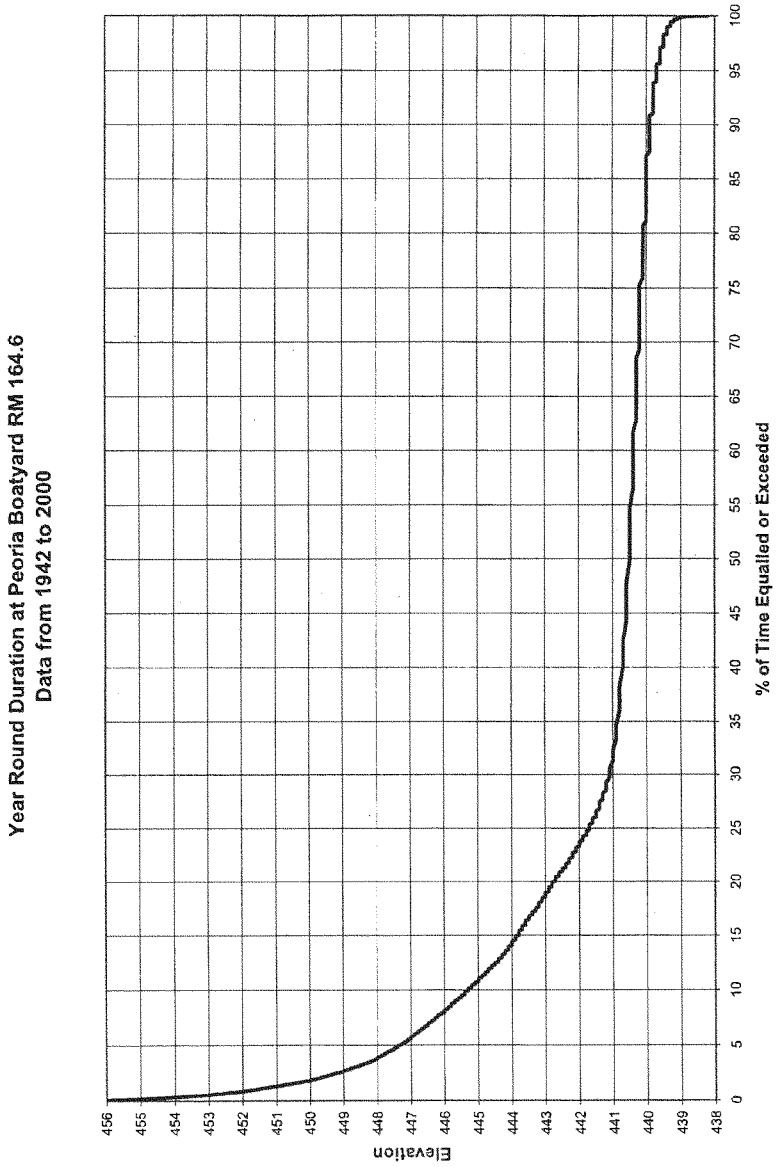


Figure 69. Year Round Duration of Water Surface Elevation Variations at Peoria Boatyard, RM 164.6. Data from 1942 to 2000. (Personal Communications, USA COE, 2001)

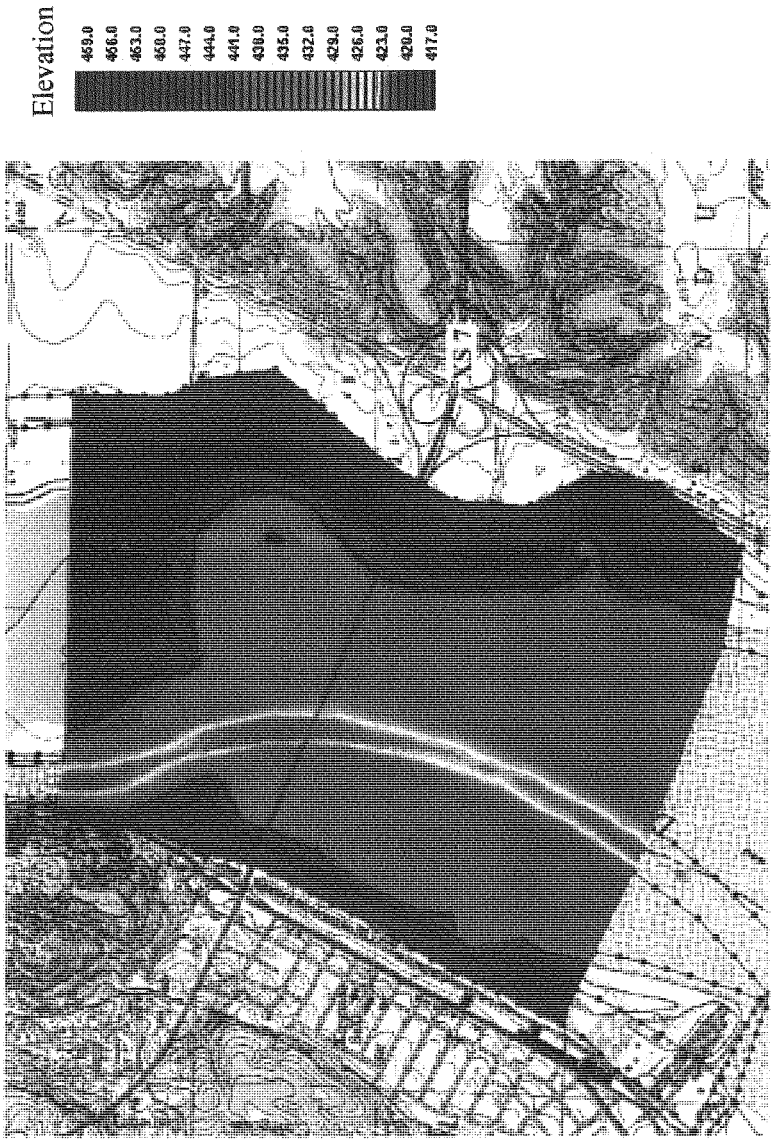


Figure 70. River cross section location just upstream of the McClugge's Bridge, Cross-Section 7

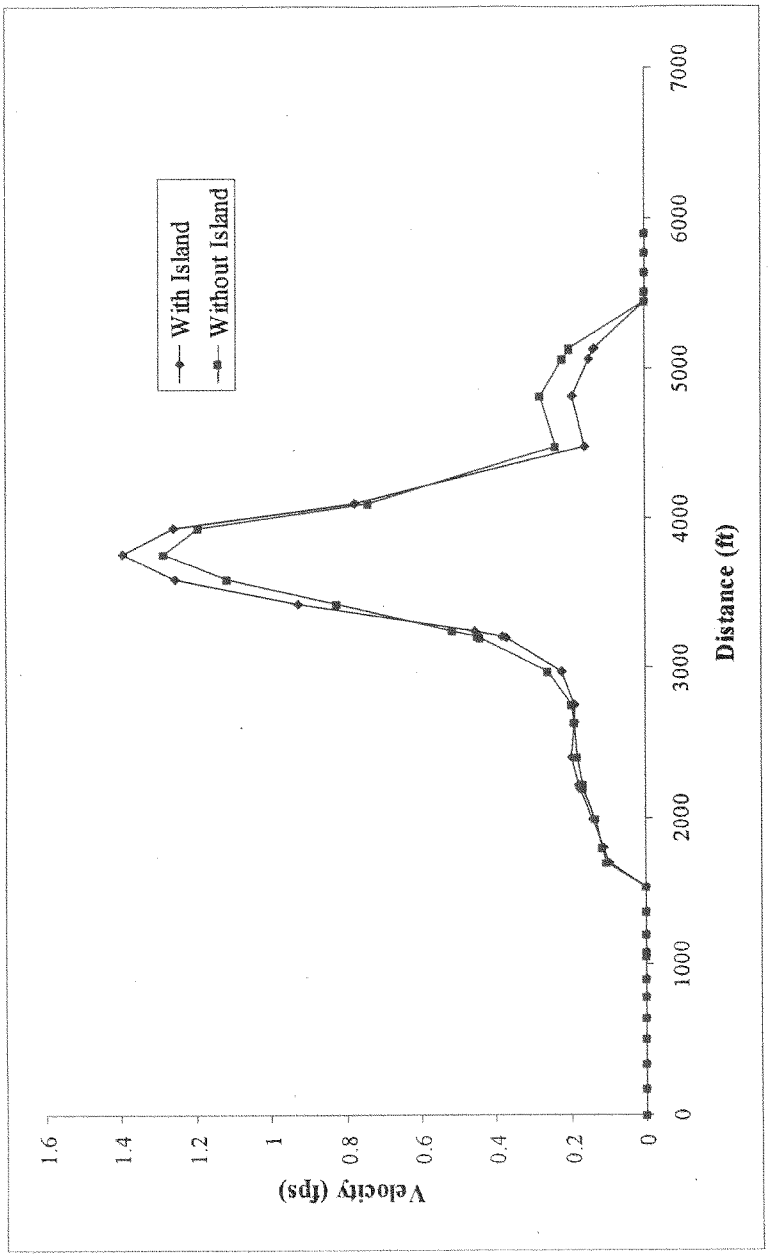


Figure 71. Lateral velocity distribution at Cross-Section 7 (upstream of the McClugge's Bridge) for a flow of 45,000 cfs and for ambient conditions and with Alternative 1

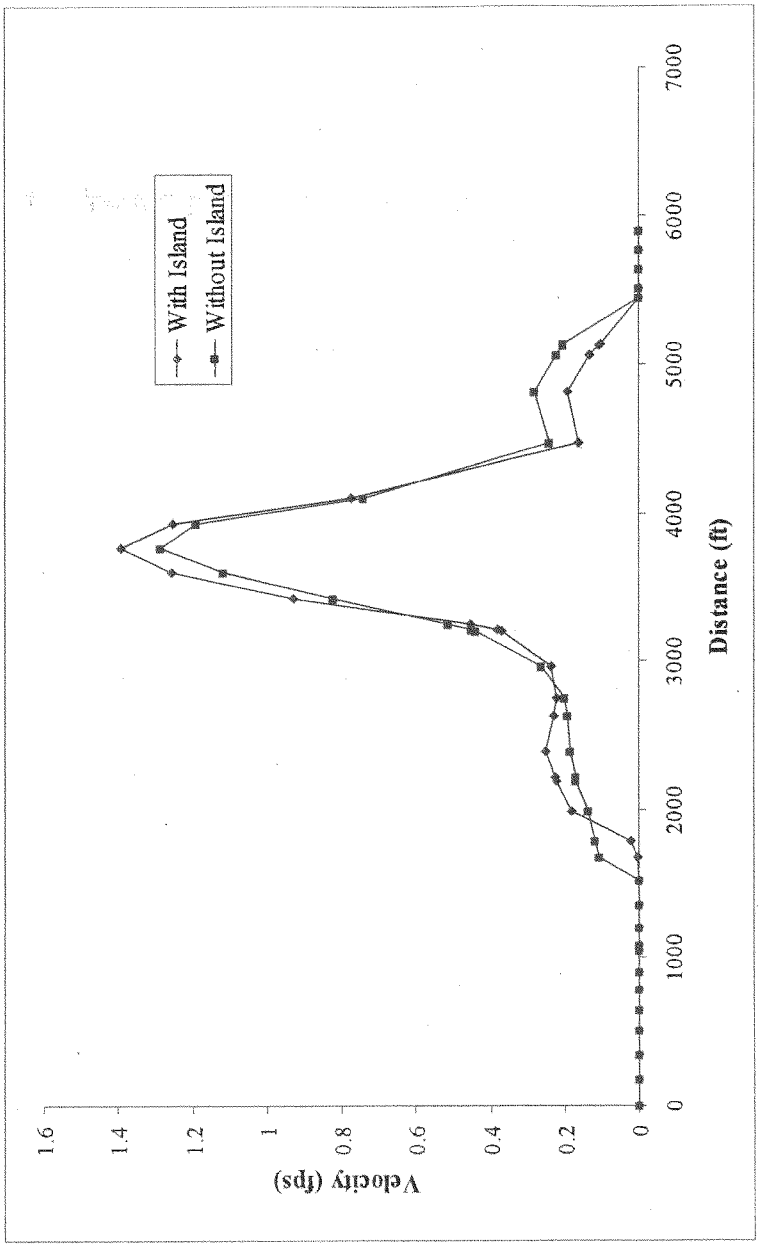


Figure 72. Lateral velocity distribution at Cross-Section 7 (upstream of the McClugge's Bridge) for a flow of 45,000 cfs and for ambient conditions and with Alternative 2

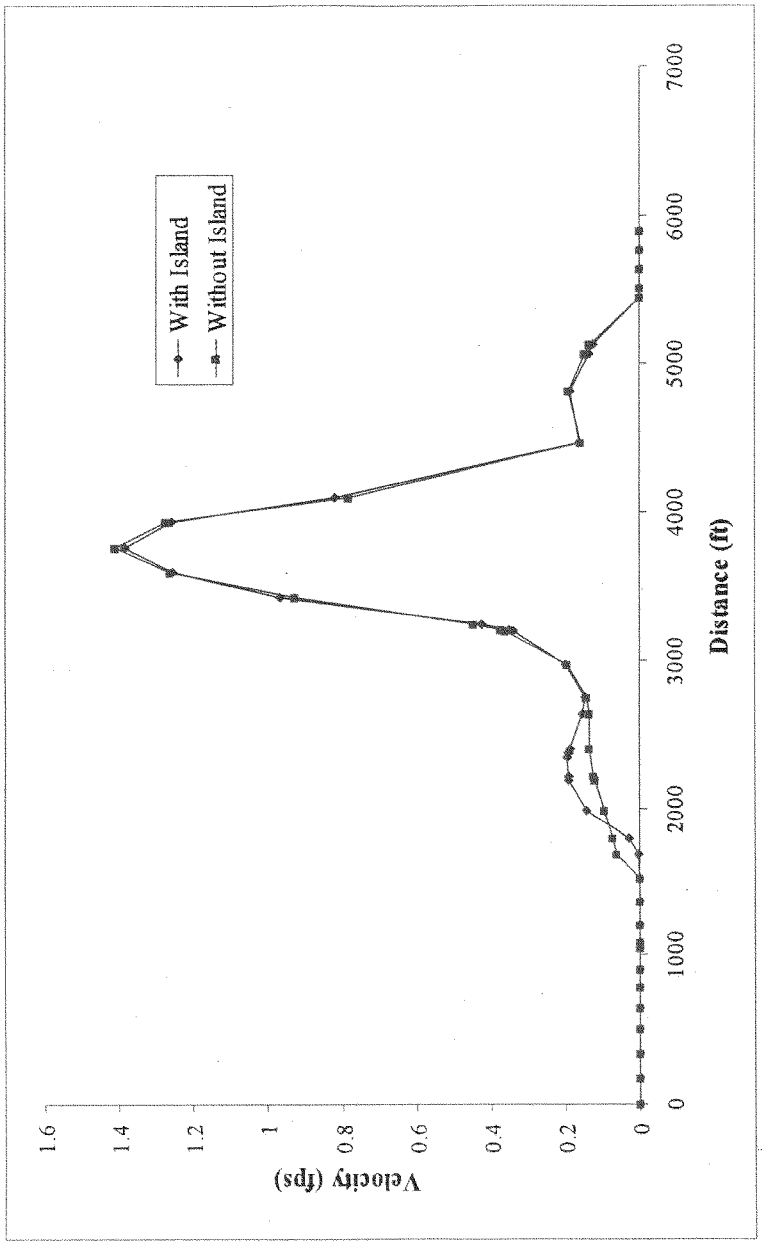


Figure 73. Lateral velocity distribution at Cross-Section 7 (upstream of the McClugge's Bridge) for a flow of 45,000 cfs and for ambient conditions and with Alternative 3

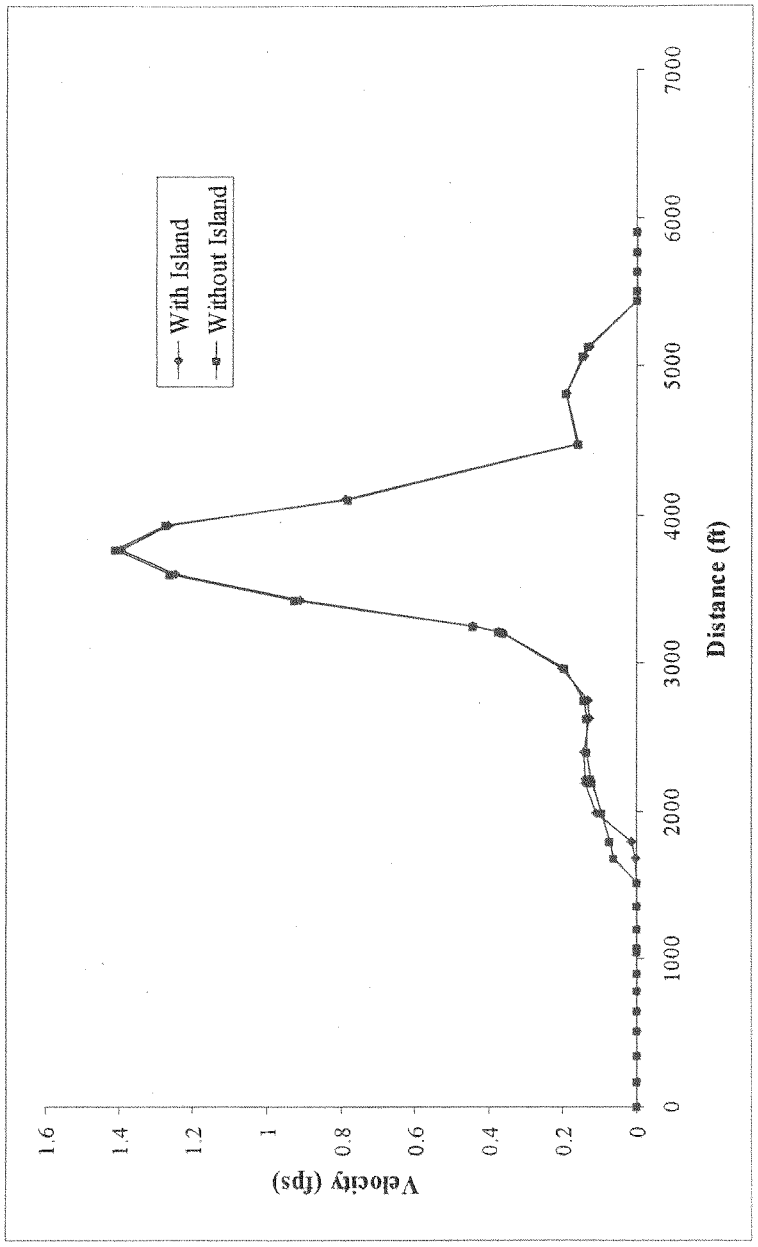
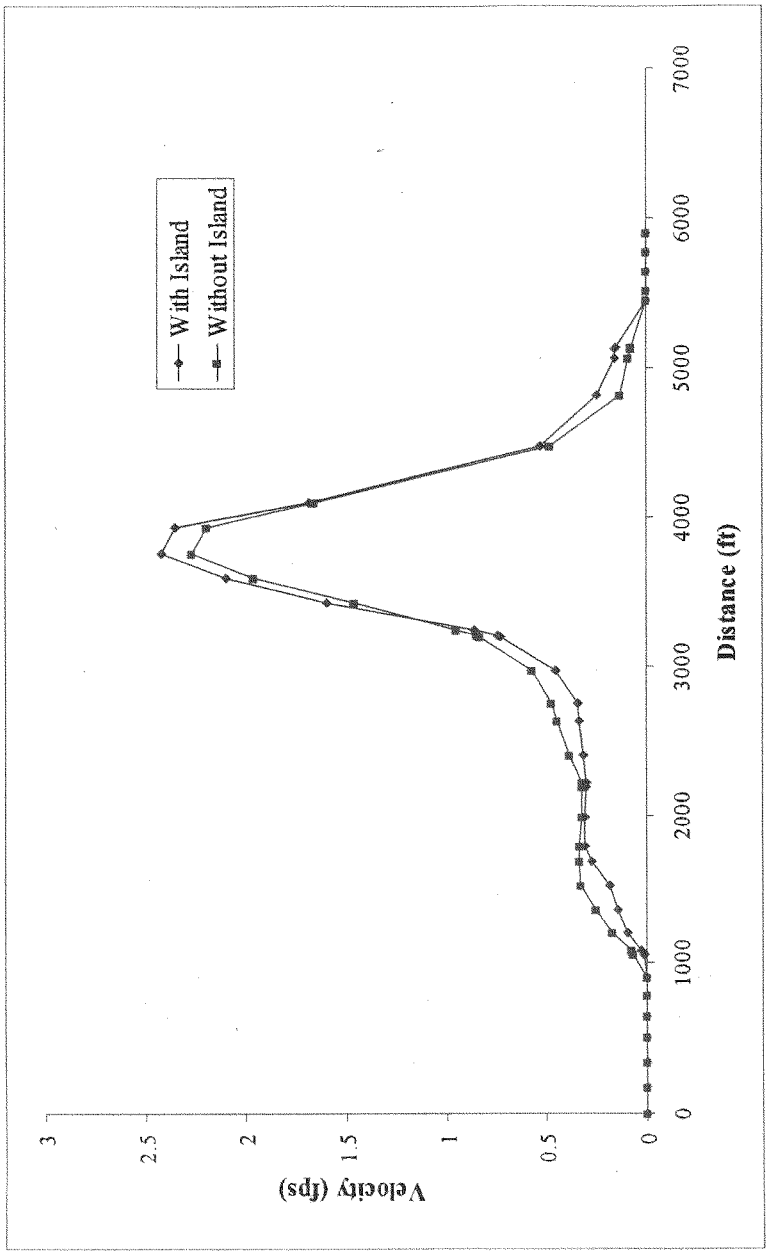


Figure 74. Lateral velocity distribution at Cross-Section 7 (upstream of the McClugge's Bridge) for a flow of 45,000 cfs and for ambient conditions and with Alternative 4



75. Lateral velocity distribution at Cross-Section 7 (upstream of the McClugge's Bridge) for a flow of 15,000 cfs and for ambient conditions and with Alternative 1

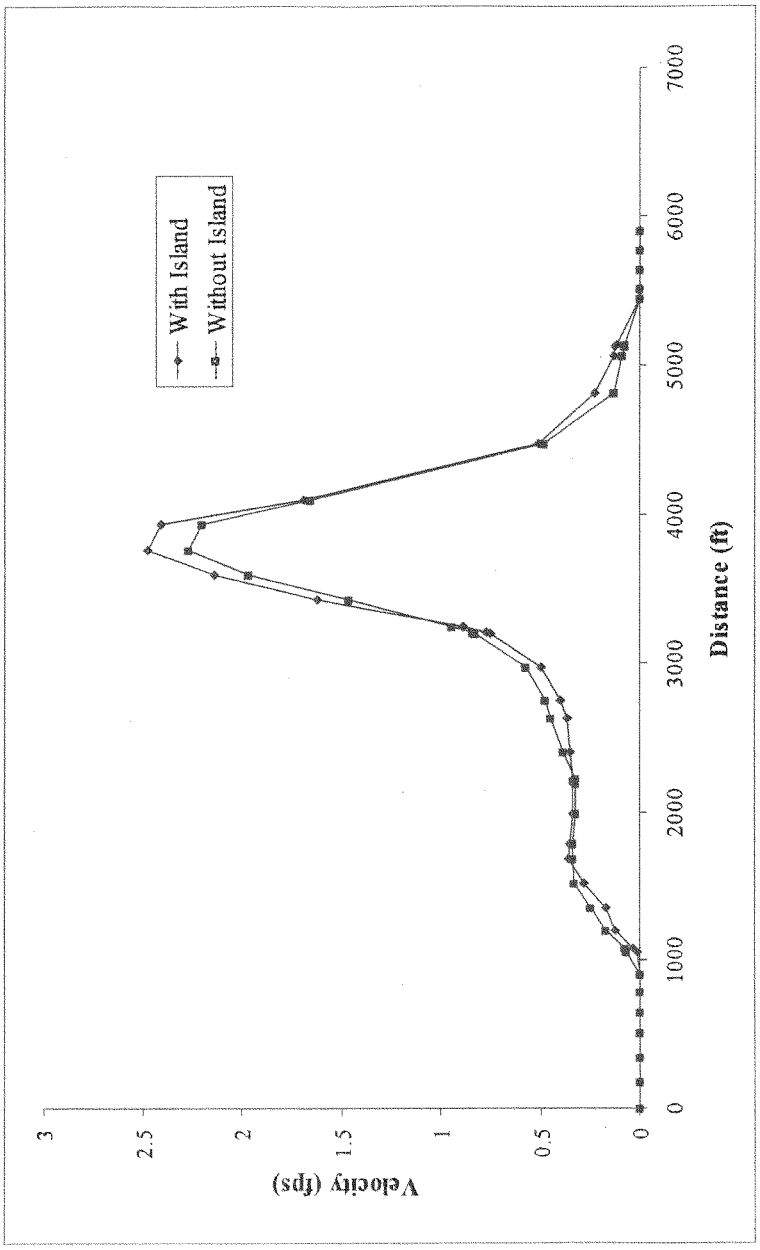
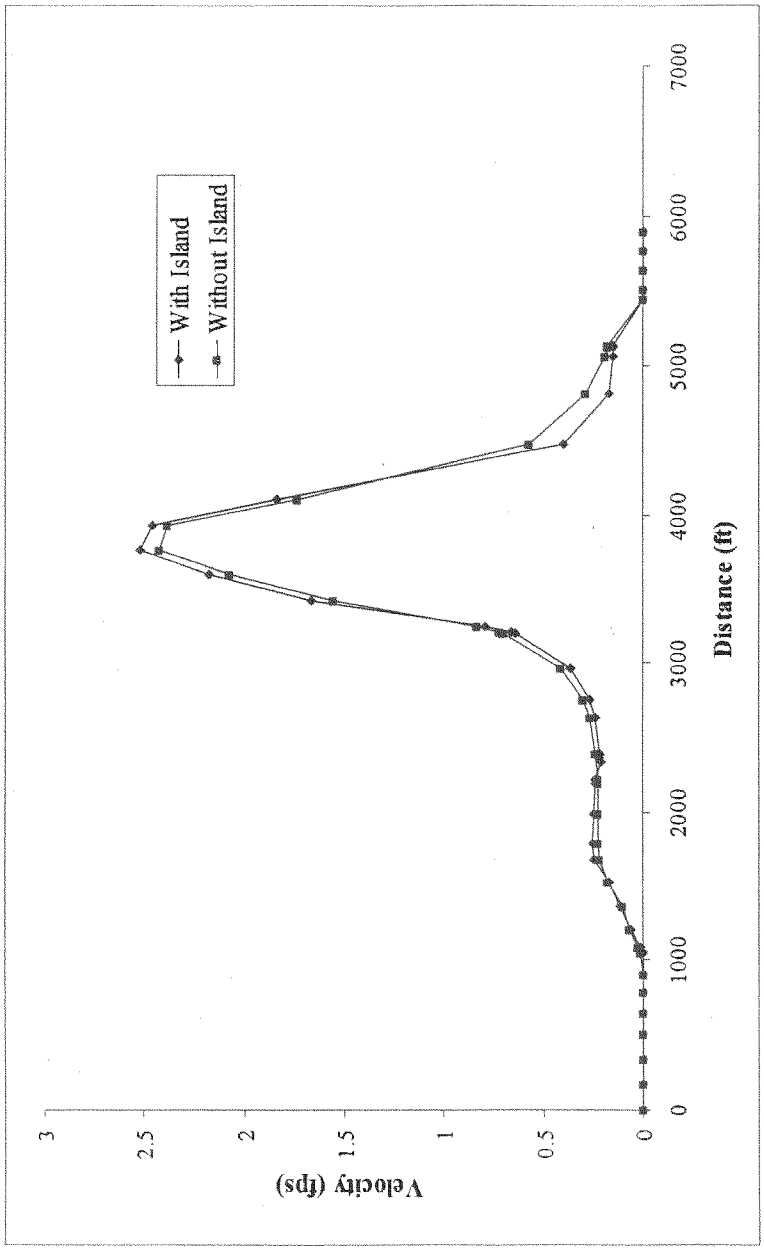


Figure 76. Lateral velocity distribution at Cross-Section 7 (upstream of the McClugge's Bridge) for a flow of 15,000 cfs and for ambient conditions and with Alternative 2



Lateral velocity distribution at Cross-Section 7 (upstream of the McClugge's Bridge)
for a flow of 15,000 cfs and for ambient conditions and with Alternative 3

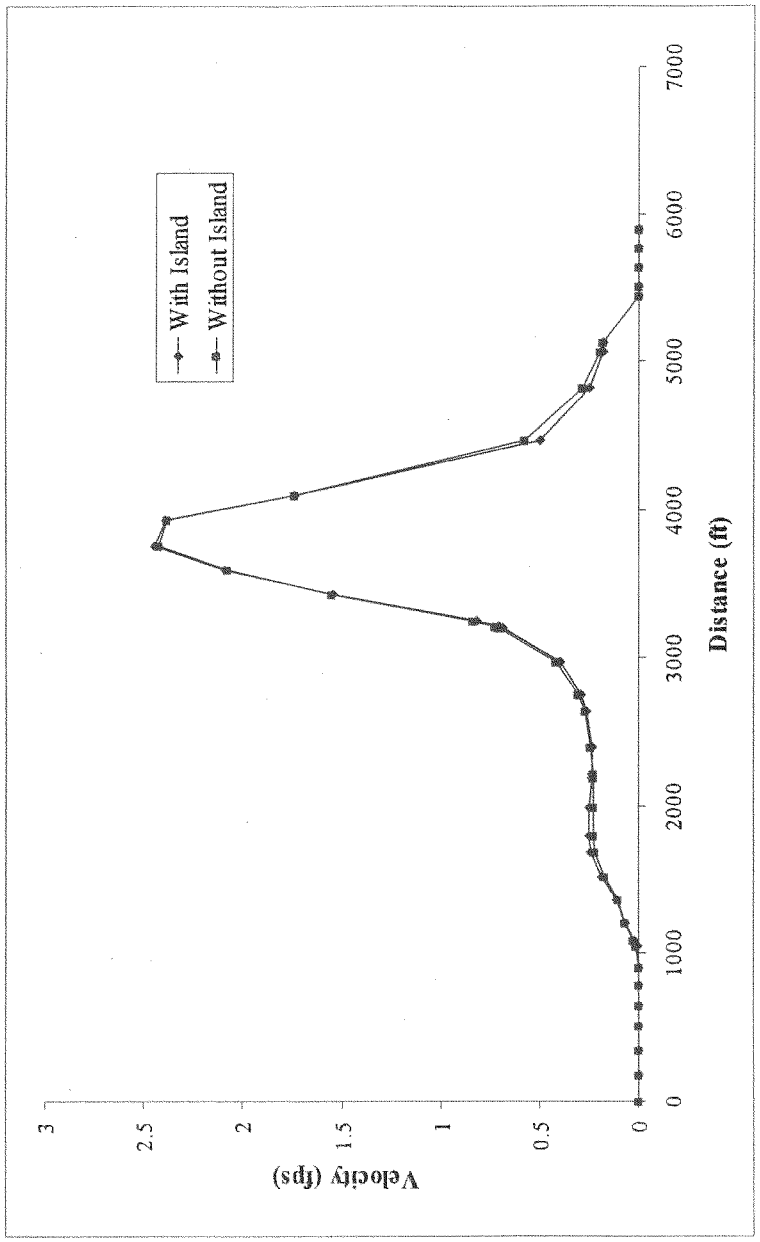


Figure 78. Lateral velocity distribution at Cross-Section 7 (upstream of the McClugge's Bridge) for a flow of 15,000 cfs and for ambient conditions and with Alternative 4

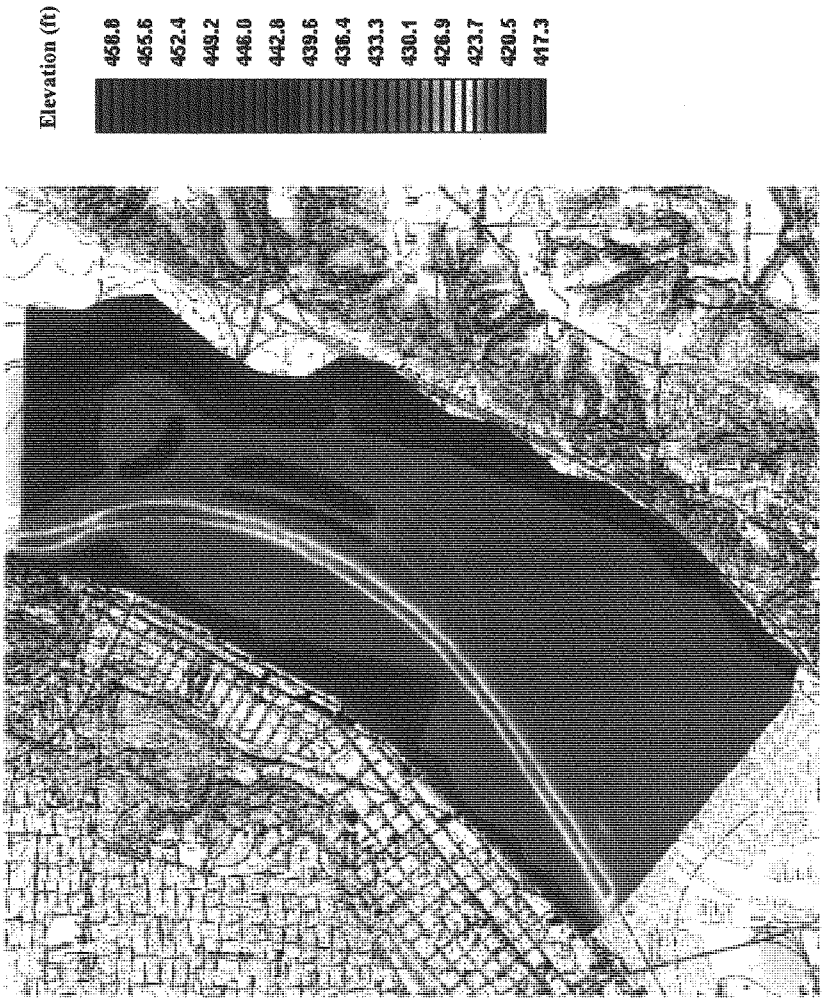


Figure 79. Elevation Variations for Alternatives 2 and 3

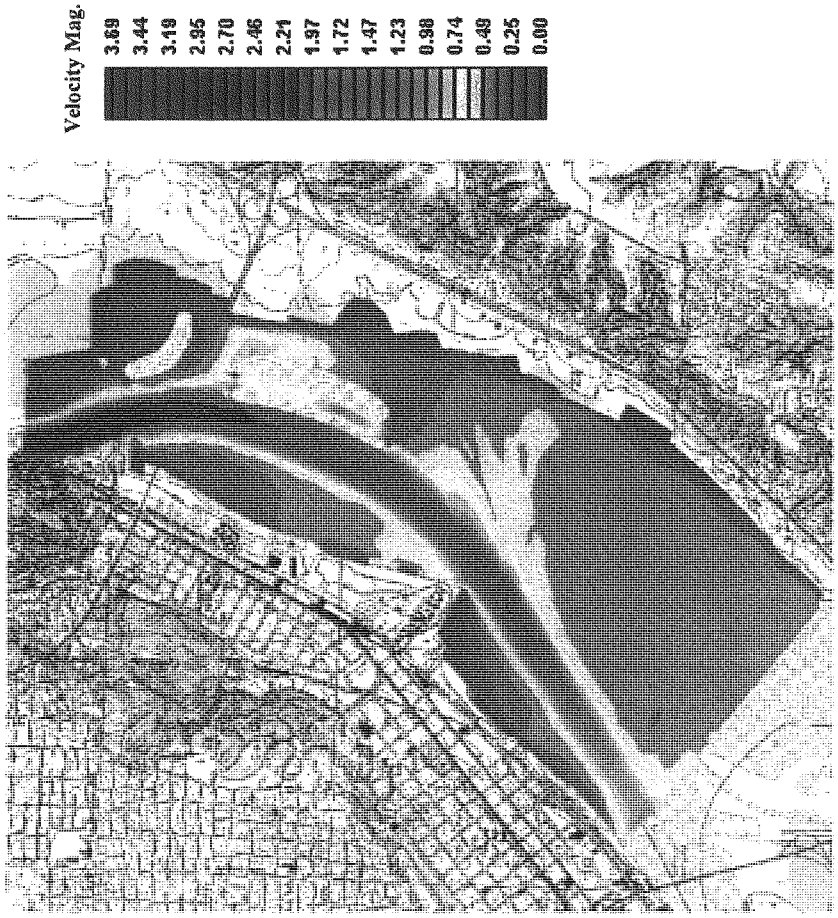


Figure 80. Spatial Velocity Distributions for Alternatives 2 and 3 for a flow of 45,000 cfs.

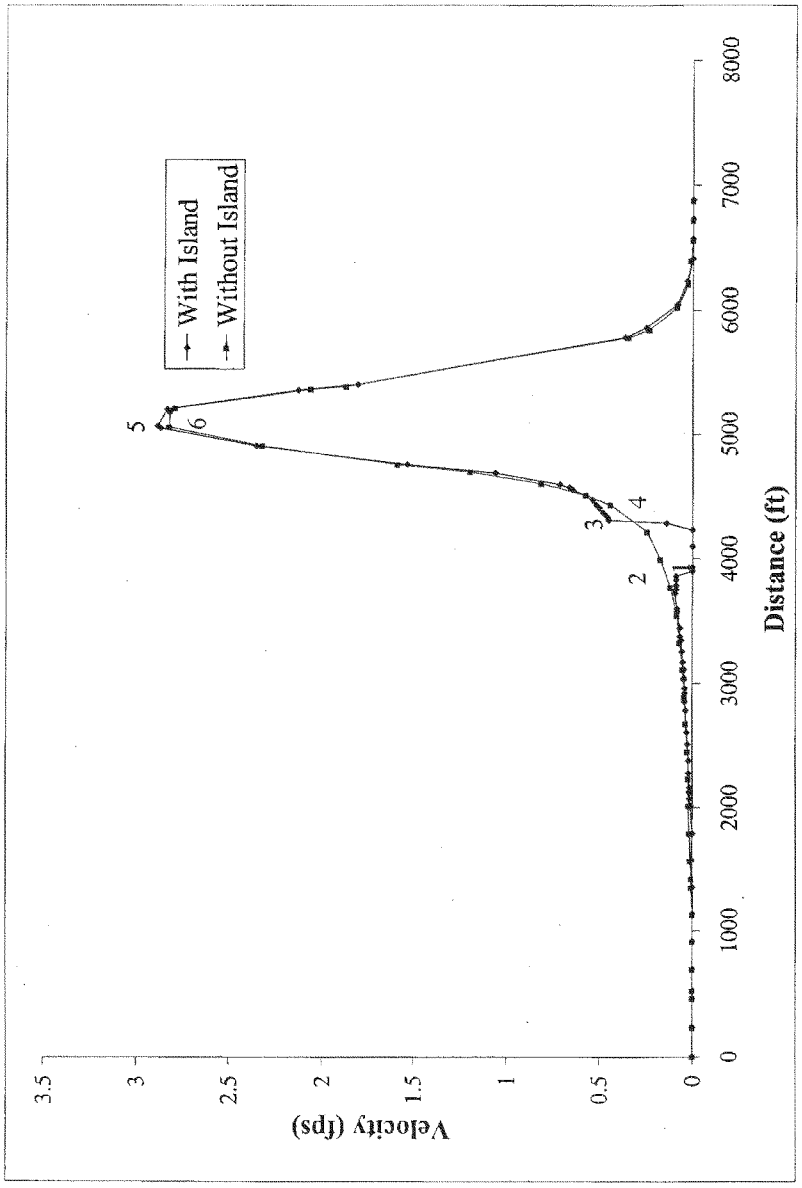


Figure 81. Lateral Velocity Distributions at Cross-section 1 (see Figure 70) for a flow of 45,000 cfs for Alternatives 2 and 3

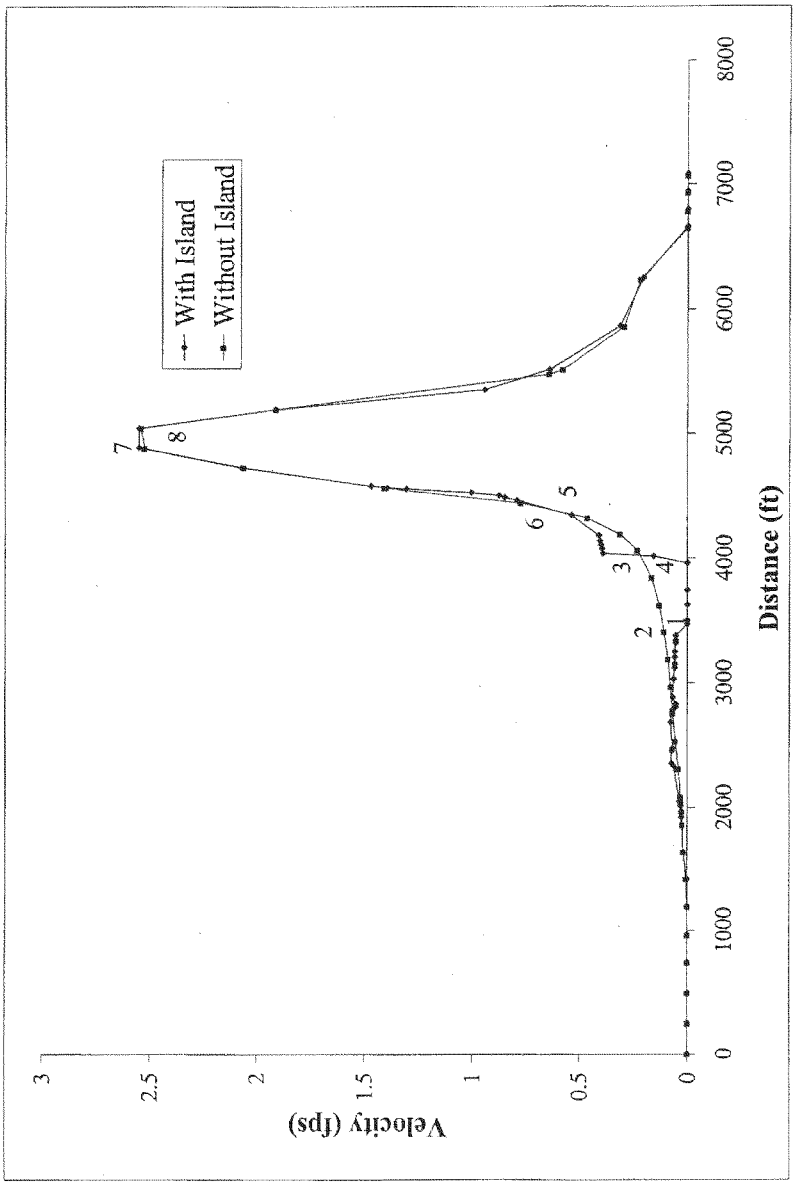


Figure 82. Lateral Velocity Distributions at Cross-section 2 (see Figure 70) for a flow of 45,000 cfs for Alternatives 2 and 3

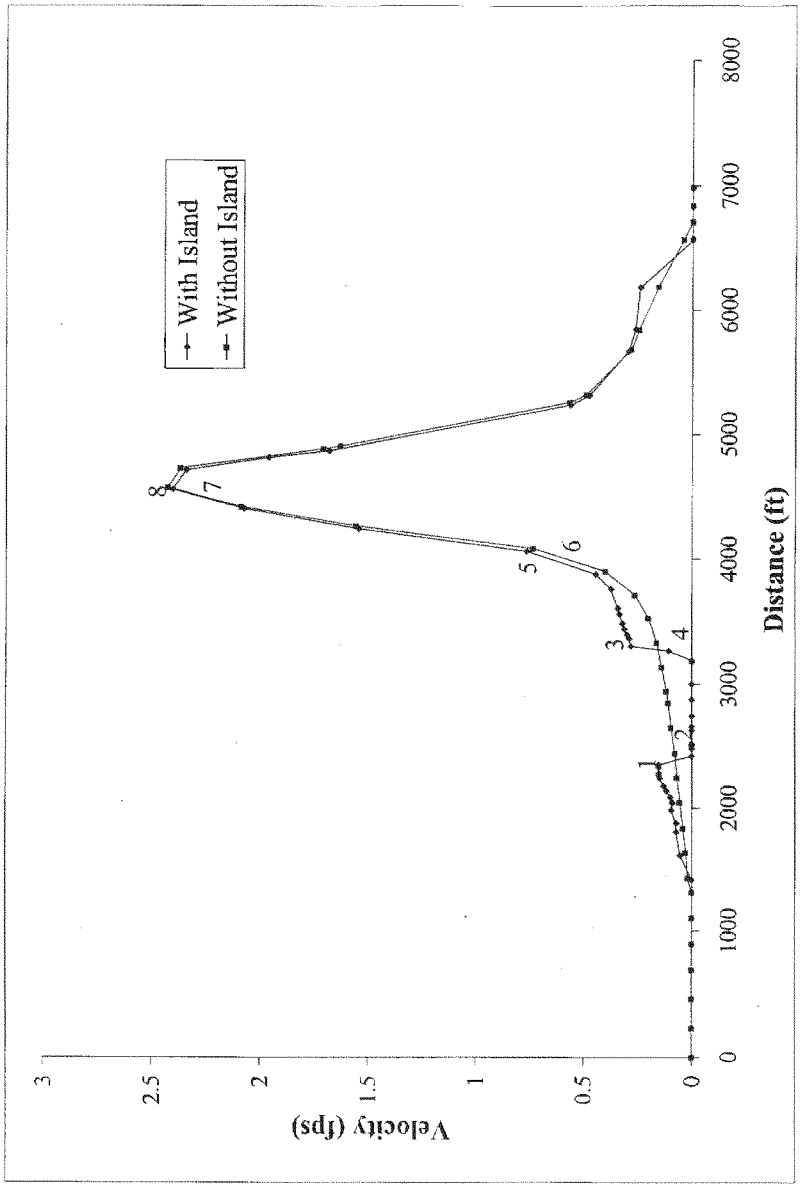


Figure 83. Lateral Velocity Distributions at Cross-section 3 (see Figure 70) for a flow of 45,000 cfs for Alternatives 2 and 3

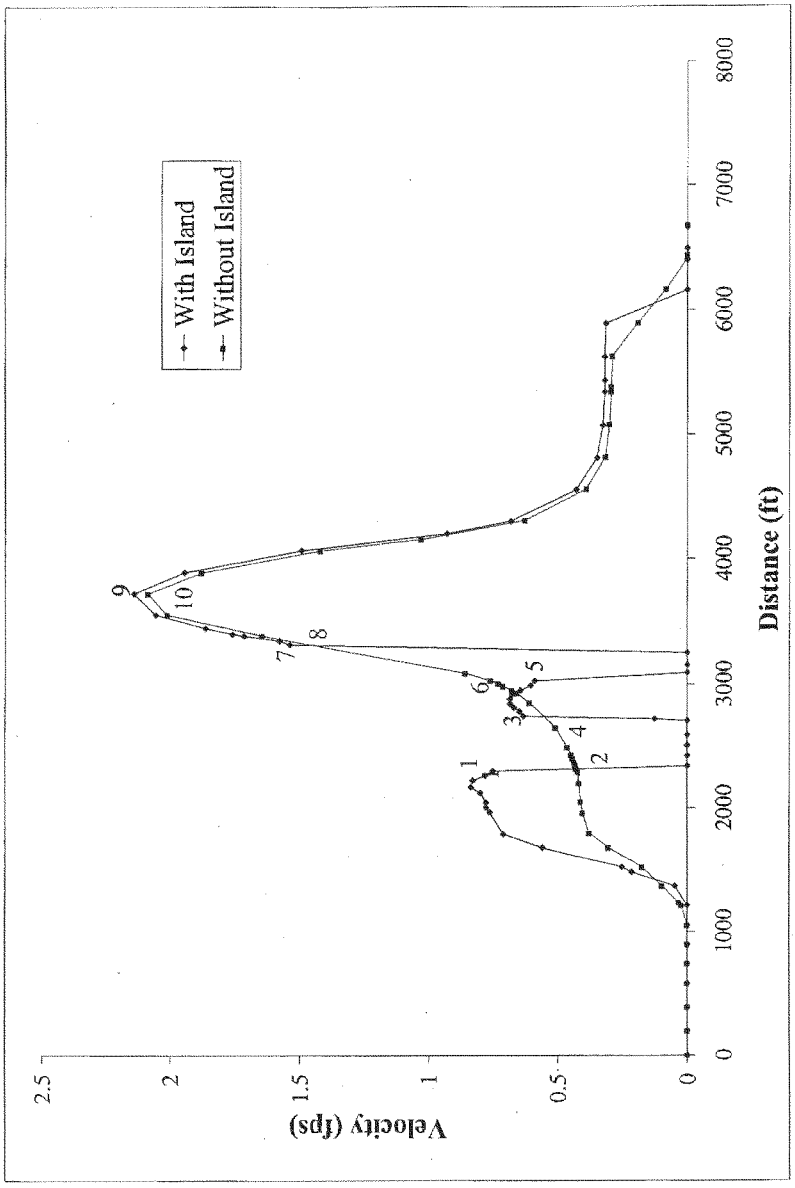


Figure 84. Lateral Velocity Distributions at Cross-section 4 (see Figure 70) for a flow of 45,000 cfs for Alternatives 2 and 3

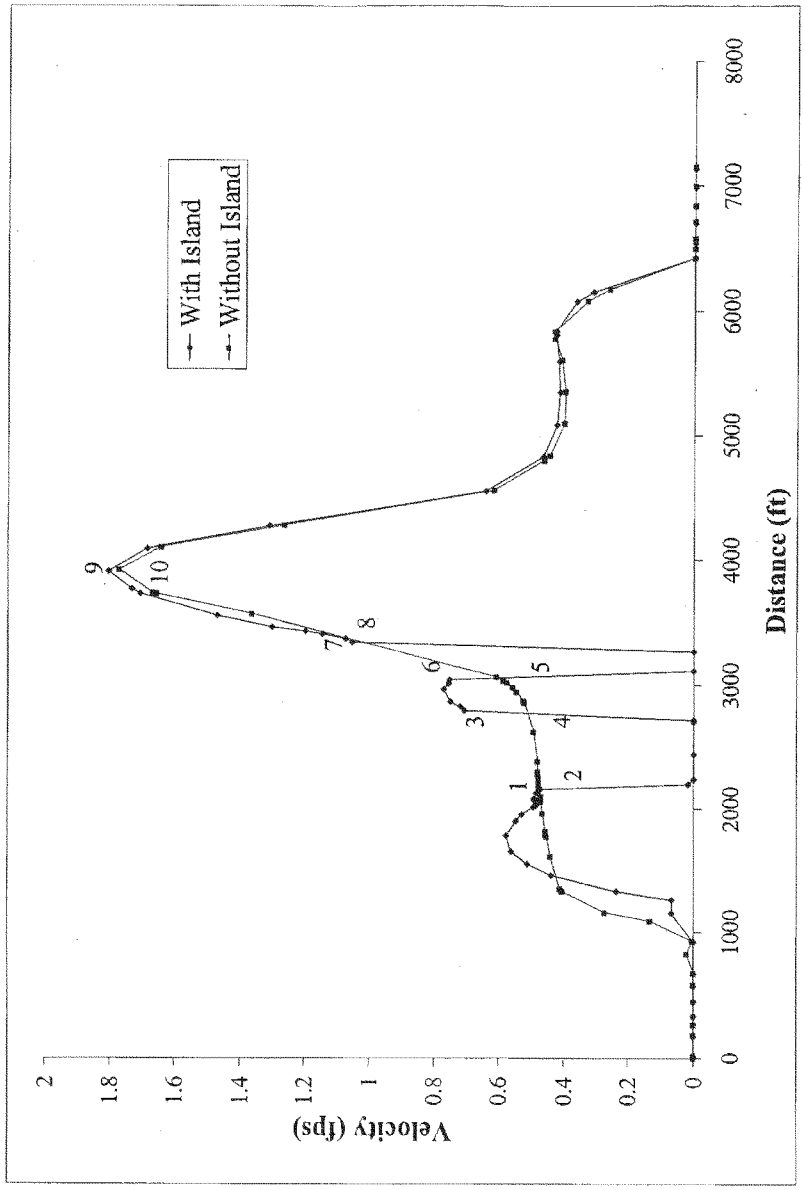


Figure 85. Lateral Velocity Distributions at Cross-section 5 (see Figure 70) for a flow of 45,000 cfs for Alternatives 2 and 3

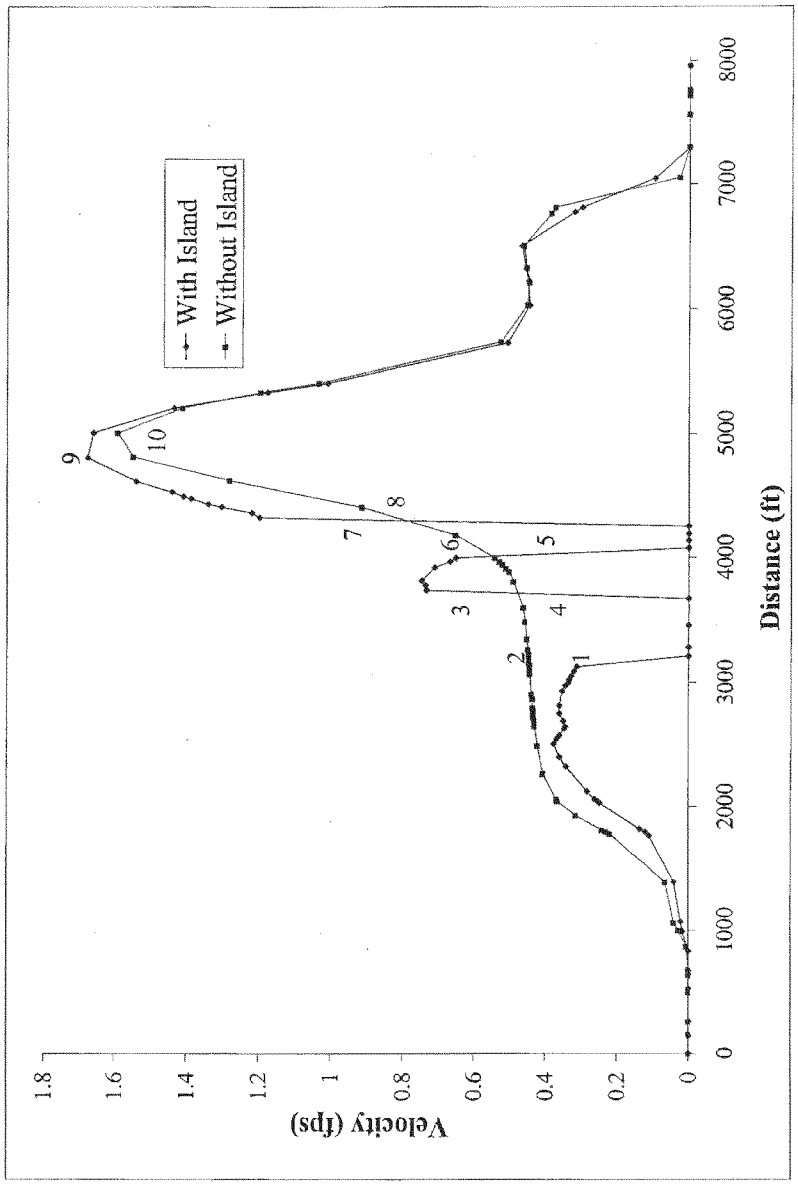


Figure 86. Lateral Velocity Distributions at Cross-section 6 (see Figure 70) for a flow of 45,000 cfs for Alternatives 2 and 3

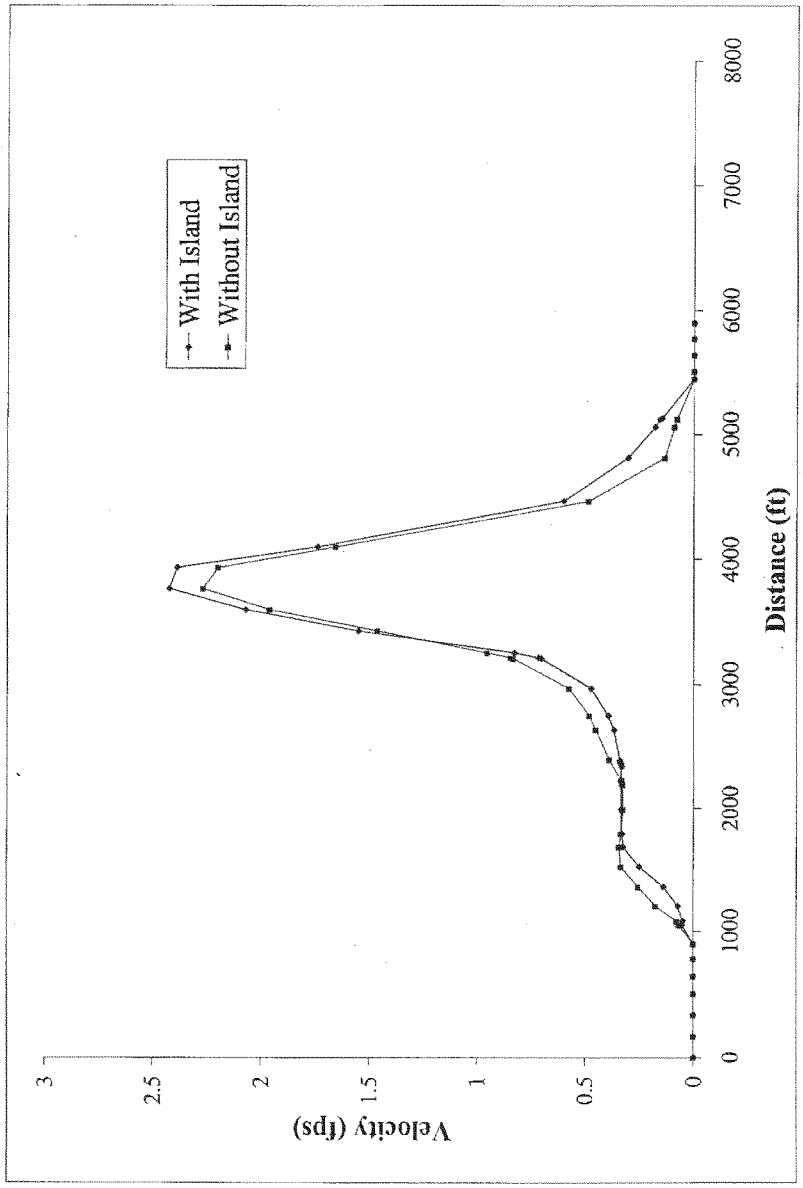


Figure 87. Lateral Velocity Distributions at Cross-section 7 (see Figure 70) for a flow of 45,000 cfs for Alternatives 2 and 3

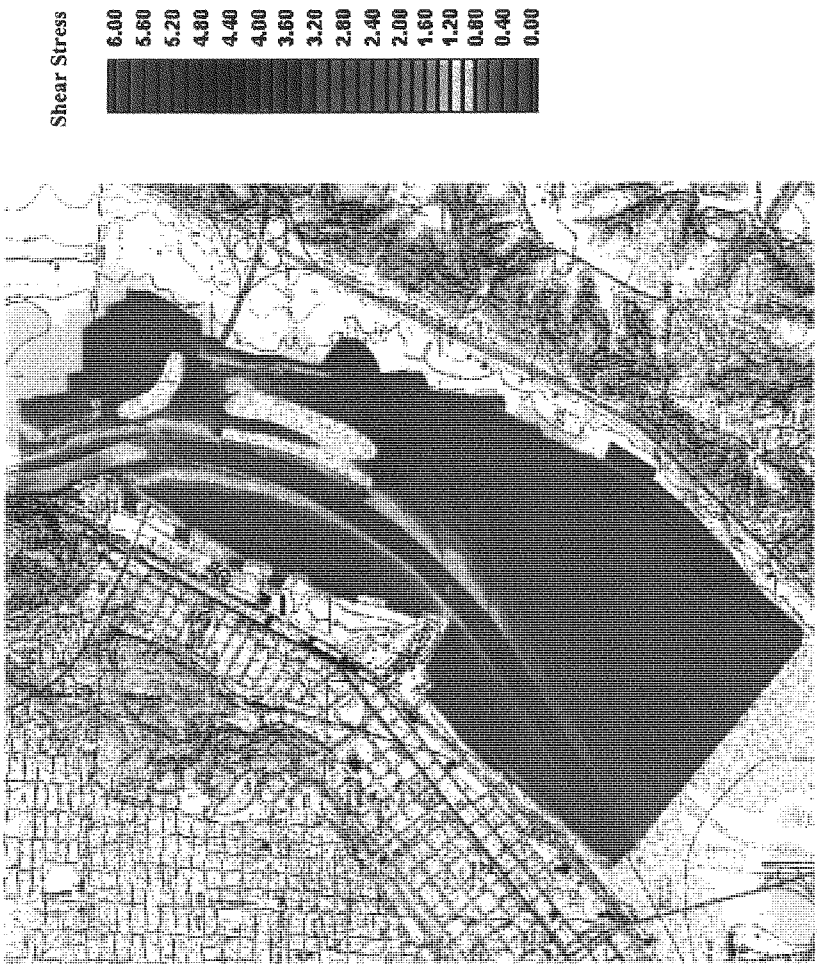


Figure 88. Shear Stress Distributions for Alternatives 2 and 3 for a flow of 45,000 cfs.

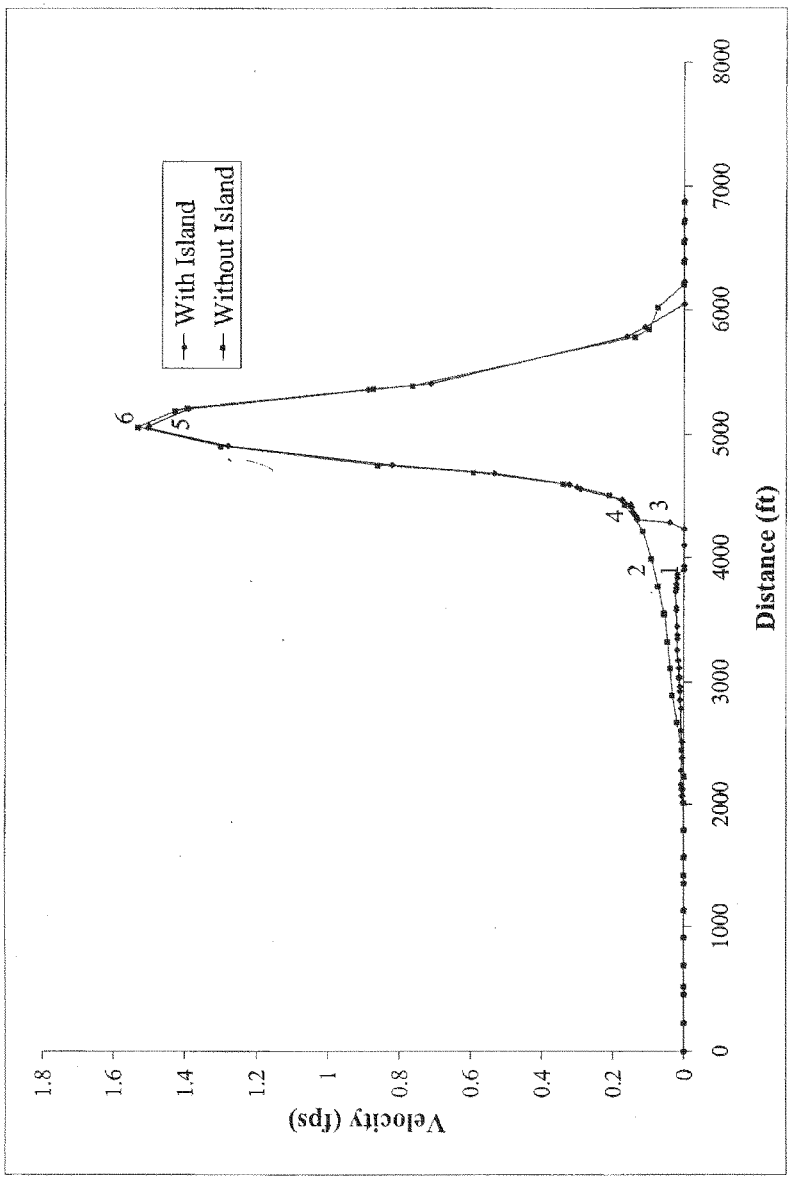


Figure 89. Lateral Velocity Distributions at Cross-section 1 (see Figure 70) for a Flow of 15,000 cfs, for Alternatives 2 and 3.

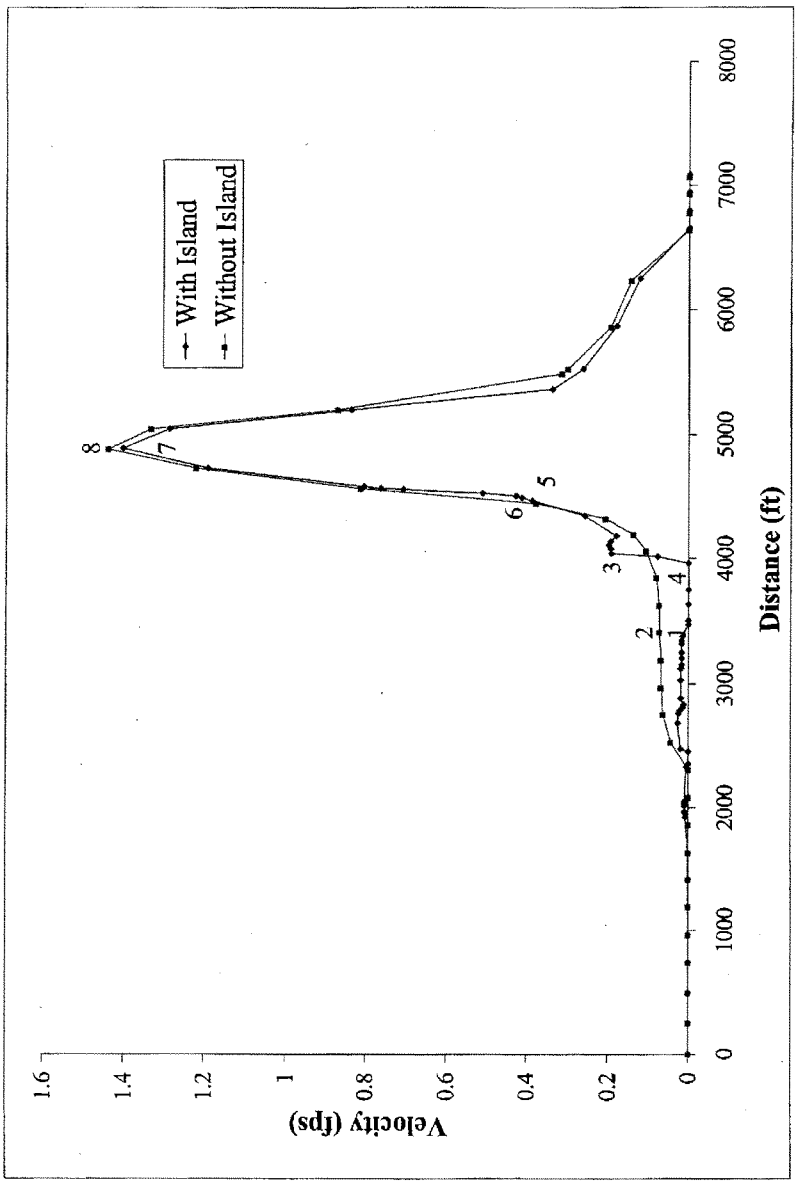


Figure 90. Lateral Velocity Distributions at Cross-section 2 (see Figure 70) for a Flow of 15,000 cfs, for Alternatives 2 and 3.

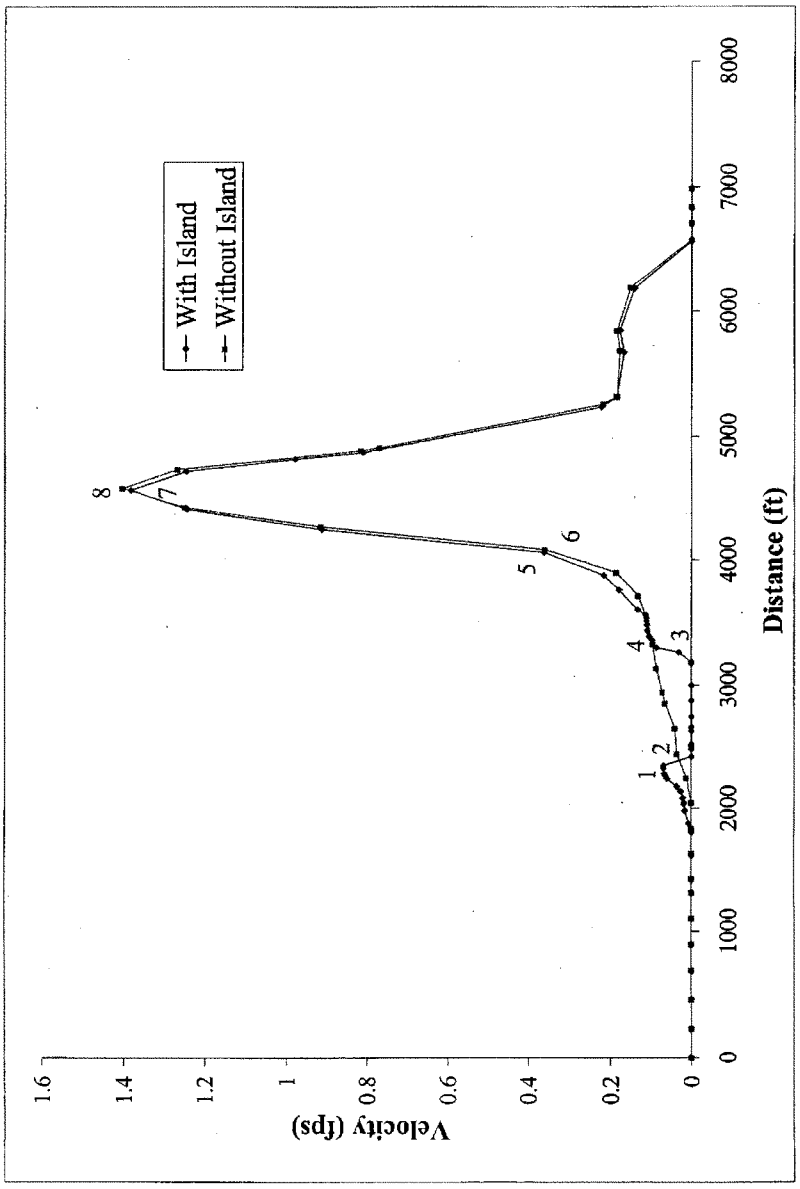


Figure 91. Lateral Velocity Distributions at Cross-section 3 (see Figure 70) for a Flow of 15,000 cfs, for Alternatives 2 and 3.

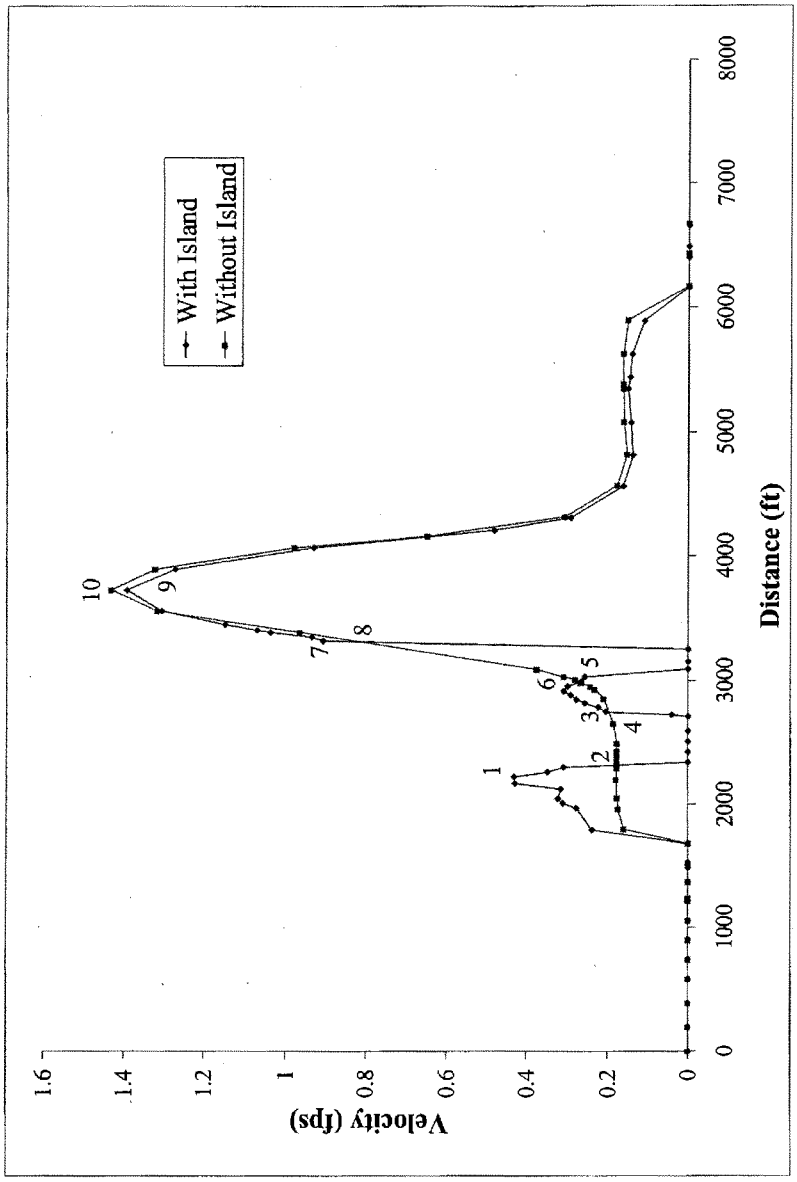


Figure 92. Lateral Velocity Distributions at Cross-section 4 (see Figure 70) for a Flow of 15,000 cfs, for Alternatives 2 and 3.

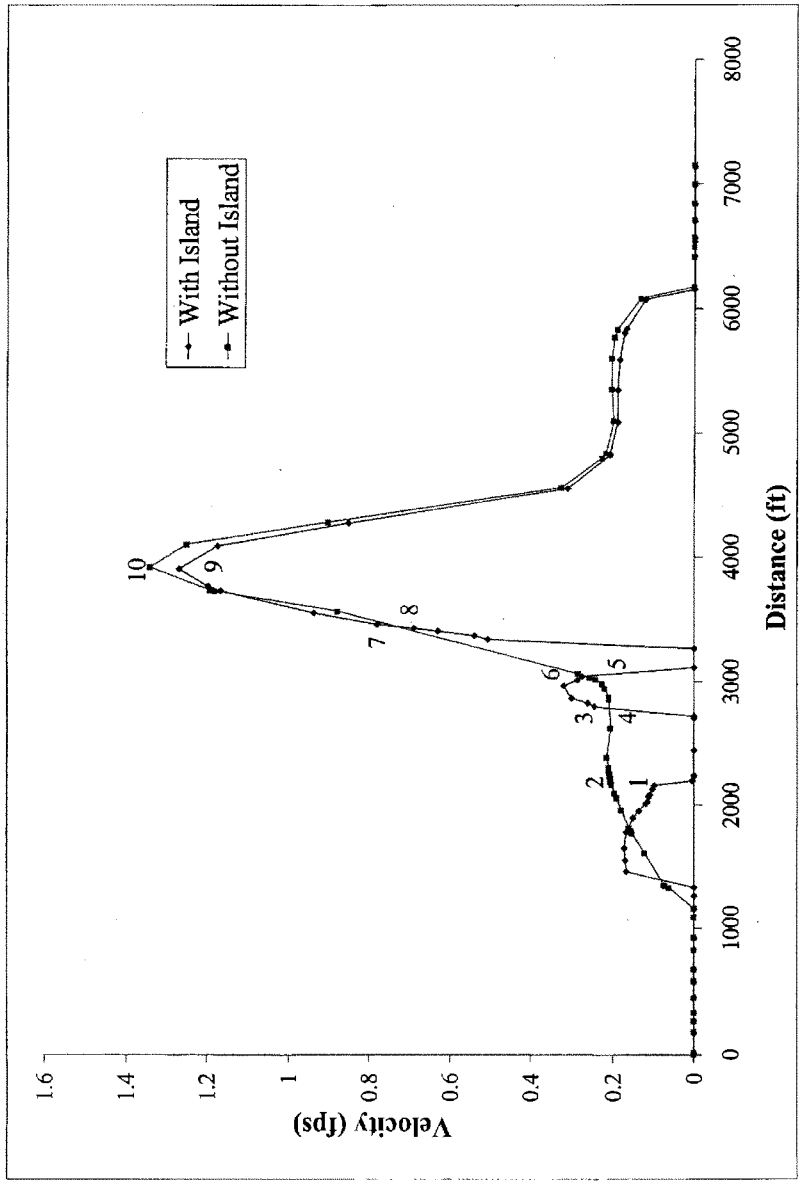


Figure 93. Lateral Velocity Distributions at Cross-section 5 (see Figure 70) for a Flow of 15,000 cfs, for Alternatives 2 and 3.

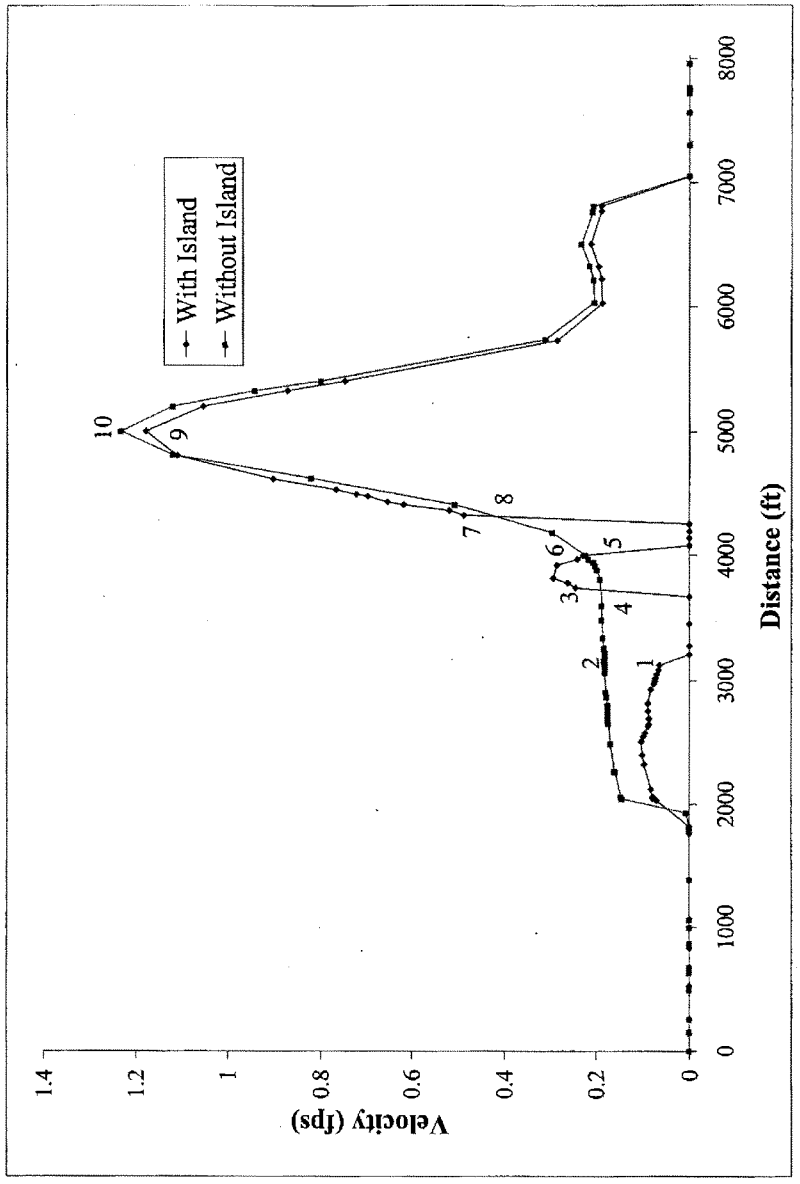


Figure 94. Lateral Velocity Distributions at Cross-section 6 (see Figure 70) for a Flow of 15,000 cfs, for Alternatives 2 and 3.

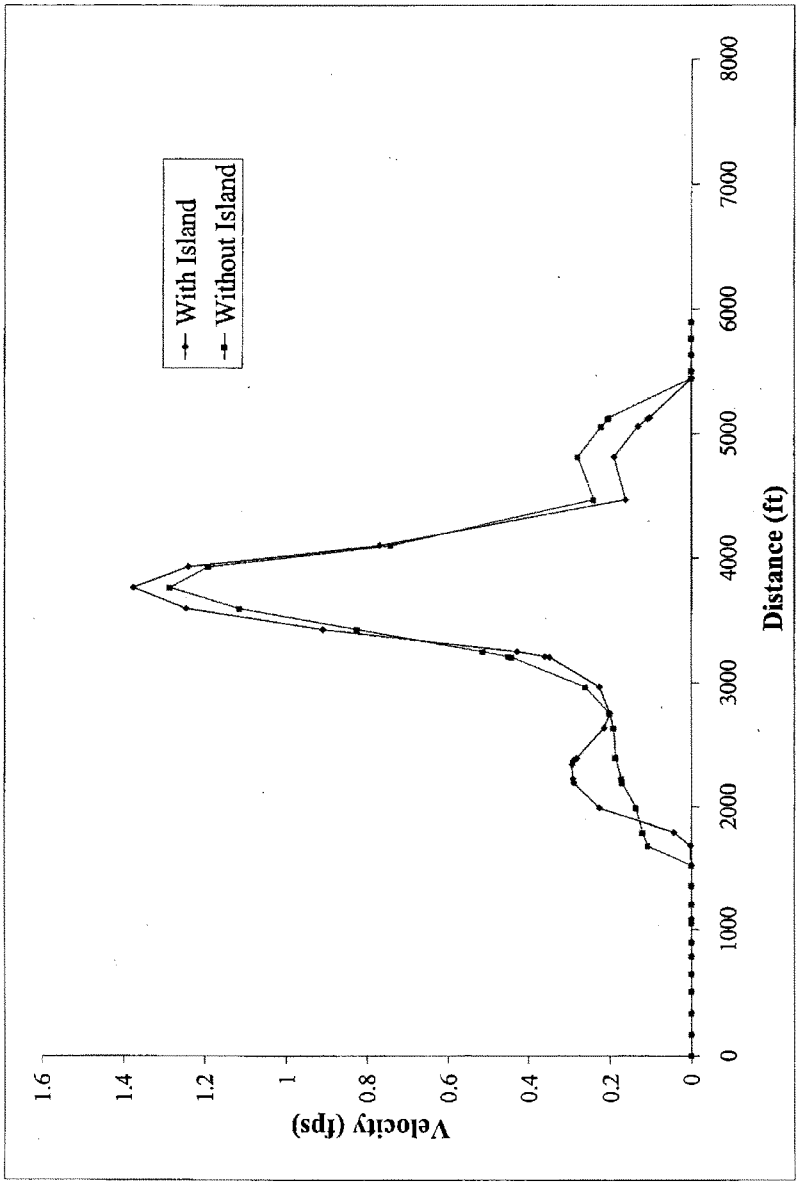


Figure 95. Lateral Velocity Distributions at Cross-section 7 (see Figure 70) for a Flow of 15,000 cfs, for Alternatives 2 and 3.

APPENDIX D-4

PEORIA LAKE ISLAND FLOOD HEIGHT IMPACTS ANALYSIS

D-4

PEORIA LAKE ISLAND FLOOD HEIGHT IMPACTS ANALYSIS

PURPOSE

The purpose of this analysis is to determine the effects on water surface elevation by locating an island or islands in Peoria Lake. There are four options for locating islands in the Peoria pool. These options are presented in the main report, and it was decided to combine Options 2 and 3 for this analysis. This scenario will cause the greatest difference in water surface elevation between the existing conditions model and a model with any of the alternative project configurations. Analysis of this combined configuration, considered to be the fully developed worst-case condition, is the basis used to evaluate the permitting and the need for mitigation. Additionally, an evaluation of a fully encroached condition (an unrealistic assumption) is presented for comparison (Figure D-4-1).

DESCRIPTION

This study utilizes the UNET model, which was developed for the Illinois River to generate the current published profiles (reference 1). The analysis that was performed was to determine the effects of locating islands in Peoria Lake near the Highway 24 Bridge. This required altering the cross-section data of the existing Illinois UNET model to simulate the existence of islands in Peoria Lake.

This analysis compares the existing conditions UNET water surface profiles to the profiles calculated for the selected plan (called Option 2 & 3). In the selected plan, one mid-sized island (Option 2) upstream of the U.S. Highways 24/150 bridge and two islands (Option 3) below the bridge would be constructed. The mid-sized island above the bridge is located at approximately a 45 degree angle to the flow of water in the river. The mid-sized island has a top elevation of 450 feet and side slopes of 6 horizontal to 1 vertical. This mid-sized island has a top width of 350 feet and is approximately 2,200 feet along the centerline of the island. The two islands below the bridge consist of two parallel islands located downstream of Highway 24 at cross section 165.3, with top elevations at 450 feet and side slopes of 6 horizontal to 1 vertical. These islands have top widths of 450 feet and 150 feet with a length of approximately 4,000 feet and are situated roughly parallel to the flow of the Illinois River. The attached map, Figure D-4-2, shows the positioning of these islands and the location of cross sections used in the analysis.

ANALYSIS

The model of the Illinois River was run using the UNET program to obtain the peak water surface profile for the Illinois River for various frequency events. The peak elevations for selected cross

sections were then compared to the Illinois River profiles (reference 1) to verify the UNET model. Upon verification of this model, it was classified as the "Base Conditions" model.

The Base Conditions model was then altered by changing appropriate cross sections to create the new model termed Option 2 and 3. The island at cross section 165.94 is at an angle to the flow, so even though the island is 350 feet wide, the actual obstruction to flow is more. Through standard engineering practices of determining the obstruction to flow, it was determined that the island would have an effective top width of 830 feet. The islands located at cross section 165.3 are parallel to the flow, so the actual top width of the islands was used as the area obstructing the flow. Figures D-4-3 and D-4-4 show cross sections used in the Base Conditions model and can be compared to Figures D-4-5 and D-4-6, respectively, which depict the same sections for the with-project conditions.

RESULTS

The attached Table D-4-1 shows the peak water surface elevations on the Illinois River for the 50%, 20%, and 1% exceedance flood events for existing conditions and the scenario combining Options 2 and 3. The spreadsheet also shows the difference in water surface elevation for these conditions. The data on the spreadsheet show that the addition of the islands has minimal effect on the water surface elevation of the Illinois River. The fact that there is not a significant effect on the water surface elevation due to the addition of the islands can largely be attributed to the fact that the velocities in Peoria Lake are very small.

As previously discussed, an unrealistic assumption of confined encroachment up to elevation 460 as shown on Figure D-4-1 was also analyzed. The results of that analysis are also presented in Table D-4-1.

Based on these results, it is concluded that construction of the proposed islands in Peoria Lake will not significantly impact flood levels.

REFERENCES

1. Illinois River Water Surface Profiles, US Army Corps of Engineers, Rock Island District, 1992.

Peoria Lake

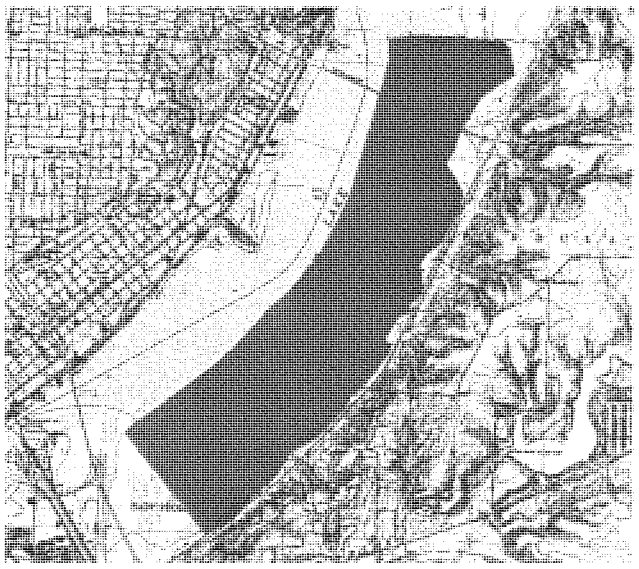


FIGURE D-4-1

Peoria Lake

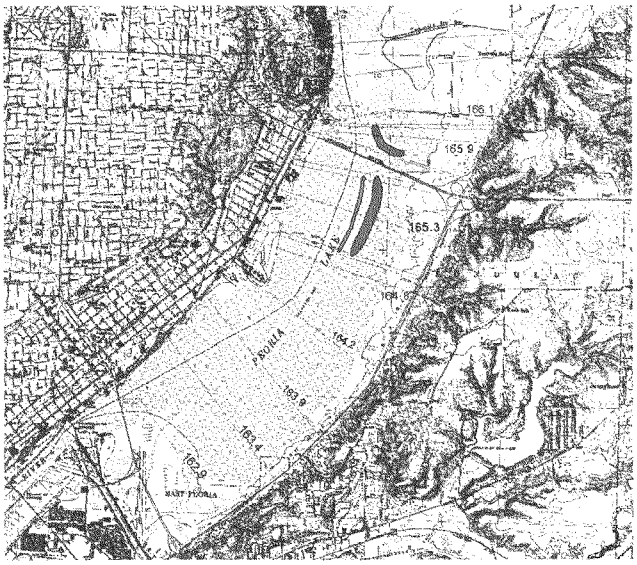


FIGURE D-4-2

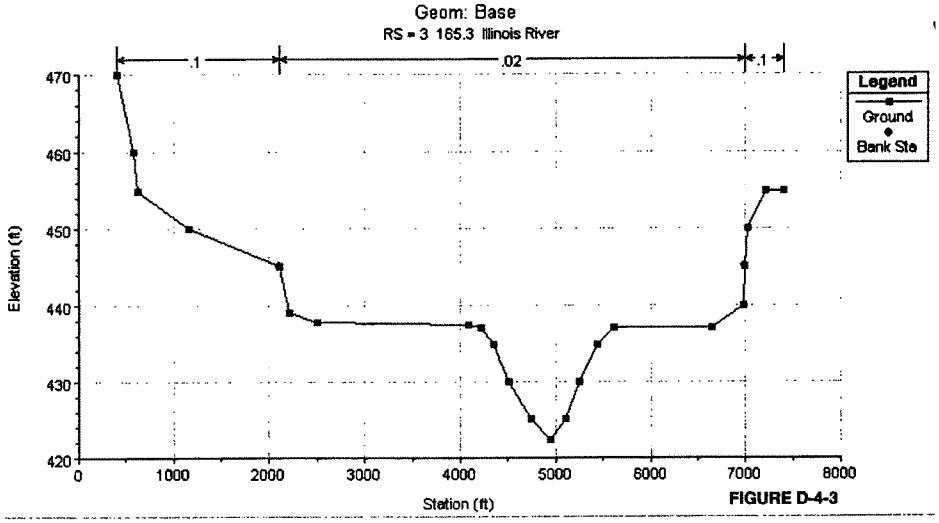


FIGURE D-4-3

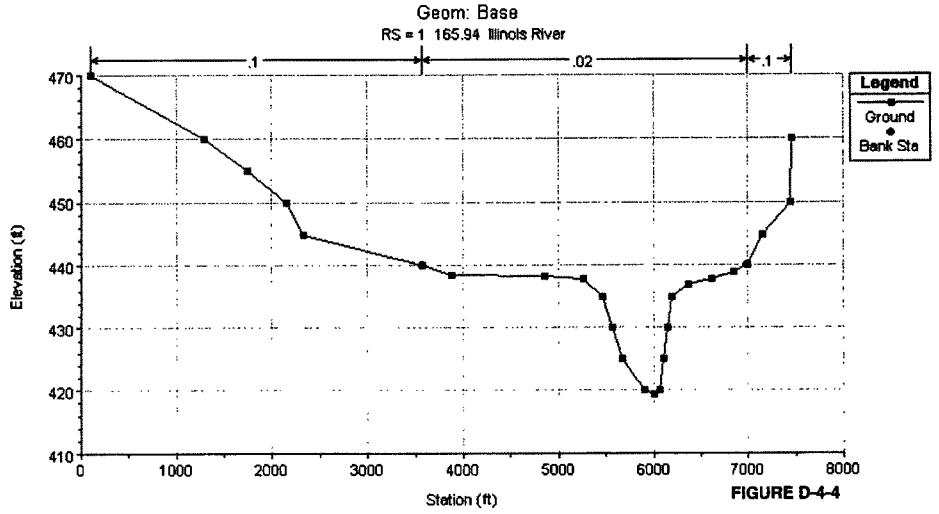


FIGURE D-4-4

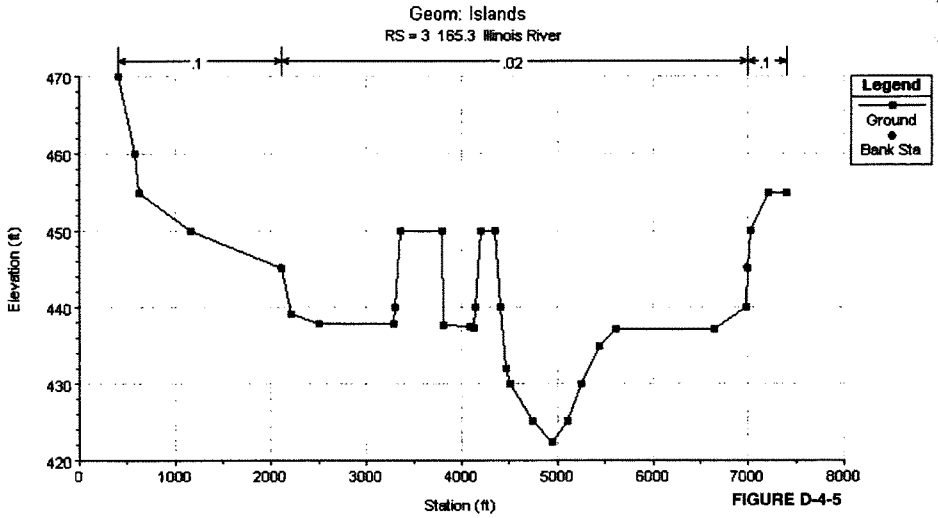


FIGURE D-4-5

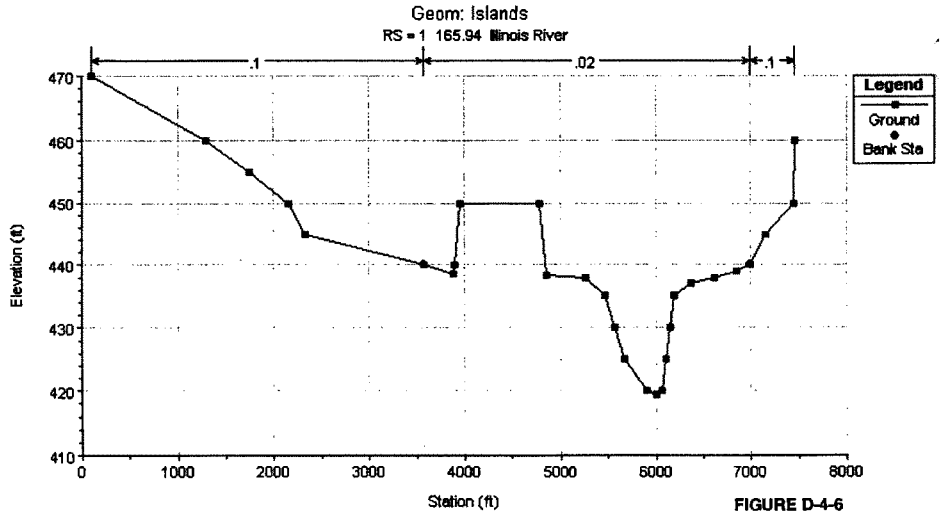


FIGURE D-4-6

TABLE D-4-1

	Base Condition				Options 2 & 3			
x-sec	2-yr flood	5-yr flood	100-yr flood	test	2-yr flood	5-yr flood	100-yr flood	test
196.1	448.99	452.72	459.68	450.84	449	452.73	459.68	450.85
166.75	448.2	451.91	458.89	450.04	448.2	451.92	458.9	450.05
166.45	448.19	451.89	458.87	450.03	448.19	451.9	458.87	450.04
166.1	448.18	451.87	458.84	450.02	448.18	451.88	458.84	450.02
165.9	448.2	451.89	458.86	450.04	448.2	451.9	458.86	450.04
165.8	448.2	451.89	458.85	450.04	448.21	451.9	458.86	450.04
165.3	448.2	451.89	458.85	450.04	448.2	451.89	458.85	450.04
164.8	448.19	451.89	458.85	450.03	448.2	451.89	458.85	450.04
164.2	448.19	451.88	458.85	450.03	448.2	451.89	458.85	450.03
163.86	448.19	451.88	458.85	450.03	448.2	451.89	458.85	450.03
163.4	448.19	451.88	458.84	450.03	448.19	451.88	458.84	450.03
162.9	448.15	451.85	458.82	450	448.16	451.85	458.82	450
157.8	447.22	450.97	457.96	449.11	447.22	450.97	457.96	449.11

APPENDIX E-1

SEDIMENTATION RATE ANALYSIS

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX E-1
SEDIMENTATION RATE ANALYSIS

CONTENTS

Subject	Page
Introduction	E-1-1
Purpose	E-1-1
Background	E-1-2
Sediment Sources	E-1-2
Hydrologic Conditions	E-1-2
Methods	E-1-3
Interpreting Bathymetric Survey Data and Converting to Digital Form	E-1-3
1903 Data	E-1-3
1932-1938 Data	E-1-4
1965 Data	E-1-5
1976 Data	E-1-5
1988 Data	E-1-5
1996 and 1999 Data	E-1-5
File Management and Analysis Techniques	E-1-5
File Management	E-1-5
Analysis Techniques	E-1-6
Data Availability	E-1-6
Results	E-1-7
Sedimentation Rate Data	E-1-7
Bathymetric Contour Data	E-1-7
Cross Section Data	E-1-8
Discussion	E-1-8
Sedimentation Rate	E-1-8
Bathymetry	E-1-8
Cross Section	E-1-8
Literature	E-1-9

CONTENTS (Continued)

Tables

No.	Title
E-1-1	Lake Volume Under Low Water Conditions
E-1-2	Lake Area Under Low Water Conditions
E-1-3	Lake Sedimentation Rate
E-1-4	Annual Lake Sediment Accumulation
E-1-5	Sedimentation in Two Off-Channel Deep Water Areas

Figures

No.	Title
E-1-1	Peoria Lake Bathymetry and Digital Elevation Model
E-1-2	Illinois River Elevation near Henry
E-1-3	Elevation Duration
E-1-4	Peoria Lake 1903 Water Surface Elevations
E-1-5	Peoria Lake Volume Below Elevation 440 NGVD
E-1-6	Upper Peoria Lake Volume Below Elevation 440 NGVD
E-1-7	Lower Peoria Lake Volume Below Elevation 440 NGVD
E-1-7A	Sedimentation Rate Study Areas A and B
E-1-8	Peoria Lake Sedimentation, 1903-1999
E-1-9	Peoria Lake 1 Foot Water Depth Contours
E-1-10	Peoria Lake Bottom Elevation Changes
E-1-10 (cont)	Peoria Lake Bottom Elevation Changes
E-1-11	Depth Below 440' Flat Pool 1999
E-1-12 thru E-1-19	Cross Section Data

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX E-1
SEDIMENTATION RATE ANALYSIS

INTRODUCTION

Peoria Lake has experienced significant sedimentation during the last century as a result of a combination of geomorphic and anthropomorphic factors. What was once a lake with diverse bathymetry, numerous islands and a variety of habitat types, is now a large, shallow lake. The only deepwater is found in and immediately adjacent to the navigation channel. This loss of bathymetric diversity has been accompanied by an equally impressive loss of biological diversity. Aquatic vascular plants are no longer present anywhere in the lake, and the lack of off-channel, deepwater habitat for overwintering may be limiting for some fish species. Efforts to restore some portions of the lake, which have been degraded by excessive sedimentation, can benefit from a more thorough understanding of the sedimentation processes that have occurred over the past 100 years. This study expands upon work done by previous researchers by incorporating data from timeframes not previously identified and by converting the data to an electronic form that is compatible with commonly used software.

PURPOSE

The purpose of this study was to utilize existing bathymetric information in order to determine historic sedimentation rates within Peoria Lake. While previous researchers have performed similar analyses (Demissie and Bhowmik 1986, Lee and Stall 1976 & 1977, Bellrose et al. 1983), this study expands upon their work in several ways. In researching the existing records for this study, a series of bathymetric surveys from the 1930's was discovered. This is an important period in the recent history of Peoria Lake because it approximates the time when significant increases in Lake Michigan diversion occurred. It also immediately precedes the construction of Peoria Lock and Dam. Both of these events resulted in changes in lake hydrologic conditions (lake area and depth). By incorporating these data into the analysis, it was possible to measure the rate of sedimentation during a time when events were occurring which raised the minimum water level in the lake.

The current study also incorporated a very complete survey performed in 1988 as well as the most recent bathymetric surveys completed in 1996 and 1999. Previously mentioned studies warned of further lake sedimentation and the eventual emergence of land forms; however, these predictions were based on extrapolations of observed trends. This study helps to establish recent trends in sedimentation.

Finally, while historic data were digitized as part of previous studies, the storage media utilized are no longer compatible with current computer technology. In this study, all data were digitized, stored on the most advanced media available, and analyzed using advanced Geographic Information Systems (GIS) software. The use of these analytical tools permitted interpreting the

data in ways not previously possible. These efforts also will make the data available to other users for further analysis.

BACKGROUND

Peoria Lake is located between River Miles (RM) 162 and 181 on the Illinois Waterway. It was formed as a result of an alluvial fan that developed near the mouth of Farm Creek, a small tributary to the Illinois River (Demissie and Bhowmik 1986). Several other tributary streams also drain directly to Peoria Lake. These streams are generally very steep relative to the Illinois River, and deltas have formed near the mouths of each tributary. The Tenmile Creek delta, which is located at RM 165.5, has formed a constriction in the river which divides the lake into Upper Peoria Lake and Lower Peoria Lake.

The earliest detailed survey of Peoria Lake was completed in 1903 by J. W. Woermann. The maps created from this survey depict the lake at low-water conditions. Under these conditions, the lake exhibited diverse bathymetry and several islands in both the Upper and Lower Lakes. Lake area was significantly less than currently exists and, as will be shown later, lake volume was also less than more recent time periods. As a result of flow diversion from Lake Michigan, minimum water levels throughout the Illinois Waterway were significantly raised from natural levels. Changes in diversion caused the water levels to vary from time to time. In 1939, the Peoria Lock and Dam was constructed, which further affected low-water levels and established a minimum pool elevation of 440 feet NGVD, 1929.

SEDIMENT SOURCES

Sediment sources to Peoria Lake include the Illinois River, which drains an area of about 13,765 square miles upstream of Peoria Lake, and 10 tributaries flowing directly to the lake, which have a combined drainage area of about 400 square miles (Figure E-1-1). It was estimated by Bhowmik et al. (1994) that nearly 100% of the sediment load to the lake comes from these sources. Previous work by Demissie and Bhowmik (1986 and 1993) indicated that as much as 40% of the total sediment deposition in the lake originated from the small tributary streams; however, both of these studies were based on short periods of record. While the large drainage area of the Illinois River compared to the tributaries belies this conclusion, one must consider the nature of the sediment load coming from these two sources. The Illinois River transports primarily suspended sediment, much of which may flow through the lake. The tributaries, on the other hand, transport substantial amounts of very coarse sand and even larger-sized materials that likely remain in the lake.

HYDROLOGIC CONDITIONS

The history of flow conditions on the Illinois Waterway is well documented by others (Bellrose et al. 1983, Larson 1979, Lee and Stall 1976, Havera et al. 1980). Beginning as early as the mid-1800's and continuing to the present, the Illinois Waterway has been modified for the purposes of improving commercial navigation and carrying waste materials away from the Chicago metropolitan area. These modifications included the construction of canals, locks and dams, channel training structures and levee systems, as well as extensive dredging and diversion of water from Lake Michigan. Major structural modifications culminated with the construction the 9-foot navigation system (consisting of 8 locks and dams) in the late 1930's. Dredging and flow diversion continue as part of the system maintenance activities.

All of these modifications have resulted in unnatural hydrologic conditions throughout the Illinois Waterway. Figure E-1-2 shows how low water levels near Henry, IL (immediately upstream of Peoria Lake) reacted to these modifications during the 1900's. Initially, water levels increased, then briefly fell, then have remained near elevation 440 NGVD. Figure E-1-3 depicts the frequency with which water levels have occurred at locations immediately upstream and downstream of Peoria Lake for the period beginning around 1870 through the present. Figure E-1-4 shows the depth contours of how Peoria Lake appeared in 1903 at different stage levels. Because most of the landforms within the lake had relatively low elevations, the character of the lake changed dramatically with small changes in water surface elevation. For instance, going from water surface elevation 434 to 438 caused the lake surface area to increase significantly and islands to all but disappear.

METHODS

Data sources for this study included bathymetric survey maps from 1903, 1932-1938, 1965, 1976, and 1988. Similar data in electronic form were available for 1996 and 1999. Each of these data sources had unique qualities which dictated how they were treated. While a detailed discussion of each data set is beyond the scope of this report, the following website provides this type of information: http://www.mvr02.usace.army.peroialake.mil. Included on this website is information about the form of the original maps and the various formats in which these maps may be obtained (paper copy, electronic images, rectified images, and GIS coverages). It also discusses characteristics of the various products generated from these data (Metadata). This report includes a general discussion of each data set and how they were analyzed.

INTERPRETING BATHYMETRIC SURVEY DATA AND CONVERTING TO DIGITAL FORM

Before the various survey data sets were digitized, inconsistencies pertaining to coordinate systems, vertical datum systems, and data densities were addressed. Unique characteristics of each data set are discussed in the following sections.

1903 Data

Between 1902 and 1904, J. W. Woermann of the U.S. Army Corps of Engineers, Chicago District (CE-NCC) directed a bathymetric and topographic survey of the Illinois Waterway from RM 287.5 to the confluence with the Mississippi River, including Peoria Lake. Survey range data were spaced approximately 500 feet apart. Data were plotted on maps showing water depths and some surrounding 1-foot topographic data. These maps were scanned using a 400 dpi gray scale color scheme. The coordinate system used for the Woermann maps was different from any system used today. Attempts to convert the coordinates to a current projection system were unsuccessful. The maps did have section/township markings that were used wherever possible to rectify the maps. Street intersections and building locations were also used if there were not enough section/township markings available. Because of the large area covered by the Woermann maps, six to eight reference points (tic marks) were used per map. The scanned images were rectified to real world coordinates using the Illinois State Plane West NAD 83 projection. After the maps were rectified, it was noticed that some adjacent maps had gaps of 100 feet or more. It was decided that attempts to adjust these gaps would only compound the problem.

The elevations noted on the map were not in the current NGVD 1929 datum. Notes on the original maps document the vertical datum as follows:

> "The precise (bathymetric) levels are based upon elevations of U.S.P.B. Ms. 2, 3, and 4, at Grafton, Illinois, established by the Mississippi River Commission in 1880. The elevations are therefore in feet above the Memphis Datum plane, which is approximately 8.13 feet below mean Gulf Level at Biloxi, Mississippi. The soundings are expressed in feet and tenths below the low water of 1901, which is the lowest stage of water on record since the opening of the Chicago Drainage Canal. The Shore line is represented for this same low water stage."

The Memphis Datum is 7.44 feet higher than NGVD 1929 datum in the Peoria Lake area, so all elevations were adjusted accordingly when the data were digitally recorded.

Because the maps were created prior to the construction of the Peoria Dam, there was no established flat pool value. The "low water surface" elevation noted on the Woermann maps was determined for several locations throughout the lake. When the digitized depths were converted to elevations, the nearest "flat pool" elevation value was used.

1932-1938 Data

The 1930's maps were the most important and most difficult set of maps with which to work. They were the most important because previous studies had not utilized data from this time period. Changes in the amount of water diverted from Lake Michigan took place between 1903 and 1965. It was felt that this time period was essential in understanding trends in sedimentation. Working with the data was difficult because there was not one complete set of maps that contained data for the entire lake.

Between 1932 and 1938, bathymetric surveys of Peoria Lake were completed by the CE-NCC on several occasions. It appears from the data that a complete lake survey was performed in 1934-1935. However, the only existing copy of the maps had been overwritten, in places, with more recent data. In order to get a complete picture of lake bathymetry, additional data were obtained from surveys performed between 1932-1938. By using maps from several different years, a very complete data set was assembled for the entire lake. Because of the variety of maps used, care was taken to ensure that data were clearly identified and documented in the metadata.

Most of the data for Upper Peoria Lake came from large "hard shell" maps. In general, the survey ranges were spaced approximately 200 feet apart and included some 1-foot topography. The hard shell maps were very deteriorated and their large size (20-30 feet in length by over 40 inches wide) and fragile condition made it impossible to work with them directly. The maps were first photographed in several sections. To permit later rectification, steps were taken to ensure that each photographed section included several coordinate markings and that adjacent photographs overlapped. Other survey data gathered in 1935 were available as a set of Mylar maps dated 1938. These maps covered the entire Lower Lake. A set of paper maps dated 1965, but containing data clearly labeled 1932-1938, was used as an additional data source.

All maps, including the photographic negatives of the hard shell maps, were scanned using a 400 dpi gray scale color scheme. All maps were rectified using at least 4 points. For the

hard shell maps, at least 4 points were used for every photographed section. Section/ township coordinate points were used when possible. The images were converted to the Illinois State Plane West NAD 83 projection system using the CORPSCON projection conversion program.

1965 Data

In 1965 and again in 1976, the Corps of Engineers Chicago District performed complete bathymetric surveys of Peoria Lake. The survey range data were available as photocopies of maps dated 1965. The transect data were spaced approximately 1,000 feet apart. This resulted in a less dense data set compared to previous surveys, and small areas of the lake were not included. Data for these areas were taken from the 1934-1935 hard shell maps which had been overwritten with data clearly labeled 1965. All maps were scanned using a 400 dpi gray scale color scheme. The images were rectified to real world coordinates in the Illinois State Plane West NAD 1983 projection.

1976 Data

The 1976 data were available on a series of photocopied maps. The data were complete but transects were only spaced 500 feet apart. All maps were scanned at 400 dpi using a gray scale color scheme. The images were rectified to real world coordinates using the Illinois State Plane West NAD 1983 projection.

1988 Data

When Demissie and Bhowmik (1986) evaluated sedimentation rates in Peoria Lake, they constructed 18 transects spaced approximately 1 mile apart. They used these data to represent bathymetric conditions immediately preceding their analysis. This density of data is not compatible with GIS analysis tools and thus was not used in this study. In 1988, CENCC performed a survey of the entire lake. The survey range data were spaced approximately 1,500 feet apart, resulting in a very dense data set. The survey data were available on paper maps that included 1988 aerial photography. The maps were scanned at a resolution of 400 dpi using a gray scale color scheme. The images were rectified to real world coordinates using the Illinois State Plane West NAD 1983 projection.

1996 and 1999 Data

In 1996 and 1999, complete surveys were performed by the Rock Island District (CEMVR). Both surveys resulted in data sets that were very dense compared to other time periods used in this study. The field data from the 1996 and 1999 surveys were available in an electronic x,y,z format in the Illinois State Plane West NAD 1983 projection. The tabular data were imported into ArcView™ as an Event Theme and converted to shapefiles.

FILE MANAGEMENT AND ANALYSIS TECHNIQUES

File Management

All maps were saved in the .tif file format. Once the maps were scanned, the images were digitally rectified. Four to six coordinates were selected to rectify each map, except as noted above. Points were chosen near the 4 corners of the map, and the center if deemed necessary, in an attempt to keep the root mean square (RMS) error below 1. When maps did

not have enough usable coordinates, section/township crossings and street intersections were used. Coordinates for these points were taken from maps that were already rectified. Rectifying images associated a Tif World File (.twf) to each corresponding .tif image.

Rectified maps were digitized using ArcView™. This process was facilitated by creating a script using ESRI's Avenue™ language, which allowed the user to easily enter each bathymetric point value. The decimal point of the depth value recorded on the maps was used for the location of the bathymetry point. Once the depths were entered into the ArcView™ table, they were converted to elevations using the flat pool elevation documented on the map. Where available, some topography information was also digitized. This was done to create a better coverage near the land-water interface.

Analysis Techniques

Combined point and topography data for each time period were converted to a surface model (Tin) using ArcInfo™ . These coverages were "clipped" to eliminate data above elevation 440 NGVD from being included in later area and volume computations. This was done by first converting the tins to 20-foot grids, creating a point coverage from the grid, and converting the point coverage to finalized tins. This process minimized distortions in the initial tins due to irregular spacing of the raw data. Where data gaps existed, such as shallow areas in the Upper Lake, fill polygons were added to the coverage. These finalized tins were used for all area, volume, and sedimentation rate computations.

Utilizing these tins, it was possible to calculate various statistics pertaining to different areas of the lake for each timeframe analyzed. It was even possible to further identify how different depth classes have changed over time. Four depth classes were used in this analysis: <3 feet, 3-6 feet, 6-9 feet, and >9 feet. These depth classes were chosen as being representative of habitat types which benefit various species of aquatic organisms. Because much of the deepwater found in the lake under low-flow conditions is associated with the navigation channel (and may be of limited habitat value), off-channel and channel areas are identified separately. For this analysis, the navigation channel is defined as an area running the length of the lake, which is 150 feet on either side of the deepest part the lake. This technique was used for all timeframes.

Finalized grids were created from the finalized tins, for appearance purposes. In certain instances, these grids were filtered in ArcInfo™ to permit creation of smooth contours for display purposes. All figures of surface models are labeled as being created from filtered or unfiltered grids.

DATA AVAILABILITY

As mentioned previously, one objective of this study was to make available in current form, data from all timeframes utilized for analysis. This will permit others to use these data for additional analyses. Paper copies of all maps except the 1934-1935 hard shell maps are available from the U.S. Army Corps of Engineers, Rock Island District (CEMVR). The photographic images of the 1934-1935 maps are available on CD from CEMVR. The photographic negatives of these maps are held by Boyd Fitzgerald Photography, Davenport, Iowa.

All maps were scanned as previously described. These are available on CD as .tif image files and as rectified files with associated .twf files. The rectified files are in the Illinois State Plane West NAD 83 projection. The scanned images and related world files are available from CEMVR. Data

from the 1996 and 1999 bathymetric surveys are available as x,y,z ASCII files from CEMVR. Shapefiles and GIS coverages created during this study are available at the website: http://www.mvr02.usace.army.peroialake.mil.

RESULTS

SEDIMENTATION RATE DATA

For the purpose of this study, 1903 is used to represent the baseline condition for Peoria Lake (since this was when the first detailed bathymetric data were collected). In order to compare data for the 1903 and 1932-1938 timeframes to data collected following dam construction, one must utilize some surface water level which represents conditions which existed during those earlier timeframes. Demissie and Bhowmik (1986) determined a rate of sedimentation for the 1903-1965 time period as though the low lake level were 440 feet NGVD. For the purpose of comparing techniques used in the different studies, lake capacity in 1903 at elevation 440 was determined. The results are plotted in Figures E-1-5 and E-1-6, along with the results from Demissie and Bhowmik (1986). Considering the different techniques utilized in the two studies, the results compare very well. The absolute volumes and rate of volume loss are very similar, especially during the earlier time periods. Differences appear around the mid-1980's because the 1986 study utilized only a few cross sections to calculate volume. Also, the authors of that study were only able to estimate lake volume for the year 2000.

A more detailed analysis of results is summarized in Tables E-1-1 through E-1-4. In these tables, and elsewhere in the report, results for the 1903 and 1930's time periods are based on the low-water surface elevation of 434 NGVD 1929. The decision to use this level was based upon information presented on the Woermann maps and data presented in Figures E-1-2 and E-1-3. Tables E-1-1 and E-1-2 list the lake volume and water surface area of the lake, respectively, by different depth classes for the eight timeframes analyzed. Also included are the lake volume and area computations after construction of the preferred project alternative (proposal 2 plus proposal 3). Table E-1-3 shows the amount of sediment that has deposited or scoured between surveys, and Table E-1-4 expresses this as an annual sedimentation rate. As noted in the tables, all values listed were computed independently from grids. In some cases, the total values may not equal the sum of the individual components due to rounding errors. In cases where the rate of change was determined, area measurements utilized in the computations were based on the first time period.

The data presented thus far attempt to describe where and to what extent scour and deposition have occurred throughout the lake. However, two specific areas located in the Lower Lake, close to the project site, were analyzed in even greater detail. These areas are shown in Figure E-1-7A. Both areas were originally greater than 9 feet and have experienced rapid sedimentation. These areas may be more representative of the worse-case rate of sedimentation which could occur at the project site, compared to the average rates of sedimentation observed in the lake. Table E-1-5 shows the sedimentation rate results of from Site A, located closest to the proposed project site, and Site B located on the opposite side of the river.

BATHYMETRIC CONTOUR DATA

Graphical representations of these data are presented in Figures E-1-8 through E-1-10. Figure E-1-8 summarizes how water depths have changed throughout the lake between 1903 and 1999, bathymetric diversity has simplified, and deposition has dominated throughout the lake. Figure E-

1-9 shows the progressive loss of water depth diversity. Figure E-1-10 shows how these depositional and erosive processes have occurred by timeframe.

CROSS SECTION DATA

Figure E-1-11 shows the locations of cross sections that were constructed from the tins. Cross sections were positioned at or near the whole river miles and at intermediate locations which were of particular interest. Figures E-1-12 through E-1-19 show these cross section results. Each plot shows all eight timeframes analyzed.

DISCUSSION

SEDIMENTATION RATE

It can be seen from the sedimentation rate results that between 1903 and 1976 the rate of sedimentation determined by this study agrees quite well with that determined by Demissie and Bhowmik (1986). After that, the rate of sedimentation seems to have lessened, with some overall scour being observed most recently. This is most pronounced in the Upper Lake, while the Lower Lake continued to fill until just recently. It is not surprising that this should occur as the trap efficiency of the Upper Lake probably decreased sooner than the Lower Lake because it experienced more rapid sedimentation during the early 1900's.

What is interesting are the results of the most recent surveys which show both the Upper and Lower Lakes gaining volume. This could be an artifact resulting from the short elapsed time between surveys. This change is also rather small and could be due to local dredging and scour which are not occurring on a wide-spread basis. However, from Figure E-1-9 it is apparent that the navigation channel is scouring throughout its length. It also appears that some scour is occurring immediately upstream of the Tenmile Creek and Farm Creek deltas where water velocities would be expected to be slightly higher compared to wider areas of the lake. Whether this trend will continue is unclear.

BATHYMETRY

It is also evident that the deeper areas of the lake, away from the navigation channel, have experienced more rapid sedimentation than shallow areas. This has resulted in little bathymetric diversity and loss of off-channel, deepwater habitat. The proposed project alternative will significantly increase both the volume and area of deepwater habitat in the Lower Lake. While these deep areas have been shown to be subject to rapid sedimentation, design features will attempt to minimize this by orienting the islands and channels to make them self-maintaining.

CROSS SECTION

From the cross-section data, it is obvious that the navigation channel has narrowed and deepened throughout the lake over time. In most locations, the navigation channel has not moved laterally over time. This appears to be the case in the project area, especially in recent years.

LITERATURE

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TABLE E-1-1

Lake Volume Under Low Water Conditions

Water Depth Class (feet)	ENTIRE LAKE Total Lake (Ac-Ft)	ENTIRE LAKE Total Channel (Ac-Ft)	ENTIRE LAKE Total Off-Channel (Ac-Ft)	UPPER LAKE Upper Lake (Ac-Ft)	UPPER LAKE Upper Lake Channel (Ac-Ft)	UPPER LAKE Upper Lake Off-Channel (Ac-Ft)	LOWER LAKE Lower Lake (Ac-Ft)	LOWER LAKE Lower Lake Channel (Ac-Ft)	LOWER LAKE Lower lake Off-Channel (Ac-Ft)
1903 Time Period (at assumed low water condition = 434.06 ft. ngvd)									
<3	4700	0	4700	4100	0	4100	600	0	600
3-6	8900	100	8800	7700	0	7800	1200	0	1200
6-9	13700	1400	12400	10300	1300	9000	3500	100	3400
>9	13800	6500	7300	8000	4800	3200	5400	1800	4100
otal below 434.0	41100	8000	33200	30100	6100	23900	11100	1900	9300
1930 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	6200	0	6200	5800	0	5800	400	0	400
3-6	30100	0	30100	27200	0	27200	2900	0	2900
6-9	20200	100	20200	15000	100	15900	4300	0	4300
>9	42000	10700	31200	26200	8100	18100	15800	2600	13200
Total below 440	98500	10800	87700	75200	8200	67000	23400	2600	20800
1965 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	8900	0	8900	8400	0	8400	500	0	500
3-6	28500	0	28500	23900	0	23900	4600	0	4600
6-9	13700	0	13700	9700	0	9700	4000	0	4000
>9	23200	10600	12600	14300	7900	6400	8900	2600	6200
Total below 440	74300	10600	63780	56200	7900	48300	18000	2600	15300
1975 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	13900	0	13900	13300	0	13300	600	0	600
3-6	25600	0	25600	19400	0	19400	6200	0	6200
6-9	4300	0	4300	2600	0	2500	1700	0	1700
>9	17200	10500	6700	10200	7800	2500	7000	2700	4300
Total below 440	61000	10500	50560	45500	7800	37700	15500	2700	12800
1988 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	15900	0	15900	14700	0	14700	1200	0	1200
3-6	17800	0	17800	12600	0	12600	5100	0	5100
6-9	2900	100	2900	1700	100	1600	1200	0	1200
>9	16100	10200	5800	9800	7400	2400	6300	2800	3500
Total below 440	52700	10300	42400	39000	7500	31500	13800	2800	11000
1996 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	18100	0	18100	15600	0	15600	2500	0	2500
3-6	7500	0	7500	5100	0	5100	2400	0	2400
6-9	2700	100	2700	1600	0	1600	1100	0	1100
>9	15000	10500	4400	10000	7900	2000	5000	2600	2400
Total below 440	43300	10600	32700	32200	7900	24300	11000	2600	8400
1999 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	17400	0	17400	15100	0	15100	2300	0	2300
3-6	10300	0	10300	7400	0	7400	2900	0	2900
6-9	2300	0	2300	1300	0	1300	1000	0	1000
>9	16500	11500	4900	10600	8600	2000	5900	2900	3000
Total below 440	46500	11500	34900	34400	8600	25800	12000	2900	9100
With Preferred Option (at assumed low water condition = 440 ft. ngvd)				Proposal #2 and Proposal #3					
<3	17000	0	17000				1900	0	1900
3-6	10300	0	10300	same as above			2800	0	2800
6-9	3000	0	3000				1700	0	1700
>9	17100	11500	5600				6500	2900	3700
Total below 440	47400	11500	35800				13000	2900	10100

TABLE E-1-2

Lake Area Under Low Water Conditions

Water Depth Class (feet)	ENTIRE LAKE Total Lake (Acres)	ENTIRE LAKE Total Channel (Acres)	ENTIRE LAKE Total Off-Channel (Acres)	UPPER LAKE Upper Lake (Acres)	UPPER LAKE Upper Lake Channel (Acres)	UPPER LAKE Upper Off-Channel (Acres)	LOWER LAKE Lower Lake (Acres)	LOWER LAKE Lower Lake Channel (Acres)	LOWER LAKE Lower lake Off-Channel (Acres)
1903 Time Period (at assumed low water condition = 434.06 ft. ngvd)									
<3	3970	0	3970	3400	0	3400	570	0	570
3-6	1990	10	1980	1730	0	1720	260	10	260
6-9	1820	170	1650	1380	160	1210	450	10	440
>9	1210	510	700	670	360	310	540	150	390
Total below 434.06	8990	690	8300	7180	520	6640	1820	170	1650
1930 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	3240	0	3240	3020	0	3020	220	0	220
3-6	6870	0	6870	6250	0	6250	620	0	620
6-9	2790	10	2780	2180	10	2170	610	0	610
>9	3190	690	2510	2040	520	1520	1150	160	990
Total below 440	16090	700	15400	13490	530	12960	2600	160	2440
1965 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	5220	0	5220	4900	0	4900	320	0	320
3-6	6730	0	6730	5800	0	5800	930	0	930
6-9	1900	0	1900	1350	0	1340	550	0	560
>9	1780	690	1090	1090	520	570	690	160	520
Total below 440	15630	690	14940	13140	520	12610	2480	160	2220
1976 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	7550	0	7550	7260	0	7260	300	0	300
3-6	6440	0	6440	5000	0	5000	1440	0	1440
6-9	590	0	590	360	0	350	240	0	240
>9	1250	690	560	740	520	220	510	170	340
Total below 440	15830	690	15140	13360	520	12830	2490	170	2320
1988 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	8210	0	8210	8520	0	8520	690	0	690
3-6	4510	0	4500	3260	0	3260	1230	0	1230
6-9	390	10	380	230	10	220	170	0	170
>9	1110	630	480	870	460	210	440	180	280
Total below 440	15220	640	14580	12700	470	12230	2530	180	2370
1996 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	11050	0	11050	9710	0	9710	1340	0	1340
3-6	2070	0	2060	1430	0	1430	630	0	630
6-9	370	10	360	220	0	210	150	0	150
>9	1070	690	380	710	520	190	360	160	200
Total below 440	14560	700	13850	12070	520	11540	2480	160	2320
1999 Time Period (at assumed low water condition = 440 ft. ngvd)									
<3	10200	0	10200	8990	0	8990	1210	0	1210
3-6	2800	0	2800	2060	0	2060	750	0	750
6-9	310	0	310	170	0	170	140	0	140
>9	1100	690	410	700	530	170	400	160	240
Total below 440	14410	690	13720	11920	530	11390	2500	160	2340
With Preferred Option (at assumed low water condition = 440 ft. ngvd)				Proposal #2 and Proposal #3					
<3	9930	0	9930				940	0	940
3-6	2800	0	2800	same as above			750	0	750
6-9	420	0	420				250	0	250
>9	1160	690	470				460	160	300
Total below 440	14310	690	13620				2400	160	2240

TABLE E-1-3

Lake Sedimentation Rate

Water Depth Class (feet)	TOTAL LAKE: Total Lake (inches/year)	TOTAL LAKE: Total Channel (inches/year)	TOTAL LAKE: Total Off-Channel (inches/year)	UPPER LAKE: Upper Lake (inches/year)	UPPER LAKE: Upper Lake Channel (inches/year)	UPPER LAKE: Upper Lake Off-Channel (inches/year)	LOWER LAKE: Lower Lake (inches/year)	LOWER LAKE: Lower Lake Channel (inches/year)	LOWER LAKE: Lower lake Off-Channel (inches/year)
1903 - 1930 Time Period (Areas determined with 1903 LWS depths)									
<3	0.14	0.00	0.14	0.18	0.00	0.18	(0.13)	0.00	(0.17)*
3-6	1.54	0.00*	1.57	1.72	0.00*	1.73	0.68	0.00*	0.53
6-9	1.20	1.83	1.13	1.38	2.22	1.36	0.59	0.00*	0.61
>9	1.18	1.48	0.95	1.53	1.73	1.15	0.82	0.89	0.80
1930 - 1965 Time Period (Areas determined with 1930 depths)									
<3	0.17	0.00*	0.17	0.19	0.00*	0.19	0.00	0.00*	0.00
3-6	0.40	0.00*	0.40	0.43	0.00*	0.43	0.13	0.00*	0.13
6-9	0.60	0.00*	0.60	0.62	0.00*	0.62	0.53	0.00*	0.54
>9	1.04	0.55	1.17	0.99	0.53	1.15	1.14	0.64	1.23
1965 - 1976 Time Period (Areas determined with 1965 depths)									
<3	(0.06)	0.00*	(0.06)	0.00	0.00*	0.00	(1.02)	0.00*	(1.02)
3-6	1.02	0.00*	1.02	1.02	0.00*	1.02	0.94	0.00*	0.94
6-9	2.47	0.00*	2.47	2.59	0.00*	2.58	2.18	0.00*	2.18
>9	1.84	0.63	2.59	2.20	0.84	3.42	1.44	0.00	1.44
1976 -1988 Time Period (Areas determined with 1976 depths)									
<3	0.28	0.00*	0.28	0.29	0.00*	0.29	0.00	0.00*	0.00
3-6	0.63	0.00*	0.63	0.60	0.00*	0.60	0.70	0.00*	0.70
6-9	1.03	0.00*	1.04	0.57	0.00*	0.59	1.30	0.00*	1.30
>9	1.05	0.74	1.45	1.22	0.96	1.83	0.80	0.59	0.90
1988 -1996 Time Period (Areas determined with 1988 depths)									
<3	0.44	0.00*	0.44	0.46	0.00*	0.46	0.22	0.00*	0.22
3-6	1.58	0.00*	1.56	1.51	0.00*	1.51	1.71	0.00*	1.71
6-9	2.31	0.00*	2.31	1.30	0.00*	1.30	3.53	0.00*	3.53
>9	2.30	1.90	2.81	2.24	1.96	2.86	3.07	2.81	3.22
1996 - 1999 Time Period (Areas determined with 1996 depths)									
<3	(0.63)	0.00*	(0.63)	(0.53)	0.00*	(0.53)	(1.16)	0.00*	(1.16)
3-6	(0.58)	0.00*	(0.58)	(0.28)	0.00*	(0.28)	(1.27)	0.00*	(1.27)
6-9	2.16	0.00*	2.22	3.64	0.00*	3.81	0.00	0.00*	0.00
>9	(3.74)	(5.22)	(1.03)	(3.38)	(4.62)	0.00*	(4.44)	(7.50)	(2.00)

* -- Sediment accumulation or scour was minimal or occurred over such a small area of the lake that a sedimentation rate could not be resolved with an acceptable degree of reliability.

TABLE E-1-4

Annual Lake Sediment Accumulation

Water Depth Class (feet)	TOTAL LAKE			UPPER LAKE			LOWER LAKE		
	Total Lake (Ac-Ft/Yr)	Total Channel (Ac-Ft/Yr)	Total Off-Channel (Ac-Ft/Yr)	Upper Lake (Ac-Ft/Yr)	Upper Lake Channel (Ac-Ft/Yr)	Upper Lake Off-Channel (Ac-Ft/Yr)	Lower Lake (Ac-Ft/Yr)	Lower Lake Channel (Ac-Ft/Yr)	Lower lake Off-Channel (Ac-Ft/Yr)
1903 - 1930 Time Period									
<3	126*	(0)	126	144	(0)	144	(15)	(0)	(19)
3-6	256	(0)	259	248	0	248	15	0	11
6-9	181	26	156	159	30	137	22	(0)	22
>9	119	63	56	85	52	30	37	11	26
1930 - 1965 Time Period									
<3	40	(0)	40	43	(0)	43	0	(0)	0
3-6	226	(0)	228	220	(0)	220	6	(0)	8
6-9	137	0	137	111	(0)	111	26	(0)	26
>9	274	31	243	169	23	148	109	9	100
1965 - 1976 Time Period									
<3	(27)	0	(27)	3	0	3	(27)	0	(27)
3-6	573	(0)	573	491	(0)	491	73	(0)	73
6-9	391	0	391	291	0	291	100	(0)	100
>9	273	36	237	200	36	164	82	0	82
1976 -1988 Time Period									
<3	158	(0)	158	158	0	158	0	(0)	0
3-6	333	(0)	333	250	(0)	250	83	(0)	83
6-9	50	(0)	50	17	(0)	17	25	0	25
>9	108	42	66	75	42	33	33	8	25
1988 -1996 Time Period									
<3	350	(0)	350	338	(0)	338	13	(0)	13
3-6	427	0	427	413	0	413	175	(0)	175
6-9	75	0	75	25	0	25	50	0	50
>9	213	100	113	125	75	50	113	38	76
1996 - 1999 Time Period									
<3	(633)	(0)	(833)	(487)	(0)	(467)	(133)	(0)	(133)
3-6	(100)	0	(100)	(33)	(0)	(33)	(67)	0	(67)
6-9	67	0	67	67	0	67	0	0	0
>9	(333)	(300)	(33)	(200)	(200)	0	(133)	(100)	(33)

TABLE E-1-5

Sedimentation in Two Off-Channel Deep Water Areas

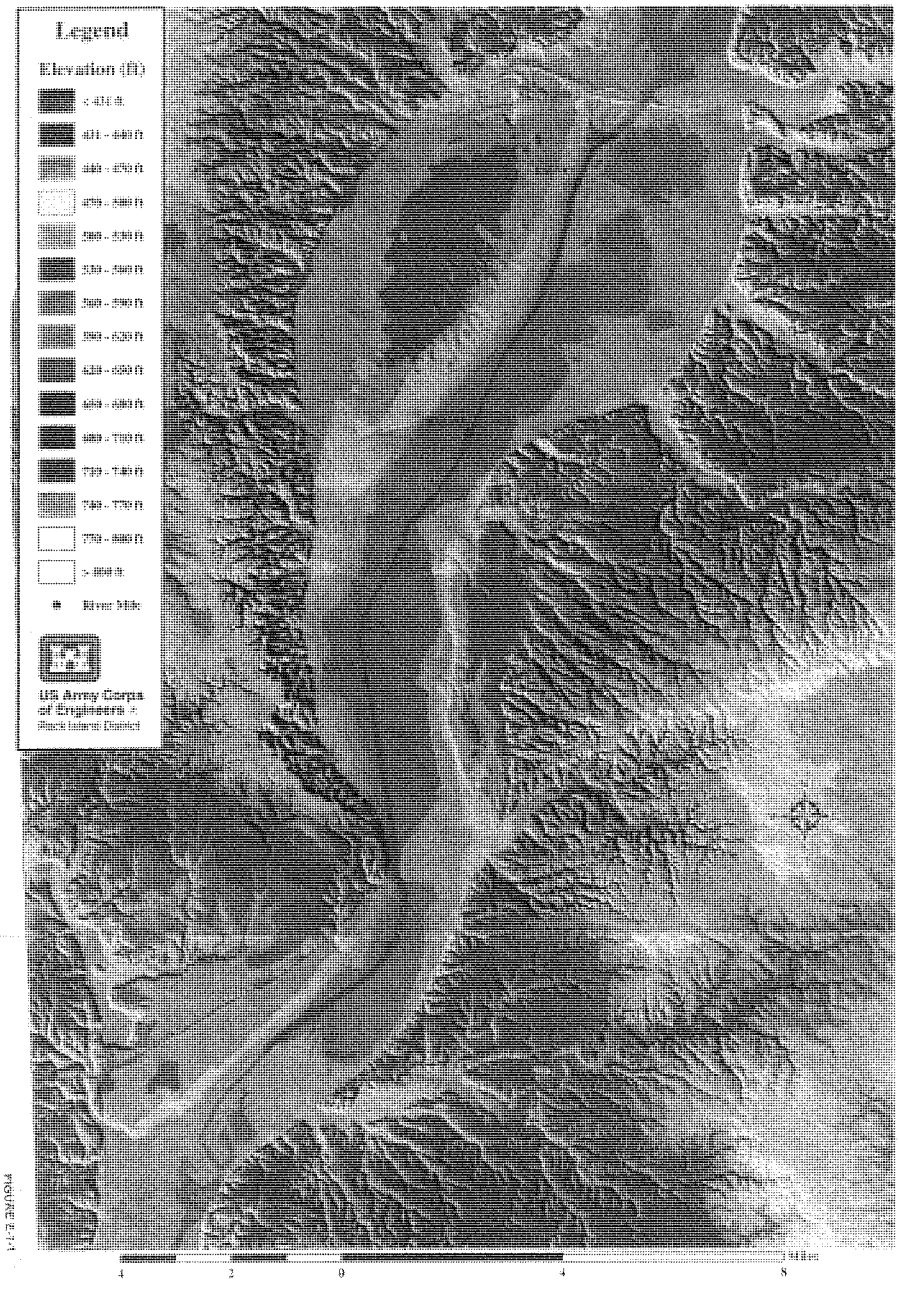
Site A

Year of Coverage	Lattice Extent	Area at Elevation 440 NGVD (acres)	Volumn Below 440 (acre-feet)	Time Period	Sedimentation (acre-ft/year)	Average Deposition (feet/year)	Average Deposition (inches/year)	Time Period	Total Deposition (feet) in Time Period
1903		24.2	119.8						
1930		24.1	142.4	1903:1930	-0.8	-0.0348	-0.4	1903:1930	-0.94
1965		23.8	79.8	1930:1965	1.7	0.0733	0.9	1930:1965	2.57
1976		23.7	50.1	1965:1976	2.7	0.1141	1.4	1965:1976	1.25
1988		24.0	41.1	1976:1988	0.7	0.0315	0.4	1976:1988	0.38
1996		24.0	20.1	1988:1996	2.6	0.1099	1.3	1988:1996	0.88
1999		24.0	26.8	1996:1999	-2.2	-0.0937	-1.1	1996:1999	-0.28

Site B

Year of Coverage	Lattice Extent	Area at Elevation 440 NGVD (acres)	Volumn Below 440 (acre-feet)	Time Period	Sedimentation (acre-ft/year)	Average Deposition (feet/year)	Average Deposition (inches/year)	Time Period	Total Deposition (feet) in Time Period
1903		55.2	388.7						
1930		55.3	804.5	1903:1930	-15.4	-0.2792	-3.4	1903:1930	-7.54
1965		50.9	486.3	1930:1965	8.6	0.1693	2.0	1930:1965	5.92
1976		51.0	283.9	1965:1976	18.4	0.3621	4.3	1965:1976	3.98
1988		50.5	199.8	1976:1988	6.8	0.1362	1.6	1976:1988	1.63
1996		50.5	172.6	1988:1996	3.4	0.0672	0.8	1988:1996	0.54
1999		50.5	148.8	1996:1999	7.9	0.1574	1.9	1996:1999	0.47

Peoria Lake
Bathymetry and Digital Elevation Model



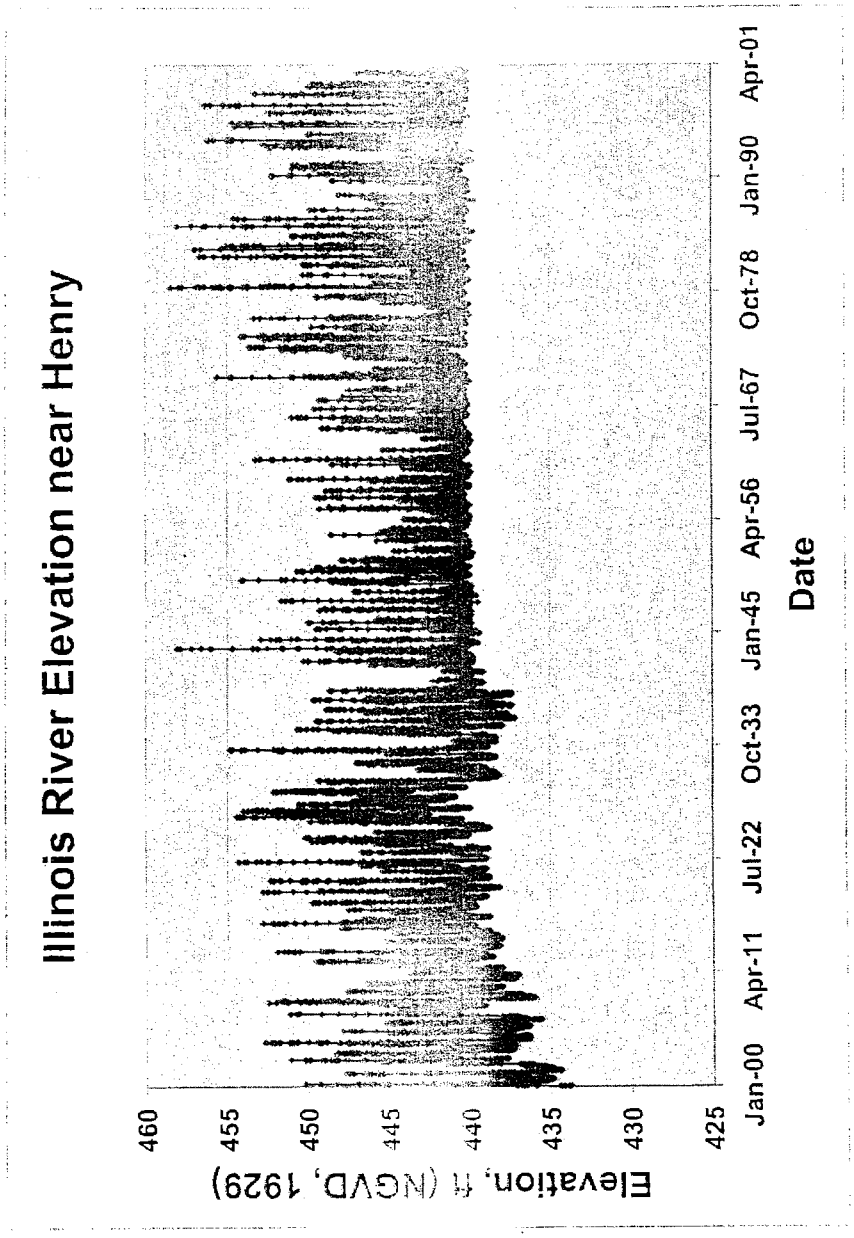

Illinois River Elevation near Henry
Elevation, ft (NGVD, 1929)
460
455
450
445
440
435
430
425
Jan-00
Apr-11
Jul-22
Oct-33
Jan-45
Apr-56
Jul-67
Oct-78
Jan-90
Apr-01
Date

FIGURE E-1-2

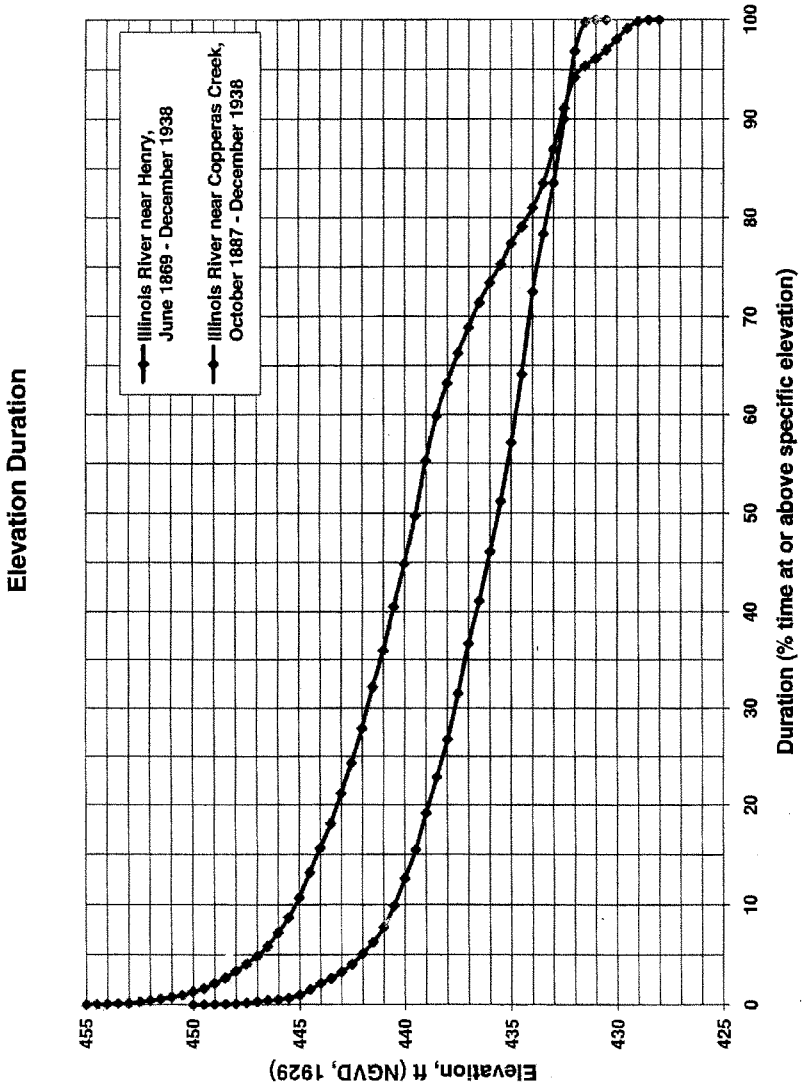

Elevation Duration
Illinois River near Henry, June 1869 - December 1938
Illinois River near Copperas Creek, October 1887 - December 1938
Elevation, ft (NGVD, 1929)
455
450
445
440
435
430
425
Duration (% time at or above specific elevation)
0
10
20
30
40
50
60
70
80
90
100

FIGURE E-1-3

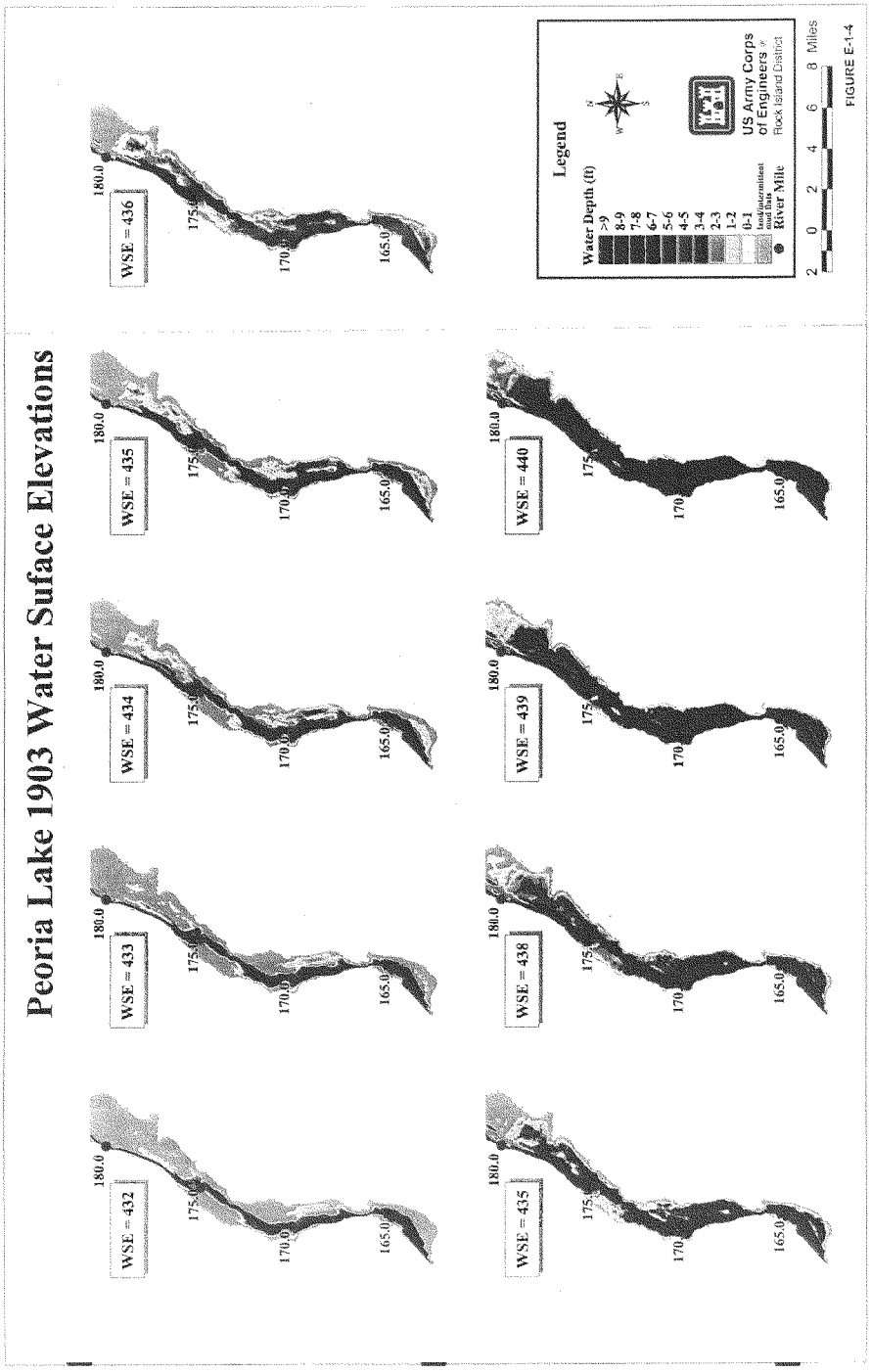

Peoria Lake 1903 Water Suface Elevations
WSE = 432
WSE = 433
WSE = 434
WSE = 435
WSE = 436
WSE = 435
WSE = 438
WSE = 439
WSE = 440
180.0
175.0
170.0
165.0
Legend
Water Depth (ft)
>9
8-9
7-8
6-7
5-6
4-5
3-4
2-3
1-2
0-1
Undifferentiated mud flats
River Mile
US Army Corps of Engineers
Rock Island District
2 0 2 4 6 8 Miles

FIGURE E-1-4

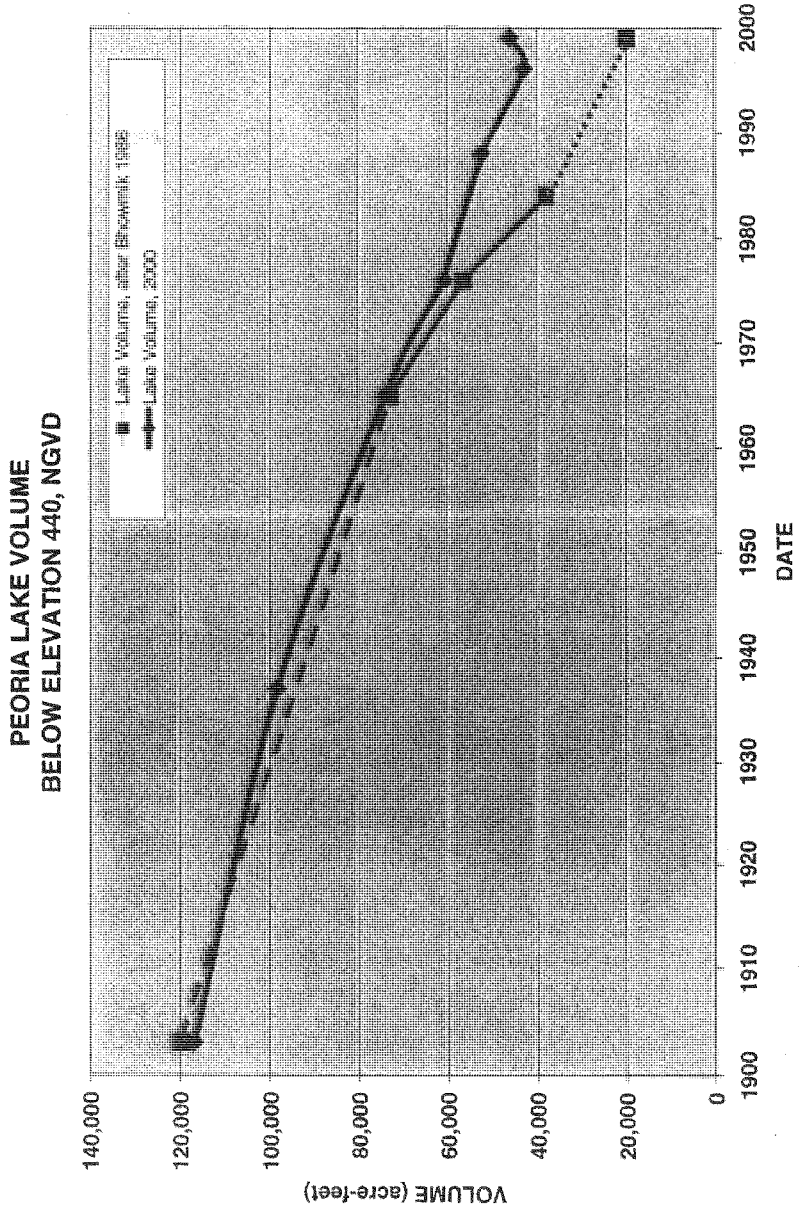

PEORIA LAKE VOLUME
BELOW ELEVATION 440, NGVD
Lake Volume, after Brownlie 1968
Lake Volume, 2000
VOLUME (acre-feet)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
DATE

FIGURE E-1-5

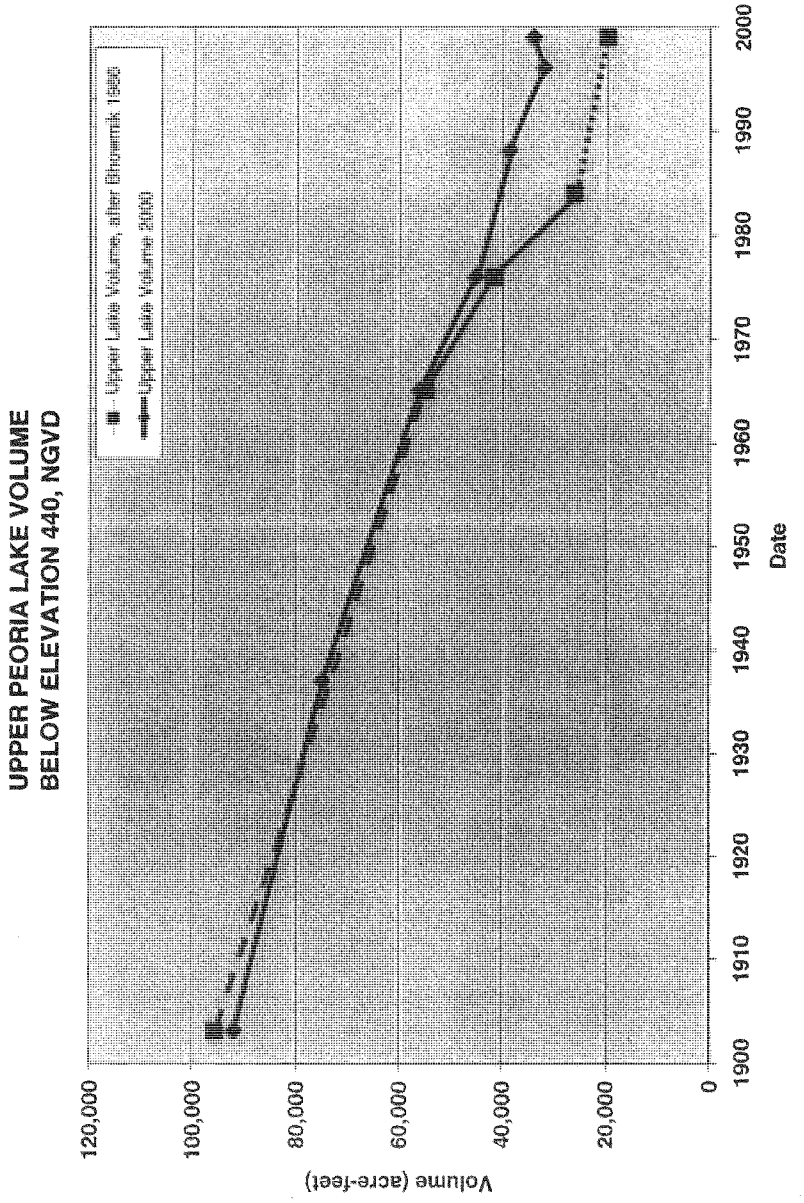

UPPER PEORIA LAKE VOLUME
BELOW ELEVATION 440, NGVD
Upper Lake Volume, after Bhowmik 1980
Upper Lake Volume 2000
Volume (acre-feet)
120,000
100,000
80,000
60,000
40,000
20,000
0
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
Date

FIGURE E-1-6

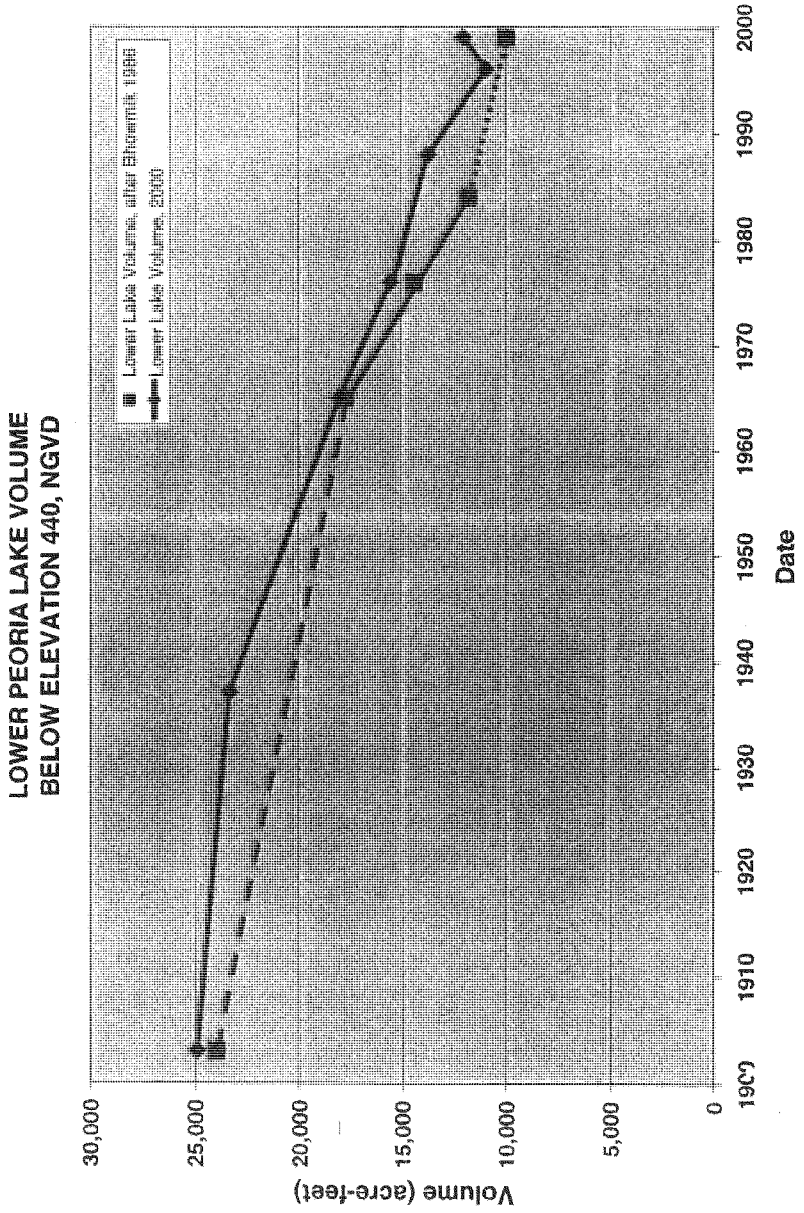

LOWER PEORIA LAKE VOLUME
BELOW ELEVATION 440, NGVD
Lower Lake Volume, after Bhowmik, 1980
Lower Lake Volume, 2000
Volume (acre-feet)
30,000
25,000
20,000
15,000
10,000
5,000
0
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
Date

FIGURE E-1-7

Sedimentation Rate Study Areas A and B

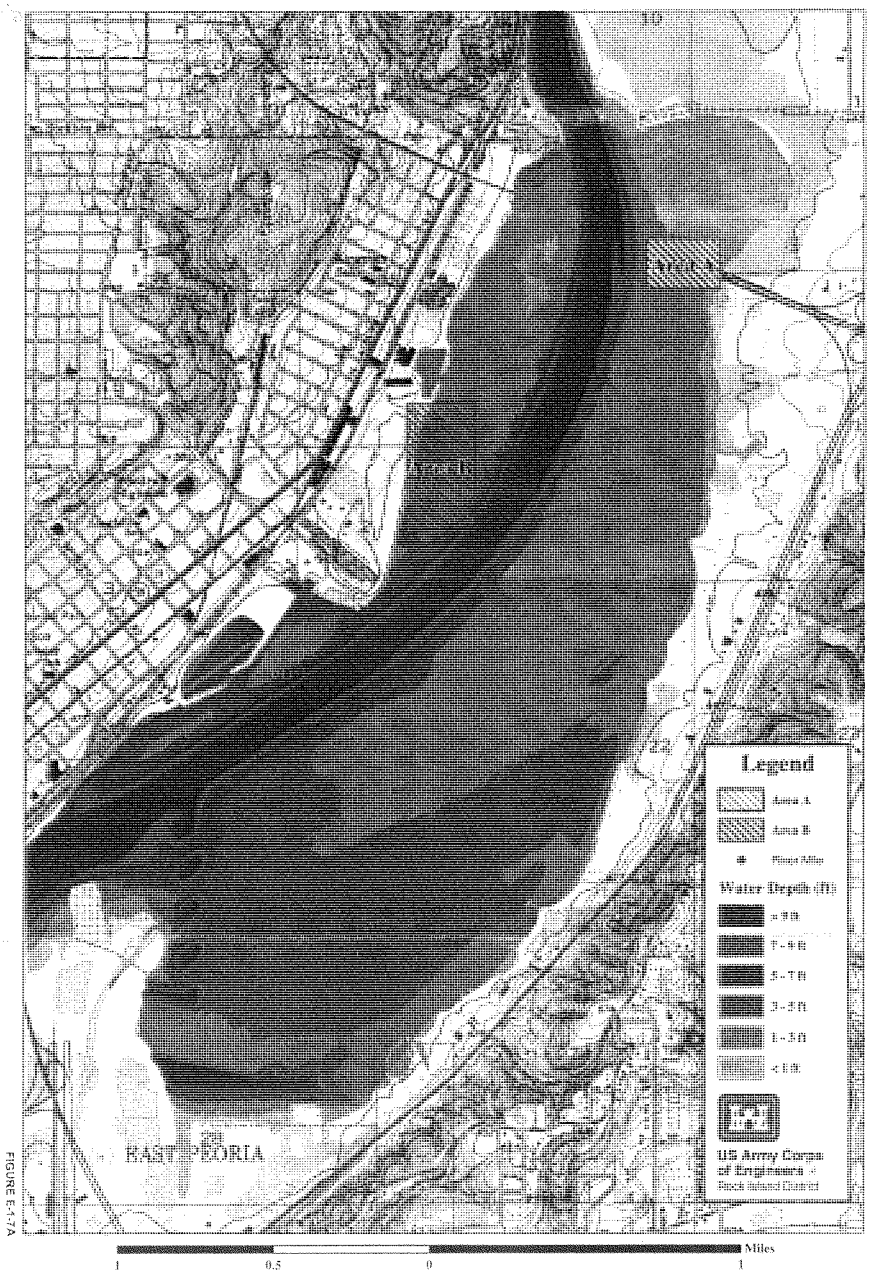
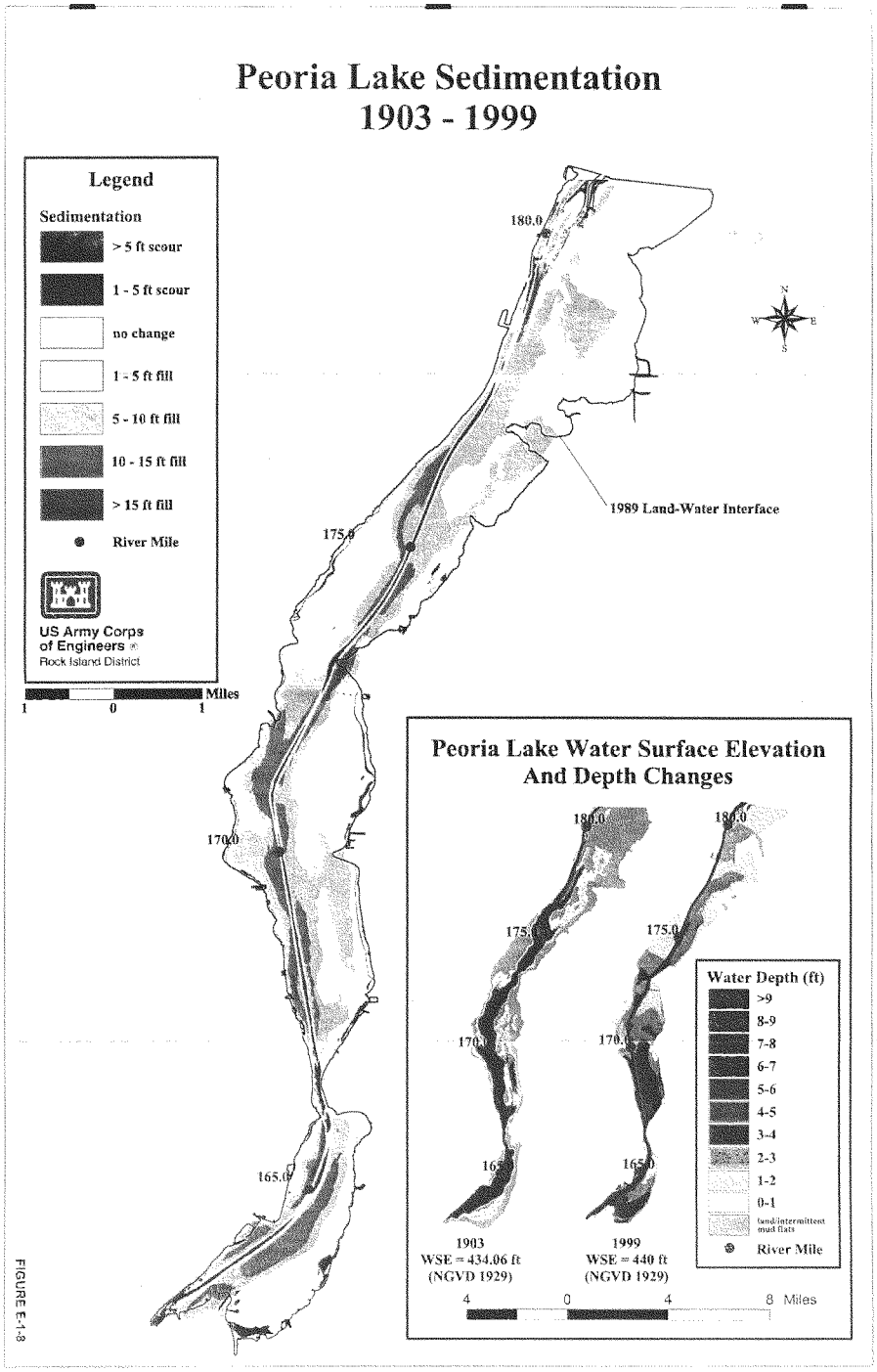


FIGURE E-1-7A


Peoria Lake Sedimentation
1903 - 1999
Legend
Sedimentation
> 5 ft scour
1 - 5 ft scour
no change
1 - 5 ft fill
5 - 10 ft fill
10 - 15 ft fill
> 15 ft fill
River Mile
US Army Corps of Engineers
Rock Island District
Miles
1 0 1
180.0
175.0
170.0
165.0
1989 Land-Water Interface
N
W
E
S
Peoria Lake Water Surface Elevation And Depth Changes
Water Depth (ft)
>9
8-9
7-8
6-7
5-6
4-5
3-4
2-3
1-2
0-1
land/intermittent mud flats
River Mile
1903
WSE = 434.06 ft
(NGVD 1929)
1999
WSE = 440 ft
(NGVD 1929)
4 0 4 8 Miles
FIGURE E-1-8

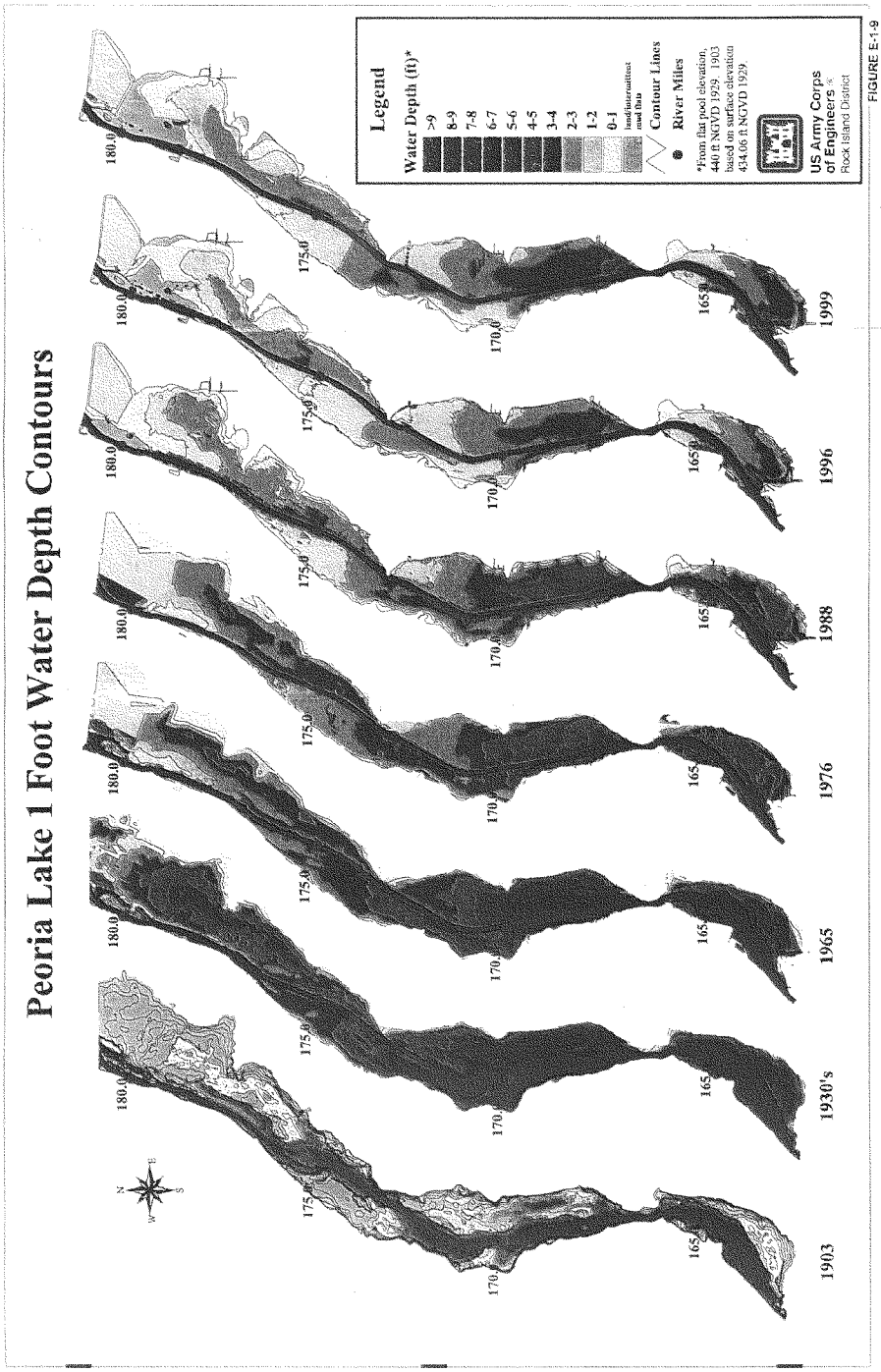
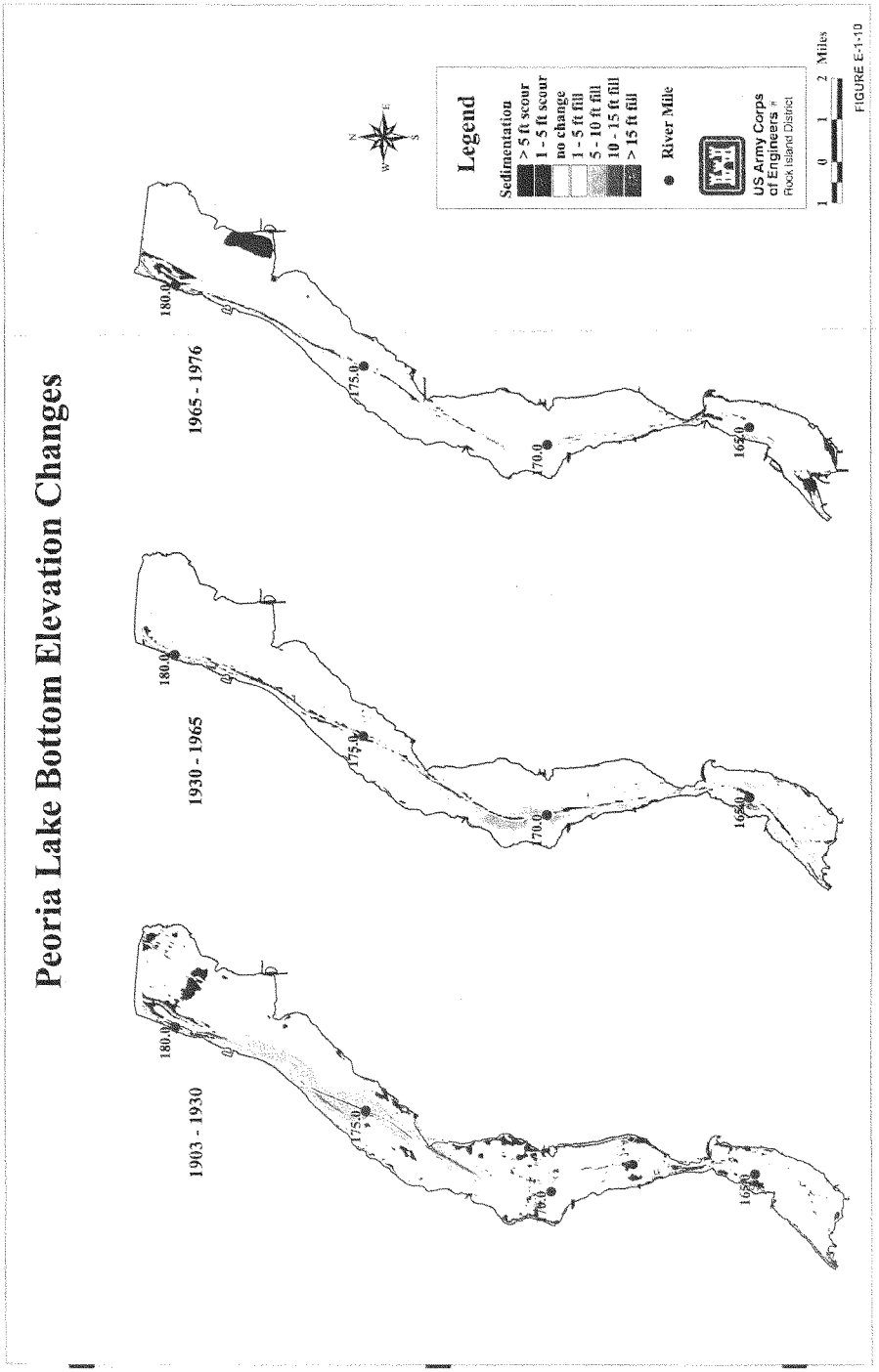

Peoria Lake 1 Foot Water Depth Contours
Legend
Water Depth (ft)*
>9
8-9
7-8
6-7
5-6
4-5
3-4
2-3
1-2
0-1
Contour Lines
River Miles
*From flat pool elevation, 440 ft NGVD 1929. 1903 based on surface elevation 434.06 ft NGVD 1929
US Army Corps of Engineers
Rock Island District
1903
1930's
1965
1976
1988
1996
1999

FIGURE E-1-9


Peoria Lake Bottom Elevation Changes
1903 - 1930
1930 - 1965
1965 - 1976
180.0
175.0
170.0
165.0
Legend
Sedimentation
> 5 ft scour
1 - 5 ft scour
no change
1 - 5 ft fill
5 - 10 ft fill
10 - 15 ft fill
> 15 ft fill
River Mile
US Army Corps of Engineers
Rock Island District
1 0 1 2 Miles
FIGURE E-1-10

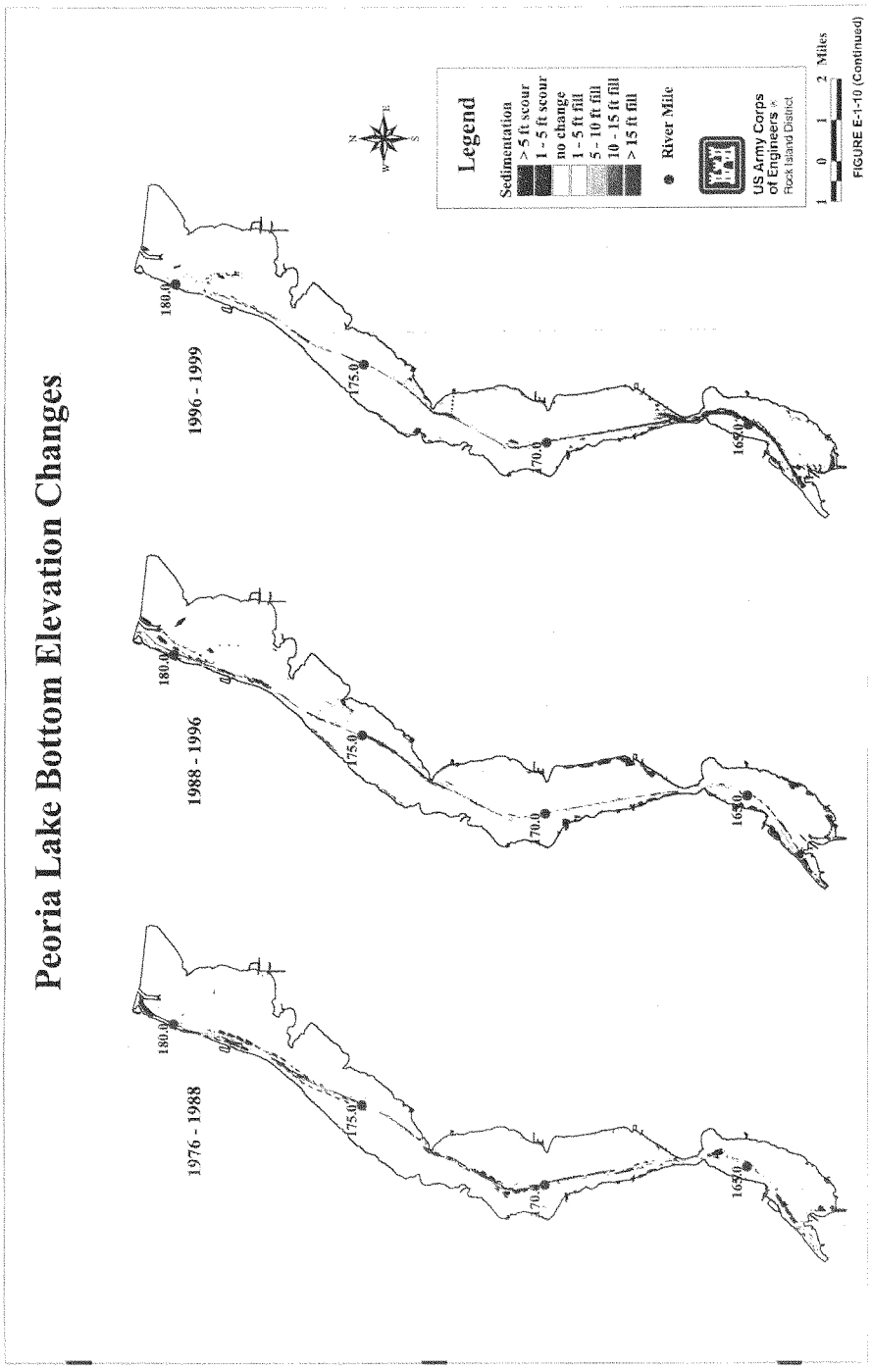
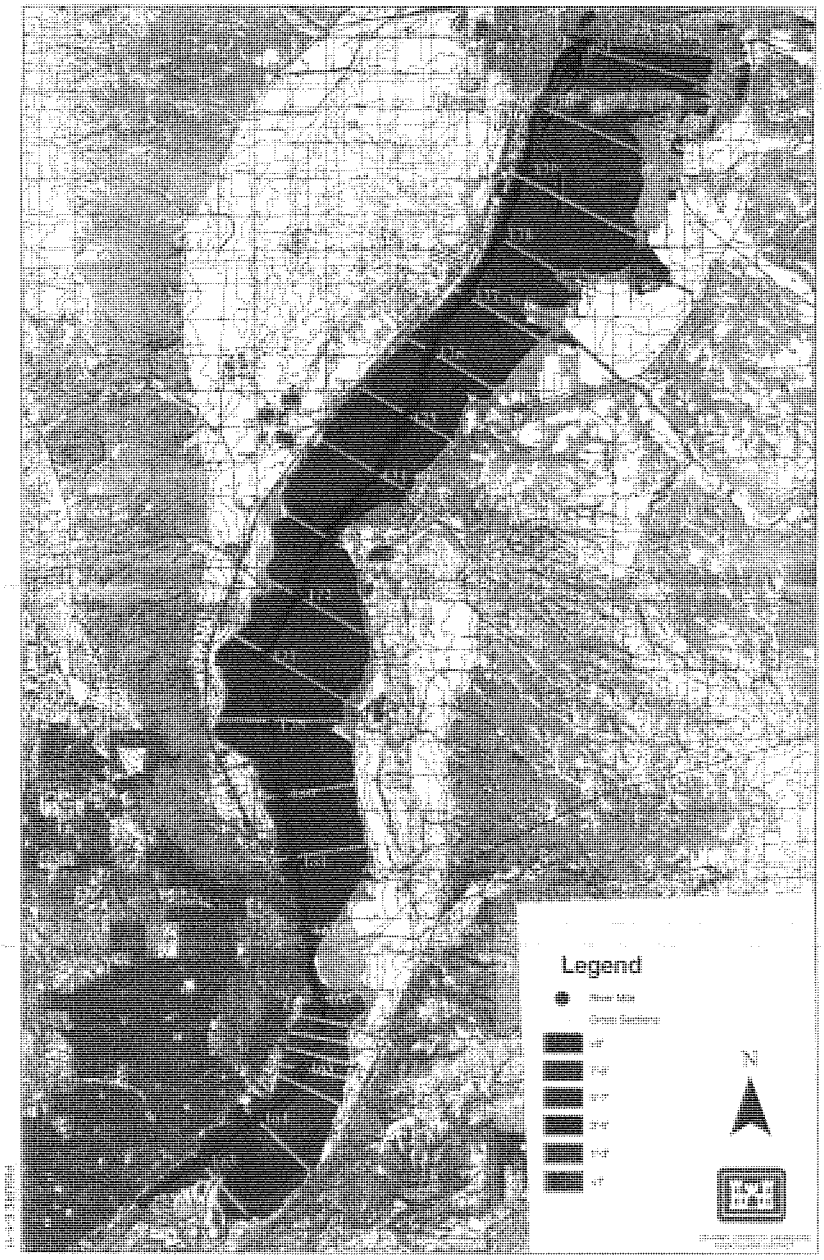


FIGURE E-1-10 (Continued)

Depth Below 440' Flat Pool 1999



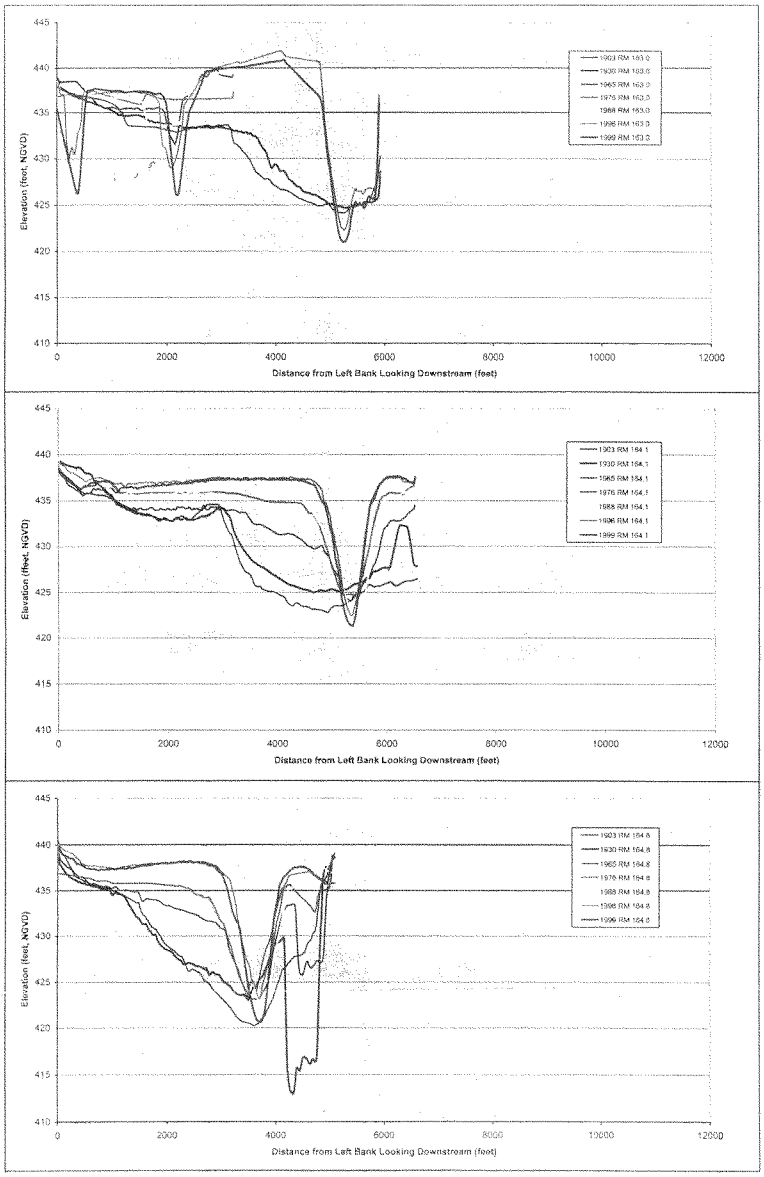

Elevation (feet, NGVD)
445
440
435
430
425
420
415
410
0
2000
4000
6000
8000
10000
12000
Distance from Left Bank Looking Downstream (feet)
1903 RM 163.0
1930 RM 163.0
1965 RM 163.0
1976 RM 163.0
1988 RM 163.0
1996 RM 163.0
1999 RM 163.0
Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1903 RM 164.1
1930 RM 164.1
1965 RM 164.1
1976 RM 164.1
1988 RM 164.1
1996 RM 164.1
1999 RM 164.1
Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1903 RM 164.8
1930 RM 164.8
1965 RM 164.8
1976 RM 164.8
1988 RM 164.8
1996 RM 164.8
1999 RM 164.8

FIGURE E-1-12

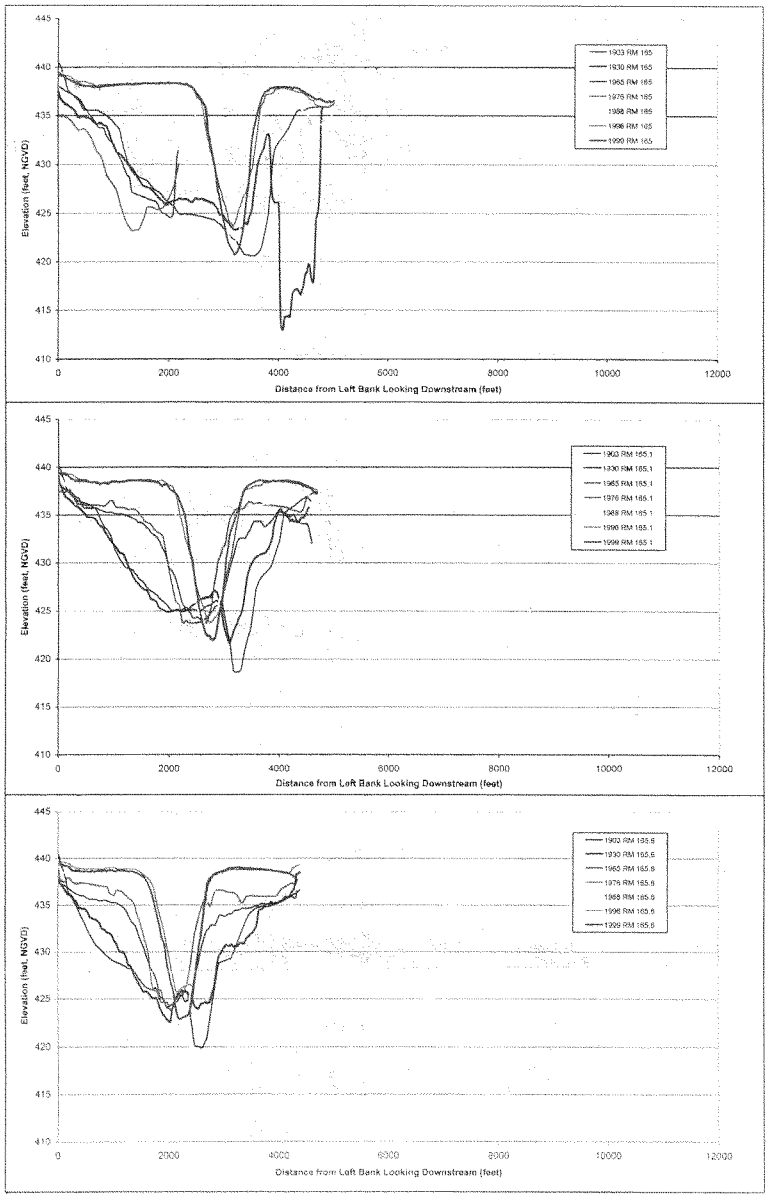

Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1903 RM 165
1930 RM 165
1965 RM 165
1976 RM 165
1988 RM 165
1996 RM 165
1999 RM 165
1903 RM 165.1
1930 RM 165.1
1965 RM 165.1
1976 RM 165.1
1988 RM 165.1
1996 RM 165.1
1999 RM 165.1
1903 RM 165.6
1930 RM 165.6
1965 RM 165.6
1976 RM 165.6
1988 RM 165.6
1996 RM 165.6
1999 RM 165.6

FIGURE E-1-13

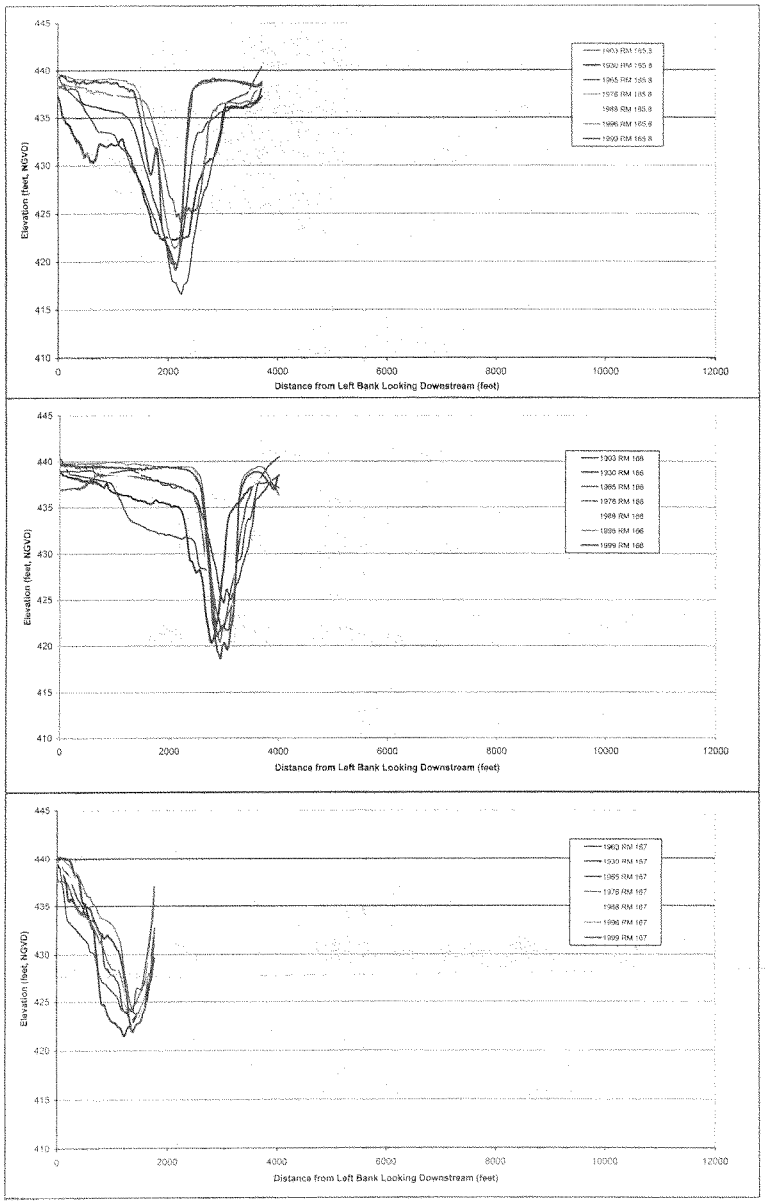

Elevation (feet, NGVD)
445
440
435
430
425
420
415
410
0
2000
4000
6000
8000
10000
12000
Distance from Left Bank Looking Downstream (feet)
1963 RM 165.8
1930 RM 165.8
1965 RM 165.8
1978 RM 165.8
1988 RM 165.8
1996 RM 165.8
1999 RM 165.8
Elevation (feet, NGVD)
445
440
435
430
425
420
415
410
0
2000
4000
6000
8000
10000
12000
Distance from Left Bank Looking Downstream (feet)
1963 RM 166
1930 RM 166
1965 RM 166
1978 RM 166
1988 RM 166
1996 RM 166
1999 RM 166
Elevation (feet, NGVD)
445
440
435
430
425
420
415
410
0
2000
4000
6000
8000
10000
12000
Distance from Left Bank Looking Downstream (feet)
1963 RM 167
1930 RM 167
1965 RM 167
1978 RM 167
1988 RM 167
1996 RM 167
1999 RM 167

FIGURE E-1-14

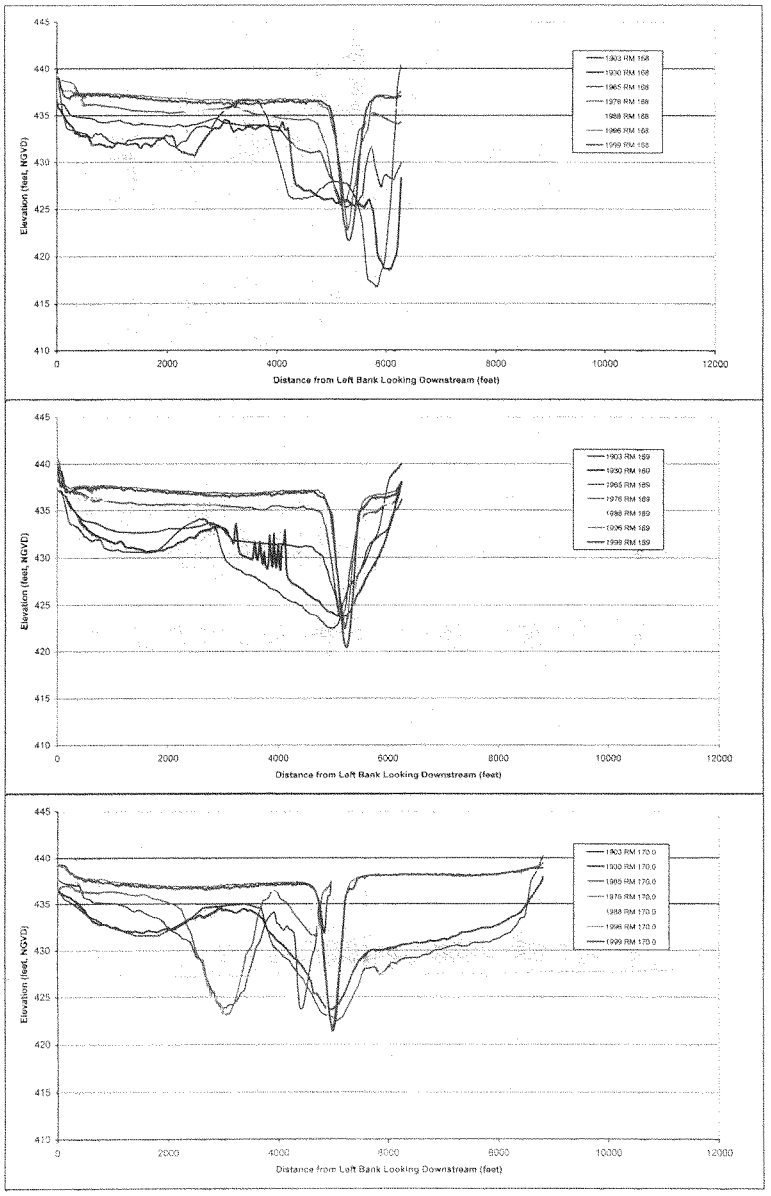

Elevation (feet, NGVD)
445
440
435
430
425
420
415
410
0
2000
4000
6000
8000
10000
12000
Distance from Left Bank Looking Downstream (feet)
1903 RM 168
1930 RM 168
1965 RM 168
1976 RM 168
1988 RM 168
1996 RM 168
1999 RM 168
Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1903 RM 169
1930 RM 169
1965 RM 169
1976 RM 169
1988 RM 169
1996 RM 169
1999 RM 169
Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1903 RM 170.0
1930 RM 170.0
1965 RM 170.0
1976 RM 170.0
1988 RM 170.0
1996 RM 170.0
1999 RM 170.0

FIGURE E-1-15

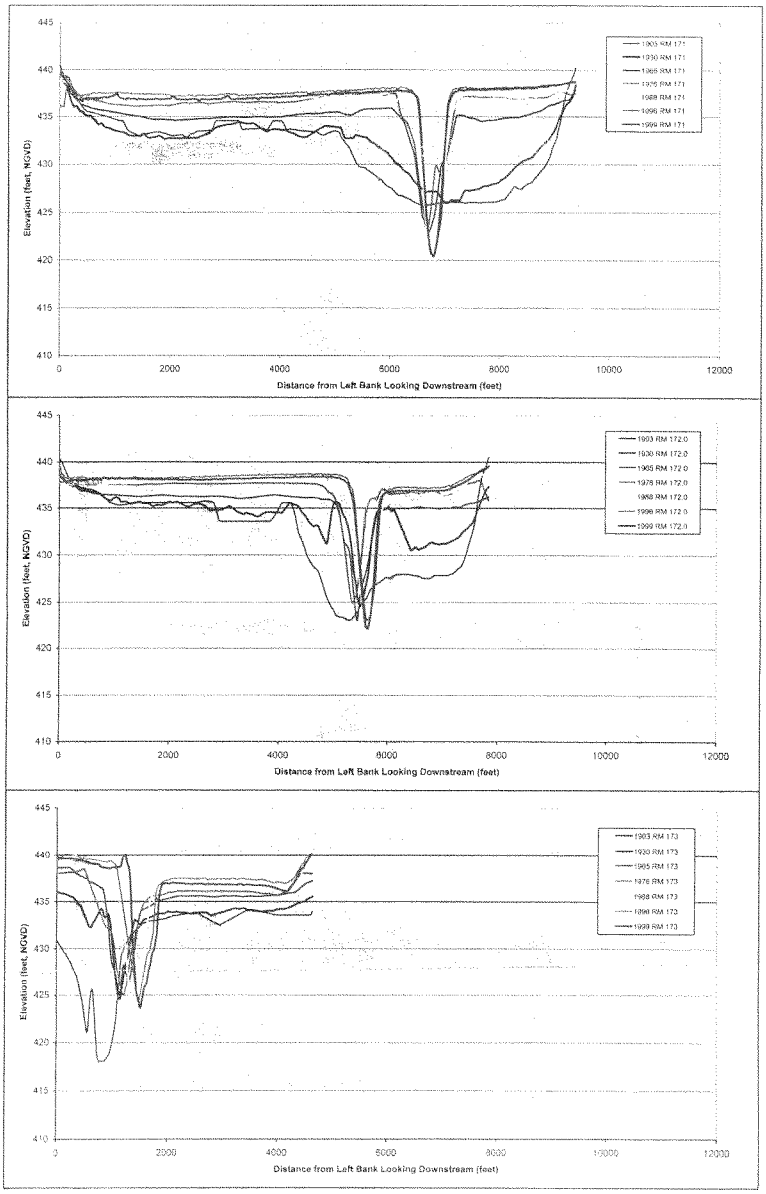

Elevation (feet, NGVD)
445
440
435
430
425
420
415
410
0
2000
4000
6000
8000
10000
12000
Distance from Left Bank Looking Downstream (feet)
1993 RM 171
1930 RM 171
1965 RM 171
1978 RM 171
1988 RM 171
1996 RM 171
1999 RM 171
Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1993 RM 172.0
1930 RM 172.0
1965 RM 172.0
1978 RM 172.0
1988 RM 172.0
1996 RM 172.0
1999 RM 172.0
Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1993 RM 173
1930 RM 173
1965 RM 173
1978 RM 173
1988 RM 173
1996 RM 173
1999 RM 173

FIGURE E-1-16

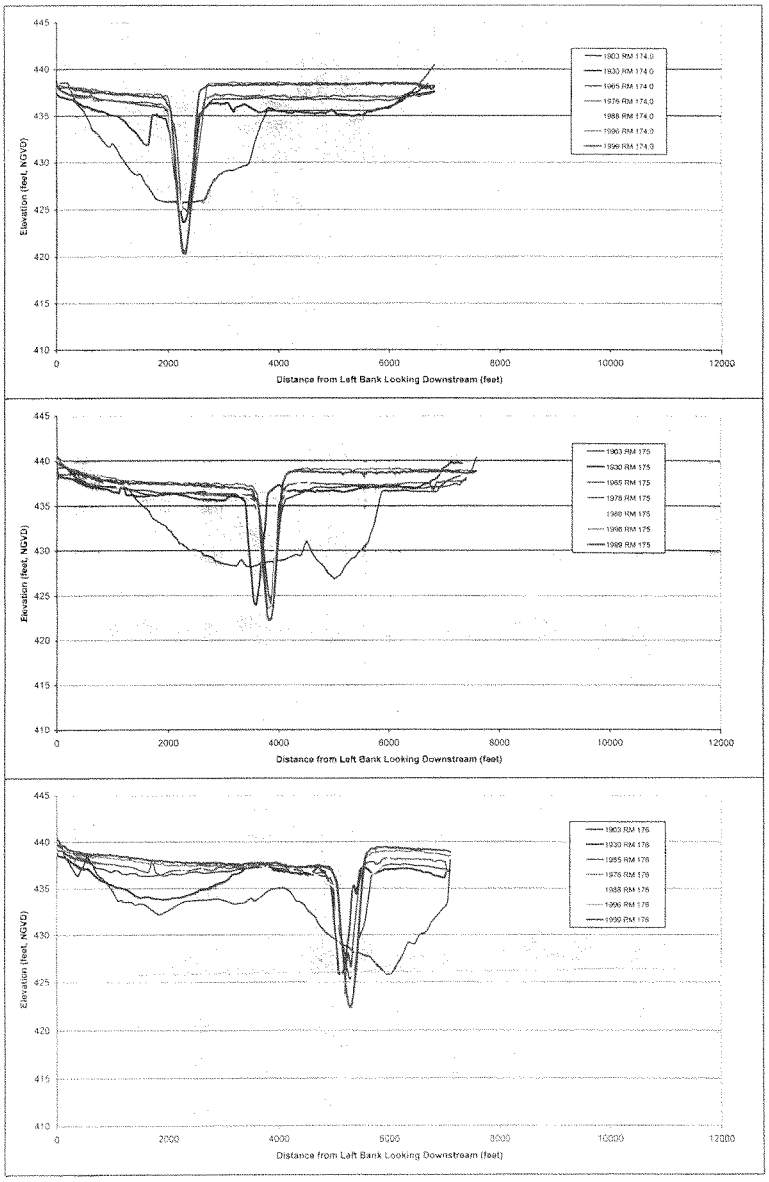

Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1930 RM 174.0
1955 RM 174.0
1975 RM 174.0
1988 RM 174.0
1996 RM 174.0
1999 RM 174.0
1930 RM 175
1955 RM 175
1975 RM 175
1988 RM 175
1996 RM 175
1999 RM 175
1930 RM 176
1955 RM 176
1975 RM 176
1988 RM 176
1996 RM 176
1999 RM 176

FIGURE E-1-17

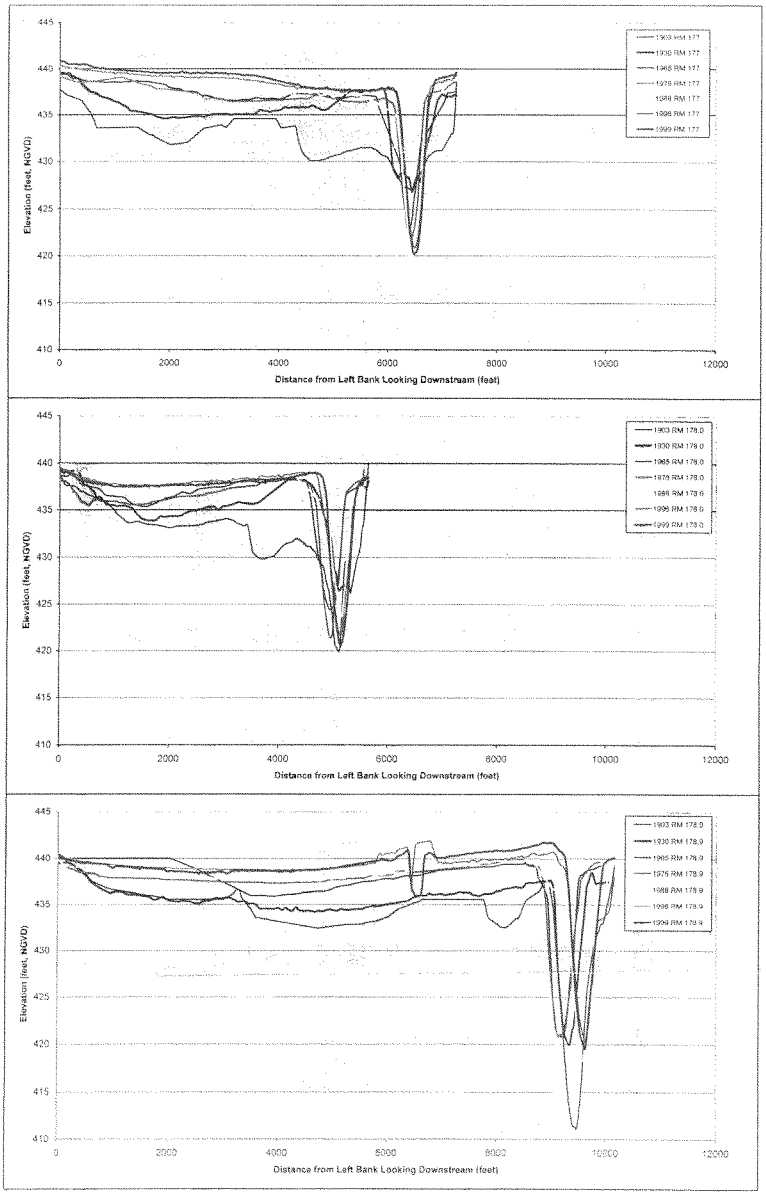

Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1963 RM 177
1930 RM 177
1965 RM 177
1976 RM 177
1988 RM 177
1996 RM 177
1999 RM 177
1963 RM 178.0
1930 RM 178.0
1965 RM 178.0
1976 RM 178.0
1988 RM 178.0
1996 RM 178.0
1999 RM 178.0
1963 RM 178.9
1930 RM 178.9
1965 RM 178.9
1976 RM 178.9
1988 RM 178.9
1996 RM 178.9
1999 RM 178.9

FIGURE E-1-18

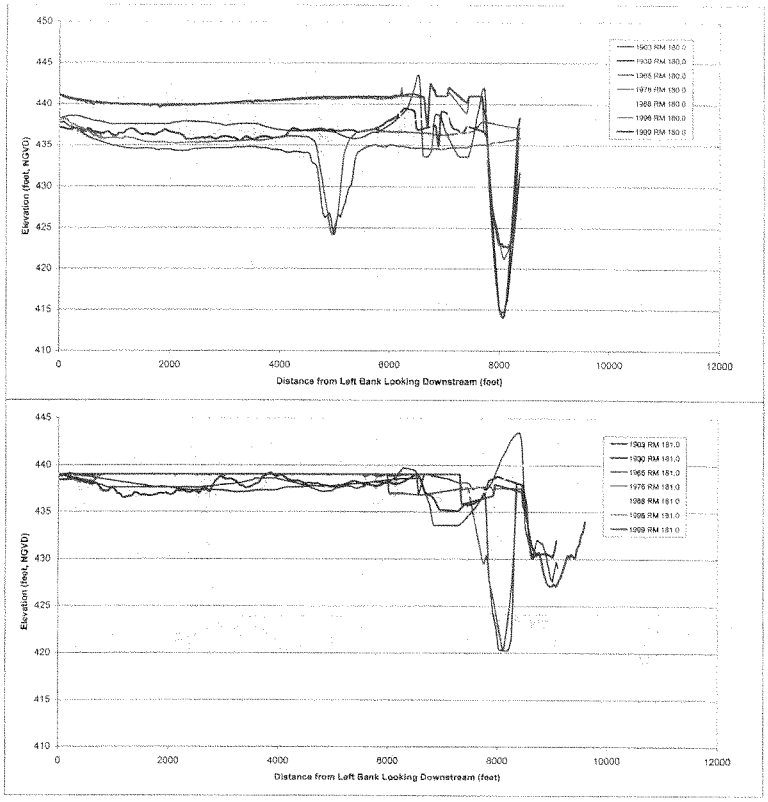

Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1903 RM 180.0
1930 RM 180.0
1965 RM 180.0
1978 RM 180.0
1988 RM 180.0
1996 RM 180.0
1999 RM 180.0
Elevation (feet, NGVD)
Distance from Left Bank Looking Downstream (feet)
1903 RM 181.0
1930 RM 181.0
1965 RM 181.0
1978 RM 181.0
1988 RM 181.0
1996 RM 181.0
1999 RM 181.0

FIGURE E-1-19

APPENDIX E-2

HISTORICAL SEDIMENTATION AT THE MOUTHS OF FIVE DELTAS ON PEORIA LAKE

Contract Report 2001-08

Historical Sedimentation at the Mouths of Five Deltas on Peoria Lake

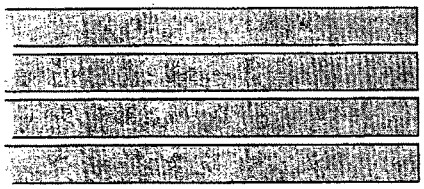
by

Nani G. Bhowmik, Erin Bauer,
William C. Bogner, and Mike Demissie

Principal Investigator
Nani G. Bhowmik

Prepared for the
Illinois Department of Natural Resources

June 2001



Illinois State Water Survey
Watershed Science Section
Champaign, Illinois

A Division of the Illinois Department of Natural Resources

Historical Sedimentation at the Mouths of Five Deltas on Peoria Lake

Contract Report
Prepared by:
Illinois State Water Survey
Watershed Science Section
2204 Griffith Drive
Champaign, Illinois

Principal Investigator
Nani G. Bhowmik

Contributors: Nani G. Bhowmik, Erin Bauer, William C. Bogner, and Misganaw Demissie

Report Prepared for the:
Illinois Department of Natural Resources

June 2001

48818

Historical Sedimentation at the Mouths of Five Deltas on Peoria Lake

By
Nani G. Bhowmik, Erin Bauer, William C. Bogner, and Misganaw Demissie
Watershed Science Section
Illinois State Water Survey

Abstract

This report summarizes the results of surveying conducted at the mouths of five deltas on Peoria Lake in 1999. The five deltas are at the mouths of Richland Creek, Partridge Creek, Blue Creek, Dickison Run, and Farm Creek. All surveying was done to include the planform of the deltas that existed in 1999. The 1999 planform of four of the five deltas except Dickison Run is different than the locations in 1902-1904. In order to estimate the volumes of deposited sediment between 1902-1904 and 1999, a grid was developed encompassing the aerial extent of the 1999 delta. Subsequently, computations determined the net volumetric accumulation of sediment within each grid for each delta: 2,683 acre-feet (Partridge Creek), 1,495 acre-feet (Blue Creek), 1,428 acre-feet (Richland Creek), 1,252 acre-feet (Farm Creek), and 338 acre-feet (Dickison Run). Relative values of the sediment accumulation could be quite misleading since most of these creeks have been altered over the last 100 years, the 1999 outlets are not at the same locations as those that existed in 1902-1904, and a significant amount of sand-and-gravel mining took place at several locations such as at Farm Creek. Still these values provide a significant contribution toward the understanding of the relative magnitudes of sediments being deposited at the mouths of these five deltas.

Keywords: *Peoria Lake, Illinois River, delta, sediment deposition, tributary, sediment*

List of Figures

Page

Figure 1. Drainage basin of the Illinois River above Peoria Lock and Dam at RM 157.8 and the profile of the Illinois River Waterway 2

Figure 2. Aerial photographs of Peoria Lake taken in 1985 3

Figure 3. Major tributaries of Peoria Lake 4

Figure 4. Drainage basin of the five tributaries with the 1999 surveyed delta areas 7

Figure 5. 1996 cross sections along the spine of each delta and the extent of the 1999 survey grid area for each delta 14

Figure 6. 1904 contour map of Richland Creek delta area 16

Figure 7. 1999 survey data, route, and grid extent for Richland Creek delta 17

Figure 8. 1999 contour map of Richland Creek delta within grid area 18

Figure 9. 1904 contour map of Partridge Creek delta area 19

Figure 10. 1999 survey data, route, and grid extent for Partridge Creek delta 21

Figure 11. 1999 contour map of Partridge Creek delta within grid area 22

Figure 12. 1904 contour map of Blue Creek delta area 23

Figure 13. 1999 survey data, route, and grid extent for Blue Creek delta 24

Figure 14. 1999 contour map of Blue Creek delta within grid area 25

Figure 15. 1904 contour map of Dickison Run delta area 26

Figure 16. 1999 survey data, route, and grid extent for Dickison Run delta 28

Figure 17. 1999 contour map of Dickison Run delta within grid area 29

Figure 18a. 1904 contour map of Farm Creek delta area, including the surveyed area of the 1999 Farm Creek delta 30

Figure 18b. 1904 contour map of the location of the 1999 Farm Creek delta area 31

List of Figures (concluded)

Page

Figure 19. 1999 survey data, route, and grid extent for Farm Creek delta 32

Figure 20. 1999 contour map of Farm Creek delta within grid area 33

Figure 21. Lateral cross section at 1999 spine of Blue Creek delta 36

Figure 22. Elevation versus surface area and elevation versus volume relationships for a) Richland Creek delta, b) Partridge Creek delta, c) Blue Creek delta, d) Dickison Run delta, and e) Farm Creek delta 37

List of Tables

Page

Table 1. Tributary Streams of Peoria Lake with Respective Drainage Areas 5

Table 2. Water-Level Elevation (feet) of Peoria Lake during 1999 Delta Surveying, Elevations in NGVD 12

Table 3. Summary of Grid Area Information 20

Table 4. Net Sediment Accumulation at the 1999 Delta Mouths within the Grid Area 34

Table 5. Sediment Accumulation Rates within the Grid Area, 1904-1999 35

Table 6. Peoria Lake Sediment Analyses: Spindler Marina Dredging Project 40

Introduction and Background

Peoria Lake, located between River Mile (RM) 160 and RM 180 on the Illinois River, is the largest bottomland lake along the Illinois River. Figure 1 shows the drainage basin of the Illinois River at Peoria Lock and Dam. The total drainage area at the lock and dam is approximately 14,165 square miles. Figure 1 also shows the profile of the Illinois River, including the location of locks and dams. Over the years, Peoria Lake has experienced a significant amount of sediment deposition (Demissie and Bhowmik, 1986). Demissie and Bhowmik (1986) showed that Peoria Lake has the highest sedimentation rate of all lakes in Illinois, and that it had lost 68 percent of its 1904 capacity by 1985. One of the many causative factors in the high sedimentation rate of this lake is the sudden change in the gradient of the Illinois River at the upper end of the lake (Figure 2). The gradient changes from 1.14-2.00 feet per mile above Peoria Lake to 0.12-0.20 feet per mile near the lake, which accelerates sediment deposition within the lake. Moreover, the Illinois River below DePue (Figure 1) is the remnant channel of the old Mississippi River. The high flow of the old Mississippi River created the broad Illinois River channel and valley below DePue. The present flow of the river is much less than that of the old Mississippi River. Thus, the channel is aggrading naturally and attempting to establish a new dynamic equilibrium under the present flow and sediment regime.

Hydrographic mapping in 1996 by the Rock Island District of the U.S. Army Corps of Engineers has shown that the capacity loss of Peoria Lake at that time could be as much as 80 percent or more. Bhowmik et al. (1993) showed that during a drought Water Year, such as in 1989, about 75 percent of the sediment input to Peoria Lake is contributed by the main stem of the Illinois River and another 25 percent is contributed by all the tributaries. In an average Water Year, such as 1990, the main stem of the Illinois River contributed only about 50 percent of the total sediment load; the remaining 50 percent came from the local tributaries. This becomes very important when one considers the fact that the drainage area of the local tributaries comprises only about 4 percent of the total drainage area, yet 50 percent of the total sediment is contributed by these tributaries in an average year. For the drought Water Year 1989, Bhowmik et al. (1993) estimated that about 65 percent of the total sediment loads contributed by local tributaries came from the bed load.

Aerial photographs of Peoria Lake taken in 1988 show that almost all the deltas have grown over the last 60 years (see Appendix). Field inspection also has shown that the main bed materials of most deltas are sand and gravel. It is clear that the local tributaries have contributed a significant amount of coarse-grained materials to Peoria Lake, which has increased the sediment deposition rates in the nearshore areas of the lake. There are at least ten major tributaries to Peoria Lake. Figure 2 shows aerial photographs of Peoria Lake with deltas created by some of the lake's tributaries. Figure 3 shows the major tributaries of Peoria Lake. The drainage areas of these tributaries vary from about 2.8 square miles to about 130 square miles with about 57.8 square miles contributed by the unnamed minor tributaries. Table 1 gives drainage areas of the major tributaries (Bhowmik et al., 1993).

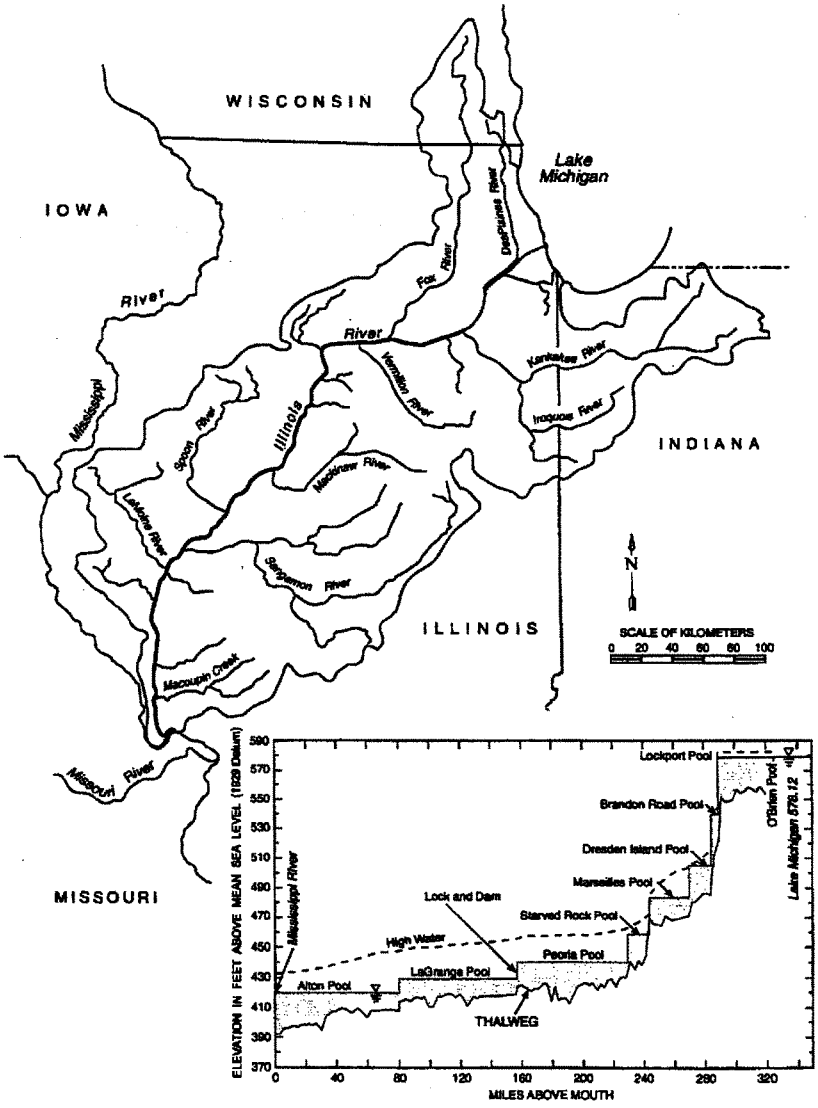


Figure 1. Drainage basin of the Illinois River above Peoria Lock and Dam at RM 157.8, and the profile of the Illinois River Waterway

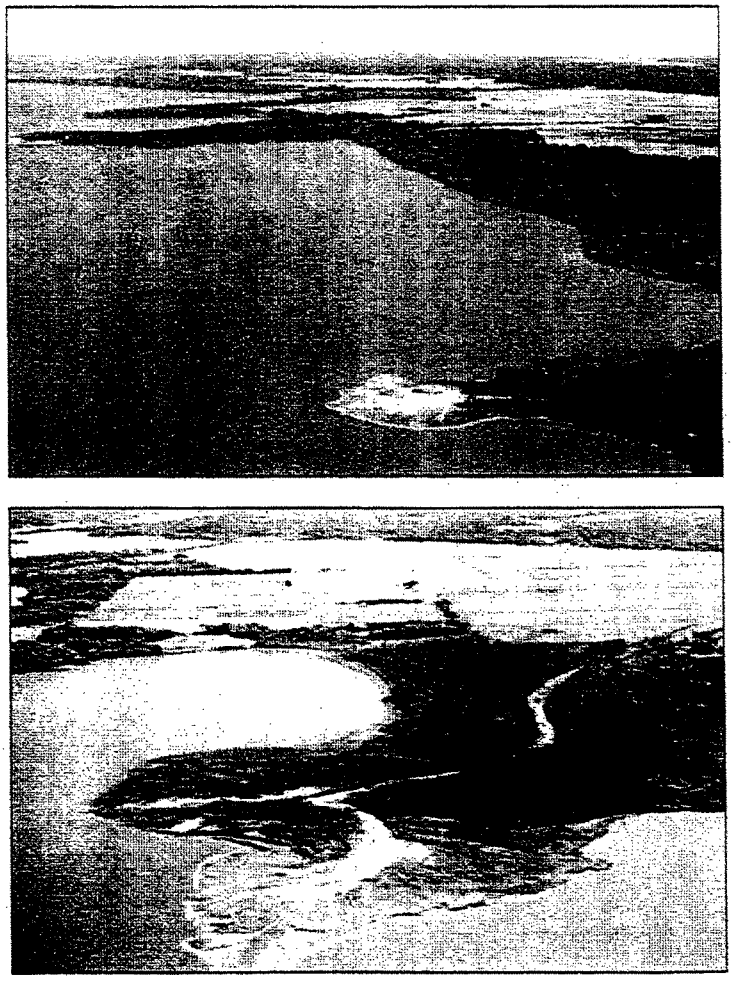


Figure 2. Aerial photographs of Peoria Lake taken in 1985

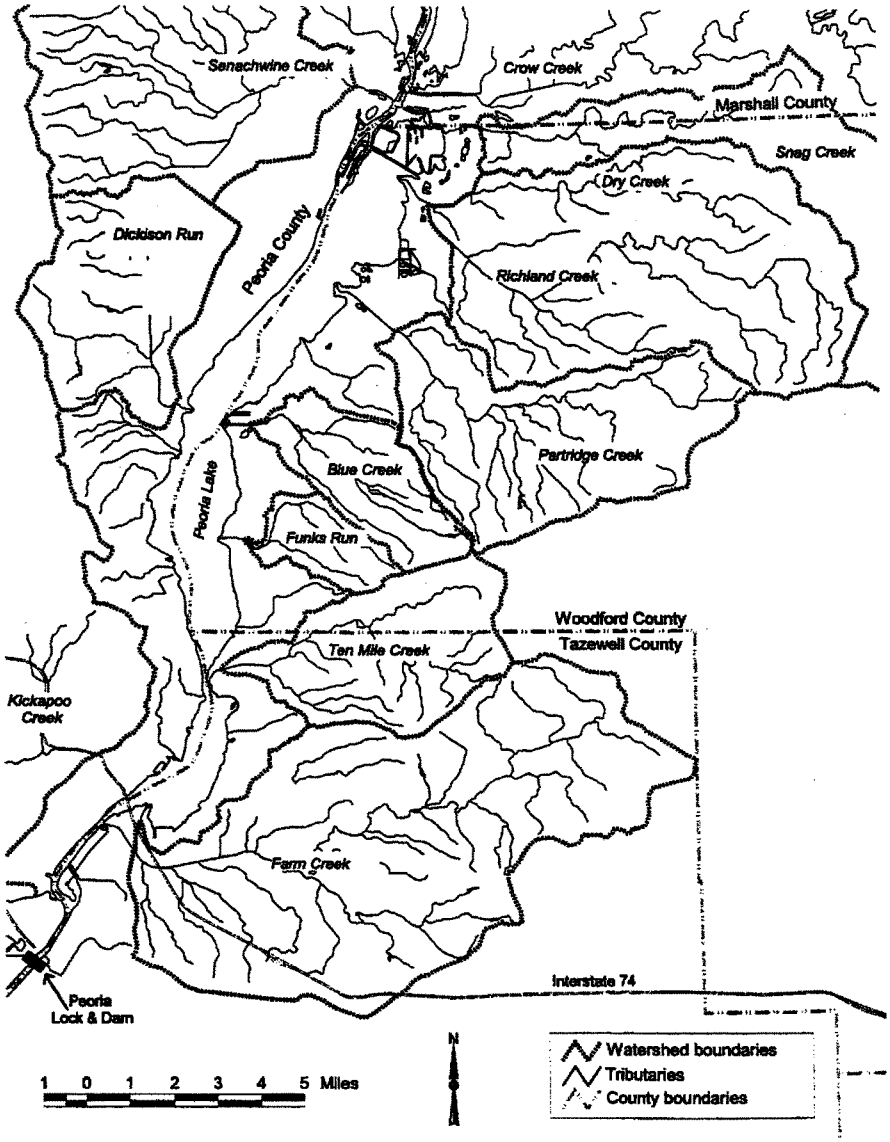


Figure 3. Major tributaries of Peoria Lake

Table 1. Tributary Streams of Peoria Lake with Respective Drainage Areas

Stream	*Drainage Area (square mile)*
Crow Creek	130.0
Dry and Richland Creek	47.0
Partridge Creek	28.0
Blue Creek	10.5
Funk's Run	5.4
Tenmile Creek	17.6
Senachwine Creek	85.0
Dickison Run	7.9
Farm Creek	60.0
Blalock Creek	2.8
Unnamed tributaries	57.8
Total drainage area	452.0

Acknowledgments

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Objectives

The results presented in this report are a component of a project on Peoria Lake being conducted for the Illinois Department of Natural Resources. The objectives of this component of the project are:

a. Survey and map the aerial extent of five deltas as of 1999.
b. Compute the amount of sediment deposited from 1904 through 1999 within the aerial extent of the 1999 planform shape.

Site Selection

After a review of available aerial photographs, five deltas were selected for their large size and evident sediment contribution to Peoria Lake: Richland Creek, Partridge Creek, Blue Creek, and Farm Creek on the east-side of the lake, and Dickison Run on the west side of the lake. Each delta was surveyed to develop the necessary contour maps of the deltas. Figure 4 shows these tributaries and the aerial extent of the surveyed area.

Limitations

Before discussing the 1999 survey and its comparison with the 1902-1904 Woermann maps, some limitations of these analyses must be stated. Most of the tributary mouths within Peoria Lake have been altered over the last 100 years. It would be nice if the areal extent of the 1999 deltas were at the same locations as those that existed in 1902-1904. However, some of the tributary mouths were channelized, diverted, and/or altered, making it difficult to compare the differences in sediment accumulations between 1902-1904 and 1999 at the delta mouths that exist today. Moreover, at many locations, significant quantities of sediment were mined, and there is no record of the volumes of these mined areas. Thus a decision was made to concentrate within the areal extent of the 1999 delta and conduct the survey within this area. Also in order to avoid including a very large area, a grid area was developed for each delta that encompassed the 1999 planform of the deltas. Subsequent analyses included in this report will show the volumes of the sediment deposited within each grid area from 1902-1904 to 1999 even though some of the tributaries discharged sediment and water at different locations than those existing today. This was the best alternative that could be adopted because the tributaries have been altered significantly. These concepts will further be discussed in subsequent sections.

Historical Analysis

Over the last 96 years, the tributary and main channel interfaces within Peoria Lake have changed dramatically. A previous report on the sediment inputs to Peoria Lake from local tributaries summarized some of the historical changes observed at the selected deltas (Bhowmik et al., 1993). Some of this text will be repeated in this report. Aerial photographs referenced in this report were taken at different times of the year, and the exact date and/or river stage at the time each photograph was taken were not always available. Still these photographs provide information for qualitative assessments of the aerial extent and variability of the delta forms. This is what has been done for this report. The aerial photographs discussed are given in the Appendix. The maps and photographic sources are:

- The Woermann maps of the Illinois Waterway from Grafton to Lockport prepared from a 1902-1904 survey conducted under direction of the U.S. Army Corps of Engineers or USACOE (Woermann, 1902-1904).

- Aerial photography flown under the direction of the U.S. Department of Agriculture-American Soil Conservation Service for the years 1939, 1951, 1957, 1963, and 1969. These photographs are available at the University of Illinois Geography Library.

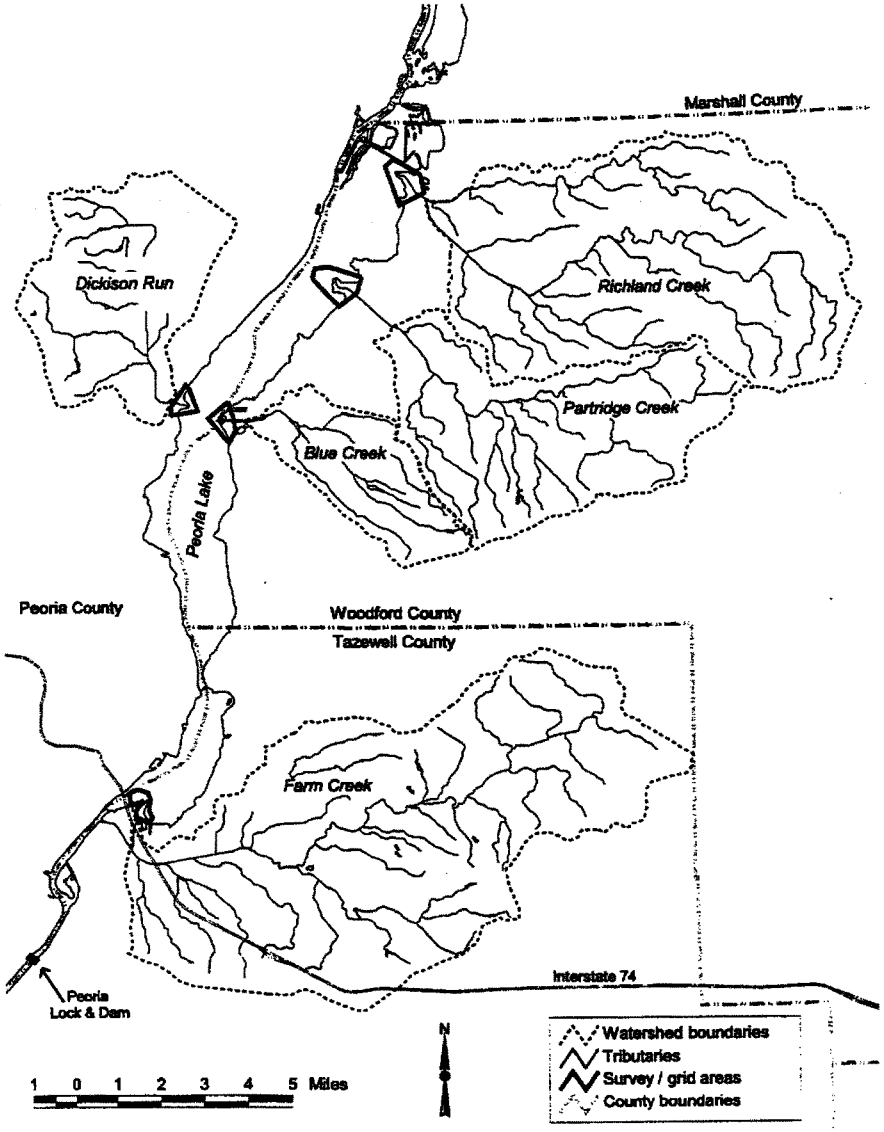


Figure 4. Drainage basin of the five tributaries with the 1999 surveyed delta areas

- Aerial photography flown under the direction of the Soil Conservation Service, 1974.
- Aerial photography flown under the direction of the Illinois Department of Transportation (IDOT) for 1988.
- Color infrared aerial photography from 1994 flown under the direction of the United States Geological Survey (USGS) managed by the Upper Mississippi River Environmental Management Technical Center (UMRE-EMTC), Onalaska, Wisconsin. These maps are available on the Web page of the UMRE-EMTC (http://www.umesc.usgs.gov/geographic_search/river_selection/illinois/peoria/peo_air_photos.html).

During the late 1900s, the natural stream channels of these deltas changed courses periodically, which formed braided channels on the delta and distributed sediment in a broad, fan-shape at the outlet of the channel (see Appendix).

> "Where these deltas form in back areas of Peoria Lake, they develop in textbook fashion, with the stream channel swinging from side to side to form a braided channel planform. Where the stream mouth flows into the main Illinois River channel, the river washes out the delta ... thus limiting the rate of apparent growth" (Bhowmik et al., 1993, p. 35).

The stream channel and outlet locations of four of the five deltas have changed dramatically since 1904, and they were not within the grid area defined by the horizontal extent of the 1999 delta. Construction projects were implemented in the 1930s and 1940s to permanently direct and channelize Richland Creek, Partridge Creek, Blue Creek, and Farm Creek (Bhowmik et al., 1993) directly toward the river. New, substantial-sized, elongated delta forms were later observed along the Peoria Lake shoreline. A brief review of the channelization, development, and recent growth of these tributaries will be discussed for each of the five deltas.

Richland Creek

The Richland Creek channel and outlet have changed dramatically since the early 1900s. Richland Creek and Dry Creek....

> "....were originally separate with end points approximately one mile apart. The 1902-1904 Woermann survey indicated no distinct outlet for either creek. The 1937 quad shows Dry Creek diverted south to an outlet into the lake, but Richland Creek still shows no outlet" (Bhowmik et al., 1993, p. 37).

This is clearly indicated in the 1939 photograph of Richland Creek (R1 in Appendix).

> "Channel change permits for Richland Creek were issued by IDOT in 1942-1943, and the 1951 photos show the two creeks channelized, with a combined channel flowing into their current outlet [R2 in Appendix]. Delta growth was apparent in 1951,

and a developed delta with vegetation and a braided outlet appears in the 1957 photograph [R2-R3 in Appendix]. In 1963, the delta had a defined channel and a large wooded area [R4 in Appendix]. Growth rates seemed to slow from 1963 to 1969, and the delta was fairly stable from 1969 to 1985 [R4-R7 in Appendix, the 1985 photograph was not available].

"The delta developed in very shallow water depths, and its growth may have been halted by a combination of increased above-water-level deposition and a change in water depth in the active growth area of the delta" (Bhowmik et al., 1993, p. 37).

Growth analysis of Richland Creek delta based on the 1902-1904 Woermann maps and the 1978 USACOE orthophoto maps found that the volume of the delta had grown by 858 acre-feet during this period (Bhowmik et al., 1993). Between 1974 and 1988, the delta area north of the stream channel may have undergone additional levee construction or improvements (R7 in Appendix). This area is a Waterfowl Management Area.

By 1994, the stream channel had developed a horseshoe-like bend to the north near the end of the delta (R8 in Appendix). Stream flow and sediment are directed toward an old early 1900s era levee and channel. The 1994 aerial photograph shows the region within the bend of the stream channel and the levee filled with sediment or leveed and vegetated.

Partridge Creek

Growth analysis of Partridge Creek delta from the 1902-1904 Woermann maps and the 1978 USACOE orthophoto maps found that the volume of the delta had grown by 1,280 acre-feet during this period (Bhowmik et al., 1993).

"The 1902-1904 Woermann maps show Partridge Creek flowing along the north side of Illinois Route 26 to discharge into the lake with Blalock Creek [to be discussed later]. The 1937 quad shows the creek following its approximate present course but with no well-defined outlet. The 1939 photography shows a similar condition with no shoreline disturbance [P1 in Appendix].

"Illinois Department of Transportation permit files indicate that a drainage permit was issued to the Partridge Creek Mutual Drainage District in 1948. By 1951, the creek had been channelized and a delta was developing [P2 in Appendix].

"The 1957 photographs indicate a braided channel distributing sediment throughout the delta with very little areal growth [P3 in Appendix]. In 1963, the flow across the delta had been channelized and the delta showed new growth [P4 in Appendix]. This channel continued to grow through 1985 as the creek cut new channels and extended itself by branching into new areas" (Bhowmik et al., 1993, p. 37).

This growth is apparent by comparing the 1969 view of P5 (see Appendix) and the 1974 view of P6 (see Appendix); the 1985 view is no longer available. The delta appears to have

grown substantially between 1974 and 1994 (P6-P8 in Appendix). During this time, the stream channel developed some broad bends, a horseshoe-like bend in its midsection, and braided channel outlets on the unvegetated delta growth of the tip.

Blue Creek

Growth analysis of Blue Creek delta from the 1902-1904 Woermann maps and the 1978 USACOE orthophoto maps found that the volume of the delta had grown by 972 acre-feet during this period (Bhowmik et al., 1993).

> "In 1957, the creek was subjected to major channelization. The outlet was moved 700 to 800 feet to the north. The older delta deposits appear stable and a new delta is forming [B1-B3 in Appendix]. The delta grew rapidly (from that time) through 1963, and the channel appeared to be braided in 1963 and 1969 [B4 in Appendix]. No major growth is apparent from 1963 to 1969.
>
> "By 1979, a channel had been dredged across the delta and renewed growth is apparent [B5 for 1974 photograph in Appendix]. In 1985, continued growth of this delta appeared to be limited by proximity to the main channel" (Bhowmik et al., 1993, p. 37).

Recent aerial photographs indicate that the delta has continued to extend into the river (B6 and B7 in Appendix).

Dickison Run

The 1902-1904 Woermann maps do not indicate a distinct stream channel across the delta to the river (Woermann, 1902-1904). The 1933 quadrangle and the 1939 aerial photograph reveal a distinct stream channel and outlet (D1 in Appendix).

By 1951, significant delta growth is clear beyond the 1939 shoreline. The stream channel is braided across the new delta (D2 in Appendix). By 1957, vegetation appears established on most of the new deposits (D3 in Appendix).

By 1974, the delta had broadened to the north and south, and vegetation appears well-established (D4 in Appendix). The only indication of the old 1957 stream channel in the 1974 photograph is a slight variation in the vegetation. The delta channel and braided outlet are no longer visible. From 1974 to 1988, no significant growth is apparent (D5 in Appendix). Traces of the stream channel and outlet are not visible in 1994 aerial photography (D6 in Appendix).

During a field inspection in 1999 under high river stage conditions, a well-defined stream channel was not found. Stream flow was dispersed across a wide (~300 feet), well-vegetated portion of the southwestern side of the delta (D6 in Appendix).

Farm Creek

"The 1902-1904 Woermann map (Woermann, 1902-1904) and a 1905 U.S. Geological Survey quadrangle map indicate that the outlet of Farm Creek was 0.25 miles south of the Franklin Street Bridge.

"In the late 1920s, a relief channel was built by the East Peoria Sanitary District to reduce flooding by the constricted main channel. This diversion channel was further modified in the late 1930s by the Sanitary District and in the mid-1950s by the Corps of Engineers.

"Aerial photography indicates that by 1939 the diversion channel had created obvious delta deposits at the outlet [as shown in F1 in Appendix]. By 1964, the diversion outlet was shifted several hundred feet north during the construction of Interstate 74, and new delta growth was taking place [F2 and F3 in Appendix].

"From 1963 to at least 1979, the delta developed in Lower Peoria Lake and was separated from the main channel by a naturally formed sandbar [F3-F5 in Appendix]. In 1985, this older channel was blocked off and a new channel was flowing directly into the main channel" (Bhowmik et al., 1993, p. 36).

By 1988, new delta growth at the outlet of the new channel was apparent (F6 in Appendix). By 1994, considerable delta growth had occurred on the downstream side of the stream outlet (F7 in Appendix). The old stream channel was still visible, and some delta growth was evident at its braided stream outlet.

Contour Development Methodology

In 1999, the Illinois State Water Survey collected topographic and hydrographic survey data of the Richland, Partridge, Blue, Dickison Run, and Farm Creek deltas (Figure 5). The surveying techniques followed are described in the following sections.

Surveying Methodology

Elevation contour information was collected between January and May of 1999 from these five deltas directly draining into Peoria Lake (Figures 4 and 5). These surveys covered the entire areal extent of the delta including those under water. Data collection was performed in two stages. The first stage involved recording the location of the land and water interface (shoreline) at different river stages to determine water-level contours on each delta. The second stage involved hydrographic surveying during high river stage conditions along several radial lines to define the shoreline, extent, and bathymetry of each delta.

The methodology and instrumentation are described in the following sections.

Water-Level Contouring

Water-level contours were collected for each delta area for a series of Illinois River stages. The approximate location of the contact point between the 1900-era lakeshore and the deposition area of the delta landform was estimated based on a review of aerial photographs and maps of each delta.

For these surveys, a backpack-mounted, differentially corrected Geodetic Positioning System (DGPS) was used to map the stage-specific shoreline of each delta. The GPS positions were differentially corrected using the Radio Technical Commission for Marine Services (RTCM) correction signals broadcast by the U.S. Coast Guard from St. Louis, Missouri, or Rock Island, Illinois, received on an MBX 2/00 Marine Beacon Receiver. Horizontal accuracy of the RTCM-corrected GPS is 1 to 5 meters (CSII, n.d. and LNPD, n.d.). Location data were collected along the water/land interface to the 1990-era lakeshore/delta landform contact point on the opposite side of the delta.

The data collection protocol for each targeted river stage and for each delta form proceeded as follows: the survey crew walked along the land/water interface to collect horizontal position information at the edge of the water on a continuous basis or at approximately 50-foot intervals. This method produced a contour outline of each delta at the same water-level elevation for Peoria Lake. Water-level reference marks were measured at the beginning and end of each data collection period to correct for a change in the water elevation during the survey. This procedure was repeated at different water levels, thus producing a series of contour lines at various water levels showing the interface of the land and water surface. Additional data were collected for any dike, berm, or levee features that might assist in the development of surface contours. Plots of the surveyed delta are described in subsequent sections.

River stages during data collection for various trips varied from approximately 443 to 448 feet National Geodelic Vertical Datum (NGVD). Vertical control was referenced to temporary reference marks established at the time of each survey. These reference marks were later surveyed to establish vertical control markers. Vertical resolution of the location of the edge of the water was 0.1 to 0.5 feet. The lower vertical resolution resulted from difficulty in locating the land/water interface in areas of loose debris accumulation. In the absence of debris, the vertical resolution was 0.1 feet. Table 2 provides water-level elevations during delta surveying.

Table 2. Water-Level Elevation (feet) of Peoria Lake during 1999 Delta Surveying, Elevations in NGVD

		Land survey		*Hydrographic surv*
Tributary	*February 2-3*	*February 9-10*	*February 22-23*	*May 10-12*
Richland Creek	448.62	446.50	443.00	445.98
Partridge Creek	448.32	446.50	443.00	445.44
Blue Creek	448.25	446.20	445.91	445.91
Dickison Run	448.25	446.21	445.17	445.17
Farm Creek	447.97	445.82	442.33	446.18

Hydrographic Survey

The water-level contouring survey at the land/water interface was supplemented by a hydrographic survey during high river stage conditions. The hydrographic survey was conducted using an Odom Hydrographic Systems (OHS, n.d.) MK II fathometer for water depth measurements with a 0.1 foot resolution and an RTCM differentially corrected Leica 9500 GPS (LNPD, n.d.) unit for horizontal control with 1 to 5 meter resolution. All navigation and data logging functions were coordinated using Hypack, a hydrographic survey software. The fathometer was calibrated daily prior to initiating measurements and at the end of the day.

The survey plan for the hydrographic portion of the survey for each delta included two boat runs around the perimeter of the delta as well as 5 to 10 radial lines. Perimeter survey runs were made at the edge of the brush line around the delta and on a line approximately 50 to 100 feet out from the brush line. Radials, approximately perpendicular to the brush line, were run from 200 to 300 feet out into the river toward the delta perimeter to define the horizontal extent of the delta relative to the flat lake-bottom or river channel. As needed, a series of lines was run across the tip of the delta to define the location of the most recent deposits.

1999 Data Analysis

Each DGPS delta dataset from the water-level contouring survey performed in 1999 was assigned the water-level elevation corresponding to the river level on the date and at the time of data collection. Hydrographic survey data were processed using Hypack software. Depth data were converted to elevation data with respect to the water-level elevation at the time of the survey. Table 2 provides the lake elevations during hydrographic surveying. All differential GPS (DGPS) and hydrographic data were converted into Geographical Information Systems (GIS) format. Each tributary channel location was delineated and digitized using a combination of the 1999 survey data, the location of the channel on the recent digitally rectified graphic of the USGS quadrangle, and the location of the channel from USGS aerial photographs.

1904 Elevation Data

Baseline elevation data were digitized from the 1904 Woermann map (Woermann, 1902-1904), contour lines, and water depths. Contour lines and the channel limits within and surrounding the grid areas of each 1999 delta were digitized using Arc/Info software. Grid selection is described in the next section. Lake-bottom contour lines were drawn relative to the Woermann depth data and digitized using Arc/Info software. The 1904 Woermann elevations were converted from Memphis Datum elevations to the National Geodetic Vertical Datum (NGVD) elevations by subtracting 7.304 feet (McKibbin, 1954). All elevations in this report are relative to NGVD.

Grid Development

Using Arc/Info 7.1.1 software, two elevation grids were developed for each delta, one representing the 1904 elevations and the other representing the 1999 elevations. The horizontal extent of the 1999 survey data was used as a guide to define the grid area for calculating the

volume of each delta. Comparisons between 1904 and 1999 elevations were based on this grid area even though in some cases the location of the 1904 tributary channel and outlet was dramatically different from its location in 1999 and was not within the grid area. The extent of each cross section from the delta was plotted based on the 1996 cross-sectional data of the Illinois River provided by the USACE. Figure 6 provides the plots along the spine of each delta. The cross section shown is not the standard river cross section. Here the axis of the spine of the delta was extended to the opposite end of the lake, and a river cross-sectional profile along this line was developed. These are the plots shown in Figure 5.

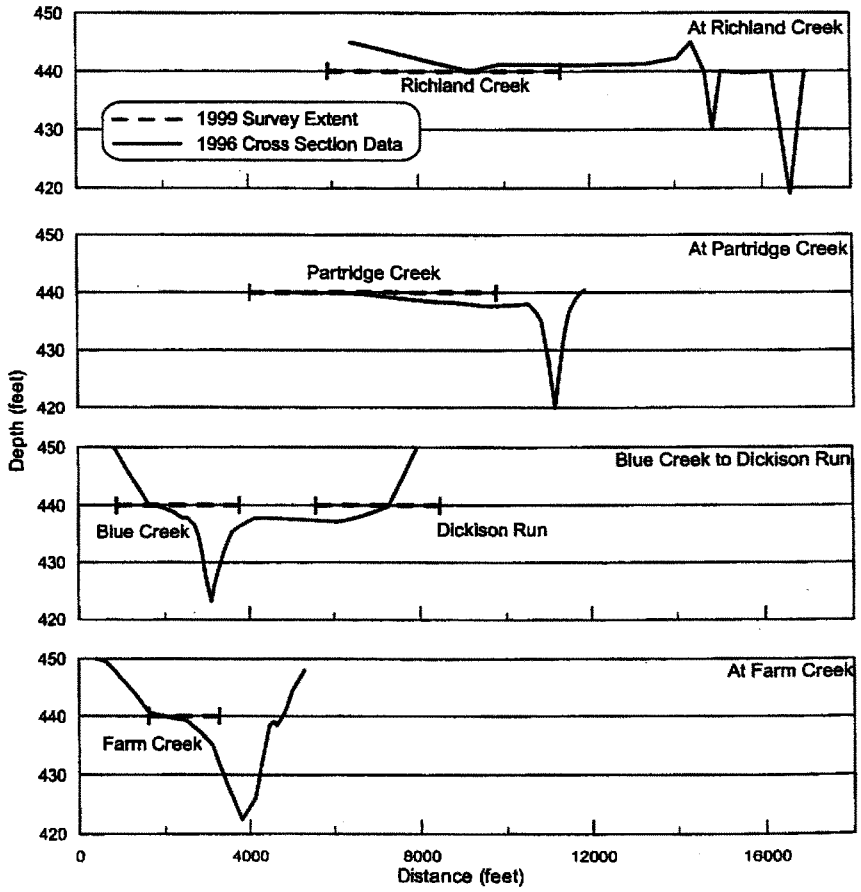


Figure 5. 1996 cross sections along the spine of each delta and the extent of the 1999 survey grid area for each delta

The 1999 elevation grid was derived from the DGPS water-level contouring survey data, the hydrographic survey data, the grid extent for each delta, and the path of the tributary. The 1904 elevation grid was derived from the Woermann contour line data and lake-bottom contours.

For some delta grids, additional contours from recent USGS quadrangle contours between DGPS survey data points or control points were added to supplement the input data as needed to produce realistic grid elevation values and slope. Because the 1904 and 1999 grids used the same grid area, they are exactly the same size and shape. The cells of the 1904 and 1999 grids also correspond exactly.

Each grid was checked with input data to verify accurate elevation representation. Surface contours were derived from the elevation grids using ArcView software. Generated surface contours from the 1904 grids were compared with the original surveyed contours from the 1902-1904 Woermann maps. Surface contours generated from the 1999 grids were compared with the surveyed data and shoreline surveys. The 1999 Blue Creek and Farm Creek grids were adjusted manually to correct for unusual shoreline shapes or regions with dramatically varying slopes that could not be derived from or defined well by the grid.

The 1904 and 1999 average grid elevations were compared to determine the net sediment accumulation during the intervening period. Table 3 summarizes characteristics of each grid. The following subsections will describe each of the five surveyed deltas.

1904 and 1999 Contour Maps

Richland Creek Delta

Figure 6 shows the 1904 contours of the Richland Creek delta area. This figure also shows the extent of the grid area selected for further analysis. These contours and a few elevation control points were used to determine a mean elevation of the grid area for the 1902-1904 era at 438.3 feet NGVD. The 1902-1904 Woermann map clearly indicates the 1904 orientation of Richland Creek to the south of the orientation.

Figure 7 shows the 1999 survey routes, including point elevation datapoint locations, water edge contours, and hydrographic survey routes. These data were used to develop a contour map within the grid area for Richland Creek (Figure 8). Based on this contour map, a mean elevation of the delta within this grid was calculated to be 442.9 feet NGVD, 3.8 feet above the 1904 mean grid elevation given in Table 3.

Partridge Creek Delta

Figure 9 shows the 1904 Woermann contours of the Partridge Creek delta. Again, the 1999 Partridge Creek location is not the same as in 1904. The 1904 contours within the grid area and a few selected elevations were used to determine the mean elevation of the grid area, 435.1 feet NGVD.

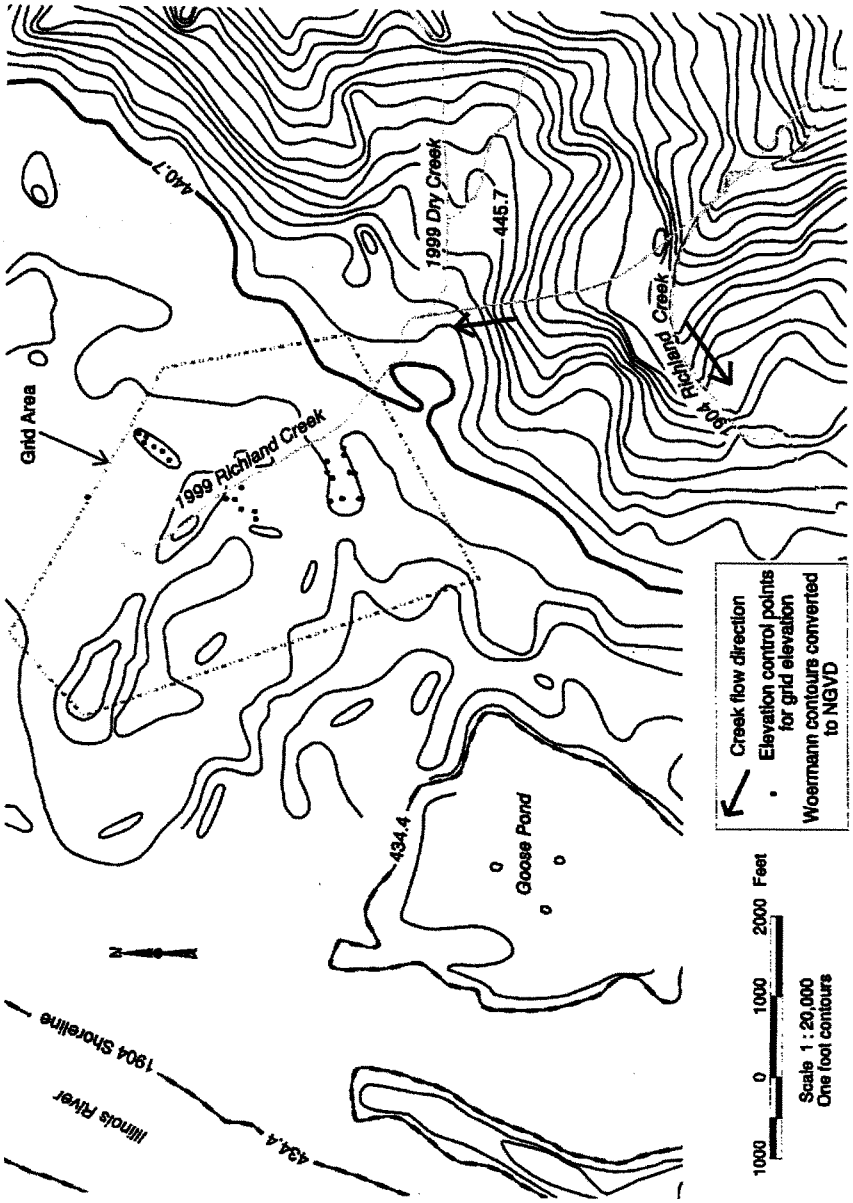


Figure 6. 1904 contour map of Richland Creek delta area

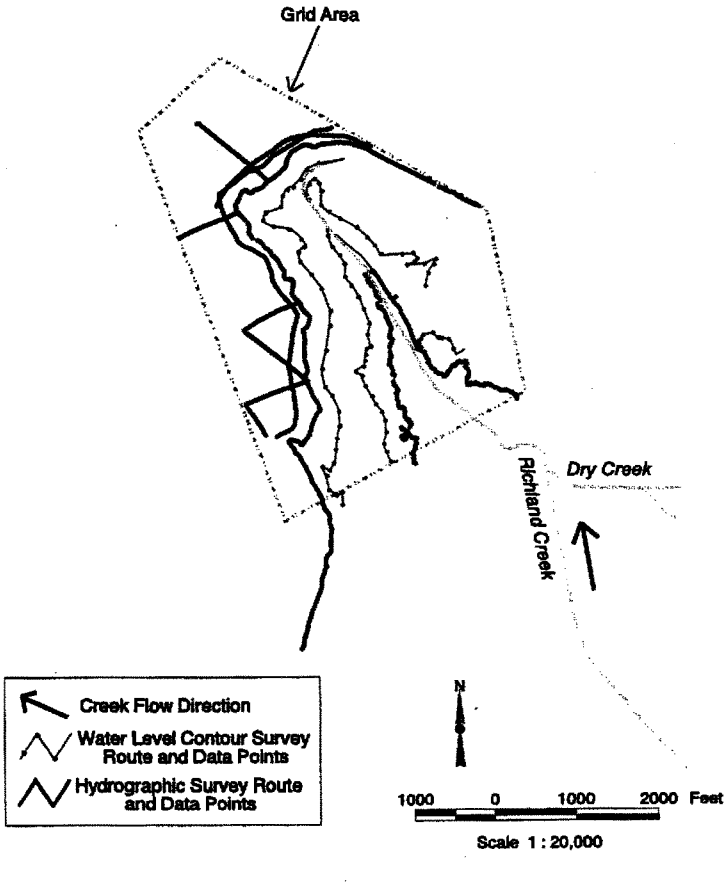


Figure 7. 1999 survey data, route, and grid extent for Richland Creek delta

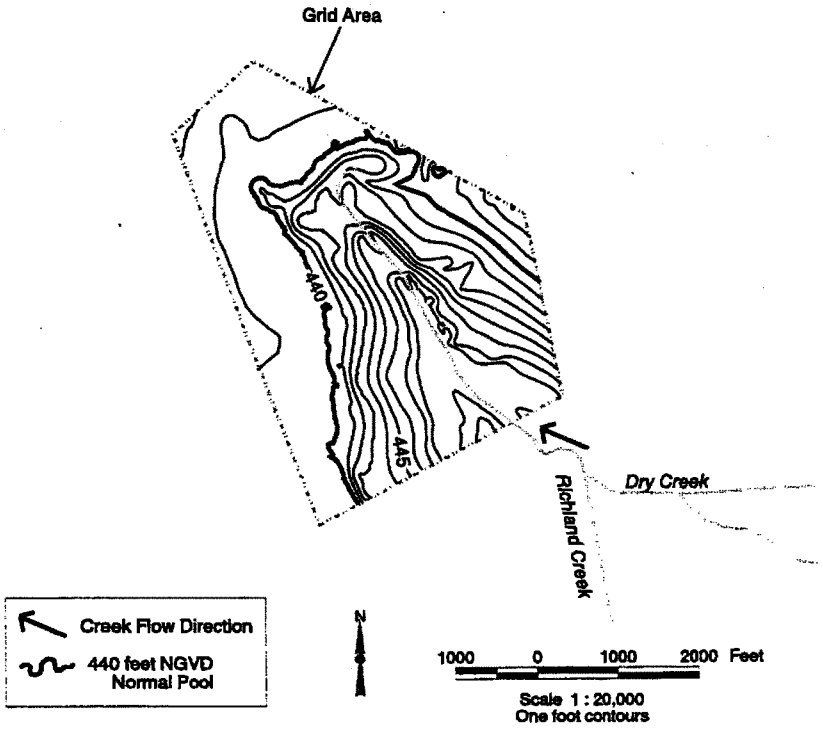


Figure 8. 1999 contour map of Richland Creek delta within grid area

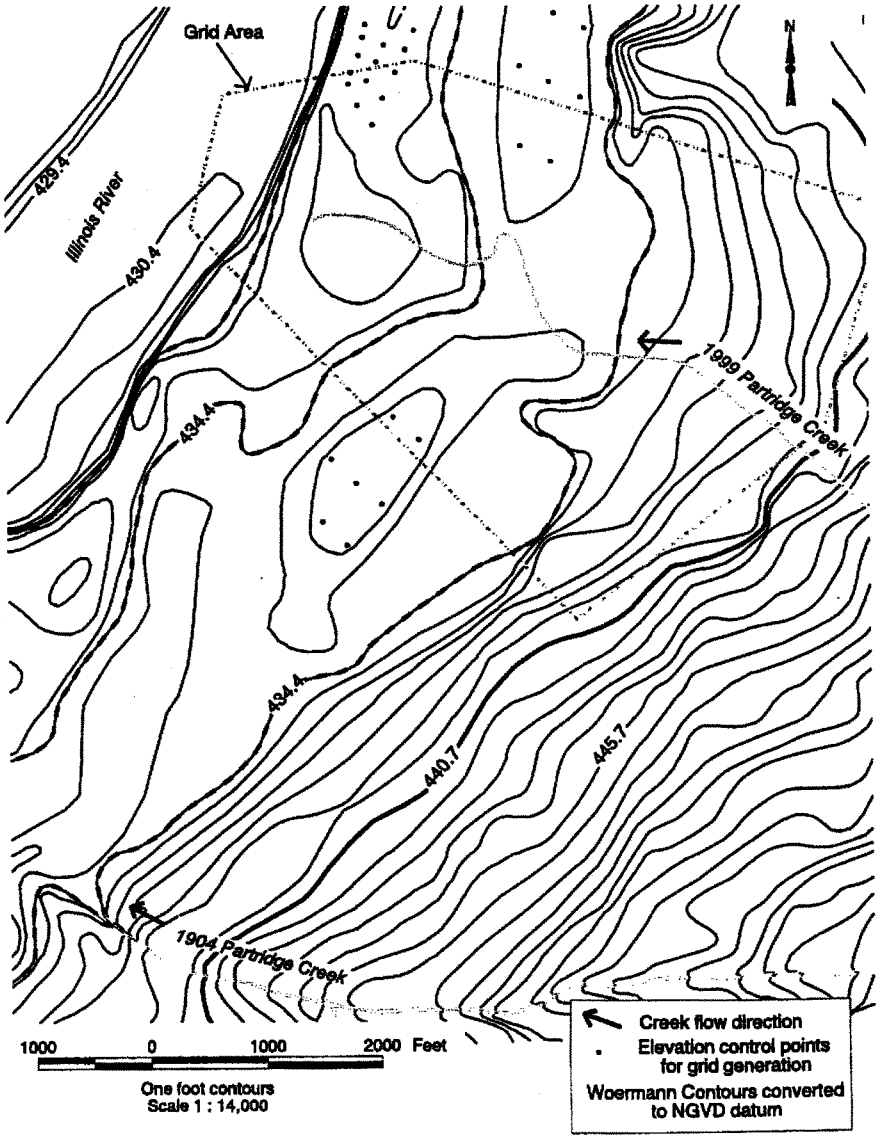


Figure 9. 1904 contour map of Partridge Creek delta area

Figure 10 shows the 1999 survey routes including point elevation data point locations, land/water surface interfaces, and the hydrographic survey routes for the Partridge Creek delta. These data were used to develop contour maps for the Partridge Creek delta within the grid area (Figure 11). Based on these contours a mean elevation for the grid area was determined to be 441.7 feet NGVD, 6.6 feet above the mean 1904 grid elevation given in Table 3.

Blue Creek Delta

Figure 12 shows the 1904 Woermann contours of the Blue Creek delta area. Similar to the 1904 Richland and Partridge Creeks, the location of Blue Creek in 1904 is some distance from the location of the 1999 Blue Creek and delta. The 1904 mean elevation of the defined grid area for Blue Creek was 433.5 feet NGVD. The 1902-1904 Woermann map indicates the 1904 orientation of Blue Creek to the north is the 1999 orientation.

The 1999 grid elevations were generated using the DGPS survey data, the hydrographic elevation data, the path of Blue Creek, the delineation of the water-level contouring survey routes, and the delineation of the 460-foot contour from the USGS quadrangle DRG. Figure 13 shows the data within the grid area. The mean grid elevation for 1999 is 440.9 feet NGVD. Figure 14 shows the contours derived from the 1999 survey within the grid. Grid elevation contours were adjusted manually to more realistically represent the topography on the irregular shoreline at 440 feet NGVD on the northern flank of the delta and along the irregular topography on the southern flank at 441 feet NGVD. The mean elevation of the grid for 1999 is 440.9 feet NGVD, 7.4 feet above the mean grid elevation of 1904 (Table 3).

Dickison Run Delta

Figure 15 shows the 1904 Woermann contours for Dickison Run. The creek essentially did not move from its 1904 orientation. Based on these contours, the mean elevation of the 1904 grid of the Dickison Run delta is 440.3 feet NGVD.

Table 3. Summary of Grid Area Information

	Cell size (feet)	*Number of grid cells*	*Grid area (acres)*	*Average grid elevation (NGVD) 1999 (feet)*	*1904 (feet)*	*Average elevation difference (feet)*	*Sediment accumulation 1904-1999 (acre-feet)*
Richland Creek	30 × 30	18,001	372	442.2	438.3	3.8	1,428
Partridge Creek	30 × 30	19,798	409	441.7	435.1	6.6	2,683
Blue Creek	30 × 30	9,737	201	440.9	433.5	7.4	1,497
Dickison Run	30 × 30	8,019	166	442.4	440.3	2.0	338
Farm Creek	15 × 15	32,281	167	432.1	432.1	7.5	1,252

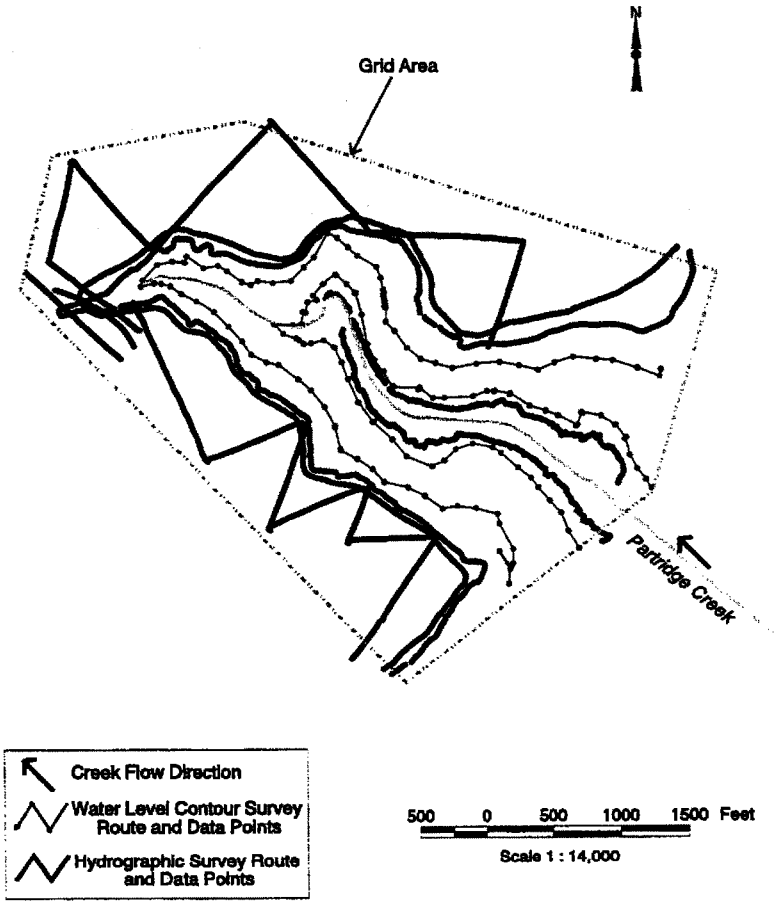


Figure 10. 1999 survey data, route, and grid extent for Partridge Creek delta

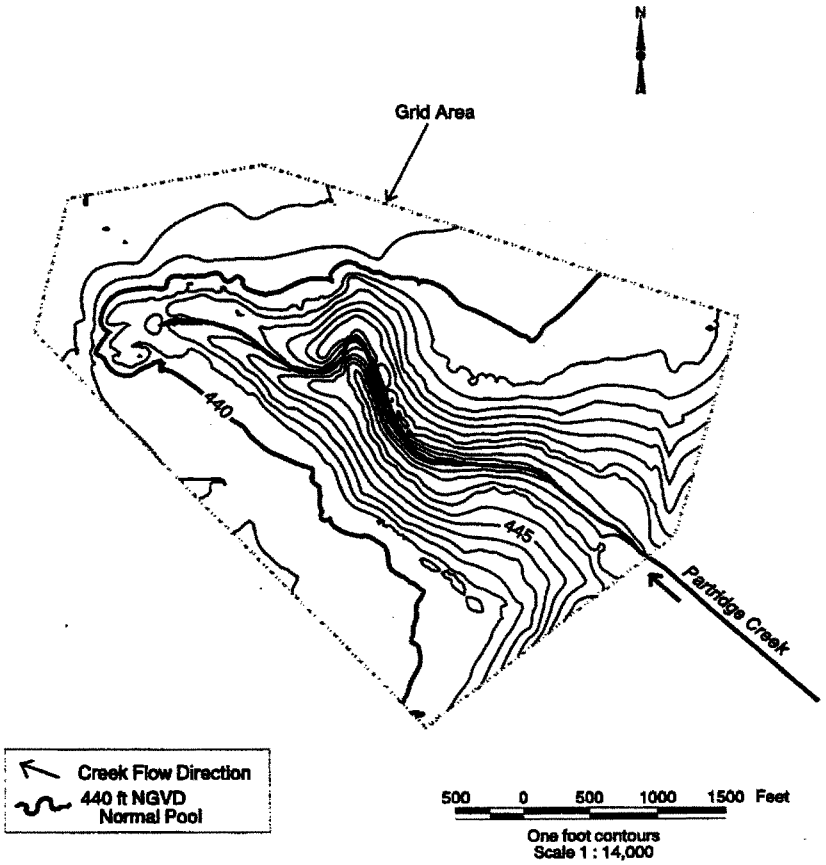


Figure 11. 1999 contour map of Partridge Creek delta within grid area

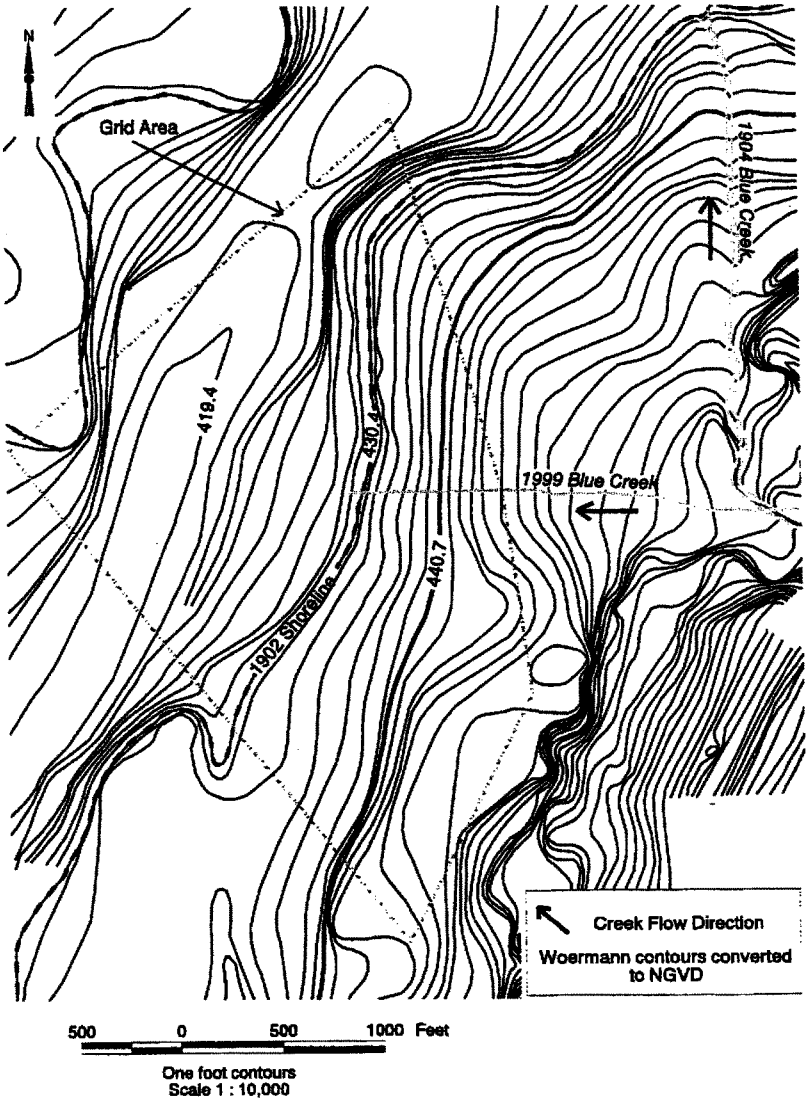


Figure 12. 1904 contour map of Blue Creek delta area

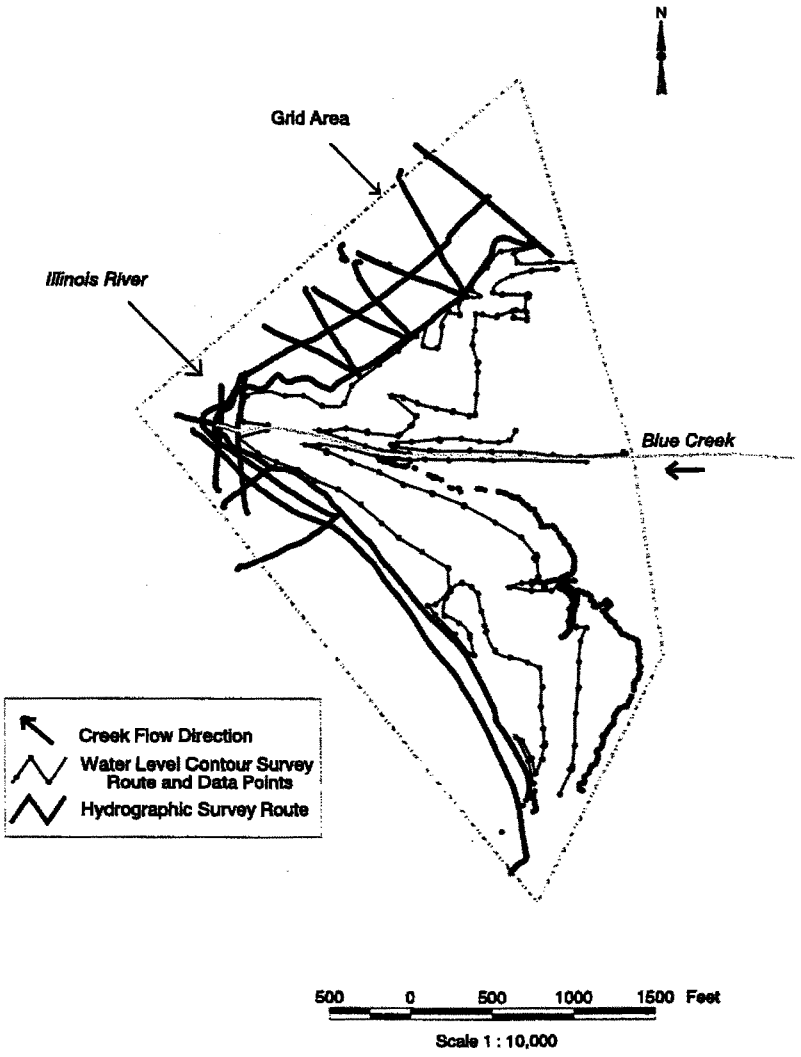


Figure 13. 1999 survey, route, and grid extent for Blue Creek delta

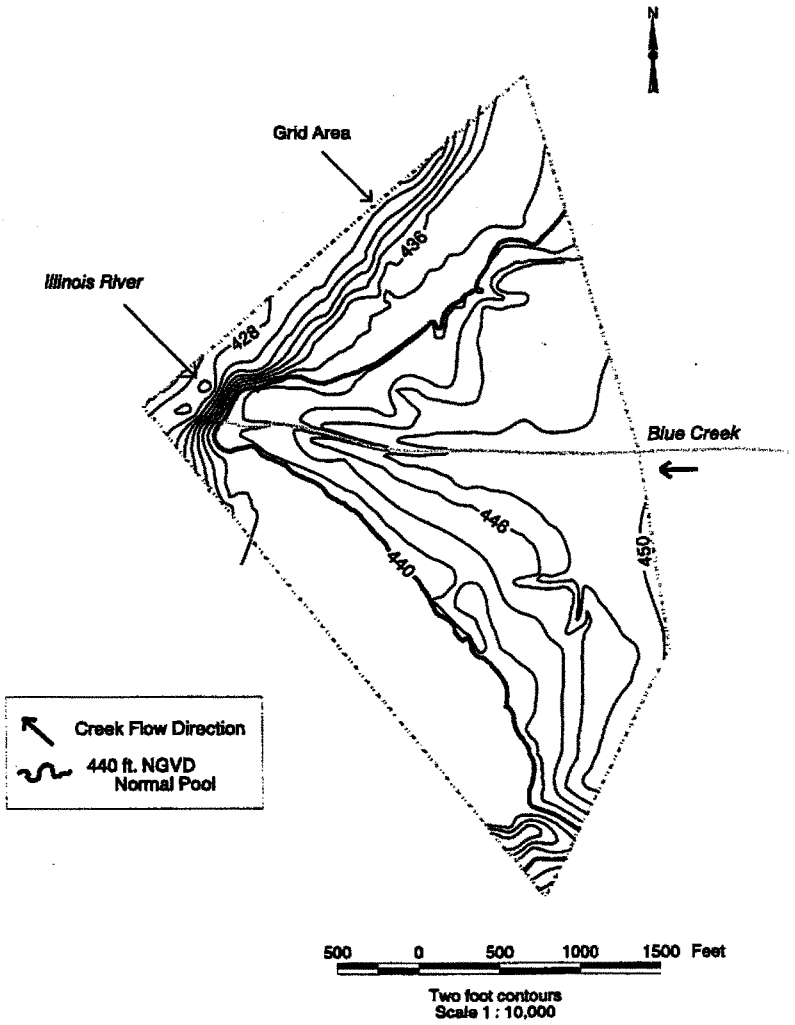


Figure 14. 1999 contour map of Blue Creek delta within grid area

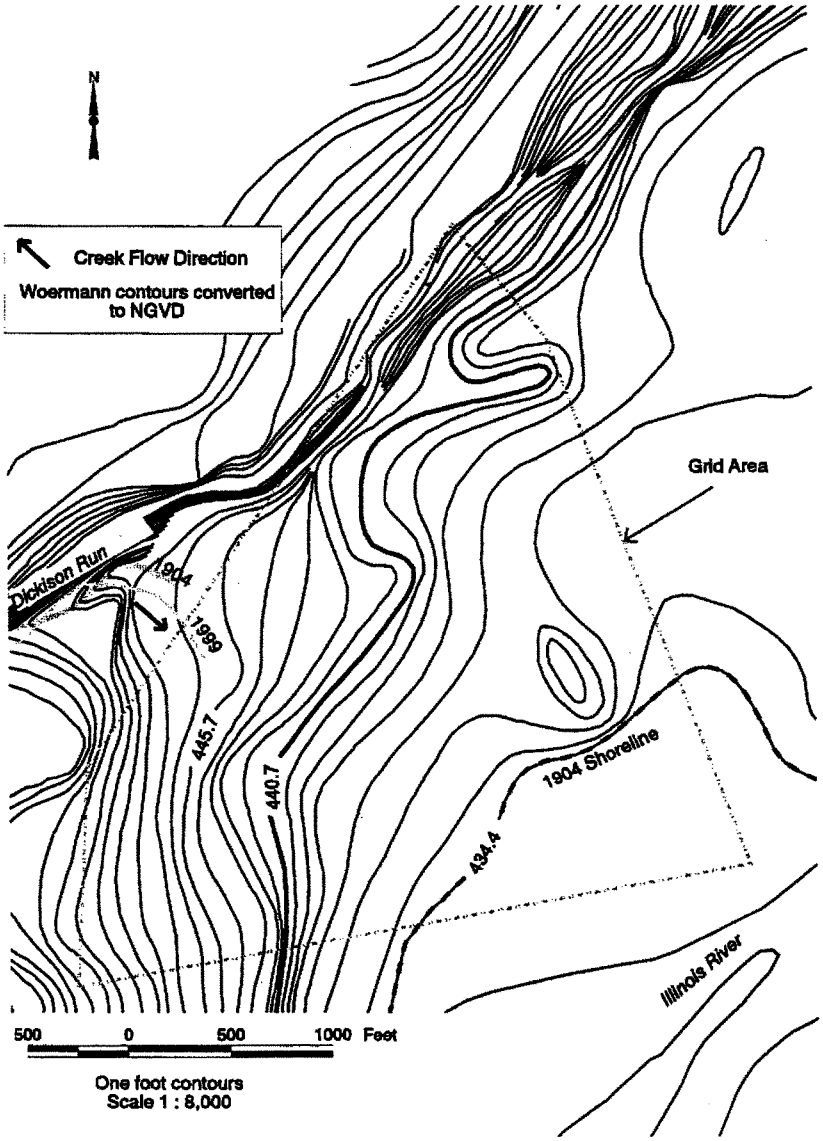


Figure 15. 1904 contour map of Dickison Run delta area

The 1999 grid elevations were generated using the following: the 1999 DGPS survey data, the hydrographic elevation data, the path of Dickison Run, the delineation of the water-level contouring survey routes, the delineation of the 470-foot contour lines from the USGS quadrangle DRG, and additional contours between DGPS points from the hydrographic survey. Figure 16 shows locations where field data were collected in 1999. Figure 17 shows 1999 contours developed from the collected data. Contours shown in Figure 17 were used to determine the mean grid elevation, 442.4 feet NGVD. This mean elevation is 2.0 feet higher than the 1904 mean elevation for the grid area (Table 3).

The 1904 and 1999 paths of Dickison Run are included in the generation of the grids to specify the direction and location of streamflow toward the grid area even though neither could be defined within the grid area. As mentioned previously, a clear-cut channel for Dickison Run on the delta could not be located during the 1999 field survey.

Farm Creek Delta

Figure 18 shows the 1904 Woermann contours of the Farm Creek delta area. Again, the location of Farm Creek in 1999 is not the same as in 1904. The path of the 1904 Farm Creek was not included in the grid because the creek did not flow through or toward the 1999 grid area in 1904. The mean grid elevation in 1904 was 432.1 feet NGVD.

- The area of the Farm Creek delta is the only one of the five deltas surveyed in this study that has been subjected to urban development pressures. The grid used to define the 1999 delta was developed around features such as a cinder disposal area, Interstate 74, and an industrial park. These facilities have developed on top of portions of the early 1900s era delta formation. Thus, in addition to sand mining for construction use, large areas of the delta deposition volume could not be defined due to subsequent development.

The 1999 grid elevations were generated using the DGPS survey data, the hydrographic elevation data, the path of Farm Creek, the delineation of the water-level contouring survey routes, and a few elevation control points. Figure 19 shows the survey routes and the extent of the grid area. Figure 20 shows the contours developed for 1999. The mean grid elevation for 1999 was 439.6 feet NGVD: 7.5 feet higher than the 1904 grid elevation (Table 3). Grid elevation contours were adjusted manually to more realistically represent the topography near the northeast corner of the cinder disposal site.

Sedimentation at Delta Mouths

Figures 6-20 present the 1904 and 1999 contour maps and the location of the grid area for each delta. As previously discussed, the 1999 outlets of four of the five creeks no longer occupy the 1904 creek channels nor do they flow into the lake at the 1904 locations. Therefore, the computed volume of the sediments to be described is the volume of the sediment deposited within the grid area between 1904 and 1999. Table 4 gives the net accumulation of sediment calculated for each grid area. These results do not include sediment volumes mined from the channels or mouths of these deltas.

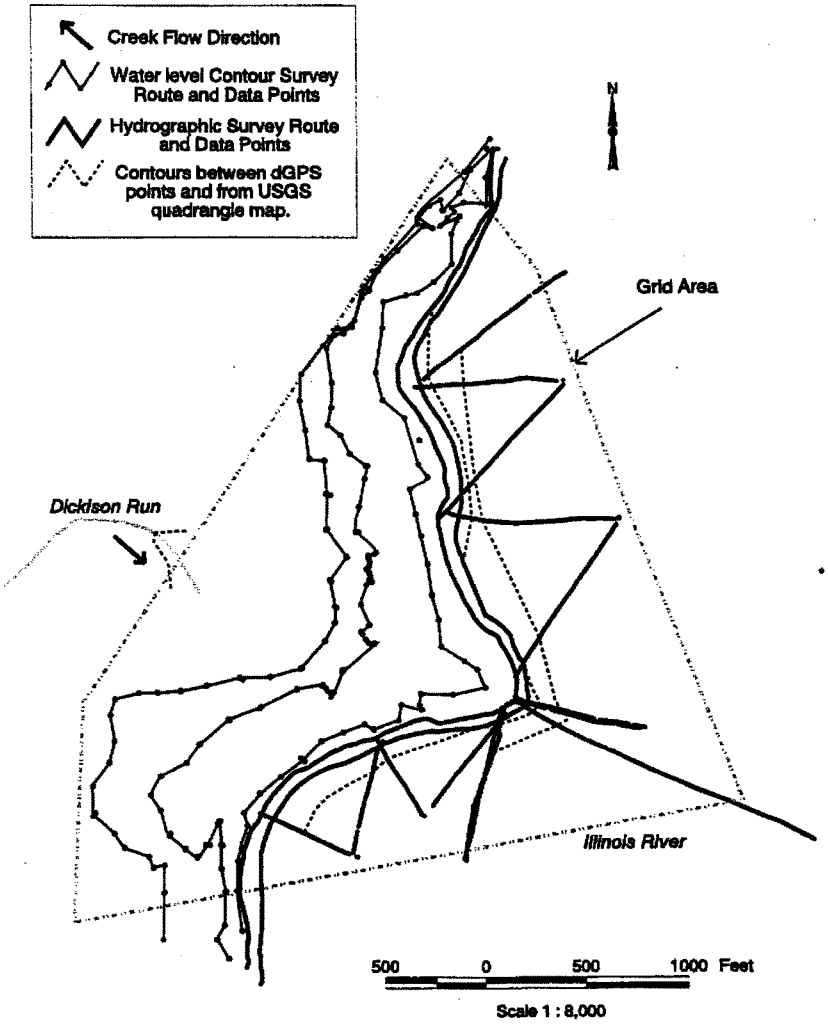


Figure 16. 1999 survey, route, and grid extent for Dickison Run delta

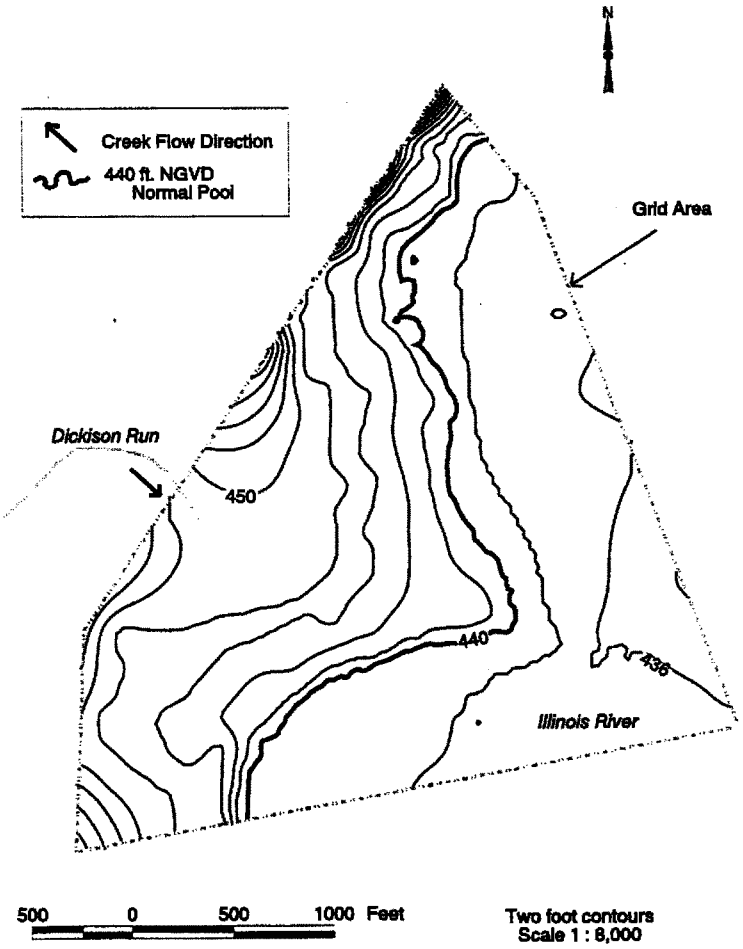


Figure 17. 1999 contour map of Dickison Run delta within grid area

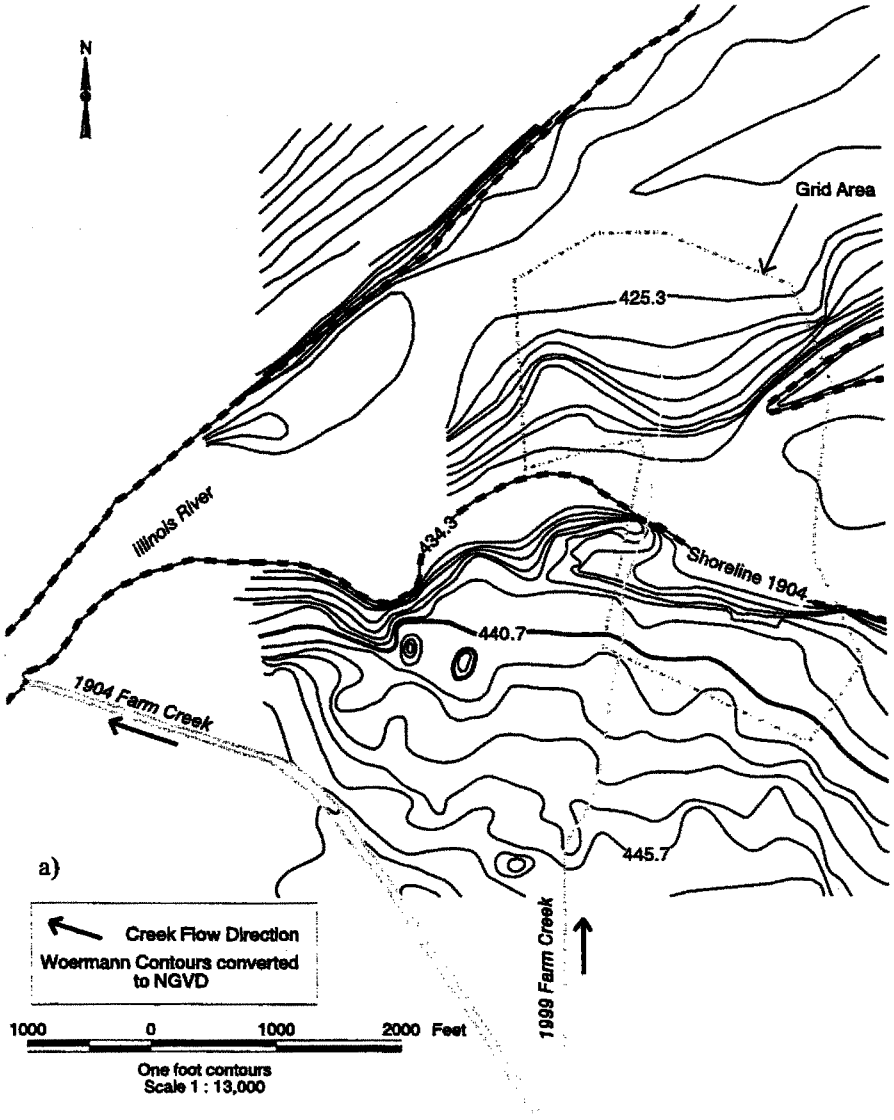


Figure 18a. 1904 contour map of Farm Creek delta area, including the surveyed area of the 1999 Farm Creek delta

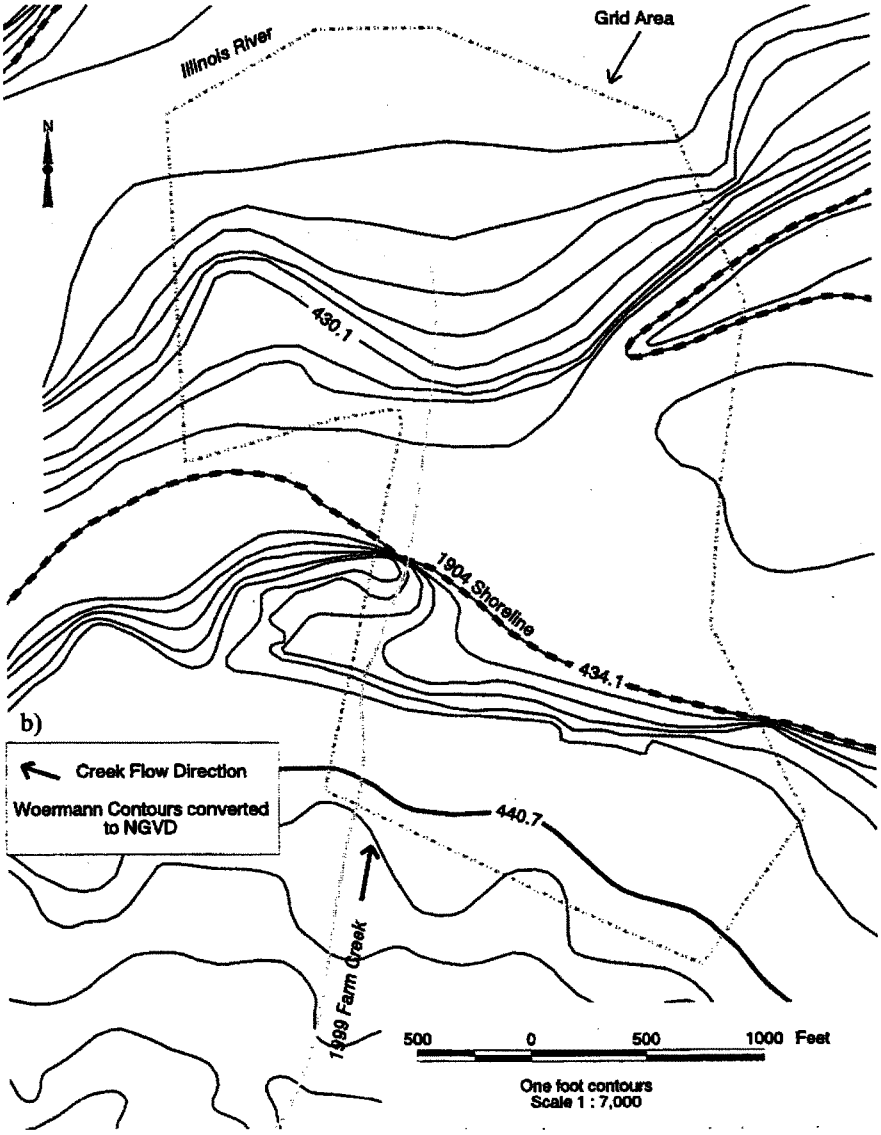


Figure 18b. 1904 contour map of the location of the 1999 Farm Creek delta area

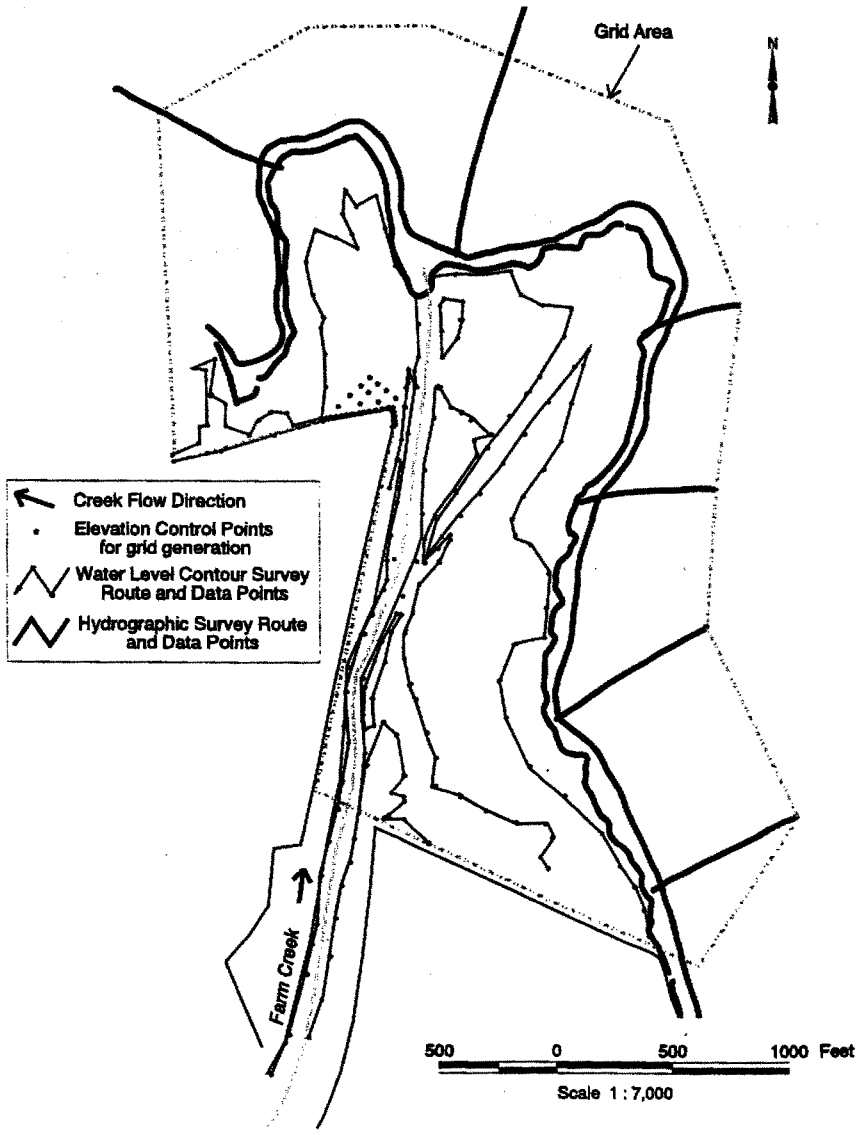


Figure 19. 1999 survey, route, and grid extent for Farm Creek delta

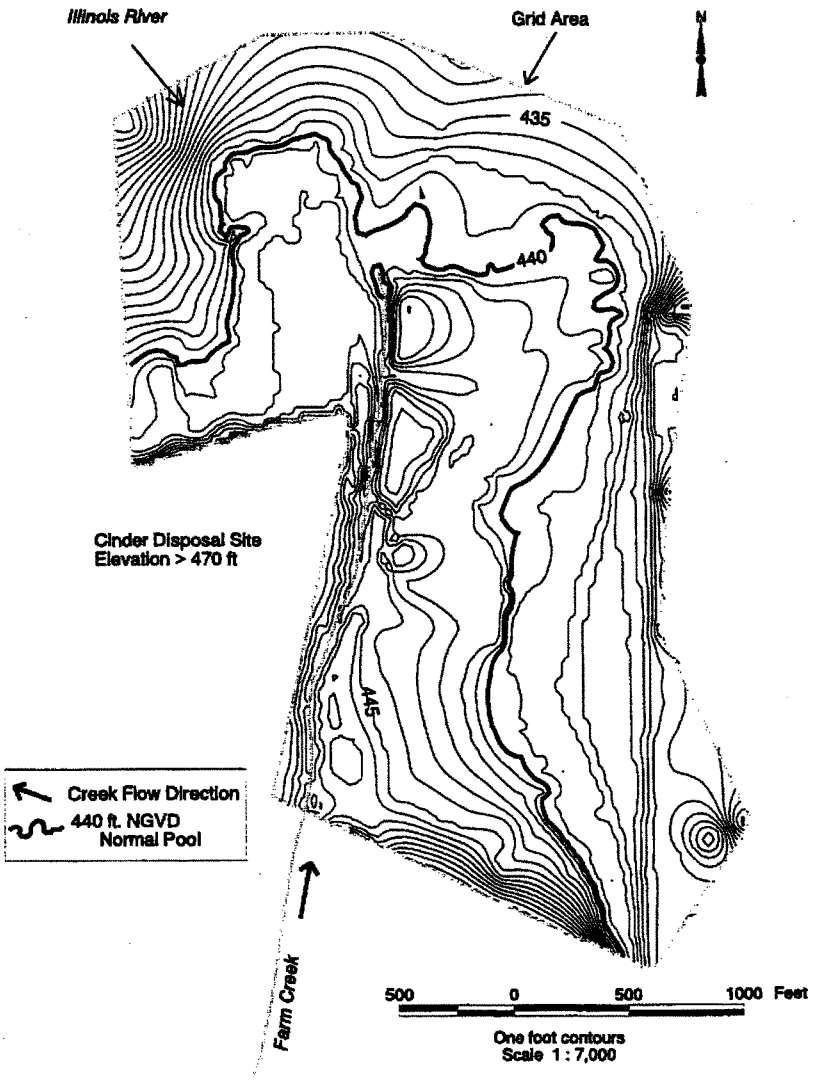


Figure 20. 1999 contour map of Farm Creek delta within grid area

Table 4. Net Sediment Accumulation at the 1999 Delta Mouths within the Grid Area

Tributary name	*Date when 1999 outlet established**	*Net sediment accumulation 1904-1999 (acre-feet)*	*Average sedimentation rate (acre-ft/year since 1904)*	*Grid area (acres)*	*Drainage area (square miles)*
Richland Creek	1944	1,428	15	372	47
Partridge Creek	1948	2,683	28	409	28
Blue Creek	1940	1,497	16	201	10.5
Dickison Run	1904	338	4	166	7.9
Farm Creek	1929	1,252	13	167	60

Note:
*Date estimated from construction permit applications or from maps.

Over the years, sediment has been mined from the channels and from the mouths of a few of these tributaries. Small sediment mining or moving operations may have occurred on Partridge, Richland, and Blue Creeks. Records of the amount of sediment moved or removed from these deltas are not available or were never kept. During the 1980s, Freesen Incorporated mined the Farm Creek channel for sediment and removed approximately 30,000 cubic yards of sediment (Personal Communication, 1999, Frank Medony, Illinois Department of Transportation). Therefore, the net sediment accumulation shown in Table 4 does not represent the actual sediment accumulation at the delta of Farm Creek. In spite of the lack of available information about sediment that may have been removed from the other deltas, the sediment accumulation values reported in Table 4, and discussed subsequently, provide important baseline values of the volume of sediment deposited at the 1999 tributary mouths compared to 1902-1904 bed elevations at the same locations.

Table 4 shows that the Partridge Creek delta had the greatest total sediment accumulation of 2,683 acre-feet while draining an area of 28 square miles, followed by Blue Creek with an accumulation of 1,497 acre-feet while draining an area of only 10.5 square miles. Richland Creek accumulated 1,428 acre-feet of sediment while draining 47 square miles, followed by Farm Creek with an accumulation of 1,252 acre-feet while draining an area of 60 square miles. The delta with the least amount of sediment accumulation is at the mouth of Dickison Run where 338 acre-feet of sediment accumulated from a drainage area of 7.9 square miles.

Using the calculated sediment accumulation from 1904-1999, the total weight of accumulated sediment within the grid area at each delta was estimated assuming a sediment weight of 70 pounds per cubic foot presented in Table 5. Partridge Creek delta has the highest sediment accumulation of about 4 million tons within the grid area, compared to 0.5 million tons for Dickison Run. In terms of sediment delivery per year per square mile of drainage area, over the 95-year period, Blue Creek had the highest rate at 2,288 tons per year per square mile of

drainage area while Farm Creek had the lowest rate of sediment delivery (34 tons per year per square mile). However, the rate of sediment delivery at Farm Creek may actually be significantly greater because an unknown amount of sediment has been removed from Farm Creek during occasional sediment mining operations.

In 1904, the lake-bottom near the Blue Creek outlet sloped gradually downward from the edge of the water to the edge of the main Illinois River channel (Figure 21). The 1999 delta form has a much steeper slope to the edge of the main river channel, where the outlet empties directly into the main Illinois River navigation channel during high river stage conditions. The main river channel flows across the leading tip of the delta, limiting the rate of apparent delta growth. It is clear that the sediment transported by Blue Creek has filled a large portion of the 1904 Illinois River channel.

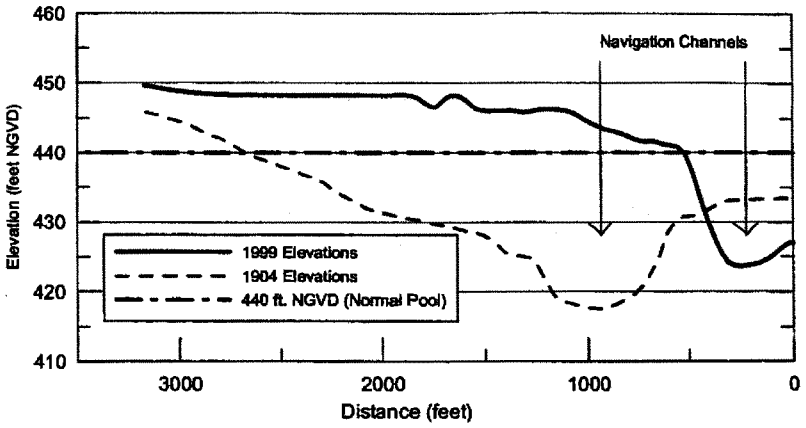
During field visits to the Peoria Lake deltas in 1999, Illinois State Water Survey professionals and others observed that the mouth of Blue Creek and the tip of the delta are located at the edge of the main Illinois River navigation channel. This proximity of the Blue Creek delta to the navigation channel is illustrated in Figure 21, which shows a cross section along the spine of the Blue Creek delta as it existed in 1999. The spine defined here is similar to the spinal cord, i.e., a line following the centerline of the creek extending through the delta and into the main channel.

In Figure 21, significant lateral movement of the navigation channel to the west, a consequence of sediment deposition from Blue Creek, is clearly visible. A comparison of the 1904 Woermann contours and 1999 survey data reveals that the centerline of the navigation channel has moved about 750 feet to the west since 1904. Thus, over the last 95 years, the delta at this location has been extending to the west at an average rate of 7 feet per year.

Table 5. Sediment Accumulation Rates within the Grid Area, 1904-1999

Tributary	*Drainage area (square miles)*	*Net sediment accumulation (acre-feet)*	*Net sediment accumulation* (tons × 10^6)*	*Rate (tons/year)*	*Net sediment accumulation (tons/square mile/year)*
Richland Creek	47	1,428	2.18	22,917	488
Partridge Creek	28	2,683	4.09	43,058	1,537
Blue Creek	10.5	1,497	2.28	24,024	2,288
Dickison Run	7.9	338	0.52	5,424	687
Farm Creek	60	1,252	1.91	20,093	34**

Notes:
*Assuming a unit weight of 70 pounds per cubic foot, one acre-foot equals 43,560 cubic feet. One ton equals 2,000 pounds.
**See explanations on sediment mining.



Note: The location of the 1999 delta spine was not the same as the 1904 delta spine.

Figure 21. Lateral cross section at 1999 spine of Blue Creek delta

The above analysis presents the magnitude of sediment accumulation at the mouth of each of the five deltas within respective grid areas. The sediment accumulation values could be used to roughly estimate long-term coarse grain sediment contributions to the lake from each of the tributaries. These values do not account for suspended sediment load transported to the lake from the tributaries and the bed load that may have been transported by each creek and by the Illinois River.

Stage-Area and Stage-Volume Relationships

The 1902-1904 and 1999 elevation contours of Richland Creek, Partridge Creek, Blue Creek, Dickison Run, and Farm Creek deltas were further used to estimate the surface areas and volumes of accumulated sediment at different elevations. The lowest existing elevation at the delta mouths in 1902-1904 was used as the base elevation for each delta. From this base elevation, the surface area and the sediment volume were computed at various elevations within the grid area of each delta. These computed values were used to develop the elevation versus surface area and elevation versus accumulated sediment volume relationships for each delta. These plots are given in Figure 22.

Unit Weight and Moisture Content

On April 18, 2000, some data were collected on Peoria Lake bed sediments to determine the unit weights and moisture contents. These data were collected near River Mile 165 on the east side of the navigation channel during a dredge operation to open a boating channel from the main navigation channel to the Spindler Marina located in East Peoria. Spindler Marina is a

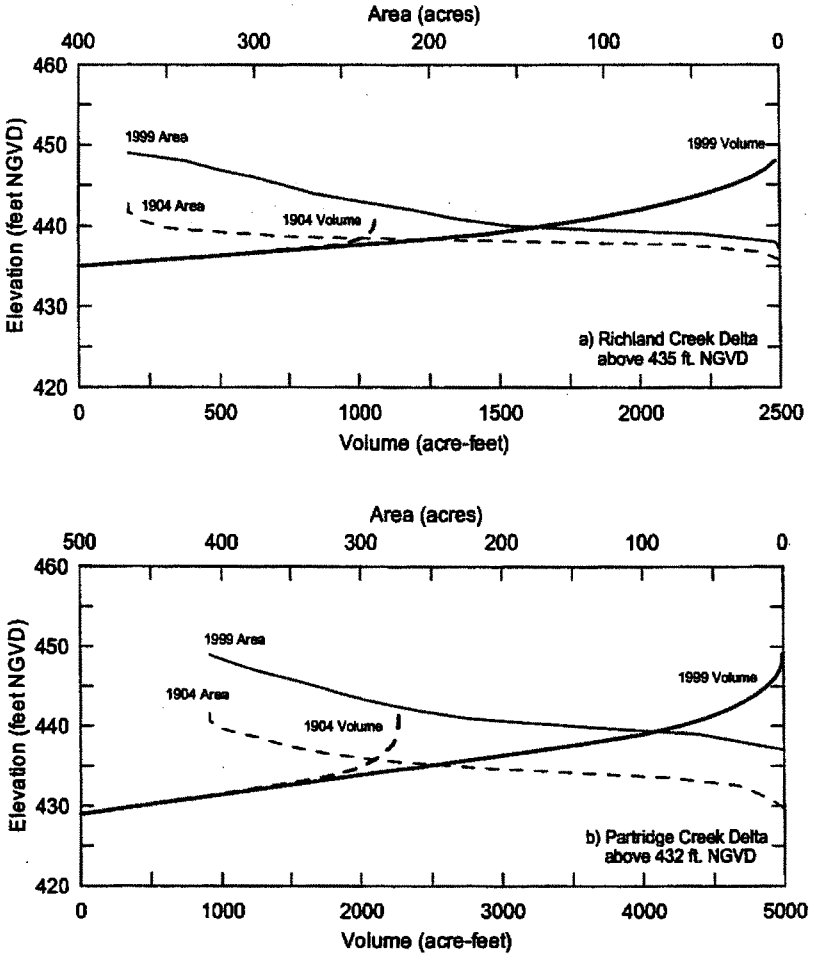


Figure 22. Elevation versus surface area and elevation versus volume relationships for a) Richland Creek Delta, b) Partridge Creek Delta, c) Blue Creek Delta, d) Dickison Run Delta, and e) Farm Creek Delta

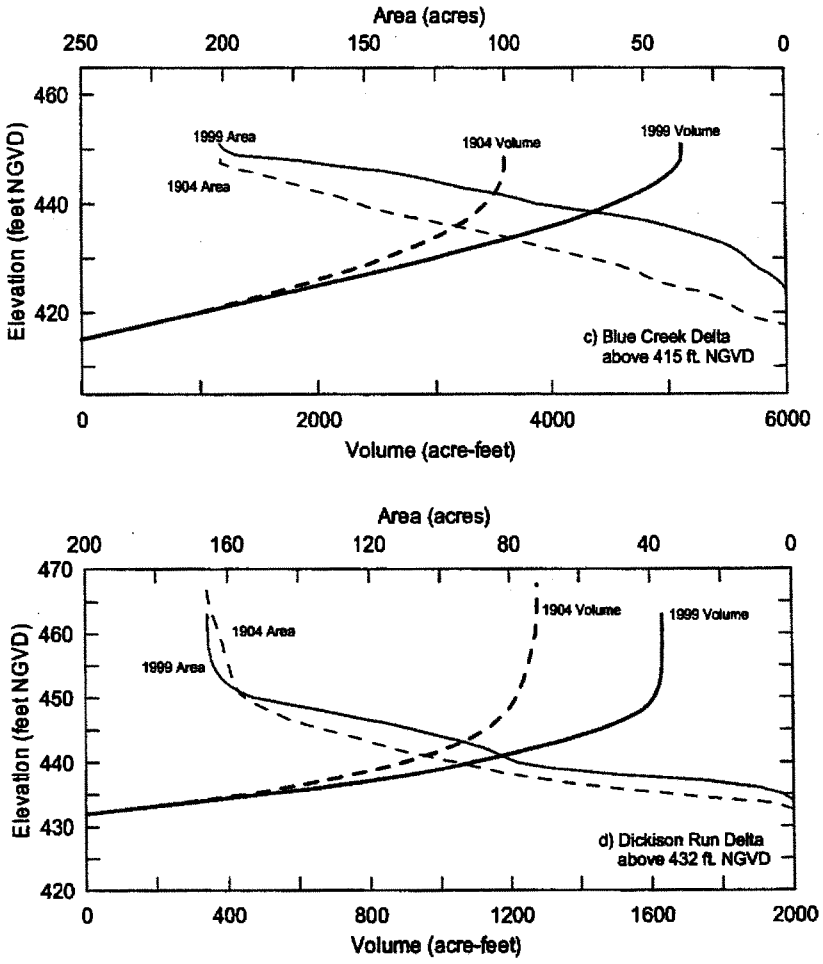


Figure 22. Continued

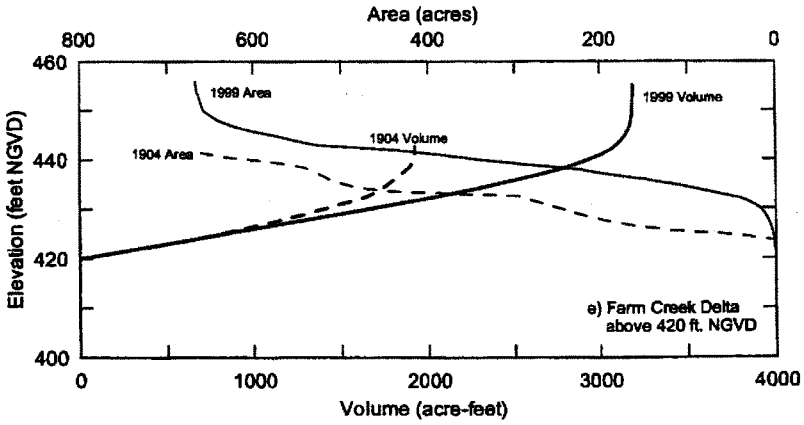


Figure 22. Concluded

facility run by the East Peoria Park District. During this dredging operation, the bed sediments were collected by two different types of dredges: cable-arm dredging bucket operation and clam-shell-type operation. The sediments were collected, lowered gently on a waiting barge, and subsequently transported to a disposal site. Samples were collected once the sediments were dropped on the waiting barge. Additional in-situ undisturbed sediment samples were also collected from the same general area for comparative purposes. Table 6 shows the results of the laboratory analyses of the ten samples collected.

Samples UW-1–UW-5 were collected from the barge after the dredged materials were lowered on the barge. Samples UW-1 and UW-2 came from the dredged materials that were removed by the cable arm dredging technique. Samples UW-3, UW-4, and UW-5 came from the dredged materials that were removed by the clam-shell dredging technique. Sampling was done very carefully at locations where samples appeared to be less disturbed. However, all the sediment on the barge was disturbed by the dredging activity.

Samples UW-6–UW-10 were collected from the bed of the Peoria Lake close to the dredged site. These undisturbed samples were collected by following the standard procedure. Samples UW-6 and UW-7 came from a single core. For example, sample UW-6 (in-situ 0.3–0.6/ 2.0) was taken from a core 2 feet long that extended from 0.3 feet to 0.6 feet below the lake bottom. Similarly, sample UW-7 (in-situ 1.5–1.8/2.0) came from the same 2-foot-long core that extended from 1.5 feet to 1.8 feet below the lake bottom.

The other three samples were collected from another core 4.2 feet long. The sample UW-8 (in-situ 0.5–0.8/4.2) was collected from the 4.2-foot-long core and extended 0.5 feet to 0.8 feet

Table 6. Peoria Lake Sediment Analyses: Spindler Marina Dredging Project

(1)	(2)	(3)	(4)	(5)	(6)
	Date	*Lab #*	*Unit weight (PD/FT3)*	*Water content (percent)*	*Water content (percent,*
UW-1 Barge Cable Arm	18-Apr-00	1525	45.4	88.4	46.9
UW-2 Barge Cable Arm	18-Apr-00	1526	39.7	104.1	50.9
UW-3 Barge Clam Shell	18-Apr-00	1527	43.9	94.8	48.7
UW-4 Barge Clam Shell	18-Apr-00	1528	48.7	81.7	44.9
UW-5 Barge Clam Shell	18-Apr-00	1529	44.5	92.7	48.1
UW-6 In-situ 0.3 – 0.6/2.0	18-Apr-00	1530	43.5	98.1	49.5
UW-7 In-situ 1.5 – 1.8/2.0	18-Apr-00	1531	45.6	89.5	47.2
UW-8 In-situ 0.5 – 0.8/4.2	18-Apr-00	1532	42.1	106.2	51.5
UW-9 In-situ 2.0 – 2.3/4.2	18-Apr-00	1533	40.3	99.2	49.8
UW-10 In-situ 3.8 – 4.1/4.2	18-Apr-00	1534	48.5	87.5	46.7

ISWS Job No: 47

Notes:
Column (5): Water content = (weight of water)/(dry net weight of sediment) × 100
Column (6): Water content = (weight of water)/(total weight of wet sediment) × 100

below the lake bottom. Similarly, sample UW-9 (in-situ 2.0–2.3/4.2) was collected from the same 4.2-foot-long core and extended 2.0 feet to 2.3 feet below the lake bottom. The last sample, UW-10 (in-situ 3.8–4.1/4.2), was collected from the same core and extended 3.8 feet to 4.1 feet below the lake bottom.

Table 6 shows all these results. Unit weights of all the samples from the barge varied from 39.7 pounds per cubic foot to 48.7 pounds per cubic foot. Unit weights of all undisturbed samples varied from 42.1 pounds per cubic foot to 48.5 pounds per cubic foot. Two columns in Table 6 describe the moisture contents of these samples. Column 5 shows the ratio of the weight of water to the net dry weight of the sediment in percent. Column 6 shows the percent of water in weight in terms of the total weight of the wet sample.

The moisture content in terms of the dry net weight of the sediments varies from 88.4 percent to 104.1 percent for dredged materials and from 87.5 percent to 106.2 percent for undisturbed samples. In terms of the total weight of the wet sediments, the moisture content varied from 46.7 percent to 50.9 percent.

This analysis showed that the dredging of Peoria Lake sediment, when done very carefully using techniques such as cable-arm or clam-shell-type dredges and keeping the structure of the dredged soil intact, has no significant effect on the moisture content of sediment compared to undisturbed sediment. However, caution must be exercised in interpreting these data. Sampling on the barge was done at places where sediment appeared to be fairly stable and intact. A random sampling would certainly show a higher moisture content than those reported here.

Summary

The Illinois State Water Survey surveyed five Peoria Lake deltas to estimate the amount of sediment accumulated at the mouths of these deltas between 1902-1904 and 1999. The deltas surveyed were: Richland Creek, Partridge Creek, Blue Creek, Dickison Run, and Farm Creek. This report summarizes the results of the field survey conducted in 1999. In addition to reporting survey results, a historical analysis of the location, movement, and aerial extent of these deltas between 1939 and 1994 is included in this report. Delta volumes and surface areas were calculated within a grid area that encompassed the areal extent of the 1999 deltas. The grid areas could not be extended to cover each of the entire 1902-1904 deltas because of significant alterations of the tributary outlets in the last 100 years or so.

Computed sediment accumulation values given in the report do not include the suspended sediment load transported to the lake from the tributaries or the bed load contribution from the main Illinois River. The volume of net sediment accumulation was determined by comparing the 1902-1904 survey results by Woermann with the detailed 1999 topographic and hydrographic survey results for each selected delta area. A selected area at the mouth of each delta was defined and an elevation grid developed for each survey year. Net sediment accumulation was determined from the difference in the mean grid elevation between 1904 and 1999.

Analyses of historical aerial photographs indicate that all of these deltas have grown between 1939 and 1994, the 55-year period for which aerial photographs are available. Four of the five tributary channels (Richland Creek, Partridge Creek, Blue Creek, and Farm Creek) have been redirected so that the 1999 tributary channels and outlets are not at the 1904 locations.

All of the deltas studied experienced net sediment accumulation. Partridge Creek had the highest amount of sediment accumulation (2,683 acre-feet) followed by Blue Creek (1,497 acre-feet). Dickison Run had the smallest net sediment accumulation (338 acre-feet). However, in terms of sediment accumulation rates per year per unit drainage area, Blue Creek had the highest rate (2,300 tons/year/square mile), followed by Dickison Run (687 tons/year/square mile), Richland Creek (488 tons/year/square mile), and Farm Creek (34 tons/year/square mile). These results must be viewed with a cautionary note. Several of the tributary channels and mouths have been mined for sediment over the years, in particular, Farm Creek. Consequently, very little information about the amount of sediment removed is known, making it impossible to estimate the quantity of sediment removed or moved. Thus, the compiled volume of sediment accumulation at the mouths of these deltas does not reflect the actual delivery of sediment and certainly underestimates the net delivery of the sediment from these tributaries to Peoria Lake.

Relationships also have been developed between elevation and sediment volumes, and elevation and surface area for each of the deltas within the respective grid areas.

Results are also presented from a sampling program to determine unit weights and moisture contents of Peoria Lake bed sediments from the east side of the channel near Spindler Marina. Both disturbed (by dredge) and undisturbed sediment samples were collected for analysis. These results show that sediment unit weights vary from 39.7 pounds per cubic foot to 48.7 pounds per cubic foot. The moisture content in terms of net dry weight of sediments varies from 87.5 percent to 104.1 percent.

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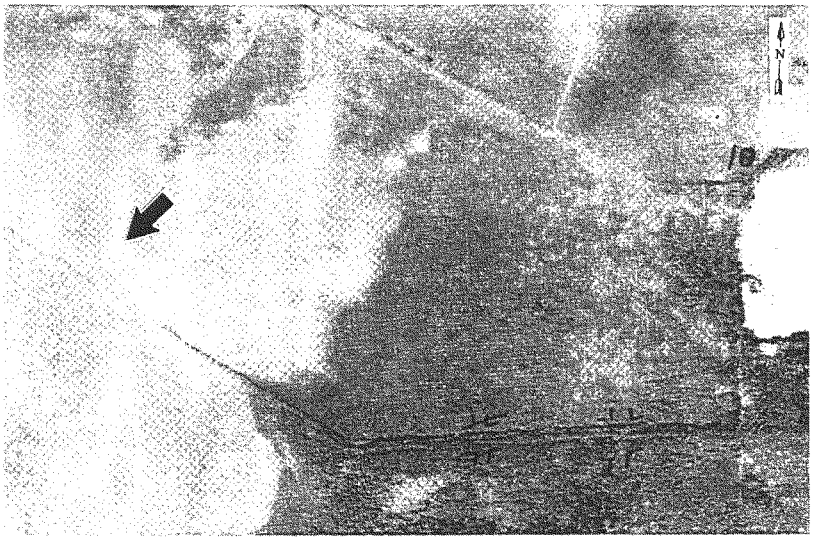
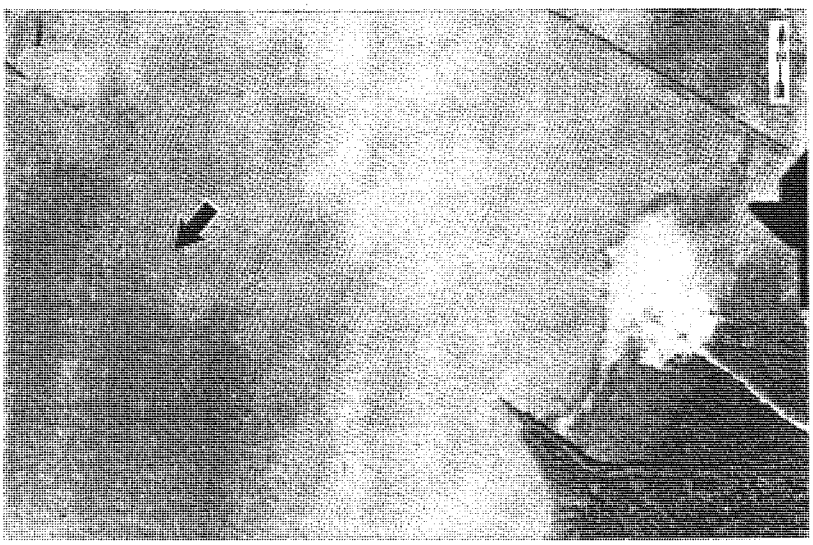
Appendix. Historical Aerial Photographs of the Five Selected Deltas

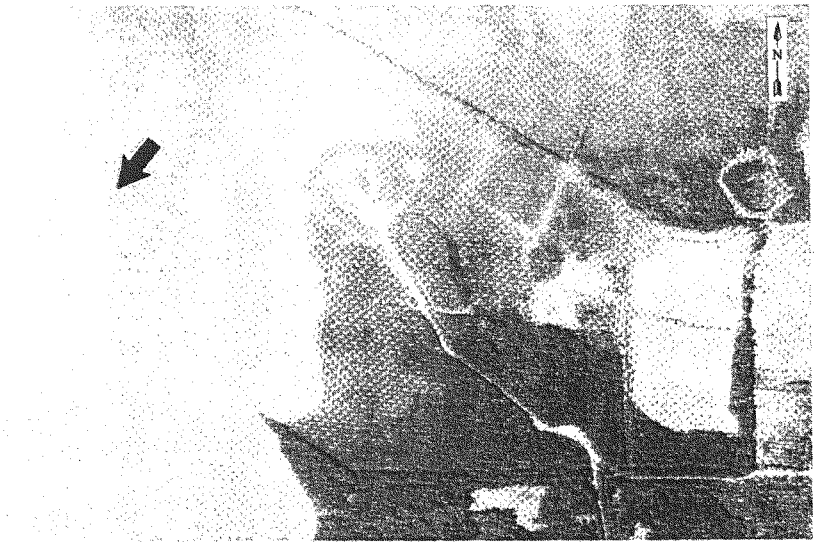
AA–R1 to R8 Aerial Views of the Richland Creek Delta



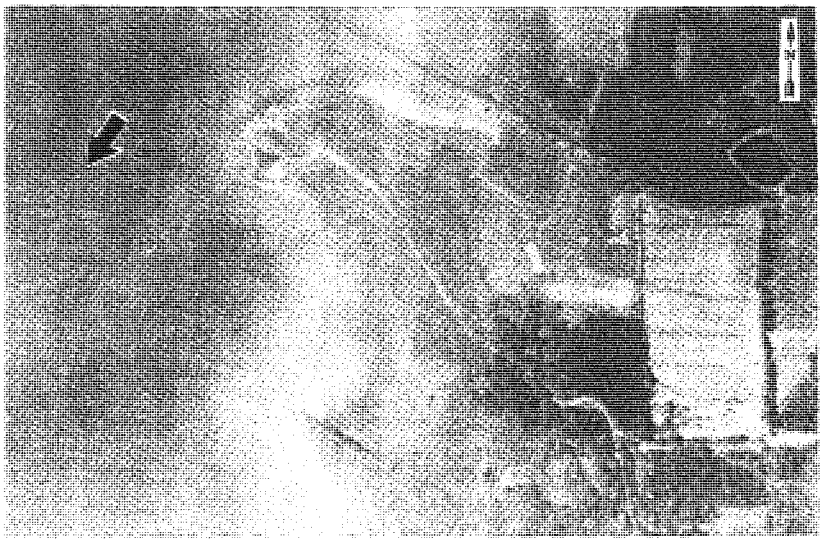
R1: Aerial view of Richland Creek Delta, 1939



R2: Aerial view of Richland Creek Delta, 1951



R3: Aerial view of Richland Creek Delta, 1957



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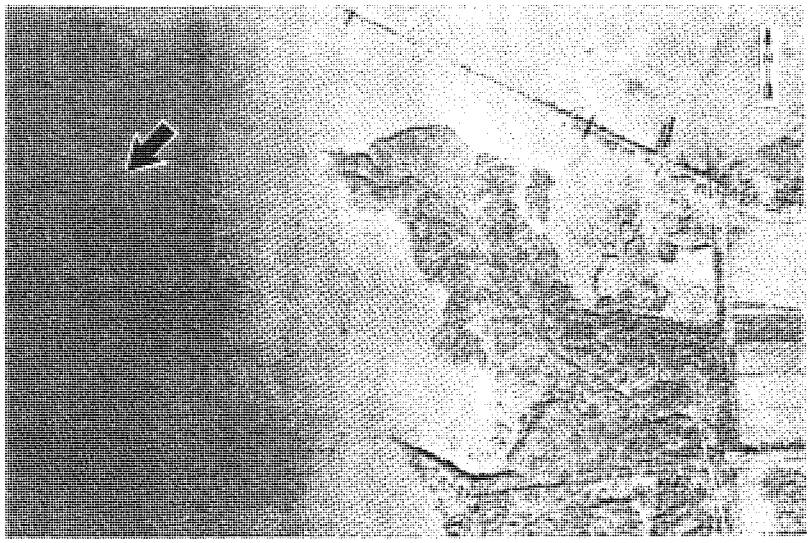

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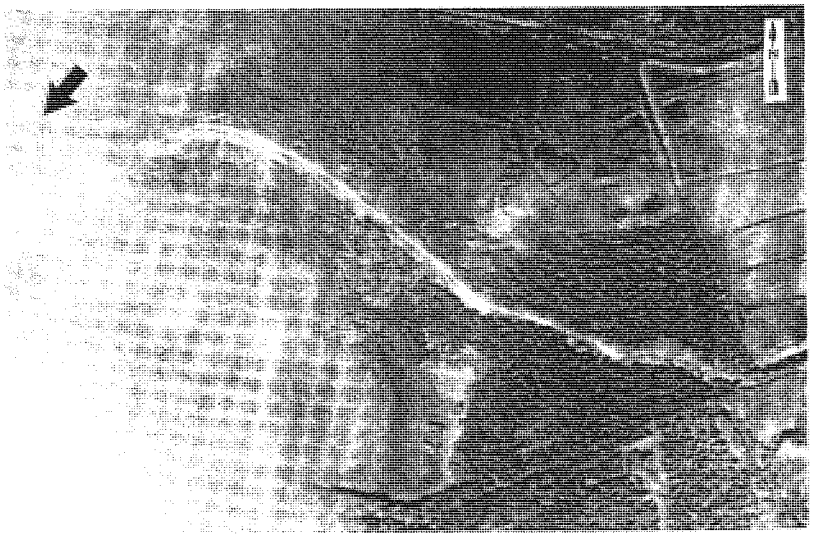

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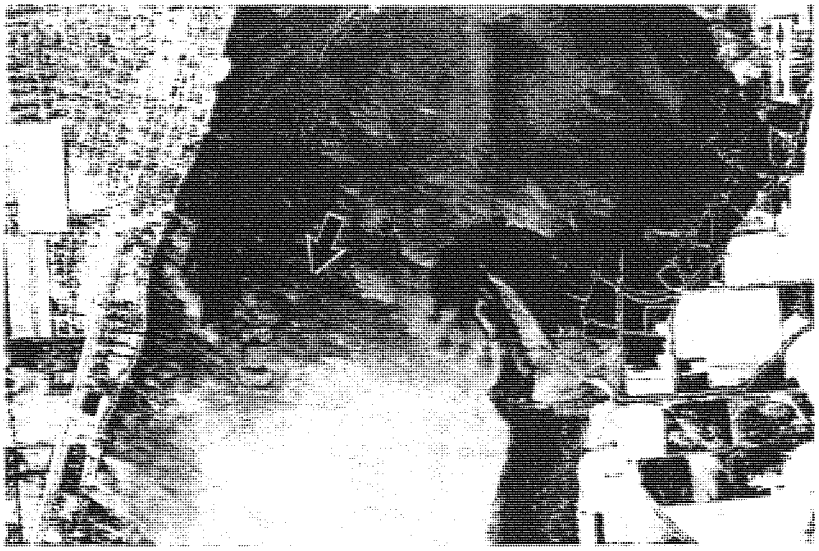
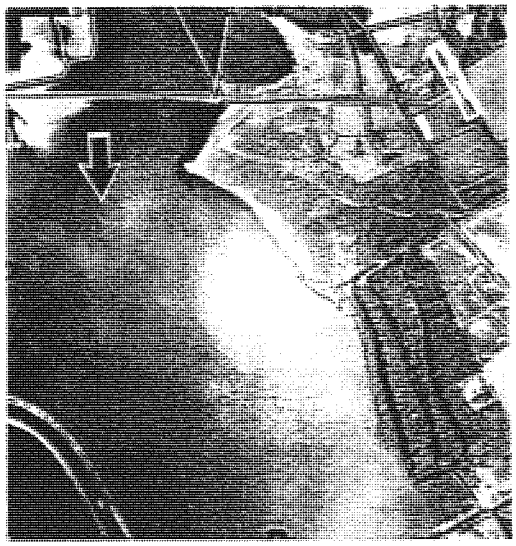
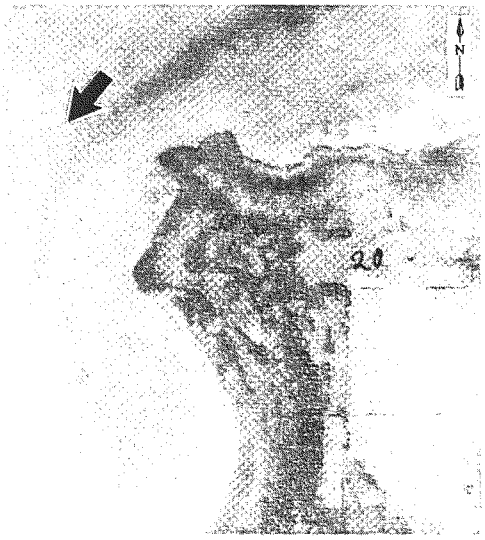


R7: Aerial view of Richland Creek Delta, 1988

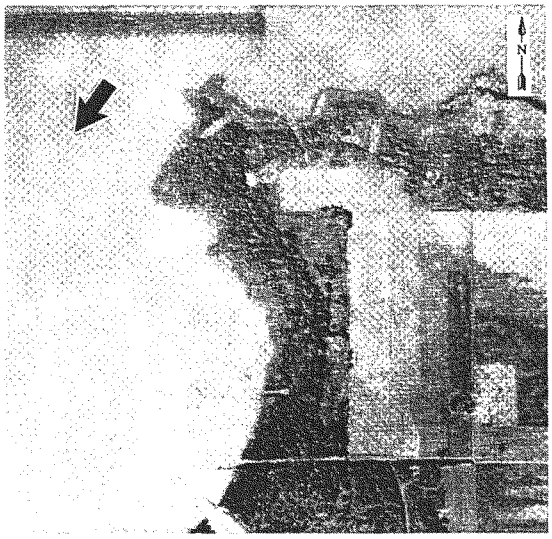


R8: Aerial view of Richland Creek Delta, 1994

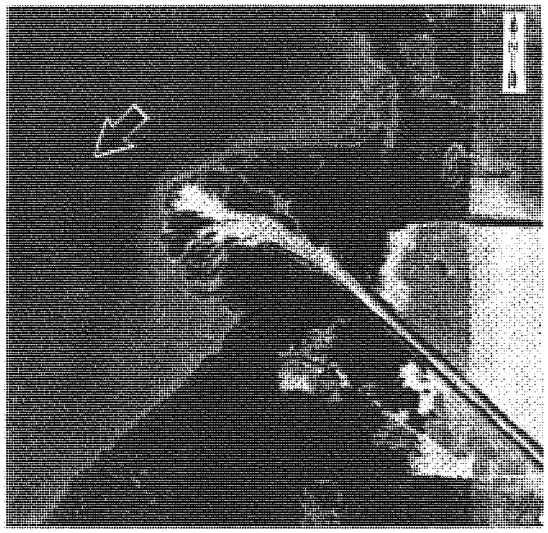
AA–P1 to P8 Aerial Views of the Partridge Creek Delta



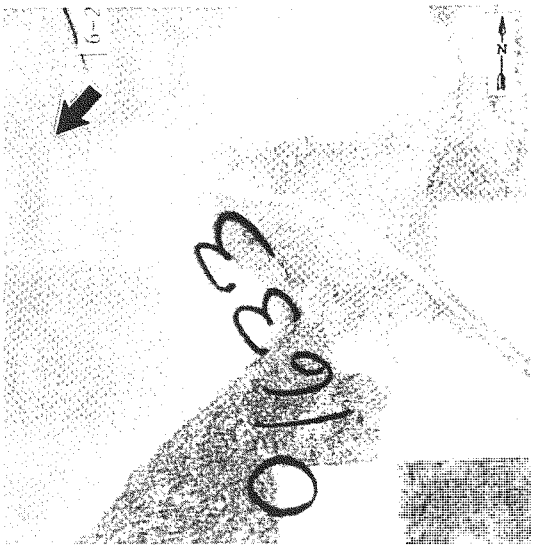
P1: Aerial view of Partridge Creek Delta, 1939



P2: Aerial view of Partridge Creek Delta, 1951



P3: Aerial view of Partridge Creek Delta, 1957



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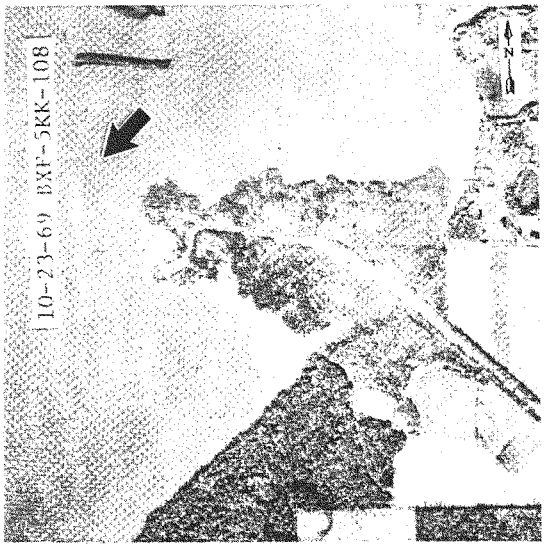

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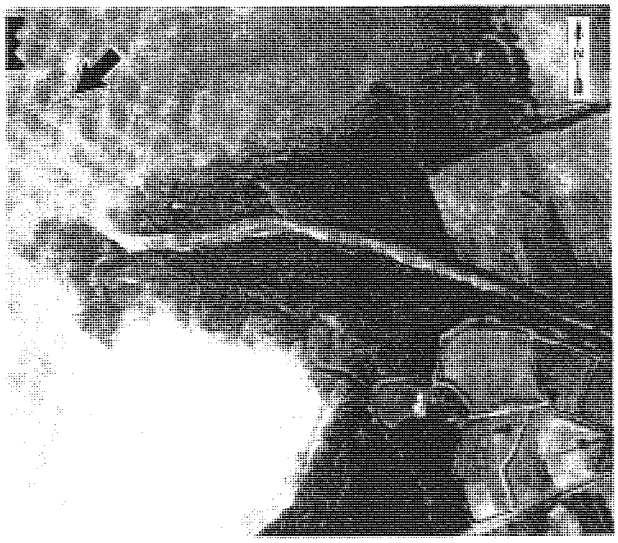

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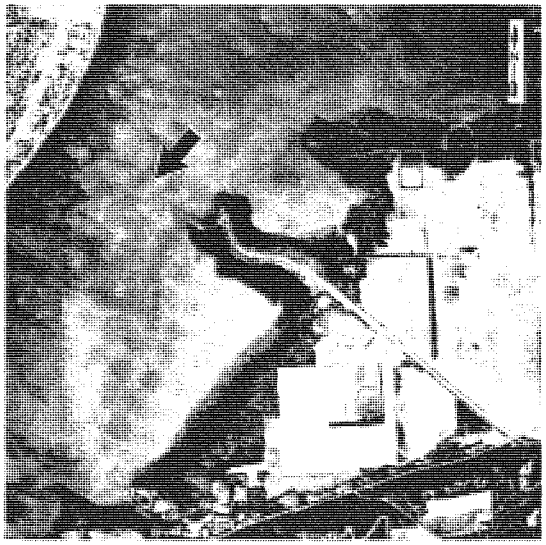
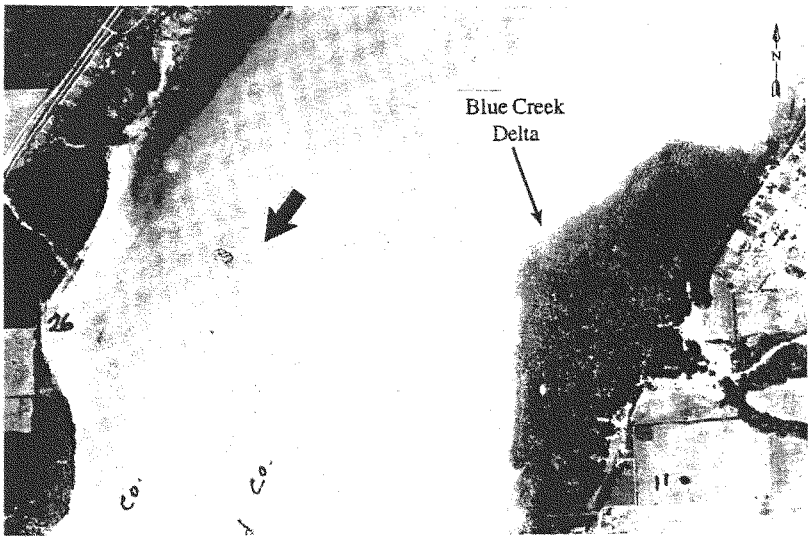


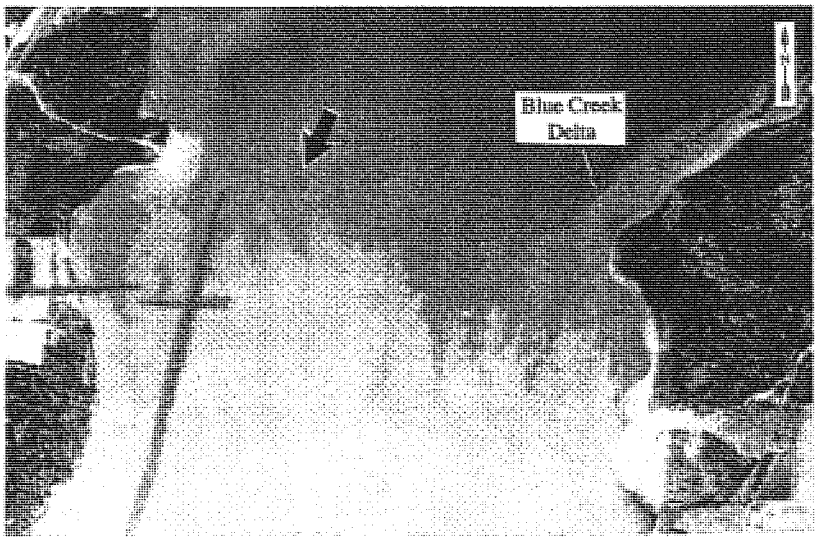
P7: Aerial view of Partridge Creek Delta, 1988

P8: Aerial view of Partridge Creek Delta, 1994

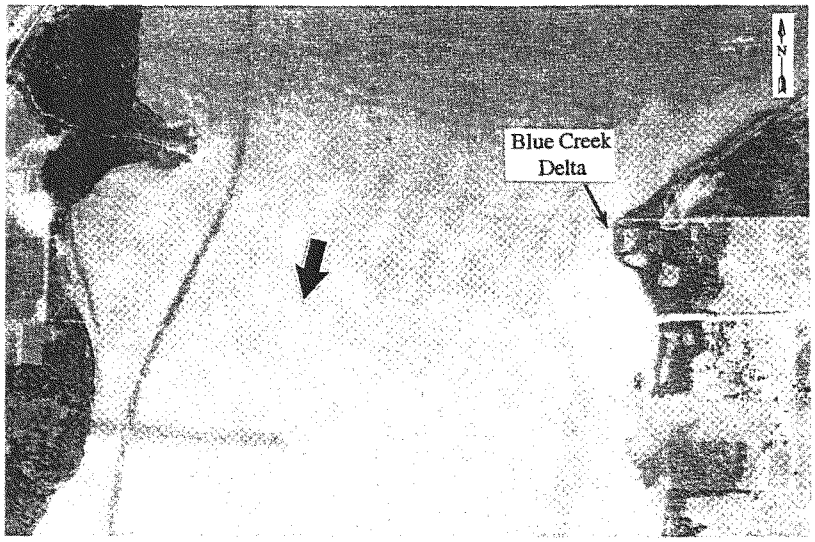
AA–B1 to B7 Aerial Views of the Blue Creek Delta



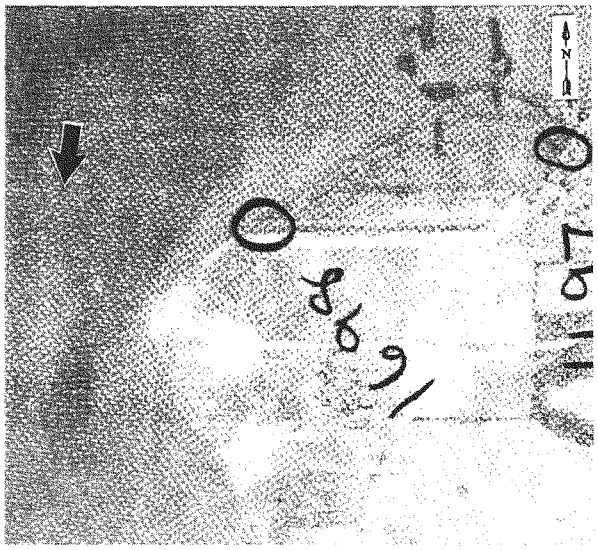
B1: Aerial view of Blue Creek Delta, 1939



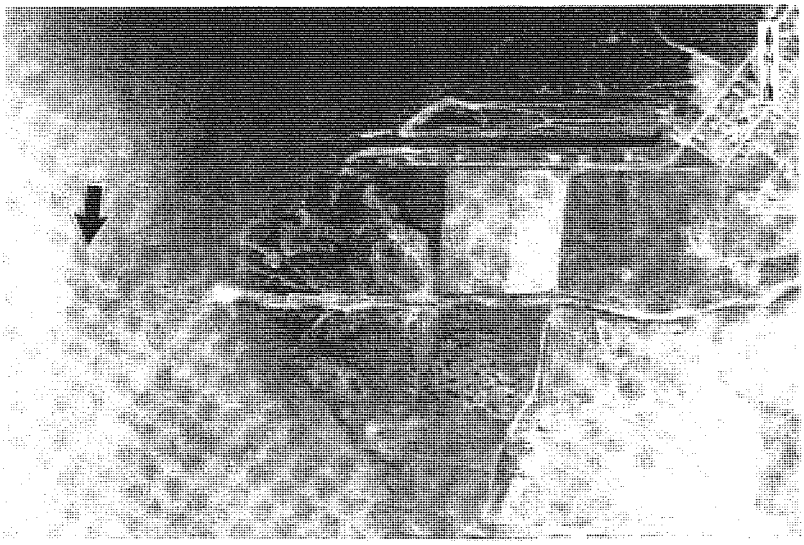
B2: Aerial view of Blue Creek Delta, 1951



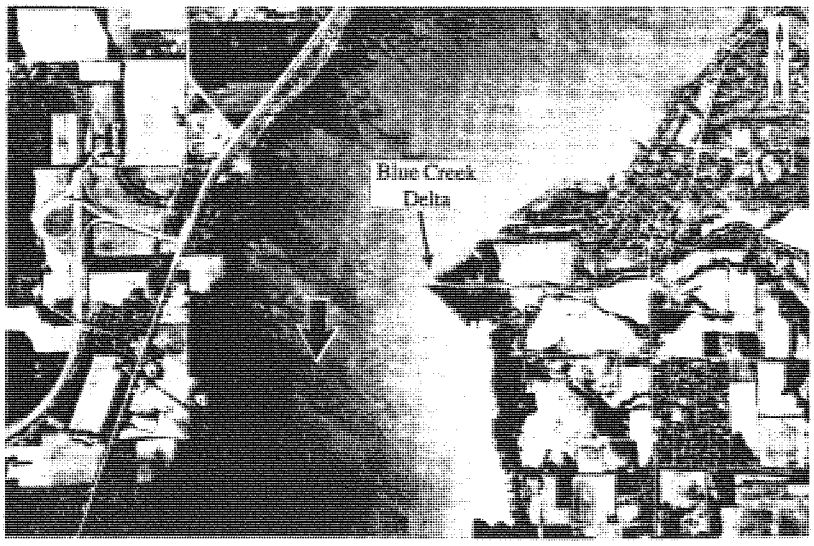
B3: Aerial view of Blue Creek Delta, 1957



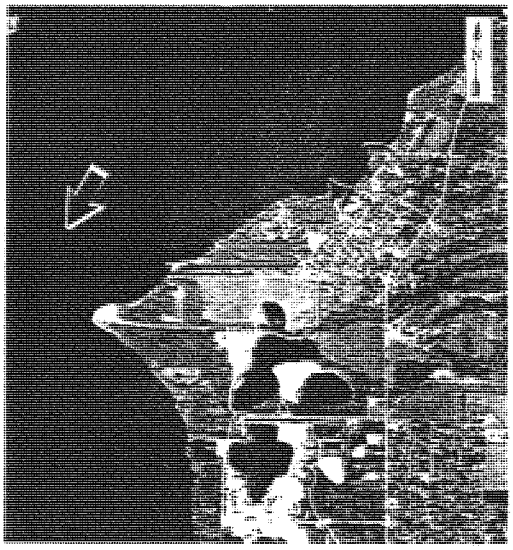
B4: Aerial view of Blue Creek Delta, 1963



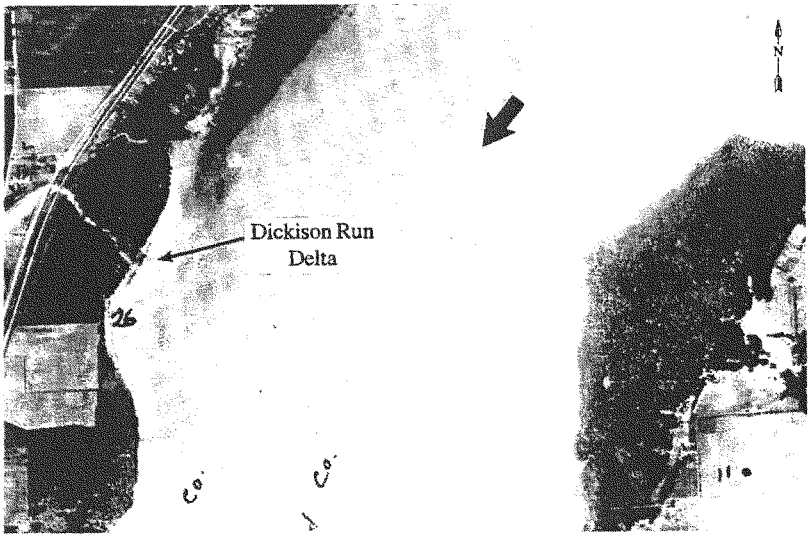
B5: Aerial view of Blue Creek Delta, 1974



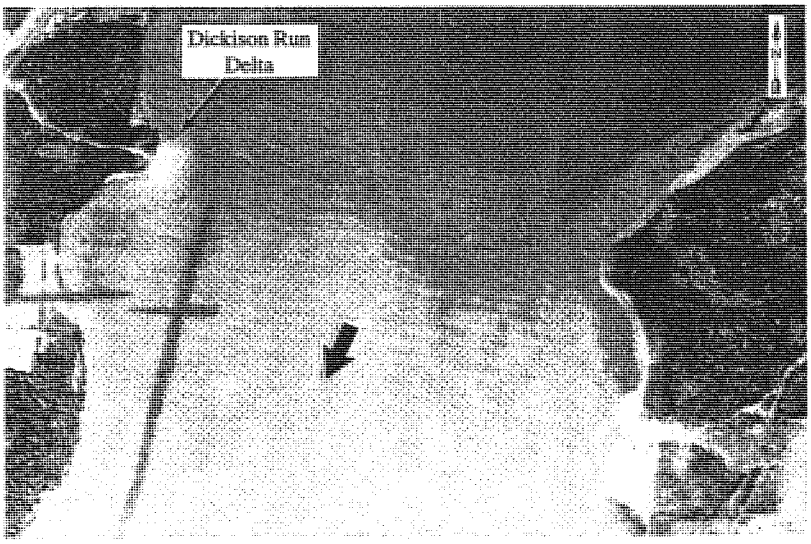
B6: Aerial view of Blue Creek Delta, 1988



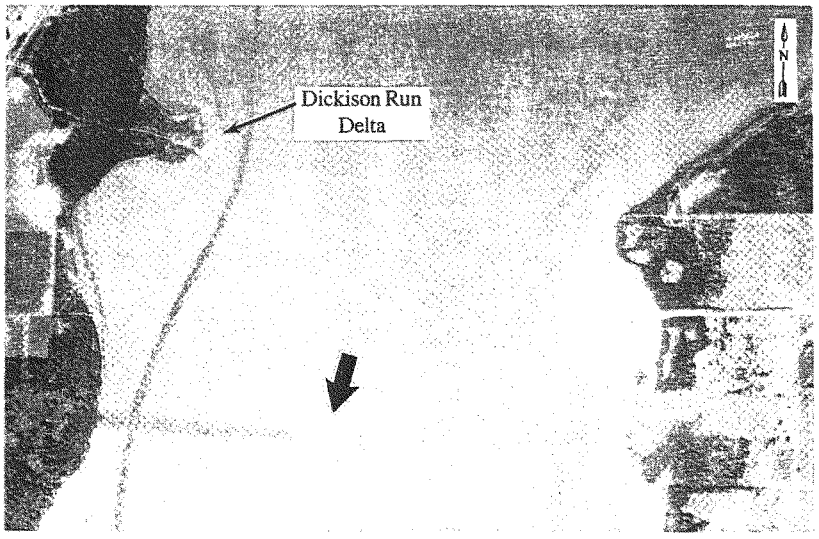
B7: Aerial view of Blue Creek Delta, 1994



D1: Aerial view of Dickison Run Delta, 1939

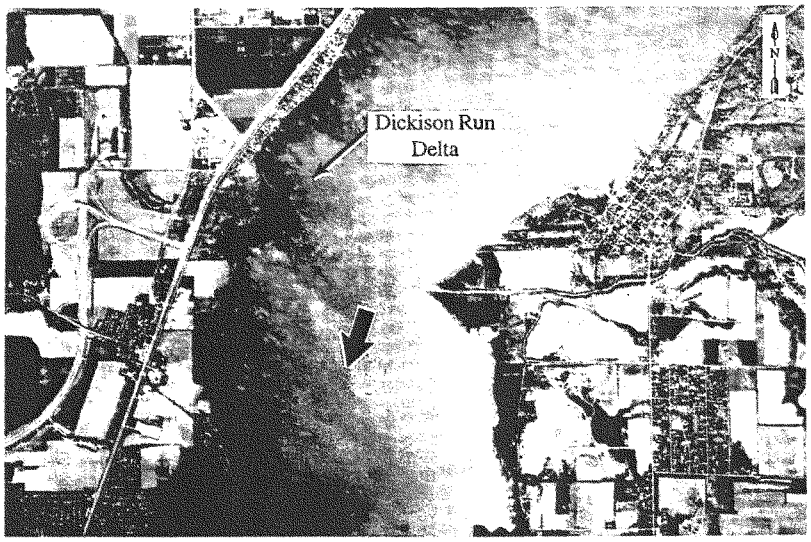


D2: Aerial view of Dickison Run Delta, 1951

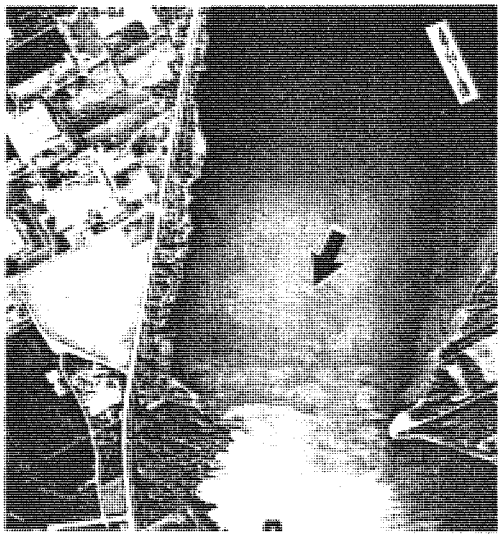


D3: Aerial view of Dickison Run Delta, 1957

D4: Aerial view of Dickison Run Delta, 1974

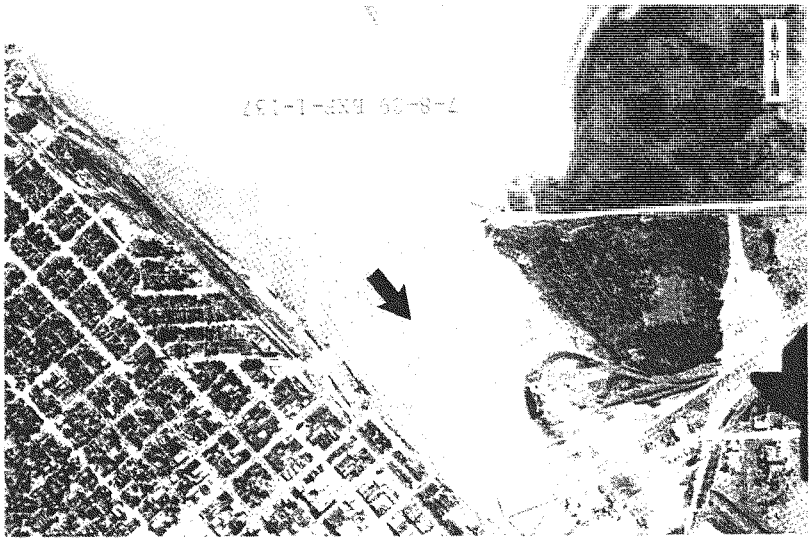


D5: Aerial view of Dickison Run Delta, 1988

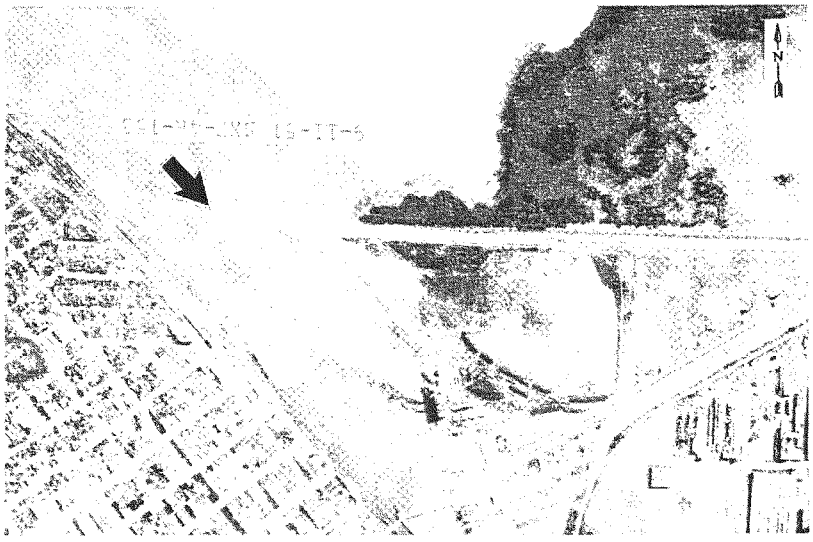


D6: Aerial view of Dickison Run Delta, 1994

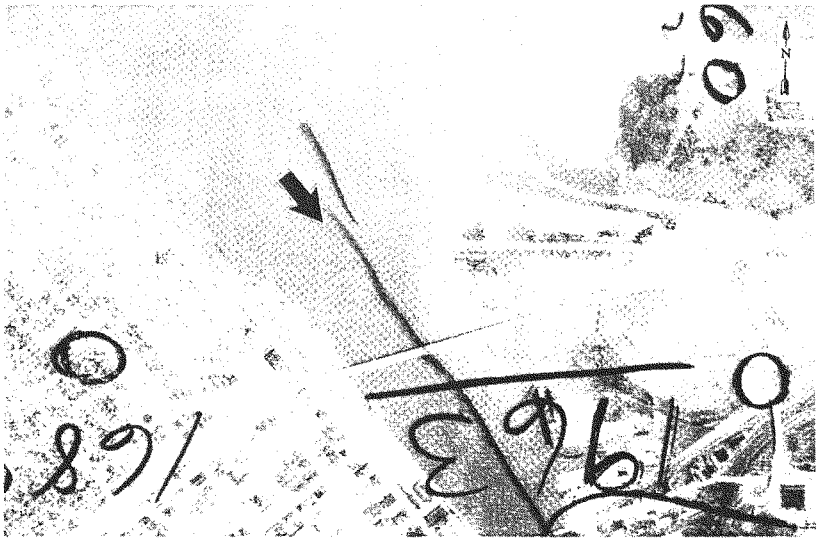
AA–F1 to F7 Aerial Views of the Farm Creek Delta



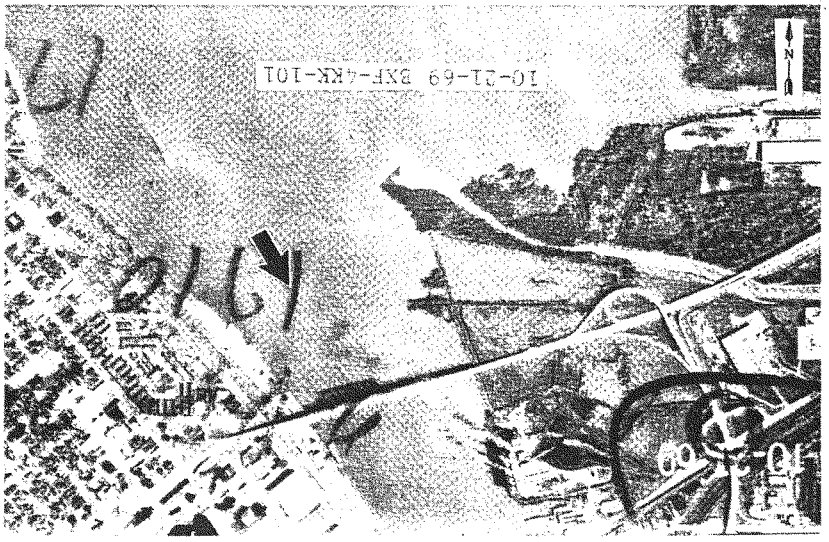
F1: Aerial view of Farm Creek Delta, 1939



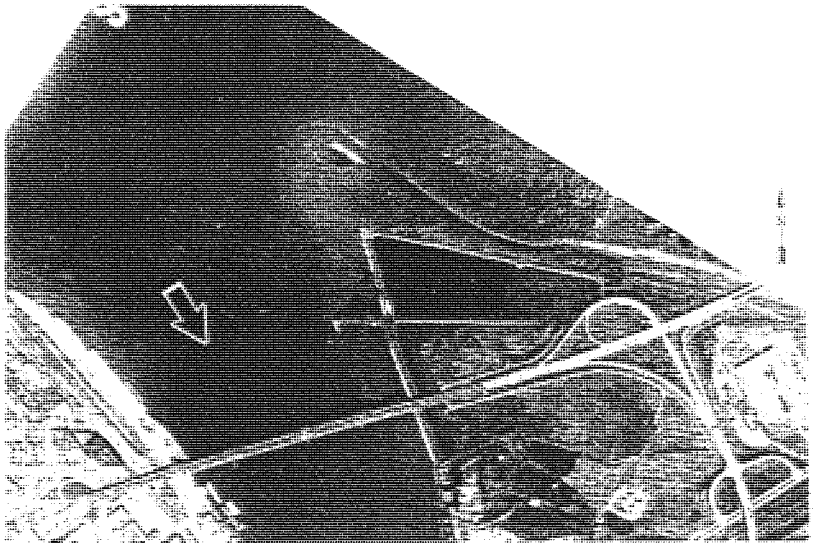
F2: Aerial view of Farm Creek Delta, 1951



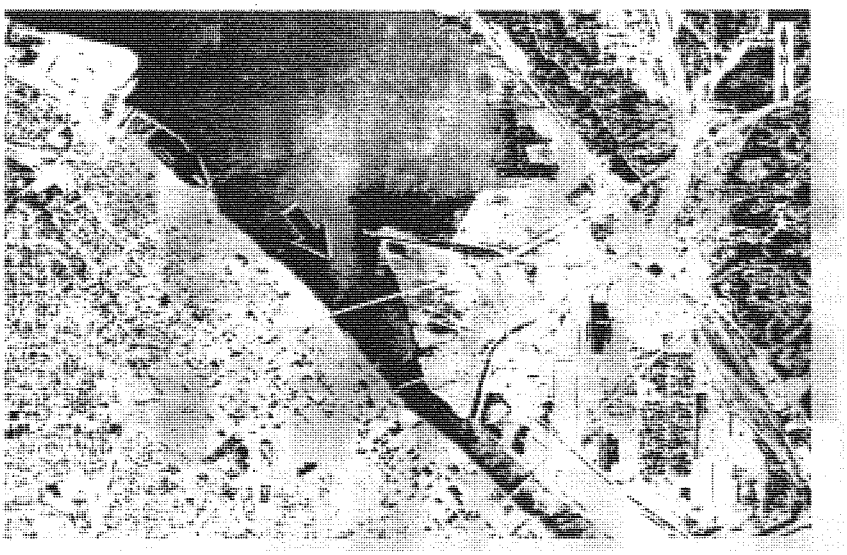
F3: Aerial view of Farm Creek Delta, 1963



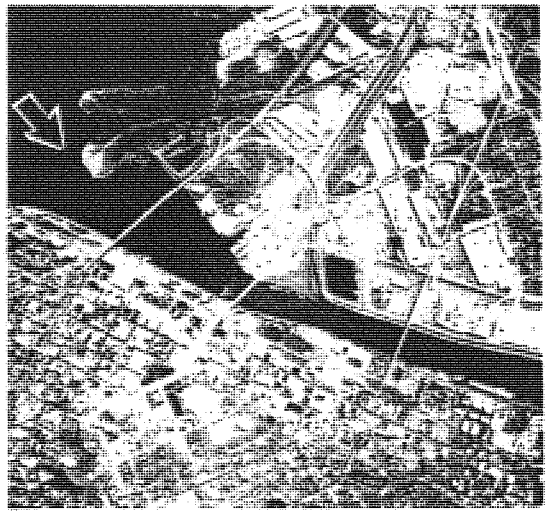
F4: Aerial view of Farm Creek Delta, 1969



F5: Aerial view of Farm Creek Delta, 1974



F6: Aerial view of Farm Creek Delta, 1988



F7: Aerial view of Farm Creek Delta, 1994

APPENDIX E-3

SEDIMENT CONTAMINANT ANALYSIS REPORT

Assessment of Sediment Quality for the Peoria River Front Environmental Restoration Project

Addendum

to

Assessment of Sediment Quality in Peoria Lake: Results from the Chemical Analysis of Sediment Core Samples Collected in 1998, 1999, and 2000

Richard A. Cahill
Illinois State Geological Survey
Open File Series 2001-4

June 29, 2001

Contents

Purpose 1

Sediment Quality Results 1
Results from Peoria Lake Sediment Vibra Core Collected near RM 165 in November 1998 1
Results from Peoria Lake Sediment Samples Collected near RM 165 in February 1999 2
Results from Peoria Lake Sediment Samples Collected near RM 165 in April 2000 2
Results from Peoria Lake Sediment Samples Collected near RM 165 in October 2000 . . 2
Results from Peoria Lake Sediment Samples Dredged in May 2000 near RM 165 and collected from sediment storage area in January 2001 by IEPA 5

Discussion 5
Comparison of Metal Results for Peoria Lake Sediment Samples Collected Near RM 165 Analyzed by ISGS, IEPA and Laboratories A and B 5
Comparison of PAH (Method 8310), PCBs and chlorinated pesticides in Peoria Lake Sediment Samples Collected Near RM 165 Analyzed by IEPA and Laboratories A and B 5
Comparison of Peoria Lake Sediment Quality to Background Soils, and IEPA Classification of Lake Sediments 9
Comparison of Peoria Lake Sediment Quality to various sediment quality guidelines for freshwater ecosystems 11

References 14

Tables

1 Location of sediment samples collected October 11, 2000 in Peoria Lake for comprehensive analysis by Laboratory B 3
2 Concentrations of Major Constituents and Metals in Peoria Lake Sediment Collected near River Mile 165 determined by ISGS, Laboratories A and B and IEPA 7
3 Concentrations of PAH (Method 8310), PCB and Chlorinated Pesticides in Peoria Lake Sediment Collected near River Mile 165 determined by IEPA and Laboratories A and B. 8
4 Range in Background Concentrations of Metals in Undisturbed Soils in the Peoria area, Mean Concentration in Illinois Soils Determined by ISGS and IEPA, and Elevated and Highly Elevated IEPA Classification of Metals in Illinois Lake Sediments 10
5 U.S. EPA Sediment Screening Values, Apparent Effects Thresholds High, Consensus-based Probable Effect Concentrations, and TACO Tier 1 Soil Remediation Objectives for Metals 12
6 U.S. EPA Sediment Screening Values, Apparent Effects Thresholds Low, Apparent Effects Thresholds High, and TACO Tier 1 Soil Remediation Objectives for selected organic compounds 13

Figures

1 Locations where sediment cores were collected in Peoria Lake near River Mile 165 between 1998 and 2000. 4

Appendices

1 Total metal concentrations in a composited sediment sample from a vibracore collected near RM 165 in Lake Peoria in 1998, analyzed by ISGS 15
2 Total recoverable metal concentrations in a composited sediment sample from a vibracore collected near RM 165 in Lake Peoria in 1998, analyzed by ISGS 16
3 Results form a comprehensive analysis of a composited sediment sample from a vibracore collected near RM 165 in Lake Peoria in 1998, analyzed by Laboratory A 17
4 Results from comprehensive analysis of sediment samples collected in Peoria Lake near RM 165 2/10/1999, analyzed by Laboratory A 20
5 Total recoverable metal concentrations and Total Carbon, Inorganic Carbon and Organic Carbon in a sediment samples from a core collected near RM 165 in Lake Peoria 4/25/2000 by ISWS, analyzed by ISGS 24
6 Results from comprehensive analysis of five sediment samples collected in Peoria Lake Near RM 165 10/11/2000, analyzed by Laboratory B 25
7 Results from comprehensive analysis of sediment samples that had been dredged from Peoria Lake in May 2000 and sampled from a dredge sediment storage area in January 2001, analyzed by the IEPA Laboratory 30

Purpose

There is considerable interest in the sediment quality near RM 165 in Peoria Lake. Dredging took place there in the summer of 2000 to maintain access to Spindler Marina. This is also an area in the lake where large-scale dredging projects are proposed. Sediment samples were collected in 1999 and 2000 to evaluate sediment quality. Samples of the sediment that was dredged in 2000 was sampled from the sediment storage area in 2001. The sediment samples were analyzed by a variety of techniques and laboratories.

The purpose of this report is to provide data on the concentrations of a large number of organic and inorganic analytes in sediments near River Mile 165 from Peoria Lake. The chemical analyses were conducted at ISGS, the IEPA, and two outside contract laboratories. The report contains new chemical results not discussed in Cahill 2001.

Sediment Quality Results

Results from Peoria Lake Sediment Vibra Core Collected near RM 165 in November 1998

The core identification, date collected, approximate river mile, latitude, longitude, and core length of vibracore collected in Peoria Lake is given below.

Core ID	Date Collected	Approximate River Mile	Latitude Deg., Min., Sec.	Longitude, Deg., Min., Sec.	Core Length (cm)
165.5	11/28/98	165.5	40 42 29.8 N	89 32 29.8 W	94

Sediment samples collected using the portable vibracoring system were collected in aluminum pipe to avoid organic contamination. A single composite was made from this core. Analytical splits of the sediment samples were analyzed by ISGS and also to an IEPA-approved contract laboratory (Lab A). Details of methods of analysis and the analytes determined by the Illinois State Geological Survey and laboratory A are found in Cahill, 2001.

The results for total metal analysis Peoria Lake are given in Appendix 1. The results for "Total Recoverable Metals" in the composite sample from Peoria Lake are given in Appendix 2.The results from laboratory A for the comprehensive list of parameters are presented in

appendix 3.

Results from Peoria Lake Sediment Samples Collected near RM 165 in February 1999

Three sediment cores were collected near Carl Spindler Marina, RM 165, in February 1999 by laboratory A. The core samples were collected at approximately 175-m (A), 450-m (B) and 725-m (C) from the entrance to the marina using a conventional gravity corer. The locations of the samples are shown in Figure 1. The cores were approximately 1 meter in length and each core was composited into a single analytical sample. The sediment samples were analyzed by laboratory A, and the results are given in appendix 4.

Results from Peoria Lake Sediment Samples Collected near RM 165 in April 2000

A sediment core was collected by the ISWS in April 2000 at the same locations as the vibracore that was collected in 1998. The core was approximately 0.3 meter in length core was separated into 6 cm intervals. Metals were determined by the ISGS with inductively coupled plasma emission spectrometry according to U.S. EPA method 6010. Total carbon, inorganic carbon and organic carbon were also determined. The results are given in appendix 5.

Results from Peoria Lake Sediment Samples Collected near RM 165 in October 2000

Five sediment cores were collected in Peoria Lake on October 11, 2000 using a conventional gravity corer. The locations of the sediment cores and the lengths of the cores recovered are listed in table 1 and shown in figure 1. Each sediment core was split into two segments. One 5-cm segment of the core was sampled for volatile organic carbon compounds. Approximately the bottom 10 cm of each core were composited and tested for a comprehensive list of metals, pesticides, semi-volatile organic compounds, PAH compounds, PCBs, and chlorinated herbicides. The analysis was done by a second contract laboratory (Lab B). The results are given in appendix 6.

Table 1 Location of sediment samples collected October 11, 2000 in Peoria Lake for comprehensive analysis by Laboratory B.

ID	Approximate River Mile	Latitude Deg., Min., Sec.	Longitude, Deg., Min., Sec.	Core Length cm
200	165.2	40 42 37.5 N	89 32 45.7 W	35
201	165.4	40 42 46.0 N	89 32 34.6 W	40
202	165.6	40 42 52.6 N	89 32 37.1 W	40
203	165.8	40 43 20.6 N	89 32 32.6 W	52
204	165.9	40 43 21.5 N	89 32 35.8 W	57

Locations of Sediment Cores Collected in Lake Peoria near RM 165.
✚ = 4/1998 Gravity Core (ISGS and Lab A); ▲= 11/1998 Vibra-Core (ISGS and Lab A);
■ = 2/1998 Gravity Cores (Lab A); ● = 10/2000 Gravity Cores (Lab B)

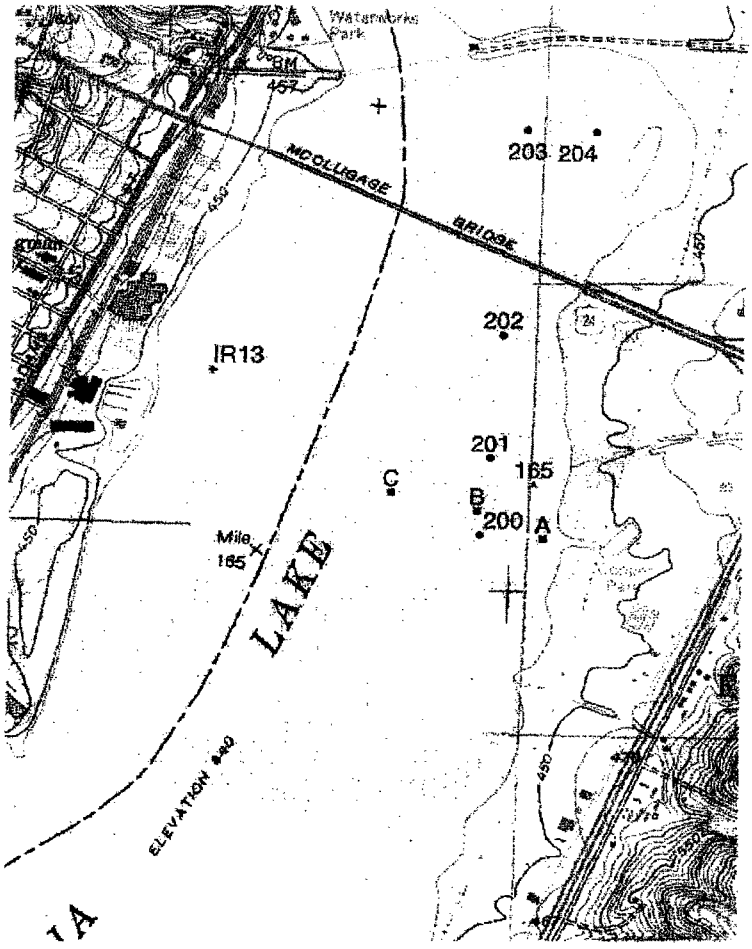


Figure 1 Locations where sediment cores were collected in Peoria Lake near River Mile 165 between 1998 and 2000.

Results from Peoria Lake Sediment Samples Dredged in May 2000 near RM 165 and collected from sediment storage area in January 2001 by IEPA

In January of 2001 the Illinois Environmental Protection Agency collected three samples of sediment that had been dredged from the Peoria Lake during the Spindler Marina channel project in May 2000. The sediment was from the channel transecting the site of the proposed Peoria River front Environmental Restoration Project. The well mixed sediment was stored at a gravel pit and had weathered outside for about nine months. The analysis for a comprehensive list of organic parameters and metals was done by the IEPA Laboratory. The results are given in appendix 7.

Discussion

Comparison of Metal Results for Peoria Lake Sediment Samples Collected Near RM 165 Analyzed by ISGS, IEPA and Laboratories A and B

The concentrations of metals and major element in sediment samples collected near RM 165 in Peoria Lake between 1998 and 2001 are listed in table 2. Included in the table are concentration in sediment collected from the sediment storage area by the IEPA. The sediment samples were collected by various techniques and represent different depths and locations.

The concentrations of arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc are similar between laboratories. Elevated levels of arsenic and cadmium determined by laboratory A were not seen in the other data sets. Silver, selenium, thallium and antimony were not detected in any of the samples. The weathered, dredged sediment concentrations tested by the IEPA were in general lower than those obtained from fresh sediment cores.

Comparison of PAH (Method 8310), PCBs and chlorinated pesticides in Peoria Lake Sediment Samples Collected Near RM 165 Analyzed by IEPA and Laboratories A and B

The concentrations of PAH, PCBs and detected chlorinated pesticides in sediment samples in cores collected near RM 165 in Peoria Lake and analyzed by laboratories A and B is provided in table 3. Included in the table are concentration in sediment collected from the sediment storage area by the IEPA.

Laboratory B found much lower levels of PAH compounds than laboratory A. The concentration of some PAH compounds determined by the IEPA on the dredged sediment were comparable to those determined by laboratory A and in a few cases higher. The high concentrations of benzo(a) pyrene and dibenz(a,h,)anthracene found by laboratory A were not found by laboratory B or the IEPA.

PCBs were not detected by either laboratory. The chlorinated pesticide MCPP detected by laboratory A was not observed by laboratory B.

Table 2 Concentrations of Major Constituents and Metals in Peoria Lake Sediment Collected near River Mile 165 determined by ISGS, Laboratories A and B and IEPA. ISGS (1) = Total Metal Concentrations, ISGS (2) = Total Recoverable Metal Concentrations. CL , core length, n, number of sub-samples used to calculate mean concentration. All values in milligram per kilogram unless noted otherwise

	ISGS (1) 11/98 CL 0.9 m n = 1	ISGS (2) 11/98 n = 1	Lab A 11/98 n = 1	Lab A 2/99 CL 1.0 m n = 3	ISGS (2) 4/00 CL 0.3 m n = 2	Lab B 10/00 CL 0.3 n = 5	IEPA 1/01 grabs n = 3
NH4-N			30	577		335	
TKN			533	614		2622	
Tot. P	1000		937			989	
Al (%)	6.40	3.43			3.35	1.07	0.89
Fe (%)	3.54	3.46			3.06	1.65	1.87
Ca (%)	3.28	3.14			3.44	2.14	4.1
Mg (%)	1.70	1.56			1.63	1.04	1.70
K (%)	2.34	0.74			0.71	0.15	0.13
Na	4900	210			<400	260	183
Mn	770	721			674	419	473
Ag			<2	<2		<2	<0.7
As		<50	26	7.7	<75	5.5	6.8
Be		1.1			1.3	0.4	0.6
Ba	470	190	106	128	189	82	113
Cd	<0.9	<5	1.7	4.4	<5	<2	<1.1
Co		14			14	7	8.5
Cr		43	32	48	51	32	22
Cu	36	31			56	27	23
Hg			0.12	0.33		0.22	0.10
Ni	<20	48			46	30	27
Pb	73	25	32	52	40	52	24
Sb		<25			<50	<10	<1
Se		<50		<1	<50	<1	<1.7
Tl		<100			<50	<1	<1.7
V		35			31	21	20
Zn	176	173			251	184	100

Table 3 Concentrations of PAH (Method 8310), PCB and Chlorinated Pesticides in Peoria Lake Sediment Collected near River Mile 165 determined by IEPA and Laboratories A and B. CL , core length, n, number of sub-samples used to calculate mean concentration same as in table 2. All values in mg/kg.

	Lab A 11/98	Lab A 2/99	Lab B 10/00	IEPA 1/01
Acenaphthene	<0.9	0.423	0.051	<0.08
Acenaphthylene	<0.9	<0.076	<0.18	<0.08
Anthracene	<0.09	0.053	<0.01	<0.07
Benzo(a) anthracene	0.31	0.195	<0.075	0.19
Benzo(a)pyrene	0.24	0.385	0.025	0.12
Benzo(b)fluoranthene	3.1	**2.05**	0.016	0.23
Benzo(g,h,i) perylene	<0.6	0.68	0.036	<0.12
Benzo(k)fluoranthene	0.13	0.21	0.024	0.25
Chrysene	0.12	0.25	0.018	0.26
Dibenz(a,h)anthracene	<0.094	**2.8**	0.006	<0.08
Fluoranthene	0.36	0.32	0.033	0.50
Fluorene	<0.94	0.093	<0.025	<0.08
Indeno(1,2,3-c,d) pyrene	<0.094	0.53	0.019	<0.14
Naphthalene	<0.093	0.26	<0.20	<0.08
Phenanthrene	0.12	0.195	0.011	0.36
Pyrene	<0.094	0.52	0.026	0.43
PCB's	<0.63	<0.074	<0.064	
2-4 D	<0.19	<0.23	<0.04	
Dalapon	<0.19	<0.23	<0.20	
Dicamba	<0.096	<0.12	<0.01	
MCPP	<3.8	1.4	<5	

Comparison of Peoria Lake Sediment Quality to Background Soils, and IEPA Classification of Lake Sediments

The ISGS has measured the background concentrations of 48 inorganic elements in 192 soil samples from 77 counties in Illinois (Frost, 1995). Included in that study were eighteen soil samples were collected in seven of the counties that border the Peoria Pool of the Illinois River. The soil samples were collected at depths of 10 to 20 cm and 70 to 80 cm.

The IEPA determined the background concentration of inorganic elements in 775 background soil samples from all 102 counties of Illinois (IEPA, 1994). The soils were collected at various depths, with different sampling techniques at sites judged by the field staff to be undisturbed by site-related activities. In the IEPA study, values reported as less than the detection limit were included in the statistics as one-half the detection limit. The analytical method used was not a total digestion procedure, so their results are not directly comparable to those of ISGS.

The IEPA has classified Illinois lake sediment quality based on the analysis of 1,876 sediment samples from 307 lakes in Illinois that have been collected since 1977. Lake sediments were considered to have "elevated" concentrations of an analyte if the concentration was between one standard deviation and two standard deviations above the mean for an analyte. Sediments were considered to have "highly elevated" concentrations if the concentration was greater than two standard deviations above the mean. In this statistical treatment of the data, all values below detection were converted to zero. This classification was not intended to be a standard, but as way to compare and classify lake sediments (Mitzelfetl, 1996).

The ranges of background concentrations of metals in undisturbed soils in the Peoria area, background concentrations of metals in Illinois soils determined by ISGS and IEPA and concentration classified as elevated and highly elevated for Illinois lake sediments by the IEPA are listed in table 4.

Table 4 Range in Background Concentrations of Metals in Undisturbed Soils in the Peoria area, Mean Concentration in Illinois Soils Determined by ISGS and IEPA, and Elevated and Highly Elevated IEPA Classification of Metals in Illinois Lake Sediments. All values in mg/kg.

	Bkg. for Soils in Peoria Area ISGS	Bkg. for Soils, Statewide ISGS	Bkg. for Soils Statewide IEPA	IEPA Elevated Sediment Concentrations	IEPA Highly Elevated Sediment Concentrations
TKN				5357 to11700	>11700
Phosphoru	200 - 1200	500		1125 to 2179	>2179
Antimony	0.8 - 1.7	1.1			
Arsenic	7 - 21	10	7	14 to 95	>95
Barium	210 - 810	545	130	271 to 397	> 397
Beryllium	0.5 - 1.9	1.4	0.7		
Boron	30 - 64	46			
Cadmium	<3	<1	1	5 to 14	>14
Chromium	40 - 91	57	17	27 to 49	>49
Cobalt	5 - 21	11	9		
Copper	15 - 51	30	20	100 to 590	>590
Lead	10 - 40	24	49	59 to 339	>339
Manganese	186 - 2170	600	767	1700 to 5500	>5500
Mercury			0.11	0.15 to 0.70	>0.70
Nickel	<16 - 53	24	17	31 to 43	>43
Selenium	<1 - 1.3	<1	0.5		
Silver	<1		0.8	0.1 to 1	>1
Thallium	< 1 - 3	1.4	0.6		
Vanadium	37 - 260	92	25		
Zinc	35 - 145	73	103	145 to 1100	>1100

Comparison of Peoria Lake Sediment Quality to various sediment quality guidelines for freshwater ecosystems

Sediment quality guidelines have been developed by a variety of agencies to classify and rank sites, and make decisions where more detailed studies are needed (Ingersoll et al., 2000). The U.S. EPA studied the severity of sediment contamination and identified watersheds that had probable concern for sediment contamination (U.S. EPA 1997). To make this assessment the U.S. EPA developed a series of screening values for 233 potential organic and metal sediment contaminants (U.S. EPA 1997). Based on available scientific studies, estimated sediment chemistry values were then developed for 111 sediment contaminants. In addition, values for estimated apparent effects threshold-low (AET-L)and apparent effects threshold-high (AET-H) were also included. These thresholds can be used to judge the degree of contamination of a sediment, Long et al. (1995).

It has been proposed that dredged sediment could be used as general use landscaping soil, or to rehabilitate strip mines, old industrial sites or brownfields. Specific standards do not exist for sediment in these applications. Illinois has regulations for cleanup of industrial sites known as TACO, an acronym for Tiered Approach to Corrective Action Objectives. This is a tool for deciding if an industrial site are clean enough for various purposes. The standards are for the protection of human health. While these standards are not directly applicable to sediment, they provide a useful reference for comparison. The levels of metals and organic compounds regulated at these locations are given in the TACO regulations, Illinois Statues (1997).

Tables 5 and 6 list the U.S. EPA sediment chemistry screening values, the apparent effects threshold high (Long et. al. 1995), consensus-based sediment quality guidelines for freshwater ecosystems recently developed for the U.S. EPA (Ingersol et al., 2000, MacDonald et al. 2000), and the TACO Tier 1 Soil Remediation Objectives for metals and organic compounds.

Most metal concentrations are well below the various sediment chemistry screening values. Nickel concentrations approach U.S. EPA sediment chemistry screening values and consensus-based sediment quality guidelines. Most PAH concentrations are well below the

various sediment chemistry screening values. The highly elevated concentration observed by laboratory A for three compounds were not confirmed by subsequent analysis.

Table 5 U.S. EPA Sediment Screening Values, Apparent Effects Thresholds High, Consensus-based Probable Effect Concentrations, and TACO Tier 1 Soil Remediation Objectives for Metals. All values are milligram per kilogram

	U.S. EPA * Estimated Sediment Screening Value	U.S. EPA* Apparent Effects Thresholds High	Consensus-based PEC&	TACO ** Tier 1 Soil ingestion
Ag	3.7	6		390
As	70	700	33	0.4 &
Be				0.1
Ba				5500
Cd	9.6	10	5	78
Co				4,700
Cr	370	270	111	390
Cu	270	1300	149	2,900
Hg	0.71	2.1	1.1	23
Mn				3,700
Ni	52		49	1,600
Pb	218	600	128	400
Se				390
Sb	200			31
Tl				6
V				550
Zn	410	1600	459	23,000

*National Sediment Quality Survey, Screening Values for Chemicals, U.S. EPA 1997. **Section 742 Tier 1 Soil Remediation Objectives, Exposure Route-Specific for Soil Ingestion.
& Listed value currently under review *From MacDonald et al. (2000).

Table 6 U.S. EPA Sediment Screening Values, Apparent Effects Thresholds Low, Apparent Effects Thresholds High, and TACO Tier 1 Soil Remediation Objectives for selected organic compounds. Values in mg/kg

	U.S. EPA * Estimated Sediment Screening Value	U.S. EPA* Apparent Effects Thresholds High	Consensus-based PEC&	TACO ** Tier 1 Soil ingestion
Acenaphthene	1.3	2	0.84	4700
Acenaphthylene	0.6	1.3		
Anthracene	1.1	13		23000
Benzo(a) anthracene	0.17	5.1	1.05	0.9
Benzo(a)pyrene	0.017	3.6	1.45	0.09
Benzo(b)fluoranthene	0.17	9.9		0.9
Benzo(g,h,i) perylene	2.6	2.6		
Benzo(k)fluoranthene	1.7	9.9		9
Chrysene	2.8	9.2	1.29	88
Dibenz(a,h)anthracene	0.017	1.0		0.09
Fluoranthene	6.2	30	2.23	3100
Fluorene	0.54	3.6	0.54	3100
Indeno(1,2,3-c,d)	0.17	2.6		0.9
Naphthalene	0.47	2.7	0.56	3100
Phenanthrene	1.8	6.9	1.17	
Pyrene	2.6	16	1.52	2300
PCB's	0.0025	3.1		10
Aldrin	0.0012			0.04
Dieldrin	0.012		0.062	0.04
DDT	0.027	0.15	0.57	2
Chlordane	0.048		0.017	0.5
Endrin	0.042		0.21	23
Methoxychlor	0.019			390
alpha BHC	0.001			0.1
gamma-BHC	0.0037		0.005	0.5
Heptachlor	0.0044		0.016	0.1
Heptachlor-epoxide	0.0022			0.07

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Appendix 1 Total metal concentrations in a composited sediment sample from a vibracore collected near RM 165 in Lake Peoria in 1998, analyzed by ISGS

Analysis Number	Core ID	Depth interval (cm)	Total carbon (%)	Inorganic carbon (%)	Organic carbon (%)	SiO2 XRF (%)	Al2O3 XRF (%)	Fe2O3 XRF (%)	CaO XRF (%)	MgO XRF (%)	K2O XRF (%)	Na2O XRF (%)
R21543	165.5	0-94	3.36	1.19	2.17	59.40	12.10	5.06	4.59	2.82	2.82	0.66

Analysis Number	Core ID	Depth interval (cm)	TiO2 XRF (%)	P2O5 XRF (%)	MnO XRF (%)	SO3 XRF (%)	Ba XRF (ppm)	Ba EDX (ppm)	Cd AAS (ppm)	Cu AAS (ppm)	Mo EDX (ppm)	Ni AAS (ppm)
R21543	165.5	0-94	0.67	0.24	0.10	0.34	470	547	<0.9	36	25	<20

Analysis Number	Core ID	Depth interval (cm)	Pb AAS (ppm)	Sn EDX (ppm)	Sr XRF (ppm)	Sr EDX (ppm)	Zn AAS (ppm)	Zr XRF (ppm)	Zr EDX (ppm)
R21543	165.5	0-94	73	<5	127	103	176	162	250

48818

673

Appendix 2 Total recoverable metal concentrations in a composited sediment sample from a vibracore collected near RM 165 in Lake Peoria in 1998, analyzed by ISGS

Analysis number	Core ID	Depth interval (cm)	Si (ppm)	Al (%)	Fe (%)	Ca (%)	Mg (%)	K (ppm)	Na (ppm)	Ti (ppm)	Mn (ppm)	S (ppm)
R21543	165.5	0-94	191	3.43	3.46	3.14	1.56	0.74	210	451	721	1,050

Analysis number	Core ID	Depth interval (cm)	As (ppm)	B (ppm)	Be (ppm)	Ba (ppm)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	La (ppm)	Li (ppm)
R21543	165.5	0-94	<50	62	1.13	190	<5	14	43	31	26	38

Analysis number	Core ID	Depth interval (cm)	Mo (ppm)	Ni (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sr (ppm)	Tl (ppm)	V (ppm)	Zn (ppm)
R21543	165.5	0-94	<10	48	25	<25	7	<50	53	<100	35	173

48818

674

Appendix 3 Results form a comprehensive analysis of a composited sediment sample from a vibracore collected near RM 165 in Lake Peoria in 1998, analyzed by Laboratory A

Sample number	Core ID	Depth (cm)	Sand (%)	Silt (%)	Clay (%)	size (mm)	Moisture (%)	Density (g/cm3)	COD (mg/l)	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)
R21543	165.5	0-94	6	41	53	0.004	48	1.6	713	26	106	1.7

Sample number	Core ID	Depth (cm)	Chromium (mg/kg)	Lead (mg/kg)	Silver (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	NH4-N (mg/kg)	TKN (mg/kg)	Cyanide (mg/kg)	Phosphorus (mg/kg)	Sulfide (mg/kg)
R21543	165.5	0-94	31.8	33.4	<1.9	0.12	<1.0	30	533	<0.95	937	81

Sample number	Core ID	Depth (cm)	Acetone µg/kg	Benzene µg/kg	Bromodichloro-methane µg/kg	Bromoform µg/kg	2-Butanone µg/kg	Carbon Disulfide µg/kg	Carbon Tetrachloride µg/kg
R21543	165.5	0-94	500	<9.6	<9.6	<9.6	71	<9.6	<9.6

Sample number	Core ID	Depth (cm)	Chlorobenzene µg/kg	Chloroethane µg/kg	Chloroform µg/kg	Dibromochloro-methane µg/kg	1,1-Dichloroethane µg/kg	1,2-Dichloroethane µg/kg
R21543	165.5	0-94	<9.6	<19	<9.6	<9.6	<9.6	<9.6

Sample number	Core ID	Depth (cm)	1,1-Dichloroethene µg/kg	cis-1,2-Dichloroethene µg/kg	trans-1,2-Dichloroethene µg/kg	1,2-Dichloropropane µg/kg	cis-1,3-Dichloropropene µg/kg	trans-1,3-Dichloropropene µg/kg
R21543	165.5	0-94	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6

Sample number	Core ID	Depth (cm)	Ethyl benzene µg/kg	2-Hexanone µg/kg	Methyl Chloride (Chloromethane) µg/kg	Methyl bromide (Bromomethane) µg/kg	4-Methyl-2-pentanone µg/kg	Methylene Chloride µg/kg	Styrene µg/kg
R21543	165.5	0-94	<9.6	<19	<19	<19	<19	<19	<9.6

48818

675

Appendix *3(continued)*

Sample number	Core ID	Depth (cm)	1,1,2,2-Tetra-chloroethane µg/kg	Tetrachloro-ethene µg/kg	Toluene µg/kg	1,1,1-Trichloro-ethane µg/kg	1,1,2-Trichloro-ethane µg/kg	Trichloroethene µg/kg	Vinyl Chloride µg/kg
R21543	165.5	0-94	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<19

Core ID	Depth (cm)	Xylenes Total µg/kg	Aroclor 1,016 µg/kg	Aroclor 1,221 µg/kg	Aroclor 1,232 µg/kg	Aroclor 1,242 µg/kg	Aroclor 1,248 µg/kg	Aroclor 1,254 µg/kg	Aroclor 1260 µg/kg	Aldrin µg/kg	gamma-BHC (Lindane) µg/kg
165.5	0-94	<9.6	<630	<630	<630	<630	<630	<630	<630	<76	<76

Sample number	Core ID	Depth (cm)	alpha-BHC µg/kg	beta-BHC µg/kg	delta-BHC µg/kg	Chlordane (Alpha) µg/kg	Chlordane (Gamma) µg/kg	4,4'-DDD µg/kg	4,4'-DDE µg/kg	4,4'-DDT µg/kg	Dieldrin µg/kg
R21543	165.5	0-94	<76	<76	<76	<76	<76	<150	<150	<150	<150

Sample number	Core ID	Depth (cm)	Endosulfan I µg/kg	Endosulfan II µg/kg	Endosulfan sulfate µg/kg	Endrin µg/kg	Endrin aldehyde µg/kg	Endrin ketone µg/kg	Heptachlor µg/kg	Heptachlor epoxide µg/kg	Methoxychlor µg/kg
R21543	165.5	0-94	<76	<76	<150	<150	<150	<150	<76	<76	<320

Sample number	Core ID	Depth (cm)	Toxaphene µg/kg	2,4-D µg/kg	2,4-DB µg/kg	Dalapon µg/kg	Dicamba µg/kg	Dichloro-prop µg/kg	Dinoseb µg/kg	MCPA µg/kg	MCPP µg/kg	Pentachloro-phenol µg/kg
R21543	165.5	0-94	<1,500	<190	<190	<190	<96	<190	<1,900	<38,000	<38,000	<19

Sample number	Core ID	Depth (cm)	Picloram µg/kg	2,4,5-T µg/kg	2,4,5-TP (Silvex) µg/kg	Acenaphthene µg/kg	Acenaphthylene µg/kg	Anthracene µg/kg	Benzo(a) anthracene µg/kg	Benzo(a) pyrene µg/kg
R21543	165.5	0-94	<190	<96	<96	<940	<940	<94	310	240

48818

676

Appendix *3(continued)*

Sample number	Core ID	Depth (cm)	Benzo(b) fluoranthene µg/kg	Benzo(g,h,i) perylene µg/kg	Benzo(k)- fluoranthene µg/kg	Chrysene µg/kg	Dibenz(a,h) anthracene µg/kg	Fluoranthene µg/kg	Fluorene µg/kg	Indeno (1,2,3-cd) pyrene µg/kg
R21543	165.5	0-94	3,100	<6.3	130	120	<94	360	<940	<94

Sample number	Core ID	Depth (cm)	Naphthalene µg/kg	Phenanthrene µg/kg	Pyrene µg/kg	Acenaphthene µg/kg	Acenaphthylene µg/kg	Anthracene µg/kg	Benzo(a) anthracene µg/kg	Benzo(a) pyrene µg/kg
R21543	165.5	0-94	<63	120	<94	<320	<320	<320	<320	<320

Sample number	Core ID	Depth (cm)	Benzo(b) fluoranthene µg/kg	Benzo(g,h,i) perylene µg/kg	Benzo(k)- fluoranthene µg/kg	Chrysene µg/kg	Dibenz(a,h) anthracene µg/kg	Fluoranthene µg/kg	Fluorene µg/kg
R21543	165.5	0-94	<320	<320	<320	<320	<320	<320	<320

Sample number	Core ID	Depth (cm)	Indeno (1,2,3-cd)pyrene µg/kg	Naphthalene µg/kg	Phenanthrene µg/kg	Pyrene µg/kg
R21543	165.5	0-94	<320	<320	<320	<320

48818

677

Appendix 4 Results from comprehensive analysis of sediment samples collected in Peoria Lake near RM 165 2/10/1999, analyzed by Laboratory A

Sample ID		A	B	C
Distance from shore		175 m	450 m	725 m
Moisture (%)		56	52	57
Total Solids-Soil (%)		43.4	47	40.8
Volatile Solid (%)		0.91	1.5	1.2
TOC (%)		0.064	0.069	0.065
Bulk Density (g/cm3)		1.4	1.2	1.3
COD (mg/l)		18.7	18.7	7.5
pH		7.6	8	8
Inorganic parameters				
Arsenic (mg/kg)		8	7.9	7.3
Barium (mg/kg)		126	134	125
Cadmium (mg/kg)		4.7	4.9	3.5
Chromium (mg/kg)		49.6	56.3	38.5
Lead (mg/kg)		54.9	59.8	42.9
Silver (mg/kg)		<2	<2	<2
Mercury (mg/kg)		0.25	0.3	0.43
Selenium (mg/kg)		<1	<1	<1
Ammonia N (mg/kg)		322	516	894
TKN (mg/kg)		387	590	866
Cyanide (mg/kg)		<1	<1	<1
Reactive sulfide (mg/kg)		<10	<10	38
Volitile organic compounds				
Acetone	µg/kg	57	63	56
Benzene	µg/kg	<11	<10	<12
Bromodichloromethane	µg/kg	<11	<10	<12
Bromoform	µg/kg	<11	<10	<12
2-Butanone	µg/kg	<23	<21	<23
Carbon Disulfide	µg/kg	<11	<10	<12
Carbon Tetrachloride	µg/kg	<11	<10	<12
Chlorobenzene	µg/kg	<11	<10	<12
Chloroethane	µg/kg	<23	<21	<23
Chloroform	µg/kg	<11	<10	<12
Dibromochloromehtane	µg/kg	<11	<10	<12
1,1-Dichloroethane	µg/kg	<11	<10	<12
1,2-Dichloroethane	µg/kg	<11	<10	<12
1,1-Dichloroethene	µg/kg	<11	<10	<12
cis-1,2-Dichloroethene	µg/kg	<11	<10	<12

Appendix 4 (continued)

Sample ID		A	B	C
Distance from shore		175 m	450 m	725 m
trans-1,2-Dichloroethene	µg/kg	<11	<10	<12
1,2-Dichloropropane	µg/kg	<11	<10	<12
cis-1,3-Dichloro propene	µg/kg	<11	<10	<12
trans-1,3-Dichloro propene	µg/kg	<11	<10	<12
Ethyl benzene	µg/kg	<11	<10	<12
2-Hexanone	µg/kg	<23	<21	<23
Methyl Chloride	µg/kg	<23	<21	<23
Methyl bromide	µg/kg	<23	<21	<23
4-Methyl-2-pentanone	µg/kg	<23	<21	<23
Methylene Chloride	µg/kg	<11	<10	<12
Styrene	µg/kg	<11	<10	<12
1,1,2,2-Tetrachloroethane	µg/kg	<11	<10	<12
Tetrachloroethene	µg/kg	<11	<10	<12
Toluene	µg/kg	<11	<10	<12
1,1,1-Trichloroethane	µg/kg	<11	<10	<12
1,1,2-Trichloroethane	µg/kg	<11	<10	<12
Trichloroethene	µg/kg	<11	<10	<12
Vinyl Chloride	µg/kg	<23	<21	<23
Xylenes (Total)	µg/kg	<11	<10	<12
PCB's				
Aroclor-1016	µg/kg	<74	<68	<76
Aroclor-1221	µg/kg	<74	<68	<76
Aroclor-1232	µg/kg	<74	<68	<76
Aroclor-1242	µg/kg	<74	<68	<76
Aroclor-1248	µg/kg	<74	<68	<76
Aroclor-1254	µg/kg	<74	<68	<76
Aroclor-1260	µg/kg	<74	<68	<76
Pesticides				
Aldrin	µg/kg	<90	<83	<93
gamma-BHC	µg/kg	<90	<83	<93
alpha-BHC	µg/kg	<90	<83	<93
beta-BHC	µg/kg	<90	<83	<93
delta-BHC	µg/kg	<90	<83	<93
Chlordane (Alpha)	µg/kg	<90	<83	<93
Chlordane (Gamma)	µg/kg	<90	<83	<93
4,4'-DDD	µg/kg	<180	<160	<180

Appendix 4 (continued)

Sample ID		A	B	C
Distance from shore		175 m	450 m	725 m
4,4'-DDE	µg/kg	<180	<160	<180
4,4'-DDT	µg/kg	<180	<160	<180
Dieldrin	µg/kg	<180	<160	<160
Endosulfan I	µg/kg	<90	<83	<93
Endosulfan II	µg/kg	<90	<83	<93
Endosulfan sulfate	µg/kg	<180	<160	<180
Endrin	µg/kg	<180	<160	<180
Endrin aldehyde	µg/kg	<180	<160	<180
Endrin ketone	µg/kg	<180	<160	<180
Heptachlor	µg/kg	<90	<83	<93
Heptachlor epoxide	µg/kg	<90	<83	<93
Methoxychlor	µg/kg	<380	<350	<390
Toxaphene	µg/kg	<1,800	<1,600	<1,800
Chlorinated Pesticide				
2,4-D	µg/kg	<230	<210	<230
2,4-DB	µg/kg	<230	<210	<230
Dalapon	µg/kg	<230	<210	<230
Dicamba	µg/kg	<110	<100	<120
Dichloroprop	µg/kg	<230	<210	<230
Dinoseb	µg/kg	<2,300	<2,100	<2,300
MCPA	µg/kg	<45,000	<42,000	<46,000
MCPP	µg/kg	140,000	120,000	<46,000
Pentachlorophenol	µg/kg	<23	<21	<23
Picloram	µg/kg	<230	<210	<230
2,4,5-T	µg/kg	<110	<100	<120
2,4,5-TP (Silvex)	µg/kg	<110	<100	<120
PAH 8310				
Acenaphthene	µg/kg	500	660	110
Acenaphthylene	µg/kg	<75	<68	<76
Anthracene	µg/kg	47	60	<76
Benzo(a) anthracene	µg/kg	160	230	<76
Benzo(a)pyrene	µg/kg	310	460	<76
Benzo(b)fluoranthene	µg/kg	2,300	1,800	<76
Benzo(g,h,i) perylene	µg/kg	260	1,100	<76
Benzo(k)-fluoranthene	µg/kg	180	240	<76
Chrysene	µg/kg	200	300	<76

Appendix 4 (continued)

Sample ID		A	B	C
Distance from shore		175 m	450 m	725 m
Dibenz(a,h)anthracene	µg/kg	2,800	2,800	<76
Fluoranthene	µg/kg	350	300	<76
Fluorene	µg/kg	<75	93	<76
Indeno(1,2,3-cd) pyrene	µg/kg	560	700	320
Naphthalene	µg/kg	320	210	240
Phenanthrene	µg/kg	160	230	<76
Pyrene	µg/kg	560	480	<76
PAH SW8270				
Acenaphthene	µg/kg	<370	<340	<380
Acenaphthylene	µg/kg	<370	<340	<380
Anthracene	µg/kg	<370	<340	<380
Benzo(a) anthracene	µg/kg	<370	<340	<380
Benzo(a)pyrene	µg/kg	<370	<340	<380
Benzo(b)fluoranthene	µg/kg	<370	<340	<380
Benzo(g,h,i) perylene	µg/kg	<370	<340	<380
Benzo(k)-fluoranthene	µg/kg	<370	370	<380
Chrysene	µg/kg	<370	<340	<380
Dibenz(a,h)anthracene	µg/kg	<370	<340	<380
Fluoranthene	µg/kg	<370	<340	<380
Fluorene	µg/kg	<370	<340	<380
Indeno(1,2,3-cd) pyrene	µg/kg	<370	<340	<380
Naphthalene	µg/kg	<370	<340	<380
Phenanthrene	µg/kg	<370	<340	<380
Pyrene	µg/kg	<370	450	<380

Appendix 5 Total recoverable metal concentrations and Total Carbon, Inorganic Carbon and Organic Carbon in a sediment samples from a core collected near RM 165 in Lake Peoria 4/25/2000 by ISWS, analyzed by ISGS

Analysis number	Core ID	Depth interval (cm)	Si (ppm)	Al (%)	Fe (%)	Ca (%)	Mg (%)	K (ppm)	Na (ppm)	Ti (ppm)	Mn (ppm)	S (ppm)
R21969	165.5	0-6	251	3.15	2.96	3.81	1.67	0.69	<400	398	715	860
R21970		24-30	248	3.55	3.15	3.06	1.60	0.72	<400	451	634	1170

Analysis number	Core ID	Depth interval (cm)	As (ppm)	B (ppm)	Be (ppm)	Ba (ppm)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	La (ppm)	Li (ppm)
R21969	165.5	0-6	<75	33	1.2	179	<5	13	43	42	24	32
R21970		24-30	<75	35	1.3	198	<5	14	58	69	24	37

Analysis number	Core ID	Depth interval (cm)	Mo (ppm)	Ni (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sr (ppm)	Tl (ppm)	V (ppm)	Zn (ppm)
R21969	165.5	0-6	<5	38	40	<50	6	<50	68	<50	27	221
R21970		24-30	<5	54	40	<50	7	<50	60	<50	35	281

Analysis number	Core ID	Depth interval (cm)	Total C (%)	Inorganic C (%)	Organic C (%)
R21969	165.5	0-6	3.78	1.25	2.53
R21970		24-30	3.49	1.23	2.26

48818

682

Appendix 6 Results from comprehensive analysis of five sediment samples collected in Peoria Lake Near RM 165 10/11/2000, analyzed by Laboratory B

		PL 200	PL 210	PL 202	PL203	PL204
	Depth(cm)	20-30	25-35	25-35	37-47	47-57
Al	%	1.00	1.31	1.30	0.89	0.85
Fe	%	1.63	1.85	1.87	1.49	1.40
Ca	%	2.06	1.85	2.07	2.60	2.12
Mg	%	0.81	0.90	1.05	1.35	1.08
K	%	0.14	0.17	0.17	0.13	0.13
Na	mg/kg	167	322	316	257	238
Mn	mg/kg	405	438	479	406	368
Ag	mg/kg	<1.9	<1.9	<1.9	<1.9	<1.9
As	mg/kg	5.8	5.8	6.6	5.48	4
Be	mg/kg	0	0	0	0	0
Ba	mg/kg	81	96.1	91.4	74.2	68.6
Cd	mg/kg	<1.9	<1.9	<1.9	<1.9	<1.9
Co	mg/kg	6.7	7.7	7.77	6.5	5.93
Cr	mg/kg	29.6	39.1	33.5	30.3	26.7
Cu	mg/kg	28.5	32.7	29.7	21.7	20.8
Hg	mg/kg	0.19	0	0	0	0
Mo	mg/kg	<4	<4	<4	<4	<4
Ni	mg/kg	25.8	36.4	32.8	27.2	25.6
Pb	mg/kg	45.2	62.5	58.4	45.5	48
Sb	mg/kg	<10	<10	<10	<10	<10
Se	mg/kg	<1	<1	<1	<1	<1
Tl	mg/kg	<1	<1	<1	<1	<1
V	mg/kg	17.6	21.1	21.2	17.4	16.4
Zn	mg/kg	160	184	159	133	120
Ammonia N	mg/kg	412	394	235	393	239
Total Kjeldahl N	mg/kg	1,090	4,060	2,250	3,010	2,700
Total cyanide	mg/kg	<2	<2	<1.9	<1.7	<1.6
Total P	mg/kg	947	1,100	1,200	904	794
pH		7.3	7.4	7.1	7.4	7.6
Total organic carbon	mg/kg	430	4,600	310	670	1,100
Moisture	%	48.5	51.8	50.3	44.2	37.8
PCBs						
Aroclor-1016	µg/kg	<64	<68	<66	<59	<53
Aroclor-1221	µg/kg	<64	<68	<66	<59	<53
Aroclor-1232	µg/kg	<64	<68	<66	<59	<53
Aroclor-1242	µg/kg	<64	<68	<66	<59	<53

Appendix 6 (continued)

		PL 200	PL 210	PL 202	PL203	PL204
	Depth(cm)	20-30	25-35	25-35	37-47	47-57
Aroclor-1248	µg/kg	<64	<68	<66	<59	<53
Aroclor-1254	µg/kg	<64	<68	<66	<59	<53
Aroclor-1260	µg/kg	<64	<68	<66	<59	<53
Volitile Organic Compounds						
Acetone	µg/kg	<25	<25	<25	<25	<25
Benzene	µg/kg	<10	<10	<10	<10	<10
Bromodichloromethane	µg/kg	<10	<10	<10	<10	<10
Bromoform	µg/kg	<10	<10	<10	<10	<10
2-Butanone	µg/kg	<19	<19	<19	<19	<19
Carbon Disulfide	µg/kg	<19	<19	<19	<19	<19
Carbon Tetrachloride	µg/kg	<10	<10	<10	<10	<10
Chlorobenzene	µg/kg	<10	<10	<10	<10	<10
Chloroethane	µg/kg	<10	<10	<10	<10	<10
Chloroform	µg/kg	<10	<10	<10	<10	<10
Dibromochloromehtane	µg/kg	<10	<10	<10	<10	<10
1,1-Dichloroethane	µg/kg	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/kg	<10	<10	<10	<10	<10
cis-1,2-Dichloroethene	µg/kg	<10	<10	<10	<10	<10
trans-1,2-Dichloroethene	µg/kg	<10	<10	<10	<10	<10
1,2-Dichloropropane	µg/kg	<10	<10	<10	<10	<10
cis-1,3-Dichloro propene	µg/kg	<10	<10	<10	<10	<10
trans-1,3-Dichloro propene	µg/kg	<10	<10	<10	<10	<10
Ethyl benzene	µg/kg	<10	<10	<10	<10	<10
2-Hexanone	µg/kg	<25	<25	<25	<25	<25
Methyl Chloride	µg/kg	<10	<10	<10	<10	<10
4-Methyl-2-pentanone	µg/kg	<19	<19	<19	<19	<19
Methylene Chloride	µg/kg	<10	<10	<10	<10	<10
Styrene	µg/kg	<10	<10	<10	<10	<10
1,1,2,2-Tetrachloroethane	µg/kg	<10	<10	<10	<10	<10
Tetrachloroethene	µg/kg	<10	<10	<10	<10	<10
Toluene	µg/kg	<10	<10	<10	<10	<10
1,1,2-Trichloroethane	µg/kg	<10	<10	<10	<10	<10
Trichloroethene	µg/kg	<10	<10	<10	<10	<10
Vinyl Chloride	µg/kg	<4	<4	<4	<4	<4
Xylenes (Total)	µg/kg	<10	<10	<10	<10	<10

Appendix 6 (continued)

		PL 200	PL 210	PL 202	PL203	PL204
	Depth(cm)	20-30	25-35	25-35	37-47	47-57
GC/MS Semivolatiles						
Phenol	µg/kg	<640	<680	<660	<590	<530
bis(2-Chloroethyl)ether	µg/kg	<640	<680	<660	<590	<530
2-Chlorophenol	µg/kg	<640	<680	<660	<590	<530
1,3-Dichlorobenzene	µg/kg	<640	<680	<660	<590	<530
1,4-Dichlorobenzene	µg/kg	<640	<680	<660	<590	<530
Benzyl Alcohol	µg/kg	<1,300	<1,400	<1,300	<1,200	<1,100
1,2-Dichlorobenzene	µg/kg	<640	<680	660	<590	<530
2-Methylphenol	µg/kg	<640	<680	660	590	<530
bis(2-Chloroisopropyl)ether	µg/kg	<640	<680	660	590	<530
3&4-Methylphenol	µg/kg	<1,300	1,400	1,300	1,200	<1,100
N-Nitroso-di-n-propylamine	µg/kg	<640	680	660	590	<530
Hexachloroethane	µg/kg	<640	680	660	590	<530
Nitrobenzene	µg/kg	<640	680	660	590	<530
Isophorone	µg/kg	<640	680	660	590	<530
2-Nitrophenol	µg/kg	<640	680	660	590	<530
2,4-Dimethylphenol	µg/kg	<640	680	660	590	<530
Benzoic Acid	µg/kg	<3,100	3,300	3,200	2,900	<2,600
bis(2-Chloroethoxy)methane	µg/kg	<640	680	660	590	<530
2,4-Dichlorophenol	µg/kg	<640	680	660	590	<530
1,2,4-Trichlorobenzene	µg/kg	<640	680	660	590	<530
4-Chloroaniline	µg/kg	<1,300	1,400	1,300	1,200	<1,100
Hexachlorobutadiene	µg/kg	<640	680	660	590	<530
4-Chloro-3-methylphenol	µg/kg	<1,300	1,400	1,300	1,200	<1,100
Hexachlorocyclopentadiene	µg/kg	<640	680	660	590	<530
2,4,6-Trichlorophenol	µg/kg	<640	680	660	590	<530
2,4,5-Trichlorophenol	µg/kg	<640	680	660	590	<530
2-Chloronaphthalene	µg/kg	<640	680	660	590	<530
2-Nitroaniline	µg/kg	<3,100	3,300	3,200	2,900	<2,600
Dimethylphthalate	µg/kg	<640	680	660	590	<530
2,6-Dinitrotoluene	µg/kg	<640	680	660	590	<530
3-Nitroaniline	µg/kg	<3,100	3,300	3,200	2,900	<2,600
2,4-Dinitrophenol	µg/kg	<3,100	3,300	3,200	2,900	<2,600
4-Nitrophenol	µg/kg	<3,100	3,300	3,200	2,900	<2,600
Dibenzofuran	µg/kg	<640	680	660	590	530
2,4-Dinitrotoluene	µg/kg	<640	680	660	590	530

Appendix 6 (continued)

		PL 200	PL 210	PL 202	PL203	PL204
	Depth(cm)	20-30	25-35	25-35	37-47	47-57
Diethylphthalate	µg/kg	<640	680	660	590	530
4-Chlorophenyl-phenylether	µg/kg	<640	680	660	590	530
4-Nitroaniline	µg/kg	<3,100	3,300	3,200	2,900	2,600
4,6-Dinitro-2-methylphenol	µg/kg	<3,100	3,300	3,200	2,900	2,600
N-Nitrosodiphenylamine	µg/kg	<640	680	660	590	530
4-Bromophenyl-phenylether	µg/kg	<640	680	660	590	530
Hexachlorobenzene	µg/kg	<640	680	660	590	530
Pentachlorophenol	µg/kg	<3,100	3,300	3,200	2,900	2,600
Di-n-butylphthalate	µg/kg	<640	680	660	590	530
Butylbenzylphthalate	µg/kg	<640	680	660	590	530
3,3'-Dichlorobenzidine	µg/kg	<1,300	1,400	1,300	1,200	1,100
bis(2-Ethylhexyl)phthalate	µg/kg	<640	680	660	590	530
Di-n-octylphthalate	µg/kg	<640	680	660	590	530
PAH'S by 8310						
Acenaphthene	µg/kg	76	47	<22	30	<18
Acenaphthylene	µg/kg	<170	<180	<180	<160	<140
Anthracene	µg/kg	10	<9	<9	<8	<7
Benzo(a) anthracene	µg/kg	<70	<75	<72	<7	<6
Benzo(a)pyrene	µg/kg	34	37	18	<3	11
Benzo(b)fluoranthene	µg/kg	18	20	11	<3	<3
Benzo(g,h,i) perylene	µg/kg	<5	63	29	<4	18
Benzo(k)-fluoranthene	µg/kg	<2	24	<22	<2	<2
Chrysene	µg/kg	30	27	10	5	<2
Dibenz(a,h)anthracene	µg/kg	<1	5	8	5	<1
Fluoranthene	µg/kg	52	45	22	<8	14
Fluorene	µg/kg	<25	<27	<26	<23	<21
Indeno(1,2,3-cd) pyrene	µg/kg	<2	34	14	<2	9
Naphthalene	µg/kg	<210	<230	<220	<200	<180
Phenanthrene	µg/kg	15	12	<5	5	<4
Pyrene	µg/kg	<230	<250	30	<220	22
Pesticides						
Aldrin	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
alpha-BHC	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
beta-BHC	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
gamma-BHC	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
delta-BHC	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Chlordane	µg/kg	<17	<17	<17	<17	<17
Chlordane (Alpha)	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Chlordane (Gamma)	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Chlorobenzilate	µg/kg	<33	<33	<33	<33	<33

Appendix 6 (continued)

		PL 200	PL 210	PL 202	PL203	PL204
	Depth(cm)	20-30	25-35	25-35	37-47	47-57
4,4'-DDD	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
4,4'-DDE	µg/kg	<3.3	<3.3	<3.3	4.2	9.3
4,4'-DDT	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Diallate	µg/kg	<33	<33	<33	<33	<33
Dieldrin	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endosulfan I	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Endosulfan II	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endosulfan sulfate	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endrin	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endrin aldehyde	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Endrin ketone	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Heptachlor	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Heptachlor epoxide	µg/kg	<1.7	<1.7	<1.7	<1.7	<1.7
Isodrin	µg/kg	<3.3	<3.3	<3.3	<3.3	<3.3
Methoxychlor	µg/kg	<17	<17	<17	<17	<17
Toxaphene	µg/kg	<79	<79	<79	<79	<79
Clorinated Herbicides						
Dicamba	µg/kg	<10	<10	<10	<10	<10
2,4-D	µg/kg	<40	<40	<40	<40	<40
2,4,5-TP Silvex	µg/kg	<10	<10	<10	<10	<10
2,4,5-T	µg/kg	<10	<10	<10	<10	<10
2,4 DB	µg/kg	<100	<100	<100	<100	<100
Dalapon	µg/kg	<200	<200	<200	<200	<200
MCPP	µg/kg	<5,000	<5,000	<5,000	<5,000	<5,000
MCPA	µg/kg	<5,000	<5,000	<5,000	<5,000	<5,000
Dichloroprop	µg/kg	<40	<40	<40	<40	<40
Dinoseb	µg/kg	<40	<40	<40	<40	<40

Appendix 7 Results from comprehensive analysis of sediment samples that had been dredged from Peoria Lake in May 2000 and sampled from a dredge sediment storage area in January 2001, analyzed by the IEPA Laboratory. All valued in mg/kg unless noted.

Sample ID	X201	X202	X203
Al (%)	0.93	0.92	0.83
Fe (%)	2.00	1.90	1.70
Ca (%)	5.10	3.50	3.70
Mg (%)	2.10	1.70	1.30
K(%)	0.14	0.12	0.13
Na	210	180	160
Mn	550	380	490
Ag	<0.7	<0.6	<0.8
As	7.2	7.0	6.2
B	9.8	12.0	11.0
Ba	110	120	110
Be	0.60	0.60	0.58
Cd	1.1	<0.6	<1.1
Co	9.4	8.9	7.3
Cr	24	18	23
Cu	26	21	21
Hg	<0.1	0.1	0.1
Ni	30	24	26
Pb	27	19	27
Se	<1.3	<1.3	<1.7
Sb	<0.8	<1	<1
Sr	47	34	43
Tl	<1.3	<1.3	<1.7
V	21	21	18
Zn	110	76	110

Table 7 continued. All values in ug/g unless noted

Sample ID	X201	X202	X203
Hexachlorobenze (ug/kg)	<5	<5	<5
Trifluralin (ug/kg)	<10	<10	<10
Alpha-BHC (ug/kg)	<5	<5	<5
Gamma-BHC (ug/kg)	<5	<5	<5
Atrazine (ug/kg)	<50	<50	<50
Heptachlor (ug/kg)	<5	<5	<5
Aldrin (ug/kg)	<5	<5	<5
Acetochlor (ug/kg)	<10	<25	<25
Alachlor (ug/kg)	<10	<10	<10
Metribuzin (ug/kg)	<10	<10	<10
Metolachlor (ug/kg)	<25	<25	<25
Heptachlor Epoxide (ug/kg)	<5	<5	<5
Pendimethalin (ug/kg)	<10	<10	<10
gamma-Chlordane (ug/kg)	<10	<10	<10
Alpha-chlordane (ug/kg)	<10	<10	<10
p,p'-DDE (ug/kg)	<5	<5	<5
Dieldrin (ug/kg)	<5	<5	<5
Captan (ug/kg)	<10	<11	<10
Cyanazine (ug/kg)	<25	<25	<25
Endrin (ug/kg)	<5	<5	<5
p,p'-DDD (ug/kg)	<5	<5	<5
p,p'-DDT (ug/kg)	<5	<5	<5
Methoxychlor (ug/kg)	<0.06	<25	<25
Phenol	<0.06	<0.07	<0.08
Bis(2chlorophenol) ether	<0.06	<0.07	<0.08
2-chlorophenol	<0.06	<0.07	<0.08
1,3-dichlorobenze	<0.06	<0.07	<0.08
1,4-dichlorobenzene	<0.06	<0.07	<0.08
1,2-dichlorobenzene	<0.06	<0.07	<0.08
2-methylpehnol	<0.06	<0.07	<0.08
4-methylphenol	<0.06	<0.07	0.19
n-nitroso-di-n-propylamine	<0.06	<0.07	<0.08
Hexachloroethane	<0.06	<0.07	<0.08
Nitrobenzene	<0.06	<0.07	<0.08
Isophorone	<0.06	<0.07	<0.08
2-nitrophenol	<0.06	<0.07	<0.08
2,4 dimethylphenol	<0.06	<0.07	<0.08

Table 7 (continued) All values in ug/g unless noted.

Sample ID	X201	X202	X203
bis(2-chloroethoxy) methane	<0.06	<0.07	<0.08
2,4-dichlorophenol	<0.06	<0.07	<0.08
1,2,4-trichlorobenzene	<0.06	<0.07	<0.08
Naphthalene	<0.06	<0.07	<0.08
4-chloroaniline	<0.06	<0.07	<0.08
Hexachlorobutadiene	<0.06	<0.07	<0.08
4-chloro-3methylphenol	<0.06	<0.07	<0.08
2-methylnaphthalene	0.07	<0.07	0.11
Hexachlorocyclopentadiene	<0.06	<0.07	<0.08
2,4,6-trichlorophenol	<0.06	<0.07	<0.08
2,4,5-trichlorophenol	<0.06	<0.07	<0.08
2-chloronaphtlalene	<0.06	<0.07	<0.08
2-nitroaniline	<0.06	<0.07	<0.08
dimethylphthalate	<0.06	<0.07	<0.08
acenaphthylene	<0.06	<0.07	<0.08
2,6-dinitrotoluene	<0.06	<0.07	<0.08
3-nitroaniline	<0.06	<0.07	<0.08
acenaphthene	<0.06	<0.07	<0.08
2,4-dinitrophenol	<0.7	<0.7	<0.8
4-nitrophenol	<0.06	<0.07	<0.08
Dibenzofuran	<0.06	<0.07	<0.08
2,4-dinitrotoluene	<0.06	<0.07	<0.08
diethylphthalate	<0.06	<0.07	<0.08
4-chlorophenyl phenyl ether	<0.06	<0.07	<0.08
Fluorene	<0.06	<0.07	<0.08
4-nitroaniline	<0.06	<0.07	<0.08
4,6-dinitro-2-methylphenol	<0.4	<0.5	<0.5
4-bromophenyl phenyl ether	<0.06	<0.07	<0.08
hexachlorobenzene	<0.06	<0.07	<0.08
pentachlorophenol	<0.2	<0.2	<0.3
Phenanthrene	0.61	0.11	0.36
Anthracene	0.07	<0.07	<0.08
di-n-butylphthalate	<0.06	<0.07	<0.08
Fluoranthene	0.78	0.24	0.48
Pyrene	0.62	0.24	0.44
Butyl benzyl phthalate	<0.06	<0.07	<0.08
3,3'-dichlorobenzidine	<0.06	<0.07	<0.08
Benzo(a)anthracene	0.28	0.12	0.20
Chrysene	0.36	0.15	0.26

Table 7 (continued) All values in ug/g unless noted.

Sample ID	X201	X202	X203
Bis(2-ethylhexyl)phthalate	<0.08	<0.08	<0.13
di-n-octylphthalate	<0.06	<0.07	<0.08
Benzo(b)fluoranthene	0.30	0.14	0.26
Benzo(k)fluoranthene	0.32	0.16	0.26
Benzo(a)pyrene	0.30	0.13	0.22
Indeno(1,2,3-cd)pyrene	<0.14	<0.07	<0.09
Dibenzo(a,h)anthracene	<0.06	<0.07	<0.08
Benzo(g,h,i)perylene	<0.12	<0.07	<0.08
Chloromethane (ug/kg)	<2.8	<2.7	<3.4
Bromomethane (ug/kg)	<7	<6.8	<8.5
Vinyl chloride (ug/kg)	<2.8	<2.7	<3.4
Chloroethane (ug/kg)	<2.8	<2.7	<3.4
Methylene chloride (ug/kg)	<7	<6.8	<8.5
Acetone (ug/kg)	28	30	28
Trichlorofluoromethane (ug/kg)	<2.8	<2.7	<3.4
Bromochloromethane (ug/kg)	<2.8	<2.7	<3.4
Carbon Disulfide (ug/kg)	<2.8	<2.7	<3.4
1,1-dichloroethylene (ug/kg)	<2.8	<2.7	<3.4
1,1-dichloroethane (ug/kg)	<2.8	<2.7	<3.4
trans 1,2-dichloroethylene (ug/kg)	<2.8	<2.7	<3.4
cis 1,2-dichloroethylene (ug/kg)	<2.8	<2.7	<3.4
Chloroform (ug/kg)	<2.8	<2.7	<3.4
1,2-dichloroethane (ug/kg)	<2.8	<2.7	<3.4
2-butanone (ug/kg)	<2.8	<2.7	<3.4
1,1,1-trichloroethane (ug/kg)	<2.8	<2.7	<3.4
Carbon tetrachloride (ug/kg)	<2.8	<2.7	<3.4
Methyl tert butyl ethere (ug/kg)	<2.8	<2.7	<3.4
Dichlorobromomethane (ug/kg)	<2.8	<2.7	<3.4
1,2-dichloropropane (ug/kg)	<2.8	<2.7	<3.4
cis 1,2-dichloropropene (ug/kg)	<2.8	<2.7	<3.4
trichloroethylene (ug/kg)	<2.8	<2.7	<3.4
Chlorodibromomethane (ug/kg)	<2.8	<2.7	<3.4
1,1,2 trichloroethane (ug/kg)	<2.8	<2.7	<3.4
Benzene (ug/kg)	5.8	6.1	5.6
trans 1,3-dichloropropene (ug/kg)	<2.8	<2.7	<3.4
2-chloroethylvinyl ether (ug/kg)	<2.8	<2.7	<3.4
Bromform (ug/kg)	<2.8	<2.7	<3.4
4-methyl-2-pentanone (ug/kg)	<2.8	<2.7	<3.4
2-hexanone (ug/kg)	<2.8	<2.7	<3.4
Tetrachloroethylene (ug/kg)	<2.8	<2.7	<3.4
1,1,2,2-tetrachlorethane (ug/kg)	<2.8	<2.7	<3.4

Table 7 (continued) All values in ug/g unless noted.

Sample ID	X201	X202	X203
Toluene (ug/kg)	11	10	11
chlorobenzene (ug/kg)	<2.8	<2.7	<3.4
ethylbenzene (ug/kg)	<2.8	3.3	<3.4
Styrene (ug/kg)	<2.8	<2.7	<3.4
Xylene (ug/kg)	3.5	4.6	4.2
Approximate Quantifications			
Misc. PNAS	0.71	0.46	0.85
Aliphatic Hydrocarbons	2.7	2.6	2.3
Solid (%)	75.7	77.4	60.1
pH (SW846)	9.0	8.9	9.1
NO3 soil extract	25	7.7	<2

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX E-4
PEORIA LAKE WATER QUALITY ANALYSIS

CONTENTS

Subject	Page
Water Quality Impacts of Dredged Material Placement	E-4-1
Mechanical Placement	E-4-1
Model Input	E-4-2
Model Output	E-4-4
Hydraulic Placement	E-4-9
Model Input	E-4-9
Model Output	E-4-11
Conclusions	E-4-11

Tables

No.	Title	Page
E-4-1	STFATE Model Input Data	E-4-2
E-4-2	Model Input Parameters	E-4-10
E-4-3	Summary of Modified Elutriate and Predicted Effluent Quality	E-4-11

Figures

No.	Title	Page
E-4-1	Maximum Zinc Concentration at Peak Depth	E-4-5
E-4-2	Maximum Concentration of Zinc Reached During Run	E-4-6
E-4-3	Maximum Ammonia Concentration at Peak Depth	E-4-7
E-4-4	Maximum Concentration of Ammonia Nitrogen Reached During Run	E-4-8

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX E-4
PEORIA LAKE WATER QUALITY ANALYSIS

WATER QUALITY IMPACTS OF DREDGED MATERIAL PLACEMENT

Water quality impacts associated with island construction activities may result from the mechanical placement of sand to construct ring levees, which would form the perimeter of the islands, and from the filling of the interior of the islands with primarily fine-grained material by hydraulic dredging. In order to assess the water quality impacts of these actions, two numerical models were used—STFATE and EFQUAL. Both models are modules of the Automated Dredging and Disposal Alternatives Management System (ADDAMS).

For the purpose of this study, two contaminant parameters were chosen for evaluation—zinc and ammonia nitrogen. Zinc has been shown to occur in elevated concentrations in the sediments near the project site by Cahill et al. 2000. Ammonia nitrogen is commonly found in the sediments and water column throughout the Illinois Waterway in elevated concentrations. By focusing on parameters that are known to occur in high concentrations, a conservative prediction of water column impacts can be made.

MECHANICAL PLACEMENT

Material used to construct the ring levee(s) will contain some percentage of fine-grained material. Associated with this fine-grained material will likely be contaminants. Since the placement of dredged material will be in open water, it is likely that contaminants will be released to the water column, requiring some limited mixing zone where water quality standards may be exceeded. The size of this mixing zone will depend on a number of factors, including the contaminant concentration in the dredged material, concentrations in the receiving water, the applicable water quality standards of the receiving water and receiving flow rate and turbulence. STFATE is capable of estimating near-field contaminant dilution and dispersion processes which determine water column impacts.

Based on previous island construction performed in Peoria pool and for purposes of estimating the water quality impacts resulting from the proposed action, it was assumed that a large clamshell bucket dredge would be used to construct the levee(s). Often sediments dredged by clamshell remain in fairly large consolidated clumps and reach the bottom in this form. Whatever its form, the dredged material descends rapidly through the water column to the bottom and only a small amount of the material remains suspended. The behavior of the material during placement is assumed to be separated into three phases: convective descent, during which the material cloud falls under the influence of gravity; dynamic collapse, occurring when the descending cloud impacts the bottom; and passive transport-dispersion, commencing when the material transport and spreading are determined more by ambient currents and turbulence than by the dynamics of the disposal operation.

MODEL INPUT

Estimation of ambient water column conditions includes current velocity and water depths over a computational grid. The dredged material is assumed to consist of a number of solid fractions, a fluid component and conservative dissolved contaminants. Each solid fraction has a volumetric concentration, a specific gravity, a settling velocity, a void ratio for bottom deposition, critical shear stress, and information on whether the fraction is cohesive and/or strippable. Table E-4-1 lists the input parameters utilized for this model.

TABLE E-4-1. STFATE Model Input Data

STFATE	Zinc	Ammonia	Units
Contaminant Selection Data			
Solid [] of dredged material	900	900	g/L
Contaminant [] in the bulk sediment	300000	200000	µg/Kg
Contaminant [] in the elutriate	87	9850	µg/L
Contaminant background [] at disposal site	0.02	0.1525	mg/L
Contaminant water quality standards	1000	15000	µg/L
Site Description			
Number of grid points (L to R)	25	25	
Number of grid points (T to B)	45	45	
Spacing between grid points (L to R)	50	50	ft
Spacing between grid points (T to B)	150	150	ft
Constant water depth	4	4	ft
Roughness height at bottom of disposal site	0.005	0.005	ft
Slope of bottom in x-direction	0	0	degrees
Slope of bottom in z-direction	0	0	degrees
Number of points in density profile	2	2	
Depth of density profile point	0,4	0,4	ft
Density at profile point	1.0000,1.0002	1.0000,1.0002	g/cc
Velocity Data			
Type of velocity profile	Site Depth Averaged Vel.	Site Depth Averaged Vel.	
Water depth of averaged velocity	4	4	ft
Vertically averaged X-direction velocity	1	1	ft/sec
Vertically averaged Z-direction velocity	0	0	ft/sec
Velocities for entire grid in X-dir	1	1	ft/sec
Velocities for entire grid in Z-dir	0	0	ft/sec

TABLE E-4-1 (Continued)

Input, Execution, and Output Keys			
Processes to simulate			
Duration of simulation	3600	3600	sec
Long-term time step for diffusion	100	100	sec
Convective descent output option	y	y	
Collapse phase output option	y	y	
Location of upper L corner of mixing zone on grid	0	0	ft
Location of lower R corner of mixing zone on grid	0	0	ft
Water quality standards at border of mixing zone for contaminant of concern	1	15	mg/L
Contaminant of concern	zinc	ammonia	
Background concentration at disposal site	0.02	0.02	mg/L
Location of upper L corner of zone of initial dilution (ZID) on grid	0	0	ft
Location of lower right corner of zone of initial dilution (ZID) on grid	0	0	ft
Water quality standards at border of ZID for contaminant of concern	0	0	mg/L
Number of depths in H2O column for which output is desired			
Depths for transport - diffusion output	2	2	ft
Predicted initial concentration in fluid fraction	300	200	mg/L
Dilution required to meet toxicity standards			percent
Dilution required to meet toxicity standards at border of ZID			percent
Material Description Data			
Total volume of dredged material in the hopper dredge	9	9	yd3
Number of distinct solid fractions	4	4	
Solid-fraction descriptions	Silt, Sand, Clay, Clump	Silt, Sand, Clay, Clump	
Solid-fraction specific gravity	2.65, 2.7, 2.65, 1.57	2.65, 2.7, 2.65, 1.57	
Solid-fraction volumetric concentration	0.031, 0.074, 0.022, 0.63	0.031, 0.074, 0.022, 0.63	yd3/yd3
Solid-fraction fall velocity	0.01, 0.1, 0.002, 3.0	0.01, 0.1, 0.002, 3.0	ft/sec
Solid-fraction deposited void ration	4.5, 0.6, 7.5, 0.4	4.5, 0.6, 7.5, 0.4	
Solid-fraction critical shear stress	0.008, 0.02, 0.001, 99.0	0.008, 0.02, 0.001, 99.0	lbs/sq ft
Cohesive? (y or n)	y, n, y, n,	y, n, y, n,	
Stripped during descent? (y or n)	y, y, y, n	y, y, y, n	
Moisture content of dredged material as multiple of liquid limit			

TABLE E-4-1 (Continued)

Material Description Data (cont)			
Water density at dredging site	1	1	g/cc
Desired number of layers	1	1	
Volume of each layer	9	9	yd3
Velocity of vessel in X-direction during dumping of each layer	0	0	ft/sec
Velocity of vessel in Z-direction during dumping of each layer	0	0	ft/sec

Disposal Operation Data			
Location of disposal point from top of grid	200	200	ft
Location of disposal point from left edge of grid	600	600	ft
Length of disposal vessel bin	6.5	6.5	ft
Width of disposal vessel bin	6.5	6.5	ft
Bottom depression length in X-direction	0	0	ft
Bottom depression length in Z-direction	0	0	ft
Bottom depression average depth	0	0	ft
Pre-disposal draft of disposal vessel	2	2	ft
Post-disposal draft of disposal vessel	0.5	0.5	ft
Time needed to empty disposal vessel	1	1	sec

MODEL OUTPUT

The output starts by echoing the input data and then optionally presenting the time history of the descent and collapse phases. In descent history, the location and velocity of the cloud centroid, the conservative constituent concentration, and the total volume and concentration of each solid fraction are provided as functions of time since release of the material. Figure E-4-1 shows the maximum concentration of zinc predicted to occur at any point downstream from the placement site. Figure E-4-2 shows the size and shape and concentrations of zinc throughout the discharge plume.

FIGURE E-4-1

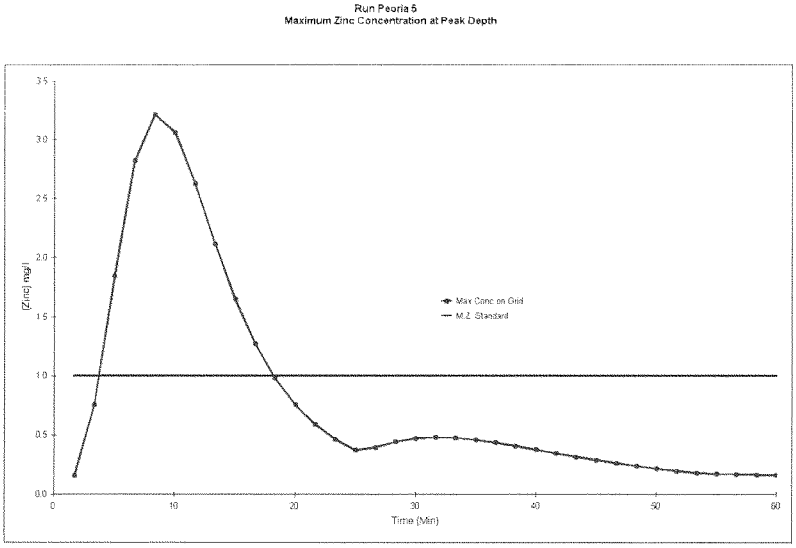
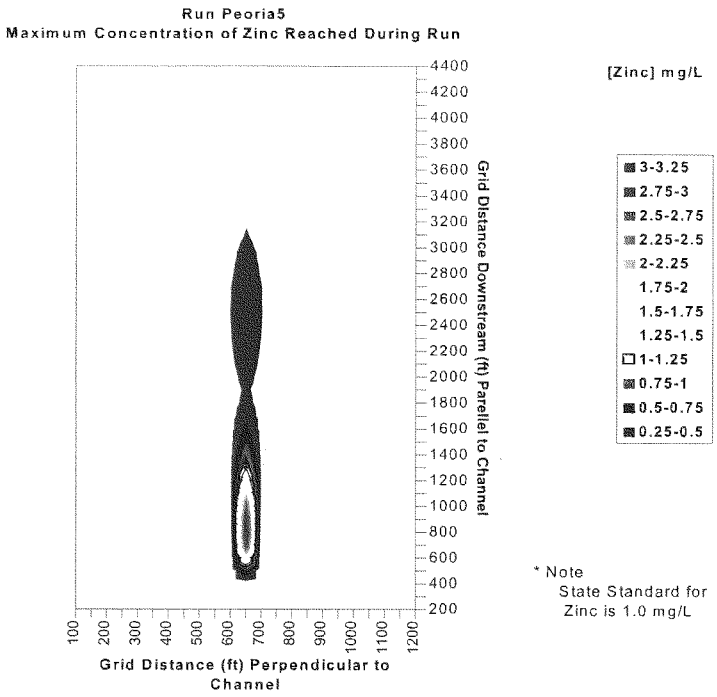

Run Peoria 5
Maximum Zinc Concentration at Peak Depth
[Zinc] mg/l
Time (Min)
Max Conc on Grid
M.Z. Standard
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
10
20
30
40
50
60

FIGURE E-4-2


Run Peoria5
Maximum Concentration of Zinc Reached During Run
[Zinc] mg/L
3-3.25
2.75-3
2.5-2.75
2.25-2.5
2-2.25
1.75-2
1.5-1.75
1.25-1.5
1-1.25
0.75-1
0.5-0.75
0.25-0.5
Grid Distance Downstream (ft) Parellel to Channel
4400
4200
4000
3800
3600
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
100
200
300
400
500
600
700
800
900
1000
1100
1200
Grid Distance (ft) Perpendicular to Channel
* Note
State Standard for
Zinc is 1.0 mg/L

Figures E-4-3 and E-4-4 show similar results for ammonia nitrogen.

FIGURE E-4-3

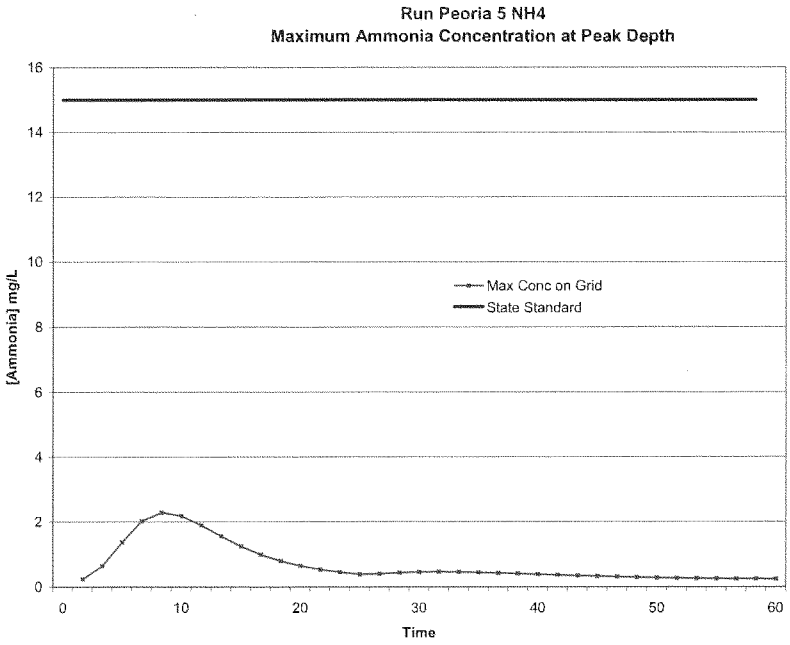
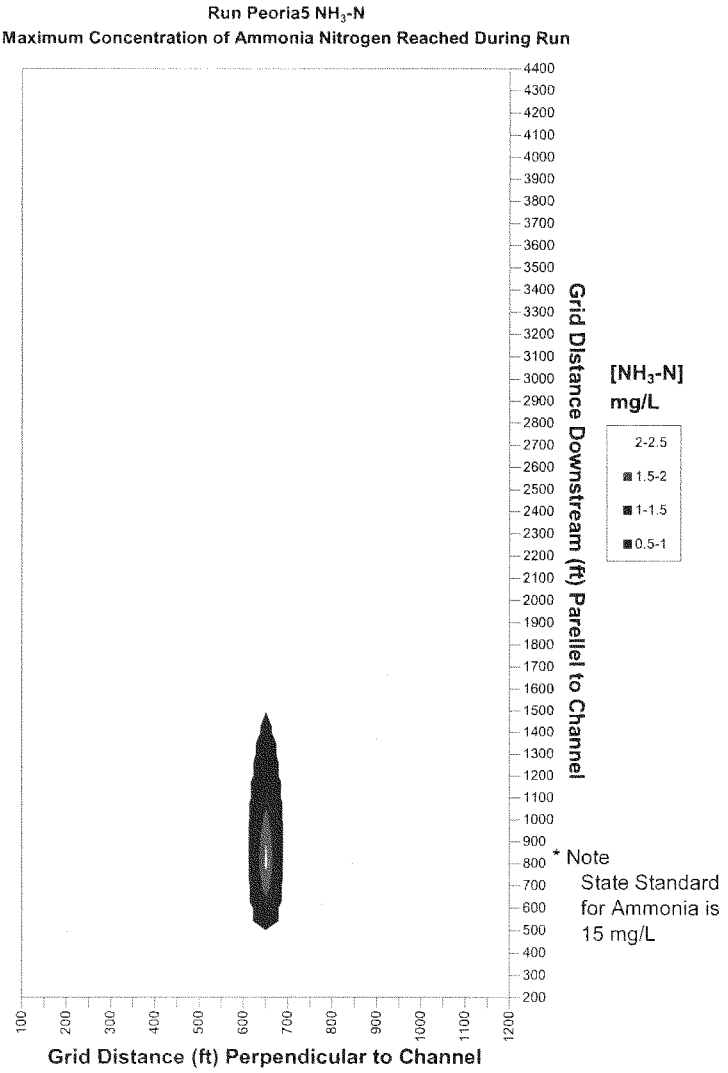


FIGURE E-4-4


Run Peoria5 NH_3-N
Maximum Concentration of Ammonia Nitrogen Reached During Run
Grid Distance Downstream (ft) Parellel to Channel
4400
4300
4200
4100
4000
3900
3800
3700
3600
3500
3400
3300
3200
3100
3000
2900
2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
200
300
400
500
600
700
800
900
1000
1100
1200
Grid Distance (ft) Perpendicular to Channel
[NH_3-N] mg/L
2-2.5
1.5-2
1-1.5
0.5-1
* Note
State Standard for Ammonia is 15 mg/L

HYDRAULIC PLACEMENT

Because hydraulic dredging is the most efficient means of moving large quantities of material, it is likely that this form of dredging will be used to perform the majority of deepwater habitat formation. The quality of water discharged from confined disposal areas is also a concern that must be addressed. The predicted concentrations of the effluent can be used with appropriate water quality standards to determine the mixing zone required to meet respective water quality standards. EFQUAL is capable of computing predicted dissolved and total contaminant concentrations in the effluent from a confined disposal site, comparing predicted effluent concentrations with specified water quality standards, and computing dilution of effluent required to meet specified water quality standards considering contaminant concentrations in the receiving water.

MODEL INPUT

The main data requirements for EFQUAL are modified elutriate test conditions and results, background receiving water concentrations, and water quality standards for contaminants of concern. Table E-4-2 lists the input parameters used for this model.

TABLE E-4-2. Model Input Parameters

Parameters	Zinc	Ammonia
For each evaluation:		
Descriptive title		
Number of modified elutriate replicates	4	4
For each modified elutriate replicate:		
Slurry concentration (optional)	1024.4	1024.4
Retention time (optional)	0.5	0.5
Total suspended solids (TSS) concentration	107700	107700
For each contaminant of concern:		
Detection limit	8	50
Test sediment concentration (optional)	355	335
Test water concentration (optional)	63	152.5
Background water concentration	63	152.5
Water quality standard	1000	15000
For each contaminant of concern and each modified elutriate replicate:		
Modified elutriate dissolved concentration	47, 71, 74, 20	10000, 11100, 4400, 14000
Modified elutriate concentration (required only if total concentrations used for comparison to standards	47, 71, 74, 20	10000, 11100, 4400, 14000
For each evaluation:		
Estimated effluent TSS concentration (required if total concentrations used for comparisons to standards)	107700	107700
Percentage increment above background and dilution calculations (used when standards are below or very close to background)	0	0

Modified elutriate test must have a minimum of 3 replicates and a maximum of 9 replicates.

MODEL OUTPUT

Results from EFQUAL are shown in Table E-4-3. Both zinc and ammonia nitrogen are expected to be below the respective standards. It should be noted that a standard also exists for un-ionized ammonia nitrogen. This standard is dependent upon water temperature and pH. At this time, it is not possible to predict with certainty what un-ionized ammonia nitrogen concentrations may occur during dredging; however, one can use conservative estimates assuming warm water temperatures and high pH values.

TABLE E-4-3. Summary of Modified Elutriate and Predicted Effluent Quality

	Ambient Water Conc. (mg/l)	Sediment Conc. (mg/kg)	Predicted Total Conc. (mg/l)	State Std. (mg/l)
Ammonia	0.15	335	9.875	15*
Zinc	0.063	355	0.053	1.0

* If ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then un-ionized ammonia nitrogen shall not exceed 0.04 mg/l.

CONCLUSIONS

Model results show that two parameters which commonly occur in elevated concentrations in the sediment and water column of the Illinois Waterway will exceed water quality standards in a small area immediately downstream from the placement site during mechanical dredging. The mechanically placed material used to construct the ring levee will be fine-grained material, which will likely have contaminant concentrations much lower than those assumed in this model exercise. It is not likely that this action will have a substantial or long-term impact to the water quality of the river.

Based on available sediment and water column concentrations of zinc and ammonia nitrogen, release of supernatant water from the confining ring levee is not expected to exceed water quality standards for those parameters. Actual field conditions may differ from the assumptions used in this model exercise and it will be necessary to construct an appropriately sized confinement area.

APPENDIX F

COST ENGINEERING

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX F
DETAILED ESTIMATE OF COST

1. GENERAL

Table 3-12 of the main report contains the detailed cost estimate prepared for the Peoria Riverfront Development (Ecosystem Restoration) Study, including Federal construction, planning, engineering, and design, and construction management costs. The current working estimate (CWE) prepared for this feasibility level study was developed after review of project plans, discussion with the design team members, and review of costs for similar construction projects. The Micro-Computer Aided Cost Estimating System (M-CACES) was utilized to assemble and calculate project element cost. Costs, including appropriate contingencies, are presented in accordance with EC 1110-2-536, Civil Works Project Cost Estimating - Code of Accounts.

2. PRICE LEVEL

Project element costs are based on December 2002 prices. These costs are considered fair and reasonable to a well-equipped and capable contractor and include overhead and profit. Calculation of the Fully Funded Estimate (FFE) was done in accordance with the Civil Works Construction Cost Index System (CWCCIS) dated 30 September 2002.

3. CONTINGENCY DISCUSSION

After review of project documents and discussion with personnel involved in the project, cost contingencies were developed which reflect the uncertainty associated with each cost item. Per EC 1110-2-263, these contingencies are based on qualified cost engineering judgment of the available design data, type of work involved, and uncertainties associated with the work and schedule. Contingencies are not a means of adding costs to the project for possible schedule slippage or to cover items which are thought to be a project requirement but are not specifically being considered in the current scope. The following discussion of major project features indicates the basis for contingency selection and assumptions made. For other elements not addressed below, the assignment of contingencies was deemed appropriate to account for the uncertainty in design and quantity calculation and further discussion is not included.

a. Feature 01, Lands and Damages.

The estimate for this feature is based on work required by Real Estate, which is described in greater detail in Appendix H of the main report.

b. Feature 06, Fish and Wildlife Facilities.

The Design and Cost Engineering Branches developed the quantities for this work.

a. **Upper and Lower Island Construction by Dredging.** The Peoria Riverfront Development (Ecosystem Restoration) Project area includes Lower Peoria Lake. The principal goal of the Recommended Plan is to enhance aquatic habitat through the restoration of depth diversity in Peoria Lake and riparian and aquatic habitat along Farm Creek, with ancillary benefits to recreational boating and fishing. Peoria Lake, the largest bottomland lake in the Illinois River Valley, exhibits loss of depth similar to other Illinois River backwater lakes. The 60 backwater lakes along the Illinois River have average volumetric losses of 70% since 1903. Loss of aquatic habitat due to sedimentation is the greatest threat to the healthy function of the Illinois River, and Peoria Lake specifically. Construction of the upper and lower islands will restore lost aquatic habitat. The Upper Island is to be constructed in four phases, placing a total of 461,000 cubic yards of material through both mechanical and hydraulic methods. The Lower Island is also to be constructed in four phases, resulting in the placement of 1,215,000 cubic yards through both mechanical and hydraulic dredging methods. The dredging unit costs are based on historical costs from previous projects.

b. **Rock Jetties.** Much of the lake currently is a uniform shallow depth with a soft substrate. The addition of firm structure, such as rock jetties/reefs, rock riprap, or root wads, would provide additional habitat diversity. Therefore, 1,000 tons of rock will be placed at the upper island to provide this diversity. An additional 4,000 tons of rock will be placed at the lower islands to accomplish the same habitat goals.

c. **Closing Structures.** In areas where there is little potential for higher current velocities to maintain water depth, deepwater habitat created by dredging has the potential to fill rapidly with sediments. Closing structures can help to minimize flow into these deepwater areas, reducing sediment delivery and increasing sustainability. Rock closing structures also provide aquatic structure. The plan calls for 3,000 tons of rock to be placed at the upper island and an additional 4,000 tons to be placed at the lower islands.

d. **Bank Protection.** In order to maximize sediment removal, it is preferable to construct the entire islands out of the river substrate. The fine silt clay that composes this material would require some bank protection to reduce the potential for island erosion due to wind- and wake-generated waves. Rock riprap was chosen as a preferred material due to the additional aquatic structure it provides. The design calls for 3,000 tons of bedding stone and 9,000 tons of riprap at the upper island. The lower island design has 9,000 tons of bedding stone and 26,000 tons of riprap.

The average contingency for the project's dredging construction is 20 percent, with a 10 percent contingency being applied to the rockwork. These contingency amounts were

determined, based on the relative degree of uncertainty associated with quantities and prices of each construction feature.

c. Feature 30, Planning, Engineering & Design.

The engineering and design for this project includes all planning and design work necessary to complete the Definite Project Report and construction plans and specifications. This cost also includes engineering support during construction, and preparation of asbuilt drawings and operation and maintenance manuals. The design effort for the construction was analyzed to determine the man-year effort required. This estimate is based upon money expended to date, discussions between the project engineer and project manager, and historical data and experience gained on other projects of similar nature.

d. Feature 31, Construction Management.

Construction management includes studies and analyses of project reports, plans and specification, and conferences with construction staff to become familiar with design requirements; biddability, contractibility, and operability reviews, pre-award activities to acquaint prospective bidders with the nature of the work; administration of construction contracts; administration of A/E contracts which provide for supervision and inspection; establishment of bench marks and baselines required for layouts of construction, relocations, and clearing; review of shop drawings, manuals, catalog cuts, and other information submitted by the construction contractor; assure specifications compliance by supervision and inspection on construction work, conferences with the contractors to coordinate various features of the project and enforce compliance with schedules; sampling and testing during construction phase to determine suitability and compliance with plans and specifications; negotiate with the contractor on all contract modifications, including preparation of all contract documents required therefore; estimate quantities, determine periodic payments to contractors, and prepare, review and approve contract payments; review and approve construction schedules and progress charts; prepare progress and completion reports; project management and administration not otherwise identified; and district overhead. These costs may be incurred at the job site, an area office, or at the District. For the Peoria Riverfront Development (Ecosystem Restoration) project, the estimated cost of construction management is $1,151,000 for a construction contract with an estimated value of $11,510,000. The construction contract for construction of the upper and lower islands has duration of slightly more than 9 years, beginning in June of 2004, and ending in September of 2013.

Peoria Riverfront Ecosystem
Selected Plan
Build Option 2 & Option 3

Designed By: CEMVR-ED-DN
Estimated By: Charles Van Laarhoven

Prepared By: CEMVR-ED-C

Preparation Date: 12/17/02
Effective Date of Pricing: 12/17/02

Sales Tax: 0.0%

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Tue 17 Dec 2002 — Tri-Service Automated Cost Engineering System (TRACES) — TIME 11:14:26
Eff. Date 12/17/02 — PROJECT PRFEC3: Peoria Riverfront Ecosystem - Selected Plan
TABLE OF CONTENTS — Rock Island District — CONTENTS PAGE 1

SUMMARY REPORTS — SUMMARY PAGE

PROJECT OWNER SUMMARY - Project.....1
PROJECT OWNER SUMMARY - Item.....2
PROJECT INDIRECT SUMMARY - Project.....3
PROJECT INDIRECT SUMMARY - Item.....4
PROJECT DIRECT SUMMARY - Project.....5
PROJECT DIRECT SUMMARY - Item.....6

No Detailed Estimate...

No Backup Reports...

* * * END TABLE OF CONTENTS * * *

Tri-Service Automated Cost[illegible]neering System (TRACES)
PROJECT PRFEC3: Peoria Rive[illegible]nt Ecosystem - Selected Plan
Rock Island District
** PROJECT OWNER SUMMARY - Project **

		QUANTITY	UOM	CONTRACT CST	ESCALATN	CONTINGN	TOTAL COST	UNIT COST
1	Upper Island			2,862,092	433,563	587,030	3,882,685	
2	Lower Island			6,906,465	1,063,586	1,401,369	9,371,421	
TOTAL	Peoria Riverfront Ecosystem	1.00	EA	9,768,557	1,497,150	1,988,399	13,254,106	13254105.80

LABOR ID: PRFEC3 EQUIP ID: RG0599 Currency in DOLLARS CREW ID: NATOOA UPB ID: UP00EA

		QUANTITY	UOM	CONTRACT CST	ESCALATN	CONTINGN	TOTAL COST	UNIT COST
1 Upper Island								
1/ 1	Stage 1a Mob/demob			101,176	9,187	22,073	132,436	
1/ 5	Stage 1a Mech. Dredge Embankment			705,301	64,046	153,869	923,216	
1/07	Stage 1b Mob/demob			101,176	10,682	22,372	134,230	
1/10	Stage 1b Dredge Interior Fill			470,238	49,649	103,977	623,864	
1/12	Stage 2a Mob/demob			101,176	18,978	24,031	144,184	
1/14	Stage 2a Mech. Dredge Embankment			209,130	39,227	49,671	298,029	
1/16	Stage 2b Mob/demob			101,176	16,803	23,596	141,575	
1/18	Stage 2b Dredge Interior Fill			494,561	82,137	115,340	692,037	
1/20	Stage 3a Rock Placement - Jettie			37,949	9,376	4,733	52,058	
1/22	Stage 3b Rock Placement Closure			113,846	28,129	14,198	156,173	
1/24	Stage 3c Erosion Prot. - Bedding			84,825	20,959	10,578	116,363	
1/26	Stage 3c Erosion Prot. - Riprap			341,539	84,388	42,593	468,520	
TOTAL	Upper Island			2,862,092	433,563	587,030	3,882,685	
2 Lower Island								
2/ 1	Stage 1a Mob/demob			101,176	9,187	22,073	132,436	
2/ 5	Stage 1a Mech. Dredge Embankment			2,054,394	186,553	448,189	2,689,136	
2/07	Stage 1b Mob/demob			101,176	10,682	22,372	134,230	
2/10	Stage 1b Dredge Interior Fill			956,691	101,009	211,540	1,269,241	
2/12	Stage 2a Mob/demob			101,176	18,978	24,031	144,184	
2/14	Stage 2a Mech.Dredge Embankment			721,703	135,373	171,415	1,028,491	
2/16	Stage 2b Mob/demob			101,176	16,803	23,596	141,575	
2/18	Stage 2b Dredge Interior Fill			1,224,240	203,323	285,513	1,713,076	
2/20	Stage 3a Rock Placement - Jettie			151,795	37,586	18,930	208,231	
2/22	Stage 3b Rock Placement Closure			151,795	37,506	18,930	208,231	
2/24	Stage 3c Erosion Prot. - Bedding			254,476	62,877	31,735	349,088	
2/26	Stage 3c Erosion Prot. - Riprap			986,667	243,789	123,046	1,353,501	
TOTAL	Lower Island			6,906,465	1,063,586	1,401,369	9,371,421	
TOTAL	Peoria Riverfront Ecosystem	1.00	EA	9,768,557	1,497,150	1,988,399	13,254,106	13254105.80

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714

Tri-Service Automated Cost[illegible]ineering System (TRACES)
PROJECT PRFEC3: Peoria Rive[illegible]nt Ecosystem - Selected Plan
Rock Island District
** PROJECT INDIRECT SUMMARY - Project **

	QUANTITY UOM	DIRECT	FIELD OH	HOME OH	INSURNCE	BOND	PROFIT	TOTAL COST	UNIT COST
1 Upper Island		2,121,623	212,162	233,379	30,806	51,959	212,162	2,862,092	
2 Lower Island		5,119,653	511,965	563,162	74,337	125,382	511,965	6,906,465	
TOTAL Peoria Riverfront Ecosystem	1.00 EA	7,241,276	724,128	796,540	105,143	177,342	724,128	9,768,557	9768557.17
Escalation								1,497,150	
SUBTOTAL								11,265,707	
Contingency								1,988,399	
TOTAL INCL OWNER COSTS								13,254,106	

48818

715

		QUANTITY UOM	DIRECT	FIELD OH	HOME OH	INSURANCE	BOND	PROFIT	TOTAL COST	UNIT COST
1 Upper Island										
1/ 1	Stage 1a Mob/demob		75,000	7,500	8,250	1,089	1,837	7,500	101,176	
1/ 5	Stage 1a Mech. Dredge Embankment		522,828	52,283	57,511	7,591	12,804	52,283	705,301	
1/07	Stage 1b Mob/demob		75,000	7,500	8,250	1,089	1,837	7,500	101,176	
1/10	Stage 1b Dredge Interior Fill		348,580	34,858	38,344	5,061	8,537	34,858	470,238	
1/12	Stage 2a Mob/demob		75,000	7,500	8,250	1,089	1,837	7,500	101,176	
1/14	Stage 2a Mech. Dredge Embankment		155,025	15,502	17,053	2,251	3,797	15,502	209,130	
1/16	Stage 2b Mob/demob		75,000	7,500	8,250	1,089	1,837	7,500	101,176	
1/18	Stage 2b Dredge Interior Fill		366,610	36,661	40,327	5,323	8,978	36,661	494,561	
1/20	Stage 3a Rock Placement - Jettie		28,131	2,813	3,094	408	689	2,813	37,949	
1/22	Stage 3b Rock Placement Closure		84,392	8,439	9,283	1,225	2,067	8,439	113,846	
1/24	Stage 3c Erosion Prot. - Bedding		62,880	6,288	6,917	913	1,540	6,288	84,825	
1/26	Stage 3c Erosion Prot. - Riprap		253,177	25,318	27,849	3,676	6,200	25,318	341,539	
TOTAL Upper Island			2,121,623	212,162	233,379	30,806	51,959	212,162	2,862,092	
2 Lower Island										
2/ 1	Stage 1a Mob/demob		75,000	7,500	8,250	1,089	1,837	7,500	101,176	
2/ 5	Stage 1a Mech. Dredge Embankment		1,522,890	152,289	167,518	22,112	37,296	152,289	2,054,394	
2/07	Stage 1b Mob/demob		75,000	7,500	8,250	1,089	1,837	7,500	101,176	
2/10	Stage 1b Dredge Interior Fill		709,180	70,918	78,010	10,297	17,368	70,918	956,691	
2/12	Stage 2a Mob/demob		75,000	7,500	8,250	1,089	1,837	7,500	101,176	
2/14	Stage 2a Mech.Dredge Embankment		534,987	53,499	58,849	7,768	13,102	53,499	721,703	
2/16	Stage 2b Mob/demob		75,000	7,500	8,250	1,089	1,837	7,500	101,176	
2/18	Stage 2b Dredge Interior Fill		907,510	90,751	99,826	13,177	22,225	90,751	1,224,240	
2/20	Stage 3a Rock Placement - Jettie		112,523	11,252	12,378	1,634	2,756	11,252	151,795	
2/22	Stage 3b Rock Placement Closure		112,523	11,252	12,378	1,634	2,756	11,252	151,795	
2/24	Stage 3c Erosion Prot. - Bedding		188,639	18,864	20,750	2,739	4,620	18,864	254,476	
2/26	Stage 3c Erosion Prot. - Riprap		731,401	73,140	80,454	10,620	17,912	73,140	986,667	
TOTAL Lower Island			5,119,653	511,965	563,162	74,337	125,382	511,965	6,906,465	
TOTAL Peoria Riverfront Ecosystem		1.00 EA	7,241,276	724,128	796,540	105,143	177,342	724,128	9,768,557	9768557.17
Escalation									1,497,150	
SUBTOTAL									11,265,707	
Contingency									1,988,399	
TOTAL INCL OWNER COSTS									13,254,106	

48818

716

	QUANTITY UOMANHRS	LABOR	EQUIPMNT	MATERIAL	SUPLS	TOTAL COST	UNIT COST
1 Upper Island	19939	859,813	1029260	232,550	0	2,121,623	
2 Lower Island	52445	2080769	2418734	620,150	0	5,119,653	
TOTAL Peoria Riverfront Ecosystem	1.00 EA 72384	2940582	3447994	852,700	0	7,241,276	7241276.40
Field Office Overhead						724,128	
SUBTOTAL						7,965,404	
Home Office Overhead						796,540	
SUBTOTAL						8,761,944	
Insurance						105,143	
SUBTOTAL						8,867,088	
Bond						177,342	
SUBTOTAL						9,044,430	
Profit						724,128	
TOTAL INCL INDIRECTS						9,768,557	
Escalation						1,497,150	
SUBTOTAL						11,265,707	
Contingency						1,988,399	
TOTAL INCL OWNER COSTS						13,254,106	

48818

		QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	SUPLS	TOTAL COST	UNIT COST
1 Upper Island									
1/ 1	Stage 1a Mob/demob		0	25,000	50,000	0	0	75,000	
1/ 5	Stage 1a Mech. Dredge Embankment		6261	219,850	302,978	0	0	522,828	
1/07	Stage 1b Mob/demob		0	25,000	50,000	0	0	75,000	
1/10	Stage 1b Dredge Interior Fill		4501	182,120	166,460	0	0	348,580	
1/12	Stage 2a Mob/demob		0	25,000	50,000	0	0	75,000	
1/14	Stage 2a Mech. Dredge Embankment		1856	65,188	89,837	0	0	155,025	
1/16	Stage 2b Mob/demob		0	25,000	50,000	0	0	75,000	
1/18	Stage 2b Dredge Interior Fill		4734	191,540	175,070	0	0	366,610	
1/20	Stage 3a Rock Placement - Jettie		167	6,515	6,116	15,500	0	28,131	
1/22	Stage 3b Rock Placement Closure		500	19,545	18,347	46,500	0	84,392	
1/24	Stage 3c Erosion Prot. - Bedding		420	16,418	15,412	31,050	0	62,880	
1/26	Stage 3c Erosion Prot. - Riprap		1500	58,636	55,041	139,500	0	253,177	
TOTAL	Upper Island		19939	859,813	1029260	232,550	0	2,121,623	
2 Lower Island									
2/ 1	Stage 1a Mob/demob		0	25,000	50,000	0	0	75,000	
2/ 5	Stage 1a Mech. Dredge Embankment		18236	640,378	882,512	0	0	1,522,890	
2/07	Stage 1b Mob/demob		0	25,000	50,000	0	0	75,000	
2/10	Stage 1b Dredge Interior Fill		9157	370,520	338,660	0	0	709,180	
2/12	Stage 2a Mob/demob		0	25,000	50,000	0	0	75,000	
2/14	Stage 2a Mech.Dredge Embankment		6406	224,963	310,024	0	0	534,987	
2/16	Stage 2b Mob/demob		0	25,000	50,000	0	0	75,000	
2/18	Stage 2b Dredge Interior Fill		11718	474,140	433,370	0	0	907,510	
2/20	Stage 3a Rock Placement - Jettie		667	26,060	24,463	62,000	0	112,523	
2/22	Stage 3b Rock Placement Closure		667	26,060	24,463	62,000	0	112,523	
2/24	Stage 3c Erosion Prot. - Bedding		1260	49,254	46,235	93,150	0	188,639	
2/26	Stage 3c Erosion Prot. - Riprap		4334	169,393	159,008	403,000	0	731,401	
TOTAL	Lower Island		52445	2080769	2418734	620,150	0	5,119,653	
TOTAL	Peoria Riverfront Ecosystem	1.00 EA	72384	2940582	3447994	852,700	0	7,241,276	7241276.40
Field Office Overhead								724,128	
SUBTOTAL								7,965,404	
Home Office Overhead								796,540	
SUBTOTAL								8,761,944	
Insurance								105,143	
SUBTOTAL								8,867,088	
Bond								177,342	
SUBTOTAL								9,044,430	
Profit								724,128	

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	SUPLS	TOTAL COST	UNIT COST
TOTAL INCL INDIRECTS								9,768,557	
Escalation								1,497,150	
SUBTOTAL								11,265,707	
Contingency								1,988,399	
TOTAL INCL OWNER COSTS								13,254,106	

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PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX G-1
HABITAT EVALUATION AND QUANTIFICATION
PEORIA LAKE

CONTENTS

Subject		Page
1.	INTRODUCTION	G-1-1
2.	HABITAT EVALUATION METHODOLOGY	G-1-2
3.	EVALUATION SPECIES SELECTION	G-1-2
4.	ASSUMPTIONS	G-1-3
	a. Current Conditions	G-1-3
	b. Model Performance	G-1-4
	c. Changes in Habitat Conditions Over Time	G-1-4
	d. General Assumptions	G-1-5
5.	RESULTS OF HABITAT ANALYSIS	G-1-5
6.	INCREMENTAL ANALYSIS OF ALTERNATIVES	G-1-7
7.	DISCUSSION	G-1-9

Tables

No.	Title	Page
G-1-1	Evaluation Species for Habitat Analysis	G-1-3
G-1-2	Aquatic Habitat AAHUs	G-1-6
G-1-3	Wetland Habitat AAHUs	G-1-6
G-1-4	Potential Combinations of Alternatives Ranked by Output	G-1-8

CONTENTS (Continued)

Figures

No.	Title	Page
G-1-1	Alternative A-1 (Island Construction)	G-1-11
G-1-2	Alternative A-2 (Island Construction)	G-1-12
G-1-3	Alternative B-1 (Island Construction)	G-1-13
G-1-4	Alternative B-2 (Island Construction)	G-1-14
G-1-5	Alternative A-1 (Dredging)	G-1-15
G-1-6	Alternative A-2 (Dredging)	G-1-16
G-1-7	Alternative B-1 (Dredging)	G-1-17
G-1-8	Alternative B-2 (Dredging)	G-1-18

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX G-1
HABITAT EVALUATION AND QUANTIFICATION
PEORIA LAKE

1. INTRODUCTION

A habitat analysis was conducted to evaluate the potential benefits of alternative habitat improvement features in Peoria Lake. Active participants included biologists from the Rock Island District of the U.S. Army Corps of Engineers and the Illinois Department of Natural Resources. The U.S. Fish and Wildlife Service, Rock Island Ecological Service Office was given copies of the evaluation team's completed field data sheets, list of assumptions, and computer generated printouts of the evaluation process for review and comment.

The benefits to be derived from habitat restoration projects are not readily convertible to actual monetary units as is customarily required for traditional projects utilizing benefit-cost analyses. A method of quantification is needed to adequately evaluate project features. Quantification of habitat restoration project outputs can then be utilized as a project performance evaluation tool, a project-ranking tool, and/or a project-planning tool. This application for project output quantification was used as a project-planning tool.

While the cost to create an acre of a particular habitat type can be measured, the number of species that will eventually utilize that acre and the quality of habitat that develops on any created acre of habitat is difficult to ascertain. One way to measure habitat is to use Habitat Evaluation Procedures (HEP). The HEP quantifies project outputs expressed in habitat units (HUs). An HU is equal to habitat **quality** (habitat suitability indices, or HSI) multiplied by habitat **quantity** (area). This index varies from zero to one and measures how suitable the habitat is for a selected species when compared to that species' *optimum* habitat. Annualized HUs can then be used to determine changes brought about by project features/alternatives over time. This annualization computes average annual habitat units (AAHUs).

Once construction begins and as a project matures, habitat changes occur, and therefore habitat benefits may change. Many features (e.g., tree planting/growth) may not begin to show significant benefits until well into a project's life. The particular dynamics of the ecosystem under study then help determine the target years chosen for analysis. With or without a project, habitat conditions generally change over time; therefore, the overall value of a proposed project depends upon the comparison of "with-project" benefits and "without-project" benefits.

Comparison of alternative designs and combinations of features is accomplished through cost-effectiveness evaluation and incremental analysis. Cost-effectiveness evaluation is used to identify the least costly solution to achieve a range of project benefits. Incremental cost analysis is a tool that can be used to scale the size of the project or of individual features by determining changes in cost associated with increasing levels of benefits.

2. HABITAT EVALUATION METHODOLOGY

The methodology used in this evaluation was a modified form of HEP, the Wildlife Habitat Appraisal Guide (WHAG).[1] The HEP were developed to aid in land management planning and require the selection and evaluation of a single target species for each computer generated evaluation. The WHAG program takes a broader approach and evaluates for a range of target species within a specified habitat type.

The WHAG was developed by the Missouri Department of Conservation and the U.S. Department of Agriculture, Soil Conservation Service (now NRCS). It is a field evaluation procedure designed to estimate habitat quality and account for changes due to land management practices. Checklist-type appraisal guides are used for upland, wetland, and aquatic habitats. Computer programs are used to analyze field data in terms of habitat suitability for various evaluation species. This analysis employed a multi-agency approach with representatives from the Corps of Engineers and the Illinois Department of Natural Resources. The U.S. Fish and Wildlife Service, while not able to be directly involved in the WHAG evaluation, was supplied with all field sheets and results of the computer generated information for review and comment.

The WHAG analysis is a numerical system for evaluating the quality and quantity of particular habitats for target species within the WHAG. The qualitative component of the analysis is known as the habitat suitability index (HSI) and is rated on a 0.1 to 1.0 scale. The suitability of a given habitat type for a set of evaluation species is determined by the qualitative characteristics of the habitat type. The WHAG procedures include the use of limiting factors, which is a habitat requirement for an individual species during a critical time of the year. Absence of that habitat characteristic makes the habitat unsuitable and results in the lowest HSI value of 0.1. Habitat quality ratings can be improved by: (1) increasing acreages for particular habitat types that may be limited or lacking; (2) altering a limiting factor, such as unpredictable water levels; (3) altering a management strategy, such as cropping practice or cover crop composition; or (4) a combination of the preceding, depending on management goals, target species requirements, or available funds.

The quantitative component of the WHAG analysis is the measure of the acres of habitat that are available for the selected species. From the qualitative and quantitative determinations, the standard unit of measure, the habitat unit (HU), is calculated using the following formula: HSI x Acres = HUs. For project planning and impact analysis, project life was established as 25 years. To facilitate comparison, target years were established at 0 (existing conditions), 1 year after, 5 years after, and 25 years after project construction. HSI and AAHUs for each evaluation species were calculated to reflect expected habitat conditions over the life of the project.

For the evaluation process, the study team reviewed aerial photography, GIS and topographic data, and preliminary design drawings. The members of the team were also familiar with the project area and most had direct knowledge of existing conditions. During the evaluation process, assumptions are developed regarding existing conditions and probable post-project conditions relative to limiting factors and/or proposed management practices.

3. EVALUATION SPECIES SELECTION

Table G-1-1 lists the evaluation species used in this analysis. These species are part of an established set in the WHAG model. Although a set list of species is used, each species represents

[1] D. L. Urich and others, "Habitat Appraisal of Private Land in Missouri," *Wildlife Society Bulletin* 12 (1984): 350-356.

a guild of other similar species that utilize the same habitat in similar ways. In essence, each species represents an array of habitat variables for the species being evaluated. These species represent key goals and objectives for the proposed project.

TABLE G-1-1. Evaluation Species for Habitat Analysis

Species	Scientific Name	Habitat Evaluated
Channel Catfish	*Ictalurus punctatus*	aquatic
Gizzard Shad	*Dorosoma cepedianum*	aquatic
L. Mouth Bass	*Micropterus salmoides*	aquatic
Bluegill	*Lepomis macrochirus*	aquatic
Crappie (WH-BL)	*Pomoxis spp.*	aquatic
Carp	*Cyprinus carpio*	aquatic
Black Bullhead	*Ameiurus melas*	aquatic
Mallard	*Anas platyrhynchos*	nonforested wetland
Lesser Yellowlegs	*Tringa flavipes*	nonforested wetland
King Rail	*Rallus elegans*	nonforested wetland
Green-Backed Heron	*Butorides striatus*	nonforested wetland
Muskrat	*Ondatra zibethicus*	nonforested wetland

Seven fish species were used to evaluate the aquatic habitat (dredging) improvements proposed by the project. Project designs for lower Peoria Lake would produce a wide diversity of aquatic habitat that currently does not exist. Channel catfish, and gizzard shad are fish that commonly inhabit main channel and channel boarder habitats. Largemouth bass, bluegill, and crappie are centrarchids that inhabit side channels and backwaters, and are important sport fish species. Carp and black bullhead are common and abundant in backwater habitats. All seven species utilize backwater areas as spawning habitat.

Five wildlife species were used to evaluate the terrestrial component (island construction) of the project. Mallard is a migratory waterfowl that utilizes early successional wetland habitat and has socioeconomic importance as a game species. Lesser Yellowlegs is a wading bird found in initial successional wetland habitat. King rail is a rare species of wading bird that prefers permanent sedge dominant wetland habitat. Green-backed heron is a wading bird found in mid-successional herbaceous and shrub dominated wetland habitat. The muskrat is a resident furbearing mammal that utilizes mid successional herbaceous wetland habitat.

4. ASSUMPTIONS

Several assumptions have been made in regards to current conditions, model performance, and changes in habitat conditions over time. Because the water level within Peoria Lake frequently fluctuates, an elevation for differentiating terrestrial and aquatic components needed to be established for the evaluation process. Flat pool is 440 msl (mean sea level) and is the lowest regulated (for navigation) water level that Peoria Lake would be allowed to reach. That elevation was selected as the dividing line between the terrestrial and aquatic habitat components proposed by the project.

a. Current Conditions. Current conditions within Peoria Lake in and around the proposed project area provide limited habitat value for most species associated with open-water habitats. The majority of the area is covered in 12-18 inches of murky water with a substrate of up to 4 feet

that is best described as "pudding." There is essentially no aquatic plant life supported by this substrate. Water quality in the lake is frequently poor and has high turbidity. Realizing that even with the generally poor habitat quality of the proposed project area, there is still some minor habitat value and some species can be found to survive under the minimal conditions provided. However, for the purposes of the evaluation, the lowest habitat value of 0.1, in essence a "0" value, was used as the baseline, or existing, condition.

While sedimentation is a major concern for the area, some recent Corps studies indicate that a trend toward reduced sedimentation rates or even equilibrium may be developing within this reach of the river. If such is the case, the prospect for dramatic changes or naturally occurring habitat improvements within the lake over the next 25 years is very low. It was therefore assumed that at year 25, "without-project" conditions would also be at or near "0" habitat value.

b. Model Performance. The WHAG was designed to be applied to many different types of habitat. In order to evaluate potential project aquatic benefits, a field data sheet was prepared using the aquatic (MOFISF) matrix for overflow water habitat. The non-forested wetland field data sheet was used in order to evaluate the island construction or wetland component of the project. It was felt that the questions asked by these types of habitat evaluation field sheets would best cover a wider range of habitat characteristics proposed by the project.

WHAG team members completed field data sheets for the Overflow Water matrix and the Non-Forested Wetland matrix in order to evaluate "without-project" and "with-project" conditions for the sediment removal (dredging) and the island construction features. This evaluation process was performed for each of the four proposed island alternatives. As the baseline and future "without-project" were assumed to be "0" habitat value, habitat evaluations for either aquatic or terrestrial project features would always be calculated against zero habitat.

There were also minor modifications made when answering some of the questions on the field data sheets. This was done to account for project changes that would provide habitat benefits but that the WHAG evaluation was too broad to pick up. An example would be large areas that the project proposes to dredge to 6 feet. Since the model looks for overwintering habitat for fish, it only addresses depths of 8 feet or greater. To account for other habitat benefits provided by dredging to 6 feet, a 10-acre area dredged to 6 feet was considered to have a similar value as 5 acres dredged to 8 feet or 6 feet of dredging would produce at least one-half the habitat value of the same area dredged to 8 feet.

Some questions on the field sheets did not precisely address changes proposed by the project. However, because habitat benefits of a similar nature would be provided by the project, the values of those benefits were considered and counted (i.e., considering riprap as comparable to natural bank structure). Also, because of the broad nature of the model, it is not sensitive enough in some instances to account for natural resource benefits that the project is anticipated to provide. Therefore, a few of the answers on the field sheets were weighted to show benefits from project features that would not have otherwise shown up in the WHAG analysis.

c. Changes in Habitat Conditions Over Time. Habitat conditions are not usually static. Either through natural processes or human activity, habitat generally evolves and may change in quality and/or quantity. Imbedded in each cover type evaluation, change has been added to the model. To assess the change over the period of analysis, target years have been defined. At each target year, a change in the habitat variables may be noticed. Noticeable changes can be characterized by a change in habitat benefit output.

Target years of 0 (baseline condition), 1, 5, and 25 (future "without-project" and future "with-project" conditions) are sufficient to analyze HUs and characterize habitat changes over the estimated project life. Hydrologic flow models and sedimentation rate models were run to indicate sustainability of project features and provide support for the project assumptions that follow.

Evaluation of the aquatic restoration features assumed that under "without-project" conditions, there would essentially be no change to the area over the 25-year span of the project. While this is not the usual situation for many habitats, there is some evidence from recent studies of the area that this is very likely the case for the project area being investigated. Under "with-project" conditions, radical changes would take place and maintain the majority of those basic project features over the 25-year life of the project. Deepwater habitat would be developed by dredging channels deep enough to maintain at least 8 feet of depth by year 25. There would also be several deep holes at various depths, some of which would be monitored to determine sedimentation rates for a variety of conditions. Additionally, broad areas would be dredged to around 6 feet deep and are anticipated to retain at least 4 feet of water depth after 25 years.

For the terrestrial/wetland component of the island features, the difference between "with-project" and "without-project" conditions is expressed by the conversion of open water aquatic habitat into island or terrestrial wetland habitat. Because of the similarity and proximity of this project to the Peoria Lake EMP project, it is assumed that constructed features would respond similarly to that project. Areas from 440 to 445 msl would be frequently inundated and would likely develop shoreline with scattered herbaceous vegetation toward the upper elevations. Around 446 msl and above (450 msl), herbaceous vegetation would develop more thickly and eventually succeed to woody growth.

d. General Assumptions. No special management of the project area would take place. While some natural bank structure may occur over the life of the project, it would contribute very little to habitat values. It is unlikely that trees would grow close enough to shore to provide any aquatic tree shading. Plant diversity at year 25 "with-project" was weighted to show a reduction of plant species by woody invasion.

5. RESULTS OF HABITAT ANALYSIS

This section describes the benefits in AAHUs for island alternatives discussed in detail in the feasibility report. These alternatives are the different sized islands and various quantities of sediment dredged to construct the islands and are shown as AlternativesA1, A2, B1 and B2. The amount of aquatic habitat restored would be proportional to the size of the islands created by the project. The construction activities would create features such as the channels around the islands and include deep holes to provide fisheries habitat. Placement of riprap on the islands would help sustain areas that may be subject to erosion and also provide fisheries benefits.

[Note: The habitat analysis was conducted using estimated acreages in the early stages of project development. The following acreage numbers do not reflect the same numbers that appear in other areas of the report. It was determined that the magnitude of acreages that changed later in the project would not significantly affect the results of the WHAG analysis and therefore did not warrant rerunning of the habitat analysis.]

Alternatives A1 and A2 are single islands located in the same vicinity above McCluggage Bridge. Alternative A1 proposes the conversion of 22 acres of shallow open water pool by removing sediments over a 13-acre area to construct an island with 9 acres of terrestrial habitat. Alternative

A2 proposes the conversion of 74 acres of shallow open water pool by removing sediments over a 55-acre area to construct an island with 19 acres of terrestrial habitat.

Alternatives B1 and B2 are both located downstream of the McCluggage Bridge and are much larger construction efforts within the same area. Alternative B1 proposes the conversion of 288 acres of shallow open water pool by removing sediments over a 219-acre area to construct two islands with a total of 69 acres of terrestrial habitat. Alternative B2 proposes the conversion of 174 acres of shallow open water pool by removing sediments over a 128-acre area to construct an island with 46 acres of terrestrial habitat.

Results of the habitat analysis for individual species are expressed in total AAHUs in the following tables. Table G-1-2 shows AAHUs for the aquatic habitat created for the four alternatives considered as most operable and feasible to pursue for consideration of the preferred alternative. Table G-1-3 shows AAHUs for the non-forested wetland habitat created for the four alternatives considered. Since the baseline HUs for the project are "0" and it is assumed they would not significantly change over the 25-year life of the project if no action were taken, a comparison of baseline HUs to future "without-project" over time is not needed. (Detailed results of the WHAG data can be found in figures G-1-1 thru G-1-8 at the end of this appendix.)

TABLE G-1-2. Aquatic Habitat AAHUs

Species	Dredging Alternative A1	Dredging Alternative A2	Dredging Alternative B1	Dredging Alternative B2
Channel Catfish	5.8	23.7	108.2	58.1
Gizzard Shad	5.3	32.5	146.2	78.5
L. Mouth Bass	1.3	0	23.1	0
Bluegill	1.3	0	21.9	0
Crappie (WH-BL)	1.4	5.4	24.6	13.2
Carp	6.3	25.7	111.8	59.8
Black Bullhead	7.3	28.3	123.2	66.0
Total AAHUs	**28.7**	**115.6**	**559.0**	**275.6**

TABLE G-1-3. Wetland Habitat AAHUs

Species	Island Alternative A1	Island Alternative A2	Island Alternative B1	Island Alternative B2
Mallard	2.4	4.0	16.1	10.6
Lesser Yellowlegs	0	0	17.5	11.1
King Rail	3.2	5.6	22.3	15.9
Green-Backed Heron	3.8	6.7	29.9	19.7
Muskrat	1.7	2.9	20.3	8.2
Total AAHUs	**11.1**	**19.2**	**106.1**	**65.5**

Dredging to create the desired aquatic habitat would also provide the material to construct the island's terrestrial habitat. Therefore, the aquatic habitat AAHUs were added to the terrestrial habitat AAHUs for each alternative to provide an overall quantification of total AAHUs for each alternative being considered. Then, total AAHUs for each alternative would be:

- Alternative A1 39.8 AAHUs
- Alternative A2 134.8 AAHUs
- Alternative B1 665.1 AAHUs
- Alternative B2 341.1 AAHUs

Because two different areas of construction are being evaluated, there is potential for various combinations of island construction to be considered. In this instance, Alternative A1 orA2 could be combined with Alternative B1 or B2 to provide a much larger complex of islands, but also at greater cost. If this were done, the total AAHUs for each alternative would be added to determine the overall project AAHUs for island combinations.

It is anticipated that the natural characteristics, and thus the habitat, of the project islands would change over time. This would occur as vegetation establishes itself and gradually develops into a forestry component on the island(s). This change would be most noticeable with the largest island(s) construction or Alternative B1 (two islands). This means that the HSI (habitat suitability index) for each target species may change somewhat over the life of the project. This change shows most dramatically for the target species yellowlegs, mallard and heron. The WHAG data showed a decline in yellowlegs habitat by changing from 0.58 HSI at year 1 to 0.1 HSI at year 25 and for mallard habitat by changing from 0.49 HSI at year 1 to 0.18 HSI at year 25. This is understandable, as the development on trees on the island(s) would reduce the habitat requisites for these target species.

On the other hand, HSI values for the target species heron rose over time from 0.58 at year 1 to 0.72 at year 25. HSI values for the target species king rail and muskrat remained the same or changed only marginally.

Changes over time in the aquatic reaches of the project were also accounted for in the WHAG model. Sedimentation in the lake is not going to stop. However, island orientation and configuration were considered to provide the most sustainable channel options with the most favorable aquatic habitat for the life of the project. Over dredging of the deep and shallow water areas was incorporated to maintain these areas so that there would still be 4 to 8 feet of water depth at the end of the 25-year project life. Because of this, HSI values for many target species changed very little or not at all. On average, the HSI values for all 4 alternatives considered ranged between 0.4 and 0.7 with virtually no change over time. Only the number of species (terrestrial or aquatic) changed with each alternative considered. Alternative A1 hit 4 of 5 terrestrial species and all 7 fish species while alternative A2 hit 4 terrestrial and only 5 fish. Alternative B1 hit all 5 terrestrial and all 7 fish species, while alternative B2 hit 5 terrestrial and only 5 fish species.

6. INCREMENTAL ANALYSIS OF ALTERNATIVES

Two analytical processes are employed to meet Federal environmental planning requirements for project decision makers. "Cost Effective Analysis" is conducted to ensure that the least cost solution is identified for each possible level of environmental output. Then, "Incremental Cost Analysis" of the least cost solutions is conducted to reveal changes in costs for increasing levels of environmental outputs. The specific numbers generated by this process are less important than the

relative relationships among potential solutions provided by the analyses; which one will produce the greater output or which one is more likely to be more costly. While these analyses do not usually lead (nor are they intended to lead) to a single best solution, they aid to improve the quality of the decision making by ensuring that a rational, supportable, focused and traceable approach is used for considering and selecting alternative methods to produce environmental outputs.

Cost effectiveness and incremental analysis is basically a three-step procedure: (1) calculate the environmental outputs of each feature; (2) determine a cost estimate for each feature; and (3) combine the features to evaluate the best overall project alternative based on habitat benefits and cost. While cost and environmental output are necessary factors, other factors such as constructibility, significance of the resources, sustainability of the project, and acceptability to the sponsor are very important in deciding on the preferred alternative.

The environmental benefits (outputs) and costs of each feature are summarized in Table 2-5 in the feasibility report. A total of nine potential combinations may be formulated with the identified increments of feasibility project features. Table G-1-4 displays these combinations in ascending order based on output. Alternative increments of each feature were then analyzed to identify the most cost-effective increments of each feature included in the selected plan. The results are summarized below.

TABLE G-1-4. Potential Combinations of Alternatives Ranked by Output

No.	Island Alternatives	Symbol	Output (AAHUs)	Construction Costs	Annualized Costs
1	No action	A0+B0	0.0		
2	Small Upper Island – No Lower Island	A1+B0	39.8	$2,102,174	$170,351
3	Large Upper Island – No Lower Island	A2+B0	134.8	$3,750,379	$303,915
4	No Upper Island – Single Lower Island	A0+B2	341.1	$6,252,267	$506,657
5	Small Upper Island – Single Lower Island	A1+B2	380.9	$8,354,441	$677,008
6	Large Upper Island – Single Lower Island	A2+B2	475.9	$10,002,646	$810,571
7	No Upper Island – Two Lower Islands	A0+B1	665.1	$9,956,668	$806,846
8	Small Upper Island – Two Lower Islands	A1+B1	704.9	$12,058,842	$977,197
9	Large Upper Island – Two Lower Islands	A2+B1	799.9	$13,707,047	$1,110,760

* Outputs are calculated as Average Annual Habitat Units (AAHUs).
** All costs in $1,000s. Represents initial construction costs only.
*** Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.

Environmental outputs were calculated as AAHUs. The annualized costs were calculated by applying a 6-3/8% interest rate to the construction costs over the 25-year life of the project. The incremental analysis for each feature was accomplished using the methodology described in Robinson *et al.*[2]

7. DISCUSSION

This section is intended to interpret the numerical results of the WHAG analysis into a narrative format that will provide insight as to how the numbers were derived and what they mean in terms of the predicted outcome of the project. [All WHAG field data sheets and output sheets are on file at the Rock Island District.]

Results of the WHAG application for the proposed alternatives were compared as increments to costs associated with the implementation of each alternative plan. This incremental cost analysis is discussed above and in Section 2 of the main report under "*Incremental Cost/Cost Effectiveness Analysis.*"

Because of the urban/industrial setting surrounding much of the lake, natural resources in the area are not as abundant as they could be. Habitat values for Peoria Lake are also limited by the lack of rooted aquatic vegetation and deepwater habitat. The bottom substrate for the lake is a thick layer (4-6 ft) of amorphous muck that few living creatures find adequate or desirable for living conditions. Heavy sedimentation, along with wind and wave action, contributes to both mechanical and physiological inhabitation of aquatic life in the lake and general low water quality. This is reflected in the extremely low HSI values used in the matrix evaluation for present conditions. Under without-project condition, these values would remain essentially unchanged over the 25-year project life as the constant wave action and shallowness of the lake keeps the bottom sediments in turbid suspension and continues to limit aquatic life in the lake.

Removing sediments and constructing one or more islands within the lake would result in a significant reduction of the amount of wind-generated waves and associated turbidity. It would also provide a large tract of wetland habitat for waterfowl as well as providing deepwater habitat for fisheries. Other aquatic life would benefit from the dredged areas through generally improved water quality within the lake. The deepwater and shallower dredged areas would remove old sediments from close association with the lake's surface and wave action. This spacing would provide a buffer area between sediment coming into the lake and the general wave action that keeps it in suspension. The dredged areas would allow that sediment to settle to the bottom where it would consolidate to form a more stable substrate and provide better conditions for aquatic life.

Terrestrial habitat gained from the island construction would provide additional diversity to the area while attracting waterfowl for nesting, feeding and loafing. The face of the island(s) would change from herbaceous vegetation to more substantial woody vegetation increasing habitat value over time. This would provide even greater diversity as the project matures and provide habitat for many more species in the future, including neo-tropical migrant birds.

Hydraulic modeling was performed to aid in the alignment of the islands for sustainability and to help indicate where erosion may pose potential problems. Rock placed along portions of the island shoreline would provide protection from erosion and also additional aquatic habitat. To aid in

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[2] Ridgley Robinson, et al., *Evaluation of Environmental Investments Procedures Manual - Interim: Cost Effectiveness and Incremental Cost Analysis, Report No. 95-R-1* (U.S. Army Corps of Engineers, Water Resources Support Center, Institute for Water Resources, Alexandria, Virginia, 1995).

decreasing potential erosion and increase habitat values even more, rock in the form of jetties is proposed to be placed at select locations around the islands.

As explained earlier, the WHAG process takes these project components into account through the evaluation of information requested on the field data sheets for specific habitat types. Group discussion by the team weighs factors for project components, and relative values are assigned using professional judgment of the team and extrapolating for probable future conditions. This information is input into the program along with present conditions (baseline) and comparisons are made for projected future with- and without project conditions. HSI values are established with this data, which then provide a measure for "quality" of habitat for each project condition being evaluated. Once the habitat quality value is assigned, the WHAG can then calculate HUs by multiplying by the *quantity* of habitat produced, in this case, acres of wetland (island) and aquatic (dredged) habitat produced.

Because of the number and variety of indicator species used by the WHAG program, a broad range of habitat criteria are considered in the calculations. As most environments are dynamic systems, HSI values for a particular species may increase or decrease over time. These changes depend on species requirements and what the WHAG team determines to be an appropriate succession or evolution for the project and its components for future conditions. For instance, the WHAG calculations gave gizzard shad a 0.64 HSI at year 1 and by year 25 that HSI value had dropped to 0.10. This does not necessarily mean that the gizzard shad population will decline during the life of the project, but rather, conditions for optimal gizzard shad habitat would likely be reduced. This could be from a change in required habitat (a project feature) or increased competition (a system change) from other species moving into the area. The reverse is also true for HSI values of indicator species.

In general, though, the WHAG results showed that the project generated stable HSI values for most of the target species over the project life. The WHAG also found that dredging produced greater habitat benefits than island/wetland creation did. This may be due in part to the fact that the aquatic habitat value of Peoria Lake is so low in the project area that virtually any improvement proposed by the project raised habitat values for the project area dramatically. Also, production of wetland habitat requires time to mature to produce quality results, whereas dredging produces desired habitat almost immediately.

In conclusion, the WHAG evaluation showed a positive habitat gain for all project components reviewed. While dredging was shown to provide greater gains in habitat value than island construction, the potential for improved water quality from reduced wind/wave action in addition to the quality of wetland habitat gained makes islands a desirable feature. Because size is the limiting factor for this particular WHAG analysis and is directly proportional to the HUs produced by the project, the more acres dredged and the more acres of terrestrial habitat created, the more total hahitat benefits the project would provide.

Figure G-1-1

Alternative A1 (Island Construction)

HABITAT TYPE ACRES				
HABITAT TYPE	PRESENT	TARGET YEARS		
		1	**5**	**25**
NonForested Wetland	0	9	9	3
Bottomland Hardwoods Wetland	0	0	0	6
Total	0	9	9	9

Species Abbreviations

MALL	Mallard
YLEG	Lesser Yellowlegs
MUSK	Muskrat
RAIL	King Rail
HERO	Green-backed Heron

MEAN HABITAT SUITABILITY INDEX (HSI)*				
SPECIES	PRESENT INDEX	TARGET YEARS		
		T-YR 1	T-YR 5	T-YR 25
MALL		0.48	0.46	0.17
YLEG				
MUSK		0.28	0.26	0.25
RAIL		0.53	0.56	0.43
HERO		0.48	0.62	0.62

*Where no values are shown, assume 0.1

Habitat Units for Target Years and Annual Average Habitat Units for Future With Project Conditions				
SPECIES	HU* T YR 1	HU* T YR 5	HU* T YR 25	ANNUAL AVERAGE HU*
MALL	4.3	4.1	0.5	2.4
YLEG				
MUSK	2.5	2.4	0.8	1.7
RAIL	4.5	5.0	1.3	3.2
HERO	4.3	5.6	1.9	3.8

*Where no values are shown, assume 0.1

Per discussion in the text (Sec 4a, Current Conditions), a baseline of 0.1 or "0" habitat is assumed for the project area. Therefore, no table for "Present Condition" is shown.

Figure G-1-2

Alternative A2 (Island Construction)

HABITAT TYPE ACRES				
HABITAT TYPE	PRESENT	TARGET YEARS		
		1	**5**	**25**
NonForested Wetland	0	19	12	9
Bottomland Hardwoods Wetland	0	0	7	10
Total	0	19	19	19

Species Abbreviations

MALL	Mallard
YLEG	Lesser Yellowlegs
MUSK	Muskrat
RAIL	King Rail
HERO	Green-backed Heron

MEAN HABITAT SUITABILITY INDEX (HSI)*				
SPECIES	PRESENT INDEX	TARGET YEARS		
		T-YR 1	T-YR 5	T-YR 25
MALL		0.48	0.46	0.17
YLEG				
MUSK		0.28	0.26	0.25
RAIL		0.50	0.56	0.43
HERO		0.48	0.62	0.62

*Where no values are shown, assume 0.1

Habitat Units for Target Years and Annual Average Habitat Units for Future With Project Conditions				
SPECIES	HU* T YR 1	HU* T YR 5	HU* T YR 25	ANNUAL AVERAGE HU*
MALL	9.1	5.5	1.5	4.0
YLEG				
MUSK	5.3	3.2	2.3	2.9
RAIL	9.5	6.7	3.9	5.6
HERO	9.2	7.5	5.6	6.7

*Where no values are shown, assume 0.1

Figure G-1-3

Alternative B1 (Island Construction)

HABITAT TYPE ACRES				
HABITAT TYPE	PRESENT	TARGET YEARS		
		1	**5**	**25**
NonForested Wetland	0	69	55	25
Bottomland Hardwoods Wetland	0	0	14	44
Total	0	69	69	69

Species Abbreviations

MALL	Mallard
YLEG	Lesser Yellowlegs
MUSK	Muskrat
RAIL	King Rail
HERO	Green-backed Heron

MEAN HABITAT SUITABILITY INDEX (HSI)*				
SPECIES	PRESENT INDEX	TARGET YEARS		
		T-YR 1	T-YR 5	T-YR 25
MALL		0.49	0.47	0.18
YLEG		0.58	0.55	
MUSK		0.49	0.48	0.46
RAIL		0.51	0.57	0.44
HERO		0.58	0.72	0.72

*Where no values are shown, assume 0.1

Habitat Units for Target Years and Annual Average Habitat Units for Future With Project Conditions				
SPECIES	HU* T YR 1	HU* T YR 5	HU* T YR 25	ANNUAL AVERAGE HU*
MALL	33.5	25.7	4.4	16.1
YLEG	39.8	30.4		17.5
MUSK	34.1	26.2	11.5	20.3
RAIL	35.5	31.4	11.1	22.3
HERO	39.8	39.5	17.9	29.9

*Where no values are shown, assume 0.1

Figure G-1-4

Alternative B2 (Island Construction)

HABITAT TYPE ACRES				
HABITAT TYPE	PRESENT	TARGET YEARS		
		1	**5**	**25**
NonForested Wetland	0	46	38	18
Bottomland Hardwoods Wetland	0	0	8	28
Total	0	46	46	46

Species Abbreviations

MALL	Mallard
YLEG	Lesser Yellowlegs
MUSK	Muskrat
RAIL	King Rail
HERO	Green-backed Heron

MEAN HABITAT SUITABILITY INDEX (HSI)*				
SPECIES	PRESENT INDEX	TARGET YEARS		
		T-YR 1	T-YR 5	T-YR 25
MALL		0.47	0.45	0.17
YLEG		0.53	0.51	
MUSK		0.29	0.28	0.26
RAIL		0.53	0.59	0.46
HERO		0.54	0.68	0.68

*Where no values are shown, assume 0.1

Habitat Units for Target Years and Annual Average Habitat Units for Future With Project Conditions				
SPECIES	HU* T YR 1	HU* T YR 5	HU* T YR 25	ANNUAL AVERAGE HU*
MALL	21.5	17.0	3.0	10.6
YLEG	24.4	19.2		11.1
MUSK	13.3	10.5	4.8	8.2
RAIL	24.3	22.3	8.2	15.9
HERO	24.9	25.9	12.3	19.7

*Where no values are shown, assume 0.1

Figure G-1-5

Alternative A1 (Dredging)

HABITAT TYPE ACRES				
HABITAT TYPE	PRESENT	TARGET YEARS		
		1	**5**	**25**
Pool	13	0	0	0
Overflow Waters	0	13	13	13
Total	13	13	13	13

Species Abbreviations

CATF	Catfish	CARP	Carp
CRPP	Crappie (Wh-Blk)	BLUE	Bluegill
LMBA	L. Mouth Bass	BUHD	Black Bullhead
GISH	Gizzard Shad		

MEAN HABITAT SUITABILITY INDEX (HSI)*				
SPECIES	PRESENT INDEX	TARGET YEARS		
		T-YR 1	T-YR 5	T-YR 25
CATF		0.49	0.49	0.41
CRPP		0.11	0.11	
LMBA				
GISH		0.64	0.64	
CARP		0.53	0.53	0.44
BLUE		0.11	0.11	
BUHD		0.61	0.61	0.53

*Where no values are shown, assume 0.1

Habitat Units for Target Years and Annual Average Habitat Units for Future With Project Conditions				
SPECIES	HU* T YR 1	HU* T YR 5	HU* T YR 25	ANNUAL AVERAGE HU*
CATF	6.4	6.4	5.3	5.8
CRPP	1.5	1.5		1.4
LMBA	1.4	1.4		1.3
GISH	8.3	8.3		5.3
CARP	6.9	6.9	5.7	6.3
BLUE	1.4	1.4		1.3
BUHD	8.0	8.0	6.9	7.3

*Where no values are shown, assume 0.1

Per discussion in the text (Sec 4a, Current Conditions), a baseline of 0.1 or "0" habitat is assumed for the project area. Therefore, no table for "Present Condition" is shown.

Figure G-1-6

Alternative A2 (Dredging)

HABITAT TYPE ACRES				
HABITAT TYPE	PRESENT	TARGET YEARS		
		1	**5**	**25**
Pool	55	0	0	0
Overflow Waters	0	55	55	55
Total	55	55	55	55

Species Abbreviations

CATF	Catfish	CARP	Carp
CRPP	Crappie (Wh-Blk)	BLUE	Bluegill
LMBA	L. Mouth Bass	BUHD	Black Bullhead
GISH	Gizzard Shad		

MEAN HABITAT SUITABILITY INDEX (HSI)*				
SPECIES	PRESENT INDEX	TARGET YEARS		
		T-YR 1	T-YR 5	T-YR 25
CATF		0.44	0.44	0.44
CRPP				
LMBA				
GISH		0.61	0.61	0.61
CARP		0.48	0.48	0.48
BLUE		0.53	0.53	0.53
BUHD				

*Where no values are shown, assume 0.1

Habitat Units for Target Years and Annual Average Habitat Units for Future With Project Conditions				
SPECIES	HU* T YR 1	HU* T YR 5	HU* T YR 25	ANNUAL AVERAGE HU*
CATF	24.3	24.3	24.3	23.7
CRPP	5.6	5.6	5.6	5.4
LMBA				
GISH	33.4	33.4	33.4	32.5
CARP	26.4	26.4	26.4	25.7
BLUE				
BUHD	29.1	29.1	29.1	28.3

*Where no values are shown, assume 0.1

Figure G-1-7

Alternative B1 (Dredging)

HABITAT TYPE ACRES				
HABITAT TYPE	PRESENT	TARGET YEARS		
		1	**5**	**25**
Pool		219	0	0
Overflow Waters		0	219	219
Total		219	219	219

Species Abbreviations

CATF	Catfish	CARP	Carp
CRPP	Crappie (Wh-Blk)	BLUE	Bluegill
LMBA	L. Mouth Bass	BUHD	Black Bullhead
GISH	Gizzard Shad		

MEAN HABITAT SUITABILITY INDEX (HSI)*				
SPECIES	PRESENT INDEX	TARGET YEARS		
		T-YR 1	T-YR 5	T-YR 25
CATF		0.54	0.54	0.47
CRPP		0.12	0.12	0.11
LMBA		0.11	0.11	
GISH		0.73	0.73	0.63
CARP		0.56	0.56	0.48
BLUE		0.11	0.11	
BUHD		0.61	0.61	0.53

*Where no values are shown, assume 0.1

Habitat Units for Target Years and Annual Average Habitat Units for Future With Project Conditions				
SPECIES	HU* T YR 1	HU* T YR 5	HU* T YR 25	ANNUAL AVERAGE HU*
CATF	117.5	117.5	102.1	108.2
CRPP	26.8	26.8	23.2	24.6
LMBA	25.1	25.1		23.1
GISH	158.8	158.8	138.0	146.2
CARP	121.7	121.7	105.1	111.8
BLUE	23.0	23.0		21.9
BUHD	134.0	134.0	115.9	123.2

*Where no values are shown, assume 0.1

Figure G-1-8

Alternative B2 (Dredging)

HABITAT TYPE ACRES				
HABITAT TYPE	PRESENT	TARGET YEARS		
		1	**5**	**25**
Pool	128	0	0	0
Overflow Waters	0	128	128	128
Total	128	128	128	128

Species Abbreviations

CATF	Catfish	CARP	Carp
CRPP	Crappie (Wh-Blk)	BLUE	Bluegill
LMBA	L. Mouth Bass	BUHD	Black Bullhead
GISH	Gizzard Shad		

MEAN HABITAT SUITABILITY INDEX (HSI)*				
SPECIES	PRESENT INDEX	TARGET YEARS		
		T-YR 1	T-YR 5	T-YR 25
CATF		0.47	0.47	0.47
CRPP		0.11	0.11	0.11
LMBA				
GISH		0.63	0.63	0.63
CARP		0.48	0.48	0.48
BLUE				
BUHD		0.53	0.53	0.53

*Where no values are shown, assume 0.1

Habitat Units for Target Years and Annual Average Habitat Units for Future With Project Conditions				
SPECIES	HU* T YR 1	HU* T YR 5	HU* T YR 25	ANNUAL AVERAGE HU*
CATF	59.7	59.7	59.7	58.1
CRPP	13.5	13.5	13.5	13.2
LMBA				
GISH	80.6	80.6	80.6	78.5
CARP	61.4	61.4	61.4	59.8
BLUE				
BUHD	67.8	67.8	67.8	66

*Where no values are shown, assume 0.1

APPENDIX H

REAL ESTATE PLAN

REAL ESTATE PLAN
PEORIA RIVERFRONT DEVELOPMENT STUDY
TAZEWELL COUNTY, ILLINOIS

[redacted]

The purpose of this Real Estate Plan is to support the ***Peoria Riverfront Development Ecosystem Restoration Study Feasibility Report with Integrated Environmental Assessment.*** The project authorization is Resolution 2500 of Committee on Transportation and Infrastructure, adopted May 9, 1996, and Section 216 of the 1970 Flood Control Act. This Real Estate Plan addresses the Lower Peoria Lake feature of the Peoria Riverfront Development Study. The proposed project area is defined to include the ***Lower Peoria Lake,*** located in Tazewell County, Illinois. The ***Lower Peoria Lake*** area project features include construction of a mid-sized upper island and two lower islands with a flowing side channel. Dredging is proposed in the ***Lower Peoria Lake*** in order to create the islands and side channels/backwaters. The project will enhance aquatic habitats through the restoration of depth diversity and reduction of sediment delivery and deposition. The Illinois Department of Natural Resources is the proposed local sponsor for this project.

[redacted]

A. The proposed study area is located within Tazewell County, IL, Sections 10 and 15, Township 26 North, Range 4 West of the third principal meridian. Maps depicting the proposed study area are included in Exhibit A-1 and A-2.

(1) Type and Number of Properties Affected by Proposed Project:

TYPE	NUMBER OF OWNERS	NUMBER OF TRACTS
COMMERCIAL		
AGRICULTURAL		
RESIDENTIAL		
OTHER	3	4

Estate Required:

Fee simple title will be acquired over approximately 634 acres.

FEE SIMPLE TITLE

The fee simple title to (the land described in Schedule A) I/(Tracts Nos. ____, ____ and ___), subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

Estate Map – The fee simple title areas are shown highlighted in yellow on the attached **Exhibit B-1 and B-2 – Estate Maps**.

(2) Ownership Discussion: This project features affect three ownerships.

(3) Land Values: Land values are discussed in the Baseline Cost Estimate, paragraph X.

C. Summary of LER required for the Peoria Riverfront Development Ecosystem Restoration Project, Peoria Lake are:

(1) Total ownerships affected:	3
(2) Total Acres Required (Fee Simple Title)	634 acres

[redacted]

The sponsor, the Illinois Department of Natural Resources, currently owns an estimated 225 acres of land in fee simple title within the Lower Peoria Lake project area. These lands are outlined in red on the attached **Exhibit C-1 and C-2 - Ownership Maps**. These interests are sufficient for the project.

[redacted]

There are no non-standard estates necessary for this project.

[redacted]

There are no Federal projects within the LER required for this project.

[redacted]

There are no federally owned lands required for the project.

Since the navigable waters will not be used for a commerce related purpose, the provisions of Navigational Servitude will not be exercised for this project.

Project maps are attached as Exhibits A, B, and C.

It is not anticipated that the project will cause induced flooding.

LOWER PEORIA LAKE

	NON FEDERAL	FEDERAL
01 Lands & Damages	$525,000	$
01 Relocation Assistance (PL 91-646)		$
01 Incidental Acquisition Costs (itemized as follows)	$ 50,000	$ 30,000
a. Monitoring LS Acquisition	$	$10,000
b. Survey	$ 6,000	$
c. Title Evidence	$ 4,000	$
d. Negotiation/Closing	$ 12,000	$
e. Appraisal	$ 4,000	$ 3,000
f. Project Management	$ 15,000	$ 9,000
g. Credits	$ 9,000	$ 8,000
TOTAL	$ 575,000	$ 30,000
SAY	$ 605,000	$

The project does not require any relocation of persons, farms, or businesses; therefore; there are no anticipated Public Law 91-646 Relocation Assistance Benefit payments.

No mineral activity is known to exist in the area of the project. There is no known timber harvesting in the project area that may affect the project.

The sponsor signed a letter of intent on 5 September 1997. The sponsor, Illinois Department of Natural Resources, also agreed to be responsible for operation and maintenance of the completed project.

The sponsor, Illinois Department of Natural Resources, has the legal capability and experience to perform the required construction, operation, and maintenance of the project. The assessment of the sponsor's capability is included as Exhibit D.

The sponsor has been advised of the PL 91-646 responsibilities in acquiring the right-of-way for the project and has been advised of their responsibilities for documenting expenses for credit on the project. A Project Cooperation will be executed after project approval is received.

No known zoning ordnances are proposed.

A schedule for land acquisition has not been determined at this time. A detailed project schedule will be developed after the feasibility report has been approved.

There are currently no planned facility or utility relocations.

[redacted]

The Rock Island District conducted a Phase 1 Environmental Site Assessment (ESA) in accordance with the appropriate standards and concluded there are no recognized environmental conditions. For more information, please consult the Phase 1 ESA for the property.

[redacted]

Public meetings have been held and landowners within the project area have been given the opportunity to express their interest in the proposed project. Landowner responses were favorable.

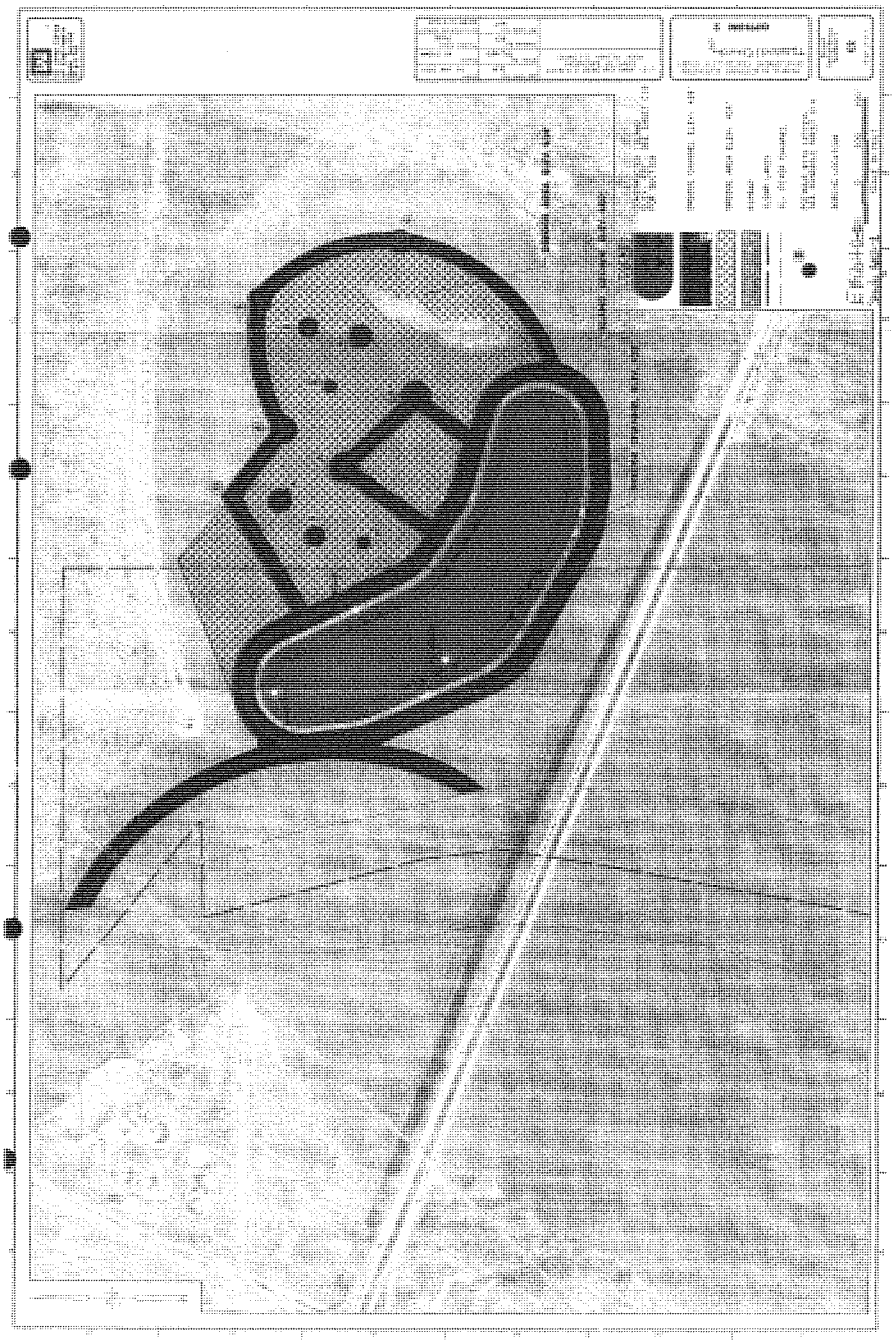
[redacted]

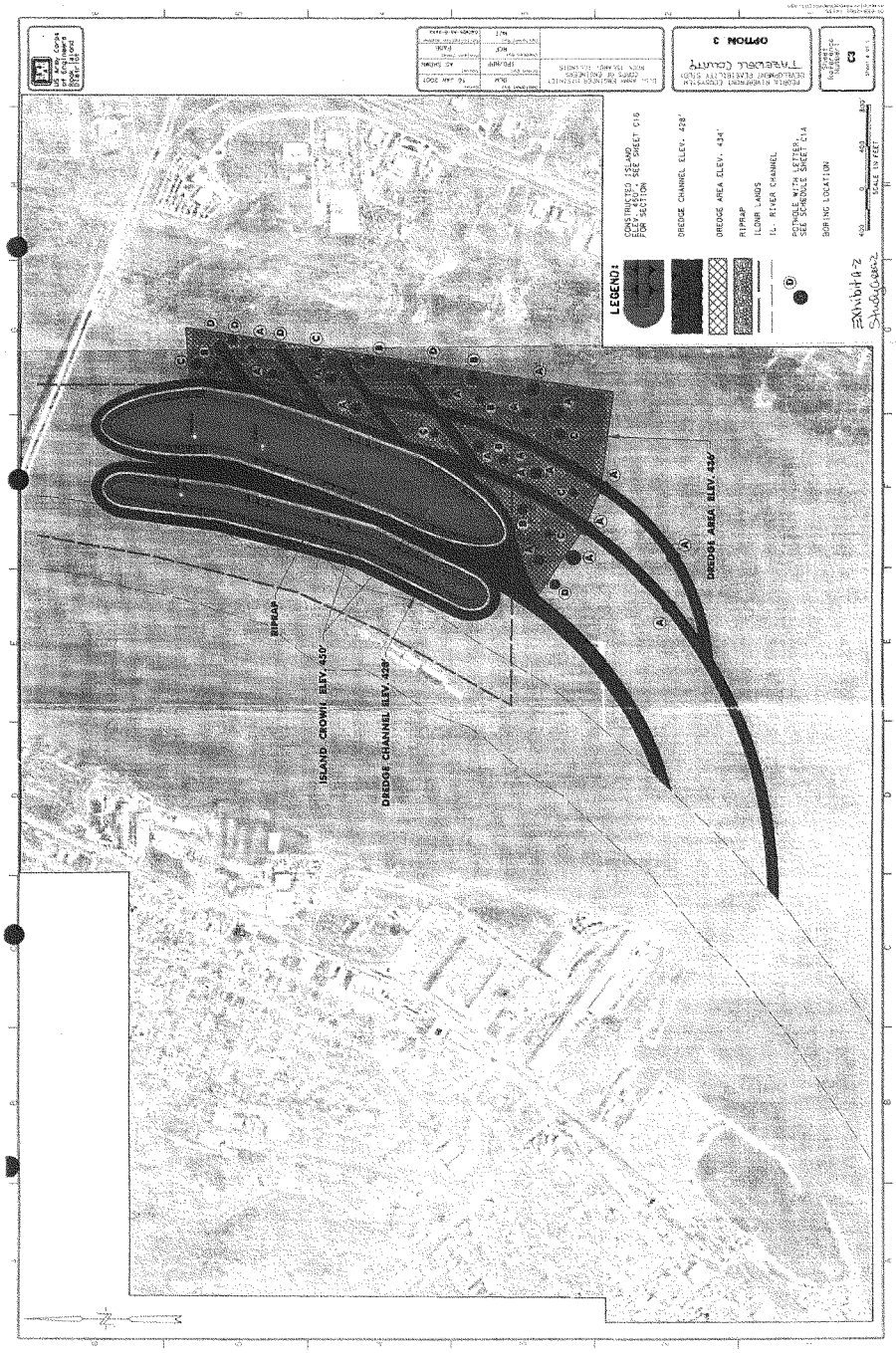
A letter will be sent to the Sponsor regarding the risks associated with acquiring land before execution of the Project Cooperation Agreement (PCA).

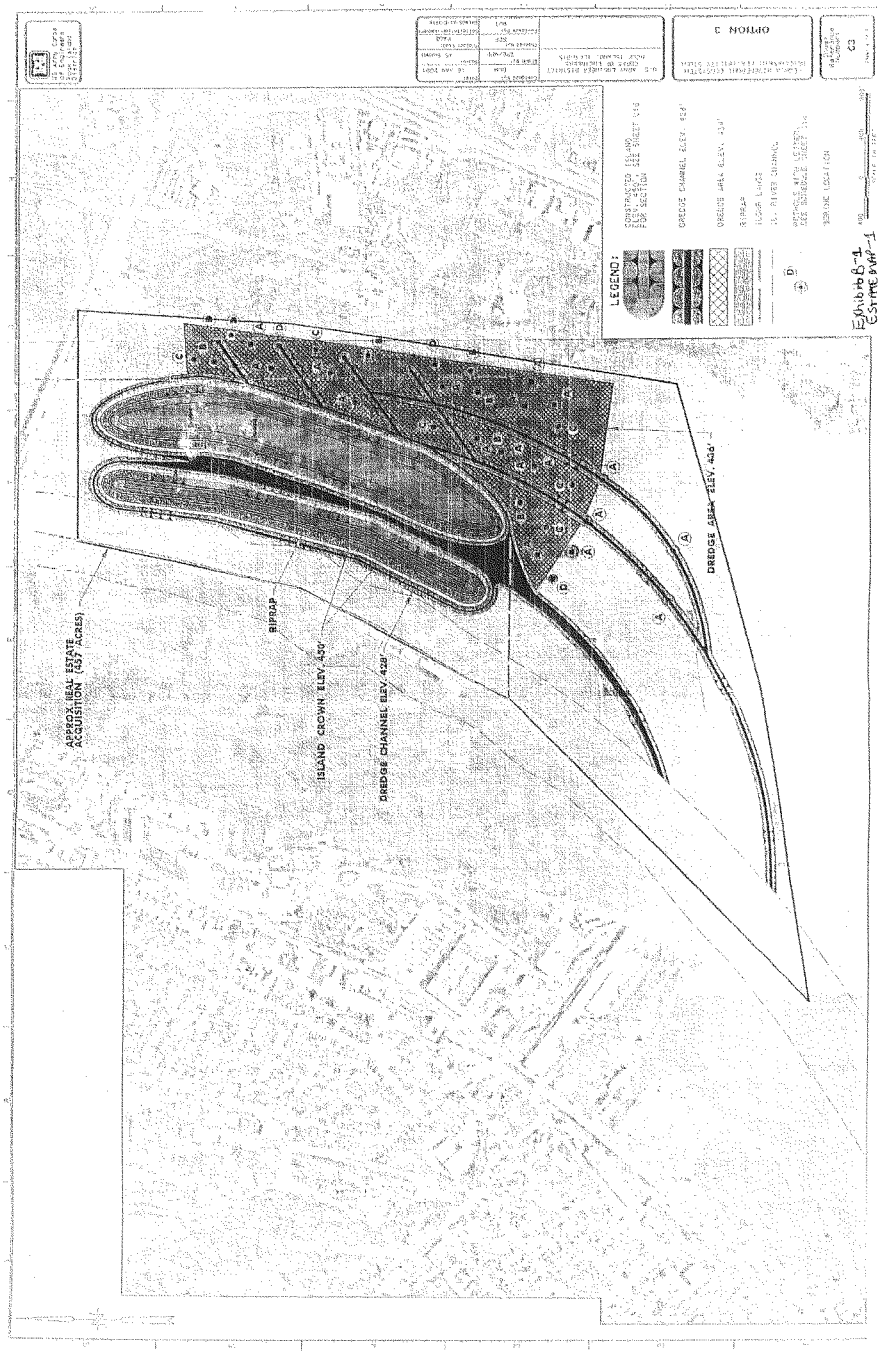
[redacted]

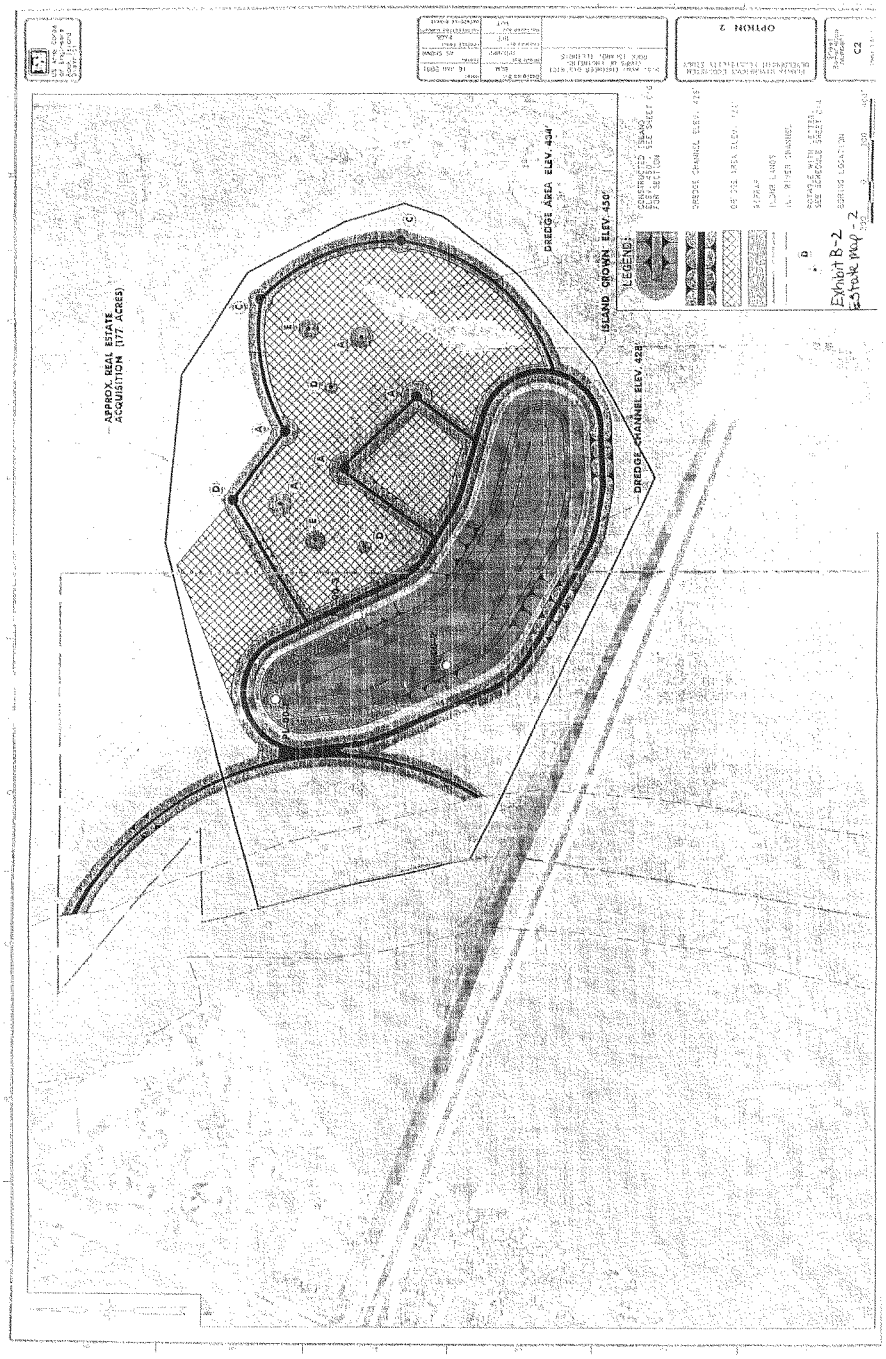
There are currently no other Real Estate issues relevant to the project.

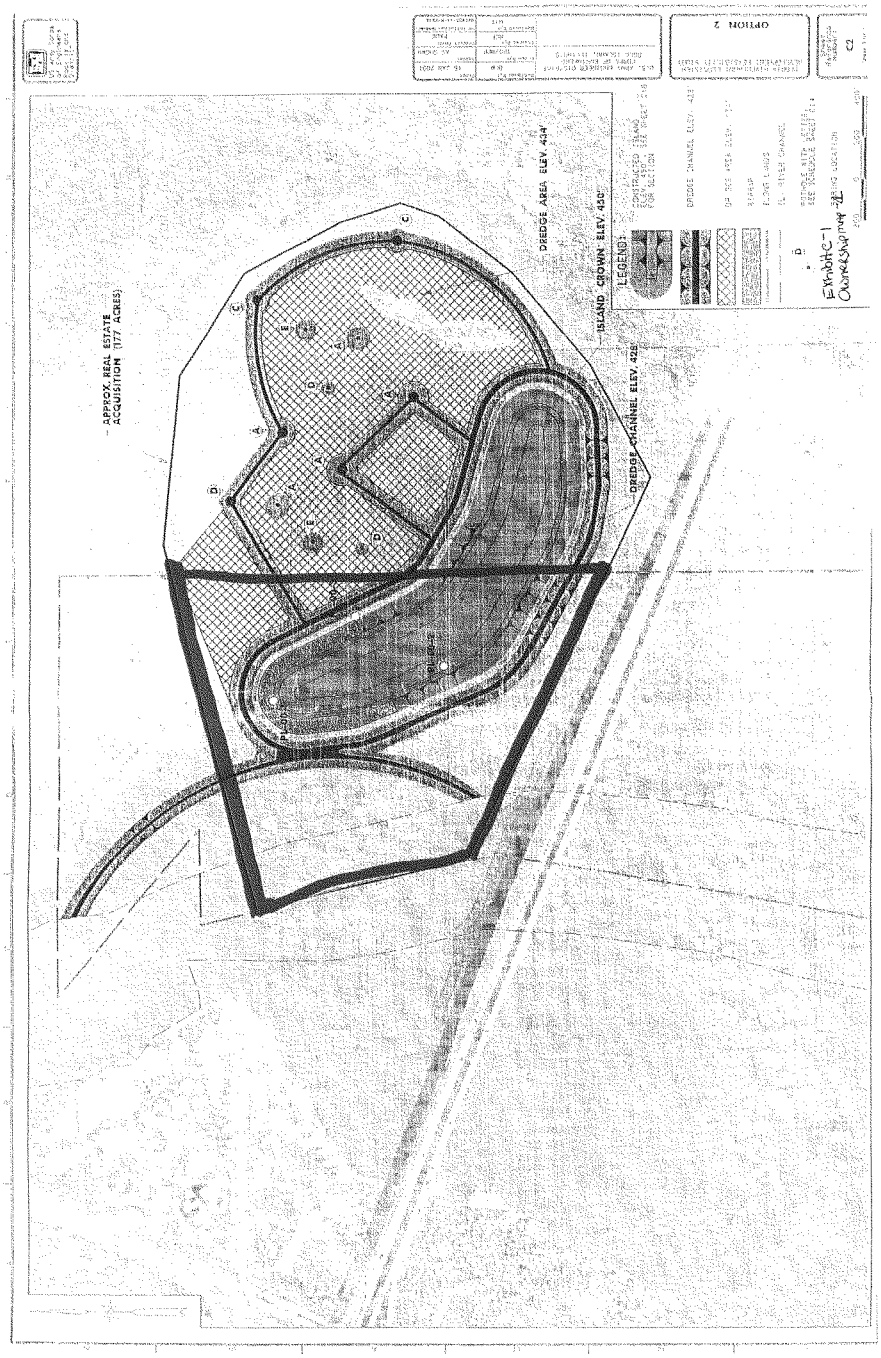
Debi VanOpdorp
Realty Specialist
Acquisition Branch

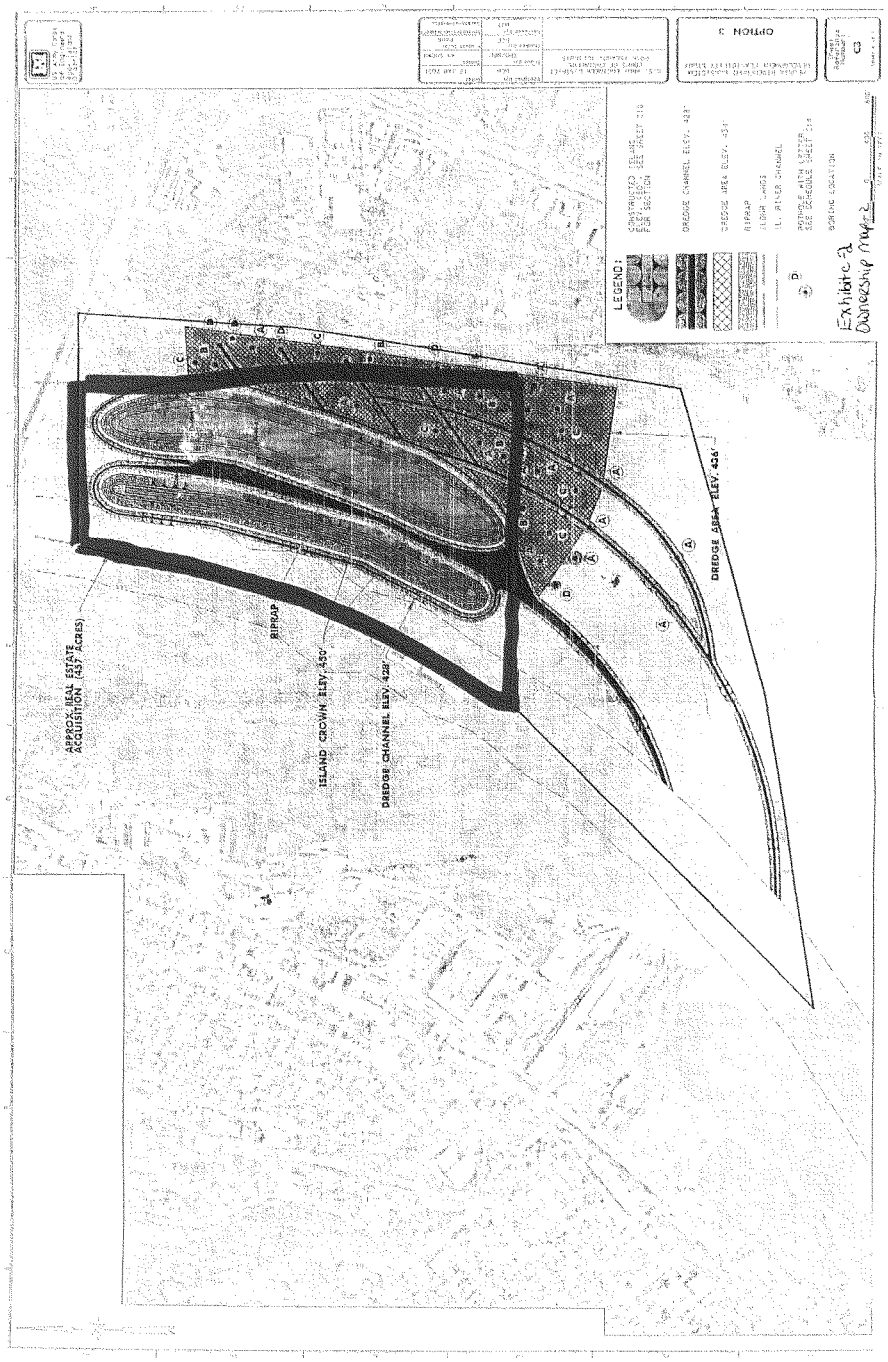



LEGEND:
CONSTRUCTED ISLAND ELEV. 450', SEE SHEET C16 FOR SECTION
DREDGE CHANNEL ELEV. 428'
DREDGE AREA ELEV. 434'
RIPRAP
ILONR LANDS
IL. RIVER CHANNEL
POTHOLE WITH LETTER, SEE SCHEDULE SHEET C14
BORING LOCATION
SCALE IN FEET
OPTION 3
RIPRAP
ISLAND CROWN ELEV. 450'
DREDGE CHANNEL ELEV. 428'
DREDGE AREA ELEV. 434'


OPTION 3
LEGEND:
APPROX. REAL ESTATE ACQUISITION (457 ACRES)
RIPRAP
ISLAND CROWN ELEV. 439'
DREDGE CHANNEL ELEV. 428'
DREDGE AREA ELEV. 416'


APPROX. REAL ESTATE ACQUISITION (177 ACRES)
DREDGE AREA ELEV. 434'
ISLAND CROWN ELEV. 456'
DREDGE CHANNEL ELEV. 428'
LEGEND:
OPTION 2
Exhibit B-2
Estate Map - 2


OPTION 2
LEGEND:
DREDGE AREA ELEV. 434'
ISLAND CROWN ELEV. 435'
DREDGE CHANNEL ELEV. 425'
APPROX. REAL ESTATE ACQUISITION (177 ACRES)


OPTION 3
LEGEND:
DREDGE CHANNEL ELEV. 428'
DREDGE AREA ELEV. 426'
RIPRAP
ISLAND CREST
IL. RIVER CHANNEL
BORING LOCATION
Exhibit A
Ownership Map
APPROX. REAL ESTATE ACQUISITION (437 ACRES)
RIPRAP
ISLAND CROWN ELEV. 450'
DREDGE CHANNEL ELEV. 428'
DREDGE AREA ELEV. 426'

ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY

PEORIA RIVERFRONT DEVELOPMENT STUDY LOWER PEORIA LAKE

I. Legal Authority:

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes? (yes/no)

b. Does the sponsor have the power of eminent domain for this project (yes/no)

c. Does the sponsor have "quick take" authority for this project (yes/no)

d. Are any of the land/interests in land required for the project located outside the sponsor's political boundary? (yes/no)

e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? (yes/no)

II. Human Resource Requirements:

a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended? (yes/no)

b. If the answer to II.a. is "yes", has a reasonable plan been developed to provide such training? (yes/no) N/A

c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? (yes/no)

d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule? (yes/no)

e. Can the sponsor obtain contractor support, if required in a timely fashion? (yes/no)

f. Will the sponsor likely request USACE assistance in acquiring real estate? (yes/no) (If "yes", provide description).

III. Other Project Variables:

a. Will the sponsor's staff be located within reasonable proximity to the project site? (yes/no)

Exhibit D

b. Has the sponsor approved the project/real estate schedule/milestones? (yes/no)

IV. Overall Assessment:

a. Has the sponsor performed satisfactory on other USACE projects? (yes/no/N/A)

b. With regard to this project, the sponsor is anticipated to be: highly capable/fully capable/moderately capable/ marginally capable/insufficiently capable. (If sponsor is believed to be "insufficiently capable", provide explanation).

V. Coordination:

a. Has this assessment been coordinated with the sponsor? (yes/no)

b. Does the sponsor concur with this assessment? (yes/no) (If "no", provide explanation).

State of Illinois
Dept.of Natural Resources

Prepared By:

Debi VanOpdorp
Realty Specialist

Reviewed & approved by:

Ralph Wertman
Chief, Real Estate Division

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX I
PROJECT PERFORMANCE ASSESSMENT AND MONITORING PLAN

CONTENTS

Subject	Page
INTRODUCTION	I-1
MONITORING PLAN	I-1
SAMPLING METHODS	I-1
Fish	I-1
Mussels	I-3
Macroinvertebrates	I-4
Waterfowl	I-4

Tables

No.	Title	Page
I-1	Monitoring and Performance Evaluation Matrix	I-5
I-2	Physical and Chemical Monitoring and Data Collection Summary	I-6
I-3	Natural Resources Monitoring and Data Collection Summary	I-7
I-4	Post-Construction Evaluation Plan	I-8

Figures

No.	Title	Page
I-1	IWW Peoria Pool, Peoria Lake Fish and Mussel Survey	I-2

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX I
PROJECT PERFORMANCE ASSESSMENT AND MONITORING PLAN

INTRODUCTION

To ensure that the selected project performs as designed, the project will be intensively monitored for the first 5 years. The project will be monitored yearly for selected physical, chemical, and biological parameters (see Tables I-2 and I-3). For the next 10 years, the project will be monitored every 3 years. For years 16 to 25, the project will be sampled every 5 years. Every 5 years, a Post-Construction Evaluation report will be prepared that will document the data collected and the project performance to date.

MONITORING PLAN

A sampling plan for fish and waterfowl was proposed and conducted in the summer of 2000 and data was used for "Without Project" analyses in conjunction with the WHAG/MOFISH. The purpose of the sampling effort was to document the present state of the fishery, mussel, benthos and waterfowl use of lower Peoria Lake, but more importantly, set the stage for subsequent sampling after project completion that will document biological gains made as a result of habitat improvement. While no aquatic vegetation exists now, if in the future, such parameters are warranted, notes will be made quantifying the presence of aquatic vegetation in the study area. It should be noted that the sampling plan devised here is general in nature because the island configurations were not final at the time sampling was performed. However, the general design and sampling locations can be determined now, and then at a later date the sampling regimes can be altered to fit the island configurations.

The sampling area is delineated by a comprehensive construction design and encompasses two general areas in Lower Peoria Lake. Sampling will be conducted in two areas, one above McClugage Bridge and one area below the bridge. The area above the bridge will be designated Station 166 which coincides with the River Mile at that location and the area below the bridge will be designated as Station 165.

SAMPLING METHODS

FISH

Fish will be sampled using a variety of gear in order to document the widest assemblage of the fisheries in the sampling area. Fish will be sampled in both locations in Lower Peoria Lake (Figure I-1). One area above McClugage Bridge, Station 166 and one below at Station 165.

Figure I-1

Electrofishing

Sampling is normally conducted using an 18-foot aluminum plate boat fitted with a 5.0-GPP Electrofishing unit. Two anode booms will be employed using the hull of the boat as an anode. A 9 hp motor will run a generator with an output power of 5,000 watts and 16 amps. Electrofishing will be conducted at each location for approximately one hour. The route of the sample will be determined by the shape of the islands and the sampling time proposed should be adequate to cover the entire shoreline of the island(s).

Trap Nets

Standard trap nets will be used which consists of two 4' x 6' frames, double throated, with five hoops made with 1 3/4" bar mesh. The trap nets have 50-foot leads. Two nets, with leads tied end to end will be set parallel to the line of the islands. Two such devices will be set at each location, designated as A and B, and will be set in the afternoon of day 1 and picked up the following day, usually 16-20 hours.

Gill Nets

Standard gill net sets will be employed at one location for each station. Nets have a solid core float line and solid core lead line and have the following dimensions: 125' length x 6' depth and consists of five 25' panels composed of ¾, 1, 1-½, 2, 2-½ inch mesh, bar measure. Due to the large numbers of gizzard shad, nets will be set before sampling on day 2 and retrieved after all other sampling is completed, usually 2 to 4 hours.

Minnow Seines

Sampling will be accomplished using the standard 30' x 6' seine having a 0.25" mesh with 6' x 6' bag located in the center of the net. Seines will be employed at selected sites along the shore of each island.

Data Collection

All fish collected will be identified to species, measured for total length (mm) and weighed to the nearest gram. Depending on the size of the collection, catches will be reported as catch per unit effort, or the number per one hour of sampling. All fish will be returned to the River immediately upon processing, except for minnow seine collections which will be preserved in 10% formalin and returned to the lab for processing. Sampling can commence after completion of the project and it is anticipated that these stations will be included in the normal annual monitoring routine of the Illinois River. However, additional sampling will be done in autumn and winter to document the use of the deepwater habitats by fish. This type of sampling will be accomplished as river conditions permit.

MUSSELS

Mussels will be collected by a combination of two methods. The first technique will be the use of a crowsfoot bar, which will be towed along the bottom on specified transects within the sampling area. If the crowfoot bar is successful in locating mussels, then a more detailed and comprehensive sampling regime will be employed. Transects will be determined based on habitat configuration and stations will be identified and sampled by hand collection with the use of underwater diving. Sampling will probably not be necessary until year-5 due to the slow growth and slow colonization

characteristics of the species involved. Depending on the results of year 5 sampling, mussels will be sampled at 5-year intervals.

MACROINVERTEBRATES

Macroinvertebrate collections will be made at selected sites throughout the construction area based on the final configuration of the islands and extent of the dredging. Collections will be made using a 508 square centimeter Ponar grab sampler. Three replicate samples will be taken at each sampling site. Samples will be washed through a 1.18-mm mesh screen. Organisms will then be picked from the screen, preserved in 10% formalin solution and returned to the lab for identification and enumeration. Remaining material from the screen will be stained with Rose Bengal, preserved in 10% formalin solution and returned to the lab for processing. Subsequent analyses will be dependent upon the number of species and densities of organisms collected. Like mussels, it is anticipated that sampling will not begin until year 5 and then every 5 years thereafter.

WATERFOWL

Waterfowl use of the areas in and around the Peoria Lake area will be collected by means of the historical and ongoing waterfowl flight surveys conducted the Illinois Natural History Survey. Transects and aerial counts are those that have historically been made as part of a Statewide census. These flights are made in the fall and spring to document the use of designated areas by migrating waterfowl.

TABLE I-1. Monitoring and Performance Evaluation Matrix

Project Phase	Type of Activity	Purpose	Responsible Agency	Implementing Agency	Funding Source	Implementation Instructions
Pre-Project	Sedimentation Problem Analysis	Define system-wide problem. Evaluate planning assumptions.	Corps	Corps	Corps	--
	Pre-Project Monitoring	Identify and define problems at site. Establish need of proposed project features.	Sponsor	Sponsor	Sponsor	--
	Baseline Monitoring	Establish baseline for performance evaluation.	Corps	Sponsor through Cooperative Agreements, or Corps	Corps/ Sponsor	See Table _____
Design	Data Collection for Design	Include quantification of project objectives, design of project and development of performance evaluation plan.	Corps	Corps	Corps	See Table _____
Construction	Construction Monitoring	Assess construction impacts; assure permit conditions are met.	Corps	Corps	Corps	See State Section 401 Stipulations
Post Construction	Performance Evaluation Monitoring	Determine success of project as related to objectives.	Corps (quantitative) Sponsor (field observations)	Sponsor through O&M, or Corps	Corps/ Sponsor	See Table I-4

TABLE I-2. Physical and Chemical Monitoring and Data Collection Summary

Type Measurement	Design Phase APR-SEP	Design Phase OCT-MAR	Construction Phase APR-SEP	Construction Phase OCT-MAR	Post-Construction Phase Years 1 –5 APR-SEP	Years 1 –5 OCT-MAR	Years 6 -15 APR-SEP	Years 6 -15 OCT-MAR	Years 16 - 25 APR-SEP	Years 16 - 25 OCT-MAR	Sampling Agency	Remarks
Water Quality Stations	2C	2C			2C,Y	2C, Y	2C,3Y	2C,3Y	2C,5Y	2C,5Y	Corps	
Turbidity												
Secchi Disk Transparency												
Dissolved Oxygen												
Specific Conductance												
Water Temperature												
pH												
Chlorophyll												
Total Alkalinity												
Suspended Solids												
Flow Measurements	10				10, Y	10, Y	10, 3Y		10, 5Y		Corps	
Velocity												
Water Depth												
Water Elevation												
Geotechnical Borings											Corps	
Boring Stations					4, Y		4,3Y		4, 5Y			
Sedimentation Transects											Corps	
Sedimentation Transects					20, Y		20,3Y		20,5Y			
Hydrographic Soundings	2				1,Y		1,3Y		1,5Y			
Survey Transects											Corps	
Cross Sections					12, Y		12,3Y		12,5Y			

Legend
C = Continuous
W = Weekly
M = Monthly
Y = Yearly
nC = n-Day Continuous
nW = n-Week Interval
nY = n-Year Interval
1,2,3 = Number of times data are collected within designated project phase
Corps = Corps of Engineers, Rock Island District
IDNR = Illinois Department of Natural Resources

TABLE I-3. Natural Resources Monitoring and Data Collection Summary

Type Measurement	Design Phase		Construction Phase		Post-Construction Phase						Sampling Agency	Remarks
					Years 1 -5		Years 6 -15		Years 16 - 25			
	APR-SEP	OCT-MAR	APR-SEP	OCT-MAR	APR-SEP	OCT-MAR	APR-SEP	OCT-MAR	APR-SEP	OCT-MAR		
Point Measurement												
Trap Nets	1				Y		3Y		5Y		IDNR	
Ponar Bottom Sampling	1				Y		3Y		5Y		IDNR	
Minnow Sienes	1				Y		3Y		5Y		IDNR	
Transect Measurements												
Gills Nets	1				Y		3Y		5Y		IDNR	
Mussel Sampling	1				Y		3Y		5Y		IDNR	
Waterfowl Count	1				Y		3Y		5Y		IDNR	
Area Measurements											IDNR	
Electro Fish Run	1				Y		3Y		5Y		IDNR	
Aerial Waterfowl Survey	1				Y		3Y		5Y		IDNR	

Legend
C = Continuous
W = Weekly
M = Monthly
Y = Yearly
nC = n-Day Continuous
nW = n-Week Interval
nY = n-Year Interval
1,2,3 = Number of times data are collected within designated project phase
Corps = Corps of Engineers, Rock Island District
IDNR = Illinois Department of Natural Resources

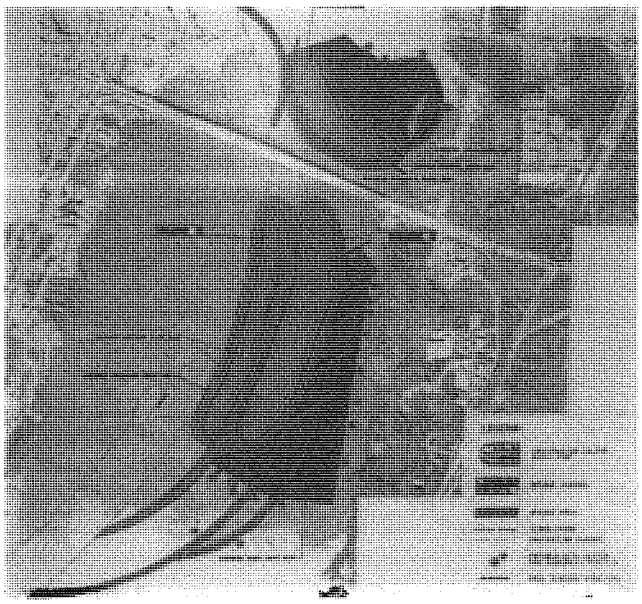
TABLE I-4. Post-Construction Evaluation Plan

Enhancement Potential									
Goal	Objective	Enhancement Measure	Unit	Year 0 Without Alternative	Year 1 With Alternative	Year 25 Target With Alternative	Year 50 With Alternative	Feature Measurement	Annual Field Observations by Site Manager
Restore and Protect Backwater Habitat	Create off-channel deepwater areas to provide year-round habitat for fisheries and associated species	Excavate channels in backwater areas	Winter water temperature (°F)	32	34	34	34		
Restore and Protect Aquatic Habitat			Water depth (acres > 8 ft)						
			Above bridge	0	53.4	53.4	53.4		
			Below bridge	0	149.9	149.9	149.9		
			Dissolved oxygen mg/L	3.0-5.0	≥ 5.0	≥ 5.0	≥5.0	Perform water quality tests at stations listed above	
	Reduce sedimentation in backwaters	Construct flowing side channel between islands below bridge	Current velocity (ft/sec)	<1.0	>1.0	>1.0	>1.0		
		Construct closing structure	Current velocity (cm/sec)	>1.0	0	0	0		

Value Engineering Study
January 22-26, 2002

Peoria Riverfront Ecosystem Development

Peoria, Illinois



US Army Corps
of Engineers
Rock Island District

Progress Toward Achieving a Sustainable Ecosystem

765

Value Engineering Study

Peoria Riverfront Ecosystem Development
Peoria, Illinois

Executive Summary

Study Results

The Value Engineering (VE) study identified 52 items for further consideration during their brainstorming session. Subsequent analysis and screenings resulted in the development of 15 VE Proposals and 22 Formulation/Design Suggestions and Comments, which are summarized below. Inasmuch as this study was performed in the Feasibility Stage of this project, most of the submittals are of the nature of formulation-type "Have you thought about?..." inputs for which monetary savings could not be developed with any degree of accuracy, and therefore, were not pursued. Monetary savings, where quantifiable, are listed adjacent to each item. However, due to both the separateness and interdependency of the items, the savings are not strictly additive and should be understood in that context. Assumptions pertaining to any cost estimates are given, where possible.

The VE study team recognizes that the project area consisted of only the Lower Peoria Lake, and that other future projects may likely follow as part of an overall restoration plan. This report thus contains a number of concepts that may be useful for future planning efforts along the Illinois River even though they may not be suitable for this particular part of the project area. The VE study team did truly think out-of-the-box.

The VE Proposals and Formulation/Design Suggestions and Comments have not been separated in the report so as to preserve the continuity of ideas. To present the VE study team's output in a format that would follow a logical thought process, the material is arranged in the following categories.

- Habitat Enhancements
- Dredging Considerations
- Containment of Material
- Island Development
- Other

VE Proposals and Design/Formulation Suggestions and Comments

Habitat Enhancements

1. Place Structure (Wood Bundles or Core-Locs) into Deep Holes Created with Dredge During Levee/Island/Marsh Construction - Page 18

2. Build Sediment Deflection Island, Deep Water Habitat, Bottomland Hardwoods and Marsh to Provide Habitat Diversity for Fish and Wildlife in Lower Peoria Lake – Page 21

3. Reconfigure the Navigation Channel to Provide Deep-Water Habitat for Over-Wintering Fish that is Semi Self-Sustaining – Page 24

4. Use River Energy and Navigation Activities to Maintain Deep-Water Habitat in a Constructed Island Complex – Page 27

5. Dredge to Create Aquatic Habitat and Place Material in a Series of Chevrons – Page 30

Dredging Considerations

6. Reduce Dredging Depths - $2,712,000 Savings – Page 31

7. Place Dredged Material into Island Interior While Building Initial Embankment – Page 39

8. Use a Positive Displacement Pump for Dredging – Page 41

9. Use a Design-Build Type Contract to Build a High Solids (High Density) Dredge for this Project – Page 42

10. The Government Should Build a High Solids (High Density) Dredge for this Project – Page 43

11. Consider Commercial Mining Operations to Remove Sediment – Page 43

12. The Government Should Attempt to Find Willing Landowners for Disposal of the Dredged Material – Page 44

Containment of Material

13. Use a Timber Pile Dike for the Perimeter of the Islands – Page 44

14. Use Containment Dikes More than Once – Page 44

15. Reduce Rip-Rap Layer Thickness - $430,000 Savings – Page 45

16. Use Reno Mat in Lieu of Rock for Wave Wash Protection - $459,000 Savings – Page 47

17. Use an Off-Bank Revetment Instead of Armoring the Bank Itself – Page 49

Containment of Material (Continued)
18. Use Gabion Walls for Confinement – Page 49

19. Use Vinyl Sheet Pile for Containment – Page 49

20. Use Geotextile Fabric Bags for Containment Dike and Seepage Drains – Page 50

21. Use GeoTubes with Rough, Stringy GeoTube Exteriors – Page 52

22. Use Small GeoTube to Begin Island Construction – Page 52

Island Development
23. Build the Islands in Lifts Similar to Indian Mounds – Page 53

24. Leave the Option Open to Build the Islands Higher – Page 56

25. Dredging and Material Placement to Mimic the Early 1900's – Page 57
Lake Contours - $2,942,000 Savings

26. Build Series of Narrow Islands Along Channel – Page 59

27. Build Island Complex – Page 60

28. Reduce the Width of Island No. 3 - $1,204,000 Savings – Page 62

29. Reduce Height, Width, and Length of Islands – Page 64

30. Remove Island No. 1 Lower Closure Structure - $60,000 Savings – Page 65

31. Addition of Closure Structure at Upstream End of Islands No. 2 and 3 – Page 66

32. Use Upland Disposal and Build Islands from Land-Based Borrow -
$260,000 Savings – Page 67

Other
33. Recommend a Continuing Authorities Program/Adaptive Management Funding Procedure to Cost-Share O&M Expenses of this Environmental Project – Page 69

34. Remove Advanced Maintenance – Page 69

35. Extend Construction Season – Page 70

36. The Government Should Compress the Construction Schedule – Page 70

37. Use a Design-Build Type Contract for this Project – Page 71

"Jump Start" Actions for Implementation

An effort should be made to demonstrate to the local community the concern that the Corps and other agencies have toward achieving sustainable solutions to this decades-old dilemma regarding the ever-increasing sedimentation of Lower Peoria Lake. Accordingly, the VE study team has identified the following "Jump Start" measures from the above listings that should be given the highest priority for implementation:

- Reduced Dredging Depths/Remove Advanced Maintenance
- Reduced Riprap Layer Thickness and use Corps Riprap Gradation
- Build Islands in Lifts Like Indian Mounds
- Reduce Width of Island No. 3
- Use Design Build Type Contract for This Project

Additionally, it is suggested that the project team pursue the concept of using study funding and outside funding sources to construct small demonstration projects designed to test new dredging technologies and dredged material containment techniques within the project area. This work would serve as a basis for follow-on design assumptions for the project.

Some island construction techniques involving geotextiles or excavated sediment protected by other means could be demonstrated and tested either in the location of the proposed islands or at a suitable spot in the Peoria Pool. A demonstration effort of this type would develop experience with the methods and help determine their suitability for this and other projects. Care should be taken so that any demonstration effort is compatible with the final configuration of the project.

A demonstration effort of the transport and dewatering of sediment for use as landscaping soil, possibly in connection with a local highway project or other development, would help determine the economic feasibility of removing sediment from the lakes for this use.

Introduction

This Value Engineering study was performed for the Rock Island District of the U.S. Army Corps of Engineers in the St. Louis District office from January 22-26, 2002. Personnel from both Corps Districts and a Senior Scientist from the Illinois Department of Natural Resources, Waste Management and Research Center, comprised the VE study team (see VE Team Member Listing).

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Project Information (As taken verbatim from Independent Technical Review draft report, dated November 20, 2001)
The Peoria Riverfront Development (Ecosystem Restoration) Project area is defined to include Lower Peoria Lake and the Farm Creek Watershed. The area lies within Peoria and Tazewell Counties, Illinois and includes Illinois River Miles 162-167. The Peoria Riverfront Development Project is a public and private cooperative effort to revitalize the city's downtown area. Development includes a visitor's center, city park, community center, riverboat landing, sports complex, entertainment centers, and retail development. This feasibility study was conducted by the U.S. Army Corps of Engineers and Illinois Department on Natural Resources (Non-Federal Sponsor) to investigate the Federal and State interest in ecosystem restoration within Lower Peoria Lake and the Farm Creek watershed.

Specific authority for conducting the Peoria Riverfront Development study is contained in Resolution 2500 of the Committee on Transportation and Infrastructure, adopted May 9, 1996. Additional authority is contained in Section 216 of the 1970 Flood Control Act and Section 519 of the Water Resources Development Act (WRDA) 2000, which authorized restoration of the Illinois River Basin.

The principal goal is to enhance aquatic habitats through the restoration of depth diversity and reduction of sediment delivery and deposition with ancillary benefits to recreational boating and fishing. The Peoria Lakes, the largest bottomland lakes in the Illinois River Valley, reflects changes similar to other lakes. In total, there are approximately 60 backwater lakes along the Illinois River with average capacity losses of 70% since 1903. This loss of aquatic habitat due to sedimentation is the greatest threat to the Illinois River.

Opportunities were explored to address these conditions, especially those that relate to the downtown Peoria Riverfront Development Project. The objectives to meet the goal include: 1) restore depth diversity, 2) provide structure for aquatic organisms, 3) increase habitat diversity, 4) improve habitat value for migratory waterfowl and shorebirds, 5) improve water quality, 6) maximize sustainability of project features, 7) reduce sediment delivery to the Peoria Lakes from tributary streams, and 8) create riparian and wetland habitat along tributary streams.

MEASURES FOR PEORIA LAKE

The following restoration measures for Peoria Lake were considered in detail to achieve the project goals and objectives:

1. No Federal Action

2. Dredging to create aquatic habitat and a small island (9-acre island and 17 acres increased depth diversity) – Upstream of the McCluggage Bridge (U.S. Highways 24 and 150)

3. Dredging to create aquatic habitat and a mid-sized island (21-acre island and 53 acres increased depth diversity) – Upstream of the McCluggage Bridge (U.S. Highways 24 and 150)
4. Dredging to create aquatic habitat and two islands with a flowing side channel (22- and 46-acre islands and 149 acres increased depth diversity) – Downstream of the McCluggage Bridge (U.S. Highways 24 and 150)
5. Dredging to create aquatic habitat and a large island (46-acre island and 99 acres increased depth diversity) – Downstream of the McCluggage Bridge (U.S. Highways 24 and 150)

MEASURES FOR FARM CREEK

The following restoration measures for Farm Creek were considered in detail to achieve the project goals and objectives:

1. No Federal Action

2. Wetland Restoration:
    a. 4-Acre Wetland Impoundment – Construction of an earthen dam creating a wetland pond with a surface area of approximately 4 acres
    b. 4-Acre and 3-Acre Wetland Impoundments – Construction of earthen dams creating wetland ponds with a surface area of approximately 4 acres and 3 acres

3. Wetland Plantings:
    a. Planting 2 rows of vegetation within and around pond perimeter(s)
    b. Planting 6 rows of vegetation within and around pond perimeter(s)

4. Prairie Plantings:
    a. Prairie plantings on 35 acres adjacent to the pond perimeter
    b. Prairie plantings on 100 acres

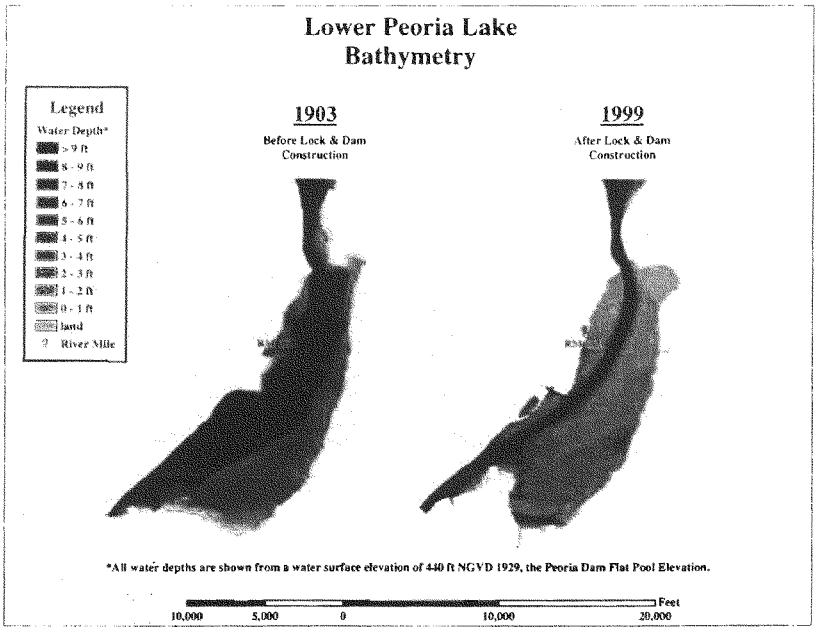
It is recommended that the Secretary of the Army for Civil Works approve the proposed project to include constructing in the Lower Peoria Lake the mid-sized upper island and two lower islands with a flowing side channel and at Farm Creek a 4-acre and a 3-acre wetland impoundment, 6 rows of wetland plantings, and 35 acres of prairie plantings.

The current estimated first cost of the recommended plan is $21,299,000. This total estimated project cost includes construction of the project features; planning, engineering, and design; construction management; real estate; and monitoring. Implementation would be cost shared 65% by the Federal Government and 35% by the Illinois Department of Natural Resources (ILDNR), the Non-Federal Sponsor. The Federal contribution is estimated at $13,844,000 and the non-Federal contribution is estimated at $7,455,000. It is the ILDNR's responsibility to provide the real estate and conduct operation and maintenance. The operation and maintenance of these features is estimated to cost $14,340 annually.

A Need for Action

Lower Peoria Lake The urgency regarding the sedimentation dilemma within Lower Peoria Lake area can be best illustrated by the bathymetry figures shown on the following page. The left figure illustrates the earliest survey data available for the lake area from 1903. As the figure indicates, there was a considerable area of the lake with depths 6 feet or greater. The right figure shows the change in depth below a water surface elevation that occurred between 1903 and 1999. Over this time period, most areas of the lake filled with several feet of sediment. Resource managers of the Illinois River are in agreement that sedimentation in both the Upper and Lower Peoria Lakes and other off-channel areas along the system is a major problem.

Since 1903, the volume of the Lower Peoria Lake below elevation 440 feet has decreased by approximately 61%. Off-channel areas have experienced even more rapid sedimentation. According to the ISWS report, *Hydraulic Investigation for the Construction of Artificial Islands in the Peoria Lakes* (July 1988), this is one of the highest sedimentation rates among all the large lakes and reservoirs in Illinois. The right figure shows that deeper off-channel areas generally experienced greater rates of sedimentation than did shallow areas. The original deeper parts of the are becoming shallower, with the lake bed becoming very flat and uniform.

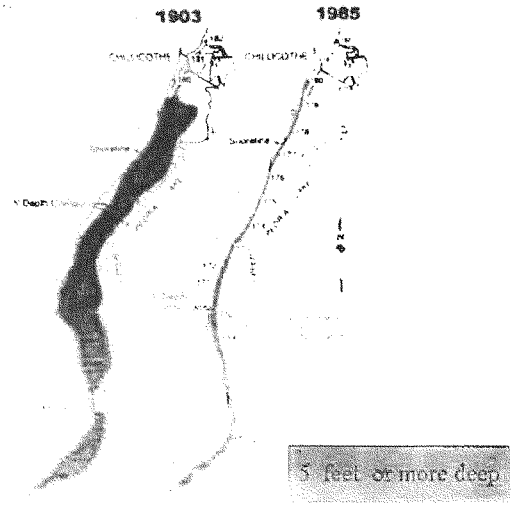

Lower Peoria Lake
Bathymetry
Legend
Water Depth*
> 9 ft
8 - 9 ft
7 - 8 ft
6 - 7 ft
5 - 6 ft
4 - 5 ft
3 - 4 ft
2 - 3 ft
1 - 2 ft
0 - 1 ft
Land
River Mile
1903
Before Lock & Dam Construction
1999
After Lock & Dam Construction
*All water depths are shown from a water surface elevation of 440 ft NGVD 1929, the Peoria Dam Flat Pool Elevation.
10,000
5,000
0
10,000
20,000
Feet

A Need for Action (Continued)

Upper and Lower Peoria Lakes Sedimentation analysis showed that the sedimentation rate in the lakes was highly variable. Since the 1930's, Upper and Lower Peoria Lakes have averaged 1.5 inches of sedimentation per year. During some period, the lakes filled in at rates as high as 3 inches/year. Further, an analysis of two significantly deeper areas revealed that the average sedimentation rate since the 1930's has been 1.5 inches/year. However, from 1965 to 1976, one hole averaged 4.3 inches/year. Based on the sedimentation analysis, the sedimentation rate for any dredging project was estimated to be 2.5 inches per year or 5 feet over the 25-year project life.

The two figures shown below illustrate some of the major changes that have occurred in the Lower Peoria Lake since the turn of the century. The first figure illustrates the bathymetry of Lower Peoria Lake based on 1903 lake bottom elevations. On the left is the lake surface and depths at water elevation 434 feet MSL the level associated with the diversion of lake Michigan Water prior to the construction of the nine-foot channel. The lake was smaller at that time and contained a large island. The figure on the right shows the 1903 bottom elevation with the flat pool of 440 feet MSL created by the Peoria Lock and Dam. The extra six feet of water covered the island and greatly expanded the water surface.

The figures show the five-foot depth contour in the Peoria Lakes at flat pool elevation based on the 1903 bottom and in 1985. Sediment deposition has dramatically reduced the depth of the lake to the point where these is essentially no deep water outside of the main channel



Illinois State Water Survey

10

Format of Report and Conduct of Workshop

This report is presented in a rolling narrative format that follows the actual sequence of events during the workshop to give the reader an insight as to how the VE Proposals and Formulation/Design Comments and Suggestions were developed. The Agenda is presented to give a summary of the workshop events. This workshop followed a five phase VE Job Plan as endorsed by SAVE International, a professional Value Engineering society.

Agenda

Tuesday, 22 January
- Start of workshop - Welcome, Announcements, and Introductions
- Information Phase - Briefing of Project by Rock Island's PM, and TM, and Questions by VE Study Team Members
- Presentation on Dredging on the Illinois Waterway – Dr. John Marlin

Wednesday, 24 January
- Explanation of VE Job Plan
- Pre-Brainstorming - Identification of Needs, Issues, and Problems
- Speculation Phase - Brainstorming
- Development of Evaluation Criteria
- Analysis Phase - Selection and Grouping of Ideas
- Assignments for Preparation of Proposals

Thursday, 25 January
- Development Phase – Individuals begin preparing write-ups for report

Friday, 26 January
- Begin to wrap up write-ups of VE Proposals and Comments/Suggestions
- Presentation Phase - Briefings by individuals to entire team
- Discussion of post-workshop assignments

Information Phase – Pre-Brainstorming Identifications

As a precursor to the actual function-oriented brainstorming session, the VE team was asked to identify what they perceived to be the needs, issues, perceptions, problems, and purposes related to the project. The following bulleted tabulations, as recorded on flip chart paper, are presented in a largely as-is unedited format to preserve the authenticity of the sessions. The VE study team members were instructed to examine these listings near the conclusion of the brainstorming session to insure that these items were considered.

Needs of Illinois Department of Natural Resources.

- Maintain aquatic character – a few feet of water.
- Diversity of aquatic habitat
  - Need depth
  - Need variation in bottom and configuration
  - Need hard, soft, sand substrate
- Provision for funding of future O&M needs due to River Dynamics
- Upland wetland and prairie habitat

Needs of the Corps

- Quantify environmental benefits
- Can't negatively impact navigation
- Don't impact the bridge, dredging or flood heights
- Be constructible in a timely manner
- Available real estate
- Increase public perception of our environmental stewardship
- Want a sustainable option
- Ecosystem restoration
- [Handcuffed] by current policy and regulations

Issues and Perceptions

- Lake is becoming a mud flat
- I like how it is in the 1950s
- The river has been studied to death
- Determining the sedimentation rate
- Will fill in again
- Bureaucratic rules state and federal
- Interpretation of rules
- Budget constraints
- Take too long to build project
- Lock and Dam caused problems
- Barges send sediments into other areas
- Upland erosion sends sediment into area
- Farmers mismanage land
- Tributary stream bank erosion
- Urban development makes more runoff and sedimentation
- River cannot carry the bed load
- Don't block my view or the boat access

Problems

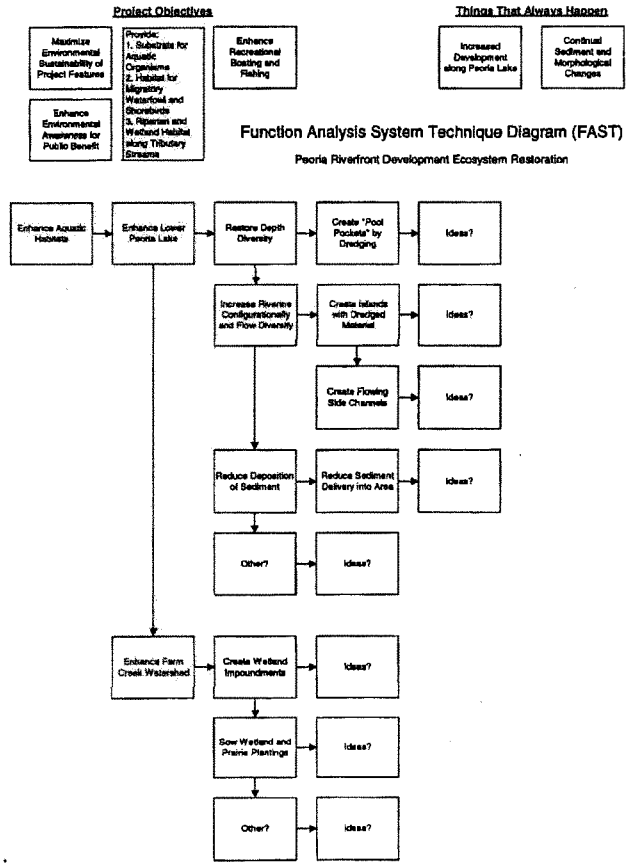
- Physical quality of materials
- Too much sediment
- Too much water pumped with sediment
- Lay of land – wide flat urbanization
- Limited containment area
- Limited funds and sequencing
- Low river velocities
- Working around endangered species – maybe a problem
- Present operation of the lock and dam system
- Fluctuation of river levels
- Coordination of flows
- Self-sustaining deep-water habitat
- Real estate constraints
- Different materials at depths
- Turbidity during construction
- May need to use only a mechanical dredge
- Limited to "footprint" area
- Identify use for material, I.E. Brownfields, beneficial use

Required Purpose

- Habitat Diversity
  - Over wintering fish
  - Turbidity
  - Underwater structure
  - Water quality oxygen
  - General depth increase
  - Brood, rearing, and spawning habitat
- How to do the above

Function Analysis System Technique (FAST) Diagram

An integral component of a VE study is the use of the Function Analysis methodology where a project is dissected into function components, described in verb-noun formats, and presented graphically. The FAST diagram presented in this report is a Strawman that was used to initiate discussions on the project prior to brainstorming and is considered by the workshop facilitator to be in a draft format based upon his limited knowledge of the project prior to the workshop.



Speculation Phase – Brainstorming for the Application of Ideas

Similar to the listing of pre-brainstorming items, the brainstorming ideas are listed in a largely as-is format and should be considered in the context that team members were encouraged by the workshop facilitator to "think outside the box" and sometimes propose ideas that although are seemingly ludicrous, would prompt another team member to associate it with a viable idea.

Idea Listing

- Deepwater pools in delta areas near tributary streams
- Modify Peoria dam to deepen pool
- Change pool operations
- Remove the locks and dams on the Illinois River
- Build mini pools and control water levels
- Dredge from channel back and place on shoreline
- Upland disposal and build islands from land based borrow
- Make Island #3 thin to function as a breakwater
- Define 6 feet as the over wintering depth
- Series of thin islands along channel
- Kens median islands
- Use gabion walls for the containment
- Use vinyl sheetpile
- Rough stringy Geotube exterior
- Use Geotubes
- Series of chevrons open side up, open side downstream facing
- Fill island interior while building berms
- Use a positive displacement pump for dredging
- Use design build
- Use a design build to build a dry dredge
- Government build high solids dredge
- Soil cement Dikes
- Geo Pillows for containment dikes with wick drains
- Timber pile dike
- Moving sheetpile dike
- Clamshell to build island complex
- Blasting to dig holes
- Drain pool to consolidate material and use land based equipment
- Ken's wildlife refuge idea
- Contract to remove topsoil to Brownfields etc.
- Remove advance maintenance
- Use existing pipelines to transport material
- Do nothing let it become a swamp
- Develop into a continuing Corps program
- Floating breakwater
- Cap program for mitigation
- Use a containment dike more than once
- Upland sedimentation structures

Idea Listing (Continued)

- Compress construction schedule
- Stepped island configuration with rock face
- Use Reno mat instead of mat
- Geotubes to begin island building sequence
- Leave open possibility of future lifts, adaptive building scenario
- Sequential building to increase island height
- Find willing landowners for dredged material placement
- Change height, width and length of islands is ok to DNR
- Different riprap sizes
- Use off bank revetment
- Put woody structures in deep holes
- Remove lower closing structure in upper island
- Put a closing structure between two islands
- Change location of project

Analysis Phase – Identifying the Good Ideas

The legend presented below was developed by the VE workshop team and utilized in the initial screening process. An alpha letter before an idea denotes the reason it was not considered further. Once this was completed, the team members then decided who should be responsible for preparing the individual write-ups. They were encouraged to do additional screening, combine similar ideas into a single submission, develop new ideas, etc. Therefore, one should not attempt to derive a correlation between the idea listing and the final presentation of proposals.

Rejection Criteria	
I	Impractical, infeasible
U	Unacceptable
C	Too costly
B	Being done

Idea Listing

- Deepwater pools in delta areas near tributary streams
- I - Modify Peoria dam to deepen pool
- B - Change pool operations
- I - Remove the locks and dams on the Illinois River
- Build mini pools and control water levels
- Dredge from channel back and place on shoreline
- Upland disposal and build islands from land based borrow
- Make Island #3 thin to function as a breakwater
- Define 6 feet as the over wintering depth
- Series of thin islands along channel
- Kens median islands
- Use gabion walls for the containment
- Use vinyl sheet pile

Idea Listing (Continued)

- Rough stringy Geotube exterior
- Use Geotubes
- Series of chevrons open side up, open side downstream facing
- Fill island interior while building berms
- Use a positive displacement pump for dredging
- Use design build
- Use a design build to build a dry dredge
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- C - Soil cement Dikes
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- C - Moving sheet pile dike
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- Put woody structures in deep holes
- Remove lower closing structure in upper island
- Put a closing structure between two islands
- Change location of project

Value Engineering Proposal

Title of Proposal: Place Structure (Wood Bundles or Core-Locs) into Deep Holes Created with Dredge During Levee/Island/Marsh Construction

Function of Proposal: Provide habitat diversity in areas with uniform bottoms.

Existing Situation: Uniform bottoms with no diversity of structure (varying depths and configuration) typically exist after a dredging event.

Proposed Change: See attached sketch and pictures of the St. Louis District's assembled wood structure for placement in side channels of the Mississippi River.

Advantages: Structural, spatial, and linear contiguity of habitats provides a richer, more continuous food source for mobile fauna than that of a homogeneous habitat.

Disadvantages and possible obstacles: Lack of wood bundle material or source of Core-Locs. Woody material will need to be anchored to the bottom to prevent floating and movement during storm events.

Justification: Acceptable and constructible.

Cost Savings: Not determined

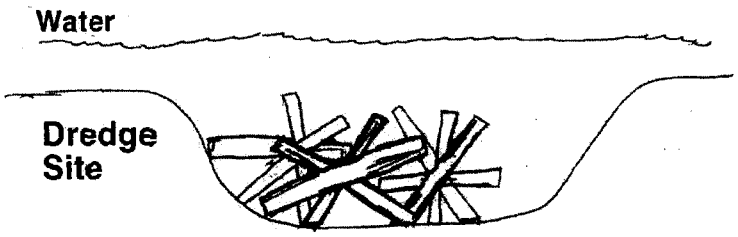
Implementation Strategy/Timetable: Anytime after dredging operation has ceased.

Necessary Coordination: Must be written into construction contract.

Assumptions: A mosaic of habitat types allows a diversity of organisms representing different trophic levels to coexist and fulfill several life functions at a single site.

Title of Suggestion or Comment:

Place Structure (Wood bundles or Core-Locs) into Deep Holes Created with Dredge During Levee/Island/Marsh Construction.

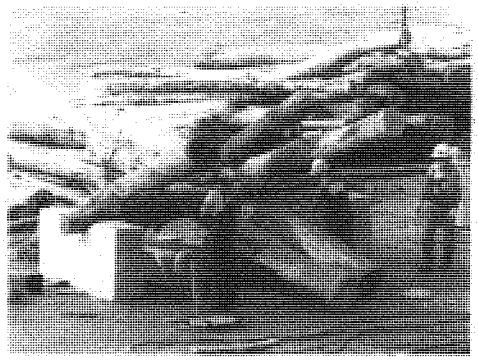


Hole: 6–8'deep

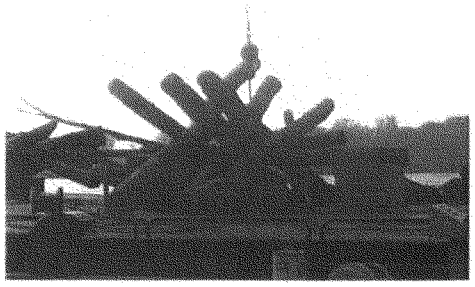
Place structure within 660' of previous location

Title of Suggestion or Comment:

Place Structure (Wood bundles or Core-Loes) into Deep Holes Created with Dredge During Levee/Island Marsh Construction.



The first of 12 bundles of woody structures being constructed by the Corps of Engineers, St. Louis District, for placement in side channels of the Mississippi River. Splayed bundles of seven to nine logs are weighted down with 1,400 pound concrete anchors so they remain underwater permanantly.



Assembled wood structure being prepared for placement in a Mississippi River side channel.

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Build Sediment Deflection Island, Deep Water Habitat, Bottomland Hardwoods and Marsh to provide Habitat Diversity for Fish and Wildlife in Lower Peoria Lake.

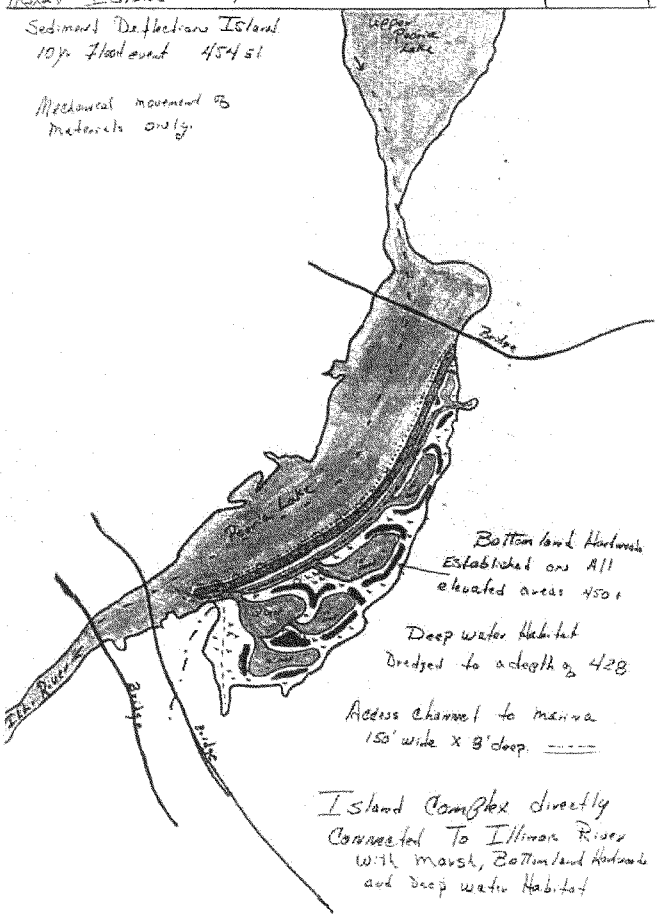
The purpose of construction activities in Lower Peoria Lake is to create habitat diversity in a 2,600-acre lake with an average depth of 18 inches and a substrate of muck and suspended clay particles. The goal is to create over wintering, brood rearing and spawning habitat for fish, plus increase water quality by reducing turbidity and increasing dissolved oxygen. The dredge material removed to create depth diversity would be placed in such a manner to reduce sedimentation, wind fetch, and increase both fish and wildlife habitat by creating a backwater island complex consisting of bottomland hardwoods, marsh and isolated deep water habitat.

A sediment deflection island elevated to 454 msl that has a base of 240 feet with a 140 foot-wide top would be constructed from just south of McClugage bridge to the confluence of Farm creek (approximately 3 miles). A complex of deep-water habitat, forested islands and marsh would be created behind this sediment deflection island (see insert). This complex is to be constructed with a dragline clamshell that has a working reach of 180 feet or more.

To provide stability and sediment deflection, off-bank revetment will be placed the entire length of the island to a height of 444 msl with 30-foot wide notch placed every 1,000 linear feet. The deflection island and interior islands will be planted to bottomland hardwoods that produce hard and soft mast to provide a diversity of resources. During construction, an access channel will be constructed to the marina and the turbulence created by users will help maintain channel depths. A series of deep-water areas will be directly connected with this access channel for movement by fish to and from the Illinois River to this backwater complex for their life requirements.

During construction of the deflection levee, the dragline can obtain material on both sides. The dredge cut should be a minimum of 40 feet from the island base on both sides. This area will provide stability, a location for the off-bank revetment and aquatic vegetation. Other islands within the complex and associated deep-water habitat should use the same guidelines (see attachment for information).

PROJECT: Peoria Riverfront Development | Page — of — | COMPUTED BY: KD
SUBJECT: (MSK29) Island + Deep Channel Backwater Habitat | CHECKED BY:



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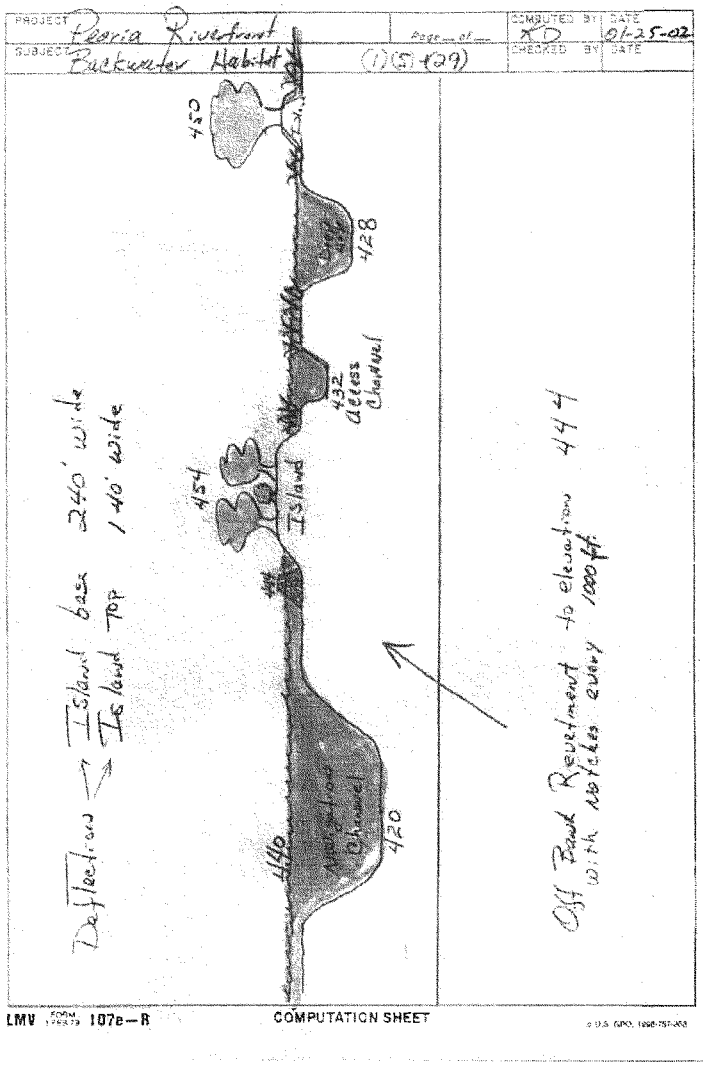

PROJECT Peoria Riverfront
SUBJECT Backwater Habitat
(1)(5)+(29)
COMPUTED BY KD
DATE 01-25-02
CHECKED BY
DATE
450
428
432 Access Channel
454
Island
444
440
420
Deflection → Island base 240' wide
Island Top 140' wide
Off Bank Revetment to elevation 444
with notches every 1000 ft.
LMV FORM 107e-R
COMPUTATION SHEET

Value Engineering Workshop – Peoria Riverfront Ecosystem Development - Item No. 3

Formulation/Design Suggestions and Comments

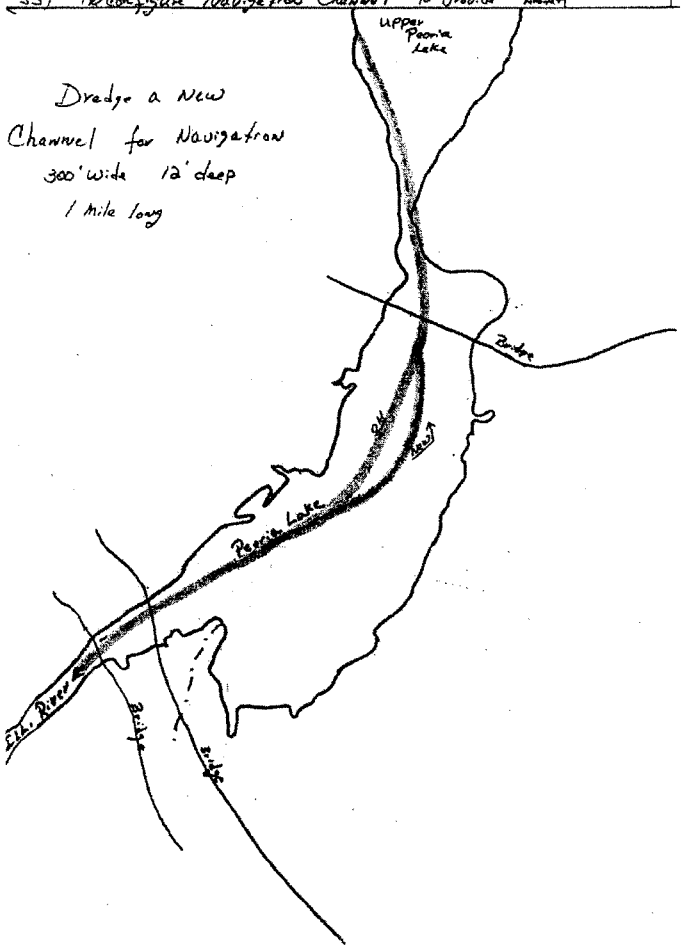
Title of Suggestion or Comment: Reconfigure the Navigation Channel to Provide Deep-water Habitat for Over-Wintering Fish that is Semi Self-Sustaining.

At present, the only deep water habitat for fish in Lower Peoria Lake (a 2,600 acre lake) is the navigation channel. The deep-water habitat exists at this location due to suspension of solids from the prop turbulence of tows and water energy from the Illinois River moving these solids downstream.

This suggestion is to dredge a new channel parallel to the existing channel for a mile or more. At the upper end of the old channel a closing structure would be placed six to eight feet below the surface (432-434 msl, elevation) to produce turbulence. A series of spur dikes would be placed throughout the remaining channel length to create diversity and maintain turbulence. The closing structure and spur dikes would be constructed of sand filled Geotubes to allow re-dredging of the channel for navigation purposes. The life span of this deep-water habitat is estimated to be between 5-10 years.

This procedure could be implemented throughout the length of Lower Peoria Lake to provide necessary deep-water habitat for over wintering fish in an undisturbed area from passing tows.

PROJECT Peoria Riverfront Development | Page ___ of ___ | COMPUTED BY KD
SUBJECT (5) Reconfigure Navigation Channel to Provide Deep Water Habitat | CHECKED BY



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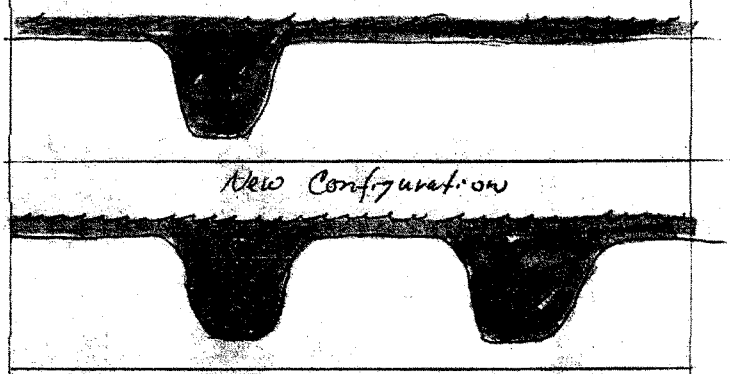
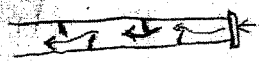
PROJECT Peoria Riverfront Dev | page ___ of ___ | COMPUTED BY KD | DATE 01-25-02
SUBJECT (55) Closing Structure + Spur Dikes | CHECKED BY | DATE



New Configuration

Closing Structure Placed 8' below Surface at upper end of Old Navigation Channel To Create Self maintaining Deep Water Habitat with Spur Dikes to maintain Diversity



Spur Dikes Angled Upstream 12 degrees

LMV FORM 107e-R COMPUTATION SHEET

26

Value Engineering Workshop – Peoria Riverfront Ecosystem Development – Item No. 4

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Use River Energy and Navigation Activities to Maintain Deep-water Habitat in a Constructed Island Complex.

Undisturbed over-wintering fish habitat is not generally available in Lower Peoria Lake. Over-wintering habit areas for fish should be a minimum of six feet deep. Any initial dredging may need to be about 12 to 15 feet deep if the depth is to be about six feet after 25 years of sedimentation. Upon investigation, the only deep water area that exists in he Lower Peoria Lake (2,600 acres) is in the navigation channel. The remaining average depth of the lake is around 18 inches and thus not suitable for over-wintering fish due to low temperatures during the winter season. The sedimentation rate in Lower Peoria Lake is very high due to the river gradient and water velocity at this location.

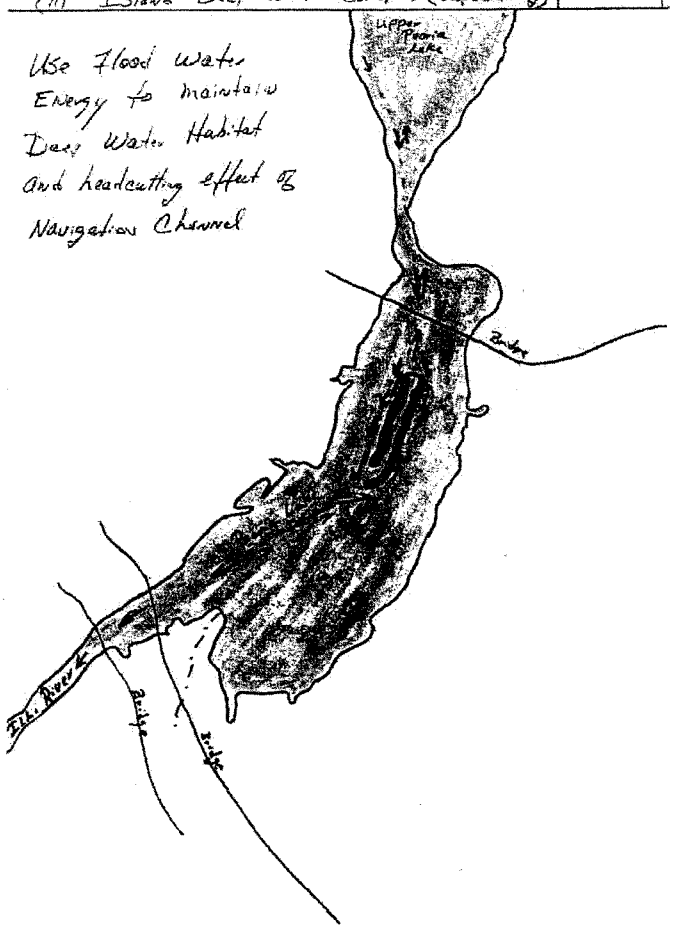
A requirement of the project is to create deep-water habitat for over-wintering fish that has a project life of 25 years. To accomplish this objective, the site must be self-sustaining and energy from flooding events must be captured to maintain the deep-water habitat.

The navigation channel at present is twenty feet deep and self-maintaining due to prop disturbance of sediments by passing tows. The suggested design is to place the island complex next to the existing navigation channel and dredge a new channel on the west side of the island complex.

Deep water would be created between the islands from dredging activity to build the island complex. A bull nose closing structure, constructed out of 300-pound stone, would be placed around the island tips and notched in the chute area to concentrate flows between the islands during high water events. The island complex would be configured to have the chute outlet fall into the deep navigation channel where increased energy will transport the sediment from the site.

Considerations for this project must include the navigation channel to be placed on both sides of the island complex. Tows must travel to the right of the island going upstream and to the left going downstream. The island complex will be elevated 10 feet above the present water surface and woody vegetation will become established. This area will be easily observed and should not become a safety hazard to navigation or the general public.

PROJECT Peoria Riverfront Development	Page — of —	COMPUTED BY KD
SUBJECT (11) Island Deep water Complex (Still brainstorming)		CHECKED BY



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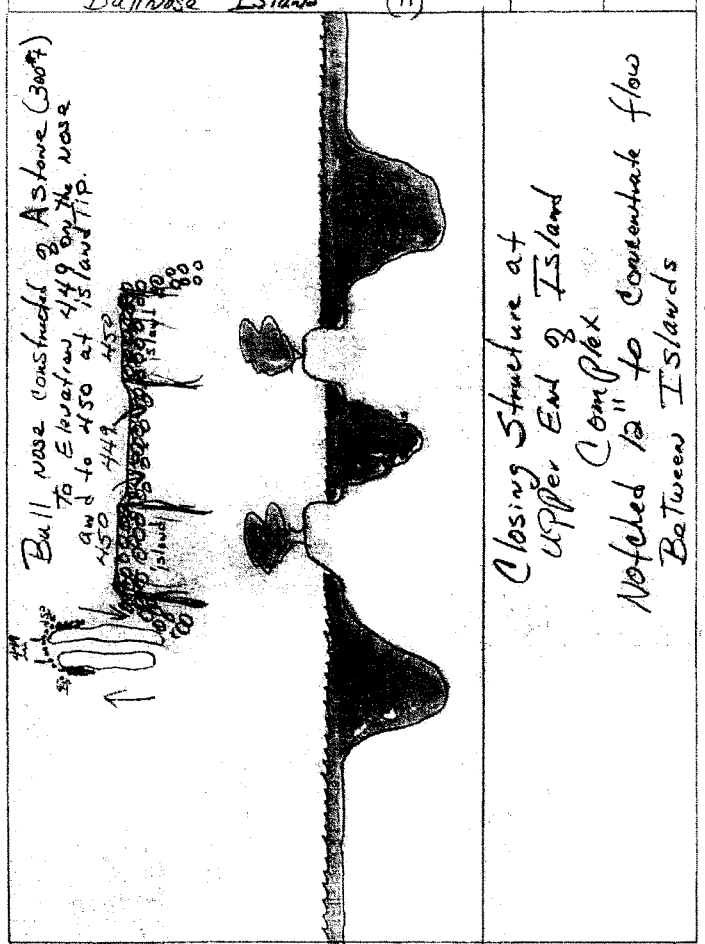
PROJECT Peoria Riverfront	Page __ of __	COMPUTED BY RD	DATE 01-25-00
SUBJECT Bullnose Island (11)		CHECKED BY	DATE



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29

Value Engineering Proposal

Title of Proposal: Dredge to Create Aquatic Habitat and Place Material in a Series of Chevrons.

Function of Proposal: Dredge to create aquatic habitat. Create terrestrial habitat with dredge material.

Existing Situation: Lower Peoria Lake has filled in with 8 to 12 feet of sediment since the 1930's destroying aquatic habitat.

Proposed Change: This proposal would dredge a series of 12' channels and 8' broad expanse area with the material being placed in a series of chevrons. See attached sketch. The chevrons would be built to elevation 446 feet MSL and could be open upstream or downstream.

Advantages:

- One or two construction years would be required because multiple dredges could work on the project and there is no need to wait for material consolidation.
- Greater habitat diversity
- More area impacted because islands are smaller and over a greater area
- More sustainable
- Eliminates most of the need for rock because interior island would not be affect by waves generated by wind or boat

Disadvantages and possible obstacles:

- Public perception because there is less boating area
- Shorter island would be more frequently overtopped

Justification:

- Lower cost
- Quicker and easier construction

Cost Savings: $4,500,000

- Eliminate 3 mobilization/demobilization - saves approximately $607,056
- Escalation in current plan is $2,335,155
- Assumed to eliminate 75% of rock requirement – savings approx. $1,500,000

Value Engineering Proposal

Title of Proposal: Reduce Dredging Depths

Function of Proposal: Reduce Dredging

Existing Situation: The existing plan calls for dredging deep channels for fish over-wintering to a depth of 16 feet below flat pool; dredging of potholes for fish over-wintering varying in depth from 8 to 20 feet below flat pool; and dredging of expansive areas for fish spawning and nursery habitat to a depth of 8 feet. The existing dredging configuration and elevations are shown on Plates 9-1 and 9-2.

Proposed Change: The proposed change is to dredge the over-wintering channels to a depth equal to the required minimum over-wintering depth plus the estimated average rate of sediment deposition; and to dredge the expansive fish spawning and nursery habitat areas to a depth of 4 feet plus the estimated average rate of sediment deposition but no deeper than the land surface elevations shown on the 1903 Woermann Survey maps.

The referenced report states (page 3-10) that "the minimum required depth for fisheries over-wintering benefits is 8 feet." However, discussions with Barb Kimler (who has been very involved with development of EMP projects on the Upper Mississippi River and Illinois Waterway) indicate that more typically the Rock Island District has used 6 feet as the minimum required depth for fish over-wintering in the Midwest on similar projects. The report also states that the average sediment deposition rate is 2.5 inches per year. This is consistent with assumed sediment deposition rates used for design of EMP projects.

Considering the above information, the depth of deep over-wintering channels and potholes should be limited to 11 feet below flat pool (6 feet for minimum over-wintering depth and 5 feet for 25 years of sediment accumulation at a rate of 2.5 inches per year). Considering that there is approximately two feet of existing water below flat pool, the required depth of actual dredge cut for the deep channels and potholes would be 9 feet.

The dredging in the expansive fish spawning and nursery habitat areas would be limited to a maximum depth of 9 feet below flat pool (4 feet for fish spawning and nursery habitat and 5 feet for 25 years of sediment accumulation at a rate of 2.5 inches per year) or the 1903 elevation, which ever is less.

The proposed dredging configurations and elevations are shown on Plates 9-3 and 9-4.

Advantages: The primary advantage of reducing the dredging depth is cost reduction. It appears that the dredging depths as currently designed have been over-estimated compared to what is required to create suitable habitat and allow for anticipated sedimentation rates over the 25-year project life. The proposed plan also has the advantage of not excavating into the firmer pre-1903 bottom material that may contain stumps and debris not present in the post-1903 deposited material. This will also allow for the more natural condition of a gradually sloping bottom profile from the shoreline out to a maximum depth of 9 feet in the fish spawning and nursery areas rather than an unnaturally constant 8-foot depth as currently designed.

Disadvantages and possible obstacles: One possible disadvantage is that the proposed design has not allowed for any contingency in the proposed dredging depths to offset inaccuracies in future sedimentation rate estimates. However, the proposed revised dredging depths are probably more realistic than those presented in the current design.

Apparently, one of the reasons for dredging the over-wintering channels 16 feet deep as presented in the current design was to obtain enough solid material using a clam shell dredge to build containment berms for hydraulic dredging of the 8-foot deep fish spawning and nursery areas. Therefore, if it is determined that hydraulic dredging of the fish spawning and nursery areas is the preferred method; reduction of the depth of the deep over-wintering channels may not be feasible with the currently planned method of building containment dikes with mechanically dredged material.

Justification: The IDNR supports this proposal. This is a constructible option as long as other low moisture content mechanical dredging techniques that do not require large containment berms can be employed or containment berms can be constructed using an alternate method.

Cost Savings: The estimated savings of this proposal is $2,700,000.

Implementation Strategy/Timetable: The current design calls for the project construction period to take 9 years. This proposal reduces the quantity of dredging required. The construction duration can easily be cut in half from that currently designed if alternate methods of containment dike construction and dredging methods are also employed.

Necessary Coordination: None anticipated.

Assumptions: Cost of all types of dredging is $4.00 per cubic yard.

Value Engineering Study – Peoria Riverfront Ecosystem Development

Cost Calculations

Title of Proposal: Reduce Dredging Depths

Island 1

Mechanical Dredging – Over-wintering Channel Near Island

Existing – 286,378 CY (6,800 LF of Channel – 14 feet of dredge cut; 25' bottom Width; 4H:1V Side slopes.

Proposed – 138,000 CY (6,800 LF of Channel – 9 feet of dredge cut; 25' bottom Width; 4H:1V Side slopes

Hydraulic Dredging – Nursery Area

Existing – 205,048 CY (Ave 6' dredging depth)

Proposed – 137,000 CY (Ave 4' dredging depth)

Island 2

Mechanical Dredging – Over-wintering Channel Near Island

Existing – 386,833 CY (9,200 LF of Channel – 14 feet of dredge cut; 25' bottom Width; 4H:1V Side slopes.

Proposed – 187,000 CY (9,200 LF of Channel – 9 feet of dredge cut; 25' bottom Width; 4H:1V Side slopes

Hydraulic Dredging – Nursery Area

Existing – 659,556 CY (Ave 6' dredging depth)

Proposed – 440,000 CY (Ave 4' dredging depth)

Island 3

Mechanical Dredging – Over-wintering Channel Near Island

Existing – 377,297 CY (9,000 LF of Channel – 14 feet of dredge cut; 25' bottom Width; 4H:1V Side slopes.

Proposed – 183,000 CY (9,000 LF of Channel – 9 feet of dredge cut; 25' bottom Width; 4H:1V Side slopes

Value Engineering Study – Peoria Riverfront Ecosystem Development

Cost Calculations

Hydraulic Dredging – Nursery Area

Existing – 143,560 CY (Ave 6' dredging depth)

Proposed – 96,000 CY (Ave 4' dredging depth

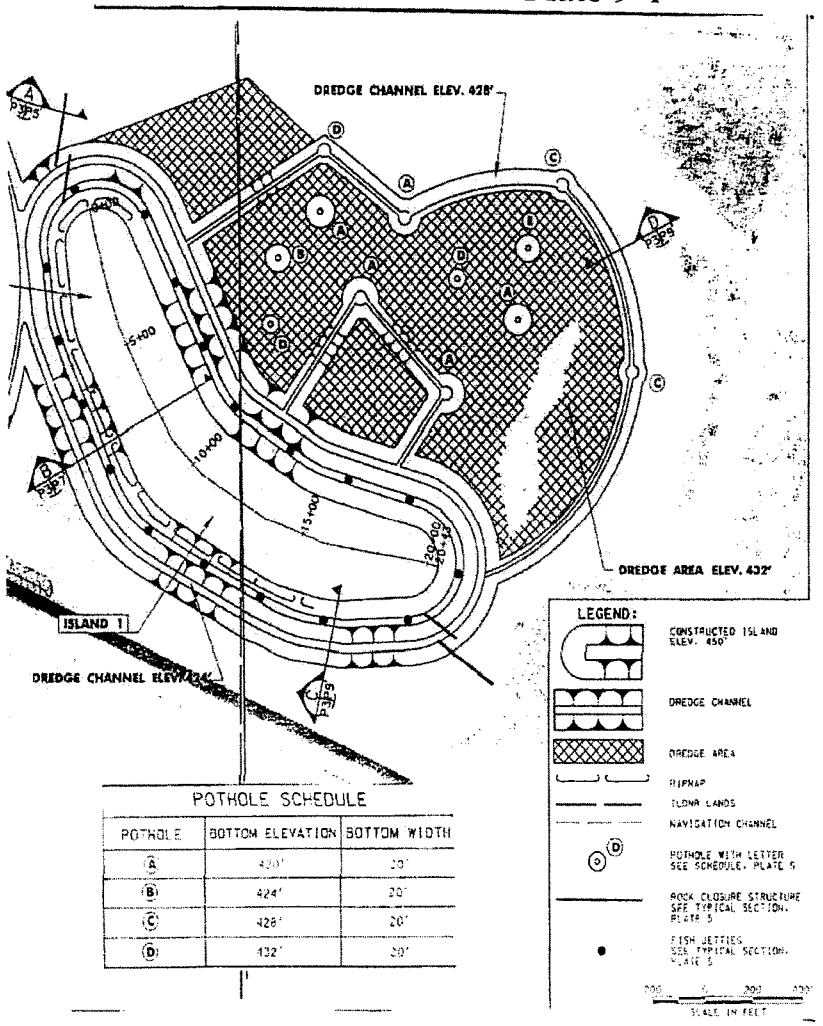
Total Reduction in Dredging Volume

Island 1 – 216,000
Island 2 – 220,000
Island 3 – 242,000
678,000 CY

Assuming an average price per cubic yard of $4.00 the estimated savings is $2,712,000

Value Engineering Study – Peoria Riverfront Development

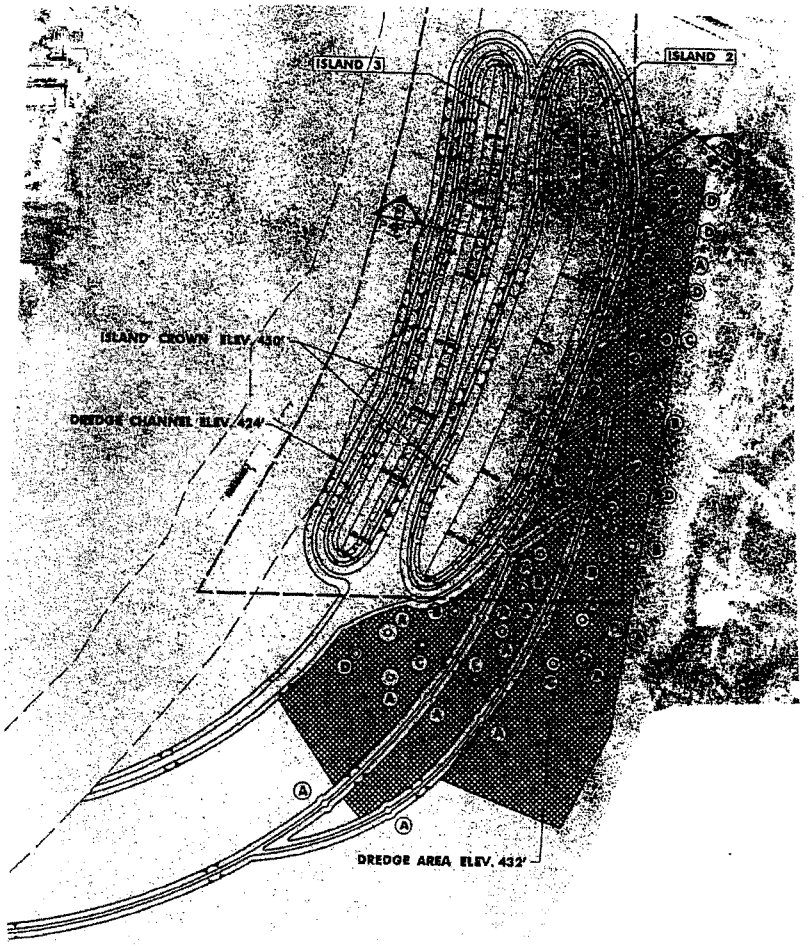
Sketch of Original Condition - Plate 9-1



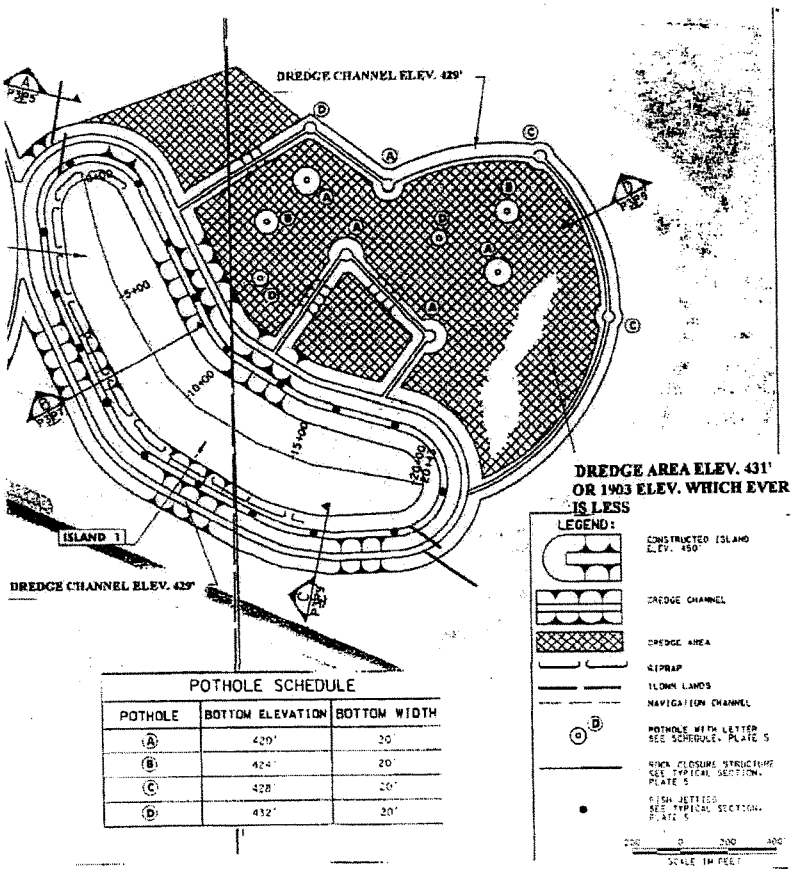
POTHOLE SCHEDULE

POTHOLE	BOTTOM ELEVATION	BOTTOM WIDTH
(A)	420'	20'
(B)	424'	20'
(C)	428'	20'
(D)	432'	20'

Sketch of Original Condition - Plate 9-2



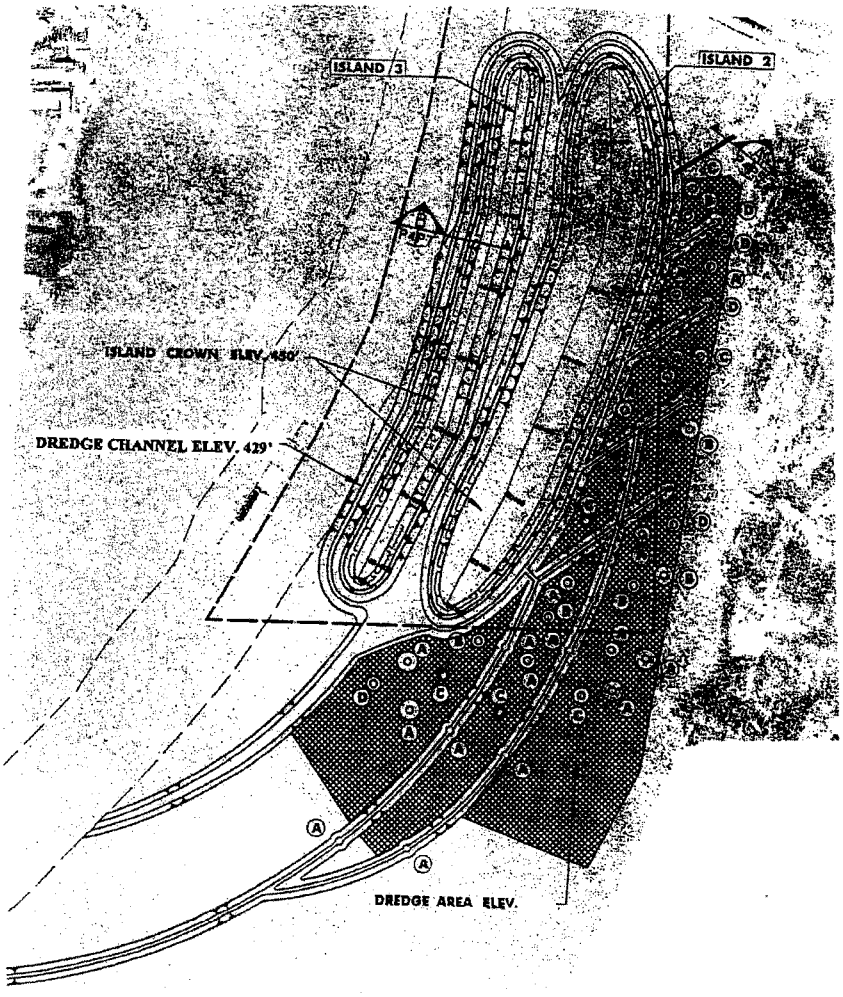
Sketch of VE Proposal Plate 9-3



POTHOLE SCHEDULE

POTHOLE	BOTTOM ELEVATION	BOTTOM WIDTH
Ⓐ	420'	20'
Ⓑ	424'	20'
Ⓒ	428'	20'
Ⓓ	432'	20'

Sketch of VE Proposal Plate 9-4



38

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 7

Value Engineering Proposal

Title of Proposal: Place Dredged Material into Island Interior while Building Initial Embankment

Function of Proposal: Complete project more quickly

Existing Situation: The applicable construction timetable envisions building a perimeter embankment in stage 1 and then hydraulically dredging into the embankment during stage 2, which begins during year 3.

Proposed Change: Begin dredging the sediment that will form the interior of the islands during stage 1. If very high solids are attained by using a positive displacement pump or conveyor this placement can begin immediately as turbidity will not be a concern. If a conventional hydraulic dredge is used, dredging could begin after a portion of the embankment is in place. Silt curtains or other means can be used to control turbidity. See figure.

Advantages: The dredged material will begin dewatering and consolidating during the first year rather than the third under this option. If a hydraulic dredge is used it will also provide more detention time for solids to settle. It will fill the interior above flat pool during the first year so that the interior of the embankment is not subjected to waves generated inside the island footprint.

Disadvantages and obstacles: A potential obstacle is the turbidity with the hydraulic dredge.

Justification: This change should allow more rapid completion and will allow more rapid consolidation of the dredged material.

Cost Savings: Cannot be determined at this time.

Implementation Strategy/Timetable::

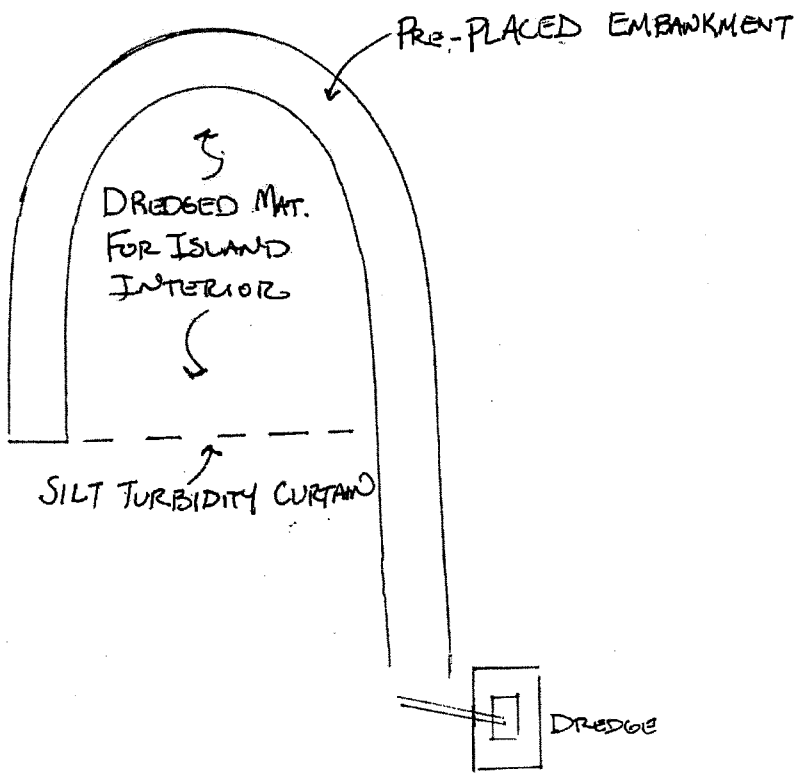
Necessary Coordination:

Assumptions: The dredged material will be placed no higher than the flat pool elevation (440) during the first year if a hydraulic dredge is used. This will assure that the embankment will not be unduly stressed before it has had a chance to begin consolidating. Silt curtains or other barriers can be used to adequately control turbidity.

If a high solids dredge is used, the material may be placed a foot or two above flat pool elevation. If the material consolidated rapidly a second lift could be placed during the first season.

Sketch of VE Proposal

PROPOSAL 17

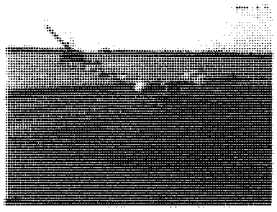


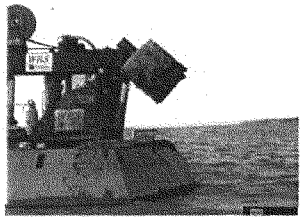
40

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Use a Positive Displacement Pump for Dredging

The current plan calls for a containment dike to be constructed with a mechanical dredge. The containment dike would then be filled with dredged material from a standard cutterhead dredge. This filling action is planned to be done in stages in order to allow the dredged material to consolidate. The dredging industry has constructed small high-density dredges using positive displacement pumps. This allows the dredged material to be excavated, transported, and placed at a much higher density than that which is possible with a standard cutterhead dredge. It is suggested that the possibility of using these types of dredges be investigated for use in this project. This suggestion concerns only those high-density dredges that are currently available. It is possible that a high-density dredge could place material with enough strength to build the containment ring, thus precluding the necessity of using a mechanical dredge. This should result in a cost savings.





Positive Displacement Pump in Operation. Note bucket head and consistency of material at outlet pipe.

41

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 9

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Use a Design-Build Type Contract to Build a High Solids (High Density) Dredge for this Project

The current plan calls for a firm fixed fee competitively bid construction contract. It is suggested that a design build type contract be used. This concept would take place by advertising for proposals for a design build project. The advertisement for proposals would contain parameters to be accomplished by the project. These parameters would include the amount of river bottom to be excavated, the required depths, the size and type of the islands, etc. The Rock Island District would analyze the proposals. The proposal with the highest value would be selected and the contract awarded to that contractor. The contractor would then submit a 30%, 60%, 100% design etc. for approval. Upon approval the contractor would build the project.

However, unlike another suggestion, it is proposed that one of the parameters is to build a use a high-density dredge in the project. The currently available high-density dredges are small both in size and capacity. A high-density dredge could place the containment ring, thus precluding the necessity of using a mechanical dredge. This should result in a cost savings. A high-density dredge could also place material at a far lower water content than a conventional dredge, thus allowing the project to be constructed faster.

The project includes approximately 2,000,000 cubic yards. A large enough high-density dredge that has enough capacity to build the project in a reasonable time frame is not known to exist. Therefore a vehicle has to be invented to get industry to build one. This vehicle is a design build contract for this project that includes the construction of a large capacity high-density dredge. The up front cost of the dredge construction would be offset by the construction savings of not using a mechanical dredge. At the end of the project the new dredge would become the property of the contractor.

We would then have produced a new type of construction equipment for use on future projects. Once this type of equipment becomes economically viable and proven, industry would follow by building additional dredges. Keep in mind where the first cutterhead dredges came from.

By using a design build concept and producing a new type of dredge, the project function can be achieved faster and at a lower overall cost. Note that Corps design cost is transferred to the contractor who can produce a much less detailed design. Also note that we have created a new tool in our toolbox and we can do a better job in the construction of environmental projects.

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: The Government Should Build a High Solids (High Density) Dredge for this Project

It is proposed that the government build and operate a high-density dredge for use in the project. The currently available high-density dredges are small both in size and capacity. A high-density dredge could place the containment ring, thus precluding the necessity of using a mechanical dredge. This should result in a cost savings. A high-density dredge could also place material at a far lower water content than a conventional dredge, thus allowing the project to be constructed faster.

The project includes approximately 2,000,000 cubic yards. A large enough high-density dredge that has enough capacity to build the project in a reasonable time frame is not known to exist. Therefore one has to be built. The up front cost of the dredge construction would be offset by the construction savings of not using a mechanical dredge. At the end of the project the government would then have a new dredge for use on additional projects.

Once this type of equipment becomes economically viable and proven, industry would follow by building additional dredges. Keep in mind where the first cutterhead dredges came from.

Title of Suggestion or Comment: Consider Commercial Mining Operation to Remove Sediment.

Function: Permit contractor to remove sediment from Lower Peoria Lakes to sell commercially as topsoil, landscaping material, or as general fill.

Existing Situation: Sand mining operations are common on the Mississippi River. It was suggested that a similar industry could develop on Lower Peoria Lakes mining sediment.

Assumption: Sediment is a good agricultural source and is not chemically contaminated. Siltation from last 100 years may prove itself to be beneficial material for agricultural use, landscaping material or fill. The sediment has been tested and proven to be a good source for growing agricultural products. Initial testing of material for contaminates has shown negative results. Additional testing is continuing.

Potential Markets: Chicago and St. Louis Brownfield projects, especially those near a waterway system, are looking for a source of fill and topsoil material.

Advantages: If a buyer is located for material then the buyer can have a contractor mine the material. The State and Corps would only have permit authority over the mining operation. Therefore, the State and the Corps would not expend funds to achieve project goals.

Further Analysis: Additional economic study needed.

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: The Government Should Attempt to Find Willing Landowners for Disposal of the Dredged Material

The current construction concept is to use an in-water confined disposal area and create islands. These islands are sized much larger than necessary to accommodate all of the required dredged material. It is suggested that the landowners adjacent to the project be contacted to see if they want this material placed on their land. The material in question has been tested and makes desirable topsoil. However additional testing is being conducted.

Title of Suggestion or Comment: Use a Timber Pile Dike for the Perimeter of the Islands.

It is proposed that a timber pile dike could be used for the perimeter of the islands. This would accomplish two things. It would serve as a wave wash barrier while at the same time confining the dredged material. However the durability of the timber pile dike is suspect. The cost of the timber pile could be compared to other methods to determine its viability

Title of Suggestion or Comment: Use Containment Dikes More than Once.

It is proposed that the first containment dike should be reused as the containment for the second phase. This would be accomplished by building an overbuilt containment dike for the first hydraulic dredge phase. The material from this dike would then be moved into a higher configuration for the second phase, thus precluding additional mobilizations the mechanical dredge.

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 15

Value Engineering Proposal

Title of Proposal: Reduce Rip-Rap Layer Thickness

Function of Proposal: Reduce rip-rap usage

Existing Situation: Riprap protection of the islands is currently designed as 24 inches of Illinois gradation RR5 on geotextile fabric.

Proposed Change: The proposed change is to use the standard Rock Island District 400-pound riprap gradation instead of Illinois RR5. Going with the Rock Island District 400-pound riprap allows us to reduce the riprap layer thickness from 24 inches to 18 inches. This is a common design on the Illinois and Mississippi Rivers in Rock Island District. In fact, it is the same gradation being used for the East Peoria Section 205 flood control project that is in the same area of Lower Peoria Lake as this project.

Advantages: The advantage is that the proposed design will provide a similar level of erosion protection at a reduced cost.

Disadvantages and possible obstacles: One disadvantage is that local rock suppliers are possibly more familiar with producing the Illinois DOT gradation currently specified. However, MVR has used the 400-pound riprap specification for many years with no problems finding suppliers to produce it.

Justification: There will be no difference in the acceptability, constructability or operability of the proposed option and the current design.

Cost Savings: (See next sheet) Estimated cost savings of $430,000.

Implementation Strategy/Timetable:

Necessary Coordination:

Assumptions:

Cost Calculations

EXISTING DESIGN

Upper Island – 8,889 Tons Illinois DOT RR5 Riprap
Lower Island – 31,170 Tons Illinois DOT RR5 Riprap

- 40,059 Tons @ $37.27/Ton = $1,493,000

Contingency	- 20%	298,600
TOTAL COST		$1,791,600

PROPOSED DESIGN

Upper Island – 6,667 Tons 400 lb. Corps Riprap
Lower Island – 23,778 Tons 400 lb. Corps Riprap

- 30,445 Tons @ $37.27/Ton = $1,134,685

Contingency – 20%		226,935
TOTAL COST		$1,361,620

COST SAVINGS: $1,791,600 - $1,361,620 = $429,980

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 16

Value Engineering Proposal

Title of Proposal: Use Reno Mat in Lieu of Rock for Wave Wash Protection

Function of Proposal: Protect Island

Existing Situation: The existing design has riprap protection for the islands. This protection consists of 6 inches of bedding stone covered by 18 inches of 400 lb rip-rap.

Proposed Change; The proposed change is to use a flat wide gabion basket known as a "Reno" mat. This involves laying down a wire cage and filling it with stone. Then covering the top with additional wire and tying it together.

Advantages: Less rock is required. Bedding is not needed. A geotextile base can be used.

Disadvantages and possible obstacles: Underwater placement is difficult

Justification: The project purpose in fulfilled at a lower cost. It is faster to construct.

Cost Savings: See attached sheet. Savings $458,499.

Implementation Strategy/Timetable: The implementation can take place before the next opportunity for inclusion of the project in a water resources bill.

Necessary Coordination: None

Assumptions: The "Reno" mat can be placed in 18 inches of water.

Cost Calculations

COST ESTIMATE WORKSHEET

PROPOSAL NO.: 41
Peoria Riverfront Development (Ecosystem Restoration) Study, Illinois

PAGE 1 OF 1

DELETIONS

ITEM	UNITS	QUANTITY	UNIT COST	TOTAL
Rip Rap	Ton	40,059	$37.27	$1,492,999
Geotextile	SF	288,000	$0.31	$89,280
		Total Deletions		$1,582,279

ADDITIONS

ITEM	UNITS	QUANTITY	UNIT COST	TOTAL
Reno Mat Stone	Cubic Yard	20,030	$37.27	$746,499
Reno Mat Wire	LS	1	$288,000.00	$288,000
Geotextile	SF	288,000	$0.31	$89,280
		Total Additions		$1,123,779
		Net Cost Decrease		$458,499
		Mark-ups	0.00%	$0
		Total Cost Decrease		$458,499

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Use an Off-bank Revetment Instead of Armoring the Bank Itself

The current construction concept is to armor the existing bank with stone. It is suggested that the stone could be placed "off bank". This would create additional habitat by have two rock surfaces, one on each side. This would also create a slack water situation between the rock and the disposal material. These advantages may by offset by the increase in rock due to the off bank revetment containing an larger cross section.

Title of Suggestion or Comment: Use Gabion Walls for Confinement

Proposed Change: Stack gabions to use as containment dike

Advantages: The use of gabion baskets provides the ability to construct a containment structure in a short time frame. The habitat for fish and wildlife is not impacted since the materials used to fill the gabion baskets consist of natural materials.

Disadvantages: Placement of the gabion baskets is labor intensive. If the gabion baskets are not placed properly the structure has the potential to overturn due to lack of adequate bearing capacity as a result of the weak foundation soils. The end result would be loss of confinement of the dredged material.

Title of Suggestion or Comment: Use Vinyl Sheet Pile for Containment

Function: Retain dredged fill.

Existing Solution: Use dredged fill as containment material.

Proposed Change: Install vinyl sheet piles to serve as containment for dredged fill

Advantages: Installation of the vinyl sheet piling can be accomplished with track mounted equipment and handled with less effort than required for steel sheet piling.

Disadvantages: Pile modulus is too low to support lateral load of 12 ft. $\pm$ of dredged fill. An analysis was performed for the loading of dredge material against sheet piling placed in the soils with the strengths identified in the geotechnical report. The displacements for PZ 27 sheet piling is in the order of two feet while displacements for the vinyl sheet piling has the potential of as much as five feet. What this means is that for the low strength soils sheet piling of any type will deflect excessively unless deep enough to fix the pile. The cost for the required length will then make this solution economically unfeasible.

Value Engineering Proposal

Title of Proposal: Use Geotextile Fabric Bags for Containment Dike and Seepage Drains

Function of Proposal: Speed up construction time of containment structures and provide a stabile structure for containment of dredge material. Geotextile fabric bags provide greater strength than placement of unconsolidated river bottom clays. (Note photos on following page.)

Existing Situation: Present plans call for excavating the river bottom clays with a special clam bucket and place the material to form a containment dike for either pumping or hydraulic placing dredge material behind the containment dike. The time required to achieve strengths to develop a stable structure becomes very large and benefits from the project are not achieved for a long period of time. The time required to obtain strength gain requires the construction operation to be intermittent resulting in multiple mobilizations and demobilizations. The present schedule anticipates 10 years to accomplish the construction of the main project features. This time appears very excessive and should be reduced to a five or less time frame.

Proposed Change: Use geotextile fabric bags filled with sand to construct containment dikes. These bags can be filled off site and taken to the area for placement and stacked similar to placement of sandbag dikes. As an added feature these bags would be placed within the dredge fill to perform as drains to enhance the consolidation of the dredge material. An alternate construction approach to enhance consolidation of the dredge material would be to construct a 12-inch sand cap after every 4 feet of dredge fill placement, sloping toward the fabric bags used for containment. This configuration will act as consolidation drains significantly decreasing the drainage path required for the dredged materials to consolidate. This will permit placement of all the dredge material to complete the embankment construction and reduce the project construction time.

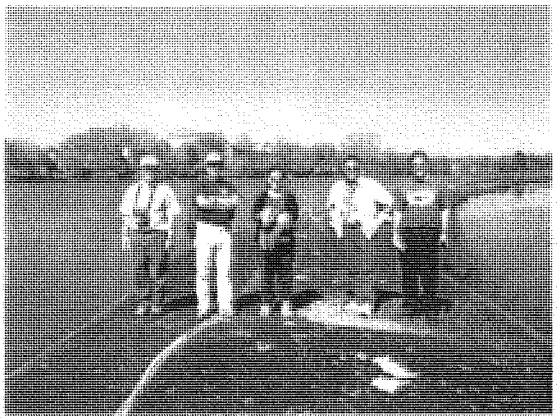
Advantages: Significant decrease in time required for construction of containment dikes and features to enhance consolidation and increase strength gain of the soils over a shorter period of time. Fewer mob / demobilization required; could possibly construct with only 1 mob / demob. Shortened construction time with features realized within acceptable time frame for habitat enhancement.

Disadvantages and possible obstacles: Preliminary analysis indicates prohibitive cost.

Justification: Ease of construction and reduction of time in putting containment structure in place. However, note cost analysis, below.

Cost Savings: After looking more closely at this proposal, one came to the conclusion that it would not be feasible from a cost standpoint. The length of the containment berm for all three islands is approximately 23,000 LF. Based on the design, you would need about 18,400 bags. Using cost data from Mel Price bags in place would be in the neighborhood of $500/bag for a total cost of about $9.2 mil. Even if we could shave the cost to $100/bag, due to the large quantities required, you are still talking about $1.8 mil. This compares to an existing cost of about 51,000cy @ $4.00/cy or $200,000. Based on this analysis its probably safe to say that the use of gabions would also be cost prohibitive.

Necessary Coordination: Biology Specialists and Geotechnical designers.



Sediment filled Geotextile tubes form an embayment at the upper end of the Drakes Creek inlet at Old Hickory Reservoir near Hendersonville, Kentucky. The tubes keep sediment from entering the embayment during all but high flows. This ecosystem restoration project included removing sediment to restore fish habitat and using the Geotubes as a wave break. The tubes have reduced turbidity in the embayment. Trees are planted on some of the tubes that will eventually resemble low islands. Other plants grow through the tubes during the summer. The tubes are available in a variety of sizes and lengths. The project was constructed by the Nashville District of the Army Corps of Engineers.

Photos: Martin, John C., PhD, Senior Scientist, Waste Management and Research Center, a division of the Illinois Department of Natural Resources.

51

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Use Geotubes with Rough, Stringy Exteriors

Function: Increased substrate material for benthos

Title of Suggestion or Comment: Use Small Geotubes to Begin Island Construction

It may be advantageous to use small diameter geotubes early in the island construction phases to provide protection to the initial embankment and to contain material dredged into the island center during the first year. The tube would likely be covered with rock

Value Engineering Proposal

Title of Proposal: Build the Islands in Lifts Similar to Indian Mounds

Function of Proposal: Improve habitat and stability characteristics of islands

Existing Situation: The exterior embankments of the islands will be built to a height of ten feet above the flat pool water level with a large clamshell crane in two operations separated temporally by four years. The embankments will rise from the water at a continuous one on six foot slope.

Proposed Change: Shape the island like a traditional Midwestern Indian mound with a first lift rising to about four feet above the flat pool, a level space 30 to 50 feet wide, and then a second lift rising to elevation 450. (See sketches on the following two pages.)

Advantages: This configuration is more stable and less likely to suffer slope failure. Vegetation growing on the first lift will help protect the embankment of the second lift from waves during high water.

This option may make it unnecessary to mobilize the long boom crane a second time.
This option increases habitat diversity because the first lift will be nearer the water and will have different soil moisture and other conditions than the top of the island.

Disadvantages and possible obstacles: This option will decrease the amount of dredged material that the island can hold without making it wider.

Justification: This option is more stable, will be more visually pleasing and have greater habitat value.

Cost Savings:

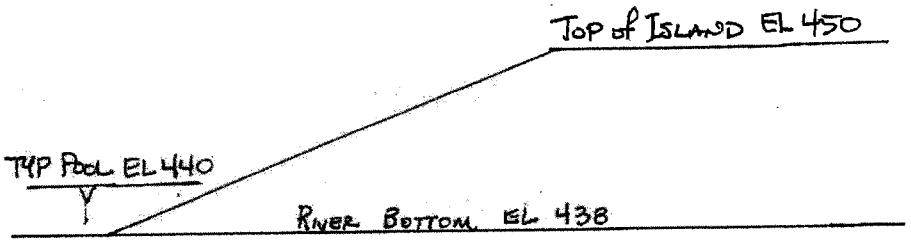
Implementation Strategy/Timetable:

Necessary Coordination:

Assumptions: It is assumed that the embankment for the second lift can be constructed by one of several methods which include: use of the long boom crane mobilized for the first lift, use consolidated material from the interior of the island's first lift, or use consolidated material as outlined in a previous suggestion.

Sketch of Original Condition

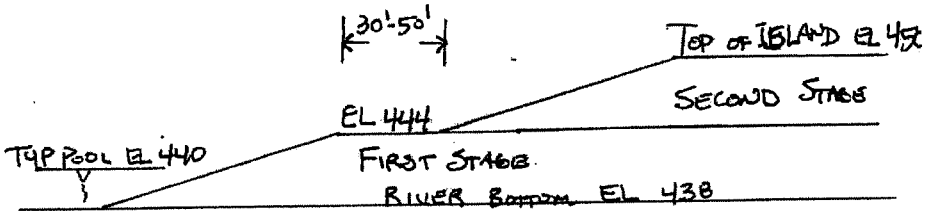
PROPOSAL 40



NOT TO SCALE

Sketch of VE Proposal

PROPOSAL 40



NOT TO SCALE

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 24

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Leave open the option to build the islands higher.

Once it is clear that the islands are stable and can bear the load, it may be possible to increase their height. Consolidated material to build an interior berm higher to contain more material can be borrowed from the top of the island.

The advantage will be the ability to contain more dredged material in the same footprint.

This option could be executed as part of this project although it may be safer and more useful at a future date after the material is fully consolidated.

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 25

Value Engineering Proposal

Title of Proposal: Dredging and Material Placement to Mimic the Early 1900's Lake Contours

Function of Proposal: To create a more sustainable and natural lake

Existing Situation: The existing Lower Peoria Lake was enlarged by the diversion of the Chicago River and the construction of the Peoria Lock and Dam to create the 9' navigation channel. Both these action raised the water levels in the Illinois River and enlarged the surface area of Lower Peoria Lake. Since the 1900, Lower Peoria Lake has been filling in with sediment.

Proposed Change: The proposed concept would involve the dredging the lake to mimic the 1903 lake bottom. The dredging would occur closer to the channel with material placement along the lakeshore. The dredging would still have deep channels and potholes but no islands would be built. The material placed along the shore would be a marsh-like area. See sketch.

Advantages: This proposal would likely be more self sustaining because the reduced area would have higher velocities and therefore the sediment would be not settle in this area. This proposal could be constructed rapidly because a island was not being constructed. The dredged material would be placed along the lakeshore in the channel thalwag.

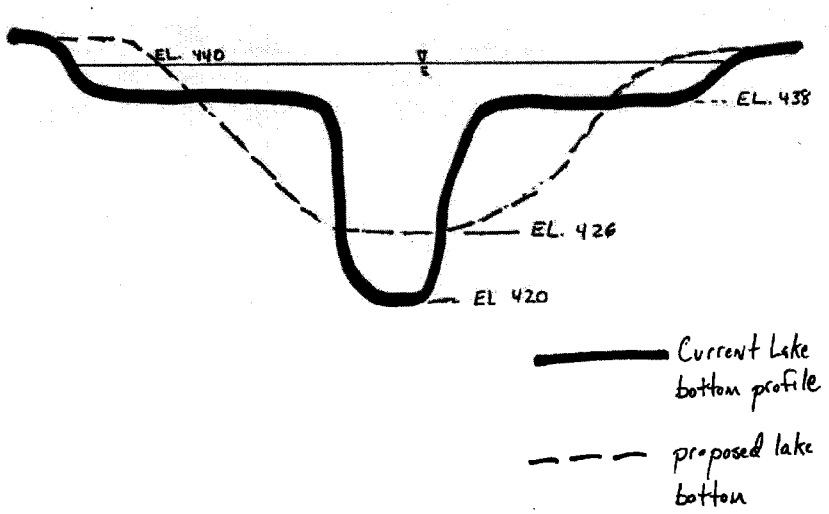
Disadvantages and possible obstacles: Public perception of this proposal could be negative because it involves loss of lake surface area. The navigation industry and Corps of Engineers would possible object to placing material in the thalwag.

Justification: This proposal could generate significant cost savings since it could be accomplished by one contact (eliminates 4 mob/demobilization) is the current selected plan. This proposal would be quicker and easier to construct.

Cost Savings (If applicable - show calculations on separate sheets): $2,942,211

- Eliminate 3 mobilization/demobilization saves approximately $607,058
- Escalation in current plan is $2,335,155

Sketch of VE Proposal



Drawing not to scale

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 26

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Build Series of Thin Islands along Channel

This was suggested as an option for the lower pair of islands. Instead of constructing Island 2 (island closest to navigation channel) as a solid barrier island, it was suggested that this island could be constructed as a string of islands along the same alignment as island 2. This would allow boat access at various locations along the length of Island 2 while still providing a great deal of wave protection for Island 3. It could also reduce the required dredging volume and therefore, project cost.

Value Engineering Proposal

Title of Proposal: Build Island Complex

Function of Proposal: Creates small islands

Existing Situation: The existing design calls for dredging of expansive open water areas with several large islands requiring transport of dredged material for up to several thousand feet.

Proposed Change: The proposed plan would utilize large mechanical dredging equipment (clamshell or excavator) to excavate and side-cast dredged material to construct an island complex with intervening deep over-wintering channels. The island complex would be protected with a containment levee open at the downstream end which would allow fish and boat access into and out of the island complex and eliminate most of the sediment input into the island complex area. The concept is shown on Plate 26-1, next page. The sketch is conceptual and actual location of the island complex could be adjusted to avoid negative impacts to local marinas and other developments.

Advantages: The advantage of this proposal is that it would produce the lowest unit cost for mechanically dredged material since no transport of material would be required from the point of excavation to the point of material placement. The island complex would be protected with a perimeter levee, thus producing a backwater island complex with very little sediment input. The backwater island complex would produce excellent deep water fish habitat and also provide a protected deepwater area with islands for boat access, water skiing, etc.

Disadvantages and possible obstacles: This proposal does not produce expansive deep open water areas as generally desired by the public and therefore may not be accepted by the public.

Justification: This proposal is constructible with standard large mechanical dredging equipment and would result in a project that would be fairly sustainable without extensive maintenance of water depths (maintenance dredging).

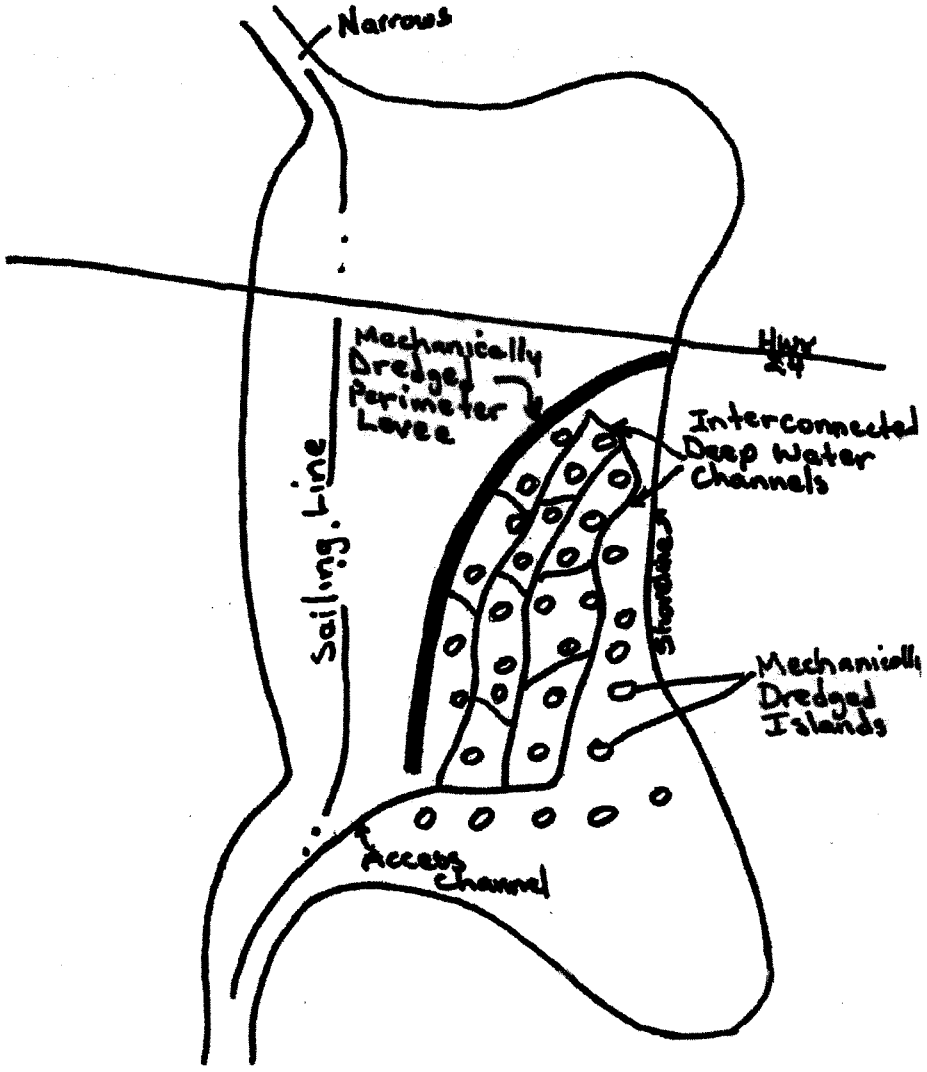
Cost Savings: It is very probable that this proposal would result in significant life cycle cost savings over that of the existing design. First cost savings could be realized by reducing dredging by approximately $1.00 per cubic yard. Cost savings for project operation and maintenance would also be significant since the perimeter levee would be constructed high enough to protect the island complex area during normal annual floods, thus significantly reducing the sediment accumulation in the dredged area. No cost estimates of this proposal were computed.

Implementation Strategy/Timetable: Since this proposal would be implemented with mechanical dredging equipment, the time to consolidate hydraulically dredged material would be removed from the project schedule, thus potentially cutting the project construction time in half.

Necessary Coordination: N/A

Assumptions: N/A

Sketch of VE Proposal Plate 26-1



61

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 28

Value Engineering Proposal

Title of Proposal: Reduce the Width of Island Number 3

Function of Proposal: Serve as breakwater for Island 2

Existing Situation: Construction of the two islands creates an off-channel deep-water habitat. The area will be located east of the east island to protect it from wind and wave action. The east island is approximately 3,850' long and 590' wide. The west island is approximately 3,650' long and 150' wide. Both islands are to provide terrestrial habitat and to provide a flowing channel between the islands.

Proposed Change: Reduce the island width and height. Reduce the crown width from 150' to 50' and reduce the crown elevation from El.450 to El.445.

Advantages: Will provide a cost savings without impacting the primary aquatic benefits

Justification: The justification is to provide the same basic function while reducing costs.

Cost Savings: $1,204,000

Assumptions: Reducing the crown elevation by 5' eliminates the need for staged construction.

VE Proposal 8

Cost Estimate Worksheet

Project: Peoria Riverfront Development

Item	Quantity	Unit	Unit Cost	Total
Mechanical Dredging	157000	cy	$4.92	$772,440
Hydraulic Dredging	60000	cy	$4.86	$291,600
Riprap - Erosion Control	2900	ton	$44.72	$129,688
Geotextile	26800	sf	$0.37	$9,916
Total Deletions:				**$1,204,000**

Item	VE Design Quantity	Unit	Unit Cost	Total
Total Additions:				**$0**
Net Cost Decrease				$1,204,000

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 29

Value Engineering Proposal

Title of Proposal: Reduce Height, Width and Length of Islands.

Function of Proposal: Reduce project dimensions

Existing Situation: The current design shows island dimensions as follows:
Island 1: Length – 2,183 ft; Width – 500 ft; Elevation – 450 ft. MSL
Island 2: Length – 3,986 ft; Width – 590 ft; Elevation – 450 ft. MSL
Island 3: Length – 3,787 ft; Width – 390 ft; Elevation – 450 ft. MSL

The current estimated total project cost is $20,554,000.

Proposed Change: The Project Sponsor has budgeted for a project with a total project cost of approximately $15,000,000. This proposal would reduce the scope of dredging and island construction such that the project would stay within the $15,000,000 total project cost desired by the local sponsor. The proposal would be to reduce the width and length of the islands and dredging quantities commensurate with a total project cost of $15,000,000.

Advantages: The project would stay within what the State of Illinois has budgeted for and can afford.

Disadvantages and possible obstacles: The project benefits would be reduced from those currently calculated due to reduced acres of dredging and island construction.

Justification: This proposal is supported by the project sponsor and would be desirable if there are no other cost cutting measures that can reduce the total project cost to $15,000,000

Cost Savings: Approximately $5.5 Million in cost savings.

Implementation Strategy/Timetable: N/A

Necessary Coordination: N/A

Assumptions: N/A

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 30

Value Engineering Proposal

Title of Proposal: Remove Island No. 1 Lower Closure Structure.

Function of Proposal: Structure may not be needed to prevent siltation behind Island No. 1.

Existing Situation: Proposed drawings show new closure structure to be built at lower end of Island No. 1 and bank line.

Proposed Change: Remove the island

Advantages: Since closure structure is far from main navigation channel removal may not affect siltation rate in new dredged area behind Island No.1. Removal of closure structure would allow easier access for recreational boaters to area behind Island No. 1.

Disadvantages and possible obstacles: Sponsor may want structure. It was suggested that structure may be altered in future to create a fish passage.

Justification: Proposed structure may not fulfill purpose.

Cost Savings: Estimated savings at 60k. Feasibility Report has 120k for two closure structures for Island No. 1. This VE Proposal removes one closure structure.

Implementation Strategy/Timetable: NA

Necessary Coordination: Discussion between Corps and Sponsor.

Assumptions: Lake is quiet near proposed closure structure location and that siltation would be low.

Value Engineering Study – Peoria Riverfront Ecosystem Development – Item No. 31

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Addition of Closure Structure at Upstream End of Islands No. 2 and No. 3.

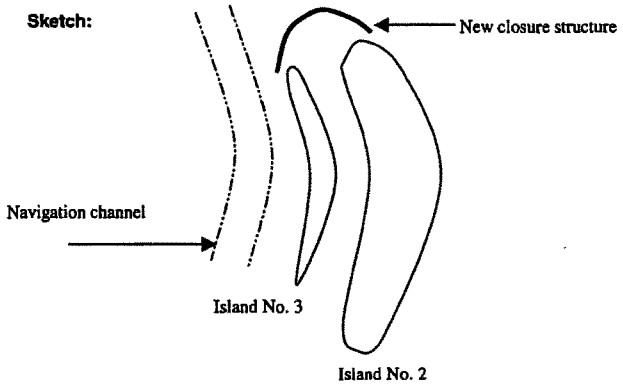
Function: Closure Structure would keep area between islands from filling with sediment.

Existing Situation: Drawings show no planned structure between Islands No. 2 and 3. Designers want free flowing "side channel" between islands. However, Lower Peoria Lake has low velocity flow.

Advantage: Keep area between Islands No. 2 and 3 from filling up. The addition of the closure structure may create deep water scour area during high flows.

Disadvantage: Closure structure would eliminate free flowing side channel concept.

Sketch:



Value Engineering Proposal

Title of Proposal: Use Upland Disposal and Build Islands from Land-Based Borrow.

Function of Proposal: Construct project using land-based areas instead of all in water work.

Existing Situation: The existing design calls for building a confined disposal area in the water with a mechanical dredge. The disposal area would then be filled incrementally with a cutterhead dredge.

Proposed Change: The proposed change is to build the islands with material from a land based borrow area. The material would be excavated from the borrow pit and hauled to the island with off road trucks. A land bridge would be constructed for access to the islands. This land bridge would later be dredged away. After the islands are built the cutterhead dredge would then pump excavated material into the land based borrow area. The land based borrow area would be filled to a higher level than the original surface.

Advantages: The islands would be smaller. As envisioned the islands are larger than they need to be to accommodate the dredged material. A land based disposal area is much easier to operate resulting in faster construction and less turbidity from the effluent. The borrow area would be raised, thus increasing its value.

Disadvantages and possible obstacles: The borrow area must be obtained by the local sponsor.

Justification: As envisioned the project will take nine years to construct. This method will allow for a faster construction time. It will also allow for the improvement of the borrow area land.

Cost Savings: See attached cost calculations. Savings $260,314.

Implementation Strategy/Timetable The implementation can take place before the next opportunity for inclusion of the project in a water resources bill.

Necessary Coordination Local sponsor will have to obtain the land.

Assumptions: A suitable borrow area can be procured.

Cost Calculations

COST ESTIMATE WORKSHEET

PROPOSAL NO.: 7 Peoria Riverfront Development (Ecosystem Restoration) Study, Illinois

PAGE 1 OF 1

DELETIONS

ITEM	UNITS	QUANTITY	UNIT COST	TOTAL
Mechanical Dredging	Cubic Yard	933,461	$4.10	$3,827,190
Cutterhead Disposal into Island	Cubic Yard	1,040,665	$4.05	$4,214,693
		Total Deletions		$8,041,883

ADDITIONS

ITEM	UNITS	QUANTITY	UNIT COST	TOTAL
Island Construction	Cubic Yard	466,731	$3.00	$1,400,192
Cutterhead Disposal into Borrow Pit	Cubic Yard	1,974,126	$3.00	$5,922,378
Borrow Acquisition	Acres	153	$3,000.00	$459,000
		Total Additions		$7,781,570
		Net Cost Decrease		$260,314
		Mark-ups	0.00%	$0
		Total Cost Decrease		$260,314

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Recommend a Continuing Authorities Program/Adaptive Management Funding Procedure to Cost-share O & M Expenses of this Environmental Project

The suggestion to consider the development of a continuing authority for restoration in the Peoria Lakes/Illinois River relates to the fact that currently under ecosystem restoration O&M is a 100% non-Federal responsibility. The project Sponsor the Illinois DNR is concerned over this 100% O&M responsibility, since the number one resource problem on the Illinois River is sedimentation (potential to require maintenance dredging to maintain desired depths). The proposed project focuses on dredging to restore historically abundant deepwater off-channel areas. However, the main stem Illinois River and its basin have been greatly modified from pre-settlement conditions (land use, Great Lakes Diversion, locks and dams, channel maintenance, Levees) that are contributing to higher sedimentation rates. In addition, the Lower Illinois River prior to the last glaciers carried the flows of the Mississippi River and as a result currently has an oversized valley for its current drainage, very low slope (1 inch/mile), and is a natural depositional zone. These conditions combine to create a degraded ecosystem where restoration actions are required if historic deepwater off-channel habitats are to be restored and maintained.

On the Upper Mississippi River system, environmental dredging projects typically have a design depth of approximately 6 feet for fisheries benefits plus the expected sedimentation rate times the 50 year project life (typically expected sedimentation rates are in the 0.1 to 1 inch per year range). However, this project due to the conditions on the Lower Illinois River used a 25 year project life in place of 50 years due to the anticipated sedimentation rate of 2.5 inches/year. This still results in over-dredging of approximately 5 feet.

This Feasibility Report and/or related Illinois River study reports should consider recommendations to Congress that the Federal Government conduct 100% Federally funded or cost shared O&M (dredging, etc.) to maintain the desired project features out into the future. This option would allow the government to minimize the initial over-dredging (first costs) and instead construct the features to roughly the design depth of 6-8 feet -and then have a cost shared O&M continuing authority to do additional maintenance dredging as necessary over the project life. The potential savings relates to the fact that dredging to the design depths avoids over-dredging. Areas that are over-dredged likely result in even higher initial sediment deposition rates, reducing the value of the investment.

Title of Suggestion or Comment: Remove Advanced Maintenance

The Project Sponsor believes that the dredging depths presented in the current design are excessive. They view this as "advanced maintenance" that is unnecessary, excessively expensive and will not really result in extending the project life beyond that if more reasonable dredging depths were established. A more reasonable approach to estimating the required dredging depths as desired by the local sponsor is addressed in the proposal entitled "Reduce Dredging Depths.

Value Engineering Proposal

Title of Proposal: Extend Construction Season

Function of Proposal: Allow more working time for contractor

Existing Situation: The draft feasibility report, p. 3-10, states "Construction activities should not occur form January 1 to June 1 to minimize potential hazards from weather related events (flood, ice, etc)".

Proposed Change: It is anticipated that construction will begin in the spring as weather and water levels permit and end when cold weather makes further operation impractical. If it were necessary to impose a date, March or April first would be better.

Advantages: Prohibiting work before June 1 is unnecessarily limits the contractor and will extend the time needed to complete the project. Weather and water levels vary widely from year to year. Much of the project area is two feet deep or less. The contractor may desire to take advantage of spring floods use deep draft equipment. Additionally some dredging by clamshell or high solids pump can be accomplished even when the water is several feet above flat pool. This change will give the contractor more flexibility.

Disadvantages and possible obstacles: None

Justification: This change will provide the contractor with a potentially longer working season and thus increase efficiency.

Cost Savings:

Implementation Strategy/Timetable:

Necessary Coordination: None

Assumptions; The contractor can decide when conditions are suitable for his equipment to operate.

Title of Suggestion or Comment: The Government Should Compress the Construction Schedule

The current construction schedule is for construction completion in 2012. This long time frame is unacceptable to the sponsor. It is suggested that the project schedule be compressed in order to satisfy the customer's needs and produce project benefits in a timelier manner. Several of the proposals and suggestions contained in this report will allow for faster construction. Once the proposals are scrutinized, accepted, and implemented, the construction time line should be revisited and adjusted accordingly.

Formulation/Design Suggestions and Comments

Title of Suggestion or Comment: Use a Design-Build Type Contract for this Project

The current plan calls for a firm fixed fee competitively bid construction contract. It is suggested that a design build type contract be used. This concept would take place by advertising for proposals for a design build project. The advertisement for proposals would contain parameters to be accomplished by the project. These parameters would include the amount of river bottom to be excavated, the required depths, the size and type of the islands, etc. The advertisement would not specify the method by which the contractor would accomplish the work. The proposals would be analyzed by the Rock Island District. The proposal with the highest value would be selected and the contract awarded to that contractor. The contractor would then submit a 30%, 60%, 100% design etc. for approval. Upon approval the contractor would build the project.

This allows the contractor to select the best methods at his disposal to build the project. The contractor is not limited by a precise design. In a project of this nature a precise design to exacting standards is not required.

By using a design build concept the project function can be achieved faster and at a lower overall cost. Note that Corps design cost is transferred to the contractor who can produce a much less detailed design.

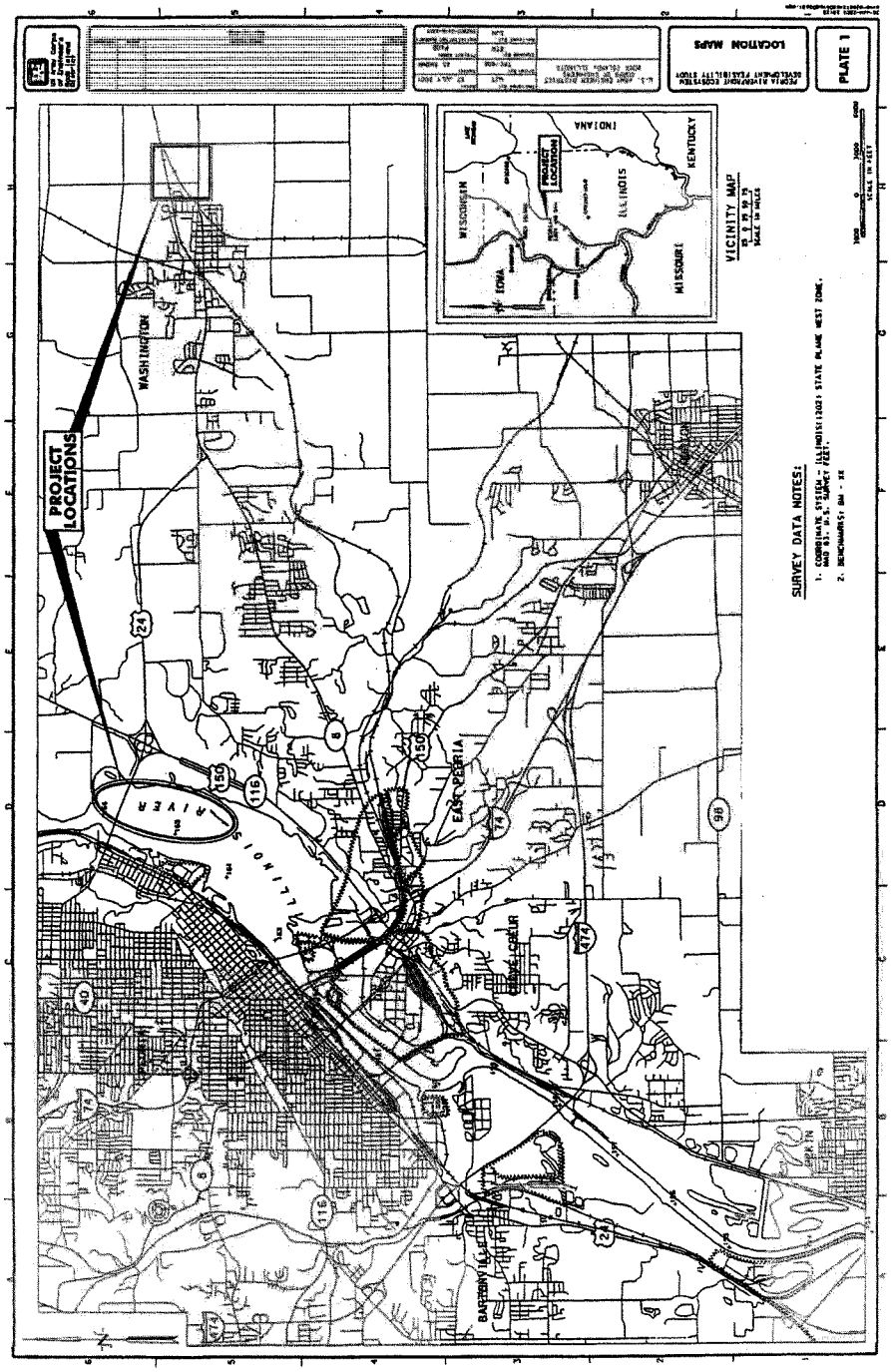


PLATE 1
LOCATION MAPS
PROJECT LOCATIONS
VICINITY MAP
SURVEY DATA NOTES:
WASHINGTON
EAST PEORIA
PEORIA
BARTONVILLE
ILLINOIS RIVER
INDIANA
KENTUCKY
MISSOURI
IOWA
WISCONSIN

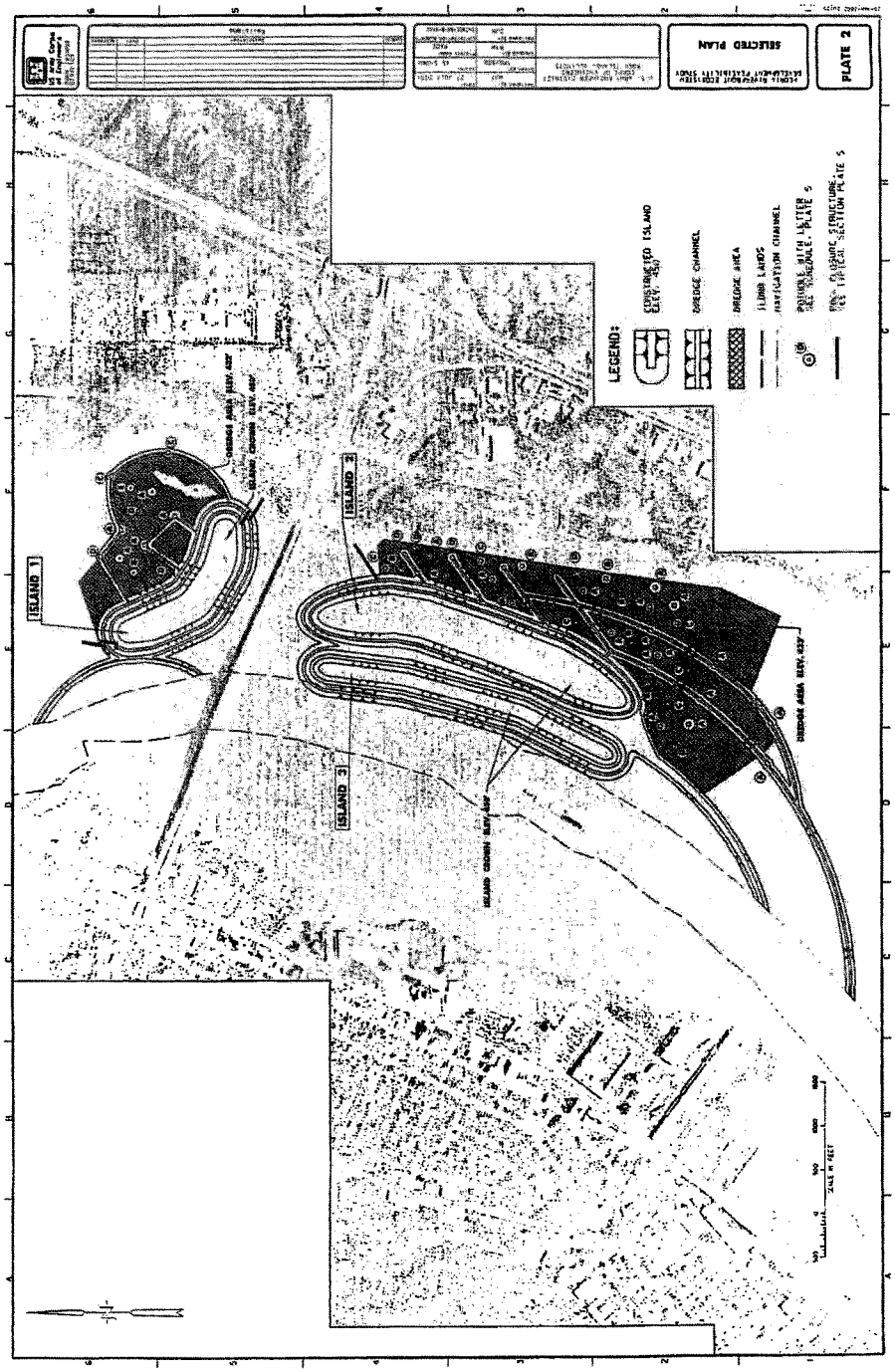


PLATE 2
SELECTED PLAN
LEGEND:
CONSTRUCTED ISLAND
DREDGE CHANNEL
DREDGE AREA
ISLAND LANDS
NAVIGATION CHANNEL
ISLAND 1
ISLAND 2
ISLAND 3

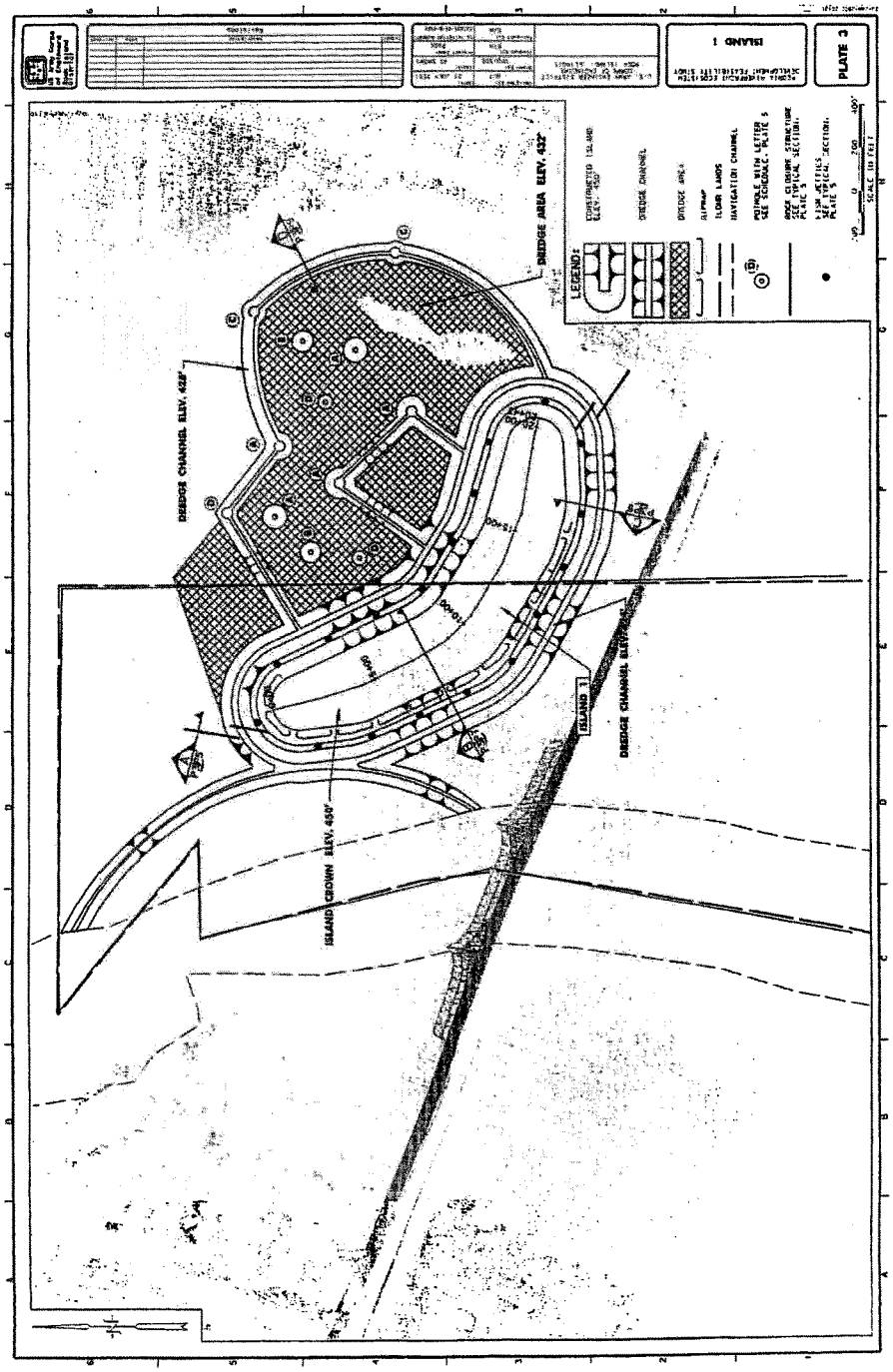


PLATE 3
ISLAND 1
LEGEND:
DREDGE AREA ELEV. 432'
DREDGE CHANNEL ELEV. 432'
ISLAND CROWN ELEV. 450'
DREDGE CHANNEL ELEV. 432'
ISLAND 1

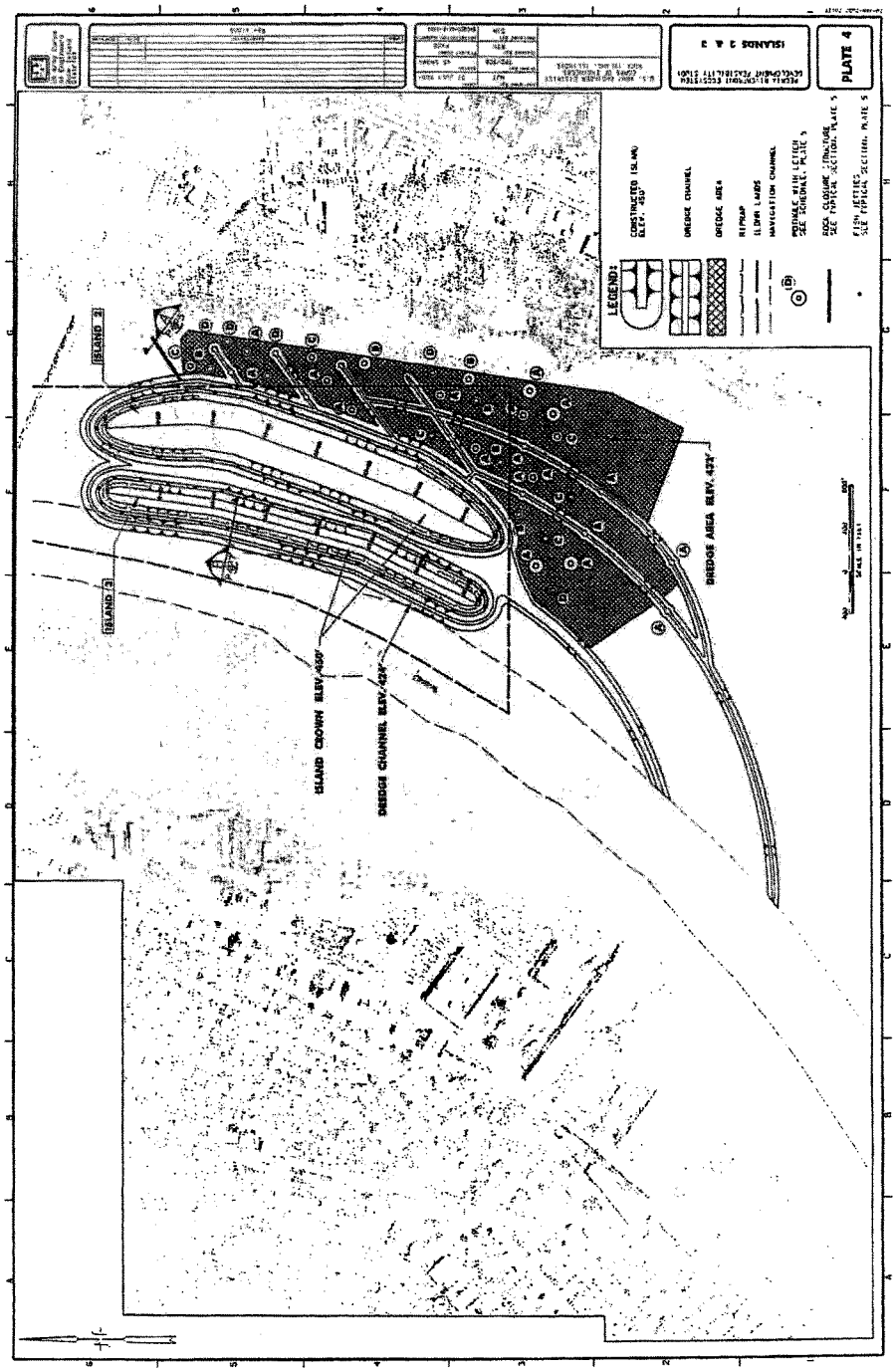


PLATE 4
ISLANDS 2 & 3
LEGEND:
CONSTRUCTED ISLAND
DREDGE CHANNEL
DREDGE AREA
RIPRAP
ILDVR LANDS
NAVIGATION CHANNEL
ROCK CLOSURE STRUCTURE
FISH JETTIES
ISLAND 2
ISLAND 3
ISLAND CROWN ELEV. 450'
DREDGE CHANNEL ELEV. 424'
DREDGE AREA ELEV. 424'

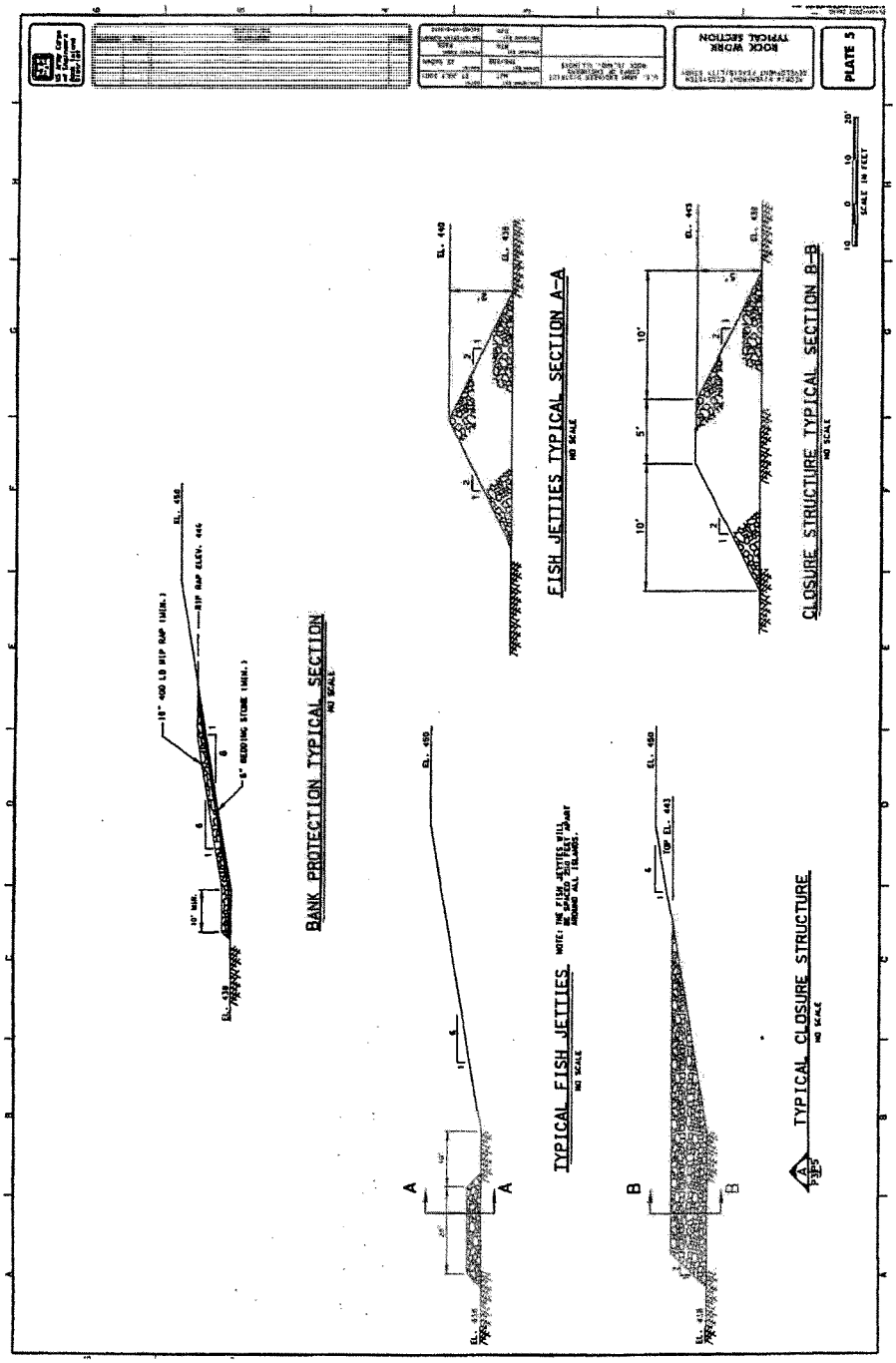


PLATE 5
ROCK WORK
TYPICAL SECTION
BANK PROTECTION TYPICAL SECTION
NO SCALE
FISH JETTIES TYPICAL SECTION A-A
NO SCALE
CLOSURE STRUCTURE TYPICAL SECTION B-B
NO SCALE
TYPICAL FISH JETTIES
NO SCALE
TYPICAL CLOSURE STRUCTURE
NO SCALE
SCALE IN FEET

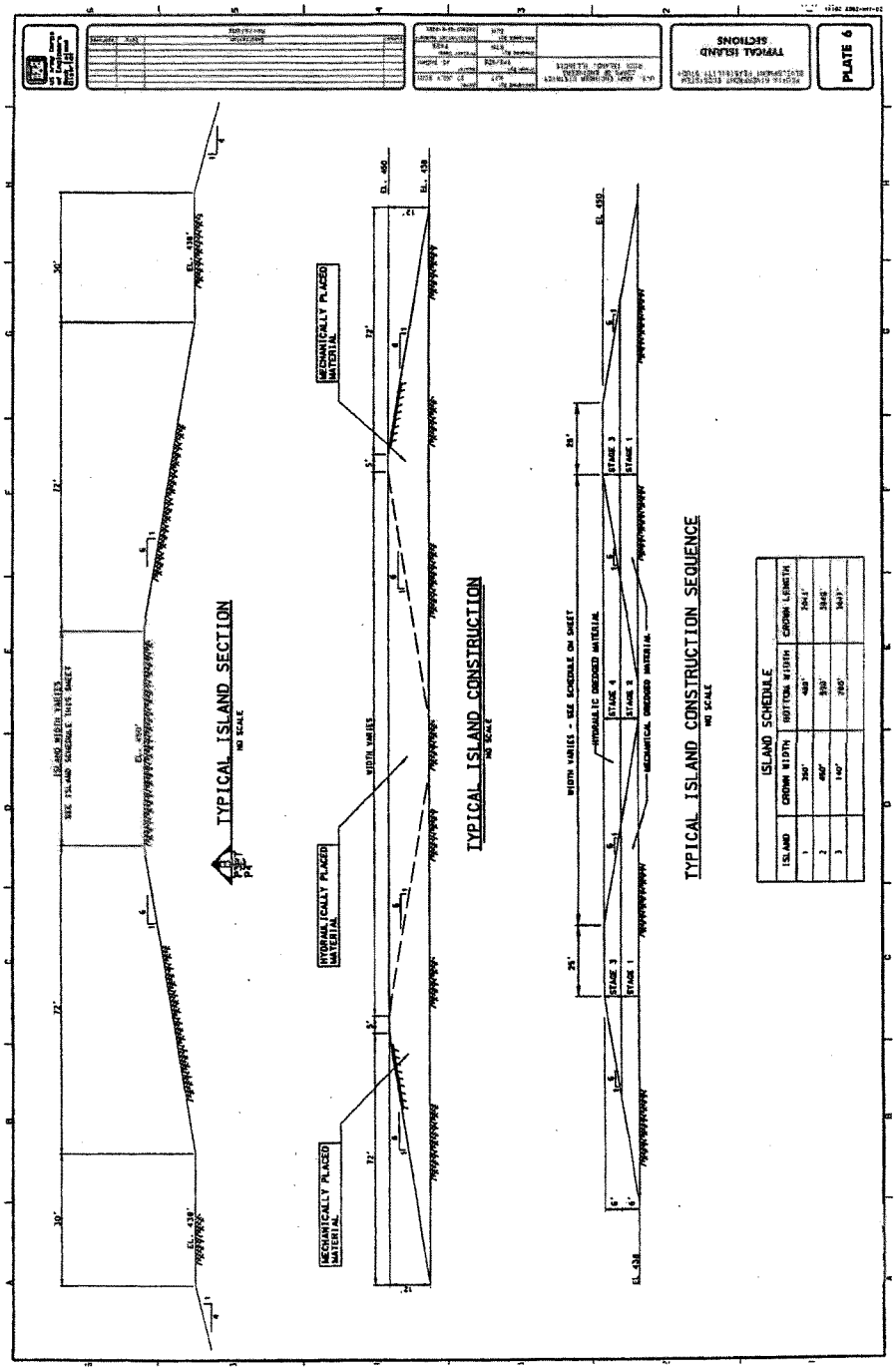


PLATE 6
TYPICAL ISLAND SECTIONS
TYPICAL ISLAND SECTION
NO SCALE
TYPICAL ISLAND CONSTRUCTION
NO SCALE
HYDRAULICALLY PLACED MATERIAL
MECHANICALLY PLACED MATERIAL
WIDTH VARIES
TYPICAL ISLAND CONSTRUCTION SEQUENCE
NO SCALE
HYDRAULIC DREDGED MATERIAL
MECHANICAL DREDGED MATERIAL
STAGE 1
STAGE 2
STAGE 3
STAGE 4
ISLAND SCHEDULE
ISLAND
CROWN WIDTH
BOTTOM WIDTH
CROWN LENGTH

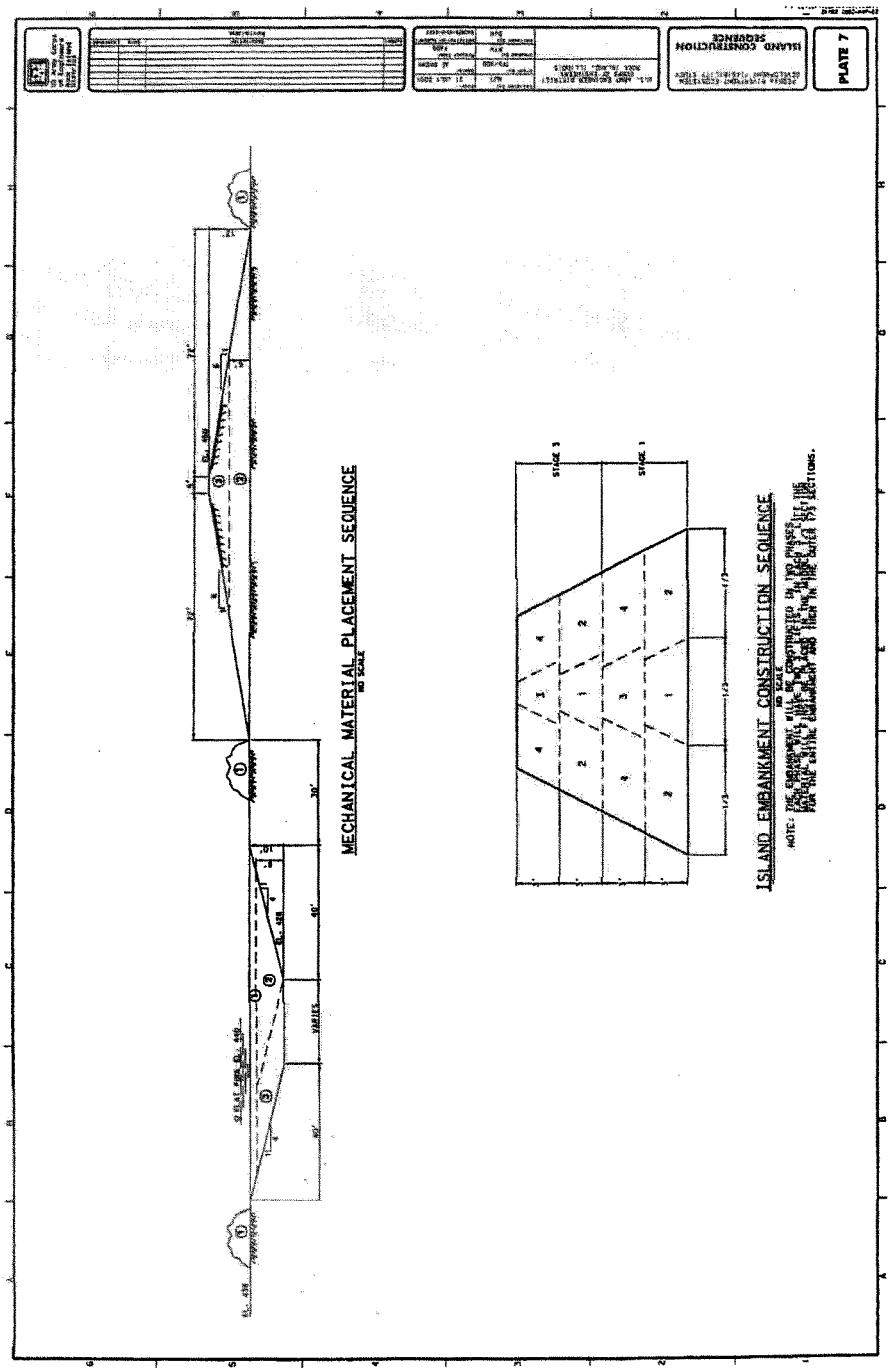


PLATE 7
ISLAND CONSTRUCTION SEQUENCE
MECHANICAL MATERIAL PLACEMENT SEQUENCE
NO SCALE
ISLAND EMBANKMENT CONSTRUCTION SEQUENCE
NO SCALE
STAGE 3
STAGE 1

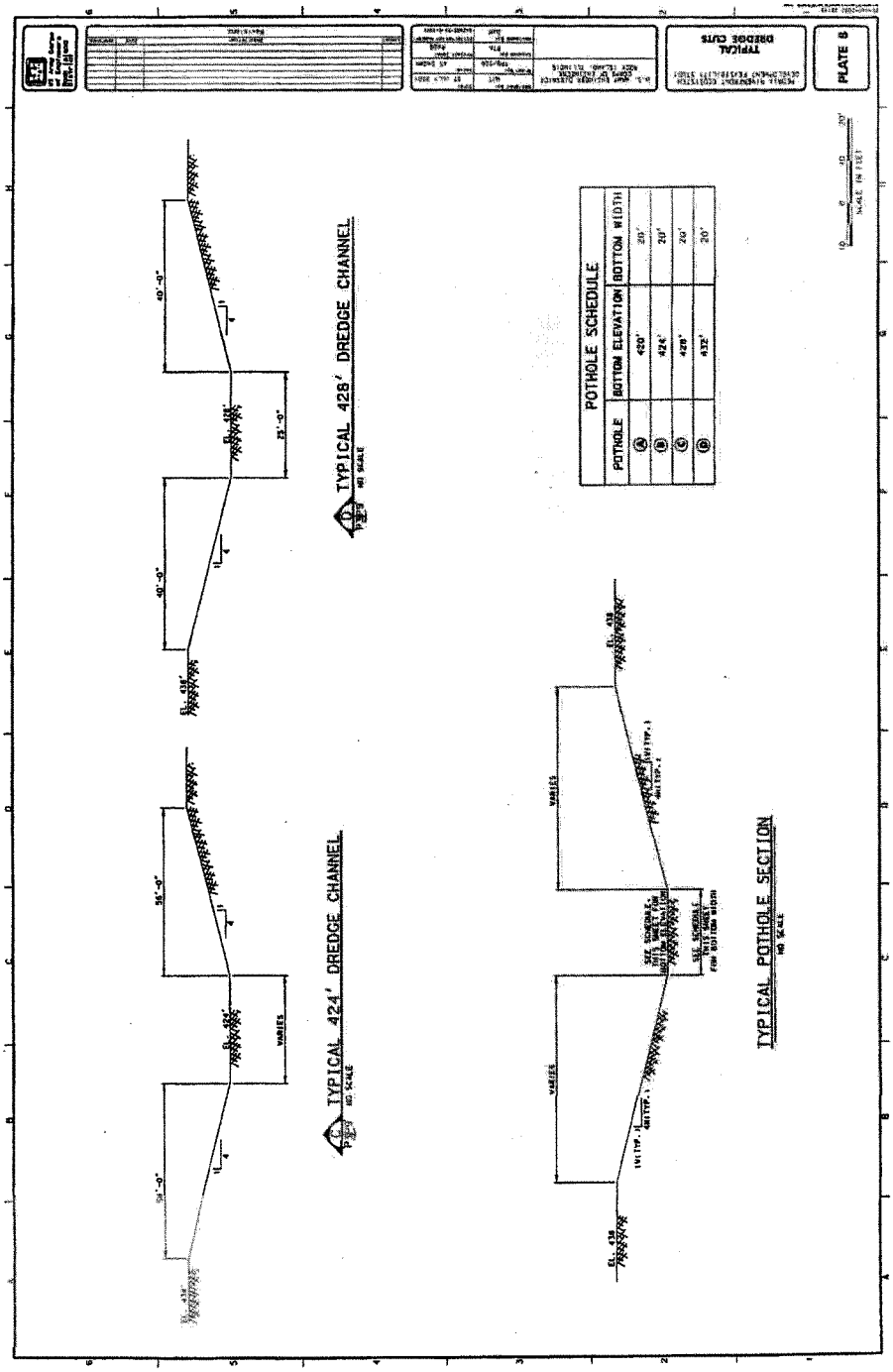


PLATE B
TYPICAL BRIDGE CUTS
TYPICAL 428' DREDGE CHANNEL
TYPICAL 424' DREDGE CHANNEL
TYPICAL POTHOLE SECTION
POTHOLE SCHEDULE
POTHOLE
BOTTOM ELEVATION
BOTTOM WIDTH
A
420'
20'
B
424'
20'
C
428'
20'
D
432'
20'

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS (ECOSYSTEM RESTORATION)

FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

TECHNICAL APPENDICES K and L

MARCH 2003

US Army Corps of Engineers ®
Rock Island District

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
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ROCK ISLAND, ILLINOIS 61204-2004

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PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS (ECOSYSTEM RESTORATION)

FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

TECHNICAL APPENDICES K AND L

MARCH 2003

Contents

Appendix K Tributary Watershed Restoration
- A General
  - A-1 Correspondence
- B Hazardous, Toxic, and Radioactive Waste Phase I & IIA Environmental Site Assessments
- D Hydrology and Hydraulics
  - D-5 Farm Creek Watershed Hydrology and Hydraulics Analysis
- F Cost Engineering
- G Habitat Evaluation and Quantification (Farm Creek)

Appendix L Distribution List

CEMVR-PM-M

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS (ECOSYSTEM RESTORATION)

TRIBUTARY WATERSHED RESTORATION FEASIBILITY REPORT WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

Appendix K

November 2002

Contents

Section 1 - Introduction

Section 2 - Plan Formulation

Description of the Study Process 2-1
Tributary Watershed Restoration 2-2
Inventory Resource Conditions 2-2
Existing Conditions 2-2
Future Without-Project Conditions 2-10
Assessment of Problems, Opportunities, and Constraints 2-10
Problem 2-10
Goals and Opportunities 2-11
Objectives 2-11
Constraints 2-12
Identify Measures and Formulate Alternative Plans for Farm Creek 2-13
Formulation Criteria 2-14
Potential Project Measures for Farm Creek 2-14
Description of Alternatives 2-14
Evaluate and Compare Plans for Farm Creek 2-17
Incremental Cost/Cost Effectiveness Analysis Process 2-17
Habitat Evaluation 2-18
Cost Estimates for Habitat Improvement Measures 2-19
Summary of Alternative Plans 2-20
Results of Incremental Cost/Cost Effectiveness Analysis 2-22
Other Factors 2-23
Significance 2-23
Hydrology and Hydraulics 2-23
Public Acceptability 2-23
Recreation 2-23
Real Estate 2-24
Select Recommended Plan 2-24

Section 3 - Description of Selected Plan

Farm Creek Restoration 3-1
Plan Components 3-1
General Description 3-1
Project Data Summary 3-2
Pond Construction 3-2
Water Control Structure 3-3
Site Plantings 3-3
Revetment and Erosion Stone 3-5
Design and Construction Considerations 3-5
Existing Site Elevations 3-5
Pond Construction 3-5
Construction Materials 3-5

Site Plantings 3-6
Construction Sequence 3-7
Permits 3-8
Historic Properties 3-8
Operation, Maintenance, and Rehabilitation Considerations 3-8
Operation 3-9
Maintenance 3-9
Project Performance Assessment 3-10
Project Cost Estimate 3-13
Plan Accomplishments 3-15

Section 4 - Environmental Impacts/Effects

Watershed Restoration 4-1
Environmental Impacts of the No Action Plan 4-1
Environmental Impacts of the Selected Plan 4-1
Natural Resources 4-1
Endangered Species 4-1
Water Quality 4-2
Air Quality 4-2
Historic Properties 4-2
Created Resources 4-3
Farm Displacement 4-3
Noise Levels 4-3
Property Values and Tax Revenues 4-3
Public Facilities and Resources 4-3
Life, Health, and Safety 4-3
Employment and Labor Force 4-3
Business and Industrial Development 4-3
Environmental Impacts of Nonpreferred Alternatives 4-4
Any Irreversible or Irretrievable Commitments of Resources Which Would Occur If the Proposed Action Were Implemented 4-6
Relationship of the Project to Land-Use Plans 4-6
Compliance with Environmental Requirements 4-6

Section 5 - Summary of Coordination, Public Views, and Comments

Coordination 5-1
Public Views and Comments - June 2000 Open House 5-2
Public Views and Comments - November 2000 Open House 5-3
Public Views and Comments - Summer 2002 Open House 5-3
Summary 5-4

References

Tables:

2-1 Tributary Streams of Peoria Lake with Respective Drainage Areas 2-3
2-2 Wetlands Types of the Farm Creek Watershed 2-9
2-3 Potential Measures to Address Study Goals and Objectives 2-12
2-4 Farm Creek Environmental Output and Costs of Each Measure 2-20
2-4 Farm Creek Alternative Evaluation 2-21
2-6 Incremental Cost Analysis of Alternate Best Buy Plans for Farm Creek 2-22
3-1 Farm Creek Project Data Summary 3-2
3-2 Probable Construction Sequence 3-8
3-3 Resource Monitoring and Data Collection Summary 3-11
3-4 Post-Construction Evaluation Plan 3-13
3-5 Estimated Project Costs 3-14
3-6 Estimated Construction Costs 3-14
3-7 Estimated Annual Operation and Maintenance Costs 3-15
3-8 Estimated Post-Construction Monitoring Costs Every 5 Years 3-15

Figures:

2-1 Peoria Tributaries 2-4
2-2 Farm Creek Site Plan 2-15
2-3 Project Site - Pools 1 and 2 Plan 2-16

Plates:

K-1 Location Maps
K-2 Farm Creek Site Plan
K-3 Project Site - Pools 1 and 2 Plan
K-4 Project Site – Pool 1 Cross Section and Profile
K-5 Project Site – Pool 2 Cross Section and Profile

Appendices:

A General
A-1 Correspondence
B Hazardous, Toxic, and Radioactive Waste Phase I & II Environmental Site Assessment
D Hydrology and Hydraulics
D-5 Farm Creek Watershed Hydrology and Hydraulics Analysis
F Cost Engineering
G Environmental
G-2 Habitat Evaluation and Quantification

Introduction

Similar to the alternatives considered in Peoria Lake, the first step was to identify the general locations and broad categories of potential improvement. There are 10 direct tributaries to Peoria Lake. However, once the focus of the in-lake alternatives was determined to be Lower Peoria Lake, the tributaries draining to this area or a relatively short distance upstream became the logical place for tributary alternatives to be investigated. This narrowed the focus to Farm Creek and Tenmile Creek. Since Tenmile Creek has a large grade control structure at the Caterpillar Proving Ground within the basin, which helps to address sediment delivery, the study team felt that Farm Creek should be the focus. Further investigations and discussions with the Sponsor identified the upper portion of Farm Creek as having the highest level of interest from public involvement.

Following release of the public review draft of this report, results from an HTRW Phase IIA Environmental Site Assessment (ESA) concluded that the project site for the recommended plan for tributary watershed restoration had significant contamination issues. Therefore, consistent with Corps of Engineers policy, the study team, in consultation with the Sponsor, decided to eliminate this element from the study's overall recommended plan. However, all data, plan formulation, design, and cost information have been included in this Appendix (K) for the tributary watershed restoration portion of the project. Information originally included in the other appendices regarding tributary watershed restoration are included as additional sections to this Appendix.

CONCISE DISCUSSION OF STUDIES, REPORTS, AND EXISTING WATER PROJECTS

The most notable documents reviewed during this study are summarized below (listed in chronological order):

- *Sediment Yield of Streams in Northern and Central Illinois*, Adams, J. Roger, et al., Illinois State Water Survey, December 1984. This report quantifies sediment yields in Illinois streams.

- *Peoria Lake Sediment Investigation*, prepared for the U.S. Army Corps of Engineers by the Illinois Department of Energy and Natural Resources, State Water Survey Division, January 1986. This report includes bathymetric profiles, results of core samples, and impacts of human activities on sedimentation. Recommended solutions to sedimentation of Peoria Lake include controlling sediment input, managing in-lake sediment, hydraulically

manipulating the Illinois River through Peoria Lake, creating artificial islands, selective dredging, and creating marshy areas.

- U.S. Army Corps of Engineers report, *Inventory and Analysis of Urban Water Damage Problems, City of Washington, Tazewell County, Illinois,* published August 1987. This study, conducted under Section 22 of Public Law 93-251, inventoried and analyzed urban water damage problems in the City of Washington. This document detailed the flood problems and their underlying causes, undersized bridge openings, accumulated debris, and siltation. Recommendations included removing debris and woody vegetation from the channel and bridge structures, clearing sediment buildup within the bridge structure, removing the deck of an abandoned bridge, and increasing bridge openings as part of any future bridgework. To date, no measures have been implemented. However, in the 2003 construction season, one of the constricting bridge decks is scheduled to be replaced.

- Daily & Associates, Engineers, Inc. report, *Preliminary Storm Water Management Study for Detention Basin Feasibility, City of Washington, Illinois*, published in November 1990. The City Council for Washington, Illinois, authorized this particular study on the feasibility of constructing up to six stormwater detention basins on creeks tributary to the city for reducing flood stages within the city. Their report indicated that five of the six sites were suitable, with varying degrees of benefits to flood reduction. No elements have been implemented to date.

- *The Illinois River: Working for Our State*, Talkington, Laurie McCarthy, Illinois State Water Survey, January 1991. This document includes descriptions of the past, current, and projected future conditions of the Illinois River. Specific portions related to this study include flora and fauna descriptions, the significance of its working role, and the many functions of the river.

- *Erosion and Sedimentation in the Illinois River Basin*, Demissie, Misganaw, et al., Illinois State Water Survey, June 1992. This report performed sediment yield calculations for Illinois River tributaries and used those relationships to construct a sediment budget for the Illinois River Valley. The report also discusses the effect of farming practices on sediment loads.

- *Source Monitoring and Evaluation of Sediment Inputs for Peoria Lake*, Bhowmik, Nani G., et al., Illinois State Water Survey, February 1993. The objectives of this report were to determine the sediment sources to Peoria Lake and to evaluate sediment loads from local tributaries to determine best management practices for the tributaries. This report also estimated the sources of sediment in Peoria Lake and what percentages of sediment in the lake are from local tributaries or the Peoria Lake. Several watershed planning efforts have been initiated on local tributary streams to address sedimentation and other issues. These include the completion of the Farm Creek Watershed Management Plan and efforts on Tenmile, Partridge, Senachwine, Kickapoo, Mossville, and Ackerman Creeks.

- *Integrated Management Plan for the Illinois River Watershed*, prepared by the Illinois River Strategy Team in cooperation with nearly 150 participants, chaired by Lt. Governor Bob Kustra, January 1997. The plan contains 34 recommendations divided into 6 sections: In the Corridor, Soil and Water Movement, Agricultural Practices, Economic Development,

Local Action, and Education. Recommendations relevant to this Feasibility Study are as follows:

1. Encourage beneficial use of sediment through three options for use of dredged materials. Create islands or increase the topographic diversity of existing islands using dredged material in support of native floodplain plant communities.
2. Implement backwater and side channel management measures at selected locations.
3. Build wetlands and other water retention capacity in urban and rural areas in the Illinois Basin, in collaboration with appropriate landowners and volunteering private landowners.
4. Reduce runoff rates throughout the watershed during the next 15 years through remedial and preventative efforts.
5. Implement regional strategies to protect, restore, and expand critical habitats in key high-quality tributaries throughout the watershed.
6. Promote reestablishing riparian corridors along tributary streams with permanent vegetation.

- *Conservation Reserve Enhancement Program.* On March 30, 1998, Mr. Dan Glickman, U.S. Secretary of Agriculture, came to Peoria, Illinois, to announce a $400 million plus effort to improve the Illinois River with a Conservation Reserve Enhancement Program (CREP). The CREP initiative will help preserve up to 132,000 acres of sensitive land surrounding the Illinois River and its tributaries, including upland areas. As of January 4, 2002, 98,352 acres were enrolled in the Illinois River Basin. An additional 29,011 acres of land is pending contract signing.

- *Storm Water Management of the City of Washington,* City of Washington, 2000. This summary document provides facts about Washington stormwater, benefits from stormwater detention basins, the City's project plans, and the financial expenditures by the City dedicated to management of the detention basins.

- *Farm Creek Erosion and Sediment Investigation*, Windhorn, R. D., Natural Resources Conservation Service, February 2001. This report estimated total sediment load to the mouth of Farm Creek at the Illinois River in East Peoria. An estimate was also made as to sediment delivery within the individual stream reaches.

- *Historical Sedimentation at the Mouths of Five Deltas on Peoria Lake*, Illinois State Water Survey, Watershed Science Section, Champaign, Illinois, June 2001. This report was prepared for the ILDNR summarizes the results of surveying conducted at the mouths of five deltas on Peoria Lake in 1999, including Farm Creek. The surveys were evaluated to estimate the volumes of deposited sediment between 1902-1904 and 1999.

- *Farm Creek Watershed Implementation Plan,* October 15, 2001. This document, prepared by the Farm Creek Watershed Planning and Technical Committees, summarizes information on the watershed and its problems. It also details goals and objectives for the watershed. Areas of interest include flooding, erosion and sediment, habitat loss, and water quality.

- *Illinois River Ecosystem Restoration Feasibility Study.* The Illinois River Ecosystem Restoration Feasibility Study is a 3-1/2 year, $5.24 million effort being conducted under the

authority of Section 216 of the Flood Control Act of 1970 in partnership with the State of Illinois Department of Natural Resources.

The study will identify the Federal and State interest in addressing problems within the entire Illinois River Watershed. System problems and a draft set of goals and objectives have been developed through numerous meetings with agency representatives, local sponsors, and other stakeholders. The principal habitat problems in the Illinois River Basin are the result of sedimentation of backwaters and side channels, degradation of tributary streams, water level fluctuations, loss of floodplain and tributary connectivity, and other adverse impacts caused by human activities. Two efforts currently underway in the study: (1) a system evaluation focused on assessing overall watershed needs and general locations for restoration, and (2) identification and assessment of site-specific projects.

A major focus of the system assessment is to conduct a Restoration Needs Assessment (RNA). The RNA will evaluate the need for restoration in the entire basin with a focus on the tributaries and subwatersheds feeding into the mainstem of the Illinois River. The RNA will provide a practical and scientific basis for assessing the large study area and identifying potential restoration project types and locations for the Illinois River and its tributaries. The RNA will define those critical assumptions controlling the ability to determine habitat needs and focus the study, planning, and construction efforts on the areas of critical need. The RNA will provide a comprehensive, basin-wide assessment of historic ecological change, existing conditions, predicted future conditions, and desired future conditions. Using selection criteria and a formulation framework developed as part of the feasibility study, the final report may recommend a multi-year program to address a larger list of projects.

A number of evaluations to develop detailed project plans for specific sites are underway. At the request of the State, the Corps has initiated assessments for six site-specific projects in the basin. The six site-specific investigations are Iroquois River, McKee Creek, Kankakee River - Mainstem, Pekin Lake, Waubonsie Creek, and Blackberry Creek.

Plan Formulation

DESCRIPTION OF THE STUDY PROCESS

The Peoria Riverfront Development Study follows the Corps of Engineers' six-step planning process specified in Engineer Regulation (ER) 1105-2-100. The process identifies and responds to problems and opportunities associated with the Federal objective and specified State and local concerns. The process provides a flexible, systematic, and rational framework to make determinations and decisions at each step so that the interested public and decision makers are fully aware of the basic assumptions employed, the data and information analyzed, the areas of risk and uncertainty, and the significant implications of each alternative plan.

If a Federal and State interest is identified, the process culminates in the selection of a plan to be recommended to Congress for implementation. As part of identifying the selected plan, a number of alternative plans are developed and compared with the no action alternative, allowing for the ultimate identification of the National Ecosystem Restoration (NER) Plan.

The NER Plan reasonably maximizes ecosystem restoration benefits compared to costs, considering the cost effectiveness and incremental cost of implementing other restoration options. In addition to considering the system benefits and costs, it will also consider information that cannot be quantified, such as environmental significance and scarcity, socioeconomic impacts, and historic properties information.

The steps used in the plan formulation process include:

1. Identify Problems and Opportunities: The specific problems and opportunities are identified, and the causes of the problems discussed and documented. Planning goals are set, objectives established, and constraints identified.

2. Inventory and Forecast Resource Conditions: This step characterizes and assesses conditions in Peoria Lake and the tributaries as they currently exist and forecasts the most probable without-project condition (or no action alternative) over the period of analysis. This assessment gives the basis by which to compare various alternative plans and their impacts. The without-project condition is what the river and its uses are anticipated to be like over the 25-year planning period without any restoration implemented as part of the study. The with-

project condition is what the river and its uses are anticipated to be like if restoration measures are implemented.

3. Formulate Alternative Plans: Alternative plans are developed in a systematic manner to ensure that reasonable alternatives are evaluated. In addition to the no action alternative, restoration alternatives in the lakes and tributaries were considered.

4. Evaluate Alternative Plans: The evaluation of each alternative consists of measuring or estimating the environmental benefits (habitat units), costs, technical limitations, and social effects of each plan, and determining the difference between the without- and with-project conditions. A key measure of the evaluation of alternative plans is a cost effectiveness-incremental cost analysis and evaluation of significance.

5. Compare Alternative Plans: Alternative plans are compared, focusing on the differences among the plans identified in the evaluation phase and public comment. As part of the evaluations, the best buy plans are identified—those plans that provide the greatest increase in benefits for the least increase in costs.

6. Select Recommended Plan: A Recommended Plan is selected and justification for plan selection is prepared. If a viable alternative is not identified, the Recommended Plan will be the no action alternative. In most cases, the NER plan will be selected from among the best buy plans.

TRIBUTARY WATERSHED RESTORATION

INVENTORY RESOURCE CONDITIONS

Existing Conditions

Sediment Delivery

Peoria Lake has 452 square miles of direct tributary drainage, with the majority of the area contained by 10 watersheds (see Table 2-1 and Figure 2-1). This represents only 3% of the Illinois River's 14,165 square miles of drainage area at Peoria Lake. These tributaries are the source of approximately 40% to 50% of the sediment deposited within Peoria Lake (Bhowmik et al. 1993). In determining the contribution of the local tributary, the ISWS conducted sediment transport monitoring to Peoria Lake for 2 years, finding that in drought years 25% of the sediment delivered to Peoria Lake was contributed by local tributaries. In an average year, 50% of the sediment delivered to Peoria Lake came from the local tributaries, whereas in a wet year the sediment load from the local tributaries to the lakes would probably exceed 50%. While the greater percentage of sediment comes from the upstream portion of the Illinois River Basin, the small area and high contributions from the local tributaries make them obvious candidates for restoration efforts.

Deltas formed where tributaries enter Peoria Lake and have grown quite large over the years. The ISWS estimated growth of five deltas using plan form survey information from 1902-1904 and 1999. Estimates of net sediment accumulation for

the deltas were: 2,683 acre-feet (Partridge Creek), 1,495 acre-feet (Blue Creek), 1,428 acre-feet (Richland Creek), 1,252 acre-feet (Farm Creek), and 338 acre-feet (Dickison Run) (Bhowmik et al. 2001).

TABLE 2-1. Tributary Streams of Peoria Lake with Respective Drainage Areas

Stream	*Drainage Area (square miles)*
Crow Creek	130.0
Dry and Richland Creek	47.0
Partridge Creek	28.0
Blue Creek	10.5
Funk's Run	5.4
Tenmile Creek	17.6
Senachwine Creek	85.0
Dickison Run	7.9
Farm Creek	60.0
Blalock Creek	2.8
Unnamed Tributaries	57.8
Total drainage area	452.0

Reprinted from Bhowmik, N.G., et al., ISWS, 2001.

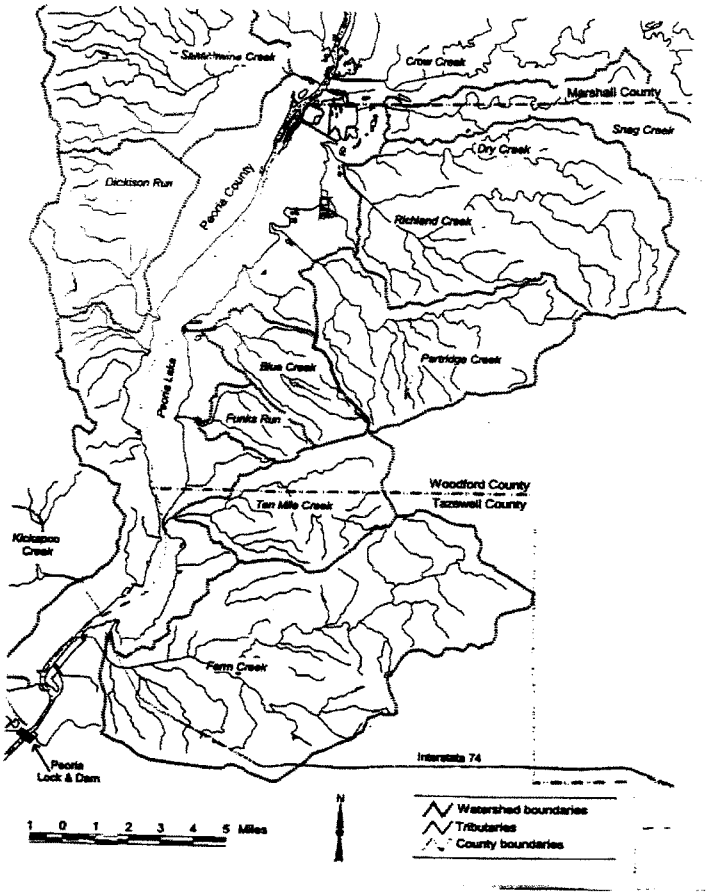

FIGURE 2-1. Peoria Tributaries (Reprinted from Bhowmik, N.G., et al., ISWS, 2001)

Causes of high tributary sediment loads are varied. Some degree of channelization has occurred; most acute is Farm Creek, which includes agricultural channelization as well as flood control. In this region, many roadways and railroad grades occupy the same or parallel corridors as streams. The results are nearly always a straightened stream channel that cannot migrate into the hardened structure and is forced into more sensitive (in terms of sediment delivery) bluff areas. The erosion results in almost instant sediment transport by the stream. In some watersheds, Farm Creek being one, urban development and resulting impervious surface generate substantial increases in surface water runoff rates and volumes. Due to topography and soil types, this runoff is forced exclusively onto highly erosive soils of severe slope. Finally, large areas of the tributary watersheds are forested. However, little or no management is underway, resulting in dense canopy with very little ground cover. During rain events, rainfall cannot infiltrate and becomes sheet flow. This surface runoff carries dislodged sediments and, due to topography, ends up in gullies or rills, further dislodging sediments.

Farm Creek

Farm Creek is in the Illinois River watershed in central Illinois and drains into Lower Peoria Lake. Its watershed is entirely within Tazewell County. The drainage area is 60.95 square miles, or 39,007 acres. The source is about 2 miles north of the City of Washington, Illinois. It flows in a westerly direction to its confluence with the Illinois River at East Peoria. Farm Creek is about 19 miles long and follows a somewhat sinuous course. From source to mouth, streambed elevation drops approximately 372 feet. The valley is flat and narrow, with very steep side slopes as far upstream as Washington, where it merges with the rolling upland. In the upper reaches, the valley width is only a few hundred feet; its maximum width near mile 4.0 (from its mouth) is about one-half mile. Wooded hills rise about 200 feet on either side of the valley. Principle tributaries to Farm Creek include Fondulac, Little Farm, School, Cole, Kerfoot, Dempsey, and Ackerman Creeks.

The streams found below the bluff line have been extensively modified to control flash flooding. Farm, Cole, Kerfoot, and Fondulac Creeks have all had channel modifications, including construction of levees, concrete lining of the channels, and straightening of the creeks. Two flood control reservoirs are currently found within the watershed. Farmdale Dam and reservoir is found on Farm Creek between the cities of East Peoria and Washington. Fondulac Dam and reservoir is located on Fondulac Creek in the northwestern portion of the watershed.

About 43% of the watershed lies within incorporated municipalities of the Village of Morton, City of Washington, City of East Peoria, and the Village of Creve Coeur. The 2000 population for this area was 54,125, which was a decline of about 1.6% from the 1990 count. After experiencing a small decline, the Tazewell County population has been growing over the past decade and is projected to have modest growth through the year 2020.

In January of 1998, the Illinois EPA funded a local watershed planning effort in the Farm Creek Watershed. The purpose of the effort was to develop a watershed implementation plan. These efforts were completed in October of 2001 with the Illinois EPA's acceptance of the Watershed Implementation Plan. This process

overlapped the feasibility study, and a high degree of coordination occurred among the Corps of Engineers, the sponsor, and the watershed planning committee. Major recommendations of the plan relevant to this study include:

1. *Problem Statement:* Flooding from increased and uncontrolled urban, agricultural, and construction runoff is causing damage to property, risk to life, and streambank instability.

Goal: A reduction of flooding, as soon as possible, by means of detention facilities and conservation buffers.

Objective #1: Identify appropriate areas for stormwater detention and conservation buffers throughout the watershed.

Objective #2: Work with Morton, Washington, East Peoria, Creve Coeur, and Tazewell County to develop consistent and logical stormwater control ordinances throughout the watershed.

Objective #3: Construct appropriate facilities on the Gregory, Tarvin, and Blumenshine tracts that reduce flood damages, increase plant and wildlife habitats, reduce sediment delivery to nearby streams, and improve discharged water quality from the sites.

2. *Problem Statement:* Sediment entering Farm Creek and its tributaries is decreasing water quality and reducing habitat areas within the watershed. Lower Peoria Lake, as the receiving water body, is also experiencing declining habitat areas and water quality due to sedimentation. Finally, as a result of sedimentation, Lower Peoria Lake is experiencing reduced recreational opportunities and increased public expenditures to maintain the Illinois River as an economic asset.

Goal: Reduce sediment deposition to the Lower Peoria Lake from Farm Creek Watershed.

Objective #1: Begin a process of integrating the Farm Creek Management Plan into the Peoria Lakes Feasibility and the Illinois River Basin Restoration Studies.

3. *Problem Statement:* Water quality in the Farm Creek Watershed is impaired due to slight nutrient and moderate siltation problems. Municipal point sources, urban stormwater runoff, hydrologic and habitat modification in the watershed, and stream flow regulation cause these problems.

Goal: Improve water quality in the watershed by reducing sediment being delivered to streams and water bodies.

Objective #1: Reduce the sediment delivered to waterways from streambank and streambed erosion through grade control, bioengineering, and reduced stormwater velocities/volumes.

4. *Problem Statement:* Wildlife habitats within the Farm Creek watershed have decreased due to the drainage of wetlands and removal of stream corridor vegetation by erosion and urbanization.

Goal: Protect, enhance, and add to the areas and types of habitat necessary to increase native wildlife populations throughout the watershed.

Hydrology and Hydraulics

The climate of Farm Creek basin above Washington is typical of the American Midwest (see Appendix D-5). It has cold, dry winters and hot, wet summers. The transition season of spring tends to be very wet, while the fall season tends to be dry. Using Peoria as representative of the basin, average temperature for the year is 50.7 degrees Fahrenheit, with a peak maximum temperature of 113 degrees on July 15, 1931, and a minimum temperature of -27 degrees on January 5, 1884. The average yearly precipitation is 36.25 inches, including an average yearly snowfall of 26.2 inches per year.

Environmental Resources

Farm Creek is a meandering stream located on a central Illinois plain. Historically, the upper watershed of the stream passed through a landscape dominated by richly diverse tall grass prairies and prairie wetland complexes, with forest communities adjacent to the stream in some areas or broad savannas dominating the landscape in others. As it flowed west, thick upland hardwood forests dominated the high bluffs overlooking the Illinois River, gradually giving way to the bottomland hardwood forest and wetland landscapes of the Illinois River floodplain. Through time, the conversion of most of this diverse landscape to urban development and agriculture has eliminated much of the natural community or replaced it with more urban tolerant species and/or invader species introduced by the European expansion westward.

Today, the upper reaches of Farm Creek east of the City of Washington meander through agricultural farm fields. The stream in this reach, on average, is approximately 3 to 4 feet wide and maintains a depth of approximately 1 to 2 feet for most of the year. The stream near the project site has a thin riparian corridor (10 to 15 feet) of herbaceous vegetation of water-tolerant grass species, as well as some scattered forbs, and 40 to 50 trees can be found along a small tributary/fencerow flowing into the creek.

The creek corridor provides sanctuary, food, water, and travel lanes for many creatures. Field mice, voles, ground squirrels, skunk, rabbit, gopher, and fox are common to areas like this. Many common bird species (i.e., sparrow, eastern meadowlark, dove, pheasant, and grouse) can also be found here, as well as predators like the red-tailed hawk. Fencerows along field borders also provide similar habitat for many of these creatures.

The site being considered for this project is approximately 109 acres and is mostly cultivated row crop farm field. There are no known state or federally listed threatened or endangered species located in this mainly agricultural area.

Wetlands

"Wetland" is a broad term that encompasses many different ecosystems that may include, but not be limited to, prairie, marshes, bogs, and swamps (USEPA 1996). They are often transitional zones between more traditional open water and dry land. They serve as a unique resource and habitat for fish and wildlife species. Wetlands do not have to be wet year round. The commonly accepted definition of wetland is an area that is inundated or saturated by surface or ground water at a frequency and duration to support, and under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions (taken from the EPA Regulations listed at 40 CFR 230.3(t)).

The U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers have joint responsibility in regulating wetlands. The wetlands information about the Farm Creek Watershed comes from the National Wetlands Inventory initiated by the U.S. Fish and Wildlife Service.

The Farm Creek Watershed has several wetlands of various types and sizes. Three hundred and fifty (350) wetlands of 29 different types are present in the watershed. A total of 880.95 acres is classified as wetlands, accounting for 2.2% of the total watershed acreage, and 305.16 acres is the result of excavation or impoundment. Operators currently farm 10.30 acres, with the rest forming natural wetlands. Table 2-2 lists the National Wetlands Inventory Code and description, with the number of said types present in the watershed and the average acres of the type listed. The existing condition of these wetlands is unknown.

Historic Properties

The tributary watershed restoration project has been recently farmed for row crops and includes landforms known to have a potential for containing significant historic properties. The Rock Island District proposed a Phase I intensive archaeological survey in the areas of potential effect to search for shallow and deeply buried historic properties. The District sent letters dated November 7, 2000, and October 5, 2001, concerning the absence of documented historic properties and the District's determination for a proposed Phase I archaeological investigation of the area of potential effect within the watershed restoration. The IHPA concurred by letter dated December 4, 2000 (IHPA Log No. 0011090020K-P, Appendix A-1) with the District's opinion to conduct a Phase I archaeological survey for the areas of potential effect located in the upland areas of the project (IHPA Log No. 0011090020K-P, Appendix A-1), consisting of the tributary watershed restoration project area.

TABLE 2-2. Wetlands Types of the Farm Creek Watershed

Code	Wetland Type	Number	Average Acres
PEM/FO1A	Palustrine-Emergent-Forested Broad Leaved Deciduous-Temporarily Flooded	1	1.3000
PEMA	Palustrine-Emergent-Temporarily Flooded	17	1.7453
PEMAF	Palustrine-Emergent-Temporarily Flooded-Semipermanently Flooded	24	0.4067
PEMAX	Palustrine-Emergent-Temporarily Flooded-Excavated	1	0.5600
PEMC	Palustrine-Emergent-Seasonally Flooded	8	1.6275
PEMCD	Palustrine-Emergent-Seasonally Flooded-Partially Drained & Ditched	2	7.3000
PEMCF	Palustrine-Emergent-Seasonally Flooded-Farmed	1	0.5400
PEMCH	Palustrine-Emergent-Seasonally Flooded-Diked & Impounded	7	4.1729
PEMCX	Palustrine-Emergent-Seasonally Flooded-Excavated	2	0.7500
PEMFX	Palustrine-Emergent-Semipermanently Flooded-Excavated	3	0.4833
PFO1A	Palustrine-Forested Broad Leaved Deciduous-Temporarily Flooded	93	4.7317
PFO1AH	Palustrine-Forested Broad Leaved Deciduous-Temporarily Flooded-Diked & Impounded	6	4.3533
PFO1C	Palustrine-Forested Broad Leaved Deciduous-Seasonally Flooded	4	0.6300
PFO1CH	Palustrine-Forested Broad Leaved Deciduous-Seasonally Flooded-Diked & Impounded	3	14.3567
PSS1/EMA	Palustrine-Scrub Shrub Broad Leaved Deciduous-Emergent-Temporarily Flooded	2	8.5700
PSS1/EMC	Palustrine-Scrub Shrub Broad Leaved Deciduous-Emergent-Seasonally Flooded	1	0.8300
PSS1/EMCH	Palustrine-Scrub Shrub Broad Leaved Deciduous-Emergent-Seasonally Flooded-Diked & Impounded	2	10.2300
PSS1A	Palustrine-Scrub Shrub Broad Leaved Deciduous-Temporarily Flooded	6	1.9283
PSS1C	Palustrine-Scrub Shrub Broad Leaved Deciduous-Seasonally Flooded	3	0.7200
PUB/ABGH	Palustrine-Unconsolidated Bottom-Aquatic Bed-Intermittently Exposed-Dike & Impounded	1	0.4700
PUBG	Palustrine-Unconsolidated Bottom-Intermittently Exposed	5	0.8140
PUBGH	Palustrine-Unconsolidated Bottom-Intermittently Exposed-Diked & Impounded	105	1.2638
PUBGX	Palustrine-Unconsolidated Bottom-Intermittently Exposed	22	0.9914
PUBKH	Palustrine-Unconsolidated Bottom-Artificially Flooded-Diked & Impounded	1	0.8600
PUBKX	Palustrine-Unconsolidated Bottom-Artificially Flooded-Excavated	4	1.6400
PUSAX	Palustrine-Unconsolidated Shore-Temporarily Flooded-Excavated	1	3.1900
PUSKH	Palustrine-Unconsolidated Shore-Artificially Flooded-Diked & Impounded	1	7.6300
R2UBHX	Riverine-Lower Perennial-Unconsolidated Bottom-Permanently Flooded-Excavated	3	3.1900
R2USA	Riverine-Lower Perennial-Unconsolidated Shore-temporarily Flooded	16	1.5981

Future Without-Project Conditions

The likely future without-project condition is anticipated to remain very similar to the present situation or degrade further. The tributary streams, which originate on relatively flat upland areas, flow through erodible loess bluffs, leading down to Peoria Lake. Further, future urbanization and continued cropping of these lands are likely to continue to maintain high volumes of sediment delivery and degradation of riparian habitat. It is anticipated that in areas where the bluffs and uplands are being developed, the rate of sediment delivery could increase rapidly.

Native wetlands will continue to remain as a small portion of the watershed land area and will likely degrade as high sedimentation fills these areas or makes them unsuitable for beneficial aquatic plants. As no native prairie exists within the watershed, with the exception of a few roadside plantings by the Illinois Department of Transportation, the expected future condition will continue to be little to no habitat of this type.

ASSESSMENT OF PROBLEMS, OPPORTUNITIES, AND CONSTRAINTS

PROBLEM

The primary resource problem in Peoria Lake is sedimentation and the resulting loss of water depth, which has reduced aquatic habitat value and diversity. Recreational opportunities have been diminished. Many Peoria Lake tributary streams have been altered, through channelization and land use practices, and are now conveying high sediment loads, thereby aggravating the sedimentation problem in Peoria Lake. The causes of high tributary sediment loads are varied. In all watersheds, some degree of channelization has occurred. In some watersheds, Farm Creek being one, urban development and resulting impervious surface generate substantial increases in surface water runoff rates and volumes. Finally, large areas of the tributary watersheds are forested. However, little or no management is underway, resulting in dense canopy with very little ground cover.

Peoria Lake, the largest bottomland lake in the valley, reflects changes similar to other lakes. Of the 60 backwater lakes along the Illinois River, the Illinois State Water Survey estimates that average volumetric loss of all lakes since 1903 is 70%, with several approaching 100% loss. This loss of aquatic habitat due to sedimentation is viewed as the greatest threat to the Illinois River. This conclusion was reached as a result of the statewide planning process that culminated in the Integrated Management Plan. Since 1903, the volume of Peoria Lake below elevation 440 feet MSL has decreased by approximately 61%. Elevation 440 feet MSL is considered "flat pool" for the Peoria Lake. The elevation is a function of the height of Peoria Lock and Dam. Areas outside of the navigation channel have experienced more rapid sedimentation. In many areas, deeper, off-channel habitats have decreased from 8 feet to 1-2 feet. The lake formerly provided a great variety of high quality habitat types and great depth diversity, including large areas of deep and shallow water habitat and numerous islands. The loss of backwater lake depth and volume has severely impacted off-channel overwintering, spawning, and nursery habitats for fish. Shallow water areas are subject to wave action that resuspends sediment, further limiting fish, aquatic vegetation, macroinvertebrate, and mussel production. Today, the lake is best characterized as a 9-foot navigation channel running through a relatively uniform shallow lake.

Peoria Lake is subject to high rates of sediment delivery from its 10 direct tributaries. These tributaries, which only represent 3% of the Illinois River watershed at Peoria, are estimated to deliver 40% or more of the sediment being deposited in the lake. This high sedimentation rate is related to the geology of the Peoria Lake region, which is surrounded by highly erodible loess bluffs and moraine deposits. In addition, alternation of the tributary watersheds has resulted in degradation of riparian habitat along stream corridors. Typically, this is the result of agricultural practices. The results are increased sheet and rill erosion in formerly riparian areas that had trapped sediments before entering tributary waters. Statewide, Illinois has lost approximately 99% of the original tall grass prairie and over 85% of pre-settlement wetlands (Noss, LaRoe and Scott 1995). Restoration of prairie and wetlands present opportunities to restore significant habitat types that were formerly abundant in the state, but that have been greatly reduced. This change in land cover from diverse vegetation to mostly row crop agriculture has significantly increased sheet and rill erosion and surface runoff in local tributaries.

GOALS AND OPPORTUNITIES

The principal goal of ecosystem restoration in Peoria Lake is to create, restore, or improve aquatic habitat by restoring depth diversity and reducing sediment delivery and deposition in Peoria Lake, with ancillary benefits to recreation. Opportunities were explored to address these conditions. The Peoria Riverfront Development Project is a public and private cooperative effort to revitalize the City's downtown area. It is fundamental to the success of the development project that the Illinois River at Peoria and Peoria Lake are healthy, functioning, and sustainable resources. Historically, the riverfront area on both sides of the river developed as a function of the transportation and aquatic resources of the Illinois River. While these same needs exist today, the need for more diversified housing, business, and industry exists along the riverfront. Much like aquatic and terrestrial habitat diversity attracts greater numbers and types of aquatic and terrestrial species, people are attracted to an area that is healthy and diverse. The goal of restoring and protecting the Illinois River at Peoria is as much in the State and local interest as it is in the Federal interest. It is supported locally by regional efforts to reduce sediment delivery, control stormwater runoff, and improve tributary water quality entering the Illinois River at Peoria. Therefore, opportunities to enhance the health, function, and sustainability of the Illinois River and Peoria Lake are by definition consistent with local efforts and vital to the success of the Peoria Riverfront Development Project. The study objectives and constraints are summarized below.

OBJECTIVES

The following objectives for the Feasibility Study were developed by an interagency study team to address the specified problems, goals, and opportunities. Following the objectives, Table 2-3 relates the study goals and objectives with potential measures. These measures were further developed and investigated as part of the Feasibility Study and are addressed in the following sections of this chapter in greater detail.

- **Maximize sustainability of project features** - If restorative measures are implemented, considerable effort should be directed to making project features sustainable (e.g., bank protection to stabilize islands, sufficient flow to minimize sedimentation, or deflection of sediment from dredged areas).

- **Reduce sediment delivery to Peoria Lake from tributary streams** - The direct tributaries to Peoria Lake compose 3% of the total drainage area at Peoria and deliver 40% or more of the

sediment deposited in the lake. Reducing sediment transport from this relatively small area would result in considerable reductions in total sediment rates in the lake.

- **Create riparian and wetland habitat along tributary streams** - Restoration of prairie and wetlands along tributaries presents opportunities to restore significant habitat types that were formerly abundant in the state, but that have been greatly reduced.

TABLE 2-3. Potential Measures to Address Study Goals and Objectives

Goals	Objectives	Measures
Create aquatic habitat	Restore depth diversity	Areas with water depth of >8 feet for overwintering fish
		Areas with water depth of ~4 feet for fish spawning and nursery habitat
		Flowing side channel
	Provide structure for aquatic organisms	Rock jetties/reefs, riprap, and root wads
	Increase habitat diversity	Create islands within Peoria Lake to provide additional shoreline and terrestrial habitat
	Improve habitat value for migratory waterfowl and shorebirds	Provide areas for waterbird resting, nesting, and feeding
	Improve water quality	Provide flow and depth necessary to maintain dissolved oxygen levels of 5 mg/l
		Create islands or breakwaters to lower turbidity levels by reducing wind-/wake-generated waves
		Create sediment traps, retention ponds, and wetland areas to filter and trap sediments before they enter Farm Creek
	Maximize sustainability of project features	Align islands to minimize deposition and increase potential for depth sustaining scour
		Bank protection to reduce island erosion
		Closing structures to minimize sediment delivery to restored deepwater areas
Reduce sediment delivery and deposition	Reduce sediment delivery to Peoria Lake from tributary streams	Sediment traps and retention ponds on tributaries
		Streambank and bed stabilization
	Create riparian and wetland habitat along tributary streams	Create wetlands and improve riparian buffers

CONSTRAINTS

The following constraints were identified during the study process:

- **No impacts on flood elevations as required by Illinois law** - Illinois state law specifies that any action in the floodplain that increases flood heights is not allowable or must be accompanied by mitigation of adverse effects. Due to the potential high cost associated with these actions, efforts were made to avoid this threshold.

- **Sponsor limitations – funding, land ownership/or ability to acquire, and desire for limited Operation and Maintenance** - As the Non-Federal Sponsor, the ability of the State of Illinois to afford various features or acquire the lands, easements and rights-of-way represented potential limiting factors. At this time, a final legal determination has not been made as to ownership of submerged lands in the Illinois River Basin. In addition, the Sponsor desires more natural and sustainable alternatives which avoid high operation and maintenance costs.

IDENTIFY MEASURES AND FORMULATE ALTERNATIVE PLANS FOR FARM CREEK

A number of sites within the Farm Creek Watershed were considered for detailed investigations (Ackerman Creek, Farmdale Reservoir, and City of Washington). These sites had existing interest in restoration, willing landowners, ease of obtaining land ownership, etc. After some investigation, a headcut on Ackerman Creek, which is located at a sewer crossing, was recommended to be pursued as a Section 14 (Emergency Streambank/Bankline Protection) project. Potential restoration at Farmdale Reservoir involved discussion with the ILDNR of possibly outgranting the site management, transferring ownership and operation, and alternatives possibly requiring restudy of the original project. It was decided, based on the scope of these alternatives, that further study, if desired, could be pursued as a separate study by the ILDNR. As a result of these discussions, efforts of this study were focused on restoration of sites upstream of the City of Washington.

The Farm Creek Watershed has a drainage area of 60.95 square miles (39,007 acres). Farm Creek flows through the City of Washington and has a drainage area of 26.5 square miles at Farmdale Reservoir. Due to concerns over flooding, the City of Washington has purchased three tracts of land along Farm Creek just east of the city for potential wetland restoration and stormwater storage. The sites evaluated for potential restoration included a 19-acre site and a 67-acre site along Farm Creek, and a 109-acre site where two unnamed tributaries approach Farm Creek. The general locations of these sites are presented on plate 15. Based on initial evaluations, the 19-acre site was eliminated due to its small size and limited slope. The 67-acre site was investigated for potential wetland creation through the construction of a weir or dam. After reviewing initial proposals, the City of Washington determined that they did not want to seek wetland creation at this time and instead would keep the site available for other future development. After screening the other two sites, study efforts focused on the 109-acre site.

It is assumed that with the upland project area limited to three potential sites upstream of Farmdale Dam, the opportunity to address sediment delivery to the Illinois River would be limited. However, the types of projects that were investigated were consistent with the goal of restoring and enhancing aquatic and riparian habitats. Further, the measures evaluated and ultimately the recommended plan illustrate the types of projects that can be implemented throughout the Peoria Lake tributaries to address sedimentation on a watershed scale. Further investigation is required to assess the feasibility of this approach to sediment reduction in the Peoria Lake tributary watersheds.

FORMULATION CRITERIA

Prior to developing specific alternatives, the study team developed the following formulation criteria:

- Ability to create aquatic habitat (maximize area with 1- to 2-foot depth for wetland benefits)
- Address sediment contribution/instability
- Proximity/relationship to any project in Peoria Lake
- No/limited impact on flooding along tributary
- Willing landowners/potential for partnerships

POTENTIAL PROJECT MEASURES FOR FARM CREEK

The following project measures were considered in detail as part of the study to achieve the project goals and objectives and to meet the stated formulation criteria:

- Wetland Impoundments: Consideration was given to constructing wetland detention ponds. The site is suitable for either 1 or 2 wetland ponds. The measures would be designed to maximize the water surface area with a depth of 18 inches. In addition, Pool 1 was designed to contain a 50-year rainfall within elevation 748 feet MSL.

- Wetland Plantings: In combination with watershed wetland impoundments, planting bankline and terrestrial vegetation would help to increase habitat values in the initial years. Planting of native species after project construction would decrease the time required and increase the likelihood for these or similar desirable species to establish through natural succession while reducing the number of undesirable invasive species. A variety of species for wetland plantings can be used, including sedges, prairie cord grass, black willow and button bush viburnum, dogwood, and bull rush.

- Prairie Plantings: This site is currently in row crop agriculture; converting some or all of the site to prairie would provide habitat value to many wetland and grassland species. The selected prairie seed mixture is a combination of grasses and forbs resembling a native Illinois ecotype.

DESCRIPTION OF ALTERNATIVES

The following measures met the goals and objectives of this project. These measures were combined to formulate various alternative plans composed of combinations of the potential project measures. As part of the formulation process, it was determined that no wetland or prairie plantings would be undertaken in the absence of some wetland restoration work. Figures 2-2 and 2-3 show the plan form view of both proposed wetland impoundments.

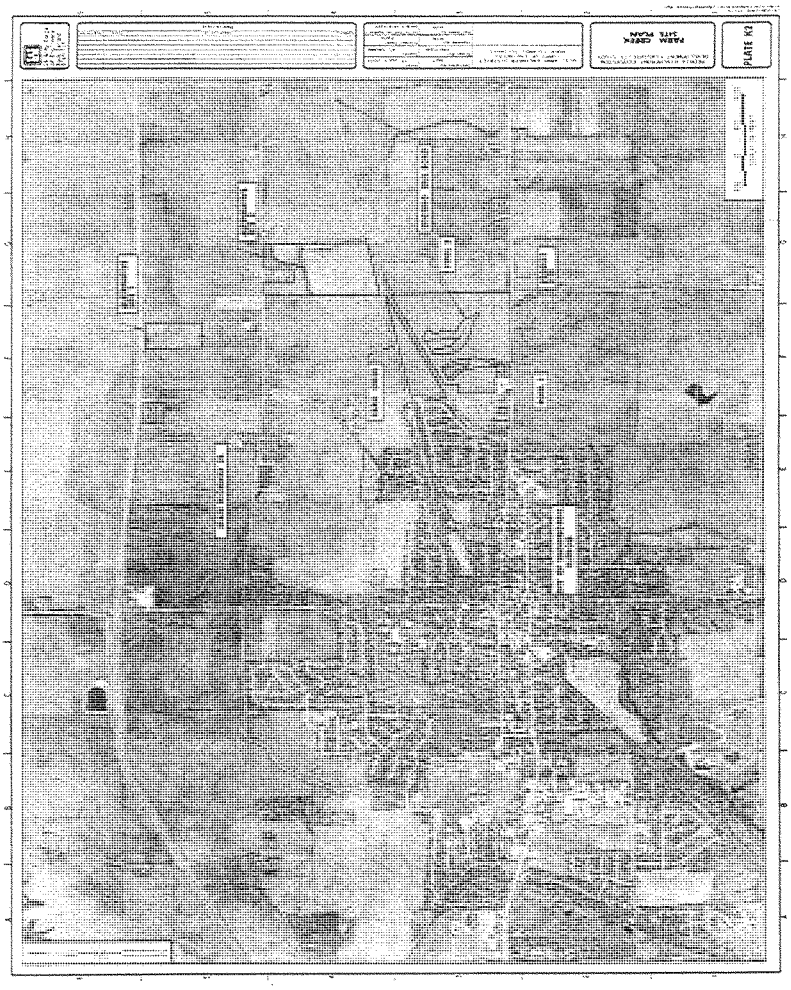

FIGURE 2-2. Farm Creek Site Plan

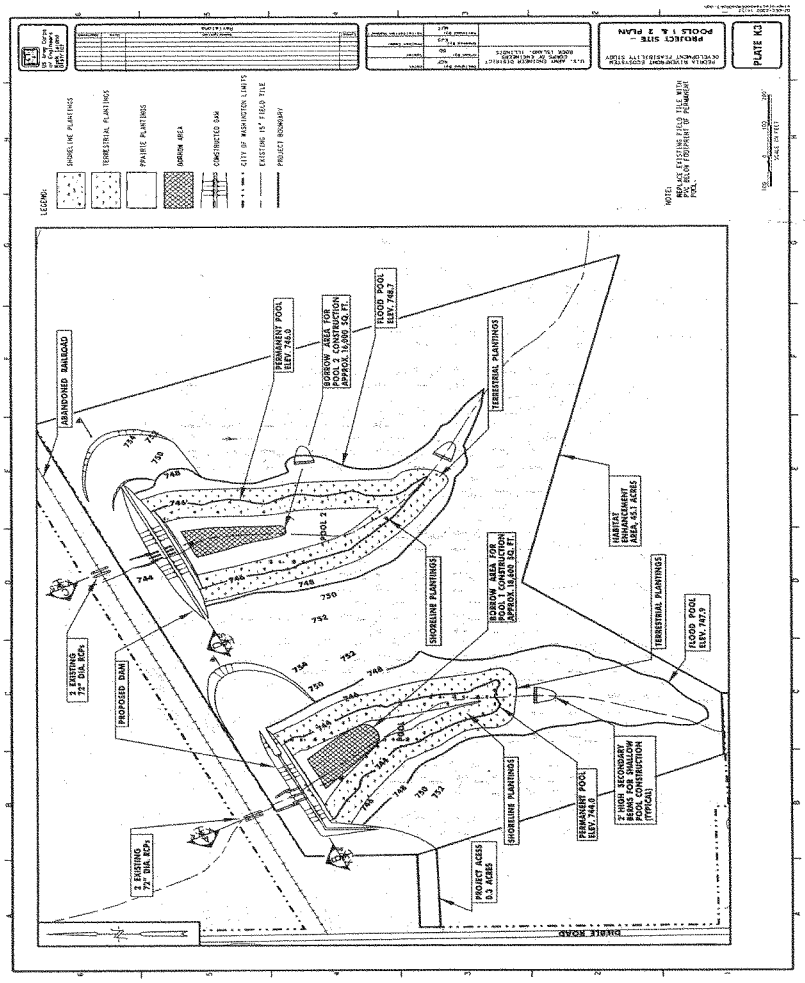

FIGURE 2-3. Project Site – Pools 1 and 2 Plan

1. No Action.

2. Wetland Impoundments:
    a. 4-Acre Wetland Impoundment – Construct earthen dam at elevation 751 feet MSL creating a wetland pond with a surface area of approximately 4 acres at elevation 746 feet MSL.
    b. 4-Acre and 3-Acre Wetland Impoundments – Construct earthen dam at elevation 751 feet MSL creating a wetland pond with a surface area of approximately 4 acres at elevation 746 feet MSL, construction of earthen dam at elevation 750 feet MSL creating a wetland pond with a surface area of approximately 3 acres at elevation 744 feet MSL.

3. Wetland Plantings:
    a. Planting 2 rows of vegetation within and around pond perimeter(s).
    b. Planting 6 rows of vegetation within and around pond perimeter(s).

4. Prairie Plantings:
    a. Prairie plantings on 20 acres adjacent to wetland perimeter.
    b. Prairie plantings on 35 acres.

During initial development of prairie planting alternatives, 35- and 100-acre measures were developed. These measures were subject to incremental and cost effectiveness analysis detailed below. However, after completion of the analysis, further consultation with the City of Washington indicated that they were no longer interested in prairie plantings on all 100 acres of the project site. Real estate analysis indicated that the 35-acre prairie measure combined with either of the wetland impoundments individually could result in greater real estate credits to the sponsor than construction costs. Therefore, a 20-acre prairie planting measure was inserted into the single wetland impoundment options. This is more appropriate in the physical and real estate costs scale of the single impoundment.

EVALUATE AND COMPARE PLANS FOR FARM CREEK

This section describes the alternatives and process needed to determine the potential cost, habitat benefits, incremental cost/cost effectiveness, significance, hydrologic/sustainability, and public acceptability. Due to uncertainties regarding the long-term sustainability of the projects in a naturally aggrading river reach, a 25-year project life was used for the analysis of habitat benefits.

INCREMENTAL COST/COST EFFECTIVENESS ANALYSIS PROCESS

The same process described for the Peoria Lake alternatives was utilized for the watershed component. Further information on the analysis can be found in Appendix G of this report.

For tributary wetland impoundments, the outputs, costs, and average cost per AAHU are presented in Table 2-4. The incremental analysis for tributary wetland impoundments evaluated Alternatives E0 to E6, F0 to F2, and various combinations.

HABITAT EVALUATION

A habitat analysis was conducted to evaluate potential benefits of habitat improvement features for the Farm Creek site portion of the Peoria Riverfront Development (Ecosystem Restoration) Study. Biologists from the Rock Island District of the U.S. Army Corps of Engineers (Corps) used a modified form of the Habitat Evaluation Procedure (HEP) program called EXHEP (EXpert Habitat Evaluation Procedures). For a more detailed explanation of the HEP evaluation process and its general application, refer to Appendix G-1 of this document.

The U.S. Army Engineer Research and Development Center, Environmental Laboratory (EL), developed the EXHEP software. It is a field evaluation procedure designed to estimate habitat quality and account for changes due to land management practices. The EXHEP program takes a rather specific approach and evaluates target species that are selected to be representative of habitat quality. This software integrates the formal scientific literature supporting the application of each HSI (Habitat Suitability Index) model, with the final reports generated by the EXHEP software. EXHEP also evaluated a broad range of target years for each species within a specified habitat type. By doing this, it is able to show habitat benefit gains and losses throughout the life of a project.

EXHEP is a species-driven evaluation process that involves mathematical associations between environmental cover types and the individual variables that compose each of those cover types. During the evaluation process, each variable of a cover type was calculated on a 0.1 to 1.0 index. This evaluation was done using suitability graphs created by the U.S. Fish and Wildlife Service (USFWS) for the Habitat Suitability Index Models Series. This series was researched and created by the USFWS to provide habitat information useful for impact assessment and habitat management. The variable suitability outcomes were then inserted into a Habitat Suitability Equation (also taken from the USFWS Habitat Suitability Series). The Habitat Suitability Equation is an evaluation that combines all Life Requisites of the specified wildlife and designates it a suitability index number. This final suitability number was then used to calculate final with- and without-project Average Annual Habitat Units (AAHUs). For a more detailed description of this habitat analysis, refer to Appendix G-2 of this report.

Several habitat types represented by species-driven HSI models were evaluated in this document. Although a particular species is used, each species represents required habitat for many other similar species that utilize the same habitat in similar ways. In essence, each species represents an array of habitat variables for the species being evaluated. These species represent key goals and objectives for the development of specific habitat types proposed by the project.

The use of this information is required to derive quantitative relationships between key environmental variables and habitat suitability within the immediate study area (i.e., within the Farm Creek Watershed). This provides the foundation for the HEP application of six species-based Habitat Suitability Index (HSI) models.

The marsh wren (*Cistothorus palustri*) is an abundant breeding bird species of freshwater and saltwater marshes and requires emergent vegetation with shallow standing water. The mink (*Mustela vison*) is a predatory, semi-aquatic mammal that is generally associated with streams, riverbanks, and freshwater marshes. The wood duck (*Aix sponsa*) is a waterfowl found around wetland areas with open water and nests in tree cavities or nest boxes. The chorus frog

(*Pseudacris triseriata*) prefers grassy areas from dry to marsh to agricultural; also suburbs where pollution and pesticides are not a problem; as well as woodlands and river wetlands. The eastern meadowlark (*Sturnella magna*) is an omnivorous ground feeding bird that nests in open fields. The field sparrow (*Spizella pusilla*) prefers old fields with scattered woody vegetation.

Certain assumptions were made regarding the project site. The proposed site is currently farmed field and therefore has a high likelihood of residual pesticides and herbicides. Some maintenance of the project area would be required. If the City had not purchased the land, it would continue to be farmed and habitat value would be maintained at its current level.

To assess change over the period of analysis, target years have been defined. At each target year, change in habitat variables may be noticed. Noticeable changes can be characterized by a change in habitat benefit output. Imbedded in each cover type evaluation, change has been added to the model. For project planning and impact analysis, project life was established at 30 years. To facilitate comparison, target years were established at 0 (existing conditions), 1 year after, 5 years after, 10 years after, and 30 years after project construction.

The quantitative component of the EXHEP analysis is the measure of the acres of habitat that are available for the selected species. From the qualitative and quantitative determinations, the standard unit of measure, the Habitat Unit (HU), was calculated using the formula (HSI x Acres = HUs). Changes in the quality and/or quantity of HUs occur as a habitat matures naturally or is influenced by development. These changes influence the cumulative HUs derived over the life of the project. HSIs and AAHUs for each evaluation species were calculated to reflect expected habitat conditions over the life of the project. Then, cumulative HUs were annualized and averaged. This determined what is known as Average Annual Habitat Units (AAHUs). AAHUs were used as an output measurement to compare all the features and project as a whole.

The options considered were one or two wetland ponds constructed with various wetland and prairie plantings schemes proposed and evaluated. The proposed selected alternative would create 2 ponds—one of 4 acres and another of 3 acres. The perimeter of each pond would be planted with 6 rows of vegetation—3 rows of aquatic vegetation and 3 rows of terrestrial vegetation. An additional 35 acres of the farm field would be planted with native prairie plants to develop a total project area of roughly 45 acres.

The project would provide wetland features that include open water, seasonally wet areas, emergent vegetation, scrub/shrub woody vegetation, and open meadow/prairie. The evaluation showed AAHU values for the selected species to be: Chorus Frog 1.4, Eastern Meadowlark 37.5, Field Sparrow 49.1, Marsh Wren 0.6, Mink 2.3, and Wood Duck 0.9. The overall outputs for the models selected show that the project area would provide a total of approximately 92 AAHUs.

For a more detailed description of the habitat analysis, refer to Appendix G-2 of this report.

COST ESTIMATES FOR HABITAT IMPROVEMENT MEASURES

In order to conduct the cost effectiveness and incremental cost analysis of the various alternatives, rough cost estimates were developed. These cost estimates were only done for the first cost of construction. It was originally thought that additional factors such as operation and maintenance and real estate costs would be very comparable for the various alternatives and, as a result, were not necessary to include for the evaluation in the initial analysis. This assumption was incorrect and resulted in a reanalysis that included real estate costs in the first construction cost portion of

the analysis. Table 2-4 summarizes the outputs and costs associated with each proposed alternative.

TABLE 2-4. Farm Creek Environmental Output and Costs of Each Measure

Potential Measure	Symbol	Output AAHUs*	Cost**	Annualized Cost***
Watershed Wetland Restoration	**E**			
No Action	E0	0	$0	$0
4-Acre Wetland Pond (no bankline or terrestrial plantings)	E1	1	$295,000	$23,900
4-Acre Wetland Pond (1 row each bankline and terrestrial plantings)	E2	3	$306,000	$24,800
4-Acre Wetland Pond (3 rows each bankline and terrestrial plantings)	E3	5	$328,000	$26,600
4-Acre and 3-Acre Wetland Ponds (no bankline or terrestrial plantings)	E4	2	$528,000	$42,800
4-Acre and 3-Acre Wetland Ponds (1 row each bankline and terrestrial plantings)	E5	6	$549,000	$44,500
4-Acre and 3-Acre Wetland Ponds (3 rows each bankline and terrestrial plantings)	E6	10	$623,000	$50,500
Prairie Plantings	**F**			
No Action Prairie	F0	0	$0	$0
20 Acres Prairie Plantings	F1	32	$29,000	$2,400
35 Acres Prairie Plantings	F2	56	$51,000	$4,100

* Outputs are calculated as Average Annual Habitat Units (AAHUs).
** Represents initial construction costs only.
*** Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.

SUMMARY OF ALTERNATIVE PLANS

In total, there are 13 possible alternative plans, developed from all the possible combinations of wetland and prairie planting alternatives. Originally, 19 alternative plans were analyzed. However, when the City of Washington reconsidered plans placing 100 acres into prairies, these alternative plans were eliminated from consideration. The number of alternatives was reduced by the fact that wetland and prairie plantings are not stand-alone features, but would only be accomplished as riparian improvements associated with a wetland impoundments option. The number was also constrained by the fact that on initial development it was realized that the 3-acre wetland pond was more costly and would produce fewer or comparable habitat benefits than the 4-acre wetland pond and as such only needed to be considered as an increment of restoration beyond the 4-acre wetland pond. Table 2-5 summarizes the outputs and costs associated with all combinations of the proposed alternatives.

TABLE 2-5. Farm Creek Alternative Evaluation

No.	Alternatives	Symbol	Output (AAHUs)*	First Cost Const. **	Annualized Cost ***	Annualized Cost/AAHUs
1	No Action	E0+F0				
2	4-Acre Wetland Pond + no prairie plantings	E1+F0	1	$295,000	$23,900	$23,900
3	4-Acre and 3-Acre Wetland Ponds + no prairie plantings	E4+F0	2	$528,000	$42,800	$21,400
4	4-Acre Wetland Pond (1 row each bankline and terrestrial plantings) + no prairie plantings	E2+F0	3	$306,000	$24,800	$8,265
5	4-Acre Wetland Pond (3 rows each bankline and terrestrial plantings) + no prairie plantings	E3+F0	5	$328,000	$26,600	$5,315
6	4-Acre and 3-Acre Wetland Ponds (1 row each bankline and terrestrial plantings) + no prairie plantings	E5+F0	6	$549,000	$44,500	$7,415
7	4-Acre and 3-Acre Wetland Ponds (3 rows each bankline and terrestrial plantings) + no prairie plantings	E6+F0	10	$623,000	$50,500	$5,050
8	4-Acre Wetland Pond + 20 acres prairie plantings	E1+F1	33	$324,000	$26,300	$795
9	4-Acre Wetland Pond (1 row each bankline and terrestrial plantings) + 20 acres prairie plantings	E2+F1	35	$335,000	$27,100	$775
10	4-Acre Wetland Pond (3 rows each bankline and terrestrial plantings) + 20 acres prairie plantings	E3+F1	37	$357,000	$28,900	$780
11	4-Acre and 3-Acre Wetland Ponds + 35 acres prairie plantings	E4+F2	58	$579,000	$46,900	$810
12	4-Acre and 3-Acre Wetland Ponds (1 row each bankline and terrestrial plantings) + 35 acres prairie plantings	E5+F2	62	$600,000	$48,600	$785
13	4-Acre and 3-Acre Wetland Ponds (3 rows each bankline and terrestrial plantings) + 35 acres prairie plantings	E6+F2	66	$674,000	54,600	$830

* Outputs are calculated as Average Annual Habitat Units (AAHUs).
** Represents initial construction costs and real estate costs.
*** Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.

RESULTS OF INCREMENTAL COST/COST EFFECTIVENESS ANALYSIS

The results of the incremental analyses shown in this section were considered with other factors, including site topography, management objectives of the resource agencies, critical needs of the region, and ecosystem needs of the Illinois River System.

Three plans were considered best buy plans—Alternatives 9, 12, and 13. In addition, Alternatives 7, 8, and 10 were considered to be cost effective. The best buy plans provide the greatest increase in benefits for the least increase in costs. In a general sense, this conveys the fact that for the aquatic areas, the 4-acre wetland pond creates habitat at a lower incremental cost than the 3-acre wetland pond. Increasing wetland plantings provides additional habitat benefits, but at a higher incremental cost. For the prairie planting areas, the larger the area planted the better, since the cost is relatively low compared to the increase in benefits. Incremental costs are detailed below in Table 2-6.

The study team, in coordination with the local sponsor(s), selected Alternative 13 as the Recommended Plan. First, it provides the greatest habitat benefits of the best buy plans. Second, it satisfies the local sponsor's desire to minimize impacts to flooding. Third, the additional increments of wetland plantings may further filter out sediments before they reach Farm Creek. Fourth, sediment delivery to an impaired stream will be reduced, thereby improving water quality. Fifth, the achievement of the above goals is consistent with the locally developed watershed plan and is supported by a variety of stakeholders outside the City of Washington and ILDNR. Sixth, and finally, the Recommended Plan is consistent with the goals and objectives of this study effort.

TABLE 2-6. Incremental Cost Analysis of Alternate Best Buy Plans for Farm Creek

No.	Alternatives	Symbol	Output AAHUs*	Annual Cost **	Avg. Annual Cost/AAHU	Inc. Cost **	Inc. Output*	Inc. $/ AAHU
1	No Action	F0	0	0.0	0	0	0	0
9	4-Acre Wetland Pond (1row each bankline and terrestrial plantings) + 20 acres prairie plantings	F8	35	$27,100	$775	$27,100	35	$775
12	4-Acre and 3-acre Wetland Ponds (1 rows each bankline and terrestrial plantings) + 35 acres prairie plantings	F11	62	$48,600	$785	$21,500	27	$796
13	4-Acre and 3-Acre Wetland Ponds (3 rows each bankline and terrestrial plantings) + 35 acres prairie plantings	F12	66	$54,600	$830	$6,000	4	$1,500

* Outputs are calculated as Average Annual Habitat Units (AAHUs).
** Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.

OTHER FACTORS

In addition to the incremental cost/cost effectiveness analysis results, the study team also considered additional factors in selecting an environmental plan. These factors include significance, hydrology and hydraulics, public acceptability, HTRW, recreation, flood reduction, and real estate, as summarized below.

Significance

Statewide, Illinois has lost approximately 99% of the original tall grass prairie and over 85% of pre-settlement wetlands (Noss, LaRoe and Scott 1995). Based on the National Wetlands Inventory, wetlands currently comprise only 880 acres or 2.2% of the land area within the Farm Creek Watershed (Tri-County Regional Planning Commission 2000). As a landcover type, grasslands currently comprise 12% of the watershed, but little, if any, would be characterized as prairie. Restoration of prairie and wetlands presents opportunities to restore significant habitat types that were formerly abundant in the state, but that have been greatly reduced.

Hydrology and Hydraulics

Each alternative consists of one or two dams designed using the NRCS program SITES with the NRH-386 criteria. Both dams are considered Class III small dams because they have a low probability of causing loss of life or causing minimal economic loss in excess of what would naturally occur down stream of the structures. Since the dams are upstream of a main line railroad track and the City of Washington, the auxiliary, or emergency, spillway was designed to safely pass one-half the probable maximum flow. Other design considerations were to contain the 24-hour, 50-year storm event on city property and keep the 24-hour, 100-year storm within 1 foot vertical on the adjoining private property. The rainfall volumes used for design were 6.2 inches for the 24-hour, 50-year event and 7.0 inches for the 24-hour, 100-year event. The permanent pool elevations were set at 744 feet MSL for Pool 1 and 746 feet MSL for Pool 2.

Public Acceptability

At the public workshops, 86% of those in attendance expressed support for tributary restoration. In general, these comments supported restoration to address erosion, reduce sediment delivery, increase wildlife habitat, restore wetlands, and increase biodiversity.

Recreation

The project site is located on the eastern edge of the City of Washington. The Comprehensive Plan Land Use Map for the city identifies this area to remain in conservation for the 25-year planning horizon. The abandoned rail corridor that splits the parcel runs through an older section of the city. Portions of the corridor are in public ownership and targeted for development as cycling and walking trails. These trails would connect the project site to the pedestrian transportation system in the city.

Hazardous, Toxic, and Radioactive Waste (HTRW)

A Phase 1 Environmental Site Assessment (ESA) was conducted for the proposed project location near the City of Washington. The review discovered a potential HTRW issue with an upgradient property currently operating as a concrete batching plant (formerly a salvage yard) adjacent to the southwestern corner of the proposed project site. Accordingly, a Phase IIA ESA was conducted to determine the type and extent of any contamination. The work included the advancement of twelve hand auger borings, installation of three temporary piezometers, collection of soil (2- and 4-foot depths) and groundwater samples, performance of in-situ hydraulic conductivity tests, and a comprehensive laboratory analysis of the collected samples. The results of the analysis when compared to the Illinois EPA Tier I remediation objectives found:

1) Three inorganics (barium, cadmium, and lead) at three locations exceeding the Soil Remediation Objective (SRO) for the groundwater ingestion pathway;
2) One PCB (1260) at one location exceeding the SRO for the soil and groundwater ingestion pathways;
3) One pesticide (dieldrin) at eight locations exceeding the SRO for the groundwater ingestion pathway with two of these locations also exceeding the residential soil ingestion pathway; and
4) Three inorganics (iron, lead, and manganese) exceeding the Groundwater Remediation Objective (GRO).

Except for the pesticide, all soil samples exceeding the Tier I SROs were those samples located immediately downgradient from the concrete batching plant. The pesticide was found throughout the site, as would be assumed for agricultural purposes, but only exceeded the Tier I SROs in the 2-foot samples. For additional information, refer to Appendix B.

Real Estate

The City of Washington currently owns the proposed project site and is a willing landowner.

SELECT RECOMMENDED PLAN

The interagency study team, together with the City of Washington, selected Alternative 13. This alternative includes a 4-acre wetland impoundment and a 3-acre wetland impoundment, with 6 rows of wetland plantings and 35 acres of prairie plantings. This alternative was selected in consideration of the cost effectiveness/incremental cost analysis, comments received during public reviews, and significance of the habitat. Appendix G contains additional information on the results of the habitat analysis. The alternative was selected as the locally preferred plan by the sponsor, the City of Washington.

This alternative best meets the study objectives. It maximizes the creation of wetland and riparian habitat in the project area, given the constraints over land availability for project features. This project is not anticipated to have a significant effect on sediment delivery to Peoria Lake due to its size relative to the watershed and location. However, it has the potential to reduce sediment delivery to Farm Creek, an impaired stream in terms of water quality. The implementation of

additional similar projects throughout the watershed could ultimately result in reductions in overall sediment delivery to Peoria Lake.

In cooperation with the USFWS and ILDNR, the Corps of Engineers has planned and designed a project that serves the needs of the resources and the resource managers, while being cost conscious. The preferred alternative has an overall output of 66 AAHUs for a total first cost of approximately $745,000. These costs are higher that those shown in the preceding tables, since once this option was selected the implementation costs were included. These costs include planning, engineering, and design; construction management; real estate; and monitoring in addition to the construction costs. Section 3 contains more detailed discussions of the project features and estimated costs.

Description of Selected Plan

FARM CREEK RESTORATION

PLAN COMPONENTS

General Description

The selected alternative using a design life of 25 years for the Farm Creek project near the City of Washington is described below:

The City of Washington would dedicate approximately 45 acres to the project. One 4-acre and one 3-acre wetland impoundments (dam construction) for habitat enhancement with 6 rows of wetland plantings would be constructed, in addition to prairie plantings on the remaining 35 acres designated to the project. The wetland impoundments have not been studied or designed for flood control or sediment retention.

Project Data Summary

Table 3-1 summarizes project data.

TABLE 3-1. Farm Creek Project Data Summary

Project Measure	Unit	Pool 1	Pool 2
Pond Construction			
Drainage Area	Acre	505	156.5
Dam Top Elevation	Feet	749.9	750.7
Maximum Pool Area	Acre	12.9	12.3
Maximum Pool Volume	Acre-Feet	48.1	43.0
Emergency Spillway Elevation	Feet	747.9	748.7
Permanent Pool Elevation	Feet	744	746
Permanent Pool Area	Acre	2.8	4.2
Permanent Pool Volume	Acre-Feet	2.8	5.6
Embankment Volume	Cubic Yards	2750	2365
Dam Top Width	Feet	6	6
Dam Length	Feet	600	550
Dam Height	Feet	6.9	6.6
Dam Seeding Area	Acre	0.6	0.5
Spillway Seeding Area	Acre	0.4	0.35
Wood Duck Boxes	Each	6	9
Erosion Stone	Ton	300	400
Water Control Structure			
Culvert Upstream Elevation	Feet	744	746
Culvert Downstream Elevation	Feet	741	742
Culvert Dimensions	Inch	60 x 24	30
Number of Culverts	Each	3	3
Culvert Length (Each)	Feet	94	86
Site Plantings			
Bankline Plantings (per row)	Feet	1466	1721
Terrestrial Plantings (per row)	Feet	1466	1721
Prairie Plantings	Acre	17.5	17.5

Pond Construction

The principal structures are compacted impervious dams meeting the Corps criteria for low hazard and the ILDNR criteria for small dams (Class III) that were designed for habitat enhancement based on a 50-year rainfall. The dam top widths would be 6 feet for Pool 1 and Pool 2 with lengths of approximately 600 and 550 feet, respectively. The centerline of the dam tops would be offset from the toe of the abandoned railroad embankment. The dam side slopes would be shaped to 3:1 horizontal on vertical. Vegetation would be planted on the dam top and side slopes. To provide for greater than a 50-year rainfall, an emergency spillway would be constructed at both pools out of compacted impervious material and will pass one half the probable maximum flood. The top elevations of the spillways are approximately 2 feet below the top of the dams, with minimum widths of 300 and 150 feet for Pools 1 and 2, respectively. The emergency spillways would be located at the east ends of the dams. For further information, refer to plates 16, 17, and 18.

Water Control Structure

Water control structures are proposed for both pools as shown on plates 16, 17, and 18. The structures for Pool 1 would consist of three 60-inch by 24-inch reinforced concrete box culverts, while the structures for Pool 2 would consist of three 30-inch-diameter corrugated metal pipes. The water control structures would be placed to maintain a permanent pool elevation of 744 feet MSL for Pool 1 and 746 feet MSL for Pool 2. A trash guard would be installed on the upstream end to prevent large debris from entering and constricting the structures with a rodent guard on the downstream end. The larger drainage area associated with Pool 1 in combination with the limited land available for storage necessitated the larger structure.

Site Plantings

Wetland and prairie plantings are proposed for the project site. The areas to be planted are presented on plate 16.

Wetland Plantings

Six rows of wetland plantings would be planted within the water and around the pond perimeter to introduce a component of aquatic vegetation to the project area.

Bankline Plantings: Three rows of bankline plantings would be planted. The first two rows of plugs would be on 15-foot spacings within the water and distributed to allow for a natural appearance. The final row would be a seed mixture placed around the perimeter of the ponds above the water's edge in a 7.5-foot band. Note the Prairie Cord Grass native to site is not an in-water plant.

- 6 to 18 Inches Water Depth: Plugs
    1. Slough Sedge
    2. Hummock Sedge
    3. Soft Stem Bull Rush
    4. Hard Stem Bull Rush

- Up to 6 Inches Water Depth: Plugs
    1. Sweet Flag Calamus
    2. Arrowhead
    3. Water Plantain

- Above Water to Edge: Seed
    1. Rice Cutgrass (15%)
    2. Switch Grass (no cultivars) (10%)
    3. Fowl Manna (15%)
    4. Prairie Cord Grass (30%)
    5. Blue Joint (30%)

Terrestrial Plantings: Three rows of terrestrial plantings would be planted around the pond perimeter to introduce a component of woody vegetation to the project area. The selected species would be planted on a 15-foot spacing except for the trees, and

distributed to allow for a natural appearance. The planted trees would maintain this natural appearance throughout the establishment process, as only the vegetation directly surrounding the seedling would be controlled. The selected species would be alternated at each pond to avoid a solid line of any individual species.

Trees: 30 trees per acre of pond. The male black willow plantings will be done using cuttings from a male black willow tree. Cuttings will be planted at the upper reach of the pond near the amphibian ponds in a cluster. Remaining trees will be planted from bare root stock and planted in clusters grouped according to species. Plantings will be at least 2 feet above conservation pool and no closer than 15 feet from the water's edge as coordinated with the ILDNR forester. Approved tree species are:

- Swamp White Oak
- Burr Oak
- Walnut
- Shagbark Hickory
- Shellbark Hickory
- Pin Oak (Southern): Use seeds
- Hawthorns
- Wild Plum: Use seeds
- Sycamore

Shrubs: At least half of the shrub plants per pool will be button bush. Plantings will be no farther than 15 feet from the water's edge.

- Button Bush: Plant at water's edge
- Remaining shrubs can be selected from the following list:

    1. Indigo Bush: 15 feet from water's edge
    2. High Bush Cranberry
    3. Arrowwood
    4. Virburnum Species
    5. An approved Cornus Species
    6. Wild Plum: Plant in clumps

Prairie Plantings

Approximately 35 acres of prairie plantings would be planted to provide a natural landscape to the project area. A combination of grasses and forbs resembling a Native Illinois Ecotype would be planted. This mixture would be applied at a rate of 6 pounds per acre with 5 pounds of grasses to 1 pound of forbs, with no more than 20% of any one species. Typical grasses include big bluestem, Indian grass, switchgrass, and little bluestem.

Revetment and Erosion Stone

Erosion stone would be placed around the upstream and downstream ends of the water control structure. The erosion stone would be sized to sufficiently resist water velocity attack. Erosion protection for wave action is not necessary due to the small size of the ponds.

DESIGN AND CONSTRUCTION CONSIDERATIONS

Existing Site Elevations

Both ponds are located to the east of Washington, Illinois. The project site is currently an agricultural field with an abandoned railroad embankement running along the northern border or downstream end. The land surface elevation ranges from 742 feet MSL near the abandoned railroad embankment to 764 feet MSL near the southern border or upstream end. Water leaving the ponds would pass through the four 6-foot diameter corrugated metal pipes (2 below each pond) in the abandoned railroad embankement and flow across a small agricultural field to a reinforced concrete box culvert. Currently during periods of high flow, water is contained just upstream of this box culvert due to an adjacent road embankement and active railroad embankement. This area would later serve as a buffer for the proposed project during large flood events.

Dam construction could be accomplished using traditional earth-moving equipment, ideally before or after spring rainfalls. Mobilization of construction equipment would likely be accomplished by truck. Project access would be just south of the abandoned railroad embankment along the west property line. For the access areas, improvements would be necessary at project completion.

Pond Construction

Borrow material for earthwork operations would be excavated just upstream of the proposed embankment areas as illustrated on plate 16. Soil investigations have determined that the borrow material consists of stiff brown lean clay in the upper 5 feet, underlain by stiff black medium clay from a depth of approximately 5 feet to 10 feet. This material is favorable for construction of the embankment areas. The limit for excavation is to not exceed a depth of 4 feet below the ground surface. For Pool 1, an area approximately 185 feet by 100 feet would be needed to provide nearly 2,750 cubic yards for construction of the dam. For Pool 2, an area slightly smaller than the size of that for Pool 1 would be needed to provide roughly 2,365 cubic yards for construction of the dam. These excavated areas would later serve as a control for the accumulation of sediment. Small, shallow depressions or "frog ponds" would also be constructed prior to the impounded wetlands for control of sedimentation. The deposited material at either of these areas would not be removed and is not anticipated to affect project features.

Construction Materials

Only common construction materials are required for this project. Revetment/erosion stone, granular surfacing, reinforced concrete box culverts, and corrugated metal pipe are available locally and can be trucked to the project site. Construction areas are easily accessible. Therefore, construction materials can be transported by conventional equipment.

Site Plantings

Wetland Plantings

The ideal spring planting date for bankline plantings includes a 2-month period between April 15th and June 15th to obtain as much growth as possible prior to winter and reduce winter mortality. It also would be possible to plant in the fall, ideally between August 15th and September 15th, but definitely not after 2 weeks prior to the early frost date. In-water plants, or bankline plantings, will be separated into three categories. Plugs will be planted in water depths up to 18 inches. In depths ranging from 6-18 inches, the following species shall be considered: slough sedge, hummock sedge, hard stem bull rush, and soft stem bull rush. In depths ranging from 0-6 inches, the following species shall be considered: sweet flag calamus, water plantain, and arrowhead. A 7.5-foot band around the perimeter, above the water's edge shall be seeded using the following mix: 15% rice cutgrass, 15% fowl manna, 30% blue joint, 10% switch grass, and 30% prairie cord grass.

The survival of terrestrial plantings is affected by many factors, including weather, competing vegetation, and animal protection. In addition, the survival of newly planted trees is positively correlated with the size and health of the seedling that is planted. The species selected (black willow and button bush) are hardy, and it is anticipated that bare root stock could be used. However, if other species are selected or a higher rate of survivability is desired, planted trees should be at least 1/2-inch caliper and 4 feet in height. The contractor would have the option of planting container-grown or balled and burlapped trees. Container-grown trees would have a minimum container size of 5 gallons. Trees would be provided from within 300 miles of the project area. Trees would be planted either in the spring between March 1st and April 30th, or in the fall after the tree becomes dormant until December 1st. For both sites, the planting areas would be prepared by disking a minimum of two times (disked and cross disked) to a minimum depth of 4 inches.

Past failures for newly planted trees can be attributed to an over-abundance of competing vegetation. Abandoned crop fields and other disturbed sites often become dominated by annual weed species such as giant ragweed and cucumber vine, which can kill young seedlings by quickly overtopping and shading the planted trees within a short period of time. To help alleviate this problem, all planting areas would be sprayed with a pre-emergent herbicide to a 6-foot-wide band around each tree immediately after placement. Additionally, a cover crop of red top grass and annual grains would be temporarily established at the planting areas to help control unwanted species. Repeated herbicide applications would be used, if necessary, to control any competing vegetation which threatens the survival of the planted trees. Follow-up spraying would be performed during the following growing season if the planted trees were threatened by competing vegetation. Following a 3-year establishment period, the surrounding ground in all planting areas may be allowed to assume a natural growth, if desired.

Planted trees are also vulnerable to damage by wildlife. Domestic animals, deer, mice, rabbits, squirrels, and beaver can destroy young seedlings. Protective measures include deer repellant and fencing. Despite good planting techniques, animal protection, and control of competing vegetation, some tree mortality within the first

year after placement is inevitable. Unavoidable mortality due to natural causes would not be expected to exceed 10%.

Prairie Plantings

The scheduled planting date should allow for shallow disking of the planting area to eliminate weeds once the soil warms up in the spring. The ideal spring planting date includes a 2-month period from April 15th and June 15th to reduce the risk of encountering hot, dry weather, which would reduce seed germination and seedling survival. It also would be possible to plant in the fall, thus allowing the seeds to stratify naturally in the soil. If a fall planting date is desired, placement should be late enough so that the seeds germinate the following spring. The freezing temperatures of winter could kill the young seedlings if planted too early.

When planting is incorporated into an existing agricultural field, the soil must be free from herbicide carry-over that may be harmful to germinating prairie plants, especially the forbs. If the field has high, standing corn stubble, the stalks should be shredded so they will not interfere with the planting devices of the prairie seed drill. Typically, soybean stubble does not present a problem.

Once the corn stubble is removed, the next consideration is weed control. The vegetation should be allowed to grow to a height of about 6 inches and then sprayed with a non-selective herbicide, such as Roundup. A 2% solution should be sufficient to kill most herbaceous plants, including agricultural weeds. If weeds continue to be a problem after planting, they can be mowed at a height of 6 to 8 inches to reduce the competition with the developing prairie plants. If only parts of the field have concentrations of weeds, these areas should be mowed and the rest of the field left undisturbed.

The seed of prairie plants may be planted by a variety of methods, including specially made drills, rotary spreaders, or hydraulic mulchers. Even dispersal of the seed over the area is important. Any large-scale planting which does not drill the seed in to the ground would require the use of a harrow and roller to firmly place the seed. If the conditions are suitable, the seed should germinate within 2 or 3 weeks.

If a drill or rotary spreader is used to plant the prairie seed, the seed must be dry and the planting area must be relatively free of vegetation greater than 3 inches in length. If the seed is wet or full of debris, the spreader or drill will not operate properly. Drying and cleaning can be accomplished by placing the seed on a concrete floor and spreading out the seed to about a 2-inch-thick layer. The seed should be turned with a rake frequently to aid the drying process. Stems, sticks, and other debris can be removed at this time. If conditions are satisfactory, the seed should be dry within 1 or 2 days or less, depending on quantity and drying conditions.

Construction Sequence

Table 3-2 summarizes the probable construction sequence. However, this sequence is only a suggestion and would not be contractually required. It is anticipated that construction would be completed with 240 days of effort.

TABLE 3-2. Probable Construction Sequence			
Sequence Number	**Construction Work Item**	**Instructions**	**Purpose**
1.	Site Preparation - Clearing/Disking	Accomplish first	Prepare agricultural field for site plantings
2.	Water Control Structures	Accomplish after site preparation is complete to allow drainage of project	Allow for correct placement of structures
3.	Pond Construction	Accomplish after water control structures are complete and when soil is not frozen	Attain greater than 95% compaction
4.	Erosion Stone	Accomplish after pond construction is complete and water control structures are installed	Provide protection for embankment and water control structures
5.	Site Plantings	Plant between March 1 and June 15 or August 15 and December 1 depending on planting type	Increase survival

Permits

A public notice is required by Section 404 of the Clean Water Act and Section 401 water quality certification will be obtained from the State of Illinois prior to project construction. Land disturbances, on greater than 5 acres, associated with this project require a National Pollutant Discharge Elimination System (NPDES) permit, or Section 402, for stormwater discharges.

Historic Properties

Under Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, the Rock Island District has made a determination of ***No Historic Properties Affected***, as defined in 36 CFR Part 800.3(a)(1) for the tributary watershed restoration project. Therefore, the undertaking is in compliance with the NHPA and can proceed as proposed. Although the District documents no historic properties affected by the restoration Peoria Lake dredging/island creation and Farm Creek impoundments, if any undocumented historic properties are identified or encountered during the dredging or construction effort, the District will discontinue all activities and resume coordination with the Illinois Historic Preservation Agency to identify the significance of the historic property and determine potential effects under Section 106 of the NHPA of 1966 and 36 CFR Part 800.

HTRW

As a result of the Phase IIA ESA, the Sponsor and the City of Washington, together with the Corps, decided to remove the tributary watershed restoration portion from this study as a

recommended plan to a separate appendix. Once the City has a clean site, as determined by the ILEPA, the project may be pursued again potentially under one of the CAP authorities.

OPERATION, MAINTENANCE, AND REHABILITATION CONSIDERATIONS

This section presents operation and maintenance instructions for the major project features. The Site Manager will take action to correct adverse conditions. To ensure feature serviceability, the Site Manager will schedule regular maintenance repair measures for accomplishment during the appropriate season. Appropriate advance measures shall be taken to ensure the availability of adequate labor and materials to meet contingencies.

Operation

This project has no general operational requirements. Specific operational requirements would be performed as determined by the Site Manager.

Maintenance

The proposed measures have been designed to ensure low annual maintenance requirements. The estimated annual maintenance costs are presented in Table 3-7. These quantities and costs may be revised during final design.

Dam Embankment

The Site Manager should provide at all times such maintenance as may be required to ensure serviceability of the dam in times of high flows. Appropriate measures should be taken to promote the growth of sod and control burrowing animals. This includes routine mowing or burning at least twice per year on the embankment and extending at least 10 feet horizontally from the toe, removal of wild growth, and repair of damage caused by erosion or other forces. Since the spillways are unlined, it will be important to maintain an established bed of sod that is mowed on a regular basis.

Water Control Structure

The water control structure should be inspected on a regular basis to determine whether seepage is occurring along the pipe through the embankment. The inlet and outlet of the water control structure should be examined for debris accumulation. In either instance, steps will be taken to correct any adverse condition and other deficiencies.

Site Plantings

Wetland Plantings. The bankline plantings would be monitored for signs of disease or other stress. Some of these symptoms may occur naturally as the plants age, especially after the seeds have matured. Large insects causing damage to the bankline plantings would be removed. For serious insect infestation, a chemical agent may be applied after obtaining guidance on the proper chemical and application rate.

Dead wetland plants would be replaced as necessary to fill voids. Unwanted vegetation adjacent to the bankline plantings would be removed. Otherwise, this vegetation would shade and crowd the desirable wetland plants. Controlling the growth of trees or high shrubs would prevent excessive shading of the bankline plantings. Most wetland plants need at least 6 hours of sunshine each day. If desired, mature wetland vegetation may be trimmed after the plants have browned in the fall for visual aesthetics. However, only approximately two-thirds of the height of the plants would be cut.

Vegetation between the terrestrial plantings would be controlled for a minimum of two growing seasons by either mowing or herbicide application. Vegetation between the planted trees would not be allowed to exceed a height of 1 foot during this maintenance period.

Prairie Plantings. If dense weeds develop, the area would be mowed to a height of 8 to 12 inches with a rotary mower when the weeds reach a height of 2 to 3 feet. It is important to use a rotary mower because of its shredding action. The vegetation cut by sickle mowers could smother the seedlings of the prairie plants. Only those parts of the planting that have a weed problem would be mowed. The use of a selective herbicide for broadleaf plants can be applied when there are scattered, dense stands of particularly troublesome weeds. Care should be taken to avoid spraying desirable prairie plants.

Prescribed burning helps to eliminate the alien, cool season grasses and weeds. Therefore, a prescribed burn should be planned for February, March, or April of the year following the planting of the prairie seed. Burning in the spring allows the vegetation to remain throughout the winter, providing excellent cover for wildlife during this critical period. In the case of bluegrass and sweet clover, burns in early April are more beneficial than burns conducted in February and early March. Burns conducted at the time of buds open may also prove to be helpful in reducing invasion by rough-leaved dogwood or other shrubs.

PROJECT PERFORMANCE ASSESSMENT

This section summarizes the monitoring and data collection of the project. The primary project objectives were summarized elsewhere in this document. The performance assessment is intended to gauge progress towards meeting these objectives. In particular, the project will be evaluated for physical changes (sedimentation, pond perimeter, depth, etc.) and vegetation.

Tables 3-3 and 3-4 present an overall description of the project phases, the activities that are to take place during certain phases, agency responsibilities, and monitoring data collection summaries.

TABLE 3-3. Resource Monitoring and Data Collection Summary [1]						
Type Measurement	**Pre-Project Phase**	**Design Phase**	**Const Phase**	**Post-Const Phase**	**Sampling Agency**	**Remarks**
POINT MEASUREMENTS						
Borings					USACE	
Geotechnical [2]	1					
TRANSECT MEASUREMENTS						
Soundings					USACE	
Sedimentation [3]			1	5Y		
AREA MEASUREMENTS						
Survey						
Pond Perimeter [4]			1	5Y	USACE	
Wetland Vegetation [5]				5Y	ILDNR	
Wildlife Vegetation [6]			1	5Y	USACE	
Site [7]	1				USACE	

Legend
Y = Yearly
nY = n-Year interval
1,2,3, --- = number of times data are collected within designated project phase

[1] Monitoring and Data Collection Summary

[2] Geotechnical Borings (Pre-Project Phase)

Boring Number	Date
PL-01-7	05-31-01
PL-01-8	05-31-01
PL-01-9	05-31-01
PL-01-10	05-31-01

[3] Sedimentation Soundings (Construction and Post-Construction Phases) – Cross-sectional survey of pond depth, one section per pool running perpendicular from the dam along the natural swale.

[4] Pond Perimeter Survey (Construction and Post-Construction Phases) – Areal survey of pond perimeter at project completion to reflect as-built conditions and thereafter to monitor performance.

[5] Wetland Vegetation Survey (Post-Construction Phase) – Informal survey of wetland vegetation around pond perimeter to estimate acreage and identify plants.

[6] Wildlife Vegetation Survey (Construction and Post-Construction Phases) – Areal survey of prairie plantings at project completion to reflect as-built conditions and thereafter to monitor performance.

[7] Site Survey (Pre-Project Phase) – Conducted spring of 2001 to locate project boundaries, field tiles, railroad embankment, and culverts; determine existing elevations at proposed dam embankment centerlines; and profile creek/tributaries.

TABLE 3-4. Post-Construction Evaluation Plan

Goal	Objective	Enhancement Feature	Unit	Year 0 Without Project	Year 0 With Project	Year X With Project	Year 25 Target With Project	Feature Measurement	Annual Field Observations by Sponsor
Enhance Wetland Habitat	Provide food, shelter, and breeding habitat for wildlife	Pond creation	Acre					Perimeter survey	Describe any embankment erosion/seepage
		Pool 1		0	3	--	3		
		Pool 2		0	4	--	4		
		Pond creation	Feet [1]					Sedimentation transects	Describe any debris or sedimentation
		Pool 1		0	2	--	1.5		
		Pool 2		0	2	--	1.5		
	Increase overall vegetation diversity and availability	Wetland plantings	Acre					Vegetation survey	Estimate area of established wetland vegetation
		Pool 1		0	1	--	1		
		Pool 2		0	1.2	--	1.2		
		Prairie plantings	Acre	0	35	--	35	Site survey	Estimate effective acreage and wildlife use

[1] Average water depth along transect

PROJECT COST ESTIMATE

Detailed cost estimates of project design and construction costs are presented in Tables 3-5 and 3-6. MCASES construction estimates are found in Appendix F. A detailed estimate of annual operation, maintenance, and rehabilitation costs is presented in Table 3-7. Table 3-8 contains the estimated monitoring costs as described in Appendix I. Quantities may vary during final design.

TABLE 3-5. Estimated Project Costs
(October 2001 Price Levels)

Account	Description	Cost Estimate
01	Lands and Damages	$220,000
02	Relocations	$ 0
06	Fish and Wildlife Facilities	$377,000
30	Planning, Engineering and Design	$ 75,000
30	Engineering During Construction	$ 10,000
31	Construction Management	$ 38,000
	Post-Construction Monitoring	$ 25,000
	TOTAL PROJECT COSTS	**$745,000**
	Federal Costs (65%)	$484,000
	State Cost (35%)	$261,000

TABLE 3-6. Estimated Construction Costs
(October 2001 Price Levels)

Item	Quantity	Unit	Unit Price	Amount
Stripping	1.0	AC	$53,199.04	$53,199.04
Cutoff Trench	2,000	CY	$2.70	$5,400.00
Dam Embankment	6,000	CY	$3.31	$19,860.00
Outlet Pipe, 36" CMP	250	LF	$59.66	$14,915.00
Outlet Hood, 36"	3	EA	$450.93	$1,352.79
Box Culvert, 24" X 60" RCP	300	LF	$242.14	$72,642.00
Storm Pipe, 15" PVC	1,500	LF	$13.79	$27,580.00
Seeding (dam)	0.9	AC	$1,246.78	$1,122.00
Seeding (spillway)	0.6	AC	$1,246.78	$748.07
Wetland Plantings (6 rows total)				
Bankline Plantings (3 rows)	9,600	LF	$1.91	$18,336.00
Terrestrial Plantings (3 rows)	9,600	LF	$2.64	$25,344.00
Prairie Plantings	35	AC	$1,040.42	$36,414.70
Wood Duck Box	15	EA	$110.76	$1,661.40
Erosion Protection Stone	775	TN	$29.38	$22,769.50
Subtotal Construction				*$302,000.00*
Contingencies				$75,000.00
Engineering During Construction				$10,000.00
Supervision and Administration				$38,000.00
TOTAL CONSTRUCTION COSTS				**$425,000.00**

TABLE 3-7. Estimated Annual Operation and Maintenance Costs (October 2001 Price Levels)

Item	Quantity	Unit	Unit Price	Amount
Operation				--
Maintenance				
Dam Inspection	8	HR	$ 40.00	$ 320
Erosion Protection Stone	10	TN	$ 30.00	$ 300
Biannual Mowing	16	HR	$ 40.00	$ 640
Herbicide/Pesticide Application	16	HR	$ 40.00	$ 640
Controlled Burning	8	HR	$ 40.00	$ 320
Debris Removal	40	HR	$ 40.00	$1,600
Rehabilitation [1]				--
TOTAL ANNUAL O&M COSTS				**$3,820**

[1] Rehabilitation cannot be accurately estimated. Rehabilitation is reconstructive work that significantly exceeds the annual operation and maintenance requirements identified above and which is needed as a result of major storms or flood events.

TABLE 3-8. Estimated Post-Construction Monitoring Costs Every 5 Years (October 2001 Price Levels)

Item	Amount
Engineering Data [1]	$760
Natural Resources Data [1]	$240
Planning, Engineering, Design [2]	$4,000
TOTAL MONITORING COSTS	**$5,000**

[1] Reference Appendix I, Tables I-2 and I-3.
[2] Includes cost of performance evaluation report.

PLAN ACCOMPLISHMENTS

The proposed project consists of multiple pond construction, water control structures, and site plantings, including wetland and prairie. This project would enhance wetland habitat by providing food, shelter, and breeding habitat for wildlife, in addition to increasing overall vegetation diversity and availability.

The constructed ponds would provide open water areas for wildlife feeding, nesting, and rearing habitat. These ponds would also support a thriving population of invertebrates, which, in turn, would provide a food source for a variety of other species. Site plantings would provide food resources for multiple resident species and increase overall habitat diversity. Additional benefits of the ponds may be a significant reduction in peak flood flows from this portion of the watershed. This will have a positive effect in terms of flood damage reduction farther downstream in the City of Washington.

The proposed enhancement features will reduce the impacts of sedimentation in the upper portion of the watershed on water quality. The features will also provide a desirable mix of open water, emergent vegetation, and littoral zone conditions, as well as increase habitat diversity by planting a variety of vegetation. Implementation of the proposed enhancement measures is projected to result in a gain of 66 AAHUs.

Environmental Impacts/Effects

WATERSHED RESTORATION

ENVIRONMENTAL IMPACTS OF THE NO ACTION PLAN

The land at the proposed Farm Creek site is owned by the City of Washington, and if there is no Federal project, the potential for environmental enhancement would be greatly reduced or may not occur at all. There is a probability of continued row crop production in the farm fields.

ENVIRONMENTAL IMPACTS OF THE SELECTED PLAN

Natural Resources

Construction of the detention dams would result in the formation of wetland impoundments of varying size at the proposed site. These impoundments would contain 4-acre and 3-acre ponds, with 6 rows of wetland plantings and 35 acres of prairie plantings.

Planting wetland species plants around and within the pond perimeter would help to quick start vegetative growth around the pools. Planting the farm fields with native prairie plants would help to create a riparian buffer with additional diverse habitat that has been missing from the area for many years. The creation of suitable flora habitat would promote colonization of the site by a variety of faunal species and provide greater diversity and species richness to the entire area.

Endangered Species

There are currently no known state or federally listed threatened or endangered species at the site. Therefore, it is our biological assessment that construction of the detention dams and wetlands would not adversely impact any state or federally listed threatened or endangered species, nor would it adversely impact any critical habitat for any of the listed species. If, after review of this document, the USFWS concurs with this assessment, they

will respond by letter stating so and the requirements of the Endangered Species Act will have been met. It is our opinion that conditions could develop which would benefit endangered species and open the way for them to colonize the project area.

Water Quality

Adequate erosion control measures would be utilized during and after project construction so there should be no adverse impacts to Farm Creek. While there are no wetlands located on the proposed project site, it is located in a water course of the US and will require a Section 404(b)(1) and Section 401 water quality certification will be obtained from the State of Illinois prior to project construction.

Air Quality

Limited air pollution effects would be produced from machinery exhaust during construction of the wetland impoundments. The project area is basically outside the city limits. The site is located within 400 feet of a residential area on the eastern boundary of the City of Washington. Impacts from exhaust are anticipated to be negligible and temporary.

Historic Properties

The Illinois Historic Preservation Agency (IHPA) concurred by letter dated December 4, 2001 (IHPA Log #0011090020k-P, Appendix A-1) with the District's proposed Phase I intensive archaeological survey on the tributary watershed restoration project. No comments were received by consulting with societies, agencies, Native American Tribes, and other interested parties; therefore, there were no considerations promulgated under 36 CFR Part 800.5(c)(3) and 800.5(f)(3) of the National Historic Preservation Act (NHPA). The Phase I archaeological survey for the Farm Creek restoration locations is documented in the final Archaeological Short Survey Report (ASSR), dated August 29, 2001 (McNerney and Anderson 2001).

The ASSR documents the discovery of historic property 11-T-410, located in Section 18, Township 26 North, and Range 2 West, within the tributary watershed restoration. Site 11-T-410 is potentially eligible to the National Register of Historic Places because of the presence of 19th century artifacts. The District and the ILDNR propose avoidance of Site 11-T-410 by changing the project boundaries of the Farm Creek Watershed restoration. Site 11-T-410 is no longer included within the area of potential effect for a determination ***No Historic Properties Affected*** as required by 36 CFR Part 800.3(a)(1) of the NHPA. The IHPA concurred with the findings of the draft report and the District's determination by letter dated October 30, 2001 (IHPA Log #0011090020k-P, Appendix A-1).

Two copies of the final ASSRs have been provided for the permanent files of the IHPA as evidence of Corps project compliance with the NHPA and its implementing regulations. Since archaeological site location is privileged information, written permission must be granted to any consulting party by the IHPA and provided to the Corps and the ILDNR as evidence of approval for receipt of copies of the Project ASSR.

Created Resources

The created resources of the area is the farm field, which would have two dams constructed to form impoundments and be planted to wetland species and native prairie vegetation. The monoculture of row crop would be changed to a more diverse ecosystem of native plantings and managed for increased habitat value. A reduction or total elimination of chemical applications used to maintain high production of crops would occur as more environmentally friendly management practices are utilized to promote the growth of the wetland and native prairie vegetation.

Farm Creek itself may also be considered to be a created resource because of the modifications brought about by farming activities in the area that have directly and indirectly affected its shape, hydrology, and flow.

Farm Displacement

No farm or farmsteads would be affected by the watershed restoration measures.

Noise Levels

The project area is basically outside the city limits. The site is located within 400 feet of a residential area on the eastern boundary of the City of Washington. Heavy construction equipment would generate a temporary increase in noise levels during project construction, which could be disturbing to nearby residents. No long-term noise impacts would result following project construction.

Property Values and Tax Revenues

It is expected that the proposed watershed restoration project would have an insignificant effect on property values and tax revenues.

Public Facilities and Resources

Public facilities and services would not be impacted by the Farm Creek alternatives.

Life, Health, and Safety

Overall, no significant impacts to life, health, or safety would result from the restoration efforts on Farm Creek.

Employment and Labor Force

Construction of the proposed project would temporarily increase short-term employment in the project area. There would be no permanent impacts to employment or labor force in Tazewell County.

Business and Industrial Development

Changes in business and industrial activity would be minimal. No business relocations would be required.

ENVIRONMENTAL IMPACTS OF NONPREFERRED ALTERNATIVES

The land at the proposed sites is owned by the City of Washington, and if there were no Federal involvement, the potential for environmental enhancement would be greatly reduced or may not occur at all. There is a high probability of continued row crop production in the farm fields, at least for the interim.

ANY IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD OCCUR IF THE PROPOSED ACTION WERE IMPLEMENTED

Fuel consumed, manpower expended, and the commitment of construction materials are considered to be irretrievable. Also, while the farmland could be returned to crop production at some future date, the economic production of the field for the period of time that it is not utilized for row crops is considered to be irretrievable.

RELATIONSHIP OF THE PROJECT TO LAND-USE PLANS

The proposed project would not conflict with any known land-use plans for the area.

COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

A. Endangered Species Act of 1973, as amended. The project would not adversely impact any threatened or endangered species or their critical habitats. The U.S. Fish and Wildlife Service (USFWS) was coordinated with concerning federally endangered species, as required by the Endangered Species Act of 1973, as amended. Their review of our initial proposal indicated that the proposed project was not likely to impact any federally listed species and requires no further action. Their letter, dated July 25, 2002, responds to both the ESA and the Fish and Wildlife Coordination Act and can be found in Appendix A-1.

B. National Historic Preservation Act of 1966, as amended. Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) establishes a program for the preservation of additional historic properties throughout the Nation, and for other purposes, approved October 15, 1966 (Public Law 89-665; 80 Stat. 915; 16 U.S.C. 470) as amended. The NHPA and its implementing regulations 36 CFR Part 800: "Protection of Historic Properties," establishes the primary policy, authority for preservation activities, and compliance procedures. The NHPA ensures early consideration of historic properties preservation in Federal undertakings and the integration of these values into each agency's mission and declares Federal policy to protect historic sites and values in cooperation with other nations, states, and local governments.

Allowing for tribal and interested/consulting party review and comment contributes to fulfilling obligations as set forth in the National Historic Preservation Act (PL 89-665), as amended; the National Environmental Policy Act of 1969 (PL 91-190); Executive Order (EO) 11593 for the "Protection and Enhancement of the Cultural Environment" (Federal Register, May 13, 1971); the Archaeological and Historical Preservation Act of 1974 (PL 93-291); the ACHP "Regulations for the Protection of Historic and Cultural Properties" (36 CFR Part 800); and the applicable National Park Service and Corps regulations.

Responses were received from the IHPA by letters dated December 4, 2000, and October 30, 2001 (IHPA Log #0011090020k-P), which concurred with the Corps' opinions and a determination of ***No Historic Properties Affected***, as defined in 36 CFR Part 800.3(a)(1) for the project as proposed. Compliance with the NHPA has been met.

C. Federal Water Project Recreation Act. Opportunities for recreational development were considered during the planning of this project. While the project is not specifically intended for recreational purposes, it is recognized that recreational opportunities would be an ancillary benefit of the project.

D. Fish and Wildlife Coordination Act. Project plans have been coordinated with the USFWS, the U.S. EPA, and the ILDNR. The USFWS and ILDNR have also been involved concerning formulation of alternatives for the project and their opinions considered in its development regarding endangered species, critical habitats, and other sensitive areas of concern. The USFWS coordination letter, dated June 27, 2001, provides comments under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); and the Endangered Species Act of 1973, as amended. All coordination responses can be found in Appendix A-1.

E. Executive Order 11988 (Flood Plain Management). Executive Order 11988 directs Federal agencies to: (1) avoid development in the floodplain unless it is the only practical alternative; (2) reduce the hazards and risks associated with floods; (3) minimize the impact of floods on human safety, health, and welfare; and (4) restore and preserve the natural and beneficial values of the floodplain. After an extensive alternatives evaluation, the placement of dredged material to construct islands in Peoria Lake is deemed to be the only practicable alternative for this project. As such, the proposed action is in accordance with Executive Order 11988 and is judged to be in full compliance.

F. Executive Order 11990 (Protection of Wetlands). The proposed alternatives for this project propose construction activities that would directly promote the development of wetlands. Since the results of the construction activities promote the development of wetland habitat, the project is deemed to be in full compliance.

G. Clean Water Act (Sections 401 and 404), as amended. A Section 404(b)(1) Evaluation for the selected plan can be found in Appendix A-4.

H. Clean Air Act, as amended. No aspect of the proposed project has been identified that would result in violations to air quality standards.

I. Farmland Protection Policy Act of 1981. Utilization of the preferred alternative would remove approximately 45 acres of farmland from production. A U.S. Department of Agriculture (USDA) Farmland Conversion Impact Rating (Form AD-1006) was submitted to the USDA for evaluation and was completed using the Farmland Protection Policy Act (FPPA) site assessment criteria. The land is classified as prime farmland. The completed Form AD-1006 can be found in Appendix A-1.

The City of Washington recently purchased three tracts of land to use as potential flood reduction projects for Farm Creek. They became aware of this project and asked the Corps of Engineers to evaluate the lands for potential consideration into the project. Site 1 was eliminated

as being too small. Sites 2 and 3 were further evaluated, with Site 3 being the only practicable alternative reasonable to meet the project goals. The AD-1006 addressed an area larger than the 45 acres currently being considered for the project. This decrease in the size of the site reduces impacts to prime farmland to the smallest reasonable increment and still makes the project viable. This project is therefore judged to be in full compliance.

K. National Environmental Policy Act of 1970, as amended. The completion and public coordination of this EA fulfills NEPA compliance.

L. National Economic Development (NED) Plan. The NED Plan is the plan that best satisfies the Federal planning objectives of increasing the Nation's output of goods and services and produces the most improvement to the national economy. Dollars and non-monetary outputs (average annual habitat units) were used to quantify all possible plans and alternatives for this project. The proposed plan is therefore considered the best to fulfill the NED objective.

Summary of Coordination, Public Views, and Comments

COORDINATION

Throughout a feasibility study, the Corps of Engineers strives to inform, educate, and involve the many groups who may have an interest in the study. This coordination is paramount to assuring that all interested parties have the opportunity to be part of the study process.

One process used for coordination is the public involvement process. Public involvement is the exchange of information with various segments of the public. It attempts to reduce unnecessary conflict and achieve consensus. The goal of public involvement and coordination is to open and maintain channels of communication with the public in order to give full consideration to public views and information in the planning process (Engineer Regulation 1105-2-100, Appendix B - Public Involvement, Collaboration and Coordination).

An effective public involvement program must identify and respond to as many affected publics as possible throughout the study and consider their input in the study's decision-making process. Content analysis is the method employed to identify public opinion, study concerns, and potential controversy. It ensures that the public involvement plan is responsive to the level of interest and concern expressed by the public, and it assesses the effectiveness of the public involvement techniques.

The main forum for receiving feedback during the Illinois River, Peoria Riverfront at Peoria, Illinois, Environmental Restoration Feasibility Study was through the study's newsletters and open houses. As discussed below, newsletters provided points of contact for the publics' questions/comments. The open house attendees were offered comment sheets to express their concerns and provide comments. Following each open house, a content analysis report was prepared to document the proceedings and public comments, and to analyze the information that was submitted. The reports described the dominant tones and themes of the feedback generated by the public participation program. A copy of each report was distributed to all study team members for use in the plan formulation process.

During the study, the Corps of Engineers coordinated not only with its cost-sharing partner, the ILDNR, but also with numerous groups including elected congressional representatives; Federal,

State, county, and city agencies; environmental groups/organizations; farm bureaus; businesses; media; and the unaffiliated general public.

PUBLIC VIEWS AND COMMENTS - JUNE 2000 OPEN HOUSE

In May 2000, a study newsletter was mailed to a distribution list of nearly 700 addresses notifying them of the study's initiation and an upcoming cost-sharing signing ceremony and public open house. The newsletter also provided information about the study area, study background, coordination efforts, and Corps of Engineers and ILDNR points of contact for comments/questions. A copy of the newsletter is included in Appendix A-1, Correspondence. A news release also was issued to media (television, radio, and newspaper) sources in the study area.

The cost-sharing signing ceremony and open house were held in Peoria, Illinois, on June 5, 2000. The ceremony, sponsored by Congressman Ray LaHood (IL-18), formally signified the partnership formed by the Rock Island District of the U.S. Army Corps of Engineers and the Illinois Department of Natural Resources to execute this study. The purpose of the open house was to meet with the public to discuss on a one-to-one basis information on the range of alternatives for restoring the environment in the Illinois River along the Peoria Riverfront, and to gather comments on the alternatives and problems in the area.

Approximately 70 members of the public attended the open house, viewed the displays, and met with study members (represented by Corps of Engineers, ILDNR, Illinois Department of Natural Resources Watershed Management, Illinois Department of Agriculture, Illinois State Water Survey, Cooperative Extension Service, and Natural Resources Conservation Service). A comment sheet was offered to the public for feedback, and approximately 27% (19) were returned.

Overall, comments were very favorable regarding the open house format, displays, and the goals of the study. A strong majority of attendees agreed:

- That the open house provided an opportunity to gain information and a better understanding of the study, that the materials and displays were informative, and that they had a chance to talk to a study team member and offer comments about the study.
- That the goal of the study should be to create and maximize habitat diversity, reduce sediment delivery from tributaries, and provide ancillary recreation benefits.
- That island creation and/or sediment removal through dredging are appropriate methods of reaching the above-stated goals.

Other responses revealed that, overall, the public considers the general placement of the island and dredged areas acceptable, that tributary restoration is viewed as the most important means of addressing sediment delivery to Peoria Lake, and that water quality is also an important issue.

The comments received at the open house were provided to the study team members for consideration and use in the analysis of the array of potential alternatives.

PUBLIC VIEWS AND COMMENTS - NOVEMBER 2000 OPEN HOUSE

In November 2000, a second newsletter was mailed to over 700 addresses. (Note that the mailing list grew to include new names added from the June 2000 open house attendees.) The newsletter provided the study background, purpose, and a study update; summarized the June 2000 open house; announced a November 29, 2000, open house; stated that another open house would be held before the study's conclusion; and listed points of contact for comments/questions. (The open house was held in conjunction with an Illinois River Ecosystem Restoration Study cost-sharing signing ceremony and open house; however, the summary of comments provided below pertains to the Peoria Riverfront Development Study only.) A copy of the newsletter is included in Appendix A-1. A news release also was issued to media (television, radio, and newspaper) sources in the study area.

The November 2000 open house was held in Peoria, Illinois. The purpose of the open house was to provide information on the study status and on the alternatives being considered for restoring the environment within the Illinois River watershed along the Peoria Riverfront and to gather comments on the alternatives. Corps of Engineers, Illinois Department of Natural Resources, and Illinois State Water Survey representatives were present at the open house to discuss the study with the public on a one-to-one basis and to receive the public's comments.

A total of 72 people attended the open house. Of those, 42% (39) returned comment sheets. The following paragraphs summarize questions asked and responding comments.

For the alternative that includes dredging to create islands, the "large island above the bridge (renamed mid-sized island above the bridge)" alternative was selected as the most acceptable by over half of those responding. About one-third of the respondents supported the "large island pair below bridge alternative (subsequently screened due to high cost and lack of sponsor interest)," and the remaining island alternatives of "small island above bridge," "single island below bridge (renamed large island below the bridge)," and "island pair below bridge" were supported fairly equally.

Additional comments received pertaining to this alternative included the need to determine a purpose for any island creation, a suggestion to move the silt in the river into a large island, and the concern for islands for wildlife and habitat restoration. Although most respondents agreed with the dredging to create islands alternative, a comment was made that this alternative is not the long-term answer to the river's problems.

The stream restoration alternatives on Farm Creek were supported by 86% of those in attendance. Additional comments about this alternative included concerns about erosion, sediment reduction, the importance of wildlife habitat, wetland restoration, and increased biodiversity.

The comments received at the open house were provided to the study team members for consideration and use in the analysis of the array of potential alternatives.

PUBLIC VIEWS AND COMMENTS – SUMMER 2002 PUBLIC MEETING

The third public meeting was held at the study's conclusion. The May newsletter announced the public meeting schedule and was mailed to each of the 800+ names on the study's mailing list prior to the meeting. A copy of the newsletter is included in Appendix A-1. A news release also was issued to media (television, radio, and newspaper) sources in the study area.

The June 2002 public meeting was held in Peoria, Illinois. The purpose of the meeting was to address the public during the public review phase and to explain the alternatives that the study team had selected to enhance the Peoria Lake and Farm Creek environment. The meeting also served as a forum for gathering comments on the recommended plans. Two sessions of the meeting were held with an open house session for the first one-half hour, followed by the public meeting portion. Representatives from the Department of Natural Resources and the Corps of Engineers met with the public on a one-to-one basis during the open house portion to discuss the displays and to receive public comments. The public meeting sessions began with a formal presentation explaining the selected alternatives, followed by a question and answer and comment/statement period.

A total of 77 people attended. Meeting attendees were asked to fill out a comment sheet after each session. A total of 35 comment sheets were returned. Four statements were entered for the record at the meeting and one statement was sent through the mail. Tributary restoration and sediment delivery remain major concerns expressed by the public both at this set of meetings and at the June 2000 open houses. Another recurring comment reiterates that the public wants to get the project moving as soon as possible.

The majority of responses (74%) regarding Peoria Lake agree that the plan would enhance aquatic habitats and restore depth diversity; however, less than half of the responders (49%) agree that the plan would address sediment delivery and deposits, and an equal number either disagreed (29%) or were neutral (20%) about whether this problem would be successfully addressed by the recommended plan. Additional comments regarding the Peoria plan reflect the concern that scouring and erosion of the islands will create other problems, that the Plan is a temporary fix and does not address the real problems causing river sedimentation.

For Farm Creek, 66% agreed that the recommended plan would maximize habitat creation, and 60% agreed that the plan would reduce sediment delivery and improve water quality. The larger number of responders that were either neutral or disagreed with the plan could indicate that many of them were not convinced that the recommended plan would meet the needs for restoring Farm Creek. This is also reiterated in the additional comments received citing that the project, as stated, only prevents flooding not sediment reduction.

The majority of questions asked during both Question and Answer sessions were directed at how the project would affect riverfront property owners, boating, water supply, water quality, flood heights, bankline erosion, and downstream area. Statements entered into the record by the Peoria Area Chamber of Commerce, Heartland Water Resources Council, Nature Conservancy, Peoria Lakes Basin Alliance and Peoria Audubon Society all support the recommended plans for this study.

The information received at the public meeting was distributed to the study team members.

SUMMARY

Various publics were identified as target audiences for public involvement and coordination, including elected congressional representatives; Federal, state, county, and city agencies; environmental groups/organizations; farm bureaus; businesses; media; and the unaffiliated general public. These publics made up the 800+ addresses on our mailing list that was used to inform, educate, and involve the public.

The goals of the coordination process were to inform, educate, and involve the public and solicit feedback through open communication and to include in the plan formulation process all publics interested in and affected by the study recommendation(s).

The newsletters and public open houses provided the public with opportunities to become informed and educated about the study and involved in the study by providing feedback to the study team. The feedback was gathered into content analysis reports and used by the study team to shape the plan formulation process and to develop the recommended plan. The study plans that are included in this report have been influenced by the public involvement process.

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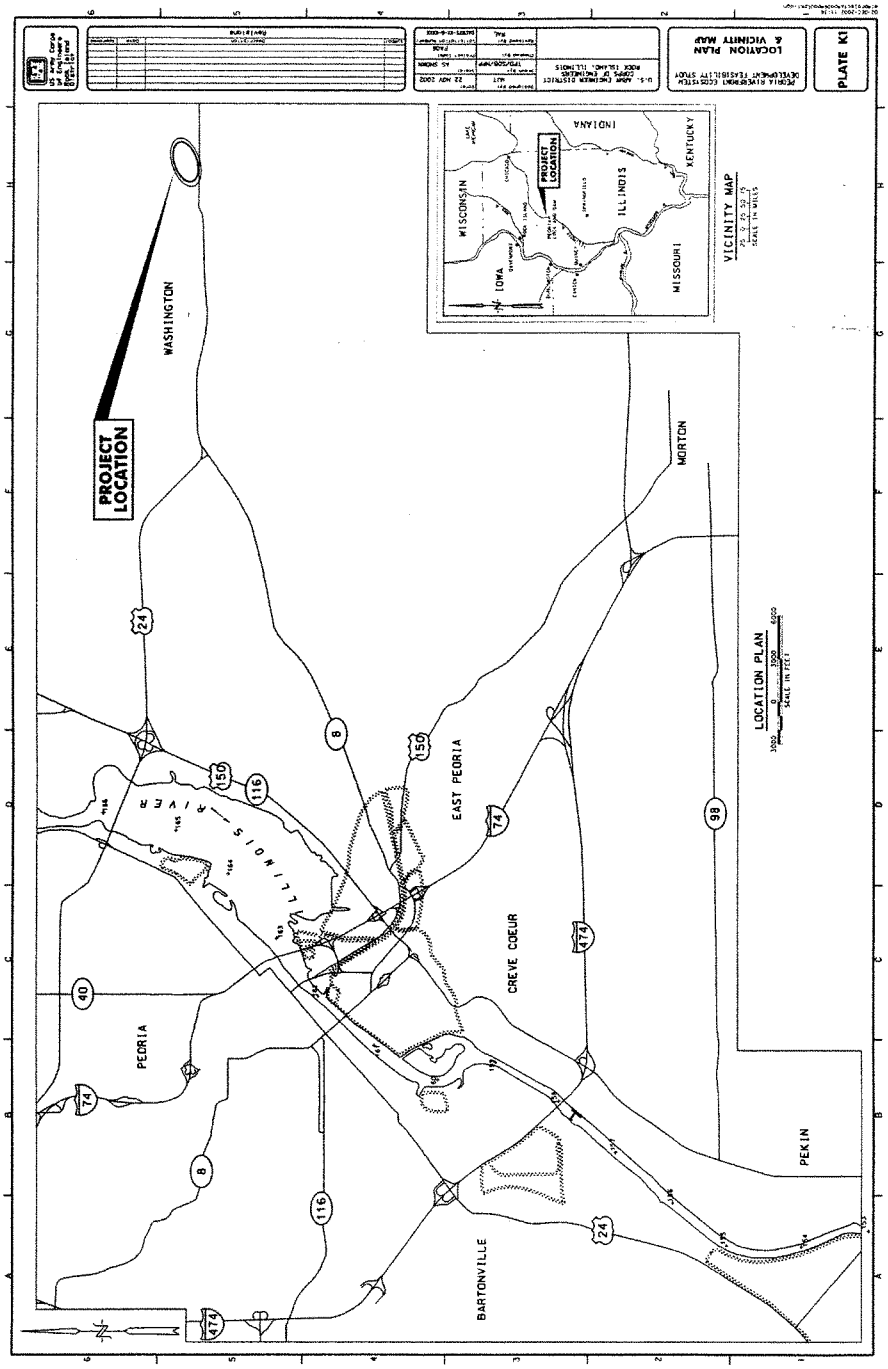
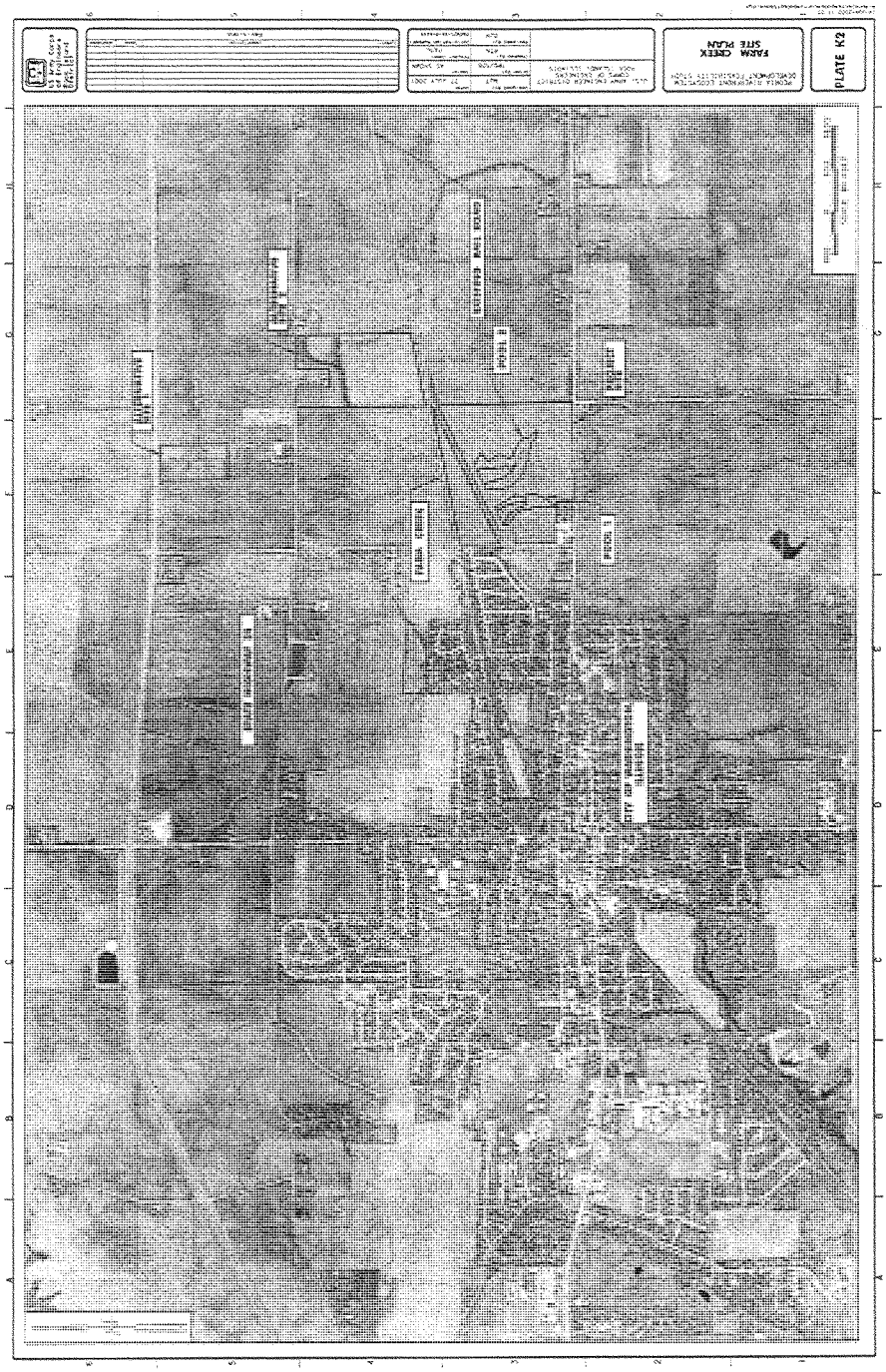

PROJECT LOCATION
WASHINGTON
PEORIA
EAST PEORIA
CREVE COEUR
MORTON
PEKIN
BARTONVILLE
ILLINOIS RIVER
INDIANA
ILLINOIS
KENTUCKY
WISCONSIN
IOWA
MISSOURI
VICINITY MAP
LOCATION PLAN
LOCATION PLAN & VICINITY MAP
PLATE K1


FARM CREEK
SITE PLAN
PLATE K2

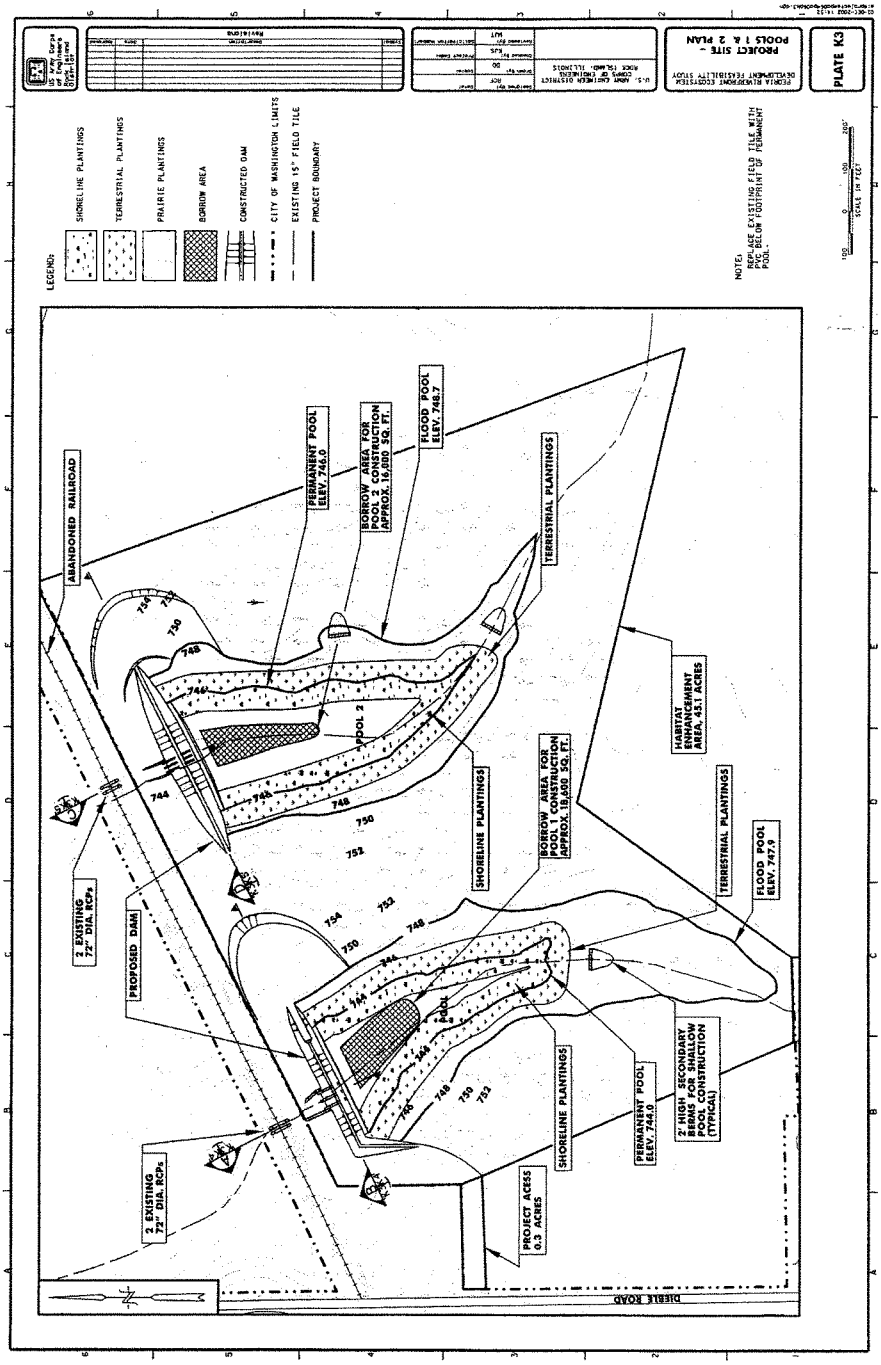


PLATE K3
PROJECT SITE - POOLS 1 & 2 PLAN
LEGEND:
SHORELINE PLANTINGS
TERRESTRIAL PLANTINGS
PRAIRIE PLANTINGS
BORROW AREA
CONSTRUCTED DAM
CITY OF WASHINGTON LIMITS
EXISTING 15" FIELD TILE
PROJECT BOUNDARY
ABANDONED RAILROAD
PERMANENT POOL ELEV. 746.0
BORROW AREA FOR POOL 2 CONSTRUCTION APPROX. 16,000 SQ. FT.
FLOOD POOL ELEV. 748.7
TERRESTRIAL PLANTINGS
HABITAT REPLACEMENT AREA, 45.1 ACRES
SHORELINE PLANTINGS
BORROW AREA FOR POOL 1 CONSTRUCTION APPROX. 19,600 SQ. FT.
TERRESTRIAL PLANTINGS
FLOOD POOL ELEV. 745.9
2 EXISTING 72" DIA. RCPs
PROPOSED DAM
SHORELINE PLANTINGS
PERMANENT POOL ELEV. 744.0
2' HIGH SECONDARY BERMS FOR SHALLOW POOL CONSTRUCTION (TYPICAL)
2 EXISTING 72" DIA. RCPs
PROJECT ACCESS 0.3 ACRES
DIEHL ROAD
POOL 1
POOL 2

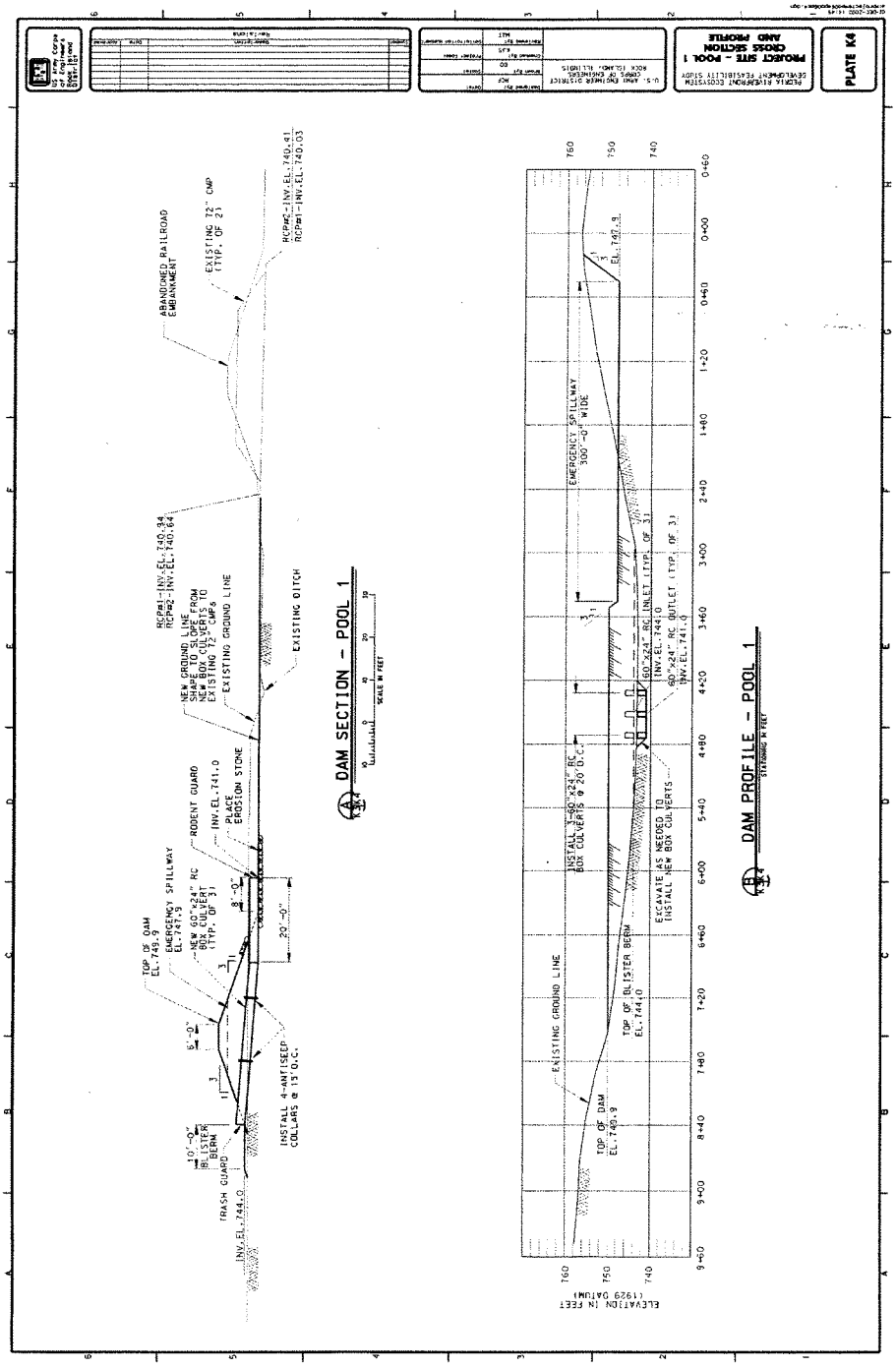


PLATE K4
PROJECT SITE - POOL 1
CROSS SECTION
AND PROFILE
DAM SECTION - POOL 1
DAM PROFILE - POOL 1
EXISTING GROUND LINE
EMERGENCY SPILLWAY
300'-0" WIDE
TOP OF DAM
EL. 749.9
TOP OF BLISTER BERM
EL. 744.0
EXCAVATE AS NEEDED TO
INSTALL NEW BOX CULVERTS
INSTALL 4-ANTISEEP
COLLARS @ 15' O.C.
TRASH GUARD
RODENT GUARD
PLACE
EROSION STONE
EXISTING DITCH
ABANDONED RAILROAD
EMBANKMENT
EXISTING 72" CMP
(TYP. OF 2)
ELEVATION IN FEET
(1929 DATUM)
STATIONING IN FEET

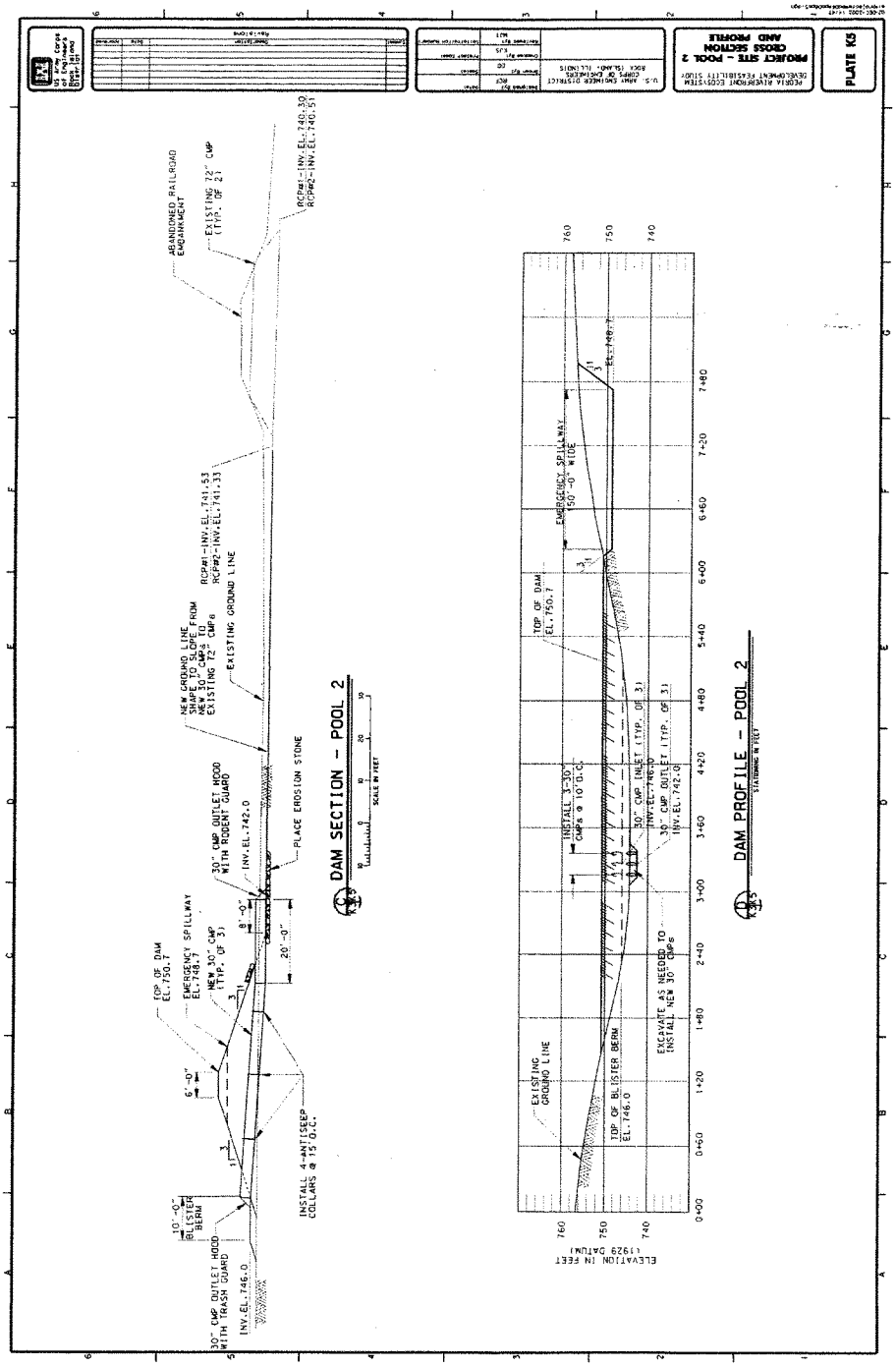


PLATE K5
PROJECT SITE - POOL 2
CROSS SECTION
AND PROFILE
ROSIA RIVERFRONT ECOSYSTEM
DEVELOPMENT FEASIBILITY STUDY
U.S. ARMY ENGINEER DISTRICT
ROCK ISLAND, ILLINOIS
DAM SECTION - POOL 2
DAM PROFILE - POOL 2
EXISTING GROUND LINE
TOP OF BLISTER BERM
EL.746.0
EXCAVATE AS NEEDED TO INSTALL NEW 30" CMPs
INSTALL 3-30" CMPs @ 10' O.C.
30" CMP OUTLET HOOD INV.EL.742.0
EMERGENCY SPILLWAY 150'-0" WIDE
TOP OF DAM EL.750.7
ELEVATION IN FEET (1929 DATUM)
STATIONING IN FEET
NEW GROUND LINE SHAPE TO SLOPE FROM NEW 30" CMPs TO EXISTING 72" CMPs
EXISTING 72" CMP (TYP. OF 2)
ABANDONED RAILROAD EMBANKMENT
RCPM1-INV.EL.741.53
RCPM2-INV.EL.741.33
RCPM1-INV.EL.740.30
RCPM2-INV.EL.740.51
PLACE EROSION STONE
INSTALL 4-ANTISEEP COLLARS @ 15'-0" C.C.
30" CMP OUTLET HOOD WITH TRASH GUARD INV.EL.746.0
10'-0" BLISTER BERM
6'-0"
20'-0"
8'-0"

APPENDIX A-1

CORRESPONDENCE

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX A-1
CORRESPONDENCE

CONTENTS

Item	Page
Feasibility Study Newsletter, Notice of Study Initiation, May 2000, prepared by the Rock Island District, U.S. Army Corps of Engineers	A-1-1
Feasibility Study Newsletter, Open House Scheduled, November 2000, prepared by the Rock Island District, U.S. Army Corps of Engineers	A-1-3
Letter from Ms. Anne E. Haaker, Deputy State Historic Preservation Officer, Illinois Historic Preservation Agency, dated December 4, 2000	A-1-6
Letter from the Rock Island District, U.S. Army Corps of Engineers, to Distribution List, dated June 7, 2001, requesting preliminary comments on the proposed Peoria Lake project	A-1-7
Letter from Mr. Richard C. Nelson, U.S. Fish and Wildlife Service, Rock Island Field Office, dated June 27, 2001	A-1-19
Letter from Mr. Robert W. Schanzle, Illinois Department of Natural Resources, dated July 18, 2001	A-1-22
Fax from Mr. Mike Diedrichsen, Illinois Department of Natural Resources, Office of Water Resources, providing comments on the project, dated September 28, 2001	A-1-27
Letter from Ms. Anne E. Haaker, Deputy State Historic Preservation Officer, Illinois Historic Preservation Agency, dated October 30, 2001	A-1-29
Letter from Mr. Steve Frank, Bureau of Land and Water Resources, Illinois Department of Agriculture, providing Form AD-1006, dated November 8, 2001	A-1-30
Feasibility Study Newsletter, Public Meetings Scheduled, May 2002, prepared by the Rock Island District, U.S. Army Corps of Engineers	A-1-33
Letter from Mr. Richard C. Nelson, U.S. Fish and Wildlife Service, Rock Island Field Office, dated July 15, 2002	A-1-37

US Army Corps of Engineers
Rock Island District

ILLINOIS RIVER, RIVERFRONT DEVELOPMENT AT PEORIA, ILLINOIS ENVIRONMENTAL RESTORATION FEASIBILITY STUDY NEWSLETTER

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Notice of Study Initiation

May 2000

CORPS OF ENGINEERS/DEPARTMENT OF NATURAL RESOURCES COST-SHARING SIGNING CEREMONY PLANNED

The U.S. Army Corps of Engineers, Rock Island District, and the Illinois Department of Natural Resources entered into a feasibility study cost-sharing agreement in October 1999 and became "partners" in a combined effort to restore the environment in the Illinois River along the Peoria Riverfront.

The public is invited to attend a 9 a.m. ceremony on June 5 as COL James V. Mudd, Rock Island District Commander, and Mr. Brent Manning, Illinois Department of Natural Resources Director, formally initiate the study and their agencies' partnership throughout the feasibility study. The ceremony is sponsored by Congressman Ray LaHood, who was instrumental in getting congressional authorization for the study. The ceremony will be held at the Gateway Center, 200 North East Water Street, Peoria, Illinois. The study is scheduled for completion in the fall of 2001.

OPEN HOUSE TO FOLLOW

A public open house will be held after the ceremony. Corps of Engineers and Department of Natural Resources representatives will be available at any time between the hours of 10:30 a.m. to 12:30 p.m. and 5:00 p.m. to 8:00 p.m. to meet with the public to discuss on a one-on-one basis information on the range of alternatives for restoring the environment in the Illinois River along the Peoria Riverfront and to gather comments on the alternatives and problems in the area. A continuously running stand-alone presentation and several displays will be available for viewing to further explain the study. All interested members of the public are encouraged to attend the open house, visit the displays, talk to the agency representatives, and to provide comments. The comments received at this open house will be considered during the study and will be part of the official NEPA scoping process.

STUDY AREA

The study area includes the Illinois River between Henry and Naples, Illinois, with a specific focus on Peoria Lake from Illinois River Mile 181.0 near Chillicothe, Illinois, to River Mile 158.0 at Peoria Lock and Dam. A total of 12 tributary streams drain directly into Peoria Lake, including Richland, Partridge, Blue, Tenmile, and Farm Creeks. Studies have indicated that these tributaries have contributed significantly to sediment delivery to Peoria Lake.

STUDY BACKGROUND

In 1998, the Corps of Engineers completed a reconnaissance study that identified problems, opportunities, and potential solutions (alternatives) to address the problems in the study area. The study results indicated that further study was warranted. This more detailed feasibility study will continue to develop and investigate alternatives to enhance aquatic habitat and reduce sediment delivery/deposition in the Peoria Lake area, with ancillary benefits to recreational boating and fishing. These efforts will help address the major problem, sedimentation of the lake that has resulted in the loss of [illegible] resulting in reduced habitat value and diversity and reductions in the lake area available to recreational boaters. In addition, degraded tributary streams are delivering high levels of sediment to Peoria Lake. Opportunities will be explored to address these conditions, especially those that relate to the downtown Peoria Riverfront Development Project.

Alternatives identified to date to be considered in the feasibility study fit into two broad categories:

(1) River restoration measures to address sediments deposited in the lakes and improve aquatic habitats. These options fall into two general categories:

(a) Dredging to create islands and side channels that would address the loss of habitat diversity within Upper and Lower Peoria Lakes, and

(b) Dredging with placement of sediment removed outside of the lakes, such as on brownfields or former mined lands, that would address historic sedimentation and restore some of the aquatic and terrestrial conditions to a less degraded condition.

(2) Watershed restoration measures to address current and future sediment delivery to the lakes. Options include implementing stream restoration on tributaries to Peoria Lake. Possible actions include reducing stream bed and stream bank erosion, slowing runoff rates, and providing land treatments (buffers, grass waterways, etc.).

COORDINATION

Throughout the study period, the Corps of Engineers will coordinate not only with our cost-sharing partner, the Illinois Department of Natural Resources, but also with Federal, State, and local governmental agencies. These agencies include the U.S. Department of Agriculture, U.S. Department of Transportation, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Geological Survey, Peoria Riverfront Development Commission, Tri-County Regional Planning Commission, Soil and Water Conservation Districts, and county and city officials.

Coordination also will be maintained with members of the general public and non-governmental organizations. Newsletters providing study updates will be produced approximately four times during the study period. Two additional meetings with the public are planned (tentatively for the fall of 2000 and the summer of 2001). Meetings will be announced in the study newsletters.

COMMENTS?

Your comments are important to us. If you have technical comments or questions about the study, please contact Mr. Brad Thompson, Project Coordinator, at 309/794-5256 (bradley.e.thompson@usace.army.mil) or Ms. Teresa Kincaid, Project Manager, at 309/794-5227 (teresa.a.kincaid@usace.army.mil). You also may write to them at the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: CEMVR-PM-M (Thompson or Kincaid)
Clock Tower Building – P.O. Box 2004
Rock Island, Illinois 61204-2004

The contact for the Illinois Department of Natural Resources is Mr. Jim Mick. Mr. Mick can be reached at 309/543-3316 (jmick@dnrmail.state.il). You may write to Mr. Mick at the following address:

Mr. Jim Mick
Illinois River Watershed Coordinator
Office of Resource Conservation
700 South 10th Street
Havana, Illinois 62644

If you are aware of someone who may wish to be added to the study's mailing list to receive newsletters and future stu mailings, please ask him/her to contact Ms. Sue Simmons at 309/794-5573 (suzanne.r.simmons@usace.army.mil).

Your comments are important to us.

A-1-2

US Army Corps of Engineers
Rock Island District

PEORIA RIVERFRONT DEVELOPMENT ENVIRONMENTAL RESTORATION FEASIBILITY STUDY NEWSLETTER

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Newsletter No. 2 November 2000

Open House Scheduled

The purpose of this newsletter is to summarize study progress to date and to announce a second open house, which will be held on November 29, 2000, in Peoria. Please see page 3 for details.

STUDY BACKGROUND

The U.S. Army Corps of Engineers, Rock Island District, and the Illinois Department of Natural Resources entered into a feasibility study cost-sharing agreement in October 1999 and became "partners" in a combined effort to restore the environment in the Illinois River along the Peoria riverfront. On June 5, 2000, Colonel James V. Mudd, Rock Island District Commander, and Mr. Brent Manning, Illinois Department of Natural Resources Director, formally initiated the study and their agencies' partnership throughout the feasibility study at a cost-sharing signing ceremony sponsored by Congressman Ray LaHood. The study is scheduled for completion in the fall of 2001.

The study focuses on Peoria Lake from Illinois River Mile 181.0 near Chillicothe, Illinois, to River Mile 158.0 at Peoria Lock and Dam. A total of 12 tributary streams drain directly into Peoria Lake, including Richland, Partridge, Blue, Tenmile, and Farm Creeks. Studies have indicated that these tributaries have contributed significantly to sediment delivery to Peoria Lake.

STUDY PURPOSE

The major problem in the Peoria Lake area is sedimentation. Degraded tributary streams deliver high levels of sediment to Peoria Lake that has resulted in loss of depth in the lake. The lake condition has resulted in reduced habitat value and diversity, and reduced areas in the lake available to recreational boaters.

The study team is concentrating on opportunities to address these problems, especially those that relate to the downtown Peoria Riverfront Development Project.

STUDY UPDATE

Study team members continue to look at alternatives which would enhance aquatic habitat and reduce sediment delivery/deposition in the Peoria Lake area, with ancillary benefits to recreational boating and fishing. Issues to be considered in evaluating various alternatives include: Is this the most cost-effective way to improve fish and wildlife habitat? Are the improvements sustainable? Are there willing landowners? Can impacts to flood heights, the navigation channel, and other infrastructure be avoided?

Alternatives that have been identified to date that address these issues include:

(1) River restoration measures to address sediments deposited in the lakes and create deep water aquatic habitats. These options fall into two general categories:

(a) Dredging to create islands and side channels/backwaters. A number of potential island locations have been evaluated. The most

promising locations to date have been in the upstream end of Lower Peoria Lake. Concepts are being explored to create deep water (>6-foot) backwater and flowing side channel habitats for fisheries benefits.

(b) Dredging with placement of sediment removed outside of the lakes. In combination with islands, additional dredging with placement in uplands areas is being evaluated. Potential placement areas include the Tenmile Creek delta, brownfields or mine lands in the Peoria area, or loading material on barges for placement on brownfields in the Chicago area.

(2) Watershed restoration measures to address current and future sediment delivery to the lakes. Farm Creek was selected as the tributary focus area based on the study authority and local interest. The study team is looking at watershed stabilization options, including buffers, water and sediment control basins, riparian habitat restoration, and stream bed and bank stabilization.

Other study efforts have included fish sampling in lower Peoria Lake. The results of this sampling confirmed that relatively few fish are able to use the existing shallow water lake reaches. This sampling helps set the baseline against which various restoration options are compared.

SUMMARY OF JUNE 5, 2000, OPEN HOUSE

Two public open house sessions were held after the signing ceremony on June 5, 2000: one in the morning and one in the late afternoon/evening. Displays were provided by the Rock Island District, Corps of Engineers; Illinois Department of Natural Resources; Illinois Department of Natural Resources Watershed Management; Illinois Department of Agriculture; Illinois State Water Survey; Cooperative Extension Service; and the Natural Resource Conservation Service. Representatives from these agencies were present to meet with the public to discuss on a one-to-one basis information on the range of alternatives for restoring the environment in the Illinois River along the Peoria Riverfront and to gather comments on the alternatives and problems.

Approximately 70 people attended the open house sessions. Although attendance was less than anticipated, those who attended spent considerable time looking at the displays and talking to agency representatives. A comment sheet was offered the attendees. Comments from those w completed a comment sheet include the following.

- 95% of the attendees agreed that the open house provided an opportunity to gain information and a better understanding of the Peoria Riverfront Development Study.
- 74% agreed that the open house provided an opportunity for everyone to offer comments about the study.
- 95% agreed that the displays and display materials provided were informative.
- 79% said that they had the chance to talk to a study team member.
- 89% agreed that the goal of the study should be to create and maximize habitat diversity, reduce sediment delivery from tributaries, and provide ancillary recreation benefits. Other comments included: improve water quality and promote tourism, dredge t entire lake, make more citizens aware Peoria Riverfront conditions; and prevent Peoria Lakes from becoming a marsh full of mosquitoes.
- 84% also agreed that island creation and/or sediment removal through dredging are appropriate methods of achieving these goals. Other comments included: this is an expensive way to deal with sediment problems caused by siltation that should be corrected upstream; it has been in talks for years – just do it; and need to meet with Peoria Lakes Basin Alliance regarding island creation, placement, and sequencing.
- 84% of the respondents agreed that tributary restoration is important to address sediment delivery to Peoria Lake.
- There were few specific comments and no consensus on the proposed general locations of islands and dredged areas.

The comments received are being considered the study team as they refine the alternatives.

JOINT OPEN HOUSE WITH ILLINOIS RIVER ECOSYSTEM STUDY PLANNED

An open house will be held on November 29, 2000, at the Gateway Center, 200 North East Water Street, Peoria, Illinois. The purpose of the open house is to provide information on the study status and on the alternatives now being considered for restoring the environment within the Illinois River watershed along the Peoria Riverfront and to gather comments on the alternatives.

Representatives from the Corps of Engineers and the Department of Natural Resources, as well as other participating State agencies, will be available *at any time* from 9:30 a.m. to noon and 4 p.m. to 7 p.m. to meet with the public to discuss on a one-to-one basis updated information on the alternatives. All interested members of the public are encouraged to attend the open house, visit updated displays, talk to agency representatives, and provide comments.

An open house to discuss the Illinois River Ecosystem Restoration Study also will be held at the Gateway Center on November 29th. Since many people in the Peoria area are interested in both studies, these open houses are being held concurrently for the public's convenience.

WHAT'S NEXT?

The study team will continue to refine the alternatives. Additional site survey and evaluation will be required for the most promising options. Based on the additional evaluations and comments from the public workshop an initial study team recommendation will be made and a draft report prepared.

One more meeting with the public will be held before the study's conclusion. The meeting will be scheduled after the draft report is released to provide an opportunity for public comment on the initial recommended plan and draft report. This meeting is tentatively planned for summer 2001. A study newsletter will announce the meeting and will provide a study update. A final newsletter will be released at the end of the study.

COMMENTS?

Your comments are important to us. If you have technical comments or questions about the study, please contact Mr. Brad Thompson, Project Manager, at 309/794-5256 or by email at bradley.e.thompson@usace.army.mil

You may write to Mr. Thompson at the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: CEMVR-PM-M (Thompson)
Clock Tower Building – P.O. Box 2004
Rock Island, Illinois 61204-2004

The contact for the Illinois Department of Natural Resources is Mr. Jim Mick. Mr. Mick can be reached at 309/543-3316 or by email at jmick@dnrmail.state.il.

You may write to Mr. Mick at the following address:

Mr. Jim Mick
Illinois River Basin Coordinator
Region III Fisheries Administrator
Illinois Department of Natural Resources
700 South 10th Street
Havana, Illinois 62644

If you are aware of someone who may wish to be added to the study's mailing list to receive newsletters and future study mailings, please ask him/her to contact Ms. Sue Simmons at 309/794-5573 (suzanne.r.simmons@usace.army.mil).

Your Comments Are Important To Us!

A-1-5

Illinois Historic
Preservation Agency

1 Old State Capitol Plaza • Springfield, Illinois 62701-1507 • (217) 782-4836 • TTY (217) 524-7128

Peoria County Please refer to: IHPA LOG #0011090020K-P
Lower Peoria Lake, Peoria & Tazewell Counties, IWW RM 163-167
Potential Island Creation/Dredging & Stream or Watershed Restoration
Feasibility Study - Peoria Riverfront Development (Ecosystem Restoration) Project

December 4, 2000

Mr. Kenneth A. Barr
U.S. Army Corps of Engineers, Rock Island District
Chief, Environmental Analysis Branch
Clock Tower Building/P.O. Box 2004
Rock Island, IL 61204-2004

Dear Sir:

Thank you for requesting comments from our office concerning the possible effects of the project referenced above on cultural resources. Our comments are required by Section 106 of the National Historic Preservation Act of 1966 (16 USC 470), as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

We concur with the Corps' proposal to conduct a Phase I archaeological survey for the ar[illegible]of potential effect (APE) located in the floodplain and upland areas of this project, and that deep testing for buried properties is appropriate for floodplain locales that comprise the APE. We also concur with the Corps' opinion that no historic properties are affected by the proposed island creation element of the Project, but understand that the Corps will resume consultation with our Office should undocumented historic properties be identified during dredging and island creation.

THE IHPA LOG NUMBER OR A COPY OF THIS LETTER SHOULD BE PROVIDED TO THE SELECTED PROFESSIONAL ARCHAEOLOGICAL CONTRACTOR TO ENSURE THAT THE SURVEY RESULTS ARE CONNECTED TO YOUR PROJECT PAPERWORK. If you have any questions, please contact Frances R. Knight at 217/782-9345.

Sincerely,

Anne E. Haaker
Deputy State Historic
Preservation Officer

AEH:FRK:bb

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

June 7, 2001

Planning, Programs, and
Project Management Division (10-1-7c)

SEE DISTRIBUTION LIST

The Rock Island District of the U.S. Army Corps of Engineers (Corps) is conducting a feasibility study to investigate enhancing aquatic habitat in Peoria Lake on the Illinois River, as well as various options that might help to reduce sediment delivery and deposition within the Peoria Lake area. This study is being conducted with our cost-share sponsor, the Illinois Department of Natural Resources (DNR). It is anticipated that the feasibility report will be completed later this year and will include an integrated Environmental Assessment (EA).

This early coordination letter serves to provide you with a brief description of the proposed projects being considered within the larger feasibility study and to ask for your agency's early comments within your area of expertise for that study. Additionally, we ask that you include comments on the proposed construction of a small-scale trial, or test island that would have a separate EA completed and distributed for public review within the next few months.

The study alternatives being considered within the larger feasibility report fall into two broad categories, as follows:

a. River restoration measures to address sediments already deposited in the lake and improve aquatic habitat. These options fall into two general categories, as follows:

(1) Dredging to create island and side channels/backwaters, and

(2) Dredging with placement of sediments removed outside of the lake, such as on brownfields or former mined lands.

b. Watershed restoration measures to address current and future sediment delivery to the lake. Options include implementing stream restoration on Farm Creek with possible actions or construction to reduce streambed and streambank erosion, slowing runoff rates, and providing land treatments (buffers, grass waterways, etc). We are also looking at an option on the Blue Creek watershed that would redirect the downstream end of Blue Creek into a nearby quarry pit that would act as a large sediment trap.

Sedimentation within Peoria Lake has resulted in the loss of depth, causing a reduction of aquatic habitat and diversity within the lake. The proposal to dredge portions of the lake to provide deep-water aquatic habitat requires that the dredged material be placed somewhere in a cost-effective manner. Using the material to create islands provides a place to put the material while also providing the opportunity to provide a more diverse ecosystem to the lake.

The area being considered for dredging and island construction is in the vicinity of the McCluggage Bridge in the upper northeast portion of Lower Peoria Lake. The island (or islands) would be created within an area owned by the Illinois DNR. Most of the area being considered for island creation has water only 1-2 feet deep with a substrate of 4 feet (or greater in some areas) of soft mud and silt the consistency of pudding. Early investigation of this area shows that it has only marginal, if any, habitat value for most aquatic species.

Dredging to construct the island(s) would range from 6-14 feet below flat pool and incorporate side channels and deep holes to provide over-wintering habitat and "edge" for fish species. The islands would be constructed to approximately 10 feet above flat pool at their highest. Additional structures, such as riprap along island shoreline and jetties out into the water, are also being considered. Various island designs and sizes are being hydraulically modeled for suitability, stability, and sustainability. Enclosures 1-4 show the various dredging and island construction options being considered at this time.

Techniques similar to those used to construct the Peoria Environmental Management Program islands would likely be utilized for this project, although others are being considered. It is anticipated that the proposed project would have a success similar to that which the upper lake island construction has had. However, recent Corps survey information shows that the substrate where the proposed island(s) in the lower lake would be constructed, while similar, may be less suitable than anticipated. For this reason, the Corps would like to pursue construction of a small test island in the same location proposed for the larger island project. This test island would allow the Corps to better determine if a larger island could be constructed in the same area. The test island's proposed dimensions would be approximately 100 feet by 50 feet and use approximately 560 cubic yards of dredged material (See Enclosure 5). An EA for the test island will be written and distributed as soon as possible. If no objections are received, construction could take place later this calendar year. Any early comments that you might have on this smaller island project would be appreciated.

Another option being considered to restore Peoria Lake is dredging of sediments with placement to a location outside of the lake. The dredging would likely take place within the same general area, but could conceivably include a larger area too. This would be determined by discussion with the Illinois DNR, project costs, and logistics for the amount of material removed.

Conversations between the Corps and the City of Chicago determined that Chicago would like to have the material transported up river for potential use in covering brownfields within the Chicago area. Other similar possibilities more locally accessible have not been identified at this time, but would be considered if your agency has any suggestions to offer.

Watershed restoration measures in Farm Creek are being considered in several places along the creek. Far up in the watershed, the City of Washington, Illinois, in northeast Tazewell County has purchased some parcels of property upstream of Washington on Farm Creek (See Enclosure 6). They are willing to work with the Corps and the Illinois DNR to develop detention basins on this land to create wetland habitat and slow water flows into and in Farm Creek. Two of the sites being considered for this work would have low earthen dikes constructed in what is currently farmed agricultural field. One site would have an earthen weir constructed across the creek and the other site would have an earthen dike constructed out of the creek and higher up in the watershed to retard runoff coming into the creek. Both areas would be planted with wetland and prairie vegetation and be allowed to develop wetland habitat behind the dikes.

Farm Creek behind the Farmdale Dam in the City of East Peoria is also being looked at for possible scenarios that might help restore portions of the creek (Enclosure 6). All proposed work would be done on Corps land within the dry reservoir. Some of the things being considered are rock weir structures in a tributary leading into the creek, reconnection of an oxbow to the creek, instream structures to reduce stream energy, bank stabilization in highly eroded areas and/or redirecting the creek to an area to form a shallow pond.

Ackerman Creek is another tributary to Peoria Lake that is being investigated for this project. Possible stream restoration within a small reach (Enclosure 6) would include bank stabilization and/or structures to form riffles and pools in the creek.

Even though Blue Creek is an intermittent stream that flows into upper Peoria Lake (See Enclosure 7), when it flows, it carries a fairly high sediment load. This is shown by the large delta that has grown into Peoria Lake. An alternative being evaluated for the feasibility report is to divert the stream into a nearby quarry. The quarry would then act as a sediment trap for the stream. The quarry is privately owned, but the owner has expressed interest in this effort.

Corps staff have researched current literature and made preliminary on-site investigations. We do not anticipate that the proposed project would adversely impact any state or federally listed, or proposed for listing, threatened or endangered species. We do not anticipate that the proposed project would jeopardize the continued existence of any species or critical habitat of any fish, wildlife, or plant that is designated as endangered or threatened. If you have any information that would alter that determination, please include it in your response to us so it can be evaluated and included in the EA.

The information provided should allow you to make preliminary comments on the proposed project. A timely review of this information and a written response for inclusion into both EAs would be greatly appreciated. Please provide your written recommendations, comments, and concerns relative to resources in your area of expertise no later than 30 days from the date of this letter.

In addition, we request that you provide us with any potential environmental restoration concepts that may fall under Section 1135 or Section 204 program authorities. These programs are authorized by the Water Resources Development Act (as amended) and require a non-Federal sponsor to cost share a percentage of project costs (details of the cost share vary between these programs). The Section 1135 program focuses on environmental quality improvement at water resources projects constructed by the Corps, which are feasible and consistent with authorized project purposes. The Section 204 program authorizes the protection, restoration, and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging activities at an authorized Federal navigation project. We are interested in pursuing restoration ideas relative to these programs as we execute our channel maintenance responsibilities. Your ideas are appreciated.

If you have any questions, please call Mr. Randy Kraciun of our Economic and Environmental Analysis Branch, telephone 309/794-5174, or write to our address above, ATTN: Planning, Programs, and Project Management Division (Randy Kraciun).

Sincerely,

ORIGINAL SIGNED BY

Kenneth A. Barr
Chief, Economic and Environmental
Analysis Branch

Enclosures

DISTRIBUTION LIST

Mr. Rick Nelson
Field Supervisor
U.S. Fish and Wildlife Service
4469 - 48th Avenue Court
Rock Island, IL 61201

Mr. Francis Lyons
Regional Administrator
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Director
Western Rivers Operations (OB)
U.S. Coast Guard, Eighth District
1222 Spruce Street
St. Louis, MO 63103-2832

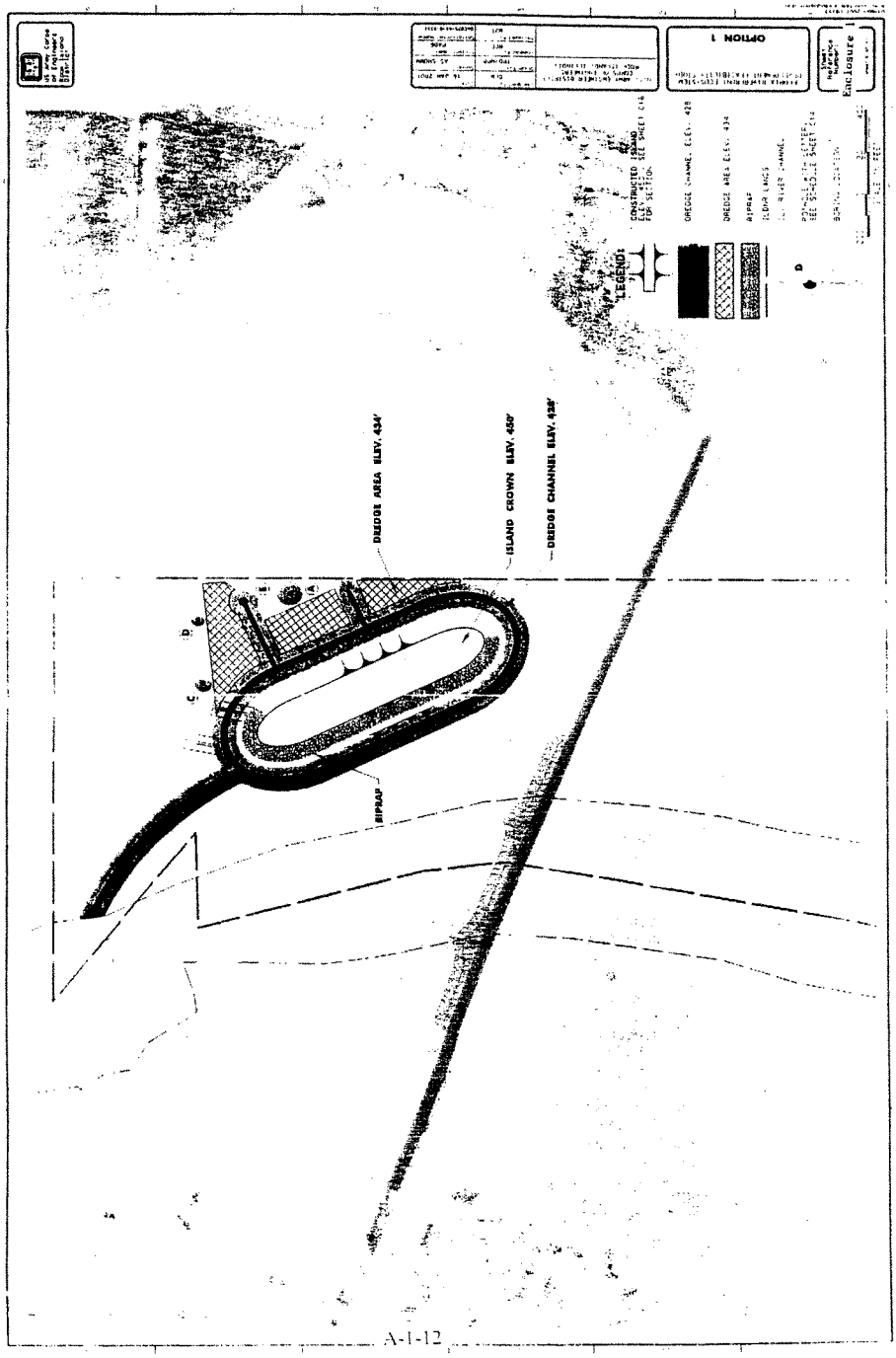
Mr. Dennis Kennedy
Senior Water Resources Engineer
Office of Water Resources
Illinois Department of Natural Resources
524 South 2nd Street
Springfield, IL 62701-1787

Mr. Bruce Yurdin
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, IL 62794

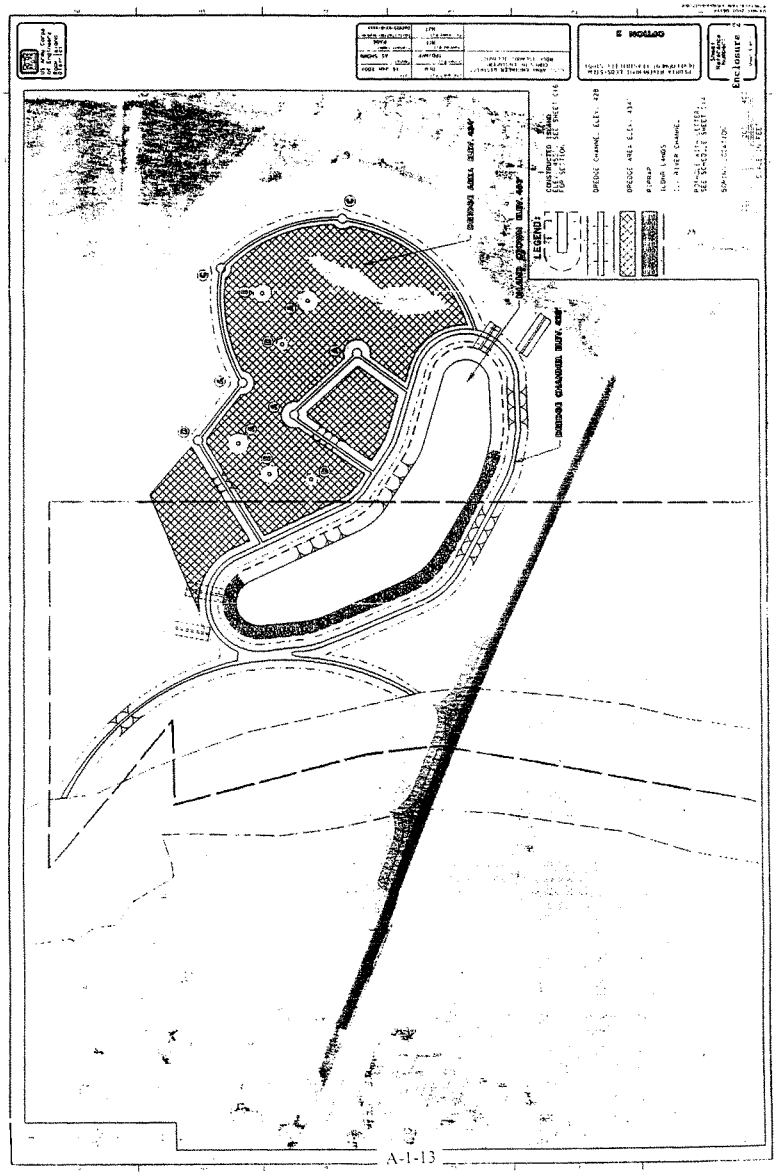
Mr. Robert Schanzle
Illinois Department of Natural Resources
Lincoln Tower Plaza
524 South 2nd Street
Springfield, IL 62701-1787

Mr. Mike Cochran
Illinois Department of Natural Resources
700 South 10th Street
Havana, IL 61231

Mr. Vern Kleen
Natural Heritage Division
Illinois Department of Natural Resources
524 South 2nd Street
Springfield, IL 62701-1787


OPTION 1
Enclosure 1
LEGEND:
DREDGE CHANNEL, ELEV. 438
DREDGE AREA ELEV. 434
RIPRAP
FLOAT LINES
DREDGE AREA ELEV. 434'
ISLAND CROWN ELEV. 450'
DREDGE CHANNEL ELEV. 438'
RIPRAP

A-1-12



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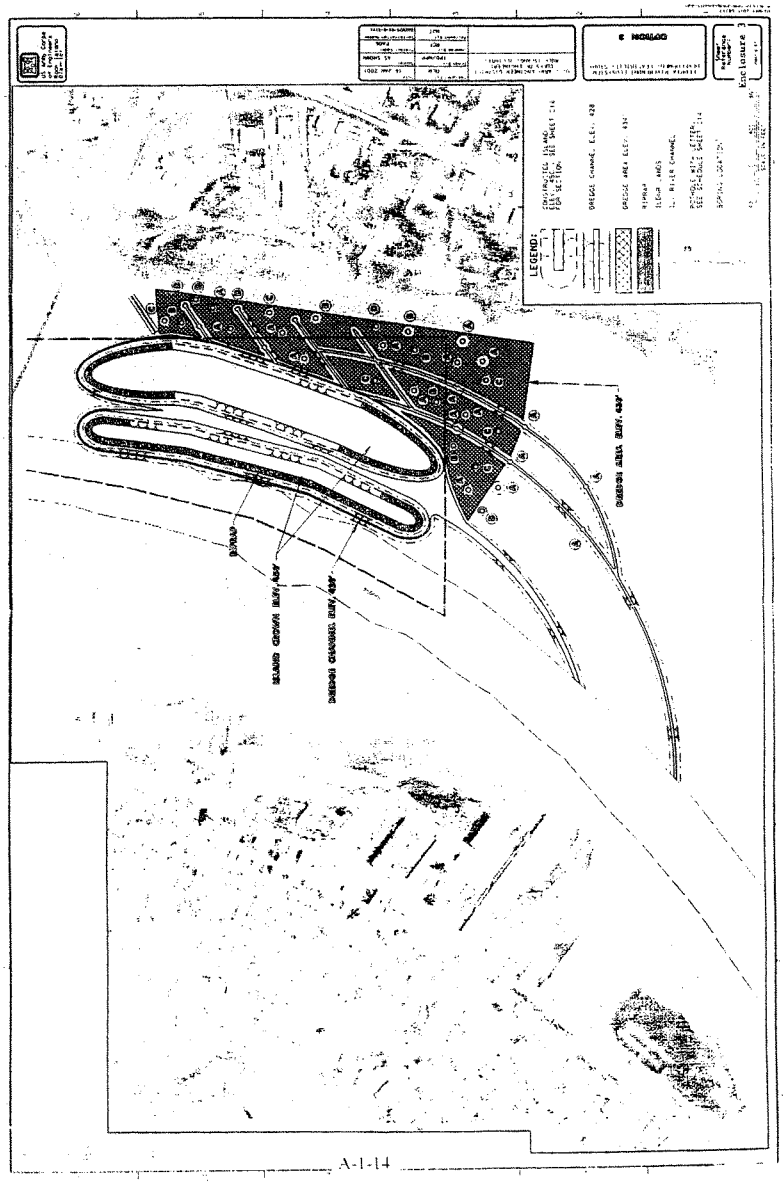
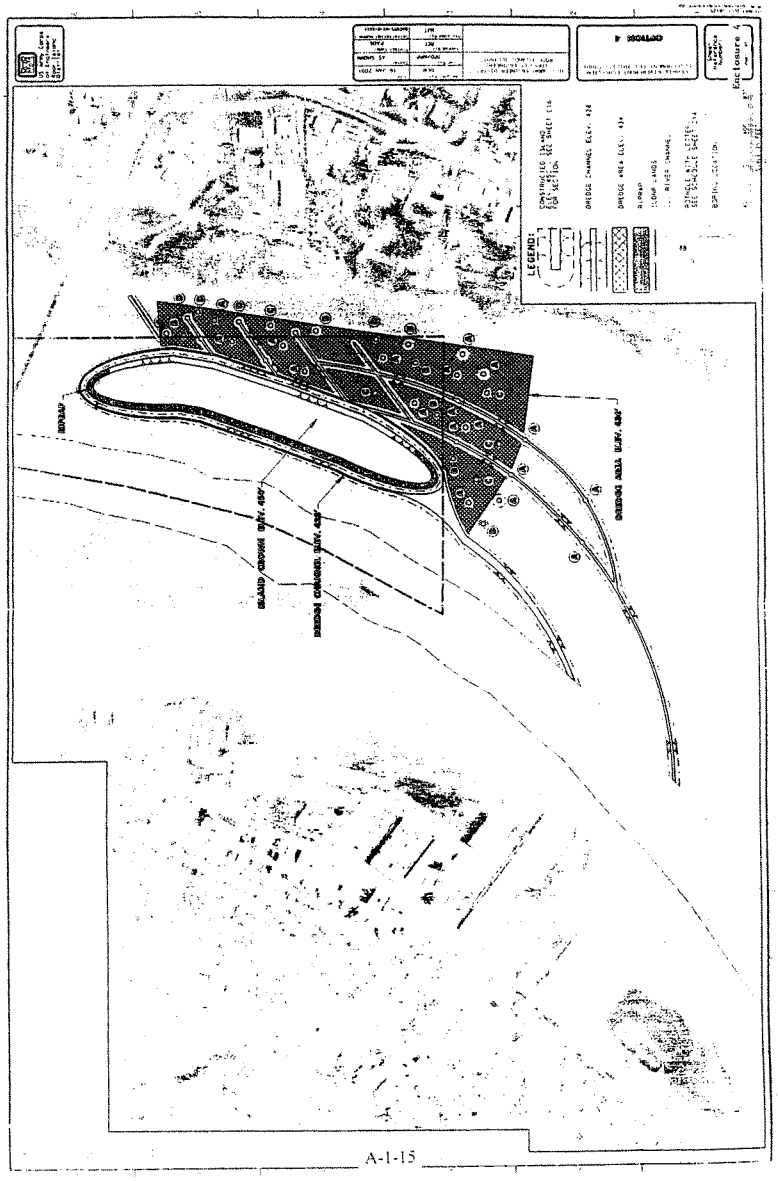
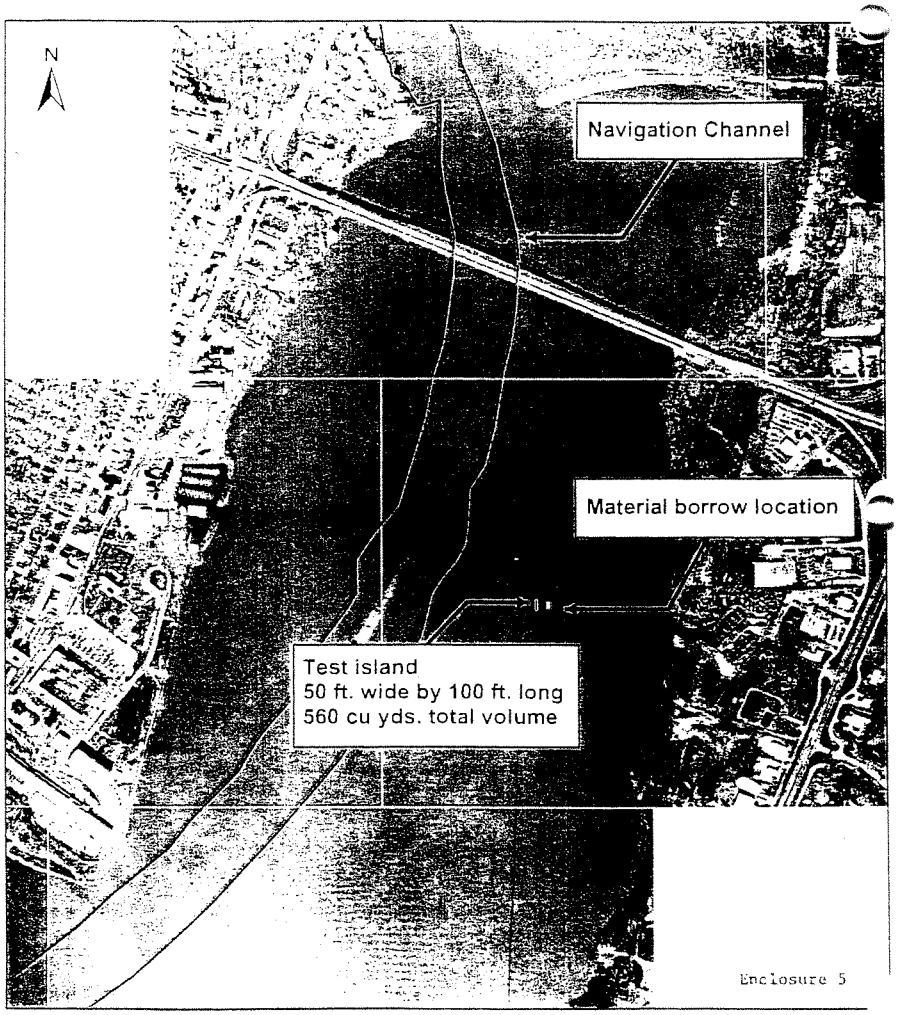

LEGEND
A-1-14


LEGEND
A-1-15

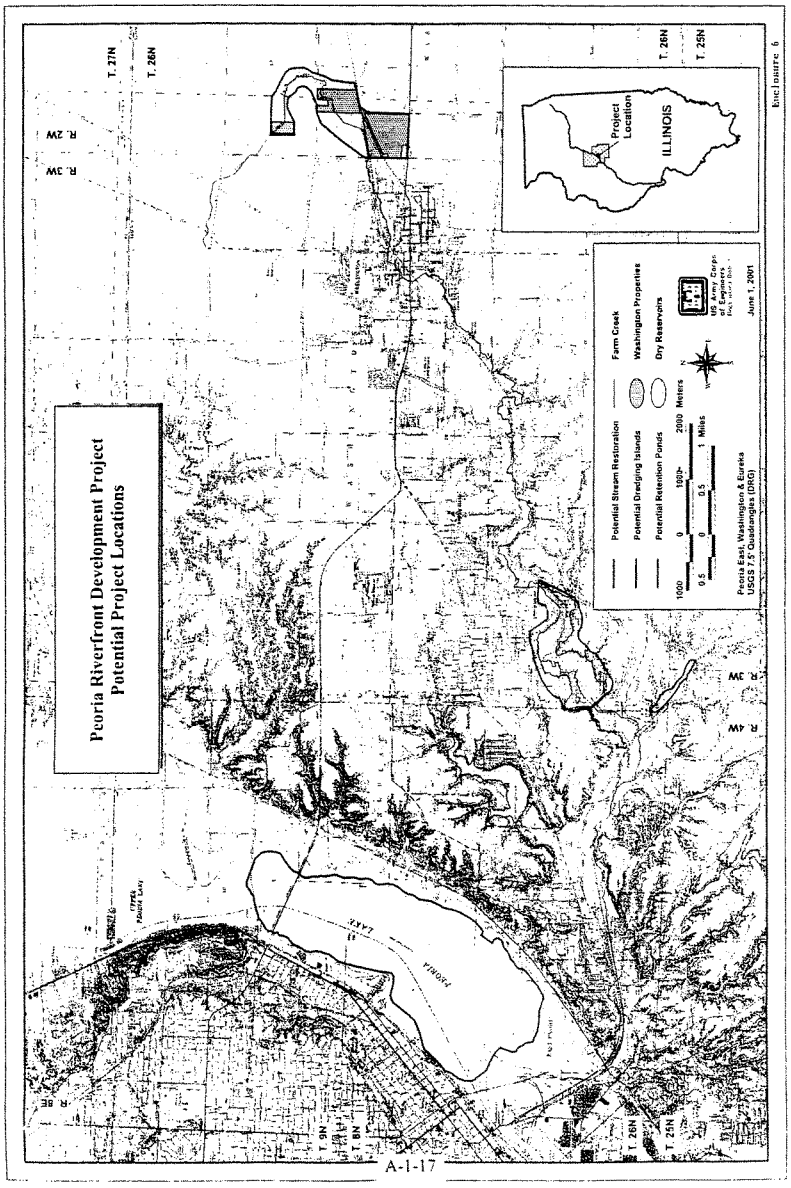
Proposed Materials Testing Island



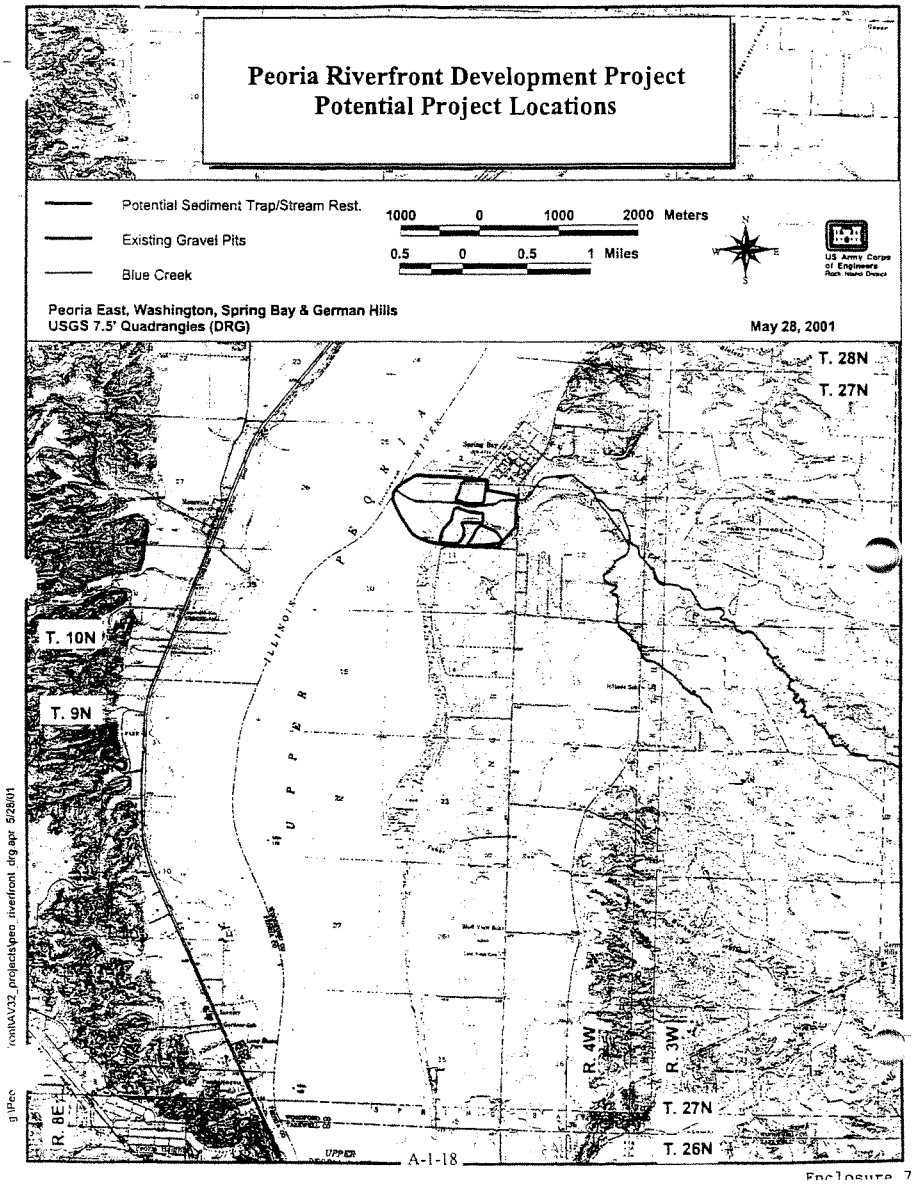
U.S. Army Corps of Engineers

For More Information contact:
Michael Tarpey, P.E.
CENWR-ED-DN

A-1-16


Peoria Riverfront Development Project
Potential Project Locations
Enclosure 6
T. 27N
T. 26N
T. 25N
R. 2W
R. 3W
R. 4W
R. 5E
T. 9N
T. 8N
T. 26N
T. 25N
Project Location
ILLINOIS
Potential Stream Restoration
Potential Dredging Islands
Potential Retention Ponds
Farm Creek
Washington Properties
Dry Reservoirs
1000 0 1000 2000 Meters
0.5 0 0.5 1 Miles
Peoria East, Washington & Eureka USGS 7.5' Quadrangles (DRG)
June 1, 2001
PEORIA LAKE
LAKE

A-1-17



A-1-18

Enclosure 7

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
4469 48th Avenue Court
Rock Island, Illinois 61201
Phone: (309) 793-5800 Fax: (309) 793-5804

IN REPLY REFER TO

FWS/RIFO

June 27, 2001

Colonel William. J. Bayles
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Bayles:

This responds to your request for early comments concerning the Peoria Lake feasibility study. These comments are provided for consideration during future project planning and for completion of the required Environmental Assessments.

The study area includes portions of Peoria Lake in Peoria Pool on the Illinois River and several of its tributaries (Farm Creek, Ackerman Creek, and Blue Creek) in Tazewell and Woodford Counties, Illinois. The purpose of the project is to restore deep water aquatic habitat within Peoria Lake and to reduce future sediment delivery into the lake.

To facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies are required to obtain from the Fish and Wildlife Service information concerning any species, listed or proposed to be listed, which may be present in the area of a proposed action. Therefore, we are furnishing you with a list of species which may be present in Tazewell and Woodford Counties.

The threatened bald eagle (*Haliaeetus leucocephalus*) is known to winter in Tazewell and Woodford Counties. Eagles utilize Peoria Lake habitats for behaviors including perching and roosting in large shoreline trees as well as hunting for fish in open water areas. We do not have any records of eagles nesting in the project area. The eagle may not be harassed, harmed, or disturbed when present, and clearing of large shoreline trees and potential nest trees should be avoided.

The threatened decurrent false aster (*Boltonia decurrens*) is known to occur in Tazewell and Woodford Counties in the Illinois River floodplain, where it occupies disturbed alluvial soils. This species has recently been recorded at several locations along Peoria Lake, including the vicinity of the proposed activities on Blue Creek. Prior to construction, a survey for the

species will be required to determine whether any individuals are in the project area. The result of the survey should be shared with this office so that an appropriate course of action can be identified. Formal consultation under the Endangered Species Act may be required if this species is present in the immediate project area. Federal regulations prohibit any commercial activity involving this species or the malicious damage or removal of this species from Federal land or any other lands in knowing violation of state law or regulation, including state criminal trespass law.

The threatened lakeside daisy (*Hymenoxys herbacea*) is known to occur in Tazewell County, where it has been introduced. However, it does not occur in the study area and will not be affected by the proposed project.

Peoria Lake Islands and Dredging

Potential activities within Peoria Lake include dredging and island construction in the upper portion of Lower Peoria Lake near the McClugage Bridge (US Hwy 150). Alternatives with various dredging and island configurations, ranging in size from approximately 22 acres to 288 acres, remain open to consideration. To compare habitat benefits of various alternatives, Wildlife Habitat Appraisal Guide (WHAG) analyses were completed by a team with representatives from the Corps of Engineers, Illinois Department of Natural Resources, Illinois Natural History Survey, and Nature Conservancy. As expected, the results showed that habitat benefits are positively correlated with the size of the project areas.

All alternatives evaluated by the WHAG team included both dredging and island construction components. Since the current array of alternatives has been expanded to include dredging with off-site disposal (i.e., no island construction), the WHAG results should not be considered valid for any alternatives which do not include island construction. In particular, sedimentation rates for alternatives involving island construction versus alternatives with no island construction should not be assumed to be equal for any future analyses.

We understand that substrate conditions in the project area have recently brought into question the likelihood of success for island construction. This is unfortunate because a project combining dredging and island features would clearly provide greater habitat diversity and value when compared to a dredging project lacking island construction. Thus, if island construction is deemed not possible, then the merits of dredging alone are questionable due to the excessive sedimentation problem in the lake. Any alternatives involving dredging in the absence of island construction should be pursued only if it is demonstrated that beneficial depths can be sustained over time. If dredged materials are removed from the lake for off-site disposal, we support efforts to find beneficial uses for the material.

A 100-ft x 50-ft test island comprised of approximately 560 cubic yards of dredged material is proposed for construction prior to implementation of a full-scale project in order to determine substrate suitability for island construction. We support the construction of a test island. This would provide an opportunity to check the likelihood of success for the proposed full-scale project and to determine whether or not the assumptions, particularly the estimated sedimentation rates, used in the WHAG analysis are valid. If actual sedimentation rates differ

significantly from those assumed in the analysis, the results should be revised accordingly.

With respect to both the full-scale and test projects, potential water quality problems resulting from sediment disturbances during construction are of concern. Measures to ensure compliance with water quality standards should be implemented for both projects.

Farm Creek
Potential activities on Farm Creek include bank stabilization, construction of detention basins, and restoration of an old oxbow. We have no objection to the proposed actions along Farm Creek. However, a combination of features is preferable and would provide greater overall habitat benefits.

Ackerman Creek
Possible restoration activities on Ackerman Creek include bank stabilization and/or riffle/pool structures. While we do not object to the implementation of either bank stabilization measures or construction of riffle/pool structures, we strongly prefer that such features be used in combination with each other as opposed to one feature being used in lieu of the other. Combined features will provide greater improvements in stream stability and habitat conditions.

Blue Creek
Potential activities on Blue Creek include diverting the stream into a gravel pit, which would act as sediment trap. As stated previously, the threatened decurrent false aster has been recorded in the vicinity of the proposed work on Blue Creek. A survey for the species will be required to determine whether any individuals are in the immediate project area so that appropriate conservation measures can be identified and implemented as needed.

Thank you for the opportunity to provide comments on this project. This letter provides comments under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); and the Endangered Species Act of 1973, as amended. If you have any questions concerning these comments, please contact Lauri Walters of my staff at 309/793-5800, ext 513.

Sincerely,

Wayne A. Fischer
for Richard C. Nelson
Supervisor

cc: ILDNR (Schanzle)
ILDNR (Cochran)
ILEPA (Yurdin)

G:\WP_Docs\LAURI\peoria.wpd

Illinois
Department of
Natural Resources
http://dnr.state.il.us
524 South Second Street, Springfield, Illinois 62701-1787
George H. Ryan, Governor • Brent Manning, Director

July 18, 2001

Mr. Kenneth A. Barr, Chief
Economic and Environmental Analysis Branch
Department of the Army
Rock Island District, Corps of Engineers
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

ATTN: Randy Kraciun
Environmental Analysis Section

Dear Mr. Barr:

Reference is made to your letter of June 7, 2001 concerning the Rock Island District's ongoing feasibility study to investigate enhancing aquatic habitat in Peoria Lake on the Illinois River, including options to reduce sediment delivery and deposition to Peoria Lake. The subject letter requests early comments on the various projects being considered within the overall feasibility study, as well as specific comments concerning the proposed construction of a small-scale trial, or test island, that will be covered by a separate Environmental Assessment.

We have compared the various project sites to the Illinois Natural Heritage Database and wish to offer the following site specific comments:

Dredging and Island Construction - the sites being considered for dredging and island construction are located in the upper northeast portion of Lower Peoria Lake near the McClugage Bridge, in Township 26 North, Range 4 West, sections 10 and 15, respectively. The database contains a 1998 record of the federally listed decurrent false aster, *Boltonia decurrens*, at the west end of McClugage Bridge, and a 2000 record on the east side of the river at Cooper Park (Attachment 1). Given the known presence of *Boltonia* in the vicinity, we recommend that surveys be conducted for the species at any shoreline or upland areas that might be disturbed by equipment staging or other construction-related disturbances, and that steps be taken to avoid adverse impacts. Additionally, the downstream island, if constructed, will lie immediately riverward of the Cooper Park North Illinois Natural Areas Inventory (INAI) site, and the potential for adverse impacts associated with its construction should be addressed in the Environmental Assessment.

Test Island - the proposed test island is located in the same general area as the downstream-most of the larger island projects: Township 26 North, Range 4 West, Section 15. We would again call to your attention the presence of *Boltonia* in the general vicinity as well as the Cooper Park North INAI site nearby.

Farm Creek near Washington - The City of Washington has purchased parcels along Farm Creek which they propose to develop into detention basins, both to create wetland habitat and to slow flows

Printed on recycled and recyclable stock

into and within Farm Creek. These parcels are located in Township 26 North, Range 2 West, sections 7 and 18. The database indicates no records of endangered/threatened species or natural areas in their vicinity.

Farm Creek behind the Farmdale Dam - this area, located in Township 26 North, Range 3 West, sections 29 and 30, is being considered for possible stream restoration within the existing dry reservoir. Restoration activities might include such things as rock weir structures, re-connection of an oxbow, bank stabilization, etc. While no threatened/endangered species are reported from the project area, an Illinois Natural Areas Inventory (INAI) site, the Farm Creek Geological Area, is located in the southeast quarter of Section 30 (Attachment 2). Provided construction activities are restricted to the stream channel, adverse impacts to the INAI site appear unlikely.

Ackerman Creek - a short reach of the creek located mostly in Township 26 North, Range 3 West, Section 31 and Township 25 North, Range 3 West, Section 6 is being considered for restoration with bank stabilization and/or pool and riffle structures. The database contains no records of endangered/threatened species or natural areas in the vicinity.

Blue Creek - this is an intermittent stream which carries a large sediment load into upper Peoria Lake during flow periods. An alternative being considered is to divert the stream into an existing quarry located in Township 27 North, Range 4 West, Section 11, which would act as a sediment trap. The database contains a 1995 record of *Boltonia decurrens* in the northwest quarter of Section 11 (Attachment 3). As with the island creation sites discussed above, we recommend that a survey be conducted for this species in any areas that might be subject to construction-related disturbances and that steps be taken to avoid impacts.

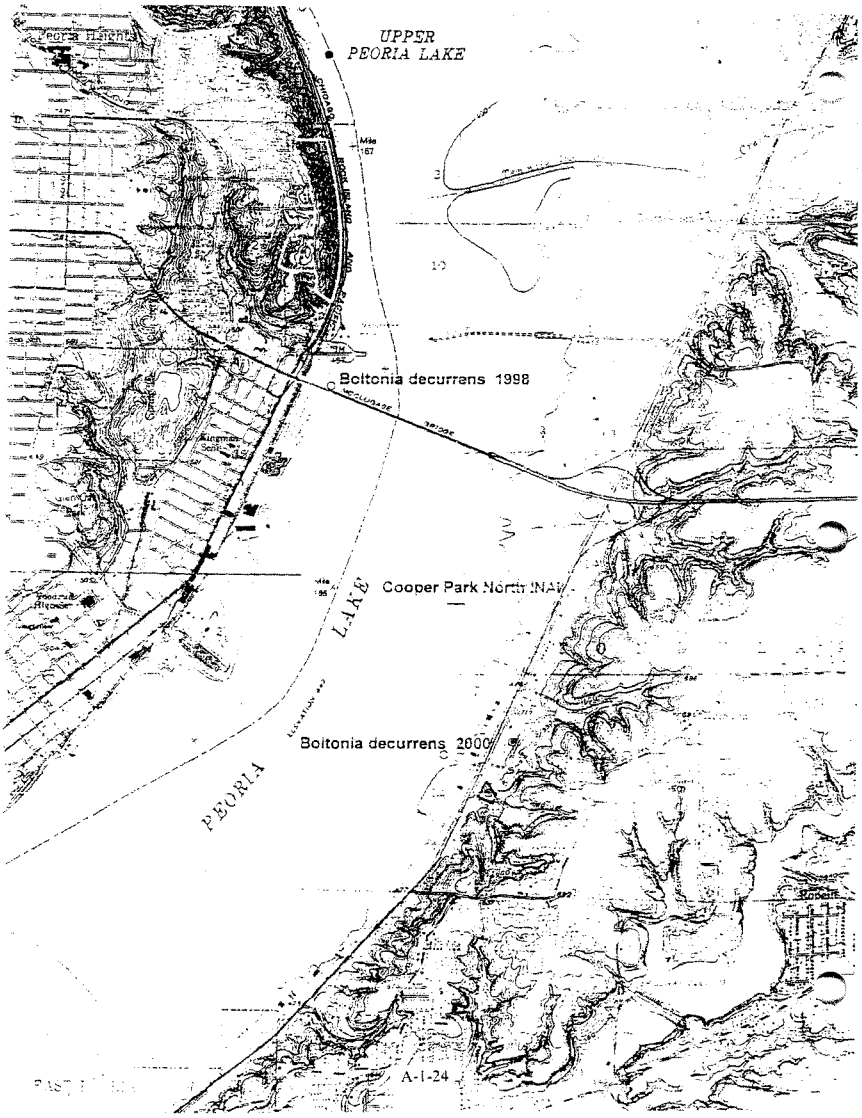
The Illinois Department of Natural Resources is participating with the Rock Island District in the Peoria Lake studies as a cost-share sponsor. We look forward to continued close coordination with your agency as the feasibility report and integrated Environmental Assessment are finalized. Please contact Jim Mick, Illinois River Basin Coordinator, at 309-543-3316 if we can be of any assistance at this time. Questions about the contents of this letter can be directed to me at 217-785-4863.

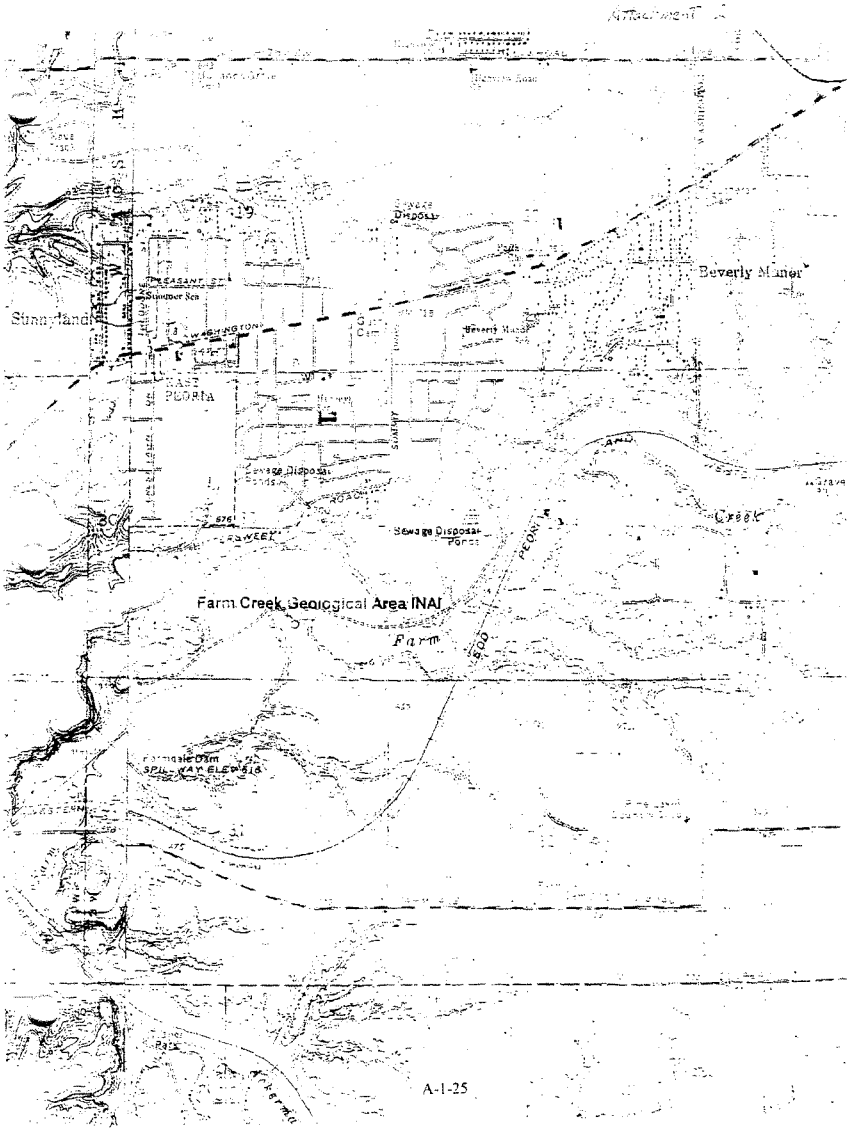
Sincerely,

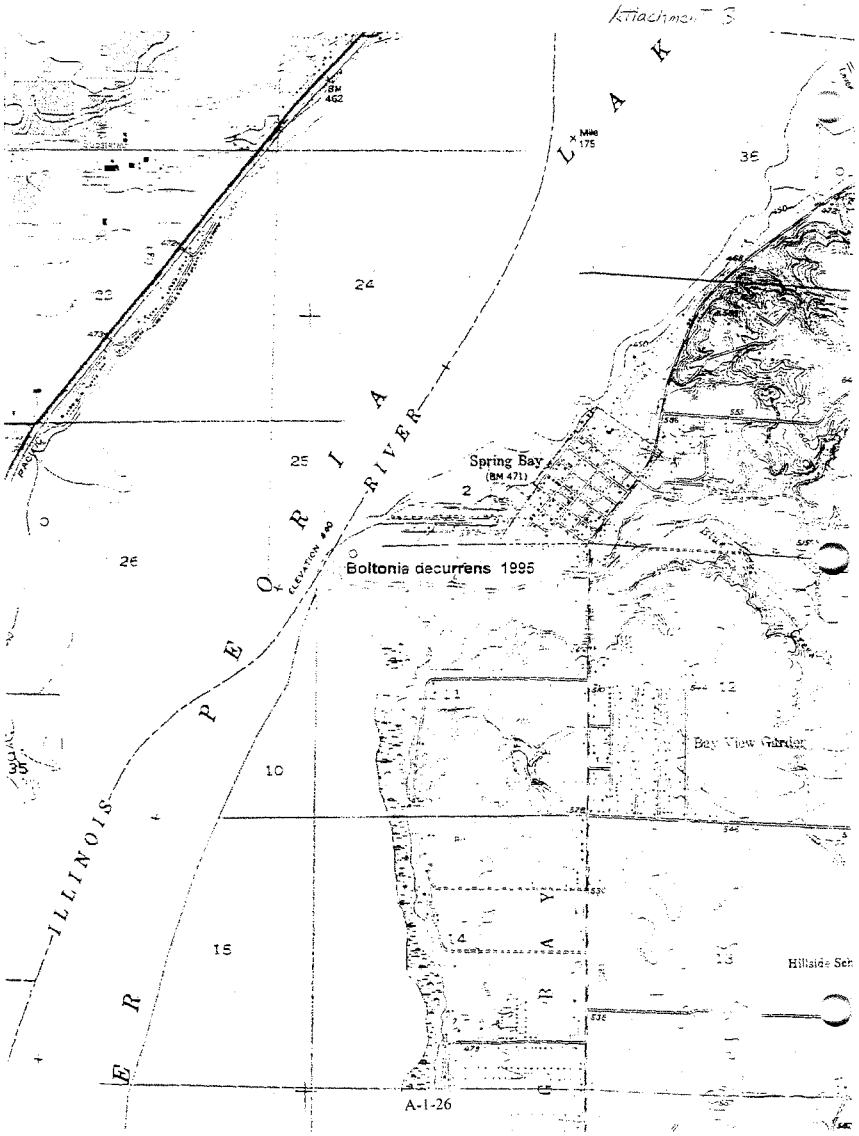
Robert W. Schanzle
Permit Program Manager
Office of Realty and Environmental Planning

RWS:rs
Attachments

cc: IDNR/ORC (Mick), IDNR/OWR (Kennedy), IEPA (Yurdin), USFWS (Nelson), USEPA (Pierard)


UPPER
PEORIA LAKE
Boltonia decurrens 1998
Cooper Park North (NAV
Boltonia decurrens 2000
PEORIA
LAKE
A-1-24


Beverly Manor
Sunnyland
Creek
Farm Creek Geological Area INAI
Farm
A-1-25


Spring Bay
(BM 471)
Boltonia decurrens 1995
Bay View Garden
Hillside Sch
ILLINOIS
PEORIA
LAKE
RIVER
A-1-26

ILLINOIS
DEPARTMENT OF
NATURAL RESOURCES
Office of Water Resources
524 South Second Street, Springfield 62701-1787

FAX

Date: Sept 28, 2001
Number of pages including cover sheet: 2

To: Randy Kracium
Phone:
Fax phone: 309/794-5157
CC:

From: Mike Diedrichsen
Phone: 217/782-3862/3863
Fax phone: 217/524-1454

REMARKS: ☒ FYI ☐ Urgent ☐ Reply ASAP ☐ Please review & comment ☐ As Requested

Re: Peoria Riverfront Ecosystem Development

Randy,

Copies of the rules and statewide permits referred to in the memo can be seen on the internet at:

http://dnr.state.il.us/waterresources/index.htm

intraoffice memorandum

to: File

from: Mike Diedrichsen MLD

date: September 28, 2001

subject: Inquiry; U.S. Army Corps of Engineers; Peoria Riverfront Ecosystem Development; Tazewell & Woodford Counties

I am just now getting to the Corps' June 7, 2001 request for input on the subject proposed work. My brief comments on the various aspects of the project are as follow:

1. **Dredging and Island Construction** - Bob Dalton has been working with the Corps on the hydraulic modeling of the islands to ensure compliance with our Floodway Construction rules. This portion of the project would also need to comply with our Public Waters rules which require that any impairment of the public's interests in the water be minimized and mitigated to the fullest practicable extent and that there be a public benefit to offset the impairment impacts.

2. **Test Island** - Requirements for the test island would be the same, but on a smaller scale, as for the other proposed islands.

3. **Farm Creek Detention Basins near Washington** - I have recently been contacted by Dave Martin of the Corps about the design of these basins. He indicated an awareness that, depending on hazard classification and size, OWR permits may be required in accordance with our Dam Safety rules.

4. **Farm Creek Stabilization behind the Farmdale Dam** - Depending, in part, on the length of stream channel to be affected, this work may be authorized by Statewide Permit No. 9.

5. **Ackerman Creek Stabilization** - Depending, in part, on the length of stream channel to be affected, this work may be authorized by Statewide Permit No. 9.

6. **Diversion of Blue Creek into a Quarry to Serve as a Sediment Trap** - This would require OWR authorization under our Floodway Construction rules but would likely be permittable if designed to prevent headcutting of the Blue Creek channel upstream of the quarry.

MLD
cc: Randy Kraciun

Received Sept 01

Illinois Historic
Preservation Agency

1 Old State Capitol Plaza • Springfield, Illinois 62701-1507 • (217) 782-4836 • TTY (217) 524-7128

Peoria County Please refer to: IHPA LOG #001109002GK-P
Lower Peoria Lake, Peoria & Tazewell Counties, IWW RM 163-167
Potential Island Creation/Dredging & Stream or Watershed Restoration
Feasibility Study - Peoria Riverfront Development (Ecosystem Restoration) Project

October 30, 2001

Mr. Kenneth A. Barr
U.S. Army Corps of Engineers, Rock Island District
Chief, Environmental Analysis Branch
Clock Tower Building/P.O. Box 2004
Rock Island, IL 61204-2004

Dear Sir:

Re: Results of Phase I Survey - Acres: 176.00; Sites: 1; Contractor: ARG #1137

Thank you for submitting the draft results of the archaeological Phase I reconnaissance survey for the project referenced above. Our comments are required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

r staff has reviewed the draft archaeological Phase I reconnaissance report that you mitted for this project. We understand that the area that was surveyed constitutes the ual project locations selected from the potential project locations depicted in your correspondence dated 7 November 2000. The Phase I survey and assessment of the archaeological resources within the chosen project locations appear to be adequate.

We concur that archaeological site 11-T-410 is potentially significant and, consequently, may be eligible for listing on the National Register of Historic Places under Criterion "D". As the watershed restoration project boundaries have been redesigned to avoid 11-T-410, we concur that no historic properties are affected by the restoration project.

We also concur that no historic properties are affected by the proposed rock jetties and rock closing structures, which are new elements of the island creation component of the proposed project.

We look forward to receiving two copies of the final survey report for our files. Please retain this letter as evidence for SHPO consultation in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. Please resume consultation with our Office should there be unanticipated discovery of historic properties during construction.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

AEH:FRK

Mr. Ron Deiss, COERI

Illinois Department of Agriculture George H. Ryan, Governor • Joe Hampton, Director

Bureau of Land and Water Resources
State Fairgrounds • P.O. Box 19281 • Springfield, IL 62794-9281 • 217/782-6297 • TDD 217/524-6858 • Fax 217/557-0993

November 8, 2001

Mr. Randy Kraciun
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Re: Peoria Riverfront Development
City of Washington
USDA NRCS Form AD-1006

Dear Mr. Kraciun:

In response to your October 1, 2001 letter to James Johnson requesting initiation of the USDA NRCS Form AD-1006 for the above referenced project, enclosed is the completed form. Also included is a copy of the revised Illinois LESA System for your reference.

The Illinois Department of Agriculture (IDA) looks forward to providing comments for the draft environmental assessment in order to determine its compliance with the federal Farmland Protection Policy Act (7 USC 4201 et seq.) and, thus, the Illinois Farmland Preservation Act (505 ILCS 75/1 et seq.).

Should you have any questions about the Form AD-1006 form, please contact Terry Savko of my staff at 217-785-4458.

Sincerely,

Steve Frank, Chief
Bureau of Land and Water Resources

SF:TS

Enclosures -3

cc: Director Joe Hampton, IDA
Joan Messina, IDA
Mike Williams, IDA
Anita Kratochvil, IDA
John Herath, IDA
Warren Goetsch, IDA

(4)

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)	Date Of Land Evaluation Request
Name Of Project: Peoria Riverfront Develop./Washington	Federal Agency Involved: U.S. Army CORPS
Proposed Land Use: Wetland/Prairie Restoration	County And State: Tazewell, IL.
PART II (To be completed by SCS)	Date Request Received By SCS: 10-12-01

Does the site contain prime, unique, statewide or local important farmland? (If no, the FPPA does not apply -- do not complete additional parts of this form). Yes [X] No [ ]

Acres Irrigated: — Average Farm Size: 372

Major Crop(s)	Farmable Land In Govt. Jurisdiction	Amount Of Farmland As Defined in FPPA
Corn, Soybeans, Wheat, Hay	Acres: 29,633,500 % 97	Acres: 27,695,900 % 91
Name Of Land Evaluation System Used: Illinois	Name Of Local Site Assessment System: Statewide	Date Land Evaluation Returned By SCS: 10-25-01

PART III (To be completed by Federal Agency)	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	135			
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	135			
PART IV (To be completed by SCS) Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	110			
B. Total Acres Statewide And Local Important Farmland	25			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.0005			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	72.8			
PART V (To be completed by SCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)	91			

PART VI (To be completed by Federal Agency) Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))	Maximum Points	
1. Area In Nonurban Use		See attached ILLINOIS LESA System factors
2. Perimeter In Nonurban Use		
3. Percent Of Site Being Farmed		
4. Protection Provided By State And Local Government		
5. Distance From Urban Builtup Area		
6. Distance To Urban Support Services		
7. Size Of Present Farm Unit Compared To Average		
8. Creation Of Nonfarmable Farmland		
9. Availability Of Farm Support Services		
10. On-Farm Investments		
11. Effects Of Conversion On Farm Support Services		
12. Compatibility With Existing Agricultural Use		
TOTAL SITE ASSESSMENT POINTS * 200	~~160~~	126
PART VII (To be completed by Federal Agency)		
Relative Value Of Farmland (From Part V)	100	91
Total Site Assessment (From Part VI above or a local site assessment) * 200	~~160~~	126
TOTAL POINTS (Total of above 2 lines) * 300	~~260~~	217

Site Selected: | Date Of Selection: | Was A Local Site Assessment Used? Yes [ ] No [X]

Reason For Selection:

When using the Illinois Site Assessment Factors, 200 points are ~~assigned~~ assigned to the Site Assessment section of the LESA system for a maximum score of 300 points.

A-1-31

Peoria Riverfront Development
City of Washington, Tazewell County, Illinois
US Army Corps of Engineers, Rock Island District Funds

PART VI-A Illinois Site Assessment Criteria	Maximum Points	Site A
1. Land Use on the Site	20	20
2. Adjacent Land Use	20	16
3. General Character of Area Within 1½ Miles of Site	20	16
4. Distance to City	20	0
5. Zoned Use of Proposed Site	20	20
6. Zoned Use of Land Adjacent to Proposed Site	20	16
7. Planned Land Use of Proposed Site	20	20
8. Compatibility of Proposed Use with Surrounding Land Uses	20	0
9. Alternative Sites Proposed on Less Productive Land	10	10
10. Availability of Central Water System	10	2
11. Availability of Central Waste Disposal System (Sewer)	10	2
12. Transportation	10	4
TOTAL SITE ASSESSMENT POINTS	**200**	**126**

PART VII		
Relative Value of Farmland	100	91
Total Site Assessment	200	126
TOTAL ILLINOIS LESA POINTS	**300**	**217**

110601
TS

US Army Corps of Engineers
Rock Island District

PEORIA RIVERFRONT DEVELOPMENT ENVIRONMENTAL RESTORATION FEASIBILITY STUDY NEWSLETTER

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Newsletter No. 3 May 2002

JUNE 19, 2002, PUBLIC MEETINGS SCHEDULED

The Illinois Department of Natural Resources and the U.S. Army Corps of Engineers, Rock Island District are nearing the completion of the Peoria Riverfront Development Environmental Restoration Feasibility Study. The study is now in the public review phase. A draft report containing the study team's proposed recommendations is available for public review at the Peoria Public Library, 107 Northeast Monroe Street, and at the East Peoria Public Library, 406 Illinois Street. The draft report also is available for review at the following website address: http://www.mvr.usace.army.mil/Peoria/. The public review phase will end on June 28, 2002.

During this review period, the Department of Natural Resources and the Corps of Engineers will host afternoon and evening public meetings on June 19, 2002. The purpose of the meetings is to explain to the public the alternatives that the study team has selected to enhance the Peoria Lake and Farm Creek environment. Details about the location, times, and format of the public meetings are provided on page 4 of this newsletter.

STUDY BACKGROUND

The U.S. Army Corps of Engineers, Rock Island District, and the Illinois Department of Natural Resources entered into a feasibility study cost-sharing agreement in October 1999 and became "partners" in a combined effort to restore the environment in the Illinois River along the Peoria Riverfront. The study area includes Lower Peoria Lake and the Farm Creek Watershed.

The Peoria Lake study area is approximately 130 miles long, from Henry, Illinois, to Naples, Illinois. Various locations were looked at within the study area, including both Upper and Lower Peoria Lakes. Early in the study process, the Corps of Engineers – Department of Natural Resources study team agreed that due to degradation of the lakes and loss of depth and diversity, restoration in either Upper or Lower Peoria Lake would provide very similar benefits. Therefore, based on study authority which specifically references the Peoria Riverfront, previous studies identifying suitable locations within the Lower Peoria Lake, and sponsor and local interest, the study team determined that restoration alternatives would focus on the Lower Peoria Lake.

Once it was determined that the focus of the alternatives would be Lower Peoria Lake, the tributaries draining to this area became the logical place for tributary alternatives to be investigated. The Farm Creek watershed has a locally led planning effort underway, funded by the Illinois Environmental Protection Agency (EPA). This planning effort has generated a comprehensive basin inventory, agency support – both financial and technical, and a consensus on watershed restoration and management goals, objectives, and actions. These activities were occurring concurrently with the Feasibility Study.

STUDY GOAL AND OBJECTIVES

The main goal of the study was to enhance aquatic habitats by restoring depth diversity and reducing sediment delivery and deposits in Peoria Lake, with secondary benefits to recreational boating and fishing.

Objectives to address this goal were to:

- **Restore depth diversity** – Sedimentation has resulted in the loss of lake depth and volume while filling the lake to a nearly uniform shallow depth outside of the navigation channel. These changes have severely impacted a number of historic habitat types including off-channel overwintering, spawning, and nursery habitat for fish. Increasing overall depth and variability of depth would restore currently limited habitat to the lake area.
- **Provide structure for aquatic organisms** – Due to sedimentation, much of the lake bottom has a uniform shallow depth with a silt substrate. Introducing additional structure (e.g., rock jetties/reefs, woody debris, etc.) would provide valuable refuge, feeding, spawning, and nursery areas for aquatic organisms.
- **Increase habitat diversity** – As part of any restoration features, efforts should be made to restore the overall habitat diversity within Peoria Lake. Providing deepwater channels and holes through shallower areas and creating islands to increase shoreline area and provide additional terrestrial

habitat would restore some of the former diversity which was historically present in the lake.

- **Improve habitat value for migratory waterfowl and shorebirds** – The Illinois River Valley is part of the Mississippi River flyway, a migration route for hundreds of thousands of waterfowl, shorebirds, and neotropical migrants. However, the study area has not been well utilized in recent times. Additional areas for waterbird resting, nesting, and feeding should be evaluated.
- **Improve water quality** – Due to the extensive lake size and shallow water depths, Peoria Lake is highly susceptible to wind and wave action that result in the resuspension of sediments, further limiting fish, aquatic vegetation, macro-intertebrates, and mussels. Reducing sediment resuspension would provide considerable benefits to aquatic species. Further, impaired water quality due to sedimentation has resulted in Farm Creek being placed on the EPA 303(d) list of impaired waters. Reduced sediment delivery to Farm Creek from its tributaries will improve water quality in the stream upstream of Farmdale Dam.
- **Maximize sustainability of project features** – If restorative measures are implemented, considerable effort should be directed to making project features sustainable (e.g., bank protection to stabilize islands, sufficient flow to minimize sedimentation, or deflection of sediment from dredged areas).
- **Reduce sediment delivery to Peoria Lake from tributary streams** – The direct tributaries to Peoria Lake compose 3% of the total drainage area at Peoria, and deliver 40% or more of the sediment deposited in the lake. Reducing sediment transport from this relatively small area would result in considerable reductions in total sediment rates in the lake.
- **Create riparian and wetland habitat along tributary streams** – Restoring prairie and wetlands along tributaries presents opportunities to restore significant habitat types that were formerly abundant in the state, but that have been greatly reduced.

STUDY CRITERIA FOR PEORIA LAKE

Several alternatives were considered to meet the objectives isted above. Criteria used to weigh the alternatives were:

- The measures should be designed to meet identified biological goals – primarily focused on creating aquatic habitat for fish (overwintering, spawning, nursery, and feeding), while maximizing habitat diversity to benefit waterfowl, shorebirds, invertebrates, and plants.
  - Overwintering habitat – depth of greater than 6 feet optimal.
  - Spawning and nursery habitat – varies by species, however firm substrate preferred..
- Minimal Operations and Maintenance to maintain measures (sustainability).
- Measures must be acceptable to the wide range of interested local and State parties (acceptability – effects on views, recreational use potential).

Along with the criteria listed above, the study team also considered cost effectiveness, resource significance, hydrology and hydraulics, public acceptability, and real estate considerations.

POTENTIAL MEASURES FOR PEORIA LAKE

The following measures were considered in the study to achieve the study's goal and objectives and to meet the formulation criteria discussed above.

- **Dredge off-channel areas to greater than 6 feet to serve as overwintering fish habitat** – The average depths of off-channel areas in much of Peoria Lake, outside of the navigation channel, are only 1-2 feet. The proposed restoration measure includes dredging areas to greater than 6 feet of depth. This is proposed to be done as a series of holes and connecting channels. Due to relatively high historic sedimentation rates, some level of overdredging is necessary. The average lake bottom elevation in these areas will be 11 feet or greater.
- **Dredge areas to at least 4 feet to increase diversity of aquatic habitat** – Due to relatively high historic sedimentation rates, some level of overdredging is necessary. This shallow depth will roughly follow historical lake contours and acreage to roughly 6 feet to allow for sedimentation rates.
- **Dredge with island construction to create flowing side channel habitat** – Create flowing habitat for riverine aquatic species, separated from navigation channel. The flow within a created side channel also has the potential to minimize sedimentation and creates the potential for periodic scouring, helping to maintain the deepwater habitat created.
- **Island creation** – The construction of islands would increase habitat diversity by providing shoreline and terrestrial habitat and areas for migratory birds. They can serve as a low-cost placement area for dredged materials from other project measures. Islands also serve as wind and wave breaks to reduce the resuspension of sediments, thereby improving water quality.
- **Aquatic structure** – Much of the lake currently is a uniform depth with a soft substrate. The addition of firm structure, such as rock jetties/reefs, rock riprap,

or root wads, would provide additional habitat diversity.

- **Closing structures** – In areas where there is little potential for higher current velocities to maintain water depth, deepwater habitat created by dredging has the potential to fill rapidly with sediments. Closing structures can help to minimize flow into these deepwater areas, reducing sediment delivery and increasing sustainability. Rock closing structures also provide aquatic structure.
- **Bank protection** – To maximize sediment removal, it is preferable to construct the entire islands out of the river substrate. The fine silt clay that composes this material would require some bank protection to reduce the potential for island erosion due to wind- and wake-generated waves. Rock riprap was chosen as a preferred material due to the additional aquatic structure it provides.

SELECTED RECOMMENDED PLAN PEORIA LAKE

The measures listed above were combined to make various alternative plans. The alternative plans were evaluated and one was found to best meet the criteria for Peoria Lake.

The alternative selected by the study team as the recommended plan is the "Mid-Sized Upper Island – Two Lower Islands with Side Channel" alternative. This alternative best meets the study objectives and would result in the greatest restoration of depth diversity of any of the plans proposed. The overall lake habitat diversity would be increased by adding shoreline and terrestrial habitats associated with the three islands and aquatic structures. The upper and lower features would increase diversity by incorporating different types of deepwater habitat. The dredged area behind the upper island would provide primarily backwater habitat, while the area around the lower islands would provide flowing side channel habitat. The islands would provide valuable resting, nesting, and feeding areas for waterfowl and shorebirds. The islands also would reduce wind- and wake-generated waves in the study area, helping to improve water quality by lowering turbidity levels.

STUDY CRITERIA FOR FARM CREEK

Several alternatives were studied to meet the objectives listed on pages 1 and 2 of this newsletter. Criteria used to weigh the alternatives were:

- Ability to create aquatic habitat (maximize area with 1- to 2-foot depth for wetland benefits).
- Address sediment contribution/instability.
- Proximity/relationship to any project in Peoria Lake.
- No/limited impact on flooding along tributary.
- Willing landowners/potential for partnerships.

POTENTIAL MEASURES FOR FARM CREEK

The following measures were considered in the study to achieve the study's goal and objectives and to meet the formulation criteria discussed above.

- **Wetland impoundments** – Consideration was given to constructing wetland detention ponds. The site is suitable for either one or two wetland ponds. The measures would be designed to maximize the water surface area with a depth of 18 inches. Also, Pool 1 was designed to contain a 50-year rainfall within elevation 748 feet mean sea level.
- **Wetland plantings** – In combination with watershed wetland impoundments, planting shoreline and terrestrial vegetation would help to increase habitat values in the initial years. This would decrease the time for native plants to become established through natural succession. The selected species for wetland plantings include Prairie Cord Grass, Black Willow, and Button Bush.
- **Prairie plantings** – This site is currently in row crop agriculture. Converting some or all of the site to prairie would provide habitat value to many wetland and grassland species. The selected prairie seed mixture is a combination of grasses and forbs resembling a Native Illinois Ecotype.

SELECTED RECOMMENDED PLAN FARM CREEK

The measures listed above were combined to make various alternative plans. The alternative plans were evaluated and one was found to best meet the criteria for Farm Creek.

The alternative selected by the study team as the recommended plan includes a 4-acre and a 3-acre wetland impoundment, with 6 rows of wetland plantings and 35 acres of prairie plantings. This alternative maximizes creating wetland and riparian habitat in the project area, given the constraints over land availability for project features. Although this alternative is not anticipated to have a significant effect on sediment delivery to Peoria Lake due to its size, it will reduce sediment delivery to Farm Creek itself and improve water quality. Implementing additional similar projects throughout the watershed could ultimately result in reductions in overall sediment delivery.

PUBLIC MEETING INFORMATION

Two public meetings will take place on June 19, 2002, at the Gateway Center, 200 North East Water Street, Peoria, Illinois.

The meetings will be held at the following times:

- 2:00 p.m. – 2:30 p.m. – open session
- 2:30 p.m. – 4:00 p.m. – public meeting
- 6:00 p.m. – 6:30 p.m. – open session
- 6:30 p.m. – 8:00 p.m. – public meeting

The format for both meetings will be identical. An open session will be held for the first one-half hour of each meeting. During that period, the public is invited to view study displays. Representatives from the Department of Natural Resources and the Corps of Engineers will be on hand to meet with the public to explain the selected alternatives and to receive public comments.

The public meetings will begin at 2:30 p.m. and 6:30 p.m. The meetings will begin with a formal presentation explaining the selected alternatives and will be followed by a question and answer and comment/statement period.

All persons with an interest in the Peoria Riverfront Development Environmental Restoration Study are encouraged to attend a public meeting.

The results of the public meetings will be summarized in a final newsletter, which will be released at the end of the study.

COMMENTS?

Your comments are important to us. If you have technical comments or questions about the study, please contact Mr. Brad Thompson, Project Manager. Mr. Thompson can be reached by telephone at 309/794-5256 or by email at bradley.e.thompson@usace.army.mil.

You may write to Mr. Thompson at the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: CEMVR-PM-M (Thompson)
Clock Tower Building – P.O. Box 2004
Rock Island, Illinois 61204-2004

The contact for the Illinois Department of Natural Resources is Mr. Jim Mick. Mr. Mick can be reached by telephone at 309/543-3316 or by email at jmick@dnrmail.state.il.

You may write to Mr. Mick at the following address:

Mr. Jim Mick
Illinois River Basin Coordinator
Region III Fisheries Administrator
Illinois Department of Natural Resources
700 South 10th Street
Havana, Illinois 62644

If you are aware persons who may wish to be added to the study's mailing list to receive newsletters and future study mailings, please ask them to contact Ms. Sue Simmons, Corps of Engineers, by telephone at 309/794-5573, or by email at suzanne.r.simmons@usace.army.mil.

Your Comments Are Important To Us

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
4469 48th Avenue Court
Rock Island, Illinois 61201
Phone: (309) 793-5800 Fax: (309) 793-5804

IN REPLY REFER TO:

FWS/RIFO

July 15, 2002

Marshall Plumley
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Mr. Plumley:

This provides our review comments on the Public Review Draft of the *Peoria Riverfront Development (Ecosystem Restoration) Study, Illinois, Feasibility Report with Integrated Environmental Assessment* dated May 2002.

Technical Comments
The third sentence in the Endangered Species section on page 5-7, which begins with "Their review of," is inaccurate and should be removed from the final report.

Endangered Species Act Comments
We concur with your findings that the proposed project will have no effect on federally listed endangered species. This conclusion is based upon the following:

1. As stated in the Endangered Species section beginning on page 4-2, staging and access activities associated with the Peoria Lake dredging and island construction will take place on existing boat ramp or marina facilities and will not impact any additional areas in the Illinois River floodplain.

2. Forested habitats will not be impacted by the project.

Provided the above statements are true, this precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should the project be modified, or if new information indicates listed or proposed species may be affected, consultation or additional coordination with this office, as appropriate, should be initiated.

This letter provides comments under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); and the Endangered Species Act of 1973, as amended.

Sincerely,

Richard C. Nelson
Supervisor

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APPENDIX B

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE PHASE I ENVIRONMENTAL SITE ASSESSMENT

CEMVR-ED-DN

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE
PHASE I ENVIRONMENTAL SITE ASSESSMENT

FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT FOR PEORIA RIVERFRONT DEVELOPMENT STUDY

FARM CREEK
CITY OF WASHINGTON, IL

CITY OF WASHINGTON TRIBUTARY UPLANDS RESTORATION

Prepared by: Mikael S. Brown

Reviewed by: Kara N. Mitvalsky, P.E.

28 February 2002

PEORIA RIVERFRONT DEVELOPMENT STUDY:
CITY OF WASHINGTON TRIBUTARY UPLANDS RESTORATION
PHASE I ESA – 28 FEBRUARY 2002

Executive Summary

1. Introduction. A Phase I Environmental Site Assessment (ESA) was performed in general conformance with ASTM Practices E 1527-00 and E 1528-00, ER 1165-2-132, and MVD DIVR 1165-2-9 for the Peoria Riverfront Development Study City of Washington Tributary Uplands Restoration Project Site. The Phase I ESA, dated 28 February 2002, is on file for review at Rock Island District Headquarters. Any exceptions to, or deletions from, this practice are described in Section 1 of the report.

2. Conclusions. This assessment has revealed no evidence of hazardous substances, HTRW, or other regulated contaminants in connection with the target property except for:

- A commercial property that contains a salvage yard that adjoins the southwest corner of the City of Washington Tributary Uplands Restoration Project Site.

- The abandoned railroad corridor adjoining the City of Washington Tributary Uplands Restoration Project Site, including the Pekin Junction siding.

3. Recommendations. Since this Phase I ESA revealed the potential existence of hazardous substances, HTRW, or other regulated contaminants within the specific target property. Continuing beyond this Phase I ESA is necessary to reduce uncertainty. A Phase IIA ESA would incorporate intrusive sampling to determine the presence or absence of contaminants and reveal any unidentified environmental liabilities. The following specific recommendations are provided:

- **Abandoned Railroad Corridor.** The limits of construction on the target property should not encroach onto any railroad corridor. The Federal Government should not acquire by fee or easement, temporary or otherwise, any property within this corridor.

- **Commercial Property Including a Salvage Yard.** Construction on the target property should not occur until a Phase IIA ESA confirms the presence or absence of hazardous substances, HTRW, or other regulated contaminants.

4. Limitations. No ESA can wholly eliminate uncertainty regarding the existence for recognized environmental conditions concerning a property. This assessment is intended to reduce, but not eliminate, uncertainty regarding the existence of recognized environmental conditions in connection with a property with reasonable limits of time and cost. If any previously unaddressed recognized environmental condition should arise, this Phase I ESA will be revisited and amended.

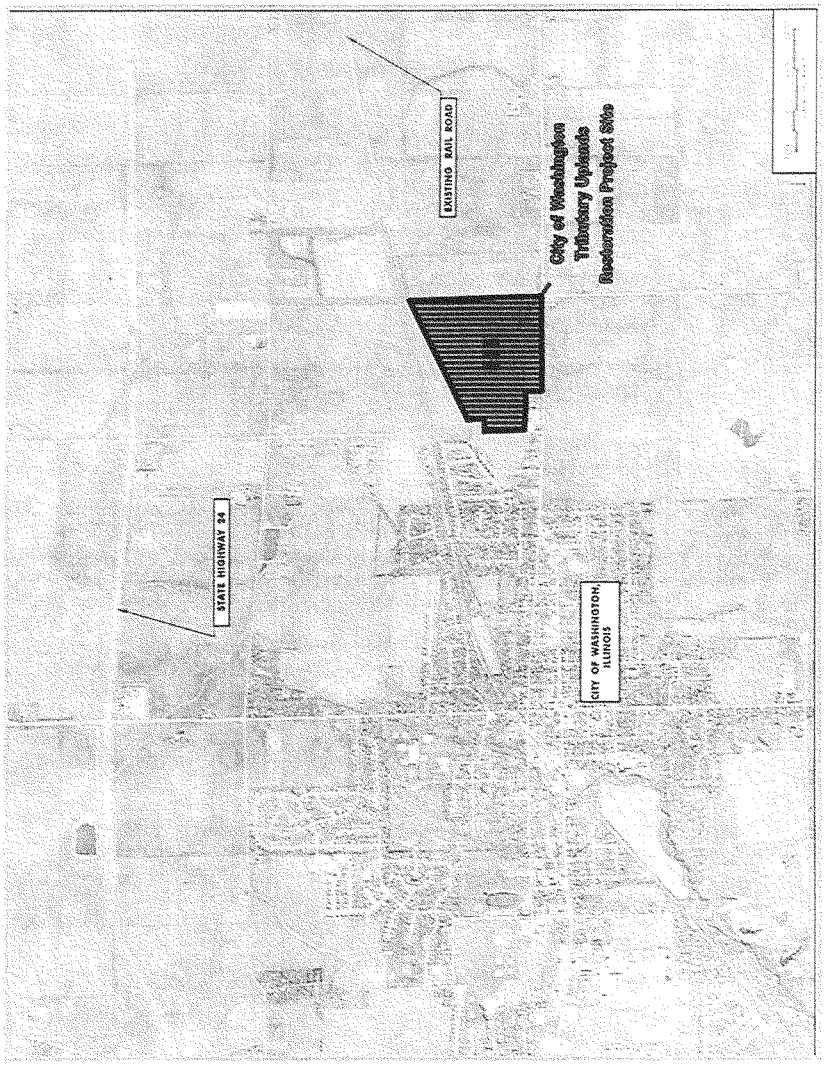

Figure ES1. City of Washington Tributary Uplands Restroation Project Location and Vicinity.

PEORIA RIVERFRONT DEVELOPMENT STUDY:
CITY OF WASHINGTON TRIBUTARY UPLANDS RESTORATION
PHASE I ESA – 28 FEBRUARY 2002

TABLE OF CONTENTS

1. INTRODUCTION 1

A. PURPOSE 1
B. SCOPE OF WORK 1
C. SIGNIFICANT ASSUMPTIONS 1
D. LIMITATIONS 3
E. EXCLUSIONS 3

2. SITE DESCRIPTION 3

A. LOCATION AND LEGAL DESCRIPTION 3
B. SITE AND VICINITY CHARACTERISTICS 4
C. CURRENT USES OF TARGET AND ADJOINING PROPERTIES 4
D. DESCRIPTIONS OF STRUCTURES, ROADS, AND OTHER IMPROVEMENTS ON TARGET PROPERTIES 4

3. PRELIMINARY INFORMATION REVIEW 4

A. TITLE RECORDS 4
B. ENVIRONMENTAL LEINS OR ACTIVITY AND USE LIMITATIONS 5
C. SPECIALIZED KNOWLEDGE REVIEW 5
D. VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES 6
E. OWNER, PROPERTY MANAGER, AND OCCUPANT INFORMATION 6

4. RECORD REVIEW 6

A. STANDARD ENVIRONMENTAL RECORD SOURCES 7
B. ADDITIONAL ENVIRONMENTAL RECORD SOURCES 8
C. PHYSICAL SETTING SOURCE(S) 10
D. HISTORICAL USE INFORMATION ON THE PROPERTY AND ADJOINING PROPERTIES .. 13

5. SITE RECONNAISSANCE 15

A. SITE SAFETY 15
B. METHODOLOGY AND LIMITING CONDITIONS 15
C. GENERAL SITE SETTING 15
D. EXTERIOR OBSERVATIONS 16
E. INTERIOR OBSERVATIONS 18

6. INTERVIEWS 18

A. INTERVIEWS WITH OWNERS 18
B. INTERVIEWS WITH SITE MANAGERS 18
C. INTERVIEWS WITH OCCUPANTS 18
D. INTERVIEWS WITH LOCAL GOVERNMENT OFFICIALS 18
E. INTERVIEWS WITH OTHERS 18

7. FINDINGS **19**

8. OPINIONS **20**

9. CONCLUSIONS **23**

10. RECOMMENDATIONS **23**

11. ADDITIONAL SERVICES **24**

TABLE OF APPENDICIES

APPENDIX A	**ACRONYMS**
APPENDIX B	**REFERENCES AND ABSTRACTS**
APPENDIX C	**VICINITY MAP AND SITE PLANS**
APPENDIX D	**SITE RECONNAISANCE: NOTES, PHOTOGRAPHS, AND SAFETY AND HEALTH PLAN**
APPENDIX E	**HISTORICAL RESEARCH DOCUMENTATION**
APPENDIX F	**REGULATORY RECORDS DOCUMENTATION**
APPENDIX G	**INTERVIEW DOCUMENTATION**

PEORIA RIVERFRONT DEVELOPMENT STUDY:
CITY OF WASHINGTON TRIBUTARY UPLANDS RESTORATION
PHASE I ESA – 28 FEBRUARY 2002

1. Introduction

a. Purpose. The purpose of a Phase I Environmental Site Assessment (ESA) is to adequately document an appropriate inquiry into identifying recognized environmental conditions on target properties. This report documents the initial reconnaissance liability assessment for the Feasibility Report and Environmental Assessment for the Peoria Riverfront Development Study City of Washington Tributary Uplands Restoration project. This inquiry is required in order to aid in minimizing Federal liability under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA); and to reduce any threats to project workers and avoid costly delays associated with environmental abatement activities. A discussion on environmental liability and definitions of key words and phrases are available from the U.S. Army Corps of Engineers Rock Island District (the District) on request (ATTN: CEMVR-ED-DN). A list of acronyms used in this report appears in Appendix A. A list of documents and records reviewed or referenced is contained in Appendix B.

b. Scope of Work. This inquiry is guided by the level appropriate for each type of property, information developed in the course of the inquiry, project requirements, regulatory agency requirements, and potential risks. The screening methods used to prepare the Phase I ESA have been selected based on the location, physical setting, surrounding land uses, and particular nature of dredged material placement sites. Intrusive field sampling and lab analyses are not used for the Phase I ESA, but are reserved for further ESA phases when required. The following documented resources were used to evaluate the existence of recognized environmental conditions within target properties as well as any recognized environmental conditions on properties within an approximate minimum search distance from the target properties:

(1) Site Specific Information.
(2) Preliminary Information Review.
(3) Record Review.
(4) Site Reconnaissance.
(5) Interviews.

c. Significant Assumptions. This subsection describes all assumptions made during this environmental site assessment.

(1) Federal and State NPDES permitted releases to water and NAAQS permitted releases to air, if found, are assumed to be *de minimus* recognized environmental conditions. Federal and State National Pollutant Discharge (NPDES) permitted releases to water and National Ambient Air Quality Standard (NAAQS) permitted releases to air are not considered recognized environmental conditions as long as all reported released hazardous substances, HTRW, and other regulated contaminants

were permitted or corrected in accordance with applicable or relevant and appropriate requirements. These permitted releases are assumed to be *de minimus* since permits and corrective action levels are designed by law to minimize material risk of harm to human health and the environment to an acceptable level. NPDES permitted biosludge application to land and uncorrected discharges to water and air in excess of permits are not assumed to be *de minimus*.

(2) **Fertilizer, pesticide, and herbicide soil residues from normal agricultural activities, if found or suspected, are assumed to be *de minimus* recognized environmental conditions.** Fertilizers, pesticides, and herbicides applied to lands during the course of normal agricultural activities, not including mixing and cleaning activities, are exempt from CERCLA and RCRA regulations. Additionally, contamination of soil from normal agricultural activities is generally not the subject of government enforcement action, therefore a *de minimus* environmental condition. Contamination associated with fertilizer, pesticide, and herbicide mixing/cleaning platforms is a recognized environmental condition.

(3) **Trash and refuse from public recreation activities, if found or suspected, are assumed to be *de minimus* recognized environmental conditions.** Public recreation is not considered a meaningful source of hazardous substance, HTRW, or other regulated materials. Public recreation is therefore a *de minimus* environmental condition. This assumption does not include the release of fuel or mechanical fluids.

(4) **Unless it is made known by interview or record search or it is obvious during a site inspection, contamination related to transportation and utility features are not suspected.** The release of hazardous substances, HTRW, or other regulated contaminants from utilities or transportation features is possible. Petroleum spills occur with vehicle accidents, hazardous substances are released with railway disasters, and oil slicks occur with navigational tragedies. However, the discovery of such contamination by means other than interviews, record searches, and visual site inspection would require exhaustive site characterization measures to reduce uncertainty. At this time, reducing this uncertainty is not reasonably ascertainable within time and cost constraints, nor is the threat of a release necessarily preventable under the Peoria Riverfront Development Study.

d. Limitations. This subsection describes limitations discovered during this site assessment.

(1) **Uncertainty Limitations.** No ESA can wholly eliminate uncertainty regarding the existence for recognized environmental conditions concerning a property. This assessment is intended to reduce, but not eliminate, uncertainty regarding the existence of recognized environmental conditions in connection with a property with reasonable limits of time and cost.

(2) **Site Reconnaissance Limitations.** The Peoria Riverfront Development Study City of Washington Tributary Uplands Restoration project involves work on permanently vacant agricultural, publicly owned land near the City of Washington, Illinois. The District had obtained rights-of-entry for target property, however no rights-of-entry or right-to-trespass were issued to the District for physical inspection of neighboring properties. Consequentially, only roadside visual inspections of neighboring properties could occur.

(3) **Record Review Limitations.** Historical and regulatory record reviews are limited by the level of data collected by the recording agency, availability of record coverage, and by data transparency. If provided by the recording agency, statements regarding database limitations were included with a copy of the findings. Record coverage research was limited to records on the District's Intranet, State and Federal regulatory agency websites, and popular mapping websites. Data was considered transparent only if it could easily be geospacially referenced to a target property.

e. Exclusions. No project sites were excluded, nor were any exceptions made to the Environmental Due Diligence Audit process, in this Phase I ESA.

2. Site Description

a. Location and Legal Description. The target study area consists of a single contiguous project site. The target property is a vacant agricultural field, located immediately east of Washington, IL along Farm Creek. Specifically, the target property is located in ¼SW Sec 18 of T26N R2W, Tazwell County, IL. Vicinity maps and site plans are located in Appendix C. Project features include construction of two impoundment features, parallel to the abandoned Atchison, Topeka, and Santa Fe (AT&SF) rail line, in separate primary ephemeral tributaries of Farm Creek, in the center of the property for flood control, siltation control, and habitat enhancement. This may require excavation and regrading of the project site as well as removal of any subsurface drainage pipe that would inhibit ponding.

b. Site and Vicinity Characteristics. Inspection of the most recent (1979) United States Geological Survey (USGS) Quadrangle map (Figure E12) and recent (1995) aerial photographs (Figure E13) indicate that the project study area is vacant agricultural crop production land bordering Farm Creek, bordered by an abandoned railroad corridor and two road corridors. The suburban community of Washington and various rural homesteads typifies the vicinity (see Figure E16).

c. Current Uses of Target and Adjoining Properties. Information was collected using the most recent (1979) USGS Quadrangle map (Figure E12) and recent (1995) aerial photographs (Figures E13) to determine the current uses of each target property and each adjoining property to the north, south, east, and west.

> Target property is a vacant contiguous agricultural crop production field. The adjoining property to the north, on the other side of the abandoned AT&SF railroad line, is a vacant agricultural crop production field. The adjoining property to the south, on the other side of U. S. Business Route 24, is a vacant agricultural crop production field. The adjoining property to the east is a vacant agricultural crop production field. The adjoining properties to the west, on the other side of Diebel Road, are private residences of the City of Washington and a vacant lot. Contiguously adjoining the southwest corner of the target property is a fenced property containing a residence, a concrete batching plant, and a salvage yard.

d. Descriptions of Structures, Roads, and Other Improvements on Target Properties. Below is a summary of improvements observed on the target property. Information was collected using the most recent (1979) USGS Quadrangle map (Figure E12), recent (1995) aerial photographs (Figure E13), and the 2001 U. S. Fish and Wildlife Service Environmental Conservation Online System Land Use Information (Figure E16).

> No structures, buildings, roads, or other improvements exist on the target property. There are several buildings and improvements on properties adjoining the project site: (1) the abandoned railroad corridor adjoining the northern border of the project site and (2) the concrete batching plant with vehicle salvage yard adjoining the southwest corner of the project site. Electrical power and/or telephone lines run along both the abandoned railroad and along the east side of Diebel Road.

3. Preliminary Information Review.

a. Title Records. A chain of title search was completed on 3 May 2001 for Tract Parcels numbers 1, 2, 3, 4, 5, 11, and 12 as indicated on the Tract Ownership Map (Figure C3). The search was subcontracted to Advanced Searches through

Environmental Data Resources, Inc. (EDR). The chain of title search did not indicate any environmental disclosures or environmental leans on the target property. Table 1 illustrates conveyances that indicate potential recognized environmental conditions. As described in Section 2.d, several power and/or telephone lines run along the border of the target property. These utility lines match the easements granted to the Central Illinois Light Company (CILCO) and the General Telephone Company (GTE) on the target property. Note that Tract #1, the active Toledo, Peoria, and Western (TP&W) and the abandoned AT&SF rail lines, was established in 1855 by the P & O Railroad.

Table 1. Conveyances Listed in Chain-of-Title Search That Indicate Potential Recognized Environmental Conditions.

DOCUMENT	GRANTOR	GRANTEE	INSTRUMENT	DATE RECORDED
Tract #1:				
29-52	Joseph Kelso & Wife	P & O Railroad	D	07-07-1855
Tract #2 (Target Property):				
1151-86	Lloyd Blumenshine	General Telephone Company	E	08-17-1975
2267-278	Lloyd Blumenshine	Central Illinois Light Company	E	11-01-1978
886078	Lloyd Blumenshine	GTE North, Incorporated	E	06-13-1994
896079	Lloyd Blumenshine	GTE North, Incorporated	E	06-13-1994

D=deed DinT=deed in trust E=easement ED=environmental disclosure ExD=executor's deed INV=probate inventory L=lease QC=quit claim ShD=sheriff's deed TsD=trustee's deed WD=warranty deed

b. Environmental Liens or Activity and Use Limitations. As stated above, the chain of title search did not indicate any environmental disclosures or environmental leans on the target property. If environmental liens or activity limitations are discovered during the real estate acquisition phase, this Phase I ESA will be revisited.

c. Specialized Knowledge Review. The following Project Sponsor, Project Engineer, and Project Team Members were interviewed for any specialized knowledge regarding the existence of hazardous substances, HTRW, or other regulated contaminants on the target property. A copy of each conversation record is found Appendix G.

Neither the Project Engineer nor any of the Project Team Members interviewed recalled any actual or specialized knowledge indicating the existence of recognized environmental conditions on the target property. The sponsor's engineer, Mr. Newman, provided a Phase I ESA completed by S.A.F.E. Inspection, Inc. (SAFE) on 7 April 2000 for the target property. (Target property was described as a "135-acre vacant lot previously owned by the Lloyd I. Blumesnshire Trust, located on the NE corner of U.S. Business Route 25 and Diebel Road, Washington, IL, 61571.) SAFE's Phase I ESA (discussed further in Section 4.b) recommends a Phase II ESA to confirm the presence or absence of migrating contamination from a salvage yard adjoining the southwest corner of the target property. Despite this recommendation, the City of Washington made a business decision to acquire the property without a Phase II ESA.

d. Valuation Reduction for Environmental Issues. At this time, there is no knowledge of a reduction in any target property's valuation due to environmental issues. If a reduction in value is discovered before real estate acquisition, this Phase I ESA will be revisited.

e. Owner, Property Manager, and Occupant Information. The following information was provided by a conversation with Mrs. Debbie Vanopdorp (see Appendix G.) Mrs. Vanopdorp provided a tract ownership map (Figure C3). The target property is one contiguous project site contained on one portion of a discontiguous property (Tract #2) owned by the City of Washington, which is dissected by an abandoned railway. Both the active and abandoned railroad corridors in the area may be currently owned by the Burlington Northern and Santa Fe Railway Company. Nevertheless, the active railroad will be referred to as the active TP&W line and the abandoned railroad will be referred to as the abandoned AT&SF line.

4. Record Review

The purpose of a record review is to obtain and review records that will help identify recognized environmental conditions on the target property. Some of the records reviewed pertain not just to the property, but also to properties within an approximate minimum search distance, in order to help assess the likelihood of problems from migrating hazardous substances or other regulated contaminants. Factors considered in determining the approximate minimum search distance (Table 1) include ASTM Standards E 1527-00 and E 1528-00, the density of the setting, the distance that hazardous substances or other regulated contaminants are likely to migrate, local geologic or hydrogeologic conditions, and other observable factors. This review included querying several environmental databases and reviewing historical and current maps and photos (see Appendices C, D, E, F). A list of references reviewed or referred to in this report is contained in Appendix B

Table 2. Approximate Minimum Search Distance. Adapted from ASTM E 1527	
Property	**Minimum Search Distance miles (kilometers)**
Federal and State-equivalent NPL Site	1 (1.6)
Federal and State-equivalent CERCLA Site	0.5 (0.8)
Federal RCRA Treatment, Storage, or Disposal Facility	1 (1.6)
Federal RCRA Generator	property and adjoining properties
Federal Emergency Response Notification Site	property only
Landfill and/or Solid Waste Disposal Site	0.5 (0.8)
Leaking Underground Storage Tank	0.5 (0.8)
State Registered Underground Storage Tank	property and adjoining properties

a. Standard Environmental Record Sources. Table 3 describes the standard environmental record sources reviewed, the provider of the source, and the date the source was reviewed. Copies of standard environmental record sources are available in Appendix F.

Table 3. Standard Environmental Record Sources.		
Reviewed	**Provider**	**Database**
4/3/2001	EDR	Federal NPL site
4/3/2001	EDR	Federal CERCLIS site
4/3/2001	EDR	Federal CERCLIS NFRAP site
4/3/2001	EDR	Federal RCRA CORRACTS TSD facility
4/3/2001	EDR	Federal RCRA non-CORRACTS TSD facility
4/3/2001	EDR	Federal RCRA generator
4/3/2001	EDR	Federal ERNS list
4/3/2001	EDR	State-equivalent NPL
4/3/2001	EDR	State-equivalent CERCLIS
4/3/2001	EDR	State landfill and/or solid waste disposal site
4/3/2001	EDR	State LUST site
4/3/2001	EDR	State registered UST

Standard environmental records, provided by EDR, did not indicate the existence of any recognized environmental conditions within the approximate minimum search distance of the target property, as described in Table 2. However, due to poor or inadequate address information, some database hits were not mapped, which is required to determine the distance a database hit is from the target property. These database

orphans were not identified as being on or within the approximate minimum search distance during site reconnaissance of the project study area.

b. Additional Environmental Record Sources. One additional environmental record source was reviewed: a Phase I ESA for the target property completed by SAFE for the City of Washington (SAFE, 2000).

SAFE Phase I ESA of the Target Property for the City of Washington. On 5 April 2001, an on-site interview was granted with the City of Washington's City Engineer, Mr. Kenneth Newman. He provided for the District's review an April 2000 Phase I ESA on the target property titled "Phase I Environmental Audit of a 135-acre Vacant Lot, Lloyd I. Blumenshine Trust, NE Corner US Route 24 & Diebel Road, Washington, IL 61571. Prepared for City of Washington by SAFE. Inspections, Inc." SAFE's Phase I ESA recommends a Phase II ESA to confirm the presence or absence of migrating contamination from a salvage yard adjoining the southwest corner of the target property. Despite this recommendation, the City of Washington made a business decision to acquire the property without a Phase II ESA.

(1) A chain of title review for the target property that was conducted at the City Recorder's Office. The audit reviewed land title records dating back to 1835. The audit was "unable to find any indicators that might be considered suspicious in nature regarding ownership use."

(2) A review of government records did not indicate any documentation related to hazardous chemicals had been filed for the target property. The audit stated that none were expected "given the nature of the former and present enterprises [agricultural crop production]" on the target property. The government record review did discover a landfill that may be within ½-mile of the property, qualifying the database hit as a recognized environmental condition according to Table 2. However, the landfill was not mappable, so it is a database orphan. The landfill, described by the Illinois Hazardous Waste Research Information Center (HWRIC) database, is HWRIC# 1798180016 which was discovered on 14 July 1987 by Lloyd Wenger of Washington, IL. The landfill was an open, illegal random dump containing only non-hazardous materials. Efforts by SAFE to locate the exact location was unsuccessful.

(3) During the audit investigation, SAFE attempted to contact the Illinois Environmental Protection Agency (ILEPA), asking for "the status of tanks at the following locations, and especially the condition of the surrounding soil at the time of any removals: Metro-Mobile Ready Mix, 163 Diebel Road, Washington, IL; Consolidated Ready Mix, 163 Diebel Road,

Washington, IL." These addresses describe the concrete batching plant located at the southwest corner of the target property. No reply from the ILEPA was received.

(4) During the audit investigation, SAFE contacted the Railroad Section of the Illinois Commerce Commission. The Railroad Section stated that it "cannot find any reported hazardous materials accidents at or near this location from 1989 to the present." The Railroad Section does not maintain information before 1989. Further investigation and interviews is not reasonably ascertainable or practically reviewable since most railroad operation-related contamination is not recorded, specifically any contamination associated with pre-environmental regulation pesticide applications and former rail line junction operations.

(5) The audit's historic record review concluded that the target property has only been used for agricultural crop production.

(6) Site reconnaissance during the audit stated, "The subject location is surrounded by a mix of residential and agricultural properties. It would appear that if subsurface contamination is present at the subject property, it would most likely have begun there, or the contaminants, if any, could have migrated from neighboring properties. Soil staining, stressed vegetation, and the like [sic] at the subject site is unremarkable [i.e., found in the ordinary course of events.]" The audit goes on to say, in reference to the concrete batching plant and salvage yard complex adjoining the southwest corner of the target property:

> "While it has been superannuated [declared obsolete] to develop any history of reported activities or accidents at the subject property relating to potential contamination by past misuse, the business and disposal practice of the neighboring businesses and property owners remain in question. It seems highly unlikely through, that they would be willing to permit inspection and/or sampling of their properties by others. Neighboring properties were not trespassed upon, their inspection was limited to visual observation within the boundaries of the subject property lines and public rights of way."

(7) The SAFE Phase I ESA concludes in the executive summary:

> "There is a concrete batching plant and vehicle junkyard located at the northeast corner of US 24 and Diebel Road, contiguous to the subject property. Due to a lack of constructive knowledge regarding past storage and disposal operations at these facilities, it is opined that the level of this investigation be escalated. As such, it is recommended that a Phase II Environmental Audit be conducted under the direction of a Registered Professional Engineer, sufficient in scope to determine

the absence, or the presence and extent, of potential soil and/or groundwater contamination on the subject property."

c. Physical Setting Source(s). Physical setting information for the target property and the general surrounding area was collected using the most recent (1979) USGS Quadrangle map (Figure E12), recent (1995) aerial photographs (Figure E13), the 2001 U. S. Fish and Wildlife Service Environmental Conservation Online System Land Use Information (Figure E16), an ISGS Illinois stratigraphy guide (ISGS, 1975), the EDR Geocheck© Physical Setting Report (Appendix F), a soil survey of Tazwell County (NRCS, 1996), and the Farmdale and Fondulac Reservoir Historic Properties Management Plan (Mcnerny and Baer, 1999).

Local bedrock geology of the area (Figure E17) is primarily Pennsylvanian age sandstones belonging to the Carbondale Formation, with strata of the overlying Modesto Formation occurring in limited areas (Figure E18). Located along the western edge of the Illinois Basin, the general dip of the bedrock units is to the southeast (ISGS, 1975). The Pennsylvanian strata is dominated by clastic rocks with sandstones commonly constituting 60 percent of the lower portion of the section (Mcnerny and Baer, 1999.) Other rock types associated with the Pennsylvanian are siltstone, shale, limestone, coal, and clay. The Illinois Basin is known for the rich and extensive coal resources found in the Pennsylvanian section. The Carbondale Formation contains the most important coal members in the state, however coal mining did not occur in the general surrounding area of the project sites (Mcnerny and Baer, 1999).

Overlying the bedrock are deposits of Pleistocene age glacial advances (Figure E19). These Ice Age deposits may be over two million years old, representing several advances and retreats of the continental ice sheets (Mcnerny and Baer, 1999). The Illinoisan glacial advance, the earliest known ice advance in Illinois, reached as far south as the Shawnee Hills and covered nearly 90 percent of Illinois at its maximum extent. Dates of this episode are not definite, but it may have extended from 60,000 to several hundred thousand years ago. Glacial events in this time range are referred to as pre-Wisconsinan. Following the retreat of the Illinois glaciers there appeared an episode known as the Sangamon. This interglacial period of perhaps some 10,000 years is recognized by a soil strata that is underlain by Illinoisan glacial till and overlain by Wisconsinan-age deposits, the most recent glacial stage which advanced into Illinois from the north and northeast. Wisconsinan ice of this stage reached south to Shelbyville and west to Peoria during the Woodfordian Substage. The Wisconsinan episode extended form approximately 10,000 to 50,000 years ago.

Physiographically, the general surrounding area is within the Bloomington Ridged Plain (Figure E20) near the boundary between the Grand Prairie Division and the Upper Mississippi River and Illinois River Bottomlands Division (Figure E21), in the Till Plains Section of the Central Lowlands Province (ISGS, 1975), a young erosional drift plain from the Wisconsinan Glaciation. The target property is located in the upper portion of

the Farm Creek Watershed, near the Farm Creek / Walnut Creek watershed divide. The general surrounding area consists of low rolling hills with little topographic variation, typical of the Bloomington Ridged Plain. There is a general topographic gradient to the north-northwest on both project sites. Entire target property upland with the exception of Farm Creek, which runs along the north side of the railroad corridor (Figure E15). Overall drainage at each site is toward Farm Creek by surface flow, drainage tile, or culvert. Drainage indicates that selective headward erosion is occurring in subsequent streams forming a trellis drainage patterns. There are several stream confluences at the project sites: Farm Creek with one second order tributary and Farm Creek with two other first order tributaries. Farm Creek, a tributary of the Illinois Waterway, is the major stream in the area, originating in northeastern Tazewell County and entering the Illinois River approximately 4.5 miles below the Farmdale Reservoir.

A contracted physical setting search through EDR did not produce site-specific hydrogeologic data for the target property. Nonetheless, regional topography (Figure E22) indicates that regional groundwater generally flows toward the Farm Creek Valley, in a north-northwest direction on the target property, where it is then likely to follow the alignment of the river valley to the Illinois River. The EDR search reports over 55 domestic wells within one-mile of the target property. Those wells which are mappable (Figure E23) show that the domestic wells are upgradient from project sites. The ability of contaminants to migrate from the target property to the domestic wells depends on the cone of depression created by each domestic well.

A NRCS soil survey (NRCS, 1996) places the target property on the border of two general soil associations (Figure E24): the Ipava-Sable Association and the Tama-Ipava-Sable Association. The Ipava-Sable Association is nearly level, somewhat poorly drained, silty soils that formed in loess. The association consists mainly of nearly level Ipava soils on broad plains and nearly level Sable soils on broad plans and in drainageways. Of minor extent in this association are the moderately well drained to well-drained Tama soils and the poorly drained Harpster soils. Tama soils are on ridges and side slopes. Harpster soils are in shallow depressions. The Tama-Ipava-Sable Association is nearly level to sloping, well drained to poorly drained soils that formed in loess. The association consists mainly of gently sloping to sloping Tama soils on ridges and side slopes, nearly level Ipava soils on broad plains, and nearly level Sable soils on broad plains and drainageways. Of minor extent in this association is the moderately well drained Catlin soils, the well-drained Saybrook soils, and the poorly drained Sawmill soils. Catlin and Saybrook soils are on side slopes near drainageways. Sawmill soils are on flood plains. A detailed description of soils on the target property is shown in Figure E25 and Table 4.

Table 4. Soils Identified by NRCS Soil Survey on Target Properties.

Unit	36B	43	69	146C2	171C2	233C2	3107
Name	**Tama silt loam**	**Ipava silt loam**	**Sable silty clay loam**	**Saybrook silt loam**	**Catlin silt loam**	**Birkbeck silt loam**	**Sawmill silty clay loam**
location	uplands, 1 to 5 percent slopes, erosion hazard	uplands, level slope	uplands, level slope	uplands, 5 to 12 percent slopes, eroded	uplands, 4 to 10 percent slopes, eroded	uplands, 5 to 10 percent slopes, eroded	flood plains, level slope, frequently flooded
surface soil type	very dark grayish brown friable silt loam	dark gray friable silty clay loam	black silty clay loam	grayish or yellowish brown silt loam	grayish or yellowish brown friable silt loam	grayish or yellowish brown friable silt loam	black or dark gray silty clay loam
surface soil thickness (in)	12	18	9	8	7	7	27
upper subsoil type	brown and dark yellowish brown friable and firm silty clay loam	dark grayish brown friable silty clay loam	dark gray and dark grayish brown silty clay loam	brown and yellowish brown friable silt loam	yellowish brown friable silty clay loam	dark yellowish brown firm silty clay loam	gray mottled firm silty clay loam
middle subsoil type	dark yellowish brown mottled firm silty clay loam	dark grayish brown mottled friable silty clay loam	grayish brown silty clay loam	yellowish brown firm silty clay loam	yellowish brown friable mottled silty clay loam and silty loam	yellowish brown firm silty clay loam and friable silt loam	N/A
lower subsoil type	yellowish brown mottled friable silt loam	light olive brown mottled friable silty clay loam	grayish brown silt loam	brown mottled firm calcareous loam	yellowish brown friable mottled clay loam	yellowish brown friable loam	olive gray mottled firm silty clay loam
subsoil thickness (in)	43	33	60	24	45	40	25
underlying material	calcareous loess, glacial till, or stratified loamy material	light olive brown mottled friable loam	sand and calcareous material	brown mottled firm calcareous loam	brown friable loam or glacial till	yellowish brown friable loam	olive gray mottled friable silty clay loam
underlying material depth (in)	60	60	N/A	60	60	60	60
seasonal high water table (ft below surface)	4 to 6	1 to 3	0.5 to 2	not described	3.5 to 6	3 to 6	< 2
permeability	moderate	moderately slow	moderate	moderate to moderately slow	moderate	moderate	moderate
runoff	medium	slow	slow to ponded	medium	medium	moderately slow	slow
organic content	moderate	high	high	moderate	moderate	moderately low	high

d. Historical Use Information on the Property and Adjoining Properties. Table 4 describes the available historical coverage for the project study area. Historic property information was primarily gathered from historic maps (Figures E1-E12, E14), a Phase I Archaeological Survey (Figure E15), a chain-of-title search on the target property (Section 3.a), and historic (1995) aerial photographs (Figure E13). Additional historic aerial photographs were available, but were not reasonably ascertainable; therefore, they were not reviewed. However, these additional photographs may be worthwhile for any future Phase II ESA. A City Directory Search was conducted by EDR, but the information collected was not practically reviewable. No Sanborn Fire Insurance Maps were available for the target property. A copy of all historical documents is located in Appendix E.

Table 5. Historical Use Records Coverage

Years		Document(s)
2000	2005	
1995	2000	USGS Washington, IL (1995) 7.5-min quad
1990	1995	1995 Orthorectified Aerial Photographs
1985	1990	
1980	1985	
1975	1980	USGS Washington, IL (1979) and Eureka, IL (1979) 7.5-min quads
1970	1975	
1965	1970	USGS Washington, IL (1970) and Eureka, IL (1970) 7.5-min quads
1960	1965	
1955	1960	
1950	1955	1950-1955 Tazewell County, IL Official Farm Plat Book
1945	1950	1950-1955 Official County Plat Book and Farmer's Directory of Tazewell County, IL
1940	1945	
1935	1940	
1930	1935	USGS Mackinaw, IL (1932) 7.5-min quad
1925	1930	1929 Standard Atlas of Tazewell County, IL
1920	1925	
1915	1920	1919 Plat Map of Tazewell County, IL
1910	1915	
1905	1910	1910 Standard Atlas of Tazewell County, IL
1900	1905	1903 Atlas of Tazewell County, IL
1895	1900	
1890	1895	1891 Platbook of Tazewell County, IL
1885	1890	
1880	1885	
1875	1880	
1870	1875	1873 Atlas Map of Tazewell County, IL
1865	1870	
1860	1865	1864 Wall Plat Map of Tazewell County, IL

Pre-1850. According to the NRCS Soil Survey of Tazewell County (NRCS, 1996), the general surrounding area was first settled by Euro-Americans in 1823. The county was established in 1827. By the 1840's, crop and livestock production had surpassed hunting in importance, beginning the mass conversion of prairie grasses and timbered areas into cropland. A Phase I Archaeological Survey (ARG, 2001) discovered historic material scatter on the top of an east/west trending terrace along the southern boundary of the target property (Figure E15) relating to a Frontier Age homestead built during the 1840s. This archaeological find may represent the homestead of the original frontier farmers who first plowed the prairie into farmland on the target property.

1850 – 1900. Joseph Kelso deeded a portion of the target property farmland to the P & O Railroad in 1855. The main stem of the railroad was built by 1864 (Figure E1), with a southern branch connecting at Pekin Junction by 1873 (Figure E2). By 1879, seven railroads extended throughout Tazewell County (NRCS, 1996), providing an extensive railway system for farmers to distribute grain and livestock. The railroad changes from the P & O to ownership of the northern branch to the Toledo, Peoria, and Western and the southern branch to the Atchison, Topeka, and the Santa Fe before 1891. The Frontier Age homestead, mentioned above, is seen on the 1864 Wall Plat Map (Figure E1), but destroyed by 1873 (Figure E2). By 1873, another structure is built on the Kelso property, just west of the Frontier Age homestead, where the concrete batching plant now exists (Figure E2). Sometime between 1873 and 1891, Joseph Kelso transfers ownership of the target property farmland to Blumenshine family, where the farmland remains in their ownership until transferred from the family estate to the City of Washington by way of a trustee's deed in 2000. Neither the chain-of-title nor the county atlas maps (Figures E1-E7, E9-10) follow the ownership of the land where the concrete batching plant now exists. By 1891, a structure at Pekin Junction was constructed. The City of Washington, established before 1864, slowly grows thought this fifty-year period (Figures E1-E3).

1900 – 1950. No significant changes on the target property are noted (Figures E4-E7). Little eastward expansion is seen in the City of Washington. After 1950, maps no longer distinguish Pekin Junction, nor show any structure at the railroad junction.

1950 – 1970. No historic documents were reasonably obtainable which covered this period.

1970 – 1980. Outbuildings are constructed at on the homestead adjoining southwest corner of the target property, where the concrete batch plant exists today, by 1979 (Figure E12). CILCO acquires utility easements on the Blumenshine property (the target property) in 1975 and 1978.

1980 – 1990. No historic documents were reasonably obtainable which covered this period.

1990 – 2001. Homestead adjoining southwest corner of the target property is a concrete batching plant, with numerous outbuildings and a salvage yard by 1995 (Figure E14). GTE acquires a utility easement on the Blumenshine property (the target property) in 1994. The AT&SF line is abandoned, and ties removed from the line, before 1995 (Figure E13). In 2000, the Blumenshine Estate transfers the target property farmland to the City of Washington by way of a trustee's deed.

5. Site Reconnaissance

a. Site Safety. A formal Site Specific Safety and Health Plan (SSHP) for this report is contained in Appendix D. Investigators followed all generic requirements of the District's Safety and Health Requirements Manual (EM 385-1-1) and the Safety and Occupational Health Requirements for HTRW Activities (ER 385-1-92). Site safety information was obtained from current aerial photographs and informal interviews with members of the Peoria Riverfront Development Study team. Assessment methods did not involve intrusive techniques, such as collecting and analyzing soil samples at the placement sites for this report.

Site reconnaissance information was obtained by project team members by way of onsite visitation on 21 November 2000 and 5 April 2001, telephone conversations, and informal interviews.

b. Methodology and Limiting Conditions. The focus of the first site visit was for reasons other than a Phase I ESA. Nonetheless, the photographs taken during this reconnaissance are included in Appendix D. The second site visit was devoted solely to Phase I ESA activities. The District had obtained rights-of-entry for the target property, however no rights-of-entry or right-to-trespass were issued to the District for physical inspection of neighboring properties. Consequentially, only roadside visual inspections of neighboring properties could occur. Site reconnaissance methodology consisted of roadside inspection of the target property and neighboring properties, a visual inspection of the abandoned railroad corridor from target property, and a visual inspection of the salvage yard from the target property. Photographs and field notes taken during the site reconnaissance are located in Appendix D.

c. General Site Setting. The City of Washington Tributary Uplands Restoration project location is predominately an area of gently sloping rolling hills of glacial origin being shaped by surface drainage. The topography is artificially raised for the active TP&W and abandoned AT&SF rail lines. A ditch along both sides of each railway berm directs surface drainage to a series of culverts to prevent washouts and pore pressures in from compromising the railroad berm. The local subsurface agricultural drainage system (clay drainage tile) is coordinated to use these railroad culverts (Figure D3) and the local topography to form the primary storm-water disposal system for the target property. The

target property is approachable from several paved public roads: Crugar Road, Diebel Road, and U.S. Business Route 24 (Walnut Street). A commercial complex consisting of a residence, a concrete batching plant, and an automobile salvage yard border the southwestern corner of the target property. Electricity is provided to these residences and commercial businesses by way of utility lines running along all roads and railroad corridors. Some of the utility poles along the railroad corridors may be original telegraph poles for former railroad operations at Pekin Junction.

(1) **Hazardous Substances in Connection with Identified Uses.** The target property is located on lands currently used for agricultural crop production. However, site reconnaissance did not reveal any fertilizer, pesticide, or herbicide mixing areas on or adjacent to the target property. Reconnaissance did discover visual indications of significant environmental conditions on the target property in connection with identified uses of the neighboring property to the southwest. Topography and clay drainage tile location indicate that any contaminated drainage from the salvage yard will directly and immediately enter the southwest corner of the target property, on the surface and subsurface.

(2) **Hazardous Substance Containers, Drums, Sacks, and Unidentified Substance Containers.** No hazardous substance containers, drums, sacks, or other unidentified substance containers were identified on the target property.

d. Exterior Observations.

(1) **Storage Tanks, Vent and Fill Pipes.** No vent or fill pipes, vacant concrete pads, or decrepit pumps were discovered on the target property.

(2) **Solid Waste Disposal and Fill Dirt.**

Abandoned Rail Line. Several indications of solid waste disposal were seen along the abandoned rail line, up to the rail junction (Pekin Junction). Site reconnaissance did reveal indications of fill dirt, soil piles, disturbed soil surfaces, and construction or demolition debris along the abandoned rail line (Photos D003, DO13-D014), immediately adjoining the target property. Specifically, there were three bulldozed piles: one pile used to prevent trespassing onto the abandoned line from Crugar Road (Photo D011) and two other piles near the junction of the abandoned line with the active line at Pekin Junction. The excavated pile near Crugar Road exposed the abandoned line's ballast, which resembled mine slag (Photo D012). At several stations along the rail line, there was indications of illegal dumping of household trash or refuse, recreational litter, appliances, automotive

batteries, automotive parts or debris (Photo D021), tires (Photo D022), and other forms of solid waste (Photo D016). These stations along the rail line immediately adjoin the target property. At some stations along the rail line, there were visual indications of solid waste incineration or burning activities. Specifically, sightings included: partially burned railroad ties (Photo D023), partially burned litter and debris, and partially burned tires.

Salvage Yard and Concrete Batching Plant. Several indications of solid waste disposal were seen on the salvage yard and concrete batching plant property, which immediately adjoins the target property, while inspecting the southwestern margins of the target property. Hazardous substance containers, drums, sacks, and other unidentified substance containers were visually observed on the salvage yard and concrete batching plant property (Photo D033). Other observations included visual identification of unusual fill dirt, soil piles, disturbed soil surfaces, construction or demolition debris; indications of dumping of appliances, automotive batteries, automotive parts or debris, tires, drums, and other forms of solid waste (Photos D027, D029-D031, D033-D034).

(3) **Stained Soil and Pavement.** Site reconnaissance did not reveal any indications of stained soil, leaks, or spills associated with leaks, spills, discharge, or dumping.

(4) **Stressed Vegetation.** No superficial indications of contamination, such as unexplainable stresses to the ecosystem, were noted.

(5) **Wells.** No indications of the property being served by private well or non-public water systems were observed. Site reconnaissance did not indicate the existence or suspected existence of dry wells, irrigation wells, injection wells, abandoned wells, or other forms of wells.

(6) **Pits, Ponds, and Lagoons.** No pits, ponds, or lagoons were observed on the target property. No evidence indicating the past presence of pits, ponds, or lagoons on the target property was observed. There was strong visual evidence indicating the past or present existence of pits, ponds, or lagoons on adjacent properties. Specifically, several pits were identified along the abandoned railroad corridor, near the junction, that smelled like concentrated animal waste. Observation of pits, ponds, or lagoons on the salvage yard and concrete batching plant property was not possible because of lack of a right-to-trespass. However, given the nature of salvage yard and concrete batching plant operations, these potentially recognized environmental conditions are likely to exist.

(7) **Industrial Waste Discharge.** No discharge points or drainage systems other than storm water drainage were observed on the target property.

(8) **Septic Systems.** Site reconnaissance did not reveal any reason to suspect the existence of septic systems on the target property.

(9) **Lead-Based Paint.** No structures or improvements were visually observed on the target property.

(10) **Polychlorinated Biphenyls (PCBs).** No indications of PCBs were identified on or adjacent to the target property. No PCB "boneyards" or suspicious pits where PCB-containing materials could be dumped were seen on or adjacent to the target property. However, any pole-mounted transformers on the project sites should be treated as PCB-containing until testing of the units shows otherwise. Nonetheless, no leaking pole mounted transformers were observed in the study area.

e. Interior Observations. No buildings or structures were visually identified on the target property.

6. Interviews

a. Interviews with Owners. The City of Washington is the sole owner and occupant of the target property. Mr. Newman, the City Engineer, was interviewed on 5 April 2001. His interview is discussed in Section 3.c.

b. Interviews with Site Managers. No other site managers for the target property were identified for interviews.

c. Interviews with Occupants. No other occupants for the target property were identified for interviews.

d. Interviews with Local Government Officials. Although mandatory to meet or exceed ASTM standards, interviews with local fire departments and local health/environmental departments were not considered applicable. There are no buildings or other improvements on the target property.

e. Interviews with Others. No additional interviews occurred.

7. **Findings.**

This section summarizes known or suspect environmental conditions associated with the property, and may include current recognized environmental conditions, historical recognized environmental conditions, *de minimus* environmental conditions, and other environmental conditions.

(1) **Agriculture and Crop Production Fields.** As indicated in the site-specific information, record review, and site reconnaissance, the target property exists on and adjoins crop production fields. (See Figures C1-C2, D1-D3, E13, E16; and Photos D001-D006, D009-D017, D020-D025, D029, D032-D034, D039-D040, D042-D043, D047, D051-D061.)

(2) **Active and Abandoned Railroad Corridors.** As indicated in the site-specific information, preliminary information review, record review, and site reconnaissance, the target property adjoins an active railroad corridor. In addition, the target property is dissected by an abandoned railroad corridor. (See Figures C1-C2, D1-D3, E1-E16; and Photos D019-D022, D024-D032, D035-D-039.)

(3) **Commercial Property Including a Salvage Yard.** As indicated in the site-specific information, preliminary information review, record review, site reconnaissance, and interviews, the target property adjoins a commercial property containing a concrete batching plant and an automobile salvage yard. (See Figures C1, C2, D1, D3, E2-E12, E13-E15; and Photos D033-D034, D040-D050)

(4) **Illegal Random Dump Database Orphan.** As indicated in the record review, an illegal random dump may exist within the approximate minimum search distance of either project site. (See Section 4.b(2).)

(5) **Illegal Solid Waste Disposal and Pits on Railroad Corridor.** As indicated in the site reconnaissance, solid waste disposal and liquid waste disposal pits were identified along the abandoned rail line.

8. Opinions.

The section shall include the environmental professional's opinion(s) of the impact on the property of known or suspect environmental conditions identified in the findings section. The logic and reasoning used by the environmental professional in evaluating information collected during the course of the investigation related to known or suspect environmental conditions shall be discussed. The opinion shall specifically include the environmental professional's rationale for concluding that a known or suspect environmental condition is or is not currently a recognized environmental condition. Known or suspect environmental conditions identified by the environmental professional as recognized environmental conditions currently shall be listed in the Conclusions Section of this report.

(1) **Agriculture and Crop Production Fields.** Site reconnaissance did not reveal any fertilizer, pesticide, or herbicide mixing areas on or adjacent to the target property. Fertilizers, pesticides, and herbicides applied to lands during the course of normal agricultural activities, not including mixing and cleaning activities, are exempt from CERCLA and RCRA regulations. Additionally, application of pesticides and fertilizer for normal agricultural activities is generally not the subject of government enforcement action, therefore a *de minimus* environmental condition.

(2) **Active and Abandoned Railroad Corridors.** Active, idle, and abandoned railroad corridors are known to contain hazardous substances, HTRW, and other regulated contaminants. A Phase IIA ESA conducted along the railroad corridors would most likely result in a detection of contaminants of concern (COCs) such as: diesel range, gasoline range, and residual oil range organics; heavy metals such as antimony, arsenic, beryllium, cadmium, chromium (hexavalent and total), copper, lead, mercury, nickel, selenium, silver, thallium, and zinc; and priority pollutant organics such as volatiles, semi-volatiles, organic pesticides, organic herbicides, and PCBs. Surficial processes such as mass wasting and fluvial processes can cause these contaminants to migrate onto adjoining properties.

Specific activities and locations where contamination is likely to exist, based on site reconnaissance, is any transformer or capacitor use for track-switching activities at Pekin Junction; arsenate herbicide and pesticide use along both rail lines, at the Pekin Junction siding, and associated with any historic operation building at Pekin Junction; residual timber preservatives leaching from tie piles on the abandoned AT&SF line; leaching of heavy metals, particularly lead and cadmium, from mine slag ballast of abandoned AT&SF line; any repetitive leakage of fuel and hydraulic fluid onto the ballast of the main line of both railroad corridors; contamination associated

with any maintenance that occurred at the Pekin Junction siding; and the illegal random dumping and subsequent incineration of potentially hazardous debris along the abandoned AT&SF line.

Site reconnaissance did not indicate significant areas of mass wasting or fluvial transport of railroad corridor soil or ballast onto the target property feature areas. The construction areas of both project sites are upland, and presumably upgradient, of observed eroded areas and the Pekin Junction siding (Photos D026-D029, D031-D032, D035-D039). Therefore, the finding is a *de minimus* environmental condition. However, the limits of construction should not encroach onto the railroad corridor.

(3) **Commercial Property Including a Salvage Yard.** As implied in SAFE's Phase I Environmental Audit unanswered letter to the ILEPA, unremediated leaking underground storage tanks may exist at the concrete batching plant. This batching plant may be a source of subsurface gasoline or diesel range organic pollution migrating onto the target property. In addition, automotive salvage yards contain a wide variety of hazardous materials due to the nature of their business.

Common chemical compounds found in salvage yards include: acetylene gas, solvents, rubber, tires, compressed oxygen, automotive fluids, degreasing agents, gasoline, hydraulic oils, fuel additives, diesel fuels, oil sludges, lubricants, asbestos insulation, and old battery casings containing lead and sulfuric acid. On-site waste piles, burial pits, and bulk storage tanks were common storage techniques at salvage yards before the promulgation and enforcement of the Resource Conservation and Recover Act of 1975 (RCRA).

Since the historic record review indicates that the salvage yard existed prior to the promulgation of RCRA, these subsurface sources of contamination are likely to exist at the salvage yard as well as surface-transported contamination from the espousing and leaching of contaminants from surface debris during storm events and spring melt. A Phase IIA ESA would most likely result in a detection of COCs such as: asbestos; cyanide; heavy metals including antimony, arsenic, beryllium, cadmium, chromium (hexavalent and total), copper, lead, mercury, nickel, selenium, silver, thallium, and zinc; priority pollutant organics including volatiles, semi-volatiles, organic pesticides, organic herbicides, and PCBs; and petroleum hydrocarbons including diesel range, gasoline range, and residual oil range organics. It should be noted that many of the raw materials found at salvage yards contain organic and PCB compounds that may represent a significant direct contact and/or inhalation hazard to assessment personnel.

The site reconnaissance and physical setting review suggest that surface and subsurface contaminants would migrate out of the salvage yard and onto the target property following the natural drainage swale represented by the Sable silty clay loam soil (Soil Unit 68, Figure E25) and underlain by a subsurface drainage tile (Figure D3.) Surficial contamination could extend as far north as the abandoned AT&SF railroad berm, affecting any excavation of the western impoundment (Pool 1) on the target property. Therefore, the salvage yard is a significant recognized environmental condition to construction of Pool 1 of the Peoria Riverfront Development Study City of Washington Tributary Uplands Restoration Project Site.

(4) **Illegal Random Dump Database Orphan.** HWRIC# 1798180016, an illegal random dump containing only non-hazardous materials, was listed in the SAFE Phase I Environmental Audit for the target property as a potential recognized environmental condition. Efforts by SAFE to locate the exact location were unsuccessful. This illegal random dump may be related to solid waste disposal observed along the railroad corridor (Photo D016). Determining the location of this reasonably unascertainable database orphan, which did not contain any hazardous materials, is beyond the time and cost constraints of this due diligence inquiry. The illegal random dump is therefore a *de minimus* recognized environmental condition.

(5) **Illegal Solid Waste Disposal and Pits on Railroad Corridor.** Site reconnaissance identified several potential sources of significant contamination along the abandoned rail line: ballast which resembled mine slag, appliances, automotive batteries, automotive parts or debris, tires, and partially burned railroad ties. Before the advent of late 20th Century environmental regulation, it was not uncommon for railroads to use mine slag and overburden from iron works, copper mines, lead mines, and coal mines as ballast. Ballast of slag and mine overburden may leach heavy metals and other contaminants into surrounding soils and groundwater. The same is true for appliances, automotive batteries, automotive parts or debris, tires, and railroad ties.

In addition to the potential contaminants associated with the observed solid waste, site reconnaissance also revealed strong visual and olfactory evidence indicating the past existence of pits that contained animal waste along the abandoned rail line. Therefore, the solid waste and pits along the railroad corridor are a significant recognized environmental condition. Since the first encountered groundwater table at the railroad corridor is likely to follow the direction of Farm Creek, contamination could extend as a diffuse plume along both railroad corridors, affecting construction of both

the western (Pool 1) and eastern (Pool 2) impoundments on the target property. Therefore, the salvage yard is a significant recognized environmental condition to construction of Pools 1 and 2 of the Peoria Riverfront Development Study City of Washington Tributary Uplands Restoration Project Site.

9. Conclusions.

A Phase I Environmental Site Assessment (ESA) was performed in general conformance with the scope and limitations of ASTM Practices E 1527-00 and E 1528-00 for the Peoria Riverfront Development Study City of Washington Tributary Uplands Restoration Project Site. The Phase I ESA, dated 28 February 2002, is on file for review at Rock Island District Headquarters. Any exceptions to, or deletions from, this practice are described in Section 1 of the report.

This assessment has revealed no evidence of hazardous substances, HTRW, or other regulated contaminants in connection with the target property, except for:

- A commercial property that contains a salvage yard that adjoins the southwest corner of the City of Washington Tributary Uplands Restoration Project Site.
- The abandoned railroad corridor adjoining the City of Washington Tributary Uplands Restoration Project Site, including the Pekin Junction siding.

No ESA can wholly eliminate uncertainty regarding the existence for recognized environmental conditions concerning a property. This assessment is intended to reduce, but not eliminate, uncertainty regarding the existence of recognized environmental conditions in connection with a property with reasonable limits of time and cost. Continuing the Environmental Due Diligence Audit process beyond this Phase I ESA to a Phase II ESA may reduce uncertainty, or reveal unidentified environmental liabilities. If any previously unaddressed recognized environmental condition should arise, this Phase I ESA will be revisited.

10. Recommendations.

Since this Phase I ESA revealed the potential existence of hazardous substances, HTRW, or other regulated contaminants within the specific target property, an intrusive assessment is recommended. Continuing beyond this Phase I ESA is necessary to reduce uncertainty. A Phase IIA ESA would incorporate intrusive sampling to determine the presence or absence of contaminants and reveal any unidentified environmental liabilities. Determining the presence or absence of contaminates on proposed project

sites is essential to quantifying and managing the risk of environmental liability with greater assurance. The following specific recommendations are provided:

(1) **Active and Abandoned Railroad Corridors.** The limits of construction on the target property should not encroach onto any railroad corridor. The Federal Government should not acquire by fee or easement, temporary or otherwise, any property within this corridor.

(2) **Commercial Property Including a Salvage Yard.** Construction on the target property should not occur until a Phase IIA ESA confirms the presence or absence of hazardous substances, HTRW, or other regulated contaminants. In the event that a Phase IIA ESA confirms the existence of hazardous substances, HTRW, or other regulated contaminants at or above regulatory action levels, the District and the project sponsor will need to study feasible alternatives to avoid the contamination. This may require the elimination of features from project alternatives; redrawing of project boundaries; or the development of an indemnification agreement. Alternatively, pursuant to the terms of the Partnership Cooperation Agreement, the project sponsor can elect as landowners to comprehensively characterize (Phase IIB ESA) any contamination identified during the Phase IIA and remediate the contamination.

11. Additional Services.

Non-scope considerations were not included within this report. Other environmental issues or conditions in the project study area may be required as part of the Environmental Due Diligence Process. These issues, such as radon and asbestos, are outside of the standard Phase I ESA practice, and therefore not included in this assessment.

APPENDIX A
ACRONYMS

ASTM	American Society for Testing and Materials
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	CERCLA Information System
CEMVR	Corps of Engineers, Mississippi Valley Division, Rock Island District
CFR	Code of Federal Regulations
CORRACTS	RCRA facility required at one time to complete a corrective action
CWA	Clean Water Act
ED-DG	Engineering Division – Design Branch, General Engineering Section
ED-DN	Engineering Division – Design Branch, Environmental Engineering Section
ED-HQ	Engineering Division – Hydraulics Branch, Water Quality Section
EDR	Environmental Data Resources, Inc.
EM	Engineering Manual
ER	Engineering Regulation
ERNS	Emergency Response Notification System
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Environmental Site Assessment
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FR	Federal Register
FWPCA	Federal Water Pollution Control Act Amendment
HMTUSA	Hazardous Materials Transportation Uniform Safety Act
HSWA	Hazardous Sold Waste Amendments
HTRW	Hazardous, Toxic, and Radioactive Waste
L	Left Descending Bank
LLL	Lender Liability Law
LUST	Leaking Underground Storage Tanks
LQG	Large Quantity Generator
MPRSA	Marine Protection, Research, and Sanctuaries Act
NAAQS	National Ambient Air Quality Standard
NFRAP	No Further Remedial Action Planned
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
OD-T	Operations Division – Technical Branch
OPA	Oil Pollution Act
PCB	Polychlorinated Biphenyl
PM-M	Programs and Project Management Division – Program Management
PPA	Pollution Prevention Act
R	Right Descending Bank

RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RE-A	Real Estate Division – Acquisitions Branch
RM	River Mile
SAFE	S. A. F. E. Inspections, Inc.
SARA	Superfund Amendments and Reauthorization Act
SQG	Small Quantity Generator
SSHP	Site Specific Safety and Health Plan
TRI	Toxic Release Inventory
TRIS	Toxic Release Inventory System
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, or Disposal Facility
USC	United States Code
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
WWW	World Wide Web

APPENDIX B
REFERENCES AND ABSTRACTS

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U. S. Geological Survey. Washington Quadrangle, Illinois, 7.5-Minute Series (Topographic) USGS Map. 1995.

APPENDIX C
VICINITY MAPS AND SITE PLANS

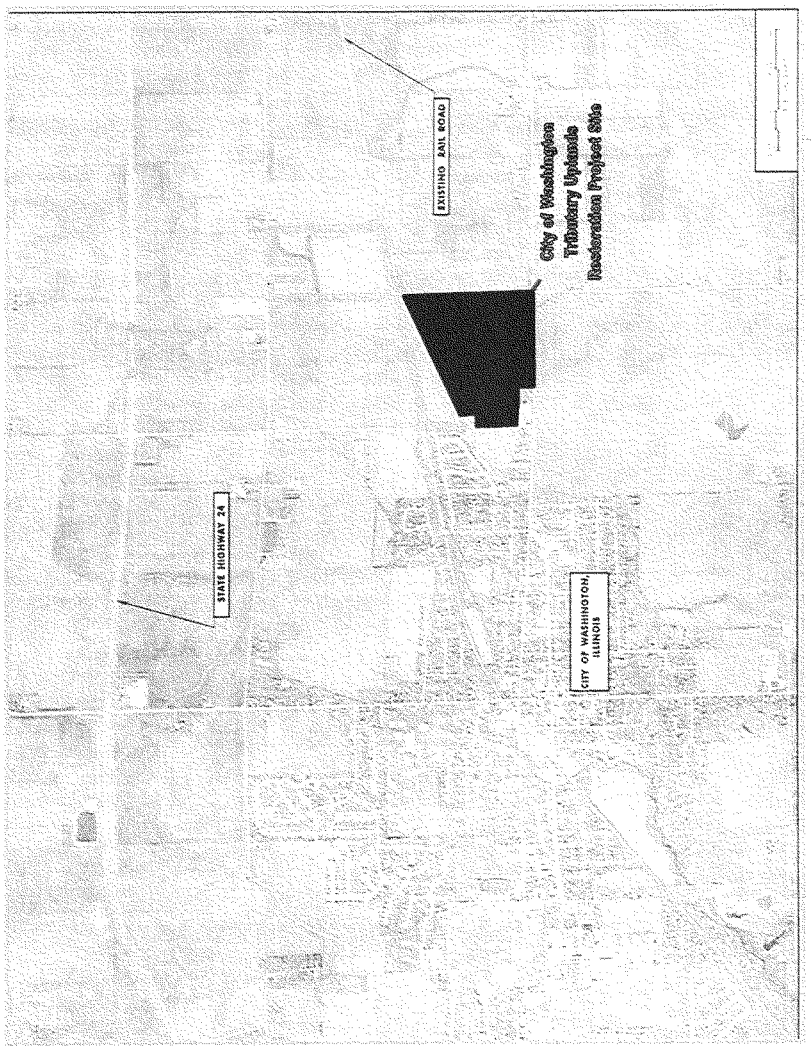


Figure C1. City of Washington Tributary Uplands Restoration location and vicinity.

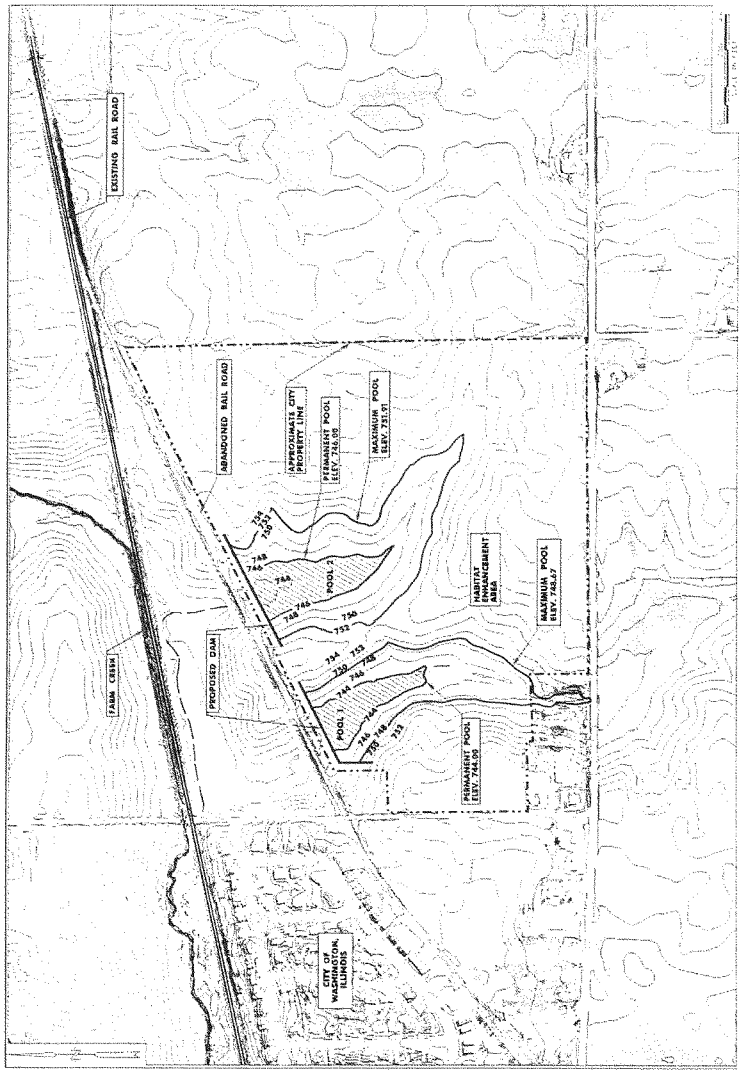


Figure C2. Site plan for propsed catchments and habitat enhancement areas.

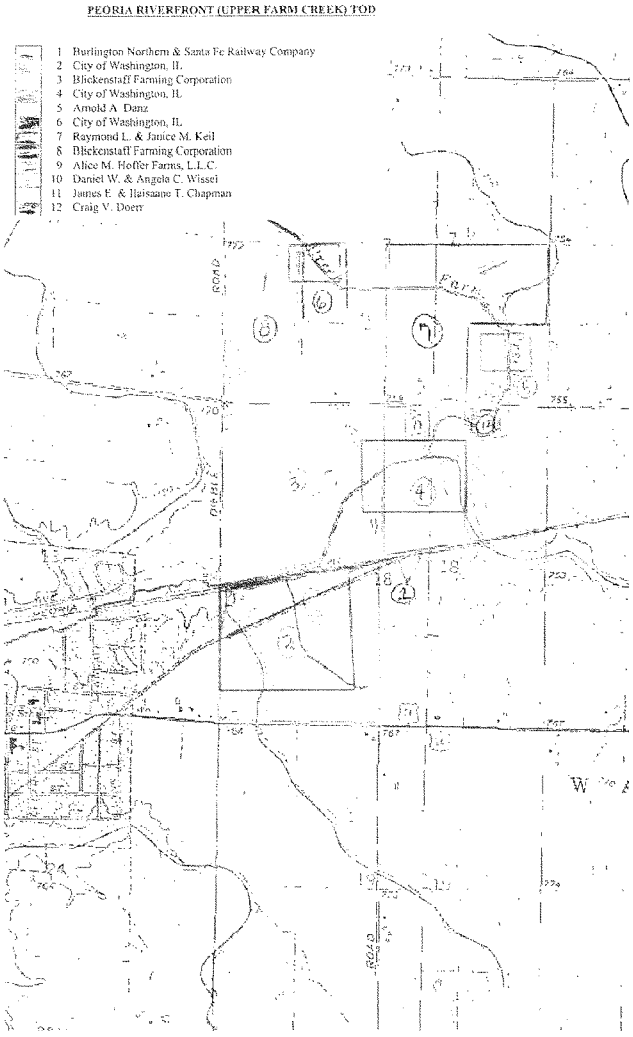


Figure C3. City of Washington Tributary Uplands Restoration Tract Ownership Data (TOD) map for project area.

APPENDIX D
SITE RECONNAISANCE: NOTES, PHOTOGRAPHS, AND SAFTEY PLAN

NOTES AND PHOTOGRAPHS. Site reconnaissance notes and photographs are included in this appendix following the informal SSHP.

SITE SPECIFIC SAFETY AND HEALTH PLAN. A formal Site Specific Safety and Health Plan (SSHP) was prepared for this report and included in this appendix. Investigators followed all generic requirements of the Corps Safety and Health Requirements Manual (EM 385-1-1) and the Safety and Occupational Health Requirements for HTRW Activities (ER 385-1-92). Site safety information was obtained from current aerial photographs, onsite reconnaissance, and informal interviews with members of the project team. Assessment methods did not involve intrusive techniques, such as collecting and analyzing soil samples at the placement sites for this report.

SITE SPECIFIC SAFETY AND HEALTH PLAN TITLE PAGE Rock Island District Corps of Engineers	This SSHP is a part of the Rock Island District HTRW Program, which includes EM 385-1-1 and ER 385-1-92.
PROJECT NAME: Peoria Riverfront Development Peoria Islands	REQUEST FOR SERVICES NO.:
JOBSITE ADDRESS: Peoria Lake, Peoria, IL	COST CODE:
PROJECT MANAGER: Brad Thompson	PHONE NO.: (309) 794-5265
SITE CONTACT: Michael Tarpey	PHONE NO.: (309) 794-5179
( ) AMENDMENT NO. ____ TO EXISTING APPROVED SSHP. DATE EXISTING APPROVED SSHP:	
OBJECTIVES OF FIELD WORK: Environmental Site Assessment for the dredged material placement site. A site visit of the project study area will be made. Environmental concerns will be documented. No intrusive investigations (soil samples, etc.) will be conducted.	SITE TYPE: Check as many as applicable: ( ) Active ( ) Landfill (X) Natural ( ) Inactive ( ) Uncontrolled ( ) Military ( ) Secure (X) Industrial ( ) Other specify: Agricultural Field ( ) Unsecure ( ) Residential ( ) Enclosed space ( ) Well Field
DESCRIPTION AND FEATURES: Summarize below. Include principal operations and unusual features (containers, buildings, dikes, power lines, hills, slopes, river, etc.). City of Washington property proposed for wetland and upland restoration	
SURROUNDING POPULATION: ( ) Residential (X) Industrial ( ) Rural (X) Urban (X) Commercial: ( ) Other:	

SITE SPECIFIC SAFETY AND HEALTH PLAN EMERGENCY CONTACTS & APPROVAL PAGE Rock Island District Corps of Engineers	This SSHP is a part of the Rock Island District HTRW Program, which includes EM 385-1-1 and ER 385-1-92.

EMERGENCY CONTACTS	**EMERGENCY CONTACTS**	**NAME**	**PHONE**

Water Supply	N/A		Project Manager	Brad Thompson	309-794-5256
Site Telephone	N/A		Safety and Health Manager	Dean Magee	309-794-5280
EPA Release Report No.	800-424-8802		Industrial Hygienist		
			Environmental Agency	Illinois EPA	309-693-5460
			State Spill Number	National Response Cntr	800-424-8802
CONTINGENCY PLANS Read and Refer to **DM 385-1-2, Appendix H.** Enter any additional Site Specific Information and clarifications below:			Fire Department		911
			Police Department		911
1. Evacuation Routes will be to the roads that lead away from the site and perpendicular to the alignment.			Poison Control Center		
2. Personnel will evacuate if there appears to be any conditions that could expose any of the site visitors to an environmental or safety hazard.			Occupational Health Unit		
3. All accidents will be reported in accordance with **DM 385-1-1, Appendix B,** including preparing an accident report form ENG 3394, as required by the appendix.			MEDICAL EMERGENCY		
4. The overall plan is to evacuate the site in case of an emergency. In case of a medical emergency, the local EMS will be contacted from the nearest available telephone (resident or business).			Hospital Name:		
			Hospital Address:		
HEALTH AND SAFETY PLAN APPROVALS			Name of Contact at Hospital:		
Prepared by: Alaena A. Ensey		Date: 3 May 2000	Name of 24-Hour Ambulance:		
Reviewed by: Kara Mitvalsky		Date: 3 May 2000	Route to Hospital (Provide description below and attach map with route to hospital on the following page). A route map was not prepared, since the emergency plan is to call 911 from the nearest telephone should there be an emergency.		

48818

1003

Site Reconnaissance

Peoria Riverfront Development Study: City of Washington Upland Tributary Uplands Restoration Project

5 April 2001

Members: Kenneth Barnes, P.E. (ED-DN)
Mikael Brown (ED-DN)

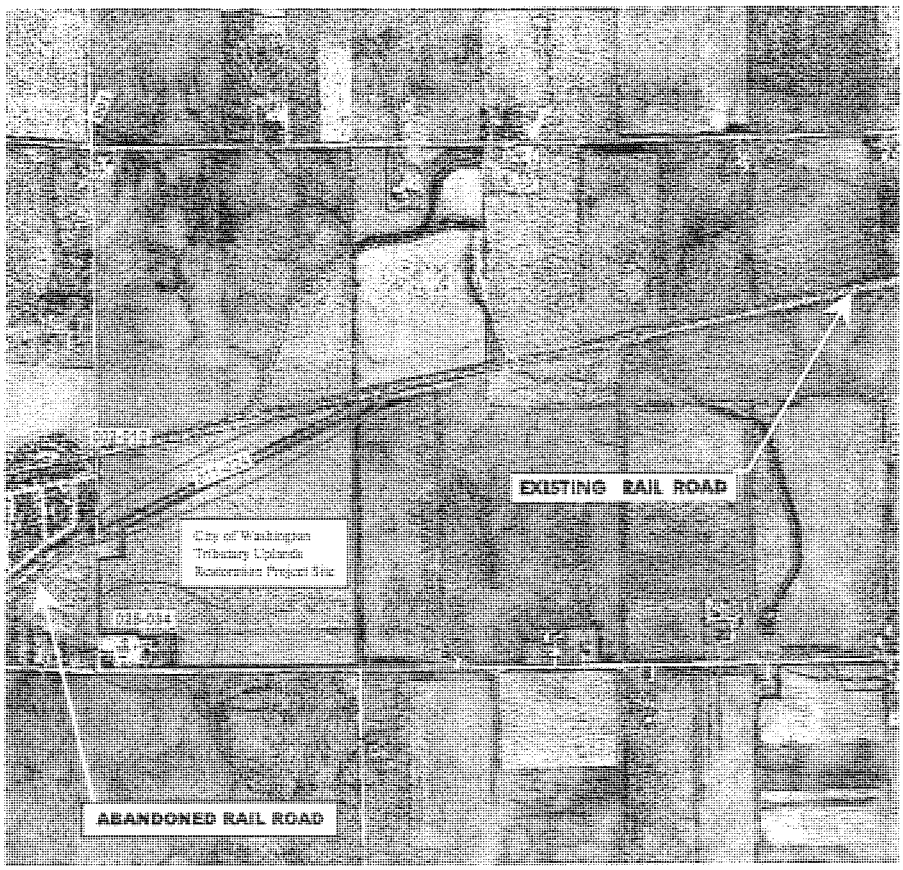


Figure D1. Index of photos taken in project study area on 4/5/01.

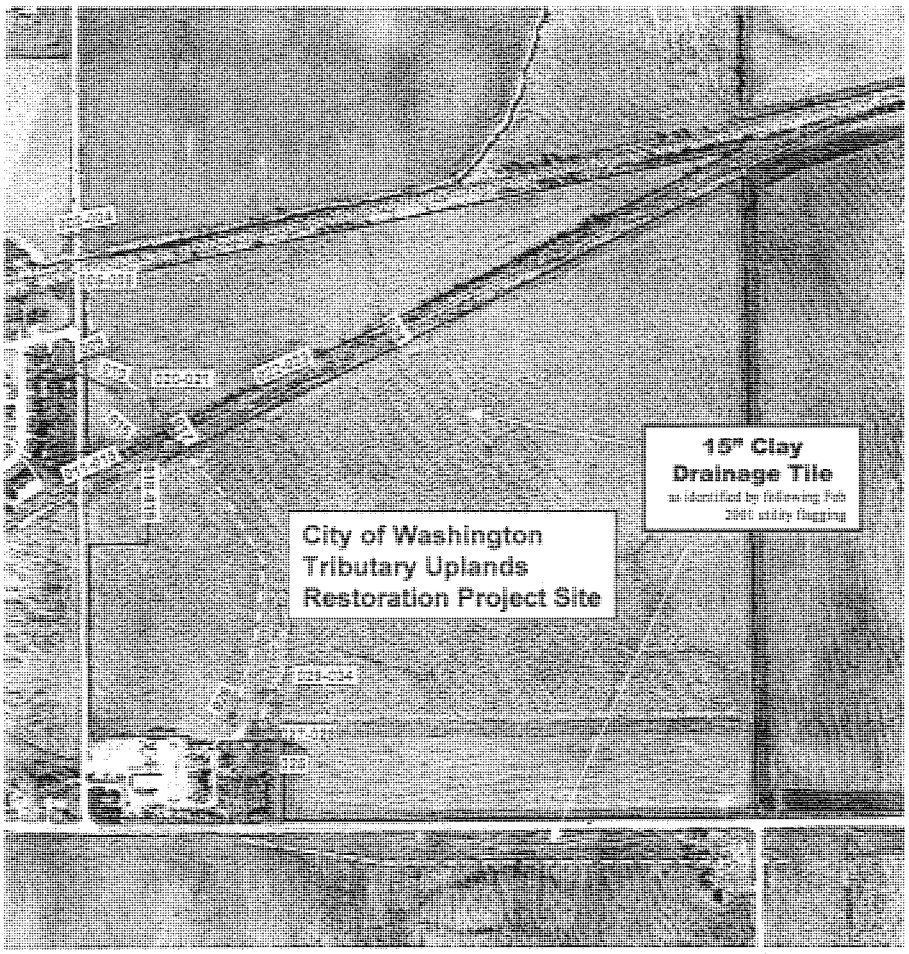


Figure D2. Index of photos taken on target property the target property on 4/5/01.

Photo D001. 4/5/01. Typically fertilizer/pesticide application in area. Chemicals are mixed offsite and brought to applicators by truck.

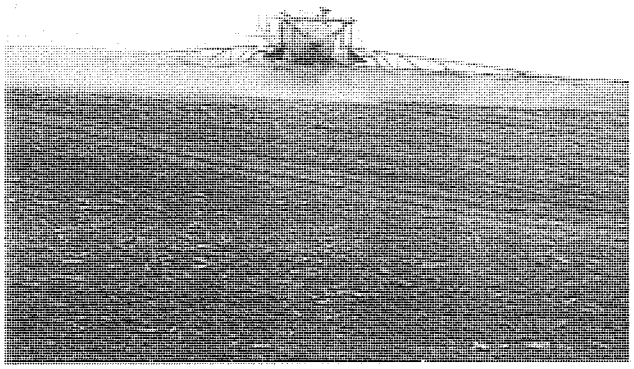
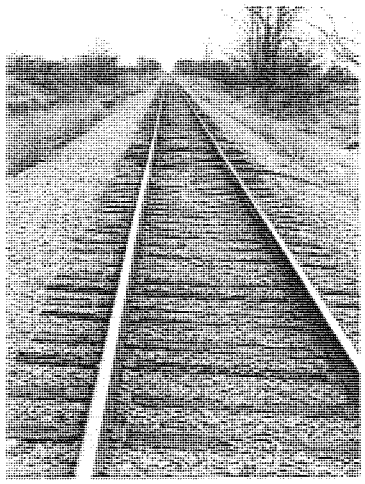


Photo D002. 4/5/01. Ditch along northern side of existing railroad track adjoining the target property.

Photo D003. 4/5/01. Typical construction debris (erosion control) and refuse along railroad ditches.

Photo D004. 4/5/01. Photo of existing railroad adjoining the target property. Photo taken on county road adjoining the target property, looking east.



Photos D005-D007. 4/5/01. Northern (smaller) triangle of the target property. Existing railroad on left, abandoned railroad on right. Note power-lines along county road.

Photo D008. 4/5/01. Power lines along county road westerly adjoining the target property.

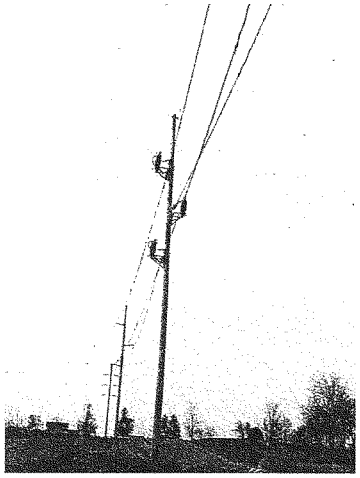


Photo D009. 4/5/01. View of the target property between railroad tracks. Power lines follow both existing and abandoned railroad lines.

Photo D010. 4/5/01. View of most the western set of culverts through abandoned railroad line.

Photo D011. 4/5/01. Access to abandoned railroad by vehicles was prohibited by a mound made from the surface soil of the railroad bed.

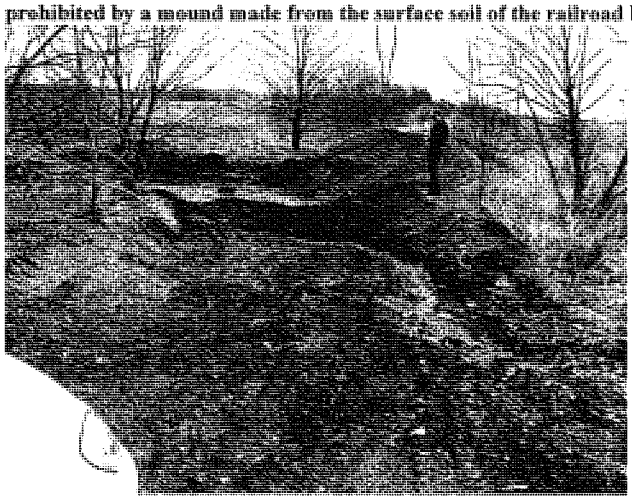


Photo D012. 4/5/01. As a result of producing a traffic control mound, the railroad ballast was exposed. Ballast is lava-like in appearance indicating the ballast is waste/debris/slag from a metal mining facility.

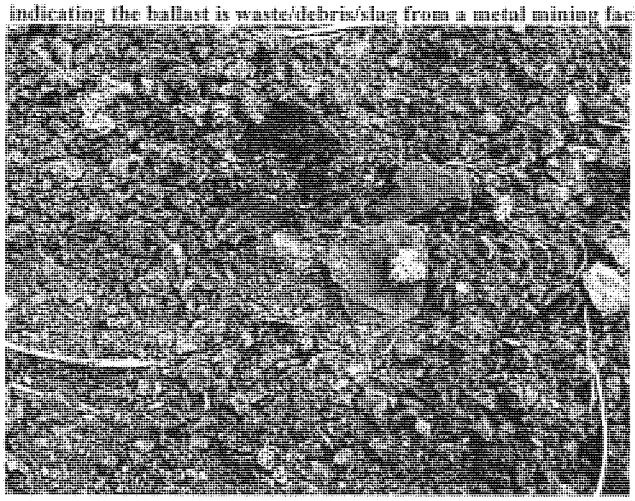


Photo D013. 4/5/01. Borrow pit from traffic control mound has been used as a dumping area of refuse. Note tire in photo.

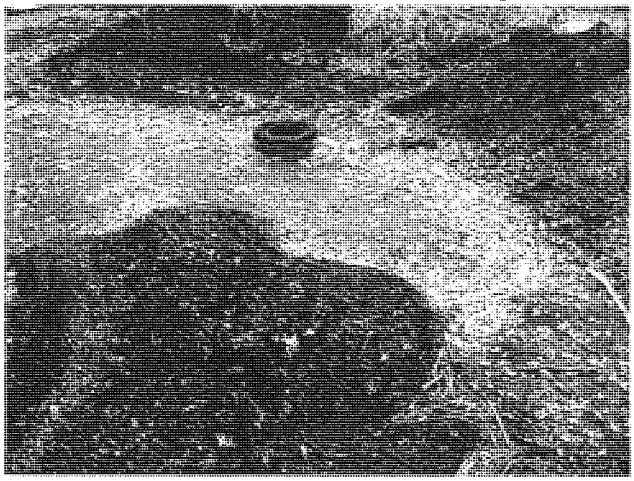


Photo D014. 4/5/01. Borrow pit from traffic control mound has been used as a dumping area of refuse. Note tire in photo.

Photo D015. 4/5/01. Photo of Ken Barnes walking along abandoned railroad.

Photo D016. 4/5/01. Pile of molds made from plastics in a pit along abandoned railroad.

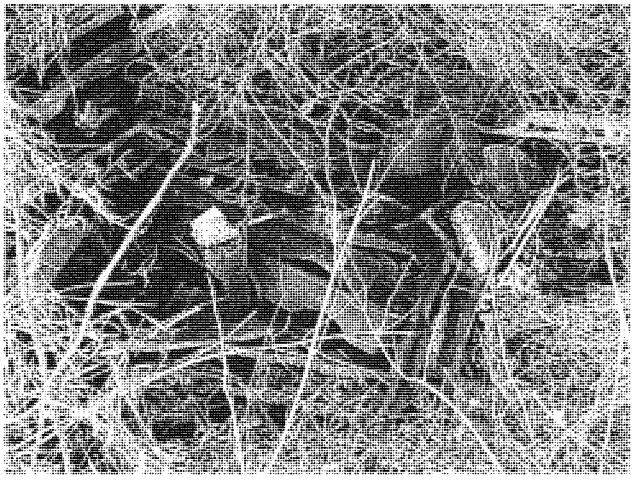


Photo D017. 4/5/01. Eroding area where drainage tile (dashed line) and surface runoff enter the western set of culverts under the abandoned railway.

Photo D018. 4/5/01. View of concrete batch plant from western culverts.

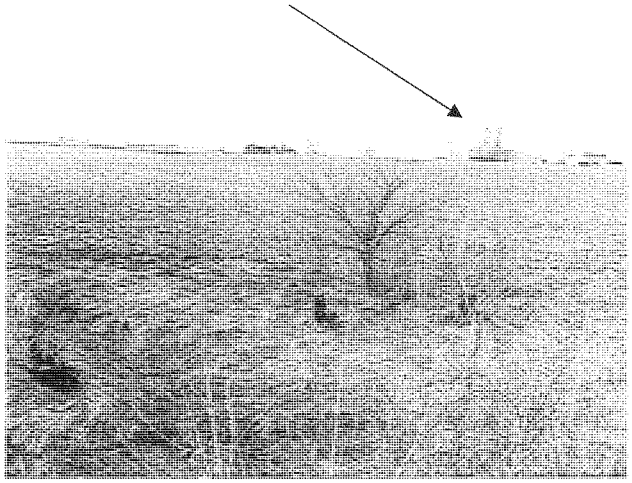


Photo D019. 4/5/01. Close-up of concrete batch plant.

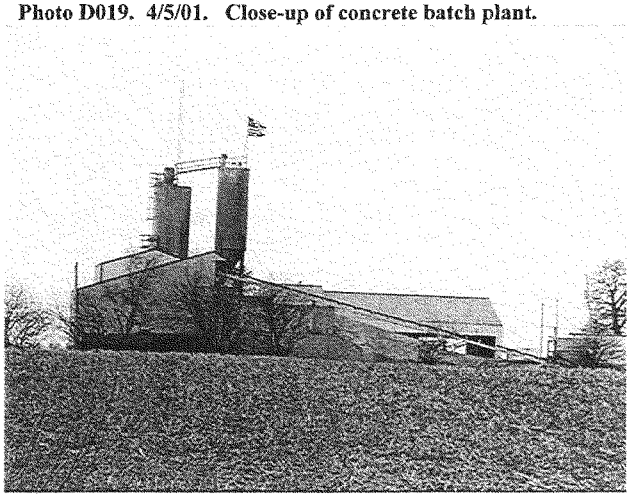


Photo D020. 4/5/01. Undercutting on downstream (northern) side of western culverts under abandoned railroad.

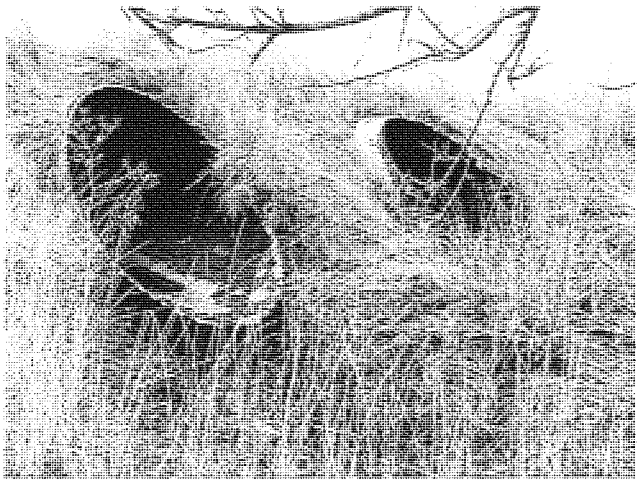


Photo D021. 4/5/01. Trash and debris in erosive cut of western culverts.

Photo D022. 4/5/01. Abandoned railroad was littered with many *forms of trash and debris, such as this used tire.*

Photo D023. 4/5/01. Pile of old railroad ties.

PEORIA RIVERFRONT DEVELOPMENT:
CITY OF WASHINGTON TRIBUTARY UPLANDS RESTORATION
PHASE I ESA – 28 FEBRUARY 2002

Photo D024. 4/5/01. Erosive area where drainage tile (seen smashed in photo) and surface drainage enter eastern culvert of abandoned railway.

Photo D025. 4/5/01. Northwest corner of junkyard.

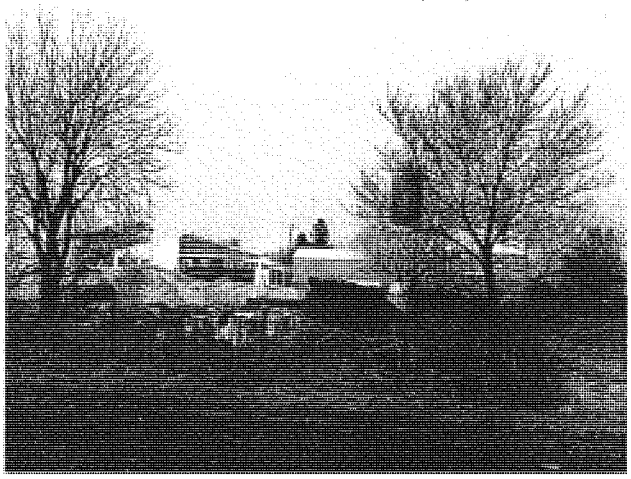


Photo D026. 4/5/01. View into junkyard from surveyed drainage tile marks. Surface drainage from junkyard follows drainage tile into agricultural field.

Photo D027. 4/5/01. Eastern side of junkyard and concrete plant adjoining southwestern end of the target property.

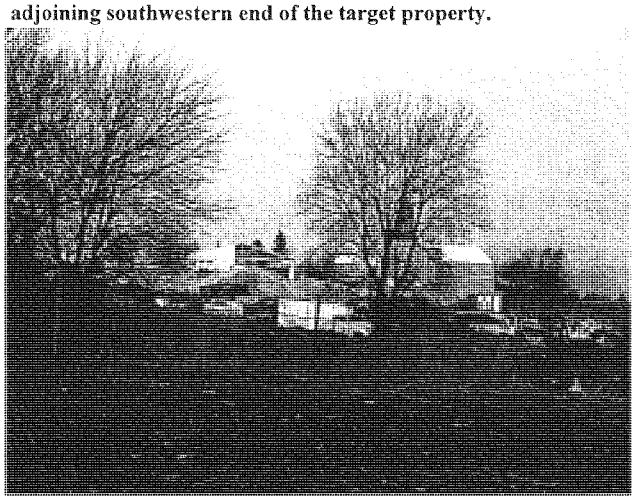


Photo D028. 4/5/01. Photo of waste incineration occurring at concrete plant.

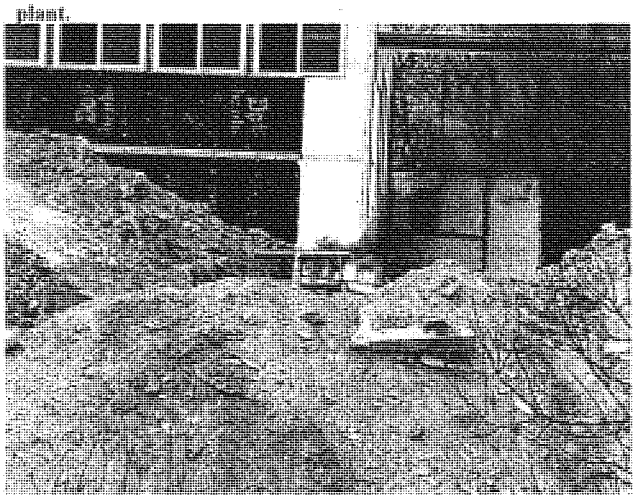


Photo D029. 4/5/01. Photo of debris in junkyard.

Photo D030. 4/5/01. Photo of debris and abandoned vehicles in junkyard.

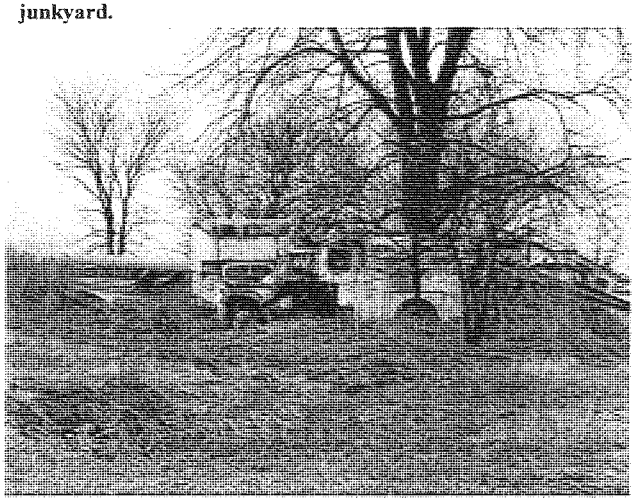


Photo D031. 4/5/01. Photo of abandoned vehicles and debris in junkyard. Piles in background are assumed related to concrete production.

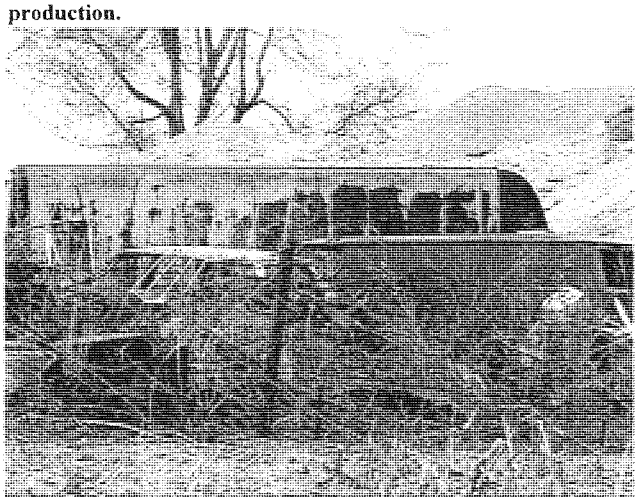


Photo D032. 4/5/01. View along northern boundary of junkyard and concrete plant.

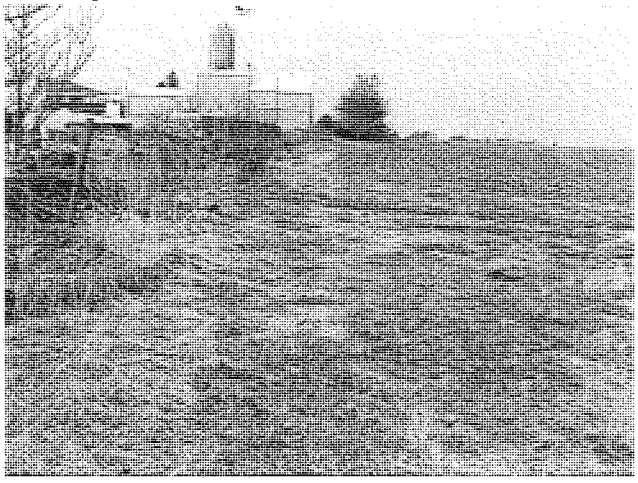


Photo D033. 4/5/01. Highly corroded 55-gallon chemical drum in junkyard.

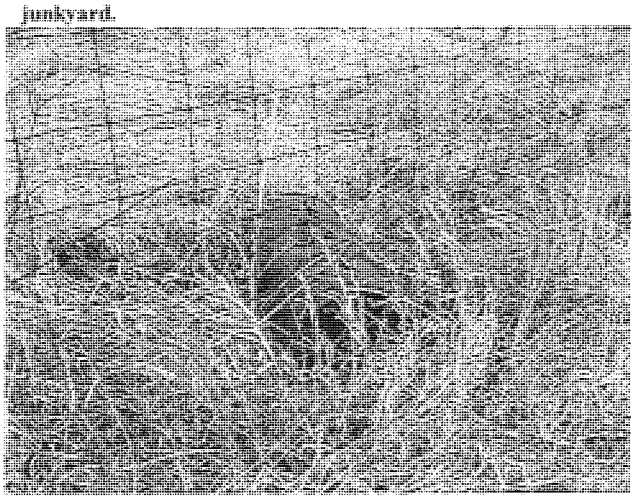
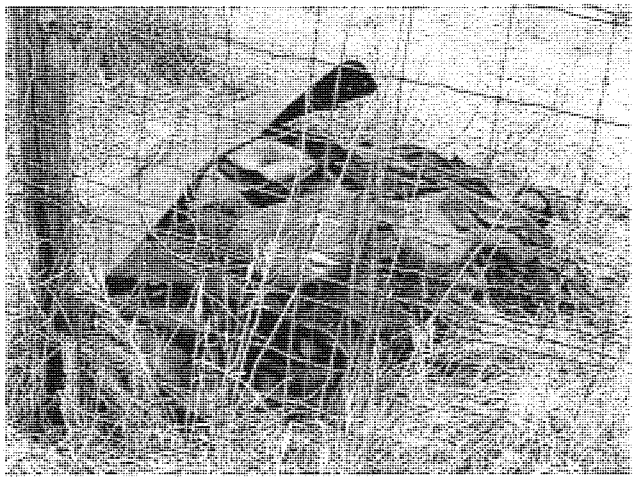


Photo D034. 4/5/01. A pile of rubber and scrap metal in junkyard.



Site Reconnaissance

Peoria Riverfront Development Study: City of Washington Upland Tributary Uplands Restoration Project

21 November 2000

Members:
Rachel Fellman (ED-DG)
Michael Tarpey (ED-DN)
Don Jorgensen (PM-AR)
Randy Kraciun (PM-AR)
Tom Kirking (ED-H)

Photo D035. 4/5/01. Surface drainage from junkyard passes through this area and onto project site.

Photo D036. 11/21/00. View of the target property.

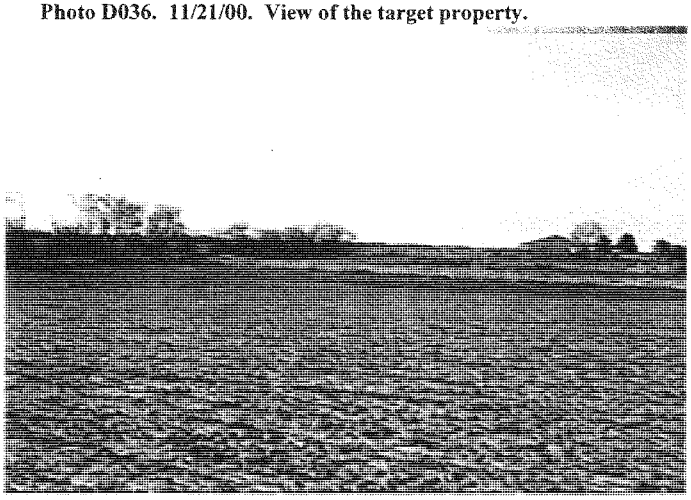


Photo D037. 11/21/00. View of the target property.

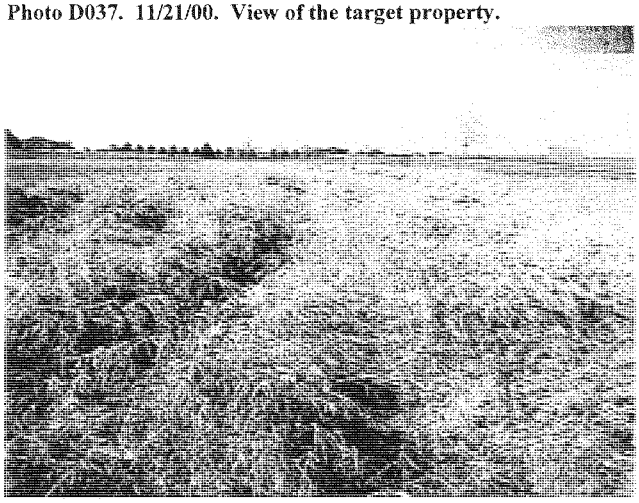


Photo D038. 11/21/00. View of the target property.

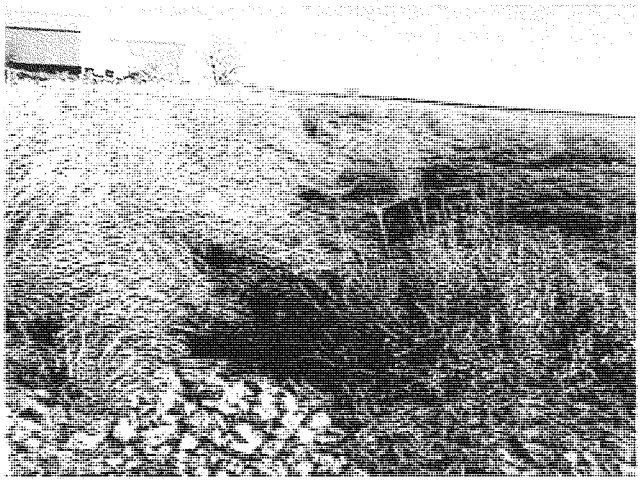


Photo D039. 11/21/00. View of the target property.

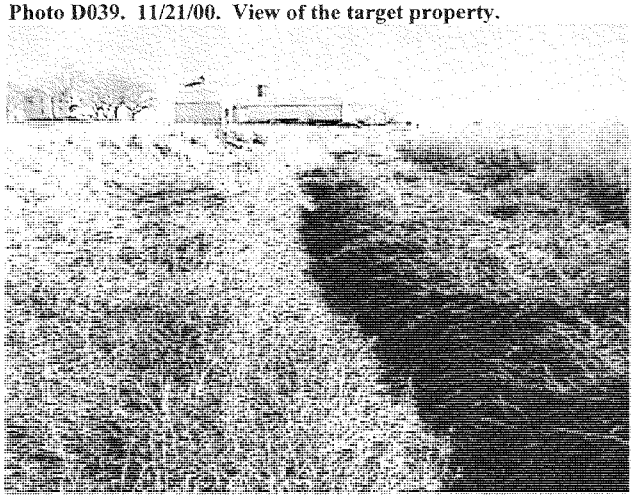


Photo D040. 11/21/00. View of the target property.

Photo D041. 11/21/00. View of the target property.

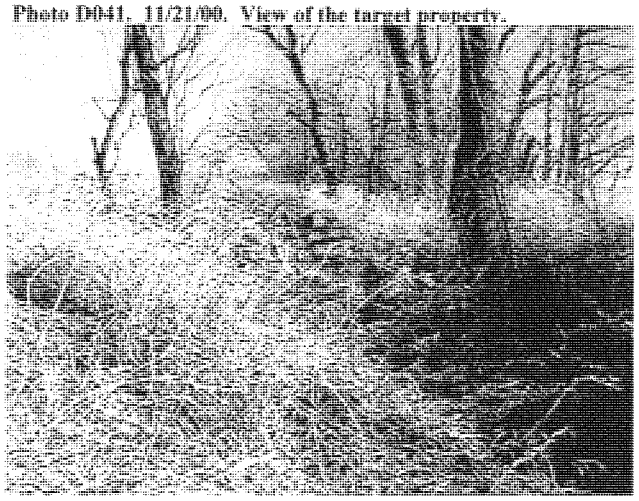


Photo D042. 11/21/00. View of the target property.

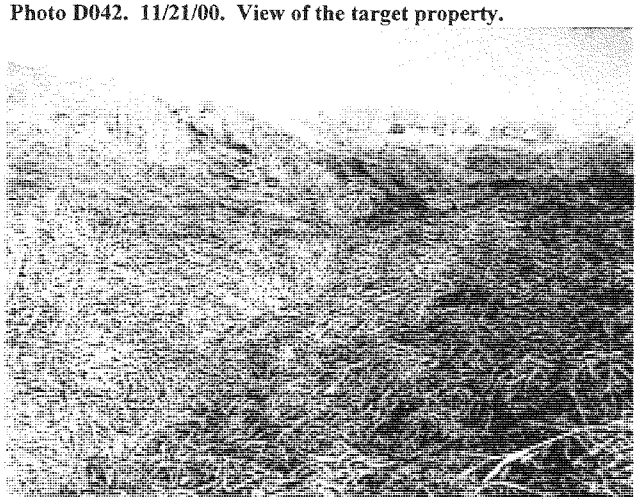


Photo D043. 11/21/00. View of the target property.

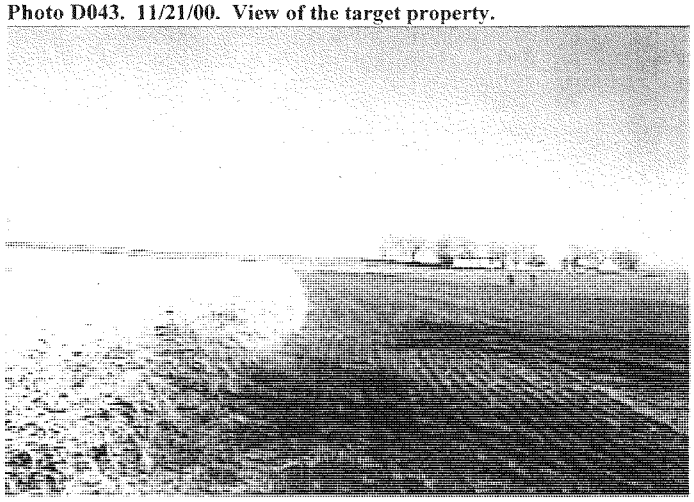


Photo D044. 11/21/00. View of the target property.

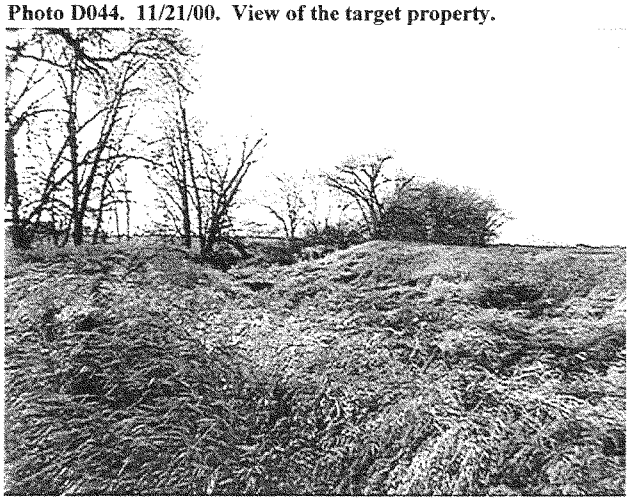


Photo D045. 11/21/00. View of the target property.

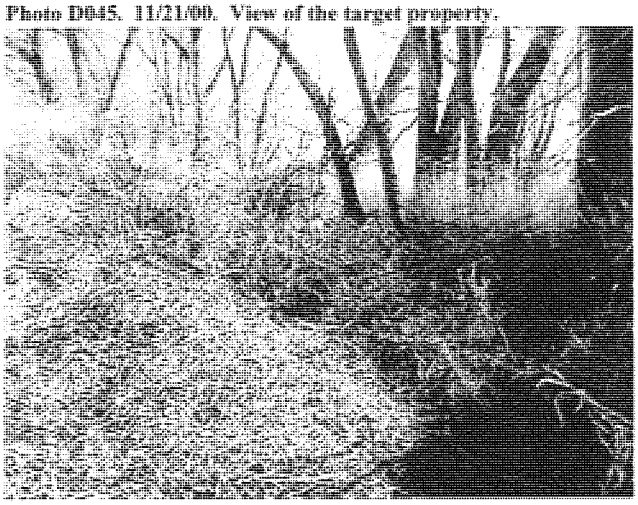
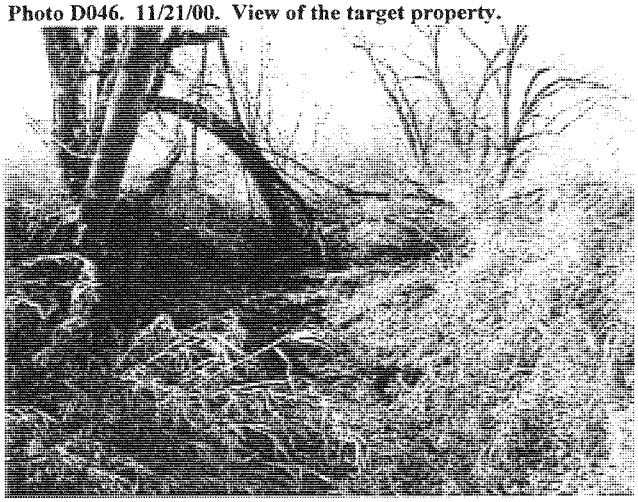


Photo D046. 11/21/00. View of the target property.



APPENDIX E
HISTORICAL RESEARCH DOCUMENTATION

Historical Use Records Coverage		
Years		Document(s)
2000	2005	
1995	2000	USGS Washington, IL (1995) 7.5-min quad
1990	1995	1995 Orthorectified Aerial Photographs
1985	1990	
1980	1985	
1975	1980	USGS Washington, IL (1979) and Eureka, IL (1979) 7.5-min quads
1970	1975	
1965	1970	USGS Washington, IL (1970) and Eureka, IL (1970) 7.5-min quads
1960	1965	
1955	1960	
1950	1955	1950-1955 Tazewell County, IL Official Farm Plat Book
1945	1950	1950-1955 Official County Plat Book and Farmer's Directory of Tazewell County, IL
1940	1945	
1935	1940	
1930	1935	USGS Mackinaw, IL (1932) 7.5-min quad
1925	1930	1929 Standard Atlas of Tazewell County, IL
1920	1925	
1915	1920	1919 Plat Map of Tazewell County, IL
1910	1915	
1905	1910	1910 Standard Atlas of Tazewell County, IL
1900	1905	1903 Atlas of Tazewell County, IL
1895	1900	
1890	1895	1891 Platbook of Tazewell County, IL
1885	1890	
1880	1885	
1875	1880	
1870	1875	1873 Atlas Map of Tazewell County, IL
1865	1870	
1860	1865	1864 Wall Plat Map of Tazewell County, IL.

THIS DOCUMENT IS ON FILE IN THE ROCK ISLAND DISTRICT – ENGINEERING DIVISION – ENVIRONMENTAL ENGINEERING SECTION

APPENDIX F
REGULATORY RECORDS DOCUMENTATION

The following regulatory records are documented in this appendix.

(1) Environmental Data Resources, Inc. Radius Map with GeoCheck: 614835.8s.

(2) Environmental Data Resources, Inc. Preliminary Sanborn Map Report: 4 April 2001.

(3) Environmental Data Resources, Inc. City Directory Search Report: 614835-6.

(4) National Aerial Resources Aerial Photography Research Summary: 3 April 2001.

(5) Advance Searches Property History: 1940 – Present, Chain of Title Search: 11148667.

PEORIA RIVERFRONT DEVELOPMENT STUDY:
CITY OF WASHINGTON TRIBUTARY UPLANDS RESTORATION
PHASE I ESA – 28 FEBRUARY 2002

ENVRIONMENTAL DATA RESOURCES, INC.

AREA REPORT

INQUIRY 614835.8S

**THIS DOCUMENT IS ON FILE IN THE ROCK ISLAND DISTRICT –
ENGINEERING DIVISION – ENVIRONMENTAL ENGINEERING SECTION**

ENVIRONMENTAL DATA RESOURCES, INC.

PRELIMINARY SANBORN MAP REPORT

4 APRIL 2001.

**THIS DOCUMENT IS ON FILE IN THE ROCK ISLAND DISTRICT –
ENGINEERING DIVISION – ENVIRONMENTAL ENGINEERING SECTION**

PEORIA RIVERFRONT DEVELOPMENT STUDY:
CITY OF WASHINGTON TRIBUTARY UPLANDS RESTORATION
PHASE I ESA – 28 FEBRUARY 2002

ENVIRONMENTAL DATA RESOURCES, INC.

CITY DIRECTORY SEARCH REPORT

614835-6.

**THIS DOCUMENT IS ON FILE IN THE ROCK ISLAND DISTRICT –
ENGINEERING DIVISION – ENVIRONMENTAL ENGINEERING SECTION**

PEORIA RIVERFRONT DEVELOPMENT STUDY:
CITY OF WASHINGTON TRIBUTARY UPLANDS RESTORATION
PHASE I ESA – 28 FEBRUARY 2002

NATIONAL AERIAL RESOURCES

AERIAL PHOTOGRAPHY RESEARCH SUMMARY.

3 APRIL 2001

**THIS DOCUMENT IS ON FILE IN THE ROCK ISLAND DISTRICT –
ENGINEERING DIVISION – ENVIRONMENTAL ENGINEERING SECTION**

ADVANCE SEARCHES

PROPERTY HISTORY: 1940 – PRESENT,

CHAIN OF TITLE SEARCH: 11148667.

**THIS DOCUMENT IS ON FILE IN THE ROCK ISLAND DISTRICT –
ENGINEERING DIVISION – ENVIRONMENTAL ENGINEERING SECTION**

APPENDIX G
INTERVIEW DOCUMENTATION

CONVERSATION RECORD	TIME 3:30 PM	DATE 3/2/01

TYPE: [X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

Location of Visit/Conference: Brad Thompson's desk (PM-M)

ROUTINE: NAME/SYMBO | INI

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Brad Thompson	CEMVR-PM-M	x5256

SUBJECT

Peoria River Front Development: Brad is the Project Manager

SUMMARY

Brad provided me the overall synopsis of the Peoria Riverfront Development project. Although no draft of the feasibility study exists, Brad provided me a map showing potential project locations as well as assisted me in preparing a simple map of main project locations on a copy of a Illinois gazetteer map.

Currently, congressional authority allows us to dredge Peoria Lake (part of the Peoria Pool of the Illinois Waterway) for navigational purposes. Congress has recently allowed funding to study the feasibility of constructing holistic solutions to the sedimentation problems in Peoria Pool. Part of that solution includes building islands in Peoria Lake as well as managing and constructing sediment traps in the upland portions of the lake's tributaries (Blue Creek, Farm Creek, Farmdale Reservoir, and Ackerman Creek)

Currently, Brad is looking at having only two project areas in the feasibility study: Peoria Lake Islands & City of Washington Upland Ponds. ED-DN will complete two separate HTRW assessments, one for each project area. Brad, as the senior author of the feasibility report, will ensure proper integration of the HTRW assessments into the feasibility study. If deemed necessary, ED-DN will provide federal & state searches for future planning around the accessory project areas (Blue Creek, Farmdale Reservoir, and Ackerman Creek). This additional HTRW information will likely occur between the "Draft" and "Final" versions of Brad's feasibility study.

Although Brad did not have any specialized knowledge or experience regarding HTRW or other regulated contaminants in the study areas, he did provide me the following informatioo:

Person's who may have specialized knowledge for all project areas:

Mike Cochran, IL DNR, (309) 543-3316
John Marlan, IL DNR Waste Management, (217) 333-8956

Person's who may have specialized knowledge for Peoria Lake Islands:

Michael Tarpey, ED-DN, x5179

Person's who may have specialized knowledge for City of Washington Upland Ponds:

Kenneth Newman, City of Washington Engineer, (309) 444-3196
Rachel Fellmen, ED-DG, x5788
Debbie Vanopdorp, RE-A, x5243

Other information:

Farmdale Reservoir: Rachel Fellmen, Corps owned reservoir what would be managed differently, no new land acquisition
Ackerman Creek: non-Corps (IL DNR) would restore stream with village of Morton as co-sponsor
Blue Creek; Clint Beckert (x5412), making sediment traps with old holding ponds

ACTION REQUIRED

1-6. Contact listed people and interview for specialized knowledge or experience with HTRW or other regulated contaminants in the project areas

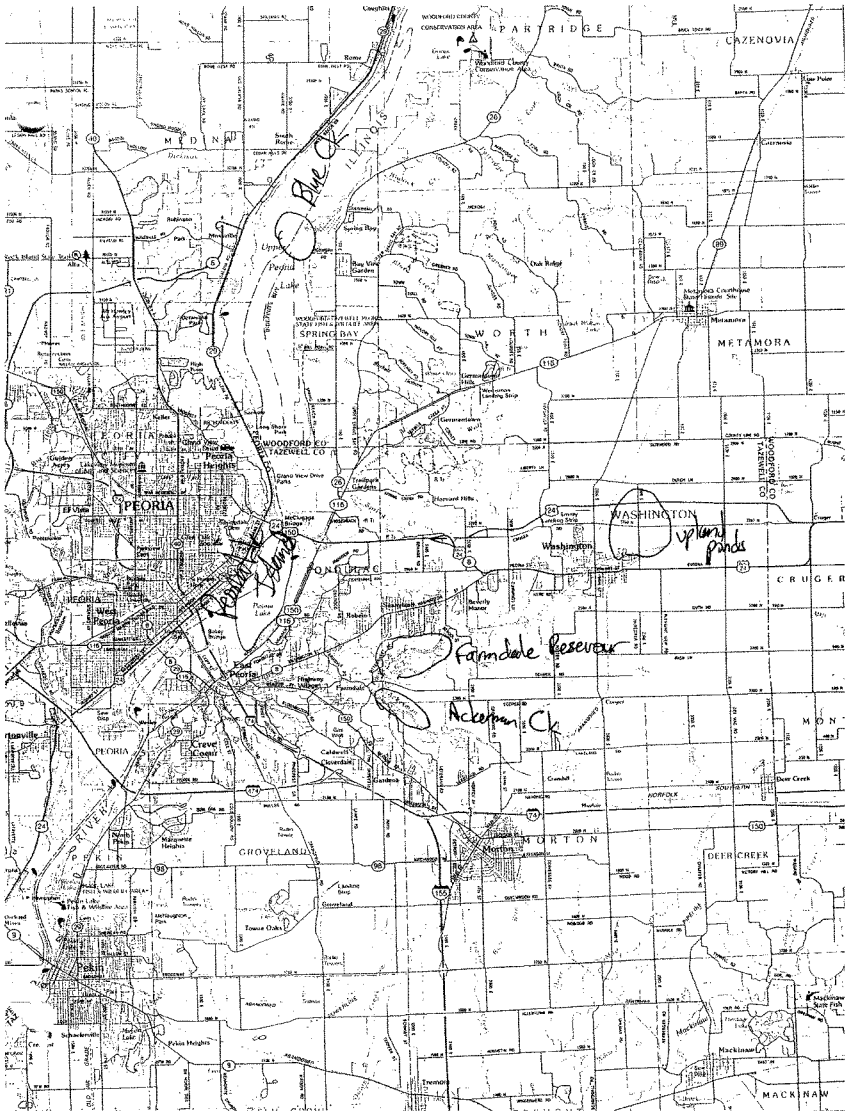
NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		3/5/01

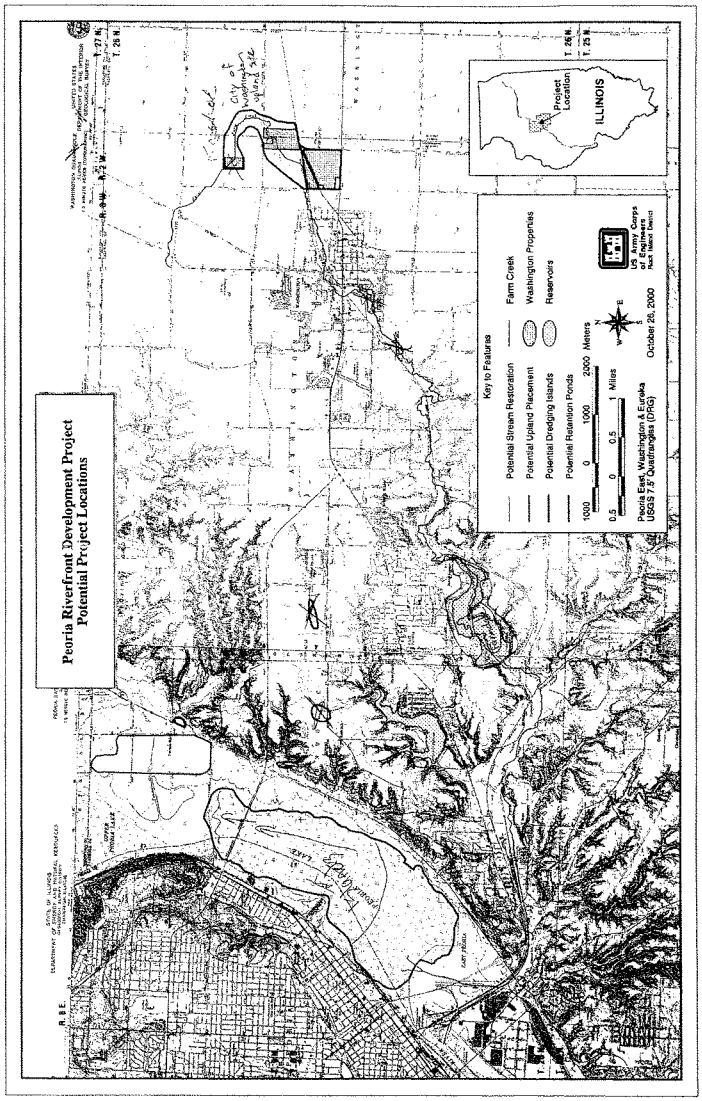
ACTION TAKEN

(1) Will not contact Mike Cochran. (2) Will not contact John Marlan. (3) Tarpey contacted on 3/7/01. (4) Kenneth contacted on 4/5/01. (5) Rachel contacted on 3/6/01. (6) Debbie contacted on 3/6/01.

SIGNATURE	TITLE	DATE
Mikael S. Brown	Civil Engineering, Co-Op	7/23/01

CONVERSATION RECORD — OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE


Blue Ck
Farmdale Reservoir
Ackerman Ck
PEORIA
WASHINGTON
METAMORA
CAZENOVIA
PARTRIDGE
MORTON
GROVELAND
DEER CREEK
MACKINAW


Peoria Riverfront Development Project
Potential Project Locations
Key to Features
Potential Stream Restoration
Potential Upland Placement
Potential Dredging Islands
Potential Retention Ponds
Farm Creek
Washington Properties
Reservoirs
Project Location
ILLINOIS
Peoria East, Washington & Eureka
USGS 7.5' Quadrangles (DRG)
October 26, 2000
US Army Corps of Engineers
Rock Island District

CONVERSATION RECORD	TIME 8:30 AM	DATE 3/6/01

TYPE: [X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

Location of Visit/Conference: Rachel Fellman's Desk (ED-DG)

ROUTINE: NAME/SYMBO | INI

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Rachel Fellman	CEMVR-ED-DG	X5788

SUBJECT

Peoria River Front Development: Rachel is project engineer for City of Washington Upland Ponds

SUMMARY

Rachel provided me with a simple project area map delineating the maximum expected property needs (with yellow highlighter). She is currently writing site descriptions, and I can get that information from her later.

Rachel was not sure if Ms. Vanopdorp was the "official" RE contact for the project, nonetheless, she encouraged me to ask her for legal property descriptions.

Rachel did not have any specialized knowledge or experience pertaining to the existence or potential existence of hazardous substances or other regulated contaminants within or adjacent to the proposed project study area. She could not confirm, nor deny the existence of a "junkyard" adjoining the SW corner of Site 3. When conducting a site visit on 21 November 2000 they did not visit the SW corner of Site 3.

21 November 2000 site reconnaissance members:

Rachel Fellmen (ED-DG)
Michael Tarpey (ED-DN)
Don Jorgensen (PM-AR) no longer with Corps
Randy Kraciun (PM-AR)
Tom Kirking (ED-H)

They did however walk along parts of the railroad tracks and did not see any indications of contamination.

Rachel will make pictures from the site visit available to me. (See MVRED\\projects\PeoriaRF\Washington)

ACTION REQUIRED

1. Speak to Ms. Vanopdorp (RE-A) about legal property descriptions.
2. View site visit pictures and possibly interview other on-site inspection team members

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		3/6/01

ACTION TAKEN

1. Debra Vanopdorp (RE-A) contacted on 03/06/01.
2. Rachel's site photos were inadequate for Phase I ESA. Phase I ESA Site Reconnaissance occurred on 4/5/01

SIGNATURE	TITLE	DATE

CONVERSATION RECORD — OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

CONVERSATION RECORD	TIME 9 AM	DATE 3/6/01	

TYPE			ROUTINE	
[X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING			NAME/SYMBO	INI
Location of Visit/Conference: Debra's Desk (RE-A)				
NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU Debbie (Debra) Vanopdorp	ORGANIZATION (Office, dept., bureau, etc.) CEMVR-RE-A	TELEPHONE NO: X5243		
SUBJECT Peoria River Front Development: Debra handles the real estate issues for the project				

SUMMARY

I asked Debra for a list of owners and users of the study area properties and for legal descriptions of the study area properties.

ACTION REQUIRED

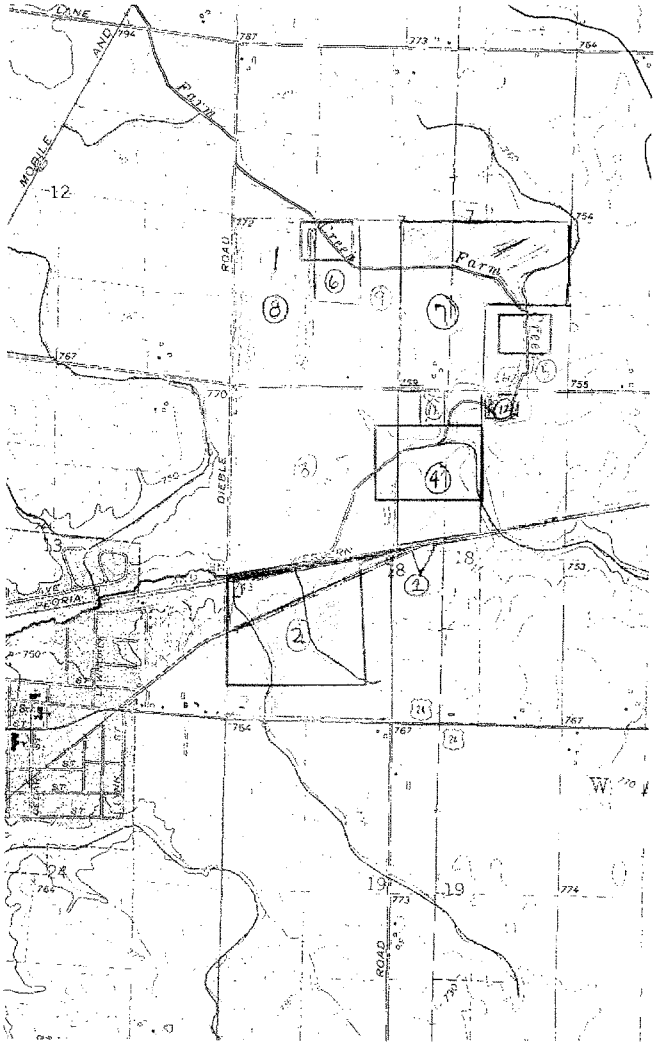
1. Wait for Debra to provide input. Promised by COB 3/6/01

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		3/6/01

ACTION TAKEN

1. Debra provided necessary information after lunch 3/6/01.

SIGNATURE	TITLE	DATE
	Civil Engineer, co-op	3/6/01


LANE
AND
MOBILE
Farm
ROAD
DIEBLE
Farm
ROAD
12
13
18
19
19
24
8
6
7
4
2
2

PEORIA RIVERFRONT (UPPER FARM CREEK) TOD

1 Burlington Northern & Santa Fe Railway Company
2 City of Washington, IL
3 Blickenstaff Farming Corporation
4 City of Washington, IL
5 Arnold A. Danz
6 City of Washington, IL
7 Raymond L. & Janice M. Keil
8 Blickenstaff Farming Corporation
9 Alice M. Hoffer Farms, L.L.C.
10 Daniel W. & Angela C. Wissel
11 James E. & Ilaisaane T. Chapman
12 Craig V. Doerr

PEORIA RIVERFRONT (PEORIA LAKE AREA) TOD

13 Christie Real Estate c/o NC IL Trust Co.
14 State of Illinois, Department of Conservation
15 Fondulac Park District
16 Miller, Martin, Trabue
17 Fondulac Park District
18 Fondulac Park District
19 Fondulac Park District
20 City of East Peoria
21 City of East Peoria
22 Local Union #183
23 City of East Peoria
24 State of Illinois, Department of Conservation
25 Illinois American Water Co., Peoria District

CONVERSATION RECORD	TIME 10:30 AM	DATE 4/5/01

TYPE: [X] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

Location of Visit/Conference: City Hall

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Kenneth Newman, City Engineer	City of Washington	(309) 444-3196

SUBJECT

Peoria River Front Development: Ken is the City Engineer for the City of Washington.

ROUTINE	
NAME/SYMBO	INI

SUMMARY

Ken Barnes (ED-DN) also attended this meeting.

Mr. Newman provided a Phase I ESA that was done by S.A.F.E Inspection, Inc. on 7 Apr 2000 for project site 2 (Vacant Land/135 acres, Lloyd I. Blumesnshire Trust, NE Corner US Route 245 & Diebel Road, Washington, IL 61571.) The executive summary of the S.A.F.E. Phase I ESA calls for Phase II work to confirm the presence or absence of migrating contamination from a junkyard adjoining the property. In spite of the risk of contamination, the city decided to purchase the property. This decision was based primarily on the assumption that the city would keep the property in perpetuity and the assumption that the property would always remained zoned for agricultural use. Mr. Newman has lived in the area for over 25 years and does not recall any incident where and oil sheen or contamination was reported to have come from the junkyard. Nor does he recall the condition of the junkyard changing (for better or worse) over that time. Nonetheless, Mr. Newman could not provide any real evidence indicating that contamination did not exist, nor could he produce any real evidence indicating that the contamination is below regulatory action levels for protecting human health, crop production, r the environment.

Mr. Newman, Ken Barnes, and I discussed about the possibility of a septic system on the property adjoining the northern end of Site 2. Mr. Newman expressed that he has knowledge of a septic system existing on the property, but would not be able to confirm its location. He recommended that at least 4 feet be maintained between the bottom of the septic leach field and any groundwater influenced by the planned maximum pond elevation.

Mr. Newman could not provide any knowledge regarding the construction or abandoning of the enclosed railroad property. The city has a continued interest in purchasing the abandoned railroad land.

ACTION REQUIRED

1. Review SAFE Phase I ESA

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Mikael Brown		4/6/01

ACTION TAKEN

1. Reviewed material upon receipt. SAFE Phase I ESA recommends Phase II.

SIGNATURE	TITLE	DATE

CONVERSATION RECORD — OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

PHASE IIA ENVIRONMENTAL SITE ASSESSMENT
PEORIA RIVERFRONT DEVELOPMENT STUDY
FARM CREEK
WASHINGTON, ILLINOIS

Prepared For:

U.S. ARMY CORPS OF ENGINEERS
ROCK ISLAND DISTRICT
P.O. Box 2004, Clock Tower Building
Rock Island, Illinois

Prepared By:

MISSMAN, STANLEY & ASSOCIATES, P.C.
2415 18th Street, Suite 203
Bettendorf, Iowa

MSA Project No. C02E013
August 22, 2002

1049

August 22, 2002

Mr. Louis Uptmor, CEMVR-ED-DN
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Building
P.O. Box 2004
Rock Island, IL 61204

RE: Phase IIA Environmental Site Assessment
Peoria Riverfront Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Dear Mr. Uptmor:

Missman, Stanley & Associates, P.C. (Missman) has completed the Phase IIA Environmental Site Assessment on the agricultural property located near the northeast corner of Walnut Street and Diebel Road in Washington, Illinois. The work conducted in assessing the subject property and the results of the assessment are discussed in the attached report. The work discussed herein was performed in accordance with the Statement of Work (SOW) prepared by your office dated April 23, 2002.

The assessment was completed with the intent of determining the characteristics of soil and groundwater quality on the property under consideration, particularly to determine if historic adjacent land use has impacted the environmental quality of near surface soils and groundwater on the subject property. We have enjoyed working with the Corps of Engineers on this project. If you have any questions regarding the information discussed in our report, please do not hesitate to contact our office.

Sincerely,

MISSMAN, STANLEY & ASSOCIATES, P.C.

By_____
Paul A. Loete, P.E.
Project Manager

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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1

2.0 INTRODUCTION 1

2.1 PROPERTY LOCATION AND CHARACTERISTICS 2

3.0 SCOPE OF ASSESSMENT 2

4.0 GENERAL HYDROGEOLOGIC SETTING 3

5.0 DESCRIPTION OF FIELD INVESTIGATION 3

5.1 AUGERING 3
5.2 DRILLING 4
5.3 SOIL SAMPLING AND ANALYSIS 5
5.4 GROUNDWATER INVESTIGATION 6
5.4.1 Piezometer Construction 6
5.4.2 Piezometer Development and Sampling 7
5.5 DECONTAMINATION 7
5.6 HYDRAULIC CONDUCTIVITY TESTING 7
5.7 HEALTH AND SAFETY 8
5.8 INVESTIGATION DERIVED WASTES 8

6.0 ANALYTICAL RESULTS 8

6.1 SOIL ANALYSIS 9
6.1.1 Inorganic Analysis 9
6.1.2 TCLP Analysis 13
6.1.3 Organic Analysis 13
6.1.3.1 Volatile Organic Compounds 13
6.1.3.2 Semi-Volatile Organic Compounds 14
6.1.3.3 Pesticides and PCBs 14
6.1.3.4 Polynuclear Aromatic Hydrocarbons 15
6.2 GROUNDWATER ANALYSIS 15
6.2.1 Inorganic Analysis 15
6.2.2 TCLP Analysis 16
6.2.3 Organic Analysis 16
6.2.3.1 Volatile Organic Compounds 16
6.2.3.2 Semi-Volatile Organic Compounds 16
6.2.3.3 Pesticides and PCBs 16
6.2.3.4 Polynuclear Aromatic Hydrocarbons 16

7.0 CONTAMINANT DISTRIBUTION AND MIGRATION 16

8.0 CONCLUSIONS 17

9.0 GENERAL COMMENTS 17

LIST OF APPENDICIES

APPENDIX A –Figures
Figure 1- Site Location Map
Figure 2 - Site Diagram
APPENDIX B –Tables
Table B-1 – Elevation Summary
Table B-2 - Analytical Summary of Soil Samples - Inorganic Analysis
Table B-3 – Analytical Summary of Soil Samples – TCLP Analysis
Table B-4 – Analytical Summary of Soil Samples – Organic Analysis
Table B-5 – Analytical Summary of Groundwater Samples
APPENDIX C - Boring Logs
APPENDIX D – Laboratory Report
APPENDIX E – Hydraulic Conductivity Calculation
APPENDIX F – Photographs
APPENDIX G – Health and Safety Plan

PHASE IIA ENVIRONMENTAL SITE ASSESSMENT
PEORIA RIVERFRONT DEVELOPMENT STUDY
FARM CREEK
WASHINGTON, ILLINOIS
August 22, 2002

1.0 EXECUTIVE SUMMARY

The Corps of Engineers is proposing to construct two impoundment wetlands, parallel to abandoned Atchison, Topeka and Santa Fe (AT&SF) rail line, in separate primary tributaries of Farm Creek located in Washington, Illinois. The impoundment wetlands will be constructed in the center of the subject property for habitat enhancement and siltation control. Preliminary, non-intrusive studies of the proposed project site revealed that the property is located downgradient of a concrete batching plant and salvage yard. To determine if adjacent land use has impacted near surface soils and subsurface groundwater, a Phase II Environmental Site Assessment was completed.

The Phase II Environmental Site Assessment included the advancement of twelve hand auger borings and three temporary peizometers. Soil and groundwater samples were collected from the borings and piezometers for chemical analysis. The soil samples were collected from depths ranging from two feet and four feet below land surface (bls). The assessment also included hydraulic conductivity testing of the aquifer materials around the piezometers.

Laboratory data from the collected samples revealed that five inorganic compounds, the pesticide dieldrin, and the PCB Arochlor 1260 were present on the site at concentrations that exceeded the Illinois Environmental Protection Agency (IEPA) Tier I remediation objectives for soil and groundwater. Dieldrin and Alchlor 1260, which were detected in the soil, exceeded both the residential and industrial/commercial remediation objectives. Each of the other constituents were either detected in groundwater, or exceeded the soil component of the groundwater ingestion route remediation objective. Remediation objectives for ingestion of groundwater are the same for residential and commercial properties. Although their source has not been confirmed, the soil samples collected on the up-gradient portion of the site exhibited relatively higher concentrations of inorganic compounds in soil and groundwater. Dieldrin was randomly distributed in shallow soil on the property. The dieldrin is likely a remnant of historic pesticide application to the agricultural land.

2.0 INTRODUCTION

Missman, Stanley & Associates, P.C. (Missman) has conducted a Phase II Environmental Site Assessment of the Farm Creek tributaries which traverse north and south on the agricultural property located near the intersection of Walnut Street and Diebel Road in Washington, Illinois. The subject property is currently occupied by agricultural cropland and is currently farmed with corn. The assessment was conducted consistent with the Statement of Work prepared by the U.S. Army Corps of Engineers (Corps) dated April 23, 2002. The work included the advancement of twelve hand auger borings, installation of three temporary piezometers, the collection of soil and groundwater samples, performance of in-situ hydraulic conductivity tests, and a comprehensive laboratory analysis of the collected samples. The intent of the assessment was to determine if the adjacent salvage yard and concrete batching plant has impacted the environmental quality of site soils and groundwater.

2.1 Property Location and Characteristics

The subject property is bounded to the north by the abandoned AT&SF rail line, to the south by Walnut Street, to the east by private land and to the west by Diebel Road. The subject property is located within the Southwest quarter of Section 18, Township 26N, Range 2W of the Third Principal in Tazewell County, Illinois. Figure 1, Appendix A, is an excerpt of a U.S.G.S. Topographic map that depicts the location of the subject property.

The property on which the environmental assessment was performed is owned by the City of Washington. Prior to commencing fieldwork associated with this project, the Corps secured a Right of Entry for sampling. The property is currently utilized as agricultural cropland. A concrete batch plant, salvage yard and residential dwelling are located near the southwest corner of the subject property. An abandoned railroad is located near the northern boundary, beyond which is agricultural cropland. Walnut Street is located south of the subject site and Diebel Road borders the western perimeter of the site. To the east of the subject site is private land.

Two drainage tiles reportedly traverse north and south through the subject property, and drain into Farm Creek north of the site. The drain tiles are constructed within two drainage swales that slope down toward the north. Reference Figure 2, Appendix A, for a Site Diagram that depicts site features.

3.0 SCOPE OF ASSESSMENT

The intent of this Phase IIA Environmental Site Assessment was to determine the presence or absence of migrating contaminants and identify any unidentified environmental liabilities in areas where impoundment wetland construction activities may occur. To achieve the intent of this project, Missman performed the following scope of work:

- Advanced twelve-hand auger borings in the vicinity of the field tiles located on the subject property. The hand auger borings were advanced to depths of approximately two and four feet below land surface (bls). The number of hand auger borings differed from the SOW because groundwater was encountered at shallow depths.

- Collected soil samples from the hand auger borings at approximately two feet and four feet bls. The collected samples were analyzed in accordance with the analytical schedule provided by the Corps.

- Three temporary piezometers were installed at depths ranging from ten feet to twenty feet bls. One groundwater sample was collected from each of the piezometers. The collected samples were analyzed in accordance with the analytical schedule provided by the Corps.

- Performed in-situ hydraulic conductivity testing on each of the piezometers.

- At the completion of the drilling and sampling, the hand auger borings and piezometers were abandoned and backfilled with a combination of boring cuttings and bentonite chip hole plug.

4.0 GENERAL HYDROGEOLOGIC SETTING

Based on our review of a geological well log in the area of the site, unconsolidated materials exist in the near surface stratum to depths of over 300 feet below land surface. The unconsolidated materials consisted of clay and sandy clay materials to depths of approximately 260 feet bls. Sands and gravels were identified on the well log below the cohesive materials. Geology identified in the borings on the site was consistent with the above referenced well log. Materials identified in the borings consisted of cohesive soils to depth of approximately 20 feet bls. Sand and gravel was identified in one of the piezometer borings at a depth of approximately 20 feet bls. The deepest soil boring on the site was advanced to a depth of twenty-five feet. Groundwater was encountered in the borings at approximately four feet bls.

The subject site contains two separate sub watersheds of Farm Creek. Farm Creek flows west along the northern property boundary to Peoria Lake, approximately 10 miles downstream from the property. Hydrogeology on the site is dominated by groundwater flow from south to north toward Farm Creek. The rate of the subsurface flow will be influenced greatly by the amount of precipitation in the upper reaches of the watershed. The upper reaches of the watersheds traversing the property are dominated by cropland. Conservation practices in these areas presumable increase the volume of water that recharges into the soil.

Hydrogeology on the property will also be influenced by the two drain tiles. These drain tiles will have the effect of lowering the water table, so that the water table is not above the elevation of the drain tiles for a significant duration. The drain tiles were observed to be flowing at the time of the sampling. Elevations of the borings, piezometers, and groundwater at each location are depicted on Table B-1, Appendix B.

For the purposes of this analysis and evaluation, it has been assumed that the groundwater on the property is Class I groundwater, as defined by Illinois Administrative Code Chapter 620. According to this chapter, Class I groundwater is generally considered potable resource groundwater. It may be possible to determine that the groundwater on the property is of a Class other than Class I.

5.0 DESCRIPTION OF FIELD INVESTIGATION

Fieldwork associated with the Phase II environmental site assessment was conducted on June 18 and 19 2002. The fieldwork consisted of hand augering twelve boreholes to an approximate depth of two and four feet bls, installation of 3 temporary peizometers, and the collection of soil and groundwater samples for laboratory analysis.

Soil sampling, analysis, and evaluation under this project was completed in accordance with the U.S. Army Corps of Engineers Engineering Manual EM 200-1-3, Environmental Quality – Requirements for the preparation of Sampling and Analysis Plans (CEMP-RT/CECW-E, February 1, 2001).

5.1 Augering

Hand augering was performed in general accordance with the protocol set forth in ASTM Designation D 1452-80 (Standard Practice for Soil Investigation and Sampling by Auger Borings). A stainless steel orchard-barrel type hand auger was used to perform the borings. The approximate boring locations were placed in Locations 1 through 4, as depicted on Figure 2, Appendix A. Locations of the borings were determined in the field by the field team leader and Mr. Louis Uptmor, representative of the Corps.

During the advancement of boring B-1, groundwater was encountered at approximately four feet below land surface. Due to the relatively high groundwater, it was decided to eliminate the five-foot below land samples and replace those samples with a two-foot below land sample in an additional boring. Samples were collected from two depths only in borings B-1 and B-6. Soil borings were designated B-1 through B-12. Reference Table B-2, Appendix B for a summary of the boring references and the depths of the collected samples.

Soil borings B-1 through B-6 were advanced in Location 1. Soil borings B-7 through B-8 were advanced in Location 2. Soil borings B-9 and B-10 were advanced in Location 3 and borings B-11 and B-12 were advanced in Location 4. The ground surface at each boring location was vegetated with native prairie grass and weeds. Reference Figure 2, Appendix A for a Site Diagram, which depicts the soil boring locations.

Prior to commencement of hand augering, a clean polyethylene sheeting was placed on the ground surface adjacent to the proposed boring location. All augur tooling and sampling equipment was stored on the sheeting during field activities. During augering, soils were visually classified in the field consistent with the practice set forth in ASTM Designation D 2488-93 (Practice for Description and Identification of Soils – Visual Manual Procedure). A stratigraphic log of each boring was completed based on field observations during drilling and sampling. Completed stratigraphic logs for each soil boring are included in Appendix C.

Generally, soils observed on the subject property consisted of a dark gray silty clay and dark brown clayey silt to a depth of approximately four feet bls. However, the soils in borings B-4 through B-6 consisted of yellowish orange silt and gravel from the ground surface to approximately six inches bls. This material had apparently been washed onto the property from the up-gradient batch plant location. Dark gray silty clay was present below the clayey silt. Groundwater was encountered in the borings at a depth of approximately four feet bls.

5.2 Drilling

The borings for the installation of the temporary piezometers were advanced with a truck mounted drill rig and 3¼ inch inside diameter hollow stem augers. Testing Service Corporation (TSC) of Bloomington, Illinois was contracted to perform the drilling. The TSC personnel performing work on this project were 40-Hour HAZWOPER Certified. Copies of the TSC personnel certifications are included in the Site-Specific Safety and Health Plan, attached as Appendix G. The work was completed in general accordance with ASTM designation D 5784-95. The approximate boring locations were placed in Location 1, and north of Location 3, and 4, as depicted on Figure 2, Appendix A. The final locations of the borings were determined by the Field Team Leader and Mr. Uptmor prior to drilling. The temporary piezometers were designated as MW-1 through MW-3.

Prior to commencement of drilling, a clean polyethylene sheeting was placed on the ground surface adjacent to the proposed boring location. All soil cuttings were stored on the sheeting during field activities. During drilling, soils were visually classified in the field in general accordance with the practice set forth in ASTM Designation D 2488-93. A stratigraphic log of each boring is included in Appendix C.

5.3 Soil Sampling and Analysis

During augering, soil samples were collected and packaged for laboratory analysis in general accordance with the Corps SOW dated April 23, 2002. Two soil samples were collected from borings B-1 and B-6 at approximately two feet and four feet bls. Soil samples were collected from borings B-2 through B-5 and B-7 through B-12 at approximately two feet bls. One duplicate sample was also obtained from boring B-6 at approximately four feet bls. The soil samples collected from the hand auger borings were obtained by placing the contents of the hand auger directly into laboratory provided containers. The samples were then immediately labeled and placed in an ice-packed cooler pending shipment to the laboratory.

A small portion of each sample was placed into a resealable plastic bag, and held for approximately fifteen (15) minutes at ambient temperature pending headspace analysis. Following the fifteen-minute holding period, the soil samples were field screened with a photoionization detector (PID). The PID measured the concentration of volatile organic vapors in the sample headspace. Soil samples exhibited PID readings from 0 to 6.0 parts per million (ppm). Results of the field vapor screening are depicted on the boring logs included in Appendix C. A MiniRAE 2000 portable VOC monitor equipped with a 10.6 eV gas discharge lamp was used for field screening. The PID was calibrated in accordance with the manufacturer's recommendations prior to the commencement of field screening activities.

During drilling for the temporary piezometers, soil samples were collected continuously with a 5-foot split spoon-sampling device. Upon collection, the samples were placed into a resealable plastic bag, and held for approximately fifteen (15) minutes at ambient temperature pending headspace analysis. Soil samples collected from the temporary piezometers exhibited vapor concentrations of up to 2.4 parts per million (ppm).

At the completion of on-site activities, soil samples were transported to PDC Laboratories, Inc. (PDC) laboratory in Peoria, Illinois. The selected samples were analyzed for the constituents on the following table:

Table 1
Laboratory Analytical Suite

Parameter	Method
Aluminum	6010/6020
Antimony	6010/6020
Arsenic	7060/7061/7062
Barium	6010/6020
Beryllium	6010/6020
Cadmium	6010/6020
Calcium	6010/6020
Chromium, Total	6010/6020
Chromium, hexavalent	7196
Cobalt	6010/6020
Copper	6010/6020
Iron	6010/6020
Lead, total	7421
Magnesium	6010/6020
Manganese	6010/6020
Mercury	7470/7471

Nickel	6010/6020
Potassium	6010/6020
Selenium	7740/7741/7742
Silver	6010/6020
Sodium	6010/6020
Thallium	7841
Vanadium	6010/6020
Zinc	6010/6020
Cyanide	
TOC	9060
% Solids	160.3
Pesticides/PCBs	8081
PNAs	8310
PH	9040/9045
Semi-Volatile Organics	
TCLP Extraction	1311
B/N/A Aqueous	8270
Volatile Organics	8260

Laboratory analysis was performed consistent with analytical methods documented in EPA publication SW-846, entitled Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. This document is the EPA Office of Solid Waste sections official compendium of analytical and sampling methods that have been evaluated and approved for use in complying with the RCRA regulations. SW-846 functions primarily as a guidance document setting forth acceptable, although not required, methods for the regulated and regulatory communities to use in responding to RCRA-related sampling and analysis requirements.

5.4 Groundwater Investigation

Three temporary piezometers (MW-1, MW-2, and MW-3) were installed on the property on June 19, 2002, by TSC of Bloomington, Illinois. The locations of the monitoring wells are presented on Figure 2, Appendix A. Groundwater was encountered at approximately thirteen to fifteen feet bls. The temporary piezometers were placed in locations determined in the field by the Field Team Leader and the Corps representative.

5.4.1 Piezometer Construction

The temporary piezometers were constructed in general accordance with the protocol set forth in ASTM Designation D 5092 (Standard Practice for Design and Installation of Groundwater Monitoring Wells in Aquifers). The temporary piezometers were constructed with two-inch Schedule 40 PVC pipe materials. A screened section with 0.01 inch slots was installed at the bottom of the temporary piezometer boring. A solid stem riser pipe was installed from the top of the screened section to approximately one to three feet above the ground surface. A clean sand pack was placed in the annular space of the borehole to a minimum of one and one-half feet above the top of the screened section. A bentonite pellet layer was placed in the annular space above the sand pack up to the ground surface. The bentonite pellets were hydrated in place with potable water obtained from an off-site source. The temporary piezometers were finished with a lockable expansion cap and a padlock. A construction diagram of the completed temporary piezometers are included in Appendix C.

5.4.2 Piezometer Development and Sampling

Following installation, the temporary piezometer was gauged with an electronic water level indicator to determine the depth of standing water in the piezometer. The piezometer was then developed by purging five standing well casing volumes from the wells. Each monitoring well was developed with a disposable polyethylene bailer, and development fluids were not collected. After a minimum forty-eight hours, the piezometers were purged of one standing well casing volume and sampled with a disposable bailer. The groundwater samples were transferred directly from the piezometer to laboratory provided containers. Upon sample collection, the containers were immediately placed in an ice-packed cooler pending shipment to PDC. The samples were relinquished to PDC laboratory under standard chain of custody documentation. Groundwater samples were analyzed for a similar analytical suite as previously identified for soil samples. The laboratory parameters for groundwater analysis are summarized on Table B-5, Appendix B.

5.5 Decontamination

Prior to mobilization to the project site, sampling equipment and downhole drilling equipment and tooling was decontaminated. Between boring and piezometer locations, the sampling equipment was decontaminated in accordance with the following procedure.

1. Wash equipment with a mixture of potable water and Alconox® detergent.
2. Rinse equipment with potable water.
3. Rinse equipment with deionized water.
4. Rinse with methanol.
5. Allow to air dry.

The equipment decontamination procedure was conducted at the point of sampling. Additionally, in an effort to minimize the probability of cross contamination, the split-spoon sampling device was decontaminated between each sampling event with a mixture of Alconox® detergent and potable water, then rinsed with potable water and rinsed with methanol.

Missman field personnel wore clean nitril gloves for each sampling event. Gloves were changed between each sampling event. Also, only clean, prepackaged sampling equipment (bailers) was used for sample collection.

5.6 Hydraulic Conductivity Testing

In an effort to quantify the hydraulic characteristics of subsurface media on the subject property, a slug test was performed on all of the temporary piezometers. The slug tests were performed in general accordance with ASTM Method D 4044. The slug test performed on piezometer MW-1 was performed by withdrawing a mechanical the slug and recording the drawdown at successive time intervals. The slug tests performed on piezometers MW-2 and MW-3 were performed by bailing a fixed volume of groundwater from the piezometers and recording the rate of recharge. Water level measurements in the piezometers were taken utilizing an electronic water level indicator.

The slug testing data was evaluated to determine the hydraulic conductivity by the Bower and Rice (1979) method. An excerpt of the Bower and Rice method, along with the hydraulic conductivity calculation sheets are attached in Appendix E.

The calculated hydraulic conductivity for each of the temporary piezometers are calculated below.

Table 2
Hydraulic Conductivity Summary

Piezometer No.	Hydraulic Conductivity (cm/sec)
MW-1	0.000016
MW-2	0.00012
MW-3	0.000092

The hydraulic conductivity values calculated herein are consistent with the values estimated by the Illinois Environmental Protection Agency for clays and clay loams. The IEPA publishes estimated hydraulic conductivity values in the appendix of the TACO regulations for modeling purposes. The hydraulic conductivity calculations are presented on Exhibit 1, 2 and 3, Appendix E.

5.7 Health and Safety

Fieldwork for this intrusive environmental site assessment was conducted utilizing Level D Personnel Protective Equipment (PPE). The PPE for this project consisted of a normal work attire including work boots and weather appropriate clothing. During augering, drilling and sampling activities, the atmosphere surrounding each borehole and soil cuttings were continuously monitored with a PID. During the fieldwork, volatile organic vapors were not detected in the work atmosphere above the field detection limit of 0.1 ppm. The highest volatile organic vapors detected in the boreholes or the soil cuttings was 6.0 ppm.

5.8 Investigation Derived Wastes

At the completion of the drilling and sampling, all investigation derived wastes were returned to the project site. The investigation derived wastes included soil cuttings, decontamination fluids, and well development fluids. Missman's Field Team Leader made the determination in the field that these materials did not have the characteristics of hazardous wastes, therefore, no investigation derived wastes were transported from the site.

6.0 ANALYTICAL RESULTS

A summary of the analytical results of collected soil and groundwater samples is presented on Tables B-2 through B-5, Appendix B. For comparative purposes, Tier I remediation objectives for Industrial/Commercial and Residential properties established under the IEPA Tiered Approach to Corrective action Objectives (TACO) Program are also included on the tables. These remediation objectives are for comparative purposes only, and have no regulatory bearing on the property. A copy of the PDC laboratory report is attached in Appendix D.

The TACO Tier I remediation objectives represent concentrations at which normal exposure via ingestion or inhalation are considered unlikely to pose a significant threat beyond background to cause adverse affects to human health or the environment. The TACO Tier I remediation objectives are based upon a target cancer risk of 1 in 1,000,000. Remediation objectives are based upon the use of the property, and

the related exposure frequency and duration. In general, the IEPA uses the exposure assumptions below in calculating the Tier I soil and groundwater remediation objectives.

Table 3
Values used in Remediation Objectives Calculations

Parameter	Residential	Industrial/commercial
Body Weight	70 kg	70 kg
Averaging Time	70 years	70 years
Exposure Frequency	350 days/yr.	250 days/yr.
Exposure Duration	30 years	25 years
Ingestion Rate - Water	2 L/day	1 L/day
Ingestion Rate - Soil	100 mg/day	50 mg/day

6.1 Soil Analysis

6.1.1 Inorganic Analysis

The inorganic analytical results of the collected soil samples are summarized on Table B-2, Appendix B. Tier I Soil Remediation Objectives (SROs) for residential and industrial/commercial properties are also presented on the table. Also, background concentrations established under the IEPA TACO program are included on the table for reference. The analytical data depicts the presence of several inorganic constituents at concentrations above the IEPA established background concentrations. None of the constituents of concern were, however, detected at concentrations that exceeded the Tier I SRO for the ingestion or inhalation exposure route for both residential and industrial/commercial properties. Although the IEPA publishes a background concentration for inorganic constituents, the background concentration is only a concentration below which remediation is impractical.

A summary of the constituents that were detected at concentrations above the established background concentration is presented below.

Table 4
Constituents Exceeding Background

Parameter	Sample No.	Concentration (mg/kg)	Background Conc. (mg/kg)
Aluminum	B-1-2 (2')	14,000	9,500
	B-1-3 (4')	10,000	
	B-4-1 (2')	12,000	
	B-6-2 (4')	18,000	
	B-6-2 Dup	16,000	
	B-8-1 (2')	12,000	
	B-9-1 (2')	16,000	
	B-10-1 (2')	15,000	
	B-11-1 (2')	18,000	
	B-12-1 (2')	13,000	

Phase IIA ESA
Peoria Riverfront Redevelopment Project – Farm Creek
August 22 2002

Parameter	Sample No.	Concentration (mg/kg)	Background Conc. (mg/kg)
Barium	B-2-1 (2')	120	
	B-3-1 (2')	200	
	B-5-1 (2')	210	
	B-6-1 (2')	140	
	B-6-2 (4')	180	
	B-6-2 Dup	150	110
	B-7-1 (2')	120	
	B-8-1 (2')	170	
	B-9-1 (2')	150	
	B-11-1 (2')	150	
	B-12-1 (2')	120	
Beryllium	B-6-2 Dup (4')	0.6	0.59
Cadmium	B-2-1 (2')	1.4	
	B-3-1 (2')	2.3	
	B-4-1 (2')	1.0	
	B-5-1 (2')	1.0	
	B-6-1 (2')	0.87	
	B-6-2 Dup	0.7	0.6
	B-7-1 (2')	0.84	
	B-8-1 (2')	1.4	
	B-9-1 (2')	0.74	
	B-10-1 (2')	0.65	
	B-11-1 (2')	0.79	
Calcium	B-4-1 (2)	55,000	9,300
	B-10-1 (2)	32,000	
Chromium	B-1-2 (2)	22	
	B-1-3 (4)	18	
	B-3-1 (2)	20	
	B-4-1 (2)	24	
	B-6-2 (4)	26	
	B-6-2 Dup (4)	22	16.2
	B-8-1 (2)	20	
	B-9-1 (2)	23	
	B-10-1 (2)	21	
	B-11-1 (2)	26	
	B-12-1 (2)	19	
Cobalt	B-5-1 (2)	18	
	B-6-2 (4)	10	
	B-6-2 Dup (4)	12	8.9
	B-8-1 (2)	12	
	B-11-1 (2)	15	

Phase IIA ESA
Peoria Riverfront Redevelopment Project – Farm Creek
August 22 2002

Parameter	Sample No.	Concentration (mg/kg)	Background Conc. (mg/kg)
Copper	B-1-2 (2)	36	
	B-2-1 (2)	240	19.6
	B-3-1 (2)	40	
	B-4-1 (2)	68	
	B-5-1 (2)	20	19.6
	B-7-1 (2)	20	
	B-8-1 (2)	51	
	B-9-1 (2)	26	
Iron	B-1-2 (2)	18,000	
	B-1-3 (4)	16,000	
	B-5-1 (2)	16,000	
	B-6-2 (4)	17,000	15,900
	B-6-2 Dup (4)	18,000	
	B-8-1 (2)	16,000	
	B-9-1 (2)	16,000	
	B-11-1 (2)	19,000	
Lead	B-2-1 (2)	150	
	B-3-1 (2)	170	
	B-4-1 (2)	49	36
	B-8-1 (2)	65	
Manganese	B-5-1 (2)	1700	
	B-6-1 (2)	770	
	B-6-2 (4)	960	
	B-6-2 Dup (4)	920	636
	B-7-1 (2)	860	
	B-8-1 (2)	1100	
	B-11-1 (2)	1200	
Mercury	B-2-1 (2)	0.068	
	B-3-1 (2)	0.061	
	B-8-1 (2)	0.065	0.06
Nickel	B-8-1 (2)	20	
	B-6-2 Dup (4)	21	
	B-8-1 (2)	20	18
	B-11-1 (2)	21	
Potassium	B-1-2 (2)	1,600	
	B-3-1 (2)	2,200	
	B-4-1 (2)	1,700	
	B-5-1 (2)	1,600	
	B-6-1 (2)	1,400	
	B-6-2 (4)	2,800	
	B-6-2 Dup (4)	2,000	1268
	B-8-1 (2)	1,500	
	B-9-1 (2)	2,100	
	B-10-1 (2)	2,800	
	B-11-1 (2)	2,200	
	B-12-1 (2)	1600	

Parameter	Sample No.	Concentration (mg/kg)	Background Conc. (mg/kg)
Selenium	B-1-2 (2)	0.74	
	B-3-1 (2)	0.62	
	B-4-1 (2)	0.73	
	B-5-1 (2)	0.97	
	B-6-1 (2)	1.7	
	B-6-2 (4)	1	
	B-6-2 Dup (4)	1.3	
	B-7-1 (2)	0.88	0.48
	B-8-1 (2)	1.4	
	B-9-1 (2)	1.2	
	B-10-1 (2)	0.76	
	B-11-1 (2)	1.5	
	B-12-1 (2)	1	
Silver	B-9-1 (2)	1.2	0.55
Thallium	B-1-2 (2)	0.38	
	B-2-1 (2)	0.48	
	B-3-1 (2)	0.58	
	B-5-1 (2)	0.56	
	B-6-1 (2)	0.47	
	B-6-2 (4)	0.46	0.32
	B-6-2 Dup (4)	0.66	
	B-8-1 (2)	0.73	
	B-9-1 (2)	0.43	
	B-11-1 (2)	0.35	
	B-12-1 (2)	0.34	
Vanadium	B-1-2 (2)	26	
	B-3-1 (2)	26	
	B-4-1 (2)	28	
	B-6-2 (4)	38	
	B-6-2 Dup (4)	32	
	B-8-1 (2)	27	25.2
	B-9-1 (2)	34	
	B-10-1 (2)	32	
	B-11-1 (2)	41	
	B-12-1 (2)	29	
Zinc	B-2-1 (2)	280	
	B-3-1 (2)	400	
	B-4-1 (2)	170	95
	B-6-1 (2)	100	
	B-8-1 (2)	150	

Based on the concentrations of inorganic constituents on the property, it does not appear that inorganic compounds on the property would pose a significant risk of causing deleterious impacts to human health or the environment, based on exposure by inhalation or soil ingestion.

6.1.2 TCLP Analysis

The toxicity characteristic leaching procedure (TCLP) results of the collected soil samples are summarized on Table B-3, Appendix B. The threshold concentrations for hazardous waste characterization by toxicity and the SROs for the soil component of the groundwater ingestion pathway are also included on the table. The analytical data revealed that none of the TCLP results were above the hazardous waste threshold concentration.

Three compounds, barium, cadmium, and lead were detected in the collected samples at concentrations exceeding the Tier I SRO for the soil component of the groundwater ingestion pathway. A summary of the compounds that exceeded the SRO is presented below.

Table 5
Constituents Exceeding Soil Component of Groundwater Ingestion Pathway Remediation Objective

Parameter	Sample No.	Concentration (mg/L)	SRO (mg/L)
Barium	B-1-3 (4')	2.3	2.0
Cadmium	B-2-1 (2') B-3-1 (2')	0.01 0.0058	0.005
Lead	B-2-1 (2') B-3-1 (2')	0.043 0.015	0.0075

In terms of comparison to the TACO Tier I SROs, the remediation objectives on the table above are for the soil component of the groundwater ingestion exposure route. This exposure route makes that assumption that concentrations of contaminants in soil will leach to groundwater, and the groundwater will be ingested. It is noted that the SRO for the soil component of the groundwater ingestion exposure route is the same for residential and commercial properties.

6.1.3 Organic Analysis

The organic analytical results of the collected soil samples are summarized on Table B-4, Appendix B. Tier I SROs for residential and industrial/commercial properties are also presented on the table.

6.1.3.1 Volatile Organic Compounds

Only one volatile organic compound, acetone, was detected in the collected soil samples above the laboratory reporting limit. Acetone was detected in each of the collected samples at concentrations above the laboratory-reporting limit. Each of the detected acetone concentrations were less than the residential and commercial Tier I SROs. Acetone is a manufactured chemical that is also found naturally in the environment. Acetone is manufactured as a component of plastics and for use as a solvent. Acetone generally does not bind well to soils. Some studies have also shown a potential for the production of acetone as a byproduct of the reaction of sodium bisulfate with humus material when using sampling method 5035.

6.1.3.2 Semi-Volatile Organic Compounds

Four semi-volatile organic compounds were detected above the laboratory-reporting limit in the collected samples. The compounds that were detected consisted of chrysene, flouranthene, and pyrene in B-2-1, and phenanthrene and pyrene in sample B-10-1. Each of the detected concentrations were less than the TACO Tier I residential and commercial SROs. Each of the detected semi-volatile organic compounds can be classified as a polynuclear aromatic hydrocarbon (PAH). PAHs are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

6.1.3.3 Pesticides and PCBs

Several pesticide and polychlorinated biphenyl (PCB) compounds were detected above the laboratory-reporting limit in the collected soil samples. Two of the compounds, PCB 1260 and dieldrin were detected at concentrations that exceeded the Tier I SRO. A summary of the samples that exceeded the SRO is presented below. The table also depicts the exposure pathways that were exceeded for each constituent.

Table 6
Summary of Constitutes Exceeding SRO

Parameter	Sample No.	Concentration (mg/kg)	Pathway Exceeded				
			Residential		Commercial		Migration to GW
			Ingestion	Inhalation	Ingestion	Inhalation	
PCB 1260	B-2-1 (2')	2.20	X		X		NA
Dieldrin	B-4-1 (2')	0.0081					X
	B-6-1 (2')	0.0048					X
	B-7-1 (2')	0.027					X
	B-8-1 (2')	0.022					X
	B-9-1 (2')	0.024					X
	B-10-1 (2')	0.017					X
	B-11-1 (2')	0.052	X				X
	B-12-1 (2')	0.14	X				X

Note: Migration to GW SRO is the same for residential and industrial/commercial properties.

It is noted that the SRO for PCB 1260 is the same for residential and commercial properties. Under the TACO program, the IEPA has established the SRO for PCBs based on 40 CFR 761. The detected dieldrin concentrations exceeded the Tier I ingestion SRO for residential properties, but were less that the SRO for commercial properties. It is noted that both the PCB and pesticide compounds were only detected in the soil samples collected from two feet. The soil samples collected from a four-foot depth did not have detectable concentrations of pesticide or PCB compounds.

Dieldrin is an insecticide and a by-product of the pesticide Aldrin. Dieldrin was widely used to control insects on agricultural cropland from 1950 to the mid 1970s. Most uses of dieldrin were banned in 1987; however, dieldrin is no longer produced in the United States due to its harmful effects on humans, fish, and wildlife. Dieldrin is a persistent, bioacculumative, and toxic pollutant targeted by EPA.

PCBs are a group of synthetic organic chemicals that can cause a number of different harmful effects. There are no known natural sources of PCBs in the environment. PCBs are either oily liquids or solids and are colorless to light yellow. Consumer products that may contain PCBs include old fluorescent lighting fixtures, electrical devices or appliances containing PCB capacitors made before PCB use was stopped, old microscope oil, and old hydraulic oil. PCB compounds are also persistent in the environment, and do not degrade rapidly.

6.1.3.4 Polynuclear Aromatic Hydrocarbons

As depicted on Table 4, several PAH compounds were detected in the collected soil samples. It is noted that under laboratory method 8310, a lower laboratory-reporting limit can be obtained than the 8270 (semi-volatile organic) method. Hence, several PAH compounds that were not detected under the 8270 scan were detected under the 8310 scan. Each of the detected constituents were, however, at concentrations less than the Tier I SRO for residential and commercial properties.

6.2 Groundwater Analysis

The analytical results of the collected groundwater samples are included on Table B-5, Appendix B. The TACO Tier I groundwater remediation objectives (GROs) for Class I groundwater are also included on the table.

6.2.1 Inorganic Analysis

Three constituents, iron, lead, and manganese were detected in the collected groundwater samples at concentrations that exceeded the Tier I Groundwater Remediation Objective (GRO).

Table 7
Summary of Constituents Exceeding GRO

Parameter	Sample No.	Concentration (mg/L)	GRO (mg/L)
Iron	MW-1 MW-2	49.0 5.4	5.0
Lead	MW-1	0.032	0.0075
Manganese	MW-1	1.7	0.15

Each of the constituents that were detected above the Tier I GRO are naturally occurring elements. It is observed that piezometer MW-1 is the well located nearest to the salvage yard, and this well exhibited the highest concentrations of inorganic constituents. In addition to being naturally occurring elements, each of the three constituents could be expected to leach from locations where metal materials are stored or buried.

6.2.2 TCLP Analysis

No constituents that were analyzed by TCLP methodology exhibited concentrations above the RCRA hazardous waste threshold concentration.

6.2.3 Organic Analysis

6.2.3.1 Volatile Organic Compounds

No volatile organic compounds were detected in the collected groundwater samples at concentrations that exceeded the laboratory-reporting limit. One volatile organic compound, chloromethane, was detected in the trip blank. The IEPA does not have a published Tier I GRO for chloromethane. Chloromethane was not detected above the laboratory-reporting limit in the collected groundwater samples.

6.2.3.2 Semi-Volatile Organic Compounds

One semi-volatile organic compound, phenol, was detected in the collected groundwater samples at a concentration above the laboratory-reporting limit. The phenol concentration detected in piezometer MW-2 was less than the Tier I GRO. Phenol is naturally occurring and man-made, and has a characteristic smell.

6.2.3.3 Pesticides and PCBs

One pesticide compound, heptachlor, was detected in the collected groundwater samples at a concentration above the laboratory-reporting limit. The heptachlor concentration detected in piezometer MW-2 was less than the Tier I GRO. Heptachlor is a synthetic chemical that was used in the past for killing insects in homes, buildings, and on food crops. It has not been used for these purposes since 1988. Heptachlor is both a breakdown product and a component of the pesticide chlordane.

6.2.3.4 Polynuclear Aromatic Hydrocarbons

Polynuclear aromatic hydrocarbons were not detected in the collected groundwater samples at concentrations above the laboratory-reporting limit.

7.0 CONTAMINANT DISTRIBUTION AND MIGRATION

Generally, the soil and groundwater samples collected from the property exhibited higher concentrations on the up-gradient portion of the site. This area is represented by soil borings B-1 through B-6, and piezometer MW-1. Samples collected from these locations are down gradient of the salvage yard and batch plant, and may represent constituents migrating onto the property.

In terms of fate and transport of contaminants on the site, the hydraulic gradient is from the south to the north. Groundwater movement would likely be directed to the drain tile, and would be discharged as surface water to Farm Creek.

Dieldrin was observed in shallow soil samples across the property. Dieldrin, by its nature is a persistent compound, and likely remains from historic pesticide application on the site. Although dieldrin was

detected at concentrations that exceeded the soil component of the groundwater ingestion route SRO, it was not detected above the laboratory-reporting limit in the groundwater.

8.0 CONCLUSIONS

Missman has completed a Phase II Environmental Site Assessment of the area proposed for the construction of impoundment wetlands for the Peoria Riverfront Development Study – Farm Creek. The Phase II assessment included the advancement of twelve hand auger borings and three temporary piezometers and the collection of soil and groundwater samples for chemical analysis, in accordance with the Corps SOW dated April 23, 2002.

Laboratory data from the collected samples revealed that five inorganic compounds, the pesticide dieldrin, and the PCB Arochlor 1260 were present on the site at concentrations that exceeded the IEPA residential and commercial Tier I remediation objectives for soil and groundwater. Although the source has not been confirmed, the soil samples collected on the up-gradient portion of the site exhibited relatively higher concentrations of inorganic compounds in soil and groundwater. Dieldrin was randomly distributed in shallow soil on the property. The dieldrin is likely a remnant of historic pesticide application to the agricultural land.

Several polynuclear aromatic hydrocarbons were also detected above the laboratory reporting limit on the site, however, the detected concentrations of PAHs were less than the residential and commercial Tier I remediation objectives.

In consideration of the proposed land use of the property, it may be prudent to evaluate the expected human exposure with respect to the values used by the IEPA in calculating the Tier I remediation objectives.

9.0 GENERAL COMMENTS

This report has been prepared for the exclusive use of the client. The discussion and conclusions of this report are based on field observations and laboratory data obtained from the subject property. Further, the discussion and conclusions of this report do not reflect any variation in subsurface conditions or chemistry on the property. Missman has performed this assessment based on the scope of work provided by the USACE.

Our goal at Missman, Stanley & Associates is to perform our work within the limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession. No other warranty or representation, either expressed or implied, is included or intended in this report.

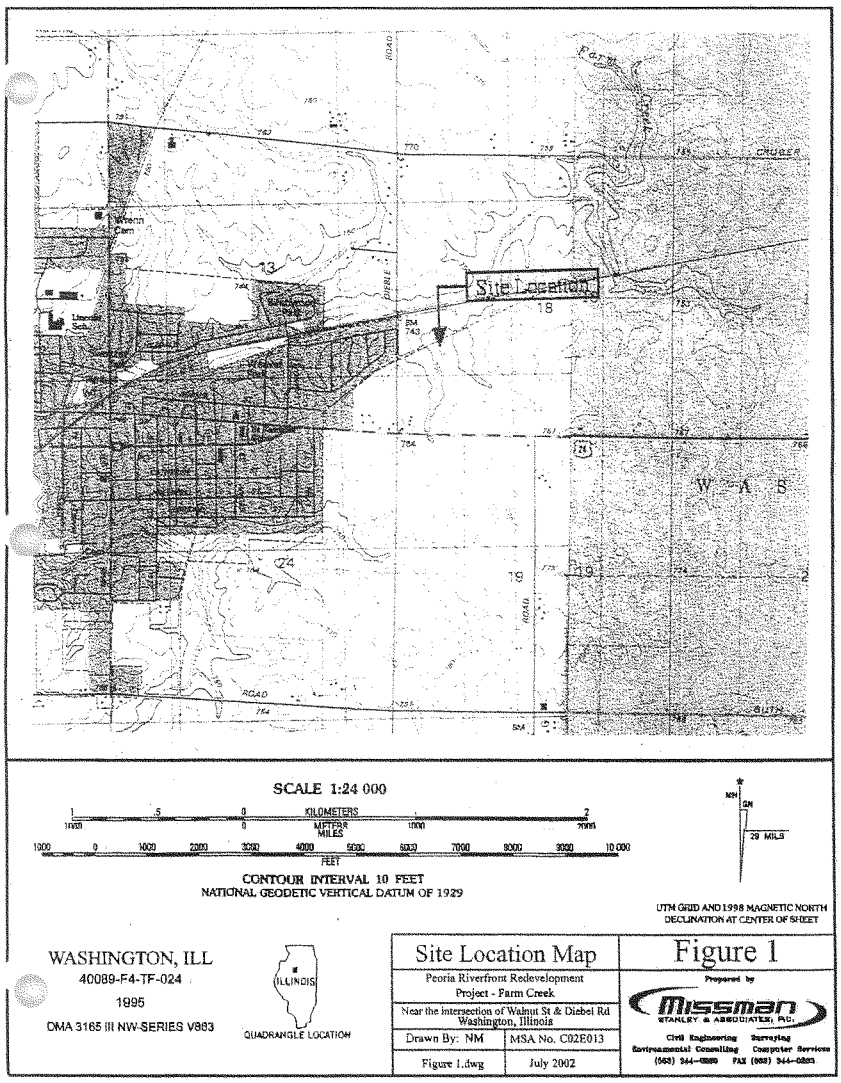
Respectfully submitted,

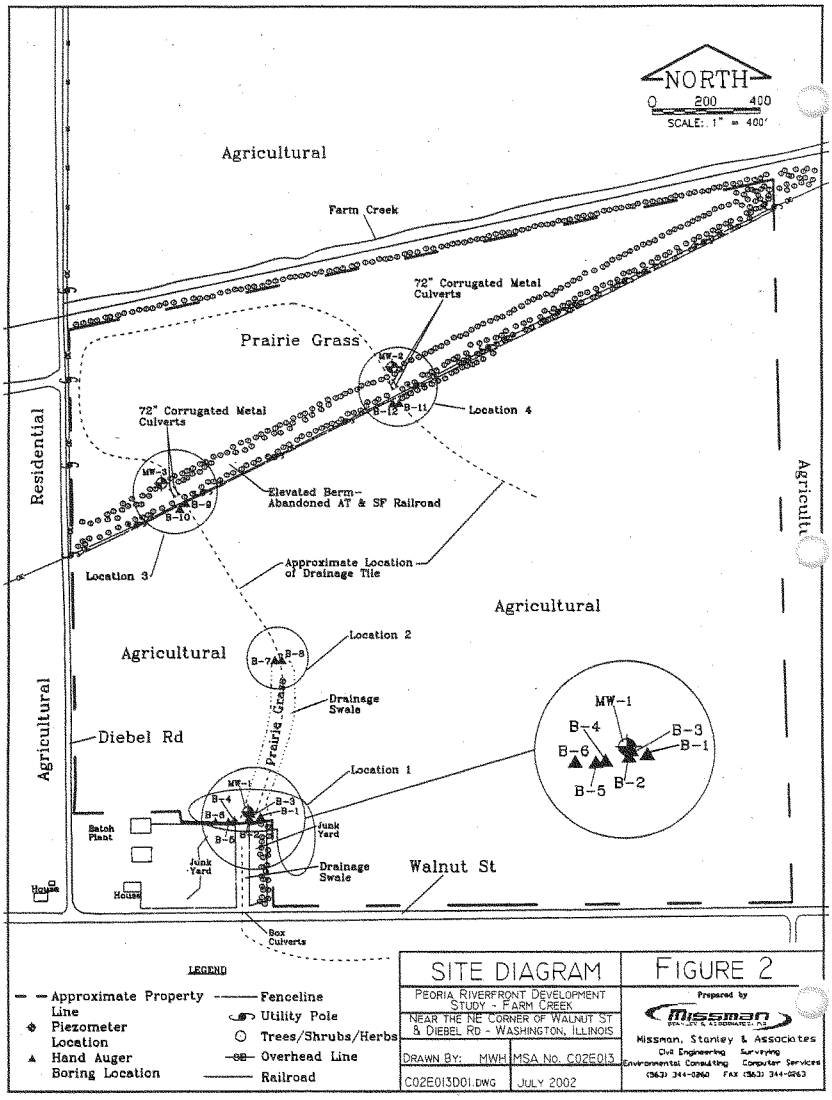
MISSMAN, STANLEY & ASSOCIATES, P.C.

By _____
Paul A. Loete, P.E.
Environmental Engineer

APPENDIX A

Figures


Site Location
SCALE 1:24 000
KILOMETERS
METERS
MILES
FEET
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
29 MILS
UTM GRID AND 1998 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET
WASHINGTON, ILL
40089-F4-TF-024
1995
DMA 3165 III NW-SERIES V883
ILLINOIS
QUADRANGLE LOCATION
Site Location Map
Figure 1
Peoria Riverfront Redevelopment
Project - Farm Creek
Near the intersection of Walnut St & Diebel Rd
Washington, Illinois
Drawn By: NM
MSA No. C02E013
Figure 1.dwg
July 2002
Prepared by
Missman
STANLEY & ASSOCIATES, P.C.
Civil Engineering Surveying
Environmental Consulting Computer Services


NORTH
0 200 400
SCALE: 1" = 400'
Agricultural
Farm Creek
72" Corrugated Metal Culverts
Prairie Grass
MW-4
B-11
B-12
Location 4
72" Corrugated Metal Culverts
MW-3
B-9
B-10
Elevated Berm-Abandoned AT & SF Railroad
Residential
Location 3
Approximate Location of Drainage Tile
Agricultural
Agricultural
Location 2
B-7
B-8
Drainage Swale
Prairie Grass
Diebel Rd
Agricultural
MW-1
B-4
B-3
B-1
B-6
B-2
B-5
Location 1
Batch Plant
Junk Yard
Junk Yard
Drainage Swale
Walnut St
House
House
Box Culverts
LEGEND
Approximate Property Line
Piezometer Location
Hand Auger Boring Location
Fenceline
Utility Pole
Trees/Shrubs/Herbs
Overhead Line
Railroad
SITE DIAGRAM
FIGURE 2
PEORIA RIVERFRONT DEVELOPMENT STUDY - FARM CREEK
NEAR THE NE CORNER OF WALNUT ST & DIEBEL RD - WASHINGTON, ILLINOIS
DRAWN BY: MWH
MSA No. C02E013
C02E013D01.DWG
JULY 2002
Prepared by
Missman, Stanley & Associates
Civil Engineering Surveying
Environmental Consulting Computer Services
(563) 344-0860 FAX (563) 344-0863

APPENDIX B

Tables

Table B-1
Elevation Summary
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Boring Well No.	Longitude	Latitude	Ground Elevation	TOC Elevation	DTW (Ft.)	Groundwater Elevation
B-1	-89.384868610	40.705216287	746.78	-	-	-
B-2	-89.385014270	40.705224029	747.48	-	-	-
B-3	-89.385011463	40.705256475	747.30	-	-	-
B-4	-89.385223638	40.705175165	749.68	-	-	-
B-5	-89.385289270	40.705162890	750.11	-	-	-
B-6	-89.385454071	40.705175244	750.92	-	-	-
B-7	-89.384643161	40.706821254	744.10	-	-	-
B-8	-89.384592788	40.706820923	744.08	-	-	-
B-9	-89.385827217	40.708410961	742.89	-	-	-
B-10	-89.385870728	40.708375999	742.24	-	-	-
B-11	-89.382998586	40.709408438	744.16	-	-	-
B-12	-89.383043225	40.709409219	744.18	-	-	-
MW-1	-89.385028131	40.705274142	746.67	748.71	6.32	742.39
MW-2	-89.383060646	40.709784717	740.72	741.71	5.20	736.51
MW-3	-89.386139475	40.708632387	737.48	739.81	2.50	737.31

Notes:

1) All elevations referenced to benchmark that was an etched square located on the east side southern culvert over Farm Creek. Benchmark elevation was at 742.31 feet.
2) TOC = Top of well casing.
3) DTW = Depth to water.
4) Longitude and latitude are represented in decimal degrees not degree, minute, seconds.

C02E013.xlsElevation

48818

1076

Table B-2
Analytical Summary of Soil Samples
Inorganic Analysis
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Parameters	Units	B-1-2	B-1-3	B-2-1	B-3-1	B-4-1	B-5-1	B-6-1	B-6-2	B-6-2 DUP	B-7-1	B-8-1	B-9-1	B-10-1	B-11-1	B-12-1	Background	Residential SRO		Ind./Comm. SRO	
		2'	4'	2'	2'	2'	2'	2'	4'	4'	2'	2'	2'	2'	2'	2'		Ingestion	Inhalation	Ingestion	Inhalation
Inorganics																					
pH	Units	6.38	6.69	7.3	6.69	9.69	7.4	7.35	7.32	7.56	7.16	6.81	6.63	6.19	6.45	6.28	NS	NS	NS	NS	NS
% Solids	%	76%	82%	80%	82%	78%	76%	79%	78%	80%	81%	81%	18%	81%	85%	83%	NS	NS	NS	NS	NS
Aluminum	mg/kg	14,000	10,000	8,800	12,000	12,000	8,600	8,100	18,000	16,000	8,300	12,000	16,000	15,000	18,000	13,000	9,500	NS	NS	NS	NS
Antimony	mg/kg	<2.6	<2.4	<2.5	<2.4	<2.6	<2.6	<2.5	<2.6	<2.5	<2.5	<2.5	<2.4	<2.5	<2.4	<2.4	4	31	NS	820	NS
Arsenic	mg/kg	5	5	5	7.3	5.6	8.2	5.6	7.8	9.2	6.4	7.2	6.5	7.6	9.6	6	13	NS	750	NS	1,200
Barium	mg/kg	110	73	120	200	110	210	140	180	150	120	170	150	110	150	120	110	5,500	690,000	140,000	910,000
Beryllium	mg/kg	0.58	0.51	0.4	0.39	0.32	0.45	0.43	0.46	0.6	0.4	0.48	0.41	0.33	0.49	0.36	0.59	160	1,300	4,100	2,100
Cadmium	mg/kg	0.58	0.52	1.4	2.3	1	1	0.87	0.44	0.7	0.84	1.4	0.74	0.65	0.79	0.6	0.6	78	1,800	2,000	2,800
Calcium	mg/kg	3,700	3,300	6,500	4,100	55,000	8,600	6,200	3,100	2,400	2,800	3,800	3,600	32,000	2,800	2,500	9,300	NS	NS	NS	NS
Chromium, total	mg/kg	22	18	12	20	24	<0.5	10	26	22	14	20	23	21	26	19	16.2	230	270	6,100	420
Chromium, hexavalent	mg/kg	<0.66	0.24	<.62	<0.61	<0.64	<0.66	<0.63	<0.64	0.12	<0.62	<0.62	<0.61	<0.62	<0.59	<0.30	NS	230	270	6,100	420
Cobalt	mg/kg	4.5	5.8	4.8	5.8	5.1	18	7.6	10	12	6.5	12	5.2	5.9	15	5.8	8.9	4,700	NS	120,000	NS
Copper	mg/kg	36	15	240	40	68	20	18	14	12	20	51	26	15	19	16	19.6	2,900	NS	82,000	NS
Iron	mg/kg	18,000	16,000	12,000	15,000	13,000	16,000	11,000	17,000	18,000	12,000	16,000	16,000	15,000	19,000	14,000	15,900	NS	NS	NS	NS
Lead, total	mg/kg	13	10	150	170	49	32	23	13	14	30	66	27	15	26	18	36	400	NS	400	NS
Magnesium	mg/kg	3,900	4,100	2,500	2,300	3,600	2,000	1,800	2,700	2,800	1,700	2,300	2,800	2,000	2,800	2,200	4,820	NS	NS	NS	NS
Manganese	mg/kg	120	210	310	570	520	1700	770	960	920	860	1100	400	440	1200	490	636	3,700	69,000	96,000	91,000
Mercury	mg/kg	0.053	0.049	0.068	0.061	0.051	0.053	0.051	0.051	0.05	0.049	0.065	0.049	0.049	0.047	0.048	0.06	23	10	610	540,000
Nickel	mg/kg	17	18	15	16	17	20	13	18	21	15	20	16	15	21	13	18	1,600	13,000	41,000	21,000
Potassium	mg/kg	1,600	1,200	1,100	2,200	1,700	1,600	1,400	2,800	2,000	1,100	1,500	2,100	2,800	2,200	1600	1268	NS	NS	NS	NS
Selenium	mg/kg	0.74	0.39	0.62	0.73	0.97	1.7	1	1.3	0.86	1	1.4	1.2	0.76	1.5	1	0.48	390	NS	10,000	NS
Silver	mg/kg	<1.3	0.21	0.32	0.22	0.19	0.38	<1.3	<1.3	<1.2	<1.2	<0.22	1.2	<1.2	0.34	<1.2	0.55	390	NS	10,000	NS
Sodium	mg/kg	62	44	96	89	54	41	48	64	90	26	43	41	65	50	43	130	NS	NS	NS	NS
Thallium	mg/kg	0.38	0.3	0.48	0.58	0.2	0.56	0.47	0.46	0.68	0.31	0.73	0.43	0.28	0.35	0.34	0.32	6.3	NS	160	NS
Vanadium	mg/kg	26	16	14	26	28	22	15	36	32	20	27	34	32	41	29	25.2	550	NS	14,000	NS
Zinc	mg/kg	56	43	280	400	170	87	100	54	50	68	150	83	54	59	54	95	23,000	NS	610,000	NS
Cyanide	mg/kg	<0.16	0.15	0.15	0.15	0.15	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.14	0.51	1,600	NS	41,000	NS

RT/MH

Notes:
1) mg/kg = milligrams per kilogram.
2) SRO = Soil Remediation Objectives for Residential and Industrial/Commercial properties set forth in TACO.
3) NS = No IEPA Standard established under Tier 1 for Specific Compound.
4) Background concentration as established by IEPA for metropolitan areas.
5) < indicates less than the laboratory method detection limit.

Table B-3
Analytical Summary of Soil Samples
TCLP Analysis
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Parameters	units	B-1-2	B-1-3	B-2-1	B-3-1	B-4-1	B-5-1	B-6-1	B-6-2	B-6-2 DUP	B-7-1	B-8-1	B-9-1	B-10-1	B-11-1	B-12-1	RCRA Haz. Waste	SRO
		2'	4'	2'	2'	2'	2'	2'	4'	4'	2'	2'	2'	2'	2'	2'		
TCLP Arsenic	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	5.0	0.05
TCLP Barium	mg/L	1.8	2.3	1.8	1.3	0.84	1.7	1.0	0.92	0.81	1.5	1.5	2.0	0.96	1.3	1.7	100.0	2.0
TCLP Cadmium	mg/L	<0.005	<0.005	0.010	0.0058	0.0041	0.00073	0.0024	0.00097	0.0011	0.0013	0.0021	0.0013	0.0010	0.00098	0.0014	1.0	0.005
TCLP Chromium	mg/L	0.0012	<0.100	0.0012	0.0011	0.0029	0.0024	0.0062	0.0037	0.002	0.0023	0.0024	0.0023	<0.1	0.0012	0.0026	5.0	0.1
TCLP Lead	mg/L	<0.0075	0.0027	0.043	0.015	0.0033	0.0027	<0.0075	<0.0075	<0.0075	0.0022	0.0033	0.0022	<0.0075	<0.0075	0.0016	5.0	0.0075
TCLP Mercury	mg/L	<0.20	<0.20	<0.20	< 20	<0.2	<0.2	<0.20	<0.2	< 20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.2	0.002
TCLP Selenium	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	1.0	0.05
TCLP Silver	mg/L	0.001	<0.050	<0.032	<0.050	0.001	0.001	<0.050	0.007	0.0075	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	5.0	0.05

WR/RT

Notes:

1) < indicates less than the laboratory method detection limit.
2) mg/L = milligrams per liter.
3) SRO - Soil remediation objective for the soil component of the groundwater exposure route.
4) Reference Figure 2, Appendix A for the sample locations.

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Table B-4.1
Analytical Summary of Soil Samples
Organic Analysis
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Parameters	units	B-1-2	B-1-3	B-2-1	B-3-1	B-4-1	B-5-1	B-6-1	B-6-2	B-6-2 DUP	B-7-1	B-8-1	B-9-1	B-10-1	B-11-1	B-12-1	Residential SROs		Industrial/Com. SROs		Migration to GW SRO
		2'	4'	2'	2'	2'	2'	2'	4'	4'	2'	2'	2'	2'	2'	2'	Ingestion	Inhalation	Ingestion	Inhalation	Class 1
Volatile Organic Compounds																					
Acetone	mg/kg	0.026	0.085	0.12	0.11	0.15	0.19	0.099	0.087	0.10	0.17	0.15	0.17	0.23	0.14	0.10	7,800	100,000	200,000	100,000	16
Benzene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	12	0.6	100	1.6	0.03
Bromodichloromethane	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	10	3,000	92	3,000	0.6
Bromoform	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	81	53	720	100	0.8
Bromomethane	mg/kg	<0.013	<0.012	<0.012	<0.012	<0.013	<0.013	<0.013	<0.013	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	NS	NS	NS	NS	NS
Carbon Disulfide	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	0.033	<0.0059	<0.006	7800	720	200,000	720	32
Carbon Tetrachloride	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	5	0.3	44	0.64	0.07
Chlorobenzene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	1,600	130	41,000	210	1
Chloroform	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	100	0.3	940	0.54	0.6
cis-1,2-Dichloroethene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	780	1,200	20,000	1,200	0.4
cis-1,3-Dichloropropene	mg/kg	<0.0026	<0.0024	<0.0025	<0.0024	<0.0026	<0.0026	<0.0025	<0.0026	<0.0025	<0.0025	<0.0025	<0.0024	<0.0025	<0.0024	<0.0024	6.4	1.1	57	2.1	0.004
Dibromochloromethane	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	NS	NS	NS	NS	NS
Ethylbenzene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	7,800	400	200,000	400	13
m,p-Xylene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	160,000	420	1,000,000	420	210
Methylene Chloride	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	85	13	760	24	0.02
o-Xylene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	160000	410	410000	410	190
Styrene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	16,000	1,500	410,000	1,500	4
Tetrachloroethene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	NS	NS	110	20	0.06
Toluene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	16,000	650	410,000	650	12
trans-1,2-Dichloroethene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	1,600	3,100	41,000	3,100	0.7
trans-1,3-Dichloropropene	mg/kg	<0.0026	<0.0024	<0.0025	<0.0024	<0.0026	<0.0026	<0.0025	<0.0026	<0.0025	<0.0025	<0.0025	<0.0024	<0.0025	<0.0024	<0.0024	6.4	1.1	57	2.1	0.004
Trichloroethene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	58	5	520	5.9	0.06
Vinyl Acetate	mg/kg	<0.013	<0.012	<0.012	<0.012	<0.013	<0.013	<0.013	<0.013	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	78,000	1,000	1,000,000	1,600	170
Vinyl Chloride	mg/kg	<0.013	<0.012	<0.012	<0.012	<0.013	<0.013	<0.013	<0.013	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	0.46	0.28	7.9	1.1	0.01
1,1,1-Trichloroethane	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	NS	1,200	NS	1,200	2
1,1,2-Trichloroethane	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	310	1,800	8,200	1,800	0.02
1,1-Dichloroethane	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	7,800	1,300	200,000	1,700	23
1,1-Dichloroethene	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	700	1,500	18,000	1,500	0.06
1,2-Dibromo-3-chloropropane	mg/kg	<0.00072	<0.00067	<0.00069	<0.00067	<0.0007	<0.00072	<0.0007	<0.0007	<0.00069	<0.00068	<0.00068	<0.00067	<0.00068	<0.00065	<0.00066	0.46	11	4	17	0.002
1,2-Dibromoethane	mg/kg	<0.00055	<0.00051	<0.00052	<0.00051	<0.00054	<0.00055	<0.00053	<0.00054	<0.00052	<0.00052	<0.00052	<0.00051	<0.00052	<0.00049	<0.00051	0.0075	0.17	0.07	0.32	0.0004
1,2-Dichloroethane	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	7	0.4	63	0.7	0.02
1,2-Dichloropropane	mg/kg	<0.0066	<0.0061	<0.0062	<0.0061	<0.0064	<0.0066	<0.0063	<0.0064	<0.0062	<0.0062	<0.0062	<0.0061	<0.0062	<0.0059	<0.006	9	15	84	23	0.03
Total Organic Carbon	mg/kg	65.00	51.00	58.00	54.00	67.00	42.00	56.00	53.00	49.00	50.00	52.00	65.00	53.00	57.00	63.00	NS	NS	NS	NS	NS
Semi-Volatile Organic Compounds																					
Acenaphthene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	4,700	NS	120,000	NS	570
Acenaphthylene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Aniline	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Anthracene	mg/kg	<0.43	0.045	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	23,000	NS	610,000	NS	12,000
Benzo(a)anthracene	mg/kg	<0.43	<0.4	0.052	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.9	NS	8	NS	2
Benzo(b)fluoranthene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.9	NS	8	NS	5
Benzo(k)fluoranthene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	9	NS	78	NS	49
Benzo(a)pyrene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.09	NS	0.8	NS	8
Benzo(ghi)perylene	mg/kg	<0.43	<0.4	0.048	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Benzyl Alcohol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Butyl benzyl phthalate	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	16,000	930	410,000	930	930
Bis(2-chloroethyl)ether	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.6	0.2	5	0.47	0.0004
Bis(2-chloroethoxy)methane	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Bis(2-ethylhexyl)phthalate	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	46	31,000	410	31,000	3,600
Bis(2-chloroisopropyl)ether	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
4-Bromophenyl phenyl ether	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Carbazole	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	32	NS	260	NS	0.6
4-Chloroaniline	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	310	NS	8,200	NS	0.7
2-Chloronaphthalene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
4-Chlorophenyl phenyl ether	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Chrysene	mg/kg	<0.43	<0.4	0.066	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	88	NS	780	NS	160
Dibenzo(a,h)anthracene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.09	NS	0.8	NS	2
Dibenzofuran	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Di-n-butylphthalate	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	7,800	2,300	200,000	2,300	2,300
1,2-Dichlorobenzene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	7,000	560	180,000	560	17
1,3-Dichlorobenzene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS

Table B-4.2
Analytical Summary of Soil Samples
Organic Analysis
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Parameters	units	B-1-2	B-1-3	B-2-1	B-3-1	B-4-1	B-5-1	B-6-1	B-6-2	B-6-2 DUP	B-7-1	B-8-1	B-9-1	B-10-1	B-11-1	B-12-1	Residential SROs		Industrial/Com. SROs		Migration to GW SRO
		2'	4'	2'	2'	2'	2'	2'	4'	4'	2'	2'	2'	2'	2'	2'	Ingestion	Inhalation	Ingestion	Inhalation	Class 1
1,4-Dichlorobenzene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	17,000	2
3,3-Dichlorobenzidine	mg/kg	<0.87	<0.8	<0.82	<0.8	<0.85	<0.87	<0.84	<0.85	<0.82	<0.81	<0.81	<0.8	<0.81	<0.78	<0.8	1	NS	13	NS	0.007
Diethyl phthalate	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	83,000	2,000	1,000,000	2,000	470
Dimethyl phthalate	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
2,4-Dinitrotoluene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.9	NS	8.4	NS	0.0008
2,6-Dinitrotoluene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.9	NS	8.4	NS	0.0007
2,6-Dichlorophenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Di-n-octyl phthalate	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	1,600	10,000	41,000	10,000	10,000
Fluoranthene	mg/kg	<0.43	<0.4	0.075	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	3,100	NS	82,000	NS	4,300
Fluorene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	3,100	NS	82,000	NS	560
Hexachlorobenzene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.4	1	4	1.8	2
Hexachlorobutadiene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Hexachlorocyclopentadiene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	550	10	14,000	16	400
Hexachloroethane	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	78	NS	2,000	NS	0.5
Indeno(1,2,3-cd)pyrene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.9	NS	8	NS	14
Isophorone	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	15,600	4,600	410,000	4,600	8
2-Methylnaphthalene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
4-Methylphenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
Naphthalene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	1,600	170	41,000	270	12
2-Nitroaniline	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9	<1.9	NS	NS	NS	NS	NS
3-Nitroaniline	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9	<1.9	NS	NS	NS	NS	NS
4-Nitroaniline	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9	<1.9	NS	NS	NS	NS	NS
Nitrobenzene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	39	82	1,000	140	0.1
N-Nitrosodimethylamine	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
N-Nitrosodiphenylamine	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	130	NS	1,200	NS	1
N-Nitrosodi-n-propylamine	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	0.09	NS	0.8	NS	0.00005
Phenanthrene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	0.078	<0.39	<0.4	NS	NS	NS	NS	NS
Pyrene	mg/kg	<0.43	<0.4	0.068	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	0.073	<0.39	<0.4	2,300	NS	61,000	NS	4,200
Pyridine	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
1,2,4-Trichlorobenzene	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	780	3,200	20,000	3,200	5
4-Chloro-3-methylphenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
2-Chlorophenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	390	53,000	10,000	53,000	4
2,4-Dichlorophenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	230	NS	6,100	NS	1
2,4-Dimethylphenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
2,4-Dinitrophenol	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9	<1.9	160	NS	4,100	NS	0.2
4,6-Dinitro-2-methylphenol	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9	<1.9	NS	NS	NS	NS	NS
2-Nitrophenol	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9	<1.9	NS	NS	NS	NS	NS
4-Nitrophenol	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9	<1.9	NS	NS	NS	NS	NS
Pentachlorophenol	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9	<1.9	3	NS	24	NS	0.03
Phenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	47,000	NS	1,000,000	NS	100
2-Methylphenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	3,900	NS	10,000	NS	15
2,3,4,6-Tetrachlorophenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	NS	NS	NS	NS	NS
2,4,5-Trichlorophenol	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9	<1.9	7,800	NS	200,000	NS	270
2,4,6-Trichlorophenol	mg/kg	<0.43	<0.4	<0.41	<0.4	<0.42	<0.43	<0.42	<0.42	<0.41	<0.41	<0.41	<0.4	<0.41	<0.39	<0.4	58	200	520	390	0.2
Pesticides and PCBs																					
PCB 1016	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	<.096	1	NS	1.0	NS	NS
PCB 1221	mg/kg	<.210	<.2	<.2	<.2	<.2	<.210	<.2	<.2	<.2	<.20	<.20	<.20	<.200	<.190	<.190	1	NS	1.0	NS	NS
PCB 1232	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	<.096	1	NS	1.0	NS	NS
PCB 1242	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	<.096	1	NS	1.0	NS	NS
PCB 1248	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	<.096	1	NS	1.0	NS	NS
PCB 1254	mg/kg	<.210	<.2	<.2	<.2	<.2	<.210	<.2	<.2	<.2	<.20	<.200	<.200	<.200	<.190	<.190	1	NS	1.0	NS	NS
PCB 1260	mg/kg	<.210	<.2	2.20	<.2	0.072	<.210	<.2	<.2	<.2	0.12	0.034	0.054	<.200	<.190	<.190	1	NS	1.0	NS	NS
Aldrin	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<0.99	<.099	<.098	<.099	<.094	<.096	0.04	3	0.3	6.6	0.5
Alpha-BHC	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	<.096	0.1	0.8	0.9	1.5	0.0005
Beta-BHC	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	<.096	NS	NS	NS	NS	NS
Chlordane	mg/kg	<2.1	<2.0	<2.0	<2.0	<2.0	<2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.000	<1.900	<1.900	1.8	72	1.6	140	10
Gamma-BHC	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	<.096	0.5	NS	4.0	NS	0.009
Delta-BHC	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	<.096	NS	NS	NS	NS	NS
4,4'-DDD	mg/kg	<.210	<.2	0.036	<.2	<.2	<.210	<0.2	<.2	<.2	0.0081	<.200	0.012	<.20	<.190	<.190	3	NS	24	NS	16
4,4'-DDE	mg/kg	<.210	<.2	0.012	<.2	0.019	<.210	0.012	<.2	<.2	0.046	0.16	0.033	0.025	0.032	0.12	2	NS	17	NS	54

C02E013.xlsSoil Organics

Table B-4.3
Analytical Summary of Soil Samples
Organic Analysis
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Parameters	units	B-1-2	B-1-3	B-2-1	B-3-1	B-4-1	B-5-1	B-6-1	B-6-2	B-6-2 DUP	B-7-1	B-8-1	B-9-1	B-10-1	B-11-1	B-12-1	Residential SROs		Industrial/Com. SROs		Migration to GW SRO
		2'	4'	2'	2'	2'	2'	2'	4'	4'	2'	2'	2'	2'	2'	2'	Ingestion	Inhalation	Ingestion	Inhalation	Class 1
4,4'-DDT	mg/kg	<.210	<.2	<.2	<.2	0.017	<.210	0.019	<.2	<.2	0.096	<.330	0.063	0.04	0.062	0.18	2	NS	17	1,500	32
Dieldrin	mg/kg	<.210	<.2	<.2	<.2	0.0081	<.210	0.0046	<.2	<.2	0.027	0.022	0.024	0.017	0.052	0.14	0.04	1	0.4	2.2	0.004
Endosulfan I	mg/kg	<.1	<.098	<.1	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	<.096	NS	NS	NS	NS	NS
Endosulfan II	mg/kg	<.210	<.2	<.2	<.2	<.2	<.210	<.2	<.2	<.2	<.2	<.200	<.20	<.200	<0.19	<.190	NS	NS	NS	NS	NS
Endosulfan Sulfate	mg/kg	<.210	<.2	<.2	<.2	<.2	<.210	<.2	<.2	<.2	<.2	<.200	<.20	<.200	<.190	<.190	NS	NS	NS	NS	NS
Endrin	mg/kg	<.210	<.2	<.2	<.2	<.2	<.210	<.2	<.2	<.2	<.2	<.200	<.20	<.200	0.014	0.013	23	NS	610	NS	1
Endrin Aldehyde	mg/kg	<.210	<.2	<.2	<.2	<.2	<.210	<.2	<.2	<.2	<.2	<.200	<.20	<.200	<.190	<.190	NS	NS	NS	NS	NS
Heptachlor	mg/kg	<.1	<.098	0.0038	<.098	<.1	<.1	<.1	<.1	<.1	<.099	<.099	<.098	<.099	<.094	0.0081	0.1	0.1	1.0	11	23
Heptachlor Epoxide	mg/kg	<.1	<.098	0.066	<.098	0.013	<.1	0.0065	<.1	<.1	0.034	0.0053	0.022	0.014	0.033	0.14	0.07	5	0.6	9.2	0.7
Methoxychlor	mg/kg	<1.0	<.980	<1.0	<.980	<1.0	<1.0	<1.0	<1.0	<1.0	<.990	<.990	<.098	<.990	<.940	<.960	390	NS	10,000	NS	160
Toxaphene	mg/kg	<1.0	<.980	<1.0	<.980	<1.0	<1.0	<1.0	<1.0	<1.0	<.990	<.990	<.098	<.990	<.940	<.960	0.6	89	5.2	170	31
Polynuclear Aromatic Hydrocarbons																					
Naphthalene	mg/kg	<.88	<.082	<.0084	<.067	<.086	<.088	<0.085	<.086	<.084	<.082	<.083	<.082	<.083	0.052	<.081	1600	170	41000	270	12
Acenaphthene	mg/kg	<.88	<.082	<.0084	0.039	0.035	0.08	<0.085	<.086	<.084	0.057	0.037	0.034	0.075	0.042	0.078	4700	NS	120000	NS	570
Acenaphthylene	mg/kg	<.88	<.082	<.0084	<0.082	<.086	<.088	<0.085	<.086	<.084	<.083	<.083	<.082	<.083	<.079	<.081	NS	NS	NS	NS	NS
Fluorene	mg/kg	<.88	<.082	<.0084	<.082	<.086	<.088	<0.085	<.086	<.084	<.083	<.083	<.082	<.083	<.079	<.081	3100	NS	82000	NS	560
Phenanthrene	mg/kg	<.88	<.082	<.0084	<.082	<.086	<.088	<0.085	<.086	<.084	<.083	<.083	<.082	<.083	0.03	<.081	NS	NS	NS	NS	NS
Anthracene	mg/kg	< 88	< 082	<.0084	<.082	<.086	<.088	<0.085	<.086	<.084	<.083	<.083	<.082	<.083	<.079	<.081	23000	NS	610000	NS	12000
Fluoranthene	mg/kg	< 088	<.0082	<.0084	<.082	<.0086	<.0088	<0.0085	<.0086	<.0084	<.0083	<.0083	<.0082	<.0083	0.036	<.081	3100	NS	82000	NS	4300
Pyrene	mg/kg	< 088	<.0082	<.0084	<.082	<.0086	<.0088	0.0084	<.0086	<.0084	<.0083	0.0078	<.0080	<.0083	<.0079	<.081	2300	NS	61000	NS	4200
Benzo(a)anthracene	mg/kg	<.088	<.0082	<.0084	0.0044	0.0038	0.0016	0.0011	<.0086	<.0084	0.0021	0.0016	0.0023	0.002	0.0066	0.0028	0.9	NS	8	NS	2
Chrysene	mg/kg	<.088	<.0082	<.0084	<.082	<.0086	<.0088	<0.0085	<.0086	<.0084	<.0083	<.0083	<.0082	<.0083	0.0064	<.0081	88	NS	790	NS	160
Benzo(b)fluoranthene	mg/kg	<.088	<.0082	<.0084	<.082	0.0064	<.0088	<0.0085	<.0086	<.0084	<.0083	<.0083	<.0082	<.0083	0.0066	<.0081	0.9	NS	8	NS	5
Benzo(k)fluoranthene	mg/kg	<.045	<.0041	<.0042	0.0018	0.0019	<.0045	<0.0043	<.0044	<.0042	<.0042	<.0042	<.0042	0.0017	0.0028	0.0016	9	NS	78	NS	49
Benzo(a)pyrene	mg/kg	<0.88	<.0082	<.0084	0.0034	0.0045	<.0088	<0.0085	<.0086	<.0074	<.0083	<.0083	<.0041	<.0083	0.0044	0.0026	0.09	NS	0.8	NS	8
Dibenz(a,h)anthracene	mg/kg	<0.88	<.0082	<.0084	<.0082	<.0086	<.0088	<0.0085	<.0086	<.0084	<.0083	<.0083	<.082	<.0083	<.0079	<.0081	0.09	NS	0.8	NS	2
Benzo(g,h,i)perylene	mg/kg	<0.88	<.0082	<.0084	<.0082	0.0062	<.0088	<0.0085	<.0086	<.0084	<.0083	<.083	<.0082	<.0083	0.0064	<.0081	NS	NS	NS	NS	NS
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.88	<.0082	<.0084	0.003	0.0062	0.0037	<0.0085	0.0046	<.0084	<.0083	<.083	<.0082	<.0083	0.0048	0.0037	0.09	NS	8	NS	14

RT/PAL

Notes:

1) < indicates less than the laboratory reporting limit.
2) mg/kg = milligrams per kilogram.
3) SRO - Soil Remediation Objective for Residential and Industrial/Commercial Properties as set forth under TACO Tier I.
4) NS = No Standard Established under TACO Tier 1.

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Table Series B-5.1
Analytical Summary of Groundwater Samples
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Parameters	units	MW-1	MW-2	MW-3	Trip Blank	Class 1 GRO
General Chemistry						
Alkalinity	mg/L	1400	330	300	NA	NS
Ammonia (N)	mg/L	0.77	0.014	<0.05	NA	NS
Chloride	mg/L	130	13	22	NA	200
Sulfate	mg/L	260	45	42	NA	400
Total Suspended Solids	mg/L	9600	27000	680	NA	NS
Total Dissolved Solids	mg/L	440	1300	460	NA	NS
Inorganics						
pH	mg/L	7.45	7.44	7.39	NA	NS
Aluminum	mg/L	84	7.9	2.2	NA	NS
Antimony	mg/L	0.002	0.00046	0.00012	NA	0.006
Arsenic	mg/L	0.018	<0.0022	<0.0022	NA	0.05
Barium	mg/L	1.4	0.13	0.11	NA	2
Beryllium	mg/L	0.00095	0.00074	0.00078	NA	0.004
Cadmium	mg/L	0.002	0.001	0.00065	NA	0.005
Calcium	mg/L	260	95	88	NA	NS
Chromium, total	mg/L	0.066	0.0093	0.003	NA	0.1
Chromium, hexavalent	mg/L	0.0076	0.0055	<0.0050	NA	NS
Cobalt	mg/L	0.023	0.0051	0.0019	NA	1
Copper	mg/L	0.035	0.0042	<0.01	NA	0.65
Iron	mg/L	**49.0**	**5.4**	1.5	NA	5
Lead, total	mg/L	**0.032**	<0.01	<0.01	NA	0.0075
Magnesium	mg/L	110	40	36	NA	NS
Manganese	mg/L	**1.7**	0.12	0.063	NA	0.15
Mercury	mg/L	<0.0002	0.000076	<0.0002	NA	0.002
Nickel	mg/L	0.055	0.01	0.0043	NA	0.1
Potassium	mg/L	37	4.0	1.4	NA	NS
Selenium	mg/L	0.0093	0.0025	0.002	NA	0.05
Silver	mg/L	<0.01	<0.01	<0.01	NA	0.05
Sodium	mg/L	320	16	6.5	NA	NS
Thallium	mg/L	0.00096	0.00087	0.00069	NA	0.002
Vanadium	mg/L	0.1	0.016	0.007	NA	0.049
Zinc	mg/L	0.48	0.011	0.0036	NA	5
TCLP Analysis						
TCLP Arsenic	mg/L	<0.05	<0.05	<0.05	NA	5.0
TCLP Barium	mg/L	0.72	0.19	0.2	NA	100.0
TCLP Cadmium	mg/L	0.002	0.00074	0.0011	NA	1.0
TCLP Chromium	mg/L	<0.1	<0.1	<0.1	NA	5.0
TCLP Lead	mg/L	<0.0075	<0.0075	<0.0075	NA	5.0
TCLP Mercury	mg/L	<0.2	<0.2	<0.2	NA	0.2
TCLP Selenium	mg/L	<0.05	<0.05	<0.05	NA	1.0
TCLP Silver	mg/L	<0.05	0.0012	<0.05	NA	5.0
Volatile Organics						
1,1,1,2-Tetrachloroethane	mg/L	<0.01	<0.01	<0.01	<0.01	NS
1,1,1-Trichloroethane	mg/L	<0.005	<0.005	<0.005	<0.005	0.2
1,1,2,2-Tetrachloroethane	mg/L	<0.005	<0.005	<0.005	<0.005	NS
1,1,2-Trichloroethane	mg/L	<0.005	<0.005	<0.005	<0.005	0.005
1,1-Dichloroethane	mg/L	<0.005	<0.005	<0.005	<0.005	0.7
1,1-Dichloroethene	mg/L	<0.005	<0.005	<0.005	<0.005	0.007
1,1-Dichloropropene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
1,2,3-Trichlorobenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
1,2,3-Trichloropropane	mg/L	<0.005	<0.005	<0.005	<0.005	NS
1,2,4-Trichlorobenzene	mg/L	<0.005	<0.005	<0.005	<0.005	0.07
1,2,4-Trimethylbenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
1,2-Dibromo-3-chloropropane	mg/L	<0.005	<0.005	<0.005	<0.005	0.0002
1,2-Dibromoethane	mg/L	<0.005	<0.005	<0.005	<0.005	0.00005
1,2-Dichlorobenzene	mg/L	<0.005	<0.005	<0.005	<0.005	0.6
1,2-Dichloroethane	mg/L	<0.005	<0.005	<0.005	<0.005	0.005
1,2-Dichloropropane	mg/L	<0.005	<0.005	<0.005	<0.005	0.005
1,3,5-Trichlorobenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
1,3,5-Trimethylbenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
1,3-Dichlorobenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
1,3-Dichloropropane	mg/L	<0.005	<0.005	<0.005	<0.005	0.001
1,4-Dichlorobenzene	mg/L	<0.005	<0.005	<0.005	<0.005	0.075
1,4-Dioxane	mg/L	<0.2	<0.2	<0.2	<0.2	NS
2,2-Dichloropropane	mg/L	<0.005	<0.005	<0.005	<0.005	NS

C02E013.xlsGroundwater

Table Series B-5.2
Analytical Summary of Groundwater Samples
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Parameters	units	MW-1	MW-2	MW-3	Trip Blank	Class 1 GRO
2-Butanone	mg/L	<0.01	<0.01	<0.01	<0.01	NS
2-Chloroethyl vinyl ether	mg/L	<0.005	<0.005	<0.005	<0.005	NS
2-Chlorotoluene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
2-Hexanone	mg/L	<0.01	<0.01	<0.01	<0.01	NS
3-Chloropropene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
4-Chlorotoluene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
4-Methyl-2-pentanone	mg/L	<0.01	<0.01	<0.01	<0.01	NS
Acetone	mg/L	<0.01	<0.01	<0.01	<0.01	0.7
Acetonitrile	mg/L	<0.05	<0.05	<0.05	<0.05	NS
Acrolein	mg/L	<0.05	<0.05	<0.05	<0.05	NS
Acrylonitrile	mg/L	<0.05	<0.05	<0.05	<0.05	NS
Benzene	mg/L	<0.005	<0.005	<0.005	<0.005	0.005
Bromobenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Bromochloromethane	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Bromodichloromethane	mg/L	<0.005	<0.005	<0.005	<0.005	0.0002
Bromoform	mg/L	<0.005	<0.005	<0.005	<0.005	0.001
Bromomethane	mg/L	<0.01	<0.01	<0.01	<0.01	NS
Carbon Disulfide	mg/L	<0.005	<0.005	<0.005	<0.005	0.7
Carbon Tetrachloride	mg/L	<0.005	<0.005	<0.005	<0.005	0.005
Chlorobenzene	mg/L	<0.005	<0.005	<0.005	<0.005	0.1
Chloroethane	mg/L	<0.01	<0.01	<0.01	<0.01	NS
Chloroform	mg/L	<0.005	<0.005	<0.005	<0.005	0.0002
Chloromethane	mg/L	<0.01	<0.01	<0.01	0.007	NS
Chloroprene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
cis-1,2-Dichloroethene	mg/L	<0.005	<0.005	<0.005	<0.005	0.07
cis-1,3-Dichloropropene	mg/L	<0.005	<0.005	<0.005	<0.005	0.001
Dibromochloromethane	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Dibromomethane	mg/L	<0.005	<0.005	<0.005	<0.005	0.00005
Dichlorodifluoromethane	mg/L	<0.01	<0.01	<0.01	<0.01	NS
Ethyl Methacrylate	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Ethylbenzene	mg/L	<0.005	<0.005	<0.005	<0.005	0.7
Hexachlorobutadiene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Iodomethane	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Isobutyl Alcohol	mg/L	<1.0	<1.0	<1.0	<1.0	NS
Isopropylbenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
m,p-Xylene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Methacrylonitrile	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Methyl Methacrylate	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Methylene Chloride	mg/L	<0.005	<0.005	<0.005	<0.005	0.005
n-Butylbenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
n-Propylbenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Naphthalene	mg/L	<0.005	<0.005	<0.005	<0.005	0.14
o-Xylene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
p-Isopropyltoluene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Pentachloroethane	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Propionitrile	mg/L	<0.01	<0.01	<0.01	<0.01	NS
sec-Butylbenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Styrene	mg/L	<0.005	<0.005	<0.005	<0.005	0.1
tert-Butylbenzene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Tetrachloroethene	mg/L	<0.005	<0.005	<0.005	<0.005	0.005
Toluene	mg/L	<0.005	<0.005	<0.005	<0.005	1
trans-1,2-Dichloroethene	mg/L	<0.005	<0.005	<0.005	<0.005	0.1
trans-1,3-Dichloropropene	mg/L	<0.005	<0.005	<0.005	<0.005	0.001
trans-1,4-Dichloro-2-Butene	mg/L	<0.005	<0.005	<0.005	<0.005	NS
Trichloroethene	mg/L	<0.005	<0.005	<0.005	<0.005	0.005
Trichlorofluoromethane	mg/L	<0.01	<0.01	<0.01	<0.01	NS
Vinyl Acetate	mg/L	<0.01	<0.01	<0.01	<0.01	7
Vinyl Chloride	mg/L	<0.01	<0.01	<0.01	<0.01	0.002
Xylenes, total	mg/L	<0.005	<0.005	<0.005	<0.005	10
Semi-Volatile Organics						
N-Nitrosodimethylamine	mg/L	<0.01	<0.01	<0.01	NA	NS
Pyridine	mg/L	<0.01	<0.01	<0.01	NA	NS
Aniline	mg/L	<0.01	<0.01	<0.01	NA	NS
bis(2-chloroethyl)ether	mg/L	<0.01	<0.01	<0.01	NA	0.01
2-Chlorophenol	mg/L	<0.01	<0.01	<0.01	NA	0.035
Phenol	mg/L	<0.01	0.0012	<0.01	NA	0.1
1,3-Dichlorobenzene	mg/L	<0.01	<0.01	<0.01	NA	0.1
1,4-Dichlorobenzene	mg/L	<0.01	<0.01	<0.01	NA	0.075

Table Series B-5.3
Analytical Summary of Groundwater Samples
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Parameters	units	MW-1	MW-2	MW-3	Trip Blank	Class 1 GRO
1,2-Dichlorobenzene	mg/L	<0.01	<0.01	<0.01	NA	0.6
Benzyl Alcohol	mg/L	<0.01	<0.01	<0.01	NA	NS
Bis(2-chloroisopropyl)ether	mg/L	<0.01	<0.01	<0.01	NA	NS
Hexachloroethane	mg/L	<0.01	<0.01	<0.01	NA	0.007
2-Methylphenol	mg/L	<0.01	<0.01	<0.01	NA	0.35
N-Nitroso-di-n-propylamine	mg/L	<0.01	<0.01	<0.01	NA	0.0018
4-Methylphenol	mg/L	<0.01	<0.01	<0.01	NA	NS
Nitrobenzene	mg/L	<0.01	<0.01	<0.01	NA	0.0035
Isophorone	mg/L	<0.01	<0.01	<0.01	NA	1.4
2-Nitrophenol	mg/L	<0.05	<0.05	<0.05	NA	NS
2,4-Dimethylphenol	mg/L	<0.01	<0.01	<0.01	NA	0.14
bis(2-Chloroethoxy) methane	mg/L	<0.01	<0.01	<0.01	NA	NS
2,--Dichlorophenol	mg/L	<0.01	<0.01	<0.01	NA	NS
1,2,4-Trichlorobenzene	mg/L	<0.01	<0.01	<0.01	NA	0.07
Naphthalene	mg/L	<0.01	<0.01	<0.01	NA	0.14
2,6-Dichlorophenol	mg/L	<0.01	<0.01	<0.01	NA	NS
4-Chloroaniline	mg/L	<0.01	<0.01	<0.01	NA	NS
Hexachlorobutadiene	mg/L	<0.01	<0.01	<0.01	NA	NS
4-Chloro-3-Methylphenol	mg/L	<0.01	<0.01	<0.01	NA	NS
2-Methylnaphthalene	mg/L	<0.01	<0.01	<0.01	NA	NS
Hexachlorocyclopentadiene	mg/L	<0.01	<0.01	<0.01	NA	0.05
2,4,6-Trichlorophenol	mg/L	<0.01	<0.01	<0.01	NA	0.01
2,4,5-Trichlorophenol	mg/L	<0.05	<0.05	<0.05	NA	0.7
2-Chloronaphthalene	mg/L	<0.01	<0.01	<0.01	NA	NS
2-Nitroaniline	mg/L	<0.05	<0.05	<0.05	NA	NS
Dimethylphthalate	mg/L	<0.01	<0.01	<0.01	NA	NS
Acenaphthylene	mg/L	<0.01	<0.01	<0.01	NA	NS
2,6-Dinitrotoluene	mg/L	<0.01	<0.01	<0.01	NA	0.00031
3-Nitroaniline	mg/L	<0.05	<0.05	<0.05	NA	NS
Acenaphthene	mg/L	<0.01	<0.01	<0.01	NA	0.42
2,4-Dinitrophenol	mg/L	<0.05	<0.05	<0.05	NA	0.014
Dibenzofuran	mg/L	<0.01	<0.01	<0.01	NA	NS
2,4-Dinitrotoluene	mg/L	<0.01	<0.01	<0.01	NA	0.00002
4-Nitrophenol	mg/L	<0.05	<0.05	<0.05	NA	NS
2,3,4,6-Tetrachlorophenol	mg/L	<0.01	<0.01	<0.01	NA	NS
Diethylphthalate	mg/L	<0.01	<0.01	<0.01	NA	5.6
Fluorene	mg/L	<0.01	<0.01	<0.01	NA	0.28
4-Chlorophenyl-phenyl ether	mg/L	<0.01	<0.01	<0.01	NA	NS
4-Nitroaniline	mg/L	<0.05	<0.05	<0.05	NA	NS
4,6-Dinitro-2-methylphenol	mg/L	<0.05	<0.05	<0.05	NA	NS
N-Nitrosodiphenylamine	mg/L	<0.01	<0.01	<0.01	NA	0.0032
4-Bromophenyl-phenyl ether	mg/L	<0.01	<0.01	<0.01	NA	NS
Hexachlorobenzene	mg/L	<0.01	<0.01	<0.01	NA	0.00006
Pentachlorophenol	mg/L	<0.05	<0.05	<0.05	NA	0.001
Carbazole	mg/L	<0.01	<0.01	<0.01	NA	NS
Phenanthrene	mg/L	<0.01	<0.01	<0.01	NA	NS
Anthracene	mg/L	<0.01	<0.01	<0.01	NA	2.1
Di-n-Butylphthalate	mg/L	<0.01	<0.01	<0.01	NA	0.7
Fluoranthene	mg/L	<0.01	<0.01	<0.01	NA	0.28
Pyrene	mg/L	<0.01	<0.01	<0.01	NA	0.21
Butylbenzylphthalate	mg/L	<0.01	<0.01	<0.01	NA	1.4
Benzo(a)anthracene	mg/L	<0.01	<0.01	<0.01	NA	0.00013
3,3-Dichlorobenzidine	mg/L	<0.02	<0.02	<0.02	NA	0.02
Chrysene	mg/L	<0.01	<0.01	<0.01	NA	0.0015
Bis(2-Ethylhexyl) phthalate	mg/L	<0.01	<0.01	<0.01	NA	0.006
Di-n-octylphthalate	mg/L	<0.01	<0.01	<0.01	NA	0.14
Benzo(b)fluoranthene	mg/L	<0.01	<0.01	<0.01	NA	0.00018
Benzo(k)fluoranthene	mg/L	<0.01	<0.01	<0.01	NA	0.00017
Benzo(a)pyrene	mg/L	<0.01	<0.01	<0.01	NA	0.0002
Indeno(1,2,3-cd)pyrene	mg/L	<0.01	<0.01	<0.01	NA	0.00043
Dibenzo(a,h)anthracene	mg/L	<0.01	<0.01	<0.01	NA	0.0003
Benzo(g,h,I)perylene	mg/L	<0.01	<0.01	<0.01	NA	NS
Pesticides & PCBs						
Alpha-BHC	mg/L	<0.00005	<0.00005	<0.00005	NA	NS
Gamma-BHC	mg/L	<0.00005	<0.00005	<0.00005	NA	NS
Beta-BHC	mg/L	<0.00005	<0.00005	<0.00005	NA	NS
Heptachlor	mg/L	<0.00005	0.000003	<0.00005	NA	0.0004
Delta-BHC	mg/L	<0.00005	<0.00005	<0.00005	NA	NS

C02E013.xlsGroundwater

Table Series B-5.4
Analytical Summary of Groundwater Samples
Phase II Environmental Site Assessment
Peoria River Development Study - Farm Creek
Washington, Illinois
Missman No. C02E013

Parameters	units	MW-1	MW-2	MW-3	Trip Blank	Class 1 GRO
Aldrin	mg/L	<0.00005	<0.00005	<0.00005	NA	0.014
Heptachlor Epoxide	mg/L	<0.00005	<0.00005	<0.00005	NA	0.0002
Endosulfan I	mg/L	<0.00005	<0.00005	<0.00005	NA	0.042
4,4-DDE	mg/L	<0.0001	<0.0001	<0.0001	NA	0.01
Dieldrin	mg/L	<0.0001	<0.0001	<0.0001	NA	0.009
Endrin	mg/L	<0.0001	<0.0001	<0.0001	NA	0.002
4,4-DDD	mg/L	<0.0001	<0.0001	<0.0001	NA	0.014
Endosulfan II	mg/L	<0.0001	<0.0001	<0.0001	NA	NS
4,4-DDT	mg/L	<0.0001	<0.0001	<0.0001	NA	0.006
Endrin Aldehyde	mg/L	<0.0001	<0.0001	<0.0001	NA	NS
Endosulfan Sulfate	mg/L	<0.0001	<0.0001	<0.0001	NA	NS
Methoxychlor	mg/L	<0.0005	<0.0005	<0.0005	NA	0.04
Toxaphene	mg/L	<0.0005	<0.0005	<0.0005	NA	0.003
Chlodane	mg/L	<0.0005	<0.0005	<0.0005	NA	0.002
Aroclor 1016	mg/L	<0.0005	<0.0005	<0.0005	NA	0.0005
Aroclor 1221	mg/L	<0.0005	<0.0005	<0.0005	NA	0.0005
Aroclor 1232	mg/L	<0.0005	<0.0005	<0.0005	NA	0.0005
Aroclor 1242	mg/L	<0.0005	<0.0005	<0.0005	NA	0.0005
Aroclor 1248	mg/L	<0.0005	<0.0005	<0.0005	NA	0.0005
Aroclor 1254	mg/L	<0.0005	<0.0005	<0.0005	NA	0.0005
Aroclor 1260	mg/L	<0.0005	<0.0005	<0.0005	NA	0.0005
Polynuclear Aromatic Hydrocarbons						
Naphthalene	mg/L	<0.002	<0.002	<0.002	NA	0.14
Acenaphthylene	mg/L	<0.002	<0.002	<0.002	NA	NS
Acenaphthene	mg/L	<0.002	<0.002	<0.002	NA	0.42
Fluorene	mg/L	<0.002	<0.002	<0.002	NA	0.28
Phenanthrene	mg/L	<0.002	<0.002	<0.002	NA	NS
Anthracene	mg/L	<0.002	<0.002	<0.002	NA	2.1
Fluoranthene	mg/L	<0.0002	<0.0002	<0.0002	NA	0.28
Pyrene	mg/L	<0.0002	<0.0002	<0.0002	NA	0.21
Benzo(a)anthracene	mg/L	<0.0002	<0.0002	<0.0002	NA	0.00013
Chrysene	mg/L	<0.0002	<0.0002	<0.0002	NA	0.0015
Benzo(b)fluoranthene	mg/L	<0.00018	<0.00018	<0.00018	NA	0.00018
Benzo(k)fluoranthene	mg/L	<0.0001	<0.0001	<0.0001	NA	0.00017
Benzo(a)pyrene	mg/L	<0.0002	<0.0002	<0.0002	NA	0.0002
Dibenz(a,h)anthracene	mg/L	<0.0002	<0.0002	<0.0002	NA	NS
Benzo(g,h,i)perylene	mg/L	<0.0002	<0.0002	<0.0002	NA	NS
Indeno(1,2,3-cd)pyrene	mg/L	<0.0002	<0.0002	<0.0002	NA	0.00043

ct/pal

Notes

1) mg/L = milligrams per liter.
2) NS = No IEPA Standard Established Under Tier I for Specific Compound.
3) < indicates less than the laboratory method detection limit.
4) Class I GRO - Groundwater Remediation Objective for Class I groundwater
5) NA - Not analyzed
6) Class I GROs for TCLP analysis are RCRA hazardous waste thresholds.

C02E013.xlsGroundwater

APPENDIX C

Boring Logs

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-1**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	4 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
				Weeds, Dark Gray Silty Clay	
B-1-1*	0-6"	HA	0.0	Dark Gray Silty Clay, Light Brown mottling @ 2-2.5'	
B-1-2*	1-2'	HA	2.1		
B-1-3*	3-4'	HA	0.0	Light Brown Silty Clay, traces of rounded Gravel	
				End of Boring	

HA: Hand Auger Sampler

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-2**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	2 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
				Weeds, Dark Brown Clayey Silt	
				1	
B-2-1*	1-2'	HA	0.1	Dark Brown Clayey Silt, Dark Gray Silty Clay @ 1.5-2'	
				2	
				End of Boring	

HA: Hand Auger Sampler

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-3**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	2 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
				Dark Brown Clayey Silt	
				1	
B-3-1*	1-2'	HA	0.5	Dark Brown Clayey Silt, Dark Gray Silty Clay @ 1.5-2'	
				2	
				End of Boring	

HA: Hand Auger Sampler

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-4**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	4 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
B-4-1*	1-2'	HA	0.1	Yellowish Orange Silt w/ subrounded gravel**	
				Dark Gray Clayey Silt	
				Dark Gray Silty Clay @ 1.5-2'	
				Dark Gray Silty Clay, moist	
				End of Boring	

HA: Hand Auger Sampler

**runoff from batch plant

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-5**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	2 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
				Yellowish Orange Silt w/ subrounded gravel**	
B-5-1*	1-2'	HA	0.0	Dark Gray Clayey Silt	
				End of Boring	

HA: Hand Auger Sampler

**runoff from batch plant

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-6**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	4 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
				Yellowish Orange Silt w/ subrounded gravel**	
B-6-1*	1-2'	HA	0.1	Dark Gray Silty Clay	
				Dark Gray @ 1.5	
B-6-2*	3-4	HA	2.4		
B-6-2* Dup	3-4	HA	2.4	Light Brown mottling @ 3.5', moist	
				End of Boring	

HA: Hand Auger Sampler

**runoff from batch plant

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-7**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	2 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
				Dark Brown Clayey Silt	
				1	
B-7-1*	1-2'	HA	0.0	Dark Gray Silty Clay	
				2	
				End of Boring	

HA: Hand Auger Sampler

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-8**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	2 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
				Dark Brown Clayey Silt	
B-8-1*	1-2'	HA	0.3	Dark Gray Silty Clay	
				End of Boring	

HA: Hand Auger Sampler

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-9**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	2 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
				Weeds, Dark Gray Clayey Silt	
B-9-1*	1-2'	HA	3.2	Dark Gray Silty Clay	
				End of Boring	

HA: Hand Auger Sampler

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-10**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	2 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
B-10-1*	1-2'	HA	0.1	Dark Brown Sitly Clay, Light Gray & Brown mottling 6" Light Brown & Gray Silty Clay 1 2 End of Boring	

HA: Hand Auger Sampler

**runoff from batch plant

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**B-11**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	18-Jun-02	**DRILLING METHOD:**	3" Hand Auger
AUGERED BY:	Missman, Stanley & Associates	**TOTAL DEPTH:**	2 feet
SCREEN:	None	**CASING:**	None

Sample No.	Depth (feet)	Method:	PID (ppm)	LITHOLOGY/REMARKS	WELL COMPLETION (None)
				Dark Brown Clayey Silt	
B-11-1*	1-2'	HA	6.0	Dark Brown Silt	
				End of Boring	

HA: Hand Auger Sampler

* Sample selected for analysis

Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 5272.
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**MW-1**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	19-Jun-02	**DRILLING METHOD:**	3.25" Hollow Stem Auger
DRILLED BY:	Testing Service Corporation	**TOTAL DEPTH:**	25 feet
SCREEN:	2" x 5' Sch. 40 PVC @ 0.01"	**CASING:**	2" x 5' Sch. 40 PVC

Sample No.	Depth (feet)	Method:	PID (ppm)
1	0-3.5	SS	0.8
2	3.5-5	SS	1.6
3	5-8	SS	2.1
4	8-10	SS	2.4
5	10-12	SS	1.7
6	12-15	SS	1.3
7	15-17	SS	1.5
8	17-20	SS	1.8
9	20-21	SS	0.9
10	21-25	SS	0.7

SS: 5' Continuous Split Spoon Sampler

LITHOLOGY/REMARKS

Dark Gray Clayey Silt

Dark Gray Silty Clay, moist

Light Brown & Gray Silty Clay, trace well rounded gravel, wet

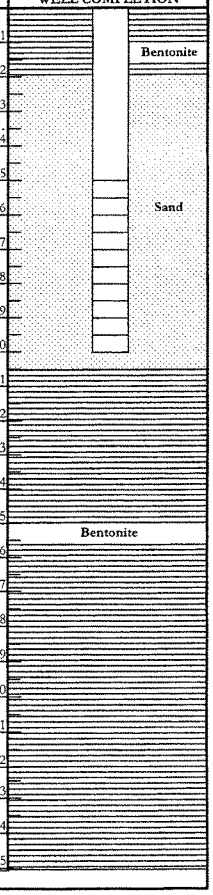
Light Gray Clayey Silt, @ 14-15' Brown Silt, Wet

Light Gray Clay, @ 19.5-20' trace well rounded Gravel, Wet

Light Gray Silt & subrounded Gravel, Saturated

End of Boring

WELL COMPLETION



Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**MW-2**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	19-Jun-02	**DRILLING METHOD:**	3.25" Hollow Stem Auger
DRILLED BY:	Testing Service Corporation	**TOTAL DEPTH:**	20 feet
SCREEN:	2" x 10' Sch. 40 PVC @ 0.01"	**CASING:**	2" x 9' Sch. 40 PVC

Sample No.	Depth (feet)	Method:	PID (ppm)
1	0-3.5	SS	0.8
2	3.5-5	SS	1.6
3	5-8	SS	2.1
4	8-10	SS	2.4
5	10-12	SS	1.7
6	12-15	SS	1.3
7	15-17	SS	1.5
8	17-20	SS	1.8
9	20-21	SS	0.9
10	21-25	SS	0.7

SS: 5' Continuous Split Spoon Sampler

LITHOLOGY/REMARKS

Dark Gray Clayey Silt

Dark Gray Silty Clay

Dark Gray Silty Clay, @ 6-7' Light & Dark Brown mottling

Light Brown Clayey Silt, trace subrounded gravel, moist

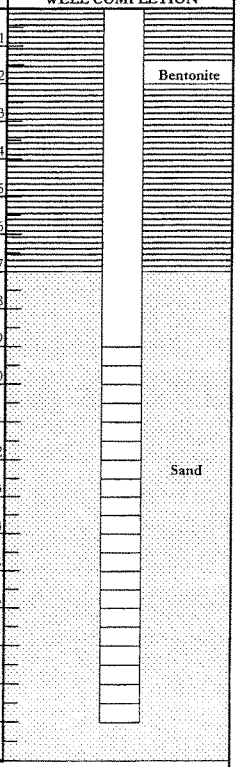
Light Gray Silty Clay, moist

Light Brown Silt, Gray @ 14.5', Moist ▼

Light Gray Clay, @ 17.5-18' subrounded Gravel

End of Boring

WELL COMPLETION



Missman, Stanley & Associates, Prof. Corp.
2415-18th Street, Suite 203, Bettendorf, Iowa 52722
Phone (563)344-0260 Fax (563) 344-0263

PROJECT NAME:	Peoria Riverfront Development Study - Farm Creek	**BORING NO.**	**MW-3**
PROJECT NO.	C02E013	**SITE LOCATION:**	Near the N.E. Corner of Diebel Road & Walnut Street Washington, Illinois
DATE OF BORING:	19-Jun-02	**DRILLING METHOD:**	3.25" Hollow Stem Auger
DRILLED BY:	Testing Service Corporation	**TOTAL DEPTH:**	15 feet
SCREEN:	2" x 10' Sch. 40 PVC @ 0.01"	**CASING:**	2" x 4' Sch. 40 PVC

Sample No.	Depth (feet)	Method:	PID (ppm)
1	0-4	SS	2.0
2	4-5	SS	1.6
3	5-6	SS	1.9
4	6-10	SS	1.4
5	10-12	SS	1.6
6	12-15	SS	1.4

SS: 5' Continuous Split Spoon Sampler

LITHOLOGY/REMARKS

Dark Gray Clayey Silt

Light Brown Clayey Silt

Light Brown Clayey Silt, trace Rounded Gravel

Light Gray Silty Clay, trace Rounded Gravel

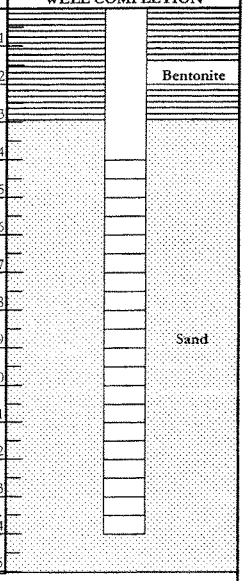
Light Gray Silt & Well Rounded Gravel, moist

Subrounded Gravel, saturated

Light Gray Clayey Silt

End of Boring

WELL COMPLETION



APPENDIX D

Laboratory Report

PDC Laboratories, Inc.
P.O. Box 9071 • Peoria, IL 61612-9071
(309) 692-9688 • (800) 752-6651 • FAX (309) 692 9689

ACCREDITED IN ACCORDANCE WITH nelac

CASE NARRATIVE – Missman Stanley and Associates.

Project No. C02E013

PDC Laboratories, Inc. received 15 soil samples in good condition on June 18, 2002. This sample set was designated as Sample Delivery Group 02062522 for pH, Cyanide, Hexavalent Chromium, Hexane Extractable Material (TPH), Moisture, Total Metals, Mercury, TCLP Metals, TCLP Mercury, Volatiles, Semi-Volatiles, Pesticides, PCBs, and PNAs. TOC analysis was subcontracted to Suburban Laboratories, and their report is included at the end of this report.

Sample Id's		Date	
Field	Lab	Collected	Received
B-1-2	02062522-1	06/18/02	06/18/02
B-1-3	02062522-2	06/18/02	06/18/02
B-2-1	02062522-3	06/18/02	06/18/02
B-3-1	02062522-4	06/18/02	06/18/02
B-4-1	02062522-5	06/18/02	06/18/02
B-5-1	02062522-6	06/18/02	06/18/02
B-6-1	02062522-7	06/18/02	06/18/02
B-7-1	02062522-8	06/18/02	06/18/02
B-8-1	02062522-9	06/18/02	06/18/02
B-9-1	02062522-10	06/18/02	06/18/02
B-10-1	02062522-11	06/18/02	06/18/02
B-11-1	02062522-12	06/18/02	06/18/02
B-12-1	02062522-13	06/18/02	06/18/02
B-6-2 DUP	02062522-14	06/18/02	06/18/02
B-6-2	02062522-15	06/18/02	06/18/02

PDC Laboratories, Inc.
P.O. Box 9071 • Peoria, IL 61612-9071
(309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689

ACCREDITED IN ACCORDANCE WITH

Project Summary

These samples were prepared and analyzed in accordance by the following methods: pH by SW-846 9045, Cyanide by SW-846 9012, Hexavalent Chromium by SW-845 7196A, Hexane Extractable Material (TPH) by SW846 9071, Percent Moisture by SM2540B, Total Metals by SW-845 6010B, Mercury by SW846 7471, TCLP Metals SW-845 1311/6010B , TCLP Mercury by SW846 1311/7470, Volatiles by SW846 8260B, Semi-Volatiles by SW846 8270C, Pesticides by SW846 8081, PCBs by SW846 8082, and PNAs by SW846 8310, and TOC by SW846 9060.

pH QC Summary

The associated Sample Replicates were performed on samples 02062522-1 and 02062522-11. All recoveries were within the specified QC recovery limits.

All associated Laboratory Control Samples (LCS) were within QC acceptance criteria.

Cyanide QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Method Blanks, Initial Calibration Blanks and Continuing Calibration Blanks were free of target analytes above report limits (RL)

The associated Matrix Spike and Matrix Spike Duplicate were performed on samples 02052522-1 and 02052522-11. All recoveries were within the specified QC criteria for sample 02062522-11, however the Matrix Spike in sample 02062522-1 was slightly outside these QC limits.

All associated Laboratory Control Samples (LCS) were within QC acceptance criteria.

Hexavalent Chromium QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Method Blanks, Initial Calibration Blanks and Continuing Calibration Blanks were free of target analytes above report limits (RL)

The associated Matrix Spike, Matrix Spike Duplicate, and Sample Replicate were performed on samples 02062522-1 and 02062522-11. All recoveries were within the method specified QC recovery criteria.

The associated Sample Replicate was performed on sample 02062522-1. All recoveries were within QC recovery limits.

All associated Laboratory Control Sample (LCS) was within QC acceptance criteria.

MISSMAN02062522

recycled paper

000002

PDC Laboratories, Inc.
P.O. Box 9071 • Peoria, IL 61612-9071
(309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689

ACCREDITED IN ACCORDANCE WITH nelac

Hexane Extractable Material (TPH) QC Summary

All holding time criteria were met for all samples.

All Method Blanks were free of target analytes above report limits (RL).

A Matrix Spike and Matrix Spike Duplicate were performed on samples 02062522-1, 02062522-8 and 02062522-15. All recoveries were within specified QC criteria.

Sample Replicates were performed on samples 02062522-1, 02062522-8 and 02062522-15. All recoveries were within specified QC limits.

All associated Laboratory Control Samples (LCS) were within QC acceptance criteria.

% Moisture

Sample Replicates were performed on samples 02062522-1 and 02062522-11. All recoveries were within specified QC criteria.

Total Metals QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Method Blanks, Initial Calibration Blanks and Continuing Calibration Blanks were free of contamination for target analytes above report limits (RL), although numerous metals were detected between the IDL and RL.

The associated Matrix Spike, Matrix Spike Duplicate, and Sample Replicate were performed on sample 02062522-1. All recoveries were within specified QC criteria except for Silver, Aluminum, Iron, Potassium, Manganese, and Antimony. A Post Digestion Spike was performed for these metals, and recovery was within QC criteria for all except Iron. Matrix interference is suspected.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

All Interference Check Samples were within QC criteria.

Mercury QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Method Blanks, Initial Calibration Blanks and Continuing Calibration Blanks were free of target analytes above report limits.

PDC Laboratories, Inc.
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A Matrix Spike and Matrix Spike Duplicate was performed on sample 02062522-1. All recoveries were within the specified QC criteria.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

TCLP Metals QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

The Method Blanks, (Preparation Blank), Initial Calibration Blanks and Continuing Calibration Blanks were free of target analytes above report limits. Please note that the TPLP Extraction Blank was carried through the digestion procedure, and is reported as the Method Blank.

The associated Matrix Spike and Matrix Spike Duplicate was performed on sample 02062522-1. All recoveries were within the specified QC criteria except Silver.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

All Interference Check Samples were within QC criteria.

TCLP Mercury QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

The Method Blanks, (Preparation Blank), Initial Calibration Blanks and Continuing Calibration Blanks were free of target analyte above report limits. Please note that the TPLP Extraction Blank was carried through the digestion procedure, and is reported as the Method Blank.

Matrix Spike and Matrix Spike Duplicate was performed on sample 02062522-1. All recoveries were within the specified QC criteria.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

Volatile QC Summary

All holding time criteria were met for all samples.

The BFB instrument performance checks were within method criteria.

In the Initial Calibration performed on July 7, 02 and associated with samples in analysis lot WG61621, PDC numbers 02062522 1-6 and 8-10, the relative standard deviation (RSD) of Carbontetrachloride was 63%, which failed to meet the acceptance criteria of 30% for 8260 Initial Calibration.

In Continuing Calibration WG61621-2, the percent difference (%D) for Acetone was 45%, which failed to meet the acceptance criteria of 30% for Continuing Calibration Verification.

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Samples in analysis lot WG61706 (samples 02062522-7 and 11-15, were analyzed analyzed following an initial calibration. All QC acceptance criteria calibration were within acceptance except for the following:

The relative standard deviation (RSD) was 26.3% for Bromomethane, which failed to meet the acceptance criteria of 15% for initial calibration. The mean %RSD for all analytes included in the calibration was 13%, which is within acceptance criteria.

The relative standard deviation (RSD) was 16.8% for 1,1,1,2-Tetrachloroethane, which failed to meet the acceptance criteria of 15% for initial calibration. The mean %RSD for all analytes included in the calibration was 13%, which is within acceptance criteria.

The relative standard deviation (RSD) was 19.6% for 1,2-Dibromo-3-chloropropane, which failed to meet the acceptance criteria of 15% for initial calibration. The mean %RSD for all analytes included in the calibration was 13%, which is within acceptance criteria.

All Method Blanks were free of target analytes above report limits.

All Surrogate Spike recoveries were within QC criteria.

Matrix Spike and Matrix Spike Duplicate was performed on sample 02062522-1. All recoveries were within the specified QC criteria.

All Surrogate Spike recoveries were within QC criteria.

All associated Laboratory Control Samples (LCS) were within QC acceptance criteria.

Semi-Volatile QC Summary

All holding time criteria were met for all samples.

The DFTPP instrument performance checks were within method criteria

All Initial and Continuing Calibration Standards were within PDC acceptance criteria.

All Method Blanks were free of target analytes above report limits.

All Surrogate Spike recoveries were within QC criteria.

Matrix Spike and Matrix Spike Duplicate was performed on sample 02062522-1. All recoveries were within the specified QC limits except for 1,4-Dichlorobenzene and 2,4-Dinitrotoluene, where recovery was above the upper QC range, with recoveries of 78%/84% and 96%/102% recovery respectively.

In the associated Laboratory Control Sample (LCS), all recoveries were within QC acceptance criteria except for 1,4-Dichlorobenzene (96%), 2,4-Dinitrotoluene (96%), and Hexachloroethane (102%), all of which recovered above the upper QC limit. Because these analytes were not detected in any samples, we believe the slight high bias does not affect the results.

Pesticides QC Summary

All holding time criteria were met for all samples.

All Initial and Continuing Calibration Standards were within PDC acceptance criteria.

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The percent difference (%D) was 23% for delta-BHC, which failed to meet the acceptance criteria of 15% for continuing calibration verification. The mean %D for all analytes included in the continuing calibration was 8.2% for 23-June-02, 8:17, which is within the acceptance criteria.

The percent difference (%D) was 18.8% for 4,4-DDD, which failed to meet the acceptance criteria of 15% for continuing calibration verification. The mean %D for all analytes included in the continuing calibration was 8.2% for 23-June-02, 8:17, which is within the acceptance criteria.

The percent difference (%D) was 23% for 4,4-DDD, which failed to meet the acceptance criteria of 15% for continuing calibration verification. The mean %D for all analytes included in the continuing calibration was 6.1% for 20-July-02, 00:46, which is within the acceptance criteria.

All Method Blanks were free of target analytes above report limits.

All Surrogate Spike recoveries were within QC criteria except for the confirmation column analysis for 02062522-8 and 02062522-13.

Matrix Spike and Matrix Spike Duplicate was performed on sample 02062522-1. Several recoveries were outside the specified QC criteria.

All associated Laboratory Control Samples (LCS) were within QC acceptance criteria.

All samples were run at a 1:10 dilution to minimize matrix interference.

PCB QC Summary

All holding time criteria were met for all samples.

All Initial and Continuing Calibration Standards were within PDC acceptance criteria.

All Method Blanks were free of target analytes above report limits.

All Surrogate Spike recoveries were within QC criteria.

Matrix Spike and Matrix Spike Duplicate was performed on sample 02062522-1. All recoveries were within the specified QC criteria.

All associated Laboratory Control Samples (LCS) were within QC acceptance criteria.

PNA QC Summary

All holding time criteria were met for all samples.

All Initial and Continuing Calibration Standards were within PDC acceptance criteria. Recovery in CCV WG61682-2 was greater than QC acceptance criteria for all analytes. However, since no target analytes were detected the results were unqualified.

The percent difference (%D) was 84% for Benzo(a)pyrene in WG61683-4, which failed to meet the acceptance criteria of 15% for continuing calibration verification . The mean %D for all analytes included in in the continuing calibration was 7.5%, which is within the acceptance criteria.

All Method Blanks were free of target analytes above report limits.

MISSMAN02062522

000006

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All Surrogate Spike recoveries were within QC criteria.

A Matrix Spike and Matrix Spike Duplicate was performed on sample 02062522-1. All recoveries were within the specified QC criteria except for Benzo(a)pyrene. Benzo(a)anthracene and Acenaphthylene.

All associated Laboratory Control Samples (LCS) were within QC acceptance criteria.

Certification

This data package is in compliance with the technical intent of Missman Stanley and Associates contract, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designee, as verified by the following signature.

Signature: Barbara Beard Name: Barbara Beard

Date: July 30, 02 Title: Project Manager

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Report Cover Page

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

This report includes information regarding the following described samples as received by the laboratory and is only valid for the parameters tested. This report contains 182 results page(s) not including the cover page(s).

Sample No.	Client ID	Site	Locator
02062522-1	SOILS	B-1-2	GRAB
02062522-2	SOILS	B-1-3	GRAB
02062522-3	SOILS	B-2-1	GRAB
02062522-4	SOILS	B-3-1	GRAB
02062522-5	SOILS	B-4-1	GRAB
02062522-6	SOILS	B-5-1	GRAB
02062522-7	SOILS	B-6-1	GRAB
02062522-8	SOILS	B-7-1	GRAB
02062522-9	SOILS	B-8-1	GRAB
02062522-10	SOILS	B-9-1	GRAB
02062522-11	SOILS	B-10-1	GRAB
02062522-12	SOILS	B-11-1	GRAB
02062522-13	SOILS	B-12-1	GRAB

000003

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Report Cover Page

Missman Stanley & Associates
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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

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PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

This report includes information regarding the following described samples as received by the laboratory and is only valid for the parameters tested. This report contains 182 results page(s) not including the cover page(s).

Sample No.	Client ID	Site	Locator
02062522-14	SOILS	B-6-2 DUP	GRAB
02062522-15	SOILS	B-6-2	GRAB
02062522-16	SOILS	1	GRAB

Certified by: _____
Barb Beard, Project Manager

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State of Illinois Certification for Bacteriological Analysis in Drinking Water -Lab Registry No. 17533
Drinking Water Certifications: Indiana (C-IL-04); Kansas (E-10338); Kentucky (90058); Missouri (00870); Wisconsin (998294430)
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Hazardous/Solid Waste Certifications: Arkansas; Kansas (E-10338); Wisconsin (998294430)
UST Certification: Iowa (240)
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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	24-Jun-02 10:00	KG
Cyanide, Total	U	0.16	mg/kg Dry	24-Jun-02 10:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.66	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		24.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		6.38	units	24-Jun-02 12:16	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	02-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	240	mg/kg Dry	02-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				20-Jun-02 12:00	DWK
Final pH		4.980		20-Jun-02 12:00	DWK
SW-846 METHOD 6010B					
Silver	U	1.0	mg/kg	27-Jun-02 08:02	DWK
Silver	U	1.3	mg/kg Dry	27-Jun-02 08:02	DWK
Silver, TCLP	J	0.0010	mg/l	28-Jun-02 09:51	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		11000	mg/kg	27-Jun-02 08:02	DWK
Aluminum		14000	mg/kg Dry	27-Jun-02 08:02	DWK
Arsenic		3.8	mg/kg	27-Jun-02 08:02	DWK
Arsenic		5.0	mg/kg Dry	27-Jun-02 08:02	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 09:51	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

000010

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
Barium		86.	mg/kg	27-Jun-02 08:02	DWK
Barium		110	mg/kg Dry	27-Jun-02 08:02	DWK
Barium, TCLP	J	1.8	mg/l	28-Jun-02 09:51	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.44	mg/kg	27-Jun-02 08:02	DWK
Beryllium	J	0.58	mg/kg Dry	27-Jun-02 08:02	DWK
Calcium		2800	mg/kg	27-Jun-02 08:02	DWK
Calcium		3700	mg/kg Dry	27-Jun-02 08:02	DWK
Cadmium		0.44	mg/kg	27-Jun-02 08:02	DWK
Cadmium		0.58	mg/kg Dry	27-Jun-02 08:02	DWK
Cadmium, TCLP	U	0.0050	mg/l	28-Jun-02 09:51	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		3.4	mg/kg	27-Jun-02 08:02	DWK
Cobalt		4.5	mg/kg Dry	27-Jun-02 08:02	DWK
Chromium		17.	mg/kg	27-Jun-02 08:02	DWK
Chromium		22.	mg/kg Dry	27-Jun-02 08:02	DWK
Chromium, TCLP	J	0.0012	mg/l	28-Jun-02 09:51	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		27.	mg/kg	27-Jun-02 08:02	DWK
Copper		36.	mg/kg Dry	27-Jun-02 08:02	DWK
Iron		14000	mg/kg	27-Jun-02 08:02	DWK
Iron		18000	mg/kg Dry	27-Jun-02 08:02	DWK
Potassium		1200	mg/kg	27-Jun-02 08:02	DWK
Potassium		1600	mg/kg Dry	27-Jun-02 08:02	DWK
Magnesium		2500	mg/kg	27-Jun-02 08:02	DWK
Magnesium		3300	mg/kg Dry	27-Jun-02 08:02	DWK
Manganese		94.	mg/kg	27-Jun-02 08:02	DWK
Manganese		120	mg/kg Dry	27-Jun-02 08:02	DWK
Sodium	J	47.	mg/kg	27-Jun-02 08:02	DWK
Sodium	J	62.	mg/kg Dry	27-Jun-02 08:02	DWK
Nickel		13.	mg/kg	27-Jun-02 08:02	DWK
Nickel		17.	mg/kg Dry	27-Jun-02 08:02	DWK
Lead		10.	mg/kg	27-Jun-02 08:02	DWK

000011

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
Lead		13.	mg/kg Dry	27-Jun-02 08:02	DWK
Lead, TCLP	U	0.0075	mg/l	28-Jun-02 09:51	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 08:02	DWK
Antimony	U	2.6	mg/kg Dry	27-Jun-02 08:02	DWK
Selenium	J	0.56	mg/kg	27-Jun-02 08:02	DWK
Selenium	J	0.74	mg/kg Dry	27-Jun-02 08:02	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 09:51	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.29	mg/kg	27-Jun-02 08:02	DWK
Thallium	J	0.38	mg/kg Dry	27-Jun-02 08:02	DWK
Vanadium		20.	mg/kg	27-Jun-02 08:02	DWK
Vanadium		26.	mg/kg Dry	27-Jun-02 08:02	DWK
Zinc		43.	mg/kg	27-Jun-02 08:02	DWK
Zinc		56.	mg/kg Dry	27-Jun-02 08:02	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 08:12	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.053	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	17-Jul-02 09:39	AMR
alpha-BHC	U	100	ug/kg Dry	17-Jul-02 09:39	AMR
gamma-BHC (Lindane)	U	80.	ug/kg	17-Jul-02 09:39	AMR
gamma-BHC (Lindane)	U	100	ug/kg Dry	17-Jul-02 09:39	AMR

000012

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	17-Jul-02 09:39	AMR
beta-BHC	U	100	ug/kg Dry	17-Jul-02 09:39	AMR
Heptachlor	U	80.	ug/kg	17-Jul-02 09:39	AMR
Heptachlor	U	100	ug/kg Dry	17-Jul-02 09:39	AMR
delta-BHC	U	80.	ug/kg	17-Jul-02 09:39	AMR
delta-BHC	U	100	ug/kg Dry	17-Jul-02 09:39	AMR
Aldrin	U	80.	ug/kg	17-Jul-02 09:39	AMR
Aldrin	U	100	ug/kg Dry	17-Jul-02 09:39	AMR
Heptachlor Epoxide	U	80.	ug/kg	17-Jul-02 09:39	AMR
Heptachlor Epoxide	U	100	ug/kg Dry	17-Jul-02 09:39	AMR
Endosulfan I	U	80.	ug/kg	17-Jul-02 09:39	AMR
Endosulfan I	U	100	ug/kg Dry	17-Jul-02 09:39	AMR
4,4'-DDE	U	160	ug/kg	17-Jul-02 09:39	AMR
4,4'-DDE	U	210	ug/kg Dry	17-Jul-02 09:39	AMR
Dieldrin	U	160	ug/kg	17-Jul-02 09:39	AMR
Dieldrin	U	210	ug/kg Dry	17-Jul-02 09:39	AMR
Endrin	U	160	ug/kg	17-Jul-02 09:39	AMR
Endrin	U	210	ug/kg Dry	17-Jul-02 09:39	AMR
4,4'-DDD	U	160	ug/kg	17-Jul-02 09:39	AMR
4,4'-DDD	U	210	ug/kg Dry	17-Jul-02 09:39	AMR
Endosulfan II	U	160	ug/kg	17-Jul-02 09:39	AMR
Endosulfan II	U	210	ug/kg Dry	17-Jul-02 09:39	AMR
4,4'-DDT	U	160	ug/kg	17-Jul-02 09:39	AMR
4,4'-DDT	U	210	ug/kg Dry	17-Jul-02 09:39	AMR
Endrin Aldehyde	U	160	ug/kg	17-Jul-02 09:39	AMR
Endrin Aldehyde	U	210	ug/kg Dry	17-Jul-02 09:39	AMR
Endosulfan Sulfate	U	160	ug/kg	17-Jul-02 09:39	AMR
Endosulfan Sulfate	U	210	ug/kg Dry	17-Jul-02 09:39	AMR
Methoxychlor	U	800	ug/kg	17-Jul-02 09:39	AMR
Methoxychlor	U	1000	ug/kg Dry	17-Jul-02 09:39	AMR
Toxaphene	U	800	ug/kg	17-Jul-02 09:39	AMR
Toxaphene	U	1000	ug/kg Dry	17-Jul-02 09:39	AMR
Chlordane (technical)	U	1600	ug/kg	17-Jul-02 09:39	AMR

000013

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2100	ug/kg Dry	17-Jul-02 09:39	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 03:31	AMR
Aroclor 1016	U	100	ug/kg Dry	25-Jun-02 03:31	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 03:31	AMR
Aroclor 1221	U	210	ug/kg Dry	25-Jun-02 03:31	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 03:31	AMR
Aroclor 1232	U	100	ug/kg Dry	25-Jun-02 03:31	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 03:31	AMR
Aroclor 1242	U	100	ug/kg Dry	25-Jun-02 03:31	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 03:31	AMR
Aroclor 1248	U	100	ug/kg Dry	25-Jun-02 03:31	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 03:31	AMR
Aroclor 1254	U	210	ug/kg Dry	25-Jun-02 03:31	AMR
Aroclor 1260	U	160	ug/kg	25-Jun-02 03:31	AMR
Aroclor 1260	U	210	ug/kg Dry	25-Jun-02 03:31	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	01-Jul-02 19:30	ELS
Naphthalene	U	88.	ug/kg Dry	01-Jul-02 19:30	ELS
Acenaphthene	U	67.	ug/kg	01-Jul-02 19:30	ELS
Acenaphthene	U	88.	ug/kg Dry	01-Jul-02 19:30	ELS
Acenaphthylene	U	67.	ug/kg	01-Jul-02 19:30	ELS
Acenaphthylene	U	88.	ug/kg Dry	01-Jul-02 19:30	ELS
Fluorene	U	67.	ug/kg	01-Jul-02 19:30	ELS
Fluorene	U	88.	ug/kg Dry	01-Jul-02 19:30	ELS
Phenanthrene	U	67.	ug/kg	01-Jul-02 19:30	ELS
Phenanthrene	U	88.	ug/kg Dry	01-Jul-02 19:30	ELS
Anthracene	U	67.	ug/kg	01-Jul-02 19:30	ELS
Anthracene	U	88.	ug/kg Dry	01-Jul-02 19:30	ELS
Fluoranthene	U	6.7	ug/kg	01-Jul-02 19:30	ELS
Fluoranthene	U	8.8	ug/kg Dry	01-Jul-02 19:30	ELS
Pyrene	U	6.7	ug/kg	01-Jul-02 19:30	ELS
Pyrene	U	8.8	ug/kg Dry	01-Jul-02 19:30	ELS

000014

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	U	6.7	ug/kg	01-Jul-02 19:30	ELS
Benzo(a)Anthracene	U	8.8	ug/kg Dry	01-Jul-02 19:30	ELS
Chrysene	U	6.7	ug/kg	01-Jul-02 19:30	ELS
Chrysene	U	8.8	ug/kg Dry	01-Jul-02 19:30	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	01-Jul-02 19:30	ELS
Benzo(b)Fluoranthene	U	8.8	ug/kg Dry	01-Jul-02 19:30	ELS
Benzo(k)Fluoranthene	U	3.4	ug/kg	01-Jul-02 19:30	ELS
Benzo(k)Fluoranthene	U	4.5	ug/kg Dry	01-Jul-02 19:30	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	01-Jul-02 19:30	ELS
Benzo(a)Pyrene	U	8.8	ug/kg Dry	01-Jul-02 19:30	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	01-Jul-02 19:30	ELS
Dibenz(a,h)Anthracene	U	8.8	ug/kg Dry	01-Jul-02 19:30	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	01-Jul-02 19:30	ELS
Benzo(g,h,i)Perylene	U	8.8	ug/kg Dry	01-Jul-02 19:30	ELS
Indeno(1,2,3-cd)Pyrene	U	6.7	ug/kg	01-Jul-02 19:30	ELS
Indeno(1,2,3-cd)Pyrene	U	8.8	ug/kg Dry	01-Jul-02 19:30	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	01-Jul-02 12:35	AJB
Vinyl Chloride	U	13.	ug/kg Dry	01-Jul-02 12:35	AJB
Bromomethane	U	10.	ug/kg	01-Jul-02 12:35	AJB
Bromomethane	U	13.	ug/kg Dry	01-Jul-02 12:35	AJB
Methylene Chloride	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Methylene Chloride	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 12:35	AJB
cis-1,3-Dichloropropene	U	2.6	ug/kg Dry	01-Jul-02 12:35	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 12:35	AJB
trans-1,3-Dichloropropene	U	2.6	ug/kg Dry	01-Jul-02 12:35	AJB
Carbon Disulfide	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Carbon Disulfide	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Acetone		20.	ug/kg	01-Jul-02 12:35	AJB
Acetone		26.	ug/kg Dry	01-Jul-02 12:35	AJB
1,1-Dichloroethene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
1,1-Dichloroethene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB

000015

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	01-Jul-02 12:35	AJB
1,1-Dichloroethane	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
trans-1,2-Dichloroethene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
cis-1,2-Dichloroethene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Chloroform	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Chloroform	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
1,2-Dichloroethane	U	5.0	ug/kg	01-Jul-02 12:35	AJB
1,2-Dichloroethane	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	01-Jul-02 12:35	AJB
1,1,1-Trichloroethane	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Carbon Tetrachloride	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Carbon Tetrachloride	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Vinyl Acetate	U	10.	ug/kg	01-Jul-02 12:35	AJB
Vinyl Acetate	U	13.	ug/kg Dry	01-Jul-02 12:35	AJB
Bromodichloromethane	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Bromodichloromethane	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
1,2-Dichloropropane	U	5.0	ug/kg	01-Jul-02 12:35	AJB
1,2-Dichloropropane	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Trichloroethene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Trichloroethene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Dibromochloromethane	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Dibromochloromethane	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	01-Jul-02 12:35	AJB
1,1,2-Trichloroethane	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Benzene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Benzene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
1,2-Dibromoethane	U	0.42	ug/kg	01-Jul-02 12:35	AJB
1,2-Dibromoethane	U	0.55	ug/kg Dry	01-Jul-02 12:35	AJB
Bromoform	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Bromoform	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Tetrachloroethene	U	5.0	ug/kg	01-Jul-02 12:35	AJB

000016

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Toluene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Toluene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Chlorobenzene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Chlorobenzene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
Ethylbenzene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Ethylbenzene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	01-Jul-02 12:35	AJB
1,2-Dibromo-3-chloropropane	U	0.72	ug/kg Dry	01-Jul-02 12:35	AJB
Styrene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
Styrene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
m,p-Xylene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
m,p-Xylene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
o-Xylene	U	5.0	ug/kg	01-Jul-02 12:35	AJB
o-Xylene	U	6.6	ug/kg Dry	01-Jul-02 12:35	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	24-Jun-02 19:33	CAH
N-Nitrosodimethylamine	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Pyridine	U	330	ug/kg	24-Jun-02 19:33	CAH
Pyridine	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Aniline	U	330	ug/kg	24-Jun-02 19:33	CAH
Aniline	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	24-Jun-02 19:33	CAH
bis(2-Chloroethyl) Ether	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2-Chlorophenol	U	330	ug/kg	24-Jun-02 19:33	CAH
2-Chlorophenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Phenol	U	330	ug/kg	24-Jun-02 19:33	CAH
Phenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
1,3-Dichlorobenzene	U	330	ug/kg	24-Jun-02 19:33	CAH
1,3-Dichlorobenzene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
1,4-Dichlorobenzene	U	330	ug/kg	24-Jun-02 19:33	CAH
1,4-Dichlorobenzene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
1,2-Dichlorobenzene	U	330	ug/kg	24-Jun-02 19:33	CAH

000017

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Benzyl Alcohol	U	330	ug/kg	24-Jun-02 19:33	CAH
Benzyl Alcohol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	24-Jun-02 19:33	CAH
Bis(2-chloroisopropyl)ether	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Hexachloroethane	U	330	ug/kg	24-Jun-02 19:33	CAH
Hexachloroethane	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2-Methylphenol	U	330	ug/kg	24-Jun-02 19:33	CAH
2-Methylphenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	24-Jun-02 19:33	CAH
N-Nitroso-di-n-propylamine	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
4-Methylphenol	U	330	ug/kg	24-Jun-02 19:33	CAH
4-Methylphenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Nitrobenzene	U	330	ug/kg	24-Jun-02 19:33	CAH
Nitrobenzene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Isophorone	U	330	ug/kg	24-Jun-02 19:33	CAH
Isophorone	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2-Nitrophenol	U	1600	ug/kg	24-Jun-02 19:33	CAH
2-Nitrophenol	U	2100	ug/kg Dry	24-Jun-02 19:33	CAH
2,4-Dimethylphenol	U	330	ug/kg	24-Jun-02 19:33	CAH
2,4-Dimethylphenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	24-Jun-02 19:33	CAH
bis(2-Chloroethoxy)methane	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2,4-Dichlorophenol	U	330	ug/kg	24-Jun-02 19:33	CAH
2,4-Dichlorophenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	24-Jun-02 19:33	CAH
1,2,4-Trichlorobenzene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Naphthalene	U	330	ug/kg	24-Jun-02 19:33	CAH
Naphthalene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2,6-Dichlorophenol	U	330	ug/kg	24-Jun-02 19:33	CAH
2,6-Dichlorophenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
4-Chloroaniline	U	330	ug/kg	24-Jun-02 19:33	CAH
4-Chloroaniline	U	430	ug/kg Dry	24-Jun-02 19:33	CAH

000018

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	24-Jun-02 19:33	CAH
Hexachlorobutadiene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	24-Jun-02 19:33	CAH
4-Chloro-3-Methylphenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2-Methylnaphthalene	U	330	ug/kg	24-Jun-02 19:33	CAH
2-Methylnaphthalene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	24-Jun-02 19:33	CAH
Hexachlorocyclopentadiene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	24-Jun-02 19:33	CAH
2,4,6-Trichlorophenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	24-Jun-02 19:33	CAH
2,4,5-Trichlorophenol	U	2100	ug/kg Dry	24-Jun-02 19:33	CAH
2-Chloronaphthalene	U	330	ug/kg	24-Jun-02 19:33	CAH
2-Chloronaphthalene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2-Nitroaniline	U	1600	ug/kg	24-Jun-02 19:33	CAH
2-Nitroaniline	U	2100	ug/kg Dry	24-Jun-02 19:33	CAH
Dimethylphthalate	U	330	ug/kg	24-Jun-02 19:33	CAH
Dimethylphthalate	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Acenaphthylene	U	330	ug/kg	24-Jun-02 19:33	CAH
Acenaphthylene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2,6-Dinitrotoluene	U	330	ug/kg	24-Jun-02 19:33	CAH
2,6-Dinitrotoluene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
3-Nitroaniline	U	1600	ug/kg	24-Jun-02 19:33	CAH
3-Nitroaniline	U	2100	ug/kg Dry	24-Jun-02 19:33	CAH
Acenaphthene	U	330	ug/kg	24-Jun-02 19:33	CAH
Acenaphthene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2,4-Dinitrophenol	U	1600	ug/kg	24-Jun-02 19:33	CAH
2,4-Dinitrophenol	U	2100	ug/kg Dry	24-Jun-02 19:33	CAH
Dibenzofuran	U	330	ug/kg	24-Jun-02 19:33	CAH
Dibenzofuran	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
2,4-Dinitrotoluene	U	330	ug/kg	24-Jun-02 19:33	CAH
2,4-Dinitrotoluene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
4-Nitrophenol	U	1600	ug/kg	24-Jun-02 19:33	CAH

000013

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2100	ug/kg Dry	24-Jun-02 19:33	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	24-Jun-02 19:33	CAH
2,3,4,6-Tetrachlorophenol	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Diethylphthalate	U	330	ug/kg	24-Jun-02 19:33	CAH
Diethylphthalate	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Fluorene	U	330	ug/kg	24-Jun-02 19:33	CAH
Fluorene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	24-Jun-02 19:33	CAH
4-Chlorophenyl-phenyl Ether	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
4-Nitroaniline	U	1600	ug/kg	24-Jun-02 19:33	CAH
4-Nitroaniline	U	2100	ug/kg Dry	24-Jun-02 19:33	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	24-Jun-02 19:33	CAH
4,6-Dinitro-2-methylphenol	U	2100	ug/kg Dry	24-Jun-02 19:33	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	24-Jun-02 19:33	CAH
N-Nitrosodiphenylamine	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	24-Jun-02 19:33	CAH
4-Bromophenyl-phenylether	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Hexachlorobenzene	U	330	ug/kg	24-Jun-02 19:33	CAH
Hexachlorobenzene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Pentachlorophenol	U	1600	ug/kg	24-Jun-02 19:33	CAH
Pentachlorophenol	U	2100	ug/kg Dry	24-Jun-02 19:33	CAH
Carbazole	U	330	ug/kg	24-Jun-02 19:33	CAH
Carbazole	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Phenanthrene	U	330	ug/kg	24-Jun-02 19:33	CAH
Phenanthrene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Anthracene	U	330	ug/kg	24-Jun-02 19:33	CAH
Anthracene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Di-n-Butylphthalate	U	330	ug/kg	24-Jun-02 19:33	CAH
Di-n-Butylphthalate	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Fluoranthene	U	330	ug/kg	24-Jun-02 19:33	CAH
Fluoranthene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Pyrene	U	330	ug/kg	24-Jun-02 19:33	CAH
Pyrene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH

000020

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-1
Client ID: SOILS
Site: B-1-2
Locator: GRAB
Collect Date: 18-JUN-02 11:00

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	24-Jun-02 19:33	CAH
Butylbenzylphthalate	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Benzo(a)anthracene	U	330	ug/kg	24-Jun-02 19:33	CAH
Benzo(a)anthracene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	24-Jun-02 19:33	CAH
3,3'-Dichlorobenzidine	U	870	ug/kg Dry	24-Jun-02 19:33	CAH
Chrysene	U	330	ug/kg	24-Jun-02 19:33	CAH
Chrysene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	24-Jun-02 19:33	CAH
bis(2-Ethylhexyl)phthalate	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Di-n-octylphthalate	U	330	ug/kg	24-Jun-02 19:33	CAH
Di-n-octylphthalate	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Benzo(b)fluoranthene	U	330	ug/kg	24-Jun-02 19:33	CAH
Benzo(b)fluoranthene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Benzo(k)fluoranthene	U	330	ug/kg	24-Jun-02 19:33	CAH
Benzo(k)fluoranthene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Benzo(a)pyrene	U	330	ug/kg	24-Jun-02 19:33	CAH
Benzo(a)pyrene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	24-Jun-02 19:33	CAH
Indeno(1,2,3-cd)pyrene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	24-Jun-02 19:33	CAH
Dibenzo(a,h)anthracene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	24-Jun-02 19:33	CAH
Benzo(g,h,i)perylene	U	430	ug/kg Dry	24-Jun-02 19:33	CAH

000021

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	24-Jun-02 10:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	24-Jun-02 10:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent		0.24	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent		0.29	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		18.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		6.69	units	24-Jun-02 12:24	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	02-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	220	mg/kg Dry	02-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				20-Jun-02 12:00	DWK
Final pH		4.930		20-Jun-02 12:00	DWK
SW-846 METHOD 6010B					
Silver	J	0.17	mg/kg	27-Jun-02 09:19	DWK
Silver	J	0.21	mg/kg Dry	27-Jun-02 09:19	DWK
Silver, TCLP	U	0.050	mg/l	28-Jun-02 09:37	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		8200	mg/kg	27-Jun-02 09:19	DWK
Aluminum		10000	mg/kg Dry	27-Jun-02 09:19	DWK
Arsenic		4.1	mg/kg	27-Jun-02 09:19	DWK
Arsenic		5.0	mg/kg Dry	27-Jun-02 09:19	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 09:37	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

000022

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
Barium		60.	mg/kg	27-Jun-02 09:19	DWK
Barium		73.	mg/kg Dry	27-Jun-02 09:19	DWK
Barium, TCLP		2.3	mg/l	28-Jun-02 09:37	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.42	mg/kg	27-Jun-02 09:19	DWK
Beryllium	J	0.51	mg/kg Dry	27-Jun-02 09:19	DWK
Calcium		2700	mg/kg	27-Jun-02 09:19	DWK
Calcium		3300	mg/kg Dry	27-Jun-02 09:19	DWK
Cadmium		0.43	mg/kg	27-Jun-02 09:19	DWK
Cadmium		0.52	mg/kg Dry	27-Jun-02 09:19	DWK
Cadmium, TCLP	U	0.0050	mg/l	28-Jun-02 09:37	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		4.8	mg/kg	27-Jun-02 09:19	DWK
Cobalt		5.8	mg/kg Dry	27-Jun-02 09:19	DWK
Chromium		15.	mg/kg	27-Jun-02 09:19	DWK
Chromium		18.	mg/kg Dry	27-Jun-02 09:19	DWK
Chromium, TCLP	U	0.10	mg/l	28-Jun-02 09:37	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		12.	mg/kg	27-Jun-02 09:19	DWK
Copper		15.	mg/kg Dry	27-Jun-02 09:19	DWK
Iron		13000	mg/kg	27-Jun-02 09:19	DWK
Iron		16000	mg/kg Dry	27-Jun-02 09:19	DWK
Potassium		1000	mg/kg	27-Jun-02 09:19	DWK
Potassium		1200	mg/kg Dry	27-Jun-02 09:19	DWK
Magnesium		3400	mg/kg	27-Jun-02 09:19	DWK
Magnesium		4100	mg/kg Dry	27-Jun-02 09:19	DWK
Manganese		170	mg/kg	27-Jun-02 09:19	DWK
Manganese		210	mg/kg Dry	27-Jun-02 09:19	DWK
Sodium	J	36.	mg/kg	27-Jun-02 09:19	DWK
Sodium	J	44.	mg/kg Dry	27-Jun-02 09:19	DWK
Nickel		15.	mg/kg	27-Jun-02 09:19	DWK
Nickel		18.	mg/kg Dry	27-Jun-02 09:19	DWK
Lead		8.3	mg/kg	27-Jun-02 09:19	DWK

000023

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
Lead		10.	mg/kg Dry	27-Jun-02 09:19	DWK
Lead, TCLP	J	0.0027	mg/l	28-Jun-02 09:37	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 09:19	DWK
Antimony	U	2.4	mg/kg Dry	27-Jun-02 09:19	DWK
Selenium	J	0.32	mg/kg	27-Jun-02 09:19	DWK
Selenium	J	0.39	mg/kg Dry	27-Jun-02 09:19	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 09:37	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.25	mg/kg	27-Jun-02 09:19	DWK
Thallium	J	0.30	mg/kg Dry	27-Jun-02 09:19	DWK
Vanadium		13.	mg/kg	27-Jun-02 09:19	DWK
Vanadium		16.	mg/kg Dry	27-Jun-02 09:19	DWK
Zinc		35.	mg/kg	27-Jun-02 09:19	DWK
Zinc		43.	mg/kg Dry	27-Jun-02 09:19	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 08:39	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.049	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	17-Jul-02 10:25	AMR
alpha-BHC	U	98.	ug/kg Dry	17-Jul-02 10:25	AMR
gamma-BHC (Lindane)	U	80.	ug/kg	17-Jul-02 10:25	AMR
gamma-BHC (Lindane)	U	98.	ug/kg Dry	17-Jul-02 10:25	AMR

000024

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	17-Jul-02 10:25	AMR
beta-BHC	U	98.	ug/kg Dry	17-Jul-02 10:25	AMR
Heptachlor	U	80.	ug/kg	17-Jul-02 10:25	AMR
Heptachlor	U	98.	ug/kg Dry	17-Jul-02 10:25	AMR
delta-BHC	U	80.	ug/kg	17-Jul-02 10:25	AMR
delta-BHC	U	98.	ug/kg Dry	17-Jul-02 10:25	AMR
Aldrin	U	80.	ug/kg	17-Jul-02 10:25	AMR
Aldrin	U	98.	ug/kg Dry	17-Jul-02 10:25	AMR
Heptachlor Epoxide	U	80.	ug/kg	17-Jul-02 10:25	AMR
Heptachlor Epoxide	U	98.	ug/kg Dry	17-Jul-02 10:25	AMR
Endosulfan I	U	80.	ug/kg	17-Jul-02 10:25	AMR
Endosulfan I	U	98.	ug/kg Dry	17-Jul-02 10:25	AMR
4,4'-DDE	U	160	ug/kg	17-Jul-02 10:25	AMR
4,4'-DDE	U	200	ug/kg Dry	17-Jul-02 10:25	AMR
Dieldrin	U	160	ug/kg	17-Jul-02 10:25	AMR
Dieldrin	U	200	ug/kg Dry	17-Jul-02 10:25	AMR
Endrin	U	160	ug/kg	17-Jul-02 10:25	AMR
Endrin	U	200	ug/kg Dry	17-Jul-02 10:25	AMR
4,4'-DDD	U	160	ug/kg	17-Jul-02 10:25	AMR
4,4'-DDD	U	200	ug/kg Dry	17-Jul-02 10:25	AMR
Endosulfan II	U	160	ug/kg	17-Jul-02 10:25	AMR
Endosulfan II	U	200	ug/kg Dry	17-Jul-02 10:25	AMR
4,4'-DDT	U	160	ug/kg	17-Jul-02 10:25	AMR
4,4'-DDT	U	200	ug/kg Dry	17-Jul-02 10:25	AMR
Endrin Aldehyde	U	160	ug/kg	17-Jul-02 10:25	AMR
Endrin Aldehyde	U	200	ug/kg Dry	17-Jul-02 10:25	AMR
Endosulfan Sulfate	U	160	ug/kg	17-Jul-02 10:25	AMR
Endosulfan Sulfate	U	200	ug/kg Dry	17-Jul-02 10:25	AMR
Methoxychlor	U	800	ug/kg	17-Jul-02 10:25	AMR
Methoxychlor	U	980	ug/kg Dry	17-Jul-02 10:25	AMR
Toxaphene	U	800	ug/kg	17-Jul-02 10:25	AMR
Toxaphene	U	980	ug/kg Dry	17-Jul-02 10:25	AMR
Chlordane (technical)	U	1600	ug/kg	17-Jul-02 10:25	AMR

000025

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	17-Jul-02 10:25	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 04:07	AMR
Aroclor 1016	U	98.	ug/kg Dry	25-Jun-02 04:07	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 04:07	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 04:07	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 04:07	AMR
Aroclor 1232	U	98.	ug/kg Dry	25-Jun-02 04:07	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 04:07	AMR
Aroclor 1242	U	98.	ug/kg Dry	25-Jun-02 04:07	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 04:07	AMR
Aroclor 1248	U	98.	ug/kg Dry	25-Jun-02 04:07	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 04:07	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 04:07	AMR
Aroclor 1260	U	160	ug/kg	25-Jun-02 04:07	AMR
Aroclor 1260	U	200	ug/kg Dry	25-Jun-02 04:07	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	01-Jul-02 20:04	ELS
Naphthalene	U	82.	ug/kg Dry	01-Jul-02 20:04	ELS
Acenaphthene	U	67.	ug/kg	01-Jul-02 20:04	ELS
Acenaphthene	U	82.	ug/kg Dry	01-Jul-02 20:04	ELS
Acenaphthylene	U	67.	ug/kg	01-Jul-02 20:04	ELS
Acenaphthylene	U	82.	ug/kg Dry	01-Jul-02 20:04	ELS
Fluorene	U	67.	ug/kg	01-Jul-02 20:04	ELS
Fluorene	U	82.	ug/kg Dry	01-Jul-02 20:04	ELS
Phenanthrene	U	67.	ug/kg	01-Jul-02 20:04	ELS
Phenanthrene	U	82.	ug/kg Dry	01-Jul-02 20:04	ELS
Anthracene	U	67.	ug/kg	01-Jul-02 20:04	ELS
Anthracene	U	82.	ug/kg Dry	01-Jul-02 20:04	ELS
Fluoranthene	U	6.7	ug/kg	01-Jul-02 20:04	ELS
Fluoranthene	U	8.2	ug/kg Dry	01-Jul-02 20:04	ELS
Pyrene	U	6.7	ug/kg	01-Jul-02 20:04	ELS
Pyrene	U	8.2	ug/kg Dry	01-Jul-02 20:04	ELS

000026

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	U	6.7	ug/kg	01-Jul-02 20:04	ELS
Benzo(a)Anthracene	U	8.2	ug/kg Dry	01-Jul-02 20:04	ELS
Chrysene	U	6.7	ug/kg	01-Jul-02 20:04	ELS
Chrysene	U	8.2	ug/kg Dry	01-Jul-02 20:04	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	01-Jul-02 20:04	ELS
Benzo(b)Fluoranthene	U	8.2	ug/kg Dry	01-Jul-02 20:04	ELS
Benzo(k)Fluoranthene	U	3.4	ug/kg	01-Jul-02 20:04	ELS
Benzo(k)Fluoranthene	U	4.1	ug/kg Dry	01-Jul-02 20:04	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	01-Jul-02 20:04	ELS
Benzo(a)Pyrene	U	8.2	ug/kg Dry	01-Jul-02 20:04	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	01-Jul-02 20:04	ELS
Dibenz(a,h)Anthracene	U	8.2	ug/kg Dry	01-Jul-02 20:04	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	01-Jul-02 20:04	ELS
Benzo(g,h,i)Perylene	U	8.2	ug/kg Dry	01-Jul-02 20:04	ELS
Indeno(1,2,3-cd)Pyrene	U	6.7	ug/kg	01-Jul-02 20:04	ELS
Indeno(1,2,3-cd)Pyrene	U	8.2	ug/kg Dry	01-Jul-02 20:04	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	01-Jul-02 14:25	AJB
Vinyl Chloride	U	12.	ug/kg Dry	01-Jul-02 14:25	AJB
Bromomethane	U	10.	ug/kg	01-Jul-02 14:25	AJB
Bromomethane	U	12.	ug/kg Dry	01-Jul-02 14:25	AJB
Methylene Chloride	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Methylene Chloride	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 14:25	AJB
cis-1,3-Dichloropropene	U	2.4	ug/kg Dry	01-Jul-02 14:25	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 14:25	AJB
trans-1,3-Dichloropropene	U	2.4	ug/kg Dry	01-Jul-02 14:25	AJB
Carbon Disulfide	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Carbon Disulfide	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Acetone		70.	ug/kg	01-Jul-02 14:25	AJB
Acetone		85.	ug/kg Dry	01-Jul-02 14:25	AJB
1,1-Dichloroethene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
1,1-Dichloroethene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB

000027

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	01-Jul-02 14:25	AJB
1,1-Dichloroethane	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
trans-1,2-Dichloroethene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
cis-1,2-Dichloroethene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Chloroform	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Chloroform	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
1,2-Dichloroethane	U	5.0	ug/kg	01-Jul-02 14:25	AJB
1,2-Dichloroethane	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	01-Jul-02 14:25	AJB
1,1,1-Trichloroethane	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Carbon Tetrachloride	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Carbon Tetrachloride	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Vinyl Acetate	U	10.	ug/kg	01-Jul-02 14:25	AJB
Vinyl Acetate	U	12.	ug/kg Dry	01-Jul-02 14:25	AJB
Bromodichloromethane	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Bromodichloromethane	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
1,2-Dichloropropane	U	5.0	ug/kg	01-Jul-02 14:25	AJB
1,2-Dichloropropane	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Trichloroethene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Trichloroethene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Dibromochloromethane	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Dibromochloromethane	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	01-Jul-02 14:25	AJB
1,1,2-Trichloroethane	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Benzene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Benzene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
1,2-Dibromoethane	U	0.42	ug/kg	01-Jul-02 14:25	AJB
1,2-Dibromoethane	U	0.51	ug/kg Dry	01-Jul-02 14:25	AJB
Bromoform	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Bromoform	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Tetrachloroethene	U	5.0	ug/kg	01-Jul-02 14:25	AJB

000028

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Toluene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Toluene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Chlorobenzene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Chlorobenzene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
Ethylbenzene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Ethylbenzene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	01-Jul-02 14:25	AJB
1,2-Dibromo-3-chloropropane	U	0.67	ug/kg Dry	01-Jul-02 14:25	AJB
Styrene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
Styrene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
m,p-Xylene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
m,p-Xylene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
o-Xylene	U	5.0	ug/kg	01-Jul-02 14:25	AJB
o-Xylene	U	6.1	ug/kg Dry	01-Jul-02 14:25	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	24-Jun-02 20:18	CAH
N-Nitrosodimethylamine	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Pyridine	U	330	ug/kg	24-Jun-02 20:18	CAH
Pyridine	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Aniline	U	330	ug/kg	24-Jun-02 20:18	CAH
Aniline	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	24-Jun-02 20:18	CAH
bis(2-Chloroethyl) Ether	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2-Chlorophenol	U	330	ug/kg	24-Jun-02 20:18	CAH
2-Chlorophenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Phenol	U	330	ug/kg	24-Jun-02 20:18	CAH
Phenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
1,3-Dichlorobenzene	U	330	ug/kg	24-Jun-02 20:18	CAH
1,3-Dichlorobenzene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
1,4-Dichlorobenzene	U	330	ug/kg	24-Jun-02 20:18	CAH
1,4-Dichlorobenzene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
1,2-Dichlorobenzene	U	330	ug/kg	24-Jun-02 20:18	CAH

000029

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Benzyl Alcohol	U	330	ug/kg	24-Jun-02 20:18	CAH
Benzyl Alcohol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	24-Jun-02 20:18	CAH
Bis(2-chloroisopropyl)ether	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Hexachloroethane	U	330	ug/kg	24-Jun-02 20:18	CAH
Hexachloroethane	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2-Methylphenol	U	330	ug/kg	24-Jun-02 20:18	CAH
2-Methylphenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	24-Jun-02 20:18	CAH
N-Nitroso-di-n-propylamine	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
4-Methylphenol	U	330	ug/kg	24-Jun-02 20:18	CAH
4-Methylphenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Nitrobenzene	U	330	ug/kg	24-Jun-02 20:18	CAH
Nitrobenzene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Isophorone	U	330	ug/kg	24-Jun-02 20:18	CAH
Isophorone	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2-Nitrophenol	U	1600	ug/kg	24-Jun-02 20:18	CAH
2-Nitrophenol	U	2000	ug/kg Dry	24-Jun-02 20:18	CAH
2,4-Dimethylphenol	U	330	ug/kg	24-Jun-02 20:18	CAH
2,4-Dimethylphenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	24-Jun-02 20:18	CAH
bis(2-Chloroethoxy)methane	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2,4-Dichlorophenol	U	330	ug/kg	24-Jun-02 20:18	CAH
2,4-Dichlorophenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	24-Jun-02 20:18	CAH
1,2,4-Trichlorobenzene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Naphthalene	U	330	ug/kg	24-Jun-02 20:18	CAH
Naphthalene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2,6-Dichlorophenol	U	330	ug/kg	24-Jun-02 20:18	CAH
2,6-Dichlorophenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
4-Chloroaniline	U	330	ug/kg	24-Jun-02 20:18	CAH
4-Chloroaniline	U	400	ug/kg Dry	24-Jun-02 20:18	CAH

000030

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	24-Jun-02 20:18	CAH
Hexachlorobutadiene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	24-Jun-02 20:18	CAH
4-Chloro-3-Methylphenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2-Methylnaphthalene	U	330	ug/kg	24-Jun-02 20:18	CAH
2-Methylnaphthalene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	24-Jun-02 20:18	CAH
Hexachlorocyclopentadiene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	24-Jun-02 20:18	CAH
2,4,6-Trichlorophenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	24-Jun-02 20:18	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	24-Jun-02 20:18	CAH
2-Chloronaphthalene	U	330	ug/kg	24-Jun-02 20:18	CAH
2-Chloronaphthalene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2-Nitroaniline	U	1600	ug/kg	24-Jun-02 20:18	CAH
2-Nitroaniline	U	2000	ug/kg Dry	24-Jun-02 20:18	CAH
Dimethylphthalate	U	330	ug/kg	24-Jun-02 20:18	CAH
Dimethylphthalate	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Acenaphthylene	U	330	ug/kg	24-Jun-02 20:18	CAH
Acenaphthylene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2,6-Dinitrotoluene	U	330	ug/kg	24-Jun-02 20:18	CAH
2,6-Dinitrotoluene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
3-Nitroaniline	U	1600	ug/kg	24-Jun-02 20:18	CAH
3-Nitroaniline	U	2000	ug/kg Dry	24-Jun-02 20:18	CAH
Acenaphthene	U	330	ug/kg	24-Jun-02 20:18	CAH
Acenaphthene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2,4-Dinitrophenol	U	1600	ug/kg	24-Jun-02 20:18	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	24-Jun-02 20:18	CAH
Dibenzofuran	U	330	ug/kg	24-Jun-02 20:18	CAH
Dibenzofuran	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
2,4-Dinitrotoluene	U	330	ug/kg	24-Jun-02 20:18	CAH
2,4-Dinitrotoluene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
4-Nitrophenol	U	1600	ug/kg	24-Jun-02 20:18	CAH

000031

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2000	ug/kg Dry	24-Jun-02 20:18	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	24-Jun-02 20:18	CAH
2,3,4,6-Tetrachlorophenol	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Diethylphthalate	U	330	ug/kg	24-Jun-02 20:18	CAH
Diethylphthalate	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Fluorene	U	330	ug/kg	24-Jun-02 20:18	CAH
Fluorene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	24-Jun-02 20:18	CAH
4-Chlorophenyl-phenyl Ether	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
4-Nitroaniline	U	1600	ug/kg	24-Jun-02 20:18	CAH
4-Nitroaniline	U	2000	ug/kg Dry	24-Jun-02 20:18	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	24-Jun-02 20:18	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	24-Jun-02 20:18	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	24-Jun-02 20:18	CAH
N-Nitrosodiphenylamine	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	24-Jun-02 20:18	CAH
4-Bromophenyl-phenylether	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Hexachlorobenzene	U	330	ug/kg	24-Jun-02 20:18	CAH
Hexachlorobenzene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Pentachlorophenol	U	1600	ug/kg	24-Jun-02 20:18	CAH
Pentachlorophenol	U	2000	ug/kg Dry	24-Jun-02 20:18	CAH
Carbazole	U	330	ug/kg	24-Jun-02 20:18	CAH
Carbazole	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Phenanthrene	U	330	ug/kg	24-Jun-02 20:18	CAH
Phenanthrene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Anthracene	J	37.	ug/kg	24-Jun-02 20:18	CAH
Anthracene	J	45.	ug/kg Dry	24-Jun-02 20:18	CAH
Di-n-Butylphthalate	U	330	ug/kg	24-Jun-02 20:18	CAH
Di-n-Butylphthalate	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Fluoranthene	U	330	ug/kg	24-Jun-02 20:18	CAH
Fluoranthene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Pyrene	U	330	ug/kg	24-Jun-02 20:18	CAH
Pyrene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH

000032

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-2
Client ID: SOILS
Site: B-1-3
Locator: GRAB
Collect Date: 18-JUN-02 11:15

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	24-Jun-02 20:18	CAH
Butylbenzylphthalate	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Benzo(a)anthracene	U	330	ug/kg	24-Jun-02 20:18	CAH
Benzo(a)anthracene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	24-Jun-02 20:18	CAH
3,3'-Dichlorobenzidine	U	800	ug/kg Dry	24-Jun-02 20:18	CAH
Chrysene	U	330	ug/kg	24-Jun-02 20:18	CAH
Chrysene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	24-Jun-02 20:18	CAH
bis(2-Ethylhexyl)phthalate	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Di-n-octylphthalate	U	330	ug/kg	24-Jun-02 20:18	CAH
Di-n-octylphthalate	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Benzo(b)fluoranthene	U	330	ug/kg	24-Jun-02 20:18	CAH
Benzo(b)fluoranthene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Benzo(k)fluoranthene	U	330	ug/kg	24-Jun-02 20:18	CAH
Benzo(k)fluoranthene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Benzo(a)pyrene	U	330	ug/kg	24-Jun-02 20:18	CAH
Benzo(a)pyrene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	24-Jun-02 20:18	CAH
Indeno(1,2,3-cd)pyrene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	24-Jun-02 20:18	CAH
Dibenzo(a,h)anthracene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	24-Jun-02 20:18	CAH
Benzo(g,h,i)perylene	U	400	ug/kg Dry	24-Jun-02 20:18	CAH

000033

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	24-Jun-02 10:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	24-Jun-02 10:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.62	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		20.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		7.30	units	24-Jun-02 12:28	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	J	100	mg/kg	02-Jul-02 09:00	TAC
Silica Gel Treated - HEM	J	120	mg/kg Dry	02-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 1051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				20-Jun-02 12:00	DWK
Final pH		5.100		20-Jun-02 12:00	DWK
SW-846 METHOD 6010B					
Silver	J	0.26	mg/kg	27-Jun-02 09:31	DWK
Silver	J	0.32	mg/kg Dry	27-Jun-02 09:31	DWK
Silver, TCLP •	U	0.050	mg/l	28-Jun-02 09:43	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		5400	mg/kg	27-Jun-02 09:31	DWK
Aluminum		6800	mg/kg Dry	27-Jun-02 09:31	DWK
Arsenic		4.0	mg/kg	27-Jun-02 09:31	DWK
Arsenic		5.0	mg/kg Dry	27-Jun-02 09:31	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 09:43	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

00003

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
Barium		98.	mg/kg	27-Jun-02 09:31	DWK
Barium		120	mg/kg Dry	27-Jun-02 09:31	DWK
Barium, TCLP	J	1.6	mg/l	28-Jun-02 09:43	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.32	mg/kg	27-Jun-02 09:31	DWK
Beryllium	J	0.40	mg/kg Dry	27-Jun-02 09:31	DWK
Calcium		5200	mg/kg	27-Jun-02 09:31	DWK
Calcium		6500	mg/kg Dry	27-Jun-02 09:31	DWK
Cadmium		1.1	mg/kg	27-Jun-02 09:31	DWK
Cadmium		1.4	mg/kg Dry	27-Jun-02 09:31	DWK
Cadmium, TCLP		0.010	mg/l	28-Jun-02 09:43	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		3.8	mg/kg	27-Jun-02 09:31	DWK
Cobalt		4.8	mg/kg Dry	27-Jun-02 09:31	DWK
Chromium		10.	mg/kg	27-Jun-02 09:31	DWK
Chromium		12.	mg/kg Dry	27-Jun-02 09:31	DWK
Chromium, TCLP	J	0.0012	mg/l	28-Jun-02 09:43	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		190	mg/kg	27-Jun-02 09:31	DWK
Copper		240	mg/kg Dry	27-Jun-02 09:31	DWK
Iron		9500	mg/kg	27-Jun-02 09:31	DWK
Iron		12000	mg/kg Dry	27-Jun-02 09:31	DWK
Potassium		870	mg/kg	27-Jun-02 09:31	DWK
Potassium		1100	mg/kg Dry	27-Jun-02 09:31	DWK
Magnesium		2000	mg/kg	27-Jun-02 09:31	DWK
Magnesium		2500	mg/kg Dry	27-Jun-02 09:31	DWK
Manganese		250	mg/kg	27-Jun-02 09:31	DWK
Manganese		310	mg/kg Dry	27-Jun-02 09:31	DWK
Sodium	J	77.	mg/kg	27-Jun-02 09:31	DWK
Sodium	J	96.	mg/kg Dry	27-Jun-02 09:31	DWK
Nickel		12.	mg/kg	27-Jun-02 09:31	DWK
Nickel		15.	mg/kg Dry	27-Jun-02 09:31	DWK
Lead		120	mg/kg	27-Jun-02 09:31	DWK

000035

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
Lead		150	mg/kg Dry	27-Jun-02 09:31	DWK
Lead, TCLP		0.043	mg/l	28-Jun-02 09:43	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 09:31	DWK
Antimony	U	2.5	mg/kg Dry	27-Jun-02 09:31	DWK
Selenium	J	0.50	mg/kg	27-Jun-02 09:31	DWK
Selenium	J	0.62	mg/kg Dry	27-Jun-02 09:31	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 09:43	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.38	mg/kg	27-Jun-02 09:31	DWK
Thallium	J	0.48	mg/kg Dry	27-Jun-02 09:31	DWK
Vanadium		11.	mg/kg	27-Jun-02 09:31	DWK
Vanadium		14.	mg/kg Dry	27-Jun-02 09:31	DWK
Zinc		220	mg/kg	27-Jun-02 09:31	DWK
Zinc		280	mg/kg Dry	27-Jun-02 09:31	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 08:45	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury		0.054	mg/kg	20-Jun-02 12:00	ERS
Mercury		0.068	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	19-Jul-02 23:28	AMG
alpha-BHC	U	100	ug/kg Dry	19-Jul-02 23:28	AMG
gamma-BHC (Lindane)	U	80.	ug/kg	19-Jul-02 23:28	AMG
gamma-BHC (Lindane)	U	100	ug/kg Dry	19-Jul-02 23:28	AMG

00003

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	19-Jul-02 23:28	AMG
beta-BHC	U	100	ug/kg Dry	19-Jul-02 23:28	AMG
Heptachlor	J	3.0	ug/kg	19-Jul-02 23:28	AMG
Heptachlor	J	3.8	ug/kg Dry	19-Jul-02 23:28	AMG
delta-BHC	U	80.	ug/kg	19-Jul-02 23:28	AMG
delta-BHC	U	100	ug/kg Dry	19-Jul-02 23:28	AMG
Aldrin	U	80.	ug/kg	19-Jul-02 23:28	AMG
Aldrin	U	100	ug/kg Dry	19-Jul-02 23:28	AMG
Heptachlor Epoxide	J	53.	ug/kg	19-Jul-02 23:28	AMG
Heptachlor Epoxide	J	66.	ug/kg Dry	19-Jul-02 23:28	AMG
Endosulfan I	U	80.	ug/kg	19-Jul-02 23:28	AMG
Endosulfan I	U	100	ug/kg Dry	19-Jul-02 23:28	AMG
4,4'-DDE	J	10.	ug/kg	19-Jul-02 23:28	AMG
4,4'-DDE	J	12.	ug/kg Dry	19-Jul-02 23:28	AMG
Dieldrin	U	160	ug/kg	19-Jul-02 23:28	AMG
Dieldrin	U	200	ug/kg Dry	19-Jul-02 23:28	AMG
Endrin	U	160	ug/kg	19-Jul-02 23:28	AMG
Endrin	U	200	ug/kg Dry	19-Jul-02 23:28	AMG
4,4'-DDD	J	29.	ug/kg	19-Jul-02 23:28	AMG
4,4'-DDD	J	36.	ug/kg Dry	19-Jul-02 23:28	AMG
Endosulfan II	U	160	ug/kg	19-Jul-02 23:28	AMG
Endosulfan II	U	200	ug/kg Dry	19-Jul-02 23:28	AMG
4,4'-DDT	U	160	ug/kg	19-Jul-02 23:28	AMG
4,4'-DDT	U	200	ug/kg Dry	19-Jul-02 23:28	AMG
Endrin Aldehyde	U	160	ug/kg	19-Jul-02 23:28	AMG
Endrin Aldehyde	U	200	ug/kg Dry	19-Jul-02 23:28	AMG
Endosulfan Sulfate	U	160	ug/kg	19-Jul-02 23:28	AMG
Endosulfan Sulfate	U	200	ug/kg Dry	19-Jul-02 23:28	AMG
Methoxychlor	U	800	ug/kg	19-Jul-02 23:28	AMG
Methoxychlor	U	1000	ug/kg Dry	19-Jul-02 23:28	AMG
Toxaphene	U	800	ug/kg	19-Jul-02 23:28	AMG
Toxaphene	U	1000	ug/kg Dry	19-Jul-02 23:28	AMG
Chlordane (technical)	U	1600	ug/kg	19-Jul-02 23:28	AMG

000037

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	19-Jul-02 23:28	AMG
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 11:50	AMR
Aroclor 1016	U	100	ug/kg Dry	25-Jun-02 11:50	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 11:50	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 11:50	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 11:50	AMR
Aroclor 1232	U	100	ug/kg Dry	25-Jun-02 11:50	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 11:50	AMR
Aroclor 1242	U	100	ug/kg Dry	25-Jun-02 11:50	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 11:50	AMR
Aroclor 1248	U	100	ug/kg Dry	25-Jun-02 11:50	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 11:50	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 11:50	AMR
SW-846 METHOD 8082					
Aroclor 1260		1800	ug/kg	17-Jul-02 01:47	AMR
Aroclor 1260		2200	ug/kg Dry	17-Jul-02 01:47	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	01-Jul-02 20:37	ELS
Naphthalene	U	84.	ug/kg Dry	01-Jul-02 20:37	ELS
Acenaphthene	U	67.	ug/kg	01-Jul-02 20:37	ELS
Acenaphthene	U	84.	ug/kg Dry	01-Jul-02 20:37	ELS
Acenaphthylene	U	67.	ug/kg	01-Jul-02 20:37	ELS
Acenaphthylene	U	84.	ug/kg Dry	01-Jul-02 20:37	ELS
Fluorene	U	67.	ug/kg	01-Jul-02 20:37	ELS
Fluorene	U	84.	ug/kg Dry	01-Jul-02 20:37	ELS
Phenanthrene	U	67.	ug/kg	01-Jul-02 20:37	ELS
Phenanthrene	U	84.	ug/kg Dry	01-Jul-02 20:37	ELS
Anthracene	U	67.	ug/kg	01-Jul-02 20:37	ELS
Anthracene	U	84.	ug/kg Dry	01-Jul-02 20:37	ELS
Fluoranthene	U	6.7	ug/kg	01-Jul-02 20:37	ELS
Fluoranthene	U	8.4	ug/kg Dry	01-Jul-02 20:37	ELS
Pyrene	U	6.7	ug/kg	01-Jul-02 20:37	ELS

000032

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
Pyrene	U	8.4	ug/kg Dry	01-Jul-02 20:37	ELS
Benzo(a)Anthracene	U	6.7	ug/kg	01-Jul-02 20:37	ELS
Benzo(a)Anthracene	U	8.4	ug/kg Dry	01-Jul-02 20:37	ELS
Chrysene	U	6.7	ug/kg	01-Jul-02 20:37	ELS
Chrysene	U	8.4	ug/kg Dry	01-Jul-02 20:37	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	01-Jul-02 20:37	ELS
Benzo(b)Fluoranthene	U	8.4	ug/kg Dry	01-Jul-02 20:37	ELS
Benzo(k)Fluoranthene	U	3.4	ug/kg	01-Jul-02 20:37	ELS
Benzo(k)Fluoranthene	U	4.2	ug/kg Dry	01-Jul-02 20:37	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	01-Jul-02 20:37	ELS
Benzo(a)Pyrene	U	8.4	ug/kg Dry	01-Jul-02 20:37	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	01-Jul-02 20:37	ELS
Dibenz(a,h)Anthracene	U	8.4	ug/kg Dry	01-Jul-02 20:37	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	01-Jul-02 20:37	ELS
Benzo(g,h,i)Perylene	U	8.4	ug/kg Dry	01-Jul-02 20:37	ELS
Indeno(1,2,3-cd)Pyrene	U	6.7	ug/kg	01-Jul-02 20:37	ELS
Indeno(1,2,3-cd)Pyrene	U	8.4	ug/kg Dry	01-Jul-02 20:37	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	01-Jul-02 15:01	AJB
Vinyl Chloride	U	12.	ug/kg Dry	01-Jul-02 15:01	AJB
Bromomethane	U	10.	ug/kg	01-Jul-02 15:01	AJB
Bromomethane	U	12.	ug/kg Dry	01-Jul-02 15:01	AJB
Methylene Chloride	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Methylene Chloride	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 15:01	AJB
cis-1,3-Dichloropropene	U	2.5	ug/kg Dry	01-Jul-02 15:01	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 15:01	AJB
trans-1,3-Dichloropropene	U	2.5	ug/kg Dry	01-Jul-02 15:01	AJB
Carbon Disulfide	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Carbon Disulfide	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Acetone		93.	ug/kg	01-Jul-02 15:01	AJB
Acetone		120	ug/kg Dry	01-Jul-02 15:01	AJB
1,1-Dichloroethene	U	5.0	ug/kg	01-Jul-02 15:01	AJB

000039

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
1,1-Dichloroethene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
1,1-Dichloroethane	U	5.0	ug/kg	01-Jul-02 15:01	AJB
1,1-Dichloroethane	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
trans-1,2-Dichloroethene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
cis-1,2-Dichloroethene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Chloroform	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Chloroform	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
1,2-Dichloroethane	U	5.0	ug/kg	01-Jul-02 15:01	AJB
1,2-Dichloroethane	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	01-Jul-02 15:01	AJB
1,1,1-Trichloroethane	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Carbon Tetrachloride	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Carbon Tetrachloride	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Vinyl Acetate	U	10.	ug/kg	01-Jul-02 15:01	AJB
Vinyl Acetate	U	12.	ug/kg Dry	01-Jul-02 15:01	AJB
Bromodichloromethane	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Bromodichloromethane	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
1,2-Dichloropropane	U	5.0	ug/kg	01-Jul-02 15:01	AJB
1,2-Dichloropropane	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Trichloroethene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Trichloroethene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Dibromochloromethane	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Dibromochloromethane	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	01-Jul-02 15:01	AJB
1,1,2-Trichloroethane	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Benzene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Benzene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
1,2-Dibromoethane	U	0.42	ug/kg	01-Jul-02 15:01	AJB
1,2-Dibromoethane	U	0.52	ug/kg Dry	01-Jul-02 15:01	AJB
Bromoform	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Bromoform	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB

000040

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
Tetrachloroethene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Tetrachloroethene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Toluene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Toluene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Chlorobenzene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Chlorobenzene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
Ethylbenzene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Ethylbenzene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	01-Jul-02 15:01	AJB
1,2-Dibromo-3-chloropropane	U	0.69	ug/kg Dry	01-Jul-02 15:01	AJB
Styrene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
Styrene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
m,p-Xylene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
m,p-Xylene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
o-Xylene	U	5.0	ug/kg	01-Jul-02 15:01	AJB
o-Xylene	U	6.2	ug/kg Dry	01-Jul-02 15:01	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	28-Jun-02 16:16	CAH
N-Nitrosodimethylamine	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Pyridine	U	330	ug/kg	28-Jun-02 16:16	CAH
Pyridine	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Aniline	U	330	ug/kg	28-Jun-02 16:16	CAH
Aniline	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	28-Jun-02 16:16	CAH
bis(2-Chloroethyl) Ether	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2-Chlorophenol	U	330	ug/kg	28-Jun-02 16:16	CAH
2-Chlorophenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Phenol	U	330	ug/kg	28-Jun-02 16:16	CAH
Phenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
1,3-Dichlorobenzene	U	330	ug/kg	28-Jun-02 16:16	CAH
1,3-Dichlorobenzene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
1,4-Dichlorobenzene	U	330	ug/kg	28-Jun-02 16:16	CAH
1,4-Dichlorobenzene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	330	ug/kg	28-Jun-02 16:16	CAH
1,2-Dichlorobenzene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Benzyl Alcohol	U	330	ug/kg	28-Jun-02 16:16	CAH
Benzyl Alcohol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	28-Jun-02 16:16	CAH
Bis(2-chloroisopropyl)ether	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Hexachloroethane	U	330	ug/kg	28-Jun-02 16:16	CAH
Hexachloroethane	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2-Methylphenol	U	330	ug/kg	28-Jun-02 16:16	CAH
2-Methylphenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	28-Jun-02 16:16	CAH
N-Nitroso-di-n-propylamine	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
4-Methylphenol	U	330	ug/kg	28-Jun-02 16:16	CAH
4-Methylphenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Nitrobenzene	U	330	ug/kg	28-Jun-02 16:16	CAH
Nitrobenzene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Isophorone	U	330	ug/kg	28-Jun-02 16:16	CAH
Isophorone	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2-Nitrophenol	U	1600	ug/kg	28-Jun-02 16:16	CAH
2-Nitrophenol	U	2000	ug/kg Dry	28-Jun-02 16:16	CAH
2,4-Dimethylphenol	U	330	ug/kg	28-Jun-02 16:16	CAH
2,4-Dimethylphenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	28-Jun-02 16:16	CAH
bis(2-Chloroethoxy)methane	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2,4-Dichlorophenol	U	330	ug/kg	28-Jun-02 16:16	CAH
2,4-Dichlorophenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	28-Jun-02 16:16	CAH
1,2,4-Trichlorobenzene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Naphthalene	U	330	ug/kg	28-Jun-02 16:16	CAH
Naphthalene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2,6-Dichlorophenol	U	330	ug/kg	28-Jun-02 16:16	CAH
2,6-Dichlorophenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
4-Chloroaniline	U	330	ug/kg	28-Jun-02 16:16	CAH

000042

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
4-Chloroaniline	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Hexachlorobutadiene	U	330	ug/kg	28-Jun-02 16:16	CAH
Hexachlorobutadiene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	28-Jun-02 16:16	CAH
4-Chloro-3-Methylphenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2-Methylnaphthalene	U	330	ug/kg	28-Jun-02 16:16	CAH
2-Methylnaphthalene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	28-Jun-02 16:16	CAH
Hexachlorocyclopentadiene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	28-Jun-02 16:16	CAH
2,4,6-Trichlorophenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	28-Jun-02 16:16	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	28-Jun-02 16:16	CAH
2-Chloronaphthalene	U	330	ug/kg	28-Jun-02 16:16	CAH
2-Chloronaphthalene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2-Nitroaniline	U	1600	ug/kg	28-Jun-02 16:16	CAH
2-Nitroaniline	U	2000	ug/kg Dry	28-Jun-02 16:16	CAH
Dimethylphthalate	U	330	ug/kg	28-Jun-02 16:16	CAH
Dimethylphthalate	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Acenaphthylene	U	330	ug/kg	28-Jun-02 16:16	CAH
Acenaphthylene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2,6-Dinitrotoluene	U	330	ug/kg	28-Jun-02 16:16	CAH
2,6-Dinitrotoluene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
3-Nitroaniline	U	1600	ug/kg	28-Jun-02 16:16	CAH
3-Nitroaniline	U	2000	ug/kg Dry	28-Jun-02 16:16	CAH
Acenaphthene	U	330	ug/kg	28-Jun-02 16:16	CAH
Acenaphthene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2,4-Dinitrophenol	U	1600	ug/kg	28-Jun-02 16:16	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	28-Jun-02 16:16	CAH
Dibenzofuran	U	330	ug/kg	28-Jun-02 16:16	CAH
Dibenzofuran	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
2,4-Dinitrotoluene	U	330	ug/kg	28-Jun-02 16:16	CAH
2,4-Dinitrotoluene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH

000043

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
4-Nitrophenol	U	1600	ug/kg	28-Jun-02 16:16	CAH
4-Nitrophenol	U	2000	ug/kg Dry	28-Jun-02 16:16	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	28-Jun-02 16:16	CAH
2,3,4,6-Tetrachlorophenol	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Diethylphthalate	U	330	ug/kg	28-Jun-02 16:16	CAH
Diethylphthalate	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Fluorene	U	330	ug/kg	28-Jun-02 16:16	CAH
Fluorene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	28-Jun-02 16:16	CAH
4-Chlorophenyl-phenyl Ether	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
4-Nitroaniline	U	1600	ug/kg	28-Jun-02 16:16	CAH
4-Nitroaniline	U	2000	ug/kg Dry	28-Jun-02 16:16	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	28-Jun-02 16:16	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	28-Jun-02 16:16	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	28-Jun-02 16:16	CAH
N-Nitrosodiphenylamine	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	28-Jun-02 16:16	CAH
4-Bromophenyl-phenylether	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Hexachlorobenzene	U	330	ug/kg	28-Jun-02 16:16	CAH
Hexachlorobenzene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Pentachlorophenol	U	1600	ug/kg	28-Jun-02 16:16	CAH
Pentachlorophenol	U	2000	ug/kg Dry	28-Jun-02 16:16	CAH
Carbazole	U	330	ug/kg	28-Jun-02 16:16	CAH
Carbazole	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Phenanthrene	U	330	ug/kg	28-Jun-02 16:16	CAH
Phenanthrene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Anthracene	U	330	ug/kg	28-Jun-02 16:16	CAH
Anthracene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Di-n-Butylphthalate	U	330	ug/kg	28-Jun-02 16:16	CAH
Di-n-Butylphthalate	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Fluoranthene	J	60.	ug/kg	28-Jun-02 16:16	CAH
Fluoranthene	J	75.	ug/kg Dry	28-Jun-02 16:16	CAH
Pyrene	J	54.	ug/kg	28-Jun-02 16:16	CAH

000044

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-3
Client ID: SOILS
Site: B-2-1
Locator: GRAB
Collect Date: 18-JUN-02 12:05

Parameter		Result	Units	Date	By
Pyrene	J	68.	ug/kg Dry	28-Jun-02 16:16	CAH
Butylbenzylphthalate	U	330	ug/kg	28-Jun-02 16:16	CAH
Butylbenzylphthalate	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Benzo(a)anthracene	J	42.	ug/kg	28-Jun-02 16:16	CAH
Benzo(a)anthracene	J	52.	ug/kg Dry	28-Jun-02 16:16	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	28-Jun-02 16:16	CAH
3,3'-Dichlorobenzidine	U	820	ug/kg Dry	28-Jun-02 16:16	CAH
Chrysene	J	53.	ug/kg	28-Jun-02 16:16	CAH
Chrysene	J	66.	ug/kg Dry	28-Jun-02 16:16	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	28-Jun-02 16:16	CAH
bis(2-Ethylhexyl)phthalate	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Di-n-octylphthalate	U	330	ug/kg	28-Jun-02 16:16	CAH
Di-n-octylphthalate	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Benzo(b)fluoranthene	U	330	ug/kg	28-Jun-02 16:16	CAH
Benzo(b)fluoranthene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Benzo(k)fluoranthene	U	330	ug/kg	28-Jun-02 16:16	CAH
Benzo(k)fluoranthene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Benzo(a)pyrene	U	330	ug/kg	28-Jun-02 16:16	CAH
Benzo(a)pyrene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	28-Jun-02 16:16	CAH
Indeno(1,2,3-cd)pyrene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	28-Jun-02 16:16	CAH
Dibenzo(a,h)anthracene	U	410	ug/kg Dry	28-Jun-02 16:16	CAH
Benzo(g,h,i)perylene	J	38.	ug/kg	28-Jun-02 16:16	CAH
Benzo(g,h,i)perylene	J	48.	ug/kg Dry	28-Jun-02 16:16	CAH

000045

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	24-Jun-02 10:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	24-Jun-02 10:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JI
Chromium, Hexavalent	U	0.61	mg/kg Dry	20-Jun-02 15:30	TIN/JI
SM METHOD 2540 B					
Moisture		18.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		6.69	units	24-Jun-02 14:36	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	J	150	mg/kg	02-Jul-02 09:00	T
Silica Gel Treated - HEM	J	180	mg/kg Dry	02-Jul-02 09:00	T
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				20-Jun-02 12:00	DWK
Final pH		4.970		20-Jun-02 12:00	DWK
SW-846 METHOD 6010B					
Silver	J	0.18	mg/kg	27-Jun-02 09:37	DWK
Silver	J	0.22	mg/kg Dry	27-Jun-02 09:37	DWK
Silver, TCLP	U	0.050	mg/l	28-Jun-02 10:59	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		9500	mg/kg	27-Jun-02 09:37	DWK
Aluminum		12000	mg/kg Dry	27-Jun-02 09:37	DWK
Arsenic		6.0	mg/kg	27-Jun-02 09:37	DWK
Arsenic		7.3	mg/kg Dry	27-Jun-02 09:37	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 10:59	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

X: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

00007

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
Barium		160	mg/kg	27-Jun-02 09:37	DWK
Barium		200	mg/kg Dry	27-Jun-02 09:37	DWK
Barium, TCLP	J	1.3	mg/l	28-Jun-02 10:59	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.32	mg/kg	27-Jun-02 09:37	DWK
Beryllium	J	0.39	mg/kg Dry	27-Jun-02 09:37	DWK
Calcium		3400	mg/kg	27-Jun-02 09:37	DWK
Calcium		4100	mg/kg Dry	27-Jun-02 09:37	DWK
Cadmium		1.9	mg/kg	27-Jun-02 09:37	DWK
Cadmium		2.3	mg/kg Dry	27-Jun-02 09:37	DWK
Cadmium, TCLP		0.0058	mg/l	28-Jun-02 10:59	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		4.8	mg/kg	27-Jun-02 09:37	DWK
Cobalt		5.8	mg/kg Dry	27-Jun-02 09:37	DWK
Chromium		16.	mg/kg	27-Jun-02 09:37	DWK
Chromium		20.	mg/kg Dry	27-Jun-02 09:37	DWK
Chromium, TCLP	J	0.0011	mg/l	28-Jun-02 10:59	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		33.	mg/kg	27-Jun-02 09:37	DWK
Copper		40.	mg/kg Dry	27-Jun-02 09:37	DWK
Iron		12000	mg/kg	27-Jun-02 09:37	DWK
Iron		15000	mg/kg Dry	27-Jun-02 09:37	DWK
Potassium		1800	mg/kg	27-Jun-02 09:37	DWK
Potassium		2200	mg/kg Dry	27-Jun-02 09:37	DWK
Magnesium		1900000	ug/kg	27-Jun-02 09:37	DWK
Magnesium		2300000	ug/kg Dry	27-Jun-02 09:37	DWK
Manganese		470	mg/kg	27-Jun-02 09:37	DWK
Manganese		570	mg/kg Dry	27-Jun-02 09:37	DWK
Sodium	J	73.	mg/kg	27-Jun-02 09:37	DWK
Sodium	J	89.	mg/kg Dry	27-Jun-02 09:37	DWK
Nickel		13.	mg/kg	27-Jun-02 09:37	DWK
Nickel		16.	mg/kg Dry	27-Jun-02 09:37	DWK
Lead		140	mg/kg	27-Jun-02 09:37	DWK

X: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

000047

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
Lead		170	mg/kg Dry	27-Jun-02 09:37	DWK
Lead, TCLP		0.015	mg/l	28-Jun-02 10:59	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 09:37	DWK
Antimony	U	2.4	mg/kg Dry	27-Jun-02 09:37	DWK
Selenium	J	0.60	mg/kg	27-Jun-02 09:37	DWK
Selenium	J	0.73	mg/kg Dry	27-Jun-02 09:37	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 10:59	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.48	mg/kg	27-Jun-02 09:37	DWK
Thallium	J	0.58	mg/kg Dry	27-Jun-02 09:37	DWK
Vanadium		21.	mg/kg	27-Jun-02 09:37	DWK
Vanadium		26.	mg/kg Dry	27-Jun-02 09:37	DWK
Zinc		330	mg/kg	27-Jun-02 09:37	DWK
Zinc		400	mg/kg Dry	27-Jun-02 09:37	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 08:50	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury		0.050	mg/kg	20-Jun-02 12:00	ERS
Mercury		0.061	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	17-Jul-02 11:10	AMR
alpha-BHC	U	98.	ug/kg Dry	17-Jul-02 11:10	AMR
gamma-BHC (Lindane)	U	80.	ug/kg	17-Jul-02 11:10	AMR
gamma-BHC (Lindane)	U	98.	ug/kg Dry	17-Jul-02 11:10	AMR

X: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

000049

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	17-Jul-02 11:10	AMR
beta-BHC	U	98.	ug/kg Dry	17-Jul-02 11:10	AMR
Heptachlor	U	80.	ug/kg	17-Jul-02 11:10	AMR
Heptachlor	U	98.	ug/kg Dry	17-Jul-02 11:10	AMR
delta-BHC	U	80.	ug/kg	17-Jul-02 11:10	AMR
delta-BHC	U	98.	ug/kg Dry	17-Jul-02 11:10	AMR
Aldrin	U	80.	ug/kg	17-Jul-02 11:10	AMR
Aldrin	U	98.	ug/kg Dry	17-Jul-02 11:10	AMR
Heptachlor Epoxide	U	80.	ug/kg	17-Jul-02 11:10	AMR
Heptachlor Epoxide	U	98.	ug/kg Dry	17-Jul-02 11:10	AMR
Endosulfan I	U	80.	ug/kg	17-Jul-02 11:10	AMR
Endosulfan I	U	98.	ug/kg Dry	17-Jul-02 11:10	AMR
4,4'-DDE	U,X	160	ug/kg	17-Jul-02 11:10	AMR
4,4'-DDE	U	200	ug/kg Dry	17-Jul-02 11:10	AMR
Dieldrin	U,X	160	ug/kg	17-Jul-02 11:10	AMR
Dieldrin	U	200	ug/kg Dry	17-Jul-02 11:10	AMR
Endrin	U	160	ug/kg	17-Jul-02 11:10	AMR
Endrin	U	200	ug/kg Dry	17-Jul-02 11:10	AMR
4,4'-DDD	U	160	ug/kg	17-Jul-02 11:10	AMR
4,4'-DDD	U	200	ug/kg Dry	17-Jul-02 11:10	AMR
Endosulfan II	U	160	ug/kg	17-Jul-02 11:10	AMR
Endosulfan II	U	200	ug/kg Dry	17-Jul-02 11:10	AMR
4,4'-DDT	U	160	ug/kg	17-Jul-02 11:10	AMR
4,4'-DDT	U	200	ug/kg Dry	17-Jul-02 11:10	AMR
Endrin Aldehyde	U	160	ug/kg	17-Jul-02 11:10	AMR
Endrin Aldehyde	U	200	ug/kg Dry	17-Jul-02 11:10	AMR
Endosulfan Sulfate	U	160	ug/kg	17-Jul-02 11:10	AMR
Endosulfan Sulfate	U	200	ug/kg Dry	17-Jul-02 11:10	AMR
Methoxychlor	U	800	ug/kg	17-Jul-02 11:10	AMR
Methoxychlor	U	980	ug/kg Dry	17-Jul-02 11:10	AMR
Toxaphene	U	800	ug/kg	17-Jul-02 11:10	AMR
Toxaphene	U	980	ug/kg Dry	17-Jul-02 11:10	AMR
Chlordane (technical)	U	1600	ug/kg	17-Jul-02 11:10	AMR

X: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

000043

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	17-Jul-02 11:10	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 04:42	AMR
Aroclor 1016	U	98.	ug/kg Dry	25-Jun-02 04:42	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 04:42	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 04:42	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 04:42	AMR
Aroclor 1232	U	98.	ug/kg Dry	25-Jun-02 04:42	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 04:42	AMR
Aroclor 1242	U	98.	ug/kg Dry	25-Jun-02 04:42	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 04:42	AMR
Aroclor 1248	U	98.	ug/kg Dry	25-Jun-02 04:42	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 04:42	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 04:42	AMR
Aroclor 1260	U	160	ug/kg	25-Jun-02 04:42	AMR
Aroclor 1260	U	200	ug/kg Dry	25-Jun-02 04:42	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	01-Jul-02 21:10	ELS
Naphthalene	U	82.	ug/kg Dry	01-Jul-02 21:10	ELS
Acenaphthene	J	32.	ug/kg	01-Jul-02 21:10	ELS
Acenaphthene	J	39.	ug/kg Dry	01-Jul-02 21:10	ELS
Acenaphthylene	U	67.	ug/kg	01-Jul-02 21:10	ELS
Acenaphthylene	U	82.	ug/kg Dry	01-Jul-02 21:10	ELS
Fluorene	U	67.	ug/kg	01-Jul-02 21:10	ELS
Fluorene	U	82.	ug/kg Dry	01-Jul-02 21:10	ELS
Phenanthrene	U	67.	ug/kg	01-Jul-02 21:10	ELS
Phenanthrene	U	82.	ug/kg Dry	01-Jul-02 21:10	ELS
Anthracene	U	67.	ug/kg	01-Jul-02 21:10	ELS
Anthracene	U	82.	ug/kg Dry	01-Jul-02 21:10	ELS
Fluoranthene	U	6.7	ug/kg	01-Jul-02 21:10	ELS
Fluoranthene	U	8.2	ug/kg Dry	01-Jul-02 21:10	ELS
Pyrene	U	6.7	ug/kg	01-Jul-02 21:10	ELS
Pyrene	U	8.2	ug/kg Dry	01-Jul-02 21:10	ELS

X: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

000050

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	J	3.6	ug/kg	01-Jul-02 21:10	ELS
Benzo(a)Anthracene	J	4.4	ug/kg Dry	01-Jul-02 21:10	ELS
Chrysene	U	6.7	ug/kg	01-Jul-02 21:10	ELS
Chrysene	U	8.2	ug/kg Dry	01-Jul-02 21:10	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	01-Jul-02 21:10	ELS
Benzo(b)Fluoranthene	U	8.2	ug/kg Dry	01-Jul-02 21:10	ELS
Benzo(k)Fluoranthene	J	1.5	ug/kg	01-Jul-02 21:10	ELS
Benzo(k)Fluoranthene	J	1.8	ug/kg Dry	01-Jul-02 21:10	ELS
Benzo(a)Pyrene	J	2.8	ug/kg	01-Jul-02 21:10	ELS
Benzo(a)Pyrene	J	3.4	ug/kg Dry	01-Jul-02 21:10	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	01-Jul-02 21:10	ELS
Dibenz(a,h)Anthracene	U	8.2	ug/kg Dry	01-Jul-02 21:10	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	01-Jul-02 21:10	ELS
Benzo(g,h,i)Perylene	U	8.2	ug/kg Dry	01-Jul-02 21:10	ELS
Indeno(1,2,3-cd)Pyrene	J	2.5	ug/kg	01-Jul-02 21:10	ELS
Indeno(1,2,3-cd)Pyrene	J	3.0	ug/kg Dry	01-Jul-02 21:10	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	01-Jul-02 15:37	AJB
Vinyl Chloride	U	12.	ug/kg Dry	01-Jul-02 15:37	AJB
Bromomethane	U	10.	ug/kg	01-Jul-02 15:37	AJB
Bromomethane	U	12.	ug/kg Dry	01-Jul-02 15:37	AJB
Methylene Chloride	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Methylene Chloride	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 15:37	AJB
cis-1,3-Dichloropropene	U	2.4	ug/kg Dry	01-Jul-02 15:37	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 15:37	AJB
trans-1,3-Dichloropropene	U	2.4	ug/kg Dry	01-Jul-02 15:37	AJB
Carbon Disulfide	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Carbon Disulfide	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Acetone		93.	ug/kg	01-Jul-02 15:37	AJB
Acetone		110	ug/kg Dry	01-Jul-02 15:37	AJB
1,1-Dichloroethene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
1,1-Dichloroethene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB

x: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

000051

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	01-Jul-02 15:37	AJB
1,1-Dichloroethane	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
trans-1,2-Dichloroethene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
cis-1,2-Dichloroethene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Chloroform	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Chloroform	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
1,2-Dichloroethane	U	5.0	ug/kg	01-Jul-02 15:37	AJB
1,2-Dichloroethane	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	01-Jul-02 15:37	AJB
1,1,1-Trichloroethane	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Carbon Tetrachloride	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Carbon Tetrachloride	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Vinyl Acetate	U	10.	ug/kg	01-Jul-02 15:37	AJB
Vinyl Acetate	U	12.	ug/kg Dry	01-Jul-02 15:37	AJB
Bromodichloromethane	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Bromodichloromethane	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
1,2-Dichloropropane	U	5.0	ug/kg	01-Jul-02 15:37	AJB
1,2-Dichloropropane	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Trichloroethene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Trichloroethene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Dibromochloromethane	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Dibromochloromethane	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	01-Jul-02 15:37	AJB
1,1,2-Trichloroethane	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Benzene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Benzene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
1,2-Dibromoethane	U	0.42	ug/kg	01-Jul-02 15:37	AJB
1,2-Dibromoethane	U	0.51	ug/kg Dry	01-Jul-02 15:37	AJB
Bromoform	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Bromoform	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Tetrachloroethene	U	5.0	ug/kg	01-Jul-02 15:37	AJB

X: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Toluene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Toluene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Chlorobenzene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Chlorobenzene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
Ethylbenzene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Ethylbenzene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	01-Jul-02 15:37	AJB
1,2-Dibromo-3-chloropropane	U	0.67	ug/kg Dry	01-Jul-02 15:37	AJB
Styrene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
Styrene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
m,p-Xylene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
m,p-Xylene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
o-Xylene	U	5.0	ug/kg	01-Jul-02 15:37	AJB
o-Xylene	U	6.1	ug/kg Dry	01-Jul-02 15:37	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	24-Jun-02 21:03	CAH
N-Nitrosodimethylamine	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Pyridine	U	330	ug/kg	24-Jun-02 21:03	CAH
Pyridine	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Aniline	U	330	ug/kg	24-Jun-02 21:03	CAH
Aniline	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	24-Jun-02 21:03	CAH
bis(2-Chloroethyl) Ether	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2-Chlorophenol	U	330	ug/kg	24-Jun-02 21:03	CAH
2-Chlorophenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Phenol	U	330	ug/kg	24-Jun-02 21:03	CAH
Phenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
1,3-Dichlorobenzene	U	330	ug/kg	24-Jun-02 21:03	CAH
1,3-Dichlorobenzene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
1,4-Dichlorobenzene	U	330	ug/kg	24-Jun-02 21:03	CAH
1,4-Dichlorobenzene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
1,2-Dichlorobenzene	U	330	ug/kg	24-Jun-02 21:03	CAH

X: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

000053

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Benzyl Alcohol	U	330	ug/kg	24-Jun-02 21:03	CAH
Benzyl Alcohol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	24-Jun-02 21:03	CAH
Bis(2-chloroisopropyl)ether	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Hexachloroethane	U	330	ug/kg	24-Jun-02 21:03	CAH
Hexachloroethane	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2-Methylphenol	U	330	ug/kg	24-Jun-02 21:03	CAH
2-Methylphenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	24-Jun-02 21:03	CAH
N-Nitroso-di-n-propylamine	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
4-Methylphenol	U	330	ug/kg	24-Jun-02 21:03	CAH
4-Methylphenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Nitrobenzene	U	330	ug/kg	24-Jun-02 21:03	CAH
Nitrobenzene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Isophorone	U	330	ug/kg	24-Jun-02 21:03	CAH
Isophorone	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2-Nitrophenol	U	1600	ug/kg	24-Jun-02 21:03	CAH
2-Nitrophenol	U	2000	ug/kg Dry	24-Jun-02 21:03	CAH
2,4-Dimethylphenol	U	330	ug/kg	24-Jun-02 21:03	CAH
2,4-Dimethylphenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	24-Jun-02 21:03	CAH
bis(2-Chloroethoxy)methane	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2,4-Dichlorophenol	U	330	ug/kg	24-Jun-02 21:03	CAH
2,4-Dichlorophenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	24-Jun-02 21:03	CAH
1,2,4-Trichlorobenzene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Naphthalene	U	330	ug/kg	24-Jun-02 21:03	CAH
Naphthalene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2,6-Dichlorophenol	U	330	ug/kg	24-Jun-02 21:03	CAH
2,6-Dichlorophenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
4-Chloroaniline	U	330	ug/kg	24-Jun-02 21:03	CAH
4-Chloroaniline	U	400	ug/kg Dry	24-Jun-02 21:03	CAH

X: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

000054

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	24-Jun-02 21:03	CAH
Hexachlorobutadiene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	24-Jun-02 21:03	CAH
4-Chloro-3-Methylphenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2-Methylnaphthalene	U	330	ug/kg	24-Jun-02 21:03	CAH
2-Methylnaphthalene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	24-Jun-02 21:03	CAH
Hexachlorocyclopentadiene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	24-Jun-02 21:03	CAH
2,4,6-Trichlorophenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	24-Jun-02 21:03	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	24-Jun-02 21:03	CAH
2-Chloronaphthalene	U	330	ug/kg	24-Jun-02 21:03	CAH
2-Chloronaphthalene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2-Nitroaniline	U	1600	ug/kg	24-Jun-02 21:03	CAH
2-Nitroaniline	U	2000	ug/kg Dry	24-Jun-02 21:03	CAH
Dimethylphthalate	U	330	ug/kg	24-Jun-02 21:03	CAH
Dimethylphthalate	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Acenaphthylene	U	330	ug/kg	24-Jun-02 21:03	CAH
Acenaphthylene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2,6-Dinitrotoluene	U	330	ug/kg	24-Jun-02 21:03	CAH
2,6-Dinitrotoluene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
3-Nitroaniline	U	1600	ug/kg	24-Jun-02 21:03	CAH
3-Nitroaniline	U	2000	ug/kg Dry	24-Jun-02 21:03	CAH
Acenaphthene	U	330	ug/kg	24-Jun-02 21:03	CAH
Acenaphthene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2,4-Dinitrophenol	U	1600	ug/kg	24-Jun-02 21:03	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	24-Jun-02 21:03	CAH
Dibenzofuran	U	330	ug/kg	24-Jun-02 21:03	CAH
Dibenzofuran	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
2,4-Dinitrotoluene	U	330	ug/kg	24-Jun-02 21:03	CAH
2,4-Dinitrotoluene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
4-Nitrophenol	U	1600	ug/kg	24-Jun-02 21:03	CAH

K: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2000	ug/kg Dry	24-Jun-02 21:03	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	24-Jun-02 21:03	CAH
2,3,4,6-Tetrachlorophenol	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Diethylphthalate	U	330	ug/kg	24-Jun-02 21:03	CAH
Diethylphthalate	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Fluorene	U	330	ug/kg	24-Jun-02 21:03	CAH
Fluorene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	24-Jun-02 21:03	CAH
4-Chlorophenyl-phenyl Ether	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
4-Nitroaniline	U	1600	ug/kg	24-Jun-02 21:03	CAH
4-Nitroaniline	U	2000	ug/kg Dry	24-Jun-02 21:03	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	24-Jun-02 21:03	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	24-Jun-02 21:03	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	24-Jun-02 21:03	CAH
N-Nitrosodiphenylamine	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	24-Jun-02 21:03	CAH
4-Bromophenyl-phenylether	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Hexachlorobenzene	U	330	ug/kg	24-Jun-02 21:03	CAH
Hexachlorobenzene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Pentachlorophenol	U	1600	ug/kg	24-Jun-02 21:03	CAH
Pentachlorophenol	U	2000	ug/kg Dry	24-Jun-02 21:03	CAH
Carbazole	U	330	ug/kg	24-Jun-02 21:03	CAH
Carbazole	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Phenanthrene	U	330	ug/kg	24-Jun-02 21:03	CAH
Phenanthrene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Anthracene	U	330	ug/kg	24-Jun-02 21:03	CAH
Anthracene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Di-n-Butylphthalate	U	330	ug/kg	24-Jun-02 21:03	CAH
Di-n-Butylphthalate	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Fluoranthene	U	330	ug/kg	24-Jun-02 21:03	CAH
Fluoranthene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Pyrene	U	330	ug/kg	24-Jun-02 21:03	CAH
Pyrene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH

X: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-4
Client ID: SOILS
Site: B-3-1
Locator: GRAB
Collect Date: 18-JUN-02 12:20

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	24-Jun-02 21:03	CAH
Butylbenzylphthalate	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Benzo(a)anthracene	U	330	ug/kg	24-Jun-02 21:03	CAH
Benzo(a)anthracene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	24-Jun-02 21:03	CAH
3,3'-Dichlorobenzidine	U	800	ug/kg Dry	24-Jun-02 21:03	CAH
Chrysene	U	330	ug/kg	24-Jun-02 21:03	CAH
Chrysene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	24-Jun-02 21:03	CAH
bis(2-Ethylhexyl)phthalate	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Di-n-octylphthalate	U	330	ug/kg	24-Jun-02 21:03	CAH
Di-n-octylphthalate	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Benzo(b)fluoranthene	U	330	ug/kg	24-Jun-02 21:03	CAH
Benzo(b)fluoranthene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Benzo(k)fluoranthene	U	330	ug/kg	24-Jun-02 21:03	CAH
Benzo(k)fluoranthene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Benzo(a)pyrene	U	330	ug/kg	24-Jun-02 21:03	CAH
Benzo(a)pyrene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	24-Jun-02 21:03	CAH
Indeno(1,2,3-cd)pyrene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	24-Jun-02 21:03	CAH
Dibenzo(a,h)anthracene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	24-Jun-02 21:03	CAH
Benzo(g,h,i)perylene	U	400	ug/kg Dry	24-Jun-02 21:03	CAH

K: DDE not confirmed based on a %D of 185. Dieldrin not confirmed based on a %D of 127.

000057

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	24-Jun-02 10:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	24-Jun-02 10:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JI
Chromium, Hexavalent	U	0.64	mg/kg Dry	20-Jun-02 15:30	TIN/JI
SM METHOD 2540 B					
Moisture		22.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		9.69	units	24-Jun-02 14:43	J
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	02-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	230	mg/kg Dry	02-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				20-Jun-02 12:00	DWK
Final pH		5.270		20-Jun-02 12:00	DWK
SW-846 METHOD 6010B					
Silver	J	0.15	mg/kg	27-Jun-02 09:44	DWK
Silver	J	0.19	mg/kg Dry	27-Jun-02 09:44	DWK
Silver, TCLP	J	0.0010	mg/l	28-Jun-02 11:15	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		9600	mg/kg	27-Jun-02 09:44	DWK
Aluminum		12000	mg/kg Dry	27-Jun-02 09:44	DWK
Arsenic		4.5	mg/kg	27-Jun-02 09:44	DWK
Arsenic		5.8	mg/kg Dry	27-Jun-02 09:44	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 11:15	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78

000053

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
Barium		87.	mg/kg	27-Jun-02 09:44	DWK
Barium		110	mg/kg Dry	27-Jun-02 09:44	DWK
Barium, TCLP	J	0.84	mg/l	28-Jun-02 11:15	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.25	mg/kg	27-Jun-02 09:44	DWK
Beryllium	J	0.32	mg/kg Dry	27-Jun-02 09:44	DWK
Calcium		43000	mg/kg	27-Jun-02 09:44	DWK
Calcium		55000	mg/kg Dry	27-Jun-02 09:44	DWK
Cadmium		0.80	mg/kg	27-Jun-02 09:44	DWK
Cadmium		1.0	mg/kg Dry	27-Jun-02 09:44	DWK
Cadmium, TCLP	J	0.0041	mg/l	28-Jun-02 11:15	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		4.0	mg/kg	27-Jun-02 09:44	DWK
Cobalt		5.1	mg/kg Dry	27-Jun-02 09:44	DWK
Chromium		19.	mg/kg	27-Jun-02 09:44	DWK
Chromium		24.	mg/kg Dry	27-Jun-02 09:44	DWK
Chromium, TCLP	J	0.0029	mg/l	28-Jun-02 11:15	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		53.	mg/kg	27-Jun-02 09:44	DWK
Copper		68.	mg/kg Dry	27-Jun-02 09:44	DWK
Iron		10000	mg/kg	27-Jun-02 09:44	DWK
Iron		13000	mg/kg Dry	27-Jun-02 09:44	DWK
Potassium		1300	mg/kg	27-Jun-02 09:44	DWK
Potassium		1700	mg/kg Dry	27-Jun-02 09:44	DWK
Magnesium		2800	mg/kg	27-Jun-02 09:44	DWK
Magnesium		3600	mg/kg Dry	27-Jun-02 09:44	DWK
Manganese		410	mg/kg	27-Jun-02 09:44	DWK
Manganese		520	mg/kg Dry	27-Jun-02 09:44	DWK
Sodium	J	42.	mg/kg	27-Jun-02 09:44	DWK
Sodium	J	54.	mg/kg Dry	27-Jun-02 09:44	DWK
Nickel		13.	mg/kg	27-Jun-02 09:44	DWK
Nickel		17.	mg/kg Dry	27-Jun-02 09:44	DWK
Lead		38.	mg/kg	27-Jun-02 09:44	DWK

Page 50

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000052

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
Lead		49.	mg/kg Dry	27-Jun-02 09:44	DWK
Lead, TCLP	J	0.0033	mg/l	28-Jun-02 11:15	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 09:44	DWK
Antimony	U	2.6	mg/kg Dry	27-Jun-02 09:44	DWK
Selenium	J	0.76	mg/kg	27-Jun-02 09:44	DWK
Selenium	J	0.97	mg/kg Dry	27-Jun-02 09:44	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 11:15	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.16	mg/kg	27-Jun-02 09:44	DWK
Thallium	J	0.20	mg/kg Dry	27-Jun-02 09:44	DWK
Vanadium		22.	mg/kg	27-Jun-02 09:44	DWK
Vanadium		28.	mg/kg Dry	27-Jun-02 09:44	DWK
Zinc		130	mg/kg	27-Jun-02 09:44	DWK
Zinc		170	mg/kg Dry	27-Jun-02 09:44	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 08:56	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.051	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 808:					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	17-Jul-02 14:11	AMR
alpha-BHC	U	100	ug/kg Dry	17-Jul-02 14:11	AMR
gamma-BHC (Lindane)	U	80.	ug/kg	17-Jul-02 14:11	AMR
gamma-BHC (Lindane)	U	100	ug/kg Dry	17-Jul-02 14:11	AMR

Page 51

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000060

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	17-Jul-02 14:11	AMR
beta-BHC	U	100	ug/kg Dry	17-Jul-02 14:11	AMR
Heptachlor	U,X	80.	ug/kg	17-Jul-02 14:11	AMR
Heptachlor	U	100	ug/kg Dry	17-Jul-02 14:11	AMR
delta-BHC	U	80.	ug/kg	17-Jul-02 14:11	AMR
delta-BHC	U	100	ug/kg Dry	17-Jul-02 14:11	AMR
Aldrin	U	80.	ug/kg	17-Jul-02 14:11	AMR
Aldrin	U	100	ug/kg Dry	17-Jul-02 14:11	AMR
Heptachlor Epoxide	J	10.	ug/kg	17-Jul-02 14:11	AMR
Heptachlor Epoxide	J	13.	ug/kg Dry	17-Jul-02 14:11	AMR
Endosulfan I	U	80.	ug/kg	17-Jul-02 14:11	AMR
Endosulfan I	U	100	ug/kg Dry	17-Jul-02 14:11	AMR
4,4'-DDE	J	15.	ug/kg	17-Jul-02 14:11	AMR
4,4'-DDE	J	19.	ug/kg Dry	17-Jul-02 14:11	AMR
Dieldrin	J	6.3	ug/kg	17-Jul-02 14:11	AMR
Dieldrin	J	8.1	ug/kg Dry	17-Jul-02 14:11	AMR
Endrin	U	160	ug/kg	17-Jul-02 14:11	AMR
Endrin	U	200	ug/kg Dry	17-Jul-02 14:11	AMR
4,4'-DDD	U	160	ug/kg	17-Jul-02 14:11	AMR
4,4'-DDD	U	200	ug/kg Dry	17-Jul-02 14:11	AMR
Endosulfan II	U	160	ug/kg	17-Jul-02 14:11	AMR
Endosulfan II	U	200	ug/kg Dry	17-Jul-02 14:11	AMR
4,4'-DDT	J,A	13.	ug/kg	17-Jul-02 14:11	AMR
4,4'-DDT	J	17.	ug/kg Dry	17-Jul-02 14:11	AMR
Endrin Aldehyde	U	160	ug/kg	17-Jul-02 14:11	AMR
Endrin Aldehyde	U	200	ug/kg Dry	17-Jul-02 14:11	AMR
Endosulfan Sulfate	U	160	ug/kg	17-Jul-02 14:11	AMR
Endosulfan Sulfate	U	200	ug/kg Dry	17-Jul-02 14:11	AMR
Methoxychlor	U	800	ug/kg	17-Jul-02 14:11	AMR
Methoxychlor	U	1000	ug/kg Dry	17-Jul-02 14:11	AMR
Toxaphene	U	800	ug/kg	17-Jul-02 14:11	AMR
Toxaphene	U	1000	ug/kg Dry	17-Jul-02 14:11	AMR
Chlordane (technical)	U	1600	ug/kg	17-Jul-02 14:11	AMR

Page 52

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000061

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	17-Jul-02 14:11	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 05:18	AMR
Aroclor 1016	U	100	ug/kg Dry	25-Jun-02 05:18	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 05:18	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 05:18	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 05:18	AMR
Aroclor 1232	U	100	ug/kg Dry	25-Jun-02 05:18	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 05:18	AMR
Aroclor 1242	U	100	ug/kg Dry	25-Jun-02 05:18	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 05:18	AMR
Aroclor 1248	U	100	ug/kg Dry	25-Jun-02 05:18	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 05:18	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 05:18	AMR
Aroclor 1260	J	56.	ug/kg	25-Jun-02 05:18	AMR
Aroclor 1260	J	72.	ug/kg Dry	25-Jun-02 05:18	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	01-Jul-02 21:43	ELS
Naphthalene	U	86.	ug/kg Dry	01-Jul-02 21:43	ELS
Acenaphthene	J	27.	ug/kg	01-Jul-02 21:43	ELS
Acenaphthene	J	35.	ug/kg Dry	01-Jul-02 21:43	ELS
Acenaphthylene	U	67.	ug/kg	01-Jul-02 21:43	ELS
Acenaphthylene	U	86.	ug/kg Dry	01-Jul-02 21:43	ELS
Fluorene	U	67.	ug/kg	01-Jul-02 21:43	ELS
Fluorene	U	86.	ug/kg Dry	01-Jul-02 21:43	ELS
Phenanthrene	U	67.	ug/kg	01-Jul-02 21:43	ELS
Phenanthrene	U	86.	ug/kg Dry	01-Jul-02 21:43	ELS
Anthracene	U	67.	ug/kg	01-Jul-02 21:43	ELS
Anthracene	U	86.	ug/kg Dry	01-Jul-02 21:43	ELS
Fluoranthene	U	6.7	ug/kg	01-Jul-02 21:43	ELS
Fluoranthene	U	8.6	ug/kg Dry	01-Jul-02 21:43	ELS
Pyrene	U	6.7	ug/kg	01-Jul-02 21:43	ELS
Pyrene	U	8.6	ug/kg Dry	01-Jul-02 21:43	ELS

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000062

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	J	3.0	ug/kg	01-Jul-02 21:43	ELS
Benzo(a)Anthracene	J	3.8	ug/kg Dry	01-Jul-02 21:43	ELS
Chrysene	U	6.7	ug/kg	01-Jul-02 21:43	ELS
Chrysene	U	8.6	ug/kg Dry	01-Jul-02 21:43	ELS
Benzo(b)Fluoranthene	J	5.0	ug/kg	01-Jul-02 21:43	ELS
Benzo(b)Fluoranthene	J	6.4	ug/kg Dry	01-Jul-02 21:43	ELS
Benzo(k)Fluoranthene	J	1.5	ug/kg	01-Jul-02 21:43	ELS
Benzo(k)Fluoranthene	J	1.9	ug/kg Dry	01-Jul-02 21:43	ELS
Benzo(a)Pyrene	J	3.5	ug/kg	01-Jul-02 21:43	ELS
Benzo(a)Pyrene	J	4.5	ug/kg Dry	01-Jul-02 21:43	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	01-Jul-02 21:43	ELS
Dibenz(a,h)Anthracene	U	8.6	ug/kg Dry	01-Jul-02 21:43	ELS
Benzo(g,h,i)Perylene	J	4.8	ug/kg	01-Jul-02 21:43	ELS
Benzo(g,h,i)Perylene	J	6.2	ug/kg Dry	01-Jul-02 21:43	ELS
Indeno(1,2,3-cd)Pyrene	J	4.8	ug/kg	01-Jul-02 21:43	ELS
Indeno(1,2,3-cd)Pyrene	J	6.2	ug/kg Dry	01-Jul-02 21:43	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	01-Jul-02 16:14	AJB
Vinyl Chloride	U	13.	ug/kg Dry	01-Jul-02 16:14	AJB
Bromomethane	U	10.	ug/kg	01-Jul-02 16:14	AJB
Bromomethane	U	13.	ug/kg Dry	01-Jul-02 16:14	AJB
Methylene Chloride	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Methylene Chloride	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 16:14	AJB
cis-1,3-Dichloropropene	U	2.6	ug/kg Dry	01-Jul-02 16:14	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 16:14	AJB
trans-1,3-Dichloropropene	U	2.6	ug/kg Dry	01-Jul-02 16:14	AJB
Carbon Disulfide	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Carbon Disulfide	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Acetone		120	ug/kg	01-Jul-02 16:14	AJB
Acetone		150	ug/kg Dry	01-Jul-02 16:14	AJB
1,1-Dichloroethene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
1,1-Dichloroethene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000063

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	01-Jul-02 16:14	AJB
1,1-Dichloroethane	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
trans-1,2-Dichloroethene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
cis-1,2-Dichloroethene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Chloroform	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Chloroform	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
1,2-Dichloroethane	U	5.0	ug/kg	01-Jul-02 16:14	AJB
1,2-Dichloroethane	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	01-Jul-02 16:14	AJB
1,1,1-Trichloroethane	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Carbon Tetrachloride	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Carbon Tetrachloride	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Vinyl Acetate	U	10.	ug/kg	01-Jul-02 16:14	AJB
Vinyl Acetate	U	13.	ug/kg Dry	01-Jul-02 16:14	AJB
Bromodichloromethane	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Bromodichloromethane	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
1,2-Dichloropropane	U	5.0	ug/kg	01-Jul-02 16:14	AJB
1,2-Dichloropropane	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Trichloroethene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Trichloroethene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Dibromochloromethane	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Dibromochloromethane	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	01-Jul-02 16:14	AJB
1,1,2-Trichloroethane	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Benzene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Benzene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
1,2-Dibromoethane	U	0.42	ug/kg	01-Jul-02 16:14	AJB
1,2-Dibromoethane	U	0.54	ug/kg Dry	01-Jul-02 16:14	AJB
Bromoform	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Bromoform	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Tetrachloroethene	U	5.0	ug/kg	01-Jul-02 16:14	AJB

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000064

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Toluene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Toluene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Chlorobenzene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Chlorobenzene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
Ethylbenzene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Ethylbenzene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	01-Jul-02 16:14	AJB
1,2-Dibromo-3-chloropropane	U	0.70	ug/kg Dry	01-Jul-02 16:14	AJB
Styrene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
Styrene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
m,p-Xylene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
m,p-Xylene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
o-Xylene	U	5.0	ug/kg	01-Jul-02 16:14	AJB
o-Xylene	U	6.4	ug/kg Dry	01-Jul-02 16:14	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 15:57	CAH
N-Nitrosodimethylamine	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Pyridine	U	330	ug/kg	25-Jun-02 15:57	CAH
Pyridine	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Aniline	U	330	ug/kg	25-Jun-02 15:57	CAH
Aniline	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 15:57	CAH
bis(2-Chloroethyl) Ether	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 15:57	CAH
2-Chlorophenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Phenol	U	330	ug/kg	25-Jun-02 15:57	CAH
Phenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 15:57	CAH
1,3-Dichlorobenzene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 15:57	CAH
1,4-Dichlorobenzene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 15:57	CAH

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000065

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 15:57	CAH
Benzyl Alcohol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	25-Jun-02 15:57	CAH
Bis(2-chloroisopropyl)ether	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Hexachloroethane	U	330	ug/kg	25-Jun-02 15:57	CAH
Hexachloroethane	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 15:57	CAH
2-Methylphenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 15:57	CAH
N-Nitroso-di-n-propylamine	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 15:57	CAH
4-Methylphenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 15:57	CAH
Nitrobenzene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Isophorone	U	330	ug/kg	25-Jun-02 15:57	CAH
Isophorone	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 15:57	CAH
2-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 15:57	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 15:57	CAH
2,4-Dimethylphenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 15:57	CAH
bis(2-Chloroethoxy)methane	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 15:57	CAH
2,4-Dichlorophenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 15:57	CAH
1,2,4-Trichlorobenzene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 15:57	CAH
Naphthalene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 15:57	CAH
2,6-Dichlorophenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 15:57	CAH
4-Chloroaniline	U	420	ug/kg Dry	25-Jun-02 15:57	CAH

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000066

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 15:57	CAH
Hexachlorobutadiene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 15:57	CAH
4-Chloro-3-Methylphenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 15:57	CAH
2-Methylnaphthalene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 15:57	CAH
Hexachlorocyclopentadiene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 15:57	CAH
2,4,6-Trichlorophenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 15:57	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	25-Jun-02 15:57	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 15:57	CAH
2-Chloronaphthalene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 15:57	CAH
2-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 15:57	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 15:57	CAH
Dimethylphthalate	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 15:57	CAH
Acenaphthylene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 15:57	CAH
2,6-Dinitrotoluene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 15:57	CAH
3-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 15:57	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 15:57	CAH
Acenaphthene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 15:57	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	25-Jun-02 15:57	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 15:57	CAH
Dibenzofuran	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 15:57	CAH
2,4-Dinitrotoluene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 15:57	CAH

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000067

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 15:57	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 15:57	CAH
2,3,4,6-Tetrachlorophenol	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 15:57	CAH
Diethylphthalate	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Fluorene	U	330	ug/kg	25-Jun-02 15:57	CAH
Fluorene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 15:57	CAH
4-Chlorophenyl-phenyl Ether	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 15:57	CAH
4-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 15:57	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 15:57	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	25-Jun-02 15:57	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 15:57	CAH
N-Nitrosodiphenylamine	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 15:57	CAH
4-Bromophenyl-phenylether	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 15:57	CAH
Hexachlorobenzene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 15:57	CAH
Pentachlorophenol	U	2000	ug/kg Dry	25-Jun-02 15:57	CAH
Carbazole	U	330	ug/kg	25-Jun-02 15:57	CAH
Carbazole	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Phenanthrene	U	330	ug/kg	25-Jun-02 15:57	CAH
Phenanthrene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Anthracene	U	330	ug/kg	25-Jun-02 15:57	CAH
Anthracene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 15:57	CAH
Di-n-Butylphthalate	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 15:57	CAH
Fluoranthene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Pyrene	U	330	ug/kg	25-Jun-02 15:57	CAH
Pyrene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000063

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-5
Client ID: SOILS
Site: B-4-1
Locator: GRAB
Collect Date: 18-JUN-02 12:45

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 15:57	CAH
Butylbenzylphthalate	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 15:57	CAH
Benzo(a)anthracene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 15:57	CAH
3,3'-Dichlorobenzidine	U	850	ug/kg Dry	25-Jun-02 15:57	CAH
Chrysene	U	330	ug/kg	25-Jun-02 15:57	CAH
Chrysene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 15:57	CAH
bis(2-Ethylhexyl)phthalate	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 15:57	CAH
Di-n-octylphthalate	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 15:57	CAH
Benzo(b)fluoranthene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 15:57	CAH
Benzo(k)fluoranthene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 15:57	CAH
Benzo(a)pyrene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 15:57	CAH
Indeno(1,2,3-cd)pyrene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 15:57	CAH
Dibenzo(a,h)anthracene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 15:57	CAH
Benzo(g,h,i)perylene	U	420	ug/kg Dry	25-Jun-02 15:57	CAH

A: 4,4'-DDT had a 50%D between the columns.X: Compound not confirmed based on a %D of 78.

000069

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	24-Jun-02 10:00	KG
Cyanide, Total	U	0.16	mg/kg Dry	24-Jun-02 10:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.66	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		24.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		7.40	units	24-Jun-02 14:45	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	02-Jul-02 09:00	TA
Silica Gel Treated - HEM	U	240	mg/kg Dry	02-Jul-02 09:00	TA
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				20-Jun-02 12:00	DWK
Final pH		5.230		20-Jun-02 12:00	DWK
SW-846 METHOD 6010B					
Silver	J	0.29	mg/kg	27-Jun-02 09:50	DWK
Silver	J	0.38	mg/kg Dry	27-Jun-02 09:50	DWK
Silver, TCLP	J	0.0010	mg/l	28-Jun-02 11:23	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		6500	mg/kg	27-Jun-02 09:50	DWK
Aluminum		8600	mg/kg Dry	27-Jun-02 09:50	DWK
Arsenic		6.2	mg/kg	27-Jun-02 09:50	DWK
Arsenic		8.2	mg/kg Dry	27-Jun-02 09:50	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 11:23	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

X: Compound determined to be not confirmed based on a %D of 156.

000076

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SCILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
Barium		160	mg/kg	27-Jun-02 09:50	DWK
Barium		210	mg/kg Dry	27-Jun-02 09:50	DWK
Barium, TCLP	J	1.7	mg/l	28-Jun-02 11:23	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.34	mg/kg	27-Jun-02 09:50	DWK
Beryllium	J	0.45	mg/kg Dry	27-Jun-02 09:50	DWK
Calcium		6500	mg/kg	27-Jun-02 09:50	DWK
Calcium		8600	mg/kg Dry	27-Jun-02 09:50	DWK
Cadmium		0.76	mg/kg	27-Jun-02 09:50	DWK
Cadmium		1.0	mg/kg Dry	27-Jun-02 09:50	DWK
Cadmium, TCLP	J	0.00073	mg/l	28-Jun-02 11:23	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		14.	mg/kg	27-Jun-02 09:50	DWK
Cobalt		18.	mg/kg Dry	27-Jun-02 09:50	DWK
Chromium		11.	mg/kg	27-Jun-02 09:50	DWK
Chromium		14.	mg/kg Dry	27-Jun-02 09:50	DWK
Chromium, TCLP	J	0.0024	mg/l	28-Jun-02 11:23	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		15.	mg/kg	27-Jun-02 09:50	DWK
Copper		20.	mg/kg Dry	27-Jun-02 09:50	DWK
Iron		12000	mg/kg	27-Jun-02 09:50	DWK
Iron		16000	mg/kg Dry	27-Jun-02 09:50	DWK
Potassium		1200	mg/kg	27-Jun-02 09:50	DWK
Potassium		1600	mg/kg Dry	27-Jun-02 09:50	DWK
Magnesium		1500	mg/kg	27-Jun-02 09:50	DWK
Magnesium		2000	mg/kg Dry	27-Jun-02 09:50	DWK
Manganese		1300	mg/kg	27-Jun-02 09:50	DWK
Manganese		1700	mg/kg Dry	27-Jun-02 09:50	DWK
Sodium	J	31.	mg/kg	27-Jun-02 09:50	DWK
Sodium	J	41.	mg/kg Dry	27-Jun-02 09:50	DWK
Nickel		15.	mg/kg	27-Jun-02 09:50	DWK
Nickel		20.	mg/kg Dry	27-Jun-02 09:50	DWK
Lead		24.	mg/kg	27-Jun-02 09:50	DWK

Page 62

K: Compound determined to be not confirmed based on a %D of 156.

000071

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
Lead		32.	mg/kg Dry	27-Jun-02 09:50	DWK
Lead, TCLP	J	0.0027	mg/l	28-Jun-02 11:23	DWK
Lead, TCLP		86.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 09:50	DWK
Antimony	U	2.6	mg/kg Dry	27-Jun-02 09:50	DWK
Selenium		1.3	mg/kg	27-Jun-02 09:50	DWK
Selenium		1.7	mg/kg Dry	27-Jun-02 09:50	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 11:23	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.43	mg/kg	27-Jun-02 09:50	DWK
Thallium	J	0.56	mg/kg Dry	27-Jun-02 09:50	DWK
Vanadium		17.	mg/kg	27-Jun-02 09:50	DWK
Vanadium		22.	mg/kg Dry	27-Jun-02 09:50	DWK
Zinc		66.	mg/kg	27-Jun-02 09:50	DWK
Zinc		87.	mg/kg Dry	27-Jun-02 09:50	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 09:12	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.053	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	17-Jul-02 11:55	AMR
alpha-BHC	U	100	ug/kg Dry	17-Jul-02 11:55	AMR
gamma-BHC (Lindane)	U	80.	ug/kg	17-Jul-02 11:55	AMR
gamma-BHC (Lindane)	U	100	ug/kg Dry	17-Jul-02 11:55	AMR

K: Compound determined to be not confirmed based on a %D of 156.

000072

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	17-Jul-02 11:55	AMR
beta-BHC	U	100	ug/kg Dry	17-Jul-02 11:55	AMR
Heptachlor	U	80.	ug/kg	17-Jul-02 11:55	AMR
Heptachlor	U	100	ug/kg Dry	17-Jul-02 11:55	AMR
delta-BHC	U	80.	ug/kg	17-Jul-02 11:55	AMR
delta-BHC	U	100	ug/kg Dry	17-Jul-02 11:55	AMR
Aldrin	U	80.	ug/kg	17-Jul-02 11:55	AMR
Aldrin	U	100	ug/kg Dry	17-Jul-02 11:55	AMR
Heptachlor Epoxide	U	80.	ug/kg	17-Jul-02 11:55	AMR
Heptachlor Epoxide	U	100	ug/kg Dry	17-Jul-02 11:55	AMR
Endosulfan I	U	80.	ug/kg	17-Jul-02 11:55	AMR
Endosulfan I	U	100	ug/kg Dry	17-Jul-02 11:55	AMR
4,4'-DDE	U,X	160	ug/kg	17-Jul-02 11:55	AMR
4,4'-DDE	U	210	ug/kg Dry	17-Jul-02 11:55	AMR
Dieldrin	U	160	ug/kg	17-Jul-02 11:55	AMR
Dieldrin	U	210	ug/kg Dry	17-Jul-02 11:55	AMR
Endrin	U	160	ug/kg	17-Jul-02 11:55	AMR
Endrin	U	210	ug/kg Dry	17-Jul-02 11:55	AMR
4,4'-DDD	U	160	ug/kg	17-Jul-02 11:55	AMR
4,4'-DDD	U	210	ug/kg Dry	17-Jul-02 11:55	AMR
Endosulfan II	U	160	ug/kg	17-Jul-02 11:55	AMR
Endosulfan II	U	210	ug/kg Dry	17-Jul-02 11:55	AMR
4,4'-DDT	U	160	ug/kg	17-Jul-02 11:55	AMR
4,4'-DDT	U	210	ug/kg Dry	17-Jul-02 11:55	AMR
Endrin Aldehyde	U	160	ug/kg	17-Jul-02 11:55	AMR
Endrin Aldehyde	U	210	ug/kg Dry	17-Jul-02 11:55	AMR
Endosulfan Sulfate	U	160	ug/kg	17-Jul-02 11:55	AMR
Endosulfan Sulfate	U	210	ug/kg Dry	17-Jul-02 11:55	AMR
Methoxychlor	U	800	ug/kg	17-Jul-02 11:55	AMR
Methoxychlor	U	1000	ug/kg Dry	17-Jul-02 11:55	AMR
Toxaphene	U	800	ug/kg	17-Jul-02 11:55	AMR
Toxaphene	U	1000	ug/kg Dry	17-Jul-02 11:55	AMR
Chlordane (technical)	U	1600	ug/kg	17-Jul-02 11:55	AMR

X: Compound determined to be not confirmed based on a %D of 156.

000073

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2100	ug/kg Dry	17-Jul-02 11:55	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 05:54	AMR
Aroclor 1016	U	100	ug/kg Dry	25-Jun-02 05:54	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 05:54	AMR
Aroclor 1221	U	210	ug/kg Dry	25-Jun-02 05:54	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 05:54	AMR
Aroclor 1232	U	100	ug/kg Dry	25-Jun-02 05:54	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 05:54	AMR
Aroclor 1242	U	100	ug/kg Dry	25-Jun-02 05:54	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 05:54	AMR
Aroclor 1248	U	100	ug/kg Dry	25-Jun-02 05:54	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 05:54	AMR
Aroclor 1254	U	210	ug/kg Dry	25-Jun-02 05:54	AMR
Aroclor 1260	U	160	ug/kg	25-Jun-02 05:54	AMR
Aroclor 1260	U	210	ug/kg Dry	25-Jun-02 05:54	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	01-Jul-02 22:17	ELS
Naphthalene	U	88.	ug/kg Dry	01-Jul-02 22:17	ELS
Acenaphthene	J	61.	ug/kg	01-Jul-02 22:17	ELS
Acenaphthene	J	80.	ug/kg Dry	01-Jul-02 22:17	ELS
Acenaphthylene	U	67.	ug/kg	01-Jul-02 22:17	ELS
Acenaphthylene	U	88.	ug/kg Dry	01-Jul-02 22:17	ELS
Fluorene	U	67.	ug/kg	01-Jul-02 22:17	ELS
Fluorene	U	88.	ug/kg Dry	01-Jul-02 22:17	ELS
Phenanthrene	U	67.	ug/kg	01-Jul-02 22:17	ELS
Phenanthrene	U	88.	ug/kg Dry	01-Jul-02 22:17	ELS
Anthracene	U	67.	ug/kg	01-Jul-02 22:17	ELS
Anthracene	U	88.	ug/kg Dry	01-Jul-02 22:17	ELS
Fluoranthene	U	6.7	ug/kg	01-Jul-02 22:17	ELS
Fluoranthene	U	8.8	ug/kg Dry	01-Jul-02 22:17	ELS
Pyrene	U	6.7	ug/kg	01-Jul-02 22:17	ELS
Pyrene	U	8.8	ug/kg Dry	01-Jul-02 22:17	ELS

&: Compound determined to be not confirmed based on a %D of 156.

000074

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	J	1.2	ug/kg	01-Jul-02 22:17	ELS
Benzo(a)Anthracene	J	1.6	ug/kg Dry	01-Jul-02 22:17	ELS
Chrysene	U	6.7	ug/kg	01-Jul-02 22:17	ELS
Chrysene	U	8.8	ug/kg Dry	01-Jul-02 22:17	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	01-Jul-02 22:17	ELS
Benzo(b)Fluoranthene	U	8.8	ug/kg Dry	01-Jul-02 22:17	ELS
Benzo(k)Fluoranthene	U	3.4	ug/kg	01-Jul-02 22:17	ELS
Benzo(k)Fluoranthene	U	4.5	ug/kg Dry	01-Jul-02 22:17	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	01-Jul-02 22:17	ELS
Benzo(a)Pyrene	U	8.8	ug/kg Dry	01-Jul-02 22:17	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	01-Jul-02 22:17	ELS
Dibenz(a,h)Anthracene	U	8.8	ug/kg Dry	01-Jul-02 22:17	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	01-Jul-02 22:17	ELS
Benzo(g,h,i)Perylene	U	8.8	ug/kg Dry	01-Jul-02 22:17	ELS
Indeno(1,2,3-cd)Pyrene	J	2.8	ug/kg	01-Jul-02 22:17	ELS
Indeno(1,2,3-cd)Pyrene	J	3.7	ug/kg Dry	01-Jul-02 22:17	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	01-Jul-02 16:50	AJB
Vinyl Chloride	U	13.	ug/kg Dry	01-Jul-02 16:50	AJB
Bromomethane	U	10.	ug/kg	01-Jul-02 16:50	AJB
Bromomethane	U	13.	ug/kg Dry	01-Jul-02 16:50	AJB
Methylene Chloride	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Methylene Chloride	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 16:50	AJB
cis-1,3-Dichloropropene	U	2.6	ug/kg Dry	01-Jul-02 16:50	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 16:50	AJB
trans-1,3-Dichloropropene	U	2.6	ug/kg Dry	01-Jul-02 16:50	AJB
Carbon Disulfide	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Carbon Disulfide	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Acetone		140	ug/kg	01-Jul-02 16:50	AJB
Acetone		180	ug/kg Dry	01-Jul-02 16:50	AJB
1,1-Dichloroethene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
1,1-Dichloroethene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB

K: Compound determined to be not confirmed based on a %D of 156.

000075

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	01-Jul-02 16:50	AJB
1,1-Dichloroethane	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
trans-1,2-Dichloroethene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
cis-1,2-Dichloroethene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Chloroform	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Chloroform	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
1,2-Dichloroethane	U	5.0	ug/kg	01-Jul-02 16:50	AJB
1,2-Dichloroethane	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	01-Jul-02 16:50	AJB
1,1,1-Trichloroethane	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Carbon Tetrachloride	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Carbon Tetrachloride	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Vinyl Acetate	U	10.	ug/kg	01-Jul-02 16:50	AJB
Vinyl Acetate	U	13.	ug/kg Dry	01-Jul-02 16:50	AJB
Bromodichloromethane	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Bromodichloromethane	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
1,2-Dichloropropane	U	5.0	ug/kg	01-Jul-02 16:50	AJB
1,2-Dichloropropane	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Trichloroethene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Trichloroethene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Dibromochloromethane	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Dibromochloromethane	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	01-Jul-02 16:50	AJB
1,1,2-Trichloroethane	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Benzene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Benzene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
1,2-Dibromoethane	U	0.42	ug/kg	01-Jul-02 16:50	AJB
1,2-Dibromoethane	U	0.55	ug/kg Dry	01-Jul-02 16:50	AJB
Bromoform	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Bromoform	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Tetrachloroethene	U	5.0	ug/kg	01-Jul-02 16:50	AJB

K: Compound determined to be not confirmed based on a %D of 156.

000076

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Toluene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Toluene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Chlorobenzene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Chlorobenzene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
Ethylbenzene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Ethylbenzene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
1,2-Dibromo-3-chloropropane	U	0.65	ug/kg	01-Jul-02 16:50	AJB
1,2-Dibromo-3-chloropropane	U	0.72	ug/kg Dry	01-Jul-02 16:50	AJB
Styrene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
Styrene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
m,p-Xylene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
m,p-Xylene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
o-Xylene	U	5.0	ug/kg	01-Jul-02 16:50	AJB
o-Xylene	U	6.6	ug/kg Dry	01-Jul-02 16:50	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 16:42	CAH
N-Nitrosodimethylamine	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Pyridine	U	330	ug/kg	25-Jun-02 16:42	CAH
Pyridine	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Aniline	U	330	ug/kg	25-Jun-02 16:42	CAH
Aniline	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 16:42	CAH
bis(2-Chloroethyl) Ether	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 16:42	CAH
2-Chlorophenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Phenol	U	330	ug/kg	25-Jun-02 16:42	CAH
Phenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 16:42	CAH
1,3-Dichlorobenzene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 16:42	CAH
1,4-Dichlorobenzene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 16:42	CAH

K: Compound determined to be not confirmed based on a %D of 156.

000077

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 16:42	CAH
Benzyl Alcohol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	25-Jun-02 16:42	CAH
Bis(2-chloroisopropyl)ether	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Hexachloroethane	U	330	ug/kg	25-Jun-02 16:42	CAH
Hexachloroethane	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 16:42	CAH
2-Methylphenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 16:42	CAH
N-Nitroso-di-n-propylamine	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 16:42	CAH
4-Methylphenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 16:42	CAH
Nitrobenzene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Isophorone	U	330	ug/kg	25-Jun-02 16:42	CAH
Isophorone	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 16:42	CAH
2-Nitrophenol	U	2100	ug/kg Dry	25-Jun-02 16:42	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 16:42	CAH
2,4-Dimethylphenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 16:42	CAH
bis(2-Chloroethoxy)methane	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 16:42	CAH
2,4-Dichlorophenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 16:42	CAH
1,2,4-Trichlorobenzene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 16:42	CAH
Naphthalene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 16:42	CAH
2,6-Dichlorophenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 16:42	CAH
4-Chloroaniline	U	430	ug/kg Dry	25-Jun-02 16:42	CAH

K: Compound determined to be not confirmed based on a %D of 156.

000078

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-S-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 16:42	CAH
Hexachlorobutadiene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 16:42	CAH
4-Chloro-3-Methylphenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 16:42	CAH
2-Methylnaphthalene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 16:42	CAH
Hexachlorocyclopentadiene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 16:42	CAH
2,4,6-Trichlorophenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 16:42	CAH
2,4,5-Trichlorophenol	U	2100	ug/kg Dry	25-Jun-02 16:42	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 16:42	CAH
2-Chloronaphthalene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 16:42	CAH
2-Nitroaniline	U	2100	ug/kg Dry	25-Jun-02 16:42	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 16:42	CAH
Dimethylphthalate	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 16:42	CAH
Acenaphthylene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 16:42	CAH
2,6-Dinitrotoluene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 16:42	CAH
3-Nitroaniline	U	2100	ug/kg Dry	25-Jun-02 16:42	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 16:42	CAH
Acenaphthene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 16:42	CAH
2,4-Dinitrophenol	U	2100	ug/kg Dry	25-Jun-02 16:42	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 16:42	CAH
Dibenzofuran	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 16:42	CAH
2,4-Dinitrotoluene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 16:42	CAH

X: Compound determined to be not confirmed based on a %D of 156.

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2100	ug/kg Dry	25-Jun-02 16:42	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 16:42	CAH
2,3,4,6-Tetrachlorophenol	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 16:42	CAH
Diethylphthalate	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Fluorene	U	330	ug/kg	25-Jun-02 16:42	CAH
Fluorene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 16:42	CAH
4-Chlorophenyl-phenyl Ether	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 16:42	CAH
4-Nitroaniline	U	2100	ug/kg Dry	25-Jun-02 16:42	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 16:42	CAH
4,6-Dinitro-2-methylphenol	U	2100	ug/kg Dry	25-Jun-02 16:42	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 16:42	CAH
N-Nitrosodiphenylamine	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 16:42	CAH
4-Bromophenyl-phenylether	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 16:42	CAH
Hexachlorobenzene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 16:42	CAH
Pentachlorophenol	U	2100	ug/kg Dry	25-Jun-02 16:42	CAH
Carbazole	U	330	ug/kg	25-Jun-02 16:42	CAH
Carbazole	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Phenanthrene	U	330	ug/kg	25-Jun-02 16:42	CAH
Phenanthrene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Anthracene	U	330	ug/kg	25-Jun-02 16:42	CAH
Anthracene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 16:42	CAH
Di-n-Butylphthalate	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 16:42	CAH
Fluoranthene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Pyrene	U	330	ug/kg	25-Jun-02 16:42	CAH
Pyrene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH

X: Compound determined to be not confirmed based on a %D of 156.

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-6
Client ID: SOILS
Site: B-5-1
Locator: GRAB
Collect Date: 18-JUN-02 13:10

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 16:42	CAH
Butylbenzylphthalate	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 16:42	CAH
Benzo(a)anthracene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 16:42	CAH
3,3'-Dichlorobenzidine	U	870	ug/kg Dry	25-Jun-02 16:42	CAH
Chrysene	U	330	ug/kg	25-Jun-02 16:42	CAH
Chrysene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 16:42	CAH
bis(2-Ethylhexyl)phthalate	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 16:42	CAH
Di-n-octylphthalate	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 16:42	CAH
Benzo(b)fluoranthene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 16:42	CAH
Benzo(k)fluoranthene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 16:42	CAH
Benzo(a)pyrene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 16:42	CAH
Indeno(1,2,3-cd)pyrene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 16:42	CAH
Dibenzo(a,h)anthracene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 16:42	CAH
Benzo(g,h,i)perylene	U	430	ug/kg Dry	25-Jun-02 16:42	CAH

X: Compound determined to be not confirmed based on a %D of 156.

000081

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August 13, 2002

Mr. Paul Loete
Missman Stanley and Associates
2415 18th Street
Suite 203
Bettendorf, IA 52722

Dear Paul:

Enclosed please find a revised copy of soil sample B-6-1 for PDC #02062522-7. Please replace it in the appropriate section in the data package. Also enclosed is a completed table of contents for SDG 02063511 which was inadvertently left out of the original package.

A revised invoice is also included. A five percent discount has been applied to the soil SDG, 02062522. PDC sincerely regrets the inconvenience caused by the late delivery of this data.

If you have any questions or I can be of further assistance please call.

Sincerely,
PDC Laboratories, Inc.

Barbara Beard
Barbara Beard
Federal Project Manager

BJB/eml

enclosures

\\LABSERVER\HOME\lgEml\Barb\Missman_813.doc

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Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Date Reported: 08/13/02
Date Received: 06/18/02

Mr. Mike Harnung

Lab Sample Number: 02062522-7 **Date Collected:** 06/18/02
Sample Information: SOILS, B-6-1, GRAB

Method	Parameter	Results	Units	Date	By
SM3500Cr D	Chromium, Hexavalent	0.5 U	mg/kg	06/20/02	TIN/JEA
SM3500Cr D	Chromium, Hexavalent	0.63 U	mg/kg Dry	06/20/02	TIN/JEA
SW9014	Cyanide, Total	0.12 U	mg/kg	06/24/02	KG
SW9014	Cyanide, Total	0.15 U	mg/kg Dry	06/24/02	KG
SM 2540 B	Moisture	21	%	06/19/02	JLR
SM 5520 F	Silica Gel Treated - HEM	180 U	mg/kg	07/02/02	TAC
SM 5520 F	Silica Gel Treated - HEM	230 U	mg/kg Dry	07/02/02	TAC
SW9045C	pH	7.35	units	06/24/02	KJB
SW9045C	pH	-	units	06/24/02	KJB
SW9045C	ph	7	units	06/24/02	KJB
SW1311	Final pH	5.16		06/24/02	DWK
SW1311	Leachate Preparation	-		06/24/02	DWK
SW6010B	Aluminum	4800	mg/kg	06/27/02	DWK
SW6010B	Aluminum	6100	mg/kg Dry	06/27/02	DWK
SW6010B	Antimony	2 U	mg/kg	06/27/02	DWK
SW6010B	Antimony	2.5 U	mg/kg Dry	06/27/02	DWK
SW6010B	Arsenic	4.4	mg/kg	06/27/02	DWK
SW6010B	Arsenic	5.6	mg/kg Dry	06/27/02	DWK
SW6010B	Arsenic, TCLP	0.05 U	mg/l	06/28/02	DWK
SW6010B	Barium	110	mg/kg	06/27/02	DWK
SW6010B	Barium	140	mg/kg Dry	06/27/02	DWK
SW6010B	Barium, TCLP	1 J	mg/l	06/28/02	DWK

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Bettendorf, IA 52722

Date Reported: 08/13/02
Date Received: 06/18/02

Mr. Mike Harnung

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW6010B	Beryllium	0.5 J	mg/kg	06/27/02	DWK
SW6010B	Beryllium	0.63 J	mg/kg Dry	06/27/02	DWK
SW6010B	Cadmium	0.69	mg/kg	06/27/02	DWK
SW6010B	Cadmium	0.87	mg/kg Dry	06/27/02	DWK
SW6010B	Cadmium, TCLP	0.005 J	mg/l	06/28/02	DWK
SW6010B	Calcium	4900	mg/kg	06/27/02	DWK
SW6010B	Calcium	6200	mg/kg Dry	06/27/02	DWK
SW6010B	Chromium	8.1	mg/kg	06/27/02	DWK
SW6010B	Chromium	10	mg/kg Dry	06/27/02	DWK
SW6010B	Chromium, TCLP	0.1 J	mg/l	06/28/02	DWK
SW6010B	Cobalt	6	mg/kg	06/27/02	DWK
SW6010B	Cobalt	7.6	mg/kg Dry	06/27/02	DWK
SW6010B	Copper	14	mg/kg	06/27/02	DWK
SW6010B	Copper	18	mg/kg Dry	06/27/02	DWK
SW6010B	Iron	8700	mg/kg	06/27/02	DWK
SW6010B	Iron	11000	mg/kg Dry	06/27/02	DWK
SW6010B	Lead	18	mg/kg	06/27/02	DWK
SW6010B	Lead	23	mg/kg Dry	06/27/02	DWK
SW6010B	Lead, TCLP	0.0075 U	mg/l	06/28/02	DWK
SW6010B	Magnesium	1300	mg/kg	06/27/02	DWK
SW6010B	Magnesium	1600	mg/kg Dry	06/27/02	DWK
SW6010B	Manganese	610	mg/kg	06/27/02	DWK

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Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Date Reported: 08/13/02
Date Received: 06/18/02

Mr. Mike Harnung

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-5-1, GRAB

	Parameter	Results	Units		
SW6010B	Manganese	770	mg/kg Dry	06/27/02	DWK
SW7471A	Mercury	0.04 U	mg/kg	06/20/02	ERS
SW7471A	Mercury	0.051 U	mg/kg Dry	06/20/02	ERS
SW7470A	Mercury, TCLP	0.2 U	mg/l	06/25/02	JEM
SW6010B	Nickel	10	mg/kg	06/27/02	DWK
SW6010B	Nickel	13	mg/kg Dry	06/27/02	DWK
SW6010B	Potassium	1100	mg/kg	06/27/02	DWK
SW6010B	Potassium	1400	mg/kg Dry	06/27/02	DWK
SW6010B	Selenium	0.82 J	mg/kg	06/27/02	DWK
SW6010B	Selenium	1 J	mg/kg Dry	06/27/02	DWK
SW6010B	Selenium, TCLP	0.05 U	mg/l	06/28/02	DWK
SW6010B	Silver	1 U	mg/kg	06/27/02	DWK
SW6010B	Silver	1.3 U	mg/kg Dry	06/27/02	DWK
SW6010B	Silver, TCLP	0.05 U	mg/l	06/28/02	DWK
SW6010B	Sodium	38 J	mg/kg	06/27/02	DWK
SW6010B	Sodium	48 J	mg/kg Dry	06/27/02	DWK
SW6010B	Thallium	0.37 J	mg/kg	06/27/02	DWK
SW6010B	Thallium	0.47 J	mg/kg Dry	06/27/02	DWK
SW6010B	Vanadium	12	mg/kg	06/27/02	DWK
SW6010B	Vanadium	15	mg/kg Dry	06/27/02	DWK
SW6010B	Zinc	81	mg/kg	06/27/02	DWK
SW6010B	Zinc	100	mg/kg Dry	06/27/02	DWK

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2415 18th Street Suite 203

Bettendorf, IA 52722

Mr. Mike Harnung

Date Reported: 08/13/02
Date Received: 06/18/02

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8081A/SW3550B	4,4'-DDD	160 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	4,4'-DDD	200 U	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	4,4'-DDE	9.9 J,A	ug/kg	07/17/02	AMR
SW8081A/SW3550B	4,4'-DDE	12 J	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	4,4'-DDT	15 J	ug/kg	07/17/02	AMR
SW8081A/SW3550B	4,4'-DDT	19 J	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	Aldrin	80 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	Aldrin	100 U	ug/kg Dry	07/17/02	AMR
SW8082/SW3550B	Aroclor 1016	80 U	ug/kg	06/25/02	AMR
SW8082/SW3550B	Aroclor 1016	100 U	ug/kg Dry	06/25/02	AMR
SW8082/SW3550B	Aroclor 1221	160 U	ug/kg	06/25/02	AMR
SW8082/SW3550B	Aroclor 1221	200 U	ug/kg Dry	06/25/02	AMR
SW8082/SW3550B	Aroclor 1232	80 U	ug/kg	06/25/02	AMR
SW8082/SW3550B	Aroclor 1232	100 U	ug/kg Dry	06/25/02	AMR
SW8082/SW3550B	Aroclor 1242	80 U	ug/kg	06/25/02	AMR
SW8082/SW3550B	Aroclor 1242	100 U	ug/kg Dry	06/25/02	AMR
SW8082/SW3550B	Aroclor 1248	80 U	ug/kg	06/25/02	AMR
SW8082/SW3550B	Aroclor 1248	100 U	ug/kg Dry	06/25/02	AMR
SW8082/SW3550B	Aroclor 1254	160 U	ug/kg	06/25/02	AMR
SW8082/SW3550B	Aroclor 1254	200 U	ug/kg Dry	06/25/02	AMR
SW8082/SW3550B	Aroclor 1260	160 U	ug/kg	06/25/02	AMR
SW8082/SW3550B	Aroclor 1260	200 U	ug/kg Dry	06/25/02	AMR

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Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Date Reported: 08/13/02
Date Received: 06/18/02

Mr. Mike Harnung

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8081A/SW3550B	Endrin Aldehyde	160 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	Endrin Aldehyde	200 U	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	GC Column	-		07/17/02	AMR
SW8082/SW3550B	GC Column	-		06/25/02	AMR
SW8081A/SW3550B	GC Column Diameter	1		07/17/02	AMR
SW8082/SW3550B	GC Column Diameter	2		06/25/02	AMR
SW8081A/SW3550B	Heptachlor	80 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	Heptachlor	100 U	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	Heptachlor Epoxide	5.2 J	ug/kg	07/17/02	AMR
SW8081A/SW3550B	Heptachlor Epoxide	6.6 J	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	Level	-		07/17/02	AMR
SW8082/SW3550B	Level	-		06/25/02	AMR
SW8081A/SW3550B	Methoxychlor	800 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	Methoxychlor	1000 U	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	Tetrachloro-m-xylene (Surr.)	96	% Recovery	07/17/02	AMR
SW8081A/SW3550B	Tetrachloro-m-xylene (Surr.)	16.7	ug/kg	07/17/02	AMR
SW8082/SW3550B	Tetrachloro-m-xylene (Surr.)	108	% Recovery	06/25/02	AMR
SW8082/SW3550B	Tetrachloro-m-xylene (Surr.)	16.7	ug/kg	06/25/02	AMR
SW8081A/SW3550B	Toxaphene	800 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	Toxaphene	1000 U	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	alpha-BHC	80 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	alpha-BHC	100 U	ug/kg Dry	07/17/02	AMR

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ACCREDITED IN ACCORDANCE WITH nelac

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Mr. Mike Harnung

Date Reported: 08/13/02
Date Received: 06/18/02

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8081A/SW3550B	beta-BHC	80 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	beta-BHC	100 U	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	delta-BHC	80 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	delta-BHC	100 U	ug/kg Dry	07/17/02	AMR
SW8081A/SW3550B	gamma-BHC (Lindane)	80 U	ug/kg	07/17/02	AMR
SW8081A/SW3550B	gamma-BHC (Lindane)	100 U	ug/kg Dry	07/17/02	AMR
SW8310/SW3550B	Acenaphthene	67 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Acenaphthene	85 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Acenaphthylene	67 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Acenaphthylene	85 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Anthracene	67 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Anthracene	85 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Benzo(a)Anthracene	0.9 J	ug/kg	07/19/02	ELS
SW8310/SW3550B	Benzo(a)Anthracene	1.1 J	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Benzo(a)Pyrene	6.7 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Benzo(a)Pyrene	8.5 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Benzo(b)Fluoranthene	6.7 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Benzo(b)Fluoranthene	8.5 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Benzo(g,h,i)Perylene	6.7 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Benzo(g,h,i)Perylene	8.5 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Benzo(k)Fluoranthene	3.4 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Benzo(k)Fluoranthene	4.3 U	ug/kg Dry	07/19/02	ELS

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Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Date Reported: 08/13/02
Date Received: 06/18/02

Mr. Mike Hamung

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8310/SW3550B	Calibration Beginning Date	-		07/19/02	ELS
SW8310/SW3550B	Calibration Ending Date	-		07/19/02	ELS
SW8310/SW3550B	Carbazole	72	% Recovery	07/19/02	ELS
SW8310/SW3550B	Carbazole	1670	ug/kg	07/19/02	ELS
SW8310/SW3550B	Chrysene	6.7 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Chrysene	8.5 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Dibenz(a,h)Anthracene	6.7 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Dibenz(a,h)Anthracene	8.5 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	ERPIMS Calibration Reference ID	-		07/19/02	ELS
SW8310/SW3550B	Fluoranthene	6.7 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Fluoranthene	8.5 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Fluorene	67 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Fluorene	85 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	GC Column	-		07/19/02	ELS
SW8310/SW3550B	GC Column Diameter	2		07/19/02	ELS
SW8310/SW3550B	Indeno(1,2,3-cd)Pyrene	6.7 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Indeno(1,2,3-cd)Pyrene	8.5 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Naphthalene	67 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Naphthalene	85 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Phenanthrene	67 U	ug/kg	07/19/02	ELS
SW8310/SW3550B	Phenanthrene	85 U	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	Pyrene	6.6 J	ug/kg	07/19/02	ELS

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Mr. Mike Hamung

Date Reported: 08/13/02
Date Received: 06/18/02

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8310/SW3550B	Pyrene	8.4 J	ug/kg Dry	07/19/02	ELS
SW8310/SW3550B	level	-		07/19/02	ELS
SW5035/8260B	1,1,1-Trichloroethane	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	1,1,1-Trichloroethane	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	1,1,2-Trichloroethane	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	1,1,2-Trichloroethane	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	1,1-Dichloroethane	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	1,1-Dichloroethane	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	1,1-Dichloroethene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	1,1-Dichloroethene	6.3 U	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	1,2,4-Trichlorobenzene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	1,2,4-Trichlorobenzene	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	1,2-Dibromo-3-chloropropane	0.55 U	ug/kg	07/02/02	AJB
SW5035/8260B	1,2-Dibromo-3-chloropropane	0.7 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	1,2-Dibromoethane	0.42 U	ug/kg	07/02/02	AJB
SW5035/8260B	1,2-Dibromoethane	0.53 U	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	1,2-Dichlorobenzene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	1,2-Dichlorobenzene	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	1,2-Dichloroethane	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	1,2-Dichloroethane	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	1,2-Dichloroethane-d4 (SURR)	101	% Recovery	07/02/02	AJB
SW5035/8260B	1,2-Dichloroethane-d4 (SURR)	27.8	ug/kg	07/02/02	AJB

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Bettendorf, IA 52722

Mr. Mike Harnung

Date Reported: 08/13/02
Date Received: 06/18/02

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW5035/8260B	1,2-Dichloropropane	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	1,2-Dichloropropane	6.3 U	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	1,3-Dichlorobenzene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	1,3-Dichlorobenzene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	1,4-Dichlorobenzene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	1,4-Dichlorobenzene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2,3,4,6-Tetrachlorophenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,3,4,6-Tetrachlorophenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2,4,5-Trichlorophenol	1600 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,4,5-Trichlorophenol	2000 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2,4,6-Tribromophenol (Surr.)	54.3	% Recovery	06/25/02	CAH
SW8270C/SW3550B	2,4,6-Tribromophenol (Surr.)	3310	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,4,6-Trichlorophenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,4,6-Trichlorophenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2,4-Dichlorophenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,4-Dichlorophenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2,4-Dimethylphenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,4-Dimethylphenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2,4-Dinitrophenol	1600 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,4-Dinitrophenol	2000 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2,4-Dinitrotoluene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,4-Dinitrotoluene	420 U	ug/kg Dry	06/25/02	CAH

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Bettendorf, IA 52722

Date Reported: 08/13/02
Date Received: 06/18/02

Mr. Mike Harnung

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8270C/SW3550B	2,6-Dichlorophenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,6-Dichlorophenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2,6-Dinitrotoluene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2,6-Dinitrotoluene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2-Chloronaphthalene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2-Chloronaphthalene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2-Chlorophenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2-Chlorophenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2-Fluorobiphenyl (Surr.)	72.4	% Recovery	06/25/02	CAH
SW8270C/SW3550B	2-Fluorobiphenyl (Surr.)	1660	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2-Fluorophenol (Surr.)	69.4	% Recovery	06/25/02	CAH
SW8270C/SW3550B	2-Fluorophenol (Surr.)	3310	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2-Methylnaphthalene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2-Methylnaphthalene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2-Methylphenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2-Methylphenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2-Nitroaniline	1600 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2-Nitroaniline	2000 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	2-Nitrophenol	1600 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	2-Nitrophenol	2000 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	3,3'-Dichlorobenzidine	660 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	3,3'-Dichlorobenzidine	840 U	ug/kg Dry	06/25/02	CAH

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Bettendorf, IA 52722

Mr. Mike Harnung

Date Reported: 08/13/02
Date Received: 06/18/02

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8270C/SW3550B	3-Nitroaniline	1600 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	3-Nitroaniline	2000 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	4,6-Dinitro-2-methylphenol	1600 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	4,6-Dinitro-2-methylphenol	2000 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	4-Bromophenyl-phenylether	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	4-Bromophenyl-phenylether	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	4-Chloro-3-Methylphenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	4-Chloro-3-Methylphenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	4-Chloroaniline	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	4-Chloroaniline	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	4-Chlorophenyl-phenyl Ether	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	4-Chlorophenyl-phenyl Ether	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	4-Methylphenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	4-Methylphenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	4-Nitroaniline	1600 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	4-Nitroaniline	2000 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	4-Nitrophenol	1600 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	4-Nitrophenol	2000 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Acenaphthene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Acenaphthene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Acenaphthylene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Acenaphthylene	420 U	ug/kg Dry	06/25/02	CAH

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Mr. Mike Hamung

Date Reported: 08/13/02
Date Received: 06/18/02

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW5035/8260B	Acetone	78	ug/kg	07/02/02	AJB
SW5035/8260B	Acetone	99	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	Aniline	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Aniline	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Anthracene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Anthracene	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	Benzene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Benzene	6.3 U	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	Benzo(a)anthracene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Benzo(a)anthracene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Benzo(a)pyrene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Benzo(a)pyrene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Benzo(b)fluoranthene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Benzo(b)fluoranthene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Benzo(g,h,i)perylene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Benzo(g,h,i)perylene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Benzo(k)fluoranthene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Benzo(k)fluoranthene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Benzyl Alcohol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Benzyl Alcohol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Bis(2-chloroisopropyl)ether	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Bis(2-chloroisopropyl)ether	420 U	ug/kg Dry	06/25/02	CAH

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Date Reported: 08/13/02
Date Received: 06/18/02

Mr. Mike Harnung

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW5035/8260B	Bromodichloromethane	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Bromodichloromethane	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	Bromoform	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Bromoform	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	Bromomethane	10 KU	ug/kg	07/02/02	AJB
SW5035/8260B	Bromomethane	13 KU	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	Butylbenzylphthalate	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Butylbenzylphthalate	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	Calibration Beginning Date	-		07/02/02	AJB
SW8270C/SW3550B	Calibration Beginning Date	-		06/25/02	CAH
SW5035/8260B	Calibration Ending Date	-		07/02/02	AJB
SW8270C/SW3550B	Calibration Ending Date	-		06/25/02	CAH
SW8270C/SW3550B	Carbazole	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Carbazole	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	Carbon Disulfide	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Carbon Disulfide	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	Carbon Tetrachloride	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Carbon Tetrachloride	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	Chlorobenzene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Chlorobenzene	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	Chloroform	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Chloroform	6.3 U	ug/kg Dry	07/02/02	AJB

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ACCREDITED IN ACCORDANCE WITH nelac

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Mr. Mike Harnung

Date Reported: 08/13/02
Date Received: 06/18/02

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8270C/SW3550B	Chrysene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Chrysene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Di-n-Butylphthalate	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Di-n-Butylphthalate	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Di-n-octylphthalate	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Di-n-octylphthalate	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Dibenzo(a,h)anthracene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Dibenzo(a,h)anthracene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Dibenzofuran	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Dibenzofuran	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	Dibromochloromethane	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Dibromochloromethane	6.3 U	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	Diethylphthalate	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Diethylphthalate	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Dimethylphthalate	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Dimethylphthalate	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	ERPIMS Calibration Reference ID	-		07/02/02	AJB
SW8270C/SW3550B	ERPIMS Calibration Reference ID	-		06/25/02	CAH
SW5035/8260B	Ethylbenzene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Ethylbenzene	6.3 U	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	Fluoranthene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Fluoranthene	420 U	ug/kg Dry	06/25/02	CAH

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Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Mr. Mike Harnung

Date Reported: 08/13/02
Date Received: 06/18/02

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8270C/SW3550B	Fluorene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Fluorene	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	GC Column	-		07/02/02	AJB
SW8270C/SW3550B	GC Column	-		06/25/02	CAH
SW5035/8260B	GC Column Diameter	0		07/02/02	AJB
SW8270C/SW3550B	GC Column Diameter	0		06/25/02	CAH
SW8270C/SW3550B	Hexachlorobenzene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Hexachlorobenzene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Hexachlorobutadiene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Hexachlorobutadiene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Hexachlorocyclopentadiene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Hexachlorocyclopentadiene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Hexachloroethane	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Hexachloroethane	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Indeno(1,2,3-cd)pyrene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Indeno(1,2,3-cd)pyrene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Isophorone	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Isophorone	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	Level	-		07/02/02	AJB
SW8270C/SW3550B	Level	-		06/25/02	CAH
SW5035/8260B	Methylene Chloride	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Methylene Chloride	6.3 U	ug/kg Dry	07/02/02	AJB

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Missman Stanley & Associates
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Bettendorf, IA 52722

Date Reported: 08/13/02
Date Received: 06/18/02

Mr. Mike Harnung

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8270C/SW3550B	N-Nitroso-di-n-propylamine	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	N-Nitroso-di-n-propylamine	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	N-Nitrosodimethylamine	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	N-Nitrosodimethylamine	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	N-Nitrosodiphenylamine	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	N-Nitrosodiphenylamine	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Naphthalene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Naphthalene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Nitrobenzene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Nitrobenzene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Nitrobenzene-d5 (Surr.)	60.4	% Recovery	06/25/02	CAH
SW8270C/SW3550B	Nitrobenzene-d5 (Surr.)	1660	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Pentachlorophenol	1600 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Pentachlorophenol	2000 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Phenanthrene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Phenanthrene	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Phenol	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Phenol	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	Phenol-d5 (Surr.)	78.5	% Recovery	06/25/02	CAH
SW8270C/SW3550B	Phenol-d5 (Surr.)	3310	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Pyrene	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Pyrene	420 U	ug/kg Dry	06/25/02	CAH

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Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Mr. Mike Harnung

Date Reported: 08/13/02
Date Received: 06/18/02

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8270C/SW3550B	Pyridine	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	Pyridine	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	Styrene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Styrene	6.3 U	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	Terphenyl-d14 (Surr.)	72.4	% Recovery	06/25/02	CAH
SW8270C/SW3550B	Terphenyl-d14 (Surr.)	1660	ug/kg	06/25/02	CAH
SW5035/8260B	Tetrachloroethene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Tetrachloroethene	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	Toluene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Toluene	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	Toluene-d8 (SURR)	93.6	% Recovery	07/02/02	AJB
SW5035/8260B	Toluene-d8 (SURR)	27.8	ug/kg	07/02/02	AJB
SW5035/8260B	Trichloroethene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	Trichloroethene	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	Vinyl Acetate	10 U	ug/kg	07/02/02	AJB
SW5035/8260B	Vinyl Acetate	13 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	Vinyl Chloride	10 U	ug/kg	07/02/02	AJB
SW5035/8260B	Vinyl Chloride	13 U	ug/kg Dry	07/02/02	AJB
SW8270C/SW3550B	bis(2-Chloroethoxy)methane	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	bis(2-Chloroethoxy)methane	420 U	ug/kg Dry	06/25/02	CAH
SW8270C/SW3550B	bis(2-Chloroethyl) Ether	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	bis(2-Chloroethyl) Ether	420 U	ug/kg Dry	06/25/02	CAH

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2415 18th Street Suite 203

Bettendorf, IA 52722

Date Reported: 08/13/02
Date Received: 06/18/02

Mr. Mike Harnung

Lab Sample Number: 02062522-7 06/18/02
Sample Information: SOILS, B-6-1, GRAB

	Parameter	Results	Units		
SW8270C/SW3550B	bis(2-Ethylhexyl)phthalate	330 U	ug/kg	06/25/02	CAH
SW8270C/SW3550B	bis(2-Ethylhexyl)phthalate	420 U	ug/kg Dry	06/25/02	CAH
SW5035/8260B	cis-1,2-Dichloroethene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	cis-1,2-Dichloroethene	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	cis-1,3-Dichloropropene	2 U	ug/kg	07/02/02	AJB
SW5035/8260B	cis-1,3-Dichloropropene	2.5 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	m,p-Xylene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	m,p-Xylene	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	o-Xylene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	o-Xylene	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	p-Bromofluorobenzene (SURR.)	104	% Recovery	07/02/02	AJB
SW5035/8260B	p-Bromofluorobenzene (SURR.)	27.8	ug/kg	07/02/02	AJB
SW5035/8260B	trans-1,2-Dichloroethene	5 U	ug/kg	07/02/02	AJB
SW5035/8260B	trans-1,2-Dichloroethene	6.3 U	ug/kg Dry	07/02/02	AJB
SW5035/8260B	trans-1,3-Dichloropropene	2 U	ug/kg	07/02/02	AJB
SW5035/8260B	trans-1,3-Dichloropropene	2.5 U	ug/kg Dry	07/02/02	AJB

Note

A: 4,4'-DDE had a 53%D between the columns. Dieldrin had a 83%D between the columns.

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	24-Jun-02 10:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	24-Jun-02 10:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.62	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		19.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		7.16	units	24-Jun-02 14:53	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	03-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	220	mg/kg Dry	03-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				24-Jun-02 06:00	DWK
Final pH		4.990		24-Jun-02 06:00	DWK
SW-846 METHOD 6010B					
Silver	U	1.0	mg/kg	27-Jun-02 10:03	DWK
Silver	U	1.2	mg/kg Dry	27-Jun-02 10:03	DWK
Silver, TCLP	U	0.050	mg/l	28-Jun-02 11:35	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		6700	mg/kg	27-Jun-02 10:03	DWK
Aluminum		8300	mg/kg Dry	27-Jun-02 10:03	DWK
Arsenic		5.2	mg/kg	27-Jun-02 10:03	DWK
Arsenic		6.4	mg/kg Dry	27-Jun-02 10:03	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 11:35	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

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Laboratory Results

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Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
Barium		100	mg/kg	27-Jun-02 10:03	DWK
Barium		120	mg/kg Dry	27-Jun-02 10:03	DWK
Barium, TCLP	J	1.5	mg/l	28-Jun-02 11:35	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.32	mg/kg	27-Jun-02 10:03	DWK
Beryllium	J	0.40	mg/kg Dry	27-Jun-02 10:03	DWK
Calcium		2300	mg/kg	27-Jun-02 10:03	DWK
Calcium		2800	mg/kg Dry	27-Jun-02 10:03	DWK
Cadmium		0.68	mg/kg	27-Jun-02 10:03	DWK
Cadmium		0.84	mg/kg Dry	27-Jun-02 10:03	DWK
Cadmium, TCLP	J	0.0013	mg/l	28-Jun-02 11:35	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		6.9	mg/kg	27-Jun-02 10:03	DWK
Cobalt		8.5	mg/kg Dry	27-Jun-02 10:03	DWK
Chromium		11.	mg/kg	27-Jun-02 10:03	DWK
Chromium		14.	mg/kg Dry	27-Jun-02 10:03	DWK
Chromium, TCLP	J	0.0023	mg/l	28-Jun-02 11:35	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		16.	mg/kg	27-Jun-02 10:03	DWK
Copper		20.	mg/kg Dry	27-Jun-02 10:03	DWK
Iron		10000	mg/kg	27-Jun-02 10:03	DWK
Iron		12000	mg/kg Dry	27-Jun-02 10:03	DWK
Potassium		880	mg/kg	27-Jun-02 10:03	DWK
Potassium		1100	mg/kg Dry	27-Jun-02 10:03	DWK
Magnesium		1400	mg/kg	27-Jun-02 10:03	DWK
Magnesium		1700	mg/kg Dry	27-Jun-02 10:03	DWK
Manganese		700	mg/kg	27-Jun-02 10:03	DWK
Manganese		860	mg/kg Dry	27-Jun-02 10:03	DWK
Sodium	J	21.	mg/kg	27-Jun-02 10:03	DWK
Sodium	J	26.	mg/kg Dry	27-Jun-02 10:03	DWK
Nickel		12.	mg/kg	27-Jun-02 10:03	DWK
Nickel		15.	mg/kg Dry	27-Jun-02 10:03	DWK
Lead		24.	mg/kg	27-Jun-02 10:03	DWK

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Laboratory Results

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Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
Lead		30.	mg/kg Dry	27-Jun-02 10:03	DWK
Lead, TCLP	J	0.0022	mg/l	28-Jun-02 11:35	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 10:03	DWK
Antimony	U	2.5	mg/kg Dry	27-Jun-02 10:03	DWK
Selenium	J	0.81	mg/kg	27-Jun-02 10:03	DWK
Selenium	J	1.0	mg/kg Dry	27-Jun-02 10:03	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 11:35	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.25	mg/kg	27-Jun-02 10:03	DWK
Thallium	J	0.31	mg/kg Dry	27-Jun-02 10:03	DWK
Vanadium		16.	mg/kg	27-Jun-02 10:03	DWK
Vanadium		20.	mg/kg Dry	27-Jun-02 10:03	DWK
Zinc		55.	mg/kg	27-Jun-02 10:03	DWK
Zinc		68.	mg/kg Dry	27-Jun-02 10:03	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 09:23	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.049	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	23-Jul-02 06:01	AMG
alpha-BHC	U	99.	ug/kg Dry	23-Jul-02 06:01	AMG
gamma-BHC (Lindane)	U	80.	ug/kg	23-Jul-02 06:01	AMG
gamma-BHC (Lindane)	U	99.	ug/kg Dry	23-Jul-02 06:01	AMG

000097

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	23-Jul-02 06:01	AMG
beta-BHC	U	99.	ug/kg Dry	23-Jul-02 06:01	AMG
Heptachlor	U	80.	ug/kg	23-Jul-02 06:01	AMG
Heptachlor	U	99.	ug/kg Dry	23-Jul-02 06:01	AMG
delta-BHC	U	80.	ug/kg	23-Jul-02 06:01	AMG
delta-BHC	U	99.	ug/kg Dry	23-Jul-02 06:01	AMG
Aldrin	U	80.	ug/kg	23-Jul-02 06:01	AMG
Aldrin	U	99.	ug/kg Dry	23-Jul-02 06:01	AMG
Heptachlor Epoxide	J	28.	ug/kg	23-Jul-02 06:01	AMG
Heptachlor Epoxide	J	34.	ug/kg Dry	23-Jul-02 06:01	AMG
Endosulfan I	U	80.	ug/kg	23-Jul-02 06:01	AMG
Endosulfan I	U	99.	ug/kg Dry	23-Jul-02 06:01	AMG
4,4'-DDE	J	39.	ug/kg	23-Jul-02 06:01	AMG
4,4'-DDE	J	48.	ug/kg Dry	23-Jul-02 06:01	AMG
Dieldrin	J	22.	ug/kg	23-Jul-02 06:01	AMG
Dieldrin	J	27.	ug/kg Dry	23-Jul-02 06:01	AMG
Endrin	U	160	ug/kg	23-Jul-02 06:01	AMG
Endrin	U	200	ug/kg Dry	23-Jul-02 06:01	AMG
4,4'-DDD	J	6.6	ug/kg	23-Jul-02 06:01	AMG
4,4'-DDD	J	8.1	ug/kg Dry	23-Jul-02 06:01	AMG
Endosulfan II	U	160	ug/kg	23-Jul-02 06:01	AMG
Endosulfan II	U	200	ug/kg Dry	23-Jul-02 06:01	AMG
4,4'-DDT	J	78.	ug/kg	23-Jul-02 06:01	AMG
4,4'-DDT	J	96.	ug/kg Dry	23-Jul-02 06:01	AMG
Endrin Aldehyde	U	160	ug/kg	23-Jul-02 06:01	AMG
Endrin Aldehyde	U	200	ug/kg Dry	23-Jul-02 06:01	AMG
Endosulfan Sulfate	U	160	ug/kg	23-Jul-02 06:01	AMG
Endosulfan Sulfate	U	200	ug/kg Dry	23-Jul-02 06:01	AMG
Methoxychlor	U	800	ug/kg	23-Jul-02 06:01	AMG
Methoxychlor	U	990	ug/kg Dry	23-Jul-02 06:01	AMG
Toxaphene	U	800	ug/kg	23-Jul-02 06:01	AMG
Toxaphene	U	990	ug/kg Dry	23-Jul-02 06:01	AMG
Chlordane (technical)	U	1600	ug/kg	23-Jul-02 06:01	AMG

000092

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	23-Jul-02 06:01	AMG
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 12:26	AMR
Aroclor 1016	U	99.	ug/kg Dry	25-Jun-02 12:26	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 12:26	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 12:26	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 12:26	AMR
Aroclor 1232	U	99.	ug/kg Dry	25-Jun-02 12:26	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 12:26	AMR
Aroclor 1242	U	99.	ug/kg Dry	25-Jun-02 12:26	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 12:26	AMR
Aroclor 1248	U	99.	ug/kg Dry	25-Jun-02 12:26	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 12:26	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 12:26	AMR
Aroclor 1260	J	94.	ug/kg	25-Jun-02 12:26	AMR
Aroclor 1260	J	120	ug/kg Dry	25-Jun-02 12:26	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	19-Jul-02 10:20	ELS
Naphthalene	U	83.	ug/kg Dry	19-Jul-02 10:20	ELS
Acenaphthene	J	46.	ug/kg	19-Jul-02 10:20	ELS
Acenaphthene	J	57.	ug/kg Dry	19-Jul-02 10:20	ELS
Acenaphthylene	U	67.	ug/kg	19-Jul-02 10:20	ELS
Acenaphthylene	U	83.	ug/kg Dry	19-Jul-02 10:20	ELS
Fluorene	U	67.	ug/kg	19-Jul-02 10:20	ELS
Fluorene	U	83.	ug/kg Dry	19-Jul-02 10:20	ELS
Phenanthrene	U	67.	ug/kg	19-Jul-02 10:20	ELS
Phenanthrene	U	83.	ug/kg Dry	19-Jul-02 10:20	ELS
Anthracene	U	67.	ug/kg	19-Jul-02 10:20	ELS
Anthracene	U	83.	ug/kg Dry	19-Jul-02 10:20	ELS
Fluoranthene	U	6.7	ug/kg	19-Jul-02 10:20	ELS
Fluoranthene	U	8.3	ug/kg Dry	19-Jul-02 10:20	ELS
Pyrene	U	6.7	ug/kg	19-Jul-02 10:20	ELS
Pyrene	U	8.3	ug/kg Dry	19-Jul-02 10:20	ELS

000099

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	J	1.7	ug/kg	19-Jul-02 10:20	ELS
Benzo(a)Anthracene	J	2.1	ug/kg Dry	19-Jul-02 10:20	ELS
Chrysene	U	6.7	ug/kg	19-Jul-02 10:20	ELS
Chrysene	U	8.3	ug/kg Dry	19-Jul-02 10:20	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	19-Jul-02 10:20	ELS
Benzo(b)Fluoranthene	U	8.3	ug/kg Dry	19-Jul-02 10:20	ELS
Benzo(k)Fluoranthene	U	3.4	ug/kg	19-Jul-02 10:20	ELS
Benzo(k)Fluoranthene	U	4.2	ug/kg Dry	19-Jul-02 10:20	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	19-Jul-02 10:20	ELS
Benzo(a)Pyrene	U	8.3	ug/kg Dry	19-Jul-02 10:20	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	19-Jul-02 10:20	ELS
Dibenz(a,h)Anthracene	U	8.3	ug/kg Dry	19-Jul-02 10:20	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	19-Jul-02 10:20	ELS
Benzo(g,h,i)Perylene	U	8.3	ug/kg Dry	19-Jul-02 10:20	ELS
Indeno(1,2,3-cd)Pyrene	U	6.7	ug/kg	19-Jul-02 10:20	ELS
Indeno(1,2,3-cd)Pyrene	U	8.3	ug/kg Dry	19-Jul-02 10:20	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	01-Jul-02 18:02	AJB
Vinyl Chloride	U	12.	ug/kg Dry	01-Jul-02 18:02	AJB
Bromomethane	U	10.	ug/kg	01-Jul-02 18:02	AJB
Bromomethane	U	12.	ug/kg Dry	01-Jul-02 18:02	AJB
Methylene Chloride	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Methylene Chloride	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 18:02	AJB
cis-1,3-Dichloropropene	U	2.5	ug/kg Dry	01-Jul-02 18:02	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 18:02	AJB
trans-1,3-Dichloropropene	U	2.5	ug/kg Dry	01-Jul-02 18:02	AJB
Carbon Disulfide	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Carbon Disulfide	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Acetone		140	ug/kg	01-Jul-02 18:02	AJB
Acetone		170	ug/kg Dry	01-Jul-02 18:02	AJB
1,1-Dichloroethene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
1,1-Dichloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	01-Jul-02 18:02	AJB
1,1-Dichloroethane	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
trans-1,2-Dichloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
cis-1,2-Dichloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Chloroform	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Chloroform	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
1,2-Dichloroethane	U	5.0	ug/kg	01-Jul-02 18:02	AJB
1,2-Dichloroethane	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	01-Jul-02 18:02	AJB
1,1,1-Trichloroethane	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Carbon Tetrachloride	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Carbon Tetrachloride	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Vinyl Acetate	U	10.	ug/kg	01-Jul-02 18:02	AJB
Vinyl Acetate	U	12.	ug/kg Dry	01-Jul-02 18:02	AJB
Bromodichloromethane	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Bromodichloromethane	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
1,2-Dichloropropane	U	5.0	ug/kg	01-Jul-02 18:02	AJB
1,2-Dichloropropane	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Trichloroethene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Trichloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Dibromochloromethane	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Dibromochloromethane	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	01-Jul-02 18:02	AJB
1,1,2-Trichloroethane	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Benzene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Benzene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
1,2-Dibromoethane	U	0.42	ug/kg	01-Jul-02 18:02	AJB
1,2-Dibromoethane	U	0.52	ug/kg Dry	01-Jul-02 18:02	AJB
Bromoform	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Bromoform	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Tetrachloroethene	U	5.0	ug/kg	01-Jul-02 18:02	AJB

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Toluene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Toluene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Chlorobenzene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Chlorobenzene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
Ethylbenzene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Ethylbenzene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	01-Jul-02 18:02	AJB
1,2-Dibromo-3-chloropropane	U	0.68	ug/kg Dry	01-Jul-02 18:02	AJB
Styrene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
Styrene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
m,p-Xylene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
m,p-Xylene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
o-Xylene	U	5.0	ug/kg	01-Jul-02 18:02	AJB
o-Xylene	U	6.2	ug/kg Dry	01-Jul-02 18:02	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 18:13	CAH
N-Nitrosodimethylamine	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Pyridine	U	330	ug/kg	25-Jun-02 18:13	CAH
Pyridine	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Aniline	U	330	ug/kg	25-Jun-02 18:13	CAH
Aniline	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 18:13	CAH
bis(2-Chloroethyl) Ether	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 18:13	CAH
2-Chlorophenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Phenol	U	330	ug/kg	25-Jun-02 18:13	CAH
Phenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 18:13	CAH
1,3-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 18:13	CAH
1,4-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 18:13	CAH

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harmung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 18:13	CAH
Benzyl Alcohol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	25-Jun-02 18:13	CAH
Bis(2-chloroisopropyl)ether	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Hexachloroethane	U	330	ug/kg	25-Jun-02 18:13	CAH
Hexachloroethane	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 18:13	CAH
2-Methylphenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 18:13	CAH
N-Nitroso-di-n-propylamine	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 18:13	CAH
4-Methylphenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 18:13	CAH
Nitrobenzene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Isophorone	U	330	ug/kg	25-Jun-02 18:13	CAH
Isophorone	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 18:13	CAH
2-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 18:13	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 18:13	CAH
2,4-Dimethylphenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 18:13	CAH
bis(2-Chloroethoxy)methane	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 18:13	CAH
2,4-Dichlorophenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 18:13	CAH
1,2,4-Trichlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 18:13	CAH
Naphthalene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 18:13	CAH
2,6-Dichlorophenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 18:13	CAH
4-Chloroaniline	U	410	ug/kg Dry	25-Jun-02 18:13	CAH

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 18:13	CAH
Hexachlorobutadiene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 18:13	CAH
4-Chloro-3-Methylphenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 18:13	CAH
2-Methylnaphthalene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 18:13	CAH
Hexachlorocyclopentadiene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 18:13	CAH
2,4,6-Trichlorophenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 18:13	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	25-Jun-02 18:13	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 18:13	CAH
2-Chloronaphthalene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 18:13	CAH
2-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 18:13	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 18:13	CAH
Dimethylphthalate	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 18:13	CAH
Acenaphthylene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 18:13	CAH
2,6-Dinitrotoluene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 18:13	CAH
3-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 18:13	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 18:13	CAH
Acenaphthene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 18:13	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	25-Jun-02 18:13	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 18:13	CAH
Dibenzofuran	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 18:13	CAH
2,4-Dinitrotoluene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 18:13	CAH

00010

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(309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689

Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 18:13	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 18:13	CAH
2,3,4,6-Tetrachlorophenol	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 18:13	CAH
Diethylphthalate	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Fluorene	U	330	ug/kg	25-Jun-02 18:13	CAH
Fluorene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 18:13	CAH
4-Chlorophenyl-phenyl Ether	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 18:13	CAH
4-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 18:13	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 18:13	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	25-Jun-02 18:13	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 18:13	CAH
N-Nitrosodiphenylamine	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 18:13	CAH
4-Bromophenyl-phenylether	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 18:13	CAH
Hexachlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 18:13	CAH
Pentachlorophenol	U	2000	ug/kg Dry	25-Jun-02 18:13	CAH
Carbazole	U	330	ug/kg	25-Jun-02 18:13	CAH
Carbazole	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Phenanthrene	U	330	ug/kg	25-Jun-02 18:13	CAH
Phenanthrene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Anthracene	U	330	ug/kg	25-Jun-02 18:13	CAH
Anthracene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 18:13	CAH
Di-n-Butylphthalate	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 18:13	CAH
Fluoranthene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Pyrene	U	330	ug/kg	25-Jun-02 18:13	CAH
Pyrene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH

000106

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-8
Client ID: SOILS
Site: B-7-1
Locator: GRAB
Collect Date: 18-JUN-02 14:45

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 18:13	CAH
Butylbenzylphthalate	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 18:13	CAH
Benzo(a)anthracene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 18:13	CAH
3,3'-Dichlorobenzidine	U	810	ug/kg Dry	25-Jun-02 18:13	CAH
Chrysene	U	330	ug/kg	25-Jun-02 18:13	CAH
Chrysene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 18:13	CAH
bis(2-Ethylhexyl)phthalate	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 18:13	CAH
Di-n-octylphthalate	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 18:13	CAH
Benzo(b)fluoranthene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 18:13	CAH
Benzo(k)fluoranthene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 18:13	CAH
Benzo(a)pyrene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 18:13	CAH
Indeno(1,2,3-cd)pyrene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 18:13	CAH
Dibenzo(a,h)anthracene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 18:13	CAH
Benzo(g,h,i)perylene	U	410	ug/kg Dry	25-Jun-02 18:13	CAH

000106

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	24-Jun-02 10:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	24-Jun-02 10:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.62	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		19.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		6.81	units	24-Jun-02 14:56	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	03-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	220	mg/kg Dry	03-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				24-Jun-02 06:00	DWK
Final pH		4.990		24-Jun-02 06:00	DWK
SW-846 METHOD 6010B					
Silver	J	0.18	mg/kg	27-Jun-02 10:09	DWK
Silver	J	0.22	mg/kg Dry	27-Jun-02 10:09	DWK
Silver, TCLP	U	0.050	mg/l	28-Jun-02 11:40	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		10000	mg/kg	27-Jun-02 10:09	DWK
Aluminum		12000	mg/kg Dry	27-Jun-02 10:09	DWK
Arsenic		5.8	mg/kg	27-Jun-02 10:09	DWK
Arsenic		7.2	mg/kg Dry	27-Jun-02 10:09	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 11:40	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

*: Compound determined to be not confirmed based on a %D of 112.

000197

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
Barium		140	mg/kg	27-Jun-02 10:09	DWK
Barium		170	mg/kg Dry	27-Jun-02 10:09	DWK
Barium, TCLP	J	1.5	mg/l	28-Jun-02 11:40	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.39	mg/kg	27-Jun-02 10:09	DWK
Beryllium	J	0.48	mg/kg Dry	27-Jun-02 10:09	DWK
Calcium		3100	mg/kg	27-Jun-02 10:09	DWK
Calcium		3800	mg/kg Dry	27-Jun-02 10:09	DWK
Cadmium		1.1	mg/kg	27-Jun-02 10:09	DWK
Cadmium		1.4	mg/kg Dry	27-Jun-02 10:09	DWK
Cadmium, TCLP	J	0.0021	mg/l	28-Jun-02 11:40	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		10.	mg/kg	27-Jun-02 10:09	DWK
Cobalt		12.	mg/kg Dry	27-Jun-02 10:09	DWK
Chromium		16.	mg/kg	27-Jun-02 10:09	DWK
Chromium		20.	mg/kg Dry	27-Jun-02 10:09	DWK
Chromium, TCLP	J	0.0024	mg/l	28-Jun-02 11:40	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		41.	mg/kg	27-Jun-02 10:09	DWK
Copper		51.	mg/kg Dry	27-Jun-02 10:09	DWK
Iron		13000	mg/kg	27-Jun-02 10:09	DWK
Iron		16000	mg/kg Dry	27-Jun-02 10:09	DWK
Potassium		1200	mg/kg	27-Jun-02 10:09	DWK
Potassium		1500	mg/kg Dry	27-Jun-02 10:09	DWK
Magnesium		1900	mg/kg	27-Jun-02 10:09	DWK
Magnesium		2300	mg/kg Dry	27-Jun-02 10:09	DWK
Manganese		870	mg/kg	27-Jun-02 10:09	DWK
Manganese		1100	mg/kg Dry	27-Jun-02 10:09	DWK
Sodium	J	35.	mg/kg	27-Jun-02 10:09	DWK
Sodium	J	43.	mg/kg Dry	27-Jun-02 10:09	DWK
Nickel		16.	mg/kg	27-Jun-02 10:09	DWK
Nickel		20.	mg/kg Dry	27-Jun-02 10:09	DWK
Lead		53.	mg/kg	27-Jun-02 10:09	DWK

Page 99

K: Compound determined to be not confirmed based on a %D of 112.

000103

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
Lead		65.	mg/kg Dry	27-Jun-02 10:09	DWK
Lead, TCLP	J	0.0033	mg/l	28-Jun-02 11:40	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 10:09	DWK
Antimony	U	2.5	mg/kg Dry	27-Jun-02 10:09	DWK
Selenium		1.1	mg/kg	27-Jun-02 10:09	DWK
Selenium		1.4	mg/kg Dry	27-Jun-02 10:09	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 11:40	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.59	mg/kg	27-Jun-02 10:09	DWK
Thallium	J	0.73	mg/kg Dry	27-Jun-02 10:09	DWK
Vanadium		22.	mg/kg	27-Jun-02 10:09	DWK
Vanadium		27.	mg/kg Dry	27-Jun-02 10:09	DWK
Zinc		120	mg/kg	27-Jun-02 10:09	DWK
Zinc		150	mg/kg Dry	27-Jun-02 10:09	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 09:29	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury		0.065	mg/kg	20-Jun-02 12:00	ERS
Mercury		0.080	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	17-Jul-02 13:26	AMR
alpha-BHC	U	99.	ug/kg Dry	17-Jul-02 13:26	AMR
gamma-BHC (Lindane)	U	80.	ug/kg	17-Jul-02 13:26	AMR
gamma-BHC (Lindane)	U	99.	ug/kg Dry	17-Jul-02 13:26	AMR

X: Compound determined to be not confirmed based on a %D of 112.

000109

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	17-Jul-02 13:26	AMR
beta-BHC	U	99.	ug/kg Dry	17-Jul-02 13:26	AMR
Heptachlor	U	80.	ug/kg	17-Jul-02 13:26	AMR
Heptachlor	U	99.	ug/kg Dry	17-Jul-02 13:26	AMR
delta-BHC	U	80.	ug/kg	17-Jul-02 13:26	AMR
delta-BHC	U	99.	ug/kg Dry	17-Jul-02 13:26	AMR
Aldrin	U	80.	ug/kg	17-Jul-02 13:26	AMR
Aldrin	U	99.	ug/kg Dry	17-Jul-02 13:26	AMR
Heptachlor Epoxide	J	4.3	ug/kg	17-Jul-02 13:26	AMR
Heptachlor Epoxide	J	5.3	ug/kg Dry	17-Jul-02 13:26	AMR
Endosulfan I	U	80.	ug/kg	17-Jul-02 13:26	AMR
Endosulfan I	U	99.	ug/kg Dry	17-Jul-02 13:26	AMR
4,4'-DDE	J	150	ug/kg	17-Jul-02 13:26	AMR
4,4'-DDE	J	180	ug/kg Dry	17-Jul-02 13:26	AMR
Dieldrin	J	18.	ug/kg	17-Jul-02 13:26	AMR
Dieldrin	J	22.	ug/kg Dry	17-Jul-02 13:26	AMR
Endrin	U	160	ug/kg	17-Jul-02 13:26	AMR
Endrin	U	200	ug/kg Dry	17-Jul-02 13:26	AMR
4,4'-DDD	U,X	160	ug/kg	17-Jul-02 13:26	AMR
4,4'-DDD	U	200	ug/kg Dry	17-Jul-02 13:26	AMR
Endosulfan II	U	160	ug/kg	17-Jul-02 13:26	AMR
Endosulfan II	U	200	ug/kg Dry	17-Jul-02 13:26	AMR
4,4'-DDT		270	ug/kg	17-Jul-02 13:26	AMR
4,4'-DDT		330	ug/kg Dry	17-Jul-02 13:26	AMR
Endrin Aldehyde	U	160	ug/kg	17-Jul-02 13:26	AMR
Endrin Aldehyde	U	200	ug/kg Dry	17-Jul-02 13:26	AMR
Endosulfan Sulfate	U	160	ug/kg	17-Jul-02 13:26	AMR
Endosulfan Sulfate	U	200	ug/kg Dry	17-Jul-02 13:26	AMR
Methoxychlor	U	800	ug/kg	17-Jul-02 13:26	AMR
Methoxychlor	U	990	ug/kg Dry	17-Jul-02 13:26	AMR
Toxaphene	U	800	ug/kg	17-Jul-02 13:26	AMR
Toxaphene	U	990	ug/kg Dry	17-Jul-02 13:26	AMR
Chlordane (technical)	U	1600	ug/kg	17-Jul-02 13:26	AMR

X: Compound determined to be not confirmed based on a %D of 112.

000110

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	17-Jul-02 13:26	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 08:16	AMR
Aroclor 1016	U	99.	ug/kg Dry	25-Jun-02 08:16	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 08:16	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 08:16	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 08:16	AMR
Aroclor 1232	U	99.	ug/kg Dry	25-Jun-02 08:16	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 08:16	AMR
Aroclor 1242	U	99.	ug/kg Dry	25-Jun-02 08:16	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 08:16	AMR
Aroclor 1248	U	99.	ug/kg Dry	25-Jun-02 08:16	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 08:16	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 08:16	AMR
Aroclor 1260	J	28.	ug/kg	25-Jun-02 08:16	AMR
Aroclor 1260	J	34.	ug/kg Dry	25-Jun-02 08:16	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	19-Jul-02 10:54	ELS
Naphthalene	U	83.	ug/kg Dry	19-Jul-02 10:54	ELS
Acenaphthene	J	30.	ug/kg	19-Jul-02 10:54	ELS
Acenaphthene	J	37.	ug/kg Dry	19-Jul-02 10:54	ELS
Acenaphthylene	U	67.	ug/kg	19-Jul-02 10:54	ELS
Acenaphthylene	U	83.	ug/kg Dry	19-Jul-02 10:54	ELS
Fluorene	U	67.	ug/kg	19-Jul-02 10:54	ELS
Flucrene	U	83.	ug/kg Dry	19-Jul-02 10:54	ELS
Phenanthrene	U	67.	ug/kg	19-Jul-02 10:54	ELS
Phenanthrene	U	83.	ug/kg Dry	19-Jul-02 10:54	ELS
Anthracene	U	67.	ug/kg	19-Jul-02 10:54	ELS
Anthracene	U	83.	ug/kg Dry	19-Jul-02 10:54	ELS
Fluoranthene	U	6.7	ug/kg	19-Jul-02 10:54	ELS
Fluoranthene	U	8.3	ug/kg Dry	19-Jul-02 10:54	ELS
Pyrene	J	6.3	ug/kg	19-Jul-02 10:54	ELS
Pyrene	J	7.8	ug/kg Dry	19-Jul-02 10:54	ELS

K: Compound determined to be not confirmed based on a %D of 112.

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ACCREDITED IN ACCORDANCE WITH nelac

Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	J	1.3	ug/kg	19-Jul-02 10:54	ELS
Benzo(a)Anthracene	J	1.6	ug/kg Dry	19-Jul-02 10:54	ELS
Chrysene	U	6.7	ug/kg	19-Jul-02 10:54	ELS
Chrysene	U	8.3	ug/kg Dry	19-Jul-02 10:54	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	19-Jul-02 10:54	ELS
Benzo(b)Fluoranthene	U	8.3	ug/kg Dry	19-Jul-02 10:54	ELS
Benzo(k)Fluoranthene	U	3.4	ug/kg	19-Jul-02 10:54	ELS
Benzo(k)Fluoranthene	U	4.2	ug/kg Dry	19-Jul-02 10:54	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	19-Jul-02 10:54	ELS
Benzo(a)Pyrene	U	8.3	ug/kg Dry	19-Jul-02 10:54	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	19-Jul-02 10:54	ELS
Dibenz(a,h)Anthracene	U	8.3	ug/kg Dry	19-Jul-02 10:54	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	19-Jul-02 10:54	ELS
Benzo(g,h,i)Perylene	U	8.3	ug/kg Dry	19-Jul-02 10:54	ELS
Indeno(1,2,3-cd)Pyrene	U	6.7	ug/kg	19-Jul-02 10:54	ELS
Indeno(1,2,3-cd)Pyrene	U	8.3	ug/kg Dry	19-Jul-02 10:54	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	01-Jul-02 18:38	AJB
Vinyl Chloride	U	12.	ug/kg Dry	01-Jul-02 18:38	AJB
Bromomethane	U	10.	ug/kg	01-Jul-02 18:38	AJB
Bromomethane	U	12.	ug/kg Dry	01-Jul-02 18:38	AJB
Methylene Chloride	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Methylene Chloride	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 18:38	AJB
cis-1,3-Dichloropropene	U	2.5	ug/kg Dry	01-Jul-02 18:38	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 18:38	AJB
trans-1,3-Dichloropropene	U	2.5	ug/kg Dry	01-Jul-02 18:38	AJB
Carbon Disulfide	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Carbon Disulfide	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Acetone		120	ug/kg	01-Jul-02 18:38	AJB
Acetone		150	ug/kg Dry	01-Jul-02 18:38	AJB
1,1-Dichloroethene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
1,1-Dichloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02052522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	01-Jul-02 18:38	AJB
1,1-Dichloroethane	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
trans-1,2-Dichloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
cis-1,2-Dichloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Chloroform	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Chloroform	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
1,2-Dichloroethane	U	5.0	ug/kg	01-Jul-02 18:38	AJB
1,2-Dichloroethane	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	01-Jul-02 18:38	AJB
1,1,1-Trichloroethane	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Carbon Tetrachloride	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Carbon Tetrachloride	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Vinyl Acetate	U	10.	ug/kg	01-Jul-02 18:38	AJB
Vinyl Acetate	U	12.	ug/kg Dry	01-Jul-02 18:38	AJB
Bromodichloromethane	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Bromodichloromethane	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
1,2-Dichloropropane	U	5.0	ug/kg	01-Jul-02 18:38	AJB
1,2-Dichloropropane	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Trichloroethene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Trichloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Dibromochloromethane	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Dibromochloromethane	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	01-Jul-02 18:38	AJB
1,1,2-Trichloroethane	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Benzene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Benzene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
1,2-Dibromoethane	U	0.42	ug/kg	01-Jul-02 18:38	AJB
1,2-Dibromoethane	U	0.52	ug/kg Dry	01-Jul-02 18:38	AJB
Bromoform	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Bromoform	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Tetrachloroethene	U	5.0	ug/kg	01-Jul-02 18:38	AJB

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000113

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Toluene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Toluene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Chlorobenzene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Chlorobenzene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
Ethylbenzene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Ethylbenzene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	01-Jul-02 18:38	AJB
1,2-Dibromo-3-chloropropane	U	0.68	ug/kg Dry	01-Jul-02 18:38	AJB
Styrene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
Styrene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
m,p-Xylene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
m,p-Xylene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
o-Xylene	U	5.0	ug/kg	01-Jul-02 18:38	AJB
o-Xylene	U	6.2	ug/kg Dry	01-Jul-02 18:38	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 18:58	CAH
N-Nitrosodimethylamine	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Pyridine	U	330	ug/kg	25-Jun-02 18:58	CAH
Pyridine	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Aniline	U	330	ug/kg	25-Jun-02 18:58	CAH
Aniline	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 18:58	CAH
bis(2-Chloroethyl) Ether	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 18:58	CAH
2-Chlorophenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Phenol	U	330	ug/kg	25-Jun-02 18:58	CAH
Phenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 18:58	CAH
1,3-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 18:58	CAH
1,4-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 18:58	CAH

k: Compound determined to be not confirmed based on a %D of 112.

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 18:58	CAH
Benzyl Alcohol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	25-Jun-02 18:58	CAH
Bis(2-chloroisopropyl)ether	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Hexachlorbethane	U	330	ug/kg	25-Jun-02 18:58	CAH
Hexachloroethane	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 18:58	CAH
2-Methylphenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 18:58	CAH
N-Nitroso-di-n-propylamine	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 18:58	CAH
4-Methylphenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 18:58	CAH
Nitrobenzene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Isophorone	U	330	ug/kg	25-Jun-02 18:58	CAH
Isophorone	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 18:58	CAH
2-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 18:58	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 18:58	CAH
2,4-Dimethylphenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 18:58	CAH
bis(2-Chloroethoxy)methane	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 18:58	CAH
2,4-Dichlorophenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 18:58	CAH
1,2,4-Trichlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 18:58	CAH
Naphthalene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 18:58	CAH
2,6-Dichlorophenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 18:58	CAH
4-Chloroaniline	U	410	ug/kg Dry	25-Jun-02 18:58	CAH

Page 106

K: Compound determined to be not confirmed based on a %D of 112.

000115

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 18:58	CAH
Hexachlorobutadiene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 18:58	CAH
4-Chloro-3-Methylphenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 18:58	CAH
2-Methylnaphthalene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 18:58	CAH
Hexachlorocyclopentadiene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 18:58	CAH
2,4,6-Trichlorophenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 18:58	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	25-Jun-02 18:58	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 18:58	CAH
2-Chloronaphthalene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 18:58	CAH
2-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 18:58	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 18:58	CAH
Dimethylphthalate	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 18:58	CAH
Acenaphthylene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 18:58	CAH
2,6-Dinitrotoluene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 18:58	CAH
3-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 18:58	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 18:58	CAH
Acenaphthene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 18:58	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	25-Jun-02 18:58	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 18:58	CAH
Dibenzofuran	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 18:58	CAH
2,4-Dinitrotoluene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 18:58	CAH

K: Compound determined to be not confirmed based on a %D of 112.

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 18:58	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 18:58	CAH
2,3,4,6-Tetrachlorophenol	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 18:58	CAH
Diethylphthalate	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Fluorene	U	330	ug/kg	25-Jun-02 18:58	CAH
Fluorene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 18:58	CAH
4-Chlorophenyl-phenyl Ether	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 18:58	CAH
4-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 18:58	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 18:58	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	25-Jun-02 18:58	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 18:58	CAH
N-Nitrosodiphenylamine	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 18:58	CAH
4-Bromophenyl-phenylether	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 18:58	CAH
Hexachlorobenzene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 18:58	CAH
Pentachlorophenol	U	2000	ug/kg Dry	25-Jun-02 18:58	CAH
Carbazole	U	330	ug/kg	25-Jun-02 18:58	CAH
Carbazole	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Phenanthrene	U	330	ug/kg	25-Jun-02 18:58	CAH
Phenanthrene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Anthracene	U	330	ug/kg	25-Jun-02 18:58	CAH
Anthracene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 18:58	CAH
Di-n-Butylphthalate	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 18:58	CAH
Fluoranthene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Pyrene	U	330	ug/kg	25-Jun-02 18:58	CAH
Pyrene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH

K: Compound determined to be not confirmed based on a %D of 112.

000117

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-9
Client ID: SOILS
Site: B-8-1
Locator: GRAB
Collect Date: 18-JUN-02 15:00

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 18:58	CAH
Butylbenzylphthalate	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 18:58	CAH
Benzo(a)anthracene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 18:58	CAH
3,3'-Dichlorobenzidine	U	810	ug/kg Dry	25-Jun-02 18:58	CAH
Chrysene	U	330	ug/kg	25-Jun-02 18:58	CAH
Chrysene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 18:58	CAH
bis(2-Ethylhexyl)phthalate	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 18:58	CAH
Di-n-octylphthalate	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 18:58	CAH
Benzo(b)fluoranthene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 18:58	CAH
Benzo(k)fluoranthene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 18:58	CAH
Benzo(a)pyrene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 18:58	CAH
Indeno(1,2,3-cd)pyrene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 18:58	CAH
Dibenzo(a,h)anthracene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 18:58	CAH
Benzo(g,h,i)perylene	U	410	ug/kg Dry	25-Jun-02 18:58	CAH

k: Compound determined to be not confirmed based on a %D of 112.

recycled paper

000118

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	24-Jun-02 10:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	24-Jun-02 10:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.61	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		18.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		6.63	units	24-Jun-02 15:15	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	03-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	220	mg/kg Dry	03-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				24-Jun-02 06:00	DWK
Final pH		4.970		24-Jun-02 06:00	DWK
SW-846 METHOD 6010B					
Silver	U	1.0	mg/kg	27-Jun-02 10:16	DWK
Silver	U	1.2	mg/kg Dry	27-Jun-02 10:16	DWK
Silver, TCLP	U	0.050	mg/l	28-Jun-02 11:46	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		13000	mg/kg	27-Jun-02 10:16	DWK
Aluminum		16000	mg/kg Dry	27-Jun-02 10:16	DWK
Arsenic		5.3	mg/kg	27-Jun-02 10:16	DWK
Arsenic		6.5	mg/kg Dry	27-Jun-02 10:16	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 11:46	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

000119

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
Barium		120	mg/kg	27-Jun-02 10:16	DWK
Barium		150	mg/kg Dry	27-Jun-02 10:16	DWK
Barium, TCLP	J	2.0	mg/l	28-Jun-02 11:46	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.34	mg/kg	27-Jun-02 10:16	DWK
Beryllium	J	0.41	mg/kg Dry	27-Jun-02 10:16	DWK
Calcium		3000	mg/kg	27-Jun-02 10:16	DWK
Calcium		3600	mg/kg Dry	27-Jun-02 10:16	DWK
Cadmium		0.61	mg/kg	27-Jun-02 10:16	DWK
Cadmium		0.74	mg/kg Dry	27-Jun-02 10:16	DWK
Cadmium, TCLP	J	0.0013	mg/l	28-Jun-02 11:46	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		4.3	mg/kg	27-Jun-02 10:16	DWK
Cobalt		5.2	mg/kg Dry	27-Jun-02 10:16	DWK
Chromium		19.	mg/kg	27-Jun-02 10:16	DWK
Chromium		23.	mg/kg Dry	27-Jun-02 10:16	DWK
Chromium, TCLP	J	0.0023	mg/l	28-Jun-02 11:46	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		21.	mg/kg	27-Jun-02 10:16	DWK
Copper		26.	mg/kg Dry	27-Jun-02 10:16	DWK
Iron		13000	mg/kg	27-Jun-02 10:16	DWK
Iron		16000	mg/kg Dry	27-Jun-02 10:16	DWK
Potassium		1700	mg/kg	27-Jun-02 10:16	DWK
Potassium		2100	mg/kg Dry	27-Jun-02 10:16	DWK
Magnesium		2300	mg/kg	27-Jun-02 10:16	DWK
Magnesium		2800	mg/kg Dry	27-Jun-02 10:16	DWK
Manganese		330	mg/kg	27-Jun-02 10:16	DWK
Manganese		400	mg/kg Dry	27-Jun-02 10:16	DWK
Sodium	J	34.	mg/kg	27-Jun-02 10:16	DWK
Sodium	J	41.	mg/kg Dry	27-Jun-02 10:16	DWK
Nickel		13.	mg/kg	27-Jun-02 10:16	DWK
Nickel		16.	mg/kg Dry	27-Jun-02 10:16	DWK
Lead		22.	mg/kg	27-Jun-02 10:16	DWK

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
Lead		27.	mg/kg Dry	27-Jun-02 10:16	DWK
Lead, TCLP	J	0.0022	mg/l	28-Jun-02 11:46	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 10:16	DWK
Antimony	U	2.4	mg/kg Dry	27-Jun-02 10:16	DWK
Selenium	J	0.99	mg/kg	27-Jun-02 10:16	DWK
Selenium	J	1.2	mg/kg Dry	27-Jun-02 10:16	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 11:46	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.35	mg/kg	27-Jun-02 10:16	DWK
Thallium	J	0.43	mg/kg Dry	27-Jun-02 10:16	DWK
Vanadium		28.	mg/kg	27-Jun-02 10:16	DWK
Vanadium		34.	mg/kg Dry	27-Jun-02 10:16	DWK
Zinc		68.	mg/kg	27-Jun-02 10:16	DWK
Zinc		83.	mg/kg Dry	27-Jun-02 10:16	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 09:34	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.049	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	17-Jul-02 16:28	AMR
alpha-BHC	U	98.	ug/kg Dry	17-Jul-02 16:28	AMR
gamma-BHC (Lindane)	U	80.	ug/kg	17-Jul-02 16:28	AMR
gamma-BHC (Lindane)	U	98.	ug/kg Dry	17-Jul-02 16:28	AMR

000121

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	17-Jul-02 16:28	AMR
beta-BHC	U	98.	ug/kg Dry	17-Jul-02 16:28	AMR
Heptachlor	U	80.	ug/kg	17-Jul-02 16:28	AMR
Heptachlor	U	98.	ug/kg Dry	17-Jul-02 16:28	AMR
delta-BHC	U	80.	ug/kg	17-Jul-02 16:28	AMR
delta-BHC	U	98.	ug/kg Dry	17-Jul-02 16:28	AMR
Aldrin	U	80.	ug/kg	17-Jul-02 16:28	AMR
Aldrin	U	98.	ug/kg Dry	17-Jul-02 16:28	AMR
Heptachlor Epoxide	J	18.	ug/kg	17-Jul-02 16:28	AMR
Heptachlor Epoxide	J	22.	ug/kg Dry	17-Jul-02 16:28	AMR
Endosulfan I	U	80.	ug/kg	17-Jul-02 16:28	AMR
Endosulfan I	U	98.	ug/kg Dry	17-Jul-02 16:28	AMR
4,4'-DDE	J	27.	ug/kg	17-Jul-02 16:28	AMR
4,4'-DDE	J	33.	ug/kg Dry	17-Jul-02 16:28	AMR
Dieldrin	J	20.	ug/kg	17-Jul-02 16:28	AMR
Dieldrin	J	24.	ug/kg Dry	17-Jul-02 16:28	AMR
Endrin	U	160	ug/kg	17-Jul-02 16:28	AMR
Endrin	U	200	ug/kg Dry	17-Jul-02 16:28	AMR
4,4'-DDD	J	9.5	ug/kg	17-Jul-02 16:28	AMR
4,4'-DDD	J	12.	ug/kg Dry	17-Jul-02 16:28	AMR
Endosulfan II	U	160	ug/kg	17-Jul-02 16:28	AMR
Endosulfan II	U	200	ug/kg Dry	17-Jul-02 16:28	AMR
4,4'-DDT	J	52.	ug/kg	17-Jul-02 16:28	AMR
4,4'-DDT	J	63.	ug/kg Dry	17-Jul-02 16:28	AMR
Endrin Aldehyde	U	160	ug/kg	17-Jul-02 16:28	AMR
Endrin Aldehyde	U	200	ug/kg Dry	17-Jul-02 16:28	AMR
Endosulfan Sulfate	U	160	ug/kg	17-Jul-02 16:28	AMR
Endosulfan Sulfate	U	200	ug/kg Dry	17-Jul-02 16:28	AMR
Methoxychlor	U	800	ug/kg	17-Jul-02 16:28	AMR
Methoxychlor	U	980	ug/kg Dry	17-Jul-02 16:28	AMR
Toxaphene	U	800	ug/kg	17-Jul-02 16:28	AMR
Toxaphene	U	980	ug/kg Dry	17-Jul-02 16:28	AMR
Chlordane (technical)	U	1600	ug/kg	17-Jul-02 16:28	AMR

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	17-Jul-02 16:28	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 08:52	AMR
Aroclor 1016	U	98.	ug/kg Dry	25-Jun-02 08:52	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 08:52	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 08:52	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 08:52	AMR
Aroclor 1232	U	98.	ug/kg Dry	25-Jun-02 08:52	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 08:52	AMR
Aroclor 1242	U	98.	ug/kg Dry	25-Jun-02 08:52	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 08:52	AMR
Aroclor 1248	U	98.	ug/kg Dry	25-Jun-02 08:52	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 08:52	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 08:52	AMR
Aroclor 1260	J	44.	ug/kg	25-Jun-02 08:52	AMR
Aroclor 1260	J	54.	ug/kg Dry	25-Jun-02 08:52	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	19-Jul-02 11:27	ELS
Naphthalene	U	82.	ug/kg Dry	19-Jul-02 11:27	ELS
Acenaphthene	J	28.	ug/kg	19-Jul-02 11:27	ELS
Acenaphthene	J	34.	ug/kg Dry	19-Jul-02 11:27	ELS
Acenaphthylene	U	67.	ug/kg	19-Jul-02 11:27	ELS
Acenaphthylene	U	82.	ug/kg Dry	19-Jul-02 11:27	ELS
Fluorene	U	67.	ug/kg	19-Jul-02 11:27	ELS
Fluorene	U	82.	ug/kg Dry	19-Jul-02 11:27	ELS
Phenanthrene	U	67.	ug/kg	19-Jul-02 11:27	ELS
Phenanthrene	U	82.	ug/kg Dry	19-Jul-02 11:27	ELS
Anthracene	U	67.	ug/kg	19-Jul-02 11:27	ELS
Anthracene	U	82.	ug/kg Dry	19-Jul-02 11:27	ELS
Fluoranthene	U	6.7	ug/kg	19-Jul-02 11:27	ELS
Fluoranthene	U	8.2	ug/kg Dry	19-Jul-02 11:27	ELS
Pyrene	U	6.7	ug/kg	19-Jul-02 11:27	ELS
Pyrene	U	8.2	ug/kg Dry	19-Jul-02 11:27	ELS

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	J	1.9	ug/kg	19-Jul-02 11:27	ELS
Benzo(a)Anthracene	J	2.3	ug/kg Dry	19-Jul-02 11:27	ELS
Chrysene	U	6.7	ug/kg	19-Jul-02 11:27	ELS
Chrysene	U	8.2	ug/kg Dry	19-Jul-02 11:27	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	19-Jul-02 11:27	ELS
Benzo(b)Fluoranthene	U	8.2	ug/kg Dry	19-Jul-02 11:27	ELS
Benzo(k)Fluoranthene	U	3.4	ug/kg	19-Jul-02 11:27	ELS
Benzo(k)Fluoranthene	U	4.1	ug/kg Dry	19-Jul-02 11:27	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	19-Jul-02 11:27	ELS
Benzo(a)Pyrene	U	8.2	ug/kg Dry	19-Jul-02 11:27	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	19-Jul-02 11:27	ELS
Dibenz(a,h)Anthracene	U	8.2	ug/kg Dry	19-Jul-02 11:27	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	19-Jul-02 11:27	ELS
Benzo(g,h,i)Perylene	U	8.2	ug/kg Dry	19-Jul-02 11:27	ELS
Indeno(1,2,3-cd)Pyrene	U	6.7	ug/kg	19-Jul-02 11:27	ELS
Indeno(1,2,3-cd)Pyrene	U	8.2	ug/kg Dry	19-Jul-02 11:27	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	01-Jul-02 19:14	AJB
Vinyl Chloride	U	12.	ug/kg Dry	01-Jul-02 19:14	AJB
Bromomethane	U	10.	ug/kg	01-Jul-02 19:14	AJB
Bromomethane	U	12.	ug/kg Dry	01-Jul-02 19:14	AJB
Methylene Chloride	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Methylene Chloride	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 19:14	AJB
cis-1,3-Dichloropropene	U	2.4	ug/kg Dry	01-Jul-02 19:14	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	01-Jul-02 19:14	AJB
trans-1,3-Dichloropropene	U	2.4	ug/kg Dry	01-Jul-02 19:14	AJB
Carbon Disulfide	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Carbon Disulfide	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Acetone		140	ug/kg	01-Jul-02 19:14	AJB
Acetone		170	ug/kg Dry	01-Jul-02 19:14	AJB
1,1-Dichloroethene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
1,1-Dichloroethene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB

000124

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	01-Jul-02 19:14	AJB
1,1-Dichloroethane	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
trans-1,2-Dichloroethene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
cis-1,2-Dichloroethene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Chloroform	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Chloroform	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
1,2-Dichloroethane	U	5.0	ug/kg	01-Jul-02 19:14	AJB
1,2-Dichloroethane	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	01-Jul-02 19:14	AJB
1,1,1-Trichloroethane	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Carbon Tetrachloride	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Carbon Tetrachloride	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Vinyl Acetate	U	10.	ug/kg	01-Jul-02 19:14	AJB
Vinyl Acetate	U	12.	ug/kg Dry	01-Jul-02 19:14	AJB
Bromodichloromethane	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Bromodichloromethane	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
1,2-Dichloropropane	U	5.0	ug/kg	01-Jul-02 19:14	AJB
1,2-Dichloropropane	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Trichloroethene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Trichloroethene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Dibromochloromethane	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Dibromochloromethane	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	01-Jul-02 19:14	AJB
1,1,2-Trichloroethane	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Benzene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Benzene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
1,2-Dibromoethane	U	0.42	ug/kg	01-Jul-02 19:14	AJB
1,2-Dibromoethane	U	0.51	ug/kg Dry	01-Jul-02 19:14	AJB
Bromoform	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Bromoform	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Tetrachloroethene	U	5.0	ug/kg	01-Jul-02 19:14	AJB

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000125

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Toluene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Toluene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Chlorobenzene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Chlorobenzene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
Ethylbenzene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Ethylbenzene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	01-Jul-02 19:14	AJB
1,2-Dibromo-3-chloropropane	U	0.67	ug/kg Dry	01-Jul-02 19:14	AJB
Styrene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
Styrene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
m,p-Xylene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
m,p-Xylene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
o-Xylene	U	5.0	ug/kg	01-Jul-02 19:14	AJB
o-Xylene	U	6.1	ug/kg Dry	01-Jul-02 19:14	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 19:44	CAH
N-Nitrosodimethylamine	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Pyridine	U	330	ug/kg	25-Jun-02 19:44	CAH
Pyridine	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Aniline	U	330	ug/kg	25-Jun-02 19:44	CAH
Aniline	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 19:44	CAH
bis(2-Chloroethyl) Ether	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 19:44	CAH
2-Chlorophenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Phenol	U	330	ug/kg	25-Jun-02 19:44	CAH
Phenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 19:44	CAH
1,3-Dichlorobenzene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 19:44	CAH
1,4-Dichlorobenzene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 19:44	CAH

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 19:44	CAH
Benzyl Alcohol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	25-Jun-02 19:44	CAH
Bis(2-chloroisopropyl)ether	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Hexachloroethane	U	330	ug/kg	25-Jun-02 19:44	CAH
Hexachloroethane	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 19:44	CAH
2-Methylphenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 19:44	CAH
N-Nitroso-di-n-propylamine	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 19:44	CAH
4-Methylphenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 19:44	CAH
Nitrobenzene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Isophorone	U	330	ug/kg	25-Jun-02 19:44	CAH
Isophorone	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 19:44	CAH
2-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 19:44	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 19:44	CAH
2,4-Dimethylphenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 19:44	CAH
bis(2-Chloroethoxy)methane	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 19:44	CAH
2,4-Dichlorophenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 19:44	CAH
1,2,4-Trichlorobenzene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 19:44	CAH
Naphthalene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 19:44	CAH
2,6-Dichlorophenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 19:44	CAH
4-Chloroaniline	U	400	ug/kg Dry	25-Jun-02 19:44	CAH

000127

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 19:44	CAH
Hexachlorobutadiene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 19:44	CAH
4-Chloro-3-Methylphenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 19:44	CAH
2-Methylnaphthalene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 19:44	CAH
Hexachlorocyclopentadiene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 19:44	CAH
2,4,6-Trichlorophenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 19:44	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	25-Jun-02 19:44	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 19:44	CAH
2-Chloronaphthalene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 19:44	CAH
2-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 19:44	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 19:44	CAH
Dimethylphthalate	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 19:44	CAH
Acenaphthylene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 19:44	CAH
2,6-Dinitrotoluene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 19:44	CAH
3-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 19:44	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 19:44	CAH
Acenaphthene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 19:44	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	25-Jun-02 19:44	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 19:44	CAH
Dibenzofuran	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 19:44	CAH
2,4-Dinitrotoluene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 19:44	CAH

00011

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 19:44	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 19:44	CAH
2,3,4,6-Tetrachlorophenol	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 19:44	CAH
Diethylphthalate	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Fluorene	U	330	ug/kg	25-Jun-02 19:44	CAH
Fluorene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 19:44	CAH
4-Chlorophenyl-phenyl Ether	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 19:44	CAH
4-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 19:44	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 19:44	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	25-Jun-02 19:44	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 19:44	CAH
N-Nitrosodiphenylamine	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 19:44	CAH
4-Bromophenyl-phenylether	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 19:44	CAH
Hexachlorobenzene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 19:44	CAH
Pentachlorophenol	U	2000	ug/kg Dry	25-Jun-02 19:44	CAH
Carbazole	U	330	ug/kg	25-Jun-02 19:44	CAH
Carbazole	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Phenanthrene	U	330	ug/kg	25-Jun-02 19:44	CAH
Phenanthrene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Anthracene	U	330	ug/kg	25-Jun-02 19:44	CAH
Anthracene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 19:44	CAH
Di-n-Butylphthalate	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 19:44	CAH
Fluoranthene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Pyrene	U	330	ug/kg	25-Jun-02 19:44	CAH
Pyrene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH

000129

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-10
Client ID: SOILS
Site: B-9-1
Locator: GRAB
Collect Date: 18-JUN-02 15:30

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 19:44	CAH
Butylbenzylphthalate	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 19:44	CAH
Benzo(a)anthracene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 19:44	CAH
3,3'-Dichlorobenzidine	U	800	ug/kg Dry	25-Jun-02 19:44	CAH
Chrysene	U	330	ug/kg	25-Jun-02 19:44	CAH
Chrysene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 19:44	CAH
bis(2-Ethylhexyl)phthalate	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 19:44	CAH
Di-n-octylphthalate	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 19:44	CAH
Benzo(b)fluoranthene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 19:44	CAH
Benzo(k)fluoranthene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 19:44	CAH
Benzo(a)pyrene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 19:44	CAH
Indeno(1,2,3-cd)pyrene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 19:44	CAH
Dibenzo(a,h)anthracene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 19:44	CAH
Benzo(g,h,i)perylene	U	400	ug/kg Dry	25-Jun-02 19:44	CAH

00013

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	25-Jun-02 09:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	25-Jun-02 09:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.62	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		19.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		6.19	units	24-Jun-02 15:07	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	03-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	220	mg/kg Dry	03-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				24-Jun-02 06:00	DWK
Final pH		5.840		24-Jun-02 06:00	DWK
SW-846 METHOD 6010B					
Silver	U	1.0	mg/kg	27-Jun-02 10:22	DWK
Silver	U	1.2	mg/kg Dry	27-Jun-02 10:22	DWK
Silver, TCLP	U	0.050	mg/l	28-Jun-02 11:52	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		12000	mg/kg	27-Jun-02 10:22	DWK
Aluminum		15000	mg/kg Dry	27-Jun-02 10:22	DWK
Arsenic		6.2	mg/kg	27-Jun-02 10:22	DWK
Arsenic		7.6	mg/kg Dry	27-Jun-02 10:22	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 11:52	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
Barium		92.	mg/kg	27-Jun-02 10:22	DWK
Barium		110	mg/kg Dry	27-Jun-02 10:22	DWK
Barium, TCLP	J	0.96	mg/l	28-Jun-02 11:52	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.27	mg/kg	27-Jun-02 10:22	DWK
Beryllium	J	0.33	mg/kg Dry	27-Jun-02 10:22	DWK
Calcium		26000	mg/kg	27-Jun-02 10:22	DWK
Calcium		32000	mg/kg Dry	27-Jun-02 10:22	DWK
Cadmium		0.53	mg/kg	27-Jun-02 10:22	DWK
Cadmium		0.65	mg/kg Dry	27-Jun-02 10:22	DWK
Cadmium, TCLP	J	0.0010	mg/l	28-Jun-02 11:52	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		4.8	mg/kg	27-Jun-02 10:22	DWK
Cobalt		5.9	mg/kg Dry	27-Jun-02 10:22	DWK
Chromium		17.	mg/kg	27-Jun-02 10:22	DWK
Chromium		21.	mg/kg Dry	27-Jun-02 10:22	DWK
Chromium, TCLP	U	0.10	mg/l	28-Jun-02 11:52	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		12.	mg/kg	27-Jun-02 10:22	DWK
Copper		15.	mg/kg Dry	27-Jun-02 10:22	DWK
Iron		12000	mg/kg	27-Jun-02 10:22	DWK
Iron		15000	mg/kg Dry	27-Jun-02 10:22	DWK
Potassium		2300	mg/kg	27-Jun-02 10:22	DWK
Potassium		2800	mg/kg Dry	27-Jun-02 10:22	DWK
Magnesium		16000	mg/kg	27-Jun-02 10:22	DWK
Magnesium		20000	mg/kg Dry	27-Jun-02 10:22	DWK
Manganese		360	mg/kg	27-Jun-02 10:22	DWK
Manganese		440	mg/kg Dry	27-Jun-02 10:22	DWK
Sodium	J	53.	mg/kg	27-Jun-02 10:22	DWK
Sodium	J	65.	mg/kg Dry	27-Jun-02 10:22	DWK
Nickel		12.	mg/kg	27-Jun-02 10:22	DWK
Nickel		15.	mg/kg Dry	27-Jun-02 10:22	DWK
Lead		12.	mg/kg	27-Jun-02 10:22	DWK

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
Lead		15.	mg/kg Dry	27-Jun-02 10:22	DWK
Lead, TCLP	U	0.0075	mg/l	28-Jun-02 11:52	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 10:22	DWK
Antimony	U	2.5	mg/kg Dry	27-Jun-02 10:22	DWK
Selenium	J	0.62	mg/kg	27-Jun-02 10:22	DWK
Selenium	J	0.76	mg/kg Dry	27-Jun-02 10:22	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 11:52	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.23	mg/kg	27-Jun-02 10:22	DWK
Thallium	J	0.28	mg/kg Dry	27-Jun-02 10:22	DWK
Vanadium		26.	mg/kg	27-Jun-02 10:22	DWK
Vanadium		32.	mg/kg Dry	27-Jun-02 10:22	DWK
Zinc		44.	mg/kg	27-Jun-02 10:22	DWK
Zinc		54.	mg/kg Dry	27-Jun-02 10:22	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 09:51	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.049	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	23-Jul-02 03:00	AMG
alpha-BHC	U	99.	ug/kg Dry	23-Jul-02 03:00	AMG
gamma-BHC (Lindane)	U	80.	ug/kg	23-Jul-02 03:00	AMG
gamma-BHC (Lindane)	U	99.	ug/kg Dry	23-Jul-02 03:00	AMG

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	23-Jul-02 03:00	AMG
beta-BHC	U	99.	ug/kg Dry	23-Jul-02 03:00	AMG
Heptachlor	U	80.	ug/kg	23-Jul-02 03:00	AMG
Heptachlor	U	99.	ug/kg Dry	23-Jul-02 03:00	AMG
delta-BHC	U	80.	ug/kg	23-Jul-02 03:00	AMG
delta-BHC	U	99.	ug/kg Dry	23-Jul-02 03:00	AMG
Aldrin	U	80.	ug/kg	23-Jul-02 03:00	AMG
Aldrin	U	99.	ug/kg Dry	23-Jul-02 03:00	AMG
Heptachlor Epoxide	J	11.	ug/kg	23-Jul-02 03:00	AMG
Heptachlor Epoxide	J	14.	ug/kg Dry	23-Jul-02 03:00	AMG
Endosulfan I	U	80.	ug/kg	23-Jul-02 03:00	AMG
Endosulfan I	U	99.	ug/kg Dry	23-Jul-02 03:00	AMG
4,4'-DDE	J	20.	ug/kg	23-Jul-02 03:00	AMG
4,4'-DDE	J	25.	ug/kg Dry	23-Jul-02 03:00	AMG
Dieldrin	J	14.	ug/kg	23-Jul-02 03:00	AMG
Dieldrin	J	17.	ug/kg Dry	23-Jul-02 03:00	AMG
Endrin	U	160	ug/kg	23-Jul-02 03:00	AMG
Endrin	U	200	ug/kg Dry	23-Jul-02 03:00	AMG
4,4'-DDD	U	160	ug/kg	23-Jul-02 03:00	AMG
4,4'-DDD	U	200	ug/kg Dry	23-Jul-02 03:00	AMG
Endosulfan II	U	160	ug/kg	23-Jul-02 03:00	AMG
Endosulfan II	U	200	ug/kg Dry	23-Jul-02 03:00	AMG
4,4'-DDT	J	32.	ug/kg	23-Jul-02 03:00	AMG
4,4'-DDT	J	40.	ug/kg Dry	23-Jul-02 03:00	AMG
Endrin Aldehyde	U	160	ug/kg	23-Jul-02 03:00	AMG
Endrin Aldehyde	U	200	ug/kg Dry	23-Jul-02 03:00	AMG
Endosulfan Sulfate	U	160	ug/kg	23-Jul-02 03:00	AMG
Endosulfan Sulfate	U	200	ug/kg Dry	23-Jul-02 03:00	AMG
Methoxychlor	U	800	ug/kg	23-Jul-02 03:00	AMG
Methoxychlor	U	990	ug/kg Dry	23-Jul-02 03:00	AMG
Toxaphene	U	800	ug/kg	23-Jul-02 03:00	AMG
Toxaphene	U	990	ug/kg Dry	23-Jul-02 03:00	AMG
Chlordane (technical)	U	1600	ug/kg	23-Jul-02 03:00	AMG

000134

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	23-Jul-02 03:00	AMG
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 09:27	AMR
Aroclor 1016	U	99.	ug/kg Dry	25-Jun-02 09:27	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 09:27	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 09:27	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 09:27	AMR
Aroclor 1232	U	99.	ug/kg Dry	25-Jun-02 09:27	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 09:27	AMR
Aroclor 1242	U	99.	ug/kg Dry	25-Jun-02 09:27	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 09:27	AMR
Aroclor 1248	U	99.	ug/kg Dry	25-Jun-02 09:27	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 09:27	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 09:27	AMR
Aroclor 1260	U	160	ug/kg	25-Jun-02 09:27	AMR
Aroclor 1260	U	200	ug/kg Dry	25-Jun-02 09:27	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	19-Jul-02 12:00	ELS
Naphthalene	U	83.	ug/kg Dry	19-Jul-02 12:00	ELS
Acenaphthene	J	61.	ug/kg	19-Jul-02 12:00	ELS
Acenaphthene	J	75.	ug/kg Dry	19-Jul-02 12:00	ELS
Acenaphthylene	U	67.	ug/kg	19-Jul-02 12:00	ELS
Acenaphthylene	U	83.	ug/kg Dry	19-Jul-02 12:00	ELS
Fluorene	U	67.	ug/kg	19-Jul-02 12:00	ELS
Fluorene	U	83.	ug/kg Dry	19-Jul-02 12:00	ELS
Phenanthrene	U	67.	ug/kg	19-Jul-02 12:00	ELS
Phenanthrene	U	83.	ug/kg Dry	19-Jul-02 12:00	ELS
Anthracene	U	67.	ug/kg	19-Jul-02 12:00	ELS
Anthracene	U	83.	ug/kg Dry	19-Jul-02 12:00	ELS
Fluoranthene	U	6.7	ug/kg	19-Jul-02 12:00	ELS
Fluoranthene	U	8.3	ug/kg Dry	19-Jul-02 12:00	ELS
Pyrene	U	6.7	ug/kg	19-Jul-02 12:00	ELS
Pyrene	U	8.3	ug/kg Dry	19-Jul-02 12:00	ELS

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	J	1.6	ug/kg	19-Jul-02 12:00	ELS
Benzo(a)Anthracene	J	2.0	ug/kg Dry	19-Jul-02 12:00	ELS
Chrysene	U	6.7	ug/kg	19-Jul-02 12:00	ELS
Chrysene	U	8.3	ug/kg Dry	19-Jul-02 12:00	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	19-Jul-02 12:00	ELS
Benzo(b)Fluoranthene	U	8.3	ug/kg Dry	19-Jul-02 12:00	ELS
Benzo(k)Fluoranthene	J	1.4	ug/kg	19-Jul-02 12:00	ELS
Benzo(k)Fluoranthene	J	1.7	ug/kg Dry	19-Jul-02 12:00	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	19-Jul-02 12:00	ELS
Benzo(a)Pyrene	U	8.3	ug/kg Dry	19-Jul-02 12:00	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	19-Jul-02 12:00	ELS
Dibenz(a,h)Anthracene	U	8.3	ug/kg Dry	19-Jul-02 12:00	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	19-Jul-02 12:00	ELS
Benzo(g,h,i)Perylene	U	8.3	ug/kg Dry	19-Jul-02 12:00	ELS
Indeno(1,2,3-cd)Pyrene	U	6.7	ug/kg	19-Jul-02 12:00	ELS
Indeno(1,2,3-cd)Pyrene	U	8.3	ug/kg Dry	19-Jul-02 12:00	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	02-Jul-02 21:06	AJB
Vinyl Chloride	U	12.	ug/kg Dry	02-Jul-02 21:06	AJB
Bromomethane	KU	10.	ug/kg	02-Jul-02 21:06	AJB
Bromomethane	KU	12.	ug/kg Dry	02-Jul-02 21:06	AJB
Methylene Chloride	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Methylene Chloride	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 21:06	AJB
cis-1,3-Dichloropropene	U	2.5	ug/kg Dry	02-Jul-02 21:06	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 21:06	AJB
trans-1,3-Dichloropropene	U	2.5	ug/kg Dry	02-Jul-02 21:06	AJB
Carbon Disulfide		27.	ug/kg	02-Jul-02 21:06	AJB
Carbon Disulfide		33.	ug/kg Dry	02-Jul-02 21:06	AJB
Acetone		190	ug/kg	02-Jul-02 21:06	AJB
Acetone		230	ug/kg Dry	02-Jul-02 21:06	AJB
1,1-Dichloroethene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
1,1-Dichloroethene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB

000136

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	02-Jul-02 21:06	AJB
1,1-Dichloroethane	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
trans-1,2-Dichloroethene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
cis-1,2-Dichloroethene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Chloroform	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Chloroform	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
1,2-Dichloroethane	U	5.0	ug/kg	02-Jul-02 21:06	AJB
1,2-Dichloroethane	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	02-Jul-02 21:06	AJB
1,1,1-Trichloroethane	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Carbon Tetrachloride	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Carbon Tetrachloride	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Vinyl Acetate	U	10.	ug/kg	02-Jul-02 21:06	AJB
Vinyl Acetate	U	12.	ug/kg Dry	02-Jul-02 21:06	AJB
Bromodichloromethane	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Bromodichloromethane	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
1,2-Dichloropropane	U	5.0	ug/kg	02-Jul-02 21:06	AJB
1,2-Dichloropropane	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Trichloroethene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Trichloroethene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Dibromochloromethane	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Dibromochloromethane	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	02-Jul-02 21:06	AJB
1,1,2-Trichloroethane	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Benzene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Benzene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
1,2-Dibromoethane	U	0.42	ug/kg	02-Jul-02 21:06	AJB
1,2-Dibromoethane	U	0.52	ug/kg Dry	02-Jul-02 21:06	AJB
Bromoform	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Bromoform	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Tetrachloroethene	U	5.0	ug/kg	02-Jul-02 21:06	AJB

000137

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Toluene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Toluene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Chlorobenzene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Chlorobenzene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
Ethylbenzene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Ethylbenzene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	02-Jul-02 21:06	AJB
1,2-Dibromo-3-chloropropane	U	0.68	ug/kg Dry	02-Jul-02 21:06	AJB
Styrene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
Styrene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
m,p-Xylene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
m,p-Xylene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
o-Xylene	U	5.0	ug/kg	02-Jul-02 21:06	AJB
o-Xylene	U	6.2	ug/kg Dry	02-Jul-02 21:06	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 20:29	CAH
N-Nitrosodimethylamine	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Pyridine	U	330	ug/kg	25-Jun-02 20:29	CAH
Pyridine	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Aniline	U	330	ug/kg	25-Jun-02 20:29	CAH
Aniline	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 20:29	CAH
bis(2-Chloroethyl) Ether	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 20:29	CAH
2-Chlorophenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Phenol	U	330	ug/kg	25-Jun-02 20:29	CAH
Phenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 20:29	CAH
1,3-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 20:29	CAH
1,4-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 20:29	CAH

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000138

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 20:29	CAH
Benzyl Alcohol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	25-Jun-02 20:29	CAH
Bis(2-chloroisopropyl)ether	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Hexachloroethane	U	330	ug/kg	25-Jun-02 20:29	CAH
Hexachloroethane	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 20:29	CAH
2-Methylphenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 20:29	CAH
N-Nitroso-di-n-propylamine	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 20:29	CAH
4-Methylphenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 20:29	CAH
Nitrobenzene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Isophorone	U	330	ug/kg	25-Jun-02 20:29	CAH
Isophorone	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 20:29	CAH
2-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 20:29	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 20:29	CAH
2,4-Dimethylphenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 20:29	CAH
bis(2-Chloroethoxy)methane	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 20:29	CAH
2,4-Dichlorophenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 20:29	CAH
1,2,4-Trichlorobenzene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 20:29	CAH
Naphthalene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 20:29	CAH
2,6-Dichlorophenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 20:29	CAH
4-Chloroaniline	U	410	ug/kg Dry	25-Jun-02 20:29	CAH

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 20:29	CAH
Hexachlorobutadiene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 20:29	CAH
4-Chloro-3-Methylphenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 20:29	CAH
2-Methylnaphthalene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 20:29	CAH
Hexachlorocyclopentadiene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 20:29	CAH
2,4,6-Trichlorophenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 20:29	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	25-Jun-02 20:29	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 20:29	CAH
2-Chloronaphthalene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 20:29	CAH
2-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 20:29	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 20:29	CAH
Dimethylphthalate	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 20:29	CAH
Acenaphthylene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 20:29	CAH
2,6-Dinitrotoluene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 20:29	CAH
3-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 20:29	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 20:29	CAH
Acenaphthene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 20:29	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	25-Jun-02 20:29	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 20:29	CAH
Dibenzofuran	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 20:29	CAH
2,4-Dinitrotoluene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 20:29	CAH

000140

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 20:29	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 20:29	CAH
2,3,4,6-Tetrachlorophenol	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 20:29	CAH
Diethylphthalate	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Fluorene	U	330	ug/kg	25-Jun-02 20:29	CAH
Fluorene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 20:29	CAH
4-Chlorophenyl-phenyl Ether	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 20:29	CAH
4-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 20:29	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 20:29	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	25-Jun-02 20:29	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 20:29	CAH
N-Nitrosodiphenylamine	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 20:29	CAH
4-Bromophenyl-phenylether	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 20:29	CAH
Hexachlorobenzene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 20:29	CAH
Pentachlorophenol	U	2000	ug/kg Dry	25-Jun-02 20:29	CAH
Carbazole	U	330	ug/kg	25-Jun-02 20:29	CAH
Carbazole	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Phenanthrene	J	63.	ug/kg	25-Jun-02 20:29	CAH
Phenanthrene	J	78.	ug/kg Dry	25-Jun-02 20:29	CAH
Anthracene	U	330	ug/kg	25-Jun-02 20:29	CAH
Anthracene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 20:29	CAH
Di-n-Butylphthalate	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 20:29	CAH
Fluoranthene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Pyrene	J	59.	ug/kg	25-Jun-02 20:29	CAH
Pyrene	J	73.	ug/kg Dry	25-Jun-02 20:29	CAH

000141

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-11
Client ID: SOILS
Site: B-10-1
Locator: GRAB
Collect Date: 18-JUN-02 16:00

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 20:29	CAH
Butylbenzylphthalate	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 20:29	CAH
Benzo(a)anthracene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 20:29	CAH
3,3'-Dichlorobenzidine	U	810	ug/kg Dry	25-Jun-02 20:29	CAH
Chrysene	U	330	ug/kg	25-Jun-02 20:29	CAH
Chrysene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 20:29	CAH
bis(2-Ethylhexyl)phthalate	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 20:29	CAH
Di-n-octylphthalate	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 20:29	CAH
Benzo(b)fluoranthene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 20:29	CAH
Benzo(k)fluoranthene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 20:29	CAH
Benzo(a)pyrene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 20:29	CAH
Indeno(1,2,3-cd)pyrene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 20:29	CAH
Dibenzo(a,h)anthracene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 20:29	CAH
Benzo(g,h,i)perylene	U	410	ug/kg Dry	25-Jun-02 20:29	CAH

000142

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	25-Jun-02 09:00	KG
Cyanide, Total	U	0.14	mg/kg Dry	25-Jun-02 09:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.59	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		15.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		6.45	units	24-Jun-02 15:23	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	03-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	210	mg/kg Dry	03-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				24-Jun-02 06:00	DWK
Final pH		4.970		24-Jun-02 06:00	DWK
SW-846 METHOD 6010B					
Silver	J	0.29	mg/kg	27-Jun-02 10:47	DWK
Silver	J	0.34	mg/kg Dry	27-Jun-02 10:47	DWK
Silver, TCLP	U	0.050	mg/l	28-Jun-02 11:58	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		15000	mg/kg	27-Jun-02 10:47	DWK
Aluminum		18000	mg/kg Dry	27-Jun-02 10:47	DWK
Arsenic		8.2	mg/kg	27-Jun-02 10:47	DWK
Arsenic		9.6	mg/kg Dry	27-Jun-02 10:47	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 11:58	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

000143

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
Barium		130	mg/kg	27-Jun-02 10:47	DWK
Barium		150	mg/kg Dry	27-Jun-02 10:47	DWK
Barium, TCLP	J	1.3	mg/l	28-Jun-02 11:58	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.42	mg/kg	27-Jun-02 10:47	DWK
Beryllium	J	0.49	mg/kg Dry	27-Jun-02 10:47	DWK
Calcium		2400	mg/kg	27-Jun-02 10:47	DWK
Calcium		2800	mg/kg Dry	27-Jun-02 10:47	DWK
Cadmium		0.67	mg/kg	27-Jun-02 10:47	DWK
Cadmium		0.79	mg/kg Dry	27-Jun-02 10:47	DWK
Cadmium, TCLP	J	0.00098	mg/l	28-Jun-02 11:58	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		13.	mg/kg	27-Jun-02 10:47	DWK
Cobalt		15.	mg/kg Dry	27-Jun-02 10:47	DWK
Chromium		22.	mg/kg	27-Jun-02 10:47	DWK
Chromium		26.	mg/kg Dry	27-Jun-02 10:47	DWK
Chromium, TCLP	J	0.0012	mg/l	28-Jun-02 11:58	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		15.	mg/kg	27-Jun-02 10:47	DWK
Copper		18.	mg/kg Dry	27-Jun-02 10:47	DWK
Iron		16000	mg/kg	27-Jun-02 10:47	DWK
Iron		19000	mg/kg Dry	27-Jun-02 10:47	DWK
Potassium		1900	mg/kg	27-Jun-02 10:47	DWK
Potassium		2200	mg/kg Dry	27-Jun-02 10:47	DWK
Magnesium		2400	mg/kg	27-Jun-02 10:47	DWK
Magnesium		2800	mg/kg Dry	27-Jun-02 10:47	DWK
Manganese		1000	mg/kg	27-Jun-02 10:47	DWK
Manganese		1200	mg/kg Dry	27-Jun-02 10:47	DWK
Sodium	J	43.	mg/kg	27-Jun-02 10:47	DWK
Sodium	J	50.	mg/kg Dry	27-Jun-02 10:47	DWK
Nickel		18.	mg/kg	27-Jun-02 10:47	DWK
Nickel		21.	mg/kg Dry	27-Jun-02 10:47	DWK
Lead		22.	mg/kg	27-Jun-02 10:47	DWK

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
Lead		26.	mg/kg Dry	27-Jun-02 10:47	DWK
Lead, TCLP	U	0.0075	mg/l	28-Jun-02 11:58	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 10:47	DWK
Antimony	U	2.4	mg/kg Dry	27-Jun-02 10:47	DWK
Selenium		1.3	mg/kg	27-Jun-02 10:47	DWK
Selenium		1.5	mg/kg Dry	27-Jun-02 10:47	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 11:58	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.30	mg/kg	27-Jun-02 10:47	DWK
Thallium	J	0.35	mg/kg Dry	27-Jun-02 10:47	DWK
Vanadium		35.	mg/kg	27-Jun-02 10:47	DWK
Vanadium		41.	mg/kg Dry	27-Jun-02 10:47	DWK
Zinc		50.	mg/kg	27-Jun-02 10:47	DWK
Zinc		59.	mg/kg Dry	27-Jun-02 10:47	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 09:57	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.047	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	23-Jul-02 02:14	AMG
alpha-BHC	U	94.	ug/kg Dry	23-Jul-02 02:14	AMG
gamma-BHC (Lindane)	U	80.	ug/kg	23-Jul-02 02:14	AMG
gamma-BHC (Lindane)	U	94.	ug/kg Dry	23-Jul-02 02:14	AMG

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	23-Jul-02 02:14	AMG
beta-BHC	U	94.	ug/kg Dry	23-Jul-02 02:14	AMG
Heptachlor	U	80.	ug/kg	23-Jul-02 02:14	AMG
Heptachlor	U	94.	ug/kg Dry	23-Jul-02 02:14	AMG
delta-BHC	U	80.	ug/kg	23-Jul-02 02:14	AMG
delta-BHC	U	94.	ug/kg Dry	23-Jul-02 02:14	AMG
Aldrin	U	80.	ug/kg	23-Jul-02 02:14	AMG
Aldrin	U	94.	ug/kg Dry	23-Jul-02 02:14	AMG
Heptachlor Epoxide	J	28.	ug/kg	23-Jul-02 02:14	AMG
Heptachlor Epoxide	J	33.	ug/kg Dry	23-Jul-02 02:14	AMG
Endosulfan I	U	80.	ug/kg	23-Jul-02 02:14	AMG
Endosulfan I	U	94.	ug/kg Dry	23-Jul-02 02:14	AMG
4,4'-DDE	J	27.	ug/kg	23-Jul-02 02:14	AMG
4,4'-DDE	J	32.	ug/kg Dry	23-Jul-02 02:14	AMG
Dieldrin	J	44.	ug/kg	23-Jul-02 02:14	AMG
Dieldrin	J	52.	ug/kg Dry	23-Jul-02 02:14	AMG
Endrin	J	12.	ug/kg	23-Jul-02 02:14	AMG
Endrin	J	14.	ug/kg Dry	23-Jul-02 02:14	AMG
4,4'-DDD	U	160	ug/kg	23-Jul-02 02:14	AMG
4,4'-DDD	U	190	ug/kg Dry	23-Jul-02 02:14	AMG
Endosulfan II	U	160	ug/kg	23-Jul-02 02:14	AMG
Endosulfan II	U	190	ug/kg Dry	23-Jul-02 02:14	AMG
4,4'-DDT	J	53.	ug/kg	23-Jul-02 02:14	AMG
4,4'-DDT	J	62.	ug/kg Dry	23-Jul-02 02:14	AMG
Endrin Aldehyde	U	160	ug/kg	23-Jul-02 02:14	AMG
Endrin Aldehyde	U	190	ug/kg Dry	23-Jul-02 02:14	AMG
Endosulfan Sulfate	U	160	ug/kg	23-Jul-02 02:14	AMG
Endosulfan Sulfate	U	190	ug/kg Dry	23-Jul-02 02:14	AMG
Methoxychlor	U	800	ug/kg	23-Jul-02 02:14	AMG
Methoxychlor	U	940	ug/kg Dry	23-Jul-02 02:14	AMG
Toxaphene	U	800	ug/kg	23-Jul-02 02:14	AMG
Toxaphene	U	940	ug/kg Dry	23-Jul-02 02:14	AMG
Chlordane (technical)	U	1600	ug/kg	23-Jul-02 02:14	AMG

00014

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
Chlordane (technical)	U	1900	ug/kg Dry	23-Jul-02 02:14	AMG
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 02:56	AMR
Aroclor 1016	U	94.	ug/kg Dry	25-Jun-02 02:56	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 02:56	AMR
Aroclor 1221	U	190	ug/kg Dry	25-Jun-02 02:56	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 02:56	AMR
Aroclor 1232	U	94.	ug/kg Dry	25-Jun-02 02:56	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 02:56	AMR
Aroclor 1242	U	94.	ug/kg Dry	25-Jun-02 02:56	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 02:56	AMR
Aroclor 1248	U	94.	ug/kg Dry	25-Jun-02 02:56	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 02:56	AMR
Aroclor 1254	U	190	ug/kg Dry	25-Jun-02 02:56	AMR
Aroclor 1260	U	160	ug/kg	25-Jun-02 02:56	AMR
Aroclor 1260	U	190	ug/kg Dry	25-Jun-02 02:56	AMR
SW-846 METHOD 8310					
Naphthalene	J	44.	ug/kg	19-Jul-02 12:33	ELS
Naphthalene	J	52.	ug/kg Dry	19-Jul-02 12:33	ELS
Acenaphthene	J	36.	ug/kg	19-Jul-02 12:33	ELS
Acenaphthene	J	42.	ug/kg Dry	19-Jul-02 12:33	ELS
Acenaphthylene	U	67.	ug/kg	19-Jul-02 12:33	ELS
Acenaphthylene	U	79.	ug/kg Dry	19-Jul-02 12:33	ELS
Fluorene	U	67.	ug/kg	19-Jul-02 12:33	ELS
Fluorene	U	79.	ug/kg Dry	19-Jul-02 12:33	ELS
Phenanthrene	J	26.	ug/kg	19-Jul-02 12:33	ELS
Phenanthrene	J	30.	ug/kg Dry	19-Jul-02 12:33	ELS
Anthracene	U	67.	ug/kg	19-Jul-02 12:33	ELS
Anthracene	U	79.	ug/kg Dry	19-Jul-02 12:33	ELS
Fluoranthene		31.	ug/kg	19-Jul-02 12:33	ELS
Fluoranthene		36.	ug/kg Dry	19-Jul-02 12:33	ELS
Pyrene	U	6.7	ug/kg	19-Jul-02 12:33	ELS
Pyrene	U	7.9	ug/kg Dry	19-Jul-02 12:33	ELS

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000147

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ACCREDITED IN ACCORDANCE WITH nelac

Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	J	5.6	ug/kg	19-Jul-02 12:33	ELS
Benzo(a)Anthracene	J	6.6	ug/kg Dry	19-Jul-02 12:33	ELS
Chrysene	J	5.4	ug/kg	19-Jul-02 12:33	ELS
Chrysene	J	6.4	ug/kg Dry	19-Jul-02 12:33	ELS
Benzo(b)Fluoranthene	J	5.6	ug/kg	19-Jul-02 12:33	ELS
Benzo(b)Fluoranthene	J	6.6	ug/kg Dry	19-Jul-02 12:33	ELS
Benzo(k)Fluoranthene	J	2.4	ug/kg	19-Jul-02 12:33	ELS
Benzo(k)Fluoranthene	J	2.8	ug/kg Dry	19-Jul-02 12:33	ELS
Benzo(a)Pyrene	J	3.7	ug/kg	19-Jul-02 12:33	ELS
Benzo(a)Pyrene	J	4.4	ug/kg Dry	19-Jul-02 12:33	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	19-Jul-02 12:33	ELS
Dibenz(a,h)Anthracene	U	7.9	ug/kg Dry	19-Jul-02 12:33	ELS
Benzo(g,h,i)Perylene	J	5.4	ug/kg	19-Jul-02 12:33	ELS
Benzo(g,h,i)Perylene	J	6.4	ug/kg Dry	19-Jul-02 12:33	ELS
Indeno(1,2,3-cd)Pyrene	J	4.1	ug/kg	19-Jul-02 12:33	ELS
Indeno(1,2,3-cd)Pyrene	J	4.8	ug/kg Dry	19-Jul-02 12:33	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	02-Jul-02 18:06	AJB
Vinyl Chloride	U	12.	ug/kg Dry	02-Jul-02 18:06	AJB
Bromomethane	KU	10.	ug/kg	02-Jul-02 18:06	AJB
Bromomethane	KU	12.	ug/kg Dry	02-Jul-02 18:06	AJB
Methylene Chloride	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Methylene Chloride	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 18:06	AJB
cis-1,3-Dichloropropene	U	2.4	ug/kg Dry	02-Jul-02 18:06	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 18:06	AJB
trans-1,3-Dichloropropene	U	2.4	ug/kg Dry	02-Jul-02 18:06	AJB
Carbon Disulfide	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Carbon Disulfide	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Acetone		120	ug/kg	02-Jul-02 18:06	AJB
Acetone		140	ug/kg Dry	02-Jul-02 18:06	AJB
1,1-Dichloroethene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
1,1-Dichloroethene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB

000148

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	02-Jul-02 18:06	AJB
1,1-Dichloroethane	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
trans-1,2-Dichloroethene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
cis-1,2-Dichloroethene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Chloroform	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Chloroform	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
1,2-Dichloroethane	U	5.0	ug/kg	02-Jul-02 18:06	AJB
1,2-Dichloroethane	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	02-Jul-02 18:06	AJB
1,1,1-Trichloroethane	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Carbon Tetrachloride	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Carbon Tetrachloride	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Vinyl Acetate	U	10.	ug/kg	02-Jul-02 18:06	AJB
Vinyl Acetate	U	12.	ug/kg Dry	02-Jul-02 18:06	AJB
Bromodichloromethane	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Bromodichloromethane	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
1,2-Dichloropropane	U	5.0	ug/kg	02-Jul-02 18:06	AJB
1,2-Dichloropropane	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Trichloroethene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Trichloroethene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Dibromochloromethane	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Dibromochloromethane	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	02-Jul-02 18:06	AJB
1,1,2-Trichloroethane	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Benzene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Benzene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
1,2-Dibromoethane	U	0.42	ug/kg	02-Jul-02 18:06	AJB
1,2-Dibromoethane	U	0.49	ug/kg Dry	02-Jul-02 18:06	AJB
Bromoform	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Bromoform	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Tetrachloroethene	U	5.0	ug/kg	02-Jul-02 18:06	AJB

000149

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
Tetrachloroethene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Toluene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Toluene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Chlorobenzene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Chlorobenzene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
Ethylbenzene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Ethylbenzene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	02-Jul-02 18:06	AJB
1,2-Dibromo-3-chloropropane	U	0.65	ug/kg Dry	02-Jul-02 18:06	AJB
Styrene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
Styrene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
m,p-Xylene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
m,p-Xylene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
o-Xylene	U	5.0	ug/kg	02-Jul-02 18:06	AJB
o-Xylene	U	5.9	ug/kg Dry	02-Jul-02 18:06	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 21:14	CAH
N-Nitrosodimethylamine	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Pyridine	U	330	ug/kg	25-Jun-02 21:14	CAH
Pyridine	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Aniline	U	330	ug/kg	25-Jun-02 21:14	CAH
Aniline	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 21:14	CAH
bis(2-Chloroethyl) Ether	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 21:14	CAH
2-Chlorophenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Phenol	U	330	ug/kg	25-Jun-02 21:14	CAH
Phenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 21:14	CAH
1,3-Dichlorobenzene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 21:14	CAH
1,4-Dichlorobenzene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 21:14	CAH

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 21:14	CAH
Benzyl Alcohol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Bis(2-chloroiscpropyl)ether	U	330	ug/kg	25-Jun-02 21:14	CAH
Bis(2-chloroisopropyl)ether	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Hexachloroethane	U	330	ug/kg	25-Jun-02 21:14	CAH
Hexachloroethane	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 21:14	CAH
2-Methylphenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 21:14	CAH
N-Nitroso-di-n-propylamine	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 21:14	CAH
4-Methylphenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 21:14	CAH
Nitrobenzene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Isophorone	U	330	ug/kg	25-Jun-02 21:14	CAH
Isophorone	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 21:14	CAH
2-Nitrophenol	U	1900	ug/kg Dry	25-Jun-02 21:14	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 21:14	CAH
2,4-Dimethylphenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 21:14	CAH
bis(2-Chloroethoxy)methane	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 21:14	CAH
2,4-Dichlorophenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 21:14	CAH
1,2,4-Trichlorobenzene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 21:14	CAH
Naphthalene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 21:14	CAH
2,6-Dichlorophenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 21:14	CAH
4-Chloroaniline	U	390	ug/kg Dry	25-Jun-02 21:14	CAH

000151

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 21:14	CAH
Hexachlorobutadiene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 21:14	CAH
4-Chloro-3-Methylphenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 21:14	CAH
2-Methylnaphthalene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 21:14	CAH
Hexachlorocyclopentadiene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 21:14	CAH
2,4,6-Trichlorophenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 21:14	CAH
2,4,5-Trichlorophenol	U	1900	ug/kg Dry	25-Jun-02 21:14	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 21:14	CAH
2-Chloronaphthalene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 21:14	CAH
2-Nitroaniline	U	1900	ug/kg Dry	25-Jun-02 21:14	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 21:14	CAH
Dimethylphthalate	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 21:14	CAH
Acenaphthylene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 21:14	CAH
2,6-Dinitrotoluene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 21:14	CAH
3-Nitroaniline	U	1900	ug/kg Dry	25-Jun-02 21:14	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 21:14	CAH
Acenaphthene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 21:14	CAH
2,4-Dinitrophenol	U	1900	ug/kg Dry	25-Jun-02 21:14	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 21:14	CAH
Dibenzofuran	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 21:14	CAH
2,4-Dinitrotoluene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 21:14	CAH

000152

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
4-Nitrophenol	U	1900	ug/kg Dry	25-Jun-02 21:14	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 21:14	CAH
2,3,4,6-Tetrachlorophenol	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 21:14	CAH
Diethylphthalate	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Fluorene	U	330	ug/kg	25-Jun-02 21:14	CAH
Fluorene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 21:14	CAH
4-Chlorophenyl-phenyl Ether	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 21:14	CAH
4-Nitroaniline	U	1900	ug/kg Dry	25-Jun-02 21:14	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 21:14	CAH
4,6-Dinitro-2-methylphenol	U	1900	ug/kg Dry	25-Jun-02 21:14	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 21:14	CAH
N-Nitrosodiphenylamine	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 21:14	CAH
4-Bromophenyl-phenylether	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 21:14	CAH
Hexachlorobenzene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 21:14	CAH
Pentachlorophenol	U	1900	ug/kg Dry	25-Jun-02 21:14	CAH
Carbazole	U	330	ug/kg	25-Jun-02 21:14	CAH
Carbazole	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Phenanthrene	U	330	ug/kg	25-Jun-02 21:14	CAH
Phenanthrene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Anthracene	U	330	ug/kg	25-Jun-02 21:14	CAH
Anthracene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 21:14	CAH
Di-n-Butylphthalate	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 21:14	CAH
Fluoranthene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Pyrene	U	330	ug/kg	25-Jun-02 21:14	CAH
Pyrene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH

000153

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-12
Client ID: SOILS
Site: B-11-1
Locator: GRAB
Collect Date: 18-JUN-02 16:15

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 21:14	CAH
Butylbenzylphthalate	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 21:14	CAH
Benzo(a)anthracene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 21:14	CAH
3,3'-Dichlorobenzidine	U	780	ug/kg Dry	25-Jun-02 21:14	CAH
Chrysene	U	330	ug/kg	25-Jun-02 21:14	CAH
Chrysene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 21:14	CAH
bis(2-Ethylhexyl)phthalate	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 21:14	CAH
Di-n-octylphthalate	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 21:14	CAH
Benzo(b)fluoranthene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 21:14	CAH
Benzo(k)fluoranthene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 21:14	CAH
Benzo(a)pyrene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 21:14	CAH
Indeno(1,2,3-cd)pyrene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 21:14	CAH
Dibenzo(a,h)anthracene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 21:14	CAH
Benzo(g,h,i)perylene	U	390	ug/kg Dry	25-Jun-02 21:14	CAH

000154

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(309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689

Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	25-Jun-02 09:00	KG
Cyanide, Total	U	0.14	mg/kg Dry	25-Jun-02 09:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.25	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.30	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		17.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		6.28	units	24-Jun-02 15:28	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	03-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	220	mg/kg Dry	03-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				24-Jun-02 06:00	DWK
Final pH		4.950		24-Jun-02 06:00	DWK
SW-846 METHOD 6010B					
Silver	U	1.0	mg/kg	27-Jun-02 10:54	DWK
Silver	U	1.2	mg/kg Dry	27-Jun-02 10:54	DWK
Silver, TCLP	U	0.050	mg/l	28-Jun-02 12:04	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		11000	mg/kg	27-Jun-02 10:54	DWK
Aluminum		13000	mg/kg Dry	27-Jun-02 10:54	DWK
Arsenic		5.0	mg/kg	27-Jun-02 10:54	DWK
Arsenic		6.0	mg/kg Dry	27-Jun-02 10:54	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 12:04	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

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000155

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
Barium		100	mg/kg	27-Jun-02 10:54	DWK
Barium		120	mg/kg Dry	27-Jun-02 10:54	DWK
Barium, TCLP	J	1.7	mg/l	28-Jun-02 12:04	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.32	mg/kg	27-Jun-02 10:54	DWK
Beryllium	J	0.38	mg/kg Dry	27-Jun-02 10:54	DWK
Calcium		2100	mg/kg	27-Jun-02 10:54	DWK
Calcium		2500	mg/kg Dry	27-Jun-02 10:54	DWK
Cadmium		0.50	mg/kg	27-Jun-02 10:54	DWK
Cadmium		0.60	mg/kg Dry	27-Jun-02 10:54	DWK
Cadmium, TCLP	J	0.0014	mg/l	28-Jun-02 12:04	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		4.8	mg/kg	27-Jun-02 10:54	DWK
Cobalt		5.8	mg/kg Dry	27-Jun-02 10:54	DWK
Chromium		16.	mg/kg	27-Jun-02 10:54	DWK
Chromium		19.	mg/kg Dry	27-Jun-02 10:54	DWK
Chromium, TCLP	J	0.0026	mg/l	28-Jun-02 12:04	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		13.	mg/kg	27-Jun-02 10:54	DWK
Copper		16.	mg/kg Dry	27-Jun-02 10:54	DWK
Iron		12000	mg/kg	27-Jun-02 10:54	DWK
Iron		14000	mg/kg Dry	27-Jun-02 10:54	DWK
Potassium		1300	mg/kg	27-Jun-02 10:54	DWK
Potassium		1600	mg/kg Dry	27-Jun-02 10:54	DWK
Magnesium		1800000	ug/kg	27-Jun-02 10:54	DWK
Magnesium		2200000	ug/kg Dry	27-Jun-02 10:54	DWK
Manganese		410	mg/kg	27-Jun-02 10:54	DWK
Manganese		490	mg/kg Dry	27-Jun-02 10:54	DWK
Sodium	J	36.	mg/kg	27-Jun-02 10:54	DWK
Sodium	J	43.	mg/kg Dry	27-Jun-02 10:54	DWK
Nickel		11.	mg/kg	27-Jun-02 10:54	DWK
Nickel		13.	mg/kg Dry	27-Jun-02 10:54	DWK
Lead		15.	mg/kg	27-Jun-02 10:54	DWK

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000156

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
Lead		18.	mg/kg Dry	27-Jun-02 10:54	DWK
Lead, TCLP	J	0.0016	mg/l	28-Jun-02 12:04	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 10:54	DWK
Antimony	U	2.4	mg/kg Dry	27-Jun-02 10:54	DWK
Selenium	J	0.85	mg/kg	27-Jun-02 10:54	DWK
Selenium	J	1.0	mg/kg Dry	27-Jun-02 10:54	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 12:04	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.28	mg/kg	27-Jun-02 10:54	DWK
Thallium	J	0.34	mg/kg Dry	27-Jun-02 10:54	DWK
Vanadium		24.	mg/kg	27-Jun-02 10:54	DWK
Vanadium		29.	mg/kg Dry	27-Jun-02 10:54	DWK
Zinc		45.	mg/kg	27-Jun-02 10:54	DWK
Zinc		54.	mg/kg Dry	27-Jun-02 10:54	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 10:02	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury		0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury		0.048	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 6081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U,X	80.	ug/kg	19-Jul-02 20:51	AMG
alpha-BHC	U	96.	ug/kg Dry	19-Jul-02 20:51	AMG
gamma-BHC (Lindane)	U	80.	ug/kg	19-Jul-02 20:51	AMG
gamma-BHC (Lindane)	U	96.	ug/kg Dry	19-Jul-02 20:51	AMG

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000157

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	19-Jul-02 20:51	AMG
beta-BHC	U	96.	ug/kg Dry	19-Jul-02 20:51	AMG
Heptachlor	J	6.7	ug/kg	19-Jul-02 20:51	AMG
Heptachlor	J	8.1	ug/kg Dry	19-Jul-02 20:51	AMG
delta-BHC	U	80.	ug/kg	19-Jul-02 20:51	AMG
delta-BHC	U	96.	ug/kg Dry	19-Jul-02 20:51	AMG
Aldrin	U	80.	ug/kg	19-Jul-02 20:51	AMG
Aldrin	U	96.	ug/kg Dry	19-Jul-02 20:51	AMG
Heptachlor Epoxide		120	ug/kg	19-Jul-02 20:51	AMG
Heptachlor Epoxide		140	ug/kg Dry	19-Jul-02 20:51	AMG
Endosulfan I	U	80.	ug/kg	19-Jul-02 20:51	AMG
Endosulfan I	U	96.	ug/kg Dry	19-Jul-02 20:51	AMG
4,4'-DDE	J	100	ug/kg	19-Jul-02 20:51	AMG
4,4'-DDE	J	120	ug/kg Dry	19-Jul-02 20:51	AMG
Dieldrin	J	120	ug/kg	19-Jul-02 20:51	AMG
Dieldrin	J	140	ug/kg Dry	19-Jul-02 20:51	AMG
Endrin	J	11.	ug/kg	19-Jul-02 20:51	AMG
Endrin	J	13.	ug/kg Dry	19-Jul-02 20:51	AMG
4,4'-DDD	U	160	ug/kg	19-Jul-02 20:51	AMG
4,4'-DDD	U	190	ug/kg Dry	19-Jul-02 20:51	AMG
Endosulfan II	U	160	ug/kg	19-Jul-02 20:51	AMG
Endosulfan II	U	190	ug/kg Dry	19-Jul-02 20:51	AMG
4,4'-DDT	J	150	ug/kg	19-Jul-02 20:51	AMG
4,4'-DDT	J	180	ug/kg Dry	19-Jul-02 20:51	AMG
Endrin Aldehyde	U	160	ug/kg	19-Jul-02 20:51	AMG
Endrin Aldehyde	U	190	ug/kg Dry	19-Jul-02 20:51	AMG
Endosulfan Sulfate	U	160	ug/kg	19-Jul-02 20:51	AMG
Endosulfan Sulfate	U	190	ug/kg Dry	19-Jul-02 20:51	AMG
Methoxychlor	U	800	ug/kg	19-Jul-02 20:51	AMG
Methoxychlor	U	960	ug/kg Dry	19-Jul-02 20:51	AMG
Toxaphene	U	800	ug/kg	19-Jul-02 20:51	AMG
Toxaphene	U	960	ug/kg Dry	19-Jul-02 20:51	AMG
Chlordane (technical)	U	1600	ug/kg	19-Jul-02 20:51	AMG

k=Compound was determined to be not confirmed because %D was 186%.

000151

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
Chlordane (technical)	U	1900	ug/kg Dry	19-Jul-02 20:51	AMG
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 10:03	AMR
Aroclor 1016	U	96.	ug/kg Dry	25-Jun-02 10:03	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 10:03	AMR
Aroclor 1221	U	190	ug/kg Dry	25-Jun-02 10:03	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 10:03	AMR
Aroclor 1232	U	96.	ug/kg Dry	25-Jun-02 10:03	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 10:03	AMR
Aroclor 1242	U	96.	ug/kg Dry	25-Jun-02 10:03	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 10:03	AMR
Aroclor 1248	U	96.	ug/kg Dry	25-Jun-02 10:03	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 10:03	AMR
Aroclor 1254	U	190	ug/kg Dry	25-Jun-02 10:03	AMR
Aroclor 1260	U	160	ug/kg	25-Jun-02 10:03	AMR
Aroclor 1260	U	190	ug/kg Dry	25-Jun-02 10:03	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	19-Jul-02 13:07	ELS
Naphthalene	U	81.	ug/kg Dry	19-Jul-02 13:07	ELS
Acenaphthene	J	65.	ug/kg	19-Jul-02 13:07	ELS
Acenaphthene	J	78.	ug/kg Dry	19-Jul-02 13:07	ELS
Acenaphthylene	U	67.	ug/kg	19-Jul-02 13:07	ELS
Acenaphthylene	U	81.	ug/kg Dry	19-Jul-02 13:07	ELS
Fluorene	U	67.	ug/kg	19-Jul-02 13:07	ELS
Fluorene	U	81.	ug/kg Dry	19-Jul-02 13:07	ELS
Phenanthrene	U	67.	ug/kg	19-Jul-02 13:07	ELS
Phenanthrene	U	81.	ug/kg Dry	19-Jul-02 13:07	ELS
Anthracene	U	67.	ug/kg	19-Jul-02 13:07	ELS
Anthracene	U	81.	ug/kg Dry	19-Jul-02 13:07	ELS
Fluoranthene	U	6.7	ug/kg	19-Jul-02 13:07	ELS
Fluoranthene	U	8.1	ug/kg Dry	19-Jul-02 13:07	ELS
Pyrene	U	6.7	ug/kg	19-Jul-02 13:07	ELS
Pyrene	U	8.1	ug/kg Dry	19-Jul-02 13:07	ELS

X=Compound was determined to be not confirmed because %D was 186%.

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
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PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	J	2.3	ug/kg	19-Jul-02 13:07	ELS
Benzo(a)Anthracene	J	2.8	ug/kg Dry	19-Jul-02 13:07	ELS
Chrysene	U	6.7	ug/kg	19-Jul-02 13:07	ELS
Chrysene	U	8.1	ug/kg Dry	19-Jul-02 13:07	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	19-Jul-02 13:07	ELS
Benzo(b)Fluoranthene	U	8.1	ug/kg Dry	19-Jul-02 13:07	ELS
Benzo(k)Fluoranthene	J	1.3	ug/kg	19-Jul-02 13:07	ELS
Benzo(k)Fluoranthene	J	1.6	ug/kg Dry	19-Jul-02 13:07	ELS
Benzo(a)Pyrene	J	2.3	ug/kg	19-Jul-02 13:07	ELS
Benzo(a)Pyrene	J	2.8	ug/kg Dry	19-Jul-02 13:07	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	19-Jul-02 13:07	ELS
Dibenz(a,h)Anthracene	U	8.1	ug/kg Dry	19-Jul-02 13:07	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	19-Jul-02 13:07	ELS
Benzo(g,h,i)Perylene	U	8.1	ug/kg Dry	19-Jul-02 13:07	ELS
Indeno(1,2,3-cd)Pyrene	J	3.1	ug/kg	19-Jul-02 13:07	ELS
Indeno(1,2,3-cd)Pyrene	J	3.7	ug/kg Dry	19-Jul-02 13:07	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	02-Jul-02 18:42	AJB
Vinyl Chloride	U	12.	ug/kg Dry	02-Jul-02 18:42	AJB
Bromomethane	KU	10.	ug/kg	02-Jul-02 18:42	AJB
Bromomethane	KU	12.	ug/kg Dry	02-Jul-02 18:42	AJB
Methylene Chloride	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Methylene Chloride	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 18:42	AJB
cis-1,3-Dichloropropene	U	2.4	ug/kg Dry	02-Jul-02 18:42	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 18:42	AJB
trans-1,3-Dichloropropene	U	2.4	ug/kg Dry	02-Jul-02 18:42	AJB
Carbon Disulfide	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Carbon Disulfide	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Acetone		86.	ug/kg	02-Jul-02 18:42	AJB
Acetone		100	ug/kg Dry	02-Jul-02 18:42	AJB
1,1-Dichloroethene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
1,1-Dichloroethene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB

X=Compound was determined to be not confirmed because %D was 186%.

000160

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	02-Jul-02 18:42	AJB
1,1-Dichloroethane	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
trans-1,2-Dichloroethene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
cis-1,2-Dichloroethene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Chloroform	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Chloroform	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
1,2-Dichloroethane	U	5.0	ug/kg	02-Jul-02 18:42	AJB
1,2-Dichloroethane	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	02-Jul-02 18:42	AJB
1,1,1-Trichloroethane	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Carbon Tetrachloride	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Carbon Tetrachloride	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Vinyl Acetate	U	10.	ug/kg	02-Jul-02 18:42	AJB
Vinyl Acetate	U	12.	ug/kg Dry	02-Jul-02 18:42	AJB
Bromodichloromethane	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Bromodichloromethane	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
1,2-Dichloropropane	U	5.0	ug/kg	02-Jul-02 18:42	AJB
1,2-Dichloropropane	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Trichloroethene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Trichloroethene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Dibromochloromethane	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Dibromochloromethane	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	02-Jul-02 18:42	AJB
1,1,2-Trichloroethane	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Benzene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Benzene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
1,2-Dibromoethane	U	0.42	ug/kg	02-Jul-02 18:42	AJB
1,2-Dibromoethane	U	0.51	ug/kg Dry	02-Jul-02 18:42	AJB
Bromoform	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Bromoform	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Tetrachloroethene	U	5.0	ug/kg	02-Jul-02 18:42	AJB

K=Compound was determined to be not confirmed because %D was 186%.

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Toluene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Toluene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Chlorobenzene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Chlorobenzene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
Ethylbenzene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Ethylbenzene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	02-Jul-02 18:42	AJB
1,2-Dibromo-3-chloropropane	U	0.66	ug/kg Dry	02-Jul-02 18:42	AJB
Styrene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
Styrene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
m,p-Xylene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
m,p-Xylene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
o-Xylene	U	5.0	ug/kg	02-Jul-02 18:42	AJB
o-Xylene	U	6.0	ug/kg Dry	02-Jul-02 18:42	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 22:00	CAH
N-Nitrosodimethylamine	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Pyridine	U	330	ug/kg	25-Jun-02 22:00	CAH
Pyridine	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Aniline	U	330	ug/kg	25-Jun-02 22:00	CAH
Aniline	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 22:00	CAH
bis(2-Chloroethyl) Ether	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 22:00	CAH
2-Chlorophenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Phenol	U	330	ug/kg	25-Jun-02 22:00	CAH
Phenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 22:00	CAH
1,3-Dichlorobenzene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 22:00	CAH
1,4-Dichlorobenzene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 22:00	CAH

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 22:00	CAH
Benzyl Alcohol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	25-Jun-02 22:00	CAH
Bis(2-chloroisopropyl)ether	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Hexachloroethane	U	330	ug/kg	25-Jun-02 22:00	CAH
Hexachloroethane	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 22:00	CAH
2-Methylphenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 22:00	CAH
N-Nitroso-di-n-propylamine	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 22:00	CAH
4-Methylphenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 22:00	CAH
Nitrobenzene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Isophorone	U	330	ug/kg	25-Jun-02 22:00	CAH
Isophorone	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 22:00	CAH
2-Nitrophenol	U	1900	ug/kg Dry	25-Jun-02 22:00	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 22:00	CAH
2,4-Dimethylphenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 22:00	CAH
bis(2-Chloroethoxy)methane	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 22:00	CAH
2,4-Dichlorophenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 22:00	CAH
1,2,4-Trichlorobenzene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 22:00	CAH
Naphthalene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 22:00	CAH
2,6-Dichlorophenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 22:00	CAH
4-Chloroaniline	U	400	ug/kg Dry	25-Jun-02 22:00	CAH

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 22:00	CAH
Hexachlorobutadiene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 22:00	CAH
4-Chloro-3-Methylphenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 22:00	CAH
2-Methylnaphthalene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 22:00	CAH
Hexachlorocyclopentadiene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 22:00	CAH
2,4,6-Trichlorophenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 22:00	CAH
2,4,5-Trichlorophenol	U	1900	ug/kg Dry	25-Jun-02 22:00	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 22:00	CAH
2-Chloronaphthalene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 22:00	CAH
2-Nitroaniline	U	1900	ug/kg Dry	25-Jun-02 22:00	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 22:00	CAH
Dimethylphthalate	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 22:00	CAH
Acenaphthylene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 22:00	CAH
2,6-Dinitrotoluene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 22:00	CAH
3-Nitroaniline	U	1900	ug/kg Dry	25-Jun-02 22:00	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 22:00	CAH
Acenaphthene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 22:00	CAH
2,4-Dinitrophenol	U	1900	ug/kg Dry	25-Jun-02 22:00	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 22:00	CAH
Dibenzofuran	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 22:00	CAH
2,4-Dinitrotoluene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 22:00	CAH

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
4-Nitrophenol	U	1900	ug/kg Dry	25-Jun-02 22:00	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 22:00	CAH
2,3,4,6-Tetrachlorophenol	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 22:00	CAH
Diethylphthalate	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Fluorene	U	330	ug/kg	25-Jun-02 22:00	CAH
Fluorene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 22:00	CAH
4-Chlorophenyl-phenyl Ether	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 22:00	CAH
4-Nitroaniline	U	1900	ug/kg Dry	25-Jun-02 22:00	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 22:00	CAH
4,6-Dinitro-2-methylphenol	U	1900	ug/kg Dry	25-Jun-02 22:00	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 22:00	CAH
N-Nitrosodiphenylamine	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 22:00	CAH
4-Bromophenyl-phenylether	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 22:00	CAH
Hexachlorobenzene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 22:00	CAH
Pentachlorophenol	U	1900	ug/kg Dry	25-Jun-02 22:00	CAH
Carbazole	U	330	ug/kg	25-Jun-02 22:00	CAH
Carbazole	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Phenanthrene	U	330	ug/kg	25-Jun-02 22:00	CAH
Phenanthrene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Anthracene	U	330	ug/kg	25-Jun-02 22:00	CAH
Anthracene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 22:00	CAH
Di-n-Butylphthalate	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 22:00	CAH
Fluoranthene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Pyrene	U	330	ug/kg	25-Jun-02 22:00	CAH
Pyrene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH

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000165

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-13
Client ID: SOILS
Site: B-12-1
Locator: GRAB
Collect Date: 18-JUN-02 16:25

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 22:00	CAH
Butylbenzylphthalate	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 22:00	CAH
Benzo(a)anthracene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 22:00	CAH
3,3'-Dichlorobenzidine	U	800	ug/kg Dry	25-Jun-02 22:00	CAH
Chrysene	U	330	ug/kg	25-Jun-02 22:00	CAH
Chrysene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 22:00	CAH
bis(2-Ethylhexyl)phthalate	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 22:00	CAH
Di-n-octylphthalate	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 22:00	CAH
Benzo(b)fluoranthene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 22:00	CAH
Benzo(k)fluoranthene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 22:00	CAH
Benzo(a)pyrene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 22:00	CAH
Indeno(1,2,3-cd)pyrene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 22:00	CAH
Dibenzo(a,h)anthracene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 22:00	CAH
Benzo(g,h,i)perylene	U	400	ug/kg Dry	25-Jun-02 22:00	CAH

X=Compound was determined to be not confirmed because %D was 186%.

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-14
Client ID: SOILS
Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	25-Jun-02 09:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	25-Jun-02 09:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent		0.10	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent		0.12	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		20.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		7.56	units	24-Jun-02 15:37	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	03-Jul-02 09:00	TAC
Silica Gel Treated - HEM	U	220	mg/kg Dry	03-Jul-02 09:00	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				24-Jun-02 06:00	DWK
Final pH		4.970		24-Jun-02 06:00	DWK
SW-846 METHOD 6010B					
Silver	U	1.0	mg/kg	27-Jun-02 11:00	DWK
Silver	U	1.2	mg/kg Dry	27-Jun-02 11:00	DWK
Silver, TCLP	J	0.0075	mg/l	28-Jun-02 12:23	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		13000	mg/kg	27-Jun-02 11:00	DWK
Aluminum		16000	mg/kg Dry	27-Jun-02 11:00	DWK
Arsenic		7.4	mg/kg	27-Jun-02 11:00	DWK
Arsenic		9.2	mg/kg Dry	27-Jun-02 11:00	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 12:23	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

000167

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-14
Client ID: SOILS
Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Barium		120	mg/kg	27-Jun-02 11:00	DWK
Barium		150	mg/kg Dry	27-Jun-02 11:00	DWK
Barium, TCLP	J	0.81	mg/l	28-Jun-02 12:23	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.48	mg/kg	27-Jun-02 11:00	DWK
Beryllium	J	0.60	mg/kg Dry	27-Jun-02 11:00	DWK
Calcium		1900	mg/kg	27-Jun-02 11:00	DWK
Calcium		2400	mg/kg Dry	27-Jun-02 11:00	DWK
Cadmium		0.56	mg/kg	27-Jun-02 11:00	DWK
Cadmium		0.70	mg/kg Dry	27-Jun-02 11:00	DWK
Cadmium, TCLP	J	0.0011	mg/l	28-Jun-02 12:23	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		10.	mg/kg	27-Jun-02 11:00	DWK
Cobalt		12.	mg/kg Dry	27-Jun-02 11:00	DWK
Chromium		18.	mg/kg	27-Jun-02 11:00	DWK
Chromium		22.	mg/kg Dry	27-Jun-02 11:00	DWK
Chromium, TCLP	J	0.0020	mg/l	28-Jun-02 12:23	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		10.	mg/kg	27-Jun-02 11:00	DWK
Copper		12.	mg/kg Dry	27-Jun-02 11:00	DWK
Iron		14000	mg/kg	27-Jun-02 11:00	DWK
Iron		18000	mg/kg Dry	27-Jun-02 11:00	DWK
Potassium		1600	mg/kg	27-Jun-02 11:00	DWK
Potassium		2000	mg/kg Dry	27-Jun-02 11:00	DWK
Magnesium		2200000	ug/kg	27-Jun-02 11:00	DWK
Magnesium		2800000	ug/kg Dry	27-Jun-02 11:00	DWK
Manganese		740	mg/kg	27-Jun-02 11:00	DWK
Manganese		920	mg/kg Dry	27-Jun-02 11:00	DWK
Sodium	J	72.	mg/kg	27-Jun-02 11:00	DWK
Sodium	J	90.	mg/kg Dry	27-Jun-02 11:00	DWK
Nickel		17.	mg/kg	27-Jun-02 11:00	DWK
Nickel		21.	mg/kg Dry	27-Jun-02 11:00	DWK
L d		11.	mg/kg	27-Jun-02 11:00	DWK

000168

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-14
Client ID: SOILS
Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Lead		14.	mg/kg Dry	27-Jun-02 11:00	DWK
Lead, TCLP	U	0.0075	mg/l	28-Jun-02 12:23	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 11:00	DWK
Antimony	U	2.5	mg/kg Dry	27-Jun-02 11:00	DWK
Selenium	J	0.70	mg/kg	27-Jun-02 11:00	DWK
Selenium	J	0.88	mg/kg Dry	27-Jun-02 11:00	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 12:23	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.53	mg/kg	27-Jun-02 11:00	DWK
Thallium	J	0.66	mg/kg Dry	27-Jun-02 11:00	DWK
Vanadium		26.	mg/kg	27-Jun-02 11:00	DWK
Vanadium		32.	mg/kg Dry	27-Jun-02 11:00	DWK
Zinc		40.	mg/kg	27-Jun-02 11:00	DWK
Zinc		50.	mg/kg Dry	27-Jun-02 11:00	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 10:08	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.050	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	23-Jul-02 04:30	AMG
alpha-BHC	U	100	ug/kg Dry	23-Jul-02 04:30	AMG
gamma-BHC (Lindane)	U	80.	ug/kg	23-Jul-02 04:30	AMG
gamma-BHC (Lindane)	U	100	ug/kg Dry	23-Jul-02 04:30	AMG

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Bettendorf, IA 52722

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Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-14
Client ID: SOILS
Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	23-Jul-02 04:30	AMG
beta-BHC	U	100	ug/kg Dry	23-Jul-02 04:30	AMG
Heptachlor	U	80.	ug/kg	23-Jul-02 04:30	AMG
Heptachlor	U	100	ug/kg Dry	23-Jul-02 04:30	AMG
delta-BHC	U	80.	ug/kg	23-Jul-02 04:30	AMG
delta-BHC	U	100	ug/kg Dry	23-Jul-02 04:30	AMG
Aldrin	U	80.	ug/kg	23-Jul-02 04:30	AMG
Aldrin	U	100	ug/kg Dry	23-Jul-02 04:30	AMG
Heptachlor Epoxide	U	80.	ug/kg	23-Jul-02 04:30	AMG
Heptachlor Epoxide	U	100	ug/kg Dry	23-Jul-02 04:30	AMG
Endosulfan I	U	80.	ug/kg	23-Jul-02 04:30	AMG
Endosulfan I	U	100	ug/kg Dry	23-Jul-02 04:30	AMG
4,4'-DDE	U	160	ug/kg	23-Jul-02 04:30	AMG
4,4'-DDE	U	200	ug/kg Dry	23-Jul-02 04:30	AMG
Dieldrin	U	160	ug/kg	23-Jul-02 04:30	AMG
Dieldrin	U	200	ug/kg Dry	23-Jul-02 04:30	AMG
Endrin	U	160	ug/kg	23-Jul-02 04:30	AMG
Endrin	U	200	ug/kg Dry	23-Jul-02 04:30	AMG
4,4'-DDD	U	160	ug/kg	23-Jul-02 04:30	AMG
4,4'-DDD	U	200	ug/kg Dry	23-Jul-02 04:30	AMG
Endosulfan II	U	160	ug/kg	23-Jul-02 04:30	AMG
Endosulfan II	U	200	ug/kg Dry	23-Jul-02 04:30	AMG
4,4'-DDT	U	160	ug/kg	23-Jul-02 04:30	AMG
4,4'-DDT	U	200	ug/kg Dry	23-Jul-02 04:30	AMG
Endrin Aldehyde	U	160	ug/kg	23-Jul-02 04:30	AMG
Endrin Aldehyde	U	200	ug/kg Dry	23-Jul-02 04:30	AMG
Endosulfan Sulfate	U	160	ug/kg	23-Jul-02 04:30	AMG
Endosulfan Sulfate	U	200	ug/kg Dry	23-Jul-02 04:30	AMG
Methoxychlor	U	800	ug/kg	23-Jul-02 04:30	AMG
Methoxychlor	U	1000	ug/kg Dry	23-Jul-02 04:30	AMG
Toxaphene	U	800	ug/kg	23-Jul-02 04:30	AMG
Toxaphene	U	1000	ug/kg Dry	23-Jul-02 04:30	AMG
Chlordane (technical)	U	1600	ug/kg	23-Jul-02 04:30	AMG

000170

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Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-14
Client ID: SOILS
Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	23-Jul-02 04:30	AMG
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 10:39	AMR
Aroclor 1016	U	100	ug/kg Dry	25-Jun-02 10:39	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 10:39	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 10:39	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 10:39	AMR
Aroclor 1232	U	100	ug/kg Dry	25-Jun-02 10:39	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 10:39	AMR
Aroclor 1242	U	100	ug/kg Dry	25-Jun-02 10:39	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 10:39	AMR
Aroclor 1248	U	100	ug/kg Dry	25-Jun-02 10:39	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 10:39	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 10:39	AMR
Aroclor 1260	U	160	ug/kg	25-Jun-02 10:39	AMR
Aroclor 1260	U	200	ug/kg Dry	25-Jun-02 10:39	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	19-Jul-02 13:40	ELS
Naphthalene	U	84.	ug/kg Dry	19-Jul-02 13:40	ELS
Acenaphthene	U	67.	ug/kg	19-Jul-02 13:40	ELS
Acenaphthene	U	84.	ug/kg Dry	19-Jul-02 13:40	ELS
Acenaphthylene	U	67.	ug/kg	19-Jul-02 13:40	ELS
Acenaphthylene	U	84.	ug/kg Dry	19-Jul-02 13:40	ELS
Fluorene	U	67.	ug/kg	19-Jul-02 13:40	ELS
Fluorene	U	84.	ug/kg Dry	19-Jul-02 13:40	ELS
Phenanthrene	U	67.	ug/kg	19-Jul-02 13:40	ELS
Phenanthrene	U	84.	ug/kg Dry	19-Jul-02 13:40	ELS
Anthracene	U	67.	ug/kg	19-Jul-02 13:40	ELS
Anthracene	U	84.	ug/kg Dry	19-Jul-02 13:40	ELS
Fluoranthene	U	6.7	ug/kg	19-Jul-02 13:40	ELS
Fluoranthene	U	8.4	ug/kg Dry	19-Jul-02 13:40	ELS
Pyrene	U	6.7	ug/kg	19-Jul-02 13:40	ELS
Pyrene	U	8.4	ug/kg Dry	19-Jul-02 13:40	ELS

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PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-14
Client ID: SOILS
Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	U	6.7	ug/kg	19-Jul-02 13:40	ELS
Benzo(a)Anthracene	U	8.4	ug/kg Dry	19-Jul-02 13:40	ELS
Chrysene	U	6.7	ug/kg	19-Jul-02 13:40	ELS
Chrysene	U	8.4	ug/kg Dry	19-Jul-02 13:40	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	19-Jul-02 13:40	ELS
Benzo(b)Fluoranthene	U	8.4	ug/kg Dry	19-Jul-02 13:40	ELS
Benzo(k)Fluoranthene	U	3.4	ug/kg	19-Jul-02 13:40	ELS
Benzo(k)Fluoranthene	U	4.2	ug/kg Dry	19-Jul-02 13:40	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	19-Jul-02 13:40	ELS
Benzo(a)Pyrene	U	8.4	ug/kg Dry	19-Jul-02 13:40	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	19-Jul-02 13:40	ELS
Dibenz(a,h)Anthracene	U	8.4	ug/kg Dry	19-Jul-02 13:40	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	19-Jul-02 13:40	ELS
Benzo(g,h,i)Perylene	U	8.4	ug/kg Dry	19-Jul-02 13:40	ELS
Indeno(1,2,3-cd)Pyrene	U	6.7	ug/kg	19-Jul-02 13:40	ELS
Indeno(1,2,3-cd)Pyrene	U	8.4	ug/kg Dry	19-Jul-02 13:40	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	02-Jul-02 19:18	AJB
Vinyl Chloride	U	12.	ug/kg Dry	02-Jul-02 19:18	AJB
Bromomethane	KU	10.	ug/kg	02-Jul-02 19:18	AJB
Bromomethane	KU	12.	ug/kg Dry	02-Jul-02 19:18	AJB
Methylene Chloride	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Methylene Chloride	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 19:18	AJB
cis-1,3-Dichloropropene	U	2.5	ug/kg Dry	02-Jul-02 19:18	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 19:18	AJB
trans-1,3-Dichloropropene	U	2.5	ug/kg Dry	02-Jul-02 19:18	AJB
Carbon Disulfide	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Carbon Disulfide	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Acetone		82.	ug/kg	02-Jul-02 19:18	AJB
Acetone		100	ug/kg Dry	02-Jul-02 19:18	AJB
1,1-Dichloroethene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
1,1-Dichloroethene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB

000172

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Client ID: SOILS
Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	02-Jul-02 19:18	AJB
1,1-Dichloroethane	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
trans-1,2-Dichloroethene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
cis-1,2-Dichloroethene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Chloroform	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Chloroform	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
1,2-Dichloroethane	U	5.0	ug/kg	02-Jul-02 19:18	AJB
1,2-Dichloroethane	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	02-Jul-02 19:18	AJB
1,1,1-Trichloroethane	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Carbon Tetrachloride	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Carbon Tetrachloride	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Vinyl Acetate	U	10.	ug/kg	02-Jul-02 19:18	AJB
Vinyl Acetate	U	12.	ug/kg Dry	02-Jul-02 19:18	AJB
Bromodichloromethane	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Bromodichloromethane	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
1,2-Dichloropropane	U	5.0	ug/kg	02-Jul-02 19:18	AJB
1,2-Dichloropropane	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Trichloroethene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Trichloroethene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Dibromochloromethane	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Dibromochloromethane	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	02-Jul-02 19:18	AJB
1,1,2-Trichloroethane	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Benzene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Benzene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
1,2-Dibromoethane	U	0.42	ug/kg	02-Jul-02 19:18	AJB
1,2-Dibromoethane	U	0.52	ug/kg Dry	02-Jul-02 19:18	AJB
Bromoform	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Bromoform	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Tetrachloroethene	U	5.0	ug/kg	02-Jul-02 19:18	AJB

000173

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Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Toluene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Toluene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Chlorobenzene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Chlorobenzene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
Ethylbenzene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Ethylbenzene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	02-Jul-02 19:18	AJB
1,2-Dibromo-3-chloropropane	U	0.69	ug/kg Dry	02-Jul-02 19:18	AJB
Styrene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
Styrene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
m,p-Xylene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
m,p-Xylene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
o-Xylene	U	5.0	ug/kg	02-Jul-02 19:18	AJB
o-Xylene	U	6.2	ug/kg Dry	02-Jul-02 19:18	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 22:45	CAH
N-Nitrosodimethylamine	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Pyridine	U	330	ug/kg	25-Jun-02 22:45	CAH
Pyridine	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Aniline	U	330	ug/kg	25-Jun-02 22:45	CAH
Aniline	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 22:45	CAH
bis(2-Chloroethyl) Ether	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 22:45	CAH
2-Chlorophenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Phenol	U	330	ug/kg	25-Jun-02 22:45	CAH
Phenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 22:45	CAH
1,3-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 22:45	CAH
1,4-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 22:45	CAH

000174

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Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 22:45	CAH
Benzyl Alcohol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	25-Jun-02 22:45	CAH
Bis(2-chloroisopropyl)ether	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Hexachloroethane	U	330	ug/kg	25-Jun-02 22:45	CAH
Hexachloroethane	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 22:45	CAH
2-Methylphenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 22:45	CAH
N-Nitroso-di-n-propylamine	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 22:45	CAH
4-Methylphenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 22:45	CAH
Nitrobenzene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Isophorone	U	330	ug/kg	25-Jun-02 22:45	CAH
Isophorone	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 22:45	CAH
2-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 22:45	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 22:45	CAH
2,4-Dimethylphenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 22:45	CAH
bis(2-Chloroethoxy)methane	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 22:45	CAH
2,4-Dichlorophenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 22:45	CAH
1,2,4-Trichlorobenzene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 22:45	CAH
Naphthalene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 22:45	CAH
2,6-Dichlorophenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 22:45	CAH
4-Chloroaniline	U	410	ug/kg Dry	25-Jun-02 22:45	CAH

000175

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-14
Client ID: SOILS
Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 22:45	CAH
Hexachlorobutadiene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 22:45	CAH
4-Chloro-3-Methylphenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 22:45	CAH
2-Methylnaphthalene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 22:45	CAH
Hexachlorocyclopentadiene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 22:45	CAH
2,4,6-Trichlorophenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 22:45	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	25-Jun-02 22:45	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 22:45	CAH
2-Chloronaphthalene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 22:45	CAH
2-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 22:45	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 22:45	CAH
Dimethylphthalate	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 22:45	CAH
Acenaphthylene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 22:45	CAH
2,6-Dinitrotoluene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 22:45	CAH
3-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 22:45	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 22:45	CAH
Acenaphthene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 22:45	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	25-Jun-02 22:45	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 22:45	CAH
Dibenzofuran	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 22:45	CAH
2,4-Dinitrotoluene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 22:45	CAH

000176

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Laboratory Results

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Bettendorf, IA 52722

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PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

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Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 22:45	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 22:45	CAH
2,3,4,6-Tetrachlorophenol	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 22:45	CAH
Diethylphthalate	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Fluorene	U	330	ug/kg	25-Jun-02 22:45	CAH
Fluorene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 22:45	CAH
4-Chlorophenyl-phenyl Ether	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 22:45	CAH
4-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 22:45	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 22:45	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	25-Jun-02 22:45	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 22:45	CAH
N-Nitrosodiphenylamine	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 22:45	CAH
4-Bromophenyl-phenylether	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 22:45	CAH
Hexachlorobenzene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 22:45	CAH
Pentachlorophenol	U	2000	ug/kg Dry	25-Jun-02 22:45	CAH
Carbazole	U	330	ug/kg	25-Jun-02 22:45	CAH
Carbazole	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Phenanthrene	U	330	ug/kg	25-Jun-02 22:45	CAH
Phenanthrene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Anthracene	U	330	ug/kg	25-Jun-02 22:45	CAH
Anthracene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 22:45	CAH
Di-n-Butylphthalate	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 22:45	CAH
Fluoranthene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Pyrene	U	330	ug/kg	25-Jun-02 22:45	CAH
Pyrene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH

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PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-14
Client ID: SOILS
Site: B-6-2 DUP
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 22:45	CAH
Butylbenzylphthalate	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 22:45	CAH
Benzo(a)anthracene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 22:45	CAH
3,3'-Dichlorobenzidine	U	820	ug/kg Dry	25-Jun-02 22:45	CAH
Chrysene	U	330	ug/kg	25-Jun-02 22:45	CAH
Chrysene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 22:45	CAH
bis(2-Ethylhexyl)phthalate	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 22:45	CAH
Di-n-octylphthalate	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 22:45	CAH
Benzo(b)fluoranthene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 22:45	CAH
Benzo(k)fluoranthene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 22:45	CAH
Benzo(a)pyrene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 22:45	CAH
Indeno(1,2,3-cd)pyrene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 22:45	CAH
Dibenzo(a,h)anthracene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 22:45	CAH
Benzo(g,h,i)perylene	U	410	ug/kg Dry	25-Jun-02 22:45	CAH

000178

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
SW-846 METHOD 9012 / 9014					
Cyanide, Total	U	0.12	mg/kg	25-Jun-02 09:00	KG
Cyanide, Total	U	0.15	mg/kg Dry	25-Jun-02 09:00	KG
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.50	mg/kg	20-Jun-02 15:30	TIN/JE
Chromium, Hexavalent	U	0.64	mg/kg Dry	20-Jun-02 15:30	TIN/JE
SM METHOD 2540 B					
Moisture		22.	%	19-Jun-02 14:55	JLR
SW-846 METHOD 9045 C					
pH		7.32	units	24-Jun-02 15:41	KJB
EPA METHOD 1664					
Silica Gel Treated - HEM	U	180	mg/kg	03-Jul-02 16:24	TAC
Silica Gel Treated - HEM	U	230	mg/kg Dry	03-Jul-02 16:24	TAC
SW-846 METHOD 7471					
Sample Preparation				20-Jun-02 10:00	ERS
SW-846 METHOD 3015					
Sample Preparation				24-Jun-02 06:00	DWK
SW-846 METHOD 3051					
Sample Preparation				19-Jun-02 12:30	BM
SW-846 METHOD 1311					
Leachate Preparation				24-Jun-02 06:00	DWK
Final pH		5.060		24-Jun-02 06:00	DWK
SW-846 METHOD 6010B					
Silver	U	1.0	mg/kg	27-Jun-02 11:06	DWK
Silver	U	1.3	mg/kg Dry	27-Jun-02 11:06	DWK
Silver, TCLP	J	0.0070	mg/l	28-Jun-02 12:29	DWK
Silver, TCLP		81.	% Recovery	28-Jun-02 10:00	DWK
Aluminum		14000	mg/kg	27-Jun-02 11:06	DWK
Aluminum		18000	mg/kg Dry	27-Jun-02 11:06	DWK
Arsenic		6.1	mg/kg	27-Jun-02 11:06	DWK
Arsenic		7.8	mg/kg Dry	27-Jun-02 11:06	DWK
Arsenic, TCLP	U	0.050	mg/l	28-Jun-02 12:29	DWK
Arsenic, TCLP		100	% Recovery	28-Jun-02 10:00	DWK

000179

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Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Barium		140	mg/kg	27-Jun-02 11:06	DWK
Barium		180	mg/kg Dry	27-Jun-02 11:06	DWK
Barium, TCLP	J	0.92	mg/l	28-Jun-02 12:29	DWK
Barium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Beryllium	J	0.36	mg/kg	27-Jun-02 11:06	DWK
Beryllium	J	0.46	mg/kg Dry	27-Jun-02 11:06	DWK
Calcium		2400	mg/kg	27-Jun-02 11:06	DWK
Calcium		3100	mg/kg Dry	27-Jun-02 11:06	DWK
Cadmium		0.34	mg/kg	27-Jun-02 11:06	DWK
Cadmium		0.44	mg/kg Dry	27-Jun-02 11:06	DWK
Cadmium, TCLP	J	0.00097	mg/l	28-Jun-02 12:29	DWK
Cadmium, TCLP		95.	% Recovery	28-Jun-02 10:00	DWK
Cobalt		8.2	mg/kg	27-Jun-02 11:06	DWK
Cobalt		10.	mg/kg Dry	27-Jun-02 11:06	DWK
Chromium		20.	mg/kg	27-Jun-02 11:06	DWK
Chromium		26.	mg/kg Dry	27-Jun-02 11:06	DWK
Chromium, TCLP	J	0.0037	mg/l	28-Jun-02 12:29	DWK
Chromium, TCLP		94.	% Recovery	28-Jun-02 10:00	DWK
Copper		11.	mg/kg	27-Jun-02 11:06	DWK
Copper		14.	mg/kg Dry	27-Jun-02 11:06	DWK
Iron		13000	mg/kg	27-Jun-02 11:06	DWK
Iron		17000	mg/kg Dry	27-Jun-02 11:06	DWK
Potassium		2200	mg/kg	27-Jun-02 11:06	DWK
Potassium		2800	mg/kg Dry	27-Jun-02 11:06	DWK
Magnesium		2100	mg/kg	27-Jun-02 11:06	DWK
Magnesium		2700	mg/kg Dry	27-Jun-02 11:06	DWK
Manganese		750	mg/kg	27-Jun-02 11:06	DWK
Manganese		960	mg/kg Dry	27-Jun-02 11:06	DWK
Sodium	J	50.	mg/kg	27-Jun-02 11:06	DWK
Sodium	J	64.	mg/kg Dry	27-Jun-02 11:06	DWK
Nickel		14.	mg/kg	27-Jun-02 11:06	DWK
Nickel		18.	mg/kg Dry	27-Jun-02 11:06	DWK
Lead		10.	mg/kg	27-Jun-02 11:06	DWK

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PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Lead		13.	mg/kg Dry	27-Jun-02 11:06	DWK
Lead, TCLP	U	0.0075	mg/l	28-Jun-02 12:29	DWK
Lead, TCLP		88.	% Recovery	28-Jun-02 10:00	DWK
Antimony	U	2.0	mg/kg	27-Jun-02 11:06	DWK
Antimony	U	2.6	mg/kg Dry	27-Jun-02 11:06	DWK
Selenium		1.0	mg/kg	27-Jun-02 11:06	DWK
Selenium		1.3	mg/kg Dry	27-Jun-02 11:06	DWK
Selenium, TCLP	U	0.050	mg/l	28-Jun-02 12:29	DWK
Selenium, TCLP		100	% Recovery	28-Jun-02 10:00	DWK
Thallium	J	0.36	mg/kg	27-Jun-02 11:06	DWK
Thallium	J	0.46	mg/kg Dry	27-Jun-02 11:06	DWK
Vanadium		30.	mg/kg	27-Jun-02 11:06	DWK
Vanadium		38.	mg/kg Dry	27-Jun-02 11:06	DWK
Zinc		42.	mg/kg	27-Jun-02 11:06	DWK
Zinc		54.	mg/kg Dry	27-Jun-02 11:06	DWK
Mercury, TCLP	U	0.20	mg/l	25-Jun-02 10:13	JEM
Mercury, TCLP		120	% Recovery	25-Jun-02 08:17	JEM
SW-846 METHOD 7471					
Mercury	U	0.040	mg/kg	20-Jun-02 12:00	ERS
Mercury	U	0.051	mg/kg Dry	20-Jun-02 12:00	ERS
SW-846 METHOD 8081A					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8082					
Sample Preparation				19-Jun-02 12:00	JS, KR
SW-846 METHOD 8270					
Sample Preparation				02-Jun-02 12:00	JT, JS
SW-846 METHOD 8310					
Sample Preparation				21-Jun-02 12:00	SC
SW-846 METHOD 8081A					
alpha-BHC	U	80.	ug/kg	23-Jul-02 05:16	AMG
alpha-BHC	U	100	ug/kg Dry	23-Jul-02 05:16	AMG
gamma-BHC (Lindane)	U	80.	ug/kg	23-Jul-02 05:16	AMG
gamma-BHC (Lindane)	U	100	ug/kg Dry	23-Jul-02 05:16	AMG

000181

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Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
beta-BHC	U	80.	ug/kg	23-Jul-02 05:16	AMG
beta-BHC	U	100	ug/kg Dry	23-Jul-02 05:16	AMG
Heptachlor	U	80.	ug/kg	23-Jul-02 05:16	AMG
Heptachlor	U	100	ug/kg Dry	23-Jul-02 05:16	AMG
delta-BHC	U	80.	ug/kg	23-Jul-02 05:16	AMG
delta-BHC	U	100	ug/kg Dry	23-Jul-02 05:16	AMG
Aldrin	U	80.	ug/kg	23-Jul-02 05:16	AMG
Aldrin	U	100	ug/kg Dry	23-Jul-02 05:16	AMG
Heptachlor Epoxide	U	80.	ug/kg	23-Jul-02 05:16	AMG
Heptachlor Epoxide	U	100	ug/kg Dry	23-Jul-02 05:16	AMG
Endosulfan I	U	80.	ug/kg	23-Jul-02 05:16	AMG
Endosulfan I	U	100	ug/kg Dry	23-Jul-02 05:16	AMG
4,4'-DDE	U	160	ug/kg	23-Jul-02 05:16	AMG
4,4'-DDE	U	200	ug/kg Dry	23-Jul-02 05:16	AMG
Dieldrin	U	160	ug/kg	23-Jul-02 05:16	AMG
Dieldrin	U	200	ug/kg Dry	23-Jul-02 05:16	AMG
Endrin	U	160	ug/kg	23-Jul-02 05:16	AMG
Endrin	U	200	ug/kg Dry	23-Jul-02 05:16	AMG
4,4'-DDD	U	160	ug/kg	23-Jul-02 05:16	AMG
4,4'-DDD	U	200	ug/kg Dry	23-Jul-02 05:16	AMG
Endosulfan II	U	160	ug/kg	23-Jul-02 05:16	AMG
Endosulfan II	U	200	ug/kg Dry	23-Jul-02 05:16	AMG
4,4'-DDT	U	160	ug/kg	23-Jul-02 05:16	AMG
4,4'-DDT	U	200	ug/kg Dry	23-Jul-02 05:16	AMG
Endrin Aldehyde	U	160	ug/kg	23-Jul-02 05:16	AMG
Endrin Aldehyde	U	200	ug/kg Dry	23-Jul-02 05:16	AMG
Endosulfan Sulfate	U	160	ug/kg	23-Jul-02 05:16	AMG
Endosulfan Sulfate	U	200	ug/kg Dry	23-Jul-02 05:16	AMG
Methoxychlor	U	800	ug/kg	23-Jul-02 05:16	AMG
Methoxychlor	U	1000	ug/kg Dry	23-Jul-02 05:16	AMG
Toxaphene	U	800	ug/kg	23-Jul-02 05:16	AMG
Toxaphene	U	1000	ug/kg Dry	23-Jul-02 05:16	AMG
Chlordane (technical)	U	1600	ug/kg	23-Jul-02 05:16	AMG

000182

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Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Chlordane (technical)	U	2000	ug/kg Dry	23-Jul-02 05:16	AMG
SW-846 METHOD 8082					
Aroclor 1016	U	80.	ug/kg	25-Jun-02 11:14	AMR
Aroclor 1016	U	100	ug/kg Dry	25-Jun-02 11:14	AMR
Aroclor 1221	U	160	ug/kg	25-Jun-02 11:14	AMR
Aroclor 1221	U	200	ug/kg Dry	25-Jun-02 11:14	AMR
Aroclor 1232	U	80.	ug/kg	25-Jun-02 11:14	AMR
Aroclor 1232	U	100	ug/kg Dry	25-Jun-02 11:14	AMR
Aroclor 1242	U	80.	ug/kg	25-Jun-02 11:14	AMR
Aroclor 1242	U	100	ug/kg Dry	25-Jun-02 11:14	AMR
Aroclor 1248	U	80.	ug/kg	25-Jun-02 11:14	AMR
Aroclor 1248	U	100	ug/kg Dry	25-Jun-02 11:14	AMR
Aroclor 1254	U	160	ug/kg	25-Jun-02 11:14	AMR
Aroclor 1254	U	200	ug/kg Dry	25-Jun-02 11:14	AMR
Aroclor 1260	U	160	ug/kg	25-Jun-02 11:14	AMR
Aroclor 1260	U	200	ug/kg Dry	25-Jun-02 11:14	AMR
SW-846 METHOD 8310					
Naphthalene	U	67.	ug/kg	19-Jul-02 14:13	ELS
Naphthalene	U	86.	ug/kg Dry	19-Jul-02 14:13	ELS
Acenaphthene	U	67.	ug/kg	19-Jul-02 14:13	ELS
Acenaphthene	U	86.	ug/kg Dry	19-Jul-02 14:13	ELS
Acenaphthylene	U	67.	ug/kg	19-Jul-02 14:13	ELS
Acenaphthylene	U	86.	ug/kg Dry	19-Jul-02 14:13	ELS
Fluorene	U	67.	ug/kg	19-Jul-02 14:13	ELS
Fluorene	U	86.	ug/kg Dry	19-Jul-02 14:13	ELS
Phenanthrene	U	67.	ug/kg	19-Jul-02 14:13	ELS
Phenanthrene	U	86.	ug/kg Dry	19-Jul-02 14:13	ELS
Anthracene	U	67.	ug/kg	19-Jul-02 14:13	ELS
Anthracene	U	86.	ug/kg Dry	19-Jul-02 14:13	ELS
Fluoranthene	U	6.7	ug/kg	19-Jul-02 14:13	ELS
Fluoranthene	U	8.6	ug/kg Dry	19-Jul-02 14:13	ELS
Pyrene	U	6.7	ug/kg	19-Jul-02 14:13	ELS
Pyrene	U	8.6	ug/kg Dry	19-Jul-02 14:13	ELS

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Benzo(a)Anthracene	U	6.7	ug/kg	19-Jul-02 14:13	ELS
Benzo(a)Anthracene	U	8.6	ug/kg Dry	19-Jul-02 14:13	ELS
Chrysene	U	6.7	ug/kg	19-Jul-02 14:13	ELS
Chrysene	U	8.6	ug/kg Dry	19-Jul-02 14:13	ELS
Benzo(b)Fluoranthene	U	6.7	ug/kg	19-Jul-02 14:13	ELS
Benzo(b)Fluoranthene	U	8.6	ug/kg Dry	19-Jul-02 14:13	ELS
Benzo(k)Fluoranthene	U	3.4	ug/kg	19-Jul-02 14:13	ELS
Benzo(k)Fluoranthene	U	4.4	ug/kg Dry	19-Jul-02 14:13	ELS
Benzo(a)Pyrene	U	6.7	ug/kg	19-Jul-02 14:13	ELS
Benzo(a)Pyrene	U	8.6	ug/kg Dry	19-Jul-02 14:13	ELS
Dibenz(a,h)Anthracene	U	6.7	ug/kg	19-Jul-02 14:13	ELS
Dibenz(a,h)Anthracene	U	8.6	ug/kg Dry	19-Jul-02 14:13	ELS
Benzo(g,h,i)Perylene	U	6.7	ug/kg	19-Jul-02 14:13	ELS
Benzo(g,h,i)Perylene	U	8.6	ug/kg Dry	19-Jul-02 14:13	ELS
Indeno(1,2,3-cd)Pyrene	J	3.6	ug/kg	19-Jul-02 14:13	ELS
Indeno(1,2,3-cd)Pyrene	J	4.6	ug/kg Dry	19-Jul-02 14:13	ELS
SW-846 METHOD 8260B / 5035 MOD					
Vinyl Chloride	U	10.	ug/kg	02-Jul-02 19:54	AJB
Vinyl Chloride	U	13.	ug/kg Dry	02-Jul-02 19:54	AJB
Bromomethane	KU	10.	ug/kg	02-Jul-02 19:54	AJB
Bromomethane	KU	13.	ug/kg Dry	02-Jul-02 19:54	AJB
Methylene Chloride	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Methylene Chloride	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
cis-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 19:54	AJB
cis-1,3-Dichloropropene	U	2.6	ug/kg Dry	02-Jul-02 19:54	AJB
trans-1,3-Dichloropropene	U	2.0	ug/kg	02-Jul-02 19:54	AJB
trans-1,3-Dichloropropene	U	2.6	ug/kg Dry	02-Jul-02 19:54	AJB
Carbon Disulfide	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Carbon Disulfide	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Acetone		52.	ug/kg	02-Jul-02 19:54	AJB
Acetone		67.	ug/kg Dry	02-Jul-02 19:54	AJB
1,1-Dichloroethene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
1,1-Dichloroethene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB

000184

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
1,1-Dichloroethane	U	5.0	ug/kg	02-Jul-02 19:54	AJB
1,1-Dichloroethane	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
trans-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
trans-1,2-Dichloroethene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
cis-1,2-Dichloroethene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
cis-1,2-Dichloroethene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Chloroform	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Chloroform	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
1,2-Dichloroethane	U	5.0	ug/kg	02-Jul-02 19:54	AJB
1,2-Dichloroethane	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
1,1,1-Trichloroethane	U	5.0	ug/kg	02-Jul-02 19:54	AJB
1,1,1-Trichloroethane	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Carbon Tetrachloride	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Carbon Tetrachloride	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Vinyl Acetate	U	10.	ug/kg	02-Jul-02 19:54	AJB
Vinyl Acetate	U	13.	ug/kg Dry	02-Jul-02 19:54	AJB
Bromodichloromethane	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Bromodichloromethane	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
1,2-Dichloropropane	U	5.0	ug/kg	02-Jul-02 19:54	AJB
1,2-Dichloropropane	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Trichloroethene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Trichloroethene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Dibromochloromethane	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Dibromochloromethane	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
1,1,2-Trichloroethane	U	5.0	ug/kg	02-Jul-02 19:54	AJB
1,1,2-Trichloroethane	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Benzene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Benzene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
1,2-Dibromoethane	U	0.42	ug/kg	02-Jul-02 19:54	AJB
1,2-Dibromoethane	U	0.54	ug/kg Dry	02-Jul-02 19:54	AJB
Bromoform	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Bromoform	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Tetrachloroethene	U	5.0	ug/kg	02-Jul-02 19:54	AJB

000185

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Tetrachloroethene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Toluene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Toluene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Chlorobenzene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Chlorobenzene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
Ethylbenzene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Ethylbenzene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
1,2-Dibromo-3-chloropropane	U	0.55	ug/kg	02-Jul-02 19:54	AJB
1,2-Dibromo-3-chloropropane	U	0.70	ug/kg Dry	02-Jul-02 19:54	AJB
Styrene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
Styrene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
m,p-Xylene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
m,p-Xylene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
o-Xylene	U	5.0	ug/kg	02-Jul-02 19:54	AJB
o-Xylene	U	6.4	ug/kg Dry	02-Jul-02 19:54	AJB
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	330	ug/kg	25-Jun-02 23:30	CAH
N-Nitrosodimethylamine	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Pyridine	U	330	ug/kg	25-Jun-02 23:30	CAH
Pyridine	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Aniline	U	330	ug/kg	25-Jun-02 23:30	CAH
Aniline	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
bis(2-Chloroethyl) Ether	U	330	ug/kg	25-Jun-02 23:30	CAH
bis(2-Chloroethyl) Ether	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2-Chlorophenol	U	330	ug/kg	25-Jun-02 23:30	CAH
2-Chlorophenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Phenol	U	330	ug/kg	25-Jun-02 23:30	CAH
Phenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
1,3-Dichlorobenzene	U	330	ug/kg	25-Jun-02 23:30	CAH
1,3-Dichlorobenzene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
1,4-Dichlorobenzene	U	330	ug/kg	25-Jun-02 23:30	CAH
1,4-Dichlorobenzene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
1,2-Dichlorobenzene	U	330	ug/kg	25-Jun-02 23:30	CAH

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
1,2-Dichlorobenzene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Benzyl Alcohol	U	330	ug/kg	25-Jun-02 23:30	CAH
Benzyl Alcohol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Bis(2-chloroisopropyl)ether	U	330	ug/kg	25-Jun-02 23:30	CAH
Bis(2-chloroisopropyl)ether	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Hexachloroethane	U	330	ug/kg	25-Jun-02 23:30	CAH
Hexachloroethane	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2-Methylphenol	U	330	ug/kg	25-Jun-02 23:30	CAH
2-Methylphenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
N-Nitroso-di-n-propylamine	U	330	ug/kg	25-Jun-02 23:30	CAH
N-Nitroso-di-n-propylamine	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
4-Methylphenol	U	330	ug/kg	25-Jun-02 23:30	CAH
4-Methylphenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Nitrobenzene	U	330	ug/kg	25-Jun-02 23:30	CAH
Nitrobenzene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Isophorone	U	330	ug/kg	25-Jun-02 23:30	CAH
Isophorone	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2-Nitrophenol	U	1600	ug/kg	25-Jun-02 23:30	CAH
2-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 23:30	CAH
2,4-Dimethylphenol	U	330	ug/kg	25-Jun-02 23:30	CAH
2,4-Dimethylphenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
bis(2-Chloroethoxy)methane	U	330	ug/kg	25-Jun-02 23:30	CAH
bis(2-Chloroethoxy)methane	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2,4-Dichlorophenol	U	330	ug/kg	25-Jun-02 23:30	CAH
2,4-Dichlorophenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
1,2,4-Trichlorobenzene	U	330	ug/kg	25-Jun-02 23:30	CAH
1,2,4-Trichlorobenzene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Naphthalene	U	330	ug/kg	25-Jun-02 23:30	CAH
Naphthalene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2,6-Dichlorophenol	U	330	ug/kg	25-Jun-02 23:30	CAH
2,6-Dichlorophenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
4-Chloroaniline	U	330	ug/kg	25-Jun-02 23:30	CAH
4-Chloroaniline	U	420	ug/kg Dry	25-Jun-02 23:30	CAH

000187

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Hexachlorobutadiene	U	330	ug/kg	25-Jun-02 23:30	CAH
Hexachlorobutadiene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
4-Chloro-3-Methylphenol	U	330	ug/kg	25-Jun-02 23:30	CAH
4-Chloro-3-Methylphenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2-Methylnaphthalene	U	330	ug/kg	25-Jun-02 23:30	CAH
2-Methylnaphthalene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Hexachlorocyclopentadiene	U	330	ug/kg	25-Jun-02 23:30	CAH
Hexachlorocyclopentadiene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2,4,6-Trichlorophenol	U	330	ug/kg	25-Jun-02 23:30	CAH
2,4,6-Trichlorophenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2,4,5-Trichlorophenol	U	1600	ug/kg	25-Jun-02 23:30	CAH
2,4,5-Trichlorophenol	U	2000	ug/kg Dry	25-Jun-02 23:30	CAH
2-Chloronaphthalene	U	330	ug/kg	25-Jun-02 23:30	CAH
2-Chloronaphthalene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2-Nitroaniline	U	1600	ug/kg	25-Jun-02 23:30	CAH
2-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 23:30	CAH
Dimethylphthalate	U	330	ug/kg	25-Jun-02 23:30	CAH
Dimethylphthalate	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Acenaphthylene	U	330	ug/kg	25-Jun-02 23:30	CAH
Acenaphthylene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2,6-Dinitrotoluene	U	330	ug/kg	25-Jun-02 23:30	CAH
2,6-Dinitrotoluene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
3-Nitroaniline	U	1600	ug/kg	25-Jun-02 23:30	CAH
3-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 23:30	CAH
Acenaphthene	U	330	ug/kg	25-Jun-02 23:30	CAH
Acenaphthene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2,4-Dinitrophenol	U	1600	ug/kg	25-Jun-02 23:30	CAH
2,4-Dinitrophenol	U	2000	ug/kg Dry	25-Jun-02 23:30	CAH
Dibenzofuran	U	330	ug/kg	25-Jun-02 23:30	CAH
Dibenzofuran	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
2,4-Dinitrotoluene	U	330	ug/kg	25-Jun-02 23:30	CAH
2,4-Dinitrotoluene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
4-Nitrophenol	U	1600	ug/kg	25-Jun-02 23:30	CAH

000188

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
4-Nitrophenol	U	2000	ug/kg Dry	25-Jun-02 23:30	CAH
2,3,4,6-Tetrachlorophenol	U	330	ug/kg	25-Jun-02 23:30	CAH
2,3,4,6-Tetrachlorophenol	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Diethylphthalate	U	330	ug/kg	25-Jun-02 23:30	CAH
Diethylphthalate	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Fluorene	U	330	ug/kg	25-Jun-02 23:30	CAH
Fluorene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
4-Chlorophenyl-phenyl Ether	U	330	ug/kg	25-Jun-02 23:30	CAH
4-Chlorophenyl-phenyl Ether	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
4-Nitroaniline	U	1600	ug/kg	25-Jun-02 23:30	CAH
4-Nitroaniline	U	2000	ug/kg Dry	25-Jun-02 23:30	CAH
4,6-Dinitro-2-methylphenol	U	1600	ug/kg	25-Jun-02 23:30	CAH
4,6-Dinitro-2-methylphenol	U	2000	ug/kg Dry	25-Jun-02 23:30	CAH
N-Nitrosodiphenylamine	U	330	ug/kg	25-Jun-02 23:30	CAH
N-Nitrosodiphenylamine	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
4-Bromophenyl-phenylether	U	330	ug/kg	25-Jun-02 23:30	CAH
4-Bromophenyl-phenylether	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Hexachlorobenzene	U	330	ug/kg	25-Jun-02 23:30	CAH
Hexachlorobenzene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Pentachlorophenol	U	1600	ug/kg	25-Jun-02 23:30	CAH
Pentachlorophenol	U	2000	ug/kg Dry	25-Jun-02 23:30	CAH
Carbazole	U	330	ug/kg	25-Jun-02 23:30	CAH
Carbazole	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Phenanthrene	U	330	ug/kg	25-Jun-02 23:30	CAH
Phenanthrene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Anthracene	U	330	ug/kg	25-Jun-02 23:30	CAH
Anthracene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Di-n-Butylphthalate	U	330	ug/kg	25-Jun-02 23:30	CAH
Di-n-Butylphthalate	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Fluoranthene	U	330	ug/kg	25-Jun-02 23:30	CAH
Fluoranthene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Pyrene	U	330	ug/kg	25-Jun-02 23:30	CAH
Pyrene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH

000189

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 18-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02062522

Sample No: 02062522-15
Client ID: SOILS
Site: B-6-2
Locator: GRAB
Collect Date: 18-JUN-02 14:20

Parameter		Result	Units	Date	By
Butylbenzylphthalate	U	330	ug/kg	25-Jun-02 23:30	CAH
Butylbenzylphthalate	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Benzo(a)anthracene	U	330	ug/kg	25-Jun-02 23:30	CAH
Benzo(a)anthracene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
3,3'-Dichlorobenzidine	U	660	ug/kg	25-Jun-02 23:30	CAH
3,3'-Dichlorobenzidine	U	850	ug/kg Dry	25-Jun-02 23:30	CAH
Chrysene	U	330	ug/kg	25-Jun-02 23:30	CAH
Chrysene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
bis(2-Ethylhexyl)phthalate	U	330	ug/kg	25-Jun-02 23:30	CAH
bis(2-Ethylhexyl)phthalate	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Di-n-octylphthalate	U	330	ug/kg	25-Jun-02 23:30	CAH
Di-n-octylphthalate	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Benzo(b)fluoranthene	U	330	ug/kg	25-Jun-02 23:30	CAH
Benzo(b)fluoranthene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Benzo(k)fluoranthene	U	330	ug/kg	25-Jun-02 23:30	CAH
Benzo(k)fluoranthene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Benzo(a)pyrene	U	330	ug/kg	25-Jun-02 23:30	CAH
Benzo(a)pyrene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Indeno(1,2,3-cd)pyrene	U	330	ug/kg	25-Jun-02 23:30	CAH
Indeno(1,2,3-cd)pyrene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Dibenzo(a,h)anthracene	U	330	ug/kg	25-Jun-02 23:30	CAH
Dibenzo(a,h)anthracene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH
Benzo(g,h,i)perylene	U	330	ug/kg	25-Jun-02 23:30	CAH
Benzo(g,h,i)perylene	U	420	ug/kg Dry	25-Jun-02 23:30	CAH

000190

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CASE NARRATIVE – Missman Stanley and Associates.

Project No. C02E013

PDC Laboratories, Inc. received 4 water samples on June 28, 2002, in good condition. The sample set was designated as Sample Delivery Group 02063511 for Alkalinity, Hexavalant Chromium, Ammonia, pH, Sulfate/Chloride, Suspended Solids, Total Dissolved Solids, Hexane Extracted Material (TPH), Total Metals, Mercury, TCLP Metals, TCLP Mercury, Volatiles, Semi-volatiles, Pesticides, PCBs, and PNAs.

Sample Id's		Date	
Field	Lab	Collected	Received
MW-1	02063511-1	06/27/02	06/28/02
MW-2	02063511-2	06/27/02	06/28/02
MW-3	02063511-3	06/27/02	06/28/02
Trip Blank	02063511-4	N/A	N/A

Project Summary

These samples were prepared and analyzed in accordance by the following methods: Alkalinity by SM 2320B, Hexavalent Chromium by SW-845 7196A, Ammonia by EPA 350.1, pH by SW-846 9045, Sulfate/Chloride by EPA 300, Suspended Solids by SM2540D, Total Dissolved Solids by EPA 350.1, Hexane Extractable Material (TPH) by EPA 1664, Total Metals by SW-845 6010B, Mercury by SW846 7470, TCLP Metals SW-845 1311/6010B, TCLP Mercury by SW846 1311/7470, Volatiles by SW846 8260B, Semi-Volatiles by SW846 8270C, Pesticides by SW846 8081, PCBs by SW846 8082, and PNAs by SW846 8310.

Alkalinity QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Method Blanks are free of target analytes above report limits (RL).

The associated Matrix Spike, Matrix Spike Duplicate and Sample Replicate were performed on sample 02063511-1. All recoveries were within method specified QC criteria for the Matrix Spike.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

Hexavalent Chromium QC Summary

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All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Method Blanks, Initial Calibration Blanks and Continuing Calibration Blanks were free of target analytes above report limits (RL)

The associated Matrix Spike and Matrix Spike Duplicate were performed on samples 02062511-1, 02062511-2, 02062511-3. All recoveries were within the method specified QC recovery criteria.

The associated Sample Replicates were performed on samples 02063511-1 and 02063511-2. All recoveries were within QC recovery limits.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

Ammonia QC Summary

All holding time criteria were met for all samples

All Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Initial and Continuing Calibration Blanks were free of target analytes above report limits (RL)

The associated Matrix Spike, Matrix Spike Duplicate and Sample Replicate were performed on samples 02063511-1, 02062511-2, and 02062511-3. All recoveries were within method specified QC criteria.

No Method Blank or Laboratory Control Samples were analyzed, as all are analytically similar to Initial Calibration Blank and Continuing Calibration Verification respectively.

pH QC Summary

The samples were analyzed 4 days after receipt.

The associated Sample Replicates were performed on samples 02063511-1, 02062511-2, and 02062511-3. All recoveries were within the specified QC recovery limits.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

Sulfate/Chloride QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Method Blanks, Initial Calibration Blanks and Continuing Calibration Blanks were free of target analytes above report limits (RL)

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The associated Matrix Spike, Matrix Spike Duplicate and Sample Replicate were performed on sample 02063511-1. All recoveries were within method specified QC criteria except for Sulfate in the MSD.

All associated Laboratory Control Sample recoveries (LCS) were within QC acceptance criteria.

Suspended Solids QC Summary

All samples were analyzed within hold time.

The Method Blank was free of target analyte at levels above report limit.

The associated Sample Replicate was performed on sample 02063511-1. All recoveries were within QC recovery limits.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

Total Dissolved Solids QC Summary

All samples were analyzed within hold time.

The Method Blank was free of contamination at levels above report limit.

The associated Sample Replicate was performed on sample 02063511-1. All recoveries were within QC recovery limits.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

Hexane Extractable Material (TPH) QC Summary

All holding time criteria were met for all samples, although the samples were received unpreserved. We preserved the samples with H2SO4 prior to analysis.

All Method Blanks were free of target analytes above report limits (RL).

No Matrix Spike and Matrix Spike Duplicate were performed on these samples.

All associated Laboratory Control Sample (LCS) recoveries were outside QC acceptance criteria.

Total Metals QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification (ICV) and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Method Blanks, Initial Calibration Blanks and Continuing Calibration Blanks were free of contamination for target analytes above report limits (RL), although numerous metals were detected between the IDL and RL.

The associated Matrix Spike, Matrix Spike Duplicate, and Sample Replicate were performed on sample 02063511-1. Several recoveries were outside specified QC criteria, often because of the high analyte concentrations

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encountered in the sample. A Post Digestion Spike was performed for Silver, Barium, Antimony, and Zinc. All recoveries were within QC criteria except for Barium. Matrix interference is suspected.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

All Interference Check Samples were within QC criteria of a recovered concentration within two times the value of the MDL.

Mercury QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

All Method Blanks, Initial Calibration Blanks and Continuing Calibration Blanks were free of target analytes above report limits.

A Matrix Spike and Matrix Spike Duplicate were performed on sample 02063511-1. All recoveries were within the specified QC criteria.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

TCLP Metals QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Verification Standards were within PDC QC acceptance criteria.

The Method Blanks, (Preparation Blanks at both Ph concentrations), Initial Calibration Blanks and Continuing Calibration Blanks were free of target analytes above report limits. Please note that the TPLP Extraction Blank was carried through the digestion procedure, and is reported as the Method Blank.

The associated Matrix Spike and Matrix Spike Duplicate were performed on sample 02063511-1. All recoveries were within the specified QC criteria except Silver.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria. There are two LCS recoveries because both extract fluids were used as the basis for these LCS samples.

All Interference Check Samples were within QC criteria.

TCLP Mercury QC Summary

All holding time criteria were met for all samples.

All Initial Calibration, Initial Calibration Verification and Continuing Calibration Standards were within PDC QC acceptance criteria.

The Method Blanks, (Preparation Blank), Initial Calibration Blanks and Continuing Calibration Blanks were free of target analyte above report limits. Please note that the TPLP Extraction Blank was carried through the digestion procedure, and is reported as the Method Blank.

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Matrix Spike and Matrix Spike Duplicate was performed on sample 02063511-1. All recoveries were within the specified QC criteria.

All associated Laboratory Control Sample (LCS) recoveries were within QC acceptance criteria.

Volatile QC Summary

All holding time criteria were met for all samples.

The BFB instrument performance checks were within method criteria.

All Initial Calibration Standards were within PDC method acceptance criteria

All Method Blanks were free of target analytes above report limits.

All Surrogate Spike recoveries were within QC criteria.

The Matrix Spike and Matrix Spike Duplicate associated with this analytical sequence was performed on a sample from another client.

All Surrogate Spike recoveries were within QC criteria.

All associated Laboratory Control Samples (LCS) were within QC acceptance criteria.

Semi-Volatile QC Summary

All holding time criteria were met for all samples.

The DFTPP instrument performance checks were within method criteria

All Initial Calibration Standards were within PDC acceptance criteria.

All Method Blanks were free of target analytes above report limits.

All Surrogate Spike recoveries were within QC criteria.

Insufficient sample volume was received to perform a Matrix Spike and Matrix Spike Duplicate on a Missman sample.

In the associated Laboratory Control Sample (LCS), all recoveries were within QC acceptance criteria except for Pentachlorophenol, where recovery was slightly high at 128%. Because these analytes were not detected in any samples, we believe the slight high bias does not affect the results.

Pesticides QC Summary

All holding time criteria were met for all samples.

All Initial and Continuing Calibration Standards were within PDC acceptance criteria.

All Method Blanks were free of target analytes above report limits.

All Surrogate Spike recoveries were within QC criteria.

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Insufficient sample volume was received to perform a Matrix Spike and Matrix Spike Duplicate on a Missman sample.

An LCS/LCSD was performed for accuracy and precision. All recoveries were within QC acceptance criteria.

PCB QC Summary

All holding time criteria were met for all samples.

All Initial and Continuing Calibration Standards were within PDC acceptance criteria.

All Method Blanks were free of target analytes above report limits.

All Surrogate Spike recoveries were within QC criteria.

Insufficient sample volume was received to perform a Matrix Spike and Matrix Spike Duplicate on a Missman sample.

An LCS/LCSD was performed for accuracy and precision. All recoveries were within QC acceptance criteria.

PNA QC Summary

All holding time criteria were met for all samples.

All Initial and Continuing Calibration Standards were within PDC acceptance criteria.

All Method Blanks were free of target analytes above report limits.

All Surrogate Spike recoveries were within QC criteria.

Insufficient sample volume was received to perform a Matrix Spike and Matrix Spike Duplicate on a Missman sample. Results for the MS/MSD associated with this extraction batch are included on a form 3 in the raw data section.

All associated Laboratory Control Samples (LCS) were within QC acceptance criteria.

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B. 1307
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Certification

This data package is in compliance with the technical intent of Missman Stanley and Associates contract, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or designee, as verified by the following signature.

Signature: Barbara Beard Name: Barbara Beard

Date: July 30, 02 Title: Project Manager

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Report Cover Page

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

This report includes information regarding the following described samples as received by the laboratory and is only valid for the parameters tested. This report contains 30 results page(s) not including the cover page(s).

Sample No	Client ID	Site	Locator
02063511-1	PROJECT #C02E013	MW-1	GRAB
02063511-2	PROJECT #C02E013	MW-2	GRAB
02063511-3	PROJECT #C02E013	MW-3	GRAB
02063511-4	PROJECT #C02E013	TRIP BLANK	GRAB

Certified by: _____
Barb Beard, Project Manager

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US Army Corps of Engineers Validation for Chemical Analysis in support of the Hazardous, Toxic and Radioactive Waste Program
State of Illinois Certification for Bacteriological Analysis in Drinking Water -Lab Registry No. 17533
Drinking Water Certifications: Indiana (C-IL-04); Kansas (E-10338); Kentucky (90058); Missouri (00870); Wisconsin (998294430)
Wastewater Certifications: Arkansas; Iowa (240); Kansas (E-10338); Wisconsin (998294430)
Hazardous/Solid Waste Certifications: Arkansas; Kansas (E-10338); Wisconsin (998294430)
UST Certification: Iowa (240)

000008

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-1
Client ID: PROJECT #C02E013
Site: MW-1
Locator: GRAB
Collect Date: 27-JUN-02 13:45

Parameter		Result	Units	Date	By
SM METHOD 2320 B					
Alkalinity, Total as CaCO3		1400	mg/l	01-Jul-02 13:35	PLI
EPA METHOD 300.0 rev 2.1					
Chloride		130	mg/l	02-Jul-02 20:05	ech
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent		0.0076	mg/l	28-Jun-02 13:00	TIN
SM METHOD 4500 NH3 D / EPA METHOD 150.1 (Phenate)					
Nitrogen, Ammonia as N		0.77	mg/l	01-Jul-02 11:21	ech
W-846 METHOD 9045 C					
pH		7.45	units	02-Jul-02 12:23	TIN
EPA METHOD 300.0 rev 2.1					
Sulfate	R	260	mg/l	02-Jul-02 20:05	ech
EPA METHOD 160.1					
Solids, Total Dissolved		440	mg/l	02-Jul-02 15:00	JLR
EPA METHOD 1664					
Silica Gel Treated - HEM	<JP	20.	mg/l	05-Jul-02 08:00	TAC
SM METHOD 2540 D					
Solids, Total Suspended		9600	mg/l	02-Jul-02 16:15	JLR
SW-846 METHOD 3015					
Sample Preparation				03-Jul-02 06:00	DWK
SW-846 METHOD 3015					
Sample Preparation				03-Jul-02 12:00	KJP
SW-846 METHOD 1311					
Leachate Preparation				01-Jul-02 14:00	DWK
Final pH		5.260		01-Jul-02 14:00	DWK
SW-846 METHOD 6010B					
Silver	U	10.	ug/l	08-Jul-02 12:17	DWK
Silver, TCLP	U	0.050	mg/l	08-Jul-02 12:17	DWK
Silver, TCLP		100	% Recovery	08-Jul-02 12:23	DWK
Aluminum		84000	ug/l	08-Jul-02 12:17	DWK
Arsenic		18.	ug/l	08-Jul-02 12:17	DWK
Arsenic, TCLP	U	0.050	mg/l	08-Jul-02 12:17	DWK
Arsenic, TCLP		100	% Recovery	08-Jul-02 12:23	DWK

Compound determined to be not confirmed based on a %D of 177.

000009

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-1
Client ID: PROJECT #C02E013
Site: MW-1
Locator: GRAB
Collect Date: 27-JUN-02 13:45

Parameter		Result	Units	Date	By
Barium		1400	ug/l	08-Jul-02 12:17	DWK
Barium, TCLP	J	0.72	mg/l	08-Jul-02 12:17	DWK
Barium, TCLP		98.	% Recovery	08-Jul-02 12:23	DWK
Beryllium	J	0.95	ug/l	08-Jul-02 12:17	DWK
Calcium		260000	ug/l	08-Jul-02 12:17	DWK
Cadmium		2.0	ug/l	08-Jul-02 12:17	DWK
Cadmium, TCLP	J	0.0020	mg/l	08-Jul-02 12:17	DWK
Cadmium, TCLP		96.	% Recovery	08-Jul-02 12:23	DWK
Cobalt		23.	ug/l	08-Jul-02 12:17	DWK
Chromium		66.	ug/l	08-Jul-02 12:17	DWK
Chromium, TCLP	U	0.10	mg/l	08-Jul-02 12:17	DWK
Chromium, TCLP		94.	% Recovery	08-Jul-02 12:23	DWK
Copper		35.	ug/l	08-Jul-02 12:17	DWK
Iron		49000	ug/l	08-Jul-02 12:17	DWK
Potassium		37000	ug/l	08-Jul-02 12:17	DWK
Magnesium		110000	ug/l	08-Jul-02 12:17	DWK
Manganese		1700	ug/l	08-Jul-02 12:17	DWK
Sodium		320000	ug/l	08-Jul-02 12:17	DWK
Nickel		55.	ug/l	08-Jul-02 12:17	DWK
Lead		32.	ug/l	08-Jul-02 12:17	DWK
Lead, TCLP	U	0.0075	mg/l	08-Jul-02 12:17	DWK
Lead, TCLP		94.	% Recovery	08-Jul-02 12:23	DWK
Antimony	J	2.0	ug/l	08-Jul-02 12:17	DWK
Selenium	J	9.3	ug/l	08-Jul-02 12:17	DWK
Selenium, TCLP	U	0.050	mg/l	08-Jul-02 12:17	DWK
Selenium, TCLP		100	% Recovery	08-Jul-02 12:23	DWK
Thallium	J	0.96	ug/l	08-Jul-02 12:17	DWK
Vanadium		100	ug/l	08-Jul-02 12:17	DWK
Zinc		480	ug/l	08-Jul-02 12:17	DWK
Mercury	U	0.20	ug/l	03-Jul-02 11:03	JEM
Mercury, TCLP	U	0.20	mg/l	03-Jul-02 11:52	JEM
Mercury, TCLP		120	% Recovery	03-Jul-02 12:08	JEM

SW-846 METHOD 8081A

X: Compound determined to be not confirmed based on a %D of 177.

000010

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-1
Client ID: PROJECT #C02E013
Site: MW-1
Locator: GRAB
Collect Date: 27-JUN-02 13:45

Parameter		Result	Units	Date	By
Sample Preparation				28-Jun-02 12:00	KR
SW-846 METHOD 8082					
Sample Preparation				28-Jun-02 12:00	KR
SW-846 METHOD 8270					
Sample Preparation				01-Jul-02 12:00	AEW
SW-846 METHOD 8310					
Sample Preparation				28-Jun-02 12:00	AEW
W-846 METHOD 8081A					
alpha-BHC	U	0.050	ug/l	17-Jul-02 05:52	AMR
gamma-BHC (Lindane)	U	0.050	ug/l	17-Jul-02 05:52	AMR
beta-BHC	U	0.050	ug/l	17-Jul-02 05:52	AMR
Heptachlor	U,X	0.050	ug/l	17-Jul-02 05:52	AMR
delta-BHC	U	0.050	ug/l	17-Jul-02 05:52	AMR
Aldrin	U	0.050	ug/l	17-Jul-02 05:52	AMR
Heptachlor Epoxide	U	0.050	ug/l	17-Jul-02 05:52	AMR
Endosulfan I	U	0.050	ug/l	17-Jul-02 05:52	AMR
4,4'-DDE	U	0.10	ug/l	17-Jul-02 05:52	AMR
Dieldrin	U	0.10	ug/l	17-Jul-02 05:52	AMR
Endrin	U	0.10	ug/l	17-Jul-02 05:52	AMR
4,4'-DDD	U	0.10	ug/l	17-Jul-02 05:52	AMR
Endosulfan II	U	0.10	ug/l	17-Jul-02 05:52	AMR
4,4'-DDT	U	0.10	ug/l	17-Jul-02 05:52	AMR
Endrin Aldehyde	U	0.10	ug/l	17-Jul-02 05:52	AMR
Endosulfan Sulfate	U	0.10	ug/l	17-Jul-02 05:52	AMR
Methoxychlor	U	0.50	ug/l	17-Jul-02 05:52	AMR
Toxaphene	U	0.50	ug/l	17-Jul-02 05:52	AMR
Chlordane (technical)	U	0.50	ug/l	17-Jul-02 05:52	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	0.50	ug/l	13-Jul-02 23:11	AMG
Aroclor 1221	U	0.50	ug/l	13-Jul-02 23:11	AMG
Aroclor 1232	U	0.50	ug/l	13-Jul-02 23:11	AMG
Aroclor 1242	U	0.50	ug/l	13-Jul-02 23:11	AMG
Aroclor 1248	U	0.50	ug/l	13-Jul-02 23:11	AMG

Compound determined to be not confirmed based on a %D of 177.

000011

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-1
Client ID: PROJECT #C02E013
Site: MW-1
Locator: GRAB
Collect Date: 27-JUN-02 13:45

Parameter		Result	Units	Date	By
Aroclor 1254	U	0.50	ug/l	13-Jul-02 23:11	AMG
Aroclor 1260	U	0.50	ug/l	13-Jul-02 23:11	AMG
SW-846 METHOD 8310					
Naphthalene	U	2.0	ug/l	05-Jul-02 12:22	ELS
Acenaphthylene	U	2.0	ug/l	05-Jul-02 12:22	ELS
Acenaphthene	U	2.0	ug/l	05-Jul-02 12:22	ELS
Fluorene	U	2.0	ug/l	05-Jul-02 12:22	ELS
Phenanthrene	U	2.0	ug/l	05-Jul-02 12:22	ELS
Anthracene	U	2.0	ug/l	05-Jul-02 12:22	ELS
Fluoranthene	U	0.20	ug/l	05-Jul-02 12:22	ELS
Pyrene	U	0.20	ug/l	05-Jul-02 12:22	ELS
Benzo(a)Anthracene	U	0.20	ug/l	05-Jul-02 12:22	ELS
Chrysene	U	0.20	ug/l	05-Jul-02 12:22	ELS
Benzo(b)Fluoranthene	U	0.18	ug/l	05-Jul-02 12:22	ELS
Benzo(k)Fluoranthene	U	0.10	ug/l	05-Jul-02 12:22	ELS
Benzo(a)Pyrene	U	0.20	ug/l	05-Jul-02 12:22	ELS
Dibenz(a,h)Anthracene	U	0.20	ug/l	05-Jul-02 12:22	ELS
Benzo(g,h,i)Perylene	U	0.20	ug/l	05-Jul-02 12:22	ELS
Indeno(1,2,3-cd)Pyrene	U	0.20	ug/l	05-Jul-02 12:22	ELS
SW-846 Method 8260B					
Dichlorodifluoromethane	U	10.	ug/l	02-Jul-02 12:26	TJP
Chloromethane	U	10.	ug/l	02-Jul-02 12:26	TJP
Vinyl Chloride	U	10.	ug/l	02-Jul-02 12:26	TJP
Bromomethane	U	10.	ug/l	02-Jul-02 12:26	TJP
Chloroethane	U	10.	ug/l	02-Jul-02 12:26	TJP
Iodomethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
Methylene Chloride	U	5.0	ug/l	02-Jul-02 12:26	TJP
Acetone	U	10.	ug/l	02-Jul-02 12:26	TJP
Acetonitrile	U	50.	ug/l	02-Jul-02 12:26	TJP
Acrolein	U	50.	ug/l	02-Jul-02 12:26	TJP
Acrylonitrile	U	50.	ug/l	02-Jul-02 12:26	TJP
Carbon Disulfide	U	5.0	ug/l	02-Jul-02 12:26	TJP
Trichlorofluoromethane	U	10.	ug/l	02-Jul-02 12:26	TJP

Compound determined to be not confirmed based on a %D of 177.

000012

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-1
Client ID: PROJECT #C02E013
Site: MW-1
Locator: GRAB
Collect Date: 27-JUN-02 13:45

Parameter		Result	Units	Date	By
Propionitrile	U	10.	ug/l	02-Jul-02 12:26	TJP
1,1-Dichloroethene	U	5.0	ug/l	02-Jul-02 12:26	TJP
3-Chloropropene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,1-Dichloroethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
trans-1,2-Dichloroethene	U	5.0	ug/l	02-Jul-02 12:26	TJP
cis-1,2-Dichloroethene	U	5.0	ug/l	02-Jul-02 12:26	TJP
2,2-Dichloropropane	U	5.0	ug/l	02-Jul-02 12:26	TJP
Chloroprene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Chloroform	U	5.0	ug/l	02-Jul-02 12:26	TJP
Dibromomethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,2-Dichloroethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
2-Butanone	U	10.	ug/l	02-Jul-02 12:26	TJP
Methacrylonitrile	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,1,1-Trichloroethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,4-Dioxane	U	200	ug/l	02-Jul-02 12:26	TJP
Isobutyl Alcohol	U	1000	ug/l	02-Jul-02 12:26	TJP
Carbon Tetrachloride	U	5.0	ug/l	02-Jul-02 12:26	TJP
Vinyl Acetate	U	10.	ug/l	02-Jul-02 12:26	TJP
Bromodichloromethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,2-Dichloropropane	U	5.0	ug/l	02-Jul-02 12:26	TJP
cis-1,3-Dichloropropene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Trichloroethene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Dibromochloromethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,1,2-Trichloroethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
Benzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,2-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,4-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,2,4-Trichlorobenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
trans-1,3-Dichloropropene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Methyl Methacrylate	U	5.0	ug/l	02-Jul-02 12:26	TJP
Bromoform	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,1,1,2-Tetrachloroethane	U	10.	ug/l	02-Jul-02 12:26	TJP
4-Methyl-2-pentanone	U	10.	ug/l	02-Jul-02 12:26	TJP

Compound determined to be not confirmed based on a %D of 177.

000013

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-1
Client ID: PROJECT #C02E013
Site: MW-1
Locator: GRAB
Collect Date: 27-JUN-02 13:45

Parameter		Result	Units	Date	By
2-Hexanone	U	10.	ug/l	02-Jul-02 12:26	TJP
Tetrachloroethene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,1,2,2-Tetrachloroethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,2,3-Trichloropropane	U	5.0	ug/l	02-Jul-02 12:26	TJP
trans-1,4-Dichloro-2-Butene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Ethyl Methacrylate	U	5.0	ug/l	02-Jul-02 12:26	TJP
Toluene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Chlorobenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Ethylbenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,2-Dibromo-3-chloropropane	U	5.0	ug/l	02-Jul-02 12:26	TJP
Styrene	U	5.0	ug/l	02-Jul-02 12:26	TJP
m,p-Xylene	U	5.0	ug/l	02-Jul-02 12:26	TJP
o-Xylene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Xylenes (Total)	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,2,4-Trimethylbenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,1-Dichloropropene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,3-Dichloropropane	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,3-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
2-Chlorotoluene	U	5.0	ug/l	02-Jul-02 12:26	TJP
4-Chlorotoluene	U	5.0	ug/l	02-Jul-02 12:26	TJP
n-Propylbenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
n-Butylbenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Bromobenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Isopropylbenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,3,5-Trimethylbenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
tert-Butylbenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
p-Isopropyltoluene	U	5.0	ug/l	02-Jul-02 12:26	TJP
sec-Butylbenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Hexachlorobutadiene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Naphthalene	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,2,3-Trichlorobenzene	U	5.0	ug/l	02-Jul-02 12:26	TJP
Bromochloromethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
1,2-Dibromoethane	U	5.0	ug/l	02-Jul-02 12:26	TJP

000014

%: Compound determined to be not confirmed based on a %D of 177.

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-1
Client ID: PROJECT #C02E013
Site: MW-1
Locator: GRAB
Collect Date: 27-JUN-02 13:45

Parameter		Result	Units	Date	By
Pentachloroethane	U	5.0	ug/l	02-Jul-02 12:26	TJP
2-Chloroethyl vinyl ether	U	5.0	ug/l	02-Jul-02 12:26	TJP
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	10.	ug/l	07-Jul-02 18:40	CAH
Pyridine	U	10.	ug/l	07-Jul-02 18:40	CAH
Aniline	U	10.	ug/l	07-Jul-02 18:40	CAH
bis(2-Chloroethyl) Ether	U	10.	ug/l	07-Jul-02 18:40	CAH
2-Chlorophenol	U	10.	ug/l	07-Jul-02 18:40	CAH
Phenol	U	10.	ug/l	07-Jul-02 18:40	CAH
1,3-Dichlorobenzene	U	10.	ug/l	07-Jul-02 18:40	CAH
1,4-Dichlorobenzene	U	10.	ug/l	07-Jul-02 18:40	CAH
1,2-Dichlorobenzene	U	10.	ug/l	07-Jul-02 18:40	CAH
Benzyl Alcohol	U	10.	ug/l	07-Jul-02 18:40	CAH
Bis(2-chloroisopropyl)ether	U	10.	ug/l	07-Jul-02 18:40	CAH
Hexachloroethane	U	10.	ug/l	07-Jul-02 18:40	CAH
2-Methylphenol	U	10.	ug/l	07-Jul-02 18:40	CAH
N-Nitroso-di-n-propylamine	U	10.	ug/l	07-Jul-02 18:40	CAH
4-Methylphenol	U	10.	ug/l	07-Jul-02 18:40	CAH
Nitrobenzene	U	10.	ug/l	07-Jul-02 18:40	CAH
Isophorone	U	10.	ug/l	07-Jul-02 18:40	CAH
2-Nitrophenol	U	50.	ug/l	07-Jul-02 18:40	CAH
2,4-Dimethylphenol	U	10.	ug/l	07-Jul-02 18:40	CAH
bis(2-Chloroethoxy)methane	U	10.	ug/l	07-Jul-02 18:40	CAH
2,4-Dichlorophenol	U	10.	ug/l	07-Jul-02 18:40	CAH
1,2,4-Trichlorobenzene	U	10.	ug/l	07-Jul-02 18:40	CAH
Naphthalene	U	10.	ug/l	07-Jul-02 18:40	CAH
2,6-Dichlorophenol	U	10.	ug/l	07-Jul-02 18:40	CAH
4-Chloroaniline	U	10.	ug/l	07-Jul-02 18:40	CAH
Hexachlorobutadiene	U	10.	ug/l	07-Jul-02 18:40	CAH
4-Chloro-3-Methylphenol	U	10.	ug/l	07-Jul-02 18:40	CAH
2-Methylnaphthalene	U	10.	ug/l	07-Jul-02 18:40	CAH
Hexachlorocyclopentadiene	U	10.	ug/l	07-Jul-02 18:40	CAH
2,4,6-Trichlorophenol	U	10.	ug/l	07-Jul-02 18:40	CAH

000015

Compound determined to be not confirmed based on a %D of 177.

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-1
Client ID: PROJECT #C02E013
Site: MW-1
Locator: GRAB
Collect Date: 27-JUN-02 13:45

Parameter		Result	Units	Date	By
2,4,5-Trichlorophenol	U	50.	ug/l	07-Jul-02 18:40	CAH
2-Chloronaphthalene	U	10.	ug/l	07-Jul-02 18:40	CAH
2-Nitroaniline	U	50.	ug/l	07-Jul-02 18:40	CAH
Dimethylphthalate	U	10.	ug/l	07-Jul-02 18:40	CAH
Acenaphthylene	U	10.	ug/l	07-Jul-02 18:40	CAH
2,6-Dinitrotoluene	U	10.	ug/l	07-Jul-02 18:40	CAH
3-Nitroaniline	U	50.	ug/l	07-Jul-02 18:40	CAH
Acenaphthene	U	10.	ug/l	07-Jul-02 18:40	CAH
2,4-Dinitrophenol	U	50.	ug/l	07-Jul-02 18:40	CAH
Dibenzofuran	U	10.	ug/l	07-Jul-02 18:40	CAH
2,4-Dinitrotoluene	U	10.	ug/l	07-Jul-02 18:40	CAH
4-Nitrophenol	U	50.	ug/l	07-Jul-02 18:40	CAH
2,3,4,6-Tetrachlorophenol	U	10.	ug/l	07-Jul-02 18:40	CAH
Diethylphthalate	U	10.	ug/l	07-Jul-02 18:40	CAH
Fluorene	U	10.	ug/l	07-Jul-02 18:40	CAH
4-Chlorophenyl-phenyl Ether	U	10.	ug/l	07-Jul-02 18:40	CAH
4-Nitroaniline	U	50.	ug/l	07-Jul-02 18:40	CAH
4,6-Dinitro-2-methylphenol	U	50.	ug/l	07-Jul-02 18:40	CAH
N-Nitrosodiphenylamine	U	10.	ug/l	07-Jul-02 18:40	CAH
4-Bromophenyl-phenylether	U	10.	ug/l	07-Jul-02 18:40	CAH
Hexachlorobenzene	U	10.	ug/l	07-Jul-02 18:40	CAH
Pentachlorophenol	U	50.	ug/l	07-Jul-02 18:40	CAH
Carbazole	U	10.	ug/l	07-Jul-02 18:40	CAH
Phenanthrene	U	10.	ug/l	07-Jul-02 18:40	CAH
Anthracene	U	10.	ug/l	07-Jul-02 18:40	CAH
Di-n-Butylphthalate	U	10.	ug/l	07-Jul-02 18:40	CAH
Fluoranthene	U	10.	ug/l	07-Jul-02 18:40	CAH
Pyrene	U	10.	ug/l	07-Jul-02 18:40	CAH
Butylbenzylphthalate	U	10.	ug/l	07-Jul-02 18:40	CAH
Benzo(a)anthracene	U	10.	ug/l	07-Jul-02 18:40	CAH
3,3'-Dichlorobenzidine	U	20.	ug/l	07-Jul-02 18:40	CAH
Chrysene	U	10.	ug/l	07-Jul-02 18:40	CAH
bis(2-Ethylhexyl)phthalate	U	10.	ug/l	07-Jul-02 18:40	CAH

000016

%: Compound determined to be not confirmed based on a %D of 177.

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-1
Client ID: PROJECT #C02E013
Site: MW-1
Locator: GRAB
Collect Date: 27-JUN-02 13:45

Parameter		Result	Units	Date	By
Di-n-octylphthalate	U	10.	ug/l	07-Jul-02 18:40	CAH
Benzo(b)fluoranthene	U	10.	ug/l	07-Jul-02 18:40	CAH
Benzo(k)fluoranthene	U	10.	ug/l	07-Jul-02 18:40	CAH
Benzo(a)pyrene	U	10.	ug/l	07-Jul-02 18:40	CAH
Indeno(1,2,3-cd)pyrene	U	10.	ug/l	07-Jul-02 18:40	CAH
Dibenzo(a,h)anthracene	U	10.	ug/l	07-Jul-02 18:40	CAH
Benzo(g,h,i)perylene	U	10.	ug/l	07-Jul-02 18:40	CAH

Compound determined to be not confirmed based on a %D of 177.

000017

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Laboratory Results

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Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-2
Client ID: PROJECT #C02E013
Site: MW-2
Locator: GRAB
Collect Date: 27-JUN-02 15:00

Parameter		Result	Units	Date	By
SM METHOD 2320 B					
Alkalinity, Total as CaCO3		330	mg/l	01-Jul-02 13:35	PLI
EPA METHOD 300.0 rev 2.1					
Chloride		13.	mg/l	02-Jul-02 21:16	ech
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent		0.0055	mg/l	28-Jun-02 13:00	TIN
SM METHOD 4500 NH3 D / EPA METHOD 350.1 (Phenate)					
Nitrogen, Ammonia as N		0.014	mg/l	01-Jul-02 11:21	ech
SW-846 METHOD 9045 C					
pH		7.44	units	02-Jul-02 12:29	TIN
EPA METHOD 300.0 rev 2.1					
Sulfate		45.	mg/l	02-Jul-02 21:16	ech
EPA METHOD 160.1					
Solids, Total Dissolved		1300	mg/l	02-Jul-02 15:00	JLR
EPA METHOD 1664					
Silica Gel Treated - HEM	<JP	0.40	mg/l	05-Jul-02 08:00	TAC
SM METHOD 2540 D					
Solids, Total Suspended		27000	mg/l	02-Jul-02 16:15	JLR
SW-846 METHOD 3015					
Sample Preparation				03-Jul-02 06:00	DWK
SW-846 METHOD 3015					
Sample Preparation				03-Jul-02 12:00	KJP
SW-846 METHOD 1311					
Leachate Preparation				01-Jul-02 14:00	DWK
Final pH				01-Jul-02 14:00	DWK
SW-846 METHOD 6010B					
Silver	U	10.	ug/l	08-Jul-02 12:04	DWK
Silver, TCLP	J	0.0012	mg/l	08-Jul-02 12:41	DWK
Silver, TCLP		100	% Recovery	08-Jul-02 12:23	DWK
Aluminum		7900	ug/l	08-Jul-02 12:04	DWK
Arsenic	U	2.2	ug/l	08-Jul-02 12:04	DWK
Arsenic, TCLP	U	0.050	mg/l	08-Jul-02 12:41	DWK
Arsenic, TCLP		100	% Recovery	08-Jul-02 12:23	DWK

000018

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-2
Client ID: PROJECT #C02E013
Site: MW-2
Locator: GRAB
Collect Date: 27-JUN-02 15:00

Parameter		Result	Units	Date	By
Barium		130	ug/l	08-Jul-02 12:04	DWK
Barium, TCLP	J	0.19	mg/l	08-Jul-02 12:41	DWK
Barium, TCLP		98.	% Recovery	08-Jul-02 12:23	DWK
Beryllium	J	-0.74	ug/l	08-Jul-02 12:04	DWK
Calcium		95000	ug/l	08-Jul-02 12:04	DWK
Cadmium	J	1.0	ug/l	08-Jul-02 12:04	DWK
Cadmium, TCLP	J	0.00074	mg/l	08-Jul-02 12:41	DWK
Cadmium, TCLP		96.	% Recovery	08-Jul-02 12:23	DWK
Cobalt		5.1	ug/l	08-Jul-02 12:04	DWK
Chromium		9.3	ug/l	08-Jul-02 12:04	DWK
Chromium, TCLP	U	0.10	mg/l	08-Jul-02 12:41	DWK
Chromium, TCLP		94.	% Recovery	08-Jul-02 12:23	DWK
Copper	J	4.2	ug/l	08-Jul-02 12:04	DWK
Iron		5400	ug/l	08-Jul-02 12:04	DWK
Potassium		4000	ug/l	08-Jul-02 12:04	DWK
Magnesium		40000	ug/l	08-Jul-02 12:04	DWK
Manganese		120	ug/l	08-Jul-02 12:04	DWK
Sodium		16000	ug/l	08-Jul-02 12:04	DWK
Nickel	J	10.	ug/l	08-Jul-02 12:04	DWK
Lead	U	10.	ug/l	08-Jul-02 12:04	DWK
Lead, TCLP	U	0.0075	mg/l	08-Jul-02 12:41	DWK
Lead, TCLP		94.	% Recovery	08-Jul-02 12:23	DWK
Antimony	J	0.46	ug/l	08-Jul-02 12:04	DWK
Selenium	J	2.5	ug/l	08-Jul-02 12:04	DWK
Selenium, TCLP	U	0.050	mg/l	08-Jul-02 12:41	DWK
Selenium, TCLP		100	% Recovery	08-Jul-02 12:23	DWK
Thallium	J	0.87	ug/l	08-Jul-02 12:04	DWK
Vanadium		16.	ug/l	08-Jul-02 12:04	DWK
Zinc		11.	ug/l	08-Jul-02 12:04	DWK
Mercury	J	0.076	ug/l	03-Jul-02 11:30	JEM
Mercury, TCLP	U	0.20	mg/l	03-Jul-02 12:19	JEM
Mercury, TCLP		120	% Recovery	03-Jul-02 12:08	JEM

SW-846 METHOD 8091A

000019

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Laboratory Results

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Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
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PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-2
Client ID: PROJECT #C02E013
Site: MW-2
Locator: GRAB
Collect Date: 27-JUN-02 15:00

Parameter		Result	Units	Date	By
Sample Preparation				28-Jun-02 12:00	KR
SW-846 METHOD 8082					
Sample Preparation				28-Jun-02 12:00	KR
SW-846 METHOD 8270					
Sample Preparation				01-Jul-02 12:00	AEW
SW-846 METHOD 8310					
Sample Preparation				28-Jun-02 12:00	AEW
SW-846 METHOD 8081A					
alpha-BHC	U	0.050	ug/l	17-Jul-02 06:38	AMR
gamma-BHC (Lindane)	U	0.050	ug/l	17-Jul-02 06:38	AMR
beta-BHC	U	0.050	ug/l	17-Jul-02 06:38	AMR
Heptachlor	J	0.0030	ug/l	17-Jul-02 06:38	AMR
delta-BHC	U	0.050	ug/l	17-Jul-02 06:38	AMR
Aldrin	U	0.050	ug/l	17-Jul-02 06:38	AMR
Heptachlor Epoxide	U	0.050	ug/l	17-Jul-02 06:38	AMR
Endosulfan I	U	0.050	ug/l	17-Jul-02 06:38	AMR
4,4'-DDE	U	0.10	ug/l	17-Jul-02 06:38	AMR
Dieldrin	U	0.10	ug/l	17-Jul-02 06:38	AMR
Endrin	U	0.10	ug/l	17-Jul-02 06:38	AMR
4,4'-DDD	U	0.10	ug/l	17-Jul-02 06:38	AMR
Endosulfan II	U	0.10	ug/l	17-Jul-02 06:38	AMR
4,4'-DDT	U	0.10	ug/l	17-Jul-02 06:38	AMR
Endrin Aldehyde	U	0.10	ug/l	17-Jul-02 06:38	AMR
Endosulfan Sulfate	U	0.10	ug/l	17-Jul-02 06:38	AMR
Methoxychlor	U	0.50	ug/l	17-Jul-02 06:38	AMR
Toxaphene	U	0.50	ug/l	17-Jul-02 06:38	AMR
Chlordane (technical)	U	0.50	ug/l	17-Jul-02 06:38	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	0.50	ug/l	13-Jul-02 23:53	AMG
Aroclor 1221	U	0.50	ug/l	13-Jul-02 23:53	AMG
Aroclor 1232	U	0.50	ug/l	13-Jul-02 23:53	AMG
Aroclor 1242	U	0.50	ug/l	13-Jul-02 23:53	AMG
Aroclor 1248	U	0.50	ug/l	13-Jul-02 23:53	AMG

000020

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-2
Client ID: PROJECT #C02E013
Site: MW-2
Locator: GRAB
Collect Date: 27-JUN-02 15:00

Parameter		Result	Units	Date	By
Aroclor 1254	U	0.50	ug/l	13-Jul-02 23:53	AMG
Aroclor 1260	U	0.50	ug/l	13-Jul-02 23:53	AMG
SW-846 METHOD 8310					
Naphthalene	U	2.0	ug/l	05-Jul-02 12:59	ELS
Acenaphthylene	U	2.0	ug/l	05-Jul-02 12:59	ELS
Acenaphthene	U	2.0	ug/l	05-Jul-02 12:59	ELS
Fluorene	U	2.0	ug/l	05-Jul-02 12:59	ELS
Phenanthrene	U	2.0	ug/l	05-Jul-02 12:59	ELS
Anthracene	U	2.0	ug/l	05-Jul-02 12:59	ELS
Fluoranthene	U	0.20	ug/l	05-Jul-02 12:59	ELS
Pyrene	U	0.20	ug/l	05-Jul-02 12:59	ELS
Benzo(a)Anthracene	U	0.20	ug/l	05-Jul-02 12:59	ELS
Chrysene	U	0.20	ug/l	05-Jul-02 12:59	ELS
Benzo(b)Fluoranthene	U	0.18	ug/l	05-Jul-02 12:59	ELS
Benzo(k)Fluoranthene	U	0.10	ug/l	05-Jul-02 12:59	ELS
Benzo(a)Pyrene	U	0.20	ug/l	05-Jul-02 12:59	ELS
Dibenz(a,h)Anthracene	U	0.20	ug/l	05-Jul-02 12:59	ELS
Benzo(g,h,i)Perylene	U	0.20	ug/l	05-Jul-02 12:59	ELS
Indeno(1,2,3-cd)Pyrene	U	0.20	ug/l	05-Jul-02 12:59	ELS
SW-846 Method 8260B					
Dichlorodifluoromethane	U	10.	ug/l	02-Jul-02 12:57	TJP
Chloromethane	U	10.	ug/l	02-Jul-02 12:57	TJP
Vinyl Chloride	U	10.	ug/l	02-Jul-02 12:57	TJP
Bromomethane	U	10.	ug/l	02-Jul-02 12:57	TJP
Chloroethane	U	10.	ug/l	02-Jul-02 12:57	TJP
Iodomethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
Methylene Chloride	U	5.0	ug/l	02-Jul-02 12:57	TJP
Acetone	U	10.	ug/l	02-Jul-02 12:57	TJP
Acetonitrile	U	50.	ug/l	02-Jul-02 12:57	TJP
Acrolein	U	50.	ug/l	02-Jul-02 12:57	TJP
Acrylonitrile	U	50.	ug/l	02-Jul-02 12:57	TJP
Carbon Disulfide	U	5.0	ug/l	02-Jul-02 12:57	TJP
Trichlorofluoromethane	U	10.	ug/l	02-Jul-02 12:57	TJP

000021

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-2
Client ID: PROJECT #C02E013
Site: MW-2
Locator: GRAB
Collect Date: 27-JUN-02 15:00

Parameter		Result	Units	Date	By
Propionitrile	U	10.	ug/l	02-Jul-02 12:57	TJP
1,1-Dichloroethene	U	5.0	ug/l	02-Jul-02 12:57	TJP
3-Chloropropene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,1-Dichloroethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
trans-1,2-Dichloroethene	U	5.0	ug/l	02-Jul-02 12:57	TJP
cis-1,2-Dichloroethene	U	5.0	ug/l	02-Jul-02 12:57	TJP
2,2-Dichloropropane	U	5.0	ug/l	02-Jul-02 12:57	TJP
Chloroprene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Chloroform	U	5.0	ug/l	02-Jul-02 12:57	TJP
Dibromomethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,2-Dichloroethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
2-Butanone	U	10.	ug/l	02-Jul-02 12:57	TJP
Methacrylonitrile	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,1,1-Trichloroethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,4-Dioxane	U	200	ug/l	02-Jul-02 12:57	TJP
Isobutyl Alcohol	U	1000	ug/l	02-Jul-02 12:57	TJP
Carbon Tetrachloride	U	5.0	ug/l	02-Jul-02 12:57	TJP
Vinyl Acetate	U	10.	ug/l	02-Jul-02 12:57	TJP
Bromodichloromethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,2-Dichloropropane	U	5.0	ug/l	02-Jul-02 12:57	TJP
cis-1,3-Dichloropropene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Trichloroethene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Dibromochloromethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,1,2-Trichloroethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
Benzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,2-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,4-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,2,4-Trichlorobenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
trans-1,3-Dichloropropene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Methyl Methacrylate	U	5.0	ug/l	02-Jul-02 12:57	TJP
Bromoform	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,1,1,2-Tetrachlorcethane	U	10.	ug/l	02-Jul-02 12:57	TJP
4-Methyl-2-pentanone	U	10.	ug/l	02-Jul-02 12:57	TJP

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-2
Client ID: PROJECT #C02E013
Site: MW-2
Locator: GRAB
Collect Date: 27-JUN-02 15:00

Parameter		Result	Units	Date	By
2-Hexanone	U	10.	ug/l	02-Jul-02 12:57	TJP
Tetrachloroethene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,1,2,2-Tetrachloroethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,2,3-Trichloropropane	U	5.0	ug/l	02-Jul-02 12:57	TJP
trans-1,4-Dichloro-2-Butene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Ethyl Methacrylate	U	5.0	ug/l	02-Jul-02 12:57	TJP
Toluene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Chlorobenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Ethylbenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,2-Dibromo-3-chloropropane	U	5.0	ug/l	02-Jul-02 12:57	TJP
Styrene	U	5.0	ug/l	02-Jul-02 12:57	TJP
m,p-Xylene	U	5.0	ug/l	02-Jul-02 12:57	TJP
o-Xylene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Xylenes (Total)	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,2,4-Trimethylbenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,1-Dichloropropene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,3-Dichloropropane	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,3-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
2-Chlorotoluene	U	5.0	ug/l	02-Jul-02 12:57	TJP
4-Chlorotoluene	U	5.0	ug/l	02-Jul-02 12:57	TJP
n-Propylbenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
n-Butylbenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Bromobenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Isopropylbenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,3,5-Trimethylbenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
tert-Butylbenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
p-Isopropyltoluene	U	5.0	ug/l	02-Jul-02 12:57	TJP
sec-Butylbenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Hexachlorobutadiene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Naphthalene	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,2,3-Trichlorobenzene	U	5.0	ug/l	02-Jul-02 12:57	TJP
Bromochloromethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
1,2-Dibromoethane	U	5.0	ug/l	02-Jul-02 12:57	TJP

000023

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-2
Client ID: PROJECT #C02E013
Site: MW-2
Locator: GRAB
Collect Date: 27-JUN-02 15:00

Parameter		Result	Units	Date	By
Pentachloroethane	U	5.0	ug/l	02-Jul-02 12:57	TJP
2-Chloroethyl vinyl ether	U	5.0	ug/l	02-Jul-02 12:57	TJP
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	10.	ug/l	09-Jul-02 18:46	CAH
Pyridine	U	10.	ug/l	09-Jul-02 18:46	CAH
Aniline	U	10.	ug/l	09-Jul-02 18:46	CAH
bis(2-Chloroethyl) Ether	U	10.	ug/l	09-Jul-02 18:46	CAH
2-Chlorophenol	U	10.	ug/l	09-Jul-02 18:46	CAH
Phenol	J	1.2	ug/l	09-Jul-02 18:46	CAH
1,3-Dichlorobenzene	U	10.	ug/l	09-Jul-02 18:46	CAH
1,4-Dichlorobenzene	U	10.	ug/l	09-Jul-02 18:46	CAH
1,2-Dichlorobenzene	U	10.	ug/l	09-Jul-02 18:46	CAH
Benzyl Alcohol	U	10.	ug/l	09-Jul-02 18:46	CAH
Bis(2-chloroisopropyl)ether	U	10.	ug/l	09-Jul-02 18:46	CAH
Hexachloroethane	U	10.	ug/l	09-Jul-02 18:46	CAH
2-Methylphenol	U	10.	ug/l	09-Jul-02 18:46	CAH
N-Nitroso-di-n-propylamine	U	10.	ug/l	09-Jul-02 18:46	CAH
4-Methylphenol	U	10.	ug/l	09-Jul-02 18:46	CAH
Nitrobenzene	U	10.	ug/l	09-Jul-02 18:46	CAH
Isophorone	U	10.	ug/l	09-Jul-02 18:46	CAH
2-Nitrophenol	U	50.	ug/l	09-Jul-02 18:46	CAH
2,4-Dimethylphenol	U	10.	ug/l	09-Jul-02 18:46	CAH
bis(2-Chloroethoxy)methane	U	10.	ug/l	09-Jul-02 18:46	CAH
2,4-Dichlorophenol	U	10.	ug/l	09-Jul-02 18:46	CAH
1,2,4-Trichlorobenzene	U	10.	ug/l	09-Jul-02 18:46	CAH
Naphthalene	U	10.	ug/l	09-Jul-02 18:46	CAH
2,6-Dichlorophenol	U	10.	ug/l	09-Jul-02 18:46	CAH
4-Chloroaniline	U	10.	ug/l	09-Jul-02 18:46	CAH
Hexachlorobutadiene	U	10.	ug/l	09-Jul-02 18:46	CAH
4-Chloro-3-Methylphenol	U	10.	ug/l	09-Jul-02 18:46	CAH
2-Methylnaphthalene	U	10.	ug/l	09-Jul-02 18:46	CAH
Hexachlorocyclopentadiene	U	10.	ug/l	09-Jul-02 18:46	CAH
2,4,6-Trichlorophenol	U	10.	ug/l	09-Jul-02 18:46	CAH

000024

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-2
Client ID: PROJECT #C02E013
Site: MW-2
Locator: GRAB
Collect Date: 27-JUN-02 15:00

Parameter		Result	Units	Date	By
2,4,5-Trichlorophenol	U	50.	ug/l	09-Jul-02 18:46	CAH
2-Chloronaphthalene	U	10.	ug/l	09-Jul-02 18:46	CAH
2-Nitroaniline	U	50.	ug/l	09-Jul-02 18:46	CAH
Dimethylphthalate	U	10.	ug/l	09-Jul-02 18:46	CAH
Acenaphthylene	U	10.	ug/l	09-Jul-02 18:46	CAH
2,6-Dinitrotoluene	U	10.	ug/l	09-Jul-02 18:46	CAH
3-Nitroaniline	U	50.	ug/l	09-Jul-02 18:46	CAH
Acenaphthene	U	10.	ug/l	09-Jul-02 18:46	CAH
2,4-Dinitrophenol	U	50.	ug/l	09-Jul-02 18:46	CAH
Dibenzofuran	U	10.	ug/l	09-Jul-02 18:46	CAH
2,4-Dinitrotoluene	U	10.	ug/l	09-Jul-02 18:46	CAH
4-Nitrophenol	U	50.	ug/l	09-Jul-02 18:46	CAH
2,3,4,6-Tetrachlorophenol	U	10.	ug/l	09-Jul-02 18:46	CAH
Diethylphthalate	U	10.	ug/l	09-Jul-02 18:46	CAH
Fluorene	U	10.	ug/l	09-Jul-02 18:46	CAH
4-Chlorophenyl-phenyl Ether	U	10.	ug/l	09-Jul-02 18:46	CAH
4-Nitroaniline	U	50.	ug/l	09-Jul-02 18:46	CAH
4,6-Dinitro-2-methylphenol	U	50.	ug/l	09-Jul-02 18:46	CAH
N-Nitrosodiphenylamine	U	10.	ug/l	09-Jul-02 18:46	CAH
4-Bromophenyl-phenylether	U	10.	ug/l	09-Jul-02 18:46	CAH
Hexachlorobenzene	U	10.	ug/l	09-Jul-02 18:46	CAH
Pentachlorophenol	U	50.	ug/l	09-Jul-02 18:46	CAH
Carbazole	U	10.	ug/l	09-Jul-02 18:46	CAH
Phenanthrene	U	10.	ug/l	09-Jul-02 18:46	CAH
Anthracene	U	10.	ug/l	09-Jul-02 18:46	CAH
Di-n-Butylphthalate	U	10.	ug/l	09-Jul-02 18:46	CAH
Fluoranthene	U	10.	ug/l	09-Jul-02 18:46	CAH
Pyrene	U	10.	ug/l	09-Jul-02 18:46	CAH
Butylbenzylphthalate	U	10.	ug/l	09-Jul-02 18:46	CAH
Benzo(a)anthracene	U	10.	ug/l	09-Jul-02 18:46	CAH
3,3'-Dichlorobenzidine	U	20.	ug/l	09-Jul-02 18:46	CAH
Chrysene	U	10.	ug/l	09-Jul-02 18:46	CAH
bis(2-Ethylhexyl)phthalate	U	10.	ug/l	09-Jul-02 18:46	CAH

000025

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-2
Client ID: PROJECT #C02E013
Site: MW-2
Locator: GRAB
Collect Date: 27-JUN-02 15:00

Parameter		Result	Units	Date	By
Di-n-octylphthalate	U	10.	ug/l	09-Jul-02 18:46	CAH
Benzo(b)fluoranthene	U	10.	ug/l	09-Jul-02 18:46	CAH
Benzo(k)fluoranthene	U	10.	ug/l	09-Jul-02 18:46	CAH
Benzo(a)pyrene	U	10.	ug/l	09-Jul-02 18:46	CAH
Indeno(1,2,3-cd)pyrene	U	10.	ug/l	09-Jul-02 18:46	CAH
Dibenzo(a,h)anthracene	U	10.	ug/l	09-Jul-02 18:46	CAH
Benzo(g,h,i)perylene	U	10.	ug/l	09-Jul-02 18:46	CAH

000026

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Laboratory Results

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2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-3
Client ID: PROJECT #C02E013
Site: MW-3
Locator: GRAB
Collect Date: 27-JUN-02 11:45

Parameter		Result	Units	Date	By
SM METHOD 2320 B					
Alkalinity, Total as CaCO3		300	mg/l	01-Jul-02 13:35	PLI
EPA METHOD 300.0 rev 2.1					
Chloride		22.	mg/l	02-Jul-02 21:33	ech
SM METHOD 3500 Cr D / SW-846 METHOD 7196A					
Chromium, Hexavalent	U	0.0050	mg/l	28-Jun-02 13:00	TIN
SM METHOD 4500 NH3 D / EPA METHOD 350.1 (Phenate)					
Nitrogen, Ammonia as N	U	0.050	mg/l	01-Jul-02 11:21	ech
SW-846 METHOD 9045 C					
pH		7.39	units	02-Jul-02 12:36	TIN
EPA METHOD 300.0 rev 2.1					
Sulfate		42.	mg/l	02-Jul-02 21:33	ech
EPA METHOD 160.1					
Solids, Total Dissolved		460	mg/l	02-Jul-02 15:00	JLR
EPA METHOD 1664					
Silica Gel Treated - HEM	JP	1.3	mg/l	05-Jul-02 08:00	TAC
SM METHOD 2540 D					
Solids, Total Suspended		680	mg/l	02-Jul-02 16:15	JLR
SW-846 METHOD 3015					
Sample Preparation				03-Jul-02 06:00	DWK
SW-846 METHOD 3015					
Sample Preparation				03-Jul-02 12:00	KJP
SW-846 METHOD 1311					
Leachate Preparation				01-Jul-02 14:00	DWK
Final pH				01-Jul-02 14:00	DWK
SW-846 METHOD 6010B					
Silver	U	10.	ug/l	08-Jul-02 12:11	DWK
Silver, TCLP	U	0.050	mg/l	08-Jul-02 12:11	DWK
Silver, TCLP		100	% Recovery	08-Jul-02 12:23	DWK
Aluminum		2200	ug/l	08-Jul-02 12:11	DWK
Arsenic	U	2.2	ug/l	08-Jul-02 12:11	DWK
Arsenic, TCLP	U	0.050	mg/l	08-Jul-02 12:11	DWK
Arsenic, TCLP		100	% Recovery	08-Jul-02 12:23	DWK

Compound determined to be not confirmed based on a %D of 100.

000027

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-3
Client ID: PROJECT #C02E013
Site: MW-3
Locator: GRAB
Collect Date: 27-JUN-02 11:45

Parameter		Result	Units	Date	By
Barium		110	ug/l	08-Jul-02 12:11	DWK
Barium, TCLP	J	0.20	mg/l	08-Jul-02 12:11	DWK
Barium, TCLP		98.	% Recovery	08-Jul-02 12:23	DWK
Beryllium	J	-0.78	ug/l	08-Jul-02 12:11	DWK
Calcium		88000	ug/l	08-Jul-02 12:11	DWK
Cadmium	J	0.65	ug/l	08-Jul-02 12:11	DWK
Cadmium, TCLP	J	0.0011	mg/l	08-Jul-02 12:11	DWK
Cadmium, TCLP		96.	% Recovery	08-Jul-02 12:23	DWK
Cobalt	J	1.9	ug/l	08-Jul-02 12:11	DWK
Chromium	J	3.0	ug/l	08-Jul-02 12:11	DWK
Chromium, TCLP	U	0.10	mg/l	08-Jul-02 12:11	DWK
Chromium, TCLP		94.	% Recovery	08-Jul-02 12:23	DWK
Copper	U	10.	ug/l	08-Jul-02 12:11	DWK
Iron		1500	ug/l	08-Jul-02 12:11	DWK
Potassium		1400	ug/l	08-Jul-02 12:11	DWK
Magnesium		36000	ug/l	08-Jul-02 12:11	DWK
Manganese		63.	ug/l	08-Jul-02 12:11	DWK
Sodium		6500	ug/l	08-Jul-02 12:11	DWK
Nickel	J	4.3	ug/l	08-Jul-02 12:11	DWK
Lead	U	10.	ug/l	08-Jul-02 12:11	DWK
Lead, TCLP	U	0.0075	mg/l	08-Jul-02 12:11	DWK
Lead, TCLP		94.	% Recovery	08-Jul-02 12:23	DWK
Antimony	J	-0.12	ug/l	08-Jul-02 12:11	DWK
Selenium	J	2.0	ug/l	08-Jul-02 12:11	DWK
Selenium, TCLP	U	0.050	mg/l	08-Jul-02 12:11	DWK
Selenium, TCLP		100	% Recovery	08-Jul-02 12:23	DWK
Thallium	J	0.69	ug/l	08-Jul-02 12:11	DWK
Vanadium		7.0	ug/l	08-Jul-02 12:11	DWK
Zinc	J	3.6	ug/l	08-Jul-02 12:11	DWK
Mercury	U	0.20	ug/l	03-Jul-02 11:35	JEM
Mercury, TCLP	U	0.20	mg/l	03-Jul-02 12:25	JEM
Mercury, TCLP		120	% Recovery	03-Jul-02 12:08	JEM

SW-846 METHOD 8081A

X: Compound determined to be not confirmed based on a %D of 100.

000028

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-3
Client ID: PROJECT #C02E013
Site: MW-3
Locator: GRAB
Collect Date: 27-JUN-02 11:45

Parameter		Result	Units	Date	By
Sample Preparation				28-Jun-02 12:00	KR
SW-846 METHOD 8082					
Sample Preparation				28-Jun-02 12:00	KR
SW-846 METHOD 8270					
Sample Preparation				01-Jul-02 12:00	AEW
SW-846 METHOD 8310					
Sample Preparation				28-Jun-02 12:00	AEW
SW-846 METHOD 8081A					
alpha-BHC	U	0.050	ug/l	17-Jul-02 07:23	AMR
gamma-BHC (Lindane)	U	0.050	ug/l	17-Jul-02 07:23	AMR
beta-BHC	U	0.050	ug/l	17-Jul-02 07:23	AMR
Heptachlor	U,X	0.050	ug/l	17-Jul-02 07:23	AMR
delta-BHC	U	0.050	ug/l	17-Jul-02 07:23	AMR
Aldrin	U	0.050	ug/l	17-Jul-02 07:23	AMR
Heptachlor Epoxide	U	0.050	ug/l	17-Jul-02 07:23	AMR
Endosulfan I	U	0.050	ug/l	17-Jul-02 07:23	AMR
4,4'-DDE	U	0.10	ug/l	17-Jul-02 07:23	AMR
Dieldrin	U	0.10	ug/l	17-Jul-02 07:23	AMR
Endrin	U	0.10	ug/l	17-Jul-02 07:23	AMR
4,4'-DDD	U	0.10	ug/l	17-Jul-02 07:23	AMR
Endosulfan II	U	0.10	ug/l	17-Jul-02 07:23	AMR
4,4'-DDT	U	0.10	ug/l	17-Jul-02 07:23	AMR
Endrin Aldehyde	U	0.10	ug/l	17-Jul-02 07:23	AMR
Endosulfan Sulfate	U	0.10	ug/l	17-Jul-02 07:23	AMR
Methoxychlor	U	0.50	ug/l	17-Jul-02 07:23	AMR
Toxaphene	U	0.50	ug/l	17-Jul-02 07:23	AMR
Chlordane (technical)	U	0.50	ug/l	17-Jul-02 07:23	AMR
SW-846 METHOD 8082					
Aroclor 1016	U	0.50	ug/l	14-Jul-02 00:35	AMG
Aroclor 1221	U	0.50	ug/l	14-Jul-02 00:35	AMG
Aroclor 1232	U	0.50	ug/l	14-Jul-02 00:35	AMG
Aroclor 1242	U	0.50	ug/l	14-Jul-02 00:35	AMG
Aroclor 1248	U	0.50	ug/l	14-Jul-02 00:35	AMG

Compound determined to be not confirmed based on a %D of 100.

000029

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-3
Client ID: PROJECT #C02E013
Site: MW-3
Locator: GRAB
Collect Date: 27-JUN-02 11:45

Parameter		Result	Units	Date	By
Aroclor 1254	U	0.50	ug/l	14-Jul-02 00:35	AMG
Aroclor 1260	U	0.50	ug/l	14-Jul-02 00:35	AMG
SW-846 METHOD 8310					
Naphthalene	U	2.0	ug/l	05-Jul-02 13:32	ELS
Acenaphthylene	U	2.0	ug/l	05-Jul-02 13:32	ELS
Acenaphthene	U	2.0	ug/l	05-Jul-02 13:32	ELS
Fluorene	U	2.0	ug/l	05-Jul-02 13:32	ELS
Phenanthrene	U	2.0	ug/l	05-Jul-02 13:32	ELS
Anthracene	U	2.0	ug/l	05-Jul-02 13:32	ELS
Fluoranthene	U	0.20	ug/l	05-Jul-02 13:32	ELS
Pyrene	U	0.20	ug/l	05-Jul-02 13:32	ELS
Benzo(a)Anthracene	U	0.20	ug/l	05-Jul-02 13:32	ELS
Chrysene	U	0.20	ug/l	05-Jul-02 13:32	ELS
Benzo(b)Fluoranthene	U	0.18	ug/l	05-Jul-02 13:32	ELS
Benzo(k)Fluoranthene	U	0.10	ug/l	05-Jul-02 13:32	ELS
Benzo(a)Pyrene	U	0.20	ug/l	05-Jul-02 13:32	ELS
Dibenz(a,h)Anthracene	U	0.20	ug/l	05-Jul-02 13:32	ELS
Benzo(g,h,i)Perylene	U	0.20	ug/l	05-Jul-02 13:32	ELS
Indeno(1,2,3-cd)Pyrene	U	0.20	ug/l	05-Jul-02 13:32	ELS
SW-846 Method 8260B					
Dichlorodifluoromethane	U	10.	ug/l	02-Jul-02 13:28	TJP
Chloromethane	U	10.	ug/l	02-Jul-02 13:28	TJP
Vinyl Chloride	U	10.	ug/l	02-Jul-02 13:28	TJP
Bromomethane	U	10.	ug/l	02-Jul-02 13:28	TJP
Chloroethane	U	10.	ug/l	02-Jul-02 13:28	TJP
Iodomethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
Methylene Chloride	U	5.0	ug/l	02-Jul-02 13:28	TJP
Acetone	U	10.	ug/l	02-Jul-02 13:28	TJP
Acetonitrile	U	50.	ug/l	02-Jul-02 13:28	TJP
Acrolein	U	50.	ug/l	02-Jul-02 13:28	TJP
Acrylonitrile	U	50.	ug/l	02-Jul-02 13:28	TJP
Carbon Disulfide	U	5.0	ug/l	02-Jul-02 13:28	TJP
Trichlorofluoromethane	U	10.	ug/l	02-Jul-02 13:28	TJP

000030

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Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-3
Client ID: PROJECT #C02E013
Site: MW-3
Locator: GRAB
Collect Date: 27-JUN-02 11:45

Parameter		Result	Units	Date	By
Propionitrile	U	10.	ug/l	02-Jul-02 13:28	TJP
1,1-Dichloroethene	U	5.0	ug/l	02-Jul-02 13:28	TJP
3-Chloropropene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,1-Dichloroethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
trans-1,2-Dichloroethene	U	5.0	ug/l	02-Jul-02 13:28	TJP
cis-1,2-Dichloroethene	U	5.0	ug/l	02-Jul-02 13:28	TJP
2,2-Dichloropropane	U	5.0	ug/l	02-Jul-02 13:28	TJP
Chloroprene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Chloroform	U	5.0	ug/l	02-Jul-02 13:28	TJP
Dibromomethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,2-Dichloroethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
2-Butanone	U	10.	ug/l	02-Jul-02 13:28	TJP
Methacrylonitrile	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,1,1-Trichloroethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,4-Dioxane	U	200	ug/l	02-Jul-02 13:28	TJP
Isobutyl Alcohol	U	1000	ug/l	02-Jul-02 13:28	TJP
Carbon Tetrachloride	U	5.0	ug/l	02-Jul-02 13:28	TJP
Vinyl Acetate	U	10.	ug/l	02-Jul-02 13:28	TJP
Bromodichloromethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,2-Dichloropropane	U	5.0	ug/l	02-Jul-02 13:28	TJP
cis-1,3-Dichloropropene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Trichloroethene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Dibromochloromethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,1,2-Trichloroethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
Benzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,2-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,4-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,2,4-Trichlorobenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
trans-1,3-Dichloropropene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Methyl Methacrylate	U	5.0	ug/l	02-Jul-02 13:28	TJP
Bromoform	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,1,1,2-Tetrachloroethane	U	10.	ug/l	02-Jul-02 13:28	TJP
4-Methyl-2-pentanone	U	10.	ug/l	02-Jul-02 13:28	TJP

Compound determined to be not confirmed based on a %D of 100.

000031

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-3
Client ID: PROJECT #C02E013
Site: MW-3
Locator: GRAB
Collect Date: 27-JUN-02 11:45

Parameter		Result	Units	Date	By
2-Hexanone	U	10.	ug/l	02-Jul-02 13:28	TJP
Tetrachloroethene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,1,2,2-Tetrachloroethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,2,3-Trichloropropane	U	5.0	ug/l	02-Jul-02 13:28	TJP
trans-1,4-Dichloro-2-Butene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Ethyl Methacrylate	U	5.0	ug/l	02-Jul-02 13:28	TJP
Toluene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Chlorobenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Ethylbenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,2-Dibromo-3-chloropropane	U	5.0	ug/l	02-Jul-02 13:28	TJP
Styrene	U	5.0	ug/l	02-Jul-02 13:28	TJP
m,p-Xylene	U	5.0	ug/l	02-Jul-02 13:28	TJP
o-Xylene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Xylenes (Total)	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,2,4-Trimethylbenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,1-Dichloropropene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,3-Dichloropropane	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,3-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
2-Chlorotoluene	U	5.0	ug/l	02-Jul-02 13:28	TJP
4-Chlorotoluene	U	5.0	ug/l	02-Jul-02 13:28	TJP
n-Propylbenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
n-Butylbenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Bromobenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Isopropylbenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,3,5-Trimethylbenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
tert-Butylbenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
p-Isopropyltoluene	U	5.0	ug/l	02-Jul-02 13:28	TJP
sec-Butylbenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Hexachlorobutadiene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Naphthalene	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,2,3-Trichlorobenzene	U	5.0	ug/l	02-Jul-02 13:28	TJP
Bromochloromethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
1,2-Dibromoethane	U	5.0	ug/l	02-Jul-02 13:28	TJP

X: Compound determined to be not confirmed based on a %D of 100.

000032

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Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-3
Client ID: PROJECT #C02E013
Site: MW-3
Locator: GRAB
Collect Date: 27-JUN-02 11:45

Parameter		Result	Units	Date	By
Pentachloroethane	U	5.0	ug/l	02-Jul-02 13:28	TJP
2-Chloroethyl vinyl ether	U	5.0	ug/l	02-Jul-02 13:28	TJP
SW-846 METHOD 8270					
N-Nitrosodimethylamine	U	10.	ug/l	07-Jul-02 19:39	CAH
Pyridine	U	10.	ug/l	07-Jul-02 19:39	CAH
Aniline	U	10.	ug/l	07-Jul-02 19:39	CAH
bis(2-Chloroethyl) Ether	U	10.	ug/l	07-Jul-02 19:39	CAH
2-Chlorophenol	U	10.	ug/l	07-Jul-02 19:39	CAH
Phenol	U	10.	ug/l	07-Jul-02 19:39	CAH
1,3-Dichlorobenzene	U	10.	ug/l	07-Jul-02 19:39	CAH
1,4-Dichlorobenzene	U	10.	ug/l	07-Jul-02 19:39	CAH
1,2-Dichlorobenzene	U	10.	ug/l	07-Jul-02 19:39	CAH
Benzyl Alcohol	U	10.	ug/l	07-Jul-02 19:39	CAH
Bis(2-chloroisopropyl)ether	U	10.	ug/l	07-Jul-02 19:39	CAH
Hexachloroethane	U	10.	ug/l	07-Jul-02 19:39	CAH
2-Methylphenol	U	10.	ug/l	07-Jul-02 19:39	CAH
N-Nitroso-di-n-propylamine	U	10.	ug/l	07-Jul-02 19:39	CAH
4-Methylphenol	U	10.	ug/l	07-Jul-02 19:39	CAH
Nitrobenzene	U	10.	ug/l	07-Jul-02 19:39	CAH
Isophorone	U	10.	ug/l	07-Jul-02 19:39	CAH
2-Nitrophenol	U	50.	ug/l	07-Jul-02 19:39	CAH
2,4-Dimethylphenol	U	10.	ug/l	07-Jul-02 19:39	CAH
bis(2-Chloroethoxy)methane	U	10.	ug/l	07-Jul-02 19:39	CAH
2,4-Dichlorophenol	U	10.	ug/l	07-Jul-02 19:39	CAH
1,2,4-Trichlorobenzene	U	10.	ug/l	07-Jul-02 19:39	CAH
Naphthalene	U	10.	ug/l	07-Jul-02 19:39	CAH
2,6-Dichlorophenol	U	10.	ug/l	07-Jul-02 19:39	CAH
4-Chloroaniline	U	10.	ug/l	07-Jul-02 19:39	CAH
Hexachlorobutadiene	U	10.	ug/l	07-Jul-02 19:39	CAH
4-Chloro-3-Methylphenol	U	10.	ug/l	07-Jul-02 19:39	CAH
2-Methylnaphthalene	U	10.	ug/l	07-Jul-02 19:39	CAH
Hexachlorocyclopentadiene	U	10.	ug/l	07-Jul-02 19:39	CAH
2,4,6-Trichlorophenol	U	10.	ug/l	07-Jul-02 19:39	CAH

Compound determined to be not confirmed based on a %D of 100.

000033

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Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-3
Client ID: PROJECT #C02E013
Site: MW-3
Locator: GRAB
Collect Date: 27-JUN-02 11:45

Parameter		Result	Units	Date	By
2,4,5-Trichlorophenol	U	50.	ug/l	07-Jul-02 19:39	CAH
2-Chloronaphthalene	U	10.	ug/l	07-Jul-02 19:39	CAH
2-Nitroaniline	U	50.	ug/l	07-Jul-02 19:39	CAH
Dimethylphthalate	U	10.	ug/l	07-Jul-02 19:39	CAH
Acenaphthylene	U	10.	ug/l	07-Jul-02 19:39	CAH
2,6-Dinitrotoluene	U	10.	ug/l	07-Jul-02 19:39	CAH
3-Nitroaniline	U	50.	ug/l	07-Jul-02 19:39	CAH
Acenaphthene	U	10.	ug/l	07-Jul-02 19:39	CAH
2,4-Dinitrophenol	U	50.	ug/l	07-Jul-02 19:39	CAH
Dibenzofuran	U	10.	ug/l	07-Jul-02 19:39	CAH
2,4-Dinitrotoluene	U	10.	ug/l	07-Jul-02 19:39	CAH
4-Nitrophenol	U	50.	ug/l	07-Jul-02 19:39	CAH
2,3,4,6-Tetrachlorophenol	U	10.	ug/l	07-Jul-02 19:39	CAH
Diethylphthalate	U	10.	ug/l	07-Jul-02 19:39	CAH
Fluorene	U	10.	ug/l	07-Jul-02 19:39	CAH
4-Chlorophenyl-phenyl Ether	U	10.	ug/l	07-Jul-02 19:39	CAH
4-Nitroaniline	U	50.	ug/l	07-Jul-02 19:39	CAH
4,6-Dinitro-2-methylphenol	U	50.	ug/l	07-Jul-02 19:39	CAH
N-Nitrosodiphenylamine	U	10.	ug/l	07-Jul-02 19:39	CAH
4-Bromophenyl-phenylether	U	10.	ug/l	07-Jul-02 19:39	CAH
Hexachlorobenzene	U	10.	ug/l	07-Jul-02 19:39	CAH
Pentachlorophenol	U	50.	ug/l	07-Jul-02 19:39	CAH
Carbazole	U	10.	ug/l	07-Jul-02 19:39	CAH
Phenanthrene	U	10.	ug/l	07-Jul-02 19:39	CAH
Anthracene	U	10.	ug/l	07-Jul-02 19:39	CAH
Di-n-Butylphthalate	U	10.	ug/l	07-Jul-02 19:39	CAH
Fluoranthene	U	10.	ug/l	07-Jul-02 19:39	CAH
Pyrene	U	10.	ug/l	07-Jul-02 19:39	CAH
Butylbenzylphthalate	U	10.	ug/l	07-Jul-02 19:39	CAH
Benzo(a)anthracene	U	10.	ug/l	07-Jul-02 19:39	CAH
3,3'-Dichlorobenzidine	U	20.	ug/l	07-Jul-02 19:39	CAH
Chrysene	U	10.	ug/l	07-Jul-02 19:39	CAH
bis(2-Ethylhexyl)phthalate	U	10.	ug/l	07-Jul-02 19:39	CAH

X: Compound determined to be not confirmed based on a %D of 100.

000034

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-3
Client ID: PROJECT #C02E013
Site: MW-3
Locator: GRAB
Collect Date: 27-JUN-02 11:45

Parameter		Result	Units	Date	By
Di-n-octylphthalate	U	10.	ug/l	07-Jul-02 19:39	CAH
Benzo(b)fluoranthene	U	10.	ug/l	07-Jul-02 19:39	CAH
Benzo(k)fluoranthene	U	10.	ug/l	07-Jul-02 19:39	CAH
Benzo(a)pyrene	U	10.	ug/l	07-Jul-02 19:39	CAH
Indeno(1,2,3-cd)pyrene	U	10.	ug/l	07-Jul-02 19:39	CAH
Dibenzo(a,h)anthracene	U	10.	ug/l	07-Jul-02 19:39	CAH
Benzo(g,h,i)perylene	U	10.	ug/l	07-Jul-02 19:39	CAH

Compound determined to be not confirmed based on a %D of 100.

000035

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-4
Client ID: PROJECT #C02E013
Site: TRIP BLANK
Locator: GRAB
Collect Date: 27-JUN-02

Parameter		Result	Units	Date	By
SW-846 Method 8260B					
Dichlorodifluoromethane	U	10.	ug/l	02-Jul-02 13:53	TJP
Chloromethane	J	7.0	ug/l	02-Jul-02 13:53	TJP
Vinyl Chloride	U	10.	ug/l	02-Jul-02 13:53	TJP
Bromomethane	U	10.	ug/l	02-Jul-02 13:53	TJP
Chloroethane	U	10.	ug/l	02-Jul-02 13:53	TJP
Iodomethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
Methylene Chloride	J	1.0	ug/l	02-Jul-02 13:53	TJP
Acetone	U	10.	ug/l	02-Jul-02 13:53	TJP
Acetonitrile	U	50.	ug/l	02-Jul-02 13:53	TJP
Acrolein	U	50.	ug/l	02-Jul-02 13:53	TJP
Acrylonitrile	U	50.	ug/l	02-Jul-02 13:53	TJP
Carbon Disulfide	U	5.0	ug/l	02-Jul-02 13:53	TJP
Trichlorofluoromethane	U	10.	ug/l	02-Jul-02 13:53	TJP
Propionitrile	U	10.	ug/l	02-Jul-02 13:53	TJP
1,1-Dichloroethene	U	5.0	ug/l	02-Jul-02 13:53	TJP
3-Chloropropene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,1-Dichloroethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
trans-1,2-Dichloroethene	U	5.0	ug/l	02-Jul-02 13:53	TJP
cis-1,2-Dichloroethene	U	5.0	ug/l	02-Jul-02 13:53	TJP
2,2-Dichloropropane	U	5.0	ug/l	02-Jul-02 13:53	TJP
Chloroprene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Chloroform	U	5.0	ug/l	02-Jul-02 13:53	TJP
Dibromomethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,2-Dichloroethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
2-Butanone	U	10.	ug/l	02-Jul-02 13:53	TJP
Methacrylonitrile	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,1,1-Trichloroethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,4-Dioxane	U	200	ug/l	02-Jul-02 13:53	TJP
Isobutyl Alcohol	U	1000	ug/l	02-Jul-02 13:53	TJP
Carbon Tetrachloride	U	5.0	ug/l	02-Jul-02 13:53	TJP
Vinyl Acetate	U	10.	ug/l	02-Jul-02 13:53	TJP
Bromodichloromethane	U	5.0	ug/l	02-Jul-02 13:53	TJP

000036

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Laboratory Results

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Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-4
Client ID: PROJECT #C02E013
Site: TRIP BLANK
Locator: GRAB
Collect Date: 27-JUN-02

Parameter		Result	Units	Date	By
1,2-Dichloropropane	U	5.0	ug/l	02-Jul-02 13:53	TJP
cis-1,3-Dichloropropene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Trichloroethene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Dibromochloromethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,1,2-Trichloroethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
Benzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,2-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,4-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,2,4-Trichlorobenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
trans-1,3-Dichloropropene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Methyl Methacrylate	U	5.0	ug/l	02-Jul-02 13:53	TJP
Bromoform	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,1,1,2-Tetrachloroethane	U	10.	ug/l	02-Jul-02 13:53	TJP
4-Methyl-2-pentanone	U	10.	ug/l	02-Jul-02 13:53	TJP
2-Hexanone	U	10.	ug/l	02-Jul-02 13:53	TJP
Tetrachloroethene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,1,2,2-Tetrachloroethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,2,3-Trichloropropane	U	5.0	ug/l	02-Jul-02 13:53	TJP
trans-1,4-Dichloro-2-Butene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Ethyl Methacrylate	U	5.0	ug/l	02-Jul-02 13:53	TJP
Toluene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Chlorobenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Ethylbenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,2-Dibromo-3-chloropropane	U	5.0	ug/l	02-Jul-02 13:53	TJP
Styrene	U	5.0	ug/l	02-Jul-02 13:53	TJP
m,p-Xylene	U	5.0	ug/l	02-Jul-02 13:53	TJP
o-Xylene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Xylenes (Total)	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,2,4-Trimethylbenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,1-Dichloropropene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,3-Dichloropropane	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,3-Dichlorobenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
2-Chlorotoluene	U	5.0	ug/l	02-Jul-02 13:53	TJP

000077

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Laboratory Results

Missman Stanley & Associates
2415 18th Street Suite 203

Bettendorf, IA 52722

Attn: Mr. Mike Harnung

Date Received: 28-Jun-02
Date Reported: 30-Jul-02
PO #: C02E013
PDC Cust. # : 237032

Login No. 02063511

Sample No: 02063511-4
Client ID: PROJECT #C02E013
Site: TRIP BLANK
Locator: GRAB
Collect Date: 27-JUN-02

Parameter		Result	Units	Date	By
4-Chlorotoluene	U	5.0	ug/l	02-Jul-02 13:53	TJP
n-Propylbenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
n-Butylbenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Bromobenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Isopropylbenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,3,5-Trimethylbenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
tert-Butylbenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
p-Isopropyltoluene	U	5.0	ug/l	02-Jul-02 13:53	TJP
sec-Butylbenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Hexachlorobutadiene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Naphthalene	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,2,3-Trichlorobenzene	U	5.0	ug/l	02-Jul-02 13:53	TJP
Bromochloromethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
1,2-Dibromoethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
Pentachloroethane	U	5.0	ug/l	02-Jul-02 13:53	TJP
2-Chloroethyl vinyl ether	U	5.0	ug/l	02-Jul-02 13:53	TJP

000038

recycled paper

APPENDIX E

Hydraulic Conductivity Calculations

Exhibit 1
Hydraulic Conductivity Calculation
Phase II Environmental Site Assessment
Farm Creek
Piezometer MW-1

List of Variables		Value
rwe	effective radius of well	
n	porosity of gravel pack	0.15
rc	radius of well casing	0.083 ft.
rw	radius of well borehole	0.67 ft.
Re	radius of influence	
y0	draw down at time = 0	
yt	draw down at time = t	
C	Dimensionless numbers from graph	
Lw	Length of Static Water Column	5.98 ft.
Le	Length of Screen (wetted)	5.0 ft.
K	hydraulic conductivity	
Calculations		
rwe	Effective Radius of Well	0.27 ft.
Le/rw	7.46 calculated	
C	1.20 From Attached Graph	
Ln(Re/rw)	1.41 calculated	
1/t Ln(y0/yt	0.003 Taken from the slope of the plot	

List of Equations

$$r_{w_e} = \left[(1-n)r_c^2 + nr_w^2\right]^{1/2}$$

$$K = \frac{r_c^2 Ln\left(R_e/r_w\right)}{2L_e}\frac{1}{t}Ln\frac{y_0}{y_t}$$

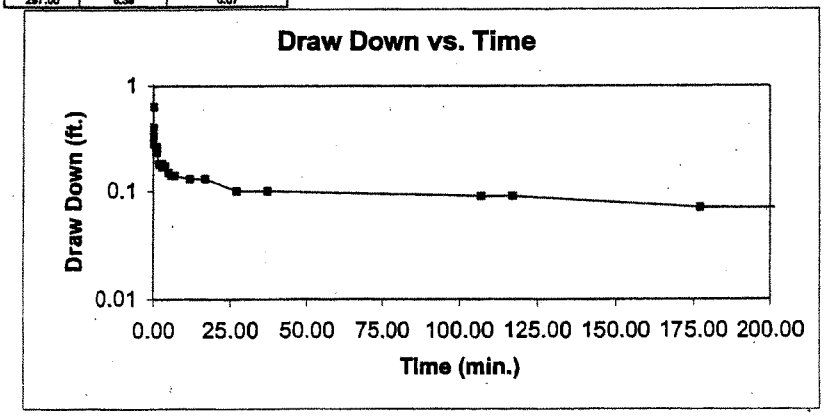
$$Ln\frac{R_e}{r_w} = \left[\frac{1.1}{Ln\left(L_w/r_w\right)} + \frac{C}{L_e/r_w}\right]^{-1}$$

K	0.000031 ft./min.	calculated
K	0.000016 cm/sec	calculated

Field Observations

Static Depth to Water	6.32 ft
Total Depth of Well	12.3 ft
Static Height of Water	5.98 ft

Time (min)	Depth To Water (ft.)	Drawdown (ft.)
0.00	7.36	1.04
0.17	6.95	0.63
0.33	6.72	0.4
0.50	6.65	0.33
0.66	6.61	0.29
0.83	6.6	0.28
1.08	6.58	0.26
1.50	6.55	0.23
2.00	6.5	0.18
2.50	6.5	0.18
3.00	6.5	0.18
3.50	6.49	0.17
4.00	6.49	0.17
5.00	6.47	0.15
6.00	6.46	0.14
7.00	6.46	0.14
12.00	6.45	0.13
17.00	6.45	0.13
27.00	6.42	0.1
37.00	6.42	0.1
107.00	6.41	0.09
117.00	6.41	0.09
177.00	6.39	0.07
297.00	6.39	0.07



C02E013.xlsMW-1Slug test

Exhibit 2
Hydraulic Conductivity Calculation
Phase II Environmental Site Assessment
Farm Creek
Piezometer MW-2

List of Variables		Value
rwe	effective radius of well.	
n	porosity of gravel pack	0.15
rc	radius of well casing	0.083 ft.
rw	radius of well borehole	0.67 ft.
Re	radius of influence	
y0	draw down at time = 0	
yt	draw down at time = t	
C	Dimensionless numbers from graph	
Lw	Length of Static Water Column	15.13 ft.
Le	Length of Screen (wetted)	10 ft.
K	hydraulic conductivity	
Calculations		
rwe	Effective Radius of Well	0.27 ft.
Le/rw	14.93 calculated	
C	1.80 From Attached Graph	
Ln(Re/rw)	1.90 calculated	
1/t Ln(y0/yt)	0.035 Taken from the slope of the plot	

List of Equations

$$r_w = \left[(1-n)r_c^2 + nr_w^2\right]^{1/2}$$

$$K = \frac{r_c^2 Ln\left(R_e/r_w\right)}{2L_e}\frac{1}{t}Ln\frac{y_0}{y_t}$$

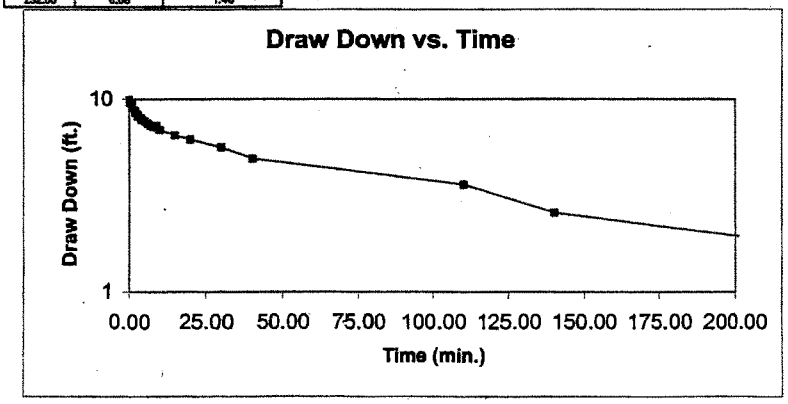
$$Ln\frac{R_e}{r_w} = \left[\frac{1.1}{Ln\left(L_w/r_w\right)} + \frac{C}{L_e/r_w}\right]^{-1}$$

K	0.0002 ft./min.	calculated
K	0.000123 cm/sec	calculated

Field Observations

Static Depth to Water	5.2 ft
Total Depth of Well	20.33 ft
Static Height of Water	15.13 ft

Time (min)	Depth To Water (ft.)	Drawdown (ft.)
0.00	16.3	11.1
0.17	15.35	10.15
0.33	15.32	10.12
0.50	15.12	9.92
0.66	14.98	9.78
0.83	14.76	9.56
1.00	14.65	9.45
1.50	14.21	9.01
2.00	13.98	8.88
2.50	13.85	8.45
3.00	13.46	8.25
3.50	13.26	8.06
4.00	13.1	7.9
4.50	12.95	7.75
5.00	12.85	7.65
6.00	12.82	7.42
7.00	12.43	7.23
8.00	12.31	7.11
9.00	12.41	7.21
10.00	12.05	6.85
15.00	11.82	6.42
20.00	11.31	6.11
30.00	10.75	5.55
40.00	10.08	4.85
110.00	3.78	3.58
140.00	7.75	2.58
210.00	7.06	1.85
232.00	6.66	1.46



C02E013.xlsMW-2Slug test

Exhibit 3
Hydraulic Conductivity Calculation
Phase II Environmental Site Assessment
Farm Creek
Piezometer MW-3

List of Variables		Value
rwe	effective radius of well.	
n	porosity of gravel pack	0.45
rc	radius of well casing	0.083 ft.
rw	radius of well borehole	0.67 ft.
Re	radius of influence	
y0	draw down at time = 0	
yt	draw down at time = t	
C	Dimensionless numbers from graph	
Lw	Length of Static Water Column	12.8 ft.
Le	Length of Screen (wetted)	10 ft.
K	hydraulic conductivity	

Calculations

rwe	Effective Radius of Well	0.45 ft.
Le/rw	14.93 calculated	
C	1.80 From Attached Graph	
Ln(Re/rw)	1.90 calculated	
1/t Ln(y0/yt)	0.03 Taken from the slope of the plot	

List of Equations

$$r_{w_e} = \left[(1-n)r_c^2 + n r_w^2\right]^{1/2}$$

$$K = \frac{r_c^2 Ln\left(R_e/r_w\right)}{2L_e}\frac{1}{t}Ln\frac{y_0}{y_t}$$

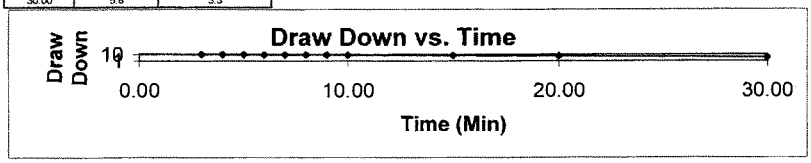
$$Ln\frac{R_e}{r_w} = \left[\frac{1.1}{Ln\left(L_w/r_w\right)} + \frac{C}{L_e/r_w}\right]^{-1}$$

K	0.0005 ft./min.	calculated
K	**0.000258 cm/sec**	calculated

Field Observations

Static Depth to Water	2.5 ft
Total Depth of Well	15.3 ft
Static Height of Water	12.8 ft

Time (min)	Depth To Water (ft.)	Drawdown (ft.)
0.00	13.38	10.88
0.17	13.35	10.85
0.33	13.3	10.8
0.50	13.22	10.72
0.66	13.18	10.68
0.83	13.1	10.6
1.00	13.06	10.56
1.50	12.94	10.44
2.00	12.7	10.2
2.50	12.61	10.11
3.00	12.48	9.98
3.50	12.31	9.81
4.00	12.16	9.66
4.50	11.99	9.49
5.00	11.84	9.34
6.00	11.53	9.03
7.00	11.26	8.76
8.00	10.96	8.46
9.00	10.73	8.23
10.00	10.48	7.98
15.00	9.18	6.68
20.00	7.95	5.45
30.00	5.8	3.3



C02E013MW-3Slug test

APPENDIX F

Photographs

Project: Peoria Riverfront Development Study – Farm Creek
Project Number: C02E013

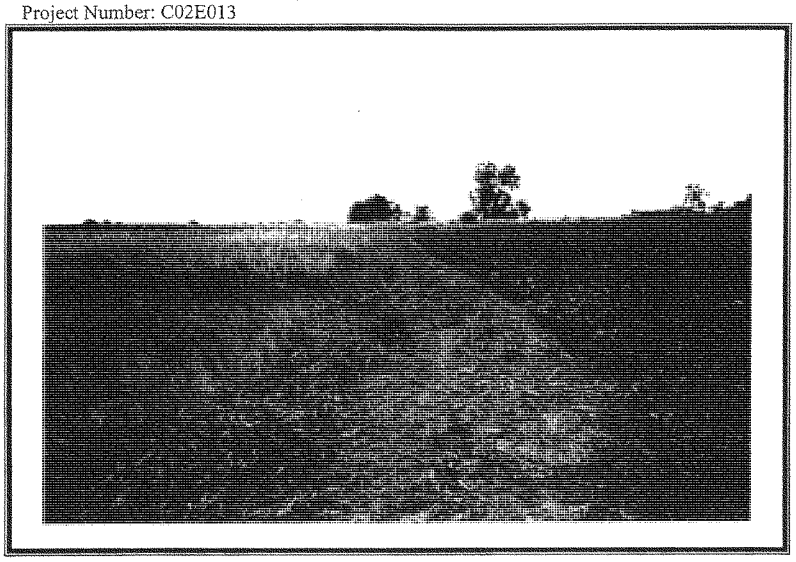


Photo 1 A view of the western most drainage swale facing south.

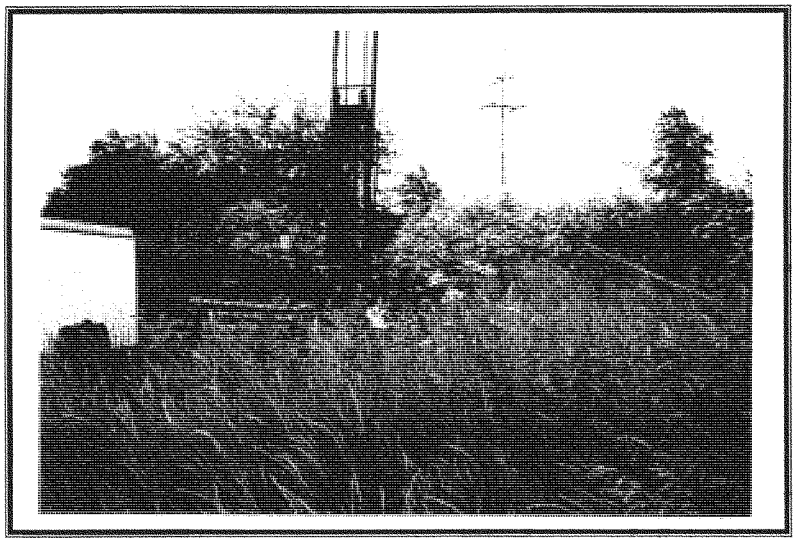


Photo 2 A view of the drill rig at the location of temporary piezometer MW-3.

Project: Peoria Riverfront Development Study – Farm Creek
Project Number: C02E013

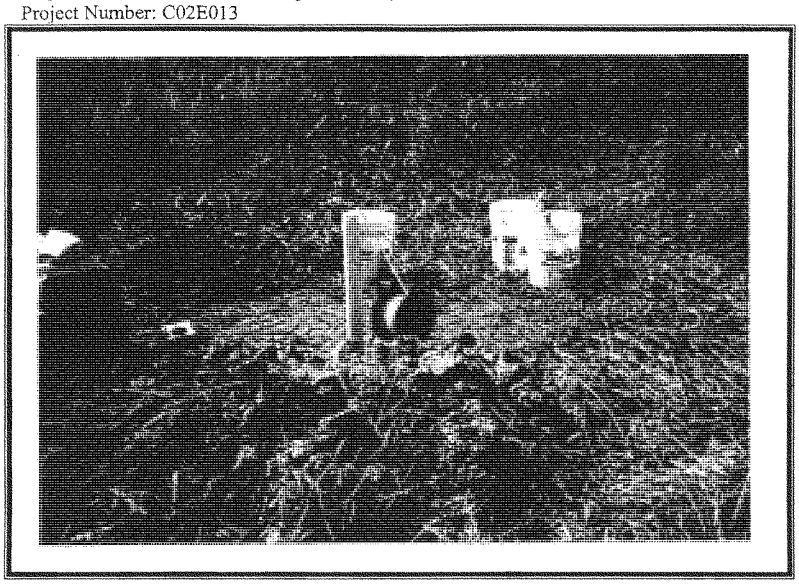


Photo 3 A view of temporary piezometer MW-1.

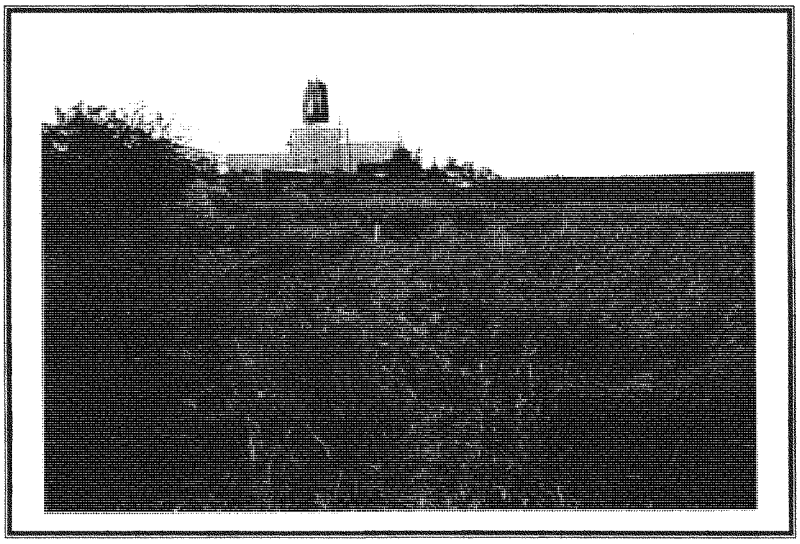


Photo 4 A view of Location 1 and the concrete batching plant facing west.

Project: Peoria Riverfront Development Study – Farm Creek
Project Number: C02E013

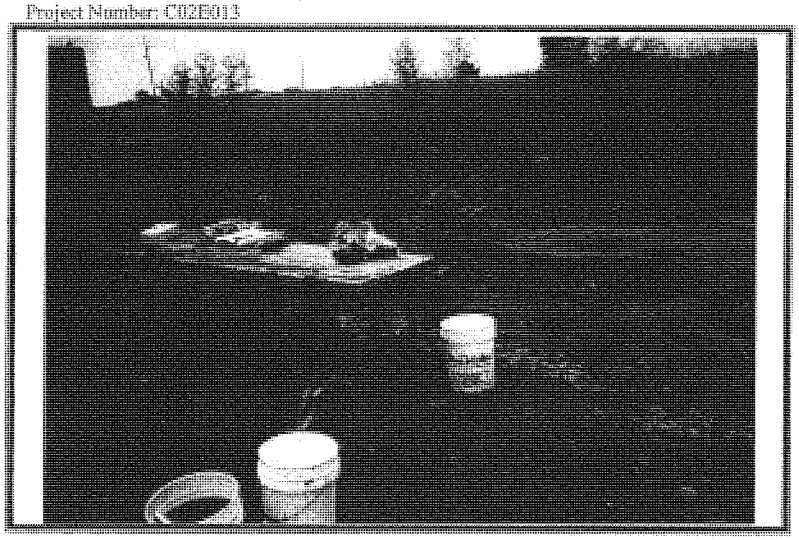


Photo 5 A view of the working station located near temporary piezometer MW-3.

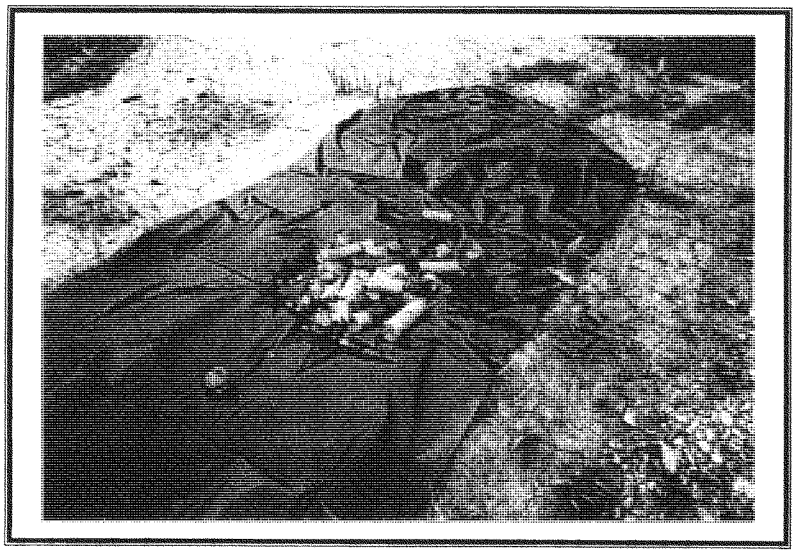


Photo 6 A view of the soils collected from temporary piezometer MW-3 placed on the plastic sheeting.

Project: Peoria Riverfront Development Study – Farm Creek
Project Number: C02E013

Photo 7 A view of the abandonment procedures temporay piezometer MW-2, which is representative of all abandonment procedures.

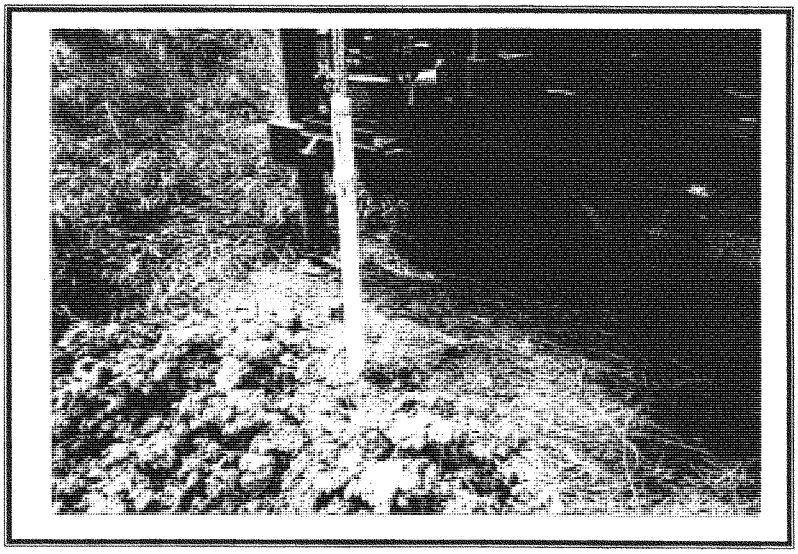


Photo 8 A view of backfilling with bentonite holeplug.

APPENDIX G

Health and Safety Plan

SITE-SPECIFIC SAFETY AND HEALTH PLAN

PEORIA RIVERFRONT DEVELOPMENT STUDY – FARM CREEK
PHASE IIA ENVIRONMENTAL SITE ASSESSMENT
WASHINGTON, ILLINOIS

MISSMAN, STANLEY & ASSOCIATES, P.C.
2415 18th Street, Suite 203
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TABLE OF CONTENTS

KEY PERSONNEL AND EMERGENCY RESPONSE SUMMARY 1

1.0 INTRODUCTION 2

1.1 SITE DESCRIPTION AND HISTORY 2
1.2 SCOPE OF WORK 2
1.3 PROJECT TEAM ORGANIZATION 3
1.4 PROJECT PERSONNEL 3

2.0 RISK ANALYSIS 5

2.1 PRE-ENTRY BRIEFINGS 5
2.2 CHEMICAL HAZARDS 5
2.3 PHYSICAL HAZARDS 6
2.3.1 Terrain 6
2.3.2 Explosion 6
2.3.3 Heat Stress 6
2.3.4 Underground Utilities 6

3.0 PERSONEL PROTECTION AND MONITORING 6

3.1 MEDICAL SURVEILLANCE 6
3.2 SITE-SPECIFIC TRAINING 7
3.3 PERSONAL PROTECTIVE EQUIPMENT AND ACTION LEVELS 7
3.4 MONITORING REQUIREMENTS 8
3.4.1 Routine Monitoring 8
3.4.2 Displacement of Combustible Gases 8
3.5 SOIL CUTTINGS 9
3.6 DEVELOPMENT/PURGE WATER 9

4.0 WORK ZONES AND DECONTAMINATION 9

4.1 SITE WORK ZONES 9
4.1.1 Exclusion Zone 9
4.1.2 Decontamination Zone 10
4.1.3 Support Zone 10
4.2 DECONTAMINATION 10
4.2.1 Decontamination of Personnel 10

5.0 ACCIDENT PREVENTION AND CONTINGENCY PLAN 11

5.1 ACCIDENT PREVENTION 11
5.1.1 Hand Augering 11
5.1.2 Drilling 12
5.2 CONTINGENCY PLAN 12
5.2.1 Emergency Procedures 12
5.2.2 Chemical Exposure 12
5.2.3 Personal Injury 13
5.2.4 Major Fire, Explosion, or On-Site Health Emergency Crisis 13
5.2.5 Emergency Numbers 13

APPENDIX A - FIGURES
Figure 1 – Sample Location Map
Figure 2 - Hospital Location Map
APPENDIX B – CHEMICAL ABSTRACT INFORMATION
APPENDIX C – SAFETY TRAINING DOCUMENTATION

PHASE IIA ENVIRONMENTAL SITE ASSESSMENT
PEORIA RIVERFRONT DEVELOPMENT STUDY – FARM CREEK
WASHINGTON, ILLINOIS

Key Personnel and Emergency Response Summary

Site Address: Northeast Corner Diebel Road & Walnut Street
Washington, Illinois

Project Personnel:

Position	Name	Office Phone	Cell Phone
Principal in Charge	Patrick Eikenberry	563-344-0260	343-4858
Project Manager	Paul A. Loete	563-344-0260	737-0650
Field Team Leader/Site Safety Officer	Wendy Rouse	563-344-0260	343-4862
Lead Driller	Bruno Williamson	309-693-8310	-
Driller Assistant	Ryan Keedy	309-693-8310	-

Emergency Information:

Eureka Community Hospital
101 South Major Street
Eureka, Illinois
309-467-2371

Directions to Hospital:

From the Site, take Walnut Street (Business Route 24) East U.S. Route 24. Proceed east on U.S. Route 24 into Eureka. Hospital is located at the intersection of U.S. Route 24 and Major Street in Eureka. The hospital is approximately 7 miles from the subject property. Reference Figure 2, Appendix A for a Hospital Location Map.

Important Phone Numbers:

Ambulance:	911
Hospital:	309-467-2371
Fire:	911
Police:	911
Poison Control Center	800-543-202

1.0 INTRODUCTION

The purpose of this safety plan is to establish personnel protection standards and mandatory safety practices and procedures for work conducted in conjunction with the Farm Creek Phase IIA Environmental Site Assessment project. This Site-Specific Safety and Health Plan (SSHP) assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are being conducted at potentially contaminated sites.

The provisions of the plan are mandatory for all Missman, Stanley & Associates (Missman) field/on-site personnel. All Missman personnel will abide by this plan. All personnel who engage in project activities must have current OSHA 40 hour HAZWOPER training and must be familiar with this plan prior to engaging in on-site activities.

1.1 Site Description And History

The subject property is an approximately rectangular property that is undeveloped and currently used as agricultural cropland. The property is bounded on the north by the abandoned Atchison, Topeka, and Santa Fe (AT&SF) rail line, and to the east by private undeveloped property. Walnut Street and Diebel Road form the southern and western property boundaries, respectively.

Immediately southwest of the subject property is a fenced private property containing a salvage yard, residence, and concrete batch plant. Field drain tile exists traversing the salvage yard, and running north through the subject property.

1.2 Scope Of Work

The intent of the proposed project is to determine if the environmental quality of the property has been impacted as a result of the historical land use and operations on and adjacent to the property. Field work associated with this project includes the collection of soil and groundwater samples for chemical analysis and the performance of aquifer testing. The duration of onsite activity will be approximately twenty five hours involving two personnel. Field tasks associated with this project include the following:

- Advance seven hand auger borings to a depth of five feet in areas with a relatively high potential for environmental impact from the adjacent property. An excerpt of this document, which depicts the approximate locations of the proposed boreholes is included as an attachment to this Site-Specific Safety and Health Plan (Reference Figure 1, Appendix A).
- Collect soil samples at approximately one foot and five feet below land surface.
- Advance three soil borings to a depth of 25 feet below land surface with a truck mounted drill rig. Install temporary groundwater monitoring wells in the boreholes. Collect groundwater samples from each of the deep borings. Perform aquifer testing to determine the hydraulic conductivity of the soil materials.
- Soil samples will be collected and analyzed for a comprehensive list of parameters including metals, volatile organic compounds, semivolatile organic compounds, pesticides, polychlorinated biphenyls, and petroleum hydrocarbons.

1.3 Project Team Organization

Table 1.1 describes the responsibilities of all on-site personnel associated with this project. The names and home offices of principle on-site personnel associated with this project are listed below (the Field Team Leader may also be the Site Safety Officer):

1.4 Project Personnel

Position	Name	Office Phone	Cell Phone
Principal in Charge	Patrick Eikenberry	563-344-0260	343-4858
Project Manager	Paul A. Loete	563-344-0260	737-0650
Field Team Leader/Site Safety Officer	Wendy Rouse	563-344-0260	343-4862
Field Team Personnel	Mike Harnung	563-344-0260	343-4862
Lead Driller	Bruno Williamson	309-693-8310	-
Driller Assistant	Ryan Keedy	309-693-8310	-

TABLE 1.1
PERSONNEL RESPONSIBILITIES

Title	General Description	Responsibilities
Project Manager	Reports to upper-level management. Has authority to direct response operations. Assumes total control over activities.	Prepares and organizes the background review of the situation, the Work Plan, the Site Safety Plan, the field team. Obtains permission for site access and coordinates activities with appropriate officials. Ensures that the Work Plan is completed and on schedule. Briefs the field teams on their specific assignments. Uses the site safety and health officer to ensure that safety and health requirements are met. Prepares the final report and support files on the response activities.
Site Safety Officer	Advises the Project Manager on all aspects of health and safety on site. Stops work if any operation threatens worker or public safety.	Periodically inspects protective clothing and equipment. Ensures that protective clothing and equipment are properly stored and maintained. Controls entry and exit at the Access Control Points. Serves as the liaison with public officials. Coordinates safety and health program activities with the Project Safety Officer. Confirms each team member's suitability for work based on a physician's recommendation. Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue. Implements the Site Safety Plan. Conducts periodic inspection to determine if the Site Safety Plan is being followed. Knows emergency procedures, evacuation routes, and telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department. Notifies, when necessary, local public emergency officials. Coordinates emergency medical care. Sets up decontamination lines on the decontamination solutions appropriate for the type of chemical contamination on site. Controls the decontamination of all equipment, personnel, and samples from the contaminated areas. Assures proper disposal of contaminated clothing and materials. Ensures that all required equipment is available. Advises the medical personnel of potential exposures and consequences. Notifies emergency response personnel by telephone or radio in the event of an emergency.
Field Team Leader	Responsible for field operations and safety.	Manages field operations. Executes the Work Plan and schedule. Enforces safety procedures. Coordinates with the Site Safety Officer in determining protection level. Enforces site control. Documents field activities and sample collection. Serves as liaison with public officials.
Work Team	Drillers, samplers. The work party must consist of at least two people.	Safely completes the on-site tasks required Complies with Site Safety Plan. Notifies Site Safety Officer or Supervisor of suspected unsafe conditions.

2.0 RISK ANALYSIS

2.1 Pre-Entry Briefings

Prior to site entry, the site safety and health supervisor will review the scope of work and site-specific safety and health plan in the staging area. If fieldwork associated with this project exceeds one day in duration, pre-entry briefings shall be conducted in the support zone before each entry to the work zone. The pre-entry briefings shall include, but not be limited to the following:

- Effectiveness of the site-specific safety and health plan.
- Proposed changes to this SSHP
- Site characterization.
- Identification and location of all hazards on site.
- Information regarding risks associated with hazardous substances which include, but are not limited to:
    1. Exposures exceeding the permissible exposure limits and published exposure levels.
    2. Immediately dangerous to life or health conditions (IDLH) concentrations.
    3. Potential skin absorption and irritation sources.
    4. Potential eye irritation sources.
    5. Explosion sensitivity and flammability ranges.
    6. Oxygen deficiency.

All equipment will be stored in the support zone and will be decontaminated prior to site entry and upon return. For this project, equipment decontamination can take place in the work zone if ambient organic vapor concentrations are less than 1 part per million (ppm).

2.2 Chemical Hazards

Chemical hazards that may be present at the site will have likely resulted from historic site and adjacent property use and operation. These uses included an adjacent salvage yard and concrete batching plant. As a result of this historic usage, compounds that may be expected to be encountered at this site include but are not limited to inorganic compounds, petroleum hydrocarbons, and solvents. Some constituents common to these uses are depicted below:

Arsenic
Benzene
Beryllium
Used Mineral-Based Crankcase Oil
Ethylbenzene
Cadmium
Automotive Gasoline
Lead
Polychlorinated Biphenyls
Polycyclic Aromatic Hydrocarbons (PAHs)
Tetrachloroethylene

This above list is not all inclusive or comprehensive, but rather depicts those contaminants that have a potential of being detected based upon the site background. Potential pathways by which exposure to

these contaminants may occur include dermal contact, ingestion, and inhalation. Chemcal abstract information for the abouve potential contaminates are included in Appendix B.

2.3 Physical Hazards

2.3.1 Terrain

The subject property is expected to be relatively flat in nature, however, the ground surface on the property may be lose and uneven. On-site hazards include, but are not limited to, tripping, falling, and cuts. Field work on this project shall be conducted in groups of at least two. Prior to commencing field work, the immediate area of the work site shall be inspected for wildlife or habitat. Avoid animal nests or dens.

2.3.2 Explosion

Volatile organic vapors can be explosive at certain pressures or temperatures, or in the presence of an ignition source. Gasoline vapors can be highly explosive, having a flash point of about -40° F. Diesel fuel is combustible, with a flash point of 110° F to 190° F and is considered to be a moderate fire hazard. During field activities, the ambient atmosphere and the borehole shall be monitored with a photoionization detector (PID) to detect the presence of volatile vapors. If volatile vapors are detected, the ambient atmosphere shall be monitored with a combustible gas indicator (CGI). If CGI readings reach or exceed 10% of the lower explosive limit, then project activities shall be ceased until such time that the combustible gas source can be identified and mitigated.

2.3.3 Heat Stress

Due to the time of year that the field work associated with this project will be undertaken, a potential exists for heat stress to occur. The use of personal protective equipment (PPE), if required, may exacerbate potential problems associated with the heat. At ambient temperatures above 80° F, the field team shall take one ten minute break per hour. Additionally, the field team shall consume a minimum of one liter of water per hour. At ambient temperatures above 90° F, the field team shall take one 15 minute break per hour, and consume a minimum of one liter of water per hour.

Monitoring of personnel wearing PPE clothing beyond Level D will be required when the ambient temperature is 70° F or above. A monitoring schedule will be developed by the Site Safety Officer in the event that PPE clothing beyond Level D is required.

2.3.4 Underground Utilities

No Fieldwork shall be completed on this project prior to having the subsurface utilities appropriately located and/or cleared.

3.0 PERSONEL PROTECTION AND MONITORING

3.1 Medical Surveillance

Personnel involved in this operation have undergone medical surveillance prior to employment at Missman and thereafter at 12-month intervals. The 12-month medical examination includes a complete medical and work history, a standard occupational physical, examination of all major organ systems, complete blood count with differential (CBC), and a SMAC/23 blood chemistry screen which includes

calcium, phosphorous, glucose, uric acid, BUN, creatine, albumin, SGPT, SGOT LDH, globulin, A/G ratio. Additionally, a pulmonary function test will be performed by trained personnel to record Forced Vital Capacity (FVC) and Forced Expiatory Volume (FEV1.0). An audiogram and visual acuity measurement, including color perception, is provided. The medical exam is performed under the direction of a licensed Occupational Health Physician. A medical certification as to the fitness or unfitness for employment on hazardous waste projects or any restrictions on his/her utilization that may be indicated, is provided by the physician. This evaluation will be repeated as indicated by substandard performance or evidence of particular stress that is evident by injury or time loss illness on the part of any worker.

3.2 Site-Specific Training

The Site Safety Officer will be responsible for developing a site-specific occupational hazard training program and providing training to all Missman personnel that are to work at the project site. This training will consist of the following topics:

- Names of personnel responsible for the site safety and health.
- Safety, health, and other hazards at the site.
- Proper use of personal protective equipment.
- Calibration and use of atmosphere monitoring equipment.
- Work practices by which the employee can minimize risk for hazards.
- Safe use of engineering controls and equipment on the site.
- Acute effects of compounds at the site.
- Decontamination procedures.
- All workers on site must possess a 40 hour Hazardous Waste Site Worker Certification.

3.3 Personal Protective Equipment And Action Levels

Field work for this project shall be conducted utilizing Level D PPE. At a minimum, Level D PPE shall consist of:

- Standard work clothes.
- Safety boots.
- Safety glasses or goggles
- Chemical protective gloves (must be worn during all sampling activities)
- Hard-hat (must be worn during drilling activities)

In the event that the concentration of organic vapors in the ambient work space exceeds 50 ppm, personnel will move away from the area until readings subside to a level below 50 ppm. In the unlikely event that the concentrations of total volatile organic compounds exceed 1,000 ppm, personnel will back off from the area and consult the office Health and Safety Officer. If ambient organic vapor concentrations remain at or near 50 ppm, then the field team shall upgrade to Level C PPE to complete field activities.

Level C protection will consist of the following:

- Standard work clothes.
- Full-face air-purifying respirator.
- Combination dust/organic vapor cartridges.
- PVC inner and nitrile outer gloves.
- Hard-hat (must be worn during drilling activities).

Both the respirator and cartridges specified for the use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.1025; 29CFR 1910.134).

Air purifying respirators cannot be worn under the following conditions:

- Oxygen deficiency.
- IDLH concentrations.
- High relative humidity.
- If contaminant levels exceed designated use concentrations.

3.4 Monitoring Requirements

3.4.1 Routine Monitoring

Monitoring for organic vapors in the breathing zone will be conducted with a photoionization detector (PID). Organic vapor monitoring shall be used in conjunction with the action levels set forth in Section 3.3 of this plan. Readings will be taken under the following circumstances:

- Upon initial entry into the site.
- When weather conditions change.
- When work begins on another portion of the site.
- When a different type of operation is initiated.
- Every five feet during drilling.

Ionizing radiation is not expected to be encountered on site, so no radiation monitoring will be performed.

3.4.2 Displacement of Combustible Gases

If organic vapors are detected in the ambient work space, then the atmosphere shall be screened with a combustible gas indicator (CGI). Work must be halted if the concentration of combustible gases exceeds 10% of the lower explosive limit. Work shall not resume until the source of combustible gases has been mitigated.

3.5 Soil Cuttings

If strong organic vapors and/or visual evidence of hazardous material are present in the auger cuttings, containment of the cuttings will be in a labeled DOT-approved, open-top, 55-gallon drum with plastic liner and sealed with a bung-top lid. The drum will be left on site for a maximum of 30 days pending laboratory analysis and disposal coordination. If analysis presents the cuttings as being hazardous, a private environmental contractor will transport the soil cuttings for proper disposal as hazardous waste complying with all Federal, state and local laws. If the analytical results of the soil cuttings reveal that they are non-hazardous in nature, the cuttings will be spread on the site.

3.6 Development/Purge Water

The temporary wells shall be developed with a disposable polyethylene bailer. Care shall be taken during well development and groundwater sampling to minimize dermal contact with the skin. If, in the opinion of the field team leader, the groundwater generated from the site exhibits characteristics of chemical contamination, such as presence of odors, free product, or unusual discoloration, the water will be containerized in labeled DOT approved 55 gallon, closed top drums. The drums will remain on site for a maximum of 30 days pending laboratory analysis of the water and coordination of disposal.

4.0 WORK ZONES AND DECONTAMINATION

4.1 SITE WORK ZONES

To reduce the potential spread of hazardous or toxic materials from the work zone to the clean zone, zones will be delineated at the site if necessary. The flow of personnel between the zones should be controlled. The establishment of the work zones will help ensure that:

- Personnel are properly protected against the hazards present where they are working.
- Work activities and contamination are confined to the appropriate areas.
- Personnel can be located and evacuated in an emergency.

Work zones will be laid out in the field by the SSO.

4.1.1 Exclusion Zone

Exclusion zones will be established if necessary for all hand auger activities; unprotected onlookers should be located 50 feet upwind of sampling activities. In the event that volatile organic vapors are detected in the breathing zone, all personnel within the exclusion zone must don Level C protection, as discussed under "Personal Protective Equipment and Action Levels".

All personnel within the exclusion zone will be required to use the specified level of protection. No food, drink, or smoking will be allowed in the exclusion or decontamination zones.

4.1.2 Decontamination Zone

Should it be necessary to establish an exclusion zone, the decontamination zone will also be utilized. This zone will be established between the exclusion zone and the support zone, and will include the personnel and equipment necessary for decontamination of equipment and personnel (discussed below).

Personnel and equipment in the exclusion zone must pass through this zone before entering the support zone. This zone should always be located upwind of the exclusion zone.

4.1.3 Support Zone

The support zone will include the remaining areas of the job site: break areas, operational directions, and support facilities (to include supplies, equipment storage, and maintenance areas). No equipment or personnel will be permitted to enter the support zone from the exclusion zone without passing through the personnel or equipment decontamination station. Eating, smoking, and drinking will be allowed only in this area.

4.2 Decontamination

4.2.1 Decontamination of Personnel

Personnel decontamination will not be necessary if Level D protection is used. However, disposable gloves used during sampling activities should be removed and bagged; personnel should be encouraged to remove clothing and shower as soon as is practical at the end of the day. All clothing should be machine-washed. All personnel will wash hands and face prior to eating and before and after using the restroom. Potable water will be located on site, supplied from an off-site source. The following general conditions shall be followed during field environmental sampling activities:

- Disposable nitril gloves shall be worn for handing sampling equipment and environmental samples.
- Areas susceptible to dermal contact with environmental media (arms, face and neck) shall be washed with soap and water immediately following field activities if exposed to potential contaminants.
- Eating or drinking is prohibited in the work zone and until hands are washed thoroughly with soap and water.
- The field team shall remove dirt and debris from boots and equipment prior to leaving the work zone.

Decontamination will be necessary if Level C protection is used. The decontamination required for Level C includes the removal and disposal of gloves and washing the respirator with Alconox detergent and rinsing with potable water. Air purifying respirator cartridges shall be disposed of at the completion of the project.

4.2.2 Equipment Decontamination

Hand auger equipment and down hole drilling equipment will be decontaminated prior to moving onto the site, prior to each sample collection procedure, and prior to the advancement of each boring at the site. The equipment will be decontaminated in the following manner:

- Scrub with a mixture of Alconox detergent and potable water, then rinse with potable water. Water used for decontamination will be obtained from an off-site source.
- Rinse equipment with deionized water.
- Rinse equipment with methanol.
- Lastly, the downhole equipment will be air dried.

A drilling sequence hierarchy (from less likely to more likely contaminated boring locations) will be imposed to reduce the potential for cross-contamination.

All sampling equipment will be decontaminated prior to use at each sampling location. The methodology used to decontaminate sampling equipment is the same as that used for downhole equipment.

5.0 ACCIDENT PREVENTION AND CONTINGENCY PLAN

5.1 Accident Prevention

All field personnel will receive health and safety training prior to the initiation of any site activities. On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations, for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before daily work assignments, regular meetings should be held. Discussions should include:

- Tasks to be performed.
- Time constraints (e.g., rest breaks, cartridge changes).
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals.
- Emergency procedures.

5.1.1 Hand Augering

Prior to any drilling activities, efforts should be made to determine whether underground installations will be encountered and, if so, where these installations are located. Safety boots must, as a minimum, be worn at all times. Borings will not be advanced near known utilities. The field Team Leader or Site Safety Officer will provide constant on-site supervision of the auguring activities to ensure that they are meeting the health and safety requirements. If deficiencies are noted, work will be stopped and corrective action will be taken (e.g., retrain, purchase additional safety equipment). Reports of health and safety deficiencies and the corrective action taken will be forwarded to the Project Manager. Periodic air

monitoring will be performed by the Site Safety Officer, (reference Table 1.1 of this plan) to ensure that proper personal protection is being utilized.

5.1.2 Drilling

Prior to any drilling activities, it shall be confirmed that underground utilities have been checked and marked. Hard-hats and safety boots must, as a minimum, be worn within 50 feet of the drilling rig. The drilling rig cannot be operated within 10 feet of power lines. The field Team Leader or Site Safety Officer will provide constant on-site supervision of the drilling subcontractor to ensure that they are meeting the health and safety requirements. If deficiencies are noted, work will be stopped and corrective action will be taken (e.g., retrain, purchase additional safety equipment). Reports of health and safety deficiencies and the corrective action taken will be forwarded to the Project Manager. Periodic air

monitoring will be performed by the Site Safety officer to ensure that proper personal protection is being utilized. Only trained competent personnel are allowed to operated mechanical drilling equipment.

5.2 Contingency Plan

5.2.1 Emergency Procedures

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on site.
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

General emergency procedures and specific procedures for personnel injury and chemical exposure, are described in the site-specific safety and health plan.

5.2.2 Chemical Exposure

If a member of the field crew demonstrates symptoms of chemical exposure, the procedures outlined below should be followed.

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should communicate to the Field Team Leader (via two-way radio or hand signals) of the chemical exposure. The Field Team Leader should contact the appropriate emergency response agency.
- Precautions should be taken to avoid exposure of other individuals to the chemical.
- If the chemical is on the individual's clothing, the chemical should be neutralized or removed if it is safe to do so.
- If the chemical has contacted the skin, the skin should be washed with copious amounts of water.
- In case of eye contact, an emergency eyewash should be used. Eyes should be washed for at least 15 minutes.

- All chemical exposure incidents must be reported in writing to the Missman Health and Safety Manager.

5.2.3 Personal Injury

In case of personal injury at the site, the following procedures should be followed:

- Another team member (buddy) should signal the Field Team Leader (via two-way radio or hand signals) that an injury has occurred.
- A field team member trained in first aid can administer treatment to an injured worker.
- The victim should then be transported to the nearest hospital or medical center. If necessary, an ambulance should be called to transport the victim. A map to the nearest hospital is included in Appendix A.
- The field Team Leader or Site Safety Officer is responsible for making certain that an accident report form is completed. This form is to be submitted to the Office Health and Safety Representative. Follow-up action should be taken to correct the situation that causes the accident.

5.2.4 Major Fire, Explosion, or On-Site Health Emergency Crisis

- Notify the paramedics and/or fire department, as necessary;
- Signal the evacuation procedure previously outlined and implement the entire procedure;
- Isolate the area;
- Stay upwind of any fire;
- Keep area surrounding the problem source clear after the incident occurs; and
- Complete the accident report form and distribute to appropriate personnel.

5.2.5 Emergency Numbers

Emergency	Contact	Phone No.
Fire	City of Washington Fire	911
Accident	Ambulance	911
Project Manager	Paul A. Loete	563-344-0260

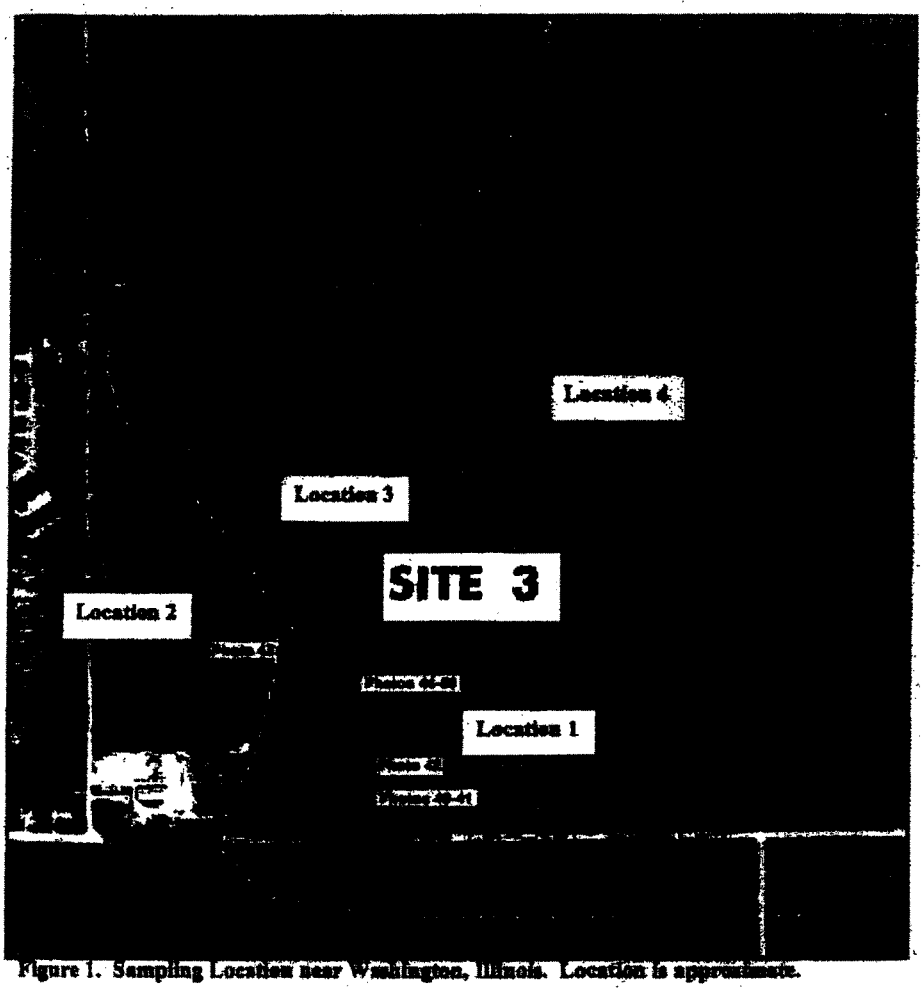
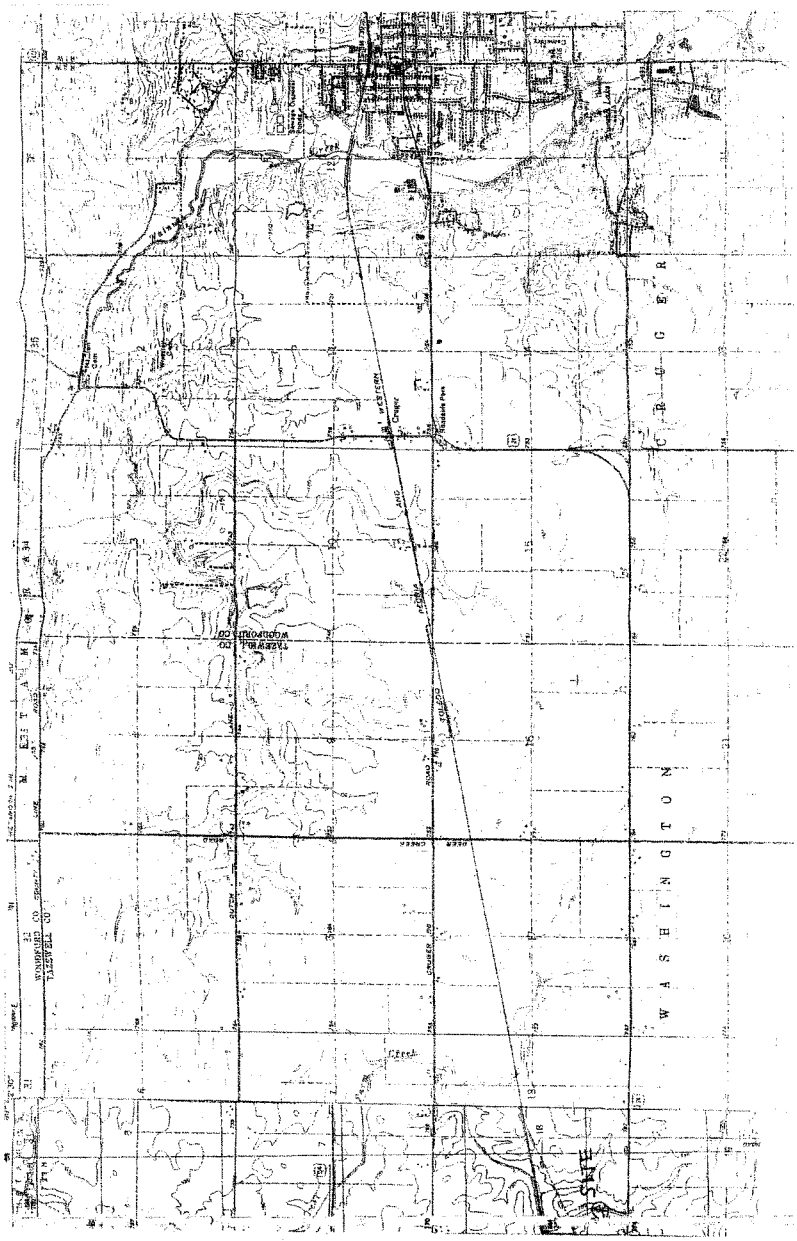


Figure 1. Sampling Location near Washington, Illinois. Location is approximate.

Legend
—— Approximation of the Drainage Tile


WASHINGTON
CREEK

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ARSENIC
CAS # 7440-38-2

Division of Toxicology ToxFAQs™ July 2001

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Organic arsenic compounds are used as pesticides, primarily on cotton plants.

What happens to arsenic when it enters the environment?

- Arsenic cannot be destroyed in the environment. It can only change its form.
- Arsenic in air will settle to the ground or is washed out of the air by rain.
- Many arsenic compounds can dissolve in water.
- Fish and shellfish can accumulate arsenic, but the arsenic in fish is mostly in a form that is not harmful.

How might I be exposed to arsenic?

- Eating food, drinking water, or breathing air containing arsenic.
- Breathing contaminated workplace air.
- Breathing sawdust or burning smoke from wood treated with arsenic.
- Living near uncontrolled hazardous waste sites containing arsenic.
- Living in areas with unusually high natural levels of arsenic in rock.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES Public Health Service
Agency for Toxic Substances and Disease Registry

appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Organic arsenic compounds are less toxic than inorganic arsenic compounds. Exposure to high levels of some organic arsenic compounds may cause similar effects as inorganic arsenic.

How likely is arsenic to cause cancer?

Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

How can arsenic affect children?

We do not know if exposure to arsenic will result in birth defects or other developmental effects in people. Birth defects have been observed in animals exposed to inorganic arsenic.

It is likely that health effects seen in children exposed to high amounts of arsenic will be similar to the effects seen in adults.

How can families reduce the risk of exposure to arsenic?

❑ If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.
❑ If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.

Is there a medical test to show whether I've been exposed to arsenic?

There are tests to measure the level of arsenic in blood, urine, hair, or fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels or arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict how the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or canceled many uses of arsenic in pesticides. EPA has set a limit of 0.05 parts per million (ppm) for arsenic in drinking water. The EPA arsenic drinking water standard of 0.01 ppm (10 ppb) reported in the ATSDR February 2001 Arsenic ToxFAQs was based on the EPA final rule for arsenic in drinking water, published on January 22, 2001, in the *Federal Register*. However, the EPA is currently reviewing the science and cost estimate supporting this rule, and, in the interim, has reverted to the previous standard for arsenic. Thus, the current EPA arsenic drinking water standard remains at 0.05 ppm (50 ppb).

The Occupational Safety and Health Administration has set limits of 10 µg arsenic per cubic meter of workplace air (10 $\mu g/m^3$) for 8 hour shifts and 40 hour work weeks.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Arsenic. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

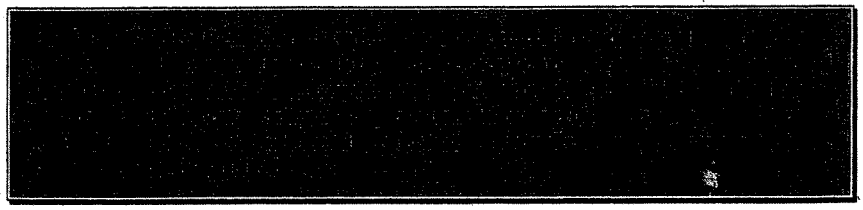
Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR

BENZENE
CAS # 71-43-2

Agency for Toxic Substances and Disease Registry ToxFAQs — September 1997

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is benzene?

(Pronounced bĕn/zēn′)

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.
- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

How might I be exposed to benzene?

- Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- People working in industries that make or use benzene may be exposed to the highest levels of it.
- A major source of benzene exposures is tobacco smoke.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

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Agency for Toxic Substances and Disease Registry

The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How likely is benzene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

Is there a medical test to show whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mgL). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

Source of Information

This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR

BERYLLIUM
CAS # 7440-41-7

Agency for Toxic Substances and Disease Registry ToxFAQs April 1993

This fact sheet answers the most frequently asked health questions (FAQs) about beryllium. For more information, you may call 888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

What is beryllium?

(Pronounced bə-rĭl'ē-əm)

Pure beryllium is a hard, grayish metal. In nature, beryllium can be found in compounds in mineral rocks, coal, soil, and volcanic dust. Beryllium compounds are commercially mined, and the beryllium purified for use in electrical parts, machine parts, ceramics, aircraft parts, nuclear weapons, and mirrors. Beryllium compounds have no particular smell.

What happens to beryllium when it enters the environment?

- Beryllium dust gets into air from burning coal and oil.
- Beryllium dusts settles from air to the soil and water.
- It enters water from rocks and soil, and from industrial waste.
- Some beryllium compounds dissolve in water, but most settle to the bottom as particles.
- Beryllium particles in ocean water may take a few hundred years to settle to the bottom.
- Most beryllium in soil doesn't move up to the surface or into the groundwater.
- Fish do not build up beryllium in their bodies from the surrounding water to any great extent.

How might I be exposed to beryllium?

- Background levels in air, food, and water are low.
- Breathing contaminated workplace air (e.g., mining or processing ores, alloy and chemical manufacturing with beryllium, machining or recycling metals containing beryllium).
- Breathing tobacco smoke from leaf high in beryllium.
- Breathing contaminated air or ingesting water or food near industry or hazardous waste sites.

How can beryllium affect my health?

Beryllium can be harmful if you breathe it. The effects depend on how much you are exposed to and for how long. High levels of beryllium in air cause lung damage and a disease that resembles pneumonia. If you stop breathing beryllium dust, the lung damage may heal.

Some people become sensitive to beryllium. This is called a hypersensitivity or allergy. These individuals develop an inflammatory reaction to low levels of beryllium. This condition is called chronic beryllium disease, and can occur long after exposure to small amounts of beryllium. This disease can make you feel weak and tired, and can cause difficulty in breathing. Both the short-term, pneumo-

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Agency for Toxic Substances and Disease Registry

nia-like disease and the chronic beryllium disease can cause death.

Swallowing beryllium has not been reported to cause effects in humans because very little beryllium can move from the stomach and intestines into the bloodstream. Beryllium contact with scraped or cut skin can cause rashes or ulcers.

How likely is beryllium to cause cancer?

The Department of Health and Human Services (DHHS) has determined that beryllium and certain beryllium compounds may reasonably be anticipated to be carcinogens. This determination is based on animal studies and studies in workers. None of the studies provide conclusive evidence, but when taken as a whole, they indicate that long-term exposure to beryllium in the air results in an increase in lung cancer.

Is there a medical test to show whether I've been exposed to beryllium?

Tests can measure beryllium in the urine and blood. The amount of beryllium in blood or urine may not indicate how much or how recently you were exposed. Small amounts of human lung and skin can also be removed from the body and examined for beryllium. These tests can be done in a doctor's office or in a hospital.

One test uses blood cells washed out of the lung. If these cells start growing in the presence of beryllium, you are probably sensitive to beryllium and may have chronic beryllium disease.

Has the federal government made recommendations to protect human health?

The EPA restricts the amount of beryllium that industries may emit into the environment to 10 grams (g) in a 24-hour period, or to an amount that would result in atmospheric levels of 0.01 micrograms (μg) beryllium per cubic meter (m^3) of air, averaged over a 30-day period.

The National Institute for Occupational Safety and Health (NIOSH) recommends a standard for occupational exposure of 0.5 μg beryllium/m^3 of workroom air during an 8-hour shift to protect workers from potential cancer.

The Occupational Safety and Health Administration (OSHA) sets a limit of 2 μg beryllium/m^3 of workroom air for an 8-hour work shift.

Glossary

Carcinogen: A substance with the ability to cause cancer.

Ingesting: Taking food or drink into your body.

Hypersensitivity: A greater than normal bodily response to a foreign agent.

Microgram (μg): One millionth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological profile for beryllium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Case studies in environmental medicine: Beryllium toxicity. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

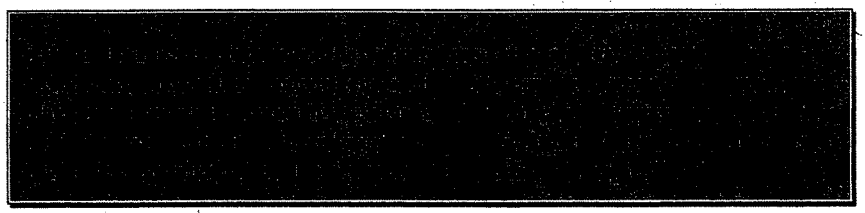
Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR

USED MINERAL-BASED CRANKCASE OIL CAS # 8002-05-9

Agency for Toxic Substances and Disease Registry ToxFAQs September 1997

This fact sheet answers the most frequently asked health questions (FAQs) about used mineral-based crankcase oil. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is used mineral-based crankcase oil?

Used mineral-based crankcase oil is the brown-to-black, oily liquid removed from the engine of a motor vehicle when the oil is changed. It is similar to unused oil except it contains additional chemicals from its use as an engine lubricant.

The chemicals in oil include hydrocarbons, which are distilled from crude oil, and various additives that improve the oil's performance. Used oil also contains chemicals formed when the oil is exposed to high temperatures and pressures inside an engine. It also contains some metals from engine parts and small amounts of gasoline, antifreeze, and chemicals that come from gasoline when it burns inside the engine.

The chemicals found in used mineral-based crankcase oil vary depending on the brand and type of oil, whether gasoline or diesel fuel was used, the mechanical condition of the engine that the oil came from, and the amount of use between oil changes. Used oil is not naturally found in the environment.

What happens to used mineral-based crankcase oil when it enters the environment?

- Used mineral-based crankcase oil enters the air through the exhaust system during engine use.
- It may enter water or soil when disposed of improperly.
- The hydrocarbon components of the oil generally stick to the soil surface.
- Some hydrocarbons evaporate into the air very quickly, and others evaporate more slowly.
- Hydrocarbon components of the oil that enter surface water bind to small particles in the water and eventually settle to the bottom.
- Hydrocarbons from used mineral-based crankcase oil may build up in shellfish or other organisms.
- Some metals in used mineral-based crankcase oil dissolve in water and move through the soil easily and may be found in surface water and groundwater.

How might I be exposed to used mineral-based crankcase oil?

- When you change the engine oil in your car.
- Breathing a small amount of the chemicals from the oil in exhaust fumes or from burning the oil as heating fuel.
- Touching contaminated soil or drinking contaminated water.

How can used mineral-based crankcase oil affect my health?

The health effects of used mineral-based crankcase oil vary depending on the brand and type of oil used and the

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service
Agency for Toxic Substances and Disease Registry

USED MINERAL-BASED CRANKCASE OIL
CAS # 8002-05-9

characteristics of the engine it came from.

Mechanics and other auto workers who are exposed to used mineral-based crankcase oil from a large number of cars have experienced skin rashes, blood effects (anemia), and headaches and tremors. However, these workers are also exposed to other chemicals, which may have caused these health effects.

Volunteers who breathed mists of used mineral-based crankcase oil for a few minutes had slightly irritated noses, throats, and eyes. Animals that ate large amounts of this oil developed diarrhea. Thus, people who swallow used mineral-based crankcase oil may also have diarrhea.

Some cows that ate used oil containing metals such as molybdenum and lead in contaminated pastures experienced anemia and tremors. Some of the cows died.

We do not know if exposure to used mineral-based crankcase oil affects the reproductive ability of men or women or whether it causes birth defects.

How likely is used mineral-based crankcase oil to cause cancer?

Long-term exposure (365 days or longer) of the skin to used mineral-based crankcase oil causes skin cancer in mice. Oils contain PAHs. Some PAHs have been identified as the cancer-causing agents. Animal tests have shown that the higher the PAH content in oil, the more likely for the oil to be carcinogenic.

The **Department of Health and Human Services (DHHS)**, the **International Agency for Research on Cancer (IARC)**, and the **EPA** have not classified used mineral-based crankcase oil with regard to its carcinogenicity in people.

Is there a medical test to show whether I've been exposed to used mineral-based crankcase oil?

Used mineral-based crankcase oil is a mixture of a large number of chemicals. Its composition depends on the brand of oil and the characteristics of the engine in which it was used. However, there are methods for determining if you have been exposed to some of the chemicals in used oil. These tests aren't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA and most states have developed regulations regarding disposal of used oil, its recycling, spraying used oil onto road surfaces for dust control, or burning it as a fuel.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To enter the air as a vapor.

PAHs: Polyaromatic hydrocarbons; a group of chemicals found in oil and other minerals.

Source of Information

This ToxFAQs information is taken from the 1997 Toxicological Profile for Used Mineral-based Crankcase Oil produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

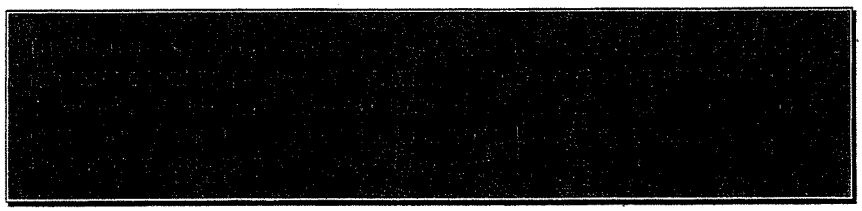
Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR

ETHYLBENZENE
CAS # 100-41-4

Agency for Toxic Substances and Disease Registry ToxFAQs June 1999

This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is ethylbenzene?

(Pronounced ĕth/ əl bĕn/ zēn/)

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

What happens to ethylbenzene when it enters the environment?

- Ethylbenzene moves easily into the air from water and soil.
- It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- In soil, it is broken down by soil bacteria.

How might I be exposed to ethylbenzene?

- Breathing air containing ethylbenzene, particularly in areas near factories or highways.
- Drinking contaminated tap water.
- Working in an industry where ethylbenzene is used or made.
- Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classifiable as to human carcinogenicity.

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No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

How can ethylbenzene affect children?

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, pesticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

How can families reduce the risk of exposure to ethylbenzene?

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

Is there a medical test to show whether I've been exposed to ethylbenzene?

Ethylbenzene is found in the blood, urine, breath, and some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 100 parts of ethylbenzene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Animal testing is sometimes necessary to find out how toxic substances might harm people or to treat those who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

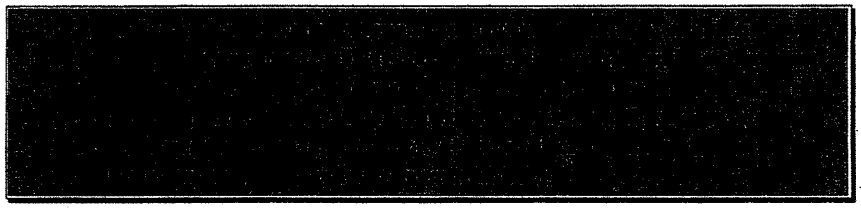
Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR

CADMIUM
CAS # 7440-43-9

Agency for Toxic Substances and Disease Registry ToxFAQs June 1999

This fact sheet answers the most frequently asked health questions (FAQs) about cadmium. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is cadmium?

(Pronounced kăd'mē-əm)

Cadmium is a natural element in the earth's crust. It is usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide).

All soils and rocks, including coal and mineral fertilizers, contain some cadmium. Most cadmium used in the United States is extracted during the production of other metals like zinc, lead, and copper. Cadmium does not corrode easily and has many uses, including batteries, pigments, metal coatings, and plastics.

What happens to cadmium when it enters the environment?

- Cadmium enters air from mining, industry, and burning coal and household wastes.
- Cadmium particles in air can travel long distances before falling to the ground or water.
- It enters water and soil from waste disposal and spills or leaks at hazardous waste sites.
- It binds strongly to soil particles.
- Some cadmium dissolves in water.
- It doesn't break down in the environment, but can change forms.
- Fish, plants, and animals take up cadmium from the environment.
- Cadmium stays in the body a very long time and can build up from many years of exposure to low levels.

How might I be exposed to cadmium?

- Breathing contaminated workplace air (battery manufacturing, metal soldering or welding).
- Eating foods containing it; low levels in all foods (highest in shellfish, liver, and kidney meats).
- Breathing cadmium in cigarette smoke (doubles the average daily intake).
- Drinking contaminated water.
- Breathing contaminated air near the burning of fossil fuels or municipal waste.

How can cadmium affect my health?

Breathing high levels of cadmium severely damages the lungs and can cause death. Eating food or drinking water with very high levels severely irritates the stomach, leading to vomiting and diarrhea. Long-term exposure to lower levels of cadmium in air, food, or water leads to a buildup of cadmium in the kidneys and possible kidney disease.

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Other long-term effects are lung damage and fragile bones. Animals given cadmium in food or water had high blood pressure, iron-poor blood, liver disease, and nerve or brain damage.

We don't know if humans get any of these diseases from eating or drinking cadmium. Skin contact with cadmium is not known to cause health effects in humans or animals.

How likely is cadmium to cause cancer?

The Department of Health and Human Services (DHHS) has determined that cadmium and cadmium compounds may reasonably be anticipated to be carcinogens.

How can cadmium affect children?

The health effects in children are expected to be similar to those in adults (kidney, lung and intestinal damage).

We don't know if cadmium causes birth defects in people. Cadmium does not readily go from a pregnant woman's body into the developing child, but some portion can cross the placenta. It can also be found in breast milk. The babies of animals exposed to high levels of cadmium during pregnancy had changes in behavior and learning ability. Cadmium may also affect birth weight and the skeleton in developing animals.

Animal studies also indicate that more cadmium is absorbed into the body if the diet is low in calcium, protein, or iron, or is high in fat. A few studies show that younger animals absorb more cadmium and are more likely to lose bone and bone strength than adults.

How can families reduce the risk of exposure to cadmium?

In the home, store substances that contain cadmium safely, and keep nickel-cadmium batteries out of reach of young children. If you work with cadmium, use all safety precautions to avoid carrying cadmium-containing dust home from work on your clothing, skin, hair, or tools.

A balanced diet can reduce the amount of cadmium taken into the body from food and drink.

Is there a medical test to show whether I've been exposed to cadmium?

Tests are available in some medical laboratories that measure cadmium in blood, urine, hair, or nails. Blood levels show recent exposure to cadmium, and urine levels show both recent and earlier exposure. The reliability of tests for cadmium levels in hair or nails is unknown.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 5 parts of cadmium per billion parts of drinking water (5 ppb). EPA doesn't allow cadmium in pesticides.

The Food and Drug Administration (FDA) limits the amount of cadmium in food colors to 15 parts per million (15 ppm).

The Occupational Safety and Health Administration (OSHA) limits workplace air to 100 micrograms cadmium per cubic meter (100 $\mu g/m^3$) as cadmium fumes and 200 μg cadmium/m^3 as cadmium dust.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for cadmium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

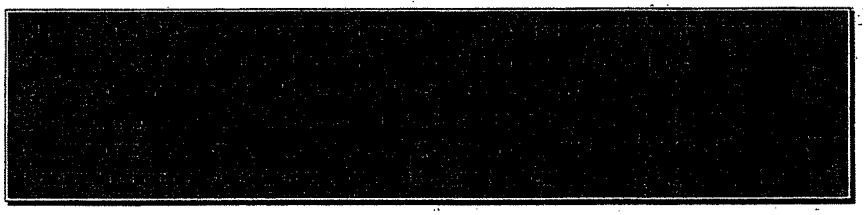
Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

AUTOMOTIVE GASOLINE

CAS # 8006-61-9

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

This fact sheet answers the most frequently asked health questions (FAQs) about automobile gasoline. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is automotive gasoline?

(Pronounced ô'tə-mō'tĭv găs'ə-lēn')

The gasoline discussed in this fact sheet is automotive used as a fuel for engines in cars. Gasoline is a colorless, pale brown, or pink liquid, and is very flammable.

Gasoline is a manufactured mixture that does not exist naturally in the environment. Gasoline is produced from petroleum in the refining process.

Typically, gasoline contains more than 150 chemicals, including small amounts of benzene, toluene, xylene, and sometimes lead. How the gasoline is made determines which chemicals are present in the gasoline mixture and how much of each is present. The actual composition varies with the source of the crude petroleum, the manufacturer, and the time of year.

What happens to automotive gasoline when it enters the environment?

- Small amounts of the chemicals present in gasoline evaporate into the air when you fill the gas tank in your car or when gasoline is accidentally spilled onto surfaces and soils or into surface waters.
- Other chemicals in gasoline dissolve in water after spills to surface waters or underground storage tank leaks into the groundwater.
- In surface releases, most chemicals in gasoline will probably evaporate; others may dissolve and be carried away by water; a few will probably stick to soil.
- The chemicals that evaporate are broken down by sunlight and other chemicals in the air.
- The chemicals that dissolve in water also break down quickly by natural processes.

How might I be exposed to automotive gasoline?

- Breathing vapors at a service station when filling the car's fuel tank is the most likely way to be exposed.
- Working at a service station.
- Using equipment that runs on gasoline, such as a lawn mower.
- Drinking contaminated water.
- Being close to a spot where gasoline has spilled or leaked into the soil.

How can automotive gasoline affect my health?

Many of the harmful effects seen after exposure to gasoline are due to the individual chemicals in the gasoline mix-

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ture, such as benzene and lead. Inhaling or swallowing large amounts of gasoline can cause death.

Inhaling high concentrations of gasoline is irritating to the lungs when breathed in and irritating to the lining of the stomach when swallowed. Gasoline is also a skin irritant. Breathing in high levels of gasoline for short periods or swallowing large amounts of gasoline may also cause harmful effects on the nervous system.

Serious nervous system effects include coma and the inability to breathe, while less serious effects include dizziness and headaches.

There is not enough information available to determine if gasoline causes birth defects or affects reproduction.

How likely is automotive gasoline to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified automotive gasoline for carcinogenicity. Automotive gasoline is currently undergoing review by the EPA for cancer classification.

Some laboratory animals that breathed high concentrations of unleaded gasoline vapors continuously for 2 years developed liver and kidney tumors. However, there is no evidence that exposure to gasoline causes cancer in humans.

Is there a medical test to show whether I've been exposed to automotive gasoline?

Laboratory tests are available that can measure elevated blood or urine levels of lead (as an indication of exposure to leaded gasoline only), benzene, or other substances that may result from exposure to gasoline or other sources. These methods are sensitive enough to measure background levels and levels where health effects may occur. These tests aren't available in most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has established many regulations to control air pollution. These are designed to protect the public from the possible harmful health effects of gasoline.

The American Conference of Governmental Industrial Hygienists (ACGIH) set a maximum level of 890 milligrams of gasoline per cubic meter of air (890 mg/m^3) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Crude petroleum: Petroleum that has not been processed.

Dissolve: To disappear gradually.

Evaporate: To change into a vapor or a gas.

Irritant: A substance that causes an abnormal reaction.

Mixture: A combination of two or more components.

Refining process: The process by which petroleum is purified to form gasoline.

Tumor: An abnormal mass of tissue.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for automotive gasoline. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

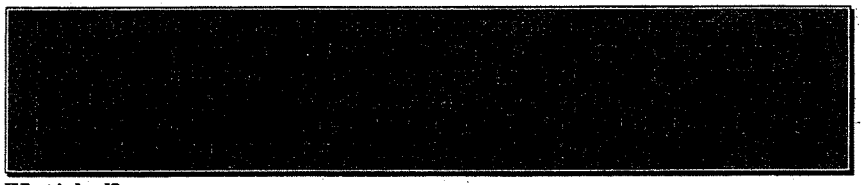
Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR

LEAD
CAS # 7439-92-1

Agency for Toxic Substances and Disease Registry ToxFAQs June 1999

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is lead?

(Pronounced lĕd)

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays.

Because of health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years.

What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When lead is released to the air, it may travel long distances before settling to the ground.
- Once lead falls onto soil, it usually sticks to soil particles.
- Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.
- Much of the lead in inner-city soils comes from old houses painted with lead-based paint.

How might I be exposed to lead?

- Eating food or drinking water that contains lead.
- Spending time in areas where lead-based paints have been used and are deteriorating.
- Working in a job where lead is used.
- Using health-care products or folk remedies that contain lead.
- Engaging in certain hobbies in which lead is used (for example, stained glass).

How can lead affect my health?

Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the reproductive system. The effects are the same whether it is breathed or swallowed.

At high levels, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, a disorder of the blood. It can also damage the male reproductive system. The connection between these effects and exposure to low levels of lead is uncertain.

How likely is lead to cause cancer?

The Department of Health and Human Services has determined that lead acetate and lead phosphate may reasonably

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be anticipated to be carcinogens based on studies in animals. There is inadequate evidence to clearly determine lead's carcinogenicity in people.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. A large amount of lead might get into a child's body if the child ate small pieces of old paint that contained large amounts of lead. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead.

How can families reduce the risk of exposure to lead?

Avoid exposure to sources of lead. Do not allow children to chew or mouth painted surfaces that may have been painted with lead-based paint (homes built before 1978). Run your water for 15 to 30 seconds before drinking or cooking with it. This will get rid of lead that may have leached out of pipes. Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children. Wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to show whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth and bones can be measured with X-rays, but this test is not as readily available. Medical treatment may be necessary in children if the lead concentration in blood is higher than 45 micrograms per deciliter (45 µg/dL).

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that children ages 1 and 2 be screened for lead poisoning. Children who are 3 to 6 years old should be tested for lead if they have never been tested for lead before and if they receive services from public assistance programs; if they live in or regularly visit a building built before 1950; if they live in or visit a home built before 1978 that is being remodeled; or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers children to have an elevated level of lead if the amount in the blood is 10 µg/dL.

The EPA requires lead in air not to exceed 1.5 micrograms per cubic meter (1.5 $\mu g/m^3$) averaged over 3 months. EPA limits lead in drinking water to 15 µg per liter.

The Occupational Health and Safety Administration (OSHA) develops regulations for workers exposed to lead. The Clean Air Act Amendments of 1990 banned the sale of leaded gasoline. The Federal Hazardous Substance Act bans children's products that contain hazardous amounts of lead.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for lead. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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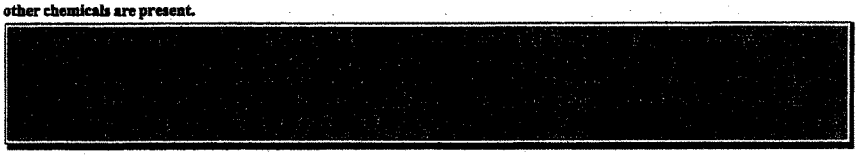
POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

❑ PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

❑ PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

❑ PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

❑ PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

❑ Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.

❑ Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.

❑ Breathing air near hazardous waste sites and drinking contaminated well water.

❑ In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects

POLYCHLORINATED BIPHENYLS

of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

❑ You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

❑ Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.

❑ Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.

❑ If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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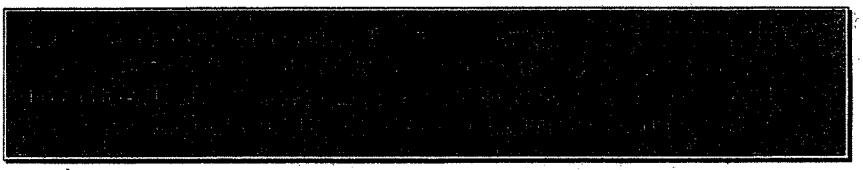
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'ĭ-sĭ'klĭk ăr'ə-măt'ĭk hī'drə-kar'bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

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- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

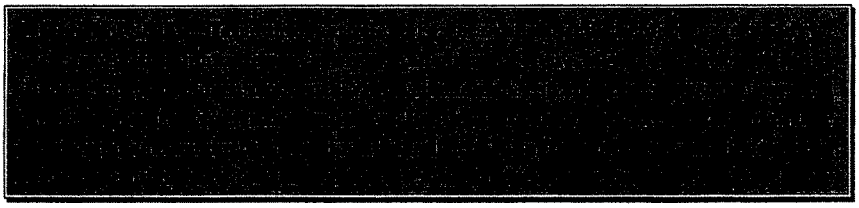
Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

TETRACHLOROETHYLENE
CAS # 127-18-4

Agency for Toxic Substances and Disease Registry ToxFAQs September 1997

This fact sheet answers the most frequently asked health questions (FAQs) about tetrachloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is tetrachloroethylene?

(Pronounced tĕt'rə-klôr' ō-ĕth'ə-lēn')

Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is also used to make other chemicals and is used in some consumer products.

Other names for tetrachloroethylene include perchloroethylene, PCE, and tetrachloroethene. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell tetrachloroethylene when it is present in the air at a level of 1 part tetrachloroethylene per million parts of air (1 ppm) or more, although some can smell it at even lower levels.

What happens to tetrachloroethylene when it enters the environment?

- Much of the tetrachloroethylene that gets into water or soil evaporates into the air.
- Microorganisms can break down some of the tetrachloroethylene in soil or underground water.
- In the air, it is broken down by sunlight into other chemicals or brought back to the soil and water by rain.
- It does not appear to collect in fish or other animals that live in water.

How might I be exposed to tetrachloroethylene?

- When you bring clothes from the dry cleaners, they will release small amounts of tetrachloroethylene into the air.
- When you drink water containing tetrachloroethylene, you are exposed to it.

How can tetrachloroethylene affect my health?

High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death.

Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high."

In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known.

Results from some studies suggest that women who work in dry cleaning industries where exposures to tetrachloroethyl-

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES Public Health Service
Agency for Toxic Substances and Disease Registry

ene can be quite high may have more menstrual problems and spontaneous abortions than women who are not exposed. However, it is not known if tetrachloroethylene was responsible for these problems because other possible causes were not considered.

Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage. Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

How likely is tetrachloroethylene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Tetrachloroethylene has been shown to cause liver tumors in mice and kidney tumors in male rats.

Is there a medical test to show whether I've been exposed to tetrachloroethylene?

One way of testing for tetrachloroethylene exposure is to measure the amount of the chemical in the breath, much the same way breath-alcohol measurements are used to determine the amount of alcohol in the blood.

Because it is stored in the body's fat and slowly released into the bloodstream, tetrachloroethylene can be detected in the breath for weeks following a heavy exposure.

Tetrachloroethylene and trichloroacetic acid (TCA), a breakdown product of tetrachloroethylene, can be detected in the blood. These tests are relatively simple to perform. These tests aren't available at most doctors' offices, but can be performed at special laboratories that have the right equipment.

Because exposure to other chemicals can produce the same breakdown products in the urine and blood, the tests for breakdown products cannot determine if you have been exposed to tetrachloroethylene or the other chemicals.

Has the federal government made recommendations to protect human health?

The EPA maximum contaminant level for the amount of tetrachloroethylene that can be in drinking water is 0.005 milligrams tetrachloroethylene per liter of water (0.005 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 100 ppm for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that tetrachloroethylene be handled as a potential carcinogen and recommends that levels in workplace air should be as low as possible.

Glossary

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

Source of Information

This ToxFAQs information is taken from the 1997 Toxicological Profile for Tetrachloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Hazardous Materials Training And Research Institute

Mike Harnung

Has Completed And Passed A Course In

40 Hour Hazardous Wastesite Worker – On Web

Date of Certificate:	3-9-01	Contact Hours:	40 Hours
Certificate Number:	350-58-1447	Course Location:	Kirkwood Community College
Expiration Date:	3-9-02	Date of Course:	Completion date 3-7-01
Examination Date:	3-9-01	Respirator Name & Model:	MSA Ultralite II M1C1

Instructor: Don Ransford

Program Director: Ron Snyder

Training for this program was developed and delivered by the:
Hazardous Materials Training And Research Institute
Kirkwood Community College
6301 Kirkwood Blvd. S.W.
P.O. Box 2068
Cedar Rapids, Iowa 52406
319-398-5677

Section #: 175580

48818

HAZARDOUS MATERIALS TRAINING AND RESEARCH INSTITUTE

MICHAEL HARNUNG

has completed and passed a course in

Hazardous Wastesite Worker Refresher

Date of Certificate:	February 28, 2002	**Contact Hours:**	8
Certificate Number:	350-56-1447	**Course Location:**	Scott Community College
Expiration Date:	February 28, 2003	**Date of Course:**	February 28, 2002
Examination Date:	February 28, 2002	**Respirator Name & Model:**	NA

Jeffrey L. Clark
Instructor

Training for this program was developed and delivered by the Hazardous Materials Training and Research Institute

Kirkwood Community College
6301 Kirkwood Blvd. SW, PO Box 2068
Cedar Rapids, IA 52406-2068
Phone: (319) 398-5677

Eastern Iowa Community College District (EICCD)
306 West River Drive
Davenport, IA 52801-1221
Phone: (563) 441-4081

Course #109768

1391

IESMC Industrial/Environmental
Safety Management Consulting

Certifies that

Wendy Moews

has been awarded this certificate for successfully completing

40 Hour Hazardous Waste Site Worker Training

in accordance with 29 CFR 1910.120

Conducted on Jan 20, 1994

Certification #: 0194HW100020
Social Security #: 329-66-8918

Jan 20, 1994
Date

James C. Meldrum, Founder

HAZARDOUS MATERIALS TRAINING AND RESEARCH INSTITUTE

WENDY ROUSE

has completed and passed a course in

Hazardous Waste Site Worker Refresher

Date of Certificate:	January 24, 2002	**Contact Hours:**	8
Certificate Number:	329-66-8918	**Course Location:**	Scott Community College
Expiration Date:	January 24, 2003	**Date of Course:**	January 24, 2002
Examination Date:	January 24, 2002	**Respirator Name & Model:**	NA

Jeffrey L. Clark
Instructor

Training for this program was developed and delivered by the Hazardous Materials Training and Research Institute

Kirkwood Community College
6301 Kirkwood Blvd. SW, PO Box 2068
Cedar Rapids, IA 52406-2068
Phone: (319) 398-5677

Eastern Iowa Community College District (EICCD)
306 West River Drive
Davenport, IA 52801-1221
Phone: (563) 441-4081

Course #109688

48818

Hazardous Materials Training and Research Institute

PAUL LOETE

has completed and passed a course in

40 HOUR HAZARDOUS WASTESITE WORKER

Date of Certificate:	May 27, 1994	Contact Hours:	40
Certificate Number:	332-78-0104	Course Location:	SCOTT CC - BETTENDORF, IOWA
Expiration Date:	May 27, 1995	Date of Course:	May 23-27, 1994
Examination Date:	may 27, 1994	Respirator Name & Model:	MSA ULTRALITE MCI1

VICKI WOOD
Instructor

PAT BERNTSEN
Program Director

#117345

Training for this program was developed and delivered by the:
Hazardous Materials Training and Research Institute

Kirkwood Community College
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Cedar Rapids, IA 542406
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Eastern Iowa Community College District
306 West River Drive
Davenport, IA 52801-1221
(319) 322-1545

1394

48818

HAZARDOUS MATERIALS TRAINING AND RESEARCH INSTITUTE

Paul Loete

has completed and passed a course in

Hazardous Waste Site Worker Refresher

Date of Certificate:	October 26, 2000	Contact Hours:	8
Certificate Number:	332-78-0104	Course Location:	Scott Community College
Expiration Date:	October 26, 2001	Date of Course:	October 26, 2000
Examination Date:	October 26, 2000	Respirator Name & Model:	NA

Jeffrey L. Clark
Instructor

Kathleen Gordon
HMTRI Associate Director

Training for this program was developed and delivered by the
Hazardous Materials Training and Research Institute

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6301 Kirkwood Blvd. SW, PO Box 2068
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Phone: (319) 398-5677

Eastern Iowa Community College District (EICCD)
306 West River Drive
Davenport, IA 52801-1221
Phone: (319) 441-4081

Course #106016

1395

APPENDIX D-5

FARM CREEK WATERSHED HYDROLOGY AND HYDRAULICS ANALYSIS

D-5

FARM CREEK WATERSHED
HYDROLOGY AND HYDRAULICS APPENDIX

CLIMATE

The basin's climate is typical of the American Midwest, with cold, dry winters and hot, wet summers. The transition season of spring tends to be very wet, while the fall season tends to be dry. Using Peoria as representative of the basin, average temperature for the year is 50.7 degrees Fahrenheit, with a peak maximum temperature of 113 degrees on July 15, 1931 and a low minimum temperature of -27 degrees on January 5, 1884. The average yearly precipitation is 36.25 inches, including an average snowfall of 26.2 inches per year. Peoria's climate is summarized in the table below.

TABLE D-5-1. Peoria Climate

Month	Average Maximum Temp. (deg. F)	Average Minimum Temp. (deg. F)	Average Temp (deg. F)	Average Precipitation (inches)	Average Snowfall (inches)
JAN	29.9	13.2	21.6	1.51	7.3
FEB	34.9	17.7	26.3	1.42	5.9
MAR	48.1	29.8	39.0	2.91	3.4
APR	62.0	40.8	51.4	3.77	1.2
MAY	72.8	50.9	61.9	3.70	T
JUN	82.2	60.7	71.5	3.99	0.0
JUL	85.7	65.4	75.5	4.20	0.0
AUG	83.1	63.1	73.1	3.10	0.0
SEP	76.9	55.2	66.1	3.87	0.0
OCT	64.8	43.1	54.0	2.65	0.1
NOV	49.8	32.5	41.2	2.69	1.9
DEC	34.6	19.3	27.0	2.44	6.4
Year	60.4	41.0	50.7	36.25	26.2

PROJECT FEATURE ANALYSES

FARM CREEK

Location

Farm Creek is a tributary to the Illinois River in central Illinois. The project consists of two environmental ponds located just upstream of Washington, Illinois (20 miles east of Peoria). The project lies entirely in Tazewell County. The drainage area of Farm Creek just upstream of Washington is 5.2 square miles. The creek flows southwesterly and empties into the Illinois River at East Peoria. The location is shown on plate 1 of the main report.

Overview

This project consists of two environmental dams. The two ponds are located on adjacent unnamed tributaries flowing into the left descending bank of Farm Creek in the City of Washington. These two ponds were designed using the Natural Resources Conservation Service (NRCS) program *SITES*. This program follows NRCS guidelines. Dams are classified according to the damage that might occur to existing and future development should the dam suddenly release large quantities of water. The established classes are shown below.

Class A: Dams located in rural or agricultural areas where failure may damage farm buildings, agricultural lands, or township and local roads.

Class B: Dams located in predominantly rural or agricultural areas where failure may damage isolated homes, main highways, or minor railroads or cause interruption of use or service of relatively important public utilities.

Class C: Dams located where failure may cause the loss of life, serious damage to homes, industrial, and commercial buildings, important public utilities, main highways, or railroads.

NRCS guidelines call for using *Technical Release 60 (TR60)* if the dam is Class B or C, or if it is Class A and the product of storage (acre-feet) times the effective height (feet) of the dam is 3,000 or more or the effective height of the dam is 35 feet or higher. If the dam is a Class A structure and does not meet the above size restrictions, then NRCS NHCD-386 guidelines can be used.

The dams in this study are Class C dams because of their location just upstream of Washington, Illinois, with a mainline railroad track and houses downstream. Both dams will have to be designed to safely pass the probable maximum flood.

Local Issue

These dams were designed to maximize habitat for a core group of species. From a hydrologic perspective, they do this by providing 1.5 to 2.0 feet of deepwater over as large an area as possible. The City of Washington is interested in as much flood protection as possible from this project. As such, earthen dams were designed and savings were calculated at downstream sites for flow reduction based on previous flood protection studies of the area.

The project site consists of two dams designed using the NRCS program *SITES* with the NRH-386 criteria. Because the dams are upstream of a main line railroad track and the City of Washington, these dams will need to have their auxiliary or emergency spillways designed to safely pass the probable maximum flow. For this study, they are designed to contain the 24-hour, 50-year storm event on city property and keep the 24-hour, 100-year storm within 1 foot vertical on the adjoining private property. The rainfall volumes for the design are 6.2 inches for the 24-hour, 50-year event and 7.0 for the 24-hour, 100-year event. Table D-5-2 summarizes the hydrology for the two dams.

TABLE D-5-2. Farm Creek Dams - Hydrology

Pool	Drainage Area (acre)	Flow Length (feet)	Watershed Slope (%)	Curve Number	Time of Concentration (hour)
1	505	12,100	1.59	82.5	2.88
2	156.5	6,600	1.19	82.5	2.05

The dams were designed to have a large area at the conservation pool inundated from 1.5 to 2 feet deep. The principal spillways were sized to keep the 24-hour, 50-year storm event on the city's property and the auxiliary spillway was sized to keep the 24-hour, 100-year storm event from flooding more than 1 foot vertical on the adjoining private properties. Table D-5-3 summarizes the dams' features.

TABLE D-5-3. Dam Sizes at Project Site

Pool	Elevation Principal Spillway (feet, NGVD)	Outlet Size of Principal Spillway	Elevation of Auxiliary Spillway (feet, NGVD)	Spillway Length (feet)	Top of Dam (feet, NGVD)
1	744	3 - 5'x2'box	747.91	300	749.91
2	746	1 - 18" hooded conduit	751.52	150	753.53

Sedimentation

A local concern for the effective life of these environmental ponds is the biological waste that floats downstream during storms. The practice of no till farming that is used in the area has resulted in corn stalks floating down to culverts, where they drop out in the backwater just upstream and historically have added up to 4 feet of soil in a 10-year period. If this should happen to any of the environmental ponds, they would become ineffective at increasing the desired habitat after only 5 years, much shorter than the minimum 25-year life of the project.

APPENDIX F

COST ENGINEERING

City of Washington
Selected Alternative
Peoria Riverfront Environmental
Study

Designed By: CEMVR-ED-DG
Estimated By: CEMVR-ED-C

Prepared By: Charles Van Laarhoven

Preparation Date: 10/18/01
Effective Date of Pricing: 10/18/01

Sales Tax: 0.0%

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48818

1402

SUMMARY REPORTS SUMMARY PAGE

PROJECT OWNER SUMMARY - Contract....1
PROJECT OWNER SUMMARY - Feature....2
PROJECT OWNER SUMMARY - Subfeatr....3
PROJECT INDIRECT SUMMARY - Contract....4
PROJECT INDIRECT SUMMARY - Feature....5
PROJECT INDIRECT SUMMARY - Subfeatr....6
PROJECT DIRECT SUMMARY - Contract....7
PROJECT DIRECT SUMMARY - Feature....8
PROJECT DIRECT SUMMARY - Subfeatr....9

No Detailed Estimate...

No Backup Reports...

* * * END TABLE OF CONTENTS * * *

	QUANTITY UOM	CONTRACT UNIT COST	TOTAL COST	NOTES
1 Bid Schedule-Selected Alternativ		301,900	301,900	
TOTAL City of Washington		301,900	301,900	

48818

1404

	QUANTITY UOM	CONTRACT UNIT COST	TOTAL COST	NOTES
1 Bid Schedule-Selected Alternativ				
1. 10 Farm Creek-Selected Alternative		301,900	301,900	
TOTAL Bid Schedule-Selected Alternativ		301,900	301,900	
TOTAL City of Washington		301,900	301,900	

48818

1405

			QUANTITY	UOM	CONTRACT UNIT COST	TOTAL COST	NOTES
1	Bid Schedule-Selected Alternativ						
1.	10	Farm Creek-Selected Alternative					
1.	10. 1	Stripping	1.35	ACR	71,819 53199.04	71,819	
1.	10. 2	Cutoff Trench	2651.00	CY	7,164 2.70	7,164	
1.	10. 3	Dam Embankment	7954.00	CY	26,322 3.31	26,322	
1.	10. 4	Outlet Pipe, 18"" CMP	119.00	LF	2,614 21.97	2,614	
1.	10. 5	Outlet Hood, 18"	1.00	EA	145 144.79	145	
1.	10. 6	Box Culvert, 24"x60"	282.00	LF	68,283 242.14	68,283	
1.	10. 7	Storm Pipe, 15" PVC	1500.00	LF	20,685 13.79	20,685	
1.	10. 8	Seeding (dam)	1.29	ACR	1,608 1246.78	1,608	
1.	10. 9	Seeding (spillway)	0.86	ACR	1,072 1246.78	1,072	
1.	10.10	Shoreline Plantings (Water)	9561.00	LF	18,302 1.91	18,302	
1.	10.11	Terrestrial Planting (perimeter)	9561.00	LF	25,244 2.64	25,244	
1.	10.12	Prairie Plantings	35.00	ACR	36,415 1040.42	36,415	
1.	10.13	Wood Duck Boxes	15.00	EA	1,661 110.76	1,661	
1.	10.14	Erosion Stone (spillway)	700.00	TON	20,566 29.38	20,566	
	TOTAL	Farm Creek-Selected Alternative			301,900	301,900	
	TOTAL	Bid Schedule-Selected Alternativ			301,900	301,900	
	TOTAL	City of Washington			301,900	301,900	

48818

1406

	QUANTITY UOM	DIRECT	FIELD OH	HOME OFC	INSURANC	PROFIT	BOND	TOTAL COST	UNIT COST
1 Bid Schedule-Selected Alternativ		233,776	11,689	24,546	4,050	23,378	4,462	301,900	
TOTAL City of Washington		233,776	11,689	24,546	4,050	23,378	4,462	301,900	

48818

1407

	QUANTITY UOM	DIRECT	FIELD OH	HOME OFC	INSURANC	PROFIT	BOND	TOTAL COST	UNIT COST
1 Bid Schedule-Selected Alternativ									
1. 10 Farm Creek-Selected Alternative		233,776	11,689	24,546	4,050	23,378	4,462	301,900	
TOTAL Bid Schedule-Selected Alternativ		233,776	11,689	24,546	4,050	23,378	4,462	301,900	
TOTAL City of Washington		233,776	11,689	24,546	4,050	23,378	4,462	301,900	

48818

1408

			QUANTITY	UOM	DIRECT	FIELD OH	HOME OFC	INSURANC	PROFIT	BOND	TOTAL COST	UNIT COST
1	Bid Schedule-Selected Alternativ											
1.	10	Farm Creek-Selected Alternative										
1.	10. 1	Stripping	1.35	ACR	55,613	2,781	5,839	963	5,561	1,061	71,819	53199.04
1.	10. 2	Cutoff Trench	2651.00	CY	5,548	277	583	96	555	106	7,164	2.70
1.	10. 3	Dam Embankment	7954.00	CY	20,382	1,019	2,140	353	2,038	389	26,322	3.31
1.	10. 4	Outlet Pipe, 18"" CMP	119.00	LF	2,024	101	213	35	202	39	2,614	21.97
1.	10. 5	Outlet Hood, 18"	1.00	EA	112	6	12	2	11	2	145	144.79
1.	10. 6	Box Culvert, 24"x60"	282.00	LF	52,875	2,644	5,552	916	5,288	1,009	68,283	242.14
1.	10. 7	Storm Pipe, 15" PVC	1500.00	LF	16,017	801	1,682	277	1,602	306	20,685	13.79
1.	10. 8	Seeding (dam)	1.29	ACR	1,245	62	131	22	125	24	1,608	1246.78
1.	10. 9	Seeding (spillway)	0.86	ACR	830	42	87	14	83	16	1,072	1246.78
1.	10.10	Shoreline Plantings (water)	9561.00	LF	14,172	709	1,488	246	1,417	270	18,302	1.91
1.	10.11	Terrestrial Planting (perimeter)	9561.00	LF	19,548	977	2,053	339	1,955	373	25,244	2.64
1.	10.12	Prairie Plantings	35.00	ACR	28,198	1,410	2,961	489	2,820	538	36,415	1040.42
1.	10.13	Wood Duck Boxes	15.00	EA	1,287	64	135	22	129	25	1,661	110.76
1.	10.14	Erosion Stone (spillway)	700.00	TON	15,925	796	1,672	276	1,593	304	20,566	29.38
	TOTAL	Farm Creek-Selected Alternative			233,776	11,689	24,546	4,050	23,378	4,462	301,900	
	TOTAL	Bid Schedule-Selected Alternativ			233,776	11,689	24,546	4,050	23,378	4,462	301,900	
	TOTAL	City of Washington			233,776	11,689	24,546	4,050	23,378	4,462	301,900	

48818

1409

Tri-Service Automated Cost Engineering System (TRACES)
PROJECT WASHT4: City of Was - Selected Alternative
Rock Island ict
** PROJECT DIRECT SUMMARY - Contract **

	QUANTITY UOM	EQUIPMNT	LABOR	MATERIAL	SUPPLYS	QUOTE	TOTAL COST	UNIT COST
1 Bid Schedule-Selected Alternativ	35,130		64,924	88,271	34,113	11338	233,776	
TOTAL City of Washington	35,130		64,924	88,271	34,113	11338	233,776	
FIELD OFFICE OH							11,689	
SUBTOTAL							245,465	
HOME OFC OH							24,546	
SUBTOTAL							270,011	
INSURANCE							4,050	
SUBTOTAL							274,061	
PROFIT							23,378	
SUBTOTAL							297,439	
BOND							4,462	
TOTAL INCL INDIRECTS							301,900	

48818

1410

	QUANTITY	UOM	EQUIPMNT	LABOR	MATERIAL	SUPPLYS	QUOTE	TOTAL COST	UNIT COST
1 Bid Schedule-Selected Alternativ									
1. 10 Farm Creek-Selected Alternative	35,130		64,924	88,271	34,113		11338	233,776	
TOTAL Bid Schedule-Selected Alternativ	35,130		64,924	88,271	34,113		11338	233,776	
TOTAL City of Washington	35,130		64,924	88,271	34,113		11338	233,776	
FIELD OFFICE OH								11,689	
SUBTOTAL								245,465	
HOME OFC OH								24,546	
SUBTOTAL								270,011	
INSURANCE								4,050	
SUBTOTAL								274,061	
PROFIT								23,378	
SUBTOTAL								297,439	
BOND								4,462	
TOTAL INCL INDIRECTS								301,900	

48818

1411

			QUANTITY	UOM	EQUIPMNT	LABOR	MATERIAL	SUPPLYS	QUOTE	TOTAL COST	UNIT COST
1	Bid Schedule-Selected Alternativ										
1.	10	Farm Creek-Selected Alternative									
1.	10. 1	Stripping	1.35	ACR	10,631	10,956	0	34,025	0	55,613	41194.54
1.	10. 2	Cutoff Trench	2651.00	CY	3,232	2,316	0	0	0	5,548	2.09
1.	10. 3	Dam Embankment	7954.00	CY	12,002	8,380	0	0	0	20,382	2.56
1.	10. 4	Outlet Pipe, 18"" CMP	119.00	LF	61	765	1,198	0	0	2,024	17.01
1.	10. 5	Outlet Hood, 18"	1.00	EA	3	44	65	0	0	112	112.12
1.	10. 6	Box Culvert, 24"x60"	282.00	LF	2,820	3,807	46,248	0	0	52,875	187.50
1.	10. 7	Storm Pipe, 15" PVC	1500.00	LF	282	8,931	6,804	0	0	16,017	10.68
1.	10. 8	Seeding (dam)	1.29	ACR	102	237	906	0	0	1,245	965.44
1.	10. 9	Seeding (spillway)	0.86	ACR	68	158	604	0	0	830	965.44
1.	10.10	Shoreline Plantings (water)	9561.00	LF	0	10,140	4,032	0	0	14,172	1.48
1.	10.11	Terrestrial Planting (perimeter)	9561.00	LF	0	7,330	12,217	0	0	19,548	2.04
1.	10.12	Prairie Plantings	35.00	ACR	3,588	7,368	5,204	0	11338	28,198	805.65
1.	10.13	Wood Duck Boxes	15.00	EA	31	279	889	88	0	1,287	85.77
1.	10.14	Erosion Stone (spillway)	700.00	TON	2,310	4,210	9,405	0	0	15,925	22.75
	TOTAL	Farm Creek-Selected Alternative			35,130	64,924	88,271	34,113	11338	233,776	
	TOTAL	Bid Schedule-Selected Alternativ			35,130	64,924	88,271	34,113	11338	233,776	
	TOTAL	City of Washington			35,130	64,924	88,271	34,113	11338	233,776	
	FIELD OFFICE OH									11,689	
	SUBTOTAL									245,465	
	HOME OFC OH									24,546	
	SUBTOTAL									270,011	
	INSURANCE									4,050	
	SUBTOTAL									274,061	
	PROFIT									23,378	
	SUBTOTAL									297,439	
	BOND									4,462	
	TOTAL INCL INDIRECTS									301,900	

48818

1412

Tri-Service Automated Cost Engineering System (TRACES)
PROJECT WASHT4: City of Washington - Selected Alternative
Rock Island District

---

o errors detected...

* * * END OF ERROR REPORT * * *

48818

1413

** PROJECT SETTINGS **

ESTIMATE TYPE : U-Unit Costs; No Crews

SALES TAX : 0.0%

DATE OF ESCALATION SCHEDULE : 10/18/01

PROJECT DIRECT COST COLUMNS

Col Type	E	L	M	U	U
Rep Width	9	9	9	9	6
Title	EQUIPMNT	LABOR	MATERIAL	SUPPLYS	QUOTE

PROJECT INDIRECT COST COLUMNS

Col Type	O	U	U	P	B
Rep Width	9	9	9	9	6
Title	FIELD OH	HOME OFC	INSURANC	PROFIT	BOND

PROJECT OWNER COST COLUMNS

Col Type	X	X	X	X	X
Rep Width	0	0	0	0	0
Title	<Unused>	<Unused>	<Unused>	<Unused>	<Unused>

PROJECT BREAKDOWN

PROJECT ID	Length	Trail Sep	Level Title	2nd View Order
Level 1 ID :	1	.	Contract	1
Level 2 ID :	6	.	Feature	2
Level 3 ID :	2	.	Subfeatr	3
Level 4 ID :	2	.	Element	0
Level 5 ID :	2	.	Indicatr	0
Level 6 ID :	2	.	Assembly	0

Owner Cost Level : 2

** PROJECT SETTINGS **

2ND VIEW COLUMNS

Quantity Column Width : 10

Col Type	X	X	X	X	X
Rep Width	0	0	0	0	0
Title	(Unused)	(Unused)	(Unused)	(Unused)	(Unused)
Shadow	X	X	X	X	X

DETAIL REPORT FORMATTING

PAGE OPTIONS
Page Break Levels : 2
Table of Contents Levels : 2

0 1 2 3 4 5 6 7

ROW OPTIONS
Print Titles at Levels : Y Y Y Y Y Y
Print Totals at Levels : Y Y Y Y Y Y
Print Notes at Levels : Y Y Y Y Y Y Y Y
Print Unit Cost Row : Y
Print Page Footer : Y
Show Cost Codes : Y

COLUMNS OPTIONS
Print Crew Id : Y
Crew Output : Y
Unit Cost : Y

UPB TITLES
No. of Levels to Print : 1
Bracket Titles With : [ ]
Include titles Notes : Y

** PROJECT SETTINGS **

OTHER REPORT FORMATTING

COLUMN TITLES FOR SUMMARY REPORTS

Column 1	FIELD OH	: FIELD OFFICE OH
Column 2	HOME OFC	: HOME OFC OH
Column 3	INSURANC	: INSURANCE
Column 4	PROFIT	: PROFIT
Column 5	BOND	: BOND

Column 1	<Unused>	: CONTINGENCIES
Column 2	<Unused>	: ESCALATION
Column 3	<Unused>	:
Column 4	<Unused>	:
Column 5	<Unused>	:

STANDARD COLUMN WIDTHS

Quantity Columns	: 10
Total cost Columns	: 12
Unit Cost Columns	: 10

SUMMARY FEATURES

Round Totals Column	: N-None
Contingency Notes	: Yes
Show Project Totals	: Yes

SPECIAL REPORT FORMATTING OPTIONS

First Alternate ID	: (None)
Show Markup at Level	: 0
Display Indirect/Owner Markup as	: A - Unit Costs Only
CSI Sort at Level	: (None)

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** PROJECT SETTINGS **

REPORT SELECTION

Project Settings :	Y	Profit Guidelines :	N
Contractor Settings :	Y		
Link Listing :	N	Measurement Units :	U.S.

	REPORT FORMAT TYPE			FOR LEVEL (S)
	Direct	Indirect	Owner	0 1 2 3 4 5 6
Detail :	N			
Project :	Y	Y	Y	Y Y Y N N N
Contractor :	N	N		N N N N N N
Division :	N	N	N	N N N N N N
System :	N	N	N	N N N N N N
2nd View :	N			
Crew :	N			N N N N N N
Labor :	N			
Equipment :	N			
Prime Labor Cost Level :	N			

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** CONTRACTOR SETTINGS **

		AMOUNT	PCT	PCT S	RISK	DIFF	SIZE	PERIOD	INVEST	ASSIST	SUBCON
AA Prime Contractor											
FIELD OFFICE OH	P		5.00								
HOME OFC OH	P		10.00								
INSURANCE	P		1.50								
PROFIT	D		10.00								
BOND	P		1.50								
LS Landscaping Subcontractor											
FIELD OFFICE OH	P		5.00								
HOME OFC OH	P		10.00								
INSURANCE	P		1.50								
PROFIT	P		9.00								
BOND	P		0.00								
CC Clearing Subcontractor											
FIELD OFFICE OH	P		5.00								
HOME OFC OH	P		10.00								
INSURANCE	P		1.50								
PROFIT	P		9.00								
BOND	P		0.00								

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APPENDIX G

ENVIRONMENTAL

APPENDIX G-2

HABITAT EVALUATION AND QUANTIFICATION (FARM CREEK)

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX G-2
HABITAT EVALUATION AND QUANTIFICATION
FARM CREEK, ILLINOIS SITE

CONTENTS

Subject		Page
1.	INTRODUCTION	G-2-1
2.	HABITAT EVALUATION METHODOLOGY	G-2-2
3.	EVALUATION SPECIES SELECTION	G-2-2
4.	ASSUMPTIONS	G-2-3
	a. Current Conditions	G-2-3
	b. Model Performance	G-2-3
	c. Changes in Habitat Conditions Over Time	G-2-3
	d. General Assumptions	G-2-3
5.	RESULTS OF HABITAT ANALYSIS	G-2-5
6.	INCREMENTAL ANALYSIS OF ALTERNATIVES	G-2-6
7.	DISCUSSION	G-2-9

Tables

No.	Title	Page
G-2-1	Species Selected	G-2-4
G-2-2	Overall Model Outputs	G-2-5
G-2-3	Farm Creek Environmental Output and Costs of Each Measure	G-2-6
G-2-4	Farm Creek Alternative Evaluation	G-2-7
G-2-5	Incremental Cost Analysis of Best Buy Plans for Farm Creek	G-2-8

CONTENTS (Continued)

Figures

No.	Title	Page
G-2-1	Alternative 1 AAHU Calculation Summary	G-2-11
G-2-2	Alternative 2 AAHU Calculation Summary	G-2-11
G-2-3	Alternative 3 AAHU Calculation Summary	G-2-12

PEORIA RIVERFRONT DEVELOPMENT, ILLINOIS
(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

APPENDIX G-2
HABITAT EVALUATION AND QUANTIFICATION
FARM CREEK, ILLINOIS SITE

1. INTRODUCTION

A habitat analysis was conducted to evaluate potential benefits of habitat improvement features for the Farm Creek site portion of the Peoria Riverfront Development (Ecosystem Restoration) Study. Biologists from the Rock Island District of the U.S. Army Corps of Engineers (Corps) used a modified form of the Habitat Evaluation Procedure (HEP) program called EXHEP (EXpert Habitat Evaluation Procedures). For a more detailed explanation of the HEP evaluation process and its general application, please refer to Appendix G-1 of this document.

EXHEP is a Microsoft Access© '97 package developed by the U.S. Army Corps of Engineers Waterways Experiment Station (WES) Experimental Lab in Vicksburg, Mississippi, to automate standard HEP calculations and facilitates large-scale HEP assessments efficiently and effectively. EXHEP uses Microsoft® Windows-compatible programming to: (1) solve complex mathematical calculations quickly and (2) provide a highly intuitive, visual interface to facilitate communication between the system and the user. As with any sophisticated mathematical evaluation, a well-tested, efficiently written, standard software package is a critical tool that saves time and improves the reliability and repeatability of the results. However, this software cannot replace the user's understanding of the conceptual basis of HEP, or its application to the decision making process. EXHEP should not be viewed as the end-all means to provide the only predictive environmental response to project development. Rather, the program should be viewed as a tool that can provide a rational, supportable, focused, and traceable evaluation of environmental effects.

EXHEP was designed to process a large amount of data quickly and efficiently, handling a large number of HSI (Habitat Suitability Index) models simultaneously. Each HSI model can incorporate any number of cover types. Each cover type can include a large number of variables, and the user can incorporate as many life requisites within each model as necessary. These capabilities support the examination of complex studies with large numbers of permutations. In some studies, it is not unusual to evaluate 10-15 HSI models (with more than 25 cover types) in an attempt to describe complex interrelationships within the ecosystem. The staggering amount of tedious mathematical calculations necessary to compute HEP at this level requires a powerful tool to evaluate environmental output. EXHEP, enhanced by its ability to communicate these activities in an organized fashion, can quickly accomplish this task. The number of permutations, processing speed, and EXHEP performance are limited only by the capacity of the user's hardware, where data storage becomes the limiting factor.

2. HABITAT EVALUATION METHODOLOGY

The information contained in the habitat evaluation for the Farm Creek project site evaluation was used to support the application of HEP in the Peoria Riverfront Development (Ecosystem Restoration) Study. The HEP Team was facilitated by the professional biological opinions of Corps staff. For the evaluation process, the study team reviewed aerial photography, GIS and topographic data, and preliminary design drawings. The members of the team were also familiar with the project area and most had direct knowledge of existing conditions.

The methodology used in this evaluation was a modified form of HEP, the Expert Habitat Evaluation Process or EXHEP. The HEP models were developed to aid in land management planning, and require the selection and evaluation of a variety of target species for each computer-generated evaluation. The EXHEP program takes a rather specific approach and evaluates target species that are assumed to be representative of habitat quality. EXHEP also evaluated a broad range of target years for each species within a specified habitat type. By doing this, habitat benefits gained and/or lost throughout the life of the project can be shown.

The U.S. Army Engineer and Research Development Center, Environmental Laboratory, recently developed the EXHEP software. It is a field evaluation procedure designed to estimate habitat quality and account for changes due to land management practices. For the Farm Creek project site, species were chosen to evaluate four separate cover types: open water, palustrine scrub shrub wetland, palustrine emergent wetland, and successionally developing grassland. This analysis employed the professional opinion of Corps staff biologists.

EXHEP is a species-driven evaluation process that involves mathematical associations between environmental cover types and the individual variables that compose each of those cover types. During the evaluation process, each variable of a cover type was calculated on a 0.1 to 1.0 index. This evaluation was done using suitability graphs created by the U.S. Fish and Wildlife Service (USFWS) for the Habitat Suitability Index Models Series. This series was researched and created by the USFWS to provide habitat information useful for impact assessment and habitat management. The variable suitability outcomes were then inserted into a Habitat Suitability Equation (also taken from the USFWS Habitat Suitability Series). The Habitat Suitability Equation is an evaluation that combines all Life Requisites of the specified wildlife and designates it a suitability index number. This final suitability number was then used to calculate final with- and without-project Average Annual Habitat Units (AAHUs).

3. EVALUATION SPECIES SELECTION

Several habitat types represented by species-driven HSI models were evaluated in this document. Although a particular species is used, each species represents required habitat for many other similar species that utilize the same habitat in similar ways. In essence, each species represents an array of habitat variables for the species being evaluated. These species represent key goals and objectives for the development of specific habitat types proposed by project.

The use of this information is required to derive quantitative relationships between key environmental variables and habitat suitability within the immediate study area (i.e., within the Farm Creek watershed). This document provides the foundation for the HEP application for the six species-based Habitat Suitability Index (HSI) models. The HSI models selected for this project were: Marsh Wren (*Cistothorus palustri*), Mink (*Mustela vison*), Wood Duck (*Aix sponsa*), Chorus Frog (*Pseudacris triseriata*), Eastern Meadowlark (*Sturnella magna*), and Field Sparrow (*Spizella pusilla*). Table G-2-1 shows all species with applicable cover types and associated variables.

The marsh wren is an abundant breeding bird species of freshwater and saltwater marshes and requires emergent vegetation with shallow standing water. The mink is a predatory, semi-aquatic mammal that is generally associated with streams, riverbanks, and freshwater marshes. The wood duck is a waterfowl found around wetland areas with open water and nests in tree cavities or nest boxes. The chorus frog prefers grassy areas from dry to marsh to agricultural; also suburbs where pollution and pesticides are not a problem; as well as woodlands and river wetlands. The eastern meadowlark is an omnivorous ground feeding bird that nests in open fields. The field sparrow prefers old fields with scattered woody vegetation.

4. ASSUMPTIONS

Assumptions have been made regarding current conditions, model performance, and changes in habitat conditions over time. These assumptions are made using best available data.

a. Current Conditions. Due to concerns over flooding, the city of Washington purchased this tract of land along Farm Creek just east of the city for potential wetland restoration and stormwater storage. The project site is agricultural farm field and has been intensively rowcropped for several years. The likelihood of residual pesticides and herbicides is high.

b. Model Performance. The quantitative component of the EXHEP analysis is the measure of the acres of habitat that are available for the selected species. From the qualitative and quantitative determinations, the standard unit of measure, the habitat unit (HU), was calculated using the formula (HSI x Acres = HUs). For project planning and impact analysis, project life was established as 30 years. To facilitate comparison, target years were established at 0 (existing conditions), 1 year after, 5 years after, 10 years after, and 30 years after project construction. HSI and AAHUs for each evaluation species were calculated to reflect expected habitat conditions over the life of the project.

c. Changes in Habitat Conditions Over Time. Habitat conditions are not usually static. Either through natural processes or human activity, habitat generally evolves and may change in quality and/or quantity. Imbedded in each cover type evaluation, change has been added to the model. To assess the change over the period of analysis, target years have been defined. At each target year, a change in the habitat variables may be noticed. Noticeable changes can be characterized by a change in habitat benefit output.

d. General Assumptions. Some maintenance of the project area would be required, with more intensive management being required over the first 5 years of the project to allow the planted vegetation to get established. If the city had not purchased the land, it would continue to be farmed and habitat value would be maintained at its current level.

TABLE G-2-1. Species Selected
(with Applicable Cover Types and Variable Associations)

FARM CREEK PROJECT SITE		
Species	Cover Types	Associated Variables
Marsh Wren	PEM	Percent Emergent Canopy
		Classification of Plant Growthform
		Percent Tree and Shrub Canopy
		Mean Water Depth
	PSS	Percent Emergent Canopy
		Classification of Plant Growthform
		Percent Tree and Shrub Canopy
		Mean Water Depth
Mink (Cover)	PEM	Percent Emergent Canopy
		Tree and Shrub Canopy
	PSS	Percent Emergent Canopy
		Percent Shrub Canopy
		Percent Tree Canopy
		Percent Tree and Shrub Canopy
Mink (Water)	PEM	Percent of Year with Surface Water
	PSS	Percent of Year with Surface Water
Chorus Frog	PEM	Water Clarity
		Percent Area with Suitable Water Depth
		Distance to Suitable Depth
		Distance Around Perimeter of Pond
		Amount of Suitable Depth
	PSS	Water Clarity
		Percent Area with Suitable Water Depth
		Distance to Suitable Depth
		Distance Around Perimeter of Pond
		Amount of Suitable Depth
Eastern Meadowlark	Grassland	Average Height of Herbaceous Canopy
		Distance to Perch Site
		Percent Canopy Cover of Grass
		Percent Herbaceous Canopy Cover
		Percent Shrub Crown Cover
Field Sparrow	Grassland	Average Height of Herbaceous Canopy
		Percent Canopy Cover of Grass
		Percent Shrub Crown Cover
		Percent of Total Shrubs < 1.5m (4.9 ft) tall
Wood Duck (Nesting)	PEM	Potential Nest Sites in Project Area
	PSS	Potential Nest Sites in Project Area
Wood Duck (Brood Cover)	PEM	Percent of Water Surface Covered by Potential Brood Cover
	PSS	Percent of Water Surface Covered by Potential Brood Cover
PEM=Palustrine Emergent Wetland		
PSS=Palustrine Scrub Shrub Wetland		
Grassland=Successional Grassland		

5. RESULTS OF HABITAT ANALYSIS

This section describes the benefits in AAHUs for the constructed wetlands and plantings associated with the Farm Creek project site. The alternatives considered were variations of one or two ponds constructed with various shoreline and prairie plantings schemes proposed and evaluated. The three alternatives evaluated in detail were:

- **Alternative 1**- a 4-acre pond with 1 row each of terrestrial and aquatic plantings and 20 acres of prairie plantings
- **Alternative 2**- a 3-acre and a 4-acre pond both with 1 row each of terrestrial and aquatic plantings and 35 acres of prairie plantings
- **Alternative 3**- a 3-acre and a 4-acre pond both with 3 rows each of terrestrial and aquatic plantings and 35 acres of prairie plantings

The proposed selected alternative would create 2 ponds—one 4 acres and the other 3 acres. The perimeter of each pond would be planted with 6 rows of vegetation—3 rows of aquatic and 3 rows of terrestrial plant species. An additional 35 acres of the farm field would be planted with native prairie plants to develop a total project area of roughly 45 acres.

The project would provide a combination of upland and wetland habitat features that include open water, seasonally wet areas, emergent vegetation, scrub/shrub woody vegetation, and open meadow/prairie. The habitat evaluation process utilized two types of species models: the single life requisite model and the multiple life requisite model. The multiple life requisite model looks at a species using more than one habitat feature that is required for different life stages. The overall outputs for the models selected show that the project area would provide a total of approximately 92 AAHUs. A breakdown of the model outputs is shown in Table G-2-2. A summary of individual species outputs for the three alternatives considered in detail can be found at the end of this appendix in Figures G-2-1 through G-2-3.

TABLE G-2-2. Overall Model Outputs

Model	Type of Model (SM / MM)*	AAHUs
Chorus Frog	SM	1.4
Eastern Meadowlark	SM	37.5
Field Sparrow	SM	49.1
Marsh Wren	SM	0.6
Mink	SM	2.3
Wood Duck	MM	0.9

*SM= single life requisite model
MM= multiple life requisite model

Once the AAHUs were computed, the environmental outputs for each potential measure were calculated and their cost was annualized. Table G-2-3 summarizes the outputs and costs associated with each component considered for the proposed project.

TABLE G-2-3. Farm Creek Environmental Output and Costs of Each Measure

Potential Measure	Symbol	Output AAHUs*	Cost**	Annualized Cost***
Watershed Wetland Restoration	**E**			
No Action	E0	0	$0	$0
4-Acre Wetland Pond (no shoreline or terrestrial plantings)	E1	1	$295,000	$23,900
4-Acre Wetland Pond (1 row each shoreline and terrestrial plantings)	E2	3	$306,000	$24,800
4-Acre Wetland Pond (3 rows each shoreline and terrestrial plantings)	E3	5	$328,000	26,600
4-Acre and 3-Acre Wetland Ponds (no shoreline or terrestrial plantings)	E4	2	$528,000	$42,800
4-Acre and 3-Acre Wetland Ponds (1 row each shoreline and terrestrial plantings)	E5	6	$549,000	$44,500
4-Acre and 3-Acre Wetland Ponds (3 rows each shoreline and terrestrial plantings)	E6	10	$623,000	$50,500
Prairie Plantings	**F**			
No Action Prairie	F0	0	$0	$0
20 Acres Prairie Plantings	F1	32	$29,000	$2,400
35 Acres Prairie Plantings	F2	56	$51,000	$4,100

* Outputs are calculated as Average Annual Habitat Units (AAHUs).
** Represents initial construction costs only.
*** Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.

After the environmental outputs and annualized costs were calculated, the incremental analysis of alternatives was completed.

6. INCREMENTAL ANALYSIS OF ALTERNATIVES

Changes in the quality and/or quantity of HUs occur as a habitat matures naturally or is influenced by development. These changes influence the cumulative HU derived over the life of the project. Cumulative HUs are annualized and averaged. This determines what is known as the Average Annual Habitat Units (AAHUs). AAHUs are used as an output measurement to compare all the features and project as a whole. Table G-2-4 summarizes the outputs and costs associated with all alternatives.

TABLE G-2-4. Farm Creek Alternative Evaluation

No.	Alternatives	Symbol	Output (AAHUs)*	First Cost Const. **	Annualized Cost ***	Annualized Cost/AAHUs
1	No Action	E0+F0				
2	4-Acre Wetland Pond + no prairie plantings	E1+F0	1	$295,000	$23,900	$23,900
3	4-Acre and 3-Acre Wetland Ponds + no prairie plantings	E4+F0	2	$528,000	$42,800	$21,400
4	4-Acre Wetland Pond (1 row each shoreline and terrestrial plantings) + no prairie plantings	E2+F0	3	$306,000	$24,800	$8,265
5	4-Acre Wetland Pond (3 rows each shoreline and terrestrial plantings) + no prairie plantings	E3+F0	5	$328,000	$26,600	$5,315
6	4-Acre and 3-Acre Wetland Ponds (1 row each shoreline and terrestrial plantings) + no prairie plantings	E5+F0	6	$549,000	$44,500	$7,415
7	4-Acre and 3-Acre Wetland Ponds (3 rows each shoreline and terrestrial plantings) + no prairie plantings	E6+F0	10	$623,000	$50,500	$5,050
8	4-Acre Wetland Pond + 20 acres prairie plantings	E1+F1	33	$324,000	$26,300	$795
9	4-Acre Wetland Pond (1 row each shoreline and terrestrial plantings) + 20 acres prairie plantings	E2+F1	35	$335,000	$27,100	$775
10	4-Acre Wetland Pond (3 rows each shoreline and terrestrial plantings) + 20 acres prairie plantings	E3+F1	37	$357,000	$28,900	$780
11	4-Acre and 3-Acre Wetland Ponds + 35 acres prairie plantings	E4+F2	58	$579,000	$46,900	$810
12	4-Acre and 3-Acre Wetland Ponds (1 row each shoreline and terrestrial plantings) + 35 acres prairie plantings	E5+F2	62	$600,000	$48,600	$785
13	4-Acre and 3-Acre Wetland Ponds (3 rows each shoreline and terrestrial plantings) + 35 acres prairie plantings	E6+F2	66	$674,000	$4,600	$830

* Outputs are calculated as Average Annual Habitat Units (AAHUs).
** Represents initial construction costs and real estate costs.
*** Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.

While the previous table lists all the alternatives available for consideration, not all are feasible. Some alternatives will not stand alone to produce adequate habitat benefits and/or are too costly to consider without combining with other alternatives. Also, while prairie planting by itself is less costly per acre

and produces more habitat benefits than wetland construction, it does not meet the requirements of the project undertaking. A combination of wetland construction and prairie planting meets the project requirements and provides a synthesis of habitat benefits that is more desired than either component alone.

All alternatives involving the 4-acre wetland provided cost-effective outputs. Three plans were considered "best buy" plans—Alternatives 9, 12, and 13. Table G-2-5 shows the best buy plans for the project. The No Action plan is always considered a best buy, as well as the largest proposed project, because it costs nothing and is the largest project because it provides the maximum habitat benefits.

TABLE G-2-5. Incremental Cost Analysis of Best Buy Plans for Farm Creek

No.	Alternatives	Symbol	Output AAHUs*	Annual Cost **	Avg. Annual Cost/AAHU	Inc. Cost **	Inc. Output*	Inc. $/ AAHU
1	No Action	F0	0	0.0	0	0	0	0
9	4-Acre Wetland Pond (1row each shoreline and terrestrial plantings) + 20 acres prairie plantings	F8	35	$27,100	$775	$27,100	35	$775
12	4-Acre and 3-acre Wetland Ponds (1 rows each shoreline and terrestrial plantings) + 35 acres prairie plantings	F11	62	$48,600	$785	$21,500	27	$796
13	4-Acre and 3-Acre Wetland Ponds (3 rows each shoreline and terrestrial plantings) + 35 acres prairie plantings	F12	66	$54,600	$830	$6,000	4	$1,500

* Outputs are calculated as Average Annual Habitat Units (AAHUs).
** Annualized cost is initial construction cost based on a 25-year project life, 6-3/8% interest rate.

These plans provide the greatest increase in benefits for the least increase in costs. In a general sense, this conveys the fact that for the aquatic areas the 4-acre wetland pond creates habitat at a lower incremental cost than the 3-acre wetland pond. Increasing wetland plantings provides additional habitat benefits, but at a higher incremental cost. For the prairie planting areas, the larger the area planted the better, since the cost is relatively low when compared to the increase in benefits.

7. DISCUSSION

This section interprets the numerical results of the analysis into a narrative format that will provide insight as to how the numbers were derived and what they mean in terms of the predicted outcome of the project. [All EXHEP field data sheets and output sheets are on file at the Rock Island District.]

Results of the evaluation for the proposed alternatives were compared as increments to costs associated with the implementation of each alternative plan. This incremental cost analysis is discussed above and in Section 2 of the main report under "Results of Incremental Cost/Cost Effectiveness Analysis."

The project site is located on the east edge of Washington, Illinois, in a predominately rural, agricultural area. Because of the nature of the farm community, habitat values are not necessarily low, but they are biased. While the human population in these areas has a low density and is scattered over a large area, intensive farming activities disrupt the plant and animal communities of these areas. These natural resource populations must deal with large tracts of mono-cultured habitat as well as physical disruptions of the soil and the application of chemicals used to maintain the high levels of production desired by today's farmer. While many modern species have adapted to this disturbed environment, it is not the optimal setting that they need to thrive.

The proposed project, although small in scale, would provide a measure of relief to many area species that currently contend with the altered resources of this agricultural environment. The proposed restoration project would provide resources that once occurred naturally over the length of Farm Creek long before the settlement of the area, emergent vegetation, scrub-shrub, and prairie. Individually, the project components provide small-scale benefits, but when combined, their benefits become much larger because of the ecosystem they create.

The evaluation process took into account these project components through the assessment of information requested by, and input into, the EXHEP program. The project biologists discussed the factors for project components and assigned relative values using professional judgment and extrapolating for probable future conditions. This information was input into the EXHEP program along with present conditions (baseline), and comparisons were made for projected future with- and without-project conditions. HSI values were established with these data, which then provided the measure for "quality" of habitat for each project condition being evaluated. Once the habitat quality value was assigned, the EXHEP software then calculated habitat units by multiplying by the *quantity* of habitat produced, in this case size of ponds, associated wetland perimeter created and prairie planted.

Because the HSI models selected for this evaluation cover the life requirements of a broad range of species, the HSI values generated by the program apply to many other species than just the models evaluated. The model is in effect evaluating each species in relation to a cover type that the project proposes to generate and the succession of that cover type over the length of the project life. The cover types being evaluated are palustrine emergent wetland, palustrine scrub shrub wetland, and grassland. Within the program various life requisites and variables are looked at. Some of the items considered are emergent, grass, shrub and tree canopy covers; average height of herbaceous canopy; pond perimeter; % of year with surface water available; water clarity and amount of suitable depth; potential brood cover and much more. The complete list can be found in table G-2-1, following Section 3 earlier in this appendix.

Also, because the values of the habitat evaluated fluctuate over time, the HSI values vary as the target years are examined. Figures G-2-1 thru G-2-3, found at the end of this appendix, show that for all alternatives evaluated in detail, virtually no HUs were produced for the first 5-10 years of the project's life. Much of this is due to the small size of the wetlands being constructed and the fact that the plantings would take some time to establish and begin producing adequate habitat for the species being evaluated. This is not to say that there would be no benefits from the project for those first few years. It's just that they would be extremely limited until the wetlands develop. Over time the habitat of the project area would change as the plants spread and build their own niche in the developing ecosystem. This maturing of the project's habitat is reflected in the HEP numbers by the increase of HUs over time.

In a few cases, the HU increase over time levels out or begins to decline. This indicates that the cover type or habitat that has established for a particular species has been optimized or limited in some way; or the cover type would not provide any further improvement. This may arise because of limitations in the plan (i.e. size of project) or other changes that occur naturally over time (e.g., vegetation maturing

and dying out). Some of this may be the result of other more aggressive species stalling the spread of other less aggressive species or actually reducing an area of a particular cover type.

A way to even out the HUs over the life of a project is to annualize the habitat units. By annualizing these values, an AAHU can be found and used in the calculation for the cost of the project over time. These changes depend on species requirements and what is determined to be an appropriate succession or evolution for the project and its components for future conditions.

The habitat evaluation results showed that this project generated stable HSI values for target species over the project life. The output values also showed that the prairie planting produced greater habitat units per acre than wetland creation alone. This is understandable when considering that wetland systems are much more complex and generally work best on a larger scale than those being proposed by this project. Even with the limitation of land available for the project, the optimum size wetlands for the area available to the project were designed. Other limitations are land contours and restrictions of the area for allowable impacts resulting from the impoundment of water during flood conditions in the upper reaches of the unnamed watershed to Farm Creek where the project is located. It was therefore determined that the best approach to increase habitat value for the area was to incorporate ecosystem design and enhance the wetland habitat by association with prairie habitat. This was done, and results of the habitat evaluation showed that the habitats provided not only complemented each other, but also produced a functioning system with improved habitat benefits over time.

Figure G-2-1

Alternative 1

AAHU Calculation Summary - With Project							
Species	TY 0 HUs*	TY 1 HUs	TY 6 HUs	TY 11 HUs	TY-31 HUs	Cumulative HUS (at TY 31)	Net AAHUs
Chorus Frog	0	0	0	0.12	.20	4.9	0.16
Eastern Meadowlark	0	0	0	0.34	0.39	729.5	26.32
Field Sparrow	0	0	0	0.45	0.82	1261.2	44.3
Marsh Wren	0	0	0	0.19	0.21	6.1	0.21
Mink	0	0	0	0.23	0.33	8.58	0.29
Wood Duck	0	0	0	0.2	0.3	7.67	0.26
						Total Net AAHUs	**71.54**

*All calculations are assumed against a baseline of minimal habitat or 0 HU value.

Figure G-2-2

Alternative 2

AAHU Calculation Summary - With Project							
Species	TY 0 HUs*	TY 1 HUs	TY 6 HUs	TY 11 HUs	TY-31 HUs	Cumulative HUs (at TY 31)	Net AAHUs
Chorus Frog	0	0	0.22	0.27	0.54	20.89	0.75
Eastern Meadowlark	0	0	0	0.34	0.39	323.93	11.69
Field Sparrow	0	0	0	0.45	0.82	559.9	19.67
Marsh Wren	0	0	0.22	0.22	0.3	12.93	0.48
Mink	0	0	0.28	0.37	0.71	27.46	0.98
Wood Duck	0	0	0.2	0.3	0.4	17.67	0.64
						Total Net AAHUs	**26.52**

* All calculations are assumed against a baseline of minimal habitat or 0 HU value.

Figure G-2-3

Alternative 3

AAHU Calculation Summary - With Project							
Species	TY 0 HUs*	TY 1 HUs	TY 6 HUs	TY 11 HUs	TY-31 HUs	Cumulative HUS (at TY 31)	Net AAHUs
Chorus Frog	0	0	0.27	0.44	0.63	37.91	1.38
Eastern Meadowlark	0	0	0.46	0.46	0.36	817.02	37.52
Field Sparrow	0	0	0	0.58	0.82	1377.34	49.06
Marsh Wren	0	0	0.23	0.26	0.2	15.95	0.62
Mink	0	0	0.46	0.77	0.98	61.85	2.26
Wood Duck	0	0	0.2	0.3	0.4	24.67	0.90
					Total Net AAHUs		**91.74**

*All calculations are assumed against a baseline of minimal habitat or 0 HU value.

APPENDIX L

DISTRIBUTION LIST

DISTRIBUTION LIST

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(ECOSYSTEM RESTORATION)
FEASIBILITY STUDY WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

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