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ASBESTOS CLEANUP IN LIBBY, MT

HEARING

BEFORE THE

SUBCOMMITTEE ON SUPERFUND, TOXICS, RISK, AND WASTE MANAGEMENT

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

SECOND SESSION

ON

TO ASSESS ASBESTOS REMEDIATION ACTIVITIES AND EVALUATE HOME INSULTATION CONCERNS RELATED TO ASBESTOS

JUNE 20, 2002

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ASBESTOS CLEANUP IN LIBBY, MT

THURSDAY, JUNE 20, 2002

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON SUPERFUND, TOXICS, RISK,
AND WASTE MANAGEMENT,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:35 a.m. in room 406, Senate Dirksen Building, Hon. Max Baucus (acting chairman of the subcommittee) presiding.

Present: Senator Baucus. Also Present: Senator Murray.

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

Senator BAUCUS. The meeting will come to order, and thank you all for being here today. I thank Senator Boxer, Senator Chafee and Senator Reid, members of this committee, for helping arrange this hearing. I am also a member of this committee, but they hold leadership positions in this committee, and I want to thank them for their efforts.

Every community in our country obviously is special, but I must say that in my State of Montana, even though every community in Montana is special, I like to speak about one in particular, and that is Libby, MT. Libby is a small town. Most people there earn their living in the woods, mills or in the mines. In January 2000, some very kind people from Libby invited me into their homes to talk about some of the health problems they were having as a result of exposure to tremolite asbestos from the defunct W.R. Grace mine.

I have become very good friends with all these people. They are wonderful, wonderful people. Their stories over the last couple of years since I first got involved in this matter have kept me focused on doing what is right for the people of Libby.

As I stood in the home of Gayla Benefield on a January afternoon, I met with nearly 30 people from Libby, all suffering from the effects of asbestos illness or had already lost loved ones due to the disease. That afternoon, I also met a man in the living room of Gayla named Les Gramstad. I want to tell you a little about Les. He is a father, husband and grandfather. He has made his living at the W.R. Grace mine. Les shared stories with me about returning home at the end of a long workday at the mine, covered completely with dust. I have to tell you, I have watched these guys get off the bus. They are just like dust bags. They are just totally filled

with dust. He would go home. His children would climb into his lap and play with him. He would embrace his wife.

You guessed it. He, not knowing he had contracted asbestosis, gave asbestos-related diseases unwittingly to his children. He gave the disease to his wife, as they came in contact with the dust. So not only is Les dying, but he also has this tremendous guilt that he has caused his loved ones to also have the disease. As we all know, this is a disease where once you get it, you just do not know what the consequences are going to be and it is very long-lasting. Most people have a very difficult time and many eventually die.

I want to show you a picture of the working mine. It is over to my left. This picture is from the late 1960's. It is close to the time that Les worked at the mine. You can just get a sense of the pollution. As you can tell from the photograph, the mill there is spewing a lot of dust in the air. That is more than 24,000 pounds of dust expelled each and every day that the mine operated, and 5,000 pounds of that 24,000 was tremolite dust—tremolite asbestos. There are many, many forms of asbestos. The worst and most deadly is tremolite. Asbestos is mined at various sites around the country. There are various forms of asbestos, but the most deadly is tremolite, and tremolite asbestos is the type of asbestos that is mined in Libby, MT.

Piles of the dust as waste from the mine were dumped as tailings that pushed right up into the Kootenai River. That is the river that runs right alongside Libby, alongside of the mine, and I know it eventually goes further west into the Columbia River and affects those States as well.

W.R. Grace gave the stuff away free. Here is what they said, W.R. Grace at the time, "Use it in your garden, in the high school track. Use it in your driveway. Stuff it in your attic for insulation." So people did, because the dust was harmless. At least that is what W.R. Grace told them. There was no one to contradict those company statements—not the State, even though there is evidence the State had that this stuff is poisonous; not the Federal Government, even though they had evidence as well. No one told the people of Libby the tailings from the W.R. Grace mine was poison. Nobody told them that.

Let me show you now what a tremolite asbestos fiber looks like magnified. That is a tremolite asbestos fiber. As you can tell, it looks like a long needle. These tiny fibers get into people's lungs and their lungs cannot get rid of them. It is like a javelin. It is like a hook. It just gets into the lungs and it gets into the membrane and it does not get out because like a javelin, it has that hook in it. Eventually these fibers cause lung cancer or deadly mesothelioma, a very rare cancer caused only by asbestos; or folks get asbestosis and die slowly and painfully as it gets harder and harder to breathe.

This is a photograph now of a Memorial Day service in May of this year. Those white crosses clearly represent people who died in Libby on account of the disease. The first night I visited Les, he told me he had asbestosis. He was exposed during the short time he spent working at the mine. Les went on to share, which is the most troubling part of the story, and I have already mentioned that not only is Les sick, but so is his wife, Narita and so are their chil-

dren who are now in their 20's and 30's. Each one of them was exposed to tremolite asbestos fibers contained in the dust Les carried home on his clothes. Every time he hugged his kids hello, as I mentioned, every time he greeted his wife at the end of a long day, he was exposing his family to asbestosis poisoning.

Les went on to tell me that his story is not unique. There are dozens more like him still living in Libby, and many who have already died—died because of their exposure to tremolite asbestos dust. Hundreds more are sick. In fact, the Agency for Toxic Substances and Disease Registry has found that Libby suffers from asbestos-related disease at the rate of 40 to 60 times the national average. W.R. Grace knew. Federal and State agencies knew. They all knew that the asbestos that contaminated the vermiculite ore was deadly.

That afternoon, Les asked me to help him and I told him I would. I will never forget the next thing he said to me. He is a tall man, a little taller then than now. He said, "Max, I will be watching you to make sure you keep your word," because I told him I would do all I could. Les did not have to say that. The instant I recognized the problems Les and the people of Libby were facing, by talking to them at Gayla Benefield's home that afternoon, I pledged to myself that I am going to do whatever I possibly can to help the people of Libby and to make this situation right for them. That is the most gut-wrenching experience I have encountered in my recent memory. It was that gripping, that tragic.

Since January 2000, I have visited Libby nine times. I have dedicated one staff person nearly full-time to focus on the issues this problem has generated. At my direction, that person has visited Libby 103 times since then. I would like her to stand. Where is Rebecca? There is Rebecca. She is aces. She runs our Kalispell office, but she has been up to Libby 103 times in the last 2 years only on this issue.

I held a field hearing during this committee in Libby 2 years ago and two town hall gatherings since then. I have opposed the Fairness Asbestos legislation during the 106th Congress, because I think that legislation would improperly restrict victims' rights to sue for damages. I have heard from the Agency for Toxic Substance Disease Registry to secure funds to complete two rounds of medical screening for the community. I have also urged USATSDR to be sensitive to developing a customized approach for serving Libby because it is so unique, our situation at Libby. I have asked the EPA's efforts in Libby to ask EPA to assist by seeing to it that additional cleanup dollars are sent to Libby—more than otherwise would have been the case.

Former Secretary of Health and Human Services, Donna Shalala has helped secure emergency funding for Libby, and Secretary Tommy Thompson has also been very helpful.

We are also fortunate to enlist the help of the University of Montana and their Center for Environmental Health Sciences as they begin to identify potential cures for asbestos-related disease.

The bottom line is that Libby is left with a massive asbestos contamination problem, both in town and at the mine site. It is everywhere. Another photo here—This is a picture of the mine site, obviously from the air. Libby is also left with a huge public health cri-

sis, as hundreds upon hundreds of folks will need expensive long-term medical care. We will hear from some our Montana witnesses about that. How should care be provided? Who is going to pay for it? Who is going to insure those who are ill?

I continue to hope that W.R. Grace will step up to the plate, but Grace has shown again and again that they will step away from any and all responsibility for what they did to the people of Libby, MT. Grace has filed for bankruptcy. Grace has been denying claims for health coverage. It has been reported that Grace has managed to hide at least $4 billion in assets, that is, transfer at least $4 billion of assets so the people of Libby cannot seek damages against the company.

It is just too much to ask a rural community in northwestern Montana to deal with this all on their own. They need help. That is what we are here to talk about. I would like to get a sense from EPA of what they are doing, what they have accomplished so far in Libby, where they are going, how they plan to get Libby a clean bill of health. We will also hear from the Agency for Toxic Substances and Disease Registry about their efforts, particular of inspector screenings and care for Libby residents. Dr. Falk testified at the committee's field hearing in Libby back in February 2000. I will be interested to hear his perspective on how far we have come, and his taking stock approach and how far we have yet to go.

I hope to also hear about what has been learned from the tragedy in Libby. That is other information that will help us do a better job of protecting people from the dangers of asbestos. I applaud our State's Governor. She, as we say in the vernacular, fired the silver bullet. As we know under CERCLA law, a State Governor has one opportunity to trigger a process which speeds up the determination of whether EPA will designate a site as on the national list of registry of sites to be cleaned up. She did that, and I applaud her for taking that action. I also appreciate Representative Rehberg's efforts on the home insulation issue in Libby, and Senator Burns has been helpful as well.

So essentially we are here to take stock about what has happened and to see what else we have yet to do in Libby. Libby needs our help. We are here to provide it. This issue is particularly important to me. I am not going to let Les down. I am not going to let the people of Libby down. I know everyone in this room feels the same way.

I would also like to introduce our first witness, a terrific Senator, Senator Patty Murray from Washington. Patty was gracious enough to let me testify in a hearing that she chairs. That was a short while ago. It was at that hearing we were able to secure the promise of various government agencies to come to Montana. We are very glad that they did. Senator Murray has been extremely concerned about this issue as it affects her people in the State of Washington. We are very honored to have you here, Senator. I know what a fighter you are for your people in Washington. At the conclusion of your testimony, you are more than welcome to share the dais and just help your people as we help Montana's.

Senator Murray.

STATEMENT OF HON. PATTY MURRAY, U.S. SENATOR FROM THE STATE OF WASHINGTON

Senator MURRAY. Thank you very much, Mr. Chairman. Thank you for your passion on this issue and helping us finally get it to the attention of the Nation as you have seen the struggles in your State. It is such a critical issue. We would not be at the point we are without your tremendous work, and I really appreciate your having this hearing today on Libby, MT and on the health and environmental problems caused by asbestos contamination from that W.R. Grace vermiculite mine.

I really appreciate the opportunity to testify before your committee today as well. Your leadership on this issue has just been essential, and none of us would be where we are today if it was not for that, and I really appreciate it.

Senator BAUCUS. Thank you.

Senator MURRAY. Mr. Chairman, I first became interested in this issue in 1999 because of a series of articles by Andrew Schneider about Libby in the Seattle Post-Intelligencer. As you know, I can relate to the people of Libby because my mother grew up in Butte, MT and like Libby, the main industry in Butte is mining. I know first-hand that these communities believed the government was protecting them from health problems caused by air and water pollution from mining.

I also became interested in this issue because Libby is only 160 miles from Spokane, WA and many people from Libby have received medical treatment in Spokane. Last year, I chaired a Senate Health, Education, Labor and Pensions Committee hearing on asbestos exposure and worker safety, and Dr. Alan Whitehouse from Spokane testified. He has treated about 500 patients from Libby. While most people thought only miners and their families could be exposed to dangerous amounts of asbestos from mining, many of his patients are sick just because they lived in Libby. Approximately 25 percent of his patients did not work in the mine or live with someone who did. Twenty-four of his patients have died in the last 3 years, and five who died were sick only from environmental exposure.

The issue is also relevant to my constituents because like most other States, Washington has many sites which processed Libby vermiculite that was contaminated with asbestos. The chart that I have behind me displays all of the sites in the United States which have received vermiculite from Libby. This map of the United States should tell every single Senator that this is not a problem somebody else has. It is a problem they have.

Of the approximately 300 sites which process this mineral, the Environmental Protection Agency and the Agency for Toxic Substances and Disease Registries have determined that 22 sites require further cleanup. One of these sites is the former Vermiculite Northwest, Inc. and then-W.R. Grace plant in Spokane. That plant began producing Zonolite insulation in 1951. Even though the plant closed down in the early 1970's, recent tests by EPA have found some soil samples from the site still have asbestos concentrations of up to 3 percent. EPA is strongly recommending that access to the site be restricted almost 30 years after that plant closed down.

At many plants where vermiculite from Libby was processed, waste rock left over from the expansion process was given away free, as the chairman noted. People used that free waste rock in their yards, in their driveways and in their gardens. The other picture you see shows Justin and Tim Jorgensen climbing on waste rock that was given out by Western Minerals, Inc. in Minneapolis, MN in the late 1970's. According to W.R. Grace records, that rock they are climbing on contained between 2 and 10 percent tremolite asbestos. This rock produced airborne asbestos concentrations 135 times higher than OSHA's current standard for workers.

Thankfully, today neither Justin or Tim has shown any signs of disease, but their risks of developing asbestos diseases, which have latency periods of 15 to 40 years, are increased from their childhood exposures. Mr. Chairman, I showed this picture several days ago at a press conference that I had, and this morning I came into the office and received an e-mail message from Lizzie Jorgensen who is the mother of the two boys in this picture. I want to read it to the committee this morning.

Greetings. Yes, please eliminate asbestos. Those two boys playing in the free rock are my sons. Justin and Tim's father, Harris Jorgensen, suffered long and hard with asbestosis and lung cancer. He died June 22, 1991 at the age of 44. An autopsy shows asbestos in his lungs. We lost that case in Federal court. Like Harris said, we may not have gotten anything out of this, but maybe it will help someone else. At this time I wonder, do my sons have to suffer also? It may be too late.

Senator MURRAY. From Lizzie Jorgensen, the mother of the two boys playing in that rock.

Today, people may still be exposed to harmful amounts of asbestos and vermiculite. Between 12 million and 35 million homes and businesses may have Zonolite insulation. This may be the case for up to 150,000 homes in my State alone. EPA has also tested agricultural products, soil conditions, and fertilizers made with vermiculite and determined that some workers may have been exposed to dangerous amounts.

As I learn more about Libby and how asbestos had ended up in products by accident, I was shocked to learn that asbestos is still being used in products on purpose. While some specific uses have been banned, the EPA's more sweeping ban was never put into effect because of a lawsuit backed by the asbestos industry. As a result, new uses of asbestos were banned, but most existing uses were not banned. Today, asbestos is still used to make roofing products, gaskets, brakes and other products. In 2001, the United States consumed 13,000 metric tons of it. Asbestos is still entering the product stream in America despite all of the known dangers to human health.

In contrast, asbestos has been banned in at least 20 other countries. It is time for the United States to ban asbestos, too. I want to ensure our government does all it can to minimize future suffering and death caused by asbestos. That is why a few days ago I introduced the Ban Asbestos in America Act of 2002. I want to thank Senator Baucus for being an original cosponsor and I appreciate the cosponsorship of Senators Cantwell, Dayton and Wellstone as well.

The Ban Asbestos in America Act of 2002 has four parts which I would like to just briefly mention. First, this bill protects the pub-

lic by requiring the EPA to ban asbestos by 2005. Like the regulations EPA finalized in 1989 under the TSCA, companies may file for an exemption to the ban. EPA may issue the exemption if there is no substitute material available and the exemption will not pose an unreasonable risk of injury to public health or the environment.

I would like to take a moment to point out to the subcommittee the connection between what happened in Libby and EPA's efforts to ban asbestos. Last year, the EPA's Inspector General conducted an investigation into why the Agency did not do a better job of protecting the people of Libby. I was struck by one of the sections of the Inspector General's report in which a letter written by EPA in 1983 is as follows: "Asbestos-contaminated vermiculite is considered a lower priority at this time than problems posed by friable asbestos-containing materials in school buildings and commercial and industrial uses of asbestos."

In 1979, EPA had issued an advance notice of proposed rulemaking that it intended to explore options to control asbestos under Section 6 of the TSCA. In 1982, EPA issued a reporting rule under Section 8(a) of TSCA to gather information about commercial and industrial uses of asbestos. EPA's proposed rule to ban asbestos was published in the Federal Register in January 1986 and the final rule was published in 1989. One of the reasons EPA did not spend more time focusing on asbestos-contaminated vermiculite was the Agency was working on the asbestos phase-out and ban rule. Unfortunately, that rule was overturned by the Fifth Circuit Court of Appeals in 1991.

There is a clear relationship between EPA's efforts to ban asbestos and the fact that the problems in Libby were overlooked. I am saddened that EPA did not spend more focused time in Libby, in part because of a competing effort to limit asbestos exposure—an effort which ultimately failed.

Second, the bill requires EPA to conduct a public education campaign about the risk of asbestos products. We need to warn people today that their home insulation, if made with vermiculite may be contaminated with asbestos. While EPA has agreed to remove vermiculite insulation from homes in Libby, the Agency currently has no plans to do this nationwide. The Ban Asbestos in America bill requires EPA and the Consumer Product Safety Commission to educate consumers about how best to handle this insulation within 6 months. The Ban Asbestos in America Act of 2002 also requires EPA to conduct a survey to determine which foreign and domestic products consumed in the United States today have been made with asbestos. EPA has estimated that as many as 3,000 products still contain this mineral.

Third, the legislation invests in research, tracking and treatment of asbestos diseases. It requires a national mesothelioma registry which would be coordinated with ATSDR's existing efforts pertaining to Libby, as well as with the National Institute for Occupational Safety and Health. The bill also authorizes funding for seven mesothelioma treatment centers nationwide to improve treatments for and awareness of this fatal cancer.

Finally, the bill requires EPA to expand its Blue Ribbon Panel on asbestos to address issues beyond the six regulated forms of as-

bestos, as EPA originally promised in its response to the Inspector General.

Over the years, asbestos has taken a staggering toll on our country. We have recently been reminded of the dangers posed by asbestos because of concerns about asbestos exposure from the dust and the debris caused by the collapse of the World Trade Center towers. Had this country acted swiftly to ban asbestos when public health evidence about its dangers first emerged, the Towers would not have been built with any asbestos at all. Now, we will need to wait probably several decades to determine whether asbestos exposures in New York will cause asbestosis, lung cancer, or mesothelioma for our first responders and residents.

I hope this subcommittee, which has primary jurisdiction over the Ban Asbestos in America Act, will consider holding a hearing on this bill in the near future, and move it as quickly as possible.

Thank you again, Senator Baucus, for your tremendous efforts on behalf of the people in your hometown and really across the entire country.

Senator BAUCUS. Thank you, Senator, for your very, very dedicated work here. You have done a great job, worked very, very hard on this. That is clear from your testimony, and clear from your statement. We would be honored to have you come up to the dais.

OK, let's hear from our next panel, which consists of Marianne Horinko, Assistant Administrator for Superfund at Environmental Protection Agency; Dr. Henry Falk, Assistant Administrator for the Agency for Toxic Substances and Disease Registry; and Dr. Gregory Wagner, Director of the Division of Respiratory Disease Studies at the National Institute for Occupational Safety and Health.

Ms. Horinko, why don't you proceed? We have a 5-minute rule here, but due to the nature of this hearing, we may relax that a little bit. If you could generally stay within 5 minutes, that would be—and your statements automatically will be included in the record.

STATEMENT OF MARIANNE HORINKO, ASSISTANT ADMINISTRATOR, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. HORINKO. Thank you.

Good morning, Senator Baucus and Senator Murray. I am Marianne Horinko, Assistant Administrator of EPA's Office of Solid Waste and Emergency Response. It is a pleasure to have the opportunity to appear before the subcommittee once again.

Today, I represent Governor Christine Todd Whitman to discuss EPA's efforts to clean up asbestos contamination in Libby, MT and describe what steps EPA is taking to address potential asbestos contamination at other sites throughout the country. I wanted to let you know that although Governor Whitman could not appear today, I can assure you that protecting the health of the residents of Libby remains one of her top priorities.

EPA is committed to working with our State and Federal partners to take the necessary steps to protect public health and the environment in Libby and at related sites. I want to thank Senator Baucus particularly for his tireless efforts in helping to ensure that

the community of Libby is protected through the cleanup of asbestos contamination.

As we all now know, many decades of mining and processing vermiculite ore contaminated with asbestos has left the community of Libby with significant health impacts. Those health impacts include cases of mesothelioma, an incurable and often fatal cancer of the chest cavity, increased risks of lung cancer, and the debilitating respiratory illness asbestosis. To address the asbestos contamination in Libby and the related health impacts, EPA, working closely with the Agency for Toxic Substances and Disease Registry or ATSDR, and the U.S. Public Health Service mobilized an emergency response team to work in Libby. In 1999, ATSDR and PHS, funded by EPA, started medical investigations in Libby to determine the magnitude of asbestos-related health impacts. The medical investigations documented evidence of widespread disease and mortality resulting from asbestos exposure.

Starting in 1999, EPA began emergency investigation and cleanup activities in Libby. After interviewing numerous residents and collecting more than 5,000 samples, EPA found high amounts of asbestos-contaminated vermiculite at the mine, the mine road, processing areas, the mine tailings pile and pond, and in residential areas of the community. In June 2000, EPA started and provided oversight for the cleanup of two former processing areas to address some of the highest levels of asbestos contamination. EPA has also started cleanup actions at the mine road, the high school track and city park facilities.

EPA plans to start additional cleanup actions at mining facilities and in the community.

I am pleased to report that on May 9, 2002, EPA approved a new action memorandum amendment significantly expanding cleanup work at Libby, including certain residential contamination in homes with vermiculite insulation. The Agency determined that this material did fall within our response authorities, particularly given the unique circumstances found in Libby with both cumulative exposure and also multiple pathways of exposure. EPA also determined that the remaining asbestos released in Libby would not have been addressed by any other authority in a timely manner.

EPA is removing vermiculite ores and mining waste from residential yards and expects to begin removal of vermiculite insulation from homes within 1 week. We expect to complete cleanup at 55 priority properties by the end of this summer. EPA is also working with ATSDR to study other locations across the country that received shipments of vermiculite from Libby. The Agency initially identified 240 locations for study, and has determined that 22 require additional investigation. EPA is sharing its findings with other State and Federal agencies to provide the information necessary to decide whether further action is needed.

One example of a situation warranting a shared Federal and State approach is the asbestos contamination discovered at the Western Minerals processing site in Minneapolis, MN. Western Minerals is estimated to have processed more than 100,000 tons of vermiculite ore from Libby, MT. The waste material generated from this processing was made available to residents as foam mate-

rial for driveways and yards. The State and EPA have conducted sampling and have been removing asbestos contamination from the former plant and from residential yards. ATSDR is currently funding a survey by the Minnesota Department of Health to determine the health impacts on former plant workers and nearby residents.

In conclusion, you have my commitment and the commitment of Governor Whitman that EPA will continue its work with other State and Federal agencies to protect the public health of the residents of Libby, as well as the health of other communities that may have been affected by asbestos-contaminated vermiculite from Libby.

Thank you again for this opportunity to share our work, and I will be pleased to answer any questions that the subcommittee or Senator Murray may have.

Senator BAUCUS. Thank you, Ms. Horinko.

Dr. Wagner.

STATEMENT OF GREGORY WAGNER, M.D., DIRECTOR, DIVISION OF RESPIRATORY DISEASE STUDIES, NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

Dr. WAGNER. Good morning, Senator Baucus, members of the subcommittee, Senator Murray.

I am Dr. Gregory Wagner, Director of the Division of Respiratory Disease Studies of the National Institute for Occupational Safety and Health, known as NIOSH. I am pleased to be here today to provide testimony on health risks to workers from asbestos and to discuss NIOSH research related to Libby, MT.

NIOSH is a public health research institute in the Centers for Disease Control and Prevention at the Department of Health and Human Services. We conduct research and make recommendations to identify and prevent work-related illnesses and injuries. My testimony today will address our knowledge about health risks to workers from exposure to airborne asbestos and asbestos-like minerals, opportunities for better prevention of asbestos exposure and disease, past NIOSH findings with respect to asbestos contamination in Libby, MT, and our ongoing research related to Libby.

Asbestos, as you know, is a term that refers to a group of naturally occurring fibrous minerals. The connection between inhalation of asbestos fibers and a number of serious and often fatal diseases is well recognized. Asbestos is a known human carcinogen. The diseases it causes, both malignant and non-malignant, are often fatal and most are preceded by years of debilitating illness.

Although the use of asbestos has been reduced or eliminated in many commercial products, asbestos and asbestos-containing materials are still found in many occupational and industrial settings and pose a risk of exposure to workers and others. Asbestos is also found in manufactured products such as gaskets and building materials. Construction and maintenance workers involved in building, demolition and renovation or in asbestos removal are at particular risk for asbestos exposure. In addition, take-home exposures to families of workers in which exposed workers bring home asbestos on their clothes, hair or shoes is also a well-recognized hazard.

Asbestos is regulated by the Occupational Safety and Health Administration, the Mine Safety and Health Administration and the

Environmental Protection Agency. Federal regulations define asbestos as a half-dozen minerals—chrysotile, crocidolite, amosite, tremolite, actinolite, and anthophyllite. In 1990, testimony to OSHA, NIOSH broadened its science-based definition of asbestos beyond the six specified asbestos minerals, basing our definition on scientific evidence from studies suggesting that fiber dimension, specifically length and diameter and fiber durability and persistence in the body, are more critical than the specific chemical or elemental composition in causation of asbestos-related disease. The NIOSH asbestos definition encompasses certain variance of the six regulated minerals, as well as so called "cleavage fragments" that can be generated from non-fibrous mineral forms of these six asbestos minerals.

Our studies of vermiculite workers in Libby began in 1980, when OSHA asked NIOSH to provide technical assistance to investigate lung problems in workers at a plant using vermiculite that had been mined in Libby. Shortly thereafter, the Mine Safety and Health Administration also requested technical assistance from NIOSH to investigate the magnitude of health hazards in vermiculite mines. In response to these requests, NIOSH undertook epidemiologic studies in Libby, MT between 1980 and 1985. Our studies showed that occupational exposure to mineral fibers that contaminated Libby vermiculite caused high rates of asbestos-related diseases among exposed workers. The mineral fibers included tremolite, one of the currently regulated asbestos minerals. However, some recent evidence indicates that only 10 to 20 percent of the fibrous minerals contained in Libby vermiculite was tremolite. The remaining 80 to 90 percent of the fiber contaminant has been characterized as several other similar fibers, such as richterite and winchite. These fibers are not currently classified as asbestos by mineralogists or regulated as asbestos.

NIOSH played a pivotal role in documenting the health hazards associated with occupational exposure to asbestos-contaminated vermiculite at the Libby mine and made our findings available beginning in 1985 through meetings in Libby with workers and their representatives, employer representatives and members of the community. NIOSH also published its findings in several scientific papers to alert the occupational health community.

It is clear in hindsight that further work remained to be done, specifically further studies of downstream users of Libby vermiculite products and better tracking of exposed workers and others. NIOSH is applying what we learned from our experience at Libby to our current and future activities, both in Libby and throughout our program.

NIOSH is following up on potential exposures of workers who use or process vermiculite from sources other than Libby. The degree to which vermiculite from these other sources is contaminated with asbestos is not clear. At OSHA's request, NIOSH is conducting environmental sampling at expansion plants and horticultural operations where vermiculite is used. We are also updating our mortality study of the Libby miners studied previously and working with the EPA on a variety of their studies as well.

Additional research possibilities that NIOSH is considering include efforts to better determine the physical and/or chemical char-

acteristics affecting toxicity of both manufactured and naturally occurring fibers. There is currently no direct evidence by which to attribute particular health effects to each possible fiber type. Epidemiologic studies of people exposed to manufactured and natural fibers would be useful, as well as studies conducted with animals to obtain mechanistic and other toxicologic data.

Also, the current analytic method for determining airborne fiber concentrations do not count the fibers that are too small in diameter or length to be detected. Additional work to improve and standardize the methods for asbestos fiber measurement would further advance prevention and control measures.

In summary, we know much about the adverse health affects caused by the inhalation of asbestos fibers. However, many research questions remain. Further research is needed to better characterize the work environments where contaminated vermiculite may be used and to determine whether vermiculite from sources other than Libby is also contaminated with asbestos. We need to increase our understanding of the health effects of fibrous minerals that fall outside the definition of asbestos and improve tracking of people potentially exposed to hazardous fibers. While information continues to be gathered, public health prudence requires that vermiculite from the Libby mine or products containing vermiculite originating in Libby be considered potentially dangerous. Proper precautions should be taken to minimize the generation and inhalation of any dust during the handling of these materials until analysis of the particular vermiculite or vermiculite-containing product shows that it does not produce an asbestos hazard.

Thank you, Senator Baucus.

Senator BAUCUS. Thank you, Doctor, very much.

Dr. Falk, welcome back.

STATEMENT OF HENRY FALK, M.D., ASSISTANT ADMINISTRATOR, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Dr. FALK. Thank you very much, and good morning Senator Baucus, Senator Murray.

My name is Henry Falk and I am the Assistant Administrator of the Agency for Toxic Substances and Disease Registry, a public health agency within the U.S. Department of Health and Human Services. I am accompanied this morning by Sharon Campolucci, who was the coordinator of our medical testing program in Libby.

Senator Baucus, ATSDR is grateful for the interest and support given by you and other members of the subcommittee and of the Montana delegation since we began working in Libby in late 1999. As you know, we came to Libby in response to concerns expressed by yourself, community members, former vermiculite mine workers and the health department. Over the last several years we have worked very closely with the U.S. EPA, the State of Montana and others to address these concerns. Without the support of all of you, we would not be able to report today on the progress that we have made in evaluating public health issues in the Libby, MT community.

We have been actively involved with citizens and public health and environmental officials to determine the extent of harm to hu-

mans from asbestos-contaminated vermiculite that was mined in Libby. In the earliest phase of our effort, we developed a plan to help guide our activities in the Libby area, and as we have shared with you in the past, this public health response plan identified the areas of responsibilities for the conduct of our health-related activities. We have worked on that plan with various members of the community, including officials there to provide input in developing our public health efforts.

I am going to give a very brief update on a number of activities that we have undertaken. First and foremost, in the medical testing program, and, as Senator Baucus noted, in the summer of 2000, we conducted medical tests on 6,149 adults in the Libby area. Of those, 18 percent showed pleural abnormalities, and of the former W.R. Grace workers included in that testing, 48 percent showed such pleural abnormalities. Most of the participants in that effort reported multiple routes of exposure.

We conducted a second phase of medical testing in the summer of 2001 with an additional 1,158 participants. The preliminary analysis of that data does not suggest any significant change in the prevalence of abnormalities from the first phase.

Again, as Senator Baucus noted, we conducted a mortality review for a 20-year period which demonstrated that asbestosis rates in the Libby area were at least 40 to 60 times higher than expected. The mortality review also suggested mesothelioma occurrence was elevated, and we expect to release an updated mortality review by early July.

We have several other investigations, such as looking at the potential value of CAT scans in addition to chest X-rays in evaluating individuals. Those are nearly complete and will be reported on in the near future.

We have done detailed planning and preparatory work for development of a registry of former Libby area miners and household contacts; and also, a key source of registrants will be those who participated in the medical testing program. We sponsored a workshop in February to consult with and solicit advice from experts in respiratory disease and asbestos to help guide the next steps for the Libby registry. The registry is intended to be a long-term effort that will not only be a repository of information and facilitate further studies, but also enable information that may come about in the future on treatment and other medical breakthroughs to be given to all the members of the registry.

We are currently working with the State to support localized planning addressing future medical needs. There is a need, as you know, for extended medical testing to continue in some form for many years. We would like to see the primary responsibility for the medical testing program transition to the State and local health departments with ongoing technical and resource support from ATSDR.

We have worked in close cooperation with Region VIII HHS staff to help the community identify sources of assistance for medical care. As you know, HHS Deputy Secretary Claude Allen visited Libby last September and was instrumental in developing the HHS response. We are very concerned about the other sites that have received asbestos-contaminated vermiculite. You have seen the chart

this morning of the many sites. We are working together with EPA to evaluate and prioritize those sites. We will be visiting a number of these sites this summer and we hope to be able to determine the extent of exposure and possible health effects from those sites as we proceed.

One site that has already elicited considerable attention is the Western Mineral Products site in Minneapolis, MN. We have been working with the Minnesota health department to collect further information on exposure and potential health effects at that site. We've also developed a protocol for use by State health departments to review their vital statistics and cancer registry data at many of these sites. We have cooperative agreements with six States to look at statistics for sites within their State, and we hope to involve several more States this year.

In addition, we've been working with four States to evaluate the mesothelioma data within their States and look for potential relationships to vermiculite or other sources of asbestos.

In summary, I would like to reiterate that we share your concerns about the situation in Libby. It may seem very dry to summarize results like this very quickly, but we understand the human impact of these health problems. We share your concerns and we want to do as much as we can. Much remains to be done.

Our primary goals for the coming year will be to implement the registry of former workers and family contacts, to establish the medical testing program on a long-term basis by transitioning primary responsibility to State and local health departments with technical and resource support from ATSDR, to conduct further epidemiologic investigations on the links between environmental exposures and development of disease, and to provide data on potential health effects in other States that had vermiculite processing centers that may have led to harmful exposures. Finally, we continue to work on the mesothelioma surveillance activities, together with NIOSH.

With your continued support, ATSDR stands prepared to continue our work and we will do whatever we can to help people in Libby and in Montana and at any other sites that may have been afflicted with these problems.

This concludes my testimony. I would be happy to respond to any questions. Thank you.

Senator BAUCUS. Well, thank you very much, Doctor. I know you've worked hard on this. We appreciate it.

Senator Murray has another hearing she has to attend, in fact, chair in about 10 minutes from now. So I'm going to turn to her for questions and give her an opportunity to ask all the questions, take all the time that you want.

Senator MURRAY. Thank you very much, Mr. Chairman, and thank you all for being here today to testify before this committee on this really critical project.

Ms. Horinko, I'll start with you. I did speak a few months ago with Governor Whitman about this issue, and I am sorry she could not be with us today. If you could just share with her my concern again and let her know I appreciate her efforts as we work to clean up Libby.

I am particularly concerned about the other sites throughout the country which process vermiculite from Libby. Now that Libby has been declared a Superfund site, do you think that any of the other sites which require further cleanup, such as the site in Minneapolis, MN, will also be declared Superfund sites?

Ms. HORINKO. Senator Murray, at the moment we are working under our emergency removal authority, which does not require us to declare a site a Superfund site in order to conduct emergency actions. That is how we have done the work thus far at Libby. At the moment, it does not appear that any of the other 22 sites may need to be declared a Superfund site. Our work at those sites is just starting, and that may not rule out Superfund site declaration at some of these others. At the moment, that is not our plan.

Senator MURRAY. At the 22 other sites, you do not think there is enough contamination at this point that you are going to declare them to be Superfund sites?

Ms. HORINKO. Not at this point, but let me stress that we are in the preliminary stages of sampling and cleanup at many of these sites, and further investigation may reveal contamination that may lead to listing one of these sites on the NPL, the Superfund National Priorities List.

Senator MURRAY. When do you expect us to know that?

Ms. HORINKO. As we continue to collect data, if additional high levels of contamination turn up at one of these sites, then we will inform you of that. At the moment, none of the information we have indicates that Superfund site listing is warranted.

Senator MURRAY. Could you please talk to us today about the current status of your efforts to work with MSHA to investigate contaminant asbestos problems at the other mines throughout the country?

Ms. HORINKO. We have looked at the other three mines in addition to Libby. We have not found a pattern of asbestos contamination that in any way approaches what we have seen at Libby at the other mines. I do not know if you want a comment at all about some of the work that MSHA or NIOSH has done, but at the moment none of the other mines appears to even approach the profile of contamination that we have seen at Libby.

Senator MURRAY. Dr. Falk, do you want to comment on that?

Dr. FALK. I think in general that I would agree with that. We had contacted early on the State health departments related to those other mining areas, and they were not seeing the kinds of problems that were seen in Libby. I do not have the specific information with me, but I could get that.

Senator MURRAY. Do you mean that you are not seeing people who have asbestosis, mesothelioma or——

Dr. FALK. It is my understanding from those State health departments that they were not seeing those kinds of increases.

Senator MURRAY. Just out of curiosity, how do you track that, since sometimes or a lot of times people move away. Libby has a fairly high retention of citizens, which is one reason it was seen early on. Some of these other mines—I mean, we are talking 30 years ago. As the people moved away, that public health department may not even be aware of it.

Dr. FALK. Yes, you are correct. People will be aware of cases that occurred in that area, and we are not aware of those that may have moved away. For example, in Libby the asbestosis rates are so high, and the mesothelioma cases are apparent. So you are correct that maybe some further formal study might identify cases elsewhere, but we are not aware, at least from within those communities at the moment, without going back and tracking down people who moved away, of those increases.

Senator MURRAY. Ms. Horinko, is your office currently participating in EPA's Blue Ribbon Panel on asbestos?

Ms. HORINKO. We are not formal participants in the panel, but we work very closely with the Office of Pollution Prevention, Pesticides and Toxic Substances which is headed by my counterpart, Assistant Administrator Steve Johnson.

Senator MURRAY. But your office is not involved in the Blue Ribbon Panel itself?

Ms. HORINKO. I do not know if we are formal members of the panel, but my staff is working very closely with the staff in that office and we will track the deliberations of this panel very closely and the research that is gathered.

Senator MURRAY. Can you give me any update on the status of the panel, where they are?

Ms. HORINKO. My understanding is that the panel will formally convene its discussions this summer and is expected to produce a report early in 2003. The panel will also be conducting a web-based stakeholder outreach and research collection information so that they can get as much research and as much information as they can from stakeholders, as well as provide information, disseminate information about the state of knowledge as we currently understand, as well as information related to safeguards and precautions that people need to take in dealing with vermiculite products.

Senator MURRAY. Is EPA still planning on limiting the scope of that panel to just the six regulated forms, or are you looking at expanding it?

Ms. HORINKO. My understanding is that we fully expect the dialog to encompass all forms of asbestos contamination.

Senator MURRAY. One more question for you—in your testimony, you said that the activities in Libby will require an additional $21 million in fiscal year 2003. EPA's budget justification for the Superfund program does not list sites, as you know. I assume the Administration included the $21 million needed for Libby in its budget request?

Ms. HORINKO. We fully expect to spend that $21 million in Libby in 2003.

Senator MURRAY. Are those funds needed just for Libby, or do they address the other 22 sites as well?

Ms. HORINKO. Whatever funding we need to address all of the 22 sites, in addition to Libby, we will include in the budget request for 2003.

Senator MURRAY. Is that part or your request now, or are you going to be looking for future dollars for that?

Ms. HORINKO. That is included in our current budget assumptions.

Senator MURRAY. Dr. Wagner, in your testimony you said that between 80 to 90 percent of the fibrous minerals in the vermiculite from Libby are fibers that are currently unregulated. Do you think the Federal Government should reevaluate regulating these minerals?

Dr. WAGNER. I think it is really important to do the scientific work to be able to understand the importance of durability, bio-persistence and how this creates hazards. At this point, we believe that fibers that are like asbestos in their physical qualities should be treated with the same caution.

Senator MURRAY. OK. You said that NIOSH made its findings about the health affects of vermiculite on workers in Libby available in the occupational health literature way back in 1985. It took newspaper articles in 1999 and Senator Baucus' leadership to get Federal agencies to mobilize to really address this problem in Libby. Share with us what in your opinion why more attention was not paid to NIOSH's findings way back in 1985 and since then?

Dr. WAGNER. I think that we did what was normal at the time, which was publication in the scientific literature, communication with the employers and with the employees and with the community residents. The kinds of things that we are doing now involve a broader communication of the risks that we identified. I think that the communication was perhaps just pro forma to the regulatory agencies, but not with specific meetings and more direct engagement.

Now, I think the coordination and communication among the government agencies that are interested and involved in the occupational and environmental hazards is really far better than it was 15 or 20 years ago. I think that we have also been more effective in our public communications. For example, I opened up my *USA Today* and saw on the front page a story relating to an investigation our division is doing on serious lung disease in a popcorn factory. I think we have been more effective in engaging with the States, engaging with other Federal agencies, engaging with the media and with the public, and that these are all important lessons that we learned that we should have done better back in the 1980's.

Senator MURRAY. Mr. Chairman, I really appreciate you letting me testify today and ask questions. I do think public education has got to be part of this because many of these people, it was 30 years ago that they were exposed. I had a constituent out here 2 days ago who went to the doctor with lung problems, and the doctor insisted it was not related back to his contamination with asbestos and absolutely refused to believe it. There is a lot of public education that needs to take place. There is a long time between when somebody was exposed to this, and when they actually come down with the diseases. Many doctors, hospitals, health care clinics have no idea unless we educate people so that these people can be diagnosed quickly. We need to go back and figure out how to treat people and to make sure we are doing the preventive things that we need to do today, and to make sure doctors are aware of this.

So we have a lot of work ahead of us.

Senator BAUCUS. You are right, Senator. In fact, sometimes listening to this conversation and thinking about it, maybe we need a Homeland Health Protection Act——

Senator MURRAY. Yes, I agree.

Senator BAUCUS [continuing]. To coordinate all the health resources and all the agencies to deal with some of the lethargy.

Senator MURRAY. Well, I hope we can at least ban asbestos so that 30 years from now we are not having another hearing.

Senator BAUCUS. I very much compliment you for introducing that legislation.

Senator MURRAY. Thank you.

Senator BAUCUS. Thank you, Senator.

I would like to do something a little bit unconventional here. That is, in an effort to get to the heart of the matter, I would like the rest of the panelists here to kind of move over to the end, and I am going to ask the other panelists to come up and testify right now. We are going to have a little dialog here among everyone—that is, the current panelists and the second panelists—so that we are more likely to get at the heart of the matter. We will try and find some more chairs. Will you all come up please? All of you—Dr. Spence, Dr. Black, Ms. Cohan, and Commissioner John.

[Laughter.]

Senator BAUCUS. OK. I deeply appreciate the other witnesses and the first panel remaining to be part of this effort. Thank you very, very much. I appreciate taking the time.

OK, Dr. Spence, why don't you proceed first, and then we will go on with Dr. Black and Ms. Cohan and Commissioner Konzen.

STATEMENT OF MICHAEL SPENCE, M.D., STATE MEDICAL OFFICER, MONTANA DEPARTMENT OF PUBLIC HEALTH AND HUMAN SERVICES

Dr. SPENCE. Senator Baucus, thank you very much. I appreciate the opportunity to be here and discuss this very important Montana issue.

As everyone is well aware, this all started with an article that appeared in the *Seattle Post-Intelligencer* in November 1999. I remember it well because it was a week before Thanksgiving. We were having a meeting with Region 8 discussing bioterrorism and our grant application. We got a phone call from the then-Administrator, Bill Yellowtail who told us to deploy to Libby and find out what was going on. We went there. We met with Brad Black. Over the ensuing months with the help of EPA and ATSDR, we developed a testing program. The testing program over that period was based on information that we received by conducting meetings with several experts throughout the Nation on asbestos, on lung disease, and on asbestos-related problems.

The bottom line is that as Dr. Falk pointed out, 6,149 people were screened that first summer. Of that population, 18 percent or approximately one in five was found to have asbestos-related disease. That is to say that if you walked into the Libby Cafe, which is a downtown eating facility, and looked around and there were 60 people in there, which it will hold, somewhere about 5 or 6 of those individuals have asbestos-related disease. They are suffering from this entity. They may have mesothelioma. They may have

lung cancer, or they may have asbestosis. But that many do have it.

A second round of testing was conducted the following summer. Again, we added another 1,000 to that and preliminary results show that the rates are going to be about the same, as Dr. Falk pointed out.

We have a major problem in Libby. This was not minor, and this many people being affected with this severe disease. We take a look at those individuals in which there is no evidence of a background of exposure—5 percent of the population in Libby have evidence of asbestos-related disease with no known exposure. That is 2.5 times higher than previously had been reported in any other study of populations at large. So we know that the background from just the fallout of being a resident of Libby is significant and puts you at increased risk. One in twenty develop severe disease.

We looked at the population at Libby and tried to estimate what our health care needs are going to be over the future months. One of the things that became very clear—we did a survey of the people coming in for the first round of testing and found that 24 percent of the population is uninsured, have no visible means of insurance. When you take a look at that sub-population of those people that are insured, interestingly enough many of them have policies in which their deductible is in the $500 to $1,000 to $2,000 to even $5,000 deductible—basic catastrophic insurance. So we are talking about a population that is terribly underinsured or uninsured.

Furthermore, the population has an unemployment rate that is twice the State average—over 11 percent of the population of Libby are unemployed, where the State average is 5.3 percent. So we are talking about individuals that have no visible means of support to get insurance to pay for their health care costs.

How do we pay for those costs? If they qualify for Medicaid, yes, they can, but not everyone does. As you know, there are many Federal restrictions on Medicaid. Is a white lung program available? No, sir, it is not. That might be one of the answers that we may have to address, because the problems that we are encountering now are only going to magnify. It is estimated that this will continue on until the year 2030 at least and maybe thereafter with regard to disease because of the latency of this problem. As I think you know, asbestos does not affect you immediately. It affects you over years, and it takes 10 to 20 to 30 years before the ramifications of this disease become apparent. The disease has three forms—mesothelioma that was pointed out, a very unusual and uncommon tumor, one that causes rapid death. The person that gets this particular tumor can expect a life expectancy of less than 1 year from date of diagnosis. Cancer of the lung is again another major problem that we have to worry about because the population has that. In addition, asbestosis—the most common form of disease that we see, is one in which there is slow scarring covering the surface of the lung, and the scarring is slow and insidious in onset, and basically the patient is smothering to death over a long period of time. It takes 10 to 20 years to die, and all that time they are getting shorter and shorter of breath. It is not a very pleasant way to die, I would not imagine.

As Dr. Falk pointed out, there has been a tremolite asbestos registry initiated, and we are working very closely with ATSDR to do that. In addition to that, we are looking forward to initiating further screening in the State of Montana of Libby registrants and also to try to identify individuals from that registry that might be willing to come to Montana for screening and doing it locally, using our resources there. We hope that we can indeed identify the large number.

Another thing that we have done is we have undertaken a look at mesothelioma in the State of Montana. Since 1979 when we had tumor registry statistics, we have found over 150 cases of mesothelioma. Not all of them are in Libby. They are throughout the rest of Montana, which proves the point of the movement of this ore. It was transferred over to various screening plants, as was pointed out on that map. In addition to that, it was transported all over the United States. What we are finding is cases of mesothelioma in areas where there are major railheads and also where there was previous screening. When we look at it county by county, we can find massive excesses in major ports or major cities in our State, compared to the rest of the State where indeed asbestos was not transported or the ore was not transported. This is a major concern.

We have to look at other future health care needs. The Health Department is also looking at immunizations of these people to protect them against respiratory diseases such as pneumonia and influenza and other projects, so there are many health care needs we are going to meet.

I think as was pointed out by Senator Murray earlier, the Ban of Asbestos Act, if it were to go into effect today this very minute, it would not be until the year 2042 until we would start seeing possibly some relief from this terrible illness.

I want to thank you for the opportunity of being here. That is the conclusion of my remarks. Thank you very much, Mr. Chairman.

Senator BAUCUS. Thank you, Doctor. That was very, very good testimony. I appreciate that.

Ms. Cohan.

STATEMENT OF PAT COHAN, COORDINATOR, CLINIC FOR ASBESTOS RELATED DISEASE

Ms. COHAN. Good morning. Thank you for inviting me here.

My name is Pat Cohan. I am a nurse. I have been a nurse for 29 years. For the last 2 years, I have been involved with the health care needs for a community related to the asbestos exposure. My introduction to the asbestos disaster was in the year 2000 when I accepted a grant position funded by HRSA to assist and cooperate and work with the ATSDR in the screening.

The job was two-fold. One was to serve as the outreach nurse for the screening, in which I handled any medical emergencies, health care concerns or urgent referrals relating to the screening. The second part of the position was to help create a clinic that would assess, diagnose and educate people with health care concerns related to the screenings.

The Center for Asbestos Related Disease, also called the CARD Clinic in Libby, was created through St. John's Lutheran Hospital and with the cooperation of all the other health care providers in the area. The volume of calls, drop-in visits, people with frantic questions and need for education was just unbelievable the first year. Of the over 6,000 people who were screened, I probably saw half of them at one point or another just answering questions. The clinic now has over 1,000 active charts, and of these close to 800 show signs of asbestos-related disease or asbestos-related changes that may develop into disease. Each of our clients and their family members have received health information and education related to pulmonary health.

In my position as a nurse, the breadth and depth of the psychosocial, the emotional health and financial concerns associated with this disaster has been without precedent. I have been in most cases first at hand to see the results of this. As with your introduction with Les Gramstad, I get to hear a lot of stories that strike home. To sit and listen to a client talk about going hunting in the hidden mountain valleys and having accidents because he will not allow his children to watch him die the way he watched his father die is pretty hard to take some days.

I have worked to find financial resources for a 47-year-old woman who never worked at the mine, was the daughter of a miner, to help her find funding to have a lung biopsy done because she was suspected of having mesothelioma. This young woman had quit her job housecleaning because she thought it was the chemicals that were making her short of breath. This person waited over 3 months to hear whether she would even be accepted into the Grace Medical Plan which right now is a major source of medical care or help for these folks.

Some of the stories are just so twisted and convoluted it is hard to sort out what the client really needs. A woman who is approaching 60 who cares for her elderly mother, both of whom have asbestos-related diseases, comes to me with complaints that she has been washing her dishes in the tub for 2 years because her kitchen is plastic-sheeted off and duct tape closed because of the leaking insulation in there. It is hard to figure out what she needs first, a kitchen or a sink or health care needs.

I have a neighbor who resided in Libby for over 40 years. This gentleman started the ambulance in Libby before there was one. He has served on every volunteer committee in the town—never complains, only works hard. He was never a miner. He never gardened with it. The only exposure he could think of was that the Zonolite was in his home for his insulation. This is a man who has hiked and skied every mountain in the Cabinet Range and in Glacier before it was the thing to do. He worked tirelessly for our community in this volunteer role. He can no longer hike. He does not volunteer. He just sits and breathes.

I have used the word "disaster" most deliberately. This is a slow-motion disaster, as we call it. Had a mine had a toxic leak and it killed 200 people outright and injured another 1,000 with 20 percent of them critically injured, I would not be here. I would be home in the emergency room. Just because this took 20 to 30 years

to come to the surface, does not make it any less of a disaster. It just makes it slower.

I cannot really talk about what the rock or the mineral properties are. That is not within my scope of care. I can only talk about the human disaster that I see and the effects on my neighbors and my friends, and strangers who come to the clinic who rapidly become friends because our clinic is about the only place where people feel safe or comfortable talking about this.

This was not—this disaster did not happen because it was an act of God. It did not happen because of some ideological conviction or religious belief or anything. It was created because somebody needed a profit. It was a very profitable enterprise. The people in Libby did indeed get great benefits from the mine when it was working and the income because there are not many places to earn a living back in the north woods. But the people, the miners were treated with no respect. The citizens of Libby were treated with less regard than they treated the over-burden of rock up at the mine.

This disaster is not over with. It is going to continue for the next 20 to 30 years. It is not a matter of waiting for the few affected people right now to die off and the problem to go away. We are worried about the children and the grandchildren who were exposed up to 2 years ago at the public schools, at the track at the grade school. We already know the kids and grandchildren were affected financially and emotionally. We are just waiting to see what the health effects are going to be.

What Libby needs, I see three things. We need research to find treatment, cure, cause or even a blood test to figure out who has been exposed. We need health insurance or a health care program that will be available for the length of time needed. We need the facility to monitor the health care effects and the progression of this disease.

I would like to take the opportunity to thank everyone who has been involved in Libby—the agencies, the ATSDR and the EPA and Health and Human Services. The representatives that they have sent in Libby have made an enormous difference in how well this has progressed. People have come to Libby and rapidly become adopted Libby citizens just because of the fine job they have done.

I also want to take the opportunity to thank our whole Montana delegation, and particularly you, Senator Baucus. Your visits, your care and your concern have been very evident, particularly through Rebecca's multiple visits. So thank you.

Senator BAUCUS. Thank you very much, Pat. That was one of the more compelling statements I have heard. I thank you very, very much.

Dr. Black.

STATEMENT OF BRAD BLACK, M.D., LINCOLN COMMUNITY HEALTH OFFICER AND DIRECTOR, CLINIC FOR ASBESTOS RELATED DISEASE

Dr. BLACK. Good morning, Senator Baucus.

I feel very fortunate to be here. This is a privilege to really be here where I can do something for Libby. Certainly, without your support, I would not be here, and I appreciate the committee taking the time to listen to Libby.

I have been a physician in Libby for 25 years. I served as the county health officer for the past 18 years, and have been a very active community member. I could go on for quite a while based on my history in Libby. I have a lot of background. But I think I am going to tell you a brief background story today, and then I would like to emphasize three points.

Let me start with the background. When I came to Libby in 1977, I was aware of asbestos-related disease in workers because my partner who was a practicing internist, had related this to me. It was just somewhat of a surprise because in medical school it had been indicated that we probably would not see much more of this disease. They just basically covered the surface on it in medical school in terms of lung diseases.

So we were both taken back a bit. But he became more inquisitive because he was county health officer then. This is the late Dr. Richard Irons. In 1978, he started probing into it farther, and entered conversations with the W.R. Grace management. He realized that they had improved their hygiene some in the mine because they had put in a wet mill in 1974, but he was still quite concerned because of the disease he was seeing.

So he actually went all the way to headquarters to try to develop a working relationship with the company, because he was concerned. He clearly desired to work with them to reduce health risks from asbestos exposure to the Zonolite workers, their family members and the community at large. He was concerned about them. He recognize the hygiene concerns at that time. I do have that letter, but it was very clear in his statement that those concerns were there. Unfortunately, they were not acknowledged.

It was shortly after this, in 1980, the EPA did their assessment and understood the potential hazards with vermiculite-associated asbestos. Unfortunately, that was not acknowledged either, and I think there was a lot of presumption by many of the physicians in the community that since the agencies had been involved, probably things were going to get better—that we were not putting people at risk.

So in 1999, there was a reporter that had come through the community. I was county health officer. He was starting to ask me questions, and I was somewhat dumbfounded. I was not expecting those. The questions were about this wider exposure in Libby. So when this broke finally in the *Seattle Post Intelligencer*, as county health officer, I was still in disbelief that we could get that much exposure in the community to cause significant lung disease. I was still one of those doubters that we would have that much disease.

It did not take me long, though, once I started probing, talking to Dr. Whitehouse, looking at the cases that were showing up that he had started noticing in the late 1990's. It became very evident that knowing the activities in Libby and where the ore had gone, I realized that we were probably into something bigger.

The past several years have been painful, and they have been very humbling for a person that has been in this community. I have several friends that have developed lung disease and lost half their lung function. It was so insidious I did not even realize it. I was not taking care of them, but it is that subtle a disease, and insidious. You cannot help but say, "Where did we go wrong? What

could I have done." That is the difficult thing we have to deal with, especially when it gets to friendship and the closeness and you realize what has happened.

These people do not complain. I think you know, Max, they are very hardworking people in Libby. They do not complain about very much, but people are concerned, of course, now.

Let me make three points out of this. No. 1, I have spent these last 2 years delving into pulmonary medicine a great deal and working very closely with Dr. Alan Whitehouse, board-certified chest physician in Spokane, who has seen a sizable number of people from Libby. The Libby exposure was extensive, and you have heard that already, but Pat and myself follow these people in the office after the screening. In other words, all the abnormal screens done by the ATSDR—I should not say all of them, but a high percentage of those—have been seen in our clinic. We found that the screening process has been very effective. Many of the people who have been screened out have been subsequently diagnosed with asbestos-related disease. So the figures that we see there are very real. That is, we may have up to 1,300 to 1,400 people out of the first screening that do have asbestos-related disease. That does not include the 2001 screening.

No. 2, this asbestos-related disease in Libby, you have heard now that it is caused by a mixture of fibers. Tremolite certainly is one component. There are several other fibers. They are all very similar. They are in the amphibole series of asbestos. I know that is another confusing term, but it is different. We have seen things with it we have not seen reported in the chrysotile or the commercial asbestos exposures. Our experience has shown it to have a higher rate of progressive lung disease. Dr. Whitehouse has actually studied that in a population of his, and has found that there is up to 70 percent of his people, no matter what they show up with on X-ray as far as degree of scarring, will tend to progress—I mean, 70 percent of them tend to progress. Some of them progress very rapidly. I included in this hearing a report on a gentleman exposed in a California expansion plant just one summer, and 50 years later he died of rapidly progressive lung disease from Libby asbestos—well-documented.

Some of the non-occupationally exposed individuals have worse lung disease than the Zonolite workers that have been there more than 15 years. When you go through their exposure history, you would not expect that. You get this strong feeling of a potency here that nobody has recognized yet, and I think it is one of those things that needs to be sorted out. We do not know that for sure. Are the other exposures—were they unusually high? It is very difficult to tell. There is great concern over relative potency that is totally different. I think this needs to be looked into very seriously.

No. 3, the incidence of malignant mesothelioma—the big word—is exceedingly high in Libby. The reports have been up to 23 cases. This is a cancer, of course, that is rare—one in a million in the general population. In Libby, MT, it is 100 times that. That rate is incredibly high. It is an ugly tumor. It is non-treatable and uniformly fatal. The tumor develops in the lining of either the chest cavity or the abdominal cavity. Those are the pain-sensitive areas of our

body—very pain-sensitive. It is an extremely painful and miserable tumor, to say the least.

Just to give you an example of the exposure—we have six people that have developed mesothelioma due to non-occupational exposures. That is just incredibly high. Right now at this current time, we lost one gentleman that worked 3 months at the company. He died this year already. He was diagnosed in January; dead in a few months. He moved away from the community. I have another gentleman—the family called from Nevada. He worked in the Forest Service and was there 15 years; never handled the materials, just lived across the river and just a little ways up the river from the processing facility in town.

Our most recent diagnosis was a well-known community member, school health nurse, and just a loved one of the community and now she is currently dying of mesothelioma. This has all happened since the—these last two have happened since I submitted testimony in April when the hearing was originally scheduled. So if that does not impact you as to adverse effects, the community is having to deal with now that the asbestos-related illnesses that we were fearful of are happening.

I want to say this real quickly, because there have not been many people who have studied Libby asbestos. Dr. Alan Whitehouse is a clinician that really has studied it a lot clinically. Now, there is another investigator, Dr. Corbett McDonald from McGill—well, he was at McGill University and was actually brought in by W.R. Grace to study the workers at the same time NIOSH was doing their study. In other words, they carried parallel studies. Their observations were similar. They realized significant disease in these workers. What is interesting is Dr. McDonald followed these same workers since this broke in 1999. He had this to say, "These vermiculite workers suffered severely from malignant and non-malignant respiratory disease." He found the death rate from mesothelioma was 10 times higher than it was for chrysotile miners—that is commercial asbestos—in Quebec. His opinion clearly is this stuff is significantly more toxic in terms of causing mesotheliomas. Once again, he has studied chrysotile extensively in the Canadian mines also, so he has some background in both fibers. So I think it means a lot when these people—the few that have investigated—recognize significant potency with Libby asbestos.

In closing, I want to express concern pertaining to how we will be able to meet the asbestos-related health care needs we are sure to face over at least 20 or 30 years and maybe longer—it is hard to say. W.R. Grace has been providing funding for our CARD Clinic—that is the Center for Asbestos Related Disease that Pat and myself, where we see people. There is also a Grace insurance program; however, these past months has shown their commitment to caring for affected individuals is waning. It suggests that our support there is self-limited. Certainly, we need a lot of research and developing therapies is a high priority for us.

Additional concerns—one, the exposures from W.R. Grace export plants all around in the United States and then areas of California (not related to Libby asbestos), where release into the environment of naturally occurring tremolite as a result of large-scale construc-

tion activities. Those are concern areas because we do not want things to happen other places when we know this particular type of fiber has the potency it does.

I just want to thank you for allowing this opportunity, and I cannot thank you enough for your persistence and your advocacy for your Montana family.

Senator BAUCUS. I appreciate that, Brad. Actually, the thanks goes to all of you; Pat, Dr. Spence, John, and all the others in the Libby community who have stepped up. I have seen it. You feel it. It is obvious and I thank you very much for all that you are doing to help the people.

Mr. Konzen.

STATEMENT OF JOHN KONZEN, LINCOLN COUNTY COMMISSIONER, LIBBY, MT

Mr. KONZEN. Thank you, Max. Thanks for the opportunity and for all the work that you have provided on behalf of Lincoln County and particularly Libby.

Good morning. My name is John Konzen. I am from Troy, MT, a community just south and west of Libby, and serve as the county commissioner for Lincoln County. You have already heard about Libby, a community I have served both as a commissioner and as a member of the Board of Directors of St. John's Lutheran Hospital.

Lincoln County is no stranger to the Federal family. Floods and forest fires dispatch Federal agencies to us regularly. Our county shares the Canadian border and a reservoir that straddles the international boundary, feeding the Columbia River Basin. There are endangered species and every other natural resource issue you can imagine. We struggle with double-digit poverty and unemployment rates. On the average day, it is fair to say that we are county with a lot on our plate.

Before I became a commissioner, I served as a teacher and a school administrator for many years. I witnessed first-hand the effects that down cycles have on resource-based communities like the ones I serve today. I can tell you first-hand how families are affected when mills close or mines shut down. But most of you would have never heard about Libby or Lincoln County if it were not for tremolite asbestos.

There was a time when the W.R. Grace mine was a good thing in our community. It meant jobs and good-paying ones. Men went to work every day to earn a living for their families. They did not step away from the responsibility, and I bet a lot of them would have gone to work every day even if they had known the risk that they were taking for themselves. That is what husbands and fathers do.

But none of those men would have ever put their families—their wives, their children or their grandchildren—in harm's way. Never, not a single one of us in this room, would have ever done that. But as you have already heard, Grace has allowed all of that to occur. There is an old saying that goes, "Many hands make light work." When Grace stepped away from their responsibility, they allowed the miners and the wives and the children of those men to do all

the heavy lifting and to take on the risk Grace was unwilling to shoulder.

As Grace continues to step away from even the small portion of responsibility they willingly accepted to help our community cover prescription drugs, home health and other medical costs, they are breaking us. Our tiny community's medical resources are already stretched very thin.

It is not just our community alone which concerns me and other Montanans who have traveled here today to speak with you. As Grace increases the distance between the rightful portion of responsibility they must bear, they further harm the State of Montana.

As Senator Baucus is well aware, people are our most precious resource in Montana. As I travel across Montana for regular meetings with other county commissioners in our State, commissioners tell me they are too concerned about the far-reaching impact Grace's lack of responsibility will have. Many fear Grace's recent decision to no longer help with medical expenses of folks who have qualified for their own medical plan has the potential to bankrupt our own State Medicaid program.

We appreciate the help the Federal family has extended to northwest Montana. We do not know where we would be without the help of the Department of Health and Human Services, the Environmental Protection Agency, the Agency for Toxic Substances Disease Registry, and Congress. Everyone is doing the heavy lifting—everyone, it seems, but Grace.

I am here to thank Congress and the hard-working folks across the country for their support of our community. You have all done your part, and we cannot begin to thank you enough. But I would also like to add that W.R. Grace still has a place at our table. We need them to do their part.

As Grace makes it way through the Federal bankruptcy court, there are several things I would ask this committee and those present to consider to set aside a separate trust fund, established by Grace, to cover the short-term prescription drugs and home health needs of the folks in Libby who are struggling with asbestos-related disease. I would also ask you to consider establishing a trust fund for the long-term health care needs and also to continue the support for the important research.

I appreciate the questions that have been raised about the long-term funding for cleanup and the statutory authority for removing insulation in homes in Libby. Good health is all any of us can ask for. A clean bill of health is the most profound mark our Federal friends will leave upon our community.

I appreciate your time and thank you on behalf of Lincoln County.

Senator BAUCUS. Thank you very much, commissioner.

I am going to ask questions now, and I would like various of you to be thinking of questions or points you might want to make to various other panelists. All of this is in a constructive mode. That is, we are not here to badger or to criticize, but we are just in a constructive mode on where do we go from here just to help the people of Libby. Although I strongly share Commissioner Konzen's view that W.R. Grace is very irresponsible here. They knew that

asbestos was there. They knew that it causes disease and did not adequately warn people about it. They are now also significantly walking away from their responsibility in the community. So I do share that criticism with many of the panelists here.

The first set of questions has to do with cleanup. I will ask Mr. Horinko those questions. Generally, the questions are around, like, how much? What is the timeframe? How much are you going to clean up? When do you think you will complete the cleanup? This is both on the ground and the insulation in the homes. Also the resource question—that is, do you feel you have the resources that you can dedicate to get the job done in the time that we have established? So Ms. Horinko, why don't you address those questions if you could please?

Ms. HORINKO. Thank you, Senator Baucus.

We have had, as you know, a very aggressive cleanup plan underway now since 1999. In fact, we estimate that from 2000 through the end of this fiscal year, 2002, we will have expended $60 million.

Senator BAUCUS. I am sorry—$16 million?

Ms. HORINKO. Sixty million dollars—six–zero.

Senator BAUCUS. Sixty—6–0.

Ms. HORINKO. Six-zero—$60 million, and as I said to Senator Murray, we anticipate spending an additional $21 million in fiscal year 2003, and have planned for that in our budget assumptions, as well as planning for followup at the other sites nationwide where there are Zonolite concerns. As I indicated earlier, we have already addressed a number of the processing facilities, the mine roads, sealed off the mine, done work at the city park and the school tracks, and hope to have those completed shortly. We have done 12 homes on a pilot basis to see if the insulation could be safely removed and the dust cleaned. That has led us to believe that in fact we can do it. We plan next week, as I said, to start interior cleaning, as well as insulation removal in the homes in Libby and plan on doing 55 priority properties this summer. We also plan on working out from the export plant to do additional removal in businesses, yards, parks, as well as interior cleaning of some businesses and some development work to start a secure landfill cell for storage of the material, disposal of the material.

Senator BAUCUS. Do you have some kind of a timeframe? Is it a short-term plan or a long-term? Let's take one at a time here.

Ms. HORINKO. Sure.

Senator BAUCUS. Let's take first the cleanup of the community and the site and so forth. We will get into the home insulation next. But let's just talk first about the non-home insulation cleanup.

Ms. HORINKO. Sure.

Senator BAUCUS. By when do you expect to have completed all action? Give us timeframe please.

Ms. HORINKO. Sure. In general, we believe in 2 years we will have completed all of the work that we currently have underway or are planning to have underway at Libby. Actually, I have got here a copy of the action memorandum amendment that we signed in May that I referenced in my testimony. It sets forth detailed tables, action description and status for each individual property, ex-

port plant, screening plant, the Raintree Nursery, the KBC Bus disposal area, and gives the current status and also our planned timeline. I will be pleased to make that available for the record.

Senator BAUCUS. Do you have dollar figures representing the different aspects there? The $21 million you mentioned, that is for fiscal year 2003. How much do you plan to at least request to the Congress to spend in the next fiscal year? Do you know?

Ms. HORINKO. In 2003 or 2004?

Senator BAUCUS. In 2004.

Ms. HORINKO. In 2004, we are just in the very preliminary stages of putting that budget formulation together right now.

Senator BAUCUS. Would you expect it to be about the same?

Ms. HORINKO. I would expect it to be about level, if not more.

Senator BAUCUS. Let me ask Commissioner Konzen, Dr. Black or Dr. Spence, any questions you have on timetable of cleanup. Does that fit? Does that seem to be in the ballpark of what you think can be done or should be done?

Mr. KONZEN. Correct. I think they had some problems with contractors.

Senator BAUCUS. I have heard that, too.

Mr. KONZEN. They got off to a slow spring, but I think they are talking to the onsite Coordinator Paul that they are moving forward and they expect to do exactly what she is saying now.

Senator BAUCUS. So you feel 2 years is reasonable?

Mr. KONZEN. Two years is very desirable. The quicker we get it cleaned up, the better we can move forward. I think they are presently working on our landfill situation and they have started clearing the timber in that area. So I believe there were contract issues.

Senator BAUCUS. So if we could right here establish that our deadline is within 2 years, that is very much agreed upon and that is a reasonable deadline to get all that cleanup completed.

Ms. HORINKO. I believe we have committed to Governor Martz that in fact we will be in and out of Libby as quickly as we possibly can.

Senator BAUCUS. I know that. I am just trying to find out what "quickly" means.

[Laughter.]

Ms. HORINKO. In the Superfund world, 2 years is record time, so that is EPA thinking.

Senator BAUCUS. We want record time here.

Ms. HORINKO. EPA is placing a very high priority on Libby.

Senator BAUCUS. You have no concern at all about the resources—that is, the dollars will be available?

Ms. HORINKO. Libby is one of our highest priority sites. The Superfund budget in general is level. I do not see any cuts to Superfund, and so I am very confident that we will be able to move forward and continue to have Libby be a very high priority.

Senator BAUCUS. Now, let's go to insulation. What is your plan there?

Ms. HORINKO. With respect to Libby or nationally?

Senator BAUCUS. Libby.

Ms. HORINKO. With respect to Libby, as I said, we will begin interior cleaning including removal of the insulation next week. We have identified 55 priority properties that we hope to have done by

the end of the summer, and we plan on continuing on to any homeowner or business within Libby that requests and we feel warrants removal of their insulation. In our action memorandum, we have planned for and budgeted 800 homes, when all is said and done.

Senator BAUCUS. When do you expect to have completed removal in all 800 homes?

Ms. HORINKO. In all 800 homes, that will probably take the entire 2-year timeframe.

Senator BAUCUS. Within 2 years. Let me ask again, does that sound reasonable to you people in Libby?

Mr. KONZEN. No. I think they have a large task at hand, and I think they have committed the resources to do it if they have the funding.

Senator BAUCUS. Do you have the funding?

Ms. HORINKO. Absolutely. That is included in this action memorandum.

Senator BAUCUS. So the $21 million for fiscal year 2003 is both—is that right?

Ms. HORINKO. That is absolutely right. That encompasses all aspects of the cleanup.

Senator BAUCUS. One slight question—the reason I am asking these questions is I am picking up that some people in Libby are wondering whether EPA is beginning to slacken a little—backing off. That is, there was a time when EPA was there working hard and Paul Peronard was, boy, he was just going like gangbusters. There is a bit of a feeling, and this is just rumor, but still—that while Paul is still going like gangbusters, maybe his regional office and more particularly at the national office, that Libby does not have the same high priority that it appeared to have a few weeks ago. Dr. Black, do you want to comment on that at all?

Dr. BLACK. There is clearly a sense in Libby that there has been some shift, and we sense, at least what we can tell, activities of Region 8 have been slowed some, but that is a perception we have had. I left this with—here, we built this trust and it has been building. We have built a very good trust. The agencies have performed excellently—EPA and ATSDR. Health and Human Services has initiated some activities also. It has been, you know, but I think we all respected Governor Whitman coming, and she came by the clinic, spent time with us. She understands the problem and I respect her a great deal. I think her commitment means something to Libby. I think we are worried about other politics, and Governor Whitman, we still support strongly her commitments and respect them. I hope they are carried through. I think that is important to us.

Senator BAUCUS. That is right. Governor Whitman has been very good. She has visited Libby a couple of times and demonstrated her commitment. I have talked to her yesterday about appearing here today, and she had other business. She could not do it. I mentioned that same point to her, and the reaction I got was that while, like all Administrators have, they have a lot on their plate and lots of things they are thinking about and worrying about is—oh, well, gee thanks, Max, for telling me that; I'll check up on that to make sure that is not the case.

But nevertheless, there is this perception in Libby that maybe things are starting to slacken off a little. I do not want to get this next person in trouble, but Paul Peronard has done a heck of a job in Libby. My view is whatever Paul wants, Paul should get.

[Laughter.]

Ms. HORINKO. I listen to you, Senator, with some bemusement because all of us here, and you more so than I because he is with you every day, know Paul very well. I speak to Paul regularly. Any characterization of Paul as slacking off is just completely inconsistent with his personality.

Senator BAUCUS. No, no. It is not Paul. The perception is not Paul. The perception he is not getting the resources that he needs. He is not getting the attention that he needs from either the regional or the national office. That is the concern.

Ms. HORINKO. Right. Well, I can assure you that at the national level, there has been significant attention, and at the senior regional level there has been significant attention. In fact, we have had regular meetings and conference calls. When I say regular meetings——

Senator BAUCUS. We are not talking about significant attention. We are talking about full attention—the same full attention that Libby has been getting.

Ms. HORINKO. Right—the same full attention. In fact, I plan on traveling to Libby July 22 with our new Regional Administrator, Robbie Roberts, as well as the Deputy Regional Administrator Jack McGraw who has been out there many times, and doing a complete site visit and tour and checking up personally on the status of activities. So Governor Whitman and I are very concerned about Libby, regularly meet and discuss the status of what is going on at Libby, regularly checking with Paul directly. So at the very senior levels, you have our commitment and assurance. Governor Whitman generally is a very hands-on Administrator. She is not distanced from the field. In fact, in my program, the Superfund Program, she has been significantly involved in the decision to dredge the Hudson and cleaning up the Hart Building from anthrax, and emergency response at the World Trade Center, and then dealing with Libby.

Senator BAUCUS. I appreciate that, but I just strongly encourage you and the Governor to directly call up Paul, talk to him and strongly encourage you to listen very favorably to what he says and recommends.

Ms. HORINKO. Absolutely.

Senator BAUCUS. We have all known Paul now a couple of years, and he is one of the best public servants I have ever had the privilege to work with or meet.

Ms. HORINKO. I could not agree more.

Senator BAUCUS. He is so dedicated to do what is right.

Dr. Black.

Dr. BLACK. I was going to say, he is really—the trust of the community with the Agency goes through Paul. He has managed to cross all barriers in the community. I think that we would all say that, wouldn't we? He has been remarkable in his ability to work with people of varying opinions and everything. I think he has everybody's respect in Libby. I sense that.

Senator BAUCUS. I appreciate that.

Ms. Horinko also, a slight question about hiring local contractors and local employees. I would appreciate it if you could address that concern as well, because there is that concern at Libby that maybe we are going out of State too much.

Ms. HORINKO. I will look into that, Senator. I am not aware of the mix of contractors that we are using, but I will talk to Paul and find out what mix of contractors and the extent to which he has really tried to reach out to local residents and have them directly involved in the cleanup.

Senator BAUCUS. Why was it not necessary to declare a public health emergency with respect to the insulation cleanup?

Ms. HORINKO. Our lawyers looked at the situation and determined that we had adequate legal authority to go ahead and do the interior cleaning and remove the insulation without going to the step of declaring a public health emergency.

Senator BAUCUS. Would anything be gained by making that declaration?

Ms. HORINKO. From a real-world standpoint, it made no difference. We will be doing exactly the same type of cleanup whether we declared a public health emergency or not. So from a technical real-world standpoint, it makes no difference whatsoever to the quality or the nature or the type of cleanup.

Senator BAUCUS. How can you assure the people of Libby that, because they know that the Administration or the EPA did not make a public health emergency declaration? That is probably part of the concern. If it is not, are they going to work as diligently as they otherwise might? How can you reassure the people of Libby that there is no change whatsoever in effect?

Ms. HORINKO. One thing that we can do is share with the community our work plans for the interior cleanups and the insulation removal that were developed well before we made the decision not to declare the public health emergency. You can see that those are identical to the work plans and the technical specifications that are contained in our action memorandum today. So the work plans, our technical expertise, the amount of resources we will bring to bear are exactly the same as we had planned 6 months ago as they are today. So seeing that technical information, sitting down with Paul and the other folks at the site, and reviewing the quality of the work that we plan to do, and the haste with which we plan to do it will, I am hopeful, reassure the citizens.

Senator BAUCUS. So the quality, the haste and the resources dedicated are exactly the same.

Ms. HORINKO. They are identical.

Senator BAUCUS. Does the absence of a public health emergency designation say anything about the hazards of vermiculite home insulation?

Ms. HORINKO. It does not say anything about the hazards of vermiculite home insulation. Our Office of Pollution Prevention, Pesticides and Toxics is currently doing a study on vermiculite home insulation, and they are planning on releasing that study in August of this year. So that will be EPA's definitive statement about the hazards of vermiculite home insulation.

Senator BAUCUS. OK, before we move onto other subjects, does anybody have any questions about the cleanup aspects?

Mr. KONZEN. Max, I have one concern. A lot of these folks work in about a 20-mile radius of Libby, which includes the community of Troy and out toward Kalispell. In talking to onsite Coordinator Paul, I am not sure whether they will go with that. About 20 percent of the workforce lived in my community, Troy. That is not on the attics to clean up and the homes to clean up. I would like to urge that that be looked at.

Senator BAUCUS. I am sorry. John, what was that again?

Mr. KONZEN. About 20 percent of the workers that worked at W.R. Grace lived in my community and traveled. They also traveled the other way, some 15 to 20 miles outside of Libby, toward Kalispell into the mine. I realize they are very concerned about the long-reaching effects of this, but these are actual workers. This community hauled it back to its gardens and yards the same as the other ones did. That has not been on the plate yet.

Senator BAUCUS. How about that, Ms. Horinko?

Ms. HORINKO. I can promise you that we will look into that, and if there are actions that are warranted to be taken, we will take them.

Senator BAUCUS. When can you get back to us as to whether or not EPA plans to address those concerns as well? What is a reasonable date?

Ms. HORINKO. Within 1 month, we can get back to you.

Senator BAUCUS. A month from now. OK. If you could let the committee know, and also the county commissioners at Libby know.

Yes?

Dr. SPENCE. Senator Baucus, another question I would have of Ms. Horinko is, we know that the ore was transported to various areas in Montana, including Great Falls where there was a popular exfoliating plant. I have no idea as to whether these have been studied, and I know that they have found hot spots along the rail line in Libby. Are there other hot spots along other railheads throughout the State of Montana that might be in need of cleanup?

Senator BAUCUS. Do you know, Ms. Horinko, whether EPA has addressed that issue?

Ms. HORINKO. I know that we have tracked some 243 other places in the country where Libby ore was transported, processed or otherwise came to be located. We tracked that not only relying upon records that W.R. Grace maintained, but we separately went back to the Bureau of Land Management at the Department of Interior and looked at their records. This is part of this followup study that Henry Falk alluded to where he is working with a number of the States. So we can get to you the list of the places that we have tracked. If we have missed something, then we will certainly followup.

Senator BAUCUS. Can you within that same month report on the question that Dr. Spence raised?

Ms. HORINKO. Absolutely. Yes, we will do that.

Senator BAUCUS. I would appreciate that very much.

OK, let's get off now into screening. Let me ask Dr. Spence, Dr. Black and Dr. Falk, I guess, where are we on screening in your

judgment, and what more do we have yet to do? I suppose a lot of this is a resource question—where are the dollars to continue to screen, because this is a disease that sometimes is not noticed or is not determined and diagnosed until sometimes later.

Dr. SPENCE. Well, interesting that you should ask this question because just this past week, I was in Atlanta and met with some of Dr. Falk's staff and we discussed ongoing screening activities. We will be initiating a request—they have initiated a request for proposal and we plan to put one in by July 10, to address screening in the future years. We hope to look at it for at least the next 5 years minimally, and this could possibly go to the year 2030, as I indicated when I was making my discussions with them.

We hope to do the screening very similar to what has been done in the previous two rounds of screening—that is, to take a look at individuals that are indeed eligible by the criteria that we established when we initiated this process; that is, anyone that lived in Libby for a period of 6 months or more prior to January 1, 1991. Once that person is identified as being eligible, then we will request them to undergo similar screenings such as an epidemiologic questionnaire, radiographic evaluation, pulmonary function testing, and then followup looking at the current standards that are employed by the Occupational Safety and Health Administration for worker following, for pneumonic diseases.

We would think that these individuals that show no evidence of any active disease should be screened on a periodic basis based on their age. At least currently, our thoughts are to put possibly two plans into effect, one that affected workers or those at highest risk and then another screening program at periodic intervals that would affect the nonworker population, but still individuals with risk based on the data that we have.

Senator BAUCUS. What is this going to cost?

Dr. SPENCE. A lot of money, Senator. I cannot put a dollar value on it today. I can tell you that to do such screening obviously we are going to need someone to staff an 800 line because we want people to call in and identify themselves. We will make the same services available. We will have the 800 line. We will also need a coordinator for this program—an individual that is knowledgeable in asbestos-related disease; one that can be assured that the people get their educational needs met, as well as their health screening needs met; and that we do the entire testing—we do not just leave any part out.

We are probably going to have numerous individuals that are going to call in from all over the United States. We do not think this is going to be limited to people in Libby or people in Montana in general. These individuals also are going need to be reassured and also given instruction in the event that they cannot come to Libby for the screening as to what they can do to identify whether they are indeed at risk or have evidence of disease.

Senator BAUCUS. I appreciate that. Dr. Black, do you want to comment on this plan, please? How does it sound to you?

Dr. BLACK. Well, we just had a moment to briefly talk about it. I think Dr. Spence knows we have always asked him when is it going to happen, because we have people coming every day now, saying, well, we couldn't get into town for the screening. That be-

comes a pretty regular question, I think, wouldn't you agree, Pat, with that? So we have the demand there, and I guess we are all for getting it going. But once again, it sounds like we are moving in the right direction.

Senator BAUCUS. So when will this begin? Maybe Dr. Falk, do you want to chime in here? We're not going to get the proposal for a little while yet.

Dr. SPENCE. I beg your pardon?

Senator BAUCUS. We are not going to get the proposal—that is, you are not going to have this plan put together—or is it now?

Dr. SPENCE. It will not be put together before July 10.

Senator BAUCUS. July 10—OK.

Dr. SPENCE. But I anticipate that I will have a written proposal in the hands of ATSDR on or before July 10 of this year.

Senator BAUCUS. All right. Do you want to comment, please, Dr. Falk?

Dr. FALK. Yes, thank you. I feel very strongly that we must establish the screening program to go on over time, and probably a very lengthy period of time. I think in the acute setting for the last several years, we have done this as a special feature in the summertime. We gear up and do it. But I think it is important for the long term to establish it on an ongoing basis to be done locally. It does not have to be done just in summer. People can do this throughout the year. It can be built into the facilities in Libby. We very much want to work with Dr. Spence and Dr. Black and figure out the best way to conduct this in Libby. We will be as supportive as we can of that.

Senator BAUCUS. When do you think you will have this again? July 10, did you say?

Dr. FALK. Yes, sir.

Senator BAUCUS. How much do you think it is going to cost? Will you have a price tag?

Dr. FALK. I am assuming a proposal that comes to us will come with a price tag, yes. We will look for that.

Senator BAUCUS. You might also give some thought to where the dollars would come from. Be a little creative about that, too. I would like you to work with me and others in the delegation, because we have to work together to figure out how we are going to get the resources and make sure this is all done quickly.

Dr. FALK. Yes, I think once we embark on something of this magnitude, if it is done properly and it should be, that we are not talking about a 1-, 2-, or 3-year program. We are talking about something for the next three decades.

Senator BAUCUS. Right.

Ms. Cohan, do you have a reaction to all this? Does it sound right to you or good to you, or what?

Ms. COHAN. Yes. We get at the clinic an average of four to six requests a week from people out of town or people in town who for some reason or other missed the other screenings, who have worries and concerns about their lung health, but do not have the resources to go in and get a chest X-ray done. At the clinic, we work with different ways of getting this done, whether they have had a chest X-ray done in the last several years, and have them send to us. Dr. Black will review it and I will do an exposure history.

So we have been trying to meet the needs in that way of people who have urgent concerns. I also have a waiting list of people who are saying, "Well, when or if the screening comes up, let me know." So yes, it is definitely going to be needed. I am not sure what the volume will be, but it will be steady.

Senator BAUCUS. Have you and Commissioner Konzen addressed sort of the psychological, social and financial scars at Libby as a consequence of this disaster, and what we might do to help the healing?

Ms. COHAN. There is probably not a person in Libby today who does not know someone, love someone, or hated someone who has been affected by this disease. Even those people in Libby who do not believe that it exists—there are still those who believe it has been blown all out of proportion because it is easier not to believe than it is——

Senator BAUCUS. In denial?

Ms. COHAN [continuing]. In denial—definitely in denial. But they still all know somebody who has died of it. So that the psychosocial impacts have been such that at the clinic we came up with some key phrases or hand signals when either myself or my assistant, Ruth, start the interview process of seeing how scared somebody is, just to you know kind of give a hand clue of how much time it is going to take to spend with them. In an average medical clinic, it is very unusual to spend 45 minutes to an hour with each new client or individual, but that is common. It is what we need to do just to get the education and bring the fear level down to a point where people can hear what you are saying.

They just want to hear yes or no, but if you say yes, I see changes, then the panic level is so high they do not hear, which is why the education piece is so high. Through a contract, through FEMA and SAMSHA, which I think you are aware of, we do have a person in place who has been working to pull all the resources in the community together. We call it the C.O.R.A. project, Community Outreach Recovery Assistance, the outreach project in which the clergy, the schools, counselors, everybody—senior citizens center—anybody who will be involved with these people, are actually pulled together and being educated on the same level so that when someone comes to them, that the information is there to flow out.

It has been a huge impact. There are third generation kids that I see who have been affected—definitely financially. At the time of life when most kids look to their parents for future support, getting through college, buying your first house—something of that nature, if your parents have used up all their resources treating an illness, these young adults do not have the kick-out money that we were fortunate enough to have to get started in life. So it has been devastated on more levels than just the illness part.

Senator BAUCUS. I also want a comment on the group community efforts, and your long counseling sessions certainly help. Is there anything else that comes to mind here? Maybe John, Dr. Spence or anybody?

Mr. KONZEN. Just a couple of quick comments—there are still people in Libby that will not get tested because the ultimate is they find out they have it and it is incurable and they cannot do any-

thing about it, so why do they want to know. That element is still out there.

We found it difficult to recruit teachers, doctors, forest service employees who have options where they want to go, when they hear about Libby. They think it is a valley of death. They want to stay away from it.

So we need desperately to get that bill of health stamped on Libby, and we need to get it cleaned up. We need to start re-selling the community, and we need to make sure people understand that it is a beautiful place and it is a safe place. If anything, that is the stigma that is attached to our community. We need to erase that.

Senator BAUCUS. How would you go about erasing it?

Mr. KONZEN. The press has been very friendly for the biggest part. I think they can play a very important role in doing that, along with folks in the Federal family who may have expertise in that area. Maybe we can get some marketing company or something to come in and help us do that.

Senator BAUCUS. I don't know. Maybe Dr. Wagner, is that something that NIOSH could do, or Dr. Falk—to help out a little bit? This denial issue—or Ms. Horinko, you are raising your hand.

Ms. HORINKO. Senator Baucus, we actually are getting more and more into the revitalization business at EPA, particularly with the passage of the new brownfields legislation, which really seeks to help de-stigmatize these communities. More and more, we are realizing our goal is not just to clean up communities, but to help revitalize them.

Senator BAUCUS. That is very important, because that is a real concern.

Ms. HORINKO. When we stamp the cleanup done, we will not walk away is my promise to you.

Senator BAUCUS. Again, it is one of the problems that the Commissioner has mentioned. It is not only that, but you know, if I have it, do I want to know and it is all that.

Mr. KONZEN. Max, one other thing—the affected population with tremolite asbestos is in Libby or the large portion of it is in Libby. I cannot encourage enough that the research occur there. I think it can be beneficial to the Nation as a whole as a result of that. Currently, we are going to be flying people to Missoula to have them tested, as part of the ongoing research at the University of Montana. I desperately would like to see that occur within our community—fly the pulmonary folks up to our community and have them do it there, rather than fly 12 people down there.

Senator BAUCUS. Dr. Wagner, can you help there, too, with the research? And Dr. Falk? I am just trying to look for some research efforts her from both of you. I think—and he makes a good point—the Commissioner makes a good point.

Dr. FALK. It is a very good point. I think that when one looks at the time that it takes, for example, to develop pleural changes, it may be as little as 10 to 20 years, but mesothelioma diseases may take, let's say, 40 years to develop. There is that period of time between those two stages where people can be greatly benefited if we come up with new ways of intervening to stop progression of asbestos-related disease.

So I think this research is absolutely essential. I am going on Monday to the conference in Missoula, and basically I would like to stress that challenge. As I think Dr. Black and Dr. Spence know, we did a workshop a while back with the National Institutes of Health to see what they knew about potential drugs or treatments on the horizon.

Senator BAUCUS. Could we get somebody in Libby, because that is on the spot. That is where the action is.

Dr. FALK. I think that is a very good point. It came up at one of the CAG meetings that I attended, and I was really very impressed that people said that they would be very eager to participate in that kind of research.

Senator BAUCUS. You could work with Dr. Holian for example.

Dr. FALK. Yes, I think maybe as we talk about how to develop the research program, some facility or some part of the program——

Senator BAUCUS. I want to help, too, because the University of Montana was recruiting Dr. Holian from Houston a couple, 3 years ago. So they asked me to call him up so I did. He said, "Yes, I would like to come to the University of Montana, but I need a lab." How much, $20,000 or $30,000? So we helped to get an appropriation for the lab and we have Dr. Holian. So all I am saying is I want to help. If you find somebody that we can designate to get up to Libby full-time on the research that is really good, let me know.

Pat.

Ms. COHAN. Thanks, Max. At this present time, Dr. Black and I are working with or cooperating with the University of Montana on a voluntary basis. I collect blood samples and do the histories and then freeze the samples. When I get enough to justify a trip to Missoula, I will go down and visit my godson and drop off the blood samples at the same time, which has helped. They have got over 200 blood samples. We are working on getting lung washing samples, which is the flying down to Missoula part, just because or the expertise needed in having the cells fresh and ready to be prepared there in Missoula, rather than in Libby, because it is, particularly in the summer, getting from Libby to Missoula with dry ice, it is pretty well melted by the time you get down there. So that having some facilities or a more convenient way of doing it, having someone who has got dedicated time right now. It is a voluntary basis that has been——

Senator BAUCUS. Who is in charge of getting this aspect together? We are setting up dates and deadlines and things. We need somebody in charge of this. Who do you want to—Dr. Black, or you Pat, or Dr. Falk or Dr. Spence—who is most appropriate?

Dr. SPENCE. Senator Baucus, this coming week, as Dr. Falk pointed out, we are going to be meeting in Missoula with Dr. Holian. In my former life, as I think you know, I was in academic medicine for 23 years. One of the things I did was a lot of research. I dealt with patients the last 9 years with HIV disease, and we did many of the same types of sampling of these individuals with regard to pulmonary samples as was required by this particular protocol.

We did it in a storefront clinic that I had operated, and I think there are ways that we can do this. So I will look at it and get back to you.

Senator BAUCUS. I was going to say, you are the man.

Dr. SPENCE. Thank you.

Senator BAUCUS. You have just been designated. You are in charge. We are talking about 1-month deadlines here. A month from now is going to be a big day. OK.

Dr. SPENCE. I will call you on the 20th, sir.

Senator BAUCUS. OK, fine.

Dr. Falk, do you have anything to add?

Dr. FALK. I will be happy to work with Dr. Spence.

Senator BAUCUS. OK, I appreciate that.

OK, now a little bit to the help. People get screened. They have the disease. They need help. They need treatment. I would like to talk a little bit about that. What is being done? What is available? What yet is needed? I think the Commissioner talked about a couple of trust funds. I don't know if that was with respect to this question or not. But you, Dr. Black, could you kind of lead off in terms of treatment? How far along are we? What needs yet to be done? These are people most of whom just do not have the resources to have the proper treatment. Somebody mentioned that 25 percent have no health insurance, and many of those who do are underinsured, very high deductibles, and the company is backing off and not helping very much. Why don't you lead off, Doctor?

Dr. BLACK. As I have mentioned before, we have already had a number through here, and have currently about 850 people with asbestos-related disease. These people, because of the nature of this particular disease, we do not discard the so-called plaques or beauty marks that have been described in the past as being insignificant. We do not deal with them that way. We think these people need following on a regular basis.

Dr. Whitehouse has indicated once a year. That is not typical. With chrysolite asbestosis, it is frequent to follow people at longer intervals. With this particular type of fiber, it requires closer—because of complications, higher complication rates and progression.

Senator BAUCUS. What treatment is needed now?

Dr. BLACK. The treatment is—well, that is—I think by the monitoring process, Senator Baucus, by monitoring people and doing the blood work and looking for markers in the blood and getting lung cells to study what is going on there with our cells of defense in trying to understand what is going on in the immune system with this disease, it will help elucidate some form of treatment. I think we certainly—there are some drug trials going on right now and there are things like that, but they are very limited because we have limited resources. Basically, those are dependent on a pharmaceutical company for the ongoing studies right now. I guess we see a need for more clinical research. I think it would be very important to correlate what is going on with the individuals, what is going on in their blood, what is going on with—those pieces.

Senator BAUCUS. Let's break this down a little bit. One is, I guess, needed research. Does the state of medical knowledge now know enough to know what the treatment should be, given infinite

resources? Or do we still need more research to find out what the treatment should be?

Dr. BLACK. That is right. There is no treatment, certainly for the fibrosis that occurs with asbestosis and asbestos-related disease, there is no treatment that has been shown to be effective. We only have one trial that I am aware of right now that we are looking at and needs further looking. But no, we are very—it has not been done, and the past has had poor outcomes in terms of the drug trials.

Senator BAUCUS. How do we go about getting it done? Who wants to take a crack at that? Dr. Falk?

Dr. FALK. There are two aspects to treatment. One is how to care for people who have, let's say, lung cancer or mesothelioma, which does not require research, but requires a lot of medical care and attention and time. But effective treatments will require research. That type of clinical research, I think, by and large has been the province of NIH and clinical centers. There are medications on the horizon that are coming along that may be helpful in intercepting the inflammatory process, the fibrosis process, but it will be an intensive effort to actually test those. I think part of Senator Murray's proposed legislation involves treatment centers as well. So I think there needs to be some really focused attention on intervening to prevent progression of these diseases.

Senator BAUCUS. I am asking you as somebody who has worked in the area what is the best way to go about accelerating treatment? What is the most efficient way and the most effective way to begin? Maybe Dr. Spence, you have got some thoughts.

Dr. SPENCE. Well, one of my thoughts on treatment, sir, is secondary prevention. We know that once a person developed the changes that they will progress, so we cannot prevent what has already happened to them. But hopefully we can in some ways delay the onset of some of the terrible aspects of this disease. One of the things that is a co-factor in the rapid progression of these diseases and also of asbestosis as well as the development of lung cancer is tobacco use.

Certainly, we need a more concerted effort. We need more funding. We need an awful lot of work in the area, because we have people now that still smoke. We recognize full well that when you are diagnosed with lung cancer, once you get that diagnosis, you will probably quit smoking, but most people will smoke right up to the time they get that diagnosis. We still have many people with asbestos-related disease or at least asbestos changes in our community up there, as well as throughout the Nation, that continue to smoke cigarettes. I think we need some good smoking education. Certainly, the tobacco bill has helped to some degree, but as you know in Montana, that bill does not address all of our needs.

Senator BAUCUS. What about resources? Given what is available in medical knowledge today, what about resources? Are people able to have the dollars to spend on the—I know the answer already—treatment that is available today? I would like you to just give us a—quantify the inadequacy of resources, if somebody could deal with that.

Dr. BLACK. Here is an example. We do not know what our funding will be next year. Will W.R. Grace be there to support the clin-

ic? We are seeing really negative directions there. We have uncertainty as to whether our clinic structure will—you know, what is the support of it? Because around that clinic, it would generate the capabilities of doing the ongoing screening, the monitoring and the research. So there are a lot of pieces here that are lacking resources. But the clinic's existence, I think, is critical to——

Senator BAUCUS. The clinic is one. So what else in addition to establishing more certainty at the clinic—if you all knew the clinic is going to be there, and well-financed, what other needs are there?

Mr. KONZEN. Well, day one, when this thing first broke, there was a group of us that worked on a health trust with W.R. Grace, and never got off base. W.R. Grace would not accept our concept of a trust. Other companies have done this. We are aware of Asarco in East Helena and we thought that would have been a good clean way to take care of this problem.

I just have some quick figures here that the medical plan that W.R. Grace now has in place, in the year 2000 spent $19,475 on patient care in Libby. In 2001, it went up to $745,000 and at 2002, 5 months into this year, it is already at $728,000. This gives you an idea what is going to happen as the sickness progresses along.

That is a very big concern for the long-term health care for these folks. If there is not a stable source of funding, it is going to bankrupt not only the hospital situation, but also our doctors. That is a tremendous burden to put on them. And now the pharmaceuticals—they spent $171,000 in 2001 and $160,000 in the first 4 months before they came in and started doing their audit.

Senator BAUCUS. Who spent that money?

Mr. KONZEN. That is the medical plan that W.R. Grace has. Those are the benefits that are being paid out.

Senator BAUCUS. I see.

Mr. KONZEN. The question that we have asked W.R. Grace is, How long is this health plan going to be in place? Can you give us some time duration? The health plan is as good as the company, and the company is in bankruptcy. So what does that tell you? That scares us.

Senator BAUCUS. Even with the health plan, though, can you address the adequacy of the health plan?

Mr. KONZEN. Correct. I think Dr. Black can maybe speak to the holes within the health plan.

Dr. BLACK. Well, let me go back to when we started this. The Grace health plan was initiated. There was a lot of trepidation because the wording in their document really eliminated local physicians from being part of the diagnosis. As we got into the program, they were very lenient and they actually allowed myself and other physicians to apply or get people into the health plan. So it was a very nice gesture on their part to show they wanted to take care of Libby. I sent them a nice letter in February 2001 and Mr. Corcoran, I guess, had responded very favorably, saying it is nice to get something positive from Libby. I thought maybe they might change and show some interest in really trying to take care of the problem.

Unfortunately, since earlier this year, we have seen an interest now to second-guess, question and utilize outside readers and

things that insurance companies generally do not do, to assess these people and deny access to the plan.

Let me give you an example, and then maybe it will make more sense to you. I had a recent case. A gentleman comes in. He had been short of breath. Anyway, we assessed him and I clearly thought he had some asbestos-related scarring on his lung, or the lining of his lung. I did another X-ray because it had been several years since his screening, actually. That is how late he was coming in. He had a new nodule, a possible cancer. So I referred him, and I told him, "look clearly, you have plaques not only on your chest X-ray, but on your scan." So I sent his application into the health plan. I assumed he would get on the program. I told him I think they will help you with this, because lung cancers have a strong association. Especially with smokers, the asbestos exposure tremendously increases the cancer risk.

And so, he had a surgery. Fortunately, we got an early cancer and it was cured. But also when the surgeon was there, he saw the plaqueing that I had described, the scarring on the lining of the lung that I had seen on my studies. I was very shocked when just a few weeks ago, I got a letter from the health network saying this gentleman has been denied on our plan. Our expert reader says he does not have asbestos-related disease, therefore the good news is, Mr. So-and-So, you do not have that disease that Dr. Black told you, and you do not qualify for the plan. That is the letter he gets.

We are seeing this over and over, and I think they are going to question everything that we see. I am not saying we are that great, but I think we know a lot more about this particular type of scarring on the lung. It is not the typical look you see with the commercial type, and I think if you send a lot of our X-rays out to other people that are accustomed to looking at them, they miss this disease. It is subtle. It has a subtle, diffuse, thin scarring that builds up gradually. It is not seen by a lot of people.

So we are just accustomed to it. I think it is a clinical diagnosis. They are taking it out of the clinical setting and they are just taking it to a radiologist, saying, does this person have disease or not? That is not the way we diagnose asbestosis.

Senator BAUCUS. I appreciate that.

We are going to have to conclude this hearing. I am trying to figure out, though, in my mind how on July 20 we get a health plan together here. I guess I will take that responsibility myself, to figure out how we develop that, but I am going to need a lot of help. The trust fund idea is a start, if we can persuade Grace to participate in addition to other appropriations. I do not know what we can come up here to help people who are suffering through no fault of their own, particularly as you explained, Commissioner. I agree with you. Some of these guys, even if they knew what was going on, they would go to work to put food on the table. But they certainly would no if they knew they were going to affect their families. That is just the nature of the people in Libby. That is really true.

I thank everybody for coming today. I know you have taken a lot of time out of your day. Your morning is now over, virtually, so thank you so very much.

Does anybody want to add anything? Has anybody said anything so outrageous it needs a response? Here is an opportunity to say something that is constructive and helps address—I see your leaning forward, Doctor.

Dr. SPENCE. I have one parting salvo, Senator Baucus. We might note that a large number of our people in Libby that have this disease are over age 65. We have also demonstrated they have low levels of insurance. Many of them are eligible for Medicare, however, and they do not have a prescription plan for Medicare and they need these medications. We need to look at a national effort to get Medicare to put in a prescription plan.

Senator BAUCUS. I could not agree more. I work as hard as I can to get that.

Dr. SPENCE. I know you do, sir.

Senator BAUCUS. I am working hard on that. That is another committee—the Finance Committee—that has jurisdiction over prescription drug benefits under Medicare. I just very much hope that Members of Congress realize the need and therefore do not politicize this issue as some are inclined to, that is one party blaming the other for not getting the job done. I am trying so hard to prevent that from happening. Just get the job done and get the benefits because people need the help, and forget the politics. I could not agree with you more, Doctor, and I am very glad that you made that point because I will be using that, too, in addition to all the other ammunition I have to help get the job done.

Thank you very much. You are great Americans and I appreciate your service to the people of Libby and to our country. Thank you very much.

[Whereupon, at 12 o'clock p.m., the subcommittee was adjourned, to reconvene at the call of the chair.]

[Additional statements submitted for the record follow.]

STATEMENT OF HON. PATTY MURRAY, U.S. SENATOR FROM THE STATE OF WASHINGTON

Senator Baucus, thank you for calling today's hearing on Libby, Montana and on the health and environmental problems caused by asbestos contamination from the W.R. Grace vermiculite mine there. Thank you also for giving me the opportunity to testify before this subcommittee. I applaud the leadership you have shown on this issue on behalf of the people of Montana and the entire country.

I first became interested in this issue in 1999 because of the series of articles by Andrew Schneider about Libby in the *Seattle-Post Intelligencer*. I can relate to the people of Libby because my mother grew up in Butte, Montana. Like Libby, the main industry in Butte is mining. I know first hand that these communities believed the government was protecting them from health problems caused by air and water pollution from mining.

I also became interested in this issue because Libby is only 160 miles from Spokane, Washington, and many people from Libby have received medical treatment in Spokane. Last year, when I chaired a Senate Health, Education, Labor and Pensions Committee hearing on asbestos exposure and worker safety, Dr. Alan Whitehouse from Spokane testified. He has treated about 500 patients from Libby. While most people thought only miners and their families could be exposed to dangerous amounts of asbestos from mining, many of his patients are sick just because they lived in Libby. Approximately 25 percent of his patients didn't work in the mine or live with someone who did. Twenty-four of his patients have died in the last 3 years, and five who died were sick ONLY from environmental exposure.

The issue is also relevant to my constituents because like most other states, Washington has many sites which processed Libby vermiculite that was contaminated with asbestos. The chart you see displayed shows all of the sites in the United States which received vermiculite from Libby. Of the approximately 300 sites which

processed this mineral, the Environmental Protection Agency (EPA) and the Agency for Toxic Substances and Disease Registries (ATSDR) have determined that 22 sites require further cleanup.

One of these sites is the former Vermiculite Northwest, Inc. and then W.R. Grace plant in Spokane. The plant began producing Zonolite insulation in 1951. Even though the plant closed down in the early 1970's, recent tests by EPA have found some soil samples from the site still have asbestos concentrations of up to 3 percent. EPA is strongly recommending that access to the site should be restricted almost 30 years after the plant closed down.

At many plants where vermiculite from Libby was processed, waste rock left over from the expansion process was given away for free. People used this free waste rock in their yards, driveways and gardens.

The other picture you see shows Justin and Tim Jorgensen climbing on waste rock given out by Western Minerals, Inc. in Minneapolis, Minnesota in the late 1970's. According to W.R. Grace records, this rock contained between 2 and 10 percent tremolite asbestos. This rock produced airborne asbestos concentrations 135 times higher than OSHA's current standard for workers. Thankfully, neither Justin nor Tim has shown any signs of disease, but their risks of developing asbestos diseases, which have latency periods of 15 to 40 years, are increased from their childhood exposures.

Today, people may still be exposed to harmful amounts of asbestos in vermiculite. Between 12 million and 35 million homes and businesses may have Zonolite insulation. This may be the case for up to 150,000 homes in Washington. EPA has also tested agricultural products—soil conditioners and fertilizers—made with vermiculite, and determined that some workers may have been exposed to dangerous amounts.

As I learned more about Libby, and how asbestos has ended up in products *by accident*, I was shocked to learn that asbestos is still being used in products *on purpose*. While some specific uses have been banned, the EPA's more sweeping ban was never put into effect because of a lawsuit backed by the asbestos industry.

As a result, new uses of asbestos were banned, but most existing uses were not banned. Today, asbestos is still used to make roofing products, gaskets, brakes and other products. In 2001, the U.S. consumed 13,000 metric tons of it. Asbestos is still entering the product stream in America, despite the known dangers to human health. In contrast, asbestos has been banned in at least 20 other countries.

Now it's time for the United States to ban asbestos, too. I want to ensure our government does all it can to minimize future suffering and death caused by asbestos. That is why yesterday we introduced the Ban Asbestos in America Act of 2002. Senator Baucus, thank you for being an original cosponsor of this important legislation. I also appreciate the cosponsorship of Senators Cantwell, Dayton and Wellstone.

The Ban Asbestos in America Act of 2002 has four parts which I would like to briefly mention. First, this bill protects the public by requiring the EPA to ban asbestos by 2005. Like the regulations EPA finalized in 1989 under the Toxic Substances Control Act (TSCA), companies may file for an exemption to the ban. EPA may issue the exemption if there is no substitute material available and the exemption won't pose an unreasonable risk of injury to public health or the environment.

I'd like to take a moment to point out to the Subcommittee the connection between what happened in Libby and EPA's efforts to ban asbestos. Last year, the EPA's Inspector General conducted an investigation into why the agency didn't do a better job of protecting the people of Libby. I was struck by one of the sections of the Inspector General's Report, in which a letter written by EPA in 1983 is quoted as follows, ". . . asbestos-contaminated vermiculite is considered a lower priority at this time than problems posed by friable asbestos-containing materials in school buildings and commercial and industrial uses of asbestos."

In 1979, EPA had issued an Advanced Notice of Proposed Rulemaking that it intended to explore options to control asbestos under Section 6 of the TSCA. In 1982, EPA issued a reporting rule under Section 8(a) of TSCA to gather information about commercial and industrial uses of asbestos. EPA's proposed rule to ban asbestos was published in the Federal Register in January 1986, and the final rule was published in 1989.

One of the reasons EPA did not spend more time focusing on asbestos-contaminated vermiculite was that the agency was working on the asbestos phaseout and ban rule. Unfortunately, this rule was overturned by the 5th Circuit Court of Appeals in 1991.

There is a clear relationship between EPA's efforts to ban asbestos and the fact that problems in Libby were overlooked. I am saddened that EPA didn't spend more time focused on Libby in part because of a competing effort to limit asbestos exposure—an effort which ultimately failed.

Second, the bill requires EPA to conduct a pubic education campaign about the risks of asbestos products. We need to warn people that their home insulation—if made with vermiculite—may be contaminated with asbestos. While EPA has agreed to remove vermiculite insulation from homes in Libby, the agency currently has no plans to do this nationwide.

The Ban Asbestos in America Bill requires EPA and the Consumer Product Safety Commission to educate consumers about how best to handle this insulation within 6 months. The Ban Asbestos in America Act of 2002 also requires EPA to conduct a survey to determine which foreign and domestic products consumed in the United States today have been made with asbestos. EPA has estimated as many as 3,000 products still contain the mineral.

Third, the legislation invests in research, tracking and treatment of asbestos diseases. It requires a national mesothelioma registry, which would be coordinated with the A.T.S.D.R.'s existing efforts pertaining to Libby as well as with the National Institute for Occupational Safety and Health. The bill also authorizes funding for 7 mesothelioma treatment centers nationwide to improve treatments for and awareness of this fatal cancer.

Finally, the bill requires EPA to expand its Blue Ribbon Panel on Asbestos to address issues beyond the six regulated forms of asbestos, as EPA originally promised in its response to the Inspector General.

Over the years, asbestos has taken a staggering toll on our country. We have recently been reminded of the dangers posed by asbestos because of concerns about asbestos exposure from the dust and debris caused by the collapse of the World Trade Center Towers. Had this country acted swiftly to ban asbestos when public health evidence about its dangers first emerged, the Towers would not have been built with any asbestos at all. Now we'll need to wait several decades to determine whether asbestos exposures in New York will cause asbestosis, lung cancer and mesothelioma for first responders and residents.

I hope this Subcommittee, which has primary jurisdiction over the Ban Asbestos in America Act, will consider holding a hearing on the bill in the near future.

STATEMENT OF HON. DENNY REHBERG, U.S. REPRESENTATIVE FROM THE STATE OF MONTANA

Thank you Mr. Chairman, for the opportunity to provide testimony before the Committee today.

Mr. Chairman, I have visited the Libby community three times within this past year to learn first hand of the health crisis that has plagued my constituents for more than a decade. At my invitation, EPA Administrator Christie Whitman joined me for a tour of Libby, where she had the opportunity to meet with community leaders and families affected by years of asbestos contamination. Her reaction to the tragic situation was a common one: she wanted to help.

With each return visit to the community, it has become increasingly clear to me that this issue reaches far beyond asbestos, Superfund designation, cleanup, or economic loss. The situation in Libby is nothing short of a health emergency, spurred on by corporate greed, that has drastically altered the lives of good, hard working Montanans.

As we analyze the difficult lessons learned from Libby, Congress cannot lose sight of the residents and their long-term healthcare needs. As time goes by and as research continues to offer new information, we may find that the tragedy of Libby is far greater than currently understood. However, regardless of future discoveries, we must be relentless in our efforts to clean up the contaminated homes, schools and businesses and provide a more secure future for the people of Libby, Montana.

During my numerous visits to Libby, both as their Congressman and as their Lt. Governor, I have pledged my steadfast commitment to the residents to see this through to the end. And as the cleanup is completed and the stigma associated with this town fades, it is incumbent upon the government to continue to assist the individuals whose health and quality of life have been affected by asbestos exposure.

Mr. Chairman, I appreciate your efforts in addressing this public health crisis. I look forward to working with my colleagues in Congress to once and for all bring about a positive conclusion to the public health nightmare that has plagued the citizens of Libby for more than a decade and to. ensure that the terrible mistakes that led to this disaster are not revisited on any another American community.

Thank you, Mr. Chairman.

STATEMENT OF MARIANNE HORINKO, ASSISTANT ADMINISTRATOR, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, U.S. ENVIRONMENTAL PROTECTION AGENCY

Good morning. I am pleased to appear today to address the cleanup of asbestos contamination in Libby, Montana, and the Agency's efforts to identify other sites nationwide that received vermiculite from Libby. EPA views the Libby asbestos site as one of the most significant Superfund sites nationally, and the Agency is committed to working with our state and Federal partners to take all steps necessary to protect human health and the environment in Libby and related sites.

BACKGROUND

Libby is a small town of about 2,600 residents in northwest Montana. Approximately 10,000 more people live in about 2000 homes located in the surrounding valley. Between 1924 and 1991, 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 5 million tons from 1963 to 1990. The processed vermiculite ore mined in Libby has been 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 2000 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 at which 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 which operated in Libby during different periods in the mine's history, prior to bagging for shipment.

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

INVESTIGATIONS AND CLEANUP RELATED TO LIBBY ASBESTOS

EPA is working closely with our Federal partners to address the asbestos contamination and related public health concerns in Libby and other communities across the country. EPA, the Agency for Toxic Substances and Disease Registry (ATSDR) and the U.S. Public Health Service (PHS) have mobilized an emergency response team to work in Libby. Coordinating closely with the community, the team conducted inspections of the former mine and processing facility, interviewed local physicians, and collected environmental samples to determine the need for environmental clean up. The team discovered significantly elevated incidence of asbestos-related disease in Libby, as well as evidence of asbestos contamination in several areas within the town.

EPA is currently taking action under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) to protect human health and the environment in Libby. W.R. Grace, an owner and operator of the vermiculite mine and facilities, filed for Chapter 11 bankruptcy protection in late 2000. The United States continues to pursue reimbursement for Superfund activities through action in the Montana Federal District Court.

MEDICAL INVESTIGATIONS

In November 1999, ATSDR and the PHS undertook medical investigations in Libby to determine the magnitude of asbestos-related health impacts in the community. These investigations, which were requested and funded by EPA, consisted of a morbidity/mortality study, development of a formal epidemiological case series, and health screening.

The mortality study for the period 1978–1998 showed that mortality in the Libby community from asbestosis was approximately 40–60 times higher than expected for such a community. ATSDR conducted health screening of roughly 6,200 individuals, including former workers, family members of workers and current and former residents of Libby. Preliminary results of the health screening of these groups showed up to 18 percent with lung abnormalities. Significantly, more than half of this sample were not former W.R. Grace workers or their family members. In short, all of

the medical investigations documented evidence of wide-spread disease and mortality resulting from exposure to asbestos.

ENVIRONMENTAL INVESTIGATIONS AND CLEANUP

EPA initiated a Superfund emergency investigation and cleanup actions in Libby. The initial investigations focused on the mine and processing areas, residences, parks and schools. From December 1999 though April 2002, EPA collected more than 5,000 samples and conducted interviews to characterize the extent and severity of asbestos contamination in and around the town of Libby. Preliminary results showed that high amounts of asbestos-contaminated vermiculite remained at the mine, the mine road, processing areas, the mine tailings pile/pond, and in residential and shared community areas.

In June 2000, EPA initiated and oversaw cleanup actions at two former processing areas to address the worst asbestos contamination. EPA has since started cleanup actions at the mine road, the high school track and city park facilities where vermiculite ore tailings were found. Cleanup has also started at several residences where piles of vermiculite or contaminated equipment from the mine were found. More cleanups are planned to address elevated levels of asbestos, both at mining facilities and in the community.

Federal agencies have maintained a program of early and meaningful outreach and coordination with the Libby community. This has included meeting frequently with the Libby Community Advisory Group, maintaining a storefront office in an accessible downtown location and frequent one-on-one communication with concerned Libby residents.

On May 9, 2002, EPA approved a new Action Memorandum Amendment for the Libby Asbestos site, authorizing additional work at known locations and sources, including certain residential contamination in homes associated with vermiculite insulation.

EPA determined that it was appropriate to address the insulation in Libby based upon the unique circumstances in Libby. EPA has determined that this material does fall within our response authorities, as detailed in the Agency's Action Memorandum Amendment of May 2002. In addition to the level of known cumulative exposure and multiple pathways, EPA determined that the remaining asbestos releases in Libby would not have been addressed by any other authority in a timely manner.

EPA has made progress with residential cleanup in Libby. We have resumed the removal of vermiculite ores and mining wastes from residential yards. We are starting to address two homes with elevated amphibole asbestos concentrations in interior dusts. EPA expects to begin the removal of vermiculite insulation from homes within 1 week. There are currently 55 properties on the "priority list" for clean up. These are properties that have high levels of amphibole asbestos in their yards, plus either vermiculite insulation or interior contamination as well. EPA expects to complete the response at these 55 properties this summer.

In support of these activities, EPA is completing designs, plans, and contracts to construct an asbestos cell at the Lincoln County Landfill. This will create a permanent disposal location for the vermiculite insulation, and facilitate year round operations. Region 8 should begin construction in mid-July.

Work is also completing clean up and restoration actions already underway. EPA expects to finish the restoration of the High School, Middle School, Screening Plant, Export Plant and remove the remaining contamination at the KDC-Flyway this season.

EPA has committed more than $60 million in fiscal years 2000 through 2002 for environmental investigations, cleanup actions and medical investigations in Libby. Current estimates place fiscal year 2003 needs at approximately $21 million. These future funding need projections are based upon assumptions about the number of homes or additional properties which may require clean up, and may be subject to significant revision as field work progresses.

The ongoing work of EPA and our partners will help determine how best to complete the long-term remediation in Libby. To date, site investigation and cleanup activities have taken place under Superfund emergency or "removal" authorities. Given the widespread contamination and public health concerns in Libby, the Governor of the State of Montana designated the Libby site as the State's one-time, top priority site for cleanup. In response, EPA listed the Libby site on the Superfund's National Priorities List (NPL) of contaminated sites. EPA is committed to working with our partners to see that all necessary actions are taken to protect public health in the Libby community.

EPA INVESTIGATIONS AND CLEANUP OUTSIDE OF LIBBY

While EPA is currently taking action under Superfund to protect human health and the environment in Libby, the Agency is working with ATSDR to study other locations across the country where vermiculite ore from the Libby mine was shipped for processing.

Between 1924 and 1991, the Libby mine produced much of the world's supply of vermiculite. EPA identified 240 locations across the U.S. that may have received Libby vermiculite for processing and distribution. Of these locations, EPA determined that 22 require further investigation by the Agency. When it appears that another agency may need to be involved, EPA shares its findings with other Federal or state agencies so that they can determine if additional followup is warranted.

One notable example of a situation warranting a Federal / state agency approach is the significant asbestos contamination at the Western Minerals site in Minneapolis, Minnesota. Western Minerals operated as a vermiculite processing facility from 1937 until 1989. Between 1964 and 1989, Western Minerals is estimated to have processed more than 118,000 tons of vermiculite ore from the Libby, Montana mine. The waste material generated during the processing of vermiculite was made available to the public for use as fill material for driveways and yards. Since September of 2000, EPA and the State have been sampling and removing asbestos contamination at the former plant site and nearby residential yards. EPA and the Minnesota Department of Health (MNDOH) have received many reports of asbestos-related disease in residents who have lived in the predominantly residential area surrounding the facility. An ATSDR-funded survey is being conducted by the MNDOH to determine the health impacts in former workers and nearby residents at the Western Minerals site.

ATSDR is currently working with state health departments to conduct or initiate reviews of health statistics for asbestos-related disease in areas of former vermiculite processing facilities across the country. EPA will continue to coordinate with ATSDR on this effort to identify any additional locations that may require environmental sampling or cleanup.

RESPONSE TO INSPECTOR GENERAL REPORT

On March 31, 2001, the EPA Office of Inspector General (IG) issued a report titled, "EPA's Actions Concerning Asbestos-Contaminated Vermiculite in Libby, Montana." The IG report focused on EPA's role in addressing asbestos contamination in Libby, as well as EPA's role in regulating asbestos. The IG report concludes that EPA's activities in Libby should continue, and emphasizes the importance of addressing potential asbestos contamination concerns associated with mining and other operations unrelated to Libby. EPA is coordinating closely with the Mine Safety and Health Administration (MSHA) and ATSDR to identify additional asbestos-contaminated sites associated with Libby or otherwise identified that may require cleanup actions under Superfund.

CONCLUSION

EPA will continue to work closely with our Federal and state partners to take the steps necessary to protect the public health of the residents of Libby, Montana, as well as the health of communities outside of Montana that have been affected by Libby asbestos.

Thank you for the opportunity to appear before you today to discuss cleanup issues associated with asbestos in vermiculite ore from Libby, Montana.

STATEMENT OF GREGORY WAGNER, M.D., DIRECTOR, DIVISION OF RESPIRATORY DISEASE STUDIES, NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH CENTERS FOR DISEASE CONTROL AND PREVENTION, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Mr. Chairman and members of the subcommittee, I am Dr. Gregory Wagner, an occupational health expert at the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC). I am pleased to appear before you today to provide this testimony on behalf of NIOSH.

NIOSH is a research institute within CDC, a part of the Department of Health and Human Services. CDC, through NIOSH, is the Federal agency responsible for conducting research and making recommendations to identify and prevent work-related illness and injury.

My testimony today will address the current scientific knowledge about health risks to workers from exposure to airborne asbestos. I also will discuss NIOSH's

past findings and current research related to asbestos contamination in Libby, Montana.

BACKGROUND

Asbestos is a term that is generally used to refer to a group of fibrous minerals with exceptional resistance to degradation by heat, acids, bases, or solvents. The minerals are not combustible and have a high melting point and low thermal and electrical conductivity. These and other useful properties had resulted in the development of thousands of commercial uses for asbestoscontaining materials by the early 1970's. However, as the use of asbestos dramatically increased, the lethal effects of airborne asbestos became clear. Regulatory action and liability concerns related to the now well-established connection between inhalation of asbestos fibers and a variety of serious and often fatal diseases have reduced or eliminated the use of asbestos in many commercial products. However, asbestos and asbestos-containing materials are still found in many residential and commercial settings and pose a risk of exposure to workers and others.

Asbestos is defined in Federal regulations as the minerals chrysotile, crocidolite, amosite, tremolite, actinolite, and anthophyllite. The Occupational Safety and Health Administration (OSHA), the Mine Safety and Health Administration (MSHA) and the Environmental Protection Agency (EPA) regulate these six minerals. All of the minerals, except for actinolite, have been used commercially. The results from epidemiologic studies of workers exposed to these minerals provide the scientific evidence of a causal relationship between exposure and adverse health effects in humans.

ASBESTOS-RELATED DISEASES

Exposure to asbestos significantly increases the risk of contracting several diseases. These include:

(1) *Asbestosis*—a disease characterized by scarring of the air-exchange regions of the lungs;

(2) *Lung cancer*—for which asbestos is one of the leading causes among nonsmokers, and which occurs at dramatically high rates among asbestos-exposed smokers;

(3) *Malignant mesothelioma*—an almost invariably fatal cancer of the tissue lining the chest or abdomen for which asbestos and similar fibers are the only known cause; and

(4) *Nonmalignant pleural disease*—which can appear as a painful accumulation of bloody fluid surrounding the lungs, but which more commonly is seen as thick and sometimes constricting scarring of the tissue surrounding the lungs.

In addition, asbestos exposure is associated with excess mortality due to cancer of the larynx and cancer of the gastrointestinal tract. The malignant diseases—the cancers including mesothelioma—are often fatal within a year or a few years of initial diagnosis. In contrast, asbestosis deaths typically occur only after many years of suffering from impaired breathing.

We do not know exactly how asbestos fibers cause disease. We do know that microscopic fibers can become airborne during various industrial processes or from handling of asbestos-containing materials and can then be inhaled and/or swallowed. As much as 50 percent or more of inhaled asbestos fibers can remain lodged in the lungs, where it is almost impossible for the body to eliminate them. Asbestos fibers are extremely resistant to destruction in body fluids, and many of these fibers are too long to be engulfed and removed by the cells that normally scavenge and remove particles that happen to deposit in the lungs. Generally, as the burden of retained fibers increases in the body, so does the likelihood of disease. Most asbestos-related diseases, particularly the malignant ones, have long latency periods often extending 10–40 years from initial exposure to onset of illness. While asbestos-related lung cancer and mesothelioma are frequently not curable, they and other asbestos-related diseases are clearly preventable by eliminating or limiting exposures to asbestos. The amount and duration of exposure are factors that can determine the risk of adverse health effects.

THE DEFINITION OF ASBESTOS

In 1990 testimony before OSHA, NIOSH broadened its science-based definition of "asbestos" as a result of concerns about the microscopic identification of the six regulated asbestos minerals. The six minerals can also occur in a non-fibrous (so-called "massive") form. The non-fibrous mineral forms of the six asbestos minerals can be found geologically in the same ore deposits in which the fibrous asbestos minerals occur or in deposits where other commercially exploited minerals are mined (e.g.,

industrial grade talc). "Cleavage fragments" can be generated from the non-fibrous forms of the asbestos minerals during their handling, crushing, or processing, and these "cleavage fragments" are often microscopically indistinguishable from typical asbestos fibers of the (fibrous) minerals.

The elemental composition of the six asbestos minerals can vary slightly as a result of geological conditions such as pressure, temperature, or proximity of other minerals. Recognizing these variations in elemental composition, NIOSH believes that the six asbestos minerals can be defined by their "solid-solution" mineral series. For example, the mineral series tremolite-ferroactinolite contains the asbestos mineral actinolite. These mineral series are considered solid-solutions in which cations (i.e., sodium, calcium, magnesium, iron, etc.) are replaced by other cations which can affect the elemental composition of the mineral without significantly altering the structure.

NIOSH bases this expanded "asbestos" definition—encompassing the entire solid-solution mineral series for each of the six currently regulated asbestos minerals and including cleavage fragments from the non-fibrous forms of these minerals-on scientific evidence from cellular and animal studies suggesting that dimension, specifically length and diameter, as well as durability, may be more critical factors in causing disease than chemical or elemental composition.

NIOSH STUDIES OF VERMICULITE WORKERS IN LIBBY, MONTANA

In June 1980, OSHA asked NIOSH to provide technical assistance to investigate lung problems in workers at a plant using vermiculite that had been mined in Libby. Shortly thereafter, MSHA also requested technical assistance from NIOSH to investigate the magnitude of health hazards in vermiculite mines. MSHA was particularly concerned about two reported cases of "dust-related lung disease" in workers at the Libby mine.

In response to these requests, NIOSH initiated epidemiological studies in Libby, Montana. The epidemiological studies carried out by NIOSH between 1980 and 1985 showed that occupational exposure to mineral fibers that contaminate Libby vermiculite caused high rates of asbestos-related diseases among exposed workers at the Libby mine complex. The fibers these workers were exposed to included tremolite, one of the minerals within the definition of asbestos as currently regulated. Some recent evidence indicates that only 10 to 20 percent of the fibrous mineral content of the Libby vermiculite was tremolite. A much higher proportion–80 to 90 percent—of the fiber contaminant in this vermiculite has been characterized as several other similar fibers that are not currently regulated as asbestos, such as richterite and winchite. Richterite and winchite are fibrous minerals that are not classified as asbestos by mineralogists.

NIOSH played a pivotal role in documenting the health hazard associated with occupational exposure to asbestos-contaminated vermiculite at the mine in Libby, Montana. NIOSH made its findings available beginning in 1985 through meetings in Libby with workers and their representatives, employer representatives, and members of the community. NIOSH also published its findings in several scientific papers to alert the occupational health community about the identified problem. It is clear in hindsight that further work remained to be done, in particular, with respect to further studies of downstream users of Libby vermiculite products. NIOSH is applying what we learned from our Libby investigations to our current and future activities both in Libby and throughout our program.

CURRENT NIOSH STUDIES

At present, NIOSH is following up on potential exposures of workers who use or process vermiculite from other sources. Since closure of the Libby mine in 1990, most of the vermiculite now being produced for domestic use is obtained from one of four mines, three of them domestic and one located in South Africa. The degree to which the vermiculite from these other sources is contaminated with asbestos is not clear. At OSHA's request, NIOSH is conducting environmental sampling at expansion plants and horticultural operations where vermiculite is used. NIOSH will complete asbestos exposure assessments at two expansion plants for each vermiculite ore supplier, along with a number of horticultural sites. We expect the field data collection to be completed by the end of 2002. At present, field sampling has been completed at four expansion plants and three horticultural operations. From these studies we expect to learn the degree to which an asbestos exposure hazard exists in vermiculite from sources other than Libby, Montana. Once these studies are completed, we plan to produce and disseminate a technical report that describes the extent to which newly mined or imported vermiculite presents an as-

bestos risk to current vermiculite worker. Based on the findings, we may issue further guidance for protective measures to be taken.

FUTURE RESEARCH ACTIVITIES

Additional research possibilities that NIOSH is considering include efforts to better determine physical and/or chemical characteristics affecting toxicity of fibers including those occurring naturally and those manufactured. Direct evidence by which to attribute particular health effects to each possible fiber type is not currently available. Epidemiological studies of people exposed to naturally occurring or manufactured fibers would provide important new information, and studies conducted with animals could provide mechanistic and other toxicologic data.

Asbestos fibers have many different lengths and diameters. Additional work to improve and standardize the methods for asbestos fiber measurement is being considered because it would help advance prevention and control efforts to protect exposed workers. Human assessment of risk and occupational exposure limits is based on airborne fiber concentrations determined by the use of phase contrast microscopy (PCM). This analytical method leaves an undetermined number of asbestos fibers collected on each sample uncounted because many fibers are too small in diameter to be detected and because the standard procedure for counting fibers using PCM takes into account only fibers longer than 5 micrometers in length. Current asbestos exposure risk assessment is based only on a subset of fibers that can be detected using PCM techniques. More sensitive analytical methods are currently available, but these methods could benefit from better standardization.

CONCLUSION

In summary, we know much about the adverse health effects caused by the inhalation of asbestos fibers. Increased understanding of the health effects of fibrous minerals that fall outside the existing definitions of asbestos will help us find ways to provide appropriate protection for workers exposed to those materials. Further identification of workplace sources of vermiculite exposure and the tracking of persons potentially exposed to fiber-contaminated vermiculite and other contaminated materials will help us develop appropriate public health strategies for preventing exposure to these materials. While information continues to be gathered, public health prudence requires that vermiculite from the Libby mine or products containing vermiculite originating in Libby be considered potentially dangerous and that proper precautions be taken to minimize the generation and inhalation of any dust during the handling of these materials until analysis of the particular vermiculite or vermiculite-containing product shows that it does not produce an asbestos hazard.

STATEMENT OF HENRY FALK, M.D., M.P.H., ASSISTANT ADMINISTRATOR, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Good morning, I am Dr. Henry Falk, and I am the Assistant Administrator of the Agency for Toxic Substances and Disease Registry (ATSDR), a public health agency within the U.S. Department of Health and Human Services (HHS). I am accompanied by Sharon Campolucci, RN, MSN, Deputy Director of the ATSDR Division of Health Studies; she was coordinator of the medical testing program in Libby.

Senator Baucus, ATSDR is grateful for the interest and support given by you and other members of the Montana delegation since we began working in Libby in late 1999. As you know, we came to Libby in response to concerns expressed by yourself, community members, former vermiculite mine workers, and the health department. Over the last several years, we have worked very closely with the U.S. Environmental Protection Agency (EPA) to address these concerns. Without the support of all of you we would not be able to report today on the significant progress we have made in evaluating the public health issues in the Libby, Montana, area.

Congress created ATSDR in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or what is more commonly known as the Superfund legislation. CERCLA mandates of ATSDR a broad, national program of Superfund site health assessments, health investigations, surveillance and registries, applied research, emergency response, health education, and toxicological data base development. Broadly speaking, ATSDR's responsibilities under Superfund, the Resource Conservation and Recovery Act (RCRA), and other Federal statutes are to assess the effects of toxic substances on community populations and to recommend interventions to protect public health where they are needed. This

may include medical screening and epidemiologic investigations of health effects of community populations exposed to hazardous substances; ATSDR undertook these activities in Libby. We also conduct investigations to measure human exposure to toxic substances released from waste sites or other sources of release. We conduct our work in close collaboration the U.S. Environmental Protection Agency (EPA), state health departments, local health agencies, and affected communities.

Since being called upon in November 1999, ATSDR has been actively involved with the citizens and public health and environmental officials to determine the extent of harm to humans from asbestos-contaminated vermiculite that was mined in Libby.

In the earliest days of our involvement in Libby, we developed a plan to help guide site-related public health activities. As we have shared with you in the past, this Public Health Response Plan identifies the areas of responsibilities for the conduct of our health-related activities. All stakeholders, including officials and the affected community, provided input throughout the process of both developing and implementing the Public Health Response Plan. The plan describes specific activities that are designed to prevent exposures and to mitigate or prevent adverse health effects. Key elements targeted in the plan were:

(1) to provide community-based medical testing to determine the health status of exposed people;

(2) to assess disease and illness trends to characterize the impact of the environmental exposure;

(3) to provide a public health education program to assist residents in obtaining full and up-to-date information on asbestos-related risks and diseases; and

(4) to collect and analyze medical and epidemiologic data to better characterize the nature and extent of asbestos-related disease in the community.

Following are updates on activities that resulted from this action plan.

MEDICAL TESTING

From July to November 2000, ATSDR staff conducted medical tests on current and former residents of the northwest Montana town. Participants included 6,149 adults who lived, worked, or played in Libby for at least 6 months before December 31, 1990. Components of the testing included an in-depth questionnaire to build an exposure history for each of the participants, three X-ray views to identify changes in the lungs and lung lining that might be the result of asbestos exposure, and a spirometry test that measured air flow in and out of the lungs to measure lung function. Of those 5590 study participants 18 years of age and older who were eligible for X-ray testing, 18 percent (994) showed pleural abnormalities (chest wall scarring). According to data reported in the literature, the rates of pleural abnormalities in the United States among groups without known exposure to asbestos range from 0.2 to 2.3 percent.

Additional findings included:

• Forty-eight percent (159 of 328) of former W.R. Grace employees who participated in the medical testing had pleural abnormalities.

• Most participants reported multiple routes of exposure (household contact, occupational, recreational, and other) to the asbestos-contaminated vermiculite. For example, 24 percent of participants who reported six or more routes of exposure had pleural abnormalities.

• Five percent (6 of 122) of those participants who reported no apparent exposure had pleural abnormalities.

The second phase of initial medical testing was conducted between July and September 2001, and included 1,158 participants. Notification letters have been sent to these participants, and ATSDR is in the process of analyzing these new data and combining them with results from those tested in 2000. Once the analysis is completed, ATSDR will produce and make available to the community a final report combining results from both medical testing phases. The preliminary analysis of this combined data does not indicate any significant change in the prevalence of abnormalities when compared to data from the first phase of testing.

ATSDR is working to "localize" the medical testing program—transitioning it to the state and local health departments with our ongoing technical and resource support.

MORTALITY REVIEW

In addition, after consultation with the National Institute for Occupational Safety and Health (NIOSH), CDC, we investigated an association between contaminated vermiculite and human health through a mortality review in which we compared death rates for residents of the Libby area with those in Montana, and the United

States, for selected diseases that have been associated with asbestos. ATSDR staff reviewed death certificate data from 1979 to 1998 for the Libby community. The review focused on the underlying cause of death in Libby-area residents. We found that mortality from asbestosis in the Libby area was at least 40 to 60 times higher than expected. We also found that death from mesothelioma appeared to be elevated. This mortality review is continuing; additional data are being reviewed to support these early findings. We expect to release this mortality review by early July.

These two investigative tools—the medical testing and mortality review—clearly indicated a public health problem in Libby. Based on these findings, ATSDR recommended many followup activities, several of which already have been initiated.

• Working with a local pulmonary physician who treats referrals from the Libby area, ATSDR has conducted a focused review of patients with an asbestos related diagnosis and no known link to vermiculite mining. This review was conducted to address community concerns about environmental asbestos exposure outside the workplace. Final revisions for the report are now in progress and preliminary results will be released later this month.

• A computerized tomography (CT) scan study is nearly complete. This study was designed to evaluate the sensitivity of the medical screening tool (chest X-rays) and to help in planning possible future medical testing activities. All 353 scans have been completed and reviewed by expert CT radiologists, and letters providing individual scan findings have been sent to participants and their physicians. Analysis of these data for the study report is underway.

• Detailed planning and preparatory work has begun on the development of a registry to track former Libby-area miners and their household contacts. This focuses on the members of this community who were at greatest risk based on exposure levels and on the results of the medical testing program; a key source of registrants would be those who participated in the medical testing program. ATSDR sponsored a workshop in February to consult with and solicit advice from experts in pulmonology and asbestos-related disease to help guide the next steps for the Libby registry. The recommendations from this group will assist in addressing the concerns of the Libby community while also meeting ongoing surveillance needs and in the collection of valuable scientific data. In addition, the registry will help us stay in contact with all of the identified individuals and provide updated information on diagnosis and treatment options. The registry is intended to be a long-standing fixture that will not only be a repository of information about the registrants, but will also be a source of the latest information about treatments and other medical breakthroughs.

• ATSDR is working with the State to support localized planning to address future medical needs. Extended medical testing will need to continue in some form for many years. People who have tested positive will need to be followed to note any progression in the course of the disease. People who have tested negative to date, but who were substantively exposed, will also need periodic testing, but probably on a different schedule. Primary responsibility for the medical testing program will be transitioned to the State and local health department with ongoing technical and resource support from ATSDR.

• ATSDR worked in close cooperation with HHS Region VIII staff to help the community identify sources of assistance for medical care. In fact, HHS Deputy Secretary Claude Allen personally visited Libby last August and was instrumental in developing an HHS response. HHS now supports the Community Health Clinic (CHC) in Libby which provides primary health care services to people in the Libby area. ATSDR has also worked cooperatively with the Center for Asbestos Related Disease (CARD) in Libby. This facility, operated by St. John's Hospital, provides ongoing medical care for persons diagnosed with asbestos related medical conditions or those requiring further evaluation after undergoing initial medical testing.

• The Lincoln County Department of Environmental Health and the University of Montana in Missoula, in cooperation with ATSDR and the Montana Department of Public Health and Human Services, are organizing a research conference for later this month (June 24–26) to discuss current asbestos-related research and plan for future projects. Conference co-sponsors include EPA, the National Institute for Environmental Health Sciences, and the National Science Foundation.

• This June to facilitate development of the future research agenda related to the Libby site.

ADDITIONAL ACTIVITIES PLANNED FOR NEXT YEAR

Now that cases have been identified through the various methods I have outlined (e.g., mortality review, case series review, and medical testing), other recommended activities include:

• epidemiologic studies to better evaluate the relationship of exposures and exposure pathways to disease;

• follow-up evaluation of individuals in the medical testing program who were referred for medical care to assure that this referral worked effectively; and

• a better determination of the clinical course and natural progression of pulmonary disease related to tremolite asbestos.

OTHER SITES THAT RECEIVED ASBESTOS-CONTAMINATED VERMICULITE

Processing of vermiculite ore shipped from Libby has occurred at approximately 300 sites in 40 states over the last 50–90 years. These sites are being reviewed to consider the potential for health problems similar to those experienced by Libby-area residents and former mine workers. ATSDR staff have been working with EPA to determine if any of these sites pose a public health hazard. This review has included site visits to assess the extent of current or past operations, and to determine the extent of human exposure and possible pathways of exposure to the asbestos. One site that has already elicited considerable attention is the Western Mineral Products site in Minneapolis, Minnesota.

This Minnesota site was used for insulation products manufacturing from 1936 to 1989. The plant received vermiculite ore from Libby, Montana, and processed the ore into insulation, fireproofing material, and other vermiculite products. Under a cooperative agreement with ATSDR, the Minnesota Department of Health (MDH) conducted a health consultation to identify health concerns related to asbestos exposure from the site. Plant workers were exposed to levels of asbestos in excess of current occupational standards for much of the time the plant was in operation, and cases of asbestos-related disease have been reported in former workers. Additionally, approximately 100 properties around the former plant have been identified as contaminated with asbestos containing wastes from the site. The EPA is in the process of removing asbestos-contaminated soil from these properties and adjoining alleys.

The extent of past and current exposures to asbestos is difficult to estimate at this time. Based on available information, past exposure to workers in the plant, residents who lived near the site and children who played on piles of vermiculite waste material may have been at risk for asbestos exposure. To address this concern, MDH initiated the Northeast Minneapolis Community Vermiculite Investigation (NMCVI), a population survey to identify and characterize asbestos exposure in a community cohort. This study involves a door-to-door interview and visual inspection of properties in the immediate vicinity of the Western Mineral Projects Plant in Minneapolis, as well as a telephone interview of former residents in the target area and other individuals who may have had exposure to vermiculite. This investigation will determine the size and demographics of the population at risk. The EPA, Minnesota Pollution Control Agency, and MDH will continue to investigate and clean up the site and surrounding community.

ATSDR staff have developed a protocol for use by the state health departments to review vital statistics and cancer registry data to determine if there might be a health impact in any affected community that warrants further investigation. During fiscal year 2001, ATSDR developed cooperative agreements with six states (Utah, Colorado, Massachusetts, California, Louisiana, and Wisconsin) to conduct health statistics reviews around sites that received asbestos contaminated vermiculite from Libby and to determine whether there is an excess of asbestos related disease. Later this summer, other states will have an opportunity to apply for support of similar health-related activities; we anticipate supporting up to four additional states. In addition, ATSDR has awarded funds to conduct evaluation of mesothelioma cases in three states (New York, New Jersey and Wisconsin). This surveillance process enables states to use their cancer registry data to identify all mesothelioma cases and then look backward to see if the disease in any portion of the cases could be associated with asbestos exposure from contaminated vermiculite or vermiculite insulation from Libby. ATSDR staff also is working with health officials in Montana to review mesothelioma cases in that state.

I would like to reiterate that ATSDR shares your concerns about the situation in Libby—both the environmental contamination and the health concerns. While we have done a great deal of work in Libby, much remains to be done. To summarize, our primary goals for this coming year are:

(1) implement the registry of former workers and family contacts;

(2) establish the medical testing program on a long-term basis by transitioning primary responsibility to State and local health departments, with technical and resource support from ATSDR;

(3) conduct epidemiologic studies to formally investigate the links between the various environmental exposures and the development of disease;

(4) provide data on potential health effects in other states that had vermiculite processing centers that led to harmful exposures; and

(5) pilot mesothelioma surveillance activities, in coordination with NIOSH.

With your continued support, ATSDR stands prepared to continue the important work we have begun and do whatever we can to help the Montana and Libby community, and any other sites that may be identified with similar problems.

Mr. Chairman, this concludes my testimony; I would be happy to respond to any questions you may have.

STATEMENT OF MICHAEL R. SPENCE, M.D., CHIEF MEDICAL OFFICER, MONTANA STATE DEPARTMENT OF PUBLIC HEALTH AND HUMAN SERVICES

Madam Chairperson and members of the committee, for the record my name is Michael R. Spence. I am a medical doctor licensed to practice medicine in the state of Monlana. I am currently the chief medical officer in the Montana State Department of Public Health and Human Services, a position that I have held for the past 5 years. In my current capacity I have the charge of addressing public health issues that impact the citizens of Montana.

In November 1999 a newspaper report indicated that there was a potential, major public health problem in Libby, Montana related to previous mining activities and community contamination. The substance in question of causing the problem was vermiculite ore, a product with many industrial applications and known to be contaminated with asbestos minerals. Large numbers of residents of Libby were described as being ill with asbestos related disease and many were said to have died from this illness. The publication of this report resulted in a team of health professionals being deployed to Libby to assess the situation. The groups of individual that met for the evaluation of the potential problem consisted of members from the Environmental Protection Agency and Health and Human Services from Region 8 located in Denver, Colorado, the Chief Medical Officer for the State of Montana, the Montana State Epidemiologist and the Lincoln County Montana Health Officer.

Over the ensuing weeks, after meeting and consulting many of the foremost world authorities on asbestos minerals and related diseases, it was determined that there was a need to evaluate Libby residents for the presence of asbestos-related disease, assess the environmental situation for asbestos mineral contamination and, if necessary, initiate remediation. The population was assessed, protocols were developed and in July 2000 the Agency for Toxic Substances and Disease Registry (ATSDR) initiated a medical screening program for the presence of asbestos related disease in the Libby population. The medical screening continued into November of that year and resulted in over 6,000 persons being evaluated. The initial screening initiative resulted in the ATSDR issuing two reports. The first was entitled "Preliminary Findings of Medical Testing of Individuals Potentially Exposed To Asbestoform Minerals Associated with Vermiculite in Libby, Montana: An Interim Report for Community Health Planning" and was provided to the community in February 2001. The second report entitled "Year 2000 Medical Testing of Individuals Potentially Exposed to Asbestoform Minerals Associated with Vermiculite in Libby, Montana: A report to the Community August 23, 2001" included all of the results of the testing activity that took place in 2000. (Exhibit A) In the summer of 2001 a second screening activity took place and an additional 1,150 persons were evaluated for asbestos-related disease.

It became apparent from the results of the screening that the problem of asbestos-related disease was not limited to Vermiculite Mine and Mill workers and their families but was also found in other individuals in the community. The ways by which these other individuals, that were neither workers nor family members, acquired their disease, based on extensive epidemiologic investigation, was thought to be through exposure to asbestos mineral contaminated vermiculite insulation materials, gardening soil and ambient dust.

It is well established by medical science that Asbestos minerals cause three major disease processes. One form is a restrictive airway disease that results from progressive damage to the lung and the tissues that surround it. The damage is that of scarring of the membrane or tissue that surrounds the lung and restricts its' ability to expand. This form of disease results in the individual being unable to take deep breaths and receive enough oxygen to support life. In essence the individual is slow-

ly smothering to death. A second form is the development of lung cancer. It has been estimated that a person exposed to asbestos minerals has a significantly greater risk of developing lung cancer than a person not exposed to asbestos minerals. If the asbestos exposed person also smokes cigarettes their risk of developing lung cancer is increased even more. The third major disease is a rapidly fatal cancer, mesothelioma, which is known to be caused by asbestos. The average time from diagnosis to death in individuals with mesothelioma is less than 1 year. An extensive, epidemiological investigation entitled "Mortality in Libby, Montana, 1979–1998" (Exhibit B) has demonstrated an excess in mortality of Libby residents from lung cancer, mesothelioma and non-malignant respiratory disease.

Asbestos minerals in causing disease do not act immediately. There is a latency period between the time of exposure to the asbestos minerals and the development of disease that is measured in tens of years with the average period being between twenty (20) and thirty (30) years. It is for this reason that a person that develops restrictive airway disease can be exposed to asbestos minerals and remain well for 20–25 years. They will then develop progressive lung disease that kills them slowly over the next 10 or more years. If they develop either lung cancer or mesothelioma after the 20–25 year time period they will usually die more quickly.

The problem of asbestos-related disease in Montana is not limited to Libby. A recent and ongoing survey of mesotheliomas that were either reported to the Montana State Tumor Registry or were found as a result of a search of death certificates of people dying in Montana has disclosed that there is an increased number of deaths from this asbestos specific cancer. These deaths are not limited to Libby and distributed throughout the state of Montana. Most of the deaths from mesothelioma that have been identified so far have occurred in towns where the asbestos mineral contaminated vermiculite ore was shipped and/or milled or along major ore shipping routes. In view of these findings it is important to realize that much of the ore that was mined in Libby was shipped to over 100 destinations outside of the state of Montana where it was milled and/or incorporated into insulating materials for houses and gardening soil.

In summary, asbestos mineral contaminated vermiculite has been unequivocally established as being causative of a progressive fatal lung disease as well as a rapidly fatal cancer, mesothelioma, in exposed individuals. The exposures resulting in the illness and/or death are not limited to mine and mill workers and their families. The problem is not limited to Libby, Montana but is widely disseminated throughout the state of Montana and over 100 sites in the United States.

Year 2000
Medical Testing of Individuals Potentially Exposed To Asbestoform Minerals Associated with Vermiculite in Libby, Montana

A Report to the Community

August 23, 2001

Agency for Toxic Substances and Disease Registry
U.S. Department of Health and Human Services
Atlanta, Georgia 30333

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INTRODUCTION

A community-based medical testing program was developed in response to reports of illness among people exposed to asbestos-contaminated vermiculite in Libby, Montana. This medical testing program, a part of the Libby Community Environmental Health Project, was undertaken by the Agency for Toxic Substances and Disease Registry (ATSDR), an agency of the U.S. Department of Health and Human Services (DHHS), with the cooperation of the DHHS Region VIII Office, the U.S. Environmental Protection Agency (EPA), the Montana Department of Public Health and Human Services, and the Lincoln County Environmental Health Department.

The principal goal of the medical testing program was to identify the asbestos-related health effects of participants exposed to asbestos from the vermiculite mine near Libby, Montana, and to refer these individuals for additional medical evaluation as needed. Other important goals of the program were to:

(a) provide EPA with information needed for identifying and eliminating current and future exposures to asbestos in the community;
(b) identify the types of illnesses experienced by these exposed people in order to better inform local health care providers; and
(c) provide the local health care community with an estimate of the additional resources necessary to attend to health care needs in the Libby area during the next 10 to 20 years.

The program was not designed as an analytic epidemiologic study with comparison groups and random sampling of exposed and comparison groups. Nevertheless, the data collected provide important information about the prevalence and degree of asbestos-related abnormalities among a large number of current and former Libby residents, and about the possible relationships between these abnormalities and a number of exposure pathways reported by community members. The main objectives of the data analysis were to (1) identify and quantify possible asbestos-related health outcomes among participants and (2) examine any association between these outcomes and the participants' exposure histories.

BACKGROUND

Commercial vermiculite from Zonolite Mountain, located approximately 6 miles from the city of Libby, Montana, was mined and milled from 1924 through 1990. This operation included blast and drag-line mining for the ore and on-site dry milling of the raw material until 1974, and periodic wet milling until 1990. The milling process was known to have released significant

quantities of asbestos into the Libby environment. Concentrated ore was then transported to a screening facility at the base of Zonolite Mountain where it was size-sorted and transported to processing facilities in Libby and also nationwide. At the expanding facilities the ore concentrate was expanded or 'exfoliated' by rapid heating. This process was known to further release asbestos fiber embedded in the mineral matrix of the ore. Two expansion facilities operated at different time periods in Libby; these plants heated ore concentrate to expand the vermiculite.

To date, the toxicity of vermiculite is not completely understood. However, it is thought that the toxic effects associated with vermiculite exposure are related to the presence of asbestoform minerals in vermiculite ore that are released during mining and processing operations. Evidence shows that ore taken from the Libby mining operation has been contaminated with asbestoform minerals, primarily including winchite and richterite, but also including tremolite, actinolite, and others (DOI 1928; USGS 2001; Atkinson et al.1982; Lockey 1984). Asbestos minerals fall into two groups or classes—serpentine and amphibole. Serpentine asbestos contains the mineral chrysotile. Regulated minerals in the amphibole class are actinolite, anthophyllite, amosite, crocidolite, and tremolite. For the remainder of this report (unless otherwise specified), the term "asbestos" or "asbestos-related" refers generally to amphibole asbestoform minerals associated with vermiculite mined near Libby, Montana.

Inhalation of asbestos fibers from asbestoform minerals suspended in air can result in a number of adverse health effects including pleural changes, asbestosis, mesothelioma, and lung cancer (Selikoff and Chrug 1965; Albelda et al. 1982; Kilburn et al. 1985; Anderson et al. 1976). The risk of developing any one of these diseases depends upon many factors including the chemistry and shape of the fiber, level of exposure, duration of exposure, the individual's physiological response to fiber exposure, and the cigarette smoking history of the exposed individual. Asbestos exposure may also cause changes in the pleura or lining of the lung and including plaques (circumscribed pleural thickening), diffuse pleural thickening, calcifications, and pleural effusions (accumulations of fluid in pleural space). The presence of pleural abnormalities associated with asbestos exposure found on chest radiographs, has also been associated with an increased risk of mesothelioma and lung cancer and pulmonary function abnormalities. The risk for lung cancer is related to the type of fiber inhaled and cumulative asbestos exposure in a dose-response manner; however, mesothelioma has been seen after exposures to relatively low levels of asbestos for short time periods (Becklake 1976). The prevalence of mesothelioma, a rare cancer of the mesothelial cells of the peritoneum or pleura, is strongly associated with asbestos exposure. In addition, cigarette smoking increases the risk for lung cancer among persons with

asbestos exposure more than the additive risk of either smoking or asbestos exposures alone.

Another health effect related to asbestos exposure is abnormal ventilation which is measured by spirometry or lung function testing. The two types of abnormal ventilation identified by spirometry are called restrictive and obstructive patterns. The obstructive pattern results from decreases in expiratory flow rates and is indicative of asthma, chronic bronchitis, and emphysema. The restrictive pattern results from decreases in pulmonary air volumes associated with parenchymal disease (as in sarcoidosis or pneumoconiosis) or extraparenchymal disease (as with neuromuscular or chest-wall disorders). Patients with asbestos-related pulmonary impairment typically demonstrate restrictive abnormalities on spirometry testing.

Previous studies by the National Institute of Occupational Safety and Health (NIOSH) (Amandus et al. 1987a, 1987b, 1987c) and McGill University (McDonald et al. 1986) found that former workers of the mine in Libby had substantial occupational exposure to asbestos. These studies both documented significantly increased rates of pulmonary abnormalities and disease (asbestosis and lung cancer) among former workers. In addition to former workers at the mine, cases of asbestos-related pulmonary impairment have been reported by area physicians among household contacts of former mine workers. Asbestos-related disease also has reportedly occurred among other residents of the community who had no known direct connection with the mining operation. This is extremely unusual and suggests that asbestos exposure occurred in Libby from alternative or non-occupational exposure pathways. Some potentially important alternative pathways for past asbestos exposure include elevated concentrations of asbestos in ambient air (EPA 1982) and recreational exposures from children playing in piles of vermiculite. Also, current potential pathways of exposure include vermiculite placed in walls and attics as thermal insulation, vermiculite or ore used as road bed material, ore used as ornamental landscaping, and vermiculite or concentrate used as a soil and garden amendment, or aggregate in driveways.

This report outlines the self-reported exposure pathways and health outcomes for 6,149 persons participating in an on-site medical testing program from July through November 2000, in Libby, Montana and Elko, Nevada. The main objectives of the data analysis were to (1) identify and quantify possible asbestos-related health outcomes among participants and (2) examine any association between these outcomes and the participants' exposure histories.

METHODS

Participants

People were eligible for participation in the medical testing program if they were former workers of W.R. Grace/Zonolite Company (WRG), secondary contractors of WRG, household contacts of former WRG workers, or had resided, worked, attended school, or participated in activities in the Libby area for a period of 6 or more months before December 31, 1990. The medical testing program consisted of a standard questionnaire, three-view chest radiographs, and simple spirometry testing. Prior to the start of the medical testing program, there had been national-level press coverage of the vermiculite situation in Libby. Therefore, community awareness was high and residents were motivated to participate. Participants were identified from telephone directories and additionally through paid newspaper, radio, and television advertisements, as well as through word of mouth and medical referrals. A toll-free telephone line was established for interested persons to obtain information about the program and for screening participants to determine eligibility. Telephone screening to determine eligibility began in April 2000, with on-site medical testing conducted from July through November 2000.

After informed consent was obtained, an in-person interview using a computer-assisted questionnaire was administered to obtain health-related information, including demographic characteristics such as age and sex, residential history, occupational history, recreational activities and other potential pathways related to asbestos exposures, cigarette smoking status, medical history, and self-reported symptoms and illnesses. Covariates potentially related to both exposures and outcomes included age, sex, cigarette smoking status, length of residence in the Libby area, concern with neighborhood environment, and self-reported pulmonary disease. Other potential confounders evaluated included reported history of chest injury or chest surgery and body mass index (BMI).

Chest radiographs were offered to participants 18 years of age or older, and included posterior-anterior (P-A), right anterior-oblique, and left anterior-oblique views. For safety purposes, women of childbearing age were informed that they should postpone receiving a chest radiograph if they were pregnant. The procedures used to obtain the chest radiographs complied with guidelines developed by NIOSH. The radiologist on site assessed the consistency and quality of each chest radiograph taken and provided a routine radiologic interpretation, which included recording asbestos-related changes on a summary report form. If findings on a chest radiograph suggested the need for immediate medical attention, the radiologist completed a referral form, and the participant was counseled and directed to an appropriate source of medical care.

In addition to evaluation and interpretation by the on-site radiologist, participants' chest radiographs were evaluated by three certified B-readers, physicians certified by NIOSH as qualified to interpret chest radiographs for environmental dust-related diseases. For analyses conducted for this report, we defined a case as (1) pleural abnormality if pleural abnormalities were identified by at least two of three B-readers using a combination of oblique and P-A views of the chest radiograph, and (2) interstititial abnormality if interstitial abnormalities were identified by at least two of three B-readers using only the P-A view of the chest radiograph. Although the typical radiologic evaluation under the International Labor Office (ILO) classification uses only the P-A view (ILO 1980), the use of both P-A and oblique views increases the ability to detect abnormalities. However, to facilitate comparisons with other studies, pleural abnormalities found only in the P-A views were also noted. Interstitial disease, in comparison to pleural disease, is best detected using the P-A view. Consequently, only the P-A view was used to report interstitial disease.

In addition to outcomes based on chest radiographs, other outcomes were considered for analysis including self-reported health conditions associated with asbestos, malignant outcomes associated with asbestos exposure (such as lung cancer and mesothelioma), and restrictive abnormalities based on pulmonary function tests. Pulmonary function testing or spirometry testing was offered to all participants. These tests followed the American Thoracic Society's guidelines and were performed by a qualified technician and interpreted by an on-site pulmonologist. The spirometric tests recorded (1) the forced expiratory volume in 1 second (FEV1); (2) the volume that can be expired, regardless of time, after a maximal inhalation, typically called the forced vital capacity (FVC); and (3) their calculated ratio (FEV1/FVC). Height and weight were measured for comparison with normative population data on the basis of the participant's age, height, and sex. Moderate-to-severe restrictive changes were defined as FVC measurements that were less than 70% of predicted value.

Exposure Characterization

To describe potential pathways of exposure to asbestos or vermiculite, participants were asked about work histories including having worked for WRG or as a contractor for WRG, having been exposed to dust at non-WRG jobs, having mixed, cut, or sprayed asbestos, or having had other occupational exposure to asbestos. Other questions sought information on household contact with WRG workers, having asbestos products in the home, use of vermiculite in gardening or insulation, and exposures through recreational activities such as playing in vermiculite piles and

playing on the ballfield near the expansion plant or playing along Rainey Creek Road. Participants were also asked if they had 'popped' vermiculite at home or if they had any other contact with vermiculite.

RESULTS

Description of the Participants

A total of 6,149 current and former residents of Libby and the surrounding area participated. This represents a substantial proportion (60.5%) of the 10,161 persons in the Libby division of Lincoln County (U.S. Bureau of the Census 2000). Among those who participated, approximately 70% currently resided in the Libby, Troy or Eureka area; 84% stated they lived in Montana. A breakdown of the total population by sex and age group is displayed in Table 1.

Table 1. Medical Testing Participants by Sex and Age Group

Sex	Age Group	Number	%
All	0-17	559	9.1
	18-44	2052	33.4
	45-64	2531	41.2
	65 or older	1007	16.4
Male	0-17	273	4.4
	18-44	972	15.8
	45-64	1263	20.5
	65 or older	499	8.1
	All Ages	3007	48.9
Female	0-17	286	4.7
	18-44	1080	17.6
	45-64	1268	20.6
	65 or older	508	8.3
	All Ages	3142	51.1

The participants were almost evenly divided by sex, 49% male and 51% female, with a similar sex distribution in each age group. The majority of participants were age 18-65 years old (75%), and 44% were in the 45-64 age group.

A breakdown of the population by sex and other key factors or covariates is presented in Table 2. Fifty-four percent (54%) of males and 45% of females were former or current cigarette smokers. Females were slightly more likely to be current smokers (21% vs. 18%). Approximately

one-half of the participants had never smoked. Of that one-half, 85% were 18 years old or older.

Males and females had similar distributions for years of residence in the Libby area. Roughly 74% of participants lived in the Libby area for 15 years or more. Of the 1,598 participants who lived in the Libby area for less than 15 years, 377 (24%) were 17 years old or younger.

Many of the participants were overweight. A BMI of 25 to 29.9 is considered overweight and a BMI of 30 or above is considered obese; 67% of participants had a body mass index 25 or higher. Males were more likely than females to have a BMI of more than 25 (72% vs. 62%), but females were slightly more likely to be obese (33% vs. 31%).

Table 2. Key risk factors by sex

Variable	Level	Male	Female
Smoking History	Never	1391 (46.3%)	1732 (55.1%)
	Ex-Smoker	1064 (35.4%)	749 (23.9%)
	Current	551 (18.3%)	660 (21.0%)
Years Lived in Libby	0-14	787 (26.3%)	811 (25.9%)
	15-22	701 (23.4%)	822 (26.3%)
	23-34	740 (24.7%)	761 (24.3%)
	34+	763 (25.5%)	738 (23.6%)
Body Mass Index	0-18	82 (2.8%)	125 (4.0%)
	19-24	742 (24.9%)	1066 (34.3%)
	25-29	1227 (41.2%)	888 (28.6%)
	30+	929 (31.2%)	1028 (33.1%)

Of the 6,149 participants, 5,590 (90.9%) were 18 years old and older, and therefore were eligible for and received chest radiographs. Of those who had chest radiographs, 37% were 18-44 years old, 45% were 45-64 years old, and 18% were 65 years old or older.

Exposure Characterization

The 18 exposure pathways that were used in the analyses are listed in Table 3. These include a number of occupational, recreational, household and other potential exposures reported by the participants. Using these pathways, an exposure profile was created for each participant for the different analyses. For some analyses, exposure variables were grouped according to broad classifications such as occupational, recreational, household, or miscellaneous exposure. The multivariate analyses focused on individual exposures controlling for all other exposures.

Participants may have had one, several, or none of these exposures

Table 3. Exposure Variables Used in the Analysis

Exposure Pathway	Abbreviation for Graphs
Ever work for WR Grace/Zonolite	Workwr
Secondary contractor work	Work2nd
Dust exposure at non WR Grace jobs	Workdust
Vermiculite exposure at non WR Grace jobs	Workvgrm
Worked in job mixing, cutting or spraying asbestos	Workoth10
Worked at any job exposed to asbestos	Workoth12
Asbestos exposure in the military	Milexp
Lived with WR Grace/Zonolite workers	HHWR
Vermiculite insulation in Lincoln County homes	Vermins
Asbestos products in Lincoln County homes	Asb
Used Vermiculite for gardening	Vermgard
Used Vermiculite around the home	Vermuse
Handled Vermiculite insulation	Vermhand
Recreational activities along Rainey Creek	Recre
Played at ballfield near expansion plant	Playball
Played in Vermiculite piles	Vermplay
Popped Vermiculite	Vermpop
Other contact with Vermiculite	Vermcont

Figures 1-3 compare the proportion of male and female participants reporting various exposure pathways.

Figure 1 shows that males were much more likely than females to have reported occupational exposures. Among those who reported having worked at WRG, 303 (92%) were male and 25 (8%) were female. Overall, 10% of males reported having worked at WRG and 12% reported having worked there as a secondary contractor. Twenty-four percent (24%) of males reported vermiculite exposure at non-WRG jobs. Two percent (2%) of respondents reported mixing, cutting, or spraying asbestos at non-WRG jobs, and 12% reported being exposed to asbestos at non-WRG jobs. Of those who reported having worked at WRG, 57% were 45-65 years old, 27% were 65 years old and older, and 16% were 18-45 years old.

Figures 2 and 3 illustrate that males were more likely than females to have been exposed to asbestos or vermiculite during non-occupational activities, though the differences were less pronounced compared to occupational exposures. The only notable exception was that females were more likely than males to have been a household contact of a WRG worker (60% vs. 40%).

Figure 1: Occupational Exposure to Asbestos or Vermiculite

Proportions by Male and Female

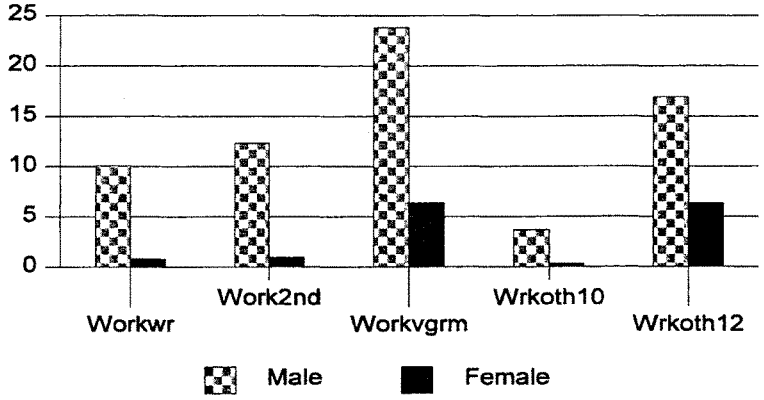


Figure 2: Recrecreational Exposure to Asbestos or Vermiculite

Proportions by Male and Female

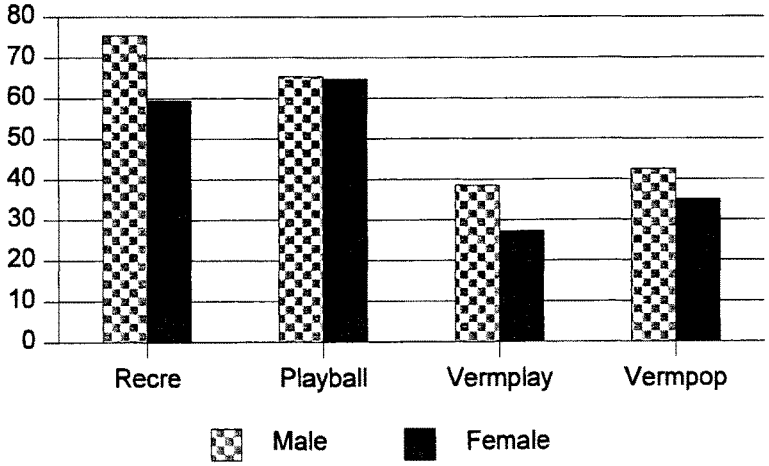
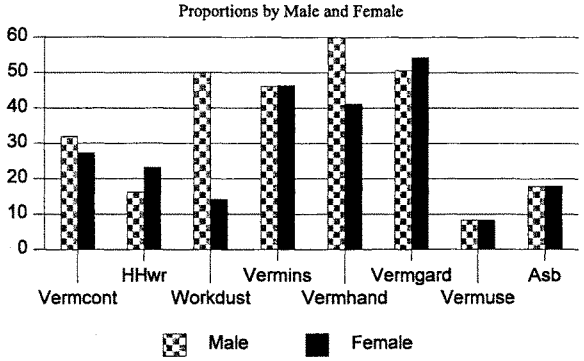


Figure 3: Other Exposure to Asbestos or Vermiculite



Of the various exposure pathways, the most common was recreational activities along Rainey Creek Road (4115 [67%] reporting 'yes') and the least common was working with asbestos in a non-WRG job (2%). Playing in the ballfields near the expansion plant was reported by 3991 participants (65%) and 2001 participants(33%) reported playing in vermiculite piles.

Chest Radiograph Abnormalities - Crude Analysis

The tables in this section report crude, or unadjusted, prevalence rates of abnormalities for the exposure categories and other risk factors. The prevalence rates are simply the number of abnormalities occurring in people in each exposure category. These crude proportions or prevalence rates do not take into account other important risk factors and are intended to be used for descriptive purposes. Because the prevalence of these abnormalities increases with age and may differ by other risk factors such as sex or BMI, adjustments for these variables were made in subsequent analyses presented later in this report.

Table 4 summarizes the number and proportion of the 5,590 participants that had chest radiographs and were identified by at least two B-readers as having a possible asbestos-related interstitial or pleural abnormality. Results are presented by exposure pathway and radiographic view.

Table 4. Number and Percent of Pleural and Interstitial Abnormalities by View and Exposure Variable

Exposure Pathway	Pleural All Views	Pleural P-A View	Pleural Obl View	Interstitial P-AView
All (n=5,590)	994 (17.8)	780 (14.0)	657 (11.8)	49 (0.9)
Ever work for WRG/Zonolite	159 (48.5)	137 (41.8)	119 (36.3)	14 (4.3)
Secondary contractor work	147 (36.8)	109 (27.3)	92 (23.1)	8 (2.0)
Dust exposure at non WRG jobs	436 (22.4)	327 (16.8)	298 (15.3)	20 (1.0)
Vermiculite exposure at non WRG jobs	215 (23.6)	166 (18.2)	135 (14.8)	8 (0.9)
Non WRG job working w/ asbestos	38 (31.4)	31 (25.6)	22 (18.2)	2 (1.7)
Worked at any job exposed to asbestos	173 (24.7)	133 (19.0)	113 (16.1)	6 (0.9)
Asbestos exposure in the military	63 (41.5)	52 (34.2)	40 (26.3)	1 (0.7)
Lived with WRG workers	303 (25.5)	255 (21.4)	207 (17.4)	16 (1.3)
Vermiculite insulation in homes	509 (21.2)	409 (17.1)	332 (13.8)	26 (1.1)
Asbestos products in homes	186 (20.1)	136 (14.7)	121 (13.1)	8 (0.9)
Used vermiculite for gardening	602 (20.3)	472 (16.0)	396 (13.4)	27 (0.9)
Used vermiculite around the home	92 (19.8)	75 (16.1)	65 (14.0)	0 (0.0)
Handled vermiculite insulation				
Sometimes	481 (20.9)	383 (16.7)	328 (14.3)	22 (1.0)
Frequently	165 (26.6)	133 (21.5)	105 (16.9)	9 (1.5)
Recreational activities along Rainey Creek				
Sometimes	455 (17.4)	347 (13.3)	317 (12.1)	18 (0.7)
Frequently	265 (21.7)	211 (17.3)	174 (14.2)	15 (1.2)
Played at ballfield near expansion plant				
Sometimes	248 (14.8)	184 (11.0)	172 (10.3)	8 (0.5)
Frequently	364 (18.8)	294 (15.2)	239 (12.3)	16 (0.8)
Played in Vermiculite piles				
Sometimes	213 (18.7)	165 (14.5)	146 (12.8)	8 (0.7)
Frequently	195 (26.0)	165 (22.0)	133 (17.7)	5 (0.7)
Popped Vermiculite				
Sometimes	392 (21.7)	317 (17.5)	268 (14.8)	12 (0.7)
Frequently	119 (25.4)	99 (21.2)	84 (18.0)	9 (1.9)
Other contact with Vermiculite				
Sometimes	279 (19.4)	215 (15.0)	195 (13.6)	11 (0.8)
Frequently	59 (24.8)	56 (23.5)	35 (14.7)	5 (2.1)

This table shows that using all views is more sensitive than either the P-A or oblique view alone for detecting pleural abnormalities. It also shows that the prevalence of pleural findings was considerably greater than for interstitial findings; 994 (18%) participants (18 years old and older) had a pleural abnormality (all views) compared to only 1% who had an interstitial abnormality. The table also shows the crude proportions of abnormalities for the various exposure pathways. These prevalence rates do not account for the possible influence of confounding variables or multiple exposures, and so cannot be used to establish a causal relationship. Nevertheless, they can be useful for identifying potentially important risk factors and to guide further environmental investigations. The exposure pathway with the highest unadjusted rate for pleural abnormalities was former WRG workers, with 159 (48%) having pleural abnormalities.

Crude odds ratios for pleural abnormalities (all views) and exposure pathways are displayed in Table 5. The odds ratio is the risk of finding a pleural abnormality for participants with a given exposure compared to those without the exposure. For example, an odds ratio of two would mean that the odds of observing an abnormality for a participant with an exposure is two times as great as that of a participant without the exposure. As in the previous table, these odds ratios do not account for confounding variables or the possibility that participants may have had multiple exposures. Such factors are accounted for in the multivariate analysis to follow.

Table 5. Crude Odds Ratios for Pleural Findings by Exposure Variable

Exposure Pathway	OR (95% CI)
Ever work for WR Grace/Zonolite	5.0 (4.0-6.3)
Secondary contractor work	3.0 (2.4-3.7)
Dust exposure at non WR Grace jobs	1.6 (1.4-1.8)
Vermiculite exposure at non WR Grace jobs	1.6 (1.3-1.8)
Worked in job mixing, cutting or spraying asbestos	2.2 (1.5-3.2)
Worked at any job exposed to asbestos	1.6 (1.3-2.0)
Asbestos exposure in the military	1.4 (1.0-1.9)
Lived with WR Grace/Zonolite workers	1.8 (1.6-2.1)
Vermiculite insulation in Lincoln County homes	1.5 (1.3-1.7)
Asbestos products in Lincoln County homes	1.2 (1.0-1.4)
Used Vermiculite for gardening	1.4 (1.3-1.7)
Used Vermiculite around the home	1.2 (0.9-1.5)
Handled Vermiculite insulation	
Sometimes	1.8 (1.5-2.1)
Frequently	2.4 (2.0-3.0)

Recreational activities along Rainey Creek	1.1 (0.9-1.3)
Frequently	1.5 (1.2-1.8)
Played at ballfield near expansion plant	
Sometimes	0.7 (0.6-0.9)
Frequently	1.0 (0.8-1.1)
Played in Vermiculite piles	
Sometimes	1.2 (1.0-1.4)
Frequently	1.8 (1.5-2.2)
Popped Vermiculite	
Sometimes	1.6 (1.4-1.9)
Frequently	2.0 (1.6-2.5)
Other contact with Vermiculite	
Sometimes	1.2 (1.0-1.4)
Frequently	1.6 (1.2-2.2)

*Exposure pathway of interest compared with those without that specific exposure. Participants may have had multiple pathways of exposure.

Crude proportions and odds ratios for pleural abnormalities (all views) for other important risk factors are displayed in Tables 6-11. Table 6 shows proportions and odds ratios for pleural abnormalities by sex. Males had a significantly higher rate of abnormalities (27%) in comparison to female participants (9%). Males were more likely to report occupational exposures and were more likely to report frequent recreational activities that involved vermiculite exposure

Table 6. Crude Rates and Odds Ratios by Sex

		Pleural Findings - All Views				
Sex	n	Normal	Abnormal	% Abnormal	Odds Ratio	95% CI
Female	2856	2602	254	8.9	1.0	0
Male	2734	1994	740	27.1	3.8	3.3 - 4.4

Table 7 shows proportions and odds ratios for pleural abnormalities by age. The odds of observing pleural abnormalities increases with age, which is related to latency and length of exposure. Rates increase from 5% in young adults 18-44 years old, to 20% for participants age 44-65 years old, to 38% for participants age 65 years old and older.

Table 7. Crude Proportions and Odds Ratios by Age

		Pleural Findings - All Views				
Agegrp	n	Normal	Abnormal	% Abnormal	Odds Ratio	95% CI
18-44 Years	2052	1949	103	5.0	1.0	0
45-64 Years	2531	2021	510	20.2	4.8	3.8 - 6.0
65+ Years	1007	626	381	37.8	11.5	9.1 - 14.6

Table 8 shows pleural findings for those participants 18-35 years old. The Libby community expressed particular interest in an assessment of health risks for the younger participants, so additional analyses were conducted on this age group.

Table 8. Pleural Findings Among Participants 18-35 years old

		Pleural Findings - All Views		
Sex	n	Normal	Abnormal	% Abnormal
All	897	881	16	1.8
Male	418	403	15	3.6
Female	479	478	1	0.2

Of the 897 participants 18 to 35 years old, 16 were observed to have a pleural abnormality. Of these 16 participants, one was age 20, four were 25-29 years old, and the remaining 11 were 30-35 years old. The abnormality rates were 0.3% for participants 18-24 years old, 0.9% for participants 18-29 years old, and 1.8% for participants 18-35 years old. A further analysis of the 16 participants with pleural abnormalities showed that they were more likely to be male, to be overweight (to be in the highest quartile for BMI), and to have reported frequent recreational activity such as playing in the vermiculite piles or "popping" vermiculite. Multivariate analysis of participants 18-35 years old identified popping vermiculite, being male, and having a high BMI to be statistically associated with finding a pleural abnormality.

Table 9 shows crude proportions and odds ratios for pleural abnormalities (all views) by cigarette smoking history. Current and former smokers were more likely to have findings of pleural abnormalities than those who never smoked. Since other studies have not found smoking to be specifically associated with pleural disease, this finding may be related to an association between cigarette smoking and exposure risk factors such as occupational exposure to asbestos.

Table 9. Crude Rates and Odds Ratios by Cigarette smoking History

		Pleural Findings - All Views				
Smoke	n	Normal	Abnormal	% Abnormal	Odds Ratio	95% CI
Never	2644	2328	316	12.0	1.0	0
Ex-Smoker	1784	1281	503	28.2	2.9	2.5 - 3.4
Current	1160	986	174	15.0	1.3	1.1 - 1.6

Table 10 shows proportions and odds ratios for pleural abnormalities by body mass index. Those with a high body mass index were more likely to have a finding of pleural abnormalities. The risk for pleural abnormalities increases with increasing quartiles of BMI.

Table 10. Crude Rates and Odds Ratios by Body Mass Index

		Pleural Findings - All Views				
BMI	n	Normal	Abnormal	% Abnormal	Odds Ratio	95% CI
1st Quartile	1170	1069	101	8.6	1.0	0
2nd Quartile	1252	1073	179	14.3	1.8	1.4 - 2.3
3rd Quartile	1485	1203	282	19.0	2.5	2.0 - 3.2
4th Quartile	1627	1208	419	25.8	3.7	2.9 - 4.6

Table 11 shows crude proportions and odds ratios for pleural abnormalities by length of residency in the Libby area. Those who lived in the Libby area for 35 years or longer were more likely to have pleural abnormalities than those who did not (33% vs. 12%).

Table 11. Crude Rates and Odds Ratios by Length of Residency

		Pleural Findings - All Views				
ResDur	n	Normal	Abnormal	% Abnormal	Odds Ratio	95% CI
0-14 Years	1221	1080	141	11.6	1.0	0
15-22 Years	1342	1209	133	9.9	0.8	0.7 - 1.1
23-34 Years	1501	1277	224	14.9	1.3	1.1 - 1.7
35+ Years	1501	1008	493	32.8	3.8	3.1 - 4.6

Multivariate Analysis - Adjusted Rates

The crude and univariate analyses considered thus far do not account for the possibility that individual associations can become weaker or stronger in the presence of other variables (known as interaction), nor do they account for the possibility that factors may confound each other. The multivariate analysis overcomes these limitations and is a useful tool for assessing the effect of several factors acting together and their association with an outcome.

Multivariate logistic regression was used to assess the association between pleural abnormalities and 18 exposure pathways, while adjusting for age, sex, BMI, cigarette smoking status, years lived in the Libby area, neighborhood environmental concern level, and pulmonary disease or pulmonary surgery or injury. The final model is displayed in Table 12.

Table 12. Results of Multivariate Logistic Regression Analysis

Variable	Level	Beta	P-Value	Odds Ratio
Intercept		-12.14	<0.01	
Workwr	Yes	2.05	<0.01	
Work2nd	Yes	0.32	0.02	1.38 (1.04-1.83)
HHWR	Yes	1.20	<0.01	
Vermpop	Sometimes	0.30	<0.01	1.35 (1.10-1.65)
	Frequently	0.26	0.14	1.29 (0.92-1.81)
Playball	Sometimes	-0.09	0.47	0.92 (0.73-1.16)
	Frequently	0.21	0.09	1.23 (0.97-1.56)
Vermplay	Sometimes	0.50	<0.01	1.65 (1.29-2.11)
	Frequently	0.57	<0.01	1.76 (1.31-2.36)
Subsex	Male	1.60	<0.01	
Resdur	15-22 Years	0.12	0.47	1.12 (0.82-1.55)
	23-34 Years	0.21	0.16	1.23 (0.92-1.64)
	35+ Years	0.72	<0.01	2.05 (1.56-2.69)
Age		0.43	<0.01	
BMI	2nd Quartile	0.32	0.06	1.37 (0.99-1.90)
	3rd Quartile	0.44	0.01	1.55 (1.13-2.12)
	4th Quartile	1.17	<0.01	3.21 (2.37-4.36)
Smoke	Ex-Smoker	0.35	<0.01	1.42 (1.16-1.74)
	Current	0.35	0.01	1.42 (1.10-1.85)
Age*Workwr	Yes	-0.02	0.04	
HHWR*Subsex	Yes*Male	-0.63	<0.01	
Age*ln(Age)		-0.07	0.01	

Final Model Fit: Hosmer-Lemeshow Goodness-of-Fit Test, Chi-Square = 4.33, DF = 8, Pr > Chi-Square = 0.83

The regression model can be used to make comparisons between various groups and to assess the relative importance of various exposure pathways and covariates in predicting pleural abnormalities.

The model shows that the following factors are associated with pleural abnormalities: having been a WRG worker or a secondary contractor at WRG; having been a household contact of a WRG worker; having frequently popped vermiculite, played in vermiculite piles or played at the

ballfields near the expansion plants; being male; being older; having lived in the Libby area for a longer period of time; having smoked cigarettes; and having a high BMI.

The model also shows that several of the variables interact with each other. For example, the odds of having a pleural abnormality among former WRG workers differs with age. As age increases, the odds of having a pleural abnormality increases, but not as quickly for former WRG workers as for non-WRG workers. The model also shows that odds of having a pleural abnormality among household contacts of former WRG workers is higher for females than for males.

The risk factors that produced the largest increase in the odds of finding pleural abnormalities were being a former WRG worker, being male, and being a female household contact of a former WRG worker. The model shows that the estimated odds of finding a pleural abnormality is 7.7 times greater for a former WRG worker when compared to a non-WRG worker of the same age, adjusting for all of the other variables in the model (i.e., assuming that the participants being compared are alike with respect to age, sex, BMI, residential history, cigarette smoking status, and other risk factors considered in the model). The model also shows that the estimated odds of finding a pleural abnormality is 4.97 times greater for males than for females after adjusting for other variables in the model. The estimated odds of finding a pleural abnormality is 3.3 times greater for females who were household contacts of former WRG workers when compared to females who were not. The corresponding increased odds for males is 2.7. The model also shows that as age increases the odds of finding a pleural abnormality increase, though the relationship is non-linear. For example, the estimated odds of finding a pleural abnormality for a 30 year old is 3.65 times greater than for a 20 year old. However, the odds reduce to 2.08 when comparing a 60 year old to a 50 year old. Among the non-occupational or household contact exposure pathways, playing in the vermiculite piles frequently was most associated with an increased odds of finding pleural abnormalities. Those who played in the piles frequently had an estimated odds of pleural abnormalities 1.76 times greater than those who never played in the piles. The model predicts that those participants with multiple exposures have increased risk of abnormal pleural findings than those with only a subset of the exposures. The majority of these participants reported multiple, rather than single exposure pathways.

The distribution of exposure pathways is displayed in Table 13. Only 2.6% of participants had no apparent exposure. Forty percent (40%) of the participants reported six or more exposure pathways.

Table 13. Distribution of Multiple Exposure Pathways for All Participants

Number of Pathways	Frequency	Percent	Percent With At Least This Number of Pathways
0	159	2.6	-
1	412	6.7	97.4
2	703	11.4	90.7
3	797	13.0	79.3
4	801	13.0	66.3
5	817	13.3	53.3
6	709	11.5	40.0
7	644	10.5	28.5
8	488	7.9	18.0
9	280	4.6	10.1
10	179	2.9	5.5
11	104	1.7	2.6
12	38	0.6	0.9
13	14	0.2	0.3
14	3	0.1	0.1
15	0	0.0	0.0
16	1	0.0	0.0

The prevalence rates for pleural and interstitial abnormalities among participants with multiple exposures compared wih those with no apparent exposures is displayed in Table 14.

Table 14. Dose Relationship - Background Rate

		Pleural Findings - All Views		Interstitial Findings- PA View	
Exposure Classification	n	Normal	Abnormal	Normal	Abnormal
No Apparent Exposure	122	116 (95%)	6 (5%)	121 (99%)	1 (1%)
1-3 Exposure Pathways	1569	1394 (89%)	175 (11%)	1559 (99%)	10 (1%)
4-5 Exposure Pathways	1488	1262 (85%)	226 (15%)	1471 (99%)	17 (1%)
6+ Exposure Pathways	2411	1824 (76%)	587 (24%)	2390 (99%)	21 (1%)

This table shows that 24% of persons reporting six or more exposure pathways (43% of participants with chest radiographs) had pleural abnormalities compared to only 5% in the no apparent exposure group. Of the interstitial findings in these groups, 1% occurred in the all exposure pathway groupings.

Pulmonary Function Testing

Pulmonary function testing identified 2.2% of men and 1.6% of women 18 years old and older with moderate-to-severe restriction in breathing capacity. Table 14 summarizes restrictive abnormalities identified in the pulmonary function tests by exposure pathway for those 18 years old and older. This does not include participants who had significant obstructive lung changes for whom restrictive changes could not be evaluated. Participants who reported they were former workers at WRG had the highest percentage of restrictive abnormalities of all exposure pathways. As with the interstitial changes seen on the chest radiographs, the number of participants with moderate-to-severe restrictive function was much lower than the number of participants with pleural abnormalities. There were no moderate-to-severe restrictive changes seen in participants less than 18 years old.

A multivariate logistic regression model showed that the following factors were associated with moderate-to-severe restrictive abnormalities: being a former WRG worker or having worked with vermiculite at a non-WRG job, having had chest surgery, being older, having a high BMI, and being a past or current smoker.

The risk factor that produced the largest increase in the odds of having a restrictive abnormality was being a current smoker. The estimated odds of a restrictive abnormality was 3.15 (1.4-7.0) times greater for a current smoker than that of a participant who never smoked. The estimated odds ratios for the other factors in the model were 3.0 (1.6-5.8) for those who reported having had chest surgery, 2.8 (1.2-6.7) for those in the highest BMI quartile, 2.4 (1.2-4.8) for former WRG workers, and 2.0 (1.1-3.6) for non-WRG workers exposed to vermiculite.

The model also shows that as age increases the odds of finding a restrictive abnormality increase. A 10-year increase in age results in an estimated increase of 10.8 for the odds of restrictive abnormality.

Participant-Reported Symptoms and Illnesses

Table 15 shows background rates of self-reported symptoms and illnesses. The most commonly reported illness was chest illness (28.1%). The most commonly reported symptom was shortness of breath (35.6%).

Table 15. Restrictive Abnormalities in Pulmonary Function, by Exposure Group

	Moderate-to-Severe Restrictive Abnormalities (less than 70% of predicted values)		
Exposure Pathway	Normal	Abnormal	% Abnormal
Ever work for WRG/Zonolite	214	13	5.7
Secondary contractor work	259	6	2.3
Dust exposure at non WRG jobs	1325	28	2.1
Vermiculite exposure at non WRG jobs	592	20	3.3
Non WRG job working w/ asbestos	81	1	1.2
Worked at any job exposed to asbestos	486	7	1.4
Asbestos exposure in the military	95	1	1.0
Lived with WRG/Zonolite workers	796	24	2.9
Vermiculite insulation in homes	1639	39	2.3
Asbestos products in homes	611	19	3.0
Used Vermiculite for gardening	2045	48	2.3
Used Vermiculite around the home	324	4	1.2
Handled Vermiculite insulation			
Sometimes	1584	32	2.0
Frequently	413	11	2.6
Recreational activities along Rainey Creek			
Sometimes	1842	36	1.9
Frequently	841	16	1.9
Played at ballfield near expansion plant			
Sometimes	1196	24	2.0
Frequently	1409	14	1.0
Played in Vermiculite piles			
Sometimes	828	9	1.1
Frequently	520	10	1.9
Popped Vermiculite			
Sometimes	1282	22	1.7
Frequently	320	7	2.1
Other contact with Vermiculite			
Sometimes	995	16	1.6
Frequently	150	6	3.9

Table 16. Background Self-Reported Symptoms and Illnesses

	Number	%
Ever Had Tuberculosis (6142)	58	0.94
Ever Hospitalized for Pneum/Plrsy (6138)	885	14.42
Congestive Heart Failure (6136)	336	5.48
Other Chest Illnesses (6148)	1733	28.19
Chest Injury Such as Broken Rib (6141)	1030	16.77
Ever Had Chest Surgery (6148)	359	5.84
Lung Disease or Condition (6148)	780	12.69
Arthritis, Scleroderma, Lupus (5560)	413	7.43
Ever had Cancer (6138)	522	8.50
Cough Phlegm in Past 2 Years (5598)	1183	21.13
Hoarse or Difficulty Swallowing (6148)	1261	20.51
Chest Pains Related to Breathing (6135)	1103	17.98
Lost More Than 15lbs in Last 6 Months (6143)	327	5.32
Ever Coughed Bloody Phlegm (6137)	979	15.95
Cough on Most Days (6143)	1423	23.16
Shortness of Breath (6136)	2187	35.6

DISCUSSION

The principal results of this report are based on findings by two out of three B-readers using three views of chest radiographs for pleural abnormalities and the P-A view for interstitial abnormalities. Eighteen percent (18%) of the participants radiographed had pleural abnormalities which were reported by at least two out of three certified B-readers for P-A and oblique views combined. Interstitial abnormalities were seen in almost 1% of the participants. Although the ILO standard for screening for pleural abnormalities is based upon the P-A view, our analyses using the combination of P-A view and oblique views increased the sensitivity of this test. Pleural abnormalities identified by combined views (17.8%) was higher than those identified by P-A view alone (14%) and the oblique view alone (12%).

Substantially greater numbers of individuals were identified as having radiographic abnormalities if we consider those participants with potential asbestos-related findings reported by at least one of the radiologists (one screening radiologist and two B-readers). By using this definition, 30% of participants had a pleural abnormality (versus 18% with two B-readers) and 7% had an interstitial abnormality (versus 1% with two B-readers). This information is important because these individuals were informed that they should have their finding reviewed by their private physician. Additional research is ongoing to determine what percentage of these individuals may actually have asbestos-related radiographic abnormalities.

Pleural abnormalities

Pleural abnormalities varied by age, sex, and BMI. Age is an important variable since it is related to both latency and length of exposure. Pleural abnormalities ranged from 5% in those 18 to 44 years old to almost 40% in those 65 years old and older. The youngest participant with an abnormality was 20 years old, and was the only person with an abnormality younger than 25 years old. Only five people below the age of 30 were identified with pleural abnormalities. The extremely low prevalence rate (0.3%) for pleural abnormalities among this youngest age group confirmed our initial decision to limit chest radiographs to those 18 years of age and older. Because of duration and latency considerations for these outcomes, we would not expect to see abnormalities in younger people.

Crude odds ratios of pleural abnormalities were almost four times higher among men than women. Men were more likely to be exposed to vermiculite through occupational or recreational contact. Not surprisingly, women were more likely than men to be exposed to vermiculite through household contact or gardening. In addition, prevalence of pleural abnormalities increased with increasing length of residence in the Libby area with an almost four-fold increased risk of pleural abnormalities among those with 35 or more years of residence when compared with residents of 14 years or less. Residents who lived in the area a long time had more opportunities for exposures unique to the Libby area. Additionally, they were more apt to be older than those who lived in the area for a short time.

In previous studies, smoking tobacco products has not been identified as a key pathological factor in the development of pleural abnormalities. However, in assessing pulmonary related changes, it is useful to control for this behavior in order be able to determine that pulmonary changes found associated with an environmental exposure could not be attributed to cigarette smoking.

BMI was also associated with pleural plaques in these analyses. While there is no known biological or pathological relationship between body mass and the development of pleural abnormalities, a heavier body mass index can make it more difficult to distinguish between pleural abnormalities and sub pleural or extrapleural fat (Sargent et al. 1984; Proto 1992). BMI has not typically been considered in other epidemiologic studies of asbestos-related radiographic abnormalities. We feel that consideration of the effects of BMI in our current analyses should improve our ability to understand causal associations and accurately estimate risks. Therefore, BMI, along with age, cigarette smoking status, and sex, was included in multivariate models assessing relationships between exposures to asbestos contaminated vermiculite and pleural abnormalities.

Those who had worked for WRG had crude prevalence rates of 48% and were five times more likely to have pleural abnormalities than non-WRG workers. Family contacts of WRG workers were twice as likely to have pleural abnormalities as those who did not have this exposure. The crude odds ratios for all exposure categories, except playing ball near the expansion plant and using vermiculite around the home, showed a statistically significant elevation.

In the multivariate model used for this analysis, the factors most strongly related to having pleural abnormalities were being a former WRG worker, being a household contact of a WRG worker, and being male. Former WRG workers had almost eight times the risk of pleural abnormalities when compared with non-WRG workers. The risk of pleural abnormalities among household contacts of WRG workers varied by sex. Women household WRG contacts compared with WRG non-contacts were at a greater risk of pleural abnormalities than male contacts vs. non-contacts. This may be due to gender differences in responsibilities for laundry and cleaning. These activities may lead to greater exposure to "take-home" dust. Additionally, women workers, who traditionally are found in more administrative or office occupations within industries, may have been exposed to less vermiculite on the job site than male workers and thus brought less vermiculite home. Men had almost five times the risk of pleural abnormalities when compared with women. Other pathways of exposure associated with pleural abnormalities included playing in vermiculite piles and popping vermiculite.

Those who answered 'yes' to six or more exposure pathways had a prevalence rate of 24% for pleural abnormalities compared with 5% for those who had no apparent exposures. No directly comparable Montana or U.S. population studies are available to estimate the rate of pleural abnormalities among those in Libby with no work-related exposures. Studies of differing groups

within the United States believed to have no substantive work-related asbestos exposures have found the prevalence of pleural abnormalities ranging from 0.2% among blue-collar workers in North Carolina (Castellan 1985), to 0.9% among loggers in Washington and Oregon (Stilbolt 1991), to 1.8% among New Jersey residents (Anderson 1979), and 2.3% among patients at Veterans Administration hospitals in New Jersey (Miller JA 1996). The closest category to a 'non-exposed' group for these analyses was the category of 'no apparent exposure' which has a prevalence rate of 5% for pleural abnormalities. Although this is greater than those of control groups or the general population found in other studies, this category may have included exposures to vermiculite which we did not consider.

Interstitial abnormalities and restrictive changes in lung function

The proportion of interstitial abnormalities and moderate-to-severe restrictive changes on participants' spirometry tests is much smaller than pleural abnormalities. This finding is consistent with clinical reports by physicians in the Libby area that patients frequently present with pleural abnormalities. Interstitial abnormalities are well correlated with asbestos exposures among occupational cohorts typically exposed to chrysotile asbestos, and appear to be associated with the latency, intensity, and duration of the exposure. Aside from former vermiculite workers, the extent of asbestos exposures associated with the non-occupational exposure pathways in Libby is presently unknown. Smaller findings of interstitial abnormalities in this population, compared to pleural abnormalities, may be due to less intense or prolonged exposures, shorter latency periods, and/or differences in the toxicologic properties of the asbestoform fibers found in the vermiculite.

The strongest risk factors for restrictive changes in participants' spirometry testing for adults 18 years old and older was current cigarette smoking, being a former WRG worker, having had chest surgery, and being in the highest BMI quartile and age. Unfortunately, restrictive changes in lung function could not be evaluated in those participants who also had obstructive changes. No restrictive changes, as defined for these analyses, were seen in participants less than 18 years old. However, latency and duration are important factors in the development of these changes and not enough time or duration of exposure may have occurred for changes to have become evident in younger people.

Symptoms and illnesses

Perhaps not unexpectedly, the most commonly reported health problem was chest illness and the most commonly reported symptom was shortness of breath. These results are difficult to interpret because there are not comparison rates for these outcomes and self-reported illnesses and symptoms are subject to recall bias.

Members of the community had requested that ATSDR report the findings for self-reported "arthritis, lupus (SLE), or scleroderma." Seven percent of the participants reported these conditions. The interview question did not distinguish between arthritis resulting from physical degeneration of joints (osteoarthritis), arthritis resulting from an autoimmune pathology (such as rheumatoid arthritis), or other forms of arthritis. Thus, all respondents cannot be assumed to be suffering from an autoimmune pathology. Asbestosis has been associated with immunologic changes (hypergammaglobulinemia, anti-nuclear antibodies, and rheumatoid factor) (Mulherin 1993) and persons with asbestosis may be predisposed to the development of SLE, given the immunological changes seen in asbestosis. However, at the present time, there is only limited information about the association between auto-immune diseases and asbestosis. Also at this time, we have no prevalence rates for illnesses such as lupus or scleroderma for the general population that could serve as a comparison group.

Limitations

Information obtained through systematic survey methods or medical testing programs can have many limitations. The medical testing program was conducted with the principal goal of providing a service to the community and assisting EPA with exposure pathway definition. The information will be useful for health care planning needs in the community, defining the scope of future environmental investigations, and understanding the natural history of asbestos-related illness which can assist local health care providers. A perspective on the magnitude of the public health problem in the Libby area can be summarized by examining the prevalence of asbestos-related abnormalities among participants. However, specific judgements about the true extent of these abnormalities in excess of expected values is difficult to determine because no control group is included. Thus, direct comparisons of the occurrence of abnormalities beyond the expected value cannot be calculated.

All studies involving volunteers are subject to selection bias. It is possible that those who volunteered for the program were more likely to have been previously diagnosed with an illness, were more likely to have experienced symptoms than a randomly selected population, or were

more likely to have had exposures and concerns about this. It also is possible that persons who thought they had little or no exposure chose not to participate. Nevertheless, this program screened more than 6,000 people in Libby and the surrounding area. The number represents a substantial proportion (61%) of the total population of the Libby area. Additionally, most of the findings in this report are on more objective outcomes such as findings from chest radiographs or spirometry measurements. Observer bias is limited by following established standards for interpretation of chest radiographs that require the use of B-readers trained in detection of occupational disease and agreement in two out of three B-readers. Findings on self-reported symptoms and illnesses must be interpreted with caution due to lack of comparison rates and the potential for recall bias.

SUMMARY

One of the principal objectives of the medical testing program was to identify illnesses experienced by participants exposed to asbestos in order to better inform local health care providers. Pleural abnormalities were observed on the chest radiographs of almost 18% of participants in the medical testing program. Interstitial abnormalities were seen in 1% of participants. The risk of pleural abnormalities increased with increasing age and increasing length of residence in the Libby area.

A second objective was to better characterize pathways of exposure and risk of illnesses in this community. Such characterization may be useful for the purpose of defining or focusing environmental investigations in Libby and other areas of suspected human exposure to asbestos-contaminated vermiculite. The factors most strongly related to having pleural abnormalities were 1) having been a WRG worker, 2) having been a household contact of a WRG worker, and 3) being male. The odds of finding a pleural abnormality was almost eight times greater for former WRG workers when compared to non-workers of the same age. The odds of finding a pleural abnormality was more than three times greater for female household contacts of WRG workers when compared with females who did not report having this exposure. Men had almost 5 times the risk of pleural abnormalities as women.

Participants could have been exposed through several pathways. This analysis found that 24% of participants with multiple exposures had abnormal pleural findings when compared with 5% of participants with no apparent exposure.

Participants who reported they were former WRG workers had the highest percentage of

restrictive changes of all exposure pathways as measured by pulmonary function testing. Being a current smoker was the strongest risk factor for having restrictive abnormalities. Other risk factors included being a former WRG worker, being a non-WRG worker exposed to vermiculite, having had chest surgery, and being in the highest body mass index category.

This report summarizes the findings from the year 2000 medical testing program and reflects efforts to provide useful information to the community and other health professionals as quickly as possible. As additional analyses of the data are completed, information presented here will be expanded and modified as necessary. This is especially true in view of new information that will be forthcoming from medical testing taking place in the summer of 2001 and other studies currently underway.

People referred to their physician for evaluation of observed abnormalities or functional breathing problems are encouraged to be evaluated for diagnosis and treatment. ATSDR will continue to work with state and federal agencies (Montana Department of Public Health and Human Services, the Libby Department of Environmental Health,, the U.S. Environmental Protection Agency and other federal agencies) and the Libby community to establish a mechanism and recommendations for future testing; to assist in addressing potential pathways of human exposure in Libby and other sites where vermiculite ore was shipped, handled or processed; and to conduct and support health investigations to assess the observed abnormalities, risks for development of abnormalities, and the natural history of illnesses among people exposed to amphibole asbestos-contaminated vermiculite.

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Appendix

Participants Residing in Nevada at the Time of the Testing

A small cohort of the 6149 members of the Libby Testing Program resided in Nevada at the time of the testing. A request was made to compare this subpopulation to the entire study population. The populations were found to be similar both in terms of demographics and outcomes.

A total of 92 participants resided in Nevada at the time of testing. Of these, 83 were age 18 or older and therefore eligible for chest radiographs.

Key Covariates and Risk Factors

The distributions of key covariates were similar between the Nevada subpopulation and the entire study population. The sex distribution of the Nevada subpopulation was identical to that of the entire study population, 49% male and 51% female. The Nevada group had a slightly different age breakdown with 10% age 0-17 years, 57% age 18-44 years, 32% age 45-64 years and 2% 65 years or older (compared to 9%, 33%, 44%, and 16% respectively), making the Nevada subpopulation a slightly younger group. The BMI distribution between the two groups was similar, 75% of the Nevada subpopulation had a BMI of 25 or greater, compared to 67% in the entire population.

The number of years spent in the Libby area by the Nevada subpopulation was similar to that of the entire study population. The Nevada cohort was less likely to have lived in the Libby area for 35 or more years, 18% compared to 27%. However, 23% of the Nevada subpopulation lived in the Libby area for 15-22 years compared to 24% for the entire study population. And 24% of the Nevada subpopulation lived in the Libby area for 23-34 years compared to 27% for the entire study population.

Of the 92 participants from Nevada, 13 were former WRG workers (13% compared to 5%), and 35 were former household contacts of workers (41% compared to 21%).

Pleural Abnormalities

The overall rate of pleural abnormalities (all views) for the Nevada subpopulation was 18%, identical to that for the general study population.

The rate of abnormalities for former WRG workers and former household contacts of WRG workers were very similar to those found in the entire population. For household contacts of

workers, the abnormality rate was 24% in the Nevada subpopulation compared to 26% for the entire study population. For former WRG workers the rates were 54% in the Nevada subpopulation compared to 49% for the entire study population.

STATEMENT OF PAT COHAN, COORDINATOR, CLINIC FOR ASBESTOS RELATED DISEASE

My name is Pat Cohan. I am a registered nurse with 29 years of experience. For the last 2 years I have been involved with the health needs of our community related to asbestos exposure. My introduction to the asbestos disaster was in 2000 when I accepted a grant position funded by HRSA for the asbestos health screenings. This position had two integral parts. The first was to be the outreach nurse for the ATSDR's screenings that summer. Over 6,000 respondents were screened and I handled any medical emergencies, health concerns, or urgent referral issues that arose after the chest X-rays were viewed. The second part of the position was to help create a clinic that would assess, diagnose, and educate people with health care concerns resulting from the screening results.

The Center for Asbestos Related Disease (CARD) was created by St. Johns Lutheran Hospital to fill this need. The volume of phone calls, visits, and drop-in visits was incredible. It seemed that everyone in town and their relative was frantic for information. We now have over 1,000 active charts and of these over 800 have some asbestos related changes evident. Each of our clients and family members has received health information and education relating to pulmonary health.

The breadth and depth of the psychosocial, emotional, health and financial concerns associated with the amphibole disaster has been without precedent and I have usually been first at hand to hear the many different life stories. To listen to a client calmly speak of hidden mountain valleys and hunting accidents because he will not allow his children to watch him die the way he watched his father suffer and die, is a reality of my job. I have worked to find financial resources for a 47-year-old woman, who has less than half of her normal lung function and no health insurance, so she can afford to have a lung biopsy done. Her chest X-ray was suspicious for a mesothelioma, a type of cancer associated with asbestos exposure. This woman, a daughter of a Zonolite miner, waited over 3 months to hear if she would qualify for Grace's medical plan.

Some of the stories are so convoluted that it's hard to sort out what is most urgent. A woman with asbestos related illness, who cares for her mother with asbestosis, has been washing her dishes in the tub for the last 2 years. Her kitchen is plastic sheeted and duct taped closed to keep the leaking Zonolite insulation from further contaminating her home.

I have a neighbor who has resided in Libby for over 40 years. He never worked at the mine, never gardened with vermiculite, and never had any contact that he knew of other than the insulation in his home. This is a man who started the Libby volunteer ambulance and who has hiked and skied every mountain in the Cabinet Mountains. He has worked tirelessly for the community in every conceivable volunteer role. Because of the asbestos damage to his lungs he can no longer ski, hike, or volunteer. His major activity now is breathing.

I have used the word disaster most deliberately. This is a slow motion disaster. Had a mine leaked a toxin into the air of Libby and 200 people immediately died with 2000 others injured, 20 percent critically, I would not be here. I would be back home in the emergency room, taking care of the sick and wounded and we would all be trying to figure how quickly the remaining toxins could be removed. We would not be struggling to find health insurance, low cost medicines, or funding for long term care and monitoring. Just because the toxin took 30–50 years to kill and maim our community, it is no less a disaster.

The damage done to this community was not an act of God; it was not for an ideological principle or for a religious conviction. It was done for profit. The exposure and the responsible parties' disrespect for people need to stop. The miners were treated as a disposable resource and the citizens of Libby were treated with no more regard than the overburden of rock at the mine. The survivors of this disaster continue to be exposed, continue to be at risk for worsening disease, and continue to worry about how they will pay for their health care needs. It is not a matter of waiting a few years for the affected people to die off and for the problem to go away. It is a matter of waiting another 20 years to see if their grandchildren's health is affected. We already know the children and grandchildren have been affected emotionally, socially and monetarily.

What does Libby need? The need for Libby is research for treatments, for health insurance that will be available for the length of the disease process, and the facility to monitor progression of this disaster for the next twenty years.

I wish to take the opportunity to thank our Montana delegation for all that has been done for the community of Libby. I especially want to thank Senator Baucus for all his attention and efforts in our community.

Thank you.

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

Good morning Chairperson Boxer, committee members, and our Montana Senator Max Baucus. As a physician and community member of Libby, Montana for 25 years, I could orate a lengthy story, but with 5-minute time constraints, I would like to tell a brief background story and then emphasize 3 important points as they relate to the Libby asbestos exposure.

I became aware of the occurrence of ARD in workers in 1977–1978-my first year in Libby. In 1978, my medical practice partner, the late Dr. Richard Irons, had engaged in conversations with WR Grace management pertaining to his desire to work with them to reduce health risk for asbestos exposure to Zonolite workers, their family members of the community. Unfortunately his concerns were not acknowledged. Nor were the EPA's concerns regarding the 1980 assessment of vermiculite-associated asbestos acknowledged. In 1999, a Seattle PI article depicted a broad scale asbestos exposure in Libby. As Lincoln County Health officer, my first response was disbelief that any widespread environmental exposure could cause lung disease. Subsequently, the past several years have been a painful and humbling educational process for myself. During the past few years I have seen numerous community workers whose lives have been significantly impacted by asbestos-related disease. Several friends have developed lung disease and have lost over one-half of their lung function. From this experience, I would like to share with you the three important observations.

(1) The Libby exposure was extensive. The ATSDR has conservatively and efficiently screened for ARD. As Medical Director of CARD in Libby, we have followed up a large number with abnormal screens and evaluations. I have recently done analysis of our patient population and found the ATSDR's observations to be very accurate. Somewhere between 1,300 to 1,400 individuals are very likely to have asbestos-related abnormalities. This does not include the ATSDR's screening in 2001, which could add another 200–300 individuals.

(2) The ARD related to Libby asbestos has appeared different then that related to commercial asbestos called chrysotile. Experience has shown it to have a higher rate of causing progressive lung disease. Dr. Alan Whitehouse has studied a group of Libby patients and observed a progression of disease in 70 percent of diagnosed patients. Some patients develop a rapidly progressive lung disease (note included case report). Nonoccupationally exposed individuals have developed lung disease that is more severe than WR Grace employees of >15 yrs. work.

(3) The incidence of malignant mesothelioma is exceedingly high. This type of tumor involves the lining of the chest or abdominal cavities. This invasive cancer eats into the chest wall and spinal column causing severe pain and is uniformly fatal. It has a high causal relationship to asbestos exposures and is termed the sentinel tumor of asbestos exposure. The occurrence of this tumor is 1 in 1 million in the general population. In Libby we are experiencing 100 times this expected incidence. Twenty-three mesotheliomas have occurred as a result of Libby asbestos exposure, with six having resulted from non-occupational exposure. Since I had submitted testimony for this hearing in April, two more individuals have been diagnosed. Their exposure history was living in Libby, one working as a forest service administrator and the other as a school health nurse. Another lady with the tumor was exposed simply working in a professional office where Zonolite workers attended appointments in dusty work clothing. Mesotheliomas can occur with relatively low asbestos exposure.

Few investigators have studied or observed the health effects of Libby asbestos. In addition to Dr. Alan Whitehouse (Board-certified chest physician, Spokane, WA) whom I mentioned, Dr. Corbett McDonald (McGill University) has familiarity.

At the request of WR Grace, Dr. McDonald studied a group of Zonolite workers in 1986. Subsequently, he has done a followup of this group and noted "these vermiculite workers suffered severely from malignant and non malignant respiratory disease." Death from mesothelioma was 10 times higher than commercial (chrysotile) asbestos miners in Quebec. He concludes that study of workers exposure to Libby tremolite is important in that it is the only study that quantifies the risk of exposure to tremolite-like asbestos in the absence of any other fiber types.

In closing, I want to express my concern pertaining to how we will be able to meet the asbestos-related health care needs we are sure to face over the next 20–30 years. WR Grace has been providing funding for the CARD Clinic and an insurance program. However, their commitment to caring for affected individuals is waning and suggests that their support is short-lived. The need for research and developing therapies is high priority.

Additional concerns extend beyond Libby to: (1) exposures from WR Grace export plants all around the US (2) areas of California where release into the environment of naturally occurring tremolite is a result of large-scale construction activities.

I thank the Superfund subcommittee for allowing us this opportunity, and our Montana delegation for their support, and special thanks to Max with his perseverance in advocating for Montanans.

STATEMENT OF JOHN KONZEN, COUNTY COMMISSIONER FOR LINCOLN COUNTY

My name is John Konzen. I am from Troy, Montana and serve as County Commissioner for Lincoln County. You have already heard about Libby, a community I serve both as an elected County Commissioner and as a member of the Board of Directors for St. John's Lutheran Hospital in Libby.

Lincoln County is no stranger to the Federal family. Floods and forest fires dispatch Federal agencies to us regularly. Our county shares the Canadian border and a reservoir that straddles the international boundary, feeding the Columbia River Basin. There are endangered species and every other natural resource issue you can imagine. We struggle with double-digit poverty and unemployment rates. On an average day, it's fair to say we are a county with a lot on our plate.

Before I became a commissioner I served as a teacher and a school administrator for many years. I witnessed first hand the effects down cycles have on resource-based communities like the ones I serve today. I can tell you first hand how families are affected when mills close or mines shutdown.

Most of you would have probably never heard about Libby or Lincoln County if it weren't for tremolite asbestos and a mine operated by W.R. Grace.

There was a time when the W. R. Grace Mine was a good thing in our community. It meant jobs and goodpaying ones. Men went to work every day to earn a living for their families. They didn't step away from their responsibility. And I bet a lot of them would have gone to work every day even if they had known of the risk they were taking on for themselves. That's what husbands and fathers do.

But none of those men would have ever put their families—their wives, children or grandchildren—in harms way. Never. Not a single one of us in this room would have done that. But as you have already heard, Grace allowed all of that to occur.

There is an old saying that goes: "Many hands make light work." When Grace stepped away from their responsibility, they allowed the miners and the wives and children of those men, to do all the heavy lifting, and to take on the risks Grace was unwilling to shoulder.

And as Grace continues to step away from even the small portion of responsibility they willingly accepted to help our community cover prescription drug, home health care and other medical costs, they are breaking us. Our tiny community's medical resources are already stretched too thin.

But it isn't just our community alone which concerns me and the other Montanans who have traveled here today to speak with you. As Grace increases the distance between the rightful portion of responsibility they must bear, they further harm the State of Montana.

As Senator Baucus is well aware, people are our most precious resource in Montana. As I travel across Montana for regular meetings with other county commissioners in our state, commissioners tell me they too are concerned about the far-reaching impact of Grace's lack of responsibility. Many fear Grace's recent decision to no longer help with medical expenses of folks who had qualified for their own medical plan, has the potential to bankrupt our own state Medicaid program.

We appreciate the help the Federal family has extended to northwest Montana. We don't know where we would be without the help the Department of Health and Human Services, the Environmental Protection Agency, the Agency for Toxic Substance Disease Registry and Congress have provided us. Everyone is doing heavylifting. Everyone it seems, but Grace.

I am here to thank Congress—and hard-working folks across the country for supporting our community. You have all done your part and we can't begin to thank you enough But I would also like to add that W.R. Grace still has a place at our table. We need them to do their part too.

As Grace makes its way through Federal bankruptcy court there are several things I would ask this committee and those present to consider to set aside a separate trust fund, established by Grace to cover the short-term prescription drug and home-health needs of folks in Libby who are struggling with asbestos-related disease. I would also ask you to consider establishing a trust fund for longer-term health care needs. I appreciate the questions that have been raised about long term funding for cleanup and the statutory authority for removing insulation in homes

in Libby. Good health is all any of us can ask for. A clean bill of health is the most profound mark our Federal friends will leave upon our community.

I appreciate your time and on behalf of Lincoln County, I thank you for this opportunity.

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