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OVERSIGHT OF FEDERAL EFFORTS TO CLEAN UP ASBESTOS IN LINCOLN COUNTY, MT

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

APRIL 5, 2007—LIBBY, MT

Printed for the use of the Committee on Environment and Public Works

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ONE HUNDRED TENTH CONGRESS
FIRST SESSION

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OVERSIGHT OF FEDERAL EFFORTS TO CLEAN UP ASBESTOS IN LINCOLN COUNTY, MT

THURSDAY, APRIL 5, 2007

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Libby, MT.

The committee met, pursuant to notice, at 1:18 p.m., in the Ponderosa Room, Libby City Hall, Hon. Max Baucus presiding.

Present: Senator Baucus.

OPENING STATEMENT OF HON. MAX BAUCUS, U.S. SENATOR FROM THE STATE OF MONTANA

Senator BAUCUS. The meeting will come to order.

First I'll thank everyone for being here. Ms. Bodine, I appreciate your making the effort to come to Libby, and clearly thank everybody this afternoon, those who will be testifying and others that wish to say something, make statements. The whole goal here is essentially for the U.S. Government to serve all of you in Libby the best way possible. You're our employers. We work for you. I mean you're the—we're the hired hands. All of us, those of us in Congress and those who serve in the executive branch of government. So the whole point of this hearing basically is to help determine for you whether the job is being done right for all of you; that is, the cleanup and the CARD Clinic and all the efforts that are so necessary to redress and turn around the disaster which W.R. Grace caused with all the vermiculite and related diseases and dislocations that it's caused to the people of Libby.

The goal here too is to soon have a time and date when all of this is behind us. That's really what this is about. Figure out how, as quickly as possible, we can close the chapter on the vermiculite and asbestos-related-disease problems as much as possible and get on with rebuilding Libby, new jobs and businesses, and just—and the times——

(Brief interruption.)

Senator BAUCUS. That's the goal. I have a prepared statement I'm going to read, and then we'll just take it from there. The book of Ecclesiastes teaches us that, "For everything there is a season and a time for every matter under heaven, a time to break down, a time to build up, a time to mourn, a time to dance, a time to keep silent, and a time to speak." At today's hearing, coming as a long winter gives away to a new season, it is time to speak up about Libby's challenges and put your cleanup back on track. It has been 7 years since news reports first exposed the extent of asbestos con-

tamination in Libby, 7 years since I first met Les Skramstad over huckleberry pie at Gayla Benefield's home.

That day I made a promise to Les and everyone in Libby, but especially to Les, because he was the one that I was talking to at the moment, that I would not stop fighting until Libby gets a clean bill of health. Our dear friend Les passed on this winter, but my promise to Les and the people of Libby remains. It is time to speak up again for Libby, to honor the memory of those who lost their lives because of asbestos exposure, to mark the progress made, and to see what remains to be done.

Important progress has been made in Libby in the last 7 years. In the year 2000, we secured money from Health and Human Services (HHS) to establish the CARD Clinic; we got money for Lincoln County through the HHS rural health outreach grant starting in 2003; and we got Lincoln County's health center funded starting in 2001, with an initial grant of $257,000. That health center recently got an infusion of $602,000 from HHS. I'll continue to push for more. We also worked to get Fannie Mae to give $75,000 worth of grants to the community for housing. I worked with the Social Security Administration to make a regulatory rule change so that it is now much easier for Libby's residents to qualify for disability benefits under the social security and supplemental security income programs. We learned the need for that when the secretary-elect was here last year.

In addition, EPA has completed 794 emergency-response level cleanups of homes and businesses. Despite this progress, much remains to be done. In August 2006, I asked the inspector general to review EPA's work in Libby because we heard reports that not all that was being done that should be done.

What that report found was truly outrageous. After 7 years, the EPA has failed to complete the necessary toxicity studies to determine the safe level of human exposure to Libby asbestos. That means that, after 7 years and hundreds of millions of dollars, EPA still cannot say how clean they need to make the homes and businesses to protect the families in Libby.

In a subsequent letter, EPA promised me that they would begin the toxicity studies within 45 days. This hearing is an opportunity for the community to see what remains to be done and how—and to hold EPA's feet to the fire to make sure that they do it. I understand there was a hearing in March where some of this was laid out, and I want to nail that down more completely.

I want to thank Ms. Bodine for joining us here in Libby today. This is pretty important stuff. As Assistant Administrator of the Office of Solid Waste Emergency Response, Ms. Bodine is in charge of the Superfund program.

Ms. Bodine, the inspector general report raised many important questions. Why wasn't a toxicity study started earlier? When will the toxicity study be complete? How does EPA intend to correct the misinformation put forward in such EPA publications as Asbestos in Your Home, those comfort letters?

Thank you for your time, and I look forward to your remarks and what you have to say. Commissioner Marianne Roose has also agreed to testify.

Commissioner Roose has served Lincoln County since 1997. She brings a wealth of local knowledge, and I look forward to her testimony in how we can make Lincoln County healthier and a more prosperous place to live, work, and raise a family.

Sitting next to her is Dr. Brad Black. Brad is also here to give us the medical community's perspective. Dr. Black is the medical director of the Center for Asbestos Related Disease here in Libby. Dr. Black has devoted his career to treating and advocating for the victims of W.R. Grace.

It's good to see you, Dr. Black.

Leroy Thom will testify about the continued needs of the community. Leroy worked for 17 years at W.R. Grace. He's the current owner of Montana Machine and Fabrication. Leroy is an active member of the Libby Community Advisory Group. Leroy, I look forward to your views of how we keep moving towards a clean bill of health.

Finally, at the end of the hearing, we will have an opportunity for members of the audience to ask questions and make statements. I think it's very important that Ms. Bodine, as well as I, and all of us who are working on this, especially Ms. Bodine as head of the Superfund program, have an opportunity to hear from all of you firsthand how your lives are affected by the work that EPA does or does not do. I hope that someday soon there will be a new season in Libby, one where people in Lincoln County no longer wonder if their homes are safe for their children, a time when businesses move to Libby without hesitation. I look forward to that day when Libby finally gets that clean bill of health.

Let me first turn to you, Ms. Bodine. Start out and—I read your written statement on the plane coming over here. Would love to hear what you have to say. I know the people of Libby would like to hear you too. So the floor is yours.

STATEMENT OF SUSAN PARKER BODINE, ASSISTANT ADMINISTRATOR, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. BODINE. Thank you, Senator Baucus. I want to thank all the members of the community who came to this hearing as well. I'm Susan Bodine. I'm the Assistant Administrator of EPA's Office of Solid Waste——

Senator BAUCUS. I'm very sorry. I pronounced it Bodeen (phonetic). It's Bodine. I'm very sorry.

Ms. BODINE [continuing]. Solid Waste and Emergency Response, which includes the Superfund program. We are the national program managers, the national directors of the Superfund program. As I'm sure most of you know, EPA is divided up into regions, so Region 8 out of Denver operates the program for the Montana area.

I came into town yesterday. This is my first trip to Libby, and I greatly appreciate the hospitality, and I greatly appreciate what a beautiful community and what a fabulous location you have here in Libby. When I arrived, I had the opportunity to go around with some of the EPA team and look at some of the ongoing cleanup work, and I also yesterday had—actually, this morning had the opportunity to meet with some of the community members as well. I met Dr. Black and Dr. Whitehouse, and we had a good discussion

at the CARD Clinic. Then later this morning I had the opportunity to meet with Mayor Berget, as well as Commissioner Roose and other leaders in the community, to get a good perspective of the needs here. I'm sure that we will also hear more today. But I want to thank people for their willingness to talk to me, and I definitely appreciated what I heard.

Now, I want you—everyone here—to know that I understand and folks who work with me understand, as the Senator said, just what a tragedy it has been in Libby and that this is very definitely a top priority for the Superfund program. The incidents of disease that you see here, we don't see that at our other sites. It's remarkable. We are committed to working with our State and our Federal and, of course, our local partners to take all the steps necessary to protect the public health and the environment here in Libby.

I know that a lot of you know what has happened to date, and what you're most interested in, and what the hearing is about is, what's going on now and what's happening in the future. I do want to review the accomplishments to date. In particular, I want to recognize the extraordinary efforts of the EPA Libby team, the folks that are working here in town, as well as the folks based in Region 8.

As you know, back in 1999, EPA sent an emergency response team to the community, immediately began collecting hundreds of samples from the soil, from the dust, from residences, from commercial facilities, and realized that there was a real problem. EPA identified where some of the major—the worst areas first; identified where some of the major locations were and conducted emergency removal actions at the high school, at the middle school, and at the elementary school. EPA immediately took action removing some of the high concentrations at the processing plants, the—export plant, and then realized that, we're in here for the long haul and began a comprehensive screening of—an attempt to screen—virtually all the properties in Libby.

In 2002 to 2003, EPA inspected over 3,500 properties for the presence of asbestos-containing materials. In May 2002, EPA issued an action memo—a removal-action memo—that set out a process and a program for removing contamination from the yards and from the homes here in Libby where the sampling showed that we had asbestos-contaminated material.

Now, through the end of 2006, as the Senator said, we've done 794 residential and commercial properties, the EPA team has removed more than 400,000 tons of asbestos-contaminated material and debris. Through those actions, they have greatly reduced the risk here, greatly reduced exposure, and I applaud them for it; I applaud the team for it. They've really done a yeomen's work. Folks that have been in a Staples recently will see that they're selling these red buttons that, if you press it, it says "that was easy."

I was thinking earlier today that we need to get one of those buttons for the EPA folks here that says "that wasn't easy," because it isn't. This is a very complicated site, and there are a lot of challenges that they've overcome, and a lot of challenges that remain.

Now, I know that what you want to hear about is what's ongoing and what's going forward, so I want to talk about five significant areas where we have ongoing work and work planned. First issue,

ongoing work, ongoing removals. We are working on developing a final cleanup standard so that we can identify what the final remedy is for the site, but we're not stopping removals. The removal actions, the yard cleanups, the home cleanups, they have been tremendously successful in reducing risks, and that work is not going to stop. So this year we're going to continue that, and the team is planning to do about 160 properties this year.

More ongoing work is additional remedial investigation. We have some more areas where we need to do some work—some investigative work. The mine, we need to do remedial investigation up at the mine. In addition, there's a little bit more investigation work that needs to be done at the processing areas, like the export plant and the former mill, the Stimson mill. The hope is that that work will let us know that we've cut off exposure there, because if we have completely cut off exposure there, then we can pick a final remedy for those sites early. We can pick that remedy soon, if there is no exposure left. So that's the purpose of the RI work, remedial investigation work.

Then this year and next year we're going to be doing the—through a cooperative agreement with the State of Montana—we're going to be doing the investigative work in Troy. We expect to investigate 1,000 properties in 2007 and 2008, and to essentially do the screening in Troy such as what's done in Libby. That's the second area.

The third area of work in 2007 is work that is both starting and continuing. First of all, on the exposure side, we're continuing with the ambient-air monitoring. In addition, we are doing both indoor and outdoor sampling that's activity-based sampling. In other words, the team will go in and stir things up and then do air sampling to see if there are fibers detected in the air. That's going to help tremendously to let us know, what's been a success of the work that we've done to date.

Then the fourth area I want to talk about is the toxicity assessment and the studies that are supporting that. We have had underway a noncancer study of Libby asbestos that's been done through Region 8, and we've also had underway a method—developing a methodology that will allow us to use some of our existing work at Libby.

In addition, we want to make sure that we have all the studies that we need to support a baseline risk assessment and support the toxicity assessment. So in January of this year, we convened a meeting down in Research Triangle Park, at EPA's laboratory down there, and invited 30 scientists to come—these are scientists from the EPA, but also from folks like ATSDR and other government agencies. We also heard from Gayla Benefield and Dr. Henningsen as well so that they could speak to the scientists and give them their perspective and their knowledge—the benefit of their knowledge of what's going on here in Libby.

At that meeting, the group there identified a list of 12 studies that will support the development of a final toxicity number, a final risk assessment for Libby. That includes the ongoing noncancer assessment, the ongoing methodology work, as well as a cancer assessment that the Office of Research and Development has started. In addition we will do a number of animal studies and some other

in vitro studies which altogether will support each other—this whole suite of studies support each other—which then supports the development of a risk number for Libby.

Then the fifth area I wanted to talk about was additional work on our analytic methods here. We want to make sure that our analytic methods are accurately detecting the fibers here in Libby. We have a series of four studies. These were also recommended by the group of scientists that we had down at Research Triangle Park. So those four studies are underway as well.

Now, all this means is that we have this ongoing work, we expect to have those studies completed after—it will take 3 years to do all of those studies, which means that we wouldn't be developing a final—a Record of Decision for the Libby residential community until that work is done.

As I said earlier, we're looking at whether we think we can do a Record of Decision at the processing areas early if we've cut exposure off. But of course risk is both toxicity and exposure. All this work is happening in parallel, and in parallel with the ongoing removal action.

So I want to report that to you and let you know that we're listening, and I understand the magnitude and the scope of the issue here, and I want to assure you that, at EPA, we are committed to protecting your community from exposure to the amphibole, and that we're going to continue to work on it until we're done. Thank you.

STATEMENT OF SUSAN PARKER BODINE, ASSISTANT ADMINISTRATOR, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, U.S. ENVIRONMENTAL PROTECTION AGENCY

Good Afternoon. I am Susan Parker Bodine, Assistant Administrator of the Office of Solid Waste and Emergency Response, U.S Environmental Protection Agency (EPA). I am pleased to appear today to discuss the Superfund cleanup activities in Libby, Montana. The Libby Asbestos Site is one of the Agency's top Superfund priorities and we remain committed to working with our State, Federal and local governmental partners to take the steps necessary to protect human health and the environment in Libby.

BACKGROUND

For more than 60 years, a vermiculite mine owned originally by the Zonolite Corporation and purchased by W.R. Grace in 1963, was one of Libby's largest employers. The now-closed vermiculite mine once produced a large proportion of the world's vermiculite—with an estimated output of more than five million tons from 1963 to 1990. The processed vermiculite ore mined in Libby was used as a soil conditioner and in the manufacture of insulation, packaging and other materials.

Over the years it operated, the mine and related facilities employed a total of about 2,000 workers in Libby. The ore was milled and beneficiated (partly cleaned of impurities) on the mine property. After milling, the ore was transported to a screening plant where the ore was graded prior to shipment by railroad to other processing plants around the country. It also went to one of two processing plants that operated in Libby during different periods in the mine's history, prior to bagging for shipment.

The vermiculite ore contained amphibole asbestos. Exposure to asbestos resulting from operation of the mine and related processing facilities has led to serious public health impacts among members of the Libby community. Asbestos-related health effects include malignant mesothelioma, an incurable, fatal cancer of the chest cavity which is associated with asbestos exposure. Further, exposure to asbestos is associated with an increased risk of all lung cancers, particularly when combined with smoking. Exposure to asbestos can also cause asbestosis, a debilitating respiratory illness caused by progressive scarring of the lung tissue that can also be fatal, and pleural abnormalities.

SITE INVESTIGATIONS AND RESPONSE

In November of 1999, the EPA sent an Emergency Response Team to Libby to investigate asbestos contamination in the community. EPA's first priorities were to assess the risk to public health from asbestos contaminated vermiculite in Libby and then take action to reduce this risk.

In December of 1999, EPA began collecting samples—nearly 700—from air, soil, dust and insulation at residences and businesses. Indoor air sample results were released in January 2000, first to property owners and then to the general public. EPA determined that Libby amphibole asbestos was present at unacceptable levels in certain locations. EPA immediately began to inspect public schools for possible exposure to asbestos and to locate areas in and near Libby that were likely to have high levels of contamination. EPA took emergency removal actions at the Libby High School, the Libby Elementary School, and the Plummer Elementary School grounds. Removal actions were also taken at two former vermiculite processing facilities (the Export Plant and the Screening Plant).

Between 2000 and 2002, EPA addressed asbestos contamination at the vermiculite mine road and disposal areas. EPA also removed contaminated material from community ball fields and conducted sampling of area residences.

On May 9, 2002, EPA approved a Removal Action Memorandum Amendment for the Libby Asbestos Site, authorizing additional work at known locations and sources, including residential contamination in houses associated with vermiculite insulation. As of the end of 2006, removal activities have been completed at a total of 794 residential and commercial properties and more than 400,000 tons of contaminated soil and debris have been removed. EPA is also conducting cleanup activities in Troy, Montana. A removal action at Troy High School has been completed. Removal actions will continue, as needed, to address immediate risks before the final remedies are selected and carried out at Libby.

To determine the extent of contamination in Libby from amphibole asbestos, EPA established a program to inspect all properties. To date, EPA has screened more than 3500 properties in and around Libby for the presence of asbestos-containing materials. In addition, EPA, working with the Montana Department of Environmental Quality, expects to begin the site investigation in Troy by May 2007 to determine which properties are contaminated with Libby amphibole asbestos and to fully support the field activities needed for the Troy Area Property Evaluation (TAPE). EPA plans to conduct property assessments in 2007 and 2008, totaling 1000 properties. EPA also plans to collect additional remedial investigation data from the Export Plant as well as the former Stimson Lumber Mill.

NPL LISTING AND DEVELOPMENT OF LONG-TERM REMEDIES

The Governor of Montana requested that the Libby site be listed on the Superfund National Priorities List (NPL) pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), which authorized each state to designate one site for inclusion on the NPL. The Libby Asbestos Site (which includes Troy, Montana) was added to the NPL in October 2002, authorizing EPA to take action to provide long-term protection at Libby through remedial actions. To select final remedies that will provide long-term protection at the Libby site, EPA must complete a baseline risk assessment that includes exposure data and toxicity information.

To develop additional information about potential exposure to amphibole asbestos, EPA will continue (and expand) the Outdoor Ambient Air Sampling Program that began last October as well as initiate a series of Indoor and Outdoor Activity Based Sampling (ABS) Programs. The Activity Based Sampling Programs are designed to evaluate the effectiveness of EPA's current property clean up program, and will also provide crucial asbestos exposure data needed for a complete baseline risk assessment.

To develop additional information about the toxicity of amphibole asbestos, EPA has been working on a toxicological review of noncancer effects of amphibole asbestos and a reassessment of the Integrated Risk Information System (IRIS) asbestos cancer health assessment.[1] In addition, EPA has been working on an interim methodology to address cancer risk estimates for amphibole asbestos.

To ensure that EPA has all the information it needs to support a baseline risk assessment for Libby, in January 2007, EPA convened a group of more than 30 scientists from EPA, the Agency for Toxic Substances and Disease Registry (ATSDR)

[1] IRIS is a database of human health effects that may result from exposure to various substances found in the environment. IRIS was initially developed by EPA staff to provide consistent information on chemical substances.

and the National Toxicology Program to identify data gaps and recommend additional studies. The meeting was hosted by EPA's National Health and Environmental Effects Research Laboratory in Research Triangle Park, North Carolina. The scientists also considered information from the Libby Technical Assistance Group.

Based on the recommendations developed from the January 2007 meeting, the Agency has identified and is implementing a comprehensive program of 12 studies to support the development of the Libby toxicity assessment and four studies that support important Libby exposure assessment analytical needs. (The list of studies is attached to this written testimony.) Detailed work plans are currently being developed, including consultation with other agencies (e.g., the ATSDR, National Institute for Occupational Safety and Health, and the National Toxicology Program) and external peer reviews. These studies are expected to take 3 years to complete. In the meantime, clean up work at the site will continue.

A definitive schedule for Records of Decision (RODs) at Libby is largely dependent on progress made on the exposure assessment and toxicity assessment work. However, we anticipate that at some of the former processing areas, if exposure pathways have been completely addressed, RODs may be completed in a shorter timeframe. EPA's tentative schedule will address seven site areas (operable units) between 2009 and 2011.

DECEMBER 2006 INSPECTOR GENERAL REPORT

In December of 2006, the EPA Office of Inspector General (IG) issued a report entitled, "EPA Needs to Plan and Complete a Toxicity Assessment for the Libby Asbestos Cleanup." The IG report focused on EPA's risk and toxicity assessment efforts associated with the removal of Libby amphibole contamination and on two public fact sheets that discussed residential exposure issues. In response to that report, EPA reaffirmed its intent to carry out all the studies needed to develop a long-term cleanup remedy for Libby. That work commenced with the January 2007 meeting at EPA's National Health and Environmental Effects Research Laboratory, which identified and recommended studies.

In response to the IG report, EPA also agreed to immediately review and revise materials provided to Libby residents regarding the safety of living with or handling asbestos. EPA had already discontinued use of the fact sheets dealing with what to do if you encounter vermiculite, including the fact sheet, "Living with Vermiculite." EPA has circulated informational materials for public comment. In addition, in early March 2007, EPA initiated a mass mailing of letters to property owners in Libby updating them on the current cleanup schedule and explaining how cleanup criteria are related to the final baseline risk assessment. A town meeting was held on March 7, 2007 (in addition to the regular TAG/CAG meetings) to discuss the work needed to develop a baseline risk assessment and how EPA plans to incorporate that work into the cleanups and assessments currently being conducted in Libby and Troy.

INVOLVEMENT OF W.R. GRACE

W.R. Grace, an owner and operator of the vermiculite mine and facilities, filed for Chapter 11 bankruptcy protection in April 2001. In late 2005, the Ninth Circuit affirmed the District Court's ruling that EPA was entitled to approximately $55 million in clean-up costs. EPA has incurred more than $100 million in response costs since the District Court's ruling. The United States continues to pursue reimbursement for Superfund program activities through cost recovery actions in the Federal Courts.

CONCLUSION

EPA remains committed to protecting public health and the environment by reducing exposure to amphibole asbestos in Libby and Troy, Montana. EPA will continue to work closely with our Federal, State, and local partners as cleanup efforts progress. The cleanup activities in Libby, Montana, have always been an Agency priority and will remain one of the Superfund program's top priorities in the years ahead.

LIBBY SUPERFUND SITE STUDIES

LIST OF TOXICITY ASSESSMENT STUDIES

EPA Region 8 Libby Amphibole Reference Concentration Development
NCEA Libby Amphibole Cancer Assessment

EPA Region 8/USGS Preparation of Libby Testing Material
EPA Region 8 Fiber Size Distribution in Libby Vermiculite
NHEERL Dosimetry Model Development. Simulation Studies
NHEERL In Vitro Dissolution Assays
NHEERL In Vitro Toxicity Endpoints
NHEERL Comparative Toxicology in Mice and Rats
NHEERL Inhalation Toxicology in Rats
EPA Region 8/NCEA New Epidemiologic Information from Libby Montana Cohort
EPA Region 8/NCEA New Epidemiologic Information from Libby Montana Cohort
NCEA New Epidemiologic Information from Other Cohorts
OSWER Interim Cancer Risk Methodology

LIST OF ANALYTICAL METHODS STUDIES

EPA Region 8 Filter Verification Studies
EPA Region 8 Low-Level Soil Method Development
EPA Region 8 Comparison Direct & Indirect Preparations
EPA Region 8 Ambient Air Collection Method Verification

ACRONYMS

NCEA—EPA National Center for Environmental Assessment
NHEERL—EPA National Health and Environmental Effects Research Laboratory
OSWER—Office of Solid Waste and Emergency Response

RESPONSES FROM SUSAN PARKER BODINE TO ADDITIONAL QUESTIONS FROM SENATOR BAUCUS

Question 1. Medical care for people that live in Libby is a top priority. People have died in Libby as a result of exposure to asbestos, and people continue to suffer serious adverse health effects from past exposure. Moreover, the threat of continued illness is ever present, since EPA acknowledges that "[t]he Libby Asbestos Superfund site is considered Human Exposure Not Under Control because people can be expected to come into contact with" asbestos.

Superfund requires the Federal Government to "in cases of public health emergencies caused or believed to be caused by exposure to toxic substances, provide medical care and testing to exposed individuals, including but not limited to tissue sampling, chromosomal testing where appropriate . . . or any other assistance appropriate under the circumstances [and that] exposed persons shall be eligible for admission to hospitals and other facilities and services operated or provided by the Public Health Service" (emphasis added).

News reports indicate that EPA was moving to declare a public health emergency in 2001, but that concerns raised by the Office of Management and Budget and W.R. Grace derailed the declaration. This raises grave concerns because of the Federal Government's commitment to care for innocent people who are suffering from exposure to asbestos.

Please provide all EPA records, including any memoranda, letters, email, meeting notes, telephone logs or other EPA records related to any EPA consideration of declaring a public health emergency at Libby, including but not limited to records that describe or relate to:

1. Any involvement of the Office of Management and Budget in the process of considering whether to declare a public health emergency in Libby,
2. Any involvement of any other Federal Agency in the process of considering whether to declare a public health emergency in Libby,
3. Any involvement of W.R. Grace, including any entity with any financial, corporate, or other business relationship to W.R. Grace, in the process of considering whether to declare a public health emergency in Libby, and
4. Any involvement of any law firm in the process of considering whether to declare a public health emergency in Libby.

Response. Because of the potentially large number of documents responsive to this request and the need to search multiple U.S. Environmental Protection Agency (EPA) offices, EPA is unable to respond to this document request at this time. We expect to provide a further response concerning this request for documents by August 31, 2007. However, the attached letter from Julie Gerberding, Administrator for the Agency of Toxic Substances and Disease Registry, is relevant to your request.

Question 2. List and describe all instances where EPA has declared a public health emergency related to the release of a hazardous substance. Please provide all EPA records, including any memoranda, letters, email, meeting notes, telephone logs or other EPA records related to any EPA decision to declare a public health emergency.

Response. Section 104(a)(3) limits EPA's response authority for a release or threat of a release. There is an exception to the limitation related to public health emergencies. There are two provisions in CERCLA concerning public health emergencies:

1. Section 104(a)(4) authorizes EPA to respond to, among other things, releases from products which are part of the structure of, and result in exposure within, residential buildings or business or community structures—if EPA determines that a release or threatened release constitutes a public health or environmental emergency and no other person with the authority and capability to respond to the emergency will do so in a timely manner; and

2. Section 104(i) outlines the Agency for Toxic Substances and Disease Registry's (ATSDR) health related authorities under CERCLA. Section 104(i)(1)(D) outlines ATSDR's medical care and testing authorities under CERCLA in cases of a public health emergency.

EPA has never made a determination that a public health or environmental emergency exists to invoke CERCLA's exception to the limits on response under Section 104(a)(3).

Question 3. Please describe the process and criteria that EPA uses to determine whether to declare a public health emergency. Please include any draft, interim or final records that EPA may rely on to:

1. Undertake the process of determining whether to declare a public health emergency, and

2. Declare a public health emergency.

Response. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) provides the process that EPA uses for implementing CERCLA. Section 300.400(b) of the NCP implements CERCLA 104 (a)(4) which authorizes EPA to respond to releases from, among other things, products which are part of the structures of, and result in exposure within, residential building or community structures—if EPA determines that the release constitutes a public health or environmental emergency and no other person with the authority and capability to respond to the emergency will do so in a timely manner. Response actions are selected under CERCLA section 104(a) and (c).

Please note that under Executive Order 12580, the authority under section 104(b) to investigate and gather information to determine whether illness, disease, or complaints thereof may be attributable to a release of a hazardous substance, pollutant or contaminant is delegated to the Secretary of Health and Human Services (HHS), not EPA. EPA consults closely with HHS and in particular the Agency for Toxic Substances and Disease Registry (ATSDR) on health related issues under CERCLA. There are provisions for health assessments and public health threat evaluations by ATSDR in the NCP (e.g., Section 300.410 "Removal Site Evaluation") and references to the role of HHS in addressing public health emergencies during response operations (Section 300.135(h)). In addition, NCP Section 300.175(b)(8)(i) includes a provision that describes ATSDR's role in preparedness planning and response.

Question 4. A 2003 report by ATSDR recommended the need for "toxicological investigations of the risks associated with low-level exposure to asbestos, especially Libby asbestos." According to the 2006 Inspector General report, EPA scientists requested the toxicity study, but EPA's budget office did not approve their request.

Please provide all EPA records, including any memoranda, letters, email, meeting notes, telephone logs or other EPA records related to any EPA consideration of conducting toxicological studies of Libby asbestos, including but not limited to records that describe or relate to:

1. Any involvement of the Office of Management and Budget in the process of considering whether to conduct toxicological studies of Libby asbestos,

2. Any involvement of any other Federal Agency in the process of considering whether to conduct toxicological studies.

3. Any involvement of W.R. Grace, including any entity with any financial, corporate, or other business relationship to W.R. Grace, in the process of considering whether to conduct toxicological studies,

4. Any involvement of any law firm in the process of considering whether to conduct toxicological studies.

Response. Because of the potentially large number of documents responsive to this request and the need to search multiple U.S. Environmental Protection Agency (EPA) offices, EPA is unable to respond to this document request at this time. We

expect to provide a further response concerning this request for documents by August 31, 2007.

Question 5. In a letter dated December 8, 2006, EPA stated it would begin toxicological studies of Libby asbestos. Please provide me with EPA's operating plan and budget for the toxicity studies in FY2007 as the funding needs and timeline for fully completing all toxicity studies.

Response. To ensure that EPA has all the information it needs to support a baseline risk assessment for Libby, in January 2007, EPA convened a group of more than 30 scientists from EPA, the Agency for Toxic Substances and Disease Registry (ATSDR) and the National Toxicology Program to identify data gaps and recommend additional studies. The meeting was hosted by EPA's ORD National Health and Environmental Effects Research Laboratory (NHEERL) in Research Triangle Park, North Carolina. The scientists also considered information from the Libby Technical Assistance Group.

Based on the recommendations developed from the January 2007 meeting, the EPA has identified and is implementing a comprehensive program of 12 studies to support the Libby risk assessment. The description of these studies and a timeline for funding are attached. Detailed work plans are currently being developed and will include consultation with other agencies (e.g., the ATSDR, National Institute for Occupational Safety and Health (NIOSH), and the National Toxicology Program (NTP) and external peer reviews.

The studies are anticipated to be completed by September 30, 2009; however, this date is tentative pending the completion of the detailed work plans. Results from the studies will be used to complete the baseline risk assessment, including the comprehensive toxicity assessment, by September 30, 2010.

The Office of Solid Waste and Emergency Response approved a budget of $2,649,250 in fiscal year 2007 for the Libby Action Plan. With recent adjustments due to detailed plans of several analytical studies, the actual fiscal year budget is $2,581,750 as of May 31, 2007. Additional funding is anticipated in fiscal years 2008 and 2009.

Enclosure 3 provides the status and anticipated funding needs for the various studies. EPA intends to provide monthly updates to this information, as requested by Senator Baucus during the field hearing.

Enclosure 3

Status of Toxicity Assessment and Analytical Methods Support Studies for Libby Amphibole
May 2007

Toxicity Assessment Studies

EPA Region 8 Libby Amphibole Reference Concentration (RfC) Development—EPA is reviewing existing human and animal studies on the Libby amphibole for noncancer health effects. EPA has contacted two researchers to access new data (not yet published) for review and possible inclusion in RfC development.

NCEA Libby Amphibole Cancer Assessment—EPA is reviewing existing human and animal data regarding cancer effects of Libby amphibole. NIOSH has recently updated their epidemiologic cohort of the workers in Libby, Montana. EPA has contacted the NIOSH researchers and is pursuing a collaborative effort such that the most up-to-date mortality data can be used in the cancer assessment.

EPA Region8/USGS Preparation of Libby Testing Material—USGS will begin collection activities for the Libby amphibole material. It is anticipated that the collection will take two field trips to gather the material properly and then three months to prepare and characterize for use in the animal toxicity and analytical methods studies.

EPA Region 8 Characterization of Fiber Size Distribution in Libby Vermiculite—Plans are being developed to begin this study in this fiscal year.

NHEERL Dosimetry Model Development and Simulation Studies—The detailed project plan has been prepared and is currently in review by external peer reviewers.

NHEERL In vitro Dissolution Assays—The detailed project plan has been prepared and is currently in review by external peer reviewers.

NHEERL In Vitro Toxicity Endpoint—The detailed project plan has been prepared and is currently in review by external peer reviewers.

NHEERL Comparative Toxicology in Mice and Rats—The detailed project plan has been prepared and is currently in review by external peer reviewers.

NHEERL Inhalation Toxicology in Rats—The detailed project plan has been prepared and is currently in review by external peer reviewers.

EPA Region 8/NCEA New Epidemiologic Information from Libby Montana Cohort—Detailed project plans are under development. EPA is currently identifying existing data and ongoing studies from Libby Montana. EPA is working with ATSDR and NIOSH for additional collaboration in this endeavor.

NCEA/EPA Region 8 New Epidemiologic Information from Other Cohorts—Detailed project plans are under development. EPA is currently identifying possible study populations as well as identifying existing data and ongoing studies from other locations that received Libby materials. EPA is working with ATSDR and NIOSH for additional collaboration in this endeavor.

OSWER Interim Risk Methodology for Quantification of Cancer Risk from Inhalation—The Science Advisory Board is establishing an asbestos panel to provide technical advice on the proposed methodology to estimate potential cancer risk from inhalation exposure. On April 19, the Science Advisory Board posted on their website (http://www.epa.gov/sab/panels/asbestos_expert_panel.htm) an invitation for public comment on a "short list" of candidates for the asbestos panel, which will provide technical advice to the Agency on this draft methodology. The comment period closes on May 24, 2007. The panel is tentatively expected to meet in September 2007.

Analytical Methods Studies

EPA Region 8 Filter Verification Studies
The detailed project plan is under development and is currently in review by internal reviewers.

EPA Region 8 Low-Level Soil Method Development
Plans are being developed to begin this study in fiscal year 2008.

EPA Region 8 Comparison Direct & Indirect Preparations
Plans are being developed to begin this study in fiscal year 2008.

EPA Region 8 Ambient Air Collection Method Verification
Plans are being developed to begin this study in fiscal year 2008.

Acronyms
ATSDR- Agency for Toxic Substances and Disease Registry
NCEA – EPA National Center for Environmental Assessment
NHEERL – EPA National Health and Environmental Effects Research Laboratory
NIOSH- National Institute for Occupational Safety and Health
OSWER – EPA Office of Solid Waste and Emergency Response
USGS – US Geological Survey

	2007 Dollars	2008 Dollars	2009 Dollars	Total Dollars
TOXICITY ASSESSMENT SUPPORT STUDIES				
a. Region 8 Libby Amphibole RfC Development	25,000	-	75,000	100,000
b. NCEA Libby Amphibole Cancer Assessment	180,000	180,000	-	360,000
c. USGS Preparation of Libby Testing Material	150,000	150,000	-	300,000
d. Region 8 Fiber Size Distribution in Libby Vermiculite	90,000	-	-	90,000
e. NHEERL Dosimetry Model Development. Simulation Studies	135,000	75,000	-	210,000
f. NHEERL In Vitro Dissolution Assays	137,000	137,000	-	274,000
g. NHEERL In Vitro Toxicity Endpoints	247,500	247,500	-	495,000
h. NHEERL Comparative Toxicology in Mice and Rats	382,250	382,250	200,000	964,500
i. NHEERL Inhalation Toxicology in Rats	-	1,112,000	-	1,112,000
j. Region 8/NCEA New Epidemiologic Information from Libby Montana Cohort	335,000	180,000	180,000	695,000
k. NCEA New Epidemiologic Information from Other Cohorts	250,000	250,000	-	500,000
l. OSWER Interim Cancer Risk Methodology	-	-	-	-
TOTAL	**1,931,750**	**2,713,750**	**455,000**	**5,100,500**
ANALYTICAL METHODS STUDIES				
m. Region 8 Filter Verification Studies	650,000	-	-	650,000
n. Region 8 Low-Level Soil Method Development	-	230,000	-	230,000
o. Region 8 Comparison Direct & Indirect Preparations	-	350,000	-	350,000
p. Region 8 Ambient Air Collection Method Verification	-	450,000	-	450,000
TOTAL	**650,000**	**1,030,000**	**-**	**1,680,000**
May 31, 2007 **GRAND TOTAL**	**2,581,750**	**3,743,750**	**455,000**	**6,780,500**

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta, GA 30333

JUN 20 2003

Mr. Clinton Maynard
Libby Community Advisory Group
1116 Louisiana Avenue
Libby, Montana 59923

Dear Mr. Maynard:

Secretary Thompson has asked me to thank you for your letter and to respond directly to you regarding community health concerns associated with exposure to asbestos in Libby, Montana.

I understand the seriousness of your concerns. Libby continues to be one of the most important environmental public health sites in our nation. During the past 3-1/2 years, public health, healthcare, and mental health agencies of the Department of Health and Human Services (HHS) have worked closely with the community, the Environmental Protection Agency (EPA), and state and local agencies to halt exposure to vermiculite contaminated with tremolite asbestos and to build health capacity at the local level.

The Agency for Toxic Substances and Disease Registry (ATSDR) has also worked proactively with the Health Resources and Services Administration (HRSA) to support community initiatives intended to improve access to healthcare services in Libby. Through a HRSA grant, a federally landed health clinic has been established in Libby. In addition, Lincoln County was recently awarded funds through a HRSA Rural Health Outreach Grant to identify and resolve remaining health issues in Libby. Though these initiatives, HHS has demonstrated its ongoing and long-term commitment to improving the health of Libby residents.

In your letter, you state that the government's response measures thus far are insufficient and request that HHS declare a "Public Health Emergency" as referenced in sections 104(i)(1)(D) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 U.S.C. 9604(i)(1)(D) and (E). These sections of CERCLA were originally enacted to provide immediate healthcare assistance in the event of an emergency situation to supplement local emergency healthcare services which might be unable to meet critical short-term healthcare needs. U.S. Public Health Service hospitals referenced in section 104(i)(1)(E) of CERCLA, which were originally intended to provide such care in the case of an emergency, were decommissioned in the mid-1980s. HHS lacks the resources or the statutory authority to provide long-term healthcare services under CERCLA or any other existing federal legislation. However, EMS agencies, particularly ATSDR, have been able to provide appropriate public health services in Libby and at other Superfund sites nationally. EMS agencies will continue to provide critical public health support to the Libby community. A "Public Health Emergency" declaration under CERCLA will not change the agency's planned activities, nor will it make additional funds available to ATSDR or HHS under existing appropriations. Therefore, no such declaration is being made at this time.

During the past 3 years, considerable progress has been made towards halting exposure to tremolite asbestos and improving the health of Libby residents. HHS agencies will continue to use appropriate public health resources and work closely with all of the community groups and state, federal, and local agencies that are involved. I remain confident that such collaboration will facilitate sustainable, long-term public health improvements in Libby.

Please feel free to contact the HHS Region VIII Office in Denver, Colorado, at (303) 844-6163 if you, members of the Libby Community Advisory Group, or other residents have any questions regarding HHS' public health activities or responsibilities in Libby. Questions about ATSDR's activities and responsibilities can also be directed to Mr. Dan Strausbaugh, ATSDR Regional Representative assigned to Libby, at (406) 457-5007. Once again, thank you for your interest in this important public health matter.

Sincerely,

Julie Louise Gerberding, M.D., M.P.H.
Administrator

cc:
U.S. Congressional Delegation, State of Montana
Governor Judy Martz, State of Montana

LIBBY ASBESTOS SITE RESIDENTIAL/COMMERCIAL CLEANUP ACTION LEVEL AND CLEARANCE CRITERIA

TECHNICAL MEMORANDUM

DRAFT FINAL - December 15, 2003

Prepared by:
U.S. Environmental Protection Agency, Region 8
999 18th Street, Suite 500
Denver, CO 80202

With Technical Assistance From:
Syracuse Research Corporation
999 18th Street, Suite 1975
Denver, CO 80202

LIBBY ASBESTOS SITE RESIDENTIAL/COMMERCIAL CLEANUP ACTION LEVEL AND CLEARANCE CRITERIA TECHNICAL MEMORANDUM

I. INTRODUCTION

In 2002, the U.S. Environmental Protection Agency Region 8 (EPA) began systematic investigation and emergency response cleanup of residential and commercial properties in Libby, Montana. The Action Memorandum Amendment dated May 8, 2002 ("the Action Memo") set forth general requirements and reasons for the emergency response cleanup (EPA 2002).

This document provides specific information about "action levels" that will be used for determining which properties or situations require an emergency response cleanup. It also provides specific information regarding "clearance criteria" that will be used to determine when such a cleanup is complete. The Appendix presents screening-level risk calculations that EPA has developed to help characterize the relationship between asbestos levels in site media and the resultant levels of health risk to residents. Although these relationships are uncertain and difficult to quantify, the calculations provide a frame of reference that helps guide decision-making at the site.

In this memorandum, the term "cleanup" is used generally to imply some type of response action and does not necessarily imply removal of contaminated material. In some instances, EPA's response action will be isolation or encapsulation of contaminated material. In some cases, where contaminated material is difficult to access or well-contained, and exposure is likely to occur very infrequently or not at all, the material may be managed in place. Details of EPA's cleanup approach can be found in the Response Action Work Plan (CDM 2003a).

II. REGULATORY PROCESS CONSIDERATIONS

EPA is currently conducting emergency response removal actions in Libby. This document sets forth action levels and clearance criteria that are applicable to these emergency response actions only. While the emergency response continues, EPA is also conducting a Remedial Investigation/Feasibility Study (RI/FS). The RI/FS will conclude with the development of a proposed plan, extensive opportunities for public comment, and publication of Record of Decision (ROD) that will set forth final action levels and cleanup decisions for Remedial Actions at Libby. Until a ROD is published, it is expected that this memorandum will guide decision-making for emergency response cleanup actions at residential and commercial properties in

Libby.

The RI/FS for Libby residential and commercial properties began in 2002. The first phase of the RI was called the Contaminant Screening Study (CSS). The CSS was a screening step intended to collect readily available information (through inspections, verbal interviews, and soil sampling) to be used in decision-making for each property. The objective was to classify properties as either (1) requiring emergency response cleanup, (2) requiring more investigation before a decision can be made, or (3) likely requiring no further action. The criteria in this memorandum, along with other information, are being used to interpret the results of the CSS and in planning for additional sampling and cleanup. Preliminary results of the CSS (soil sample results are not yet available) are found in the CSS Draft Final Technical Memorandum (CDM 2003b). The Technical Memorandum will be updated and expanded when soil sample results are available. As of this writing, more than 1200 properties have been identified that likely require cleanup. The RI/FS is expected to be complete in approximately 2005 at which time the total number of properties requiring cleanup will be known.

Again, final site-specific cleanup standards will be established upon completion of the RI/FS and publication of a ROD. Similarly, the site-specific decision-making approach, action levels, and clearance criteria set forth here may be changed upon receipt of new information. This has two important implications. First, some properties will not meet *any* of the criteria for emergency response, but may meet lower or different criteria that are established in the future. In such an instance, these properties would be addressed later. Second, it is possible that properties that are earmarked for cleanup based upon the criteria set forth here may not require cleanup if different criteria are established in the future.

III. SAMPLING APPROACH

Throughout this memorandum, there are general references to sampling and analysis methods. A detailed discussion of the many sampling approaches, analysis methods, counting methods, sample preparation methods, and quality assurance steps is beyond the scope of this document.

- Details of EPA's dust sampling and analysis protocol for various situations can be found in the Indoor Dust Sampling and Analysis Plan (EPA 2003).
- Details of EPA's air sampling and analysis protocol for various situations can be found in the Response Action Work Plan (CDM 2003a).
- Detail s of EPA's soil sampling strategy for various situations can be found in the
    - CSS Sampling and Analysis Plan (SAP) (CDM 2002)
    - CSS SAP Revision I (CDM 2003b)
    - Remedial Investigation SAP (CDM 2003c)
    - Response Action Work Plan (CDM 2003a)

It is also important to note that EPA's sampling and cleanup program is based solely upon the presence of "Libby asbestos." Libby asbestos (LA) is a form of amphibole asbestos unique to the Libby vermiculite deposit and is fundamentally different from more commonly found chrysotile asbestos. Chrysotile asbestos was used in commercial products for decades and is found throughout the environment of the U.S. and the world. EPA will not base cleanup decisions or take action based upon the presence of chrysotile asbestos not associated with the Libby mine, except where necessary to protect worker safety or where it may present an imminent and substantial endangerment.

IV. CLEANUP APPROACH AND DECISIONS REQUIRED FOR EACH PROPERTY

To date, much of EPA's investigation and cleanup approach has been geared toward finding and addressing *sources* of LA. The major sources in the area, such as the mine, the screening and export plants, and large vermiculite piles, have already been isolated or cleaned up. Remaining sources at residential/commercial properties generally include (but aren't necessarily limited to) vermiculite insulation or soils with elevated levels of LA. Sources, through a variety of mechanisms, can serve to contaminate indoor dust and have the potential to release significant amounts of LA when disturbed. Source removal or isolation ensures that loading to indoor dust (one of the most significant exposure pathways over a lifetime) is minimized immediately. With respect to this, each property in Libby generally requires three independent decisions regarding cleanup:

- Cleanup of the attic or interior walls (ATTICS/WALLS)
- Cleanup of indoor living space (INTERIORS)
- Cleanup of outdoor soils (SOILS)

Contamination in one area or bulk source does not automatically imply contamination in another. For instance, a particular property may require cleanup of an attic but not the interior or outdoor soils. Some properties may require cleanup in the attic, interior, and soils. Any combination is possible depending upon the unique conditions of each property.

EPA's cleanup approach considers not only the presence of source materials and the concentration of LA within them, but also the likelihood that these source materials may be disturbed. Based upon this approach, some source materials that are less likely to be disturbed may be left in place (such as in walls, below hard surfaces, and at depth). In some situations, EPA may remove or further isolate such materials to prevent even infrequent exposures, depending on the situation.

For those properties requiring emergency response cleanup, EPA is adopting cleanup procedures and criteria that will that help ensure we conduct only one cleanup action at individual

properties, even if action levels are lowered or changed in the future. It is obviously inconvenient, impractical, and costly to clean a property twice. This approach is cost effective and protective.

V. ACTION LEVELS

Any one of the following conditions will generally trigger emergency response cleanup for that portion of the property.

ATTICS/WALLS

- Visual confirmation of open, non-contained, or migrating vermiculite insulation

INTERIORS

- Visual confirmation of vermiculite in the indoor living space
- Concentration of LA in an indoor dust sample greater than 5,000 Libby asbestos (LA) structures per square centimeter (s/cm2) using AHERA counting methods. This will be referred to as 5,000 AHERA s/cm2.

Each level, or floor, of a building is evaluated and sampled separately. At least two samples are collected from each floor. Libby sampling data has shown that in many cases, only one floor is highly impacted (e.g. material tracked in from outside on the ground floor). This sampling and cleanup approach allows us to focus cleanup resources on the portion of the interior where the greatest problem exists.

SOILS

- Visual confirmation of vermiculite or other vermiculite mine related materials in "specific use areas." A specific use area is defined as a garden, former garden, planter, or other defined area of a yard likely to receive significant use and generally not covered with grass.
- Concentration of LA in specific use areas or other yard soils by any analytical method greater than or equal to 1% Libby asbestos.

VI. ACTION LEVEL RATIONALE AND DISCUSSION

ATTICS/WALLS

Based upon available information, EPA has determined that vermiculite insulation found in Libby is a potential source for current and ongoing exposures to LA. Past sampling by EPA in Libby has clearly shown that while LA concentrations in bulk vermiculite insulation may vary considerably (presumably even within the same home), all or most vermiculite insulation has the ability to release LA when disturbed and that disturbance can lead to excessive risk (EPA 2001). Given the collective magnitude of exposures in Libby, EPA has determined that visual confirmation of open, non-contained, or migrating vermiculite insulation is sufficient justification for emergency response cleanup. Cleanup is not contingent upon other factors or information such as the concentration of LA in bulk insulation, volume of insulation, condition of the building, or LA dust levels in the building, but such factors may be considered when determining how quickly EPA responds and how extensive the cleanup will be.

INTERIORS

Exposure to contaminated indoor dust, even dust with a relatively low level of LA, is an important exposure pathway. This is because people spend most of their lives in their homes and exposure occurs continually. However, indoor dust is a *secondary* medium - it can only become contaminated through disturbance of some other source of LA. Such sources may include , but are not limited to, vermiculite insulation, on-property soils, off-property soils, or past vermiculite processing operations. Again, the most important step to break this pathway is to address the sources that are contaminating indoor dust or have the potential to contaminate indoor dust in the future. In Libby, EPA is not relying upon measured dust levels to decide if residential/commercial sources must be addressed. Our approach is to find and address sources with the potential to contaminate indoor dust regardless of current indoor dust levels. In this regard, indoor dust action levels should not be considered triggers for overall cleanup, but only a trigger for aggressive interior cleaning by EPA. This approach ensures that situations that may present a short-term exposure hazard are addressed as quickly as possible.

EPA has established two key "action levels" relating to interior cleanup: presence of visible vermiculite in the indoor living space and indoor dust samples that contain greater than 5,000 AHERA s/cm2. During the CSS, EPA is visually inspecting interiors for the presence of visible vermiculite, such as insulation that has migrated into the living space from the attic or walls. If vermiculite is observed on a particular level, even in small amounts, cleanup of that entire level is triggered and no dust samples are collected on that level. If vermiculite is not observed on a particular level of a building, dust samples are collected on that level to determine if cleanup is necessary.

Visible Vermiculite

Using visual observation of uncontrolled vermiculite material as a trigger for an emergency cleanup action is conservative, protective, and cost effective. This approach ensures that primary source materials are removed, as well as any associated contamination. It addresses resident concerns regarding vermiculite in the living space. This approach also reduces the costs associated with routine sampling and analysis of interiors.

Indoor Dust Samples

Dust samples will be collected for those structures or levels of structures not containing visible vermiculite to determine if cleanup of those structures or levels is necessary. Unfortunately, establishing action levels based upon indoor dust levels is not straightforward. There are two primary reasons for this:

- Unlike air samples, there are no established regulatory or health-based standards to guide the determinations of acceptable concentrations of asbestos in indoor dust.

- The relationship between the concentration of asbestos in dust and the resultant concentration in air (the medium that actually determines human exposure and risk) is highly variable. This is because the relationship depends on a long list of different factors, most important of which is the nature and frequency of dust disturbance. This means that it is difficult to calculate a value in dust that corresponds to an acceptable level in air, and it is even harder to try to select a level in dust based on site-specific measurements. This difficulty is discussed more in the Appendix.

Given these difficulties, EPA has developed an interim site-specific action level of 5,000 AHERA s/cm2 for interior cleaning. In choosing this value, EPA considered several factors:

- Screening level risk estimates for exposure to indoor dust presented in the Appendix indicate that if a resident were exposed to 5,000 AHERA s/cm2 in dust throughout the home for 70 years, the risk of cancer would likely be in the range of 1 in 100 to 1 in 1,000, much higher than the level of 1 in 10,000 level that EPA usually considers to be the limit of acceptable risk. Although these calculations are screening-level and uncertain (see the discussion in the Appendix), and even though it is expected that the levels in dust will decline after source removal is complete, it is still clear that dust levels this high constitute a potential risk that warrants aggressive interior cleaning to ensure protectiveness and to stop even short-term exposures.

- Aggressive interior cleaning by EPA is costly and cleaning the interiors of all houses in Libby would be very expensive and significantly extend the cleanup duration. Therefore, a reasonable cutoff must be established below which such time-consuming and costly

cleanup can be omitted, so that available resources can be directed to source removal and the situations presenting the most risk. This does not mean that dust cleanup at levels below 5,000 AHERA s/cm2 is not appropriate, but only that less aggressive methods may need to be used. Providing each resident with a HEPA vacuum and encouraging frequent vacuuming and wet-wiping surfaces will be most effective. This will accelerate the process of decreasing dust loading levels and will achieve similar success to that of an EPA cleanup at a fraction of the cost and effort.

- Concentrations of 5,000 AHERA s/cm2 in dust appear to be on the lower end of the background levels of asbestos contaminated dusts observed in residences in other communities (see Appendix). While the types of asbestos fibers found in indoor dust in other communities is generally different from LA, this information provides some context regarding the dust concentrations of asbestos that people are being routinely exposed to in their homes and businesses in other areas. The health risks or consequences stemming solely from these routine dust-related asbestos exposures is unknown.

- Dust levels of 5,000 AHERA structures/cm2 can be readily detected using efficient sampling techniques. The sensitivity of the analytical methods EPA is using to quantify asbestos in dust vary based on several factors, but are typically on the order of 1,000 AHERA s/cm2. Detection of asbestos concentrations below this level in dust require more extensive analysis and are much more costly to achieve.

SOILS

EPA has established two key "action levels" relating to outdoor soil cleanup: presence of visible vermiculite or other vermiculite mine-related material in specific use areas and soil samples containing greater than or equal to 1% LA.

Visible Vermiculite

During the conduct of the CSS in 2002, EPA visually inspected many properties for vermiculite or vermiculite mine related materials (generally referred to just as vermiculite) in soils. If vermiculite was observed in a particular area (e.g. front yard, side yard, garden, etc), no soil sample was collected in that area. If vermiculite was not observed, a soil sample was collected from that area. Past observations showed that when visible vermiculite was noted, samples confirmed the presence of Libby asbestos approximately 70% of the time using polarized light microscopy (PLM) (CDM 2002). If more sensitive methods were used, this number may have been higher. Thus, the presence of visible vermiculite was considered a reasonably good indicator for the presence of LA and material that could serve as a potential source of LA to air or dust. Using visible vermiculite as a trigger for cleanup, rather than sampling every area that contained visible vermiculite, had the benefits of being conservative, protective, and simple.

This same general approach of using visual observations as a trigger for cleanup was also employed during the remediation of other large source areas in Libby, such as the screening plant, export plant, and flyway property. It will also be used for the remediation of the rail yard in Libby by Burlington Northern Santa Fe (BNSF Workplan 2002).

While conducting the CSS in 2002, EPA discovered three key points regarding visible vermiculite in soils:

- The number of properties with visible vermiculite in soils was far greater than originally anticipated.
- While there were exceptions to the trend, the amount of visible vermiculite varied considerably from a few flakes over a generally wide area to very concentrated amounts in small areas. The CSS, as originally planned, had no systematic way to account for this or differentiate it other than sampler observations.
- There were several instances where vermiculite was observed in areas that were difficult to access and where exposure was likely to occur infrequently, if at all. There are likely many more of these situations that were not discovered during the CSS that will become apparent through subsequent, more detailed investigations or during cleanup.

Because of these factors, EPA reevaluated the proposed initial approach to visible vermiculite in soils described in the CSS SAP (CDM 2002). Rather than assuming that all occurrences of visible vermiculite would result in cleanup, EPA decided to limit the emergency response cleanup of visible vermiculite to specific use areas that pose the most substantial opportunities for disturbance. There are several reasons for this:

- Vermiculite was generally used as a soil amendment in specific locations such as gardens.
- Specific use areas are more likely to lack ground cover, such as grass, that would minimize creation of dust.
- Specific use areas are likely to be actively and frequently disturbed through activities such as gardening.
- Specific use areas are generally small and can be cleaned up quickly at low cost. A large scale sampling program may not be justified for these situations, considering that for many of these situations (CSS SAP, CDM 2002) sampling will confirm the presence of LA. Cleaning up entire yards, large portions of yards, or areas that are infrequently accessed or disturbed is a much larger and expensive task and additional sampling is clearly warranted.

Soil Samples

Similar to indoor dust concentrations, establishing action levels based upon soil contamination levels is not straightforward. There are two primary reasons for this:

- Unlike air samples, there are no established regulatory or health-based standards to guide the determination of acceptable concentrations of asbestos in soil.

- It is extremely difficult to predict airborne asbestos exposures (which is the exposure of concern for health and regulatory standards) based upon the asbestos concentrations in outdoor soil samples. A variety of factors can influence the extent of airborne exposures associated with asbestos fibers in soil, the most important of which appears to be disturbance of contaminated soil by human activity. Other factors which may affect the suspension of asbestos fibers into the air, and thus airborne asbestos exposures, include the environmental conditions, moisture content of the soil, concentration of asbestos in the soil, the type of the soil, and the characteristics of the asbestos present.

Thus, development of the site-specific information necessary to accurately predict the risk between concentrations of asbestos in soil and airborne exposures and secondary contamination of indoor dust, if even possible, would require an extensive sampling effort that included numerous outdoor areas under various test conditions and scenarios. Such investigations would be extremely difficult, costly, and lengthy. Further, considering the magnitude of the cleanup in Libby, such an investigation would divert limited financial resources away from the essential work of cleaning up the worst exposures and conditions present today.

At this time, and in the absence of visible vermiculite in a specific use area, EPA has selected a concentration of 1% LA or greater as a site-specific action level for emergency response soil cleanup. When selecting this level, EPA considered several factors.

- Although there are no standards for acceptable concentrations of asbestos in soil, this standard was applied during previous emergency response cleanups in Libby.

- Screening-level risk estimates for exposures at a home with contaminated soil (presented in the Appendix) suggest that risk levels for a resident living for 70 years at a property with a level of 1% asbestos in the soils are on the order of 1 additional cancer expected per 1000 people. This is well above the risk level of 1 in 10,000 that EPA usually considers to be the upper limit of acceptable risk. Although the calculations are uncertain (see the discussion in the Appendix), these results support the conclusion that removal of soils that contain 1% or more asbestos is needed to protect public health.

- Inexpensive analytical methods currently available (e.g. PLM) can detect levels of 1% or greater with some confidence. Site-specific improvements in the use of PLM analysis at

Libby have led to much higher confidence in sampling results and the ability to detect and quantify asbestos levels in soils at 1% and even less than 1%. EPA is currently testing several methods to determine their ability to detect and quantify levels less than 1%.

It is important to note that EPA does not assert that soil concentration of less than 1% LA are necessarily safe or acceptable, and in certain circumstances, soils with less than 1% Libby asbestos may be remediated under the current emergency response program. Depending on the accessibility and frequency of exposure, EPA may elect to remove or isolate soils containing less than 1% LA. Similarly, if a portion of a property meets either emergency response action level for soils (i.e., visible vermiculite in specific use areas or LA greater than 1%), EPA will remediate all soils at the property with any detectable LA. This is primarily so that properties will not have to re-cleaned later if a lower action level is adopted. This is considered protective and cost effective. The approach, however, is to target properties where this is *not* the case first. Soils that meet the emergency response action levels take priority whenever possible. This is also consistent with previous cleanups in Libby.

VII. CLEARANCE CRITERIA

Cleanup of a portion of a property is considered complete and the property "clean" when all of the following site-specific criteria are met.

ATTICS/WALLS

- No uncontrolled visible vermiculite remaining in accessible areas
- Any vermiculite remaining is well-contained
- The *average* of approximately 5 samples of disturbed air collected in the attic indicate less than .01 AHERA structures per cubic centimeter of air (AHERA s/cm3).

INTERIORS

- No visible vermiculite remaining in accessible areas or living space
- No LA structures are detected in *any* of approximately 5 samples of disturbed air on the level(s) or floor(s), indicating disturbed air concentrations are generally less than .001 AHERA s/cm3.

SOILS

- No substantial visible vermiculite or waste material remains within the area of excavation
- In excavated areas, soil samples collected at the depth of cut are non-detect for LA by PLM. If maximum depth of cut is reached (12 inches for yards, 18 inches for specific use

areas), soil samples collected at the bottom of excavation must be less than 1% LA by PLM. Clean backfill is then placed over the excavation. This approach ensures that no detectable LA (by PLM) remains to a depth of 12-18 inches, but allows small amounts of LA to remain well below ground surface, where soil is unlikely to be disturbed. More information on the clearance sampling approach for soils is found in the Response Action Work Plan (CDM 2003a).

If these criteria are not met, re-cleaning, additional excavation, or other steps may occur, and the process is repeated. If any situations occur where clearance criteria cannot be met, unique approaches may be considered.

VIII. CLEARANCE CRITERIA RATIONALE AND DISCUSSION

ATTICS and INTERIORS

Attics and interior living spaces are both cleared using an approach based generally upon procedures outlined in the Asbestos Hazard Emergency Response Act (AHERA), but with different final numerical standards to account for the different amount of exposure likely for each. Once physical cleanup is complete, and visual inspection shows that all vermiculite is removed or contained, each individual space (e.g. the attic or particular floor of the home) is blown with a 1 horsepower leaf blower for several minutes. The action of walking through the living space and aggressively blowing dust from all surfaces, effectively simulates a high-end exposure. Following this action, fans are set up in the space to keep the air circulating, and air samples are collected.

EPA considered the use of settled dust samples for a clearance criteria, rather than aggressive air sampling. However. because the property was just cleaned, a settled dust sample would likely not be representative and is not as directly correlated with risk estimates as air concentrations. The use of aggressive air sampling is also feasible in this situation because the resident is already relocated and a controlled environment is present.

When EPA selected these site-specific clearance criteria, we considered several factors:

- Sampling occurs after the source is removed and is conducted after the dust throughout the space is aggressively disturbed. These conditions will not simulate normal living conditions suspected in the future, but rather approach worst-case conditions. The primary intent of the all clearance sampling is to ensure that sources were effectively addressed, not to demonstrate an expected long-term exposure level.

- Requiring a non-detect for *each* of five samples in the living space, as opposed to calculating the *average* of the five samples, increases the protectiveness of the cleanup in

the interior living space. Under this scenario, the absolute maximum concentration in any one sample that is possible is less than .005 AHERA s/cm2, but average exposure concentrations across the living space are effectively less than 1/5 the detection limit of a single sample, or less than .001 AHERA s/cm3.

- Screening-level risk estimates for exposures to asbestos-contaminated air presented and discussed in the Appendix suggest that risk levels for someone exposed *continually* to an air concentration of 0.001 AHERA s/cm3 for 70 years are on the order of 1 additional cancer expected per 10,000 people. EPA generally only takes action if risk estimates exceed a level of 1 additional cancer per 10,000 people. Although the risk calculations are uncertain (see the discussion in the Appendix), the results support the conclusion that the clearance level is protective of human health, especially because the long-term average concentration in air is likely to be lower than that measured following active disturbance.

- Because exposure in attics is likely to occur far less frequently than in main living spaces, higher numerical standards are applied and a mean concentration is used. The clearance criteria for interior living space in Libby are currently about 5-10 times more stringent.

- EPA understands that attainment of the chosen indoor clearance criteria will not necessarily indicate complete removal of all interior LA contamination. It is anticipated that if primary sources of contamination are remediated, then settled dust levels will decline over time. To help ensure that these levels do, in fact, decline, EPA will provide a HEPA vacuum to property owners of all properties that EPA has cleaned. EPA will also provide HEPA vacuums to other property owners whose properties are below the action level and have not been cleaned. Details of the scope of the HEPA vacuum program are found in HEPA Vacuum Program Fact Sheet (EPA 2003b). Furthermore, post-cleanup sampling is being planned to ensure that indoor dust levels remain low or decline as expected. This is discussed more in the final section of this memorandum.

SOILS

Soils requiring cleanup are cleared using an step-by-step approach. Limited excavation of the defined area occurs until no visible vermiculite is observed, or until the native soil horizon is reached. At this point, a representative number of soil samples are collected dependent upon the size of the excavation. If these samples are non-detect by PLM, the excavation is considered complete and the area is backfilled with clean soil. If LA is detected by PLM, excavation continues until the maximum depth of excavation is reached (12 inches for general yard areas, 18 inches for specific use areas). At this point, excavation would only proceed further (generally to a maximum of three feet regardless of contaminant levels) if gross contamination is observed or PLM samples indicate higher levels of LA (e.g. greater than 1%).

When establishing this approach, EPA considered the following factors:

- Nearly all exposure comes from near-surface soils. These soils generate dust and are often actively disturbed. In most circumstances, contamination is also limited to near surface soils. To ensure resources are focused on the soils that are most likely to result in human exposures, a maximum depth of excavation was established at 12-18 inches. These depths are based on based on the depth that typical residential activities may intrude into the soil (such as planting, rototilling, or installation of sprinklers). Below this depth, disturbance and exposure will occur very infrequently if at all.

- It is important to distinguish that at least two variations of PLM analysis are being used in the Libby residential/commercial investigation and cleanup. A site-specific PLM method, which involves off-site preparation of the sample, is currently being used to analyze surface soil samples (where frequent, ongoing exposure and dust generation occurs). This analysis is used to determine which specific areas require cleanup. Other methods of soil sample analysis are also being considered for these samples. All of these methods are intended to provide lower detection limits than "standard" PLM, which has traditionally been used for analysis of asbestos in bulk materials. However, "standard" PLM, by NIOSH Method 9002, was selected as the analytical method for clearance testing of soils at depth because of it's ability to recognize soils that exceed 1% LA, and because PLM can be performed on-site with a short turn-around time. This allows real time decisions to be made about whether further excavation is needed, and allows the excavation to be closed as soon as possible. Use of alternative analytical methods that might have lower detection limits than PLM are not feasible because they require off-site analysis and results may not be available for days or weeks. Leaving an excavation open for this time is hazardous and very cost inefficient.

IX. FUTURE ACTIONS AND FOLLOW UP

Based on the information available, EPA has developed an emergency response cleanup program that:

- focuses on elimination of exposures that are likely to occur frequently and continually over time;
- removes nearly all identified LA sources, focusing on sources that are most likely to be disturbed;
- isolates sources that are impractical to remove;
- addresses the highest exposures in the quickest manner possible;
- leaves low residual levels of LA and minimizes the likelihood of future re-cleaning;
- considers the many uncertainties regarding asbestos analysis and risk assessment that suggest risks could be higher than anticipated and employs strategies (from sample

collection to cleanup) to help compensate for these;
- reduces future management needs; and
- is protective, cost-effective, and implementable.

EPA recognizes the program does not completely eliminate all potential exposure to LA in Libby. In fact, such a program is impossible to fund or implement. Because of this, future management and review will be required to ensure the long-term protectiveness of the remedy. Nearly all cleanups require some level of long-term management. At Libby, EPA is already taking several steps to address this issue:

- EPA is providing HEPA vacuums and interior cleaning guidance to residents so they can immediately, and continually, address low levels of residual contamination and any particulate contamination that may be reintroduced into their homes. Guidance on additional steps to take to minimize the potential for exposure to residual asbestos and to increase their confidence in the safety of their home or business will be included in a package of information that residents and business owners receive after cleanup of their property.

- EPA, in conjunction with the Montana Department of Environmental Quality and local government, will develop a long-term operations and maintenance (O&M) plan to deal with future management issues. Key points of this plan will likely include ongoing education, guidance for residents encountering or working with vermiculite in the future, and a management system for any necessary removals of vermiculite including cleanup assistance and disposal procedures at the Lincoln County landfill.

- Most importantly, as part of the Remedial Investigation, EPA will institute a monitoring program for properties that were cleaned up. Not all properties will be visited, but a sufficient number to draw statistical conclusions will be sampled. This monitoring will measure actual dust and air levels, allowing EPA to (1) determine the efficacy of the cleanups after some time has passed, (2) test assumptions that affect the cleanup approach (e.g. Have dust levels declined? Have textiles and carpets that were not removed affected ambient conditions? Have heating and ventilation systems reintroduced contamination?), and (3) provide actual exposure data for use in the baseline risk assessment for the site. Based upon the results of this sampling, it is possible that the cleanup approach and/or criteria may be modified. EPA will also continue to implement other sampling programs to help aid in understanding of Site conditions.

- Using the best information available, a baseline risk assessment will be completed for the site. Using this and other information, final cleanup levels will be established. These will be compared to the measured residual levels at properties where cleanup has occurred, and levels at properties that did not meet the criteria for cleanup, to ensure that all necessary cleanup occurs and that final conditions are protective. The final decisions

and actions for the Libby cleanup will undergo extensive public review and comment.

X. POTENTIAL QUESTIONS AND ANSWERS

Question: How do Libby indoor air clearance levels compare to existing regulatory standards?

The current standard for worker protection, the Permissable Exposure Limit (PEL), established by the Occupational Safety and Health Administration (OSHA), is no greater than 0.1 Phase Contrast Microscopy Equivalent (PCME) s/cm3 for an eight hour exposure. While few consider this level protective, and OSHA clearly states that it is *not* intended to be fully protective, it nonetheless is a current standard which governs worker exposure. The clearance standard for Libby interior cleanings, after accounting for differences in counting rules (AHERA vs PCM), and for differences in assumed exposure frequency and duration, is equivalent to approximately 1/50 this amount. This means that Libby clearance levels are much more protective.

Without going into the details of the Asbestos Hazard and Emergency Response Act (AHERA) clearance protocol for schools, it can be generalized to say the clearance standard for asbestos removals is 70 AHERA structures per square millimeter (s/mm2) on the sample filter. This generally corresponds to an airborne concentration of about 0.02 s/cc. This standard is compared against the *average* of multiple samples, whereas in Libby interiors we compare each of approximately five samples to our clearance standard. Thus, EPA's effective clearance criteria at Libby (less than 0.001 AHERA s/cm3) is approximately 20-fold lower than the AHERA standard. Again, Libby clearance levels are more protective.

Question: How will indoor air in Libby compare to other locations across the country?

This is hard to say, but it is safe to say that asbestos (mainly chrysotile asbestos) is present in the air and dust nearly all countries, specifically in urban environments. This is due to its widespread use for decades and the fact that it is a naturally occurring mineral. While there is no single widely acknowledged "background" level of asbestos, several studies have shown asbestos levels (mainly chrysotile) in urban or industrial environments on the order of 0.01 s/cm3 or higher (Murchio, 1973; John et al, 1976; Chatfield, 1983). This is approximately ten times the clearance level for Libby. This does not imply these levels are safe or acceptable, but it does illustrate that all urban areas, and many rural homes with asbestos containing construction materials, are impacted by asbestos to some degree due to its widespread use over time.

Data on the levels of amphibole asbestos in other locations around the US are limited, but it is important to recall that products from the Libby vermiculite mine, including vermiculite insulation, were shipped and used in many, many homes across the county. At this point, it is unclear what, if any, cleanup will occur at these homes. At this point, Libby is the only place in

country where vermiculite insulation is being systematically removed from attics.

In the recent cleanup of the apartments around the former World Trade Center, EPA used similar techniques for air clearance sampling. While the details of the sampling and analysis are beyond the scope of this memo and the cleanup situation is somewhat different, it is safe to say that the numerical air clearance criteria used at the WTC cleanup is very similar to the criteria we are using at Libby.

Question: A concentration of 0.001 s/cm3 in air seems like a very low number, but 5,000 s/cm2 in dust seems very high. Why is there such a difference?

The main reason is related to the fact that only a small fraction of dust finds its way into air at any given time - perhaps about 0.1%. If 0.1% of dust that contains 5000 s/cm2 becomes distributed in the air of a room, the concentration in air would be about 0.009 s/cc. Thus, even though the numbers are very different, the risk they represent is similar. This is discussed in more detail in the Appendix.

Question: I thought asbestos-containing materials had to contain greater than 1% asbestos to be a problem. Why are you cleaning up soils and insulation with less than 1% asbestos?

A level of 1% asbestos is a regulatory standard that generally applies to asbestos containing commercial products such as brake pads, pipe wrap, and construction materials. The history of this regulatory standard is too long to discuss here, but the standard is not risk-based and does not apply to all situations In Libby, we have based our decisions for soil action levels and clearance criteria on site-specific risk calculations that show soils below 1% may still present risks that are higher than EPA generally considers acceptable.

Question: Why is EPA using AHERA analysis and counting rules for air/dust samples in Libby?

There are many ways to determine what constitutes an asbestos structure or fiber. Different analytical methods have different rules for determining what structures to count and what not to count. In Libby, we have analyzed such a large number of samples and counted so many asbestos fibers that we know what the general distribution of all fibers is. This enables us to convert sample results among different counting methods, no matter what method we used in the first place on a particular sample. We use AHERA for air and dust analysis because: (1) it is a standard method that can be performed by many labs, (2) it is economical, and (3) similar to the ISO 10312 Method, it counts short length fibers (e.g. fibers less than 5 microns in length). However, we can easily convert our AHERA sample results to PCME or ISO or otherwise. This is discussed in detail in the Appendix.

Question: When you are done, you should be done. Why do you have to go back and revisit cleaned up properties to sample again?

EPA is making every effort to ensure that any cleanup at a property will be sufficient that a return visit to that property will not be needed. However, because we are not sure what the final action levels will be for soil and dust, we cannot guarantee that we may not need to come back in a few cases. In addition, we are not yet certain that re-contamination from residual sources (dust in heating ducts, carpets, upholstery, etc) is not a problem. It is for this reason that we believe the only way to ensure the cleanup worked, and continues to work, is to revisit cleaned-up homes and sample after some time has passed, and compare the measured levels to final action levels. There is no better measure of potential exposure than testing homes over time while people live in them.

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APPENDIX

SCREENING LEVEL ESTIMATES OF EXPOSURE AND RISK FROM LIBBY AMPHIBOLE IN AIR, DUST, AND SOIL

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APPENDIX

SCREENING LEVEL ESTIMATES OF EXPOSURE AND RISK FROM LIBBY AMPHIBOLE IN AIR, DUST, AND SOIL

NOTE: All numeric values derived from the Libby database are based on data available at the time of document preparation and are subject to change pending updates or corrections to the database or revision of data selection procedures.

1.0 INTRODUCTION

This appendix is a description of the methods used by EPA to perform a screening-level evaluation of the potential risks of cancer to residents in Libby, MT, from inhalation exposures to amphibole asbestos fibers in air. For convenience, amphibole fibers of this type are referred to as Libby Amphiboles (LA). At present, quantitative methods are not available for estimating the level of non-cancer risks from asbestos exposures.

The methods used in this appendix to evaluate risks from asbestos in air are the same as those that have been used previously (Weis 2000, 2001a, 2001b), but take advantage of new information on concentration and particle size distribution derived from site-specific samples. In addition, the methods used here begin to assess the relationship between asbestos concentrations in various source media (indoor dust, outdoor soil) and potential health risks to residents for asbestos-related cancers. These assessments are intended to help provide a basis and frame-of-reference for establishing action levels and cleanup criteria for the ongoing emergency response actions in Libby. As additional information becomes available and as the cleanup progresses towards final remedial decisions, these approaches may be modified as appropriate, in consultation with the community, to ensure a safe and healthy environment.

2.0 BASIC APPROACH

Risk from asbestos is associated mainly with inhalation exposure of suspended asbestos fibers. Because asbestos fibers are heavier than air and settle out onto surfaces, they will not typically be found in air measurements unless they have been released from contaminated surfaces or source materials by a disturbance:

Disturbance
Source ----------> Air -----> Inhalation Exposure -----> Increased Risk of Lung Disease

The concentration of fibers that occur in air following disturbance of a source and the resultant level of human exposure and risk depend on a very wide variety of highly variable factors, including:

- the concentration of fibers in the source material
- the nature of the disturbance of the source
- the physical properties of the source
- the volume of air into which the fibers are released
- the air flow or ventilation rate in the area where fibers are released
- the particle size distribution of the released fibers
- the frequency and duration of the release
- the frequency and duration of human exposure in the area where release has occurred

Because of these many factors and the wide range of values that each may assume, our ability to predict risk to a resident based only on a measure of the concentration of fibers in the source material is very limited. For similar reasons, our ability to specify a concentration of fibers in the source material that is "safe" is also very limited. Nevertheless, even though there are many difficulties and uncertainties in attempting to predict the potential risks associated with asbestos contaminated surfaces and materials, we can apply available information to develop a useful construct and derive reasonable screening-level estimates of the "safe" concentration of asbestos in source materials. This process provides an important tool for risk managers to help determine which areas, sources, and situations require the most immediate attention for remediation.

3.0 RISKS FROM ASBESTOS FIBERS IN AIR

3.1 Inhalation Risk Models

At present, government agencies in the United States have not developed a standard method to estimate risks for asbestos-related non-cancer health endpoints such as asbestosis or pleural fibrosis. However, methods have been developed to estimate the risk of pulmonary cancer (lung cancer, mesothelioma) due to inhalation exposure to asbestos.

Data on the quantitative relationship between inhalation exposure to asbestos and increased risk of pulmonary cancer are derived mainly on studies of workers who have been exposed to various types and levels of asbestos in the workplace. Most of these studies estimated the concentration of asbestos

in air using phase contrast microscopy (PCM). In order for a particular asbestos structure[1] to be counted as a PCM fiber, the structure must have an aspect ratio (length divided by width) of at least 3:1, must have a length of 5 um or more, and must be thick enough to be detectable under PCM (about 0.25 um or more). The empiric relationship between excess lifetime cancer risk and airborne concentration of PCM fibers established by USEPA is expressed as follows:

$$\text{Excess Pulmonary Cancer Risk} = C_{air}\ (\text{PCM fibers/cc}) \cdot 0.23\ (\text{per PCM fiber/cc})$$

For example, if an individual were exposed to an airborne concentration of 0.001 PCM fibers/cc for a lifetime, the risk (probability) of that individual developing pulmonary cancer because of the asbestos exposure would be about 0.00023 (2.3E-04). Stated another way, if a total of 100,000 people were exposed to 0.001 PCM fibers/cc for a lifetime, about 23 extra cases of pulmonary cancer would be expected to occur in the group of 100,000.

Although the PCM-based risk model remains the current standard for estimating pulmonary cancer risk from asbestos (IRIS 2003), there are some technical issues associated with the approach. First, the PCM analysis method has a poor ability to distinguish asbestos fibers from non-asbestos fibers. This is unlikely to have been a major problem in most workplace studies because most of the airborne fibrous particles would likely have been asbestos, but may be a problem in the residential setting where many PCM fibers may not be asbestos (Weis 2001b). Second, most researchers believe that risk of cancer from inhalation of asbestos depends in large part on the size (length and width) and type (chrysotile, amphibole) of the asbestos, although the exact relationship is not yet clear. Thus, the empiric risk factors for cancer derived from workplace studies may not be appropriate for use at a location such as Libby if the asbestos fiber characteristics (fiber size distribution and mineral type) in Libby are substantially different than in the workplace studies.

Because of these issues, some researchers are working to develop new methods for predicting cancer risk from inhalation of asbestos. One of these efforts is being sponsored by the USEPA and is being performed by Berman and Crump (USEPA 1999). The method being developed by Berman and Crump explicitly takes mineral class (chrysotile, amphibole) and particle size (length, width) into account. Based on work completed to date, Berman and Crump have concluded that the concentration of long (>10 um) and thin (< 0.5 um) asbestos fibers is the primary determinant of

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[1] Asbestos particles may occur in a variety of sizes and shapes. The word "structure" is used to refer to any asbestos particle, while the word "fiber" refers to asbestos structures that have a long and thin shape, usually defined as a aspect ratio (length divided by width) of 3 to 5 (depending on the counting rules).

cancer risk, with a smaller contribution from intermediate length (5-10 um) thin fibers. Because thin fibers may be difficult to measure by PCM, the Berman-Crump approach uses a more powerful technique (transmission electron microscopy, or TEM) as the preferred measurement technique. For convenience, structures observed in TEM that are longer than 10 um and thinner than 0.5 um are referred to as "Berman-Crump protocol structures-long" (BCPS-l), and structures observed in TEM that are 5-10 um long and thinner than 0.5 um are referred to as "Berman-Crump protocol structures-short" (BCPS-s). For lifetime exposure, the cancer risk factors for short and long protocol structures are shown below:

$$\text{Risk} = C_{air}(\text{BCPS-s}) \cdot 0.049 + C_{air}(\text{BCPS-l}) \cdot 15$$

3.2 Methods for Estimating PCM and BCPS Concentrations in Air

In order to estimate health risk from asbestos concentrations in air, estimates of airborne asbestos levels must have units of concentration that are consistent with the risk model selected for use (i.e., PCM fibers for the IRIS risk model, and BCPS for the Berman Crump risk model). Most samples of air analyzed at the Libby site have been analyzed using TEM and a set of counting rules specified by ISO-10312 (ISO 1995). In addition, a large number of samples have also been analyzed by TEM using a set of counting rules specified by AHERA (USEPA 1987). In both cases, all LA structures (including not only fibers but also bundles, clusters and matrices) greater than about 0.5 um in length and containing one or more elements with an aspect ratio of about 3:1 or higher have been recorded so that the raw data are available to characterize the complete LA particle size distribution in air and dust samples.

For ISO 10312, data are available for over 6200 individual structures[2]. The distributions of length, width, and aspect ratio are shown in Figure 3-1. The availability of these data makes it possible to calculate the fraction of all LA ISO structures[3] that fall into any particular size class, including the risk-based classes above. Note that a structure identified by TEM that has the same size attributes as required for PCM is referred to as a PCM-equivalent (PCME) structure. Based on these data, the following fractions are observed:

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[2] See Attachment 1 for a detailed description of the data selection and calculation procedure.

[3] This includes not only the particle size classes traditionally included under ISO counting rules, but also "excluded" fibers that have been included for purposes of more fully characterizing the particle size distribution.

PCME = 0.28·(Total ISO)
BCPS-s = 0.13·(Total ISO)
BCPS-l = 0.042·(Total ISO)

For example, on average, about 28% of the total LA structures recorded during analysis by ISO 10312 would be counted as PCME fibers. Similarly, for particles recorded using AHERA rules[4], the conversion factors for estimating risk-based structures from total AHERA-based counts are as follows:

PCME = 0.43·(Total AHERA)
BCPS-s = 0.15·(Total AHERA)
BCPS-l = 0.059·(Total AHERA)

Because these factors are known with good confidence, it is possible to estimate the number of a particular risk-based structure type in a sample by measuring the total number of structures and multiplying by the appropriate fraction. The advantage of estimating the number and concentration of risk-based structures by this approach is increased statistical confidence and decreased cost. For example, on average, only about 4% of all ISO structures are BCPS-l. Thus, to get a reliable count of the number of BCPS-l structures in a sample, it would be necessary to count at least 100-200 total structures (a slow and costly requirement). Alternatively, if the estimate of concentration is based on total structures, then a reliable estimate can be obtained by counting only 5-10 total structures and multiplying by the factor above. Because of the advantages in statistical confidence and cost savings, this is the approach that EPA has selected for use in assessing risks from various source materials at this site.

Figure 3-2 shows the relationship between PCME fibers actually observed in individual samples of air and dust and the value calculated from the total ISO count using the ratio described above. As expected, observed values may be either higher or lower than the calculated value, but the overall correlation is good.

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[4] This ratio is based only on fibers that meet AHERA counting rules, not including any "excluded" fibers that have been recorded in the database.

3.3 Calculation of Risk-Based Concentrations in Air

Long-Term Exposures

Based on the risk models described above, the concentrations of Libby amphibole in air that correspond to various levels of lifetime excess pulmonary cancer risk are as follows:

Cancer Risk-Based Concentration of Libby Amphibole Fibers in Air (s/cc)

Excess Cancer Risk Level	Based on IRIS Risk Model			Based on Berman-Crump Risk Model			
	PCM/ PCME	Total ISO	Total AHERA	BCPS-s	BCPS-l	Total ISO	Total AHERA
1E-02	4.3E-02	1.6E-01	1.0E-01	2.0E-01	6.6E-04	1.6E-02	1.1E-02
1E-03	4.3E-03	1.6E-02	1.0E-02	2.0E-02	6.6E-05	1.6E-03	1.1E-03
1E-04	4.3E-04	1.6E-03	1.0E-03	2.0E-03	6.6E-06	1.6E-04	1.1E-04
1E-05	4.3E-05	1.6E-04	1.0E-04	2.0E-04	6.6E-07	1.6E-05	1.1E-05

For example, based on the on the IRIS PCME risk model, an excess cancer risk of about 1E-04 would be predicted for a person exposed to a long-term average concentration of 0.0016 (1.6E-03) total ISO s/cc or 0.0010 (1.0E-03) total LA AHERA s/cc. Based on the Berman-Crump risk model, a risk level of 1E-04 would be predicted for a person exposed to a concentration of 0.00016 (1.6E-04) total ISO s/cc or 0.00011 (1.1E-04) total AHERA s/cc. In both cases, it is important to note that the risks are based on an assumed long-term (70-year lifetime) exposure. If exposure is for shorter times, risks are also lower, as discussed below.

Intermediate and Short-Term Exposures

When intermediate or short-term exposures occur, the exact magnitude of the risks depends on the duration of exposure as well as the age at exposure. For example, an exposure of 10-years duration that occurs at age 20-30 will pose a higher risk of lung cancer and mesothelioma than if the exposure were to occur at age 40-50. This age dependency is relatively minor for lung cancer, but is quite marked for mesothelioma. However, as an initial approximation, risk from less-than-lifetime exposure may be estimated by assuming risk is a linear function of the time-weighted average exposure concentration. For example, the risks to a person exposed for 40 years would be about 40/70 (57%) as large as the risks to a person who was exposed for a lifetime (70 years). Likewise, an exposure that occurs only for 1 hour per day is about 1/24 (4%) as hazardous as if the exposure

occurred for a full day, and an exposure that occurs only 10 days per year is about 10/365 (2%) as hazardous as if the exposure occurred every day per year. Because of this, risks from brief and intermittent exposures (e.g., those that may be encountered by firefighters at a burning house with vermiculite insulation, or those that might be experienced by a homeowner during once-only remodeling in an area with vermiculite insulation) are generally of lower concern than long-term exposures, even if the short-term exposures are to levels that would be of great concern if the exposure were long-lasting.

3.4 Risk Estimates for Indoor Air Concentrations Observed in Libby

"Typical" Indoor Air Levels

Measurements of Libby amphibole concentrations in indoor air have been performed at a number of residential and commercial properties in Libby. Based on current data, LA structures have been detected in one or more air samples from about 40% of the locations tested. The following table summarizes the range of values observed[5], and the excess cancer risk levels that would be associated with residential exposure to the levels that have been detected.

Pulmonary Cancer Risks from Indoor Air in Libby

Parameter	Low Detect (5th percentile)	Average Detect (mean)	High Detect (95th Percentile)
Concentration (Total ISO s/cc)	0.00013	0.0083	0.0621
Risk (IRIS model) - 40 years exposure	5E-06	3E-04	2E-03
Risk (IRIS model) - 70 years exposure	8E-06	5E-04	4E-03
Risk (Berman-Crump model) - 40 years exposure	5E-05	3E-03	2E-02
Risk (Berman-Crump model) - 70 years exposure	8E-05	5E-03	4E-02

As seen, in some cases the levels of LA detected are so low that there is little basis for concern. However, both average and high-end values are above the risk level of 1E-04 where EPA typically takes action under Superfund.

Comparing the risk estimates above with those that have been presented previously (Weis 2002a, 2002b) is difficult, since there have been a number of changes in the database as well as a change in

[5] See Attachment 1 for a detailed description of the data selection and calculation procedure.

the methods used to estimate the concentration of risk-based structures (see Section 3.2, above). Nevertheless, the range of estimated PCME concentrations used to estimate risks above are generally quite similar to those used previously, as shown below.

Comparison of Current and Previous Concentration Estimates

Evaluation	Number	PCME Concentration (Detects Only) (f/cc)		
		Low	Average	High
Previous (Weis 2001b, as corrected in SRC 2002)	39 samples	0.0003	0.0017	0.0120
This report	154 properties (property average)	0.00004	0.0023	0.0174

Risks from Repeated Exposures to Disturbed Vermiculite Insulation

EPA is currently taking actions to eliminate or reduce the potential for exposure of residents and workers to vermiculite insulation. As discussed in previous memos (Weis 2002a, 2002b), vermiculite insulation is of concern because it contains LA, and disturbance of the insulation can lead to locally high concentrations of LA in air. As described above, the risks from such exposures are related both to the concentrations of LA fibers in air which may be generated, and also to the frequency and duration of such exposures. Presented below are screening-level risk estimates for two populations of people who may have this type of exposure, including residents in houses with vermiculite insulation who may be exposed periodically, and tradespeople (e.g., electricians, plumbers, other contractors) whose profession may bring them into contact with vermiculite insulation on a regular basis. All calculations are based on an assumed air concentration of 0.68 total ISO structures per cc (the mean value measured in person air monitors during active disturbance of vermiculite insulation at three homes studied during the Phase II Scenario 3 studies performed by EPA in Libby)[6]. This total ISO concentration corresponds to about 0.19 PCME s/cc, 0.089 BCPS-s s/cc and 0.028 BCPS-l s/cc.

[6] See Attachment 1 for a detailed description of the data selection and calculation procedure.

Screening-Level Risk Estimates for Disturbance of Vermiculite

Exposed Population	Assumed Exposure Scenario				Estimated Excess Risk of Cancer	
	Description	hrs/day	days/ yr	yrs	IRIS Risk Model	B-C Risk Model
Resident	Getting holiday decorations out of storage in attic	0.5	2	40	3E-06	3E-05
	Once-only do-it-yourself home remodeling project	4	10	1	3E-06	3E-05
	Multiple do-it-yourself home remodeling projects	4	20	10	6E-05	6E-04
Trades person	Remodeling or repair work in homes with vermiculite insulation	8	150	25	2E-03	2E-02

As seen, infrequent exposures (such as going into an attic with exposed vermiculite only a few times per year, or a once-only remodeling project that leads to direct exposure to disturbed vermiculite) have estimated risks that do not exceed EPA's usual level of concern (1E-04). However, risks may enter a range of concern for residents who frequently engage in activities that bring them into direct exposure to vermiculite, or for tradespeople who frequently work in houses with vermiculite insulation

Short-term Risks from Exposures to Disturbed Sources

Even though cancer risk from exposure to asbestos is most appropriately viewed as a chronic concern, short-term standards have been established by OSHA to limit exposures of workers in the workplace. There are two types of short-term limits, as follows:

STEL (Short-term exposure limit)	1.0 PCM f/cc
TWA PEL (8- hr time-weighted average permissible exposure level)	0.1 PCM f/cc

In Libby, all EPA workers engaged in sampling or remedial activities wear personal air monitors to help guard against excess asbestos exposures. Two types of sample are collected:

- "excursion samples", which are short-term samples (usually about 30 minutes) and are taken during activities that are suspected to have the highest potential for exposure

- "TWA" samples, which usually span a longer collection interval (2-4 hrs), and are intended to help characterize the daily average exposure of the worker

Data from the personal air monitors of EPA workers provide a large database of PCM measurements that can be used to characterize how likely it is that short-term exposure limits may be exceeded. These data are shown below:

Frequency of Short-Term OSHA Exceedences for EPA Workers

Sample Type	OSHA Standard	Total Number of Samples	Number Exceeding OSHA Standard
Excursion	1 f/cc	1474	40 (2.7%)
TWA	0.1 f/cc	2117	419 (19.8%)

As seen, a number of short-term exceedences have occurred during EPA's remedial activities, supporting the conclusion that disturbance of asbestos-containing sources can be of potential human health concern[7]. However, a majority of the exceedences are associated with activities that are not likely to be representative of activities that area residents will engage in:

Location of Activity	Type of Activity		
	Disturbing Soil	Disturbing Vermiculite	Misc Other
Current residential/commercial area of Libby	4	154	66
Current or former mining/processing areas	63	8	164

As seen, in the main residential/commercial area of Libby, the majority of exceedences have been associated with vermiculite removal. Because locations with exposed vermiculite will be eliminated by EPA's current clean-up program, this pathway will not be applicable to residents in the future except as a consequence of remodeling activities that may expose new vermiculite. Disturbances of soil in the residential area appear to be unlikely to cause exceedences of the short-term standards, but

[7] Note: all EPA workers wear appropriate personal protection equipment so that these exceedences are not a basis for health concern in the workers. However, these same exceedences would be of potential concern for unprotected residents.

have been a common source of exceedences for workers doing clean-up in the current or former mining/processing areas.

Based on these data, it is concluded that, except for vermiculite disturbance, most area residents have low probability of an exposure that will exceed short-term asbestos exposure guidance values.

3.5 Risk Estimate for EPA's Air Clearance Criterion

At present, EPA is using a concentration of 0.001 AHERA s/cc as the clearance criterion for determining that remedial activities in homes or workplaces have been successful and that risks are within acceptable bounds. If this concentration were assumed to be an accurate measure of the long-term average air concentration in a home, risks to a resident would be about 1E-04 based on the IRIS risk model, and about 9E-04 based on the Berman-Crump risk model. Risks to a tradesman working in a house remediated to this level would be about 2E-06 to 2E-05. However, the actual risks are likely to be substantially lower, since the air samples used to evaluate any remaining contamination in a home or workplace are collected immediately after vigorous disturbance of dust with a leaf-blower. Thus, the airborne exposure concentrations measured under these conditions are likely to be higher than the true long-term average exposure concentrations which occur during normal daily activities. Thus, application of this clearance criterion is considered to be highly protective of human health for the cancer risks of concern, both for residents and for tradespeople.

4.0 RISKS FROM ASBESTOS FIBERS IN DUST

4.1 Basic Equations

As noted earlier, asbestos structures in dust are of potential health concern primarily because they can become resuspended in air where they can be inhaled. The relationship between the concentration of structures in air (s/cc) and the asbestos loading in dust (s/cm^2) may be expressed as a ratio:

$$K = C(air) / L(dust)$$

Clearly, the value of K is expected to be highly variable, depending on the nature of the forces that disturb the dust and cause the fibers to become resuspended. Thus, it is appropriate to consider that there are a series of K values, depending on the forces acting on the dust, and that the average K factor for a house is the time weighted-average (TWA) of the K-factors for all of the different types of activities that disturb the dust:

$$K(average) = \sum K_i \cdot TWF_i$$

where:

K_i = K factor for activity type "i"
TWF_i = Time-weighting factor for activity type "i"

For the purposes of this screening assessment, two basic types of K factors are identified for a residential setting:

- the "baseline" value that applies under routine household conditions. The forces that lead to dust resuspension include thermal air currents, mechanical vibrations, and human or pet movements and activities.

- The "active cleaning" value that applies when dust is being actively disturbed by an activity such as sweeping, dusting, beating carpets or upholstery, etc.

Thus, the average value of C(air) is calculated from L(dust) as

$$\text{Average } C(air) = L(dust) \cdot (K_{baseline} \cdot TWA_{baseline} + K_{cleaning} \cdot TWA_{cleaning})$$

Given the estimate of average C(air), risks may be estimated using the various risk models above.

4.2 Parameter Values

TWA Values

The time weighting factors for "baseline" and "cleaning" activities are expected to vary widely between different homes and different people. Based on surveys of human activity patterns reported in EPA's Exposure Factors Handbook (USEPA 1977), an average of about 2 hours per day are spent in cleaning activities (Table 15-71 and Table 15-90), and this activity occurs an average of about twice per week (Table 15-51). Based on this, the TWA for cleaning is:

$$TWF_{cleaning} = (2 \text{ hrs}/24 \text{ hrs}) / (2 \text{ days}/7 \text{ days}) = 0.024$$

Defining "baseline" as all time other than that spent in active cleaning, the TWF for baseline is:

$$TWF_{baseline} = 1 - TWF_{cleaning} = 0.976$$

K Factor for Active Cleaning

Data on resuspension factors (K factors) for dust resuspension due to various types of activities are limited, and values range widely. Values published in the literature from studies at other sites are summarized in Table 4-1 (Millette and Hayes 1994). As seen in the lower half of Table 4-1, K factors for resuspension of asbestos under controlled conditions tend to fall mainly in the range of 1E-04 to 1E-06 s/cc per s/cm^2. After excluding the values associated with operating a forklift and a cable pull (these are not representative of exposures that would occur in a home), the geometric mean value of the remaining values is about 2E-05 s/cc per s/cm^2. In this regard, the maximum possible value for the K factor is 4.1E-03, which represents the case when 100% of the dust is resuspended in the air of a room that is 8 feet high. Thus, a K factor of 2E-05 represents a case where only 0.5% of the total dust is suspended in air.

Data collected by EPA at the site during Phase II Scenario 2 (USEPA 2001b) were intended to provide a basis for deriving a site-specific K factor for active cleaning, but the results are disappointing. In these studies, samples of air and dust were collected in several homes during various types of active cleaning activities (sweeping, vacuuming, etc). Although the ratio of the average concentration in personal air samples (total ISO s/cc) divided by the average loading in dust (total ISO s/cm2) is 1.8E-05 s/cc per s/cm^2 (similar to the value derived from the literature)[8], there were no instances in which structures were detected in both air and dust at the same home. This prevents a meaningful analysis of the relationship in paired samples (as would be preferred). This result is partly a consequence of the statistical uncertainty around each measurement, as well as the inherent variability between different homes and different types of cleaning activities. While the site-specific data are consistent with published estimates of K factors, the extreme variability and uncertainty of the site-specific data necessitates our usage of the literature-based estimates for active cleaning.

K Factor for "Baseline" Activities

No data were located in the literature on the K factor that describes the resuspension of dust and asbestos particles during baseline (non-active cleaning) activities in a home or workplace, although

[8] See Attachment 1 for a detailed description of the data selection and calculation procedure.

Lumley et al. (1971) reported that the concentration of PCM fibers in air of an asbestos-insulated warehouse increased about 10-fold over baseline ("hardly any activity") when there was "a lot of activity", and that moving boxes in another warehouse increased airborne levels about 3-fold compared to baseline (no activity). Based on these data, it may be concluded that the K-factor for baseline is probably about 1/3 to 1/10 that of active disturbance. Based on the screening-level K value of 2E-05 s/cc per s/cm^2 for active cleaning activities identified above, this would correspond to a baseline K-factor value of about 2E-06 to 7E-06 s/cc per s/cm^2.

An alternative value can be estimated from data collected in Libby during Phase I and Phase II studies. These studies provide data on the concentration of asbestos in indoor air (both personal and stationary monitors) and in dust in residential and commercial locations. Two approaches are possible. In the first approach, the baseline K-factor can be estimated simply by dividing the average indoor air concentration by the average indoor asbestos loading in dust[9]. The results are shown below:

Estimated K Factors for Baseline Activities in Libby

Data Collection Phase	Detection Freq.		Mean C(air) (Total ISO s/cc)	Mean L(dust) (Total ISO s/cm^2)	Ratio (Baseline K Factor)
	Air	Dust			
Phase I	54/145	195/484	0.0029	830	3.5E-06
Phase II	7/16	3/14	0.0015	213	7.2E-06

As above, because these estimates of concentrations in air and loading in dust are not paired (i.e., air and dust were not collected at the same time or place), the K-values should be interpreted only as an estimate of what may be typical under baseline conditions.

The second approach is to utilize only those data that are paired in space (i.e., both air and dust are from the same house), and to calculate the best fit line of the following form: C(air) = K·L(dust). A total of 146 such data points exist. Based on these data[10], the best fit linear regression has a slope of 1.8E-06 s/cc per s/cm^2. However, most of the data points (127 out of 146) are non-detect either for air and/or for dust, so the slope estimate is highly uncertain.

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[9] See Attachment 1 for a detailed description of the data selection and calculation procedure.

[10] See Attachment 1 for a detailed description of the data selection and calculation procedure.

Based on these very limited data, it is concluded that the value of K under baseline conditions likely falls in the range of 1E-06 to 8E-06 s/cc per s/cm^2, and a value of 4E-06 s/cc per s/cm^2 was selected to be representative. Clearly, this value should be viewed as only a rough estimate, and it should be understood that actual values could vary substantially from home to home and from time to time.

4.3 Calculation of Cancer Risk-Based Loadings for Dust

Based on the equations and inputs discussed above, the relationship between lifetime excess cancer risk and the level of asbestos structures in dust are as follows:

Cancer Risk-Based Loading in Dust (s/cm^2)

Cancer Risk Level	Based on IRIS Risk Model			Based on Berman-Crump Risk Model			
	PCM/ PCME	Total ISO	Total AHERA	BCPS-s	BCPS-l	Total ISO	Total AHERA
1E-02	9,930	35,700	23,200	46,600	151	3,580	2,560
1E-03	993	3,570	2,320	4,660	15	358	256
1E-04	99	357	232	466	1.5	36	26
1E-05	10	36	23	47	0.15	3.6	2.6

For example, based on the IRIS PCME risk mode, a 1E-04 excess cancer risk is expected when the dust loading is about 232 total AHERA s/cm^2. Based on the Berman-Crump risk model, an excess risk of 1E-04 is predicted for a total AHERA dust loading of 26 s/cm^2. However, it is evident from the discussions of the equations and inputs above that these risk-based values for dust should be viewed as estimates that contain a substantial amount of uncertainty. This uncertainty is due mainly to the uncertainty regarding the relationship between air and dust, as well as uncertainty in the relative contribution of different activity patterns to the average value of K. Thus, actual risk-based concentration (RBC) values may be either higher or lower, depending on the actual range of conditions that exist across the community of Libby.

4.4 Cancer Risk Estimates for Dust Levels Observed in Libby

Measurements of Libby amphibole concentrations in indoor dust have been performed at a number of residential and commercial properties in Libby. At present, the majority of dust analyses have been performed using ISO 10312 counting rules, although most future dust samples will be evaluated using AHERA (ASTM 1995). Of the dust samples evaluated to date by ISO 10312, LA fibers have been

detected in about 40% of the locations (199/491). The following table summarizes the range of values observed[11], and the excess cancer risk levels that would be associated with lifetime residential exposure to the levels that have been detected.

Predicted Cancer Risks from Indoor Dust in Libby

Parameter	Low Detect (5th percentile)	Average Detect (mean)	High Detect (95th Percentile)
Concentration (Total ISO s/cm^2)	28	2,048	7,418
Risk (IRIS model)	8E-06	6E-04	2E-03
Risk (Berman-Crump model)	8E-05	6E-03	2E-02

As seen, in some cases the levels of LA detected in dust are so low that there is little basis for concern, but both average and high-end values are above the risk level of 1E-04 where EPA typically takes action under Superfund.

4.5 Evaluation of Cancer Risk Associated with EPA's Action Level for Dust

At present, EPA takes active steps to clean dust on any floor of a home where the average loading on that floor exceeds 5,000 total AHERA structures per cm^2. It is important to recognize that this action level is not based on a consideration of the long-term acceptability of this level, since the predicted lifetime risks would be quite high (on the order of 2E-03 to 2E-02, depending on which risk model is used) if it were assumed that this value was the true long-term average concentration in the entire home. However, actual house-wide average levels are likely to be several-fold lower, since dust samples are collected from areas most likely to be contaminated, and usually only one level of a house is substantially impacted. In addition, after remediation of primary sources, it is expected that dust levels will fall over time as a result of normal air cycling and routine cleaning by residents. Although the rate at which levels would fall is hard to predict, EPA anticipates that once the major primary sources are removed, the indoor dust concentrations and any corresponding risks to human health will be substantially reduced in a relatively short time frame. Further, training of occupants in appropriate cleaning techniques and use of EPA-supplied HEPA vacuum cleaners will help ensure reduction of indoor dust concentrations. EPA is currently planning additional investigations to validate that dust levels are in fact dropping to acceptable levels.

[11] See Attachment 1 for a detailed description of the data selection and calculation procedure.

5.0 RISKS FROM ASBESTOS FIBERS IN SOIL

5.1 Basic Equations

Asbestos fibers in outdoor soil can lead to human exposure by one or more of three different pathways:

1. Resuspension from soil into outdoor air as the result of wind forces acting on exposed soil
2. Resuspension from soil into outdoor air as a result of active disturbance of the soil (e.g., working in the garden, rototilling, etc).
3. Transport of soil from outdoors into indoor dust, from which indoor activities can lead to inhalation exposure as discussed in Section 5 (above).

For erosion of asbestos from soil into outdoor air, the basic equation is:

$$C(\text{outdoor air}) = C(\text{soil}) \cdot PEF/s \cdot FPG \cdot 10^{-6}$$

where :

C(outdoor air) = concentration of asbestos structures in air (s/cc)
C(soil) = concentration of asbestos in soil (grams of asbestos per gram bulk soil)
PEF = particulate emission factor (grams of silt per m^3 of air)
s = silt content of soil (grams of silt per gram of bulk soil)
FPG = average number of asbestos fibers of per gram of asbestos
10^{-6} = conversion factor (m^3 per cc)

For transport of outdoor soil into indoor dust, the basic equation is:

$$C(\text{dust}) = ksd \cdot C(\text{soil})$$

where:

C(dust) = concentration of asbestos structures in dust (grams of asbestos per gram of dust)
ksd = fraction of indoor dust that is attributable to outdoor soil (grams soil per gram dust)
C(soil) = concentration of asbestos in soil (grams per gram)

Given an estimate of C(dust), L(dust) may be estimated as:

$$L(dust) = C(dust) / D \cdot FPG$$

where:

L(dust) = asbestos loading in dust (s/cm^2)
C(dust) = asbestos concentration in dust (grams asbestos per gram dust)
D = mass of dust per unit area (grams dust per cm^2)
FPG = Number of asbestos fibers per gram asbestos

Given L(dust), risk may be calculated as described above (see Section 4.1).

Note that this approach assumes that all asbestos that is present in soil is currently (or may become in the future) in the form of respirable particles. This approach is an over-simplification in some cases, since some asbestos particles in soil are too large to become airborne and be inhaled. However, such large particles may become disaggregated to free fibers in the future due to weathering or mechanical forces, so the risk estimates should be considered to reflect what risks may be now (if all particles are currently fibers) or may become in the future (if some particles are currently large).

5.2 Parameter Values

TWA Values

The time that different people spend indoors and outdoors is highly variable, but the average values based on a national survey are about 1.5 hours per day outdoors, and 21 hours per day indoors (the remainder is spent in vehicles) (USEPA 1997, page 15-16). Thus, the TWF for exposure to ambient outdoor air and indoor air are approximately:

TWF(ambient outdoor air) = 1.5 hrs / 24 hr = 0.0625
TWF(indoor air) = 21 hrs / 24 hr = 0.875

The time spent engaging in outdoor activities that result in active disturbance of soil (e.g., working in the garden) is also likely to be highly variable. Based on a national survey, about 2/3 of the total respondents did not engage in gardening (USEPA 1997, Table 15-61). Of the remaining respondents, a large majority (nearly 80%) spent less that 24 hours per month gardening. Taking 12 hours per month as an estimate of what is likely to be typical for people who garden, the TWF is as follows:

TWF(disturbed outdoor air) = (12 hrs/month) / (720 hrs/month) = 0.0167

PEF Factors

The release of soil particles into outdoor air as a function of wind erosion is a complex function of the wind speed, the "roughness" of the terrain (which influences how turbulent the air flow is), the size of the exposed soil source area, and the properties of the soil (including the fraction that is covered with vegetation). Based on conservative national default values, the USEPA (1996, 2001a) has calculated a default as follows:

PEF (wind erosion) = 7.4E-10 kg of soil per m^3 of air

Because the fine particles in soil are preferentially eroded in preference to the coarser soil particles, it is assumed the wind-eroded soil particles all belong to the silt fraction (< 50 um in diameter).

Mathematical models exist for calculating PEFs for various types of active disturbances of soil (plowing a field, driving a vehicle on a dirt road, etc.) (Cowherd et al. 1985), but these are all very crude models and none are likely to be particularly relevant for the types of active disturbances that may affect a resident while working in their yard. Therefore, the PEF for active soil disturbance was simply assumed to be 100 times higher than for wind erosion:

PEF(active disturbance) = 100 · PEF(wind erosion) = 7.4E-08 kg of soil per m^3 of air

As will be seen below, the overall risk from asbestos in soil is not very sensitive to this assumption, so efforts to derive a more reliable value do not appear to be warranted.

Ksd Value

Indoor dust is composed of particles derived from many different sources, and only a fraction of the total is derived from exterior soil. Studies on the relationship between arsenic and lead in soil at numerous mining sites in the western United States suggest that in most cases, the fraction of dust derived from soil is likely to be about 20%-40% (ISSI 2001). Thus, for the purposes of the screening calculations at this site, a value of 30% (Ksd = 0.3) is assumed. Note that this assumes that the outdoor yard soil is uniformly contaminated with asbestos. In cases where only a portion of the yard is contaminated, the total soil contribution to dust may still be 30%, but only a fraction of that will contain asbestos. Thus, the value of 30% is likely to be conservative in many cases.

FPG value

The number of fibers per gram (FPG) of any particular size category of asbestos per gram total asbestos varies widely as a function of the size distribution of the asbestos particles composing the sample. At this site, an estimate of FPG for each risk-based fiber type was derived by estimating as follows:

$$FPG(x) = \frac{x}{\sum_{i=1}^{N} \left(w_i^2\right) \cdot l_i \cdot \delta \cdot 1E-12}$$

where:

N = total number of LA fibers observed in samples of air and dust from Libby
x = total number of fibers of type "x" observed in the total set of N fibers
w_i = width (um) of LA fiber "i"
l_i = length (um) of LA fiber i"
δ = density of LA fibers (3.1 grams/cc)
1E-12 = conversion factor (cc per um^3)

Based on a total of over 8,300 structures observed at Libby, estimates of FPG for each of the three main risk-based fiber types is as follows:

Fiber Type	Estimated FPG
Total	2.9E+10
PCM/PCME	9.0E+09
BCPS-s	3.9E+09
BCPS-l	1.3E+09

Silt Fraction

The fraction of a soil sample that is composed of particles that are silt-sized or smaller varies widely from location to location. Site-specific measurements of the silt content of soils in Libby have not yet been performed. However, the U.S. Department of Agriculture Soil Survey Program database for Montana does provide some data on the silt fraction for soils collected in and around Lincoln County

(USDA 2003). The fraction of silt in surface soil (depth < 25cm) ranged from 0.23 to 0.95, with a mean of 0.70. The mean value of 0.70 was used in the screening-level risk calculations for soil.

Dust Loading

The amount of total dust on a surface (g/cm^2) is expected to vary widely from location to location and from time to time, depending on the types and rates of dust deposition on surfaces and on the frequency and thoroughness of cleaning. At this site, a set of 20 samples of dust were collected by vacuuming five template areas of 100 cm^2 each (total area = 500 cm^2) from carpets and floors in residential properties in Libby, and weighing the amount of dust collected. Values ranged from a minimum of non-detect (< 0.0002 mg/cm^2) to a maximum of 0.06 mg/cm^2, with a mean of about 0.01 mg/cm^2. The mean value (1E-05 g/cm^2) was used in the screening-level risk calculations for soil.

5.3 Calculation of Cancer Risk-Based Concentrations for Soil

Based on the equations and inputs discussed above, the risk-based concentrations of asbestos structures in soil (expressed as mass percent) are as follows:

Cancer Risk-Based Concentrations in Soil (mass percent)

Risk Level	Based on IRIS Risk Model	Based on Berman-Crump Risk Model
1E-02	36%	3.7%
1E-03	3.6%	0.37%
1E-04	0.36%	0.04%
1E-05	0.04%	0.004%

An interesting point to note is that most of the risk (about 86%) from asbestos in soil is attributable to the transport of the soil to indoor dust rather than the exposures which occur to asbestos in ambient or disturbed outdoor air. This is mainly because the time spent outdoor exposed to ambient air or to air near disturbed soil are quite small compared to the time spent indoors.

5.4 Cancer Risk Estimates for Soil Levels Observed in Libby

Measurements of Libby amphibole concentrations in outdoor yard soil have been performed at a number of residential and commercial properties in Libby using polarized light microscopy (PLM).

Of these properties, LA fibers have been observed in one or more soil samples from about 20% of the locations (64 out of 328)[12]. In most of these cases, the levels of LA in soil have been too low to quantify (these are reported as "Trace" or "<1%"), which probably corresponds with concentrations that are mainly in the 0.1-1% range. Based on the screening-level assumptions described above, soil concentrations in this range are predicted to correspond with excess lifetime cancer risk levels of 3E-05 to 3E-04 (IRIS risk model) to 3E-04 to 3E-03 (Berman Crump risk model). In a few cases, levels of asbestos were high enough to quantify, with levels of 4% to5% having been observed. If these values were assumed to be representative of the entire yard, they would correspond to a lifetime excess cancer risk in the range of 1E-03 to 1E-02 (depending on which risk model is used).

5.5 Estimated Cancer Risks at EPA's Action Level for Soil

At present, EPA removes and replaces soils that are estimated to contain 1% or more asbestos (grams per gram). In addition, EPA removes all soils with visible vermiculite at a residence if any soil location at that residence exceeds 1% asbestos. Based on the assumptions described above, a concentration of 1% LA in soil poses an excess cancer risk of about 3E-04 based on the IRIS PCM risk model and about 3E-03 based on the Berman-Crump risk model. However, these calculations are based on several assumptions that may tend to overestimate actual hazard. Most important is the assumption that the entire yard is contaminated with asbestos, while most sites evaluated to date tend to have asbestos in only one or two parts of the yard. If the total area contaminated were only 1/10 of the yard, this would tend to reduce the amount of asbestos entering house dust from yard soil, and risk estimates might be as much as 10-fold lower. In addition, the calculations do not account for the effects of snow cover and frozen ground, both of which tend to reduce transport of soil into indoor dust. Finally, the calculations do not take actual particle size into account, and particles that are too large to be respirable are evaluated as if they have undergone degradation to individual fibers. Based on these considerations, EPA is using an emergency response action level of 1% asbestos concentration in soil. It is anticipated that EPA's actions to remove or otherwise minimize exposure to soil asbestos concentrations above 1% are likely to capture areas of major concern from this medium at this time. Depending on site conditions and circumstances of potential human exposure, final action levels may be reduced even further to ensure protection of long-term human health.

6.0 SUMMARY

Reliable prediction of human health risk due to asbestos in environmental media (air, dust, soil) is very difficult. This is because of uncertainty at all stages of the risk assessment process. Table 6-1

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[12] See Attachment 1 for a detailed description of the data selection and calculation procedure.

lists the main sources of uncertainty, and provides a judgement about how large and in which direction the error associated with the uncertainty might be. Inspection of this table emphasizes the many different sources of uncertainty that exist, and how uncertain the risk estimates are (especially those associated with expected releases from soil or dust). Risk managers and the public should take these uncertainties into account when interpreting the calculations in this document.

Despite this uncertainty, the screening level calculations reported in this appendix provide a starting point for quantitative risk-based decision-making at this site. More specifically, the calculations have shown that there are numerous locations in Libby where concentrations of Libby amphibole in air, dust, and/or soil are above a level of potential health concern and provide further basis for ongoing emergency response actions. Based upon the screening level calculations, and other available information concerning exposures and health effects within the community, EPA believes that the current "action levels" and "clearance criteria," described above, provide a reasonable framework to allow for progress of time-critical remediation work to reduce high risk exposures and protect public health.

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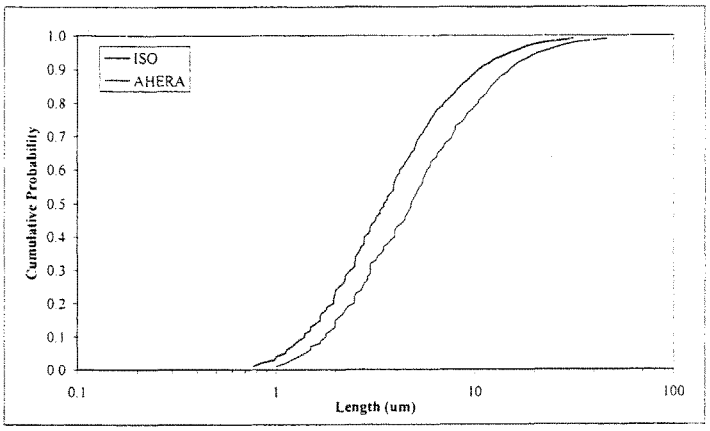
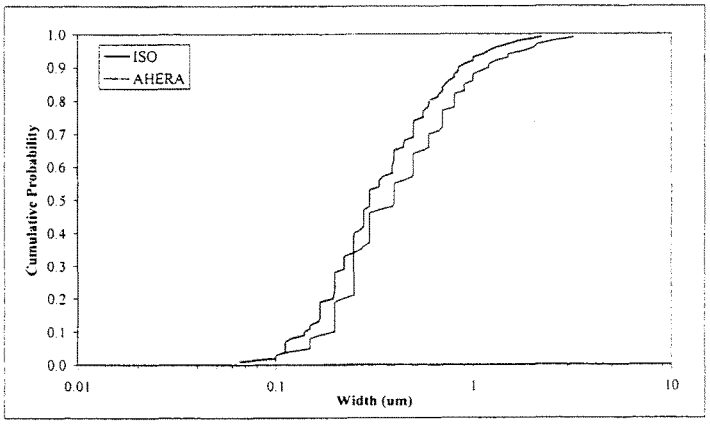
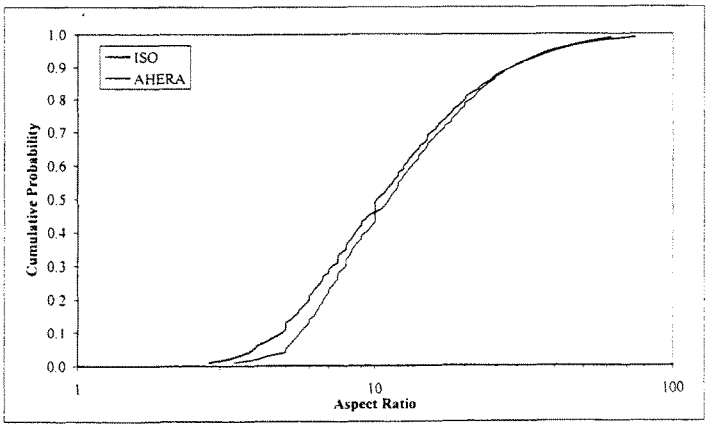
Figure 3-1
Structure Characteristic Distributions

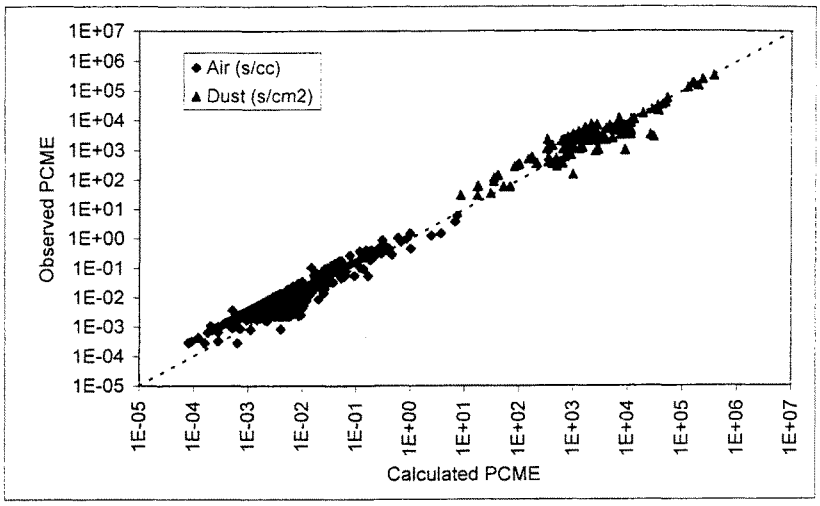






Dist graphs 7-31-03.xls: graphs
8/14/2003

Figure 3-2. Correlation of Observed and Calculated PCME Fiber Levels



PCMEasb obs vs pred.xls

TABLE 4-1. K FACTORS REPORTED AT OTHER SITES

Contaminant	Activity	K (s/cc per s/cm^2)
^{131}I-labeled dust	Active work in confined space	4.3E-05
Beryllium	Warehouse inventory	2E-02
Alpha emitters	Walking	4.9E-04
Uranium particles	Cart movement	1.45E-04
Chrysotile dust in a warehouse	Handling contaminated materials	2.0E-03 to 4.2E-03
Microorganisms	Air jet Moist mopping	1.2E-03 2.0E-04
Zinc Sulfide powder	Vigorous sweeping	1.9E-04
Asbestos (controlled studies)	Gym/athletic activities	2.4E-05
	Cleaning a storage area	3.1E-05
	Operating a forklift in a warehouse	3.6E-03
	Cable pull	1.4E-05
	Broom sweeping	7.1E-05
	Conventional carpet cleaning	3.9E-06

Source: Values are compiled from numerous reports as summarized by Millette and Hayes (1994)

TABLE 6-1. SUMMARY OF UNCERTAINTIES

Pathway	Variable	Basis of Uncertainty	Likely Magnitude in Overall Risk Estimate	Likely Direction of Error
Inhalation of fibers in air	C(air)	Based on typical number of grid openings counted (10-40), estimates have moderate to high statistical uncertainty. Values may vary as a function of time and location.	Medium	Either higher or lower
	Cancer Unit Risk Factors	Dependence of cancer risk on fiber size and type of asbestos not certain; more than 10-fold difference between different models	Medium-Large	Unknown
	Non-cancer reference concentration	No value is currently available; dependence on fiber size and type is unknown	Large	Underestimate non-cancer risk
Exposure to fibers from disturbance of indoor dust	C(dust)	Based on typical number of grid openings counted (10-40), estimates have moderate to high statistical uncertainty. Values may vary as a function of time and location.	Medium	Either higher or lower
	K Factor for active cleaning	Value is highly variable, depends on details of source, disturbance, and location; values from literature span 2 orders of magnitude; site specific estimate of mean is within literature range	Large	Either higher or lower
	K Factor for "baseline" residential activities	Nearly no information from literature. Site value is crude estimate of "typical". Actual values may vary widely.	Very Large	Either higher or lower
	TWF for active cleaning and baseline exposures	Based on national default values. Activity patterns in Libby may be different.	Small	Either higher or lower

Pathway	Variable	Basis of Uncertainty	Likely Magnitude in Overall Risk Estimate	Likely Direction of Error
Exposure to asbestos in outdoor air due to releases from soil	C(soil)	Quantification of asbestos in soil is difficult; current methods are only semi-quantitative. Estimates do not account for the presence of large (non-respirable) particles, since these may become respirable in the future.	Medium	Either higher or lower
	PEF for release of asbestos from soil to ambient outdoor air	Based on conservative national default values. Conditions in Libby may be different. For example, the factor assumes 50% vegetative cover, while actual site conditions may vary. The factor does not consider effect of snow cover or frozen ground.	Small	More likely to overestimate than underestimate
	Silt content of soil	Based on county wide statistics. Conditions in Libby may differ.	Small	Either higher or lower
	TWF for exposure to ambient outdoor air	Based on national default values. Activity patterns in Libby may be different.	Small	Either higher or lower
Exposure to asbestos in outdoor air due to releases from soil	TWF for active soil disturbance	Based on national default values for gardening. Activity patterns in Libby may be different.	Small	More likely to overestimate than underestimate
	PEF for release of asbestos from soil to outdoor air following active disturbance	Assumed value, very uncertain. Nevertheless, because exposure frequency and duration are assumed to be small, overall contribution to risk is small.	Small	Unknown
Exposure to asbestos in soil following transfer to indoor dust	Transfer of asbestos from soil into indoor dust	Based on studies on lead and arsenic at other sites. Conditions in Libby may vary. Assumes that entire yard is contaminated with asbestos. If only hot-spots exist, risks will be lower. Does not quantitatively consider effect of snow, frozen ground, or vegetative cover.	Large	Either higher or lower; probably higher in most cases.

Pathway	Variable	Basis of Uncertainty	Likely Magnitude in Overall Risk Estimate	Likely Direction of Error
	Estimate of fibers per gram of asbestos	Based on site data.	Small.	Unknown.
	Dust loading	Based on limited site data. Values are highly variable between locations, and are also likely to vary with time.	Large	Either higher or lower.

ATTACHMENT 1
DOCUMENTATION OF DATABASE QUERIES AND DATA REDUCTION

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1 INTRODUCTION

This attachment provides details of methods used to obtain data from the Libby 2 Database and to calculate values and parameters needed in risk evaluation. All results are based on the database as it existed on July 31, 2003. Many of the results in this attachment involve calculations in Excel® spreadsheets. These spreadsheets are frequently noted in footnotes ("filename.xls") and are available upon request.

2 CREATING A HORIZONTAL DATABASE LAYOUT FOR TEM RESULTS

The Libby 2 Database table that contains all of the raw results data (called "BtblResults") is organized in a vertical layout (see tables below for an example of horizontal vs. vertical layout). For the purposes of running efficient queries, SRC has converted the organizational structure of

the TEM structure data to a horizontal layout using a crosstab query [1].

Example of a horizontal layout:

Analysis IDSeqN	Grid Name	Primary Structure	Total Structure	Length	Width	Aspect Ratio	Class
5678	A3	1	1	5.88	0.28	21.00	LA

Example of a vertical layout:

Analysis IDSeqN	Grid Name	Characteristic	Result	Class
5678	A3	Primary Structure	1	LA
5678	A3	Total Structure	1	LA
5678	A3	Length	5.88	LA
5678	A3	Width	0.28	LA
5678	A3	Aspect Ratio	21.00	LA

3 PARTICLE SIZE DISTRIBUTIONS

3.1 ISO/AHERA Structure Distribution Figures

The Libby amphibole (LA) structure distributions shown in Figure 3-1 were generated by querying the database to obtain all LA structures reported for air and dust samples by both TEM-ISO and TEM-AHERA (N = 6238 ISO structures, N = 2116 AHERA structures). Cumulative frequency distributions were generated for length, width and aspect ratio [2].

Interim DB: TEM Calc ISO (Btbl Linkage).mdb & TEM Calc AHERA (Btbl Linkage).mdb Query Name: structure dist graph *Based on the Horizontal Layout of Raw Structure Data (see below for details)*		
Field	Constraint	Comment
SampleMediaDesc	Like "Air" Or Like "Dust"	
SampleQCTypeDesc	Like "Field Sample"	Excludes all QC samples (e.g. blanks, etc.)

[1] The crosstab queries (qryTEMResultsCrosstab) for ISO and AHERA are located in the interim DBs "TEM Calc ISO (Btbl Linkage).mdb" and "TEM Calc AHERA (Btbl Linkage).mdb", respectively. Because of their complexity, query details are not provided in this attachment but are available upon request.

[2] Dist graphs 7-31-03.xls

Interim DB: TEM Calc ISO (Btbl Linkage).mdb & TEM Calc AHERA (Btbl Linkage).mdb Query Name: structure dist graph *Based on the Horizontal Layout of Raw Structure Data (see below for details)*		
Field	Constraint	Comment
AnalysisMethod	Like "TEM-ISO10312" or Like "TEM-AHERA"	
ResultsMineralClass	Like "LA"	
TSTRUC (Total)	Is Not Null And Not Like 0	Excludes all non-countable structures

3.2 ISO/AHERA Structure Statistics

Every LA structure identified by TEM-ISO or TEM-AHERA for both air and dust (using the same structure data set used to prepare structure distribution figures above) was classified as to its size class on the basis of length, width, and aspect ratio as follows [3]:

AHERA: Length ≥ 0.5um, Aspect Ratio ≥ 5
PCME: Length ≥ 5um, Width > 0.25um, and Aspect Ratio ≥ 3
BCPS-short: Length ≥ 5um and < 10um, Width ≤0.5um
BCPS-long: Length ≥ 10um, Width ≤ 0.5um

Based on these classifications, the following ratios were established:

		Ratio
PCME/ISO	1734/6238	0.28
BCPS-s/ISO	812/6238	0.13
BCPS-l/ISO	261/6238	0.042
PCME/AHERA	872/2034	0.43
BCPS-s/AHERA	303/2034	0.15
BCPS-l/AHERA	119/2034	0.059

[3] Dist stats 7-31-03.xls

		AnalysisMethod		
		TEM-AHERA	TEM-ISO10312	Total
Air	Total Structures	2018	4401	6419
	AHERA	1945	3876	5821
	PCME	848	1388	2236
	BCPS-s	290	574	864
	BCPS-l	113	208	321
Dust	Total Structures	98	1837	1935
	AHERA	89	1728	1817
	PCME	24	346	370
	BCPS-s	13	238	251
	BCPS-l	6	53	59
Air + Dust	Total Structures	2116	6238	8354
	AHERA	2034	5604	7638
	PCME	872	1734	2606
	BCPS-s	303	812	1115
	BCPS-l	119	261	380

3.3 Fibers per Gram

The number of asbestos fibers per gram of total asbestos (FPG) was calculated as follows [4]:

$$FPG = \#\text{ of LA Structures}_{\text{fiber type}} / \text{Total LA Mass}$$

where: fiber type = PCME, BCPS-s or BCPS-l

$$\text{Total LA Mass (g)} = \sum \text{length (um)} \cdot \text{width}^2 \text{ (um)} \cdot 1\text{E-}12 \text{ (cm}^3\text{/um}^3) \cdot 3.1 \text{ (g/cm}^3)$$

Asbestos fibers per gram of total asbestos (FPG)			
	LA structures	LA mass (g)	FPG
total	8354	2.89E-07	2.9E+10
PCME	2606		9.0E+09
BCPS-s	1115		3.9E+09
BCPS-l	380		1.3E+09

4 CALCULATING THE AREA-EVALUATED-WEIGHTED (AEW) CONCENTRATION/LOADING VALUE

This risk evaluation focused on air concentrations and dust loadings as analyzed by TEM-ISO. For each ISO analysis, concentration/loading is reported for each of three mineral classes – Libby amphibole (LA), other amphibole (OA), and crysotile (C) – for seven structure dimension "bins". The structure dimension bins are defined as follows:

[4] Dist stats 7-31-03.xls

Bin	Length	Width	Aspect Ratio
A			< 5
B	< 0.5um		≥ 5
C		> 0.5um	≥ 5
D	≥ 0.5um - 5um	≤ 0.5um	≥ 5
E	5um - 10um	≤ 0.5um	≥ 5
F	> 10um	≤ 0.5um	≥ 5
G	all	all	all

Summary statistics for air and dust were based on concentrations/loadings from LA, Bin G.

If an air or dust sample (which is represented by a unique Index ID) was analyzed using the same Prep Method (Direct or Indirect) more than once (e.g.: one sample analyzed by ISO Indirect counting 10 grid openings (GOx) on 7/12/01 and 30 GOx on 9/2/01), it is necessary to calculate the total Area-Evaluated-Weighted (AEW) concentration/loading value across all analyses for the sample.

The AEW concentration/loading is calculated using the following steps and equations [5]:

AEW Concentration or Loading = $\sum$ (GOx · GO area · Concentration or Loading) / $\sum$ (GOx · GO area)

Step 1 – For each Analysis ID, calculate GOx · GO area · Concentration or Loading (GOxAC)
Step 2 – For each Analysis ID, calculate GOx · GO Area (GOxA)
Step 3 – For each Prep Method, calculate the $\sum$(GOxAC) and $\sum$(GOxA)
Step 4 – For each Prep Method, calculate the AEW by dividing $\sum$(GOxC) by $\sum$(GOx)
Step 5 – If an Index ID has results for both Prep Methods (Direct and Indirect), select the maximum concentration/loading value to represent the Index ID.

Example:

Index ID	Analysis ID	Media	Analysis Method	Prep Method	GOx	LA Bin G count	LA Bin G conc	AEW LA Bin G conc	Final AEW LA Bin G conc
X-00123	001	Air	ISO	Indirect	10	1	0.008	0.011	0.03
X-00123	002	Air	ISO	Indirect	30	2	0.012		
X-00123	003	Air	ISO	Direct	10	1	0.03	0.03	

[5] The AEW calculations are performed within the interim DB "TEM Calc ISO (Btbl Linkage).mdb" in a four part query (qry_ISO LA BinG Conc). Because of its complexity, query details are not provided in this attachment but are available upon request.

5 INDOOR AIR CONCENTRATIONS OBSERVED IN LIBBY

5.1 Exposures to Typical Indoor Air

In order to evaluate risks from typical residential and workplace exposures to indoor air in Libby, the database was queried to obtain air concentrations for all indoor air samples (personal and stationary) collected during Phase 1, Phase 2 Scenario 1 (routine activity scenario), and Phase 2 Scenario 2 (cleaning scenario, pre-activity). Air samples collected during the Phase 1R investigation were excluded because they are likely to be impacted by remedial activities and not representative of typical exposure scenarios.

Air concentrations were averaged first across all samples within a property and then summary statistics were calculated across properties [6].

Total ISO, AEW Bin G LA Concentration

Media		Detect. Freq.	Mean[1]	5th Percentile[1]	95th Percentile[1]	Mean sensitivity[2]
Indoor Air (s/cc)	by sample	96/309	0.0230	0.00021	0.1420	0.0064
Indoor Air (s/cc)	by property	59/154	0.0083	0.00013	0.0621	0.0025

1 Based on Detects only
2 Based on NDs only

Interim DB: TEM Calc ISO (Btbl Linkage).mdb Query Name: phase 1 air-dust data		
Field	Constraint	Comment
SamplePhaseDesc	Like "Phase 1"	
LocationLandUse Desc	Not Like "Industrial"	Excludes any industrial properties that are not representative of the risk evaluation exposure scenarios.
LocationProperty GroupDesc	Not Like "*Screen*" and Not Like "*Export*" and Not Like "2059 Bryant St (Denver, CO)"	Excludes any samples collected from the Screening Plant or Export Facility because they are not representative of the risk evaluation exposure scenarios. Excludes properties not located in Libby, MT.
SampleMediaDesc	Like "Air" or Like "Dust"	
SampleQCTypeDesc	Like "Field Sample"	Excludes all QC samples (e.g. blanks, etc.)

[6] air dust summ stats_risk calc v2.xls

Interim DB: TEM Calc ISO (Btbl Linkage).mdb Query Name: phase 1 air-dust data		
Field	Constraint	Comment
For Air Samples,		
SampleMatrixDesc	Not Like "Outdoor"	Excludes any samples that are not representative of indoor exposures.
For Dust Samples,		
SampleMatrixDesc	Not Like "Cloth" and Not Like "Vehicle"	Excludes any samples that are not representative of indoor exposures.

Based on a review of the air and dust samples collected as part of Phase 1 by the data managers and Libby field team, the following samples were also excluded from summary statistics as being unrepresentative of typical residential and workplace exposures.

Excluded Phase 1 Indoor Air Samples:
--1020 California Ave (1-00295, 28-28152)
--1022 1/2 California Ave (1-07238, 1-07239)
--107 W. 4th St - EMSL Lab (1-06863, 1-06870, 1-06931)
--110 River Run Ln (1-06804, 1-06805)
--115 W. 2nd St - Kootenai Angler (1-07242, 1-07243, 1-07244, 28-28124)
--120 River Run Ln (1-06801, 1-06802)
--1203 Minnesota Ave - Millwork West (1-06907, 1-06908)
--303 W. Thomas St (Planer Bldg) (1-04593, 1-04594, 1-04595, 1-04598, 1-04599, 1-06871, 1-06872, 1-06873, 1-06874, 1-07209, 1-07210, 1-07231, 1-07232)
--318 Louisiana Ave - CDM Federal (1-07207)
--517 Montana Ave (1-01946, 1-01947)
--Location = NA (1-02121, 1-06862, 28-28132, 28-28134, 28-28136, 28-28138, 28-28140)

Excluded Phase 1 Dust Samples:
--1022 1/2 California Ave #A (1-01959)
--1022 1/2 California Ave #B (1-01961, 1-01962)
--107 W. 4th St - EMSL Lab (1-07911, 1-07912, 1-07913, 1-06651, 1-06739, 1-06740, 1-06741, 1-06742, 1-06743, 1-06744, 1-06745, 1-06746, 1-06747, 1-06748, 1-06749, 1-06750, 1-06751, 1-06754, 1-06755, 1-06756, 1-06757, 1-06866, 1-06889, 1-06890, 1-07184, 1-07195, 1-07233, 1-07250, 1-07367, 1-07368, 1-07427, 1-07429)
--17115 Highway 37 N - Libby Dam (1-03373, 1-03374)
--2293 Kootenai River Rd Barn (1-07871, 1-07872)
--3496 Highway 2 S (1-03935, 1-03936, 1-03937, 1-03938)
--517 Montana Ave (1-01950, 1-01951)
--High School Bleachers (1-03858, 1-03859)
--Libby Pub Schools Admin Bldg (1-03151, 1-03152)

Interim DB: TEM Calc ISO (Btbl Linkage).mdb Query Name: phase 2, scenario 1 data		
Field	Constraint	Comment
SamplePhaseDesc	Like "Phase 2"	
SampleScenarioDesc	Like "01-*"	Restricts samples to those collected during Phase 2, Scenario 1 (routine activity).
SampleMediaDesc	Like "Air"	
SampleQCTypeDesc	Like "Field Sample"	Excludes all QC samples (e.g. blanks, etc.)
For Air Samples,		
SampleMatrixDesc	Not Like "Outdoor"	Excludes any samples that are not representative of indoor exposures.
PumpFilterDiameter	Like 25	Excludes any Hazdust samples.

Interim DB: TEM Calc ISO (Btbl Linkage).mdb Query Name: phase 2, scenario 2 data		
Field	Constraint	Comment
SamplePhaseDesc	Like "Phase 2"	
SampleScenarioDesc	Like "02-*"	Restricts samples to those collected during Phase 2, Scenario 2 (cleaning).
SampleMediaDesc	Like "Air"	
SampleQCTypeDesc	Like "Field Sample"	Excludes all QC samples (e.g. blanks, etc.)
For Air Samples,		
SampleMatrixDesc	Not Like "Outdoor"	Excludes any samples that are not representative of indoor exposures.
PumpFilterDiameter	Like 25	*Note: several samples designated as NULL required reclassification.* Excludes any Hazdust samples.
SampleTWAEXC	Like "TWA"	*Note: several samples required reclassification.* Restricts samples to those collected across the full period, excludes any excursion samples.
SamplePrePostClear	Like "Pre"	*Note: several samples required reclassification.* Restricts samples to those collected prior to commencement of cleaning activities.

5.2 Exposures to Disturbed Vermiculite

In order to evaluate the exposure of residents and workers to vermiculite insulation, the database was queried to obtain air concentrations for all indoor air samples (personal and stationary) collected during Phase 2 Scenario 3 (collected during active vermiculite disturbance).

Air concentrations were averaged first across all samples within a property and then summary statistics were calculated across properties [7].

Total ISO, AEW Bin G LA Concentration

Summary across properties:	
0.45	average air conc (s/cc) stationary
0.68	average air conc (s/cc) personal

Interim DB: TEM Calc ISO (Btbl Linkage).mdb Query Name: phase 2, scenario 3 data		
Field	Constraint	Comment
SamplePhaseDesc	Like "Phase 2"	
SampleScenarioDesc	Like "03-*"	Restricts samples to those collected during Phase 2, Scenario 3 (active disturbance).
SampleMediaDesc	Like "Air"	
SampleQCTypeDesc	Like "Field Sample"	Excludes all QC samples (e.g. blanks, etc.)
For Air Samples,		
SampleMatrixDesc	Not Like "Outdoor"	Excludes any samples that are not representative of indoor exposures.
PumpFilterDiameter	Like 25	*Note: several samples designated as NULL required reclassification.* Excludes any Hazdust samples.
SampleTWAEXC	Like "TWA"	*Note: several samples required reclassification.* Restricts samples to those collected across the full period, excludes any excursion samples.

[7] Phase 2, Scenario 3 Air Data.xls

Interim DB: TEM Calc ISO (Btbl Linkage).mdb Query Name: phase 2, scenario 3 data		
Field	Constraint	Comment
SamplePrePostClear	Like "N/A"	*Note: "N/A" = During; several samples required reclassification.* Restricts samples to those collected during active disturbance activities.

5.3 Exposures to Disturbed Sources

In order to evaluate short-term risks from exposures to disturbed sources, the database was queried to obtain air concentrations for all worker personal monitoring air samples. Because the OSHA limits which were used to evaluate these short-term exposures are based on PCM, the database was queried to obtain air samples that had been analyzed by PCM-7400.

Interim DB: Non ISO-AHERA DB (Btbl Linkage).mdb Query Name: pcm personal air data		
Field	Constraint	Comment
SamplePersonalStationary	Like "Personal"	Restricts samples to those that are personal monitoring.
SampleMediaDesc	Like "Air"	
SampleQCTypeDesc	Like "Field Sample"	Excludes all QC samples (e.g. blanks, etc.)
AnalysisMethod	Like "PCM-7400"	Restricts samples to those that were analyzed by PCM-7400.
AnalysisFilterStatus	Is NULL or Like "Analyzed"	Excludes any samples that were overloaded or that were not analyzed.

After a review of the query output, several additional samples were excluded for the following reasons:

- The sample comment field indicated that the sample was a hazdust sample or that the filter size was 37mm (indicating a hazdust sample). {N = 24 samples}
- The total number of fields counted was zero or NULL. This typically indicates that the sample was either overloaded or not analyzed. {N = 203 samples}
- The limit of detection (LOD) was reported as zero or NULL. The LOD should be calculated for every sample. {N = 28 samples}
- The reported air volume collected was reported as zero or NULL. This typically indicates that the sample is a field blank. {N = 7 samples}
- The reported structure concentration (f/cc) was reported as zero or NULL. This field should report either the calculated concentration for a detect or < LOD for a non-detect. {N = 79

samples}

- The reported structure concentration (f/cc) for a non-detect was not equal to < the calculated sample LOD. {N = 3 samples}

Two types of air samples were collected as part of the worker exposure monitoring process - excursion (EXC) samples and time-weighted average (TWA) samples. In some cases the sample type (EXC or TWA) was not assigned and was inferred based on the sample collection period [8].

Each personal monitoring air concentration was compared to the appropriate OSHA short-term limit without adjustment for differences in collection period duration. EXC samples were compared to the short-term exposure limit (STEL = 1.0 PCM f/cc) and TWA samples were compared to the 8-hr time-weighted average permissible exposure level (PEL = 0.1 PCM f/cc).

Number of PCM Worker Air Samples Above the OSHA Limit

Sample Type	N total	N detects > std
TWA std = 0.1 f/cc	2117	419
EXC std = 1 f/cc	1474	40

Samples that were detected above their respective OSHA limit, were classified according to the type of activity (active vermiculite disturbance, active soil disturbance, other) and the general location in which the activity was performed (current residential/commercial area of Libby, current or former mining/processing areas) [9].

Locations/Types of Activities for Samples Above the OSHA Limit

	Mining Related			Residential/Commercial		
Sample Type	Soil Dist.	Verm Dist.	Other	Soil Dist.	Verm Dist.	Other
TWA	57	7	155	4	136	60
EXC	6	1	9	–	18	6

6 DERIVATION OF RESUSPENSION (K) FACTORS

6.1 K Factor for Active Cleaning

In order to derive site-specific estimates of resuspension (K) factors associated with active cleaning, the database was queried to obtain air concentrations and dust loadings for all indoor samples collected during Phase 2 Scenario 2. The data set is nearly identical to that provided by the query "phase 2, scenario 2 data" (see Section 4) with the following exceptions:

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[8] PCM Exceedance Calcs_10-21-03.xls

[9] PCM Exceedance Calcs_10-21-03.xls

Field	Constraint	Comment
SampleMediaDesc	Like "Air" or Like "Dust"	
For Air Samples,		
SamplePrePostClear	Like "N/A"	*Note: several samples required reclassification.* Restricts samples to those collected during active cleaning.
For Dust Samples,		
SamplePrePostClear	Like "Pre"	*Note: several samples required reclassification.* Restricts samples to those collects prior to commencement of cleaning activities.

The average Scenario 2 personal air AEW LA Bin G concentrations (non-hazdust, full period, during activity) were calculated within each property. The average Scenario 2 dust AEW LA Bin G loading (pre-activity) was calculated within each property. Non-detects were evaluated at 0. The average Scenario 2 air concentration across all properties was then divided by the average Scenario 2 dust loading across all properties [10].

Cleaning K: 3.89E-03 / 2.13E+02 ⟶ **1.8E-05**
Avg Scenario 2 Air (Personal, Full, During) / Avg Scenario 2 Dust (Pre-Activity)

6.2 K Factor for "Baseline" Activities

6.2.1 Based on Phase 2 Data

In order to derive site-specific estimates of resuspension (K) factors associated with "baseline" activities, the database was queried to obtain air concentrations and dust loadings for all indoor samples collected during Phase 2 Scenario 1 and Phase 2 Scenario 2 (pre-activity). The data sets are identical to that provided by the queries "phase 2, scenario 1 data" and "phase 2, scenario 2 data" (see Section 4).

The average Scenario 1 personal and average stationary air AEW LA Bin G concentrations (non-hazdust, full period) were calculated within each property. The average Scenario 2 dust AEW LA Bin G loading (pre-activity) was calculated within each property. Non-detects were evaluated at 0. The average Scenario 1 air concentration across all properties was then divided by the average Scenario 2 dust loading across all properties [11].

[10] site-specific K_7-31-03.xls

[11] site-specific K_7-31-03.xls

Background K: 1.53E-03 / 2.13E+02 ⟶ **7.2E-06**
Avg Scenario 1 Air (Personal+Stationary) / Avg Scenario 2 Dust (Pre-Activity)

Detection Freq.:	Air	Dust
	7/16	3/14

6.2.2 Based on Phase 1 Data

Several air and dust samples collected at residential and commercial locations as part of the Phase 1 investigation are representative of "baseline" activities, therefore the database was queried to obtain air concentrations and dust loadings for all indoor samples collected during Phase 1. The data set is identical to that provided by the query "phase 1 air-dust data" (see Section 4).

The average Phase 1 personal and average stationary air AEW LA Bin G concentrations were calculated within each property. The average Phase 1 dust AEW LA Bin G loading was calculated within each property. Non-detects were evaluated at 0. The average Phase 1 air concentration across all properties was then divided by the average Phase 1 dust loading across all properties [12].

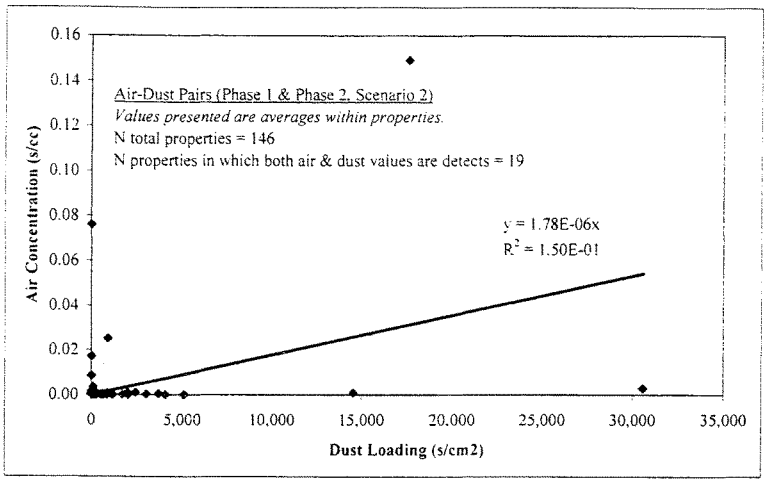
	detect. freq.		Avg	Stdev	50th	90th	99th
air	54/145	37%	2.91E-03	1.71E-02	0.00E+00	7.27E-04	1.00E-01
dust	195/484	40%	8.30E+02	3.94E+03	0.00E+00	1.14E+03	1.76E+04
			↓				
	Phase 1, Baseline K:		**3.5E-06**				

6.2.3 Based on Phase 1 and Phase 2 Data

For each property in which both air and dust were sampled, the average Phase 1 & Phase 2, Scenario 2 personal and average stationary air AEW LA Bin G concentration (non-hazdust, full period, pre-activity) was calculated within each property. The average Phase 1 & Phase 2, Scenario 2 dust AEW LA Bin G loading (pre-activity) was calculated within each property. Non-detects were evaluated at 0. The paired data for each property was plotted and a linear regression line was fit assuming a y-intercept of zero [13].

[12] ph1 air-dust v2.xls (TAB: all_house avg)

[13] ph1 & ph2 air-dust pairs v2.xls



7 DUST LEVELS OBSERVED IN LIBBY

In order to evaluate risks from typical residential and workplace exposures to indoor dust in Libby, the database was queried to obtain dust loading for all indoor dust samples collected during Phase 1 and Phase 2 Scenario 2 (pre-activity). The data sets are identical to that provided by the queries "phase 2, scenario 1 data" and "phase 2, scenario 2 data" (see Section 4). Dust samples collected during the Phase 1R investigation were excluded because they are likely to be impacted by remedial activities and not representative of typical exposure scenarios.

Dust loadings were averaged first across all samples within a property and then summary statistics were calculated across properties [14].

Total ISO, AEW Bin G LA Loading

Media	Detect. Freq.	Mean[1]	5th Percentile[1]	95th Percentile[1]	Mean sensitivity[2]
Indoor Dust (s/cm2)	196/485	2,048	28	7,418	1,129

1 Based on Detects only
2 Based on NDs only

[14] air dust summ stats_risk calc v2.xls

8 SOIL LEVELS OBSERVED IN LIBBY

In order to evaluate risks from typical residential exposures to surface soil in Libby, the database was queried to obtain asbestos mass fraction estimates for all soil samples collected during the Contaminant Screening Study. Results were restricted to analyses performed by PLM-NIOSH 9002, PLM-Gravimetric, or PLM-Visual Estimation (VE).

Interim DB: Non ISO-AHERA DB (Btbl Linkage).mdb
Query Name: soil data_PLM-VE

Field	Constraint	Comment
SamplePhaseDesc	Like "Contaminant Screening Study"	
LocationProperty GroupDesc	Not Like "Screening Plant"	Excludes any samples collected from the Screening Plant because they are not representative of typical residential exposure scenarios.
SampleMediaDesc	Like "Soil-Like"	
SampleMatrixDesc	Like "Surface Soil"	Excludes soils collected from subsurface depths because residential contact is unlikely.
SampleQCTypeDesc	Like "Field Sample"	Excludes all QC samples (e.g. blanks, etc.)
AnalysisMethod	Like "PLM-VE"	
AnalysisLabQCDesc	Like "Not a QA*"	Excludes all QA samples (e.g. Recounts, etc.)
ResultsMineralClass	Like "LA"	

Interim DB: Non ISO-AHERA DB (Btbl Linkage).mdb
Query Name: soil data_PLM-Grav

Identical to "soil data_PLM-VE" with the following exceptions:

Field	Constraint	Comment
AnalysisMethod	Like "PLM-Grav"	

Interim DB: Non ISO-AHERA DB (Btbl Linkage).mdb
Query Name: soil data_PLM-9002

Identical to "soil data_PLM-VE" with the following exceptions:

Field	Constraint	Comment
AnalysisMethod	Like "PLM-9002"	

Interim DB: Non ISO-AHERA DB (Btbl Linkage).mdb Query Name: soil data_PLM-9002 *Identical to "soil data_PLM-VE" with the following exceptions:*		
Field	Constraint	Comment
ResultsMineralClass	Like "TREM-ACTN"	This mineral class is representative of "LA".

In cases where more than one analysis was performed for the same sample, the highest analysis result was used to represent the sample [15]. In cases where more than one sample was collected for the same property, the highest sample result was used to represent the property. The following ranking system was used to select the highest result:

Detected >> below QL >> Trace >> Not Detected

328	N Properties w/ 1+ soil samples analyzed via PLM		
	264	ND	*80%*
	46	Tr	*14%*
	14	<QL	*4%*
	4	Detect	*1%*

For soil samples in which both the coarse and fine fractions were analyzed and one or both of the result values were detects, the final sample result was the mass-weighted average of the two fractions [16]. The mass-weighted average was calculated as:

$$(MF\%_{coarse} \cdot Mass_{coarse} + MF\%_{fine} \cdot Mass_{fine}) / (Mass_{coarse} + Mass_{fine})$$

[15] soil summ stats_risk calc.xls

[16] soil summ stats_risk calc.xls

Libby Community Advisory Group
Meeting Summary
January 11, 2007

Introductions
Gerald Mueller and members of the Libby Community Advisory Group (CAG) introduced themselves. A list of the members in attendance is attached below as Appendix 1

Agenda
The CAG agreed to the following agenda for this meeting:
- Libby Legislative Funding Request
- Review of CAG Operation and Structure
- Boothman Pit Soils Analytical Technique
- Agency Reports
  - EPA
  - TAG
  - CARD
- Public Comment
- Next Meeting Agenda

Libby Legislative Funding Request
Bill Patten passed out a copy of the latest draft of legislation requesting a $3 million appropriation to Libby for asbestos-related disease health care. See Appendix 2. Mr. Patten noted that previously the thinking was that the funding would go to LAMP. However, the legislature cannot appropriate money to a non-profit organization; instead, it must appropriate funds to a state agency which can then provide funding to the Lincoln County health board. Representative Chas Vincent has agreed to carry the legislation, and the other two members of the Libby delegation, Senator Aubyn Curtiss and Representative Ralph Heinert will co-sponsor it. Mr. Patten stated that to pass the bill, we will need the support and testimony of people from the Libby community.

Audience Member Comment - We should have a bus going to Helena.

Audience Member Comment - Copies of the legislation, HB 407 can be found at the legislative web site at http://data.opi.mt.gov/bills/2007/billpdf/LC2129.pdf.

Audience Member Comment - The state is in part responsible for the asbestos contamination here. We should hit the state up for $10 million to hire lawyers.
Response by Gayla Benefield - Several lawsuits have been filed against the state. They are on hold.

Review of CAG Operation and Structure
Bill Patten began the discussion by reviewing the document he provided at the December CAG meeting. This document provided ideas following up on the survey he conducted.

Audience Member Question - How many people participated in your survey?

Answer by Bill Patten - I surveyed 27 individuals. My survey was not meant to have scientific validity as representative of the Libby community. I conducted it in response to the homework assignment given at the October CAG meeting to talk with interests in the community such as business owners and realtors to learn why they are not attending CAG meetings and to invite them back.

Audience Member Comment - This survey should be expanded to take in the entire Libby community.

CAG Member Comment - When the CAG was first formed, some of us identified and sought CAG representation from the different segments of our community. We should go public with a notice that we are reorganizing and are seeking additional members.

Audience Member Comment - The CAG is the most important group in town.

CAG Member Comment - CAG members should represent some segment of the community rather than just themselves as individuals.

CAG Member Comment - In addition to group or organizational representatives, we also need individuals so we can get both sides of the story. Advisory groups are congressionally mandated to get the public involved. CAG membership should be open to anyone who wants to help out.

Audience Member Comment - Seven years ago, when I first began attending CAG meetings, I did so in the audience. The CAG then had about 30 members. Some participated to oppose a Superfund designation. About half of the CAG members dropped out when the Superfund designation issue did not go away. I later took a seat on the CAG because I didn't feel anyone was representing me.

CAG Member Comment - Perhaps we should have a mix of CAG members, some of whom represent community groups and a few who serve as individuals.

Audience Member Question - What specifications are in the Superfund law for community advisory groups?
Answer by Ted Linnert - EPA has written guidelines for community advisory groups, but they are flexible. An advisory group can be whatever the community wants it to be.

Audience Member Comment - My concern is that the true impacted parties should be represented on the CAG. These are the victims of asbestos-related disease and the homeowners. Some 1,400 properties face cleanups. We have formed a homeowners association to involve these property owners. The first meeting was attended by 35 homeowners. This meeting was not just a bitch session. People were interested in what happens when a cleanup occurs. We talked about actions people can take to protect themselves, such as by vacuuming.

Audience Member Comment - We prepared an application to EPA for a $50 thousand environmental justice grant to support the homeowners association. We finished a draft on a Thursday, and it was due on the following Monday. However, we opted not to submit it because we were advised that we probably would have to be a 501(c)(3) non-profit organization. We may

submit the grant next year, but we will need community support.

CAG Member Comment - What happens to our homes directly affects the community. We need to involve realtors and the business community on the CAG in addition to homeowners.

CAG Member Comment - Everyone impacted should be represented. We should continue to have representation from EPA, the hospital, CARD, TAG, and the Operation and Maintenance Working Group.

Audience Member Question - Is EPA generally represented on advisory groups?
Answer by Ted Linnert - EPA generally participates, but as a non-voting member.

Audience Member Comment - The CAG is important because it provides a venue for EPA to get a consistent message to the community.
Response by Paul Peronard - EPA does attend many community group meetings and will continue to do so. We try to provide a consistent message to all of them. However, people have different interests. They can hear the same statements but interpret them to have different meanings, depending on their interests.

Audience Member Comment - I spent four years on the CARD board of directors, and then I took a year off. Many community organizations are looking for our time. People only have so much time to serve in community organizations, and only some people are willing to give it. The CAG is an important organization to this community.

CAG Member Comment - We used to have elected officials on the CAG. Since the city got in bed with W.R. Grace, EPA is not allowed to attend city meetings. Community members are precluded to ask questions at county commission meetings. Our local officials were elected to represent the community. We should send a letter to the cities of Libby and Troy and the county asking them to have a representative participate on the CAG.

CAG Member Question - Is there a legal reason that county commissioners are not on the CAG?
Answer by Paul Peronard - EPA is not allowed to pay local officials to participate in groups such as the TAG. We pay for the CAG facilitator and for meeting room and sound arrangements. CAG members are not paid, so local officials can be members.

Audience Member Comment - There was a point when the county was considering legal action against W.R. Grace and was advised by the Donovan Group that it should not be on the CAG.

CAG Member Comment - One of the reasons that our local officials stopped participating on the CAG is because they were repeatedly attacked.

CAG Member Comment – No one likes to be attacked. We need to be careful about the language we use. We can challenge ideas and seek information without attacking people.

CAG Member Comment - In our first three years, there was a lot of emotion at our meetings. But people needed a way to express the anger they were feeling. This emotion has largely dissipated.

We have achieved a lot since then. For example, we have gotten medical care and psycho-social services.

CAG Member Comment - Since I have been coming to CAG meetings over the last few years, communication at CAG meetings has changed for the better. Detailed information is getting out. I like the idea of an environmental justice grant to support the homeowners association.

CAG Member Comment - Our elected officials are also concerned about the negative publicity Libby has gotten because of the Superfund cleanup. At a recent county commission meeting, the story was told about a local woman flying on a commercial airline. When the woman in the seat next to her learned she was from Libby, the non-Libby resident demanded to change her seat.

Audience Member Comment - At a recent Nordic Fest, someone didn't want to bring their horses here because of concern about the asbestos contamination.

CAG Member Comment - One of the challenges we face at the hospital in recruiting medical staff is concern about the contamination.

CAG Member Comment - About once a month, a negative story about Libby hits main street, but people continue to move here and properties are selling. The most recent edition of the Western News reports that in 2006, 47 building permits were issued for $3.2 million in construction. Some 56 new septic systems were installed in Libby and 47 in Troy. Flathead Electric had 38 new installations in the Libby area along with 120 rebuilds and upgrades. Last year 126 homes sold in Libby and 41 in Troy. The sale prices for Libby homes ranged from $47 thousand to $800 thousand. Home prices in Troy ranged from $59,900 to $2.9 million. According to the mayor, few houses are available at $100 thousand.

CAG Member Comment - In addition to addressing issues such as the property cleanups, we need to focus on how we move into the future.

CAG Action - The CAG agreed to contact the Cities of Libby and Troy and the Lincoln County Commissioners and request that these governments have a member representing them on the CAG. Bill Patten and Tanis Hernandez agreed to draft and send a letter on behalf of the CAG making the invitation to the cities and county and requesting a response. The letter will also explain that the CAG is considering reformulating itself. Bill Patten was authorized to sign the letter on behalf of the CAG. Current CAG members also agreed to review the original list of CAG members and come to the February CAG meeting prepared to identify the specific organizations to invite to designate representatives to serve as CAG members. Mr. Mueller was asked to send to the CAG the original roster of CAG members.

The CAG then developed a list of topics that it will address in its reformulation discussion. These topics will be discussed after the new members have joined the CAG. The list included:

- Organization name;
- Number of members;
- Membership requirements and responsibilities;
- Purpose/mission statement;

- Ground rules;
- Agenda setting;
- Role of facilitator, if any;
- Designation of a chair person;
- CAG meeting room; and
- Relationship to other community groups.

Bill Patten and LeRoy Thom also volunteered to visit the local newspapers and radio stations to seek publicity that the CAG is reformulating and considering the preceding list of issues.

Boothman Pit Soils Analytical Technique

Paul Peronard discussed the available instruments used to analyze soil samples. One is the phase contrast microscope. This instrument has the lowest magnification and may not be useful in distinguishing between types of fibers, such as asbestos and cellulose. It is not used to analyze Libby soil samples. Another is the polarized light microscope (PLM). This instrument can magnify up to 2,000X, but is generally used in analyzing soil samples in the 400 - 800X magnification range. The third instrument is the transmission electron microscope, (TEM) which can magnify up to 40,000X, and is generally used at magnifications around 20,000X. The final instrument is the scanning electron microscope (SEM), which can also magnify up to 20,000X. Use of this instrument is generally limited to research; it is not used for commercial analyses. The United States Geological Service has used SEM in research on Libby amphibole. One might expect that, because of its higher magnification capability, TEM would be the best instrument for Libby soil analysis. This is not correct, however, because of TEM's small field of view. Asbestos in soil samples is generally not evenly distributed, but occurs in clumps. Using TEM may miss a significant amount of asbestos fibers, resulting in what is known as a false negative reading, i.e., asbestos is present but not detected. TEM is routinely used to analyze ambient air samples, rather than solid media samples. For solid sample analysis, PLM is used because it can view a larger sample size.

Two types of PLM analysis exist. The difference between the two relates to sample preparation rather than the instrument itself. In polarized light microscopy, visual estimation (PLM-VE), the sample is ground and homogenized, which eliminates the clumping issue. The analytical sensitivity of the standard PLM analysis, known as NIOSH 9002, is a 1% asbestos concentration. PLM-VE is sensitive down to a concentration of 0.2% asbestos. This means that the sensitivity limits of both PLM techniques are higher than the concentrations of concern; thus a non-detect sample may contain asbestos in amount with negative health consequences. EPA will address this issue in the risk analysis.

In the Boothman Pit analyses, and the analyses of all backfill (i.e. clean) soils, EPA uses the following procedure:

- First, all loads of backfill are visually inspected for vermiculite sources.
- Second, every 3,000 cubic yards (yd^3) a sample is taken for a PLM-VE analysis, which is conducted in Denver. These samples are ground, homogenized and sent out to a commercial laboratory.
- Third, when quick turn-around is needed, the NIOSH 9002 PLM technique is used because it can be done locally.

- Fourth, one of five personnel involved in the digging and transportation of backfill material wear personal ambient air samplers, which are analyzed using the PLM and TEM instruments.
- Fifth, at the site in which backfill is place, activity based sampling occurs. In this sampling, ambient air monitoring is conducted of sample activities expected on the site, such as raking and crawling in the dirt. These samples are analyzed using TEM.

Using this procedure, EPA can be 100% confident that backfill will not be a source of asbestos contamination. Backfill will have an asbestos concentration at least four orders of magnitude less than the contaminated soil that is being removed and replaced, even when the contaminated soil has a non-detect asbestos concentration reading.

Audience Member Question - Do you use activity sampling after sod is laid?
Answer - It depends on the site.

Audience Member Question - Is the Boothman pit licensed by the state?
Answer - Yes. Removing 10,000 yd^3 triggers the state permitting requirement.

Audience Member Question - When you open a pit to provide backfill, do you analyze the material that is scraped off and set aside?
Answer - No. You raise a good point, and we should analyze this material.

Audience Member Comment - Soils adjacent to the disturbed area for the backfill pit should also be analyzed.

Audience Member Comment - I am relieved that EPA is conducting the activity sampling.

Audience Member Question - Does the grinding affect sample morphology?
Answer - Yes. PLM-VE cannot be used to determine asbestos fiber size distributions. TEM is used in ambient air sampling and to determine fiber size distributions.

Audience Member Comment - Chris Weis told me that the resolution limit for PLM is 0.25 microns.
Response - PLM is used for solid matrix samples, not for individual asbestos fiber analysis.

Audience Member Question - Do you keep track of moisture content when conducting activity based sampling?
Answer - No, but we do not do this sampling in the rain. The activity sampling is conducted under typical Libby summer day conditions. Typical and worst case conditions will be addressed in the risk analysis.

TAG Report

Gayla Benefield reported on behalf of the TAG. The TAG board of directors has elected new officers. Mike Noble is the new chairman and Kathy Sullivan is the Treasurer. The TAG Technical Advisor, Gerry Henningsen, and Gayla Benefield have been invited to attend an EPA meeting at Research Triangle Park in North Carolina to discuss Libby risk studies. Scientists from across the country will be attending.

EPA Report

Mike Cirian reported for EPA on the following topics.

Training - Next month EPA will conduct free asbestos-related training for the public and contractors. With some exceptions, attendance will be on a first-come-first serve basis. The exceptions are slots that will be reserved for fire fighters and other city personnel. Four classes will be offered, with class size limited to 20 students per class. The classes will be: a 40-hour hazardous waste operator class, a 40-hours asbestos contractor/supervisor class, an 8-hour hazardous waste operator refresher class, and an 8-hour asbestos contractor/supervisor class refresher class.

Ambient Air Sampling - Nine rounds of ambient air sampling have been conducted, and a tenth round is beginning. At the last CAG meeting, EPA proposed reporting the results of this sampling quarterly. Public comments on the frequency and format of the reporting are still being taken.

Environmental Resource Specialist Position - Two incidents involving this position occurred since the last CAG meeting. Both were house fires. The first had a fatality. EPA and the fire department learned from the first fire, and response to the second was better from an asbestos contamination perspective.

Audience Member Question - Would you please discuss the detection of asbestos in the ambient sampling in Helena?
Answer - EPA is conducting ambient air sampling in Helena and Eureka to provide control/background sampling to compare to the Libby air sampling. One Helena sample appeared to have six Libby amphibole detections, and the highest asbestos background concentrations measured to date. We are rechecking the analyses. Assuming the Libby amphibole concentration readings to be correct, we are trying to understand what the source might be. We are characterizing the areas surrounding the Helena monitor in search of a possible source or explanation.

CARD Clinic Report

Tanis Hernandez reported on behalf of CARD. She stated that CARD will be conducting a series of meetings on the third Tuesday of the next three months at 7:00 p.m. in the Ponderosa Room of Libby City Hall. *The CARD Research Series: Guiding Asbestos Research Towards Treatment.* On February 20, CARD will present what asbestos research is all about, the role of the Libby community and the role of CARD. On March 20, the topic will be understanding how a successful research center is created and the importance of coordinated research. On April 17, CARD will present on past, current, and future research projects and how they can lead to improved treatment.

Public Comment

Audience Member Question - To ensure that we can have confidence in the cleanups of our homes, will EPA have an independent company test the validity of the cleanups?
Answer by Paul Peronard - Any firm that EPA pays would probably not be viewed as independent. We do not plan to have a company independent of EPA check the cleanups. EPA will be going back to some of the homes cleaned to resample for contamination. We also routinely send blind samples to more than one commercial laboratory to check the validity of the sampling results.

Next Meeting Agenda Topics

The CAG agreed to the following topics for its next meeting:

- An update on the status of the funding legislation.
- A discussion of the community groups that should be invited to send representatives to participate on the CAG.
- Follow-up on the letter to the Cities of Libby and Troy and Lincoln County requesting their participation on the CAG.
- Agency reports.

Next Meeting

The next meeting is scheduled for 7:00 to 9:00 p.m. on February 8, 2007 in the Ponderosa Room of Libby City Hall.

Appendix 1
CAG Member & Guest Attendance List
January 11, 2007

Members	**Group/Organization Represented**
DC Orr	City of Libby
Bill Patten	St. John's Lutheran Hospital
Paul Peronard	EPA
Ted Linnert	EPA
Mike Cirian	EPA - Libby
LeRoy Thom	Former Grace Employee
Gayla Benefield	TAG - LCAVRO
Eileen Carney	Board of Respiratory Therapists
Visitor	
Gerry Henningsen	TAG Technical Advisor

Appendix 2

Unofficial Draft Copy

As of: January 5, 2007 (9:55am)

LC2129

□□□□Bill No.□□□□

INTRODUCED BY □□□□□□□□□□□□□
BY Request of the □□□□□□□□

A bill for an Act entitled: "An act allowing funding in the asbestos disease account to be used by the department of public health and human services for grants to the Lincoln County health board asbestos-related disease programs, including services that supplement health care plans and provide screening services; appropriating $3 million for the programs; providing a contingent termination date; and providing an effective date."

WHEREAS, ongoing litigation with W.R. Grace & Company and delays at the federal level in approving asbestos-related legislation put future funding for important programs that assist those exposed to asbestos in jeopardy; and

WHEREAS, programs providing annual screening benefits to individuals exposed to asbestos and supplementing the health care needs of individuals diagnosed with asbestos-related diseases have limited funding.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MONTANA:

Section 1. Section 50-1-111, MCA, is amended to read:

"**50-1-111. Asbestos disease account.** There is an asbestos disease account in the state special revenue fund to be used by the department for grants to the Lincoln County health board to be used for the following purposes:

(1) providing case management services for asbestos patients;

(2) maintaining and overseeing a working network of Lincoln County health care and social service providers;

(3) providing direct services to individuals who have a positive result as determined by a qualified physician for asbestos-related diseases~~;~~. Services include, but are not limited to, programs that assist in the following:

(a) paying certain costs associated with annual screenings for asbestos-related disease; and

(b) assisting individuals who have medical needs that are not fully covered by a governmental, group, or individual healthcare plan;

(4) evaluating the programs for effectiveness and quality; and

(5) pursuing both short-term and permanent funding for health care and social service needs of asbestos patients."

(Internal References to 50-1-111: None.)

NEW SECTION. **Section 2. Fund transfer -- appropriation.** There is transferred $3 million from the general fund to the asbestos disease account provided for in 50-1-111. The money in the account is appropriated to the department of public health and human services to be used for grants to the Lincoln County health board for the purposes stated in 50-1-111.

NEW SECTION. **Section 3. Contingent termination.** (1) The asbestos diseases account provided for in 50-1-111 terminates n the date that the director of the department of public health and human services certifies to the governor that a permanent source of funding for medical and psychosocial care for Lincoln County asbestos patients is established through resolution of the ongoing litigation or federal program.

(2) The governor shall transmit a copy of the certification to the code commissioner.

(3) Any excess funds remaining upon the termination of the account must be transferred to the general fund.

NEW SECTION. **Section 4. (standard) Effective date.** [This act] is effective July 1, 2007.

- END -

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Senator BAUCUS. Thank you, Ms. Bodine, very, very much. Thank you.

Is it true that—refresh your recollection here—that in 2003 the report by the Agency for Toxic Substances and Disease Registry, ATSDR, recommended a need for, "toxicological investigations of the risks associated with low-level exposure to asbestos, especially Libby asbestos"? Is it also true that the report stated that, "The exact level of risk cannot be determined due to uncertainties in the analysis and toxicology of Libby asbestos"? Do you remember that report?

Ms. BODINE. I don't have it right in front of me. Yes, I believe that's—that is my recollection of what that report says, yes.

Senator BAUCUS. Right. Is it also true that, in 2006, inspector general report, the—according to the inspector general report in 2006, EPA's own scientists requested a toxicity study, but EPA's budget office did not approve their request?

Ms. BODINE. I read that in the inspector general's report. That's the information I have about that.

Senator BAUCUS. So your only knowledge is based on what you read in the inspector general report?

Ms. BODINE. I was not here in—I was not an EPA employee in 2003, so I'm not personally familiar with that.

Senator BAUCUS. I'm talking about 2006.

Ms. BODINE. You're talking about the report in——

Senator BAUCUS. According to the inspector general's report, EPA scientists requested a toxicity study, but EPA's budget office did not approve their request. Why would—if EPA's own scientist requested a toxicity study, along the lines of ATSDR recommendation, why in the world would the EPA not follow through and do that study, or, stated differently, why would EPA's own budget turn that down?

Ms. BODINE. It's my understanding that—again, that this was—this wasn't a request that was made in 2006. But it's my understanding that the decision at the time was to focus on the removals and addressing immediate risks by removing asbestos-contaminated material and that there was a team at EPA that was looking at asbestos issues as a national issue and was developing a whole series of studies to then examine and study this asbestos-toxicity issue more broadly. Because of that, there was not, at that time, a Libby-specific study.

Senator BAUCUS. Is a toxicity study necessary to do a baseline risk assessment?

Ms. BODINE. To do a risk assessment, you have to understand both exposure and toxicity.

Senator BAUCUS. It's a necessary component?

Ms. BODINE. So if we don't have—generally we, in the Office of Solid Waste and Emergency Response, use the toxicity numbers that have been developed by the ORD, the Office of Research and Development. These are called IRIS numbers. So generally we have existing toxicity numbers that we're able to use, and then what we generally do is determine what the exposure is and apply the toxicity number. The problem is that the cancer toxicity number that the Agency has is based on chrysotile, and, as we've all learned, the amphibole at Libby is very different.

Senator BAUCUS. That's correct. That's all the more reason why it's so curious that the EPA didn't follow its own scientists' recommendations and do a toxicity analysis.

Ms. BODINE. The noncancer toxicity assessment, using specifically the amphibole, has been underway for a while. With respect to the cancer toxicity numbers, the work that is very far along is work that's been developed to be able to use the existing toxicity numbers and then adjust those numbers downward based on studies—epidemiological studies.

Now, going forward, what we did was get the recommendations of scientists, both within EPA and other agencies, and got the recommendations.

Senator BAUCUS. Put this all in context. Some time ago we got word, frankly, from some technical people at the EPA that EPA was dragging its heels, was cutting corners, on any potential toxicity analysis, just wasn't doing the job. So I requested—wrote a letter to the inspector general to look into this and see whether, in fact, the EPA was doing what its own scientists said it should be doing, and which ATSDR also suggested that has to be done in order to do risk assessment. The IG's report concluded, as you all know, end of last year, that, yeah, they're not doing the job; they need toxicity analysis, as we suspected was the case. The inspector general's conclusion was the EPA was not doing analysis. I don't want to belabor the point, but, as you said, we need a toxicity analysis as one of the conditions to get the job done here. It very much looks like the EPA has been cutting corners, that it's not doing it right the first time; it didn't make the budget request. I'm a little bit surprised that you didn't know about all that. It seems to me, if you're the Assistant Administrator in charge of Superfund, I would expect that you would know; the bucks stops, you know, with you, and the Administrator, but certainly the Superfund stops with you.

I'm just quite put out, frankly. Here it is, it's been 7 years, and EPA has been putting in a lot of work, a lot of cleanup has been good. It feels like, due to budget reasons, EPA was trying to get away with something by cutting corners and frankly was caught. Caught by the IG, inspector general. I'm just wondering—history is history, but that's my analysis of what happened. The real question now is how to move forward and get this all done as quickly as we possibly can.

You say it takes 3 years now to do this analysis. I have several questions about that. My Lord, why didn't you start this 3 years ago instead of right now? What can we do to speed up this analysis? I'm also wondering what your budget is? How many dollars are you allocating to this and over how many years? How much are you spending on this each year in the 3 years to get it done?

Ms. BODINE. I don't have a 3-year breakdown, but we have on the toxicity—the 12 toxicity studies—or the studies that are feeding into developing the toxicity number, we have a budget that's been developed by the scientists that are working on it. They're currently developing more detailed study plans. But for the 12 studies, the total cost is about $4.5 million.

Senator BAUCUS. Four and a half million for the toxicity analysis. That includes the 12?

Ms. BODINE. The 12 studies, yes.

Senator BAUCUS. But you also, in that paragraph in your statement, talk about four other studies.

Ms. BODINE. Those are another $1.68 million. Those are the methods—making sure that our analytical methods that we're using here at Libby are good enough to detect to asbestos here.

Senator BAUCUS. What's the total request, the total——

Ms. BODINE. The total funding for the 12 studies plus the four studies, the estimate is about $6.2 million.

Senator BAUCUS. It's going to cost about $6.2 million to do the toxicity analysis; is that correct?

Ms. BODINE. Well, the toxicity analysis is really the $4.5 million. The other is the—the analytical methods are making sure—it's data testing, making sure our data is good. These are all studies that are going to support developing a final number, as is the continuing work on the exposure side, that's also work that——

Senator BAUCUS. Is that—sorry.

Ms. BODINE. Go ahead.

Senator BAUCUS. Go ahead.

Ms. BODINE. All the work that we've done to date on remedial investigation, all the work we're continuing to do, that helps us know what the exposure levels are. The activity-based-sampling work that we're going to be doing this year, that's going to help us know what the exposures are. Then you take the exposure data and you apply it to the toxicity number to come up with an estimate of risk.

Senator BAUCUS. Is that amount budgeted? Is that locked in, those dollar amounts, you know where you're going to spend it? Is that a wish list? Or what's the status of that request?

Ms. BODINE. We're committed to doing all that work.

Senator BAUCUS. You're going to do it, period?

Ms. BODINE. Yes.

Senator BAUCUS. Over 3 years?

Ms. BODINE. Over 3 years I know we're doing all the studies. The activity-based sampling is not going to take years, but yes, we are going to be doing all that.

Senator BAUCUS. Do you need to do the toxicity—must that be completed before you can do a baseline risk study?

Ms. BODINE. To do a baseline risk assessment, yes.

Senator BAUCUS. That's necessary to tell the people of Libby how clean clean is?

Ms. BODINE. Correct.

Senator BAUCUS. Is there a way to speed up that 3 years?

Ms. BODINE. I don't believe there is, because some of—there's a sequence. Because remember these studies—some of the studies are done to then support—to have information that feeds into other studies. So we have a sequence of studies laid out and timelines for when they start and when they're completed. So because some things have to happen before other things happen, I'm not aware that there are opportunities to speed it up.

Senator BAUCUS. More resources, more money was spent?

Ms. BODINE. We identified the list of studies based on what the scientists told us from the meeting down in Research Triangle Park and have agreed—we have agreed that this is the list of studies

that we're going to do based on the scientific recommendation, and that's what we're going to do. We have a cost estimate for that. It may be more, but we're going to do them anyway.

Senator BAUCUS. Would it make sense or not make sense for you to go back and talk to them and see if there's a way to do it more quickly, again if more resources—I want——

Ms. BODINE. I understand that. I'd be happy to go back and ask the scientists again. We have a Gantt chart that is sequencing them, but I will definitely ask your question and get back to you.

Senator BAUCUS. Could you, you know, because we want to help; we want to get this done and do whatever it takes to get it done. I'm just curious though: Why wasn't this requested earlier? I get this funny feeling it was—you went down to Research Triangle and other places only because, frankly, of the IG report. That's probably because I asked for that report and the IG looked into the EPA, and EPA is going to—not to chastise you—at least said yeah, this has to be done. So why has this taken such a long time to get started?

Ms. BODINE. There was work underway already on developing the toxicity number for Libby amphibole specifically. Again, on the noncancer risk, that work is well underway and is using data from a cohort of workers out of Marysville, OH. They worked at one of the processing plants there, and they have data from those people that they can use to develop a noncancer risk.

On the cancer side, we had two things going on. One was a methodology to use EPA's existing number and translate it into a Libby-specific number. In addition, the Office of Research and Development has started a cancer study as well also using Libby amphibole. I don't know why things weren't started faster, other than to know that, given the situation at Libby and given the magnitude of exposure, that, when you have that situation, we go in and we do—we take emergency action. We don't stop and do a study. EPA goes in and removes the contaminated material to get the risk down as low as possible as quickly as possible.

Senator BAUCUS. History is history, but we can only deal with the present and future. Let us know what needs to be done. I'd also like EPA to send me a report, month-end status, monthly reports.

Ms. BODINE. On the status of the studies?

Senator BAUCUS. The toxicity studies, with a word or two in there of what could or should be done to speed this up. Would you do that, please?

Ms. BODINE. Yes.

Senator BAUCUS. Great. I appreciate that.

I recall a question about a number of response-level cleanups. Year before last, there were 225 emergency-response cleanups and the following year there were 16. I've been told that the EPA plans to complete 135 this year. I'm curious why the lower number.

Ms. BODINE. I've been told 160.

Senator BAUCUS. I mean 160. I misspoke.

Ms. BODINE. The properties that we're doing this year are larger and more complex than some of the properties we've done in the past. So the removal—when I talked to you before, you know, the removal action work is continuing while we're doing the additional

sampling work and the additional studies, but because these properties are larger and more complex, there are fewer of them.

Senator BAUCUS. Again, I'm just trying to move things along here.

Ms. BODINE. I understand that.

Senator BAUCUS. Next, what cancer-risk level does EPA use to determine the Agency will conduct an emergency cleanup of a home in Libby or in Troy?

Ms. BODINE. We have screening criteria that we have been using. We have a clearance number that is based on a variety of things, including whether we can detect the asbestos fibers on surfaces, whether we—if we know that there's asbestos insulation in the attic, we'll take action. So we have a number of triggers for taking the emergency action. It's—we have a document that lays out what the action levels are.

Senator BAUCUS. Well, is it true the EPA normally protects people to a—generally the extent of one person in 1 million have an increased risk of getting cancer? Is that the general rule? Although EPA may go as low as 1 person in 10,000 in some cases. Whereas, here in Libby, according to EPA's 2003 draft final document, the risk is much greater, much higher; that is, 1 person in 100; 1 person in 1,000, which is kind of scary on the surface. Very unfavorably with the EPA's norm.

Ms. BODINE. Right. The risk range that you are identifying as the 1 in 10,000 to one in a million excess-cancer-risk range is a range that's used for remedial action for final cleanup action. For a removal action, which is not intended to be a permanent remedy, we have lower numbers. Then you go back and determine if more work needs to be done.

Senator BAUCUS. Right.

Ms. BODINE. That's not a final cleanup number.

Senator BAUCUS. You're implying therefore, or are you, that when it's permanent, then you're up to 1 in 1 million risk of cancer?

Ms. BODINE. The Agency—and it's in the National Contingency Plan, which are regulations for Superfund—uses a range, and that's as you identified, between 1 in 10,000 and one and a million. Then it's site specific where the range——

Senator BAUCUS. The main point being we're a little concerned here in Libby if your risk is a much greater risk of cancer, between 1 in 100 to 1 in 1,000. You say it's temporary; it's not permanent. So we have to ask the question: Why shouldn't our risk of protection be the norm, which I understand to be between 1 and 1 million and 1 in 10,000, which is much more protected than what's happening here in Libby?

Ms. BODINE. That's, again, the difference between the emergency removals and the final-removal action.

Senator BAUCUS. What level in the final?

Ms. BODINE. We will be in the risk range. I don't know what the final number will be. But we'll be informed by the toxicity studies and the exposure numbers and then——

Senator BAUCUS. But the standard normal——

Ms. BODINE. Is the range.

Senator BAUCUS. The range is between 1 and 10,000——

Ms. BODINE. One in a million.

Senator BAUCUS. So we expect to be within the range, at the very least, on the final?

Ms. BODINE. Yes.

Senator BAUCUS. Good. Couple questions about funding. Basic questions, Ms. Bodine. If the Agency had more money over the last few years, could the Agency have done more work to investigate and clean up asbestos? If you had more in the past, would you have done more? That's the basic question.

Ms. BODINE. Libby, as I said, is one of our highest priorities. It is—when you talk about the national program, we have all of our sites, it is getting more appropriated money than any other site. If we had—if there was more money dedicated to Libby, up to a certain point, yes, more work could be done. The point is—there's not endless capacity to do additional work. They are doing—during the construction season, the team here is cleaning up about a house a day, which is very—a very high rate of activity. But I would expect that—again, I wouldn't know how much, but I would expect some more to be done.

Senator BAUCUS. I only ask because there's an EPA document which discussed the 2005 funding for Libby cleanup which answered that same question. "Yes, additional funding of 2 million per year will allow cleanup of approximately 50 additional homes per year, which reduced the estimate duration of the cleanup by approximately 1 or 2 years." I don't know if you're familiar with the EPA document.

Ms. BODINE. I'm not familiar with it.

Senator BAUCUS. Does that sound reasonable?

Ms. BODINE. Two million for——

Senator BAUCUS. Two million more per year would allow cleanup of 50 additional homes a year, which would reduce the estimated duration of the cleanup by approximately 1½ years. That's a quote.

Ms. BODINE. I would have to ask the staff that's actually——

Senator BAUCUS. Does that sound reasonable?

Ms. BODINE. It sounds reasonable off the top of my head. I would have to ask the folks who actually do the work whether that's accurate.

Senator BAUCUS. Sure. My office just handed me the document. Here it is. So we'll pass it on to you.

Ms. BODINE. Thank you.

Senator BAUCUS. I'm just curious. Why hasn't EPA asked Congress for money to clean up asbestos to protect folks in Libby? Why haven't you asked for more money?

Ms. BODINE. We develop our budget based on what we see as the needs for the Superfund program nationally, and then after—then we allocate the funding that we receive among the sites that have ongoing construction.

Senator BAUCUS. That's the process?

Ms. BODINE. Right, that's the process.

Senator BAUCUS. Why not ask for more? Your own documents say 2 million more we could move this thing along a lot faster. Why don't you ask for more?

Ms. BODINE. What I was trying to explain when I was answering your question is we don't ask for funding based on each individual

site. We ask for funding based on what we expect to be the needs for the national program when we do our budget request. The actual determination for each site is made later after we know what our budget is as part of our work-planning process. The funding that we already know we have that we received from Congress, we then allocate out.

Senator BAUCUS. In fact, the EPA asked for 7 million less for Superfund cleanups for 2008 than in the preceding year. Not only did you not ask for more, you asked for 7 million less. I might say the Senate recently rejected the proposed cuts to the EPA for the Superfund program and authorized an additional of more than 200 million to clean up toxic-waste sites. It's a bit difficult for us to work together in a partnership when EPA wants to cut.

Ms. BODINE. The entire Superfund budget funds a variety of different programs and offices. Within our remedial action funding, we did increase that amount in 2008. But overall, your numbers are correct. Overall the dollar amounts went down. It didn't come out of the remedial action funding.

Senator BAUCUS. Can you tell us a little bit about the Troy cleanup, timeline for Troy.

Ms. BODINE. In 2007 and 2008, we are going to be doing the assessment of properties there, and then we'll take that data to determine whether we need to do the removals there. Much like we did in Libby.

Senator BAUCUS. All right. The bottom line here is we have a problem, we need a solution, and it seems to me that most solutions occur when people work together, but also when both, in good faith, want to get the job done very quickly. I just encourage you very, very strongly to ask for more money. You see the need here. I mean it's great. It's been 7 years now. You're new to the job, but that's irrelevant.

Ms. BODINE. That's correct.

Senator BAUCUS. You're the person; you're responsible; you're the top administrator, basically, of this particular program. So I urge you to be very, very vigorous in asking for more money so you can get the job done. In the meantime, I want to work with you and help provide the resources necessary to get the job done. We're going to get monthly reports now on the toxicity, and I would appreciate it if you also let us know whatever you want. I have a telephone. And question: What do you think we could do together to get this problem solved more quickly?

Ms. BODINE. I want to thank you for inviting me here, because I completely agree that it's very important for people to come here and listen to the community and see for themselves, first of all, what a beautiful place this is, but second what an unbelievable situation there is here.

Senator BAUCUS. You have some great people. I see Paul over here. I worked with Paul beginning about 2000. I may be speaking out of place here, but my impression is that the people of Libby really appreciate Paul's work. He's a dedicated, hardworking guy. Unfortunately, he left town after 2 years of working here, but he's back. They're clapping because he's back. Libby likes Paul.

Ms. BODINE. I know.

Senator BAUCUS. We just—you can take a lot of cues from Paul. I suggest you just do whatever Paul wants. I think that's a good note to end on. Thank you. Otherwise, Ms. Bodine, anything else you want to say?

Ms. BODINE. No. Thank you very much.

Senator BAUCUS. Thank you very much.

Next we have Marianne. (Brief interruption.)

STATEMENT OF MARIANNE B. ROOSE, COMMISSIONER, BOARD OF COUNTY COMMISSIONERS, LINCOLN COUNTY, MT

Ms. ROOSE. Thank you, Senator Baucus, and other committee members for allowing me this time today to testify at your hearing on behalf of the Lincoln County Board of Commissioners. We are grateful to Congress and especially to you, Senator Baucus, for following through on your commitment to the asbestos victims of Libby and Troy and addressing the issues of concern. We are very grateful for your sincerity, and it is appreciated by all of us. I would like to offer my testimony by answering three questions that we believe would be informative for this hearing.

No. 1, what issues are we facing? The main issue that our communities are still facing and of which there is still no answer is, how clean is clean? When this cleanup process was first started, there was a lot of discussion whether the air is safe to breathe in Libby and what is a safe level of asbestos. After 7 years into the cleanup process, there is still no definitive answer. Homes are being cleaned now, but the asbestos is being left in the walls. Previously it was felt that this was safe as long as it was not disturbed. That is now being questioned by both the public and the EPA itself. There is a possibility that the EPA may have to go back in and reclean homes that have already been cleaned. Six years into this project it was determined that more air testing has to be done to determine if the air is safe here, even though originally we were assured that it was. That testing will take another year to complete while all the time we still have that question hanging over our head. This leads to rumors, anxiety, and general distrust of the work that has been completed to date.

No. 2, what has the uncertainty regarding the cleanup cost our communities? The uncertainty of not knowing what a safe level of asbestos is and is the air in Libby safe to breathe continues to be on the forefront of visitors, organizers of community events, and people looking to relocate to Libby.

Some recent examples include a reduction in participation for our annual Nordic Fjord horseshow. Some participants have declined coming because they are uncertain if the air is safe and whether the soil in the arena area poses an unsafe condition for their horses. Even though we have reassured them that it is safe, the uncertainty of knowing for sure has led to cancellation of participants. Another example is the recruitment efforts at St. John's Hospital. We have been told that there have been several doctors that would have liked to relocate here due to our area of beauty and lifestyle but are uncertain whether it is safe to raise their children here. There are many more examples of these types of public uncertainty that keep hanging over our head.

No. 3, what can and should EPA do to address the communities' needs? First let me say that we think the EPA is doing a good job with the cleanup efforts in Libby. It has been a process of learning as we go. When problems have occurred in the past, EPA has been very receptive to changing their practices or procedures to address those. They continue to listen to the public and to our concerns and adjust programs to better serve our communities.

There are some things that we think can be done to help improve conditions in Libby and also let the world know that Libby is a safe place to visit or live. Thought should be given to demolishing homes with reimbursement given to the owners for homes when the cost of cleanup is substantially more than the value of the house being cleaned. Considering Senator Baucus has recently directed Fannie Mae to work with Libby and our other communities for affordable housing, there may be a plausible solution that the Federal Agencies working together could identify that would benefit both the homeowners and the Government. It seems that it may be more of a taxpayer advantage to have EPA review the cost-effectiveness of cleanup compared to demolition and at the same time be able to offer low-interest loans to these homeowners through the Fannie Mae. Troy residents are concerned that cleanup efforts have been delayed in their community. We hope that the effort in Troy remains on schedule for starting the project this spring and is not delayed.

Another community need is a research center with a clinical site that would be able to treat our resident victims locally with the latest available means. It seems very logical to us that research and treatment should be done where the source of contamination is heaviest. We encourage continued support of the Libby CARD Clinic and its future efforts to establish a research clinic in Libby, MT.

Also our local emergency-service organizations, especially our fire departments, need additional protective equipment to be able to respond to emergencies in contaminated homes. It is unfair to ask volunteers to respond to these emergencies and put themselves and their families at risk without appropriate protective equipment and clothing.

After air-quality testing and other testing is completed, we also need substantial media coverage outside of the area to let everyone know that Libby is a safe place to visit, raise your kids, or to retire here. The current stigma of unsafe attached to Libby needs to be overcome so that we can continue to improve our economy, have families look at us as a great place to live, and be able to get our pride back as a community.

I want to thank all of you for your time today and extend a very specific thanks to Senator Baucus for remaining concerned about Libby and our future. Thank you, Max.

STATEMENT OF MARIANNE B. ROOSE, COMMISSIONER, BOARD OF COUNTY COMMISSIONERS, LINCOLN COUNTY, MT

Thank you Senator Baucus and other Committee Members for allowing me this time today to testify at this hearing on behalf of the Lincoln County Board of Commissioners.

We are very grateful that Congress, and especially Senator Baucus, is following through on their commitment to address the asbestos issues affecting Libby and Troy in southern Lincoln County. Your sincerity is greatly appreciated by all of us.

I would like to offer my testimony today by answering three questions that I believe would be informative for this hearing.

1. *What issues are we facing?* The main issue that our communities are still facing and of which there is still no answer is "How clean is clean?" When this cleanup process was first started, there was a lot of discussion whether the air is safe to breathe in Libby and what is a safe level of asbestos. After 7 years into the clean-up process, there is still no definitive answer. Homes are being cleaned now but the asbestos is being left in the walls. Previously, it was felt that this was safe as long as it was not disturbed. That is now being questioned by both the public and EPA itself. There is a possibility that the EPA may have to go back in and re-clean homes that have already been cleaned. Six years into the project, it was determined that more air testing has to be done to determine if the air is safe here even though originally we were assured it was. That testing will take another year to complete while all the time we still have that question hanging over our head. This leads to rumors, anxiety, and general distrust of the work that has been completed to date.

2. *What has the uncertainty regarding the clean-up cost the community?* The uncertainty of not knowing what a safe level of asbestos is and is the air in Libby safe to breathe continues to be on the forefront of visitors, organizers of community events, and people looking to relocate to Libby.

Some recent examples include a reduction in participation for our annual Nordic Fjord horse show. Some participants have declined coming because they are uncertain if the air is safe and whether the soil in the arena area poses an unsafe condition for their horses. Even though we have reassured them that it is safe, the uncertainty of knowing for sure has led to cancellations of participants. Another example is the recruitment efforts at St. Johns Hospital. We have been told that there have been several doctors that would have liked to relocate here due to our area beauty and lifestyle but are uncertain whether it is safe to raise their children here. There are many more examples of these types of public uncertainty that keep hanging over our head.

3. *What can/should EPA do to address the communities' needs?* First let me say that we think the EPA is doing a very good job with their clean-up efforts in Libby. It has been a process of learning as we go. When problems have occurred in the past, EPA has been receptive to changing their practices or procedures to address those. They continue to listen to the public and to our concerns and adjust programs to better serve our communities.

There are some things that we think can be done to help improve conditions in Libby and also let the "world" know that Libby is a safe place to live or visit.

Thought should be given to demolishing homes, with reimbursement given to the owners, for homes where the cost of clean-up is substantially more than the value of the house being cleaned. Considering Senator Baucus has recently directed Fannie Mae to work with Libby and our other communities for affordable housing, there may be a plausible solution that the Federal agencies working together could identify that would benefit both the homeowner and the government. It seems that it may be more of a taxpayer advantage to have EPA review the cost effectiveness of clean-up compared to demolition and at the same time be able to offer low interest loans to these homeowners through the Fannie Mae program.

Troy residents are concerned that clean-up efforts have been delayed in their community. We hope that the effort in Troy remains on schedule for starting the project this spring and is not delayed.

Another community need is a research center with a clinical side that would be able to treat our resident victims locally with the latest available means. It seems very logical to us that research and treatment should be done where the source of contamination is heaviest.

Also, our local emergency service organizations, especially our fire departments, need additional protective equipment to be able to respond to emergencies in contaminated homes. It is unfair to ask volunteers to respond to these emergencies and put themselves and their families at risk without appropriate protective equipment and clothing.

After air quality testing and other testing is completed, we also need substantial media coverage outside of the area to let everyone know that Libby is a safe place to visit, raise your kids, or to retire here. The current stigma of "unsafe" attached to Libby needs to be overcome so that we can continue to try to improve our economy, have families look at us as a great place to live, and be able to get our pride back as a community.

I want to thank all of you for your time today and extend a special thanks to Senator Baucus for remaining concerned about Libby and our future.

Senator BAUCUS. Thank you very much. Who wants to go next?

STATEMENT OF BRAD BLACK, M.D., LINCOLN COUNTY HEALTH OFFICER, MEDICAL DIRECTOR, CENTER FOR ASBESTOS RELATED DISEASE

Dr. BLACK. I also want to thank Senator Baucus and the committee for making the effort to come to the community to bring this hearing where the people are and where people have been affected. As you all know, my name is Brad Black, and I've been a physician in the practice of medicine in the Libby community since 1977. In 1983 I also became the Lincoln County health officer and continue to this day to serve in a consultative role.

It was in the late 1990s when cases of asbestos-related diseases were identified in Libby residents whose only source of asbestos exposure was environmental. Soon thereafter, the suspicion of widespread environmental exposure was realized and the potential of a very large health impact appeared likely to develop. With the support of Senator Max Baucus, the community responded by developing a center for asbestos-related disease. This infrastructure was developed to meet the anticipated special needs that would evolve out of the asbestos screening and ongoing monitoring of the exposed Libby population.

Since the clinic opened in July 2000, we have seen over 1,800 people with varying degrees of asbestos-induced problems. The CARD has put programs in place for community outreach education and case management. It has been very humbling and painful to see the people—the number of people afflicted with disabling lung disease, cancer, and mesotheliomas in our community. In addition to the previous Zonolite workers and family members, those who played in ore piles and lived and worked in the community have been affected. For us every day is a constant challenge when we reflect on the failures in the public-health system that were partly to blame for the subsequent asbestos exposure and illness.

That compels one to work harder to ensure that affected people receive appropriate and adequate care, and furthermore the critical need to prevent further asbestos-induced disease. My experience in working at CARD over the last 7 years has enlightened me to meet the issues regarding Libby asbestos. It repeatedly appears to cause a debilitating lung disease with lower exposures, far below what would be received in an occupational setting. In addition to the debilitating lung disease, we have also documented 10 mesotheliomas since 1996 that have resulted from low environmental exposure. The fiber not only has the propensity to induce pleural fibrosis and mesothelioma but also has the characteristic of causing severe pleurisy with progressive scarring. These observations stand out and are associated with a mixture of asbestos fibers not previously studied. There is a significant amount of uncertainty about how much exposure to these fibers results in the observed health problems. This uncertainty will continue to linger over any asbestos cleanup in Libby until we have improved reassurance that we are working toward a safe completion. Extensive toxicologic studies planned by Region 8 EPA scientists appear to address the main concerns that I have in order to better understand the exposure risk due to Libby asbestos.

In order to remove the current levels of uncertainly, I feel we need to pursue research directed at three key areas that have also

been well described in the NIOSH draft roadmap for research. These are highly pertinent to the Libby asbestos. One of these is to improve the techniques for sampling and analysis of mineral fibers and other particles. Two, determination of importance of different mineral fibers and the fiber-like cleavage fragments as to the potential toxicity. Three, better understanding of the mechanisms of the toxicity of these mineral fibers and these fiber-like cleavage fragments.

I think the planned epidemiologic studies are a very important contributor to understanding exposure risk involved. The CARD has extensive health-assessment data accumulated over the past 7 years. The epidemiological studies of a subset of the CARD clinic population would involve assessments of morbidity of the subset of the population and ongoing extensive health monitoring, developing a better exposure assessment, and correlate with each health outcome should provide improved understanding of exposure risk.

The knowledge gained from these toxicology studies will not only be critical to Lincoln County asbestos cleanup, but also help protect individuals who have exposure to Libby asbestos around the United States. The successful completion of these vital studies will require CARD infrastructure support to expand capability of database development, data entry, added testing equipment and staff and space.

In summary, it is my role as Lincoln County health officer to ensure that no residents are at increased risk of developing asbestos-induced health problems. The currently planned studies as delineated by Regional 8 EPA with sufficient funding through completion should provide that reassurance.

I also never want to leave off—and I know this is not pertinent necessarily to the discussion today, but the emphasis on the lack of healthcare funding and the failures of the promises made by W.R. Grace are sitting in front of us, and to not talk about that every time we talk about our community and asbestos is wrong. We have citizens that are not being treated right, and it continues to worsen. So I bring that up as an ending note, because I just can't leave it out. I respectfully submit this to the committee and thank you for this opportunity.

STATEMENT OF BRAD BLACK, M.D., LINCOLN COUNTY HEALTH OFFICER, MEDICAL DIRECTOR, CENTER FOR ASBESTOS RELATED DISEASE

My name is Brad Black. I have been a physician and practicing medicine in Libby, Montana since July 1977. Since 1983 I have served as consulting Lincoln County Health Officer. I have a very extensive history in the background leading up to the realization of the extensive environmental exposure of asbestos to this community.

Since July 2000, I have served as medical director for the Center for Asbestos Related Disease (CARD). This is a locally developed clinic that is under the direction of a volunteer community board. The center was developed with the knowledge that there was a very extensive exposure to asbestos involving countless numbers of individuals that are both current residence as well as individuals who have left the community and relocated to other areas of the country.

The local medical community in Lincoln County recognized that there would be a need for an organized and central location for respondents who participated in the asbestos health screens done by the ATSDR to have their screening results interpreted for diagnosis, education, counseling and treatment. In December 1999 Montana Senator Max Baucus secured a grant from Health Resources and Services Administration. With these resources the clinic was formed to meet the special community-wide medical needs for those affected by exposure to asbestos.

A cooperative venture between the local Libby hospital, professional medical community, Lincoln County Health office and Federal agencies created the Center for Asbestos Related Disease, Inc. Dr. Alan Whitehouse, a practicing and board certified pulmonologist from Spokane, Washington, had been treating a large number of individuals with asbestos-related disease due to the Libby Amphibole for numerous years prior, became a consultant to the CARD at the opening of the clinic. Through his dedication to his work and to the Libby community, he continues to travel to Libby monthly to provide specialty pulmonary consultation support for the CARD.

I personally have spent the last 7 years entrenched in specialty pulmonary care related to ARD working alongside Dr. Whitehouse. I also have dedicated myself to continued learning, attending multiple conferences and professional meetings attended by prestigious asbestos experts, practicing physicians and researchers known both nationally and internationally. Several of these experts have reviewed numerous cases from the CARD cohort.

During these last 7 years, the amount of complications related to asbestos exposure and disease has been humbling. It has truly been an education and privilege to be involved in the evaluation and care of these individuals.

Since 1996 there have been at least 10 cases of mesothelioma caused by the environmental exposure to the Libby asbestos. The total number of mesotheliomas that have occurred since I have been in Libby have totaled 29. For a population of this size that is highly unusual and further indicates the extreme toxicity of the Libby Amphibole fiber in causing these types of cancers that are specific to asbestos exposure. Additionally, there are numerous individuals that vacationed and recreated in and around the vermiculite ore piles that have developed disabling pulmonary disease.

We currently follow close to 1,800 patients with varying degrees of asbestos related abnormalities and disease. We continue to evaluate at least 20 new patients per month due to history of exposure or developing symptoms. There are a number of observations that are striking and of concern in this patient population. Of greatest concern from a public health stand point and from the superfund asbestos clean-up project, is the relative potency and toxicity of this mixture of Amphibole asbestos. The frequency of lung disease and cancer from environmental exposure is overwhelming. The numbers of cases that relate to environmental exposure out-number the individuals who were Zonolite workers or family members of workers in the past.

The cumulative time and exposure levels of non-mine related affected individuals who have rather profound lung disease demonstrate a remarkably lower level of exposure than they would be for individuals traditionally exposed occupationally to asbestos. Not infrequently, those who recreated in and around vermiculite ore or were family members of vermiculite workers ended up with more severe lung disease than the individuals who worked at the Zonolite facility. It has become obvious that with these observations of the high number of mesotheliomas due to environmental exposure to asbestos along with disabling lung disease, that the potency of the Libby Amphibole fiber needs further evaluation and scrutiny.

Basically we do not know what the exposure risk is to this type of asbestos. It has never been studied previously and the clinical observations are quite concerning. At the current time there are plans for toxicology studies that will be addressing the issues of this concern. EPA Region 8 scientists have presented me with intent of activities which would include the following important considerations:

1. Complete and comprehensive exposure assessments which are essential to gain a better understanding of exposure risk.

2. Follow up of epidemiologic work at both the Libby site as well as the Marysville, Ohio site. Extensive health data is available through the CARD including ongoing cumulative surveillance and monitoring of health status and disease progression compiled in a cohesive process. The opportunity to do extended investigation over time of the health effects from asbestos exposure, as well as collection of tissue sampling at appropriate times, could greatly enhance the ability to understand and define the exposure risk.

3. Development of analytical and toxicology studies that are comprehensive in its analysis should be directed toward those that are set forth in the draft asbestos road map done by NIOSH and submitted for review. The important points of this study would involve development of improved sampling and analytic methods for detection of asbestos and other mineral fibers. Development of information and knowledge on exposures to asbestos and other mineral fibers and fiber-like cleavage fragments and the health outcomes of those exposures. The Libby population was highly exposed to both natural asbestos fibers as well as fiber-like cleavage fragments, which have unknown toxicity potential, which clearly need to be studied in this population. There needs to be a broader understanding of the important determinacy

of toxicity for fibers and for fiber-like cleavage fragments that are in the Libby Amphibole mixture.

In summary, I would like to state from my background as a long term Libby resident, practicing physician and as an exposed member of the population. I am aware of the historic failures to help protect the public and certainly have been humbled by the occurrence of asbestos induced disease in our community. We do not need to have further failure in the area of public health. It is essential at this time that individuals in our community are reassured that both current and future residents will no longer be at health risk from asbestos for long term living in this area.

I'm certainly hopeful that the current activities in cleanup and asbestos abatement have satisfactorily provided prevention of hazardous exposure at the present and long into the future. The health outcomes observed however certainly demands that we make sure we are proceeding in the right direction to clean up asbestos in our community.

It is essential at this time that the EPA funds and executes a comprehensive Amphibole asbestos toxicity assessment to assure both myself and our community that all risk to asbestos exposure is no longer an issue. This is especially important to the younger individuals who are and will be living in the community in the future where lower level asbestos accumulated over time has to be taken in to consideration. It is only when we have completed this toxicity assessment that we can be assured and confident we have protected human health.

Libby residents no longer need to have uncertainty when their health is an issue. What we learn from the toxicity assessment will not only help our community but also serve to better define health risks for many people around the nation and world that could come in contact with Zonolite insulation products. As you may or may not know this is a much bigger health and economic concern that goes beyond the extensive issues that have been observed in Libby.

I thank you for the opportunity to give input to the committee and am most confident that you are following up to make certain that Libby is taken care of in the appropriate manner for the long term health and safety of individuals.

Senator BAUCUS. Thank you, Brad, very much. Leroy, it's all yours.

STATEMENT OF LEROY THOM, BOARD MEMBER, LIBBY AREA TECHNICAL ASSISTANCE GROUP, INC.

Mr. THOM. I'd like to thank Senator Baucus and the committee also for inviting me to testify today, I think. My name is Leroy Thom, I'm a local businessman, I'm a former worker of the mine, and I'm a member of several committees and organizations that are related to the cleanup issues here in Libby.

As a community, we have seen Senator Baucus' commitment in his many trips to Libby and his many efforts to wrestle with the issues with this very complex issue. As many times as Max has been in Libby, I'm surprised that the Mayor hasn't given him a key to the city. Not that Max would need one, because our community is one that has no locked doors or gates. We are a community that trusts that everything is and will be done right. Generally that is the case. However, in the case of the issue before us today, some things have gone awry, and that's why we're here today.

This issue started in 1999, and, in 2000, EPA started emergency-response cleanup. In 2002, Governor Martz fired a silver bullet, and Libby was listed as a Superfund site on the national priority list. To that point, everything was great. In 2003, promises and commitments were made to fully and completely clean up Libby. At this time Region 8 had made plans to do both toxicological studies and exposure studies, probably the two most important tools that Region 8 would need to ensure a safe and effective cleanup. These studies, as of today, are still not done. Why has—why? This has been asked many times by people, and the answer is it wasn't funded.

In 2006 there was a push to get a record of decision so the EPA could move from emergency response to remediation of the cleanup. This ROD would have bypassed the risk assessment and have no basis to ensure that any cleanup would be safe. So we're here today with concerns. What is clean? Are the areas and homes where contamination has been left behind going to come back to create the same health risks that were there before a home or property was cleaned? Is EPA going to have to revisit these properties again?

We know today Region 8 has a new team, a team that, by all accounts, seems to be an experienced and well-rounded team, and it sounds like we will be getting a tox study and a risk assessment that has validity. As we heard today, that may take 3 more years.

So what do we need to do? We need closer oversight with improved cooperation between EPA and the community, we need improved support from EPA headquarters to Region 8, we need improved science, better communication, research into and involving healthcare, continued review and access of all technical documents that relate to this site in Libby, and, most importantly, proper funding to ensure that this project gets back on the track it has been derailed from. Thank you.

LIBBY HEALTH

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LATAG VIEWPOINTS FOR EPA R8 REMEDIATION OF LIBBY

Presented by

Leroy Thom, LATAG Board Member

4 April 2007

I. **PAST:** to understand* *Where we have been, where we are now, where we need to be*

- **1999**: *discovered* by EPA for Emergency Response *Removals*
- **2000**: *first removal* cleanup action initiated
- **2002**: proposed and *listed* as Superfund site on National Priority List (NPL)
  - Completion by 2003 estimated for Emergency Response removals
  - Amphibole asbestos fibers recognized as contaminant of concern
  - Ecological hazards to endangered species from tailings in watershed

  LATAG (Libby Area Technical Assistance Grant) financed

  RI/FS (remedial investigation/feasibility study) started at Libby (OU4)
- **2003**: *Promises and Commitments* made up to now to **fully** CLEAN-UP Libby
- **2004**: *RI/FS* started at Troy (OU7)
- **2006**: *RI/FS* started at Export & Screening Plants, Stimson Lumbar
- **2006**: R8 tried to rush ROD (Record of Decision) without valid risk assessment
  - *Engineering ROD?* **partial removals - *left*** *residual contamination*
  - *Remediation Goal?* no target concentration derived to protect health
  - *R8 risk studies?* toxicity and exposure studies ready to go in 2002-3

II. **PRESENT:** renewed opportunity *Extra chance to properly assess risks at Libby!*

- **2006**: New management team assembled – good and experienced

  Paul Peronard: over-all site manager, **Ted Linnert**: communications, **Mike Cirian**: on-site, **Fran Costanzi**: secondary OUs, **Bonita Lavelle**: mine-site, Roger Hoogerheide: Troy – with **Catherine LeCours** (DEQ)
- **2007**: Senator Baucus helped emphasize needs and priorities for EPA at Libby

  Increased resources provided to R8 for risk assessment at Libby

  Enhanced Agency effort towards risk-related studies on LA asbestos

III. **FUTURE:** closer oversight *Improved cooperation needed between EPA and Libby*

- **EPA needs to:** improve science, involve LATAG & Libby, communicate better

  Science: all studies must be done **completely and correctly**, with *risk-focus; and CLINICAL research and health CARE of patients must be supported*

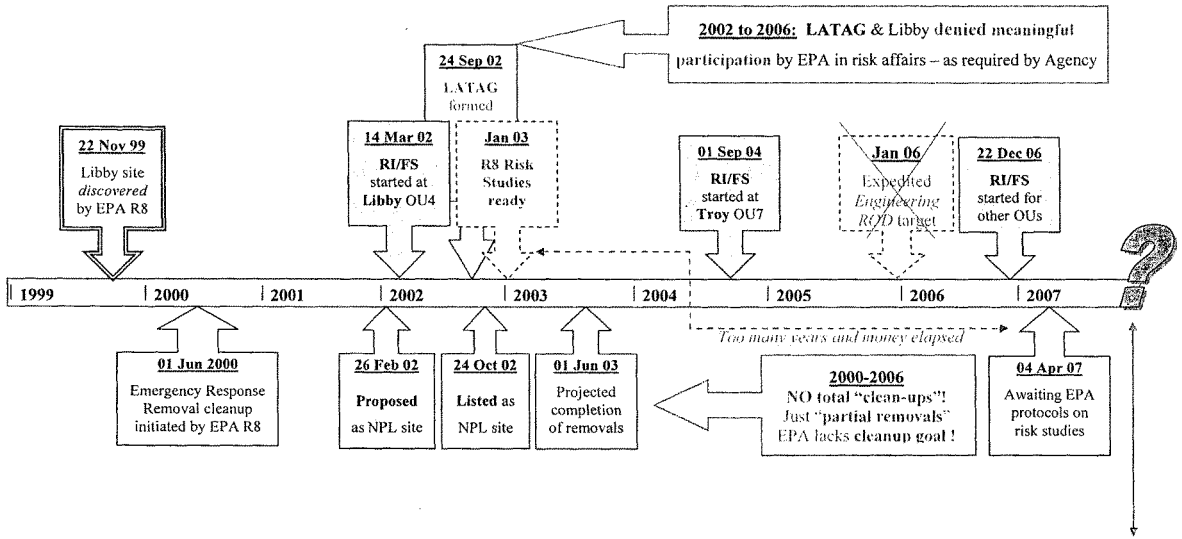
  Peer-Review: studies must **involve LATAG** in all aspects of *technical design and reviews,* with full participation in R8-led expert-science review panels

  Communication: recent **improvement**, but *much more is needed* to heal Libby; and outreach to other national sites with LA contamination is needed
- **Define SUCCESS**: determine scientifically sound, risk-based concentrations of LA asbestos fibers, for use in remediating Libby to reduce excess risks of disease

* see TIMELINE, based on http://cfpub.epa.gov/supercpad/SiteProfiles/index.cfm, and attachments

Timeline of Superfund Events and Progress at Libby MT

Where have we been, and Where do we need to be?



STATUS: PROMISING NEW TEAM FROM R8 IS IN-PLACE, WITH WIDER EPA SUPPORT, AND IS CAPABLE OF SUCCEEDING

IF 1) *R8 IS GIVEN ALL NEEDED RESOURCES & ALLOWED TO COMPLETE REQUIRED SITE WORK AND SCIENCE*

AND 2) *LATAG (AND OTHER REPRESENTATIVES) CAN FULLY PARTICIPATE IN ALL STUDY PLANNING AND REVIEWS*

Senator BAUCUS. Thank you. Marianne, you raised a very interesting point about maybe it's more effective and smarter use of taxpayers' dollars to help people go on with their lives if some of these homes are demolished. It might cost a lot more to clean up than it would be to demolish and get a new one. That's an excellent idea.

Are people working on this? Is somebody trying to flush this out a little bit?

Ms. ROOSE. I can tell you it has been addressed to the commissioners and I'm sure many others several times, and the answer to us has always been they don't buy new homes; they do not replace them.

Senator BAUCUS. I don't know if your microphone is on.

Ms. ROOSE. That question has been asked many times, Senator, and——

(Brief interruption.)

Ms. ROOSE. One more time. That question has been asked many times, and I know that, throughout the community, when we've seen some of the older homes that were full of asbestos being cleaned, and the question has been: Why would they do that when it would be much more cost-effective to build a new home or to get a modular, and healthier and safer? We were told that was not a part of the program.

Senator BAUCUS. Is that something that you think some of people in Libby would like to pursue?

Ms. ROOSE. Yes, I do. You can ask the audience. But it's a question——

(Audience clapping.)

Ms. ROOSE. Max, I believe there's probably folks in projects who have talked to you about the numbers of dollars that the cleanup has cost on an older home, and it would have been much more cost-effective and healthier and safer.

Senator BAUCUS. But EPA says it doesn't have the authority?

Ms. ROOSE. We were always told that's not a part of their program.

Senator BAUCUS. It's not a customary part, but let's look into that and see. That's a very interesting idea.

Ms. ROOSE. Thank you.

Senator BAUCUS. Brad, could you explain a little more to me about, I guess, gaps in knowledge—find my notes—that you were talking about; namely, better understand the pathways of disease and so forth that might, what, help you in your work or help with the cleanup or what? I wasn't quite certain.

Dr. BLACK. I think that one of the parts of the toxicology study was to actually do epidemiologic work; that is, work looking at health outcomes and then trying to reconstruct asbestos exposure in these clients of the clinic that we follow and try to get a better understanding of the amounts of exposure that led to the levels of disease that we observed in those patients. If we do that over enough of them and follow them, we get a better feel for the potency of the fibers and how much it takes to create significant lung disease.

Senator BAUCUS. That would then help develop the baseline risk assessment and determine how clean is clean; that is, one of the ways?

Dr. BLACK. It's one piece that complements the others, which also—and I mentioned in there—you know, we got a different fiber that's never been studied. We see that it takes less of it to cause significant lung disease. We don't understand—you know, we only measured the large long fibers, because it's much easier to measure long fibers.

Senator BAUCUS. Who would do these studies, do you think? Who would be the best person, the best Agency, the best outfit to do this work?

Dr. BLACK. The EPA. They're the ones who do it. They need to be on this and helping us figure out are we looking at the right fibers. You know, we have all these short fibers that are mixed in there, and a lot of those are under the normally regulated——

Senator BAUCUS. Have you talked to them about that?

Dr. BLACK. Yes.

Senator BAUCUS. What do they say?

Dr. BLACK. I think we're in line with that.

Senator BAUCUS. Do they agree?

Dr. BLACK. Oh, yeah, I think so. Is Paul around here to stand up and say yes?

Mr. PERONARD. Absolutely. It's one of the 12 studies Ms. Bodine mentioned earlier working with the CARD clinic and ATSDR to do this focus reassessment of the——

Dr. BLACK. Right. Then hopefully to break down these fibers, decide if the fraction of the small fibers are—try to determine the toxicity of those types of fibers in comparison to the long fibers and get a better feel for really what's—what are the fibers that are causing all the disease here, and why is the pattern we're seeing different? You know, why is the pattern of disease different? It may sit with some of these issues related to fiber——

Senator BAUCUS. I'm no expert in all this, but is there a right balance between the toxicity studies and the epidemiological studies? Is that—does there need to be a balance there?

Dr. BLACK. Yes, there does. There are pieces out of each of these we need to answer specific questions.

Senator BAUCUS. Do you think the balance of the EPA is about right, or would you move it one direction or another?

Dr. BLACK. I sense that we're hitting all the areas, and from my end and my knowledge, it looks to be balanced out fairly well.

Senator BAUCUS. Do you have any advice—you heard Ms. Bodine talk about the study, Paul alluded to it, the 12 parts of it to be done in 3 years. Do you have any advice here now that they should do that study? While you're here, it's an opportunity to give some advice. What do you think?

Dr. BLACK. I'm like everybody else. I was one that thought these were being done and didn't realize that until I sent a letter to you so stating that I was disappointed that we were this far behind, our community didn't deserve to have things delayed. My understanding has been the same as yours, is if there was more funding, things would move along faster.

I keep hearing about restricting budgets and restricting budgets. So suddenly the next thing we know, the tox studies were dropped out. This was from my perspective. I think if somebody—if we don't get a sustained funding and we keep getting things cut and this

and that and the job that—you know, we have to go back review this again and find out, oh, it's not being done right. I think it's a tragedy to Libby. I think, from what we've been through here, we deserve better. I think we need a steady support to get the job done here. We watch money go a lot of places, and I don't think we've had any events in our country that match Libby's.

Senator BAUCUS. I'm not aware of any. I've not heard of any.

Dr. BLACK. To see what we're witnessing now, and it's—you feel like people are suddenly forgetting Libby again. This dropping of toxicology studies was just another example. It's set very wrong. It set very wrong in me and——

Senator BAUCUS. That's what Les Skramstad said: Don't forget us. After a while it tends to sometimes be forgotten.

I forgot to ask Ms. Bodine this question. If she wants to, she can come up and give an answer.

What's your thought of what happens after 3 years? I mean are we going to start cleanup—if we reach our baseline risk assessment, then at that point do we have our record of decision, and that means—what happens after 3 years? We're trying to speed up the 3 years, but what——

Ms. BODINE. The studies will be done, and then we'll be able to have the toxicity information that we then apply the exposure data to, and that then allows us to develop cleanup numbers specific to Libby. Based on that—again, we're going to have to look and see what that means. Based on that, we would develop the final remedy.

Senator BAUCUS. How long will that take?

Ms. BODINE. The estimate for that is 2011, for the Record of Decision, for the final Record of Decision, for the residential area. As I mentioned earlier, if we completely cut off exposure, we can—for some of the other areas, like the processing plants, we would be able to do it earlier.

Senator BAUCUS. You're saying 4 years from now? We're 2007. 2011. Four years.

Ms. BODINE. Right.

Senator BAUCUS. What does that mean? That is, when will Libby be cleaned up properly?

Ms. BODINE. I can't answer that, because I don't know what all that information is going to tell us, because the remedy is going to be informed by the results of the risk assessment.

Senator BAUCUS. Now——

Ms. BODINE. So either we will know that we don't have to go back and do any of these homes or we will know that there is more work to be done. But at this point I can't tell you, because I don't—we don't know that.

Senator BAUCUS. So it's possible that the Record of Decision could say or the toxicity analysis could say we have to go back and do some of these areas all over again?

Ms. BODINE. It's possible that we would go back—we would have to go back in and retest, and if the number was—if what we were finding in a home was higher than what our risk assessment was telling us, we would have to do more, yes, that is definitely possible.

Senator BAUCUS. Assuming that the toxicity analysis is leaning toward going back again due to the Record of Decision, that in and of itself does not mean Libby is cleaned up just because the Record of Decision—

Ms. BODINE. That means we know we have the plan.

Senator BAUCUS. Your best guess of what that plan might contemplate?

Ms. BODINE. I don't want to speculate.

Senator BAUCUS. We're not going to hold you to it. I just want to hear—you're doing the best you can.

Ms. BODINE. I really don't want to speculate.

Senator BAUCUS. We need to know though. We need a plan.

Ms. BODINE. Right, but you—we all agree we need this—we need the information, we've got—we're going to get good information on—we've already started developing on the cancer and the noncancer, we're going to have the—informed by the exposure information that we're going from the lung tissue that Dr. Black, which will help us then know what the exposures were. That all goes—all feeds up in—and that will be corroborated by animal studies. That will all feed up to know what level of exposure is within our risk range that we talked about earlier. But I can't tell—I can't tell you now what the answer is. I can't tell you what the outcome is before we've done the studies.

Senator BAUCUS. I understand. I'm giving you a lot of assumptions that helped lead us to our earlier conclusion. Namely, toxicity analysis, let's assume, is great, no problem; we know what we have to and don't have to go back and do anything all over again. Assume that for the moment. Just assume. Then Record of Decision baseline——

Ms. BODINE. Then we would look at our data and make sure that what—that if it was a place where there was still some exposure, that it was below the level that we had determined was an acceptable risk.

Senator BAUCUS. I don't know if I'm alone in trying to figure all this out.

Ms. BODINE. I appreciate that.

Senator BAUCUS. I think a lot of other people are trying to figure it all out. It might be helpful just to lay it all out unvarnished, just—I mean with some dates. I mean be dead honest.

Ms. BODINE. But I——

Senator BAUCUS. I know. With some high and lows and with some parameters, with some good-case and, you know, not-so-good-case scenarios so we know what we're doing. I think, to some degree, we're going to have to find solutions thinking out of the box here.

This is just going on way too long. I don't know what it all is. Marianne talked about some of the housing that may be part of it. It just seems unconscionable, frankly, that something that began, you know, late 1990s—1999, here we are 2007, and we're not going to, at the earlier, have this—close this chapter until 2011. Maybe even later after that. I think it behooves us, all of us in this community—you, me, everybody—to a little bit go back, if not to the drawing board, at least really start thinking big here, outside of the box. Come on, let's—we can't just keep doing things the ordi-

nary way. We have to find unordinary ways, extraordinary ways, to get the results.

Ms. BODINE. We want to make informed decisions based on information—

Senator BAUCUS. I totally agree with that.

Ms. BODINE. I don't want to speculate or give you a worse-case scenario that may prove to be totally, completely unfounded, because I think that would be damaging to the community.

Senator BAUCUS. Is it possible that because EPA has only been cleaning to a level cancer risk of 1 to, what, to 100 in some cases——

Mr. PERONARD. That's not actually right what you just said, sir. This is the second time. If you look at the document, what we describe in there is that the trigger conditions that exist, we think are the 1 to 100, 1 to 1,000. Our cleanups are going to be below that target, given the uncertainty of the risk assessment. So it's not fair to say our cleanups are the 1 to 1,000 level. They're probably actually well below that. It is—you're sort of missing the comparison there. Some conditions right now are patently unsafe. When we're addressing those, and we get something that is much safer as a product, it does not leave a 1-in-100 risk behind——

Senator BAUCUS. That's correct.

Mr. PERONARD. It's probably substantially below that.

Senator BAUCUS. That's right. I think we established that earlier when Ms. Bodine was talking earlier; namely, we were talking the greater risk level in the early stages; we were talking much lower risk level in the later stages. I think that's understood here. At least that's my understanding. Is that right or not right?

Mr. PERONARD. I mean you would always want to push risk levels down as far as you can get them. The reason there's a range is you balance that with uncertainties that surround your cleanups, which God knows we got here, and your ability, the practicability to implement the remedies. The only point I was trying to make is not confusing the existing conditions for the homes we targeted, which are clearly unacceptable with what the end product is of the cleanups that we've done, which are substantially lower in terms of risk.

Senator BAUCUS. I thought I made that clear earlier, but I'm glad you're making it more clear. I appreciate that.

Anyway, OK, so you're going to get to those higher levels when you finish, correct?

Mr. PERONARD. Correct.

Senator BAUCUS. Paul, anything else you want to say. You're more knowledgeable here than a lot of people.

Mr. PERONARD. We do the cost analysis on demolitions all the time. We've actually done, since I've been back in the project, four demolitions. They always cost us more money than cleanups, and they typically leave the homeowner in a worse situation financially, when you look at what we're allowed to compensate for under the Uniform Relocation Act and what their insurance coverage is.

So we typically, as a practical matter, don't like doing demolitions. They cost a lot of money. A lot of it has to do with the sampling you have to do to make sure you don't spread it to the next house. A lot of it also gets into the fact we don't get to put

people out onto the street, and the replacement housing costs kills us. The other part of that is standard regulations only allow for demolition in lieu of asbestos removal if the house is structurally unsound. That, by the way, is when you get a house that's of zero value is about the time you start seeing a break-even point from a monetary standpoint. I'm with you. We want to spend dollars wisely. Everybody makes the assumption that demolition would be much cheaper. I can you tell you 99 times out of 100 that's absolutely untrue as well.

Senator BAUCUS. It's untrue under current law. There's always an opportunity to change the law. There could be other reimbursement, more reimbursement, more aid, more assistance to people. That's kind of what I'm getting at in thinking outside the box here. I'm trying to get us not to think in usual ways of doing things only. All that is important. We need the data, as we've established. I mean this requires, I think, some pretty special, creative thinking. I'm just asking all of us to kind of dig deeper, think more creative. That's all I'm asking.

Could you maybe, Leroy, give us some thoughts on—apparently the EPA sent out some letters that some people thought were a little improper, so-called comfort letters or learning to live with vermiculite and so forth. If you could just talk about that a little. Has that been cleaned up or cleared up? I understand you sent out another letter this month. I've not seen them. But I'm just curious on that subject. What is the status?

Mr. THOM. I believe that the living with vermiculite brochure was removed by EPA after several years of requests from Libby on and off from the community. There are some comfort letters out there that are being looked at, I know, from the TAG perspective, and that there are new letters that have been rewritten.

Senator BAUCUS. Have you seen them?

Mr. THOM. Yes, I have.

Senator BAUCUS. Are you satisfied?

Mr. THOM. I think basically we're satisfied.

Senator BAUCUS. Good. OK. Anybody else have something to say before I go to the audience? Ms. Bodine, do you want to finish up?

Ms. BODINE. No. This is useful.

Senator BAUCUS. Thank you for coming. It's not easy to get to Libby. Thank you very, very much.

Let's get to the audience now. Who has questions? If you could just speak your name, and say what you have to say.

Mr. WILLIAMSON. My name is Lloyd Douglas Williamson. I am one—I feel disrespectful to the American flag that we didn't stand by and stand with it. I still think there's time to do it in this situation here.

The second thing, what the doctor and his friend has done to us, and not being told and listened to by your program did a lot, but he knew a lot from people, and he knew a lot more than a lot of people know.

Now, my third item is on this—my third item is: Why don't you believe in why Libby has to say their points here? I'm a contractor, been a contractor all my life. Not 100 percent. But this situation that was done leaving these facilities out there and saying that it was all right to take and to build houses that were completely 80,

90 years old and to save that and prolong it, that was one of the most stupidious situations I've ever seen in my life. That stuff is still killing people. We have to wait 3 years before we go on here. Three years, yes. I believe my figure said 2010. That means that it takes that long, in 2007, with computers, and we absolutely don't know anything about this which was done. Eight years ago, nine years ago, it was told that this was bad stuff. The Government was here and told us exactly what that was. It was bad, we believed it, and it's just as bad now. Thank you very much.

Senator BAUCUS. That raises a question I have for, again, Ms. Bodine. I'm sorry. As public servants, it's our job to answer questions as best we can. What can be done in the interim? This gentleman prompted a question in my mind with his question. While we're working on the 3-year study, trying to speed it up, et cetera, doing the epidemiological studies and things Dr. Black was talking about, are there structures that can be cleaned up in the interim so we're not just sitting around waiting? I know you're going to do 160 sites this next year.

Ms. BODINE. We're not sitting around. We're going to continue with the removal actions as we have been. So we're definitely not going to be sitting around. To address remaining risks that may be left over—we'll find out—but that may be left over from removals, we're also setting up a program with an environmental-resource specialist so that people know who to call to ask questions. Right now they call Mike. We'll have another person on board whose job is going to be to be a resource to the community so that, if they encounter asbestos, they encounter vermiculite, that they have a person to go to to know how to handle it safely.

Senator BAUCUS. Are the 160 sites identified?

Ms. BODINE. I don't believe so.

Mr. CIRIAN. We do have them identified. As an overall group, we have all the properties identified, up to the ones that wouldn't let us do the contaminant screening studies. But we do have to put them into a task order, and we have the first three task orders specifically identified for coming up, and the rest of them are being done with designs and everything to move that forward.

Senator BAUCUS. Could you give me a list of those sites, please.

Mr. CIRIAN. Yes, sir.

Senator BAUCUS. We have a list of people signed up who want to testify. I think it's only proper that they be allowed to speak first and anybody else afterwards. Gayla Benefield.

Ms. BENEFIELD. Yes, Max, boy, we've come a along ways, haven't we.

Senator BAUCUS. We have. Since your living room.

Ms. BENEFIELD. Yes, since my living room. But, by golly, the tough survive, because we're still here. Actually, I want to speak on behalf of Les and the family. The first time you met Les, you shook his hand. He didn't feel it was necessary to have a signed statement or anything else. You shook his hand. He always said you stood by your word as a gentleman. I spoke to Les just before he died, and Les made me promise that I wouldn't give up, and he said he had spoken to you, and you wouldn't give up. That's the biggest thing. I want you to be assured that we're not going to give up here in Libby, we're going to continue on. We don't have Les

around to shake hands with, but we hold you to that handshake. We had this made up. This is just a picture of a working man. That is our friend.

Senator BAUCUS. This is wonderful.

Ms. BENEFIELD. I thought you would like it.

Senator BAUCUS. It is a silhouette of Les. It's just wonderful.

Ms. BENEFIELD. It's his feather, it's his microphone.

Senator BAUCUS. Thank you.

Ms. BENEFIELD. When you think of Les, I'll tell you what—I'm going to gripe today—you have to think carpets, walls, crawlspaces. Something Les never quite understood was why they would put a limit of $10,000 on a home. We're talking about a human life. We're talking about safety in human life for the rest of our life. Les was worried about future generations, and if it's going to take more than that to clean a home or why aren't we doing it faster. But all Les was worried about was not himself, not my generation, but future generations.

Senator BAUCUS. That's very true. Over and over he made that point to me.

Ms. BENEFIELD. Just remember, walls, carpets, crawlspaces, and that was Les.

Senator BAUCUS. Thanks so much. He was a real inspiration to all of us. Let's all give a round of applause to Les. I know he can hear it.

(Audience applauded.)

Senator BAUCUS. Ms. Bodine, you would have loved Les. He was quite a guy.

Next I have Gordon Sullivan.

Mr. SULLIVAN. Senator Baucus, thank you for coming today, and everybody who spoke. I was the past technical advisor for the Libby community. I've lived in town here for 10 years. My wife has lived here for over 25 years. We're business owners. Now I'm an outdoor writer and I work in Libby.

When I hear Dr. Black talk about mesothelioma exposures or diagnosis in a certain period of time, that causes my heart to jump, Brad, because exposure started for me the day I got my house back from the EPA.

Early on Paul Peronard came to me and said, "you know, we're going to need some houses to clean up here in Libby." I stepped forward on behalf of my family. My house is the only thing I have, my house and my health. The day I got my house back, the next day I got hit in the face with a coffee can full of asbestos-containing insulation. The exposure went on and on and on until I crawled in the basement that they had contracted to clean but never cleaned, and I found electrical receptacles taped off with raw vermiculite behind them. I found floors with sparkling vermiculite imbedded in them by polyurethane. Then last summer, after I thought my property was clean, I went out and rototilled about 2500 square feet in my yard, and I came up with tailings that could go anywhere from 10 to 20 percent.

In that 2,000-square-foot path, there are two of your sample spots over, Ms. Bodine. I can't tell you what it takes to trust an organization like the EPA, but Paul and Mike and everybody at the EPA has all acknowledged that there were mistakes made in our

house. None of them have talked about the exposure caused to me and my family or the people who visit us in our house. They don't talk about that. They talk about coming back and cleaning our house up again. I can't tell you, Ms. Bodine, how difficult it is for me to trust you again. I just can't do it. It will take some guy like Paul to get my trust back.

Incidentally, Senator Baucus, in 2006, October 2006—would everybody that was in the Denver Lite conference on Libby, MT, down in Denver raise their hand? Everybody who sat in that conference. I think you did, Paul, Courtney.

We had a commitment, on October 2004, for a risk assessment. We had been working on a risk assessment for months and months and months before that. When we left that conference—and Gayla, you can help me on this—they promised us, Senator Baucus, that we would have a risk assessment in 6 months. Am I right Gayla? Leroy?

Mr. THOM. Yes, you are.

Ms. BENEFIELD. Yes.

Mr. SULLIVAN. How many promises does it need? How many promises does it take? We would like to think there's a new day coming in Libby, MT. I especially would like to see that happen, because now they're coming back to clean my house up a second time, and I don't trust you, Ms. Bodine. I'm sorry to say that, but I don't trust you.

Incidentally, Senator Baucus, in about 2003 the TAG went to work with the EPA and started to look at the demolition of houses. In October 2004, we submitted to the EPA a 106-page community-response document that specifically dealt with the use of PLM as an analytical tool, the demolition of houses and the potential of replacing them, we challenged the EPA's cost-benefit-analysis theories. Paul, you might throw into your calculations the fact that, when you do your cost-benefit analysis on replacing houses, you don't put in the most expensive component; that's operation and maintenance. Do you, Paul? Because we don't know what the long-term operation and maintenance on every house in Libby, MT, will be. Do we Paul?

Mr. PERONARD. No, sir.

Mr. SULLIVAN. Senator Baucus, we've covered a lot of ground inside this city. We've had some good leadership. But the fact is that we've not been dealt with in good faith. I was one of the four people that participated in the article that started the inspector general's investigation. I spent endless time with Cory Rumple, I spent endless time with Sean Hurdle (phonetic), the next inspector general. The fact is, Senator, we've never gotten Cory Rumple's report have we?

Senator BAUCUS. Not to my knowledge.

Mr. SULLIVAN. We won't, will we?

Senator BAUCUS. We'll find it.

Mr. SULLIVAN. That's another issue of good faith.

Senator Baucus, I thank you.

Senator BAUCUS. You're welcome. Thank you very, very much.

Next, Clinton. Good to see you, Clinton. For the recorder, it's Clinton May.

Mr. MAYNARD. Clinton Maynard.

Senator BAUCUS. Maynard. I'm sorry.

Mr. MAYNARD. Senator, thanks for coming here, and members of the hearing committee.

Max, what the risk assessment is going to give us is the number that—the level where we start seeing disease, that's what risk assessment is going to give us. It cites specific information and gives us at what level of exposure do we start seeing disease. OK. I just wanted to clarify that so that what I'm about to say here makes a little bit more sense. I'm going to censor my prepared statement here, because I think we're moving in the right direction here. I think, Senator, thinking out of the box is correct. Thank you.

I would like to begin by dispelling the myth that we don't know what we are dealing with here, this amphibole asbestos. Researchers discovered 46 years ago that, if one wants to see what mesothelioma looks like, all you have to do is dose some rats with amphibole family mineral fiber. There is, in fact ample science in place for us to know when we are being lied to, and we can recognize a bogus cleanup when we see one being imposed upon us.

Senator Baucus, you recently expressed outrage at the IG report. Thank you, sir. You spoke of people being held accountable. Well, sir, I would expect that, if you go down that road, you will find that no one will be held accountable, and you will see a lot of fingers all being pointed in the same direction. The Integrated Risk Information System IRIS, the rule book, is wrong. IRIS incorrectly assesses fiber type. This allows for those who would to twist the truth to an unrecognizable and dangerous state. IRIS is the scapegoat. IRIS does not reflect the best-available science. Please fix it now.

We are 7 years into this now, and the office of the inspector general has had to recommend that we have a risk assessment. What's wrong with this picture? It's called suppression of science to the further detriment to this already-exposed population. So who is it that might benefit from suppression of the sites? Well, W.R. Grace & Company. The citizens have called foul and have been proven right—proven to be right. I have heard and I believe that EPA science personnel have been shut out of the discussion over these many years now. Unacceptable.

Senator, please insist that science steer the ship from here on out, and please also insist that the public is not only heard but listened to. If our Nation does not recognize and address preventable exposure to amphibole mineral fiber in Libby and nationally, well, I guess we're all a sorry lot.

Finally, I believe that we have reached the point in all of this that Libby is in desperate need of funding for legal assistance, with no strings attached. See what you can do for us. Thank you all for your time.

Senator BAUCUS. Clinton, thanks so very much. You hung in there. You were at some of the meetings in the past. It's great to see you, but, on the other hand, I wish that we were getting this thing solved so you wouldn't have to come up and speak so often. Thanks, Clinton.

Next we have——

Mr. FLYNN. My name is Kevin Flynn.

Senator BAUCUS. Kevin?

Mr. Flynn. You know me, Max.

Senator BAUCUS. I guess I do now.

Mr. FLYNN. I'm a fourth-generation asbestos worker out of New York City. I live in Billings. Max has been to my house. Those jobs you fight for, Max these aren't here; you're not fighting for these jobs.

What I want to tell you is that the companies that you hire, that are your low bidders, two of them IRS Environmental and Marcose (phonetic), between the two of them have over 75 OSHA violations in the asbestos industry. Did you know that?

Ms. BODINE. No.

Mr. FLYNN. It scares me. See, my family put that stuff in the Empire State Building, and I take it out all over the country. It scares me to talk to you about emergency removal. It scares me about high activity, because what you do is you lower your 29 CFR, Code of Federal Regulations, the rules that tell us how to remove asbestos. When you lower those standards, what happens? The worker's exposed because safety records go out the window, the way they remove it goes out the window. There's nothing high rate about removing asbestos.

What scares me the most is, you don't have nothing to compare Libby to? I can. The Twin Towers. When the twin towers came down, it was nothing but asbestos, the whole cloud of dust, the whole air was filled with asbestos. The EPA lowered the standards to clean that place up as fast as possible. Again, there's nothing fast about removing asbestos nothing, because that kills you. I'll tell you what, the workers that cleaned that place up and the public are as sick as when it fell today, but only faster, because there was more of it.

You need to take a look about—at best-value contracting, the most-responsible bidder the most-responsible lower bidder. Your contractors right now with no level of toxicity to tell what's in the air, are just throwing dirt around. They're just moving dirt from here and moving dirt from there. It's been proven a few times already. I know that.

Nice seeing you again, Max. Thanks.

Senator BAUCUS. Thank you, Kevin, very much. Thank you.

I have also now a Bill Caldwell.

Mr. CALDWELL. Thank you. I have my 2-minute talk here, and I'll give you a copy of it. My name is William D. Caldwell.

Senator BAUCUS. Anybody who has prepared remarks, they'll all be included in the record automatically.

Mr. CALDWELL. My name is William D. Caldwell, and, along with my wife, Marjorie, reside at 580 Greers Ferry here in Libby. I thank you Senator Baucus for this opportunity to comment on the asbestos-cleanup efforts here in Libby.

During the fall 2002, our home and lot were tested for the presence of asbestos, and in October of that year, Paul came out and visited with us in our kitchen and presented us with a report stating that our house was free of asbestos and that contamination did exist in our garden and in certain flower beds and around the grounds outside. Mr. Peronard advised us that we should discontinue the use of the garden until the EPA could clean it up which we've done. That was nearly 5 years ago, and in spite of repeated inquiries, we've been unable to obtain any kind of schedule

as to when decontamination of our property would take place. While always courteous, "not this year; maybe next," is the extent of the answers that we've been given. I understand and I don't question that unexpected higher priority kinds of operations do come up, such as the high-school-track area, and things do happen and plans need to change. But I think it's slowed the work on residential sites, but I also understand that failing to plan an entire task often results in wasted effort and needless expense.

Interesting that the term planning has come up several times here today. This is just an example. I'm not widely experienced in the asbestos issues that are here in Libby, just from our own personal observations. But as an example, about 3 years ago a property very close to ours—actually, our adjoining back-door neighbor—was cleaned up. Then last year another property that adjoins our garden next to us was cleaned up. Presumably sometime in the future our property is going to be cleaned up. So just from an operational point of view, it strikes me that there are a lot of efficiencies that can be obtained by looking at the total task and grouping things that make sense to be grouped. There are savings to be made, in terms of equipment mobilization, in terms of—for the contractor. It makes it less expensive for them to move equipment in. If they have to come back to the same place year after year moving equipment and supplies, it costs money. It also costs the EPA administrative—their contract administrators additional time in dealing with some of these things.

Just from an overall efficiency point of view, it seems that there could be some advances made by looking at the whole job and at least providing us as residents, with some knowledge when our property is going to be attended to. You know, "Well, not this year; maybe next," is not a really good answer. I mean we know how many properties are out there that need attention. As I said before, surely that number can change, but we do have quite a bit of knowledge about it.

Perhaps even more importantly, cleaning up certain properties and leaving adjoining properties untreated for several years seems to invite recontamination of the previously treated property. In short, failure to plan the entire job is not only frustrating to the affected residents of Lincoln County but invites inefficiency and excessive costs.

Senator BAUCUS. Thank you, Bill, very much.

Mr. CALDWELL. You're welcome.

Senator BAUCUS. Thank you.

I would like Ms. Bodine or Paul or somebody maybe to comment on that. Bill clearly has raised an issue here, and he clearly is trying to find a reasonable solution here. So I'm just wondering the degree to which there is a public schedule so people know what it is. I'm sure things change a little bit from time to time. Is there some kind of process for the people to get more involved in what the schedules are so—after all, this—I don't want to be corny about this, but these are our employers, and you know, we're working for them. We need to find a system that works for them.

Mr. PERONARD. We have a couple of different prioritization schemes for how we target select houses but you can stop and do the math real quick. We're short—just short of 1,500 properties

right now that are in the cleanup queue to do. If you get to do say an average of 200 a year, which is about what our pace has been—a little less this year; a little more some other years—somebody is going to wait 7 years. At the current funding level, current pace of cleanups that's inevitable. When we go into target properties for cleanup, especially the first 2, 2½ years, we try to target prioritize by asbestos concentrations, conditions of the house, try to put places with active leaks ahead of places that just have it in the attic, for example. We started doing a little bit of geographic grouping last year, because we've gotten rid of most of the obvious targets.

We run into a problem doing the geographic groupings, and a lot of this has to do with, when you start dealing with individual homeowners, we want to do these four properties that are in the queue, we want to do them this date and this schedule. We actually have a hard time accommodating folks. "We can't do it this month, because my son is getting married," you know "we've got vacation plans, we won't be in the area." So we end up taking these geographic groupings and breaking them down largely to accommodate homeowner schedules. I'm sorry Mr. Caldwell—folks up here in Libby are infinitely reasonable. That has always been the case. I'm sorry somebody—I wouldn't want to be in the position of being at the tail end of the list but there is going to be a tail end of the list, and I frankly, don't see a way around it at the current pace of production.

Senator BAUCUS. Are these criteria and priorities and groupings commonly known to the community? Does everybody know what they are?

Mr. PERONARD. When we launch——

Senator BAUCUS. Not the criteria, but that sites the houses.

Mr. PERONARD. When you—when we——

Senator BAUCUS. I can ask the people in the room here. Bill doesn't know. Others don't know.

Mr. PERONARD. We have put out—when we started the residential cleanup program in 2000, we actually put out a list of triage criteria at a couple public meetings. You know, they were fairly widely attended, but it was back back in 2002, when we talked about the worse first and how we were going to sort them. The properties we're doing now all tend to be the less-obvious candidates. They're all about the same, in terms of contamination level and the types of property we're doing. Some are bigger than others, some have more gardens involved, but we don't have the really—a lot of those screamers left anymore, where it's dropping in the ceiling now. Those do tend to be the ones—you know, somebody comes in, "Hey, I started a remodeling job, and I dropped the stuff in my kitchen," those are the ones that get sped up and moved up in the schedule, because there's an immediate exposure——

Senator BAUCUS. I understand. It just seems to me—all of us have to bend over backwards to find new ideas. It just seems to me that some of the questions here is trust, you've heard, and some of it is frustration, as you've heard. Ignorance breeds fear. People that don't know something, naturally it's fearful. I'm just trying to explore with you if there's some way to deal with all of that, particularly on the scheduling part of it, some ways where you can re-

evaluate the community, have a town meeting or something: Here's what we're doing; here's the list. Some people are going to like it; some are not going to like it. Go through it all. As you said, people in Libby are reasonable. They're going to know basically, their house is not quite as bad as some other. I'm just trying to find some way here that we can really communicate really well with the people in Libby to deal with the schedule. That's all.

We have more witnesses here. I have to get through them all. Edna Johnson.

Eileen CARNEY. Thanks, Max. Edna asked me to read her statement. She's the lady in the wheelchair.

I'd like to use this opportunity to tell how asbestosis has affected members of my family. So far we have lost five relatives who have died from it, and several of us have suffered from having it. My brother and his wife have been on oxygen for over a year. She can't drive anymore. Neither of them worked at the Zonolite mill, but grew up in Libby since 1926 and breathed the air that killed since 1920, when they began to mine—process the vermiculite ore. I was born in Libby in 1930 and grew up here, as did all my four children and 11 grandchildren. Several of my grandchildren have lupus and rheumatoid arthritis and got it in their 20s and 30s. They have pulmonary breathing problems and have to use breathing aids, such as a nebulizer, as I use every day. Sometimes my whole chest, heart, and lungs hurt when I breath, and it lasts four hours or so. But I know lots of Libby people who are much worse off than me and are on oxygen struggling to breathe for 4 years before dying. Our family has lost two brothers-in-law, a cousin and his wife, and a nephew, most of whom died from asbestosis at a young age. Now my brother and his wife are declining rapidly. A lot of my young sons-in-law have it now.

Senator BAUCUS. Thank you very much. Thank you very much. Thank you.

Others who wish to speak. We have a couple minutes here. Yes, sir.

Mr. WOOD. Sorry, I didn't sign up to speak so I'll just take a quick second here. My name is Tom Wood.

Senator BAUCUS. Say what you want to say.

Mr. WOOD. I pack a lot of weight around this town, Max. I'm chief of the Libby volunteer fire department, and I want to thank Kirby from your office who has been very helpful to us the last few months and I want to thank Commissioner Roose for her statement.

We have a very, very big problem in the asbestos still in these buildings, folks. We talk about taking it out of the roofs. It's still in the walls. We have between 120 and 150 fire calls a year as a volunteer fire department. We're breaching these walls all the time. Our people are covered with vermiculite when we leave the fire scenes. Across the street, there's still a roped-off area of a fire of about 2 months ago. Three o'clock in the morning, 20° F it's a little bit chilly out to have to wash all your people down with fire hoses and wash your equipment before you can leave the fire scene because it's covered in vermiculite. It's a problem, and it's something that we desperately need some help with funding to buy the proper equipment that this little town can't afford. We're looking

at a half-a-million bucks or more to get the equipment that is needed. We can't wait 3 years. We can't wait 3 more minutes. We've had three major house fires, one of which an individual passed away in the fire. When we brought the individual out, we had to have the ambulance decontaminated because there was vermiculite in the fire. It's costly, there's things that—we need some help. I believe you have it in your appropriations.

Senator BAUCUS. You're right.

Mr. WOOD. We really appreciate any help——

Senator BAUCUS. We discussed just now how you made a request, and we're going to try to get additional funds.

Mr. WOOD. Thank you. I don't know that the community is even aware of the problem we have with this. We try to not be political as a volunteer fire department, but we really need to. I got to looking Max—I'll make this real short—over the last couple of years, we've buried, I believe, seven of our volunteer firemen that have got too old and retired. Five of those are from asbestos issues. One of them worked at Zonolite. The other four didn't. So they're getting it from someplace, and it could very well be from these fire scenes that these guys are attending. Thank you.

Senator BAUCUS. Thank you very much. Thank you.

What I'd like to do, Ms. Bodine, is you and I kind of share. I can—ask each other—we can each say what we've learned here. Some things you learned and I'll mention some things I learned. I'll just give you the first opportunity.

Ms. BODINE. Thank you. I have learned how deeply the asbestos exposure has affected the community. It's one thing to read about it, but it's another thing to come and talk to people and hear about it firsthand. Thank you.

Senator BAUCUS. You're welcome. Couple things I've learned. One is we just need more money.

We have to move more quickly, and I'm again urging the EPA to make a larger request to the Administration in all the budget requests that you make. We just need more money here. That's simple. That's clear. That's obvious. We just need to speed up this process. It's been since 2000. We have to find some way, I mentioned, thinking outside of the box, some way for all of us together. I put the burden on you, and I put the burden on me, frankly, to try to figure out how to do that, because, after all, you're the implementer you and Paul and contractors and so forth, you're ones that do the actual work.

Number 3, I learned we're going to do this toxicity study. That's good news. Working with Dr. Black, ready to make that happen. I'm a little concerned how long it's going to take. But, again you're going to give me a monthly report. So we can kind of work with that and see what we can do to make it work even better.

One thing we did not touch on at all, and it's a huge tragedy, as Dr. Black referred to, and that's the medical needs in this community. We're going to have to—that's a whole separate subject. That's not really EPA. But the more you help in your work, on the margin, on the edge, that's going to help us on the medical side too. We're going to certainly deal with the medical side as well.

One thing I'm going to do—this photograph touches me so much. I'm going to put it in my personal office so I see it every day and

my staff sees it every day. I'm going to do something else. I'm going to give you a copy, and I'm going to ask you to put it in your personal office. You and I together get this done.

Ms. Norita SKRAMSTAD. Max, I just want to say thank you for the honor that you bestowed on Les. Thank you.

Senator BAUCUS. This is what it's all about. Thank you very much everybody. Do we have somebody else?

Ms. PRIEST. I'm Alice Priest. Everybody—well, not everybody, but the majority are complaining the EPA don't do this and the EPA don't do that.

Senator BAUCUS. You have to put the microphone close to you. Right up next to your mouth. Almost bite it.

Ms. PRIEST. So many of them here today are against the EPA: They don't do this right, they don't do that right, they—well, I'm for the EPA. If you want to see it, how the EPA works, Senator Baucus before you go back, go down on West 1st Street, and they're working on a place there, and it will surprise you how hard they work. Thank you.

Senator BAUCUS. I'm sure that's the case. We're all for the EPA. We just want to make sure we get this job done as quickly as possible.

Yes, sir.

Mr. PARKER. I can probably do without that thing.

Senator BAUCUS. You could. You have the big voice.

Mr. PARKER. My name is Mel Parker, and my wife and I own the treating plant up there on the river where W.R. Grace used to have their exfoliation and where all of the ore came in from the mine site there. They came in in the year 2000, sir, and they just got done cleaning it up in 2006, which was last year. A couple of things have come up. We recognized, as the EPA was cleaning up our property with its contractors that there was problems dealing with us that we tried to handle on our own, but we could see an overlap, in that when it came to doing the residential areas, that we were going to run into basically the same problems. What we are concerned about here now is that they have broken the Libby area up into operating units and—for example, Stimson is one, our screening plant is another, the mine is another one here, the export plant, and Stimson. What I can't understand, is it because we don't have the risk assessment done on toxicity and exposure, they are talking about? Ms. Bodine is talking about being able to get a resolution on some of those areas before they get a completion done on the residential areas within this Unit No. 7, whatever the Libby area is. What I can't understand is, how can we have any resolution at all on what the risk assessment is before it is completed? Not just giving us resolution now and the export plant resolution and the mine site resolution, but holding off until they get done with those before they go on to give the record of decision to the City. It seems to me, and perhaps there's an answer to this, as to why we are going to get a record of decision before the residents within the Libby area are going to get a resolution.

Senator BAUCUS. That's a good question.

Ms. BODINE. I actually mentioned, when we were talking about the fact that we were hoping to do some record of decision earlier, there are two components to a risk assessment: Exposure and tox-

icity. If you cut off exposure, then your risk is zero; you have no exposure. So whether your toxicity number is here or here, it's not going to matter because you don't have exposure. So the hope is that for some areas, we will be able to go—and we're going to do some more remedial—some more data collection this year. We will be able to go in and confirm that we've cut off exposure, which would then allow us to go forward.

Senator BAUCUS. Does that answer your question?

Mr. PARKER. No, sir, it doesn't.

Senator BAUCUS. Let's try again.

Mr. PARKER. Let's take up at the mine site all right. The mine site is where the ore all came from originally. There are corridors coming out of the mine area. One of them would be down Rainy Creek which is right where we are, and that affects basically two particular operating units. If you go down toward Troy and you get just past the four lane, you can look off to your right, and you will see Vermiculite Mountain. That material used to come down through there, and then, with the wind coming from Troy up that canyon, it would blow it back into Libby. So consequently, until you finish up the mine site, I can't truly understand how on earth you're ever going to get a risk assessment that can be done in one place and not another when you're impacting at least four different operating units.

Ms. BODINE. If our data shows that there's still exposure at—again, at whatever operable unit then we're going to have to wait until we have the toxicity number to apply to the exposure. But if we have another operable unit where we can show that we've cut off exposure, then we are hopeful that we will be able to proceed more expeditiously, more quickly, as you have asked. So I don't have an answer, because it will depend on what the data says on whether there is exposure. For your particular plant, I don't know—if there is ongoing exposure, then it would have to wait. If there isn't, then that's something——

Senator BAUCUS. If you're as familiar geographically with the area, and Bill—Paul is. Maybe, Paul, you can help Bill here.

Mr. PERONARD. With Bill's property screening—conceptually, Ms. Bodine is absolutely right. The big piece that we have to figure out for the screening plant, for example, is really its relationship to the mine and the ambient air coming off the mine. Now Ms. Bodine did not mentioned that as one of the possible earlier candidates. We haven't even started the ambient-air sampling. We started the ambient-air sampling in Libby covering the export plant and the former Stimson mill, and we're going to push out to the processing areas and the mine site this summer. So we'll start collecting that exposure information.

The idea is, with the big sources removed at places like the export plant, presuming—and this is presumption—wait for the data to see—if the ambient-air numbers come back on the low side, then we might be able to move forward those outside of the toxicity-assessment process. That's—that's subject to what the data says.

But, Mel, you're right. You have to collect that information to cover those exposure pathways. For each of the operable units, including the screening plant, we have a conceptual site model trying to identify what exposure pathways we think are out there and

what data we need to collect to get those. The idea is for these places where we've done rather significant cleanups, that the biggest contributors to the risk and exposure we've already remediated.

Senator BAUCUS. Mel, now what do you think?

Mr. PARKER. I can understand what he's saying. What was just mentioned to me was the analytical procedure that they're going to do that. Now, I believe they're going to use a PLM, which is a polarized light microscopy to do that, but yet that has not been proven to be the analytical procedure that they're going to use to finally come up with a risk assessment. So here we are going through before we get a ROD and trying that on different operating units but not coming up with a correct solution, you might say to the ROD.

Senator BAUCUS. We're not going to resolve that totally here. I do have an idea. Right after this meeting, if you could talk to Paul, and then—after you talk to Paul, get back to me as to whether you're satisfied. I'm going to give you some addresses here and some information that you can get back to me.

This, I think, has been helpful. We kind of have our marching orders. We know what we have to do. Let's altogether do it. That's all there is to discuss. I am going to give everybody my personal private email and my personal telephone. I'll wait until you get a pencil and paper. This is my personal private email. It's not my office email. So when you write me, it's personal private, you know, only I see it, which means, if you don't get a response, you know who to blame. I will respond. But I'll also give it to my office, to my staff, to help work on it, to get a solution. Here's my email address, personal private. Ms. Bodine, you and I can go back and forth with this too. I can get yours. Here's mine. Personal private. maxbaucus, one word lower case m-a-x-b-a-u-c-u-s. maxbaucus@earthlink.net. It's maxbaucus@earthlink.net. Telephone number is 202–224–4375. I just urge you to write me, talk to me as we work all these issues through. I'm as committed today as I was when I was in Gayla's living room. We're going to get this done and done the right way.

I have four rules in my office. Here are the four rules: No. 1 is remember the people we serve; Rule No. 2, do it now; Rule No. 3 is do it right the first time, and Rule No. 4 is make it fun. So let's together remember who we're serving, do it now, do it right the first time, then make sure we have a good time doing it, because it's the right thing to do. Thanks everybody very, very much.

[Whereupon, the proceedings concluded at 3:31 p.m.]

[Additonal statements submitted for the record follow.]

Senator Arlen Specter
Written Statement Submitted for the Record on the Committee for Environment & Public Works
Field Hearing re: "Oversight of Federal Efforts to Cleanup Asbestos in Lincoln County, Montana"
April 11, 2007

Chairwoman Boxer, Ranking Member Inhofe, and Sen. Baucus, thank you for the opportunity to submit testimony before your Committee concerning remediation of the worst community-wide contamination of asbestos ever experienced in the history of the United States. Over the past few years, the Senate has become increasingly aware of the horrific tragedy that befell thousands of unsuspecting residents in the small mining town of Libby, Montana. These residents, many who have died or are now suffering from debilitating asbestos related diseases, were exposed to deadly asbestos fibers that saturated their community for decades as a result of nearby vermiculite ore mining operations of W.R. Grace. Reports and studies show that tremolite asbestos – a contaminant of the mined vermiculite ore -- found its way into the homes, schools, parks and playgrounds of Libby.

In response to this widespread contamination, the Governor of Montana in December 2001 designated Libby as a Superfund site subject to federal cleanup efforts by the Environmental Protection Agency. I applaud the Members of this Committee for conducting oversight to find out what the EPA has done and what remains to be done to clean up asbestos contamination in Libby. It is important to ensure that the federal government is taking adequate steps to remediate this environmental catastrophe.

This said, I believe that it is equally important that Members on this Committee not lose sight of an entire generation of Libby residents who have suffered and continue

to suffer from their asbestos exposure. Many of these victims cannot secure adequate compensation in today's tort system for their injuries because the company most responsible for the contamination, W.R. Grace, has filed for bankruptcy.

As many Committee Members know, I have spent much of the last several years in the Senate fighting for the victims of asbestos exposure by advancing legislation that would provide them timely and fair compensation. Indeed, with the help and leadership of Senators Baucus and Burns, we included specific provisions in my legislation that addressed the unique medical circumstances facing those Libby residents exposed to asbestos.

By submitting this statement today, it is my hope that the hearing record will send a clear signal to the residents of Libby that the Congress has not forgotten about their desperate need for adequate compensation. As this Committee continues to ensure the success of vital cleanup efforts in Libby, rest assured that I will continue fighting on behalf of the residents. Thank you.

Testimony of: Gordon Sullivan
143 Crossway Ave
P.O. Box 718
Libby, MT 59923

Greetings

My name is Gordon Sullivan. I am a resident of Libby, Montana where I work as a professional outdoor writer and photographer. My wife Cathie has been a resident of Libby for over 28 years and has operated a successful small business for over 25 years.

We own a home located at 143 Crossway Ave. which was seriously violated by the EPA and its oversight contractors Volpe, CDM and Environmental Restoration in June of 2003.

Being concerned citizens of Libby, both my wife and I have attempted to be active in the public discussion relating to the cleanup standards imposed by the EPA and its contractors since 2000.

I began my participation by attending public meetings and trying to learn as much as possible about the important decisions being made by the EPA relating to the health and safety of my hometown. Throughout my professional management career, which spanned the disciplines of mining, high temperature research and development, healthcare management and finally, conservation, I was active as an environmental advocate and became familiar with the work and decision making paradigms of various federal agencies. Sensing the seriousness of the pending technical issues surrounding the Libby Asbestos Site, in May of 2003, after helping to establish the Libby Area Technical Assistance Group (the TAG Grant holders for the Libby project), I became their Technical Advisor and served in the that position for two years before resigning in frustration. During my work as Technical Advisor, I served as an "Advocate for Property and Business Owners of Libby" and witnessed the cleanup through the eyes of my neighbors, (1700 plus private property owners).

After serving as the LATAG Technical Advisor for two years and seeing no effort to either educate or communicate technical issues to the impacted public, I went on as an independent advocate speaking out publicly for the right of each impacted property owner to be fully informed. Throughout my activity, I regularly attended private sector asbestos related workshops, Community Advisory Group meetings, Operation and Maintenance meeting, LATAG meetings and closed educational sessions presented by EPA region Eight.

I presently network with a host of national advocates, researchers and concerned scientists located across the nation and consider myself "above average" when it comes to an understanding of asbestos related topics and cleanup measures surrounding asbestos.

In the last six months I have worked with other private property owners in the Libby community in an effort to start a "Business and Homeowners Association" and through that activity have again have heard from dozens of property owners. The association is designed as an information gathering and dissemination tool to be used by the impacted home and business owners as they reach out to the EPA to fully participate in the important decisions and activities directly affecting their property. The group has been well received in the community however, without EPA support and funding I anticipate it will slowly drift by the way side.

My appearance today at the Senate Environmental and Public Works Committee Hearing marks the final time I will appear in public in the attempt to have my voice and the voice of those I represent heard by EPA decision makers. After five years of diligent pursuit, hundreds of phone calls to elected officials, countless meetings wherein the voice of the impacted public is seriously limited by the EPA, having the same EPA and its contractors purposely undermine my activities, I have finally come to the conclusion that the Environmental Protection Agency listens to only a small selection of individuals within Lincoln County. And without exception, those persons have been hand selected by the EPA and supported accordingly. The remaining public, by virtue of serious time limitations set in public meetings (CAG, LATAG, Operations and Maintenance, Lincoln County Commissioners Meeting, etc.) as well as federal hearings (Senate Environment and Public Works Committee Hearing-two minute limitation for public testimony), has no voice and in as much, is severely disenfranchised when it comes to public participation.

As a way of providing testimony to the Senate Environment and Public Works Committee and Montana's Senator Max Baucus, I respectfully submit the following testimony limited to a single area of concern, "the willful suppression of science on behalf of the Environmental Protection Agency and the intentional exposure of citizens and visitors to the towns of Libby and Troy, Montana to Libby amphibole asbestos."

My opening statement, as dramatic as it might seem comes not from a casual understanding of the evolving cleanup work between the years of 2000 and 2007, or from a casual observance from outside the fence so to speak instead, it comes from the very core of the work plans and Technical Memorandum (Libby Asbestos Site Residential/ Commercial Cleanup Action Level and Clearance Criteria, Technical Memorandum December 15, 2003, included as appendix "A") imposed on Libby by the EPA. That important document presently drives the cleanup activity under way in Libby and proposed for start up in Troy.

Within the Technical Memorandum it is clearly stated beginning on page 9, paragraph 8, ***Inexpensive*** *analytical methods currently available (e.g. PLM)* ***can detect levels of 1% or greater with some confidence.*** Site-specific improvements in the use of PLM analysis at Libby (PLM-VE) have led to much higher confidence in sampling

results and the ability to detect and qualify asbestos levels in soils at 1% and even less than 1%. (Emphasis added Gordon Sullivan)

It is clear after reading this EPA quote that the use of **PLM** (polarized light microscopy) in daily decision making on the Libby Asbestos Site is fraught with misgivings and EPA's own uncertainty. As a consequence it cannot be construed that the use of PLM represents the use of "best available science" especially when the same managers admit in their Technical Memorandum that a better analytical tool (PLM-VE) has led to a "much higher level of confidence in sampling results."

The sad reality is, for a number of years since the development of PLM-VE in late 2002, it has not been used extensively, even though it is more definitive and consequently more protective of human health and safety. In the February Technical Assistance Meeting during his briefing to the group, Paul Peronard, EPA Team Leader was quoted as saying "**PLM continues to be the workhorse of our analytical methods.**" When I questioned Mr. Peronard, believing he meant to say the more definitive PLM-VE, he responded **"No, I mean PLM."**

The sole reason PLM is used as an analytical method over PLM-VE centers around two issues; contractor convenience and cost. While a standard PLM analysis can be performed at the lab in Libby, PLM-VE needs to be sent off to Denver and can take as long as two days and the costs for both sample preparation and analysis are considerably higher.

We can therefore assume that the health and well being of the people of Libby, as well as those who visit our town, is considered secondary to project costs and convenience, and that management paradigm leads to daily on-going exposure.

Ironically, the EPA has little faith in either analytical procedure as is willing to demonstrate their own lack of trust publicly, quote taken from the January 11, 2007 Libby Community Advisory Group meeting wherein I was following up with Paul Peronard on the continued use of PLM. In his comments Peronard, provides direct evidence as to the effectiveness of both PLM and PLM-VE. The quote comes from page 5 paragraph 4 of the minutes, *"Two types of PLM exist. The difference between the two relates to sample reparation rather than the instrument itself. In polarized light microscopy, visual estimation (PLM-VE), the sample is ground and homogenized, which eliminates the clumping issue.* ***The analytical sensitivity of standard PLM ANALYSIS, KNOWN AS NIOSH 9002 is 1% asbestos concentration. PLM-VE is sensitive down to a concentration of 0.2% asbestos. <u>This means that the sensitivity limits of both PLM techniques are higher than the concentrations of concern; thus a non-detect sample may contain asbestos in amount with "negative health consequences." EPA will address this issue in the risk analysis.</u>***

Final "risk analysis for the Libby Asbestos Site is projected to take between 2 and 4 years which amounts to a lot of public exposure while we continue to use an analytical

tool already employed for at least six years and will continue to be employed for an additional 2 to 4 years.

As a component for the upcoming 2007 cleanup season, PLM-NIOSH 9002 (PLM) will continue to be the "workhorse" analytical tool at the site. Literally thousands of unprotective cleanup decisions have been already made using PLM and thousands more will be made while we wait for a "believable" risk assessment. The continued use of "PLM is not "protective" to public health and safety as stated by Libby Team Leader Paul Peronard.

As a matter of fact, the historic use of PLM has created a serious false sense of security willingly perpetrated by both the EPA and its contractor CDM virtually every day on the project. The willful deception begins when contractors report to an uninformed public and work force that a sample has been analyzed and come back "non-detect." The use of the term "non-detect" is one of the most dangerous statements a federal agent can use when reporting sample results performed by an analytical method with known protective limitations. Without a comprehensive understanding of analytical methods in general and their specific sensitivity level, the term "non-detect" connotes an absence of Libby amphibole asbestos, when in fact, all the sample shows is the sensitivity tolerance of the PLM 9002 method, which is **1% asbestos by weight**.

To see through the deception, it is helpful to see what the EPA themselves believe when they talk about **1% asbestos** by weight in their procedural documents.

In their own words, as stated again in the Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum, December 15, 2003, **"It is important to note that the EPA does not assert that soil concentration of less than 1% LA (Libby Amphibole) is necessarily safe or acceptable. . ."**

So severe is the misconception surrounding the term "non-detect" among the work force, I personally witnessed on a rainy morning at the property of Mike Powers, two Environmental Restoration (ER) supervisors walk directly across a pile of dirt. Mixed in the pile of muddy dirt, completely visible to the naked eye, was vermiculite containing Libby amphibole asbestos. When I asked the workers if they were not concerned about the vermiculite they had just walked across the leader responded, "It's not a problem, it has been tested by CDM and the samples came back "non-detect." With that, the employees got into their pickup truck, adorned with large clumps of contaminated dirt clinging to their boots. I followed the pair to the local Mac Donald's Restaurant were they sat in a booth surrounded by local high school kids. Under the table rested the next level of exposure for the trusting town of Libby.

The false sense of security created by the continued use of PLM and subsequently reporting one sample after another as bring "non-detect", is not a casual oversight instead, it is a deliberate act of deception and leaves in its wake, new and unnecessary exposures.

In the oblivious absence of a Risk Assessment for the Libby project, it seems the EPA would be acting in an even more "protective" way however, both historically and presently the contrary is true and in the future we the community of Libby will suffer.

From the deliberate use of PLM a serious question arises. **Who is responsible for next round of exposure?** While W.R Grace criminally called the release of Libby amphibole "nuisance dust" and put public concerns aside, the EPA chooses to call the same hazardous material "non-detect" but taken in comparison Libby amphibole is the same hazardous material today as it was during the work days W.R. Grace and more importantly, the health effects of "short term" and "low dose" exposure is now well understood and certainly should provide protective guidance to the Environmental Protection Agency.

The EPA continues to employee an analytical tool they know does not work and in turn has set soil cleanup levels they themselves say are neither "safe nor acceptable".

Why should we trust an agency that demonstrates such a meager level of regard for both their own administrative guidelines which should be "overly protective" in a case like the Libby Asbestos Site as well as the hard science that continues to stare them in the face.

We talk about holding EPA's feet to the fire and the place to start to do that is on a local level, on a daily level. Any future exposure for the town of Libby will not come from a greedy company like W.R. Grace we have attended to that through legal action. Instead, exposure will come from those who we trust to cleanup our homes and businesses and to perform in a protective way. The citizens of Libby need to be fully informed and educated on the intrigues of the EPA cleanup in order for them to protect their own heath and safety as well as ensure a proper response is rendered to their private property.

End

Testimony for April 5, 2007 Hearing regading EPA Asbestos cleanup in Libby.

My name is William D. Caldwell and, along with my wife, Marjorie, reside at 580 Greers Ferry, Libby Mt. and I thank you Senator Baucus, for the opportunity to comment on the asbestos cleanup efforts of the EPA in Libby.

During the Fall of 2002 our home and lot were tested for the presence of asbestos. In October of that year Paul Peronard presented us with a report stating our house was free of asbestos contamination but our garden area and certain flower beds around the house were contaminated. Mr. Peronard advised we discontinue the use of the garden until the EPA could clean it up; which we have done.

That was nearly 5 years ago and in spite of repeated inquiries we have been unable to obtain any kind of a schedule for the decontamination of our property. While always courteous, "Not this year, maybe next" is the extent of the answers we have been given.

I understand and don't question that unexpected and higher priority sites, such as the High School track area, have been discovered which have slowed efforts on residential sites. However I also understand that failing to plan the entire task often results in wasted effort and needless expense. For instance, about 3 years ago a close neighbor's property was cleaned up, last summer the flower beds on another neighbor's property which adjoins the corner of our garden were cleaned up and presumably sometime in the future, our property will receive attention. This means that on three separate occasions, heavy equipment, supplies and other unique tools of the trade will have been moved from Libby or elsewhere to essentially the same location. Not only does this waste the contractor's time, but taxpayers money. Further, there is bound to be a similar benefit to the EPA by reducing the time required for EPA contract administrators to do their jobs.

Perhaps even more importantly, cleaning up certain properties and leaving adjoining properties untreated for several more years seems to invite re-contamination of the previously treated property.

In short, failure to plan the entire job is not only frustrating to affected residents of Lincoln County, but invites inefficiency and excessive cost.

William D. Caldwell 4/2/07

Marjorie D Caldwell 4-2-2007

Thank you for the opportunity to comment on the Libby Asbestos Superfund cleanup. My name is DC Orr. I was born and raised in Libby, my father before me, his father a young man when he came to Libby nearly a century ago.

While you may have been reading about Libby for the last seven years, I have lived the story my whole life. My father started a contracting business in the 40's that I operate today. We contracted earthwork for WR Grace from the early seventies until after they shut down.

When you read about the tracks at the schools being contaminated, I personally prepared those tracks for the asphalt surfacing. I am concerned because you haven't heard about the walking path that I built with Grace at one of the schools.

When you read about the skating rink built with contaminated material, I knew the story before it was written because I built that rink. I am concerned that you haven't read about the other two skating rinks that I built on school property.

When you read about the high rate of satisfaction homeowners express with their cleanups, they call me to tell how the EPA contractors stole their possessions and vandalized their homes.

When EPA announced the identification of "significant" contamination on US Highway 37 North and blamed it on Graces' historical operations, I pointed out that we had rebuilt that highway with clean fill in 1996, after Grace ceased operations in 1990, and identified the "visible Vermiculite" as having been spilled by the EPA contractors hauling contaminant to the mine. EPA then changes their story to implicate MT DOT, DOT finds no contamination.

When you read about the piles of product that the kids jumped in at the Export Plant, I buried those piles at the direction of WR Grace in conjunction with the first cleanup of the Export Plant in the 90's, before Grace gave it to the City. I am concerned that the superficial cleanup EPA allowed Grace to perform at this site never uncovered that fact. We continue to uncover problems at the Export Plant today. The boatramp debacle came after I told EPA that I had encountered contamination there while burying a communications cable through that public park in 1996.

When you read about the cleanup of the Screening Plant, you don't read about me being hired by the property owners to repair a waterline EPA contractors shoddily installed. I encountered contamination on top of the waterline. This was not contamination left behind under the terms of the agreement, "at depth" as they call it, this was contamination the EPA contractor was paid to remove and replace with clean fill. EPA admitted that they allowed the contractor to violate the terms of the contract. I was exposed because of this lack of oversight.

Whether from corruption or incompetence, this cleanup is failing. My hands-on experience with the sites and issues puts me in a unique position to critique the efforts of EPA in Libby. If you rely solely on what you read about Libby, information carefully manipulated by EPA, you get a very different picture than what I have seen with my own eyes.

Paul Peronard freely admits that EPA "dropped the ball" in Libby. The first of seven Libby OIG investigations sought to identify how EPA could have possession of critical studies in the seventies and eighties and failed to regulate the industry responsible for the problems we face today. OIG cited funding deficiencies as the reason people are sick today.

I am concerned that framing the debate as "dropping the ball" minimizes the magnitude of this EPA regulatory failure. Dropping the ball brings to mind playing games. If you "drop the ball" in sports, you give up a run, lose possession of the ball, or allow a few points to be racked up against you. When EPA drops the ball in Libby, the consequences involve the lives of my neighbors and relatives. Human health was the biggest issue when EPA came to Libby in 1999.

EPA is dropping the ball on another generation in Libby. The primary reason in my estimation is a lack of local involvement in the decisions affecting us all. The CAG was formed to share information with the public on the cleanup. Anyone publicly critical of the cleanup is beat down at these meetings until public involvement is reduced to only those supporting the cleanup, mostly those making money off of it. Libby has a history of putting money ahead of human health.

Les Skramstad was accused of planting contamination after he pointed out the superficial cleanup of the buildings at the Export Plant. EPA ultimately forced Grace to destroy those City-owned buildings, without requiring replacement.

Gordon Sullivan, our first paid technical advisor, pushed for a toxicity assessment early on in his tenure. He argued that not only couldn't EPA prove the efficacy of their cleanups without a toxicity assessment, they couldn't prove that the cleanup wasn't actually spreading contamination and harming human health. He was ridiculed and discredited until his ultimate ouster as technical advisor.

Clinton Maynard pointed out the dangerously absurd position put forth in the "Living with Vermiculite" brochure, persistently requesting that it be changed or removed. He was ultimately vindicated, but at great personal cost.

The Parkers, Siefkes, Carol Ray, Kerry Beasley, myself, and a host of others have been met with tactics of dehumanization and defamation that folks in close knit rural America are unfamiliar with. Paul Peronards EPA profile at one time accused my brother, a state legislator, of a standoff with EPA. It said he threw them off his property. It was a lie.

Gordon and Clinton have been answered only after Congressional involvement. The crucial questions they asked were left unanswered through years of persistent involvement in TAG and CAG. It isn't that EPA couldn't answer their questions, once our Congressmen became involved the issues were readily admitted. The problem lies in the years of stonewalling we encountered before that.

Because these questions were ignored, the cleanup was able to proceed without proper protocols for handling Libby amphibole asbestos. I have pictures of cleanup personnel standing in contamination without personal protective equipment. They spread it when they travel from job to job. Decontamination protocols are not based on science, because there is no science. Familiarity breeds contempt for the material when there is no toxicity assessment. EPA contractors were recently witnessed illegally dumping contaminated material in the public portion of the local landfill.

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