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POLICIES FOR HANDLING IMPACTS OF OFFSHORE OIL AND ENERGY FACILITIES IN MIDDLESEX COUNTY

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POLICIES FOR HANDLING THE IMPACTS FROM OFFSHORE OIL AND COASTAL ENERGY FACILITIES IN MIDDLESEX COUNTY

FINAL REPORT

U.S. DEPARTMENT OF COMMERCE NOAA
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Prepared By The

Middlesex County Planning Board

Environmental Systems Section

New Brunswick, New Jersey

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ABSTRACT

This report presents policies for handling the impacts from offshore oil and coastal energy facilities that might seek to locate in Middlesex County in the future. These policies are the result of a year long energy facilities planning effort funded and conducted with the New Jersey State Department of Environmental Protection's Office of Coastal Zone Management. In essence, the policies state that offshore oil and coastal energy facilities may be located in the coastal, already industrialized areas of Middlesex County only if they do exceed public health and safety standards and do not create excessive costs for tax payers and local government. In that present institutional arrangements are identified as inadequate, recommendations are also made toward the development of an adequate and efficient system of management techniques to insure public health and safety. Information as to the number and type of energy facilities currently located in Middlesex County, as well the identification of the potential for additional energy facilities seeking to locate in the County are also presented.

TABLE OF CONTENTS

INTRODUCTION
The Study of Offshore Oil and Coastal Energy Facilities I
The Audience II
Statement of Purpose II
Objectives III

I. Existing Energy Facilities: Components in a Regional Pattern of Energy Supply 1
A. The Current Pattern of Supply 1
1. The United States 1
2. The North Atlantic Region 2
B. Inventory of Existing Facilities in Middlesex County 4
1. Petroleum Refineries 4
2. Marine Terminals 10
3. Pipelines and Pipeline Terminals 13
4. Petrochemical Industry 16

II. Future Demand for Petroleum and Petroleum-Related Facilities 18
A. Projections of Future Energy Demands 18
B. The Potential for New Growth in Petroleum-Related Facilities 22

III. The Potential for OCS Related Facilities Locating in Middlesex County 36
A. Introduction 36
1. High Development Projection 39
2. Medium Development Projection 45
3. Low Development Projection 47
4. Summary 49

IV. Development Opportunities for OCS and Energy Facilities 50
A. Areas Meeting Industrial Siting Criteria of Petroleum-Related Facilities 51

V. Potential Distributions and Impacts of Energy Facilities in Middlesex County 62

VI. The Public Participation Program: Developing Siting Policies for Energy Facilities 76

VII. Policies for Handling the Impacts from Offshore Oil and Coastal Energy Facilities 81
A. General Policies 81
B. The Suitability and Non-Suitablity of Siting Energy Facilities in Middlesex County: A General Statement 84
C. Suitability of Specific Offshore Oil and Coastal Energy Facilities in Middlesex County 85
1. Offshore Oil Support Facilities 86
2. Transportation and Storage Facilities 88
3. Processing Facilities 88
D. Specific Policies
1. Deepwater Port 89
2. Liquified Natural Gas Facilities 91
3. Offshore Oil and Gas Facilities 93

VIII. A Management System: Next Steps in Coastal Zone Management 94
A. Recommendations: Toward the Development of a Coastal Zone Management System 94
B. Recommendations: County Role in Coastal Energy Facility Siting 96
1. County/State Relationships 96
2. County/State Relationships 96
a. Coordination with Other Counties 96
b. Coordination of Coastal Planning with County's Master Plan 97
c. County/Municipal Relationships 98
d. County/Public Relationships 98
C. Next Steps: A Strategy 99

Appendix A
Appendix B

INTRODUCTION

The Study of Offshore Oil and Coastal Energy Facilities

Middlesex County's Offshore Oil and Coastal Energy Facilities Planning Study is part of a joint State/Federal government effort to develop comprehensive policies and programs for the management of coastal areas. The coastal zone is an area in which industry, trade, recreation, waste disposal, and conservation interests all press most sharply on the limited resources of the environment. The rapidly increasing pressures in the coastal zone are created by problems of conflicting use, as evidenced by the continuing destruction of valuable coastal wetlands and beaches. These competing pressures are best dealt with by a management system which permits conscious and informed decision-making to be made from among development alternatives. The United States Congress enacted the Coastal Zone Management Act (CZMA) of 1972 (Public Law No. 92-583; 90 Stat. 1013) to help institute such a management system for coastal areas.

Section 305 of the CZMA authorizes funds for the development of State coastal zone management programs to each coastal state. New Jersey's Department of Environmental Protection Office of Coastal Zone Management (NJDEP/OCZM) is nearing the end of its third year CZMA authorized grant. As part of its third year program NJDEP/OCZM contracted with eleven coastal county planning boards and one county environmental agency to begin preliminary planning for the onshore impacts of offshore oil and other coastal energy facilities.

The Middlesex County Planning Board's Offshore Oil and Coastal Energy Facilities Planning Study is funded with a grant from a DEP/OCZM contract.

The submission of this final report is in fulfillment of contractual obligations. The policies, strategies, impacts and positions set forth in these pages represent a year long effort which has brought forth a process of addressing the questions and concerns of energy facility siting in Middlesex County. On-going efforts toward further development of these policies are now required. The process of effectuating the goals embodied in the emerging siting policies must now be put in motion.

The Audience

The report is primarily addressed to municipal, county and state officials who may soon be faced with decisions regarding the development of offshore oil and coastal energy facilities. Siting policies emerging from coordinative efforts with local government officials, business and industry representatives, civic and environmental groups, and other interested parties are presented, and a strategy for future planning efforts is outlined. The background and basis for these policies are also included in the form of information on: 1) existing petroleum facilities in Middlesex County; 2) requirements regarding the types of new facilities, and impacts of new facilities that might seek to locate in Middlesex County; and 3) the public participation efforts which have resulted in the formulation of siting policies and strategy. The policies, data, and documentation are presented for use by all parties interested in developing an understanding of offshore oil and coastal energy facilities and addressing the issues and impacts of siting energy facilities within the County.

Statement of Purpose

It has been estimated that the amount of energy demanded by the North Atlantic Region will increase by more than 100 percent between 1975 and

2000. This increasing demand will result in changes in the number and types of energy facilities needed in the region. This report identifies the policies for handling the impacts from energy facilities that have begun to emerge from our OCS and Energy Facility Planning efforts.

This report does not attempt to definitively determine the suitability of energy facilities in Middlesex County. Instead, the decision of siting energy facilities is recognized to be an evaluative process. Positive and negative impacts of facility siting must be carefully assessed, and the values that are placed on economic growth, environmental quality, natural resources, and the public's health, safety and welfare must be clearly defined so that proper siting decisions can be made. Energy facility siting decisions are also recognized to occur at many different levels and in varying jurisdictions of government regulatory agencies and ruling bodies. For these reasons a dynamic approach for energy facility siting decisions is proposed and presented in the following pages.

Objectives

This report was created with the following objectives:

1) To inventory existing energy facilities in Middlesex County, and describe their relationship to the overall regional network of energy facilities and the current pattern of energy supply;

2) To identify the potentials for future energy facility development in the County (including offshore oil related facilities), and project possible distributions of these facilities in those areas of the County meeting basic industrial siting criteria; and

3) To describe the public participation program which was undertaken and which serves as the foundation on which siting policies for energy facilities have been developed.

4) To present the policies which are emerging to handle the impacts of offshore oil and coastal energy facilities.

5) To provide municipal, county, and state officials and all interested parties with information useful in dealing with the impacts of energy facility siting.

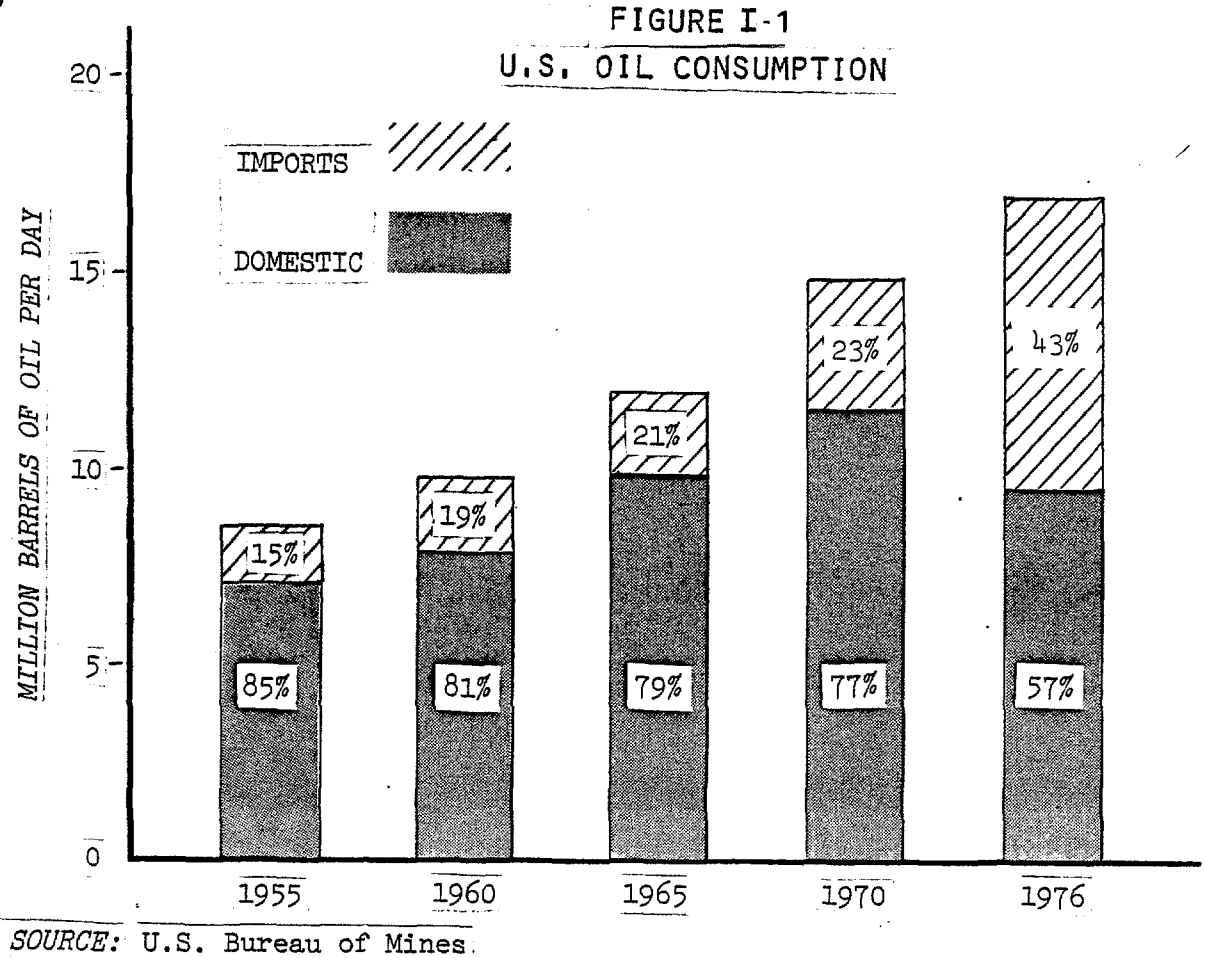
I. EXISTING PETROLUEM-RELATED FACILITIES: COMPONENTS IN A REGIONAL PATTERN OF ENERGY SUPPLY

A. THE CURRENT PATTERN OF PETROLEUM SUPPLY

1. The United States

The United States uses more energy per person than any other nation in the world. Petroleum is the nation's primary energy source, accounting for 45% of the nation's consumption. In the past twenty years, oil consumption in the U.S. has nearly doubled. As our nation's hunger for petroleum has been steadily rising, domestic production, having reached a peak of 11.2 million barrels per day (MB/D) in 1970, has been steadily declining. To fill the increasing gap between demand and domestic supply, foreign oil is being imported in ever increasing quantities. Figure I-1 shows these trends in U. S. oil consumption.

FIGURE I-1
U.S. OIL CONSUMPTION



SOURCE: U.S. Bureau of Mines

Foreign oil imports have increased significantly since 1970, when domestic production first began declining. Between 1955 and 1970, the amount of foreign oil imported to this Country increased by 2.1 MB/D. Since 1970 foreign imports have increased by 3.9 MB/D.

2. The North Atlantic Region

The East Coast of the United States, which comprises the Petroleum Administration for Defense (PAD) District I, and the North Atlantic Region, which comprises the northern extent of PAD I, are shown in figure I-2. The North Atlantic Region includes the greater portion of a Northeastern megalopolis which ranges from Boston, Massachusetts to Richmond, Virginia. The vast concentration of population, industry, and related economic activity located within this region represents one of the largest markets for petroleum products in the world. The North Atlantic Region, however, is currently an area almost entirely lacking in any petroleum resources of its own and is therefore most dependent on imports of oil from both foreign sources and other regions of the country, particularly the Gulf Coast. The majority of oil delivered to the North Atlantic Region comes in the form of refined petroleum products (65%)[1]. Originating from both domestic and foreign sources and processed at refineries outside of the PAD I district, these refined products are transported via tanker and pipeline to terminals in the North Atlantic Region where they are temporarily stored and then distributed to final market.

The remaining oil imported to the North Atlantic comes in the form of crude oil and is transported primarily from foreign sources via

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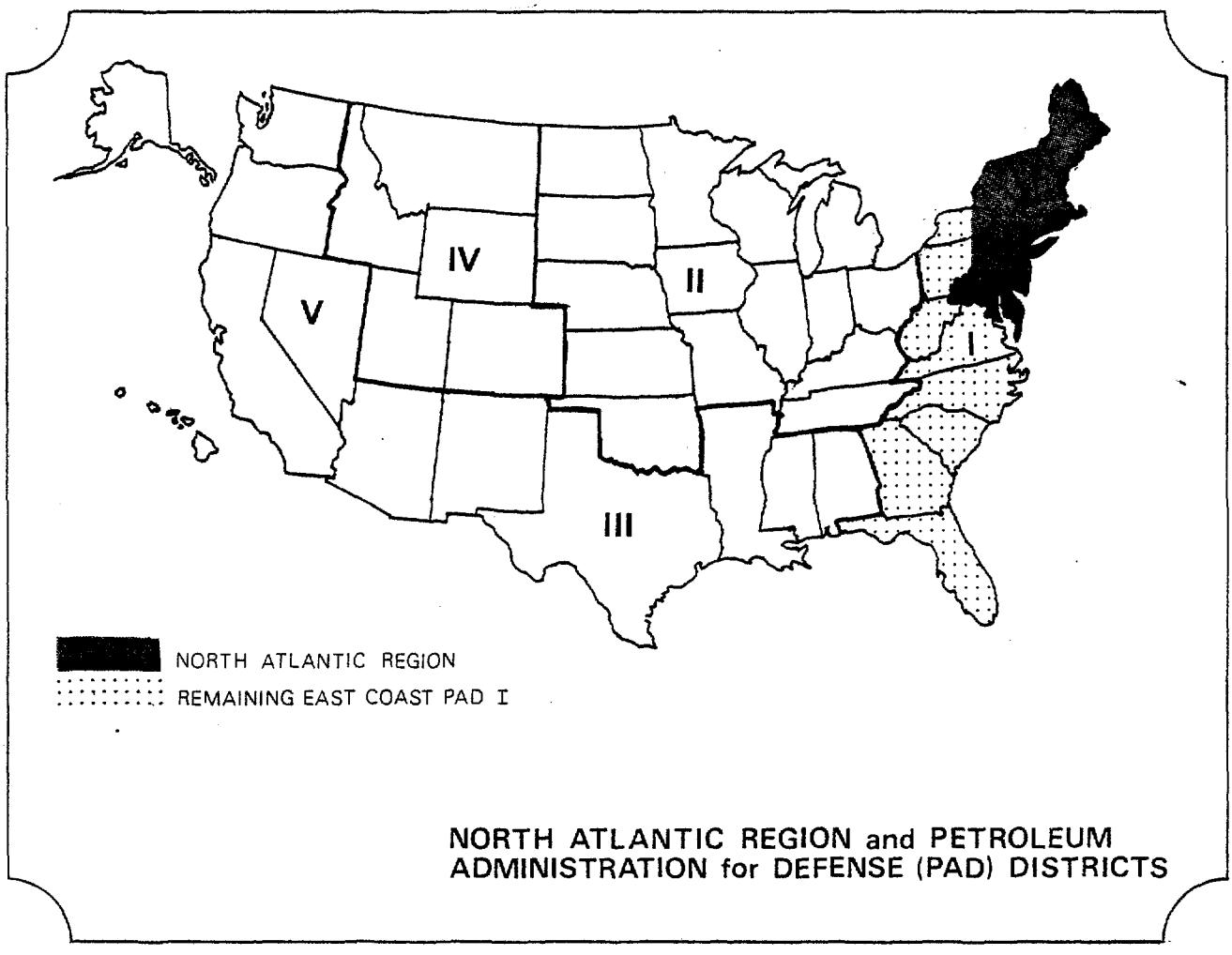
1) Derived from Mineral Industrial Surveys, U.S. Dept. of Interior, Bureau of Mines, "Supply, Demand, and Stocks of All Oils by P.A.D. Districts and Impacts to the United States by Country: Year 1976", and "Petroleum Refineries in the United States and Puerto Rico, January 1976, - Crude Oil Capacity -

FIGURE I-2



tankers to refineries located in the region where it is processed to obtain fuels (i.e., gasoline, jet fuel, heating oil, and residual oil used for electrical generation), feedstocks for petrochemical products such as plastics and fertilizers, waxes, lubricants, coke, and asphalt.

The following section discusses the various energy facilities that are the physical components in the regional pattern of energy supply which to date has had profound impacts on the landscape, environmental quality, and social and economic character of Middlesex County. Facilities located in Middlesex County are specifically identified and described and their relationships to the overall regional network of energy facilities and the current pattern of energy supply are examined.

B. INVENTORY OF EXISTING PETROLEUM FACILITIES IN MIDDLESEX COUNTY

1. Refineries

The modern refinery consists of a series of units designed to produce a number of petroleum products by physically and chemically altering all or part of the crude oil stream. The complexity of the system depends on the type of crude being refined and the number and characteristics of the products being refined. In addition to the processing units, other components of the refinery include storage tanks, influent and effluent water treatment facilities, ancilliary buildings and services (administration building, machine shop, storage and warehouse, electrical substation, firehouse, pumping stations, truck loading terminals, etc.) transportation systems (road, marine terminal, pipeline, railroad spurs, parking lots, etc.) and a buffer zone.

According to the Bureau of Mines, as of 1976, there were 15 refineries with a combined total capacity of 1,614,200 barrels of oil per day in the North Atlantic Region (Table I-1). Refineries in the Middlesex and Union County/Arthur Kill area[2] (32%) and the Delaware River area (62%) constitute the largest concentrations of this existing capacity, producing a wide range of products including asphalt, coke, lubricants, and wax, but primarily refinery gasoline, jet fuels, and heating oils for the regional market (Figure I-3). The only other major refinery over 50,000 barrels/day in the North Atlantic region is along the York River in Virginia (3%). Three small asphalt refineries, one located in East Providence, R.I. and two in Baltimore, Md. account for only 2% of the regions' total capacity.

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2 The Exxon Bayway Refinery in Linden, Union County is included here due to major impacts on adjacent Middlesex County, such as employment opportunities, air pollution impact, etc.

REFINERY CAPACITY IN THE EAST COAST (PAD I)

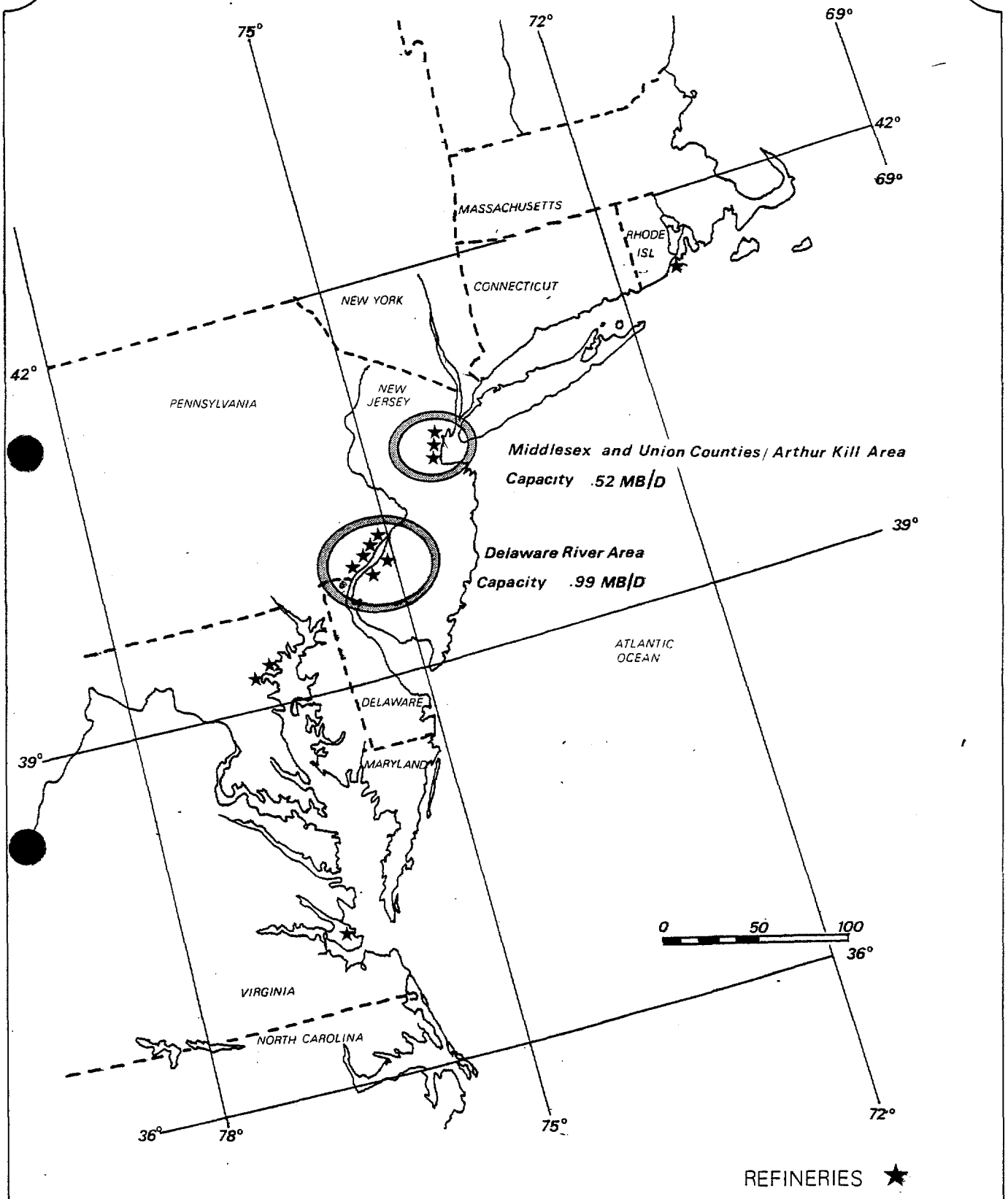
January 1, 1976

REGION/STATE	COMPANY	LOCATION	CAPACITY[1] (1,000 barrels/day)	PRODUCTS[5]
North Atlantic Region				
(Middlesex & Union Co./Arthur Kill) New Jersey	Amerada Hess Corp.	Woodbridge	67.9[2]	G
	Chevron Oil Co.	Perth Amboy	160.0[3]	G-A
	Exxon Co.	Linden	295.0[3]	G-A
		Subtotal	522.9	
(Delaware River)				
New Jersey	Mobil Oil Corp.	Paulsboro	98.0	G-K-L-W
	Texaco, Inc.	Westville	88.0	G
Eastern Pennsylvania	Atlantic Richfield Co.	Philadelphia	185.0[4]	G-A
	BP Oil Corp.	Marcus Hook	143.0	G
	Gulf Oil Corp.	Philadelphia	174.3	G
	Sun Oil Corp.	Marcus Hook	165.0	G-A-L-W
Delaware	Getty Oil Co.	Delaware City	140.0	G-K
		Subtotal	993.3	
(Remaining Region)				
Virginia	Amoco Oil Co.	Yorktown	53.0	G-K
Maryland	Amoco Oil Co.	Baltimore	15.0	A
	Chevron Asphalt Co.	Baltimore	13.5	A
Rhode Island	Mobil Oil Corp.	E. Providence	7.5[6]	A
New Hampshire	A. Johnson & Co.	Newington	9.0	(NA)
		Subtotal	98.0	
		NORTH ATLANTIC REGION TOTAL	1,614.2	
Remaining East Coast				
New York	Ashland Oil Inc.	N. Tonowanda	64.0	G-A
	Mobil Oil Corp.	Buffalo	43.0	G-A
Western Pennsylvania	Pennzoil Co.	Oil City	10.0	G-L-W
	Pennzoil-Wolf's Head	Reno	2.1	L-W
	Quaker State Corp.	Emlenton	3.3	G-L-W
	Quaker State Corp.	Southport	6.5	G-L-W
	United Refining	Warren	52.0	G-A
	Valvoline Oil Co.	Freedom	6.8	L-W
	Witco Chem. Corp.	Bradford	9.0	G-L
West Virginia	Pennzoil Co.	Falling Rock	4.9	G-L-W
	Quaker State Corp.	Newell	9.7	G-L-W
	Quaker State Corp.	St. Marys	5.0	G-L-W
Georgia	Amoco Oil Co.	Savannah	13.0	A
	Young Refinery Corp.	Douglasville	5.0	A
Florida	Seminole Asphalt Refinery, Inc.	St. Marks	6.0	A
		REMAINING EAST COAST TOTAL	240.3	
	TOTAL REFINERY CAPACITY EAST COAST (PAD I)		1,854.5	

Source: U.S. Bureau of Mines. Mineral Industry Survey "Petroleum Refineries in the United States and Puerto Rico January 1, 1976"

(1) Crude oil distillation capacity
(2) Shutdown in 1974, but operable
(3) Up-to-date capacity information was obtained directly from these two companies
(4) 60,000 barrels/day. Shutdown, but operable
(5) Products: G-Gas and Oil; A-Asphalt; K-Coke; L-Lubricants; W-Wax
(6) Currently closed

FIGURE I-3



LOCATION of EXISTING REFINERIES on the NORTH ATLANTIC COAST

Middlesex County is the site of two of the five existing refineries in New Jersey (See map on pg. 9.). The Amerada Hess Corporation refinery in Woodbridge Township was constructed in 1958. One of the last two refineries built in the Northeast, it was shut down in 1974 with an operating capacity of 67,900 barrels per day. Cited in the decision to close the plant were expansion plans that were described by company officials as necessary in order to produce a sufficient profit but that were made economically impractical by delays resulting from environmental lawsuits. Nevertheless, this refinery is still maintained and operates a marine terminal and storage facilities there to handle the delivery of refined petroleum products. The capacity set aside by the closing of this refinery was more than taken up in Hess's huge new refinery in the Virgin Islands (595,000 barrels/day).

The Chevron Oil Company refinery has been in continuous operation on a 325 acre site in Perth Amboy since 1950. It is on the site of the old Barber Oil refinery built in the early 1900's. The Chevron facility presently refines crude oil originating exclusively from foreign sources. On the average one tanker is received at the dock facilities every three days. The average tanker capacity is 500,000 barrels. Larger size tankers that, when fully loaded, are unable to navigate to the dock facilities because of insufficient channel depth must weigh anchor in the New York Harbor area off the eastern shore of Staten Island where barges unload just enough crude oil to allow the tanker to reach the Perth Amboy waterfront.

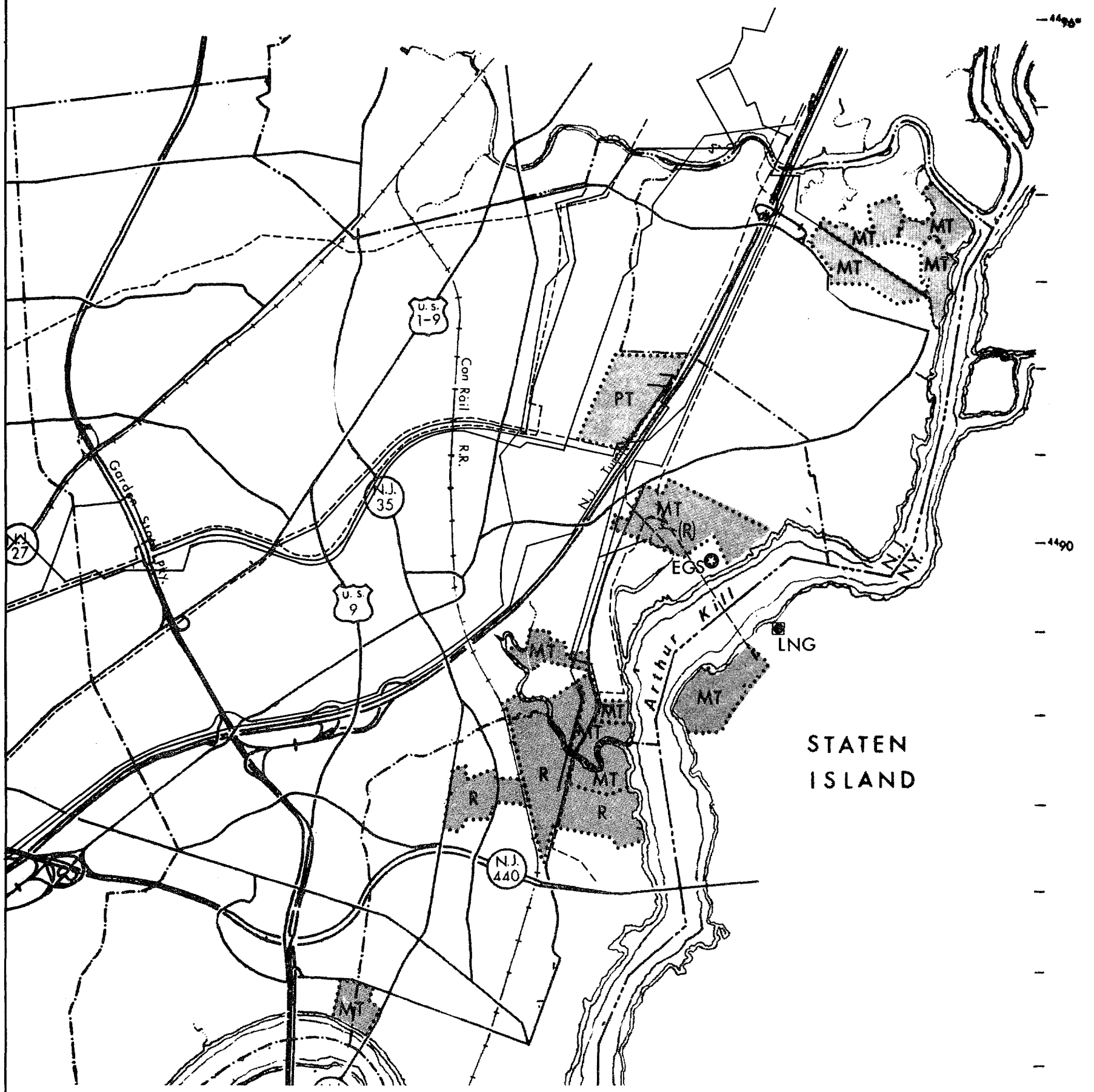
The refinery operations are geared toward removing the high concentrations of sulfur found in the foreign crude oil Pollution control

facilities treat the hydrogen and ammonia sulfides that occur as a by-product of the refinery operation. In addition waste water treatment facilities and oil spill containment equipment offer additional environmental safeguards.

Motor gasoline and No. 2 fuel oil are principal products refined at this 160,000 barrel/day facility. Following the preparation of an environmental impact assessment and various permit processes, Chevron was permitted to undertake an approximately 80,000 barrel/day expansion. Expansion plans were predicated on projections of future demands for the Chevron products in its market region. The market region which this refinery serves encompasses 13 states, stretching from Maine to Virginia.

Total storage capacity for the Chevron refinery complex is approximately 8.0 million barrels. Of this total capacity, 1.5 million barrels is for crude oil storage. Daily water needs of the operation include 50 million gallons per day of brackish cooling water obtained from the Arthur Kill. Two million gallons per day of fresh water for producing steam and for potable purposes are obtained from the Middlesex Water Company. The refinery employs 480. Because of its just completed expansion, Chevron is paying $4 million in taxes per year to the City of Perth Amboy.

The following map of 1977 Energy Facilities (page 9.) was derived through interpretations of 1974 aerial photographs and direct contacts with some of the companies that own facilities in the County.



Scale In Feet
0 4000 8000

Map prepared by the Middlesex County Planning Board, June 1977.

PROCESSING

REFINERIES — R

STORAGE

MARINE TERMINAL — MT

PIPELINE TERMINAL — PT

RESEARCH

NUCLEAR — N

DISTRIBUTION

OIL PIPELINE

GAS PIPELINE

INTERCONNECTION

PUBLIC UTILITIES

LNG FACILITY — LNG

SNG PLANT — SNG

ELECTRIC GENERATING STA. — EGS

1977 ENERGY FACILITIES – Middlesex County, N. J.

CHANNEL DATA (1-27)

RARITAN RIVER

The controlling depths at Mean Low Water were 10 feet for a width of 100 feet from the Washington Canal to the New Jersey Turnpike Bridge; thence 9 feet for a width of 100 feet to New Brunswick.

Northwest Reach

1.2 Naut. Mi., 200 ft. w. - 15 ft. MLW

1 — 2 — 3

1. Navigation Marker #31
2. Overhead Power Cable, Auth. Cl. 128 ft.
3. Navigation Marker #30

Crab Island Reach

1.2 Naut. Mi., 200 ft. w - 15 ft. MLW
3. Navigation Marker #30
4. Navigation Buoy #25

Red Root Reach

1.5 Naut. Mi., 300 ft. w. - 25 ft. MLW
4. Navigation Buoy #25
5. Navigation Marker #14

Titanium Reach

0.6 Naut. Mi., 300 ft. w. - 25 ft. MLW

6 — 7 — 8

6. Crossman Dock
7. MCSA Dock
8. Navigation Buoy #1

Keasby Reach

0.9 Naut. Mi., 300 ft. w - 25 ft. MLW

5/8 — 9 — 10

5/8 Navigation Marker #14/Navigation Buoy #1
9. Governor Thomas E. Driscoll and Thomas A. Edison Bridges - Fixed Bridges, Hor. cl. 199 ft., Vert. cl. 134 ft.
10. Victory Bridge - Swing Bridge, Hor. cl. 140 ft., Vert. cl. 28 ft.

Sand Point Reach

0.9 Naut. Mi., 300 ft. w. - 25 ft. MLW
10. Victory Bridge
11. Railroad Bridge - Swing Bridge, Hor. cl., North Draw 132 ft., Hor. cl., South Draw 133 ft., Vert. cl. 8 ft., Overhead power cable Auth. cl. 135 ft.

South Amboy Reach

1.2 Naut. Mi., 300 ft. w. - 25 ft. MLW

11 — 12 — 13

11. Railroad Bridge
12. Navigation Buoy, Raritan River Cutoff
13. Navigation Marker #12

Great Beds Reach

0.6 Naut. Mi., 300 ft. w. - 25 ft. MLW
13. Navigation Marker #4
14. Navigation Buoy #5

Raritan River Cutoff

1.0 Naut. Mi., 600 ft. w. - 20 ft. MLW
12. Navigation Buoy, South Amboy Reach
13. Intercept with Ward Point Bend (west)

RARITAN BAY/ARTHUR KILL

Red Bank Reach

1.2 Naut. Mi., 600 ft. w. - 35 ft. MLW
16. Navigation Marker #35
17. Navigation Marker #46

Ward Point Bend (east)

1.1 Naut. Mi., 600-800 ft. w. - 35 ft. MLW
17. Navigation Marker #46
18. Navigation Marker #56

Ward Point Secondary Channel

0.9 Naut. Mi., 400 ft. w. - 30 ft. MLW
19. Navigation Marker #55
14. Navigation Buoy #5
17. Navigation Marker #46

Ward Point Bend (west)

1.3 Naut. Mi., 600-800 ft. w. - 35 ft. MLW
18. Navigation Marker #56
15. Intercept with Raritan River Cutoff
20. Navigation Marker #2

Outerbridge Reach

1.6 Naut. Mi., 600 ft. w. - 35 ft. MLW

20 — 21 — 22

20. Navigation Marker #2
21. Outerbridge Crossing - Cantilever Bridge, Hor. cl. 675 ft.; Vert. cl. 143 ft.
22. Navigation Buoy #5

Port Socony Reach

0.8 Naut. Mi., 600 ft. w. - 35 ft. MLW
22. Navigation Buoy #5
23. Navigation Buoy #8 - Intercept with Port Socony Dock approach
    NOTE: Dock approach decreases in depth from 34 ft. MLW at main channel to 11-1/2 ft. MLW at its extreme.
24. Navigation Marker #11

Port Reading Reach

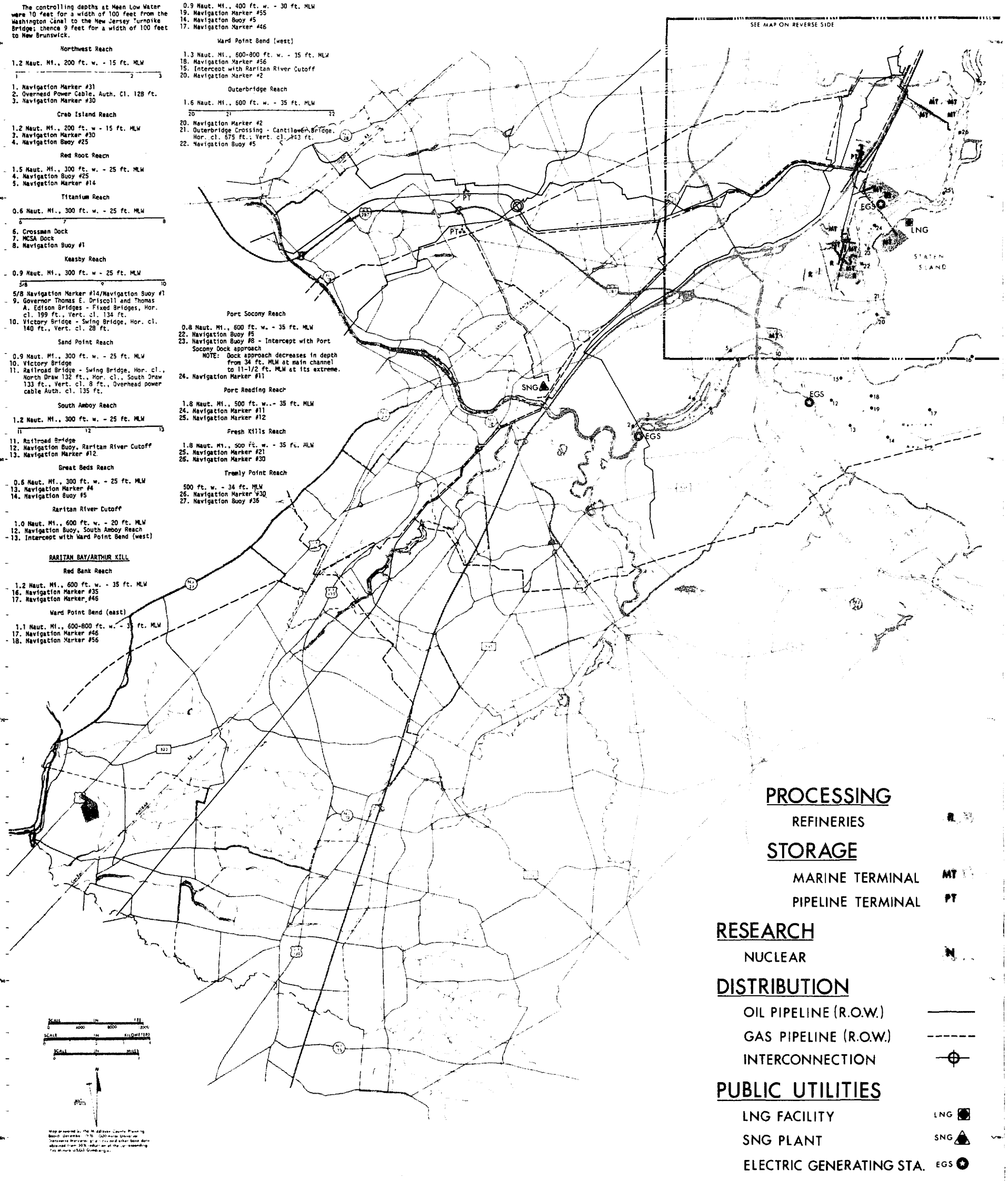
1.8 Naut. Mi., 500 ft. w.- 35 ft. MLW
24. Navigation Marker #11
25. Navigation Marker #12

Fresh Kills Reach

1.8 Naut. Mi., 500 ft. w. - 35 ft. MLW
25. Navigation Marker #21
26. Navigation Marker #30

Tremly Point Reach

500 ft. w. - 34 ft. MLW
26. Navigation Marker #30
27. Navigation Buoy #35



1977 ENERGY FACILITIES – Middlesex County, N. J.

2. Marine Terminals

Tankers, barges, and marine terminals are the facilities mechanism which transport refined petroleum products and crude oil over waterways. Marine terminals consist of berthing capacity for vessels, unloading and/or loading equipment, storage tanks, terminal control and safety equipment, and harbor and navigation facilities. Terminals vary in their size, function, loading facilities and processing equipment.

In the North Atlantic Region, existing marine terminals function to:

1) receive refined petroleum products from tankers and store them for delivery overland to final markets; and/or

2) receive crude oil from tankers for delivery to nearby refineries.

Tankers transport about 74% of the petroleum supplied to the North Atlantic Region. Petroleum storage capacity in the North Atlantic Region's ports is shown in Table I-2. The New York, N.Y./N.J. harbor area surpasses all other areas in the number and capacity of oil storage tanks. A large portion of this capacity is composed of tanks associated with the marine terminals to which crude oil and refined petroleum products are delivered. A scan of the N.Y./N.J. harbor area reveals that, by far, the majority of storage facilities are located along the Arthur Kill and the Kill Van Kull, the waterways bordering between New Jersey and Staten Island.

TABLE I-2
NORTH ATLANTIC PORTS
PETROLEUM STORAGE CAPACITY (1)

Port	Number of Tanks	Capacity (bbls)
Searsport, Maine	8	642,000
Portland, Maine	14	137,000
Portsmouth, New Hampshire	NA	NA
Salem, Mass.	NA	NA
Boston, Mass.	365	15,131,000
Fall River, Mass.	100	3,362,000
Providence, R.I.	442	8,616,000
New London, Conn.	38	1,050,000
New Haven, Conn.	182	6,362,000
Bridgeport, Conn.	58	1,871,000
New York, N.Y. & N.J.	3,428+	93,775,000
Albany, N.Y.	249	11,031,000
Port Jefferson, L.I., N.Y.	53	850,000
Delaware Bay	1,809	61,508,000
Baltimore, Md.	493	14,910,000
Potomac River, Md.	NA	NA
York River, Va.	NA	680,000
Hampton Roads, Va. (Norfolk and Newport News)	363	9,610,000
TOTAL	7,602+	229,535,000+

(1) Does not include numerous private facilities outside indicated port limits.

SOURCE: U.S. Army Corps of Engineers. Interim Report Atlantic Coast Deep Water Port Facilities Study. June 1973.

In Middlesex County, nine marine terminals occupy various waterfront acreage along the Arthur Kill and the Raritan River in the northeastern portion of the County (See map on pg. 9.). Eight of these terminals receive refined petroleum products from tankers and barges and store them for overland delivery via tank trucks, rail cars, and/or pipelines to final market. Although it is presently handling refined petroleum products, the Hess Terminal in Woodbridge is located at the site of the idle Hess refinery which at one time received crude oil deliveries. The only marine terminal currently receiving crude oil is part of the Chevron Oil Company refinery complex in Perth Amboy.

Marine terminals in Middlesex County are as follows:

Name	Location Waterbody/Municipality	Type of Oil
American Oil Co.	Arthur Kill/Carteret	Crude
American Oil Co. and Phillips Petroleum Co.	Arthur Kill/Carteret	Refined Products
Chevron Oil Co.	Arthur Kill/Perth Amboy	Refined Products
General American Transportation Co. (GATX)	Arthur Kill/Carteret	Refined Products
Hess Oil Co.	Arthur Kill/Woodbridge	Refined Products (at one time crude)
Hess Oil Co.	Arthur Kill/Perth Amboy	Refined Products
Hess Oil Co.	Raritan River/Perth Amboy and Woodbridge	Refined Products
Royal Petroleum Co.	Arthur Kill/Woodbridge	Refined Products
Shell Oil Co.	Arthur Kill/Woodbridge	Refined Products

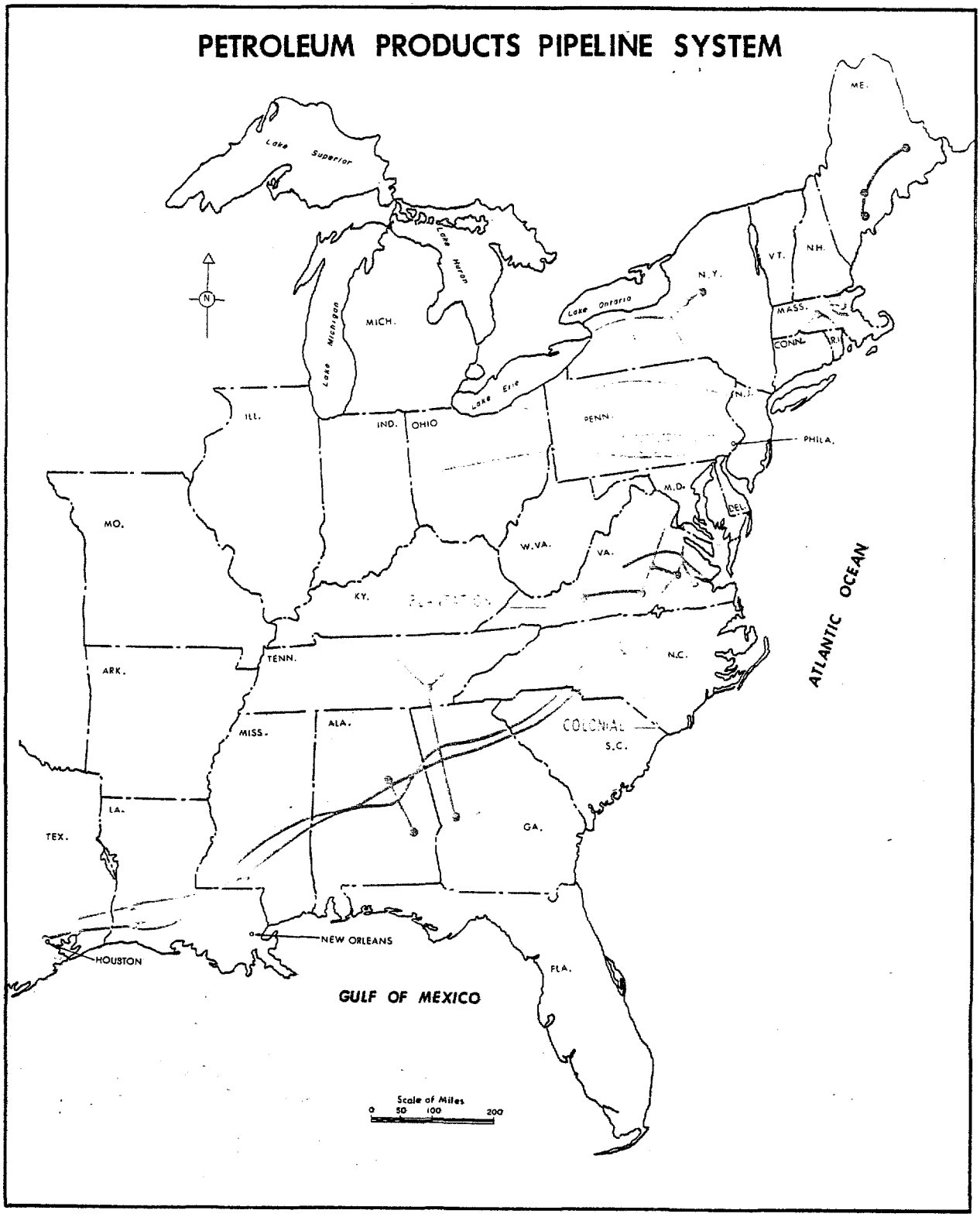
3. Petroleum Pipelines and Pipeline Terminals

Pipelines are the primary mode of overland transport for petroleum products. The major pipelines serving the North Atlantic Region are the Colonial Pipeline Company (the largest in the U.S.) and the Plantation Pipeline Company, both of which originate at the Gulf Coast and transport only refined petroleum products (Figure I-4). Having a combined capacity of about 1.2 MB/D these two pipeline systems transport about 26% of the petroleum supplied to the North Atlantic Region. Products transported from the Gulf Coast consist principally of motor gasoline and jet fuel (65%) and distillate fuel oil (30%).

Storage tanks, office space, and a pumping station are the basic components in a pipeline terminal. Upon reaching the North Atlantic Region, oil piped from the Gulf Coast is temporarily stored at pipeline terminals, from which it is eventually distributed to market. Lesser pipelines transport oil from these pipeline terminals, as well as from refineries and marine terminals in the Region, to final market destinations. In particular, a number of pipeline systems transport refined products from the Delaware River Area refineries to the Middlesex and Union County/Arthur Kill Area. Additionally, product pipeline systems transport oil products from both Middlesex and Union County/Arthur Kill refineries and Delaware River refineries to market regions in Western Pennsylvania and mid-state New York.

Five major petroleum product pipelines currently transect Middlesex County. (See map on page 9.). Three of the pipelines transport oil products to the Middlesex and Union County/Arthur Kill Area. They are:

FIGURE I-4


PETROLEUM PRODUCTS PIPELINE SYSTEM
Lake Superior
Lake Huron
Lake Michigan
Lake Ontario
Lake Erie
MICH.
ILL.
IND.
OHIO
PENN.
N.Y.
VT.
N.H.
ME.
MASS.
CONN.
R.I.
N.J.
PHILA.
M.D.
DEL.
W.VA.
VA.
KY.
MO.
TENN.
N.C.
ARK.
MISS.
ALA.
S.C.
GA.
LA.
TEX.
FLA.
HOUSTON
NEW ORLEANS
GULF OF MEXICO
ATLANTIC OCEAN
Scale of Miles
0 50 100 200

PIPELINE NAME	SIZE	MAXIMUM CAPACITY (bbl/day)	TOTAL MILEAGE	ORIGIN-DESTINATION
Colonial	30"	828,000	1,600	Pasadena, Texas-Woodbridge, NJ
Sun	14"	86,000	90	Marcus Hook, PA-Newark, NJ
Sohio (Harbor)	16"	144,000	81	Phila., PA-New York Harbor

The Colonial pipeline terminates in Middlesex County at a pipeline terminal consisting of twenty-five storage tanks and pumping facilities located in Northern Woodbridge Township. Smaller pipelines connect this terminal with Shell and Chevron facilities in Woodbridge and Perth Amboy, respectively. The Sun Pipeline Company maintains a relatively small pipeline terminal in Piscataway, consisting of two small storage tanks and functioning as a dropoff and regional distribution point.

The two remaining refined petroleum pipelines in Middlesex County transport products from the Middlesex and Union County/Arthur Kill Area to Pennsylvania for distribution in that area: They are:

PIPELINE NAME	SIZE	MAXIMUM CAPACITY (bbl/day)	TOTAL MILEAGE	ORIGIN-DESTINATION
Buckeye (2)	16" 20"	151,000 230,000	33.4 33.4	Linden, NJ-Macungie, PA
Getty (Tidewater) (2)	6"	7,800	115	Bayonne, NJ-Williamsport, PA

The Getty pipeline has located along its right-of-way, in South Plainfield, a pipeline terminal consisting of two small storage tanks.

In addition to the five major pipelines located in Middlesex County, a number of shorter pipelines transport oil products between the various pipeline terminals, marine terminals, and refineries located in the Northeastern portion of Middlesex County and neighboring Union County.

4. Petrochemical Industry

The word "petrochemical" is used to describe those chemicals derived from petroleum and natural gas liquids. Petrochemical producers utilize these raw materials to manufacture a broad array of primary chemicals and intermediates; through further chemical processing, these intermediates are converted into an even wider range of chemical derivatives.

Most of the petrochemical industry's products, both primary and intermediate organic chemicals and their derivatives, are practically unknown to the consumer because the average person never sees or buys them. The customers of the petrochemical industry are, in general, other industries, which use petrochemicals as the raw materials for the manufacture of thousands of industrial and consumer products. Packaging material made from plastics is the largest end use followed by building materials, tires, clothing, transportation equipment, home furnishings, housewares, furniture, appliances, and toys. There are others such as fire retardants and solvents, perfumes, cosmetics and medicines, dyes, antifreeze, adhesives, and many, many more.

New Jersey leads the nation in manufacturing chemicals and synthetics, and Middlesex is one of the leading chemical manufacturing counties in the State, (See Table I-4). Petrochemical products constitute the largest portion of chemical industry operations. The predominance of petrochemical industries in Middlesex County can be explained easily by the primary siting factor for such operations; i.e. the availability of raw materials. In Middlesex County, the heavy concentration of such petroleum related facilities as refineries, marine terminals, and pipelines represent sources of raw materials. It follows that petrochemical industries seek sites in proximity to such facilities. New Jersey Department of Labor and Industry statistics indicate that approximately 100 chemical companies, employing 20,700, are located in Middlesex County.

TABLE I-4
1976 EMPLOYMENT IN CHEMICAL AND ALLIED INDUSTRIES IN NEW JERSEY[1]

Labor Market Areas	Chemical Industry Employment (SIC 28)	% of Total State Chemical Industry Employment
Atlantic County	400	0.3%
Bergen County	13,200	10.8%
Camden SMSA[2] (Comprised of Camden, Burlington, & Gloucester Counties)	4,900	4.0%
Cumberland County	300	.3%
Hudson County	6,800	5.6%
Mercer County	3,800	3.1%
Middlesex County	20,700	17.0%
Monmouth County	1,600	1.3%
Newark SMSA[2] (Comprised of Essex, Morris, Somerset & Union Counties)	48,700	40.0%
Passaic County	9,700	8.0%
Remainder of State	11,700	9.6%
STATE OF NEW JERSEY TOTAL	121,800	100.0%

(1) All figures are for employees covered under the State unemployment insurance system.

(2) SMSA is abbreviation for Standard Metropolitan Statistical Area; a U.S. Census reporting classification for high population urban areas.

SOURCE: New Jersey Department of Labor and Industry, telephone interview July 27, 1977.

II. FUTURE DEMAND FOR PETROLEUM AND PETROLEUM-RELATED FACILITIES

A. PROJECTIONS OF FUTURE ENERGY AND PETROLEUM DEMANDS

The discussion in Chapter I of current petroleum supply and demand for the United States, the North Atlantic Coast, and Middlesex County clearly identifies the existing patterns of oil transport, processing, and delivery that effect Middlesex County. To fully examine the potential range of future growth of petroleum-related facilities that might occur in Middlesex County, the future demand for petroleum in this region was examined. Projections of future petroleum demand for the North Atlantic Coast are shown in the bottom portion of the graph in Figure II-1. Petroleum, as of 1975, was being supplied to the region in the form of crude oil (35%) and refined petroleum products (65%).[1] The upper portion of Figure II-1 shows the projected demands for total energy for the North Atlantic Coast. It is assumed that future total energy demand will be met by the five basic energy forms that are meeting current demands. The following table presents these basic energy forms and their percentage of total 1975 energy demand.

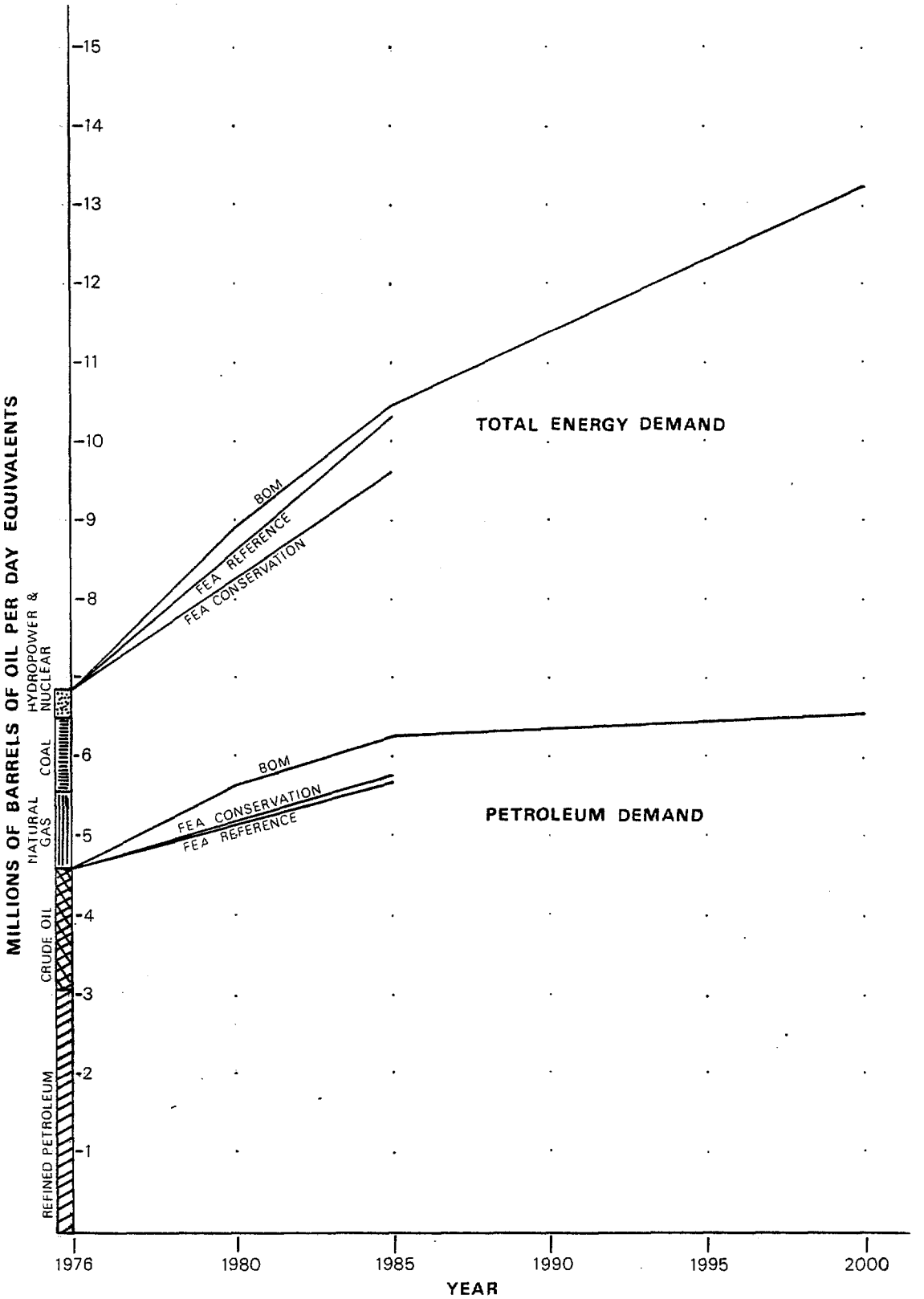
TABLE

Energy From:	% of Total Demand -1975
Oil	66%
Coal	15
Natural Gas	14
Nuclear	3
Hydropower	2

[1] Derived from "Supply, Demand and Stocks of all Oils by P.A.D. Districts and Imports to the United States by Country; Year 1976 "Mineral Industry Surveys, U. S. Dept. of Interior, Bureau of Mines.

FIGURE III-I

PROJECTED DEMAND FOR TOTAL ENERGY AND PETROLEUM PRODUCTS IN THE NORTH ATLANTIC COAST REGION



SOURCE: Graph data from U.S. Congress, Office of Technology Assessment(Working Papers:) Coastal Effect of Offshore Energy Systems, November 1976

Both the upper and lower portions of the graph shown in Figure II-1 consist of three separate projections, two by the U. S. Federal Energy Administration (FEA) and one formulated by the Bureau of Mines (BOM) of the U. S. Department of Interior,

Originally formulated as part of the 1976 National Energy Outlook, the FEA's projections are based on the agency's econometric model and reflect variations in such broad types of energy demand determinants as energy prices, economic conditions, population, and the potential for energy conservation. One scenario, the reference case, assumes "business as usual" economic conditions and does not include conservation measures of the type likely to be prompted by governmental intervention, although it does reflect some conservation resulting from higher energy prices and new natural gas prices.

The FEA conservation scenario assumes that stringent government conservation policies and programs will be instituted. Improved auto efficiency, van pooling programs, increased airline load factors, better conservation, and peak load management by utilities are all assumed as means to limit the demand for petroleum. On the supply side, major assumptions include: 1) restrictions on nuclear power plant construction (no projects beyond currently granted construction permits) and, 2) environmental restrictions on mining and burning coal.

Even with the institution of government conservation policy and programs as assumed in the FEA conservation scenario, petroleum and total energy demand will continue to rise. In fact, petroleum demand under FEA's conservation scenario is actually projected to be higher by 1985 than the projection of

petroleum demand under FEA's reference scenario. Since the development of nuclear and coal fuels is restricted under the conservation scenario, petroleum demand is deduced to be higher than in the reference case which does not assume stringent limitations on other fuel sources.

The projection made by the Bureau of Mines (BOM) (originally published in 1975 in Energy through the Year 2000), is essentially an extrapolation of present trends in energy consumption, with judgement imposed to reflect expectations about limitations to supply. Deregulation of oil and gas is assumed. The potential for conservation was not considered in their forecast, although a projection of a declining trend in energy per value added ratios does inject some measure of increased efficiency.

B. THE POTENTIAL FOR NEW GROWTH IN PETROLEUM-RELATED FACILITIES

The grant shown in Figure II-I presents recently published estimates of the future demand for petroleum and other energy sources in the North Atlantic Region. It is evident that petroleum demand is expected to increase greatly by the year 2000. The following discussion focuses on the possible modes by which petroleum might be supplied to the North Atlantic Region in the future. The purpose of this section is to establish ranges of future energy facility growth and to illustrate and deminsionalize the potential demand for energy facilities. This illustration of the range of possibilities concerning petroleum-related facilities, including facilities related to offshore oil development, is tentatively presented to generally portray the North Atlantic Region's energy future and the facilities which might locate in Middlesex County.

The 1976 supply of petroleum to the North Atlnatic Region totaled 4.6 MB/D and consisted of 1.6 MB/D in crude oil and 3.0 MB/D in refined petroleum products.[2] The amount of crude oil supplied to the Region is approximately equivalent to the regional refinery capacity. By the year 2000 petroelum demand is expected to increase by 1.9 MB/D so that the total amount of petroleum needed to supply the Region would rise to 6.5 MB/D. Future petroleum demand will be satisfied through one of three possible arrangements:

1) increasing the amount of crude oil supplied to the Region; or
2) increasing the amount of refined petroleum products supplied to the Region; or
3) increasing the amount of both crude oil and refined petroleum products supplied to the Region.

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[2]Derived from Mineral Industrial Surveys, U. S. Dept. of Interior, Bureau of Mines, "Supply, Demand and Stocks of All Oils by P.A.D. Districts and Imports to the United States by Country: Year 1976," and "Petroleum Refineries in the United States and Puerto Rico, January, 1976, -Crude Oil Capacity-

Presently, crude oil facilities consist of refineries, associated marine terminals, storage tanks, and distribution facilities such as railroad tank cars, tank trucks, and product pipelines. The present system of refined petroleum product facilities consists of marine terminals, storage tanks, major proudct transmission pipelines and pipeline terminals, and distribution facilities such as railroad tank cars, tank trucks, and product pipelines. To meet future demand, either one of these systems of facilities, or both, might expand in capacity and number of facilities. In addition, with the imminent exploration and potential development and production of oil and gas off the Atlantic Coast, facilities associated with such Outer Continental Shelf (OCS) activities should contingently be expected to locate in the Region, and oil, if found, could contribute to the Region's future petroleum supply.

Offshore oil and gas related facilities may be categorized into two basic groups. The first group consists of those facilites previously unknown in the Region, such as facilities engaged in the exploration and construction phase of OCS activities, but also including some processing facilities associated with the production phase.

TABLE II-1

OCS-Related Facilities new to the North Atlantic Region

exploration and construction phase	permanent service buses pipeline support base platform installation support base platform fabrication yards
production phase	offshore crude oil pipelines partial processing plants gas processing plants

The second group consists of facilities which already exist in the Region, plus refineries and petrochemical firms which may expand their operations as a result of offshore oil.

TABLE II-2
OCS-Related Facility Types Already existing in the North Atlantic Region

exploration and construction phase	refineries marine terminals petrochemical industries pipe coating yards repair and maintenance yards

The following section will discuss the possible means by which petroleum demand may be met in the future. The discussion will consist of three separate scenarios, each with different assumptions regarding:

1) the replacement or non-replacement of offshore oil for the crude oil that is presently being imported into the North Atlantic Region;

2) the growth in refinery capacity in Middlesex County and the North Atlantic Region; and

3) the growth in the capacity of those facilities that transport, store, and distribute refined petroleum products to the North Atlantic Region.

SCENARIO 1

Under this scenario it is assumed that: (1) "barrel-for-barrel replacement" of offshore oil for crude imports will occur; (2) the refinery capacity in the County or Region will not change, (3) the capacities of the Regional facilities to transport and store refined petroleum products will increase to accommodate an additional 1.9 MB/D. Figure II-2 indicates the changes in relative amounts of crude and refined petroleum and the facilities that will be associated with these changes.

Under these assumptions, 0-.594 MB/D of Atlantic OCS oil may be transported to Middlesex and Union Counties for refining.[3] This crude oil would replace an equivalent amount of imported crude and no additional refinery capacity would be needed. Various OCS facilities may locate in Middlesex County to support the development, production and transportation of OCS crude oil.

If the find of recoverable resources of oil off the Atlantic Coast is very low and state and local regulations do not significantly inhibit the development of OCS facilities in other counties in New Jersey, then no or very few facilities will be developed in Middlesex County. The number of OCS facilities likely to locate in Middlesex County will increase with increases in the amount of discovered recoverable resources of oil and the effectiveness of state and local regulations in limiting development in other coastal counties.

Figure II-2 also indicates that various new regional facilities would be needed to transport, receive, and store 1.9 million barrels per day of refined petroleum products. The County Planning Board has not estimated the number of these facilities that would locate in Middlesex County. It is likely, though, that the County would experience some development since it is already a major port and transshipment point for petroleum products supplying the New York and North Atlantic Region market.

[3] Based on U. S. Dept. of Interior, Burea of Land Management estimates. See Chapter III and Appendix A.

FIGURE II-2

FUTURE DEMAND FOR PETROLEUM AND PETROLEUM RELATED FACILITIES

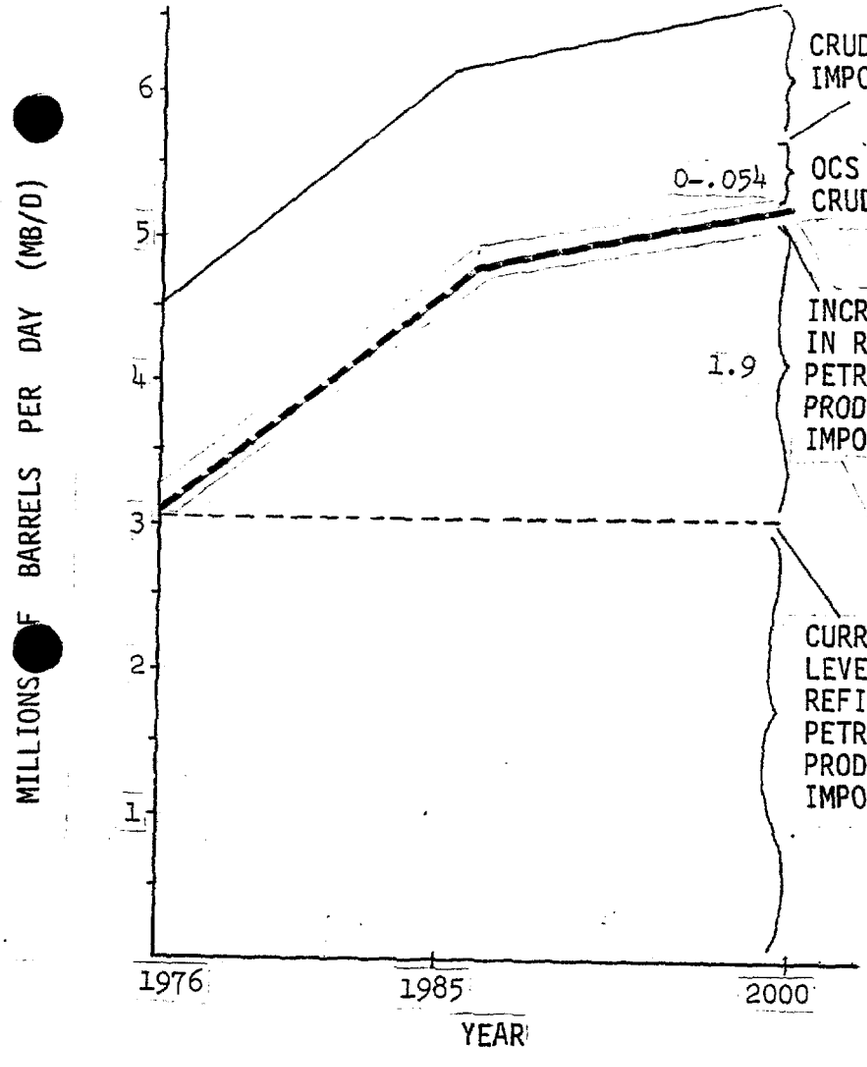
SCENARIO 1

Assumptions:

1) Barrel for barrel replacement of offshore oil for existing crude oil imports

2) Refinery Capacity: No change in Middlesex County or the North Atlantic Region

3) Refined Petroleum Facilities Capacity: Increase in the North Atlantic Region to accommodate an additional 1.9 MB/D



Number or Capacity of OCS Facilities Likely to Locate in Middlesex County

Gas Processing Plants	0	3
Partial Processing Plants	0	.37 MB/D Capacity
Tank Farms	0	2
Pipeline Landfalls	0	2
Marine Terminals	0	1
Permanent Support Base	0	2
Pipeline Support Base	0	1
Platform Support Base	0	1

REGIONAL FACILITY DEMAND

Refined Products Transportation and Storage Facilities:

- marine terminals (deepwater ports)
- storage tanks
- pipelines & pipeline terminals

Table II-3 summarizes the land, water supply, energy, and employment requirements of the OCS-related facilities likely to locate in Middlesex County if the high impact development projection were to occur. Table II-4 summarizes the environmental impacts of these facilities under the same high impact development projection.

TABLE II-3

SUMMARY OF REQUIREMENTS OF FACILITIES PROJECTED UNDER THE HIGH DEVELOPMENT PROJECTION

Requirements / Onshore Facilities	# of Facilities Projected	LAND		WHARF SPACE		WATER		FUEL and/or ELECTRICITY		EMPLOYMENT		
		Acres/ Facility	Total Acres	Feet Facility	Total Feet	Gallons/ Facility	Total Gallons	Quantity/ Facility	Total	Workers; Facility	Total Workers	Local Workers (Approximately)
Permanent Service Bases	1-2	25-50	25-100	800	800-1600	41MGY during development 2MGY potable *.112MGD during .005MGD potable	41-82MGY 2MGY potable *.1-.224 MGD development .005-.01MGD potable	216000-27000 barrels/yr. during develp. 76,800-96,000 barrels/yr. during production	216,000-540,000 barrels/yr. during develp. 76,000-192,000 barrels/yr. during production	50-60/platform 250-300/5 platforms during drilling	500-1200 for 10 platforms (2 bases) during drilling	250-600
Pipeline Installation Support Base	1	5	5	200	200	N/A	N/A	50,000 gals./mo. for lay barges 180,000 gals./mo. for burying barges	230,000 gals./mo. for 1 lay barge and 1 burying barge. + deisel oil for tugs	25/pipeline 250-300/lay barge spread	25/pipeline 250-300	13
Platform Installation Support Base	1	5	5	200/ four platforms installed	200+	N/A	N/A	100,000 gals. of deisel fuel/derrick barge/month 150,000 gals./tug per month	37,800,000 - 100,000,000 gals/yr.[1]	100 offshore 25 onshore	125	40
Pipeline Landfalls	1-2	50-100 ft. right-of-way; 40 ac. if pumping station needed; 60 if terminal needed	1-200	-	-	N/A	N/A	N/A	N/A	17 onshore	17-34	N/A
										N/A	N/A	N/A
Tank Farms Capacity (Barrels)	1-2		17-58	-	-	N/A	N/A			N/A	N/A	N/A
1,000,000		17	17-34 or					8 million KWH/yr.				
2,000,000		37	37 or					14 million KWH/yr.				
3,000,000		50	50 or					N/A	N/A			
3,500,000		58	58					N/A	N/A			
Partial Processing Plant (250,000 BOPD capacity)	1		300-340	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gas Processing Treatment Plant	1-3	50-75	50-225	-	-	.2MGD average	.2 to .6 MGD	64.8 million KWH/yr. 360 million cu. ft. of gas/month from plant	64.8-175 million KWH/yr. 360-1080 million cu. ft. gas/month	N/A	N/A	N/A
Marine Terminal (1 Million barrel storage capacity)	1	30	30	N/A	N/A	limited assuming no processing		8 million KWH/yr. tank farm 1 million KWH/yr. terminals 11,800 barrels of fuel/year	9 million KWH/yr. 11,800 barrels of fuel/year	560 constr.(1 yr.) operation 10-9	560 constr.(1 yr.) operation 10-90	112 construction (1 yr.) 6-67 operation

\- = negligable or zero
NA = not available
* Million Gallons Per Day (MGD) figures have been calculated by averaging of monthly and yearly figures
[1] This yearly quantity will vary greatly depending on the number of platforms installed

SOURCE: NERBC, FACTBOOK and Estimates For New England, and the Conservation Foundation, Onshore Impacts of OCS Oil and Gas Development

SUMMARY OF ENVIRONMENTAL IMPACTS OF FACILITIES PROJECTED

UNDER THE HIGH DEVELOPMENT PROJECTION

Impacts / Onshore Facilities	# of Facilities Projected	AIR EMISSIONS -- Sources & Tons/Year						MAJOR WASTEWATER POLLUTANTS			
		Hydro-carbons	Partic-ulates	Sulfur Oxides	Nitrogen Oxides	Carbon Monoxide	Hydro-gen Sulfide	Hydro-carbons	Heavy Metals	Antifouling Substances	Suspended Solids
Permanent Service Base	1	Fuel Stor-age 3.0		Mobile Sources	Mobile Sources	Mobile Sources		Runoff			
Pipeline Install-ation Support Base	1	Fuel Stor-age 1.0 to 3.0		Mobile Sources	Mobile Sources	Mobile Sources					
Platform Install-ation Support Base	1	Fuel Stor-age 15 to 40		Mobile Sources	Mobile Sources	Mobile Sources					
Pipeline Landfalls	1-2	Compressors & Pumps		Compres-sors	Pumps	Pumps					
Tank Farms	Two (1 million bbl cap.) 1 (2 mil-lion bbl cap.)	Crude Stor-age tank evapora-tion Transfer losses .1 lb./barrel trans-ferred stor-age									
Partial Processing Plant (250,000 BOPD Capacity)	1	Tank Evapor-ation Leakage Pumps Mobile Sources		Combustion of gas pumps for oil - water separator Mobile Sources	Pumps Mobile Sources	Mobile Sources	leakage		process water		process water
Gas Processing Treatment Plants (.3 to .5 BCFGPD) (assuming sulfer con-tent of 0.9% by volume)	1-3	Process leaks 11,498-56,913 (1958 data)		Sulfur recovery process 580-2871	Process	Process	Sulfur re-covery 142-846 (1958 data)	Prpcess Water	Cooling Water process boiler water	Cooling Water boiler water	
Marine Terminal (1 million barrel storage capacity)	1	Crude Stor-age Tank Evaporation Transfer losses .1 lb./barrel transferred						Runoff Ballast Water			

SOURCES: NERBC, FACTBOOK, and Estimates for New England, and The Conservation Foundation, Onshore Impacts of Oil and Gas Development.

TABLE II-4
SUMMARY OF ENVIRONMENTAL IMPACTS OF FACILITIES PROJECTED
UNDER THE HIGH DEVELOPMENT PROJECTION
(Continued)

Impacts / Onshore Facilities	# of Facilities Projected	NOISE EMISSIONS (decibels; source)	SOLID WASTE
Permanent Service Base	1	Up to 85; 24 hours/day-pumps 90-96; pneumatic power tools 92-100; air compressors	Up to 6 tons/year during drilling
Pipeline Installation Support Base	1	NA	Up to 6 tons/year
Platform Installation Support Base	1	Up to 85; 24 hours/day	Up to 6 tons/year
Pipeline Landfalls	1-2	90-100; compressors 140; annual pipeline venting	NA
Tank Farms	1-2	NA	Contaminated sludge and sediments
Partial Processing Plant	1	80-90; pumps 81-96 at 20 feet; flarestacks 81-96; treating vessels	NA
Gas Processing Treatment Plant	1-3	92-100; air compressors : 81-96 at 20 feet; flarestacks: 24 hours/day 90 at 6 feet; boilers :	Sludges, scale, spent dessicants, filtration media, oil absorbants
Marine Terminal	1	NA	Contaminated sludge and sediments

NA = Not Available
SOURCES: NERBC, FACTBOOK, and Estimates for New England, and The Conservation Foundation, Onshore Impacts of OCS Oil and Gas Development.

SCENARIO 2

Under this scenario it is assumed that: (1) OCS oil will not replace crude oil imports and that the amount of crude oil imported will not change, (2) refinery capacity in Middlesex County will increase by 0 to .594 million barrels per day. for processing of OCS crude, and (3) the capacity of the North Atlantic Region's facilities for transport and storage of refined petroleum products will increase to accommodate an additional 1.3 million barrels per day. Figure II-3 indicates the changes in the relative amounts of crude and refined petroleum and the facilities that will be associated with these changes.

Under those assumptions additional refinery capacity, stimulated solely by offshore oil production, would be developed in Middlesex County. The increased refinery capacity would stimulate an increase in the petrochemical industry resulting in the establishment of 0 to 3 petrochemical complexes in the County.[4] In addition, Figure II-3 indicates that various OCS related facilities may develop in Middlesex County. The number of facilities that are developed depends primarily on the amount of oil discovered in the Atlantic OCS and the effect of state and local regulations in limiting development in other coastal counties.

Figure II-3 also indicates that various new regional facilities would be needed to transport, receive and store 1.3 million barrels per day of refined petroleum products. Some of these might include: marine terminals (a possible deepwater port for refined petroleum products); storage tanks; and/or refined product pipelines from southern refineries. It is likely that the County will

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[4] Arthur D. Little, Inc. report to the Council on Environmental Quality, Potential Onshore Effects of Deepwater Oil Terminal-Related Industrial Development Vol. II East Coast, pp. 2-12.

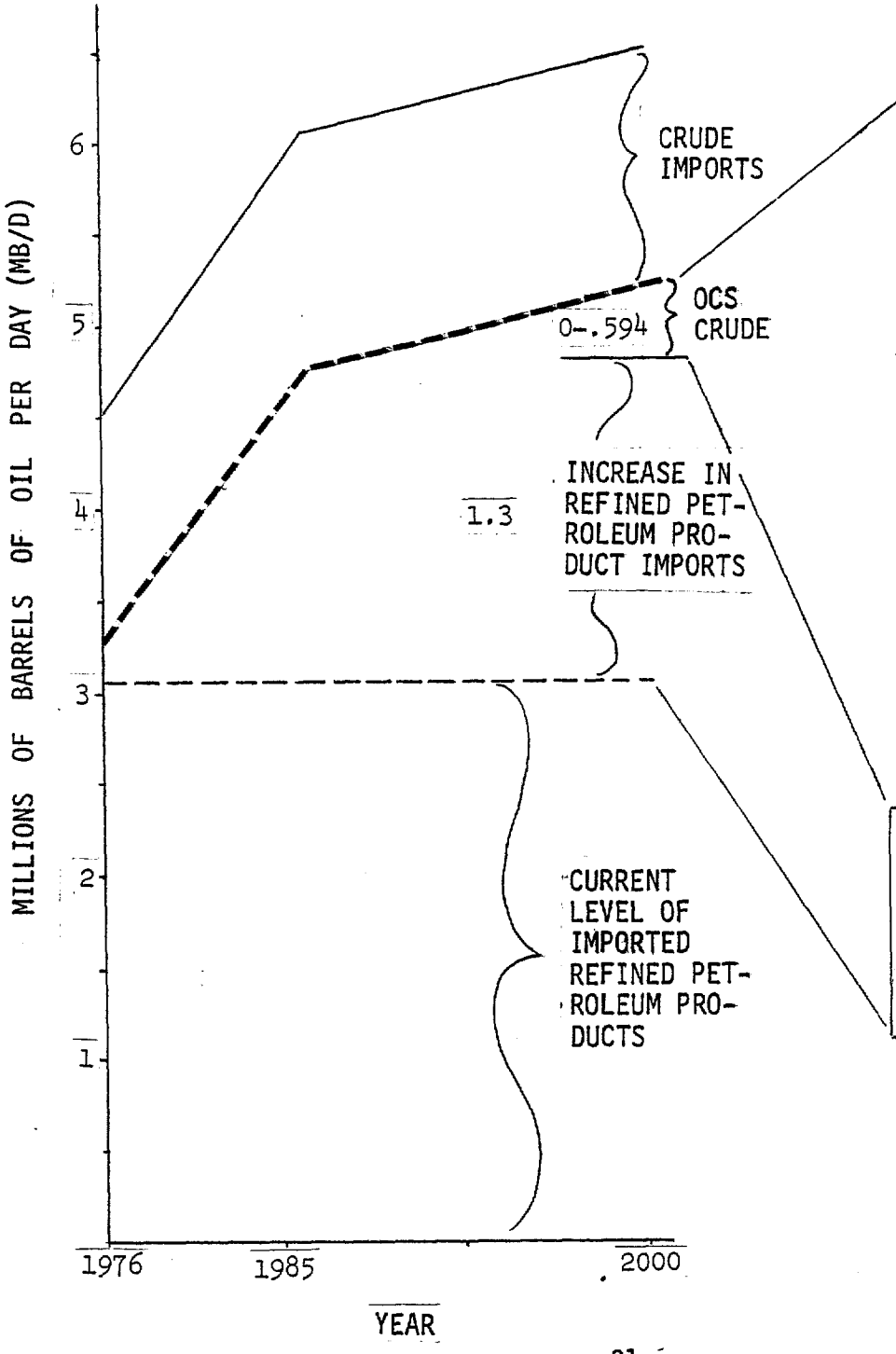
FIGURE II-3
FUTURE DEMAND FOR PETROLEUM AND PETROLEUM RELATED FACILITIES
SCENARIO 2

Assumptions:

1) No replacement of OCS oil for existing crude oil imports

2) Refinery Capacity: 0-.594 MB/D increase in Middlesex County induced by offshore oil

3) Refined Products Facilities Capacity: Increase in North Atlantic Region to accommodate an additional 1.3 MB/D



Number or Capacity of OCS-Related Facilities Likely to Locate in Middlesex County

Refineries	0	.549 MB/D Capacity
Petrochemical Complexes	0	3
Gas Processing Plants	0	3
Partial Processing Plants	0	.37 MB/D Capacity
Tank Farms	0	2
Pipeline Landfalls	0	2
Marine Terminals	0	1
Permanent Service Bases	0	2
Pipeline Support Base	0	1
Platform Support Base	0	1

REGIONAL FACILITY DEMAND

Refined Products Transportation and Storage Facilities:

- marine terminals (deepwater ports)
- storage tanks
- pipelines & pipeline terminals

experience some development of these facilities since it is a major port and transshipment point for petroleum products supplying the New York and North Atlantic Region market.

Table II-5 summarizes some of the impacts associated with refineries and petrochemical complexes likely to locate in Middlesex County under this scenario. The impacts and requirements for the remaining OCS induced facilities can be found in Table II-3 and Table II-4.

TABLE II-5

Selected Impacts Associated with Refineries and Petrochemical Complexes

For a 250,000 bbl/day refinery

Land Requirement	Employment	Water Demand	Environmental Impacts
1000-1500 Acres	410 Operation 80% Local	5.4-7 mgd brackish	Air quality (especiall hydrocarbon emissions) Water quality Noise Solid waste

For 0-7 petrochemical complexes

Employment	Potable Water Demand	Environmental Impacts
0-29,000 Persons	60 MGD	Air quality Water quality Noise Solid Waste

Source: Arthur D. Little, Inc., report to the Council on Environmental Quality, Potential Onshore Effects of Deepwater Oil Terminal-Related Industrial Development Vol. II East Coast.

SCENARIO 3

Under this scenario it is assumed that: (1) refinery capacity in the North Atlantic Region will increase by 1.9 million barrels to accomodate both growth in market demand and OCS oil; and (2) the capacity of refined products facilities will not change.

Figure II-4 indicates the OCS and petroleum facilities that are likely to be located in the region and Middlesex County if these assumptions hold true. The graph illustrates that by 2000 approximately 1.9 million barrels of crude oil per day will be entering the North Atlantic Region from the Atlantic OCS tracts and foreign sources. This would require the development of between nine and ten refineries in the Region, each with a capacity of 200,000 barrels of oil per day. Such an increase in refinery capacity would stimulate the development of up to 10 petrochemical complexes in the Region.[5] In addition 6.6 MB/D of crude oil storage capacity would be required.[6]

Table II-6 identifies some selected impacts from petrochemical complexes and storage tanks. Impacts associated with refineries can be found in Table II-5. Impacts and requirements for the remaining OCS induced facilities can be found in Tables II-3 and II-4.

[5]Arthur D. Little, Inc. report to the Council on Environmental Quality Potential Onshore Effects of Deepwater Oil Terminal Related Industrial Development Vol. II East Coast, pp. 2-14.

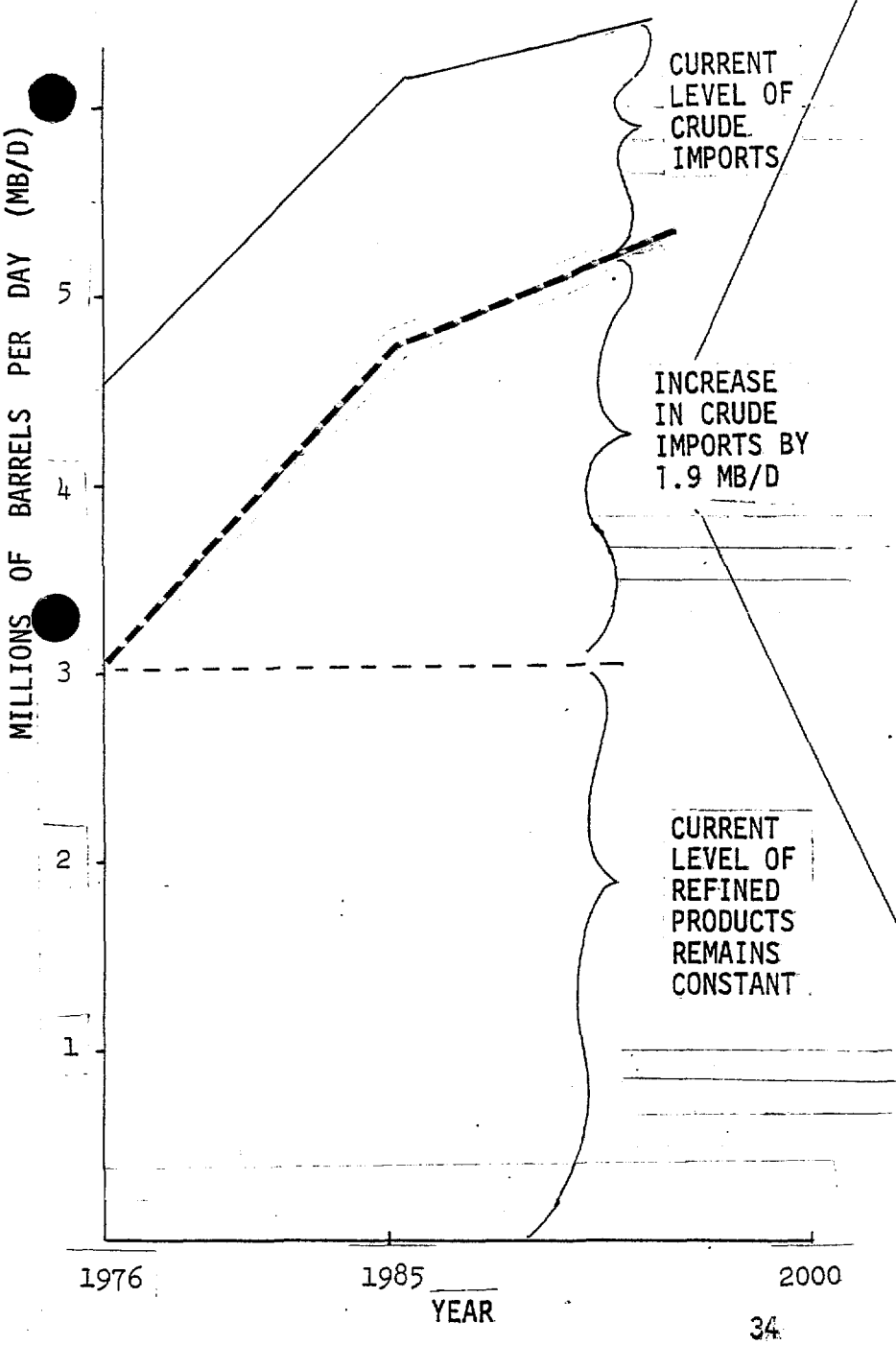
[6]Ibid.

FIGURE II-4
FUTURE DEMAND FOR PETROLEUM AND PETROLEUM RELATED FACILITIES
SCENARIO 3

Assumptions:

1) Refinery Capacity: Increase by 1.9 MB/D in the North Atlantic Region induced by OCS oil and growth in market demand

2) Refined Products Facilities Capacity: Remains Constant



Regional Facility Demand

Refineries - 1.9 MB/D Capacity

Petrochemical Complexes - 10

Crude Oil Storage - 6.6 MB/D

Number of Capacity of OCS Facilities Likely to Locate in Middlesex County

	Low Impact	High Impact
Gas Processing Plants	0	3
Partial Processing Plants	0	.37MB/D Capacity
Tank Farms	0	2
Pipeline Landfalls	0	2
Marine Terminals	0	1
Permanent Support Base	0	2
Pipeline Support Base	0	1
Platform Support Base	0	1

TABLE II-6

SELECTED IMPACTS ASSOCIATED WITH PETROCHEMICAL COMPLEXES AND STORAGE TANKS

For 0-10 Petrochemical complexes*

Employment	Potable Water Demand	Environmental Impacts
0-41,500	100 MGD	Air quality Water quality Solid waste Noise

For Storage Tanks:

Employment	Water Demand	Environmental Impacts
NA	NA	Air quality Water quality

NA = Not Available

*Source: Arthur D. Little, Inc. report to the Council on Environmental Quality, Potential Onshore Effects of Deepwater Oil Terminal-Related Industrial Development, Vol. II East Coast.

III. THE POTENTIAL FOR OFFSHORE OIL RELATED FACILITIES LOCATING IN MIDDLESEX COUNTY

A. INTRODUCTION

As identified in Chapter II, offshore oil activities in the Baltimore Canyon off the New Jersey Coast, as well as other Atlantic Coast areas, might result in the location of support, transportation, storage, and processing facilities in Middlesex County. A brief synopsis of offshore oil activities and more detailed descriptions of the type, requirements, and impacts of these offshore oil related facilities may be found in Appendix A. The following chapter identifies the range and dimensions of the potential offshore oil related facilities that might locate in Middlesex County.

Three projections of offshore oil facilities development are presented - high development, medium development, and low development. The projections are based on different assumptions: (1) the amounts of oil and gas discovered, and their production rates and (2) the effects of the permit procedure of the Coastal Area Facilities Review Act (CAFRA) and other state and local regulatory policies on development in other coastal counties. The discussion of each projection will contain a tentative allocation of the numbers and kinds of facilities that are likely to locate in Middlesex County.

These allocations are not intended to be predictions but rather are presented to provide a picture of onshore development as it might occur under each set of assumptions. These allocations of OCS-related development in Middlesex County will be carried out judgementally from projections made by the Bureau of Land Management (BLM) of the U.S. Department of the Interior and other organizations such as the Office of Technology Assessment (OTA), the Council on Environmental Quality (CEQ), and the American Petroleum Institute (API). These projections are displayed in Table III-2. The variation in projections is caused by the un-

certain nature of geological estimates and the different methods used to determine the number of facilities that will be required and developed depends on many factors including: (1) the quantities of oil and gas found; (2) how many strikes are made, and by which companies; (3) where the strikes occur and; (4) the rates of production. The production rate factor, although very important, is very difficult to predict.[3] Peak production rates for the Baltimore Canyon tracts have been projected to range from 0.3 to 1.5 million barrels of oil per dya and from 1.8 to 9.0 billion cubic feet of natural gas per day. The actual production rates cannot be predicted at this time, however, the rates will have a major effect on the timing, pace, and intensity of development and production. This section will employ a different range of production rate for each projection.

3. For example, past production wells have exhibited rates ranging from 250 to 950 barrels of oil per day.

PROJECTIONS OF OCS-RELATED FACILITIES GENERATED BY ATLANTIC COAST ACTIVITIES

	ATLANTIC COAST	BALTIMORE CANYON			OCS SALE NO. 40			GEORGES BANK	SOUTHEAST GEORGIA EMBANKMENT
	USGS*	CEQ	API	USGS 1975	BLM/FEIS SALE, NO. 40	OTA	BLM/DEIS SALE, NO. 42 & No. 43	BLM/DEIS SALE NO. 42	BLM/DEIS SALE NO. 43
Undiscovered Recoverable Resources Oil (Billion Barrels)	0-6	-	6.0	3-5	2.6	1.8-4.6	0.4-1.4	0.18-0.65	0.28-1.0
Undiscovered Recoverable Resources Gas (Trillion Cubic Feet)	0-22	-	32.0	15-25	12.8	5.3-14.2	2.6-9.4	1.2-4.3	1.9-6.8
Peak Production Rate Oil (Million Barrels Per Day)	-	0.5-1.5	1.1	-	0.74	0.3-0.7	0.32	0.053-0.181	.056-0.170
Gas (Billion Cubic Feet Per Day)	-	1.8-3.6	8.0	-	4.4	0.9-2.0	3.08	0.47-1.54	0.47-1.4
Rigs									
Exploratory	-	4-10	15	-	10	5-10			
Development	-	11-24	80	-	15	11-24			
Platforms	-	30-74	180	-	10-50	25-52		10-25	20-75
Support Bases	-	-	5.5	-	4	-	-	2-3	1-3
Pipeline	-	-	-		4 (Tot. 810 miles)	2 (80 mi. ea.)	Offshore: 100-450 mi. Onshore: 35-120 mi.	Offshore: 500-750 mi. Onshore: 25-50 mi.	Offshore: 160-320 mi.
Pipeline Terminals/Tank Farms	-	-	8	-	1-4	2/2	-	0-1	1-2
Platform Fabrication Yard			Brown & Root's Va. Proposal Cited. (980 Acres)		Brown & Root's Va. Proposal Cited (980 Acres)	Brown & Root's Va. Proposal Cited (980 Acres)			1100 Acres for possible platform fabrication. In addition to planned Brown & Root's proposal
Gas Processing Plants	-	4-8 (0.5 BC FCPD)	8 (1 BCFGPD)		8 (0.5 BCFGPD)	3-7 (0.3-0.5 BCFG PD)	3-8 (0.3-015 BCFG PD)	1-3 (0.3-0.5 BCFGPD)	1-2 (0.3-0.5 BCFGPD)
Refineries	-	Additional Capacity of 0.56-1.68 MMBO PD by 2000							
Petrochemical Complexes	-	1-6 (1 billion lb./hr. olefins complexes)							

*USGS, Geological Estimates of Undiscovered Recoverable Oil and Gas Resources in the U.S., 1975.

1. HIGH DEVELOPMENT PROJECTION

The high development projection is based on two fundamental assumptions. The first assumption is that there will be a relatively high find of oil and gas reserves in the Baltimore Canyon and the other Atlantic lease sale tracts. The Baltimore Canyon lease sale No. 40 will be assumed to hold approximately 1 to 2.6 billion barrels of recoverable resources of oil and 6 to 9 trillion cubic feet of recoverable resources of natural gas. The high figure is taken from an early projection made by the Bureau of Land Management. The entire Atlantic Coast will be assumed to hold approximately 4 to 6 billion barrels of recoverable resources of oil and 14 to 22 trillion cubic feet of recoverable resources of natural gas. Lease Sale No. 40 production rates will be assumed to range from 0.5 to 0.7 million barrels of oil per day and 2.0 to 4.0 billion cubic feet of gas per day. For the purposes of all three projections it will be assumed that the amount of crude oil entering Middlesex and Union Counties from the Atlantic tracts will range from 0 to .594 million barrels of oil per day (MB/D). This assumption is based on projections that all of the oil (0. - .181 MB/D) [4] from the Georges Bank Sale No. 42, and one half of the oil (.0 to .370 MB/D) [4] from Baltimore Canyon Sale No. 40, and one fourth of the oil (.0 to .043 MB/D) [5] from Southeast Georgia Embayment Sale No. 43 will be shipped to refineries in Middlesex and Union Counties. Under the high development projection it will be assumed that .396 to .594 MB/D of oil will be transported to refineries in Middlesex and Union Counties.

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[4] These figures are derived from United States Department of the Interior, Draft Environmental Statement, OCS Sale No. 42, and Final Environmental Statement, OCS Sale No. 40 (January 1975)

[5] This projection is based on an assumption that one-half of the oil from lease sale No. 43 will be shipped to the refineries in the Delaware River Region and that one-half of this oil will be shipped to refineries in Middlesex and Union Counties.

It will also be assumed that one-half of the daily peak production of gas (or 1 to 2 billion cubic feet of gas per day) will be piped to Middlesex County for processing.

The second assumption is that the CAFRA permit procedure will significantly limit the development of OCS-related facilities in the coastal zone areas within the jurisdiction of the act and, consequently, facility developers will tend to locate in non-CAFRA areas such as Middlesex County. This assumption is related to a pre-supposition that coastal towns in CAFRA will seek to limit development of activities that might jeopardize their existing tourist based economies.

(a) Probable Offshore Activities

1. Exploration - Exploratory drilling will probably begin shortly after the legal problems of lease sale No. 40 are resolved. Various sources have projected different figures for exploratory rigs, but most sources seem to agree that 4 to 10 rigs will be used for the lease sale 40 tracts.

2. Development - Development drilling rigs will probably be installed approximately 2 to 3 years following the first discovery. The sources are also in disagreement on the number of development rigs needed, but the projections range from 5 to 15 rigs for lease sale No. 40. Similarly, the projections of needed platforms vary greatly, but generally range from 10 to 50.

3. Transportation of Oil and Gas - Alternative methods for transporting the oil and gas to onshore processing facilities will be analyzed several years before production begins. Pipelines appear to be the most probable method of transport from the Baltimore Canyon. The most recent BLM figures project 450 miles of offshore pipelines and 50 miles of onshore pipelines for the high find projection.

(b) Probable Onshore Facilities

The level of onshore activity is closely related to the level of offshore activity. Exploration will be the major offshore activity during the first several years of the high development projection. Development drilling and production activities may continue for as long as 30 years during which time permanent service bases and other activities will develop and operate.

Some facilities will operate to serve the activities in other lease sale areas such as the Georges Bank and the Southeast Georgia Embayment. For example, refineries, marine terminals, and petrochemical plants in Middlesex County may be used to store and/or process oil products from other OCS lease sale tracts.

This subsection will discuss the onshore facilities that are likely to be generated by activities in the Baltimore Canyon and other Atlantic lease sale tracts and make tentative allocations of the number and types of facilities that may locate in Middlesex County.

1. Temporary Service Bases - A temporary service base has already been established in Rhode Island and will probably be sufficient to support most exploration activities in the Baltimore Canyon and the Georges Bank.

2. Permanent Service Bases - As discoveries are made permanent bases will be established. BLM originally projected a need for 4 bases, but these figures may be subject to change due to the reduced projections of likely finds. Presumably 3 or 4 permanent service bases will be needed to support a relatively high find of 1.4 billion barrels. If one or two bases locate in Maryland or Delaware and one base in Southern New Jersey then one or two bases could locate in the Middlesex County area.

3. Pipeline and Platform Installation Support Bases - Most sources have not projected numbers of pipeline and platform installation support bases that will be generated by Baltimore Canyon activity. In Estimates for New England the Resource and Land Investigations (RALI) project estimated a need for 2 pipeline installation service bases and 2 platform installation service bases for an expected find in the Georges Bank of 2.4 billion barrels of oil and 12.5 trillion cubic feet of natural gas. Reasoning by analogy, at least 1 pipeline installation service base and 1 platform installation service base will be needed to support Baltimore Canyon activity. Under the high impact projection it is possible that both would locate in Middlesex County.

4. Repair and Maintenance Yards - "Repair and Maintenance Yards" is a phrase that refers loosely to the many firms that provide repair services for OCS-related vessels. Existing repair facilities are usually employed and therefore, it is likely that CAFRA will not bar repair activities from existing yards (if any) in the coastal zone. Middlesex County repair and service facilities will presumably service a significant number of mid-size vessels.

5. Pipe Coating Yards - Most sources make no projections of the number of pipe coating yards that will be needed to support the Baltimore Canyon activities. The RALI estimates for New England project a need for 2 pipe coating yards to support the laying of 2,000 miles of offshore pipe. Existing New Jersey plants should be able to supply the 450 miles of pipe needed for lease sale No. 40 under the high impact projection. In this case, a 25-30 acre "railhead operation" might be located along the Raritan or Arthur Kill. On the other hand, it is possible that a new full scale pipe coating yard would seek to locate along either channel.

6. Pipeline Landfalls - The BLM has estimated a need for 1 to 4 pipeline landfalls for the Baltimore Canyon. Gas pipeline landfalls tend to locate close to the nearest transmission line. Oil pipeline lanfall sites will probably be influenced by proximity to refineries. Considering the existing gas transmission lines and refineries in Middlesex County, it is possible that one gas landfall and one oil landfall would seek to locate in the county.

7. Tank Farms - Tank farms are oil and petroleum product storage facilities that are located near pipelines, marine terminals or refineries. One or two tank farms may seek to locate near new or expanded refineries and/or partial processing treatment plant.

   A marine terminal may be built in Middlesex County to receive crude oil from non-Baltimore Canyon Atlantic lease sale tracts. A tank farm might be colocated with the terminal.

8. Platform Fabrication Yards - Brown and Root, Inc. a platform fabrication company, has purchased a large tract of land and has begun to construct a platform fabrication yard in Virginia. The Bureau of Land Management has concluded that an additional yard will be needed to support the activities in the Southeast Georgia Embayment.

   The Virginia yard will be able to supply the platforms needed in the Baltimore Canyon. A new yard will not be developed in Middlesex County because there are no sites that meet industrial location requirements.

9. Marine Terminals - Under the high development projection it is assumed that there will be high finds in the Georges Bank and the Southeast Georgia Embayment. If this occurs then tankers will probably be used to ship crude oil to the Mid-Atlantic states for refining. Some of this crude oil will presumably be processed at the refineries in and neat Middlesex County and in this case at least one marine terminal will be built in Middlesex County. Another may be built in the Delaware River - Philadelphia area.

10. Partial Processing Plants - If crude oil is transported by tanker from the Georges Bank and the Southeast Georgia Embayment, then it will probably be partially processed offshore. Crude from lease sale 40 tracts will probably be transported by pipeline and partial processing plants with a total output of up to 370,000 barrels of oil per day will be needed in or neat Middlesex County. This quantity refers to the amount of oil produced after partial processing. When processing occurs on-shore pipelines actually carry many more barrels of gross unprocessed fluids containing gas, oil and water.

    Considering the high daily production rate under this projection and the fact that the EXXON refinery is lo- in Union County and the Chevron and inactive Hess refinery are located in Middlesex County seems likely that a partial processing plant will seek to locate in Middlesex County.

11. Gas Processing Plants - Gas processing plants are generally located somewhere between the pipeline landfall and the gas company's transmission lines. The capacity of gas processing plants range from two million to two billion cubic feet per day. The size and specifications of an individual facility depend on several factors, including the size of the gas deposit, the expected rate of production, the composition of the gas and the market prices of the various hydrocarbon products.

    The BLM has concluded that 3 to 8 plants with capacities ranging from 0.3 to 0.5 billion cubic feet of gas per day will be needed to process gas from lease sale 40. If eight are needed, and gas pipelines are landed in Middlesex County, then 1-3 gas processing plants will probably seek to locate in the county.

12. Refineries - There are many complex factors that influence decisions to construct new refineries. The discovery of oil in the Baltimore Cnayon and other Atlantic lease sale areas merely adds the factor of a local supply to this decision-making process.

If this local supply of crude oil is used to replace imported oil,[6] then it will not have a significant affect on decisions to build new refineries or to increase the capacity of existing refineries. However, new refineries and/or additional capacity may be needed to meet future product demand in the North Atlantic region. (For a further discussion of these assumptions, see chapter II .)

It is also difficult to predict the exact location of any new refineries. It is arguable, however, that Middlesex County will be attractive to the oil industry as a location for refineries. This agrument is eased on the grounds that the county: (1) has the transportation facilities needed by refineries, and (2) is located in the center of the northeast's market area.

For the purposes of the high development projection it will be assumed that a refinery capacity will increase in Middlesex County by .396 to .594 MB/D to refine crude oil supplies from the Baltimore Canyon and other Atlantic lease sale areas.

13. As a result of increase feedstock availability, both from refineries and gas plants, up to three new petrochemical plants might seek to locate in the Middlesex County area.

Table III-3 summarizes the number and types of onshore facilities that may locate in Middlesex County if the assumptions of the high development projection hold.

TABLE III-2

ONSHORE FACILITIES THAT MAY SEEK TO LOCATE IN MIDDLESEX COUNTY - HIGH DEVELOPMENT PROJECTION

1-2 permanent service base
1 pipeline installation support base
1 platform installation support base
1-2 pipeline landfalls
2 tank farms
1 marine terminal
1 partial processing plant
1-3 gas processing plants (1 billion cu. ft/day each)
refinery capacity: increase by .594 MB/D 3 petrochemical plants

6. This assumption of barrel for barrel replacement was made by BLM in the Draft Environmental Impact Statement of OCS Sale No. 40.

2. MEDIUM DEVELOPMENT PROJECTION

The medium development projection is based on two assumptions. The first assumption is that there will be a medium sized find of recoverable resources of oil and gas in the Baltimore Canyon and the other Atlantic lease sale tracts. The Baltimore Canyon lease sale No. 40 will be assumed to hold approximately .4 to 1 billion barrels of recoverable resources of oil and 2.6 to 6 trillion cubic feet of recoverable resources of natural gas. The entire Atlantic coast will be assumed to hold approximately 2 to 4 billion barrels of recoverable resources of oil and 6 to 14 trillion cubic feet of recoverable resources of natural gas. The low values of these ranges are the quantities associated with a 25 percent probability (1 in 4 chance) that at least these amounts will be found. The high values are the quantities associated with a 75 percent probability (3 in 4 chance) that at least these amounts will be found.[7] Lease Sale No. 40 production rates will be assumed to be 0.2 to 0.5 million barrels of oil per day and 1.0 to 2.0 billion cubic feet of gas per day. It is likely that .198 to .396 million barrels of oil per day and .5 to 1. billion cubic feet of gas per day will be transported to Middlesex and Union Counties. The second assumption is that the CAFRA permit procedure and local regulations will only place moderate limits on the development of OCS-related facilities in the coastal zone areas within the jurisdiction of the act and consequently some facilities will be able to locate in counties within the CAFRA coastal zone.

Probable Onshore Facilities

Under the assumptions of the medium development projection it seems likely that most OCS-related facilities would locate in other states or in

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[7] These and other figures have been drawn from Geological Estimates of Undiscovered Recoverable Oil and Gas Resources in the United States, Geological Survey Circular 725, 1975, pp. 28-31.

other coastal counties of New Jersey. Some of the facilities that would probably not seek to locate in Middlesex County include temporary and permanent service bases and platform fabrication yards.

Table III-4 summarizes the number and types of onshore facilities likely to be built in Middlesex County if the assumptions of the medium impact projection hold true.

TABLE III-3

ONSHORE FACILITIES THAT MAY SEEK TO LOCATE IN MIDDLESEX COUNTY - MEDIUM IMPACT DEVELOPMENT PROJECTION

1 pipeline installation support base
1 pipeline
1 marine terminal
1 storage tank farm associated with partial processing plant
1 partial processing plant
1-2 gas processing plant (1 billion cu. ft./day each)
Partial processing plant (Total output capacity of up to 247,000 BOPD)
Refinery capacity: reopening of 67,900 BOPD Hess facility
1 petrochemical plant

3. LOW DEVELOPMENT PROJECTION

The low development projection is also based on two assumptions. The first assumption is that there will be a low sized find of recoverable oil and gas resources in the Baltimore Canyon and the other Atlantic lease sale tracts. The Baltimore Canyon lease sale No. 40 will be assumed to hold approximately 0 to .4 billion barrels of recoverable resources of oil and 0 to 2.6 trillion cubic feet of recoverable resources of natural gas. The entire Atlantic Coast will be assumed to hold approximately 0 to 2 billion barrels of recoverable resources of oil and 0 to 6 trillion cubic feet of recoverable resources of natural gas. Baltimore Canyon production rates will be assumed to range from 0 to 0.2 million barrels of oil per day and 0 to 1. billion cubic feet of gas per day. It will also be assumed that 0 to .198 billion barrels of oil per day will be shipped to refineries in Middlesex and Union Counties from all of the Atlantic lease sale tracts. Natural gas, however, will be processed in other counties that are closer to the lease sale 40 tracts. The second assumption is that CAFRA and other state and local regulations will not significantly prohibit or limit development of OCS-related facilities in the other coastal counties of New Jersey.

Probable Facilities

Under the assumptions of the low development projection it is likely that no support bases, gas processing plants, partial processing plants, pipeline landfalls, or refineries will be built in Middlesex County. A marine terminal, however, may be needed to unload and store crude oil tankered in from lease sale 40 tracts. Tankers will probably be used because the production rate will not justify construction of a pipeline.

other coastal counties of New Jersey. Some of the facilities that would probably not seek to locate in Middlesex County include temporary and permanent service bases and platform fabrication yards.

Table III-4 summarizes the number and types of onshore facilities likely to be built in Middlesex County if the assumptions of the medium impact projection hold true.

TABLE III-4
ONSHORE FACILITIES THAT MAY SEEK TO LOCATE IN MIDDLESEX COUNTY - MEDIUM IMPACT DEVELOPMENT PROJECTION

1 gas processing treatment plant
1-2 pipeline landfalls
1 pipeline installation support base
1 marine terminal
Partial processing plant (Total output capacity of up to 247,000 BOPD)

4. SUMMARY

The following table (Table III-5) summarizes the offshore facilities that will probably be generated if the assumptions of the various projections hold true.

TABLE III-5
SUMMARY OF DEVELOPMENT PROJECTIONS

DEVELOPMENT PROJECTIONS	ASSUMPTIONS	ONSHORE FACILITIES LIKELY TO LOCATE IN MIDDLESEX COUNTY
1. High Impact	a. High find of recoverable oil and gas Sale No. 40 - 1.0 to 2.6 billion barrels of oil 6.0 to 12.8 trillion cubic feet of gas Atlantic Total - 4. to 6. billion barrels of oil 14 to 22 trillion cubic feet of gas Production Rates - 0.5 to 0.7 million BOPD 2.0 to 4.0 billion CFGPD Middlesex & Union Counties - .396-.594 million BOPD 1.0 to 2.0 billion CFGPD b. State and local policies significantly limit development of OCS-related facilities in the CAFRA coastal zone.	1 or 2 permanent service bases 1 pipeline installation support base 1 platform installation support base 1 or 2 pipeline landfalls 2 tank farms 1-3 gas processing treatment plants Refinery (capacity of .396-.594) 1 marine terminal Partial processing plant (Up to 370,000 BOPD capacity needed)
2. Medium Impact	a. Medium find of recoverable oil and gas Sale No. 40 - 0.4 to 1.0 billion barrels of oil 2.6 to 6.0 trillion cubic feet of gas Atlantic Total - 2.0 to 4.0 billion barrels of oil 6.0 to 14 trillion cubic feet of gas Production Rates - 0.2 to 0.5 million BOPD 1.0 to 2.0 billion CFGPD Middlesex & Union Counties - .198 to .396 million BOPD .5 to 1.0 billion CFGPD b. State and local policies moderately limit development of OCS-related facilities in the CAFRA coastal zone.	1 gas processing treatment plant 1 or 2 pipeline landfalls 1 pipeline installation support base 1 marine terminal Partial processing plant (Up to 247,000 BOPD capacity needed)
3. Low Impact	a. No or low find of recoverable oil and gas Sale No. 40 - 0. to .4 billion barrels of oil 0. to 2.6 trillion cubic feet of gas Atlantic Total - 0. to 2.0 billion barrels of oil 0. to 6.0 trillion cubic feet of gas Production Rates - 0 to 0.2 million BOPD 0 to 1.0 billion CFGPD Middlesex & Union Counties - 0 to .198 million BOPD No gas b. State and local policies do not significantly limit development of OCS-related facilities in the CAFRA coastal zone.	1 marine terminal

IV. DEVELOPMENT OPPORTUNITIES FOR OCS AND ENERGY FACILITIES

Development opportunities are the sites and/or areas that satisfy industrial siting criteria or physical siting requirements for OCS and energy facilities. These industrial siting criteria include:

I. Transportation Access
   A. Major highways (truck access)
   B. Railroads
   C. Ocean Access
      1. adequate channel depth
      2. channel clearance
II. Land
   A. Size of tract
   B. Vacant or redevelopable
   C. Industrially zoned
   D. Environmental Features
III. Wharf Space - existing, developable
IV. Water Supply - brackish, potable
V. Electricity Demands

There are various general areas in Middlesex County that meet the industrial siting criteria of - (1) transportation access (road, rail and ocean),[1] (2) proximity to the Baltimore Canyon, (3) land zoned for heavy industry, (4) water supply and (5) electric power for service and support bases, repair and maintenance yards,[2] and pipe coating yards.[3] These areas border on the Arthur Kill and the Raritan River and are shown in Figure IV-5. It should be noted that these are general areas and are not specific sites meeting every siting criteria. Some of the land in these areas is vacant and is suitable for development of wharves.

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1. The area inland of the Swing Railroad Bridge crossing the Raritan meet the siting criteria of channel clearance for steel platform installation support bases if horizontal clearance in excess of 130 feet is required.

2. Repair and maintenance services will probably be provided by existing port facilities. If a new facility is needed, then areas along the Arthur Kill and the Raritan River will meet the criteria for a new yard serving most medium sized OCS vessels.

3. Existing pipe coating yards may be able to supply, coat and store the pipe for the Baltimore Canyon pipelines. In this case, a small port facility for storage and loading and unloading of barges would be required. The siting criteria for this type of facility are met by the general areas bordering the Arthur Kill and the lower Raritan River.

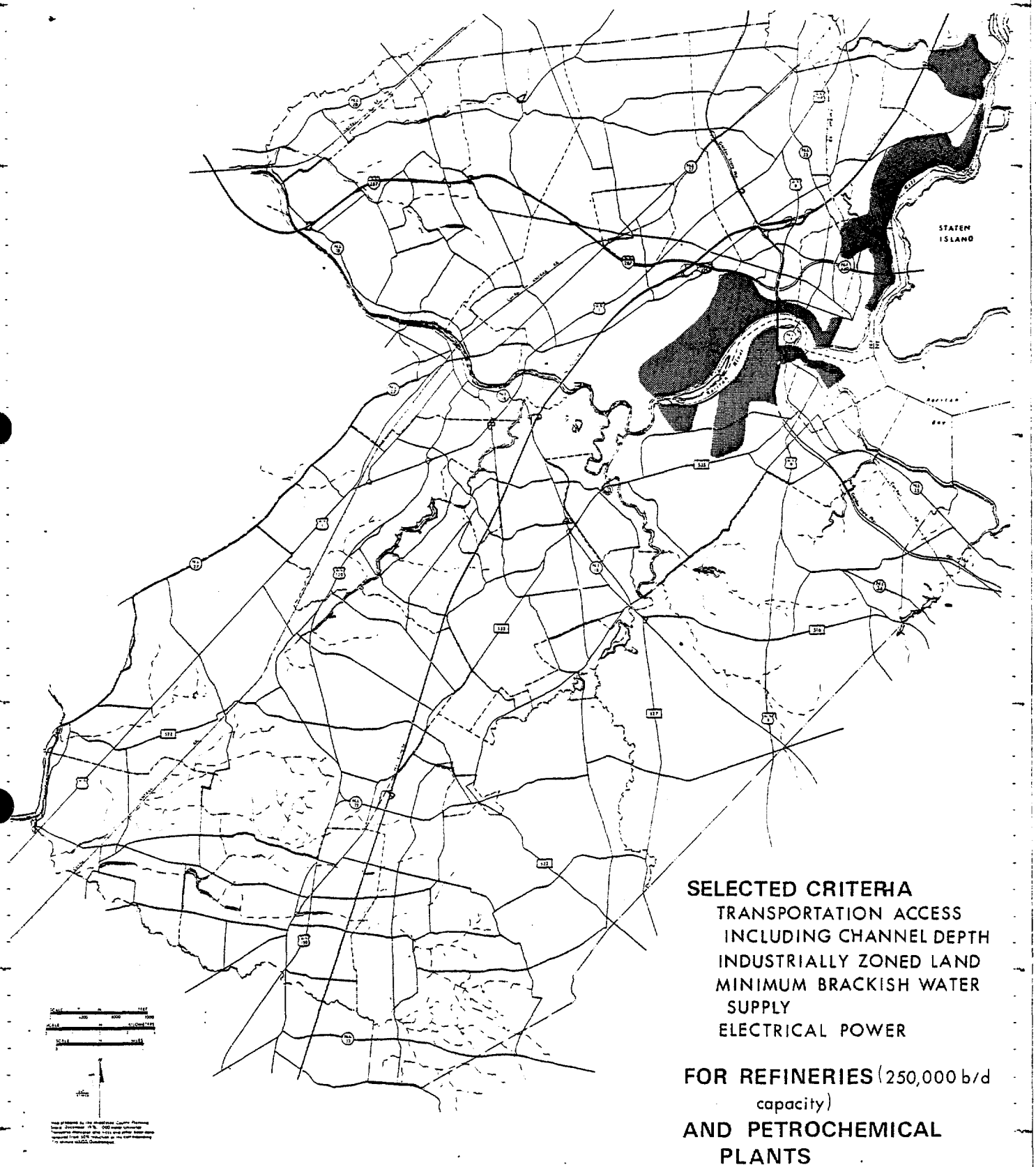
A. Areas Meeting Selected Industrial Siting Criteria of PETROLEUM Related Facilities

The purpose of this section is to present a preliminary analysis of the general areas in Middlesex County that meet most of the major industrial siting criteria for each of the types of petroleum-related facilities. The industrial siting criteria that have not been used in making this preliminary determination include: (1) the size and vacant or redevelopable nature of the tracts of land; and (2) wharf space availability. Other important factors affecting a decision to build a facility have been considered wherever these factors tend to limit the location of that type of facility. For example, partial processing plants will usually locate somewhere between oil pipeline landfalls and a refinery, and this factor has taken into account in making the preliminary determination of development opportunities for partial processing plants (See figure IV-2).

1. Petroleum Refineries

The process involved in making the decisions whether and where to locate a new refinery entails multifarous factors and considerations. The size and complexity of a specific refinery will greatly affect its industrial siting criteria and requirements. For instance, a refinery with a capacity of 250,000 barrels of oil per day usually requires 1,000 to 1,500 acres of flat vacant industrially zoned land, rail and road transportation access, at least 10.5 million gallons of brackish water per day (MGD), and access to electrical power. The only areas of industrially zoned land in Middlesex County where a refinery could obtain 10.0 MGD of brackish water are located along the Arthur Kill and the lower Raritan River.

FIGURE IV-1



AREAS MEETING INDUSTRIAL SITING CRITERIA – REFINERIES AND PETROCHEMICAL PLANTS

Figure IV-1 illustrates the areas meeting the siting criteria and factors of transportation access, heavy industrial zoning, minimum brackish water supply and electrical power for refineries with a capacity of 250,000 barrels of oil per day. The land in these general areas is not necessarily vacant or redevelopable. In addition, the specific zoning and site plan review regulations of various municipalities may not allow the development of refineries and some other OCS facilities.

2. Petrochemical Complexes

The primary consideration in petrochemical plant siting is the availability of raw materials or feedstock. Historically, petrochemical plants have been dependent on the output of natural gas processing plants—natural gas liquids such as butane, propane, and ethane—for feedstock material. In addition, gas itself, comprised 90% of methane, is a major raw material and fuel for petrochemical operations. More recently, crude refinery outputs, such as naptha and gas oil, have begun constituting another major source of raw material and fuels for the petrochemical industry..

Petrochemical industries would thus seek to locate either: (1) close to refineries and ports where napthas and crude oil could be imported; or (2) near refined product and/or natural gas pipelines.

Areas in Middlesex County bordering existing natural gas and refined product pipelines can be seen on the map on page 9 — .

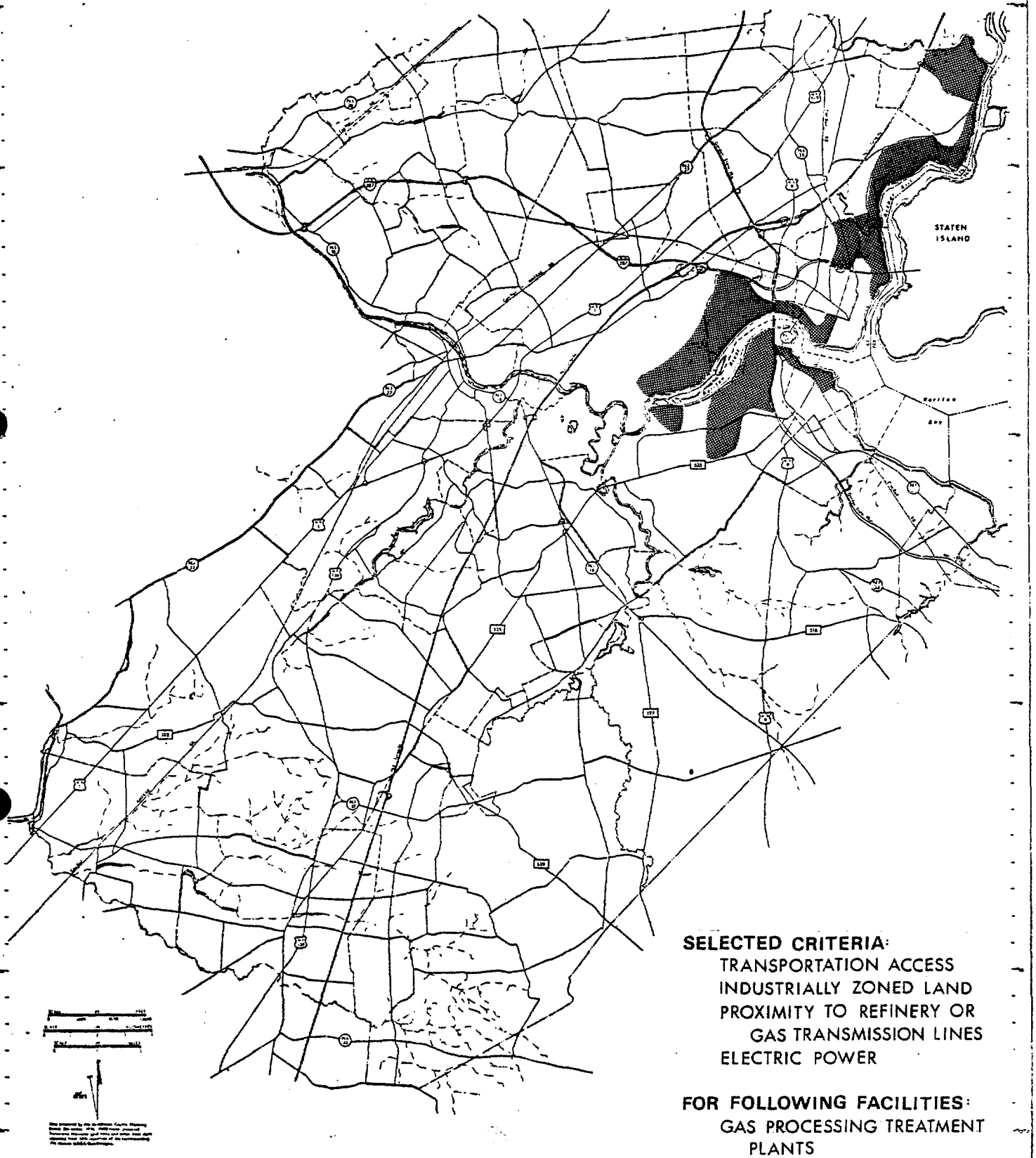
Petrochemical industries seeking to locate near either existing or potential refineries would seek sites in the same areas that meet the industrial siting criteria for refineries (figure IV-1).

3. Gas Processing Treatment Plants and Partial Processing Plants

Gas processing treatment plants recover liquifiable hydrocarbons from the raw gas stream. They are usually located between the gas pipeling landfall and commercial gas transmission lines. It is likely that these plants would locate near the Raritan Bay (See figure IV-2) to be close to gas pipeline landfalls and relatively close to commercial gas transmission lines. It is also quite possible, however, that gas processing treatment plants would locate on industrially zoned sites in other parts of the county.

Partial processing plants remove water from the unprocessed oil well stream before it is transported to refineries for final treatment. These plants tend to locate between the oil pipeline landfall and refineries. Other siting criteria of partial processing plants include: (1) rail access for transportation of natural gas liquids; (2) road access for transport of smaller quantities of natural gas liquids and solid waste; (3) relatively large tracts of land zoned for heavy industry; (4) 200,000+ gallons of water per day; and (5) electric power. The areas immediately adjacent to the Raritan River and the Arthur Kill meet these basic industrial siting criteria and are relatively close to the refineries and potential sites for landfalls (See figure IV-2).

FIGURE IV-2



SELECTED CRITERIA:

TRANSPORTATION ACCESS
INDUSTRIALLY ZONED LAND
PROXIMITY TO REFINERY OR GAS TRANSMISSION LINES
ELECTRIC POWER

FOR FOLLOWING FACILITIES:

GAS PROCESSING TREATMENT PLANTS
PARTIAL PROCESSING PLANTS

AREAS MEETING INDUSTRIAL SITING CRITERIA - PROCESSING

4. Tank Farms

Tank farms store crude oil or refined petroleum products before shipment to refineries or various markets. Tank farms may be associated with refineries, pipelines, and marine terminals.

a. Marine Terminal and/or Refinery Tank Farms

The industrial siting criteria for tank farms associated with refineries and/or marine terminals include: (1) transportation access by rail, road and usually sea, (2) industrially zoned land, (3) small quantities of water, (4) electric power and (5) proximity of refinery or market. Figure IV-3 indicates the areas meeting these basic industrial siting criteria. This map shows that the tanks associated with the marine terminal or refinery can be located inland of the wharves of the marine terminal.

b. Pipeline Tank Farms

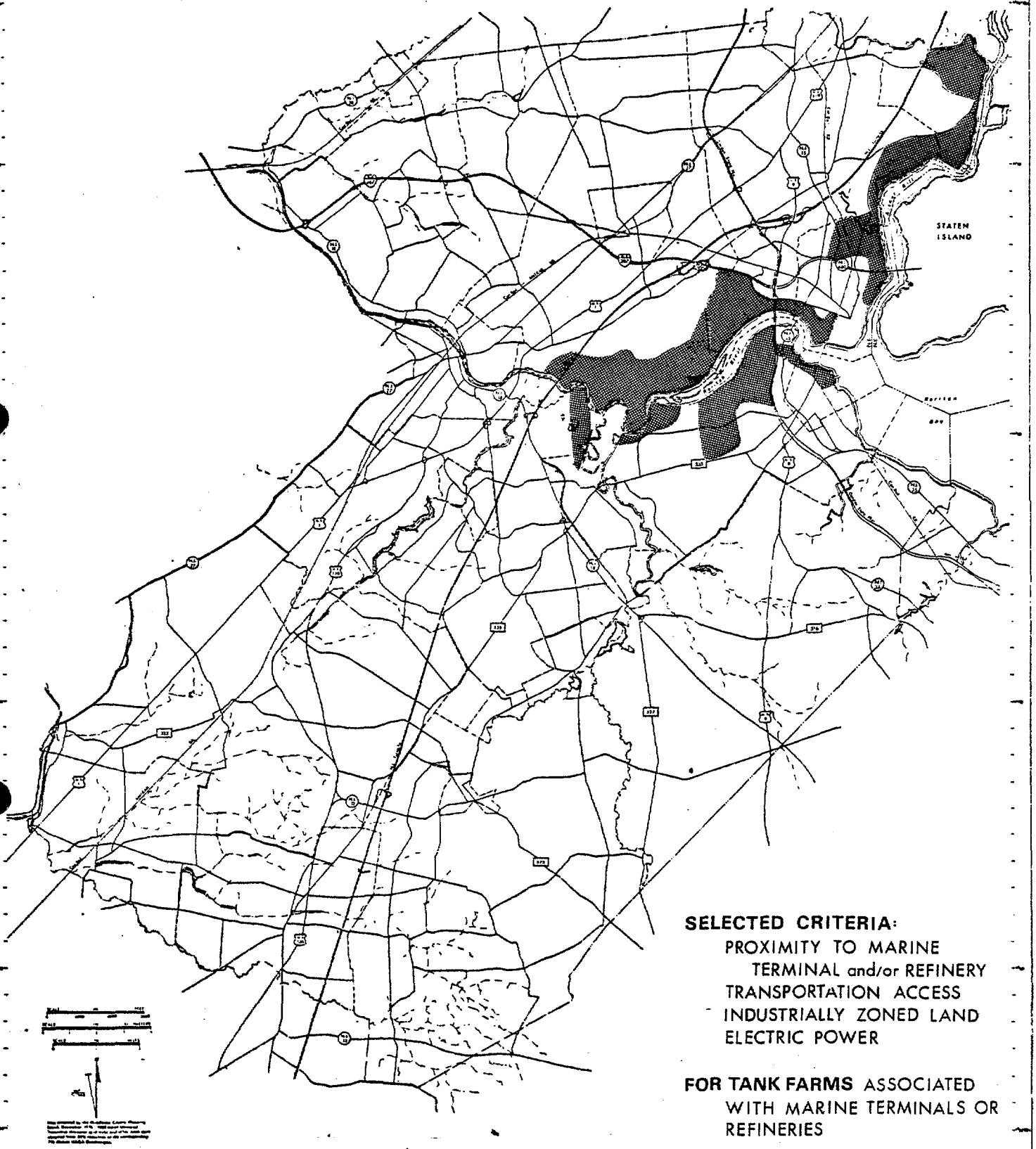
If tank farms are associated with pipelines, then many industrially zoned vacant and redevelopable sites throughout the County could meet the siting criteria for tank farms.

The basic industrial siting criteria for tank farms associated with pipelines include: (1) proximity to pipeline, (2) transportation access by road and rail, (3) industrially zoned land, (4) small quantities of water, and (5) some electric power. If new pipelines for crude oil from the Baltimore Canyon are landed in Middlesex County then pipeline tank farms may be located on industrially zoned sites[6] on or near

[6]See the map of Industrial Zoned Land in Appendix B.

2

FIGURE IV-3



AREAS MEETING INDUSTRIAL SITING CRITERIA-
MARINE TERMINAL and/or REFINERY TANK FARMS

Raritan Bay and relatively close to the refineries in and near Middlesex County. Other pipeline tank farms may be located along existing or new refined product pipelines.[7]

5. Pipeline Landfalls

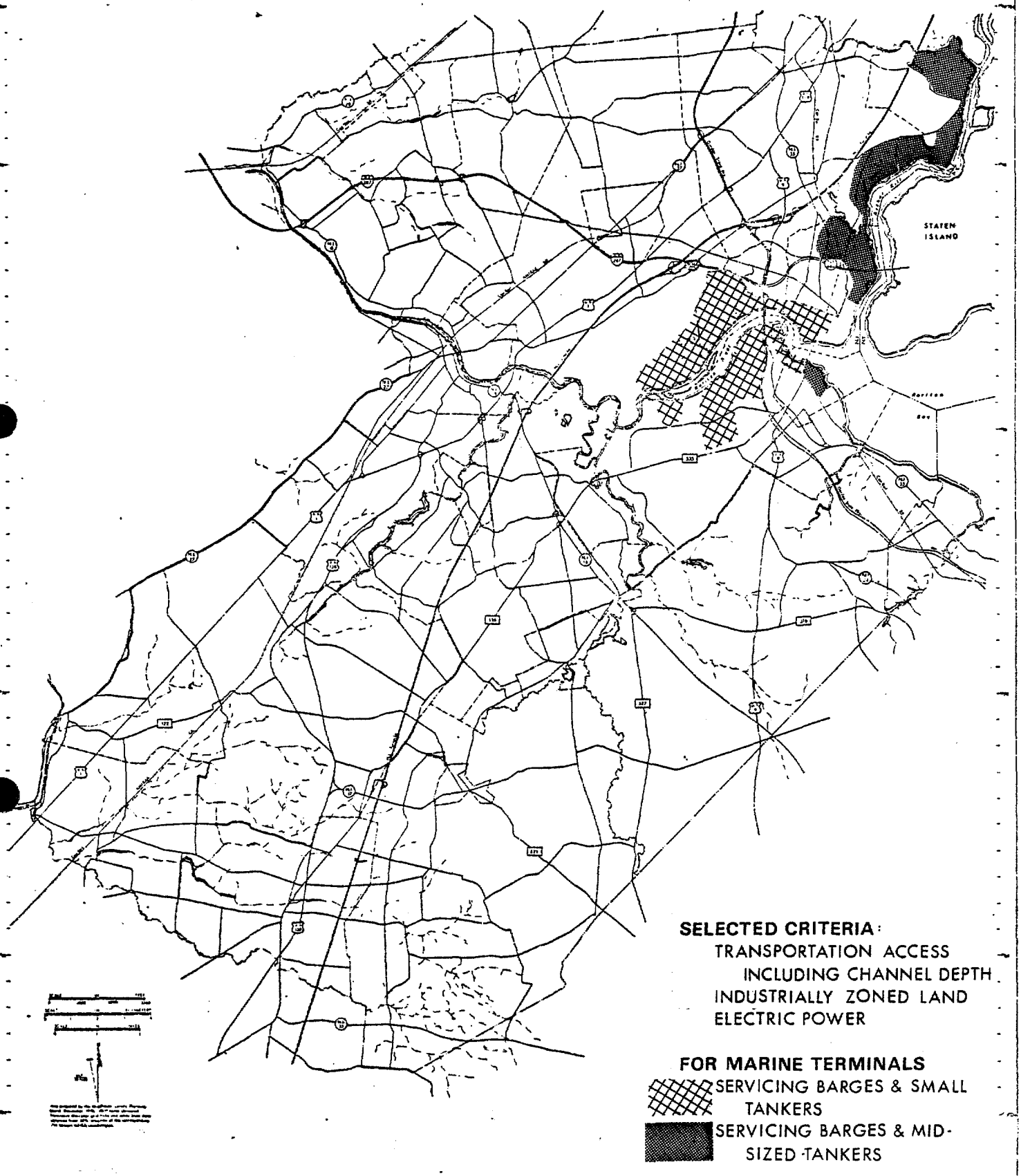
Pipeline landfalls is a phrase used to describe the location where submerged gas and oil pipelines come ashore. These facilities may include a pumping station and some storage tanks. Pipeline landfall facilities are usually located on flat industrially zoned land on or near the ocean, bay or other body of water. No specific channel depths are required and therefore pipeline landfall facilities for Baltimore Canyon pipelines may be located along or near the Raritan Bay or the Arthur Kill.

6. Marine Terminal

Marine terminals receive and store crude oil and refined petroleum products and transfer them to refineries and/or various markets. They usually have special navigational requirements such as turning area, navigational aids and sheltered harbors, depending on the size of the tankers and barges expected to arrive at the terminal. Other industrial siting criteria of marine terminals include: (1) proximity to refineries (if crude oil is received), (2) industrially zoned land, (3) a minimal amount water; and (4) some electrical power. The general areas along the Arthur Kill and the lower Raritan River also meet the industrial siting criteria for marine terminals. However, the areas inland of the Swing Railroad

[7] See the 1977 Energy Facilities Map (page 9) for an indication of existing oil pipelines and pipeline terminals.

FIGURE IV-4



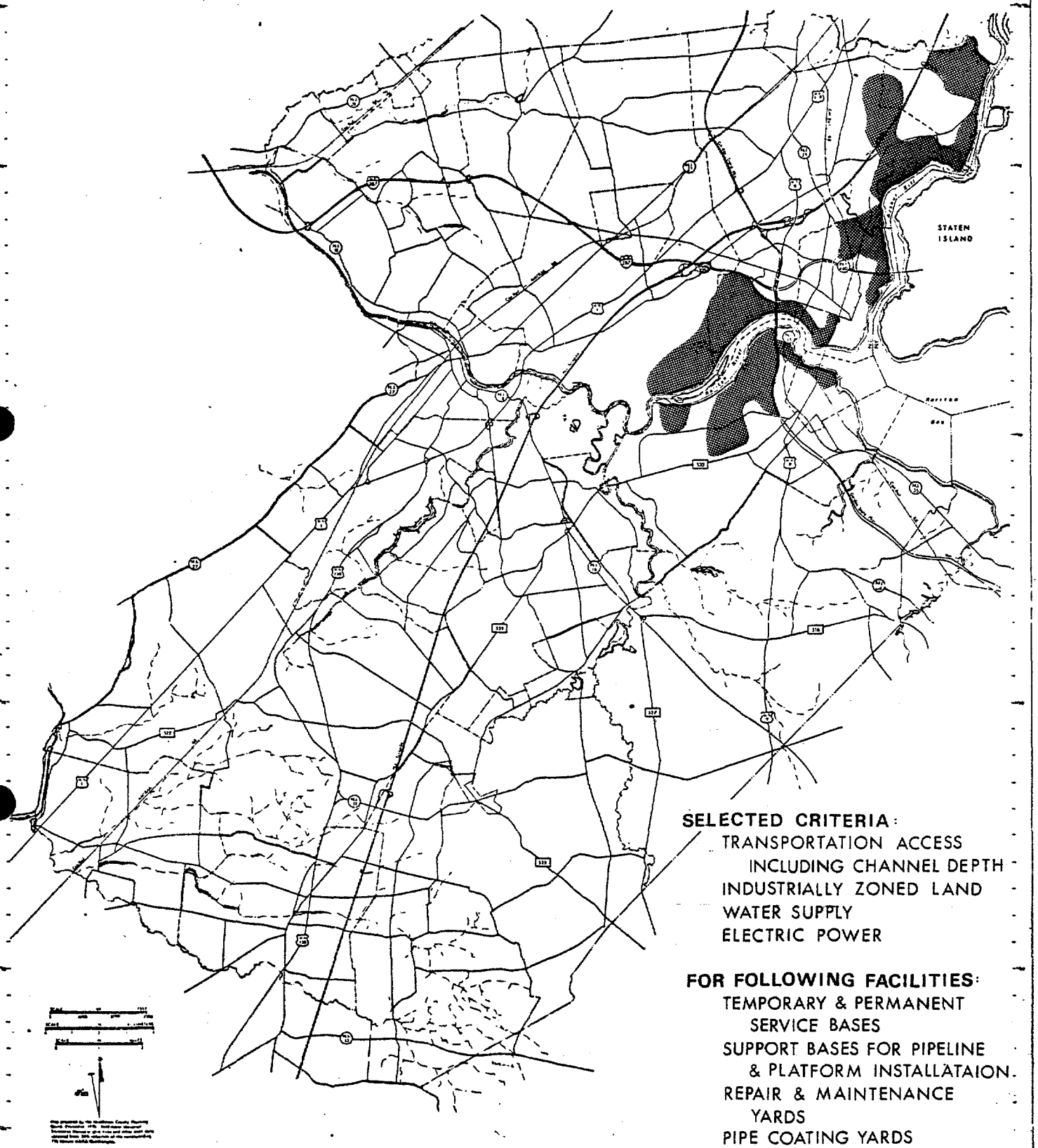
AREAS MEETING INDUSTRIAL SITING CRITERIA - MARINE TERMINALS

Bridge crossing the Raritan between South Amboy and Perth Amboy can only meet the siting criteria for marine terminals serviced by small tankers and barges. This is due to the limited horizontal clearance (132 feet) of the Swing Bridge. Figure IV-4 indicates these general areas meeting the industrial siting criteria.

7. Service and Support Bases, Repair and Maintenance Yards and Pipe Coating Yards

There are two types of service bases--temporary bases and permanent bases—and two types of support bases--steel platform installation support bases and pipeline installation support bases. Repair and maintenance yards and pipe coating yards have siting criteria and physical requirements that are very similar to service and support bases. All of these facilities require transportation access by roads, rail and sea. The channels to the sea must have depths of at least 15 to 20 feet. These bases are usually located within 200 miles of the offshore drilling tracts.

FIGURE IV-5



AREAS MEETING INDUSTRIAL SITING CRITERIA - SERVICE BASES & SUPPORT BASES

V.
POTENTIAL DISTRIBUTIONS AND IMPACTS OF ENERGY FACILITIES IN MIDDLESEX COUNTY

Following the release of the Interim Report in August 1977, meetings with municipal representatives and other interested parties were held. For these meetings, it was felt that participants would be more likely to respond and express their preferences and concerns if the impacts from energy facility development could be clearly illustrated to them. For this reason, and in spite of the risk that this effort might be misinterpreted as an indication of where energy facilities should go in the County, four possible scenarios of how energy facilities might be distributed in Middlesex County were developed.

These scenarios of possible energy distributions are presented in the following pages. They are hypothetical and presented solely for the purpose of illustrating energy facility impacts. They are based on the estimates of energy resource and facility demands and the areas identified as meeting industry's basic siting criteria found in Chapter III and IV of the Interim Report (Part Two of this Report). The four scenarios consist of one distribution of refined petroleum products facilities, one distribution of facilities that would result from the development of a deepwater port and two distributions, a high and medium scenario, of offshore oil and gas facilities. The high and medium scenarios of OCS facilities are based on the upper and middle range finds of offshore oil and gas that could be directed to Middlesex County. Summarized after each of these scenarios are the major related impacts.

HIGH SCENARIO - OCS

Under this distribution a full complement of offshore oil facilities are projected for Middlesex County. This is based on the assumptions that:

1) CAFRA regulations and state coastal management policies will deter development of most offshore oil facilities along Southern New Jersey's tourist economy-shoreline

2) High finds of oil and gas will be made along the Atlantic Outer Continental Shelf (OCS) resulting in up to .594 MBD of crude oil being transported to Middlesex and Union Counties/Arthur Kill Area

3) Offshore oil will stimulate the development of new refineries as opposed to a barrel for barrel replacement of offshore oil for existing crude oil imports at existing refineries.

Facility projections are as follows:

Processing Facilities

Refineries: 2 New 250,000 bbl/day facilities
reopening of 67,900 bbl/day Hess facility

3 Petrochemical Plants

3 Gas Processing Plants (1 billion cu. ft./day each)

1 Partial Processing Plant

Storage and Distribution Facilities

2 Pipeline Landfalls and Terminals
2 Storage Tank Farms Associated with increase in refinery capacity
1 marine terminal

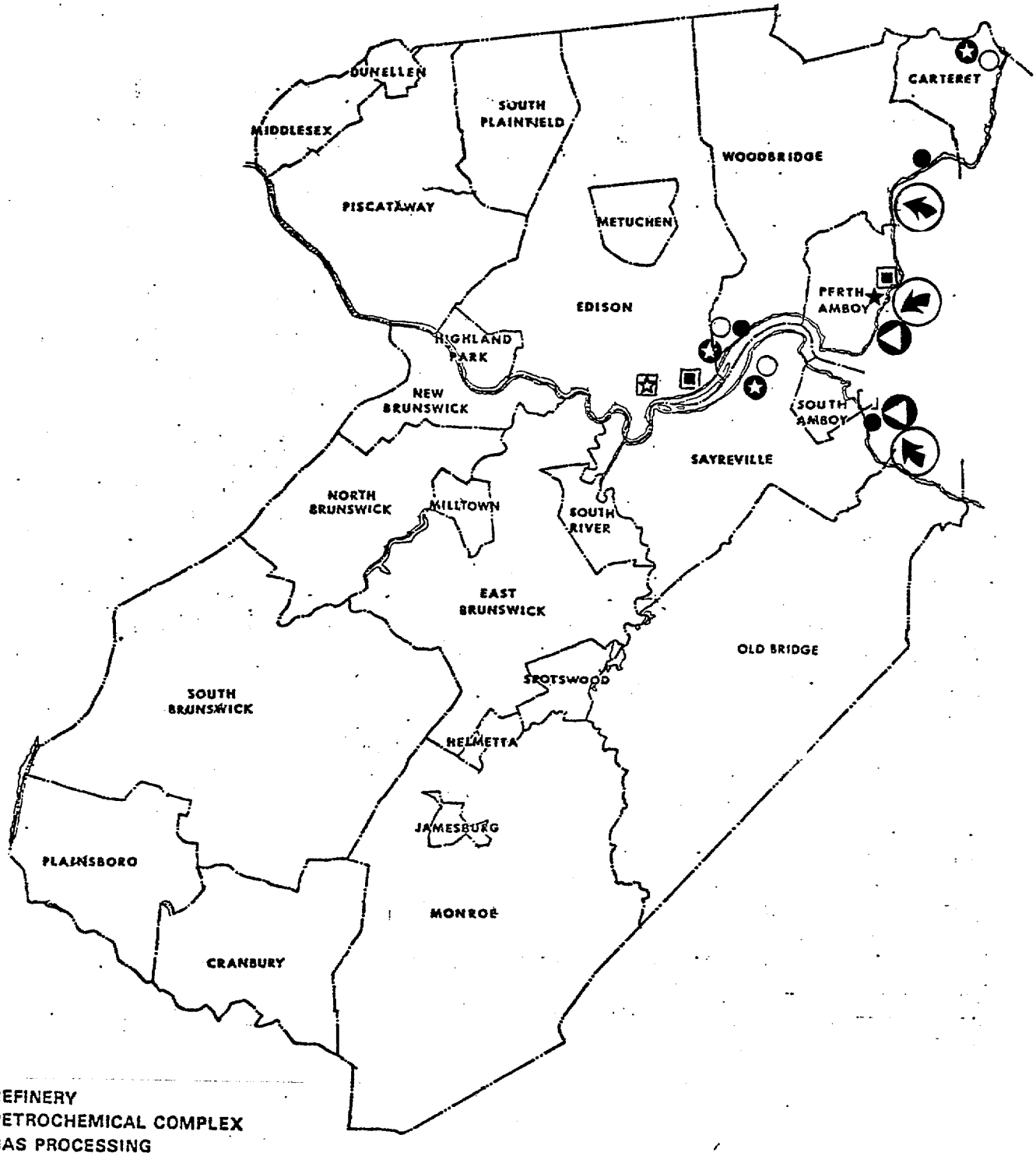
Support Facilities

2 Permanent Support Bases

1 Pipeline Support Base

1 Platform Installation Support Base

FIGURE V-1



- REFINERY
- PETROCHEMICAL COMPLEX
- GAS PROCESSING
- PARTIAL PROCESSING

- PERMANENT SUPPORT BASE
- PIPELINE SUPPORT BASE
- PLATFORM INSTALLATION BASE
- PIPELINES & MARINE TERMINALS
- STORAGE TANK FARMS

HIGH SCENARIO - OCS

TABLE V-1

HIGH SCENARIO - OCS

Summary of Major Impacts

	Impacts or Community Services & Facilities			Economic Impacts		Environment Impacts			Land Use Impacts	
	Potable Water Supply (MGD)	Toxic, hazardous & solid waste	Sewage Transportation Fire Protection	Employment	Capital Investments	Water Quity	Air Quality	Noise	Environmentally Sensitive Areas	Compatability with existing land use
Processing facilities	See Accompanying Table									
Refineries			Moderate or minor impacts		$815 million	Major impacts			Irreversible and irretrievable commitment of resources	Major impacts depending on specific site
Petrochemical plant		Major impacts		Operation: 4150 (98% local)	$368 million					
Gas Processing plant				Construction: 2830	$ 85 million					
Partial Processing Plant					$ 13 million					
Storage and Distribution Facilities										
Pipeline landfall & Terminal		Minor Impact	Minor Impact	Installation: 250-300	$2.4 million	Moderate to major impacts depending on specifics of site			Irreversible and irretrievable commitment of resources	Major to moderate impacts depending on specific site
				Operation: 17						
Support facilities										
Permanent support base		Moderate Impact	Minor Limited Impacts	Operation: 572 (70% local)	$1.3 million	Moderate to minor impacts depending on specifics of site			Irreversible and irretrievable commitment of resources	Moderate impacts depending on specific site
Pipeline Support Base										
Platform Installation Base										

TABLE V-2

SUMMARY OF OFFSHORE OIL AND COASTAL ENERGY FACILITIES - WATER SUPPLY IMPACTS: HIGH FIND SCENARIO

Location	Type of Facility	Number of Facilities	Water Use per Facility (MGD)	Total Water Need (MGD)
North County	Petroleum Refinery	2	1.3 - 1.75 (67,900 bbl/d Hess) 5.4 - 7.0 (250,000 bbl/d New)	6.7 - 8.75
	Petrochemical Complex	2	5 - 10	10 - 20
	Gas Processing Plant	2	1.5	3
	Partial Processing Plant	1	negligible	negligible
	Permanent Support Base	2	0.2	0.4
	Platform Support Base	1	negligible	negligible
	Pipeline Landfall	1	negligible	negligible
	North County Water Demand Sub Total			20.1 - 32.2
South County	Petroleum Refinery	1	5.4 - 7	5.4 - 7
	Petrochemical Complex	1	5 - 10	5 - 10
	Gas Processing Plant	1	1.5	1.5
	Pipeline Support Base	1	negligible	negligible
	Pipeline Landfall	1	negligible	negligible
	South County Water Demand Sub Total			11.9 - 18.5
	TOTAL COUNTY WATER DEMAND (Does not include provision for unknown water demand of petrochemical complexes, often high)			32 - 50.7

MEDIUM SCENARIO - OCS

Under this distribution the following is assumed:

1) CAFRA regulations and state coastal management policies will deter development of processing and storage and distribution offshore oil facilities along Southern New Jersey's tourist economy shoreline

2) Medium finds of oil and gas will be made along the Atlantic Outer Continental Shelf (OCS). Demand for additional refinery capacity will be limited to the reopening of the Hess refinery

3) Offshore oil will not stimulate the development of new refineries.

Facility projections are as follows:

Processing Facilities

Refineries: reopening of 67,900 bbl/day Hess facility

1 Petrochemical Plant

2 Gas Processing Plant (1 billion cu. ft. 1 day each)

1 Partial Processing Plant

Storage and Distribution Facilities

1 Pipeline Landfall and Terminal

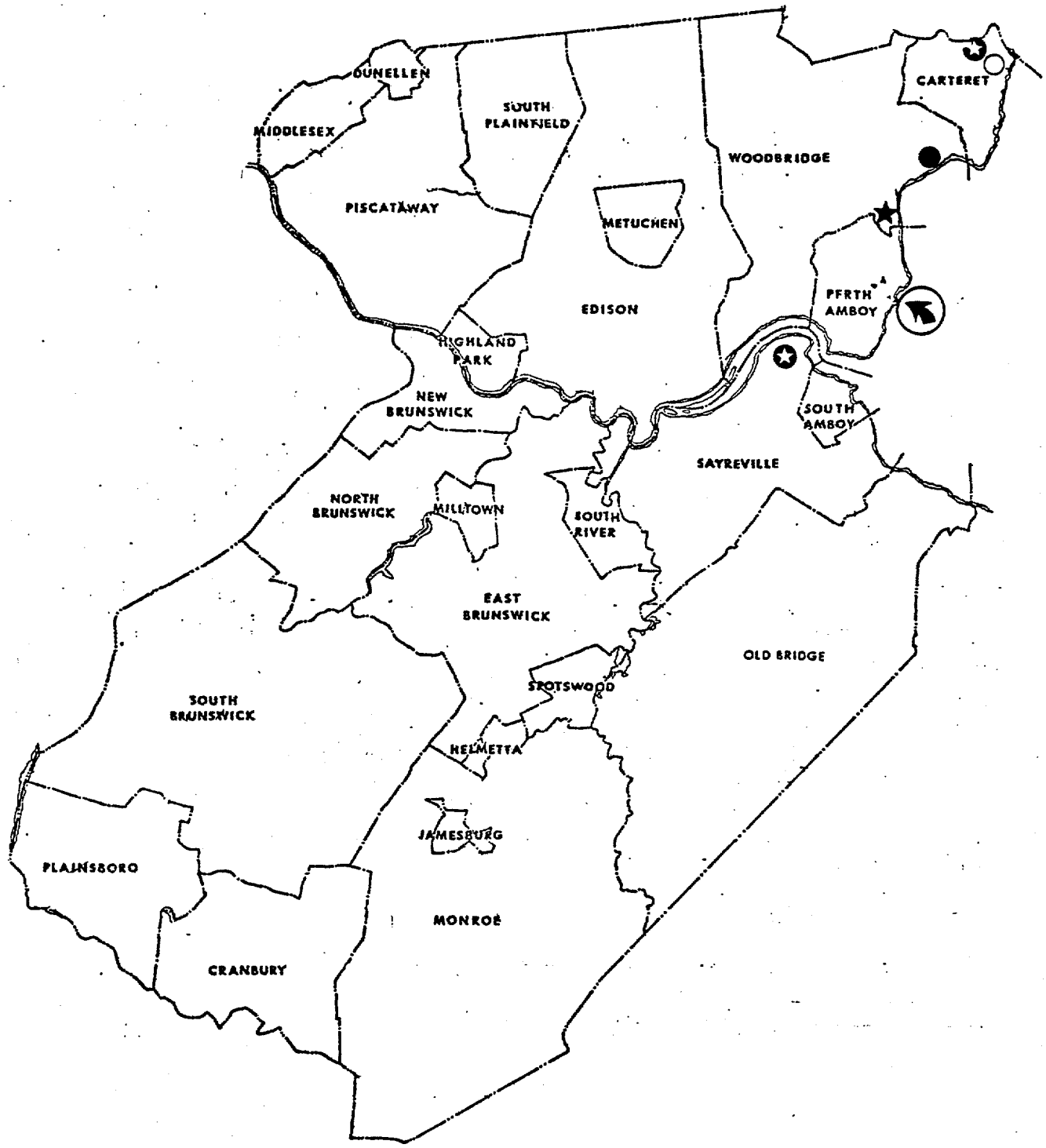
1 Storage Tank Farm Associated with partial processing plant

1 Marine Terminals

Support Facilities

1 Pipeline Installation Support Base

FIGURE V-2



● REFINERY
○ PETROCHEMICAL COMPLEX
✪ GAS PROCESSING
★ PARTIAL PROCESSING
Ⓟ PIPELINE LANDFALL & TERMINAL

MEDIUM SCENARIO - OCS

MEDIUM SCENARIO - OCS

SUMMARY OF IMPACTS

Processing Facilities and Storage & Distribution Facilities

Impacts on Community Services & Facilities:

Water Supply - 5 mgd,major impacts

toxic, hazardous, and solid waste - major to moderate impacts

sewerage
transportation — Moderate to minor impacts
fire protection

Economic Impacts:

Employment: 537 (79% local)

Capital Investments: $185 million (not including HESS reopening)

Environmental Impacts:

Air Quality
Water Quality — Major impacts that could severely affect the
Nose — health, safety and welfare of your community

Land Use Impacts:

Environmental Sensitive Areas: Irreversible and irretrievable commitment of resources

Compatability with Existing Land Uses: Major impacts depending on specific site

Refined Petroleum Products Facilities

Under this distribution it is assumed that:

1) The Middlesex and Union Counties/Arthur Kill area will continue to be a major transhipment point for refined petroleum products

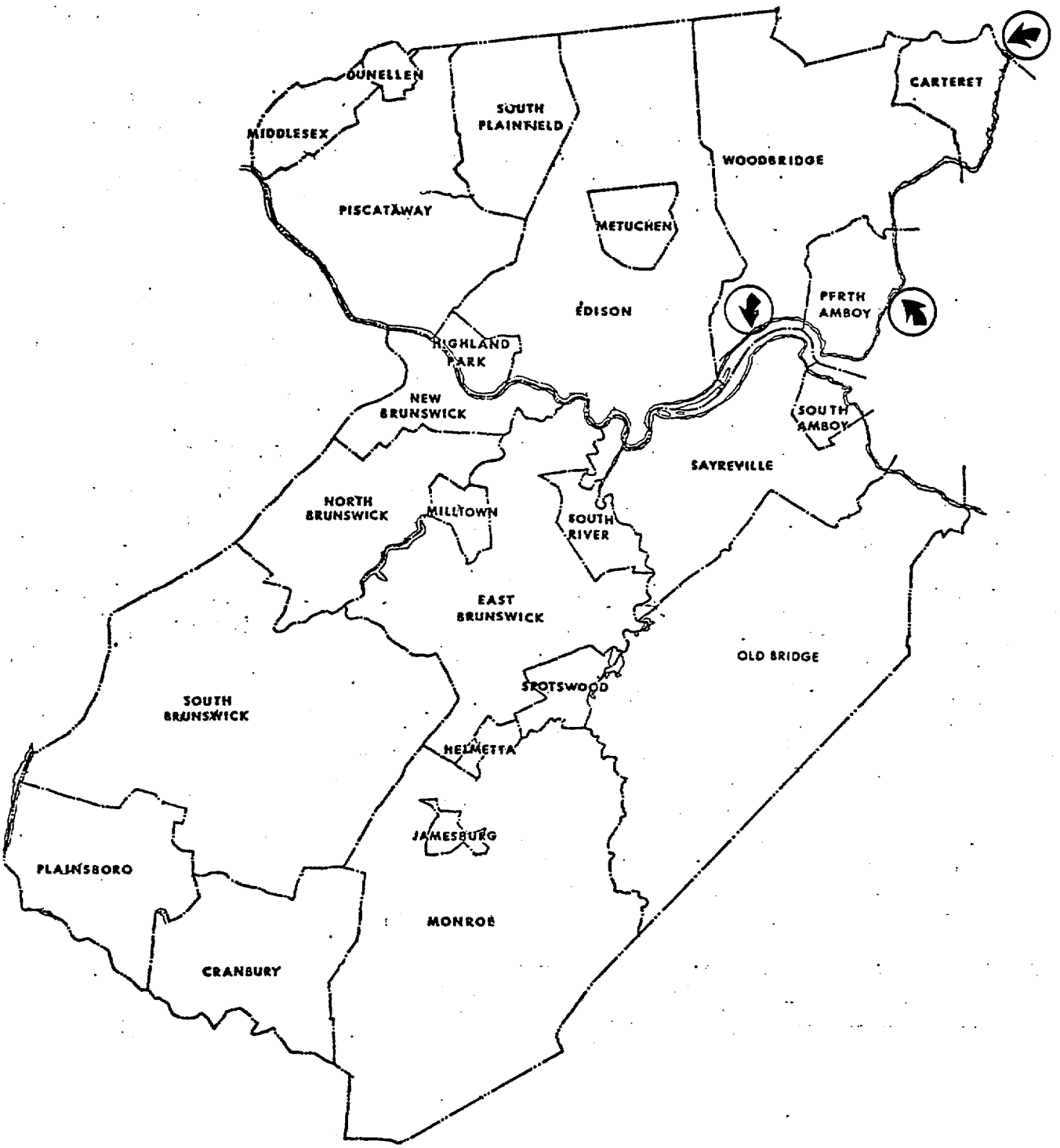
2) To meet future petroleum demand more marine terminals for refined products will seek sites in Middlesex County.

Facility projections are as follows:

Storage and Distribution Facilities

3 Marine Terminals

FIGURE V-3



MARINE TERMINALS

REFINED PETROLEUM PRODUCTS FACILITIES

REFINED PETROLEUM PRODUCTS FACILITIES

SUMMARY OF IMPACTS

Storage & Distribution Facilities
(3 Marine Terminals)

Impact on Community Services & Facilities: moderate to minor depending on specifics of site

Economic Impacts: - Not Available -

Environmental Impacts:

Air Quality - Hydrocarbon emission from storage tanks and transfer operations

Exhaust emissions from compressors, etc.

Water Quality - Bilge Water
Ballast Water (BOD,COD, suspended solids,
Storm Runoff oil and grease.)

Chronic small oil spills from handling operations

Infrequent major oil spills from groundings, collisions and other accidents

Land Use:

Environmentally Sensitive Areas: Irreversible and irretrievable committment of resources

Compatability with Existing Land Use: Major to moderate impacts depending on specific sites

Deepwater Port

As an alternative to increasing imports of refined petroleum to the North Atlantic Region, a deepwater port could be located in the Mid-Atlantic coastal area to accomodate very large crude carriers (VLCC) or the so called supertankers. As projected by an Arthur D. Little, Inc. report to the Council on Environmental Quality in 1971 deepwater port development could result in the expansion of existing Middlesex County refineries and the development of additional petrochemical plants.

Facility projections are as follows:

Processing Facilities

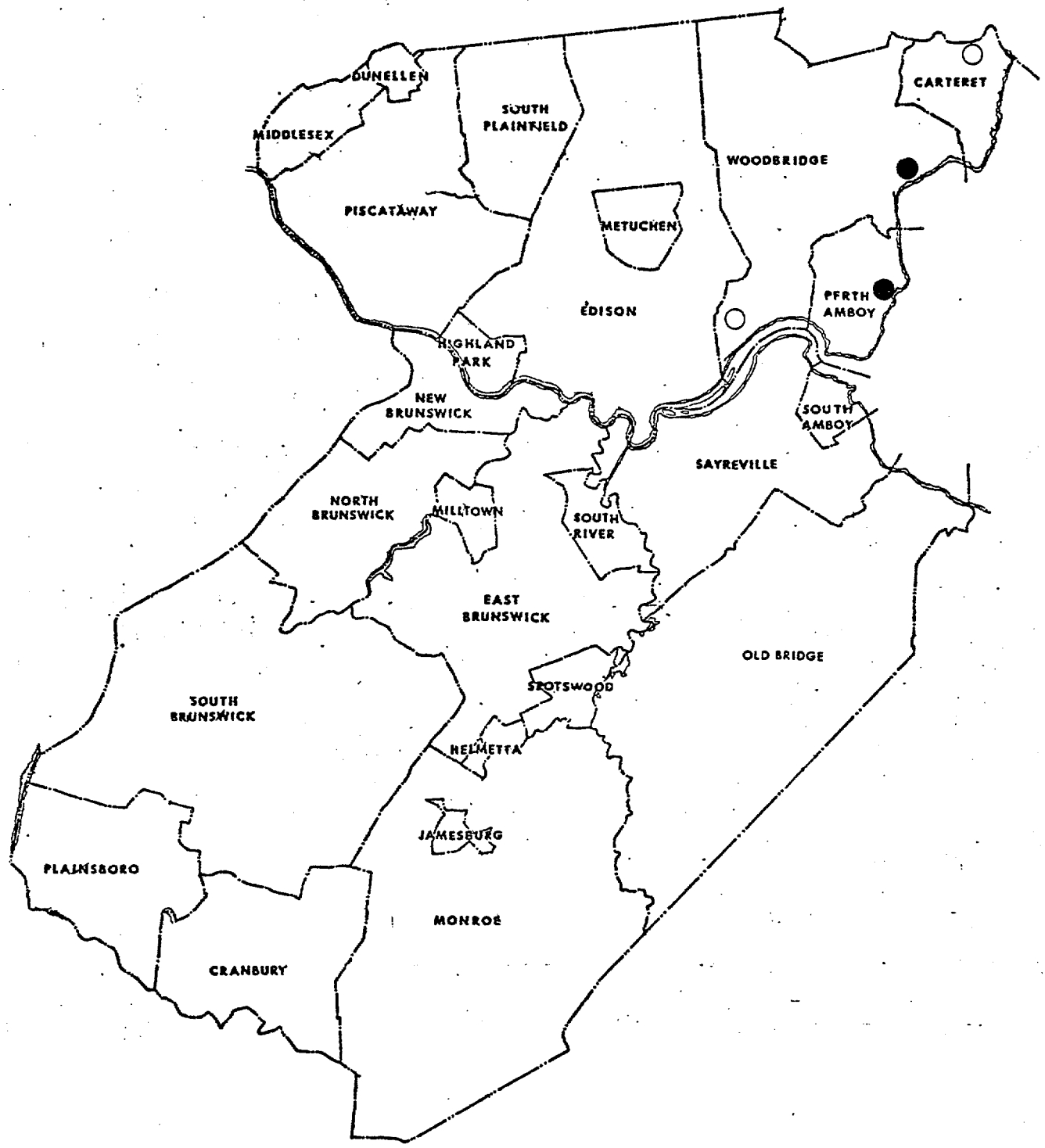
Refineries: reopening and expansion of Hess facility
expansion of Chevron facility

2 Petrochemical Plants

Storage and Distribution Facilities

Deepwater port on Sandy Hook

FIGURE V-4



● REFINERY
○ PETROCHEMICAL COMPLEX

DEEPWATER PORT

DEEPWATER PORT

SUMMARY OF IMPACTS

Processing Facilities

Impacts on Community Services and Facilities:

Water Supply - major impacts

Toxic, hazardous, and solid waste - major impacts

Sewerage
Transportation - moderate to minor impacts
Fire protection

Economic Impacts: - Not Available -

Environmental Impacts:

Air Quality
Water Quality
Noise
Major impacts that could severely affect the health, safety, and welfare of your community

Land Use:

Environmentally Sensitive Areas: Irreversible and irretrievable commitment of resources

Compatibility with Existing Land Use: Major impacts depending on specific site

VI. THE PUBLIC PARTICIPATION PROGRAM: DEVELOPING SITING POLICIES FOR ENERGY FACILITIES

The public participation program involved a process where technical data and information necessary for the understanding of energy facilities and related impacts was made available to various parties in the form of the Interim Report. Government officials, business and industry representatives, civic and environmental groups and other interested parties were then given an opportunity to address themselves to the issues and impacts of energy facilities siting via meetings and questionnaires. A summary of how municipal officials and other interested parties responded is presented in the following pages. A copy of the questionnaires, more detailed analysis of the questionnaire results and records from the meetings held may be found in Appendix A.

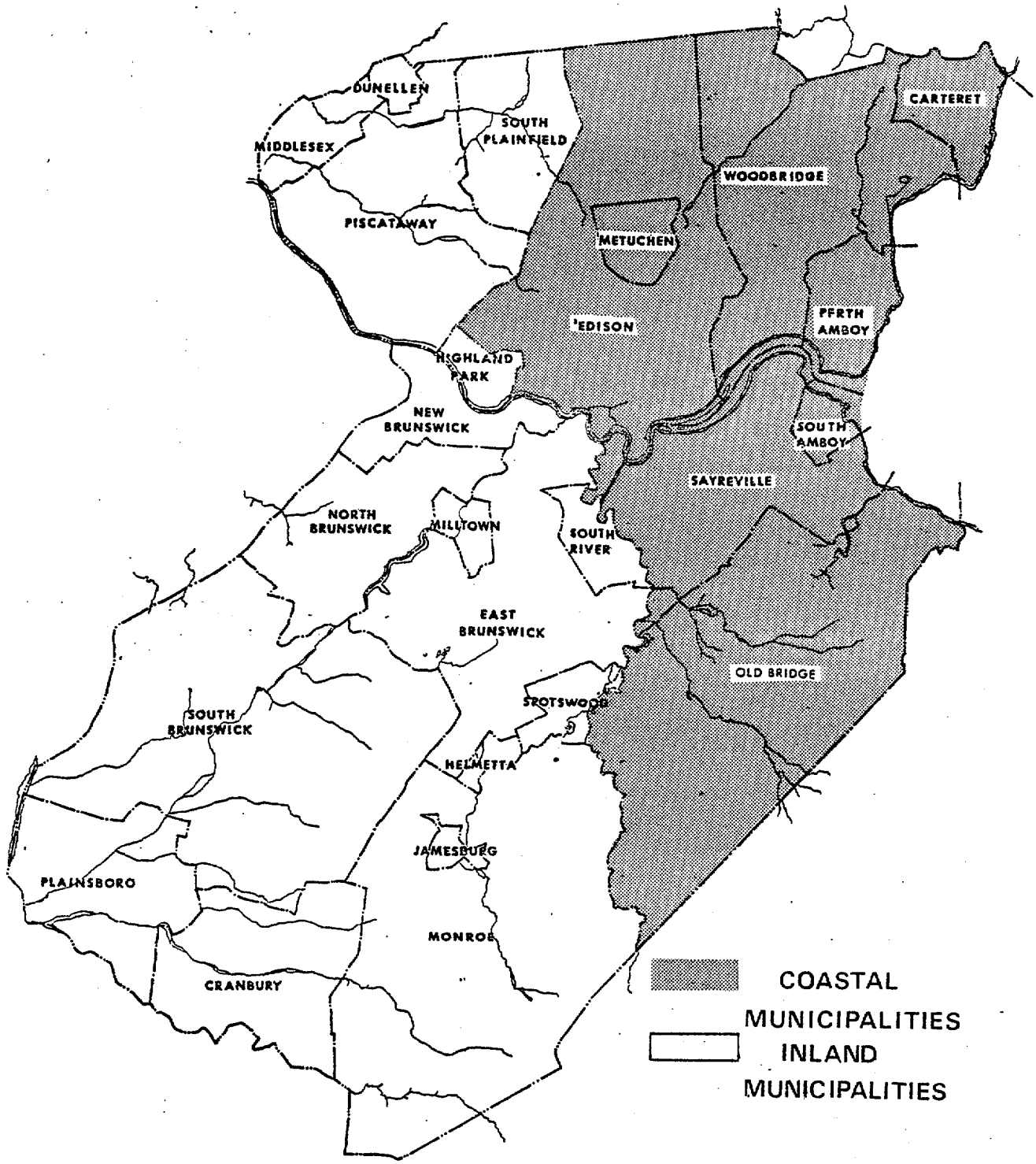
Summary of Responses

A total of 19 participants from ten of the Counties' 25 municipalities responded to the questionnaires. Respondents were categorized as representing either a coastal or inland municipal viewpoint. A map identifying these municipalities may be found on the following page.

Coastal Municipalities

Responses to the questionnaires coming from coastal municipalities consistently favored local siting of offshore oil support facilities. Permanent support bases, platform installation support bases, pipeline installation support bases and pipe coating yards were generally land uses accepted by most respondents. In the case of permanent support bases and platform installation support bases, 100 percent agreement and acceptance was evidenced by the Perth Amboy municipal representative, who indicated that infrastructure to support

FIGURE VI-1



MIDDLESEX COUNTY

such facilities already existed in the City.

Processing and storage and distribution facilities such as refineries, petrochemical plants, gas processing plants and marine terminals received less overwhelming approval from the respondents. Approximately half of the participants indicated a very strong preference for siting all types of facilities because of the economic benefits, particularly in terms of increased employment opportunities. The other 50 percent of the respondents identified potentially adverse impacts these facilities might have on air and water quality and adjacent land uses. There was clear opposition to locating gas processing plants and storage tank farms: with citizen opposition, unsightly appearance and environmental problems cited as the major reasons. Local regulations regarding zoning and site plan review procedures were judged as adequate for handling the siting of energy facilities by 80 percent of the respondents.

In Woodbridge, the Port Reading Coal yards on the Arthur Kill and the Keasby area, along the Raritan River, were identified by one municipal official as being suitable for offshore oil support facilities. Perth Amboy municipal officials have also initiated efforts to attract support facilities to the vacant and redevelopable areas around the Outerbridge Crossing on the Arthur Kill. In general, areas along the Arthur Kill, Raritan Bay and Raritan River were identified by some respondents as well suited for energy facility development.

Areas adjacent to the Sewaren residential section of Woodbridge were identified by one municipal official as unsuitable for energy facilities. The South Amboy Planning Board noted that sites in South Amboy were unsuitable for all facilities expect service and support base.

Most respondents from coastal municipalities generally favored a balanced policy for siting energy facilities. Those facilities that do not detrimentally impact municipal resources or services are seen as beneficial in ameliorating the economic deterioration of the older urban and industrialized cities. A portion of coastal municipality respondents favored an approach of attracting energy facilities to Middlesex County and overcoming detrimental impacts on air and water resources and public services once facilities were located. One respondent advocated a prohibition policy noting that existing energy facilities were already having serious detrimental impacts on the County, as evidenced by the high pollution and deteriorated quality of Raritan Bay and the Arthur Kill.

Inland Municipalities

Those responding to the questionnaire from inland communities were found to have a much broader distribution of responses than those from coastal municipalities. Not one of the eleven energy-related development types was favored by a majority of responses, however, a large number of the responses remained neutral on the subject.

Responses were consistently in opposition to the siting of refineries, gas and partial processing plants, petrochemical complexes and storage tank farms in the inland municipalities. The reasons given included:

1) The hazard of accidents,
2) odor problems and
3) unavailability of sufficient land areas and suitable sites.

Responses were evenly distributed, with many municipal representatives maintaining a neutral position on the locating of permanent service bases, platform and pipeline installation bases, pipe coating yards, pipeline landfills and marine terminals. Among the reasons provided were, once again,

inadequate sites and the location of the municipality not being appropriate for such facilities.

Responses regarding land use policies were consistently opposed to the location of refineries, petrochemical industries, gas and partial processing plants, marine terminals and pipeline landfills. Municipal land use policies were identified as compatible (by a slim margin) for storage tank farms, permanent service bases and platform and pipeline installation bases. Responses from Highland Park, Middlesex and Plainsboro indicated no compatibility for any of the eleven facility types. The Mayor and Council of Middlesex Borough commented that all of the facilities were not compatible due to the unavailability of vacant land and specific zoning limitations. Of the total responses, 67 percent stated local regulations would prove adequate to safeguard against the detrimental impacts associated with energy facilities.

Inland municipalities identified the lands bordering Raritan Bay, Raritan River and the Arthur Kill as being suitable for energy facilities. Plainsboro indicated the construction of highway I-92 would permit certain service industries where transportation by truck is necessary. Residential and rural areas were generally regarded as unsuitable for all energy facility development.

VII
POLICIES FOR HANDLING THE IMPACTS FROM OFFSHORE OIL AND COASTAL ENERGY FACILITIES

The previous chapters have presented:

* An inventory of existing energy facilities in Middlesex County, and the description of their relationship to the overall regional network of energy facilities and the current pattern of energy supply;

* The identification of the potentials for future energy facility development in the County (including offshore oil related facilities), and the projection of possible distributions of these facilities in these areas of the County meeting basic industrial siting criteria; and

* A description of a public participation program which is the foundation on which public policy must be formulated.

The result of the above planning efforts has been the emergence of general policies for siting energy facilities in Middlesex County and the development of an understanding as to what next steps are necessary in order to safely handle the impacts from energy facility siting. These findings, as well as previous policy positions on specific energy facility proposals of the past few years, are presented in the following chapter.

A. GENERAL POLICIES

The following policies provide a framework for dealing with the impacts from those energy facilities that might potentially seek to locate in Middlesex County. These policies reflect the preferences and opinions of the municipal and county government officials, business and industry representatives, civic and environmental groups, and other interested parties that participated in Middlesex County's public participation program.

1. Seek or accomodate only a type and number of energy facilities in Middlesex County that do not:

   * Exceed public health and safety standards; and

   * Create excessive costs for taxpayers and local government, for new or expanded public facilities and services.

Many government officials and parties recognize a pressing need for the positive economic benefits (in terms of jobs and tax revenues) that energy facilities represent. Many also recognize the potentially adverse impacts some energy facilities might have on the water and air resources of the County as well as an increased demand on existing public services. The above policy reflects an understanding of both these issues and points to a process of siting energy facilities based on a careful and accurate evaluation of their impacts.

2a. Seek or accomodate all types of energy facilities in the coastal municipalities of Middlesex County in accordance with the above policy.

Inland municipalities generally indicated that the majority of energy facilities were inappropriate in their communities because of either infeasability due to coastal dependency or detrimental environmental impacts. Many respondents from inland municipalities identified the coastal areas of the Arthur Kill and Raritan Bay as being best suited for energy facility development. Coastal municipalities presented a more diverse variety of opinions on siting policies. Many parties identified areas in their municipalities as being well suited and demanding of all energy facility development. Other parties expressed objections to certain facilities because of detrimental impacts. This policy reflects the feeling of many parties that the industrial areas of the Arthur Kill and Raritan Bay are best suited for energy facility development and that such development should be contingent

on the evaluation and consideration of potentially adverse impacts.

2b. Seek or accomodate indirect or induced economic growth from energy facilities - especially of a research or service nature - throughout the county, according to the capabilities of natural resources and existing and future public services to absorb such growth.

Although most energy facilities appear to be inconsistent with inland municipal development preferences, indirect or induced economic growth, especially of a research or service nature, is consistent with the industrial development programs of most municipalities. The impacts of such development on groundwater supplies, water quality, sewer systems and deficient intermunicipal roads must be carefully assessed. The extent to which such economic growth should be accomodated in the County must be conditioned by the existing capacities of these systems to absorb such growth.

3. Seek a fair and equitable share of State and Federal Aid for the provision of basic infrastructure and services to support agreed upon energy facilities and indirect and induced economic growth.

Middlesex County and its municipalities recognize that the potentials for new or expanded energy facilities and induced growth may very well bring with them the need for significant new public investments in such basic infrastructure and services as major water supplies, road improvements, pollution control equipment and/or management programs, including solid waste, sewerage, runoff, and air emission equipment, occupational health and related safety services, etc. Accordingly, it behooves us to insure that as we meet our share of the State and National interests in hosting safe and acceptable energy facilities, that the State and Federal governments reciprocate with a fair and equitable share of these public costs, and in a timely manner. This means that we would seek and expect

priority treatment in the allocation of various categorical and block grant programs, in order to build and provide the necessary public infrastructure and services as these are required to sustain energy facilities and induced growth. Thus, capital improvement priorities and service levels locally will not be strained to the detriment of existing taxpayers and residents including the energy industry and its work force. Rather the County and its municipalities will seek sufficient and timely fundings and investment levels to properly service this new growth so that existing and future residents and industries of this area are fairly treated.

B. THE SUITABILITY AND NON-SUITABILITY OF SITING ENERGY FACILITIES IN MIDDLESEX COUNTY: GENERAL STATEMENT

The above policies recognize that it is neither appropriate or possible to determine the suitability or non-suitability of siting offshore oil and coastal energy facilities in Middlesex County at the present time. What is presently required, is the formulation and implementation of institutional arrangements which will assure the safety and health of Middlesex County's population. Such institutional arrangements would mandate the careful and comprehensive assessment of any energy facility that might adversely impact the social, economic or physical environment of the County (i.e. Suitability Assessment). In such cases where technical questions are unanswerable or disputed, the technical questions would become policy questions of "do we or can we accept the risk?" At the present time no such assessment of energy facility siting impacts are mandated and no assurances of safety and health can be given.

The possibility of energy facilities locating in Middlesex County is very real. Middlesex County's shoreline is already well endowed with energy facilities. State coastal protection regulations do not extensively cover Middlesex County, and the State's Coastal Management Strategy encourages such facilities as refineries and petrochemical to locate in already industrialized areas such as Middlesex County. No conflicts that might block the siting of energy facilities, such as with the tourist-recreation industry in Cape May, Atlantic, Ocean and Monmouth Counties, exists in Middlesex County. On the contrary, incentives and precedents would tend to dictate the desire of industry and government to locate additional energy facilities in Middlesex County.

The need, therefore, to be adequately prepared for siting energy facilities is critical. Institutional arrangements must be firmly in place if Middlesex County is to safely handle the impacts from offshore oil and coastal energy facilities.

C. SUITABILITY OF SPECIFIC OFFSHORE OIL AND COASTAL ENERGY FACILITIES IN MIDDLESEX COUNTY

Based on the general policies and the understanding of the suitability of energy facilities in Middlesex County presented in the above sections of this chapter, the following section identifies the suitability of specific energy facilities in Middlesex County.

All offshore oil and other coastal energy facilities fall into three broad categories which vary in their function and impact. These types of energy facilities and the degree to which they would be suitable or unsuitable in Middlesex County are identified in the following section. The suitability of these specific energy facilities is summarized in Table VII-I.

TABLE VII-1

SUITABILITY OF ENERGY FACILITIES IN MIDDLESEX COUNTY

TYPE OF FACILITY	SUITABILITY
SUPPORT Temporary Support Base Permanent Support Base Pipeline Installation Support Base Platform Installation Support Base	Probably suitable - requires more specific study
TRANSPORTATION AND STORAGE Pipelines Marine Terminals Petroleum Storage Tank Farms	No determination possible - more specific impact assessment is required before suitability can be determined
PROCESSING Refineries Petrochemical Plants Gas Processing Plants	No determination possible - more specific impact assessment is required before suitability can be determined

1. Offshore Oil Support Facilities

These facilities include temporary and permanent support bases, pipeline construction support bases, and platform construction support bases. Consisting primarily of warehousing and storage vessels, a support facility basically serves as a transfer point for materials and men. Necessary equipment supplies are gathered and stored at a base and from there loaded on to boats or barges (depending on the type of base) for shipment to offshore locations.

Impacts from such facilities are relatively minor in comparison to the other types of energy facilities. Locating such a facility in an already industrialized sector of Middlesex County's coastal zone would be consistent with policies of certain coastal municipalities to attract low-polluting industrial development. The City of Perth Amboy is currently attempting to attract a support facility to locate in vacant lands adjacent to the Outerbridge Crossing. This site was identified in an independent study conducted by the Rutgers University Center for Coastal and Environmental Studies as being suitable for such a support facility. Certain questions, however, as to the navigational safety and the impact of such development on the wetlands (of as yet undetermined value), which constitute the site still remain. In addition, such a facility might use as much as .413 million gallons of potable water per day. Although the Perth Amboy water system, which receives its water primarily from wellfields in Old Bridge Township, is currently capable of delivering these amounts of water, serious regional and long-range water supply considerations must be carefully analyzed and assessed to determine the full impact of municipal industrial development policies on the region's water supply resources.

2. Transportation and Storage Facilities

These facilities include pipelines, marine terminals, and petrochemical storage tank farms. Such facilities actually handle and store crude or refined petroleum and as such, represent emission sources. In addition, facilities such as storage tank farms require large amounts of land and their development would constitute the irretrievable commitment of a valuable coastal resource. Transportation and storage facilities would require careful and comprehensive impact assessment before their suitability could be determined.

3. Processing Facilities

These facilities include refineries, petrochemical plants, and gas processing plants. Processing facilities chemically alter petroleum substances and are major sources of air pollution emission and wastewater contaminants. Sophisticated control technologies are available and generally required by the Federal Environmental Protection Agency. In addition, processing facilities require large amounts of land for equipment and buffer zones. Their development would constitute the irretrievable commitment of a valuable coastal resource. Processing facilities would require careful and comprehensive impact assessment before their suitability could be determined.

D. SPECIFIC POLICIES

The following policy positions pertain to specific energy facilities that have sought to locate in Middlesex County in the past five years. The positions are derived from resolutions and statements approved or adopted by municipal and county government bodies in response to proposed energy facility development.

1. Deepwater Port

From 1972 through 1974, numerous studies exploring the possibilities of siting a deepwater port off the coast of New Jersey came to Middlesex County Planning Board's attention. At its regular meeting of January 11, 1973 the Planning Board adopted the following position:

"* Whereas, given the immense pressure for the construction of a deep water port, little detailed analysis seems to have been done regarding the impact of such a project on the areas to be served by it, and

* Whereas, little consideration seems to have been given to the possibility of establishing energy conservation programs to alleviate the need for increased oil and gas imports, and

* Whereas, Middlesex County requires considerable governmental and private effort to improve levels of basic services and eliminate environmental pollution as a result of the rate of existing development, and

* Whereas, regional development control powers required to deal with such a project are not presently available in New Jersey;

Now therefore be it resolved, that the Middlesex County Planning Board is opposed to the construction of a deep water port facility anywhere along the coast of New Jersey, or in the Delaware Bay or in any other location which will substantially increase petrochemical industrial development in Middlesex County and the surrounding region, until such time as evidence is presented that the resulting increased industrial development will be environmentally sound and beneficial to the people of this area and until such time that regional development control regulations are in effect."

This position was submitted in behalf of both the Planning Board and the Middlesex County Board of Chosen Freeholders at a hearing held in Middletown Township on January 16, 1973 by the Philadelphia District of the U.S. Army Corps of Engineers regarding the site selection for a deepwater port facility. This position was also sent to all Representatives and Senators serving Middlesex in the United States Congress and all Senators and Assemblymen serving Middlesex County in the New Jersey

Legislature. The Planning Board's position on deepwater port development was reiterated by Planning Director Douglas S. Powell at a public hearing on March 4, 1974 held by the New Jersey Senate Committee studying deepwater port proposals. The positions of the Planning Board were summarized as follows:

> " It (the Planning Board) has found from numerous studies that a deepwater port of a type and size as recommended by the Corps of Engineers will have such impacts on Middlesex County as to exceed healthful environmental standards for air quality, exceed the high levels of development already planned for the County and exceed any plans for providing water supplies for the County.
>
> In the absence of plans to show how the onshore impacts in Middlesex County of a deepwater port off the coast of New Jersey can meet proper environmental standards, the Middlesex County Planning Board is on record opposing a deepwater port. (However, it is emphasized that the Board is not opposed to a port in the absence of plans that first carefully link the provision of needed services such as water, sewerage, good transportation, housing and other urban functions to the projected impacts of the port, and second, carefully link the levels of total development resulting from a port to the meeting of safe and healthful environmental standards now and in the future in Middlesex County.
>
> Third, the County Planning Board recognizes that the plans needed to limit and control development in Middlesex County impacted by a deepwater port must be regional in scope to meet the needs and standards of such regional functions as water supply, sewerage and air quality; and, further, the Board recognizes that such regional plans must be backed with the powers necessary to implement them.
>
> Finally, the Board seeks study of the proposals of the Arthur Little, Inc. report that would result in a distribution of several deepwater ports along the East Coast of the United States to avoid over concentration in only one or two locations.
>
> In conclusion, it would be my opinion that these would be the implications of these positions to legislation which may be considered to regulate a deepwater port off New Jersey's Coast.
>
> 1) The legislation should be based upon and implement a state policy that seeks to avoid over concentration of impacts of a deepwater port in New Jersey through a distribution of three or more deepwater ports on the Eastern Seaboard as recommended by Arthur Little, Inc.

2) The legislation should be based upon and implement a state policy that authorizes state and/or regional land use controls to guide land development in the counties that have been identified as affected by the onshore impacts of a deepwater port off New Jersey.

3) The legislation should be based upon and implement a State policy which distributes the onshore oil refining, storage, and distribution facilities and associated petrochemical and other resulting economic developments associated with a deepwater port in a balanced and planned manner that prevents over concentrations of impacts in any counties or regions of the State and prevents the impacts from exceeding legislated and sound environmental standards."

2. Liquified Natural Gas Facilities (LNG)

An LNG terminal and gasification facility is currently located on Staten Island across the Arthur Kill from Perth Amboy, Carteret, and Woodbridge. This facility is currently not in operation because necessary permits have not yet been granted by the Federal Power Commission (FPC). The FPC permit process for this facility is presently stalled at the public hearing stage. Subsequent to hearing FPC must determine whether or not it will grant an operating permit.

In a statement of the Middlesex County Planning Board presented at a Public Forum conducted by the Middlesex County Advisory Council on Environmental Protection concerning the Staten Island LNG facility, the Planning Board presented the following position:

" The Middlesex County Planning Board is aware of the extremely dangerous properties of liquid natural gas and is further aware of the dangers and possibilities of accidents related to the storage and regasification of this extremely cold and volatile material. However, the Board is fully aware that the greatest potential danger and greatest probabilities of accidents are related to the waterborne transportation of LNG and the almost certain catastrophic results that will occur to surrounding inhabited areas if accidental large spills of LNG occur onto waterways.

The literature on LNG is clear that following a major spill of LNG on water, this liquid will spread rapidly over the water, warm, vaporize into a gas, rise above the water as a large cloud, begin to drift downwind hovering with the wind over a large area, and almost certainly--in a densely inhabited area-- be ignited into a severely hot explosive fireball with extremely damaging results to the areas and people engulfed on the ground by this extensive fireball.

The Board is aware that the Distrigas LNG facility is located on the narrow twisting Arthur Kill, a waterway which with the Kill Van Kull has so vast a volume of waterborne traffic each year that these two waterways carry tonnages equal to that carried in the nation's second ranking port--New Orleans.

Because of the certainty of catastrophic results of spills of LNG and because of the huge tonnages and frequent ship movements on the narrow and circuitous Arthur Kill, the Board foresees an inevitability of an eventual major accident, major spill and major catastrophe associated with the operations of this facility in Staten Island but affecting tens of thousands of families in Middlesex County.

Because of these dangers the Board is opposed to any shipment and unloading of LNG into this facility. The Board recognizes the needs for natural gas to serve New Jersey, New York City and the New York Metropolitan Region. The Board feels that poor judgement was used in seeking to force this dangerous facility onto a twisting, heavily-used, accident-prone waterway-- the Arthur Kill-- and further to force its location in a densely settled area in view of the known uniquely dangerous properties of LNG. The Board recommends that to meet the needs for natural gas, immediate steps be taken jointly by the Federal and State Governments with private business participation to design and build an offshore facility for the unloading, storage and regasification of LNG at a site sufficiently distant from the shores of Staten Island and New Jersey to insure the protection of the inhabited areas of New York City and New Jersey in the event of an untimely accident."

Responding to recent attempts to renew efforts to have the LNG facilities in Staten Island approved by the FPC, the Mayor and Council of the Borough of Carteret passed a resolution on December 21, 1976 reaffirming its opposition to this facility. The resolution reads as follows:

" WHEREAS, Distrigas has attempted to store dangerous LNG gas in Staten Island close to heavily populated areas and close to the Borough of Carteret; and

WHEREAS, Energy Terminal Services Corporation is now attempting to take over the application and renew efforts to have LNG gas stored in the very same tanks proposed; and

WHEREAS, the public is likely to be confused as to the application before the Federal Power Commission because of the change of name from Distrigas to Energy Terminal Services Corporation;

NOW, THEREFORE BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY, that we do reaffirm our opposition to the placement of dangerous LNG tanks in highly populated areas and urge our legislative representatives to bar such storage."

3. Offshore Oil and Gas Facilities

In response to the Draft Environmental Statement Proposed 1976 Outer Continental Shelf Oil and Gas Lease Sale No. 40, the Middlesex County Planning Board authorized a statement which presented the following position:

" As indicated in the introduction to this review, the Middlesex County Planning Board recognizes that political and economic pressure is growing in the support of the exploration for, and development of oil and gas resources and that the nation and the region need to develop those resources which may be found on the outer continental shelf offshore New Jersey. The Board also recognizes that the onshore development resulting from the exploration for, and development of OCS oil and gas reserves may have a substantial and detrimental impact on the human environment of Middlesex County if proper long and short range planning does not precede and accompany the implementation of OCS development.

The Middlesex County Planning Board maintains that a detailed and comprehensive data base and analysis is required as a foundation for planning for the future of the County."

VIII
A MANAGEMENT SYSTEM: NEXT STEPS IN COASTAL ZONE MANAGEMENT

The policies for handling the impacts from offshore oil and coastal energy facilities in the previous chapter, call for the development and implementation of institutional arrangements which will assure the safety and health of Middlesex County's population. Such institutional arrangements would mandate the comprehensive assessment of any energy facility that might adversely impact the social, economic, or physical environment of the County.

The purpose of this section is to make recommendations as to how such institutional arrangements should or could be made. Recommendations pertaining to the development or reformulation of coastal management system and the role Middlesex County should play in this process are presented. These recommendations are meant to be read in conjunction with the Coastal Management Strategy for New Jersey, Section Four: Management System, prepared in September, 1977 by the New Jersey Department of Environmental Protection, Office of Coastal Zone Management. In addition, the final section of this report presents a strategy for next steps in Middlesex County's coastal management planning efforts.

A. RECOMMENDATIONS: TOWARD THE DEVELOPMENT OF A COASTAL ZONE MANAGEMENT SYSTEM

1. Permit and development reviews for coastal related development should be simplified and integrated into a more efficient and consistent procedure.

The current institutional basis for implementing coastal management policies for Middlesex County consists of multiple permit reviews under

the State CAFRA, Wetlands, and Riparian Laws, as well as municipal and county development reviews depending on the specific development proposal. These multifarious review processes and policies are inefficient and unwieldly. Delays and sometimes arbitary decisions increase the cost all must pay for environmental protection.

2. The institutional basis for adequately reviewing energy facility development proposals should be developed in close coordination with other regional and state resource management planning programs currently underway (i.e. 208 Water Quality Planning, State and regional Water Supply Planning efforts, Federal Clean Air Act Admendments compliance efforts, and toxic, hazardous, and solid waste management planning efforts).

Various planning groups and agencies, including coastal zone management efforts, are currently in the midst of studying the ways in which Middlesex County's coastal economic, recreational, and natural resources can be developed and protected. Culmination of these efforts will result in the discussion and possible implementation of numerous legislative and/or administrative reforms. The development of both coastal management policies for Middlesex County and the institutional framework by which they are to be implemented should therefore be closely coordinated with other resource management planning agencies and groups.

3. Policies, guidelines, and standards which insure the health and safety of Middlesex County's population should be developed and be reflective of the widely divergent and unique characteristics of Middlesex County's Coastal Zone.

From the primarily industrialized areas of the Arthur Kill, to the more diverse riverfront development along the Raritan River, to the residential and recreational areas of South Amboy, Sayreville, and Old Bridge, Middlesex County's coastal zone consists of many different types

of land and water uses. Policies, guidelines, and standards governing these areas should therefore reflect the specific needs of these specific areas. For example, one aspect of the industrialized Arthur Kill area of concern to both the 208 water quality planning group and coastal zone management efforts is the deteriorated condition of the Arthur Kill waters. One clearly recognizable and specific objective of development review permits and waste water effluent permits would therefore be the improvement in the quality of this waterway.

B. RECOMMENDATIONS: COUNTY ROLE IN COASTAL ENERGY FACILITY SITING

1. County/State Relationships

Continuation of the contractual and joint energy facilities planning relationship between Middlesex County and the N.J. DEP Office of Coastal Zone Management (DEP/OCZM) is recommended. In addition, it is suggested that coordinated planning efforts with this State agency be expanded to include a wide variety of coastal management issues. Monthly County/State coordination meetings are an effective means of communication between each of the coastal counties themselves as well as the counties and DEP/OCZM. Moreover, coordination meetings of this nature offer the opportunity for other State agencies, such as the newly formed Department of Energy, to work in conjunction with DEP/OCZM and the coastal counties.

2. County/County Relationships

a. Coordination with other counties. Planning for energy facilities is most effective at the county level because this intermediate level of government is best able to bring state energy facilities planning together with the various municipal policies currently emerging. Crucial to the

development of siting policies standards truly representative of the various regional publics is the formalization of coordinative meetings between counties. In that counties can best speak for constituent municipalities without the loss of individual representation that would occur at a greater scale of organization, continuation of the joint energy facilities planning relationship between Middlesex and the other coastal counties is recommended in order to insure proper communication and coordination of on-going planning efforts.

b. Coordination of Coastal Planning with County's Master Plan. During calendar 1978, the Middlesex County Planning Board will refine its various short and long range plans and programs to include provision and support for particular energy facilities, sizes and locations that reflect the county's energy policy as generally stated in this report. This will occur simultaneously with joint municipal and county resolution of remaining major land use and functional system issues, such as those that are identified and scheduled for resolution in the County's Water Quality Management Plan of the Lower Raritan Middlesex County 208 Program, and dated October 1977. Thus consideration of the provision of adequate and safe water supplies, air quality maintenance, appropriate land use patterns and sufficient acreage, required capital investment programs, etc. will be brought into coordination with a more definitive siting plan for energy facilities, induced growth and related impacts. In this overall plan and program refinement process scheduled for 1978, the balanced energy policy stated herein will be more definitively expressed and incorporated.

c. County/Municipal Relationships

Continuation and expansion of the coordination efforts that Middlesex County has conducted with municipal officials is recommended. Working with municipal governments is an instrumental component in handling impacts from energy facilities as identified in the policies and strategy of the previous section. More municipalities must become involved in the planning process in that a greater depth of understanding and degree of involvement is necessary for the development of an effective county-wide siting policy.

With approval of the new "Municipal Land Use Law" in January, 1976, municipalities have been charged with updating and coordinating their master plans with zoning regulations. Many of the municipalities in Middlesex County are in the process of conforming to this new law. As revisions are made, they will be monitored for energy facility considerations. New municipal environmental commissions that are formed as a result of this law will be given an opportunity to assess the impacts from energy facilities.

d. County/Public Relationships

Continuation and expansion of the energy facilities public participation program is highly recommended. Public preferences and concerns help guide the planning effort and elicits the responses of the localities where energy facility siting and their impacts might occur. Greater levels of participation would facilitate the planning effort.

C. NEXT STEPS: A STRATEGY

Below is presented a strategy for dealing with the impacts from offshore oil and coastal energy facilities. This strategy serves as both a set of interim guidelines for the proper management of energy facilities as well as a guide for future planning efforts. The strategy consists of:

1. The identification of the impacts associated with those energy facilities that might locate in the County and the determination of the effects of these impacts on the economic, social, and physical environment in which the facilities are to be sited;

2. The continued information of public and participation of interested parties as to the issues and impacts of energy facility siting;

3. The effectuation of open, informed and appropriate decision-making by those governmental bodies and regulatory agencies involved in approving or permitting the siting of energy facilities; and

4. The analysis of the existing legal and regulatory mechanisms which affect energy facility siting, the identification of gaps or deficiencies in existing mechanisms that could lead to adverse impacts, and the recommendation of changes or improvements in existing mechanisms to appropriate government bodies and agencies.

APPENDIX A

OUTER CONTINENTAL SHELF OIL AND GAS ACTIVITIES

Offshore operations of the petroleum industry began as extensions of onshore exploration, development and production. The earliest offshore production in the United States was developed off Summerland, California, in 1896. The offshore portion of the field was an extension of an onshore discovery made prior to 1894. Similarly, most of the early activities in areas covered with water were carried out to recover oil from reservoirs that had already been discovered and defined through onshore exploration.

Gradually, as technology has advanced, exploration and development activities have been moving further offshore to areas with greater water depths and more hostile environments. For example, production has begun in the cold and stormy waters of the North Sea, and seven exploratory wells have been drilled in the Santa Barbara Channel, off California, in water more than 1,200 feet deep.

Most exploratory and development drilling activities have been conducted in the geographical areas known as the continental shelf. The legal and physiographic definitions of the continental shelf differ slightly, but the general phrase continental shelf refers to the shallow submarine plain of varying width that forms a border to a continent and typically ends in a steep slope to either a more gently sloping continental rise or the oceanic abyss. Off the coasts of the United States, the shelf is very broad in the Gulf of Mexico and around western and northern Alaska, moderately wide along much of the Atlantic Coast and relatively narrow along the Pacific Coast.

Most of the subsea continental shelf lands adjacent to the United States are under the jurisdiction, ownership and control of the United States Government. The phrase Outer Continental Shelf (OCS) was defined in the Outer Continental Shelf Lands Act of 1953 (67. Stat. 462; 43 U.S.C. 1331-1343, 1964)

as the subsea lands lying seaward of the territorial limit of the states and extending to the boundary of federal and international claims of jurisdiction. This Act, the Submerged Lands Act of 1953 (67 Stat. 29; 43 U.S.C. 1301-1315), and a series of United States Supreme Court cases establish federal control, ownership and jurisdiction over the sea bed and subsea soil beyond the three mile territorial limit of the states.[1] Thus, the coastal states retain control, ownership, and jurisdiction over, and consequently the right to develop the mineral resources of, the subsea lands extending out to the territorial limit.

The Outer Continental Shelf Lands Act also authorizes the Secretary of the Interior to establish rules and regulations implementing the Act and to lease offshore tracts for mineral and resource exploration and exploitation. Between 1954 and 1974 the U.S. Department of the Interior sold 2,384 oil and gas leases comprising 10,884,624 acres.

The following map (Figure A-1) indicates the general areas of OCS lands for which lease sales have been proposed. Lease Sale No. 40, or the first Balitmore Canyon lease sale, was held in August, 1976. But on February 17, 1977 the United States District Court of the Eastern District of New York enjoined all related activities of Lease Sale No. 40.[2] The Court held that the Department of the Interior had not met the requirements of the National Environmental Policy Act.

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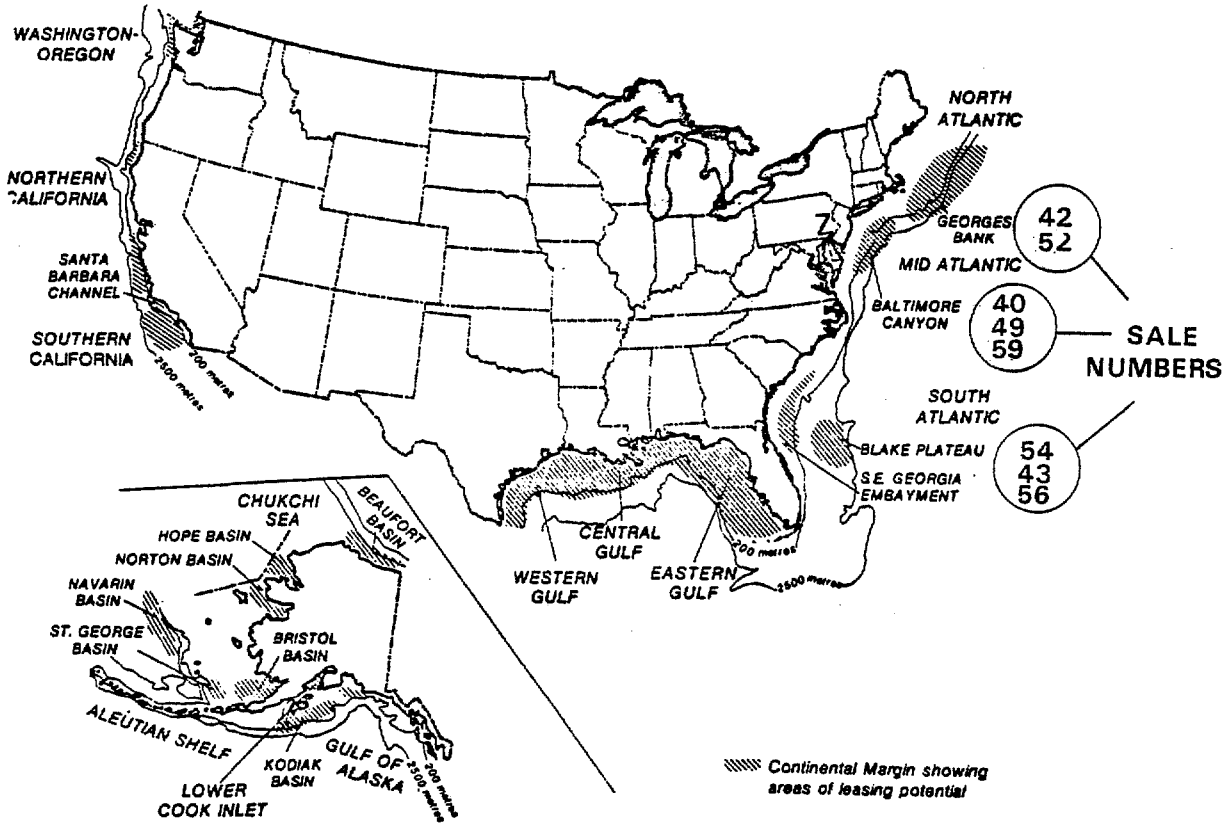
1. The territorial limit is approximately 12 miles in the case of Texas and the Gulf Coast of Florida.

2. The United States Court of Appeals for the Second Circuit lifted this injunction on Aug. 25, 1977, and indicated that the Department of Interior maintains continuous control over the venture to deal with any environmental problems that might occur. At this time, exploratory drilling is expected to begin during early 1978, with commercial production by 1981 at the earliest.

FIGURE A-1

Areas of the OCS Under Consideration for Leasing



SOURCE: *Leasing and Management of Energy Resources on the Outer Continental Shelf,* Bureau of Land Management/U.S. Geological Survey, 1976.

Figure A-1 also shows the location of seven proposed Atlantic Ocean lease sales; these include: The North Atlantic or Georges Bank Lease Sale (No. 42), the South Atlantic or Souteast Georgia Embayment Lease Sale (No. 43), the second Mid-Atlantic or Baltimore Canyon Lease Sale (No. 49), the second South Atlantic or Blake Plateau Lease Sale (No. 54), the second North Atlantic Lease Sale (No. 52), the third South Atlantic Lease Sale (No. 56), and the third Mid-Atlantic Lease Sale (No. 59).

It is highly probable that the development and production of the oil and gas in these lease sales will have significant impact on New Jersey

and Middlesex County. This chapter will discuss: (1) the phases of OCS oil and gas activity; (2) the types of OCS facilities and their requirements and impacts; and (3) three projections of potential development of OCS facilities in Middlesex County.

A. PHASES OF OCS OIL AND GAS ACTIVITY

The process of offshore oil and gas activity is commonly divided into five phases: (1) leasing, (2) exploration, (3) development, (4) production, and (5) shutdown. For a given petroleum field, the phases may encompass a period ranging from 15 to 40 years. Figure 2 showed the phases in the life of a hypothetical oil and/or gas field and illustrated the fact that these phases may overlap considerably. For example, exploration activities continue after development activities have begun, and production will begin before development is completed. Continuation beyond the exploration phase, however, is entirely dependent upon the discovery of economically recoverable reserves of oil or gas.

The five phases of OCS oil and gas activity are described below as they relate to time involved, industry activities, federal government activities, state and local activities and potential onshore facilities.

1. Leasing

Time:

Approximately 19 months from "call for nominations" to the actual lease sale: geophysical exploration (by industry) may have begun many years before.

Industry Activities:

Preparation of internal market and capability analyses; preliminary geophysical exploration (under permit from USGS); nomination of tracts for consideration in the lease sale; preliminary location analysis for staging areas; and possibly onshore site acquisition.

Federal Government Activities:

The leasing process, managed by the Bureau of Land Management (BLM), includes: environmental baseline studies; "call for nominations" by the oil and gas industry of tracts it believes hold the greatest promise for oil and gas; draft (DES) and final environmental statements (FES) prepared by BLM in cooperation with USGS and the Fish and Wildlife Service (FWS); these are submitted to the Council on Environmental Quality (CEQ) and made available to the public; a decision to lease is made by the Secretary of the Interior based on the FES and an internal decision document; at the lease sale itself tracts of the OCS are offered to the "highest responsible qualified bidder," with or without stipulations. Any bid may be rejected.

State and Local Activities:

Participation in the call for nominations, in which state and local governments—and citizens—may identify tracts which should not be considered for leasing ("negative nominations") or upon which special conditions should be imposed; participation in tract selection meetings and review and comment on draft environmental statements (DES). Planning may begin for siting and providing public services in future phases.

Onshore Facilities:

Geophysical and geological exploration vessels will use existing ports.

2. Exploration Phase

Time:

One to seven years from lease sale: an average of two years for discovery of economically recoverable oil or gas reserves and five years or more for identification of size and area of the find; up to five years until lease abandonment if no discovery is made.

Industry Activities:

Additional geophysical surveys to locate geological structures favorable for oil and gas; exploration plans submitted to USGS and "notices" of support activities submitted to appropriate Governors; exploratory drilling by drilling companies (under contract to the oil companies which lease tracts); if discovery is made, intense supplementary exploration, possibly for many years, to establish the area and size of the field, and to ensure that all possible geological structures containing oil and gas have been located; preparation of internal development projections, preliminary field development plans and financial estimates. If no commercial discovery is made, industry will abandon the lease and onshore service bases.

Federal Government Activities:

USGS supervises operations: reviews, accepts and approves exploration plans, issues drilling permits, monitors the drilling procedures; Environmental Protection Agency (EPA) issues pollution control permits; the Corps of Engineers (COE) and U.S. Coast Guard (USCG) regulate navigation.

State and Local Activities:

Assume regulatory and permitting authority over the siting and operation of service bases and portions of operations within the limits of state waters; plan for siting of potential onshore facilities if discovery is made, mitigating employment and environmental impacts, and for providing and financing public services. (May be involved in planning and permits for anticipatory siting—see below).

SOURCE: The Conservation Foundation, David C. Williams and Jeffrey A. Zinn, (ed.), Source Book: Onshore Impacts of Outer Continental Shelf Oil and Gas Development, May, 1977, pp. 8-9.

Onshore Facilities:

Temporary service bases are established, generally located in existing developed harbors, with associated repair and maintenance yards and general shore support (heliports may be established at existing airports); as a rule no new facilities are constructed but industry may anticipate discovery and plan for and option land for permanent service bases; options for pipe coating yards and platform fabrication yards may also be taken; state and local government may be involved in permits for these facilities.

3. Development Phase

Time:

Four to nine years—starting with the discovery of economically recoverable resources and extending through initial pipeline installation or tanker operations.

Industry Activities:

Application to USGS and COE for development drilling permits; Field Development Plans submitted to adjacent states; development drilling and production platforms put in place.

Federal Government Activity:

USGS reviews and approves field development plans, and issues permits for development drilling and OCS gathering lines; COE issues permits for drilling structures and pipelines in navigable waters; BLM issues permits for pipeline rights-of-way on the OCS; the Office of Pipeline Safety (DOT), Federal Power Commission (FPC) and Interstate Commerce Commission (ICC) are involved in regulation of common carrier pipelines. EPA and the Occupational Safety and Health Administration (OSHA) issue permits and regulate operating activities.

State and Local Activities:

Issue permits for nearshore and onshore pipeline rights-of-way, land use, and construction of onshore and nearshore facilities; regulate water and other resource uses, hazards to the environment, and other activities; plan siting of service bases and other onshore facilities listed below (service bases generally are not federally regulated); provide public services for employees and induced population, many of them at a temporarily high level for the relatively short-term development phase.

Onshore Facilities:

Permanent service bases
Repair and maintenance yards
General shore support
Platform fabrication yards
Platform installation service bases
Pipelines and landfalls
Pipeline installation service bases
Pipe coating yards
Partial processing plants
Gas processing and treatment plants
Marine terminals

Essentially all major facilities for the production phase are installed during the development phase.

4. Production Phase

Time:

Ten to 25 or more years—from first petroleum landing onshore to field shutdown.

Industry Activities:

Operation of facilities constructed during the development phase; activities to maintain and improve the rate and volume of production: construction of additional production platforms, new wells and well "workover," additional pipelines, storage facilities; and regular servicing of wells and platforms.

Federal Government Activities:

Monitoring and regulating of routine operations, by USGS, COE, USCG, EPA, BLM, OSHA, FPC, DOT and ICC, and others; respond to oil spills; possible additional leasing.

State and Local Activities:

Provision of public services for onshore facilities and added population; monitoring onshore petroleum operations; anticipation of employment decline during production phase and eventual shutdown.

Onshore Facilities:

Additional pipelines (see Development Phase)

5. Shutdown Phase

Time:

One to three years from end of production phase; representative cumulative time from lease sale—25 years.

Industry Activities:

Dismantling offshore facilities and sealing all wells with cement 15 feet below the surface of the seabed; closing or reducing onshore facilities as production ceases.

Federal Government Activities:

Monitoring and enforcing abandonment regulations, by USGS.

State and Local Activities:

Mitigating past impacts, covering the loss of accustomed revenues, and efforts to maintain the economic base.

Onshore Facilities:

Facilities identified above are closed or shifted to other uses.

B. Description, Impacts and Requirements of Onshore Facilities[3]

There are various types of onshore facilities that are directly associated with OCS oil and gas activities. These facilities carry out many different functions including: supporting and servicing offshore activities, transporting, storing, treating, and processing of oil and natural gas. This sub-section will present a brief description of each facility and some of the impacts and requirements of each facility.

1. Temporary Service Bases

Temporary service bases serve as a logistical link between onshore and offshore activities. These bases generally support initial exploratory drilling operations and their main activity is the transfer of materials and workers between onshore and offshore operations. Service bases may be established by the oil companies, or service companies that supply drilling fluids and muds, tools and other items. A typical base would include:

* berth space for supply and crew boats
* dock space for loading and unloading
* warehousing and open storage areas
* a helipad
* space to house supervisory and communication personnel

IMPACTS AND REQUIREMENTS

Land	5-10 acres on all weather harbor, Warehouse: 1/2 acre/rig; open storage: 1 acre/rig; operations and office space; helipad; 1 acre/rig (may be elsewhere); parking area.
Waterfront	200 feet of wharf/rig; 15-20 feet water depth at pier.

3. Most of the information used in this sub-section was derived from Factbook: Onshore Facilities Related to Oil and Gas Development published in 1976 by the New England River Basins Commissions (NERBC) under agreement with the Resource and Land Investigations (RALI) Program of U.S. Department of the Interior's Geological Survey. See also, The United States Congress Office of Technology Assessment, Working Papers: Coastal Effects of Offshore Energy Systems, November, 1976 and The Conservation Foundation, Source Book: Onshore Impacts of OCS Oil and Gas Development, 1977.

Water	5.2 million gals/rig/year for supply boats; 13,272 barrels of fuel/rig/year at drilling site.
Labor	45 onshore service base jobs/rig For operation phase
Composition	75% local jobs
Wages	Approx. $735,000/year; $17,000 average wage.
Capital Investment	$150,000 - $250,000 for land leasing and construction
Air Emissions	Hydrocarbons from fuel storage tanks and vehicle operation
Wastewater Contaminants	Hydrocarbons, and heavy metal from bilge and ballast water discharged by boats
Noise	Up to 85 decibels on a 24 hour basis
Solid Waste	Up to 6 tons/day during drilling operations including hazardous, oil contaminated wastes

2. Permanent Service Bases

Permanent service bases perform the same functions as temporary bases, but differ primarily in size, intensity, activity and ownership. They generally operate during development drilling and provide the same types of goods and services as those needed during exploratory drilling. Permanent bases are usually established by oil or service companies. They are usually located at or close to temporary bases and within 200 miles of rigs.

IMPACTS AND REQUIREMENTS:

Land	25-50 acres on all-weather harbor; 10,000 square feet for permanent office and communications space; 1 acre/platform for helipad; remainder for warehouses and open storage.

Waterfront	200 ft. of wharf/platform; 15-20 ft. water depth at pier.
Water	8.2 million gallons/platform/year during development drilling. Little during production.
Fuel	54,000 barrels of fuel/platform/year during development. 19,200 barrels of fuel/platform/year during production.
Labor	50-60 jobs/platform during drilling; 50% local initially, rising to 80% local,all for Operation Phase
Wages	Approximately $1 million; average wage $17,000.
Capital Investment	$1-3 million.
Air Emissions	Hydrocarbons from fuel storage and vehicle operations.
Wastewater Contaminants	Hydrocarbons, heavy metals from bilge and ballast water.
Noise	Up to 85 decibels; 24 hours a day.
Solid Waste	Up to 6 tons/year during drilling.

3. Steel Platform Installation Support Bases

Steel platform installation support bases are very similar to temporary service bases. They perform services for installation of platforms and are normally established by companies involved in platform installation. They are usually located as close as possible to areas of installation and other service bases.

IMPACTS AND REQUIREMENTS:

Land	Approx. 5 acres of waterfront land.
Wharf Space	200 feet/4 platforms installed.
Water Depth	15-20 feet at pier.
Sea Access Clearance	Channel roughly 5 times width of largest barge. Vertical clearance roughly the length of the platform base.
Fuel	Diesel fuel requirements: 100,000 gals/derrick barge/month; 150,000 gals/tug/month.
Transportation	1 supply boat/platform; 1 crew boat/platform; 1 helicopter/platform.
Offshore Labor	Approx. 100/installation spread; 25% local jobs, all for Operation Phase
Offshore Wages	Average wage $18,000
Onshore Labor	25 workers/installation spread; 50% local jobs, all for Operation Phase
Environmental Impacts	Roughly the same as temporary service base.

4. Repair and Maintenance Yards

Repair and maintenance yards consist of many firms of varying capabilities which provide services to operators of vessels and equipment involved in OCS development. Most medium-sized vessels can be serviced in harbors that customarily handle large fishing fleets while larger

vessels and semi-submersible rigs must be serviced in major shipyards.

A repair yard catering specifically to the petroleum industry is not likely to be sited on a new site in a frontier area. Most services can be provided by existing repair facilities in fishing ports and larger ports.

5. Transportation Facilities

There are two major types of transportation facilities involved in the movement of oil and natural gas--pipeline systems and tanker systems. These types of facilities may be used separately or in combination. Pipeline systems may include the following components: pressure source, gathering stations, a landfall and an onshore destination. An oil company may construct its own pipeline, or a consortium of oil companies may construct a common carrier pipeline. Tanker systems are composed primarily of tankers and marine terminals. Marine terminals consist of berthing capacity for vessels, loading and/or unloading equipment, storage tanks, terminal control and safety equipment and harbor and navigation facilities.

IMPACTS AND REQUIREMENTS:

(1) Pipelines and Landfall Facilities	
Route	Shortest distance, as modified by anchorages, active faults, shifting bottom sediments, rock outcrops, areas environmentally sensitive.
Shore Approach	Gently sloping sand or shingle preferred, avoid shifting currents and sediments.
Landfall	50-100 foot right-of-way. 40 acres of pumping station, if required. 60 acres for terminal, if required.

Offshore Labor	250-300 jobs per lay barge spread, During Operation Phase
Offshore Wages	$5.5 million annually per lay barge spread. Average unskilled wage: $15,000. Average skilled wage: $25,000.
Onshore Labor	Negligible - 20 workers; 15 local to operate terminal or pumping station.
Onshore Wages	$16,000 average annual.
Capital Investment	Varies with pipe diameter from $700,000/mile for 8" pipe to $2 million/mile for 42" pipe. Shore terminal - $2.5 million.
Air Emissions	Minimal; chiefly hydrocarbons, nitrogen oxides and sulfur oxides from compressors along route.
Noise	90-100 decibels from compressors; 140 decibels from annual pipeline venting.

(2) Tanker Systems - Marine Terminals

With most of the land taken up by storage tanks, the size of a terminal depends on the throughput from offshore, the number of berths at the terminal, the size and frequency of tankers, and the extra storage needed to provide for loading downtime. Data below are for a 250,000 bbl/day throughput mid-depth terminal with storage capacity of 1 million barrels in four 250,000 bbl tanks.

Land	Approx. 30 waterfront acres, assuming no processing, largely for storage tanks.
Water Depth	50-60 feet sheltered water at mid-depth pier or mooring buoy.
Fresh Water	Limited, assuming no processing.

Energy	8 million kwh/year at tank farm 1 million kwh/year at terminal 11,800 barrels of fuel/year
Construction Labor	560 workers, 20% local jobs
Construction Wages	$19,600 average annually.
Operation Labor	10-90 (depending on degree of contract labor used), 70% local jobs
Capital Investment	Approx. $50 million
Air Emissions	Hydrocarbons from tanks and transfers, exhaust emissions from vessels and compressors.
Wastewater Contaminants	BOD;COD; suspended solids; oil and grease from bilge, ballast, and storm water; chronic small spills; potential for large spills.
Solid Waste	Contaminated sludge and sediments.

6. Pipeline Installation Support Bases

Pipeline installation support bases are required to serve in the installation of pipelines. These waterfront bases are established by oil or service companies during exploration and can be used to serve many installation activities. Some of the vessels serviced include barges and tug boats. These support bases usually operate for a short period of time unless a large volume of pipelaying is expected.

IMPACTS AND REQUIREMENTS:

Land	Approx. 5 acres (pipe is stored at the pipecoating yard).

Waterfront	200 foot wharf/spread; 15-20 foot depth; wide enough channel to maneuver barges (5 times width of barge.)
Fuel	50,000 gallons/lay barge; 180,000 gallons/jet barge.
Labor	Approx. 25 onshore jobs; 50% local jobs All for Operation Phase
Wages	Approx. $425,000 annually. Average wage $17,000. (In cold climates, labor and wages are likely to be seasonal).
Environmental Impacts	Site alteration and construction impacts, air emmissions, wastewater, noise, solid wastes and aesthetic impacts similar to temporary service bases.

7. Partial Processing Plants

Partial processing plants remove impurities from the oil well stream. Natural gas is usually separated at the production platform. Partial processing plants reduce water and sediment content of oil well stream to approximately 1%. They may be located offshore or onshore depending on the relative costs, mode of transportation and nature of the wellstream. There is some question over whether this type of facility would be necessary or appropriate in the development of Mid-Atlantic oil and gas resources.

IMPACTS AND REQUIREMENTS:
(Most figures for plant processing 100,000 bbls/day gross fluids)

Land	15 acres/100,000 barrels processed; 33% oil treatment and storage; 49% gas treatment and liquid petroleum gas storage; 9% water treatment 9% metering and recording unit.
Waterfront	Not required.
Water	10,000 gals/month.

Energy	1.5 million cu. ft./day gas; 400,000 kwh/month.
Labor	150 construction jobs for 15 months; 10 jobs during operation.
Wages	$14,400/year average wage.
Capital Investment	$13 million.
Air Emissions	Hydrocarbons, hydrogen sulfide, sulfur oxides, nitrogen oxides.
Wastewater Contaminants	Suspended solids, oil and grease, heavy metals, phenols, halogens, chromium.
Noise	80-90 decibels from pumps; 81-96 decibels from flarestacks; 81-96 decibels from treating vessels.

8. Gas Processing Treatment Plants

Gas processing treatment plants recover liquifiable hydrocarbons not removed by normal separation methods from the raw gas stream before it enters a commercial transmission line. There are no standard sizes or designs for gas plants. Single plants are specifically designed for the particular gas stream they process.

IMPACTS AND REQUIREMENTS:
(For a 1 billion cubic feet/day facility)

Land	50-75 acres.
Water	200,000 gals/day average
Energy	5.4 million kwh/month; 360 million cu. ft./month natural gas from feedstock.

Construction Labor	500 workers for 1 1/2 years	
Operation Labor	45-55 workers; 60% local jobs	
Operation Wages	Approx. $750,000/year. $14,500 average annually.	
Capital Investment	$85 million.	
Air Emmissions	Major Hydrogen Sulfide Sulfer oxides Hydrocarbons (depending on sulfer content of gas found)	Minor Particulates Carbon monoxide Nitrogen oxides
Wastewater Contaminants	Dissolved hydrocarbons, sulfuric acid, chromium, zinc, phosphates, bases, sulfite.	
Noise	80-100 decibels from boilers, compressors and flarestacks; 24 hours/day.	
Solid Wastes	Sludges, scale, spent dessicants, filtration media, oil absorbants.	

9. Petroleum Refineries

Refineries consist of a series of units designed to produce a number of petroleum products by physically or chemically altering all or part of a crude oil stream. The complexity and scale of a refinery depends on the type of crude oil being refined and the number and characteristics of the products desired. Other refinery components include: storage tanks, influent and effluent water treatment.

The principal factors influencing the industry's decision to establish a new refinery are the nature of the market, the source of crude oil and the available water depth. A site that is located in a strong petroleum market, close to a guaranteed source of crude oil (import or local)

and along a navigable waterway will usually be an attractive site to refiners.

IMPACTS AND REQUIREMENTS:

(Moderately complex 250,000 bbl/day refinery)

Land	1000-1500 acres clear, flat, industrially zoned land.
Water	10.5 million gals/day withdrawn;
Energy	1.45 million kwh/day; 19,800 bbls/day fuel oil.
Construction Labor	1800 average over 3 years; 3500 peak employment; 70% local jobs
Construction Wages	$38.5 million; $18,000 average annual.
Operation Labor	410; 80% local jobs
Operation Wages	$6.5 million; $15,250 average annual.
Capital Investment	**$500-750 million.**
Air Emissions	Carbon monoxide, sulfur oxides, nitrogen oxides, hydrocarbons, and particulates from processing, process machinery, leaks from valves, seals, and storage tanks, and vehicle emissions.

Wastewater Contaminants	Thermal effluent, anti-fouling chemicals, a variety of contaminated process waters, BOD, COD, etc.
Noise	50 decibels at boundary.
Solid Waste	Contaminated process solids and effluent solids requiring special handling, variety of general packaging and domestic solid waste.

10. Platform Fabrication Yards

Platform fabrication yards are large waterfront sites on which drilling and production platforms are entirely or partially constructed. There are two major types of platform fabrication yards--steel platform fabrication yards and concrete platform fabrication yards. These yards are purchased and constructed by platform construction companies. The layout, size, requirements and impacts of these yards are determined by the complexity and number of platforms being constructed.

a. Steel Platform Fabrication Yards

These are large waterfront facilities consisting mostly of cleared land, warehousing, machine shops, and administrative offices.

IMPACTS AND REQUIREMENTS:

Land	200-1000 acres on navigable waterway.
Waterfront	15-30 ft. depth at pier.
Sea Access	210-350 ft. (horizontal clearance and vertical).
Water	100,000 gallons/day (for 9 platforms and no steel rolling); 1.24 million gallons/day (for 2-4 platforms with steel rolling).
Labor	250-500 workers/steel platform; 80% local jobs, all for Operation Phase
Wages	Average wage $19,000.
Capital Investment	$30-60 million (start-up capital only).
Wastewater Contaminants	Heavy metals, particulates.
Solid Waste	Packaging materials, metal scraps, debris.
Air Emissions	Sand and metal dust from sand blasting; hydrocarbons and organic compounds from paint evaporation; carbon monoxide, sulfur oxides, nitrogen oxides from vehicles.
Noise	80-100 decibels; 24 hours a day.

b. Concrete Platform Fabrication Yards

Concrete platform fabrication yards are constructed on waterfront sites

with considerable open space. The platforms are built in large, deep dredged dry dock basins, separated from deep adjacent water by a dam.

IMPACTS AND REQUIREMENTS:

Requirements of concrete platform fabrication yards in some ways differ markedly from steel. The 30-80 foot bases are constructed in dry dock and then floated a few hundred yards at most to very deep (150-300 feet) water for construction of the tall pillars upon which the deck section is attached. Thus the single most important requirement is a large open site with immediately adjacent very deep water.

Land	Minimum 50 acres/platform.
Water Depth	35-50 feet at pier; 150-300 feet adjacent.
Sea Access Clearances	Over 400 feet (vertical).
Water	40,000 gal/day at a one-platform yard; 165,000 gal/day at peak activity.
Energy	3 megawatts: 45,000 gal. diesel fuel stocked; 11 tons gas stocked.
Labor	350-450 average; 600-1200 peak; 85-90% local jobs, All for Operation Phase
Wages	$8.8 million annually; $19,500 average wage.
Air Emissions	Sand, cement, and metal dust; hydrocarbons and organic compounds; carbon monoxide; sulfur oxide, nitrogen oxides from vehicles and equipment.
Wastewater	Particulates, heavy metals, chemicals.
Noise	80-100 decibels, 24 hours.
Solid Waste	Packaging materials, metal scraps, contaminated and uncontaminated debris.

11. Pipe Coating Yards

Pipe coating yards are industrial facilities that coat steel pipe with mastic (a protective coating or cement) and weight it with concrete before it is submerged. This process helps prevent corrosion and overcome flotation.

There are two types of pipe coating yards--permanent plants that consist of about 100-150 acres and "portable plants" or "railhead operations" that can be built on 30 acres of land. Approximately 95% of a yard is used for outdoor storage of pipe.

IMPACTS AND REQUIREMENTS:

Land	100-150 acres on waterfront. 30 for portable facility; 95% storage, 5% operations.
Marginal Wharf	750 feet.
Water Depth	20-30 feet at pier.
Water	3000-15,000 gals/day.
Energy	1 million kwh; 12-13 million cu. ft./yr. gas.
Capital Investment	$8-10 million; $1 million for portable plant.
Air Emissions	Particulate matter, nitrogen oxides, sulfur oxides, carbon monoxide, hydrocarbons.
Wastewater Contaminants	Hydrocarbons, alkaline substances, particulates, metal fragments.
Noise	90-100 decibels (uncontrolled).
Solid Waste	Concrete, metal scraps, contaminated and uncontaminated debris.

Labor	100-200 workers during operating season (March-September).
Wages	$2 million (assuming 175 workers); average wage $11,500.

12. Tank Farms

The tank farm is a portion of a system that receives, transports temporarily stores, blends, and distributes petroleum, raw materials, petroleum products, and related substances. Tank farms may be located adjacent to refineries, marine terminals, or pipelines.

The storage vessels used at tank farms may be characterized as closed storage vessels and open storage vessels. The closed storage vessels include fixed roof tanks, pressure tanks, floating-roof tanks and conservation tanks; open storage vessels include open tanks, reservoirs, pits and ponds.

Land	Tank Farm Capacity	Land (acres)
	1,000,000	17
	2,000,000	37
	3,000,000	50
	3,500,000	58
Freshwater	Limited (assuming no processing)	
Energy	8 million kwh/year for a tank farm with a 1 million barrel capacity (in four 250,000 barrel tanks)	
Air Emissions	Hydrocarbons from evaporation from storage tanks and transfer operations. Exhaust emissions from vessels and compressors.	
Wastewater Contaminants	BOD, COD, suspended solids.	
Solid Waste	Contaminated sludge precipitated during storage.	

APPENDIX B

PROGRAM OF PUBLIC PARTICIPATION

THE PUBLIC PARTICIPATION PROGRAM: DEVELOPING SITING POLICIES FOR ENERGY FACILITIES

Introduction

The public participation program involved a process by which technical data and information necessary for the understanding of energy facilities and related impacts were made available to various parties in the form of the OCS-Interim Report. Government officials, business and industry representatives, civic and environmental groups and other interested parties were then given an opportunity to address themselves to the issues and impacts of energy facilities siting via meetings and questionnaires. A summary of how municipal officials and other interested parties responded is presented in the following pages. A copy of the questionnaire, the analysis of the questionnaire results, and a record of the meetings held are all presented.

Procedure

A questionnaire entitled, "How Should Your Municipality and Middlesex County Meet the Potentials and Impacts of Energy Facilities?" accompanied the distribution of the Planning Board's OCS-Interim Report, a copy of which is included at the end of this appendix. The main purpose of the questionnaire was to solicit and identify the general agreement with or opposition to the location of new, energy-related facilities from the perspective of the local municipality as well as the compatibility of municipal land use policies in relation to the siting of specific types of facilities.

Included in the survey were questions designed to assess the adequacy of local regulations as they would apply to the siting of new energy-related facilities and the degree to which these regulations provide the necessary level of protection of the community's health, safety and welfare with regard to the

potential effects of such development.

A map of Middlesex County, including an inset of its northeastern quadrant where petroleum refining, storage and petro-chemical industries are already operating, provided respondees an opportunity to indicate those general areas in Middlesex County considered appropriate in siting various OCS and petroleum-related facilities.

The Offshore Oil and Coastal Energy Facilities Study - Interm Report - prepared in August 1977 was distributed to County and municipal officials, agencies and departments, environmental groups, civic organizations, business interests, participating Coastal Zone Management Counties, and appropriate State and federal agencies. This group included:

Municipal - Mayors
Municipal Council Members
Municipal Planning Boards
Environmental Commissions
Industrial Commissions
Township Clerks

Municipal - Engineers
Planning Directors
Administrators
Water Departments and Authorities
Public Works Directors
Libraries

County - Board of Chosen Freeholders
County Planning Board
Transportation Coordinating Committee
Lower Raritan/Middlesex County 208 Water Quality Policy Advisory Committee
County Engineer
Middlesex County Office of Solid Waste Management Programs
Middlesex County Water Supply Advisory Committee

Other Environmental & Civic Groups - New Jersey Public Interest Research Group (P.I.R.G.)
League of Women Voters

Business/Labor Interests

- Chambers of Commerce
  N.J. Builders Association
  Labor Unions
  Major Industries including energy-related concerns
  Private Water Companies

Press and News Media serving Middlesex County

Following the distribution of the Interim Report, articles on the study appeared in The Home News, New Brunswick, The News Tribune, Woodbridge, The Courier News, Somerville, The Star-Ledger, Newark. In addition, a news item referring to the study was aired over WCTC Radio, New Brunswick.

The following list identifies those municipalities which were asked to respond to the questionnaire. The responses were divided into two groups--coastal and inland municipalities. Municipalities included in each group included:

Coastal	In-Land
Carteret	Cranbury
Edison	Dunellen
Old Bridge	East Brunswick
Perth Amboy	Helmetta
Sayreville	Highland Park
South Amboy	Jamesburg
Woodbridge	Metuchen
	Middlesex
	Milltown
	Monroe
	New Brunswick
	North Brunswick
	Piscataway
	Plainsboro
	South Brunswick
	South Plainfield
	South River
	Spotswood

Coastal municipalities are defined as those having direct access to navigable waterways including the Raritan River, Raritan Bay and the Arthur Kill. The remaining municipalities without such direct access were therefore categorized as in-land municipalities. There are eighteen municipalities in this category, almost all of which have some form of petroleum or gas pipeline within their jurisdiction.

Interested parties which replied to the Planning Board are outlined below by municipality:

COASTAL MUNICIPALITIES RESPONDING
TO THE OFFSHORE OIL AND
COASTAL ENERGY FACILITIES QUESTIONNAIRE

Municipality	Affiliation
Perth Amboy	Engineer
Sayreville	Municipal Attorney Civic Organization Representative
South Amboy	Planning Board Industrial Commission Chairperson
Woodbridge	Office of Business Administrator Planning Department Chamber of Commerce Private Citizen

INLAND MUNICIPALITIES RESPONDING TO THE OFFSHORE OIL AND COASTAL ENERGY FACILITIES QUESTIONNAIRE

Municipality	Affiliation
East Brunswick	Planning Board Chairperson Environmental Commission Chamber of Commerce Civic Organization Representative Private Citizen
Highland Park	Planning Board Chairperson
Middlesex	Mayor and Council
North Brunswick	Private Citizen
Plainsboro	Housing and Community Development Committee Member Municipal Clerk
South Brunswick	Director of Planning and Development

Responses to the questionnaire summarized by coastal and inland municipalities are shown on the attached questionnaires.

Upon distribution of the Interim Report, municipal officials, press and media were notified by mail of a public meeting concerning energy-related development in the coastal and inland municipalities. In addition, notices of this meeting were posted in municipal libraries in the County.

Two public meetings were held to discuss the Interim Report for Coastal municipalities, October 13, 1977, Middlesex County College, Edison, New Jersey and for Inland/Pipeline municipalities, October 20, 1977, Burr D. Coe Vocational and Technical High School, East Brunswick, New Jersey. A record of these proceedings is attached. A News Tribune reporter attended both meetings and an article was published in the newspaper the following day.

During these meetings, participatns were ásked to consider three (general) alternative policies governing the location of on-shore energy facilities as a means to begin addressing the development of a joint Municipal/County policy governing off-shore oil and coastal energy facilities development in Middlesex County.

Summary of Responses

The following section presents the responses to the questionnaires. A summary of these responses is presented in Cahpter VI.

WHICH POSITION SHOULD YOUR MUNICIPALITY AND COUNTY TAKE IN ADDRESSING POTENTIAL ON-SHORE ENERGY FACILITIES?

NAME: Total Responses

REPRESENTING: _____

ADDRESS: _____

_____

TELEPHONE: _____

ALTERNATIVE POLICIES FOR
ON-SHORE ENERGY FACILITIES
MIDDLESEX COUNTY, NEW JERSEY

(Circle One)

40% BETWEEN →

1. Attraction Policy - Attract any number and type of facilites without regard to their impacts

40% 2. Balanced Policy - Allow facilities selectively with regard to their impacts to protect basic public health safety and welfare standards.

3. Prohibition Policy - Prohibit all energy facilities.

1. Are you (or the group you represent) opposed to or in favor of development of the following facilities in your municipality? (Circle one)

a. Refineries	45% Strongly Opposed	Opposed	Neutral	Favor	Strongly Favor
Why?	73%				
b. Petro-chemical Complexes	54% Strongly Opposed	Opposed	Neutral	Favor	Strongly Favor
Why?					
c. Gas Processing Plants	Strongly Opposed	45% Opposed	Neutral	Favor	Strongly Favor
Why?	73%				
d. Partial Processing Plants	36% Strongly Opposed	Opposed	Neutral	Favor	Strongly Favor
Why?	64%				
e. Storage Tank Farms	36% Strongly Opposed	36% Opposed	Neutral	Favor	Strongly Favor
Why?	73%				
f. Permanent Service Bases	Strongly Opposed	Opposed	Neutral	Favor	55% Strongly Favor
Why?					
g. Platform Installation Support Bases	Strongly Opposed	Opposed	Neutral	Favor	55% Strongly Favor
Why?					

h.	Pipeline Installation Support Bases Why?	Strongly Opposed	Opposed	Neutral	36% Favor	27% Strongly Favor
i.	Pipe Coating Yards Why?	Strongly Opposed	Opposed	Neutral	45% Favor	Strongly Favor
j.	Marine Terminals Why?	Strongly Opposed	Opposed	Neutral	36% Favor	27% Strongly Favor
k.	Pipeline Landfalls Why?	Strongly Opposed	27% Opposed	36% Neutral	Favor	Strongly Favor

4. a. In terms of potential OCS and petroleum facilities, are existing local regulations (circle one):

73%

More than adequate Adequate Inadequate

b. To ensure your community's health, safety, and welfare or to improve the compatibility of OCS and petroleum facilities with nearby land uses, is there a need to amend any of your local regulations?

If so, what recommended changes do you have in mind?

Please forward all questionnaires and any additional comments and questions you might have to:

Middlesex County Planning Board
40 Livingston Avenue
New Brunswick, NJ 08901

Attn: Mr. James Fong
(201) 246-6863

WHICH POSITION SHOULD YOUR MUNICIPALITY AND COUNTY TAKE IN ADDRESSING POTENTIAL ON-SHORE ENERGY FACILITIES?

NAME: Coastal Municipalities

REPRESENTING: _____

ADDRESS: _____

_____

TELEPHONE: _____

COASTAL MUNICIPALITIES
ALTERNATIVE POLICIES FOR
ON-SHORE ENERGY FACILITIES
MIDDLESEX COUNTY, NEW JERSEY

(Circle One)

50% Between

1. Attraction Policy - Attract any number and type of facilites without regard to their impacts

2. Balanced Policy - Allow facilities selectively with regard to their impacts to protect basic public health safety and welfare standards.

3. Prohibition Policy - Prohibit all energy facilities.

N=4

1. Are you (or the group you represent) opposed to or in favor of development of the following facilities in your municipality? (Circle one)

	Strongly Opposed	Opposed	Neutral	Favor	Strongly Favor
a. Refineries	33%				
Why?					
b. Petro-chemical Complexes	50%			33%	
Why?				50%	
c. Gas Processing Plants					
Why?	67 %				
d. Partial Processing Plants	33%	16%	16%	16%	16%
Why?					
e. Storage Tank Farms	50%				
Why?	67%				
f. Permanent Service Bases					67%
Why?				100%	
g. Platform Installation Support Bases					67%
Why?				100%	

h.	Pipeline Installation Support Bases Why?	Strongly Opposed	Opposed	Neutral	Favor	50% Strongly Favor 83%
i.	Pipe Coating Yards Why?	Strongly Opposed	Opposed	Neutral	33% Favor	33% Strongly Favor 67%
j.	Marine Terminals Why?	Strongly Opposed	Opposed	Neutral	33% Favor	33% Strongly Favor 67%
k.	Pipeline Landfalls Why?	Strongly Opposed	33% Opposed	33% Neutral	Favor	33% Strongly Favor

2. Are the following facilities compatible with your municipality's land use policies? (i.e., are they acceptable under your zoning ordinance, fire ordinance, noise, etc.)

Facilities	Compatible?		COMMENTS
Refineries	50% Yes	No	
Petrochemical Industries	50% Yes	No	
Gas Processing Plants	Yes	75% No	
Partial Processing Plants	Yes	75% No	
Storage Tank Farms	50% Yes	No	
Permanent Service Bases	75% Yes	No	
Platform Installation Support Bases	100% Yes	No	
Pipeline Installation Support Bases	100% Yes	No	
Pipe Coating Yards	75% Yes	No	
Marine Terminals	75% Yes	No	
Pipeline Landfalls	50% Yes	No	

4. a. In terms of potential OCS and petroleum facilities, are existing local regulations (circle one):

80%

More than adequate Adequate Inadequate

b. To ensure your community's health, safety, and welfare or to improve the compatibility of OCS and petroleum facilities with nearby land uses, is there a need to amend any of your local regulations?

If so, what recommended changes do you have in mind?

Please forward all questionnaires and any additional comments and questions you might have to:

Middlesex County Planning Board
40 Livingston Avenue
New Brunswick, NJ 08901

Attn: Mr. James Fong
(201) 246-6863

WHICH POSITION SHOULD YOUR MUNICIPALITY AND COUNTY TAKE IN ADDRESSING POTENTIAL ON-SHORE ENERGY FACILITIES?

NAME: Inland Municipalities

REPRESENTING: _____

ADDRESS: _____

_____

TELEPHONE: _____

INLAND MUNICIPALITIES
ALTERNATIVE POLICIES FOR
ON-SHORE ENERGY FACILITIES
MIDDLESEX COUNTY, NEW JERSEY

(Circle One)

1. Attraction Policy - Attract any number and type of facilites without regard to their impacts

✓ 2. Balanced Policy - Allow facilities selectively with regard to their impacts to protect basic public health safety and welfare standards.

3. Prohibition Policy - Prohibit all energy facilities.

There was only a single response to this question and that was in favor of a balanced policy. East Brunswick Planning Board Chairperson, Joan Abromowitz, did indicate during the October 20th meeting of Inland Municipalities that each proposed energy-related development should be reviewed individually and a decision made based on the merits of the case.

1. Are you (or the group you represent) opposed to or in favor of development of the following facilities in your municipality? (Circle one)

	Strongly Opposed	Opposed	Neutral	Favor	Strongly Favor
a. Refineries	50%				
Why?	83%				
b. Petro-chemical Complexes	57%				
Why?	86%				
c. Gas Processing Plants		43%			
Why?	71%				
d. Partial Processing Plants	33%				
Why?	67%				
e. Storage Tank Farms		43%			
Why?	57%				
f. Permanent Service Bases		28%	43%	28%	
Why?					
g. Platform Installation Support Bases		25%	38%	25%	
Why?					

h.	Pipeline Installation Support Bases	Strongly Opposed	Opposed	33% Neutral	33% Favor	Strongly Favor
	Why?					
i.	Pipe Coating Yards	Strongly Opposed	29% Opposed	29% Neutral	29% Favor	Strongly Favor
	Why?					
j.	Marine Terminals	Strongly Opposed	33% Opposed	33% Neutral	Favor	Strongly Favor
	Why?					
k.	Pipeline Landfalls	Strongly Opposed	20% Opposed	40% Neutral	20% Favor	Strongly Favor
	Why?					

2. Are the following facilities compatible with your municipality's land use policies? (i.e., are they acceptable under your zoning ordinance, fire ordinance, noise, etc.)

Facilities	Compatible?		COMMENTS
Refineries	Yes	86% No	
Petrochemical Industries	Yes	86% No	
Gas Processing Plants	Yes	86% No	
Partial Processing Plants	Yes	86% No	
Storage Tank Farms	60% Yes	No	
Permanent Service Bases	67% Yes	No	
Platform Installation Support Bases	60% Yes	No	
Pipeline Installation Support Bases	60% Yes	No	
Pipe Coating Yards	50% Yes	No	
Marine Terminals	Yes	86% No	
Pipeline Landfalls	Yes	75% No	

N = 8

4. a. In terms of potential OCS and petroleum facilities, are existing local regulations (circle one):

67 %

More than adequate Adequate Inadequate

b. To ensure your community's health, safety, and welfare or to improve the compatibility of OCS and petroleum facilities with nearby land uses, is there a need to amend any of your local regulations?

If so, what recommended changes do you have in mind?

Please forward all questionnaires and any additional comments and questions you might have to:

Middlesex County Planning Board
40 Livingston Avenue
New Brunswick, NJ 08901

Attn: Mr. James Fong
(201) 246-6863

DOCUMENTATION OF ACTIONS
LEADING TO THE PUBLIC MEETING ON THE
MIDDLESEX COUNTY PLANNING BOARD'S FINAL REPORT -

POLICIES FOR HANDLING THE IMPACTS FROM
OFFSHORE OIL AND ENERGY FACILITIES IN MIDDLESEX COUNTY

ON
December 13, 1977 - 5:00 P.M.

Conference Room
MIDDLESEX COUNTY PLANNING BOARD
40 Livingston Avenue
New Brunswick, New Jersey

(Written comments on the report will be accepted by the Middlesex County Planning Board through December 20, 1977)

In accordance with the rules and regulations governing public participation activities and in accordance with the New Jersey County and Regional Planning Enablict Act (40:27-4), the following requirements have been met and steps taken:

November 9, 1977:

Decision was announced at the November meeting of the Middlesex County Planning Board to hold the public meeting on the (draft) OCS Policy Report to commence immediately following the Board's regularly scheduled December 13, 1977 meeting.

November 18, 1977:

Notice of the public meeting was published in the 208 Environmental Report, a newsletter of the Lower Raritan/Middlesex County area.

November 29, 1977:

Formal wirtten announcement was made of the public meeting on December 13, 1977 and distributed throughout the county to municipal and county officials, agencies and representatives of industry, business, labor, civic environmental and media organizations.

December 4, 1977:

Notice of the public meeting was published in the Homes News, a major area newspaper.

December 7, 1977:

Notice of the public meeting was published in the Home News, The News Tribune and the Courier News.

December 9, 1977:

A press release was issued to local media in the Middlesex County area announcing the release of the (draft) OCS Policy Report and the public meeting date.

Copies of the (draft) OCS Policy Report and an announcement of the public meeting were distributed throughout county and municipal agencies and officials, representatives of industry, business, labor, civic, environmental and media organizations.

MINUTES FOR THE OCS PUBLIC MEETING

OF DECEMBER 13, 1977 AT

5:00 P.M.

ATTENDANCE:

Public:

Thomas Levandoski, South Amboy Industry Chairman
J. Thomas Cross, South Amboy Mayor
John Runyon, East Brunswick Township Administrator, 208 PAC Chairman
Carl Hintz, East Brunswick Township Planner
Stanley Rogaski, Central Jersey Air Pollution Agency

Members of the Middlesex County Planning Board Staff:

Douglas S. Powell, Director
Douglas V. Opalski, Assistant Director
Robert J. Nardi, MCPB Staff
Deborah Malek, MCPB Staff
William Cesanek, MCPB Staff
Jim Fong, MCPB Staff
Jim Bach, MCPB
Nike Prieston, 208 Water Quality Management Planning Staff

Douglas V. Opalski opened the meeting with the attached statement marked #1. Mr. Opalski continued and made the following points:

- United States Environmental Protection Agency has approved the necessary permits for exploratory drilling for lease sale #40 off the N.J. coast.

- The Federal Government (United States Department of Energy) has identified two sites in Middlesex County for further study as possible locations for the emergency storage of ten million barrels of fuel oil.

- New Jersey Department of Environmental Protection, Offshore Coastal Zone Management is proceeding toward adoption of a Coastal Zone Management Strategy for the C.A.F.R.A. area of the state, which preludes protection for most of Middlesex County.

In light of the above developments it is an opportune time for municipalities of Middlesex County to explore the possibilities of offshore oil drilling and review the impact of joint policy position for handling this development.

Mr. Opalski gave a brief background (see attached) and then a summary of the six steps to be considered as policies. (see attachment). Strategy to be taken was discussed. (see attached).

Discussion and Comments:

Tom Levandoski (S.A.): Reading the newspapers about the oil industries I've read that the basic port facilities would go to Rhode Island and everything else outside our area and the tank farms would be located in the Perth Amboy/South Amboy area. Since the Federal government is involved and the Oil Industry and it says somewhere in the law that the Federal government can override the County - What can the County do to protect our interests down there? We do not want the dirty end of the deal. We want the support facilities. They're telling us we're going to get the tank farms. We don't want those farms, the people don't want those farms. We got enough of them sitting out there already. Yet everytime you read a release from the oil companies or from Washington this seems to be where their strategy seems to be lying; putting the tank farms in this area, because we are not protected by the CAFRA laws in this area. They have a loophole. Everybody else is being protected. We aren't. How are we going to be protected?

Mr. Center (MCPB Chairman): What services facilities do you desire?

Mayor Cross (S.A.): Time out, time out. We want no part of the oil facilities. Mr. Levandoski is speaking for himself. The reason we don't want any part of these facilities is because we need the land we have for our own use, to get the best rateables we can for our community. Our community is an old community. We're also the third largest community in Middlesex County. I think what we need is something that is going to help our community.

I think you're all aware if Jersey Central Power and Electric leaves South Amboy we're in big trouble because we receive a great deal of gross receipts taxes from Jersey Central. So we are very, very concerned what we are going to put in our land in South Amboy.

We've got a piece of landfill property and we've got great waterfront property which the railroads evacuated many years ago and I think is empty, and I think we've got some property down on Main Street which is old Rt. 3 or 4. We want to keep that property. We want to keep that a rateable.

Now they're talking about putting offshore supports. They talk about using alot of water for these supports. We don't have these water facilities. We want to be protected. That's what our main purpose for being here is for to be protected.

Everytime I read in the paper an article in the Star-Ledger, South Amboy/Perth Amboy, South Amboy/Perth Amboy and nobody writes me a letter telling what they're going to do. I don't know anything. It's a shame really. The only thing we do know is what's in here (draft of Middlesex County's final report) and I think this is very vague, it's not that explicit.

Mr. Center: So you're saying you don't want any tank farms or support facilities?

Mayor Cross: No way.

Mr. Center: Although they may bring rateables?

Mayor Cross: Well, if they talk a million dollars in rateables to me, I'll talk to them.

John Runyon, 208 Policy Advisory Committee: The 208 Policy Advisory Committee has created a task force to review the CAFRA Coastal Management Plan which was recently submitted. 208 Advisory Committee is extremely concerned about the coastal and management areas within the 208 area. I would like to make this report a part of the meeting. (See underlined in enclosed report) for what was read at meeting.

Carl Hintz (E. Brunswick): I think that the maps showing the coastal municipalities and those that show the inland areas should be consistent with the recently proposed boundaries of the Department of Environmental Protection, and to that end we feel East Brunswick should be included in the coastal municipalities.

Jim Fong, MCPB Staff: The delineation of East Brunswick as an inland municipality is really for the sake of our public participation effort and is not a related state's coastal zone boundary. In other words, we determined because of E. Brunswick's location in relation to the channel in the Raritan River it was not conducive to the location of types of coastal facilities as say Edison would be with a 20 foot channel. That's the only reason E. Brunswick is classified as an inland municipality. This classification has no bearing on the State's coastal zone boundary.

Doug Opalski (Asst. Dir. MCPB): The Planning Board has taken a position on Marcy 8, 1977 in response to proposed coastal zone boundaries and that position was until the County Planning Board knows better about the implications in the coastal zone that it would accept the preliminary coastal zone as delineated by the Dept. of Environmental Protection at that time which would include E. Brunswick by virtue of the delineation of the one foot flood level along the river frontage and that is the applicable position I think you are concerned about. The Planning Board is on record as seeking to have designated those municipalities that are affected by tide including E. Brunswick as well as other municipalities. We also made reference to the fact that the state's coastal zone management strategy is only applicable to CAFRA at this time and excludes municipalities such as yours. We agree with you entirely. (Responding to Carl Hintz). Mr. Opalski closed the meeting after no further comments or questions with the statement that all comments will be considered by the Planning Board and the Board of Freeholders and put into the record of this meeting.

The meeting adjourned at 5:20 p.m.

POLICIES

FOR HANDLING IMPACTS OF

OFFSHORE OIL AND COASTAL ENERGY FACILITIES IN

MIDDLESEX COUNTY, N.J.

BACKGROUND

- Participating in a Nationwide Coastal Planning Effort: The Middlesex County OCS and Energy Facilities Planning Study

- Focus: To Develop Plans and Policies to Meet and Manage Impacts of Energy Facilities

- Objectives:

  1) To gather and disseminate information on energy facilities

  2) To coordinate and communicate with local governments, interest groups, and the general public

  3) To develop a framework for decision making at the local level

  4) To identify preferences in siting policies for energy facilities

POLICIES

1. Seek or accomodate only a type and number of energy facilities in Middlesex County that do not:

   a) Exceed public health and safety standards;

   b) Create excessive costs for taxpayers and local government for new or expanded public facilities and services.

2a. Seek or accomodate all types of energy facilities in the coastal municipalities of Middlesex County in accordance with the above policy.

2b. Seek or accomodate indirect or induced economic growth from energy facilities - especially of a research or service nature - throughout the county, according to the capabilities of natural resources and existing and future public services to absorb such growth.

3. Seek a fair and equitable share of state and federal aid for the provision of basic infrastructure and services to support agreed upon energy facilities and indirect and induced economic growth.

4. Deepwater Port and associated petro-chemical industry opposed until evidence is sufficient to insure beneficial and environmentally sound impacts, and related regional development control regulations are in effect.

5. Liquified natural gas facilities opposed near developed on-shore areas; should be located safe distances offshore.

6. Acceptability of onshore development affecting Middlesex County and resulting from offshore exploration and development contingence upon acceptable short and long range plans/programs to support such development.

STRATEGY

FOR HANDLING THE IMPACTS FROM ENERGY FACILITIES AND TO GUIDE FUTURE PLANNING

1) Identify the impacts from energy facilities in greater detail.

2) Generate open and frank discussion among municipal officials and interest groups on the issues and impacts of energy facilities.

3) Effectuate open, informed, and appropriate decision making by government bodies and regulatory agencies on energy facility siting.

4) Analyze and recommend changes in the institutional, legal and regulatory mechanisms which have jurisdiction or authority over the siting of energy facilities.

STATEMENT
OF THE COASTAL MANAGEMENT TASK FORCE
OF THE LOWER RARITAN/MIDDLESEX COUNTY
WATER QUALITY MANAGEMENT PROGRAM
POLICY ADVISORY COMMITTEE
ON
COASTAL MANAGEMENT STRATEGY FOR NEW JERSEY: CAFRA AREA

December, 1977

At its regular meeting of November 22, 1977 the Lower Raritan/Middlesex County Water Quality Management Program's Policy Advisory Committee (PAC), a citizen and municipal advisory group, created a Task Force to review the Report entitled: Coastal Management Strategy for New Jersey, CAFRA Area, dated September 1977 and issued by the New Jersey Department of Environmental Protection (NJDEP). The PAC authorized that the Task Force transmit a statement on behalf of the PAC to be submitted to the State for the record of the hearings scheduled on that Report.

1) The Lower Raritan/Middlesex County Coastal Management Task Force recognizes that the current institutional basis for implementation of coastal land and water resource protection involves multiple permit reviews under the State CAFRA, Wetlands and Riparian Laws, as well as municipal and county development reviews depending on the circumstances involved. The Task Force also recognizes that the review and granting of State permits occurs at varying layers of the NJDEP's bureaucracy and that different guidelines, policies and mechanisms are used by the CAFRA Permit Section, the Wetlands Section and the (Natural Resource Council) Riparian Lands Management Section in each of their permit review processes. The Task Force views these multifarious review processes and policies as inefficient and unwieldy. Delays and sometimes arbitrary decisions increase the costs that all must pay for environmental protection.

   The Task Force recommends that the permit reviews for coastal related development be simplified and integrated into a more efficient and consistent procedure. All permit decisions should be based on a set of management policies and guidelines which clearly define appropriate development types and performance standards. An individual or corporation seeking a coastal permit should be presented with an understandable procedure which can be followed. A single coastal permit coordinating agency could reduce any confusion or repetition in the coastal development review process. Permit integration would also facilitate the on-going development of policies and management strategies for the non-CAFRA areas of the Northern Waterfront in that Riparian Laws are currently the single means of coastal zone planning and regulation in this region and should therefore compliment and be consistent with CAFRA area policies.

2) A management strategy for the non-CAFRA portions of the coastal zone, especially the Northern Waterfront areas encompassing Middlesex County, is seen as essential by the Lower Raritan/Middlesex County Coastal Management Task Force. First, the Task Force believes that the south shore of Raritan Bay from the terminus of the current CAFRA boundary at Morgan Creek to Victory Bridge (included

in the municipalities of Sayreville and South Amboy) is a residential-recreation coastal area similar in characteristics to much of the CAFRA region.

The Lower Raritan/Middlesex County Task Force therefore recommends that the CAFRA boundary be extended up along the Raritan Bay, including the Raritan estuary to the Victory Bridge.

Second, the Task Force recognizes that the areas along the Arthur Kill from Perth Amboy to Carteret support predominantly heavy industrial and urban development. The areas along the Raritan River from the Victory Bridge to the Fieldville Dam and the South River to Duhernal Dam are less intensively developed but do display a wide variety of land and water use types: from heavy industrial development and landfills (e.g., Kin-Buc and National Lead), to urban development such as New Brunswick, to parks and recreation areas such as Johnson and Donaldson Parks, to relatively pristine estuaries and undelineated wetlands in Sayreville, East Brunswick and South River.

These two areas of Middlesex County's coastal zone should be developed according to specific policies, guidelines and standards which reflect the unique qualities of these waterways. Land and water use policies governing the Raritan and South River areas should recognize the importance of maintaining the quality of the river system as a water supply source, especially for the maintenance and management of groundwater supplies such as the Farrington Sands Aquifer, which have already been subject to extensive salt water intrusion. Because of the potential for pollutants to enter the groundwater system from the River, care must be exercised in the location of any industrial pollution sources along the waterway. Moreover, urban and agricultural runoff, or non-point sources, must be managed and controlled at their source in order to achieve the water quality goals for the region.

Areas along the Arthur Kill are not only already industrialized but also economically depressed. Any type of economic development in this area would, according to municipal officials, be tremendously beneficial and in most cases coveted. In this area, yet other sets of policies and standards should apply in determining proper land and water uses. Because of the Arthur Kill's deteriorated condition, the Task Force recognizes a need to pursue a strategy whose aim is to improve the quality of the waterway. Whereas a policy of non-deterioration and protection are appropriate in the CAFRA region and even possibly in certain areas along the Raritan River, the Arthur Kill poses special water quality problems which must be actively improved upon. Granting riparian permits should, therefore, reflect the environmental standards and policies desired by this region for this region.

The 208 Policy Advisory Committee has just recently recommended the adoption of their Water Quality Plan to the Middlesex County Board of Freeholders. This comprehensive plan is cognizant of the interrelationships between all water resources, both surface and ground, how these impact land use, and ultimately how the management of water resources relates to the diverse needs of the area's municipal officials, industries and citizens. Therefore, through the Policy Advisory Committee, this Task Force believes there is the beginning of a local management council which can now focus on the issues of energy facility development in the coastal areas of Middlesex County and the associated water quality standards and resultant land use policies and performance standards which are needed to insure the health and safety of the region. The Lower Raritan/Middlesex County Task Force believes it is in a position to work closely with the State DEP/Office of Coastal Zone Management in devising and implementing a management strategy for the coastal areas in Middlesex County. Finally, the Task Force believes that local governments and publics should be closely involved in a coordinated planning process for coastal management that includes consideration of water quality, air quality and other relevant issues and topics.

The Lower Raritan/Middlesex County Coastal Management Task Force feels that through a consideration of the above two recommendations and an acceptance of this hand that is now being offered in the spirit of continued cooperation, sound management policies and programs can be instituted to insure our common goals.

The Coastal Management Task Force

John Runyon /gh.

John Runyon, Chairman, LR/MC PAC
East Brunswick Township Administrator
Janine Bauer, NJPIRG, Rutgers
Diane Donnelly, East Brunswick Planning Board
John Korzun, E.R. Squibb & Sons
Edward O'Connor, Morgan-Bayview Improvement Assn.
Rose Sakel, Middlesex County Citizens Conserv. Council
Anne Schopf, East Brunswick Citizen
George Searle, Tower Marine, Inc.
Avice Wilson, Citizens Committee for Environ. Protection
Edward Zanat, Borough of Carteret

12/14/77

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ADDITIONAL PIPELINE MAP CONTACTS

Sun Pipeline Company
King of Prussia, PA

Sohio Pipeline Company
Woodbury Heights, NJ

Shell Oil Company
Seawaren, NJ

Texas Eastern Transmission Corporation
Houston, Texas

Transcontinental Gas Pipeline Corporation
Newark, NJ