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WORKPLACE SAFETY AND ASBESTOS CONTAMINATION

HEARING

OF THE

COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

FIRST SESSION

ON

EXAMINING WORKPLACE SAFETY AND ASBESTOS CONTAMINATION, FOCUSING ON THE COMBINED AUTHORITY AND EFFORTS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, MINE SAFETY AND HEALTH ADMINISTRATION, AND THE ENVIRONMENTAL PROTECTION AGENCY TO PRESCRIBE AND ENFORCE REGULATIONS TO PREVENT HEALTH RISKS TO WORKERS FROM EXPOSURE TO AIRBONE ASBESTOS

JULY 31, 2001

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C O N T E N T S

STATEMENTS

TUESDAY, JULY 31, 2001

	Page
Murray, Hon. Patty, a U.S. Senator from the State of Washington	1
DeWine, Hon. Mike, a U.S. Senator from the State of Ohio	3
Burns, Hon. Conrad, a U.S. Senator from the State of Montana, and Hon. Max Baucus, a U.S. Senator from the State of Montana	4
Lauriski, David D., Assistant Secretary For Mine Safety and Health, U.S. Department of Labor; R. Davis Layne, Acting Assistant Secretary For Occupational Safety and Health, U.S. Department of Labor; Kathleen M. Rest, Acting Director, National Institute For Occupational Safety and Health, Centers For Disease Control and Prevention, U.S. Department of Health and Human Services; and Michael Shapiro, Acting Assistant Administrator, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency	9
Rehberg, Hon. Dennis, a Representative in Congress from the State of Montana	17
Lemen, Richard, M.D., professor and private consultant, Emory University, Atlanta, GA; John Addison, Epidemiologist, John Addison Consultancy, United Kingdom; George Biekkola, former employee, Cleveland Cliff Iron, L'anse, MI; Michael R. Harbut, M.D., Medical Director, Center For Occupational and Environmental Medicine, Southfield, MI; Alan Whitehouse, board-certified chest physician, Spokane, WA; David Pinter, former employee, Virginia Vermiculite, Inc., Louisa, VA; and Ned K. Gumble, mine manger, Virginia Vermiculite, Inc., Louisa, VA	21

ADDITIONAL MATERIAL

Articles, publications, letters, etc.:	
Senator Burns	44
Senator Baucus	44
David D. Lauriski	46
R. Davis Layne	48
Kathleen M. Rest	50
Michael H. Shapiro	55
Richard Lemen, M.D.	56
John Addison	59
George Biekkola	60
Michael R. Harbut, M.D.	61
Alan Whitehouse, M.D.	63
David Pinter	65
Letter to Senator Murray from Joseph Heller	66
Response to written questions of Senators Kennedy and Murray from EPA	67
Response to written questions of Senator Wellstone from EPA	69
Letter to Senator Murray from Mary Gazaille	69
Response to written questions of Senators Kennedy and Murray from David D. Lauriski	70
Letter to Senators Kennedy and Murray from R. DeLon Hull	75
Response to written questions of Senator Kennedy from John L. Henshaw	76
Letter to Christine Todd Whitman from Judy Martz, Governor of Montana	78

Page

Articles, publications, letters, etc.—Continued
Letter to Senators Jeffords and Kennedy from Senator Murray 79
Letter to Senator Kennedy from Edward C. Sullivan 80
Michael McCann 81
Barry Castleman 82
Gary F. Collins 86
James Fite 88
Ned K. Gumble 90
Miscellaneous material 112

WORKPLACE SAFETY AND ASBESTOS CONTAMINATION

TUESDAY, JULY 31, 2001

U.S. SENATE,
COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS,
Washington, DC.

The committee met, pursuant to notice, at 2:10 p.m., in room SD–430, Dirksen Senate Office Building, Senator Murray presiding.

Present: Senators Murray, Wellstone, Reed, and DeWine.

OPENING STATEMENT OF SENATOR MURRAY

Senator MURRAY [presiding]. This committee hearing will come to order.

Good afternoon. This afternoon, we are going to hear testimony about asbestos exposure. Like many Americans, I thought asbestos was banned many years ago. In fact, if you read the newspapers, you would think so, too.

Here is an article from the Associated Press from just 3 days ago. It is titled "Asbestos Forces College of William and Mary Freshmen out of Dorm." The article explains that asbestos was discovered in a freshman dormitory.

Today it is common for parts of older buildings from here in the Dirksen Senate Building to the Kennedy Center Opera House to be closed to remove asbestos. But this story that I have from 3 days ago says that asbestos was, and I quote "banned in 1977."

Tragically, that is just not true. Asbestos was not banned. Today it is in consumer products; it is handled by workers every day, and it is still a health danger. Many Americans think asbestos was banned because for years in the 1980's, the Environmental Protection Agency tried to ban it. Unfortunately, the asbestos industry brought a lawsuit and convinced an appeals court to overturn the ban in 1991.

Although the EPA was able to prevent new uses of this dangerous substance, asbestos remains legal for use in consumer products. Let me give you a few examples of how workers may be exposed to asbestos today.

In garages and repair shops, auto mechanics today are repairing brakes which may be tainted with asbestos. In many homes, attics, roofs, and crawl spaces are lined with Zonolite insulation which was made with vermiculite from Libby, MT. In garden centers, nursery workers are handling products made with vermiculite which may be contaminated with asbestos. On construction sites

across the country, workers are handling roofing materials that contain asbestos. And finally, miners who mine for talc and taconite and vermiculite may be exposed to asbestos at work.

So the sad truth is that asbestos was not banned and is still used today. Asbestos ends up in commercial products like brake pads and roofing materials intentionally, but it also ends up in consumer products by accident. For example, many lawn care products contain vermiculite. Unfortunately, when that vermiculite is ored, it may contain traces of asbestos. So the asbestos ends up in a big bag of fertilizer, not on purpose, but through contamination. This is known as "contaminant asbestos."

Now, the EPA says that those small amounts will not hurt us as consumers. But what about all the workers who created the product? What should the Government do to protect those workers and the public from a known carcinogen?

I called for this hearing to raise awareness about the dangers of asbestos, to find out what protections are in place for workers today, and to learn what steps we can take to further protect American workers.

I became aware of the ongoing dangers of asbestos through a series of articles in the Seattle Post Intelligencer. The series began with an investigation into a mine in Libby, MT. For years, workers mined vermiculite at the W.R. Grace facility in Libby. Almost 200 people have died from exposure to asbestos in the mine, and many more residents are sick—in fact, dozens of those who are ill did not even work in the mine but were exposed to contamination in the air they breathed.

The problem in Libby is so bad that the Environmental Protection Agency is considering declaring the town a Superfund site. It is the Government's responsibility to protect public health. Unfortunately, the Government failed to protect the people of Libby.

But the problem is not limited to Libby, MT, as the map behind me shows. The ore that was mined in Libby, MT was sent to at least 33 States. Factories and plants in all of those States processed the tainted ore from Libby. Today efforts are underway to further investigate exposure at 17 of these sites, including a site in my home State, in Spokane, WA.

The human cost of asbestos exposure is staggering. Today workers are suffering from asbestosis and cancer. Unfortunately, it can take between 40 and 50 years for diseases from asbestos to materialize. That means that years from now, more people will become sick because of exposure that is occurring today.

This afternoon you will hear more about how asbestos and asbestiform fibers affect human health from several of our witnesses. You will also hear about how these diseases impact people's lives.

I look forward to hearing what Federal agencies are doing to protect workers. So today, with the help of our witnesses, I hope we will answer these questions and in the process help raise awareness about these dangers.

I want to thank many people who have traveled here from across this country to be here today to help raise this issue in front of Congress.

In conclusion, I am pleased that Senator Max Baucus and Senator Burns are here. They have both worked very hard on this issue, and they will both testify shortly. Congressman Rehberg from Montana will also be here shortly, and when he comes, we will interrupt where we are and allow him to testify as well.

Thank you to all of you for being here.

I will turn now to Senator DeWine and ask if he has an opening statement.

OPENING STATEMENT OF SENATOR DEWINE

Senator DEWINE. Madam Chairman, thank you very much for holding this hearing. It is very, very important, and I look forward to hearing the testimony.

As you can see from the map that you have displayed, one of the sites that received the substance was in Marysville, OH, so we have not only a national interest, but for me a parochial interest as well.

I think it is important for us to investigate Government action or inaction in asbestos-related tragedies of the sort that occurred in Libby, MT. Let me also say that the asbestos issue is much larger than what happened at the mines in Libby, and the Government's involvement is not limited to simply regulations or the lack of regulations and oversight.

Our system for dealing with the tragedy associated with asbestos exposure is inadequate—it is inadequate to say the least. When a person is afflicted with asbestos-related diseases, his or her only recourse today is the court system. Certainly this system cannot give back to the afflicted the quality of life that they had prior to their exposure. It can, of course, offer victims some peace of mind through monetary awards and help with medical bills, while at the same time punishing those responsible for their conditions.

The tragedy that we face today is that the Federal Government encouraged the use of asbestos even after everyone knew its dangers. Despite its wrongdoing, the Federal Government is still sidestepping, I believe, any responsibility. In doing so, we are contributing to the second victimization of these deserving asbestos victims.

How is that so? Well, when asbestos began coming into courtrooms in droves, the Federal Government argued that it was not liable for any damages, claiming sovereign immunity. The courts accepted that argument. This left all the asbestos manufacturers responsible for payments to the victims. For a while, this arrangement was working out as far as victims won court cases and were paid by manufacturers.

However, Madam Chairman, as the number of lawsuits continued to grow and victims continued winning their claims, asbestos manufacturers started going bankrupt. Over the past 18 years, at least 34 major companies have gone bankrupt. When a company declares bankruptcy due to asbestos, it immediately stops paying claims, leaving at least some claimants uncompensated and forcing others to seek even greater amounts of compensation from the remaining solvent defendants.

These bankruptcies can drag on for years without payment to claimants. Meanwhile, still solvent defendants are forced to pick up

a larger share of the overall claims to be paid due to joint and several liability, often resulting in the layoff of workers. The Federal Government, which shares some of the blame for the problem, has not paid one dime.

Because of these concerns, I introduced a bipartisan bill along with Senator Hatch, Senator Leahy, Senator Voinovich, and others that would provide targeted tax incentives for former asbestos manufacturers who were seeking to compensate victims.

Our legislation would exempt from tax any income earned by a designated settlement fund, a qualified settlement fund established for the purpose of compensating asbestos victims.

This bill would also allow companies to carry back net operating losses for the years giving rise to the asbestos liabilities.

Under our bill, any tax savings would be devoted to compensating victims. This is an effective approach to helping compensate victims and one that I urge my colleagues to support.

Again, Madam Chairman, as I said earlier, I am happy that you have called this hearing. It is my hope that Congress will look much further into this issue and in the end do the right thing to help provide deserving asbestos victims some peace of mind and quality of life.

By passing the legislation that I have referenced that changes our Tax Code, the Federal Government can in effect accept some responsibility for the situation that we are in today.

Again let me thank you, Madam Chairman, for holding the hearing. I look forward to hearing the testimony of the witnesses.

Senator MURRAY. Thank you, Senator DeWine.

We will move now to our first panel.

Senator Baucus, please proceed.

Senator BAUCUS. Thank you, Madam Chairman.

My colleague Senator Burns has a very pressing appointment, and he asked if he could go first, and that is fine with me.

Senator MURRAY. Please proceed.

STATEMENTS OF HON. CONRAD BURNS, A U.S. SENATOR FROM MONTANA, AND HON. MAX BAUCUS, A U.S. SENATOR FROM MONTANA

Senator BURNS. I thank my colleague from Montana, and Madam Chairman, I want to crash your party. I would ask unanimous consent to be allowed to enter my statement in the record.

Senator MURRAY. Without objection.

Senator BURNS. I want to thank you very much for holding this hearing. I appreciate your efforts on this, because it really does cry out for a hearing.

Also, there is a letter from the Governor of Montana to the Administrator of the EPA that I would like to put in the record.

I appreciate your patience and your understanding. I have another hearing on Spectrum over in the Commerce Committee, so I appreciate it very much, and thank you again for holding this hearing.

Senator MURRAY. Thank you.

[The prepared statement of Senator Burns and attachments may be found in additional material.]

Senator MURRAY. Senator Baucus, please proceed.

Senator BAUCUS. Thank you, Madam Chairman.

I have a statement which I would like to have included in the record, too, and I would just like to speak from my heart.

Senator MURRAY. Without objection.

Senator BAUCUS. This is one of the greatest personal tragedies I have ever witnessed.

Picture a small town, Libby, MT, up in the northwestern corner of our State. It is a bit insulated, a bit isolated. It is not on the main track, main roads that are traveled across our country. It is a mining town, a logging community, and with fewer logs being harvested and the mines not returning as much, this is a town that has been battered with strikes, with layoffs, and people are just struggling. These are basic Americans, men and women, trying to put food on the table, working to try to get a decent day's wage.

One of the economic underpinnings of Libby is the zonolite mine purchased by W.R. Grace. It is a huge operation very close to town. It is basically a big mine where you mine this stuff and put it in trucks that come down and go on to the railroad cars.

I visited this mine a good number of years ago and was stunned by the dust and the conditions, the bad working conditions that these people faced. It particularly struck me when the mostly men would get off the bus after coming down from the mine to the town, and it was just like a dust bin; I have never seen such dust. And clearly, the dust was not good.

I had no idea of knowing, but I think some of the employees there had a bit of an idea of knowing that it was not only dust, but that there was something here that was not quite right.

Essentially, over a number of years, with more and more people becoming suspicious about this dust, gradually the company, W.R. Grace, began to divulge more information about what was contained in this dust.

This has been a case where lots of different groups of people dropped the ball. It is my judgment that W.R. Grace knew what was going on, knew the dust contained asbestos. This is a very serious form of asbestos called "tremolite." This is the worst kind of asbestos. It does much more damage when it gets into your lungs.

Grace knew; they knew what was going on—the documents clearly indicate they knew what was going on—but did not warn their workers.

The State of Montana could have done a lot better job. The State of Montana dropped the ball—few warnings, did not follow up—it just got pushed off and so forth.

The same with the Federal Government. The EPA could have done a lot better job; the EPA dropped the ball in not investigating this a lot more closely.

As a consequence, we now have people in this little town who have been struggling years anyway just to make ends meet, now beset with a huge tragedy that is just taking over the whole community, the whole town.

The most heart-wrenching experience I ever had in my life was sitting in the living room of Les Scramsted. Les Scramsted is a resident of Libby. Les is my age. He is 59 years old. Les worked in the mine for just a little over a year.

Les would come home after working in the mine pretty dusty—and he knew something was not quite right—he would come home to his family at the end of the day, embrace his wife, and his children would jump up into his lap.

Les is dying. Les has asbestos-related disease, and I do not know how much longer Les has. He is deteriorating in front of your eyes. I have seen Les over the last couple of years when I first got involved in this issue, and it stuns me and saddens me to see just how much Les has aged. I do not know how much longer Les has to live, frankly.

At the same time, Les unwittingly transmitted the dust, asbestos, vermiculite, tremolite, to his wife—she now has asbestos-related disease—and to his kids who jumped up in his lap and hugged him when he came home.

Picture the guilt that Les has in infecting his whole family, causing his family to die because of this disease, having no idea what he was doing. Not only is he dying because he has asbestos-related disease; he is now causing his family to die. Grace is causing them all to die—and in fact, in some sense, so are we, the Federal Government, State government, because we did not do our duty.

This is a huge tragedy of immense proportions. I would guess that between 1,000 and 2,000 people in Libby are eventually going to die. As you mentioned in your statement, this is a disease which is not detected right away. Sometimes x-rays do not test positive; over a period of time, a later x-ray might test positive. It takes tremendous skill to evaluate these x-rays. It could take up to 40 years for someone who is infected with asbestosis or mesothelioma or one of these diseases to actually know.

Add to that the cleanup problems. You mentioned Superfund designation in your statement. This is a huge issue for the people of Libby. They do not want their town to be known as a waste site. They are trying to deal with current conditions and put this behind them, get treated, and so forth. So it has that dynamic.

Again, this is the company town. The company put food on the table, yet the company caused the deaths. So think of the cross-currents that exist with all of that in this small community.

Meantime, lots of people have stepped up and done a terrific job. A couple of them are in the audience today that I know personally—Dr. Whitehead from Spokane. Lots of residents would go over and visit him; he would give them lung tests. We did not have the capability in Libby, really, they did not have the specialty to do it—although Dr. Black in Libby has done a super job and is struggling as hard as he can to get up to speed and get the equipment and so forth. Dr. Whitehead will tell you about all the patients that he has treated and the medical problems that all these people have.

EPA has now stepped up. There is a person on the ground named Paul Peronard. Paul Peronard is one of the best public servants I have ever seen. He works extremely hard—if you look at him, you would not believe it—he has a bald head and an earring and tatoos and so forth—but I will tell you this guy just bleeds for the people of Libby, and they love him. It is one of the few times where the people are working with someone from the feds who is really working very hard, and I just want you to know what a great job he is doing.

EPA is also working to negotiate with Grace which area to clean up and in what way. In my judgment, Grace is foot-dragging. They are not allowing access to the site the way they should. That is part of the problem here. I think EPA is trying to do the best they can given the difficult situation.

There is another Federal agency, the ATSDR, which is affiliated with the Centers for Disease Control in Atlanta. They are doing the screening. To be honest, it took them a little bit to get up to speed. I think they kind of looked down their noses a bit at Libby, MT way up there, but we finally got them up to Libby and they saw the sad plight that these people are faced with, and now they are doing a lot of the screening. So ATSDR is doing the screening, and they have EPA trying to help with the cleanup.

Senator DeWine mentioned the bill. This may be a partial solution to help the people of Libby. Earlier legislation introduced last year let the company off the hook; but now, with all the lawsuits and with the company threatening bankruptcy, legislation like this is necessary.

It is also clear to me that Grace has transferred 89 percent of their assets beyond the reach of any bankruptcy court to minimize liability. There are public statements from Grace officials to that effect saying "We are making this reorganization to insulate ourselves from bankruptcy."

This is just one of the worst cases I have ever seen, and I just hope the committee—and I know the committee will really think thoughtfully about this as we now try to figure out how to put together the pieces and how to get the regulations in place to deal with the current problem as it continues to exist. As you mentioned, regrettably, major national newspapers have erroneously claimed that the problem has stopped. It has not stopped. I do not know how they got that misinformation, but they have, it is out there, and people think it is not a problem. It is; it is still in the air; it is in the ground.

This stuff was taken down to Libby and spread on the ball fields where the kids play baseball. That is how some of the kids got it. It is in the gardens. The stuff is all over town. It was put into attic insulation. The problem now is how to deal with the insulation in the attics. And I know the problems in the rest of the country.

At one time, this mine provided 80 percent of the vermiculite in the world—80 percent at its peak. This stuff is all over, and it is a huge dereliction of responsibility—responsibility by the company, responsibility by the local, State and Federal Government—and I just hope we have learned a lesson from this to minimize something like this ever happening again.

Thank you.

[The prepared statement of Senator Baucus may be found in additional material.]

Senator MURRAY. Thank you, Senator Baucus, for a very compelling story about a small town in your State that has had an impact that no city in this country should have to go through.

I certainly think that we need to do everything we can to help the citizens there and to make sure this never happens again. What is most astounding to me is that it is not like this is not happening. It is happening. There are products being used everywhere,

and we need to do what we can to let the public know that this is a problem, and we have to decide as a Federal Government what our part is in making sure that consumers know that.

Senator BAUCUS. Just remember Les Scramsted. That is all I ask is that you remember Les.

Senator MURRAY. Well, thank you very much, Senator Baucus, and I will ask you to join us on the dias here in just a few minutes.

Senator Wellstone, did you have any questions?

Senator WELLSTONE. I am going to be very brief. I want to say three things in less than 2 minutes.

The first is that, Max, I do not believe that I have ever heard you speak better. I have never seen you—that is not to say that you have not spoken with emotion and made a compelling case since I have been here in the Senate—but I have never quite seen you this way, and it is because it is all very personal; you know the people. And I would thank you.

That is my first point. My second point is that we know in Minnesota how far the tentacles of this contamination can reach. We have thousands of citizens in Minneapolis who are potentially at risk from a facility that processed this asbestos-laden vermiculite from the W.R. Grace Co. in Libby, MT. Unfortunately, lots of people in Minnesota are vulnerable.

My third point is that Bruce Vento, who was a very dear friend of mine from Minnesota, a Congressman from the 4th District, died of mesothelioma or asbestosis. It came from exposure to asbestos at work when he was younger. Bruce went very fast; it is a very cruel disease. We must do all we can to prevent future illnesses and deaths from asbestosis.

My fourth point is that I remember assigning a book when I was teaching that I think was written in 1970 by Paul Brodier, as I remember, titled "Expendable Americans." I only mention it because of the title, but again, this was about the same issue. It was about some workers in Tyler, TX, and the industry knew, and they died of mesothelioma and asbestosis, and the industry knew. They had known forever and ever and ever, and they did not let them know—thus, they were expendable, they were just made expendable. It is just simply outrageous.

Finally, I have a statement that I would ask to be included in the record. As chair of the subcommittee that has jurisdiction over OSHA and workplace safety and mine safety and other issues, this is very important in terms of MSHA, and I know we have the director here, and I welcome him.

So I thank you for this hearing, Madam Chairman. It is extremely important.

Senator MURRAY. Thank you, Senator Wellstone.

Senator WELLSTONE. Thank you for your testimony, Max.

Senator BAUCUS. Thank you.

Senator MURRAY. Senator DeWine?

Senator DEWINE. I have no questions, Madam Chairman.

Senator MURRAY. Senator Baucus, if you want to join us on the dias for our other panels, that would really be appreciated.

Senator BAUCUS. Thank you. I will for a short while.

Senator MURRAY. I would ask our second panel to come forward now.

David Lauriski is Assistant Secretary for Mine Safety and Health at the Department of Labor.

Davis Layne is acting Assistant Secretary for Occupational safety and health at the Department of Labor.

Kathleen M. Rest, Ph.D., is acting Director of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Department of Health and Human Services.

And Michael Shapiro is acting Assistant Administrator of the Office of Solid Waste and Emergency Response at the EPA.

David Lauriski, we will begin with you.

STATEMENTS OF DAVID D. LAURISKI, ASSISTANT SECRETARY FOR MINE SAFETY AND HEALTH, U.S. DEPARTMENT OF LABOR; R. DAVIS LAYNE, ACTING ASSISTANT SECRETARY FOR OCCUPATIONAL SAFETY AND HEALTH, U.S. DEPARTMENT OF LABOR; KATHLEEN M. REST, ACTING DIRECTOR, NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH, CENTERS FOR DISEASE CONTROL AND PREVENTION, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES; AND MICHAEL SHAPIRO, ACTING ASSISTANT ADMINISTRATOR, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. LAURISKI. Madam Chair and members of the committee, I am pleased to appear before you today to discuss the ongoing efforts of the Mine Safety and Health Administration to promote miner safety and health.

With your permission, I will provide you with an abbreviated version of my statement and would ask that my full statement be entered for the record.

Senator MURRAY. Without objection.

Mr. LAURISKI. Having spent virtually all of my life and career associated with the mining industry, it is a privilege for me to serve the American people, Secretary Chao, and President Bush in this important capacity. We will do everything we can to improve upon the tremendous advances in safety and health in the mining industry that have occurred over the past 30 years.

I have shared with the MSHA staff my priorities and expectations and would like to share them with you.

Mining in the 21st century presents us with new opportunities. If we are to continue the success of the past, we must find new and creative approaches to protecting health and safety.

I am firmly committed to carrying out the responsibilities under the Federal Mine Health and Safety Act of 1977, but as both the Secretary and I have said, investments in up-front prevention through compliance assistance, education, training, and other outreach activities are critical if we are to move off the plateau that we have seemed to reach in the past few years. In this regard, I have asked MSHA staff, mines, mine operators, as well as representatives of the mining community and labor associations, to think creatively. I am firmly committed to hearing the thoughts, suggestions, and ideas of all of our stakeholders.

This hearing focuses on workplace safety and asbestos contamination. MSHA's asbestos regulations date to 1967. At that time, the Bureau of Mines used a 5 million particles per cubic foot of air

standard. Through the years, up until 1978, that standard was changed an additional three times to the current standard of 2 fibers per milliliter. Since enactment of the Mine Act, MSHA has conducted regular inspections at both surface and underground operations at metal and nonmetal mines. During its inspections, MSHA routinely takes samples which are analyzed for compliance with the asbestos standard.

In briefings with the MSHA staff, I was advised on the issues surrounding vermiculite mining in Libby, MT and elsewhere. I was pleased to learn that the Agency had taken steps to determine current mines' exposure levels to asbestos, including taking samples at all existing vermiculite, taconite, talc, and other mines to determine whether asbestos was present and at what levels.

Since spring of 2000, MSHA has taken almost 900 samples at more than 40 operations employing more than 4,000 miners. During our sampling events, the MSHA staff also discussed with the miners and mine operators the potential hazards of asbestos and the types of preventive measure that could be implemented to reduce exposures. These efforts continue today.

I have read the Office of Inspector General's evaluation of MSHA's handling of inspections at the W.R. Grace & Company mine in Libby, MT which was issued in March of this year. The report contains five recommendations, and I can assure you that we are diligently working to address the issues raised in those recommendations.

The Inspector General recommended that MSHA lower its existing permissible exposure limit for asbestos to a more protective level and address take-home contamination from asbestos. It also recommended that MSHA use transmission electron microscopy to analyze fiber samples that may contain asbestos.

We are currently considering these recommendations, which would involve rulemaking. I appreciate the review and analysis conducted by the Inspector General and am giving considerable thought to their recommendations as we work toward our decisions. Please be assured that I share your conviction that miners' health must be protected, and certainly miners should not be exposed to contamination at hazardous levels.

The Inspector General also recommended that the Agency remind its staff of the Mine Act's prohibition of giving advance notice of inspections. Section 103(a) of the Mine Act states in part that "in carrying out the requirements of this subsection, no advance notice of an inspection shall be provided to any person." I am pleased to report that MSHA recently reissued a memorandum to the Agency's inspectors for metal and nonmetal, reminding them of this provision.

Finally, a fifth recommendation of the report dealt with training of MSHA inspectors and other health professionals on asbestos-related matters. We have held training sessions to date with our industrial hygienists, and we are working diligently with our mine inspectorate so that they can recognize asbestos in their daily work activities.

We believe that education and training are critical to promoting miner safety and health. They provide mine operators and miners with the knowledge needed to take actions to prevent injuries and

illnesses. Sharing our knowledge and information with the mining public and other interested parties is part of our education and training efforts.

The Mine Act in my view gives MSHA all the tools necessary to protect miners' safety and health. The history of miners' safety and health over the past 25 to 30 years demonstrates the statute's effectiveness. The Libby experience is of course troubling. More effective and efficient use of the Mine Act's enforcement, education, training, and technical support authorities will help us achieve even greater improvements in our industry. These provisions as well as those outlining our rulemaking authorities and responsibilities provide us with the necessary framework to ensure miners are appropriately protected from harmful contaminants including asbestos.

Madam Chair, members of the committee that concludes my remarks. I would be happy to answer any questions you might have.

Senator MURRAY. Thank you.

[The prepared statement of Mr. Lauriski may be found in additional material.]

Senator MURRAY. Mr. Layne?

Mr. LAYNE. Thank you, Madam Chair.

With your permission, I would like to have OSHA's complete formal testimony entered into the record and briefly summarize my statement for the committee.

Senator MURRAY. Without objection.

Mr. LAYNE. Thank you.

I too appreciate the opportunity to testify today on how the Occupational Safety and Health Administration protects workers from the dangers of asbestos exposure.

Asbestos can cause a variety of serious health effects including asbestosis, mesothelioma, lung cancer, and many other types.

The Occupational Safety and Health Act gives the Secretary of Labor authority over all working conditions of employees engaged in business affecting commerce, except those conditions with respect to which other Federal agencies exercise statutory authority to prescribe or enforce regulations affecting occupational safety or health.

Since OSHA's inception in 1971, the agency has used its authority for standard-setting, enforcement, and compliance assistance to protect workers from the threat of asbestos. In fact, there has been more rulemaking activity involving asbestos than any other hazard regulated by OSHA. Between 1971 and 1994, OSHA issued two emergency temporary standards, three major notices of proposed rulemaking, three final rules, and 31 Federal Register notices related to asbestos.

Indeed, the final asbestos rule issued in June 1972 was the agency's first comprehensive standard. This regulation reduced the permissible exposure limit or PEL to an 8-hour, time-weighted average of two fibers per cubic centimeter of air, with a maximum ceiling of 10 fibers at any one time.

In June of 1986, due to new scientific evidence regarding the carcinogenicity of asbestos, the PEL was lowered to an 8-hour, time-weighted average of 0.2 fibers per cubic centimeter of air. This rule provided for engineering controls, work practices, personal protec-

tive clothing and equipment, decontamination, communication of hazards to workers, regulated areas, housekeeping procedures, recordkeeping, and employee training.

Further, in August of 1994, to provide even better worker protection, OSHA published two final asbestos standards—one for general industry and one for construction. It also added shipyards as a covered industry. The permissible exposure limit was reduced to 0.1 fiber per cubic centimeter. Work practices and engineering controls required under the 1994 standard further reduced the risk to workers.

The standard also addresses exposures during automobile brake and clutch work and roofing work as well. It requires that engineering controls and good work practices be implemented at all times during brake servicing. In addition, employers must provide training to all brake and clutch repair workers.

OSHA enforces the current asbestos standard through its inspection program. Since October 1995, OSHA has cited employers for violations of its asbestos standards over 15,000 times. There were almost 3,000 inspections conducted by Federal or State OSHA programs in which the standard violations were cited, including violations found in residential and commercial construction, auto repair facilities such as brake shops, as well as hotels.

In addition to enforcement, OSHA provides compliance assistance to employers and employees to help them understand the dangers associated with asbestos and what can be done to minimize that threat. OSHA's web page connects computer users to concise and easy-to-read publications on asbestos which are available to the public free of charge. OSHA has also developed software that can be downloaded from is web site to provide expert interactive advisers for building owners, managers and lessees, as well as for contractors of building renovation, maintenance, and housekeeping services.

Once installed on a computer, the software asks questions about a particular building site. It then asks follow-up questions based upon answers and produces a report on responsibilities under the asbestos rules.

OSHA's onsite consultation program, which is free and available to employers in all 50 States, provides expert assistance on asbestos. Consultants identify asbestos in the workplace and explain methods for reducing exposure. Over the last 5 years, the State consultants have taken over 800 asbestos samples from 162 small businesses for laboratory analysis.

OSHA actively coordinates with other Federal agencies on asbestos and asbestos-related issues. The OMNE Committee, composed of representatives from OSHA, MSHA, the National Institute for Occupational Safety and Health, and the Environmental Protection Agency, meets monthly to exchange information about mutual areas of concern.

OSHA has also requested technical assistance from NIOSH to determine potential asbestos exposure from working with materials that contain vermiculite. In response to our request, NIOSH has conducted investigations of horticultural facilities to determine potential exposures to employees from asbestos-contaminated vermiculite used in potting soil and lawn and garden products. In ad-

dition, NIOSH is in the process of investigating exposures at vermiculite exfoliation plants, and a report from NIOSH is expected by the end of this year.

OSHA has continuous, multifaceted programs to address health and safety hazards associated with asbestos, both in production and as a contaminant. These programs apply to all workplace settings covered by the OSH Act and are intended to protect all workers, including those who process and work with materials potentially contaminated with asbestos.

OSHA believes its current statutory authorities are sufficient to carry out its responsibilities. Given its broad mission to protect workers from all types of occupational hazards, over the years, the agency has devoted a significant portion of its resources to the health effects caused by asbestos exposure and will continue to do so.

This concludes OSHA's formal remarks. I will be pleased to answer any questions the committee may have.

Senator MURRAY. Thank you, Mr. Layne.

[The prepared statement of Mr. Layne may be found in additional material.]

Senator MURRAY. Ms. Rest?

Ms. REST. Madam Chairman, members of the committee, I am pleased to be here today on behalf of NIOSH, the National Institute for Occupational Safety and Health, which as you know is a public health research institute within the Centers for Disease Control and Prevention, a part of the Department of Health and Human Services.

With me today is Dr. Gregory Wagner, Director of the NIOSH Division of Respiratory Disease Studies in Morgantown, WV.

My comments will summarize briefly the more detailed written statement that we have prepared and submitted for the record. My testimony will briefly describe asbestos and asbestos-related diseases, current scientific knowledge about the hazards to workers from exposure to asbestos, NIOSH's ongoing research related to this problem, and opportunities for better prevention of asbestos exposure and asbestos-related disease.

Asbestos is a term that refers to a group of naturally-occurring fibrous minerals. The connection between inhalation of asbestos fibers and a number of very serious and often fatal diseases is well-established. Nevertheless, as you said, asbestos and asbestos-containing materials are still found in many residential and commercial settings where they continue to pose a risk of exposure and disease to workers and to others.

Asbestos is a known human carcinogen. It can cause both malignant and nonmalignant diseases, including asbestosis, which is an emphysema-like disease, pleural disease, lung cancer, malignant mesothelioma, cancer of the larynx and of the gastrointestinal tract. These diseases are described more fully in our written statement. Suffice it to say that most of these diseases take years to develop, they are often fatal, and they are preceded by many years of debilitating illness that brings emotional and financial devastation to workers and to their families.

It is not known exactly how asbestos fibers cause disease, but what is known is that fibers too small to be seen by the human eye

can become airborne during various industrial processes or from handling these asbestos-containing products. These microscopic fibers can be inhaled or swallowed. When inhaled, these fibers can remain lodged in the lungs where, because of their size and their durability, the body may be unable to remove them.

In general, as the amount of the fiber that stays in the lung increases, so too does the likelihood of the disease.

Vast numbers of workers, as many as 8 million, have been exposed to asbestos since World War II. As of the early 1990's, NIOSH estimated that nearly 700,000 workers in general industry remain potentially exposed—and that estimate did not include workers in mining, railroad, agriculture and several other industry sectors.

Asbestos continues to be found in many occupational and industrial settings, including the manufacture and repair of automotive brakes and clutch linings; it is found in certain manufactured products, including gaskets and building materials. Construction workers involved in building demolition and renovation, or in asbestos removal, are at particular risk of asbestos exposure, as are maintenance personnel.

In addition, take-home exposures to families of workers in which workers bring home asbestos in their hair, on their clothes, or on their shoes, is also a well-recognized hazard.

Because there is no recognized safe level of exposure for the carcinogenic effects of asbestos, exposure prevention is key. One approach to preventing worker exposure includes substitution of less hazardous materials; improved labeling of all asbestos-containing materials would also help alert employers and workers to the need to implement effective exposure controls.

As mentioned, deaths from asbestos-related disease reflect exposures from years earlier. To provide a better understanding of more recent occupational exposure, NIOSH analyzed asbestos sampling data collected by both OSHA and MSHA inspectors during the period 1987 to 1996. While concentrations of asbestos decreased over that period of time, asbestos continued to be detected in workplace settings ranging from textile operations to schools.

Furthermore, the airborne asbestos fiber concentrations were detected above the regulatory exposure limit.

At OSHA's request and as indicated, NIOSH is providing technical assistance to asses exposure to asbestos and other mineral fibers at specific worksites, including selected vermiculite expansion plants and horticultural operations that use vermiculite. We expect to complete the field data collection by early in calendar year 2002.

In 1990 testimony to OSHA, NIOSH broadened its science-based definition of asbestos beyond the six specific asbestos minerals currently regulated. NIOSH based its definition on scientific evidence from animal and cellular studies suggesting that fiber dimension—specifically, length and diameter—and durability are more critical than the specific chemical or elemental composition in the causation of asbestos-related disease.

The NIOSH definition encompasses certain variants of the six——

Senator MURRAY. Dr. Rest, if you could summarize, please, because we have a large second panel that we want to hear as well.

Ms. REST. Certainly. In conclusion, we know a lot about the adverse health effects caused by the inhalation of asbestos fibers, and we have known it for a long time. Many exposures or potential exposures in the workplace have been identified, and appropriate precautions are being taken.

However, many research questions remain to be answered to more fully understand the health effects of asbestos-like minerals and to prevent asbestos-related disease. Increased understanding of the health effects of these fibrous minerals that fall outside existing definitions would help us find better ways to provide appropriate protection for these workers, as would continued identification and tracking of workers in workplaces with potential exposure to these fiber-contaminated vermiculite and other contaminated materials.

Thank you, Senator Murray and members of the committee. I would be happy to answer any questions.

Senator MURRAY. Thank you.

[The prepared statement of Ms. Rest may be found in additional material.]

Senator MURRAY. Mr. Shapiro.

Mr. SHAPIRO. Good afternoon, Madam Chairman and members of the committee. I too have submitted our full testimony for the record and will be presenting a summary.

I am pleased to be here today to discuss EPA's efforts to clean up asbestos contamination in Libby, MT and the Agency's efforts to identify related sites nationwide.

I want to make it clear that EPA views the Libby asbestos site as one of the most significant sites we are dealing with nationally, and we are committed to working with our partners to take all steps necessary to protect human health and the environment in Libby and related locations.

As Senator Baucus noted, Libby is a small town of about 2,600 residents in northwest Montana. For more than 60 years, a mine operated in Libby which produced 80 percent of the world's vermiculite. The vermiculite was shipped around the country for use as a soil conditioner and in the manufacture of insulation and packaging material. The mine and processing facilities in Libby employed roughly 2,000 workers from 1924 to 1991.

One of the substances in the Libby vermiculite ore was asbestos. Asbestos contamination resulting from mining and processing operations has led to serious public health concerns among members of the Libby community.

EPA is working closely with other Federal and State agencies to address the asbestos contamination and public health concerns in Libby and other communities across the country. The response to potential asbestos contamination is a multiagency effort. EPA, the Agency for Toxic Substances and Disease Registry, ATSDR, and the U.S. Public Health Service established an emergency response team on November 22, 1999 to begin environmental and medical investigations in Libby.

EPA is focusing on site investigation and cleanup activities in Libby using its Superfund authority. The Agency is also using Superfund to assess the need for cleanup at other locations across the country where vermiculite ore was mined or shipped.

Thus far, EPA has committed more than $30 million for the investigation and cleanup in Libby.

In June of 2000, EPA initiated or provided oversight of cleanup at two heavily contaminated former processing areas in Libby. The Agency has also started the cleanup of a mining road, town park facilities, a high school track, and several residences.

In addition to Libby, EPA identified 243 locations around the country that may have mined or received vermiculite from a variety of sources. As of early July, EPA completed initial evaluations of possible asbestos contamination at 216 of these facilities. Thus far, we have determined that 17 locations require response by EPA and other Federal or State agencies.

One example is the Western Minerals site in Minneapolis, MN, which processed over 118,000 tons of vermiculite ore from Libby between 1937 and 1989. Since September of 2000, EPA and the State of Minnesota have been sampling and removing asbestos contamination at the former plant site and nearby residential yards. An ATSDR-funded health survey is being conducted by the Minnesota Department of Health to determine the magnitude of the health impacts to former workers and nearby residents.

In March of 2001, EPA's Office of Inspector General issued a report which focused on EPA's activities in Libby as well as EPA's broader role in regulating asbestos. The report concluded that EPA should continue its cleanup efforts in Libby and also emphasized the importance of cross-agency coordination to address potential contamination associated with mining and other operations unrelated to Libby.

EPA will continue to work closely with our Federal partners, including MSHA, OSHA, ATSDR, NIOSH, and the Public Health Services to protect the public health in Libby, MT and any other community that may be threatened by asbestos contamination from vermiculite ore or other sources.

EPA is also coordinating closely with our Federal and State partners to evaluate health data that may suggest additional sources of contamination.

Thank you for the opportunity to appear today. I welcome any additional follow-on questions.

[The prepared statement of Mr. Shapiro may be found in additional material.]

Senator MURRAY. Thank you very much to all of our panelists.

If there is no objection, Senator Wellstone has asked for 10 seconds to make a statement, and then we will turn to Congressman Rehberg for an opening statement and then we will go back to questions of the panel.

Senator Wellstone?

Senator WELLSTONE. Thank you, Madam Chair. I do not know if I can quite do it in 10 seconds., and it is actually not to make a statement. I just wanted to say to Mr. Shapiro that if it is okay, I want to put some questions to you in writing for your response.

And to Mr. Lauriski, thank you for being here, and thank you for coming by last week when we had a chance to talk. I want to also get a few questions to you in writing if I could. It sounds like you are going to be going in a different direction. You mentioned looking at a new rule, because I know your standard is far less rig-

orous than EPA or OSHA, and even with the workers in Libby, although several hundred have died, by your standard, many of them were, at least theoretically, not in harm's way, but they were, and I am wondering if you will be considering promulgating a rule to get a much stronger standard—but could I put that to you in writing and get your response?

Mr. LAURISKI. Certainly.

Senator WELLSTONE. Thank you.

Thank you, Madam Chair.

Senator MURRAY. Thank you, Senator Wellstone.

[Written questions of Senator Wellstone may be found in additional material.]

Senator MURRAY. Congressman Rehberg, please proceed.

STATEMENT OF HON. DENNIS REHBERG, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MONTANA

Mr. REHBERG. Thank you, Senator Murray.

I am a little nervous to be here. This is my first opportunity to be on the Senate side—and I can tell you I do not believe everything my House Members have told me about you—although I understand you are very cheap over here; my chair has broken already. [Laughter.]

I am late. We were voting on the rule on cloning. I suspect that if it had passed 45 years ago, I could have done them both at the same time. But I am here now, and I thank you for giving me the opportunity to join my colleague Senator Baucus—and thank you, Max, for taking the lead on this very important issue.

I am here today as the Member of the House of Representatives representing the entire State of Montana and in this case the community of Libby in Lincoln County.

As you may know, vermiculite ore has been mined near Libby since the 1920's. Most recently, it was mined by W.R. Grace & Company. A great deal of evidence indicates that many Libby area residents died or became ill due to exposure to asbestos-contaminated vermiculite ore.

I visited the community four times in the last year, including two times since taking office in January. During my most recent visit on July 6, 2001, I held a community meeting. After listening to 3 hours of testimony and discussion at that meeting, one thing became perfectly clear: The community has a right to know more about the current and past efforts by the Environmental Protection Agency to protect local residents from the health threats caused by asbestos-contaminated vermiculite ore.

I also determined that in the future, the actions and inactions of the past must be avoided at all costs to prevent another situation from occurring like the one that did in Libby.

On July 12, 2001, Inspector General for the EPA Nikki Tinsley went to Montana to discuss the contents of the report, "EPA's Actions Concerning Asbestos-Contaminated Vermiculite in Libby, Montana" released on March 31st of this year.

At this meeting, Inspector General Tinsley was able to provide some useful information. However, the Inspector General's report failed to address several important issues that are pertinent to the Libby situation.

As a result, I have requested the General Accounting Office to conduct an official investigation into the EPA's actions surrounding its efforts to address the very serious health threats the Libby community has faced and continues to face.

We now know that W.R. Grace was aware of the potential health threat their mined product posed. We know that EPA had numerous documentations of asbestos-related health issues because of the mining practices in Libby, along with conflicting information on the dangers of vermiculite. What we do not know is why the EPA did not take a closer look at the health-related issues in Libby in light of the history of reports, letters and studies documenting health problems there.

I understanding that funding limitations and other priorities can be distractions to an agency, but in Libby and all across the country, people were and are dying.

The EPA has spent upward of 20 years studying the reports of asbestos-related disease in Montana and elsewhere due to exposure to W.R. Grace mine products. In the meantime, people have been dying, exposure has continued, and the community has been torn apart.

It is important that Congress continue to explore possible changes to Federal laws and regulations that can help the Libby community in its efforts to address its ongoing health-related problems and to see that any past mistakes can be avoided in the future. Libby provides a tragic example of how uncertainty about levels of contamination can prove to be fatal.

I thank the committee for having this hearing and urge you to keep people in mind as you continue to explore this issue, because we cannot put a price on human life. It is incumbent upon us to err on the side of caution when dealing with toxic substances.

I understand the tragedy in Libby cannot be undone, but it is only through introspection that we can avoid in the future the mistakes of the past.

Thank you, Senator Murray.

Senator MURRAY. Thank you very much, Congressman. Thank you for joining us today.

The Senate has called a vote. I am going to ask three very quick questions and then let Senator Baucus ask a question, and then we will take a short recess and come back for further questioning and our third panel.

Dr. Rest, let me begin with you. A yes or no answer—do you believe that asbestos should be banned altogether in the United States to protect public health?

Ms. REST. I believe the best way to protect people from a hazard as serious as asbestos is to prevent exposure to that material and do everything we can to——

Senator MURRAY. Do you believe it should be banned?

Ms. REST. I believe that we have to do everything we can to prevent the exposure.

Senator MURRAY. Mr. Shapiro, do you believe that we should ban asbestos?

Mr. SHAPIRO. Speaking on behalf of EPA, as you know, at one point, we did propose and actually promulgated a rule to ban asbestos in most products. That rule was overturned by court deci-

sion. At this point, we have not reached any conclusion about whether to re-look at the issue of banning products.

Senator MURRAY. It is my understanding that the administration at that time back in 1991 did not pursue that case to further courts; is that correct?

Mr. SHAPIRO. I believe you are correct, yes.

Senator MURRAY. OK.

Mr. Layne, quickly, you mentioned a lot that OSHA is doing to prevent this kind of disaster. How do we explain that today people are still being exposed to asbestos in everything from mechanics' shops to nurseries to mines if we are doing so much?

Mr. LAYNE. It is really a continuing issue that we face on job safety and health generally across the board, and that is to look for innovative ways that we can reach employers and employees and educate them about workplace hazards.

Senator MURRAY. And since that takes so much time and obviously has not been effective, do you think we should ban asbestos?

Mr. LAYNE. I think the regulations that we have in place, if followed, can protect the worker.

Senator MURRAY. Senator Baucus?

Senator BAUCUS. Thank you, Madam Chairman.

You know, one of the big problems here is that agencies tend to point the finger at other agencies as being responsible, and they do not live up to their own responsibilities. There is just too great a dispersion of authority, and it is so easy for agencies to not step up and do what the public expects them to do. We do not have time to get into that at this point, but I hope that during the rest of this hearing and at some very imminent appropriate date, that can be settled and that a lot of you can figure out, not only with respect to asbestos but other problems that arise, how you can avoid passing the buck to the other agencies. I think a lot of that has happened here.

Another question that I have a hard time answering is why do we need more studies. It is pretty clear what has happened in Libby. I do not think anybody needs more evidence. I understand EPA has a blue ribbon panel to study asbestos—at least, that is what one of your administrators or someone at EPA testified to a short while ago. One of your agencies has a standard that is 20 times more lenient than another. I do not know what gives here.

There are other mines operating today. Libby, fortunately, is closed; the mine has been shut down. But there are other mines—I understand we will hear from someone later from Virginia. I do not know how much he is exposed; my guess is to some degree similar to the exposure of Les Scramsted in Libby.

I do not know how much more you folks need. I do not know how much value you place on people's lives. I think you hide behind rules. I think you hide behind regulations. You hide by passing the buck. These are people who are dying.

I want all four of you to come to Libby, MT, and I want you to look in their faces. I want you to see Les Scramsted—and you had better hurry; you had better hurry if you are going to see Les. [Applause.]

Senator MURRAY. The audience will please remain silent.

Senator BAUCUS. Can I get a commitment out of each of the four of you that you will come to Libby, MT this summer?

Mr. Shapiro?

Mr. SHAPIRO. I would be happy to.

Senator BAUCUS. Dr. Rest?

Ms. REST. Absolutely.

Senator BAUCUS. Mr. Lauriski?

Mr. LAURISKI. I would be happy to.

Senator BAUCUS. Mr. Layne?

Mr. LAYNE. Yes, sir. We are expecting a new assistant Secretary soon, and I will pass that on to him.

Senator BAUCUS. And I would like you to go, too.

Mr. LAYNE. Yes, sir.

Senator BAUCUS. All right.

I have no further questions. Thank you.

Senator MURRAY. Thank you, Senator Baucus.

We are going to take a short 5-minute recess to allow Senators to vote, and we will resume this panel for final questions when we come back and then go to our final panel.

[Recess.]

Senator MURRAY. We will resume the hearing, and in the interest of time, since this hearing is supposed to conclude at 4 o'clock, unfortunately, and we got started a little late and had a vote in between and are going to have another vote shortly, because of that, I and any other Senators on this committee will submit our questions to this panel, and if we could get you to respond in writing, I would really appreciate it, since we have a number of people who have traveled here from around the country who are unable to come back again.

What I will do, then, is dismiss this panel and ask our second panel to come forward at this time.

[Written questions from Senators may be found in additional material.]

Senator MURRAY. We will now begin with the second panel. I will remind everyone that they have 5 minutes, and I will gently remind you when your time has expired.

Today we will begin with Dr. Richard Lemen, a professor and private consultant from Emory University in Atlanta, GA; John Addison, an epidemiologist with John Addison Consultancy, United Kingdom; George Biekkola, a former employee of Cleveland Cliff Iron, L'Anse, MI; Dr. Michael R. Harbut, medical director of the Center for Occupational and Environmental Medicine in Southfield, MI; Dr. Alan Whitehouse, a board-certified chest physician in private practice in Spokane, WA; David Pinter, a former employee of Virginia Vermiculite, Incorporated, from Louisa, VA; and Ned Gumble, mine manager of Virginia Vermiculite, from Louisa, VA.

Again, thank you to all of you. I know some of you traveled a long way to be here today, some with health problems, and I really appreciate you coming and giving your testimony to the committee today.

Let us begin with Dr. Richard Lemen.

STATEMENTS OF DR. RICHARD LEMEN, PROFESSOR AND PRIVATE CONSULTANT, EMORY UNIVERSITY, ATLANTA, GA; JOHN ADDISON, EPIDEMIOLOGIST, JOHN ADDISON CONSULTANCY, UNITED KINGDOM; GEORGE BIEKKOLA, FORMER EMPLOYEE, CLEVELAND CLIFF IRON, L'ANSE, MI; DR. MICHAEL R. HARBUT, MEDICAL DIRECTOR, CENTER FOR OCCUPATIONAL AND ENVIRONMENTAL MEDICINE, SOUTHFIELD, MI; DR. ALAN WHITEHOUSE, BOARD-CERTIFIED CHEST PHYSICIAN, SPOKANE, WA; DAVID PINTER, FORMER EMPLOYEE, VIRGINIA VERMICULITE, INC., LOUISA, VA; AND NED K. GUMBLE, MINE MANAGER, VIRGINIA VERMICULITE, INC., LOUISA, VA

Dr. LEMEN. Thank you for inviting me, Senator Murray, to this very important hearing on the topic of asbestos and disease.

I am Dr. Richard Lemen. I retired from the United States Public Health Service, where I was Assistant Surgeon General of the United States and deputy director and acting director of the National Institute for Occupational Safety and Health. I have spent virtually my entire professional career since 1970 studying the health effects related to asbestos exposure.

In the United States, it is estimated that between 189,000 and 231,000 deaths have occurred since 1980 due to workplace exposure to asbestos. Another 270,000 to 330,000 deaths are expected to occur over the next 30 years, and for those workers exposed over a working lifetime to the current Occupational Safety and Health Administration 0.1 fibers per cc, three out of every 1,000 will die as a result of asbestos-related diseases.

Given that the National Institute for Occupational Safety and Health estimates, as of 1990, that nearly 700,000 men and women are potentially exposed at work, the future mortality from asbestos-related disease will continue to occur well into this new century.

If deaths of workers exposed to asbestos in the United States at the current occupational standard are anywhere near the magnitude just expressed, what, then, would be the magnitude of disease and death to the countless number of unsuspecting consumers using asbestos-containing products?

These products include such things found in the home as lamp sockets, floors, cat box fill, braking mechanisms in washing machines, furnaces, dishwashers, lawn products, and many, many others.

Because these products are not only manufactured by workers but are also used, maintained and repaired by workers, the workers suffer additional exposure from consumer products.

Why, then, is any form of asbestos still allowed in commercial products within the United States or the rest of the world, for that matter? The Environmental Protection Agency produced a list on the internet that I observed of at least 44 suspected asbestos-containing materials. Within their list were cement pipes still being used for transportation of potable drinking water and friction products such as brakes, to name just two of the widely-used commercial products.

Imports of asbestos-containing products still arrive in the United States each year and include such things as asbestos-containing corrugated sheet, sheet panels, tubes and pipes, brake linings, gas-

kets, and for brakes alone over the last 4 years, the imports have increased from $59 million in 1996 to $89 million in the year 2000; asbestos textile products in the form of yarn, thread, cord, string, knitted material, clothing—and they all appear to be increasing each year according to the United States Geological Survey.

The most recent Criteria Document from the World Health Organization's International Program for Chemical Safety states in 1988 that no threshold has been identified for carcinogenic risks. This is consistent with the World Health Organization's earlier conclusion in 1989 that "The human evidence has not demonstrated that there is a threshold level for lung cancer or mesothelioma below which exposure to asbestos dust would be free of hazard to health." The World Health Organization recognizes what NIOSH concluded 25 years ago in 1976, that "only a ban can assure protection against carcinogenic effects of asbestos."

Asbestos has been responsible for a massive epidemic of disease and death since its commercial exploitation, primarily beginning at the turn of the last century. As we enter the new millennium, we do not want to promote the myth, as is currently promoted by parties interested in the continued commercial exploitation of chrysotile, one of the forms of asbestos, that it was the other forms, the amphiboles, which were responsible for the massive epidemic. Chrysotile, by the way, makes up about 98 percent of the commercial use of asbestos.

The fact that Austria, Belgium, England, the Czech Republic, Chile, Denmark, El Salvador, Finland, France, Germany, Iceland, Italy, Latvia, the Netherlands, New Zealand, Norway, Poland, Saudi Arabia, Sweden, and Switzerland have all banned asbestos leads us to recognize that these countries feel the safe use of all forms of asbestos is not attainable and that alternative materials posing less risk to public health are desirable.

The World Trade Organization, not known for its friendliness to environment and labor standards, has nonetheless recently upheld a panel decision recognizing France's right to ban chrysotile asbestos, finding sufficient scientific evidence for the ban. And it was just announced yesterday that Argentina is intending to ban asbestos in their country as well.

I would like to go on and say that while it is true that asbestos consumption has declined in the United States and Europe, sales to other countries, particularly Southeast Asia, South America, Eastern Europe, has increased based on its use in the construction industry.

Senator MURRAY. Dr. Lemen, please summarize, and you can submit your full testimony.

Dr. LEMEN. I would like to summarize and complete my testimony to ask, with all the scientific data and knowledge about asbestos, why is it still allowed in commercial products for general consumer usage such as brakes, lawn products, cement pipes, and others? We have seen the toll on workers mining asbestos, manufacturing asbestos, and using asbestos-containing products. What will the toll on the American consumer be if asbestos continues to be allowed in commercially available products in American workplaces?

Now is the time for the United States join the growing list of nations that have banned the further importation and use of asbestos.

I would like to close by quoting the very eminent British public health statistician, Sir Bradford Hill, who said in 1965: "All scientific work is incomplete, whether it be observational or experimental. All scientific work is liable to be upset or modified by advancing knowledge. That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the action that it appears to demand at a given time."

The time is now, and the action we must take is clear.

I would like to say that I also have some material for the committee to look at that was purchased yesterday in Houston, TX. These are asbestos-containing gaskets imported from Brazil.

Senator MURRAY. Thank you, Dr. Lemen.

[The prepared statement of Dr. Lemen may be found in additional material.]

Senator MURRAY. Mr. Addison, please proceed.

Mr. ADDISON. Madam Chairman, thank you very much for allowing me the opportunity to speak to you this afternoon.

My name is John Addison, and I am an independent scientific consultant working in the field of mineralogy and health. I am actually a geologist by training. I was head of the Mineralogy Group at the Institute of Occupational Medicine in Edinburgh for about 15 years. The IOM is one of the foremost charitable research organizations in occupational health in the world.

My responsibilities there ranged from analytical measurement of dust in the occupational environment, including all of the asbestos minerals, to characterize asbestos and other minerals used in carcinogenicity testing and the determination of asbestos in human and animal tissue samples.

Over the last 20 years, I have been a member of the UK Health and Safety Executive Working Group, developing and drafting formal methods used for identification of asbestos in bulk samples and in airborne dusts. I am an internationally-recognized expert and have testified previously in U.S. Federal hearings with respect to the definition of asbestos, and in particular to the issues related to the nonasbestos forms of the amphibole minerals.

There are many complex issues involved in the measurement of asbestos in dust and bulk samples, but one of the most important distinctions that must be made is that between the asbestos minerals in the amphibole mineral group and their normal nonasbestos analogues. These are minerals that are effectively the same chemical composition but with subtly different crystal structures that lead to very different physical-chemical properties and different toxicological behavior.

These differences have led to the clear distinction being made between asbestiform amphiboles and their nonasbestos analogues in the regulatory framework for asbestos in the United States, in the UK, and in much of the rest of Europe.

One very important aspect of this issue is that all of the amphibole minerals have the property of forming crystal fragments that may meet the size definition of a regulatory fiber, but that does not mean that these fragments are asbestos, nor does it mean that they have the same toxicological properties as asbestos.

Within this context, it was entirely appropriate that the fiber counts performed by OSHA for regulatory purposes discriminated between the cleavage fragment fibers of amphiboles and true asbestos fibers. Such a distinction is not only appropriate, but it is essential for the proper regulation of large numbers of industrial rock and mineral processes within the United States and elsewhere since many of these contain amphibole minerals, and these will generate cleavage fragment fibers that meet regulatory size criteria even though they are not asbestos.

Having previously advised The Vermiculite Association, which is the international association of vermiculite miners and users, on issues related to amphibole and asbestos minerals, I was invited by Mr. Gumble of Virginia Vermiculite to assist him when it became apparent that there were possible asbestos outcrops within the ore body of the mine.

Over the last 2 years, I have spent 15 days working at the mine, inspecting the ore body, personally explaining to every member of staff the health effects of asbestos, methods of identification, airborne dust monitoring, and many other aspects of asbestos science.

I confirmed for Virginia Vermiculite that a tremolite asbestos did occur indeed as thin veins within the ore body, but these were not persistent and were only sparsely developed in terms of the whole mass of the ore. Since the thin tremolite veins could be recognized by an experienced operator, they could be removed when encountered and would not contribute to worker dust exposure during processing, nor would it finish up in the product.

Even if the tremolite asbestos veins had simply been mixed in with the ore while it was being processed, it is unlikely that the tremolite asbestos would have been detected by conventional U.S. asbestos methods.

Other small occurrences of actinolite asbestos also appeared to be found at the margins of intrusive masses of granitic rock that are found cutting the main rock mass of the deposit. Once again, these asbestos occurrences were not persistent and were only sparsely developed. Since the granitic rocks have no value as a vermiculite ore, they would not normally be disturbed nor would there be any value to their processing.

Toward the end of my visits, I recommended that Virginia Vermiculite should request a visit from Dr. Malcolm Ross, probably the leading authority in the world on asbestos minerals, and formerly of the U.S. Geological Survey. He confirmed what I had found and furthermore suggested that such asbestos occurrences are widespread throughout the whole of the Appalachian Mountains and the Piedmont areas—not to say the Rocky Mountains and many other parts of the continent.

In these circumstances, it is almost impossible to absolutely exclude the possibility of asbestos occurring in any mineral or rock development, but that does not mean that all such developments should cease——

Senator MURRAY. Mr. Addison, if you could summarize quickly, I would appreciate it.

Mr. ADDISON. Yes. One more sentence. That does not mean that all such developments should cease, only that sufficient care and attention must be paid to properly manage the asbestos problems.

It is clear to me that in their considerable efforts to identify their problems, to manage the asbestos in their mine, and to minimize the possible health effects on workers, Virginia Vermiculite has set an excellent example and should be commended.

Thank you for your time.

Senator MURRAY. Thank you, Mr. Addison.

[The prepared statement of Mr. Addison may be found in additional material.]

Senator MURRAY. Mr. Biekkola.

Mr. BIEKKOLA. Senator Murray and members of the committee, my name is George Biekkola from L'Anse, MI. I am 67 years old, and I have asbestosis.

I began working for Cleveland Cliffs Iron Company in Michigan in 1964. After almost 30 years on the job, I had to retire early because of my disability.

I like being able to do things for myself, but now I cannot mow the lawn because my lungs are damaged. I have only two-thirds of my lung capacity, and that is because my lungs are filled with asbestos fibers and have scarred from years of exposure. This puts a big burden on my heart, so I have to be careful not to exert myself too much.

I also have to be very careful that I do not catch pneumonia or any lung condition, because my lungs are not able to fight off infections.

I thought I would be spending my retirement traveling out West with my wife, hunting deer up in the mountains, but today I cannot. This is not how I thought I would be spending my retirement, but when I think about the other guys I worked with, I guess I came out lucky. Like my friend Dale Roberts, an electrician. He was so excited to retire and could hardly wait to help his son run a portable sawmill. Six months later, he was dead of mesothelioma. Or my friend Joe Brogan—2 weeks after Joe retired, he was dead of asbestosis/mesothelioma.

Senators, I could give you more names—in fact, when I finally took the mining company to court a few years ago, I brought with me a stack of over 200 death certificates.

I am here today to tell you my story so that maybe somebody else working in a mine or a brake shop or a factor will not lose——

Senator MURRAY. That is fine, Mr. Biekkola. Just take your time.

Mr. BIEKKOLA [continuing]. Will not lose the things I have lost.

Because it takes 20 to 30 years for the scarring in the lungs to show up on an x-ray, many people are not aware of the problem. Most Americans think asbestos is no longer a danger, but they are wrong. Today, asbestos fibers are still used in manufacturing and are still ruining the health of workers like myself.

Companies will tell you that asbestos is not a problem, just like they told me. Senators, they lied. We need to worry about asbestos. We need our Government to protect us.

In my job, I operated a hard rock drill. Often, I would drill through veins of asbestos and would breathe in the dust along with the rock dust. The safety equipment was limited. I also worked overtime in the kilns and crushers, where I was exposed to more asbestos.

Eventually, I learned how to repair electronic equipment around the mine. Often, that equipment was wrapped in asbestos. I have brought some examples of some gaskets and packing material and thermal-couple wire that I handled throughout my job.

In 1987, x-rays showed asbestos in my lungs, but the company doctor and the lung specialist told me not to worry about it.

In 1990, I went to see Dr. Michael Harbut. He told me a different story about asbestosis, and he told me to get out of the mine. I went back to the company with the doctor's report, but they told me, "Your job is here. Be at work tomorrow," and that was that.

Later, I went to the Mayo Clinic in Minnesota for several days of tests. I showed these results to the company's personnel man, and he laughed at me and told me I could throw my medical report in the garbage.

Because of my disability, I retired at age 60. Today I cannot do the things that I want to do for myself and my family.

In the coming months, many workers will be diagnosed with asbestosis. I just wish the company would be more responsive to those workers and their families and not wait until those workers have died.

Senators, please make sure that what happened to me will not happen to anybody else. Please raise the safety standards and keep a better eye on these companies. Workers like me are counting on you to protect us. Please do not let us down.

Thank you.

Senator MURRAY. Thank you very much, Mr. Biekkola.

[The prepared statement of Mr. Biekkola may be found in additional material.]

Senator MURRAY. Dr. Harbut?

Dr. HARBUT. My name is Michael Harbut. I am a doctor of medicine and a teacher at the Wayne State University School of Medicine in Detroit, MI. I am also a past chair of the Occupational and Environmental Health Section of the American College of Chest Physicians and am a board member, as was Congressman Bruce Vento, of the Mesothelioma Applied Research Foundation.

Each year, I have approximately 3,200 contacts with patients who are ill as a result of their occupational or environmental exposures. Hundreds of these patients have asbestos-related diseases or cancers. Most of them die before they were meant to. My remarks today, therefore, are not only from the perspective of a physician who knows that much of the sickness and death which he daily confronts was preventable; in honesty, I am also angry at the industry and its friends in high places who have allowed this carnage to occur.

I want to speak briefly about what asbestos fibers are and what they do when inhaled. It is quite commonly known that asbestos fibers cause scarring of the lungs and lung cancer; what is less commonly known is that persons with significant asbestos exposure have an increased overall death rate from all cancers.

Asbestos fibers are microscopic airborne needles which penetrate the delicate tissue of the lung and have been identified in every organ of the body. Anywhere from a handful of years to decades later, persons with asbestos-related disease develop a thickening on the covering of their lungs, their smaller airways become narrowed,

and the membrane over which oxygen passes to the bloodstream becomes thickened, increasing the work of breathing. They become short of breath on climbing a few stairs; they cannot walk from the shopping center lot to the store without stopping; and before too long, any exertion can cause a profound shortness of breath. Many patients ascribe the symptoms to "just growing old." If they do seek medical attention, the diagnosis of asbestosis is rarely rendered. There are several reasons for this.

First, even for trained physicians, it can be a tough diagnosis to make. Notwithstanding the mass tort litigation where an asbestosis diagnosis may be less than reliable, a real asbestosis diagnosis made by a real doctor just does not happen that often. One reason is that sometimes there are problems in identifying the asbestos fibers, one of the reasons why we are here today.

Even if a patient has all the clinical signs and symptoms of asbestosis, there is sometimes inadequate data to confirm the presence of what the Government has decided constitutes an asbestos fiber. These are sometimes called asbestiform fibers, and in some cases, the inhaled dust may contain a percentage of asbestos below what was previously believed to be harmful or may be regulated as a "particulate not otherwise classified."

To illustrate this, please see the x-rays I have brought. The first demonstrates a normal lung; the second, a patient with early but definite asbestosis. It is those white lines that look like dust that represent the asbestos scars.

You will see that the third is quite similar to the second, demonstrating what appears to be early, definite asbestosis, but when we ashed this patient's left lung after it was transplanted, we found no asbestos fibers, but we did find a number of "cousins" of asbestos. This x-ray also shows what the inhaled dusts have done to the surviving lung over a period of 10 years.

If you take a look at the film on the right, it shows the natural course of asbestos in the patient's right lung. It is a massive scarring. Fortunately, the left lung is transplanted.

The fifth film shows what appears to be an early but definite asbestosis in a mine from Michigan's Upper Peninsula. He was not given this diagnosis by the courts, however, because his exposures fell below MSHA's notice.

The next film shows an advanced asbestosis in a steelworker, and the last demonstrates asbestosis in an autoworker who made brake shoes.

Diagnoses are also not made for insurance reasons. Once a patient receives a diagnosis of asbestosis, it is a fair bet the doctor and the hospital will have a very hard time getting paid for care. The patient can be thrust into a compensation system which rarely rules in his or her favor, and the patient's ability to acquire health or life insurance is severely impaired.

So not only have these patients been assaulted by the fibers, they are assaulted by the law. They are also assaulted by funding policies for research. As an example, for every six breast cancer deaths, the National Cancer Institute is funding a study. There is one study funded for every 80 mesothelioma deaths. Mesothelioma is the relentless cancer of the covering of the lungs and intestines caused by asbestos which is usually found at autopsy, but when

discovered before death, confers an average life expectancy of 6 months—a death from a fiber inhaled 40 years earlier.

In my remaining moments, I would like to make a few suggestions which I think would help alleviate illness, suffering, and preventable death in our generations and those of our children.

First, the Government should convene a panel of scientists and clinicians who know a lot about asbestos, its cousins, and the disease they cause. One requirement of membership of physicians would be that they have treated at least 100 persons with asbestos-related disease over the previous 5 years. The panel would study all diseases which present clinically, as does the 2001 brand of asbestosis. The panel would also look at the health, compensation, and insurance issues growing out of asbestos and asbestiform exposures.

Finally, the Government should immediately encourage the refocus of at least some of its resources on the prevention, early diagnosis, and someday cure of asbestosis and mesothelioma. Prevention actually is an easy one—just ban the use of asbestos in the United States, as have nations all over the world.

For decades, the society, the courts, and much of the Government have regarded asbestosis as a legal inconvenience. My patients and I ask you to understand that to them and their families, asbestosis means disease and death.

Thanks very much for inviting me, and thank you for having these hearings.

Senator MURRAY. Thank you.

[The prepared statement of Dr. Harbut may be found in additional material.]

Senator MURRAY. Dr. Whitehouse.

Dr. WHITEHOUSE. Thank you, Senator Murray.

My name is Dr. Alan Whitehouse. I am a chest physician and pulmonologist from Spokane, WA. Spokane is 160 miles from Libby and is the primary referral source for patients with lung disease from the Libby area. I have been privileged and saddened to have taken care of many people from Libby who have asbestosis.

Libby, as you know, was the site of the W.R. Grace Corporation vermiculite mine. Vermiculite is an insulating compound very commonly used for insulation, soil conditioning, and in fertilizers. The ore body of the W.R. Grace mine contained up to 27 percent tremolite asbestos.

Tremolite is a highly toxic asbestos that is a contaminant with no commercial value. The insulating material is produced by heating the ore, or "popping" it after attempts are made to separate the tremolite asbestos from the ore body itself.

Unfortunately, all the tremolite cannot be separated from the vermiculite. Both the partially refined ore and the finished product, known as zonolite, were sent throughout the country. The ore was sent to approximately 60 expansion plants to be made into insulating material, as you have noted up there on the slide.

The finished product contained significant quantities of tremolite asbestos and was shipped throughout the country for various forms of insulation from both Libby and the 60 or so expansion plants.

Asbestosis, as you have heard, creates an intense inflammation in the lining of the lung and produces fibrosis and scarring within

the lung itself. There is a latency period from the time of exposure of anywhere from 15 to 40 years from the time of last exposure.

All this scarring prevents the lungs from expanding and prevents gas exchange of oxygen and carbon dioxide. People who have progressive asbestosis die of a variety of illnesses. About 3 percent in the Libby series will die of mesothelioma, which is a cancer that you have heard about; many will die of respiratory failure, which is basically a form of suffocation due to an inability to oxygenate your body. The incidence of lung cancer is up to seven times expected from the general population.

Unfortunately, vermiculite with this contaminant, tremolite, was scattered throughout the entire Libby area. It was present around the expansion plant, which was right near downtown Libby; it was present along the rail lines; it was used throughout the community as a soil conditioner, placed on the playgrounds of the schools to help condition the track; it was placed on the ball field and was worked regularly to keep the ground suitable for playing baseball. It was available free to the community to use in attic insulation, and many of the homes in Libby are insulated with vermiculite. Children played in the piles of vermiculite for many years.

These were all fairly heavy exposures to asbestos, but unfortunately, there is also a significant number of people who have asbestos-related disease in whom the only source of asbestos that you can find is that they lived in Libby, MT and neither played in it as children nor were employed by Grace, nor lived with families of miners.

Through the years, especially since 1980, I have seen a number of miners who worked in the plant who had asbestosis. It was thought until the last 5 to 7 years that this disease had been confined to the miners and their families. In the last 5 years, I have seen an alarming number of patients who had no direct exposure to the mine or to the miners, who have asbestosis but obtained the disease from just living in Libby, MT. These include the children who played in vermiculite, rail workers, loggers who had logged around the mine property, men who worked in the lumber mill where they had used vermiculite on the plywood dryers, people who lived next to the expansion plant and storage bins, and people who just lived near downtown Libby who could not be identified as having any significant other exposure.

I have been collecting a database for a number of years and currently have 396 cases in the database. They range all the way from patients with a few pleural placques to people who have died of this disease. One hundred three of this, or approximately 25 percent, are people who have never worked for Grace and whose exposure was environmental only in Libby. Twenty-four of my patients have died in the last 3 years, and five of these were people who only had environmental exposure.

It is clear from the data that I have that people can obtain severe asbestosis with what would appear to be relatively minimal exposure.

The current EPA/CDC screening program of 6,000 residents of Libby has turned up between 20 and 30 percent abnormal x-rays. There will likely be another 1,500 people with abnormal x-rays

added to my 400, and they are going to screen another 2,000 to 3,000 people this year.

Asbestosis is a progressive disease. It is not known whether everybody with pleural placques will develop severe disease or not. It is clear that over 100 of my patients have severe disease, and about 75 percent of my patients with even mild disease are having progressive loss of pulmonary function, taking into consideration the changes in their function that goes with age. This 75 percent are losing approximately 3 to 5 percent of their lung function per year over and beyond what would be expected from aging. These are people with mild disease who were exposed in the sixties and seventies and now have reached the point in the latency period to start progressing rather rapidly.

It is clear that you can get asbestosis from what was thought to be a minimal exposure. Tremolite is considerably more toxic than chrysotile and may not take nearly as much exposure to get severe disease.

Tremolite is present in many places throughout this Nation in the attic insulation where Zonolite was used. It is unclear how severe a problem this is, although I have one patient with asbestosis whose only exposure was home insulation.

It does not appear from the data we have from Libby that there is anything such as a safe level of airborne asbestos. It may well be that we are still contaminating large numbers of people nationwide, particularly with tremolite, without actually knowing it.

I will conclude by saying the following. The W.R. Grace Corporation was very well aware of the extent of this asbestos contamination throughout their ownership of the mine. There are probably many similar places in this country where a significant amount of exposure is contaminating, especially the 60 expansion plants, and I have cases from Great Falls, from California, from Spokane, and I know of cases from Minneapolis, all related to that.

Because of this long latency period of asbestosis, it is likely that we will continue to see new cases until at least the year 2030 if we banned asbestos at this point in time.

Thank you.

Senator MURRAY. Thank you, Dr. Whitehouse.

[The prepared statement of Dr. Whitehouse may be found in additional material.]

Senator MURRAY. Mr. Pinter.

Mr. PINTER. Members of the Senate, ladies and gentlemen, my name is David Pinter of Louisa, VA.

Before I quit 2 months ago out of fear for my health, I worked for Virginia Vermiculite for more than 22 years. I was a heavy equipment operator and mechanic and worked every day excavating and loading vermiculite for processing at the plant. I also loaded and distributed the waste rock that was left over at the end of the processing, and several times a week, I hauled the processed ore through the town of Louisa to dump it at an uncovered stockpile near the middle of town, or I loaded it onto a boxcar to be shipped all over the country.

Every day I worked in clouds of dust doing each part of my job. Some days the dust was so thick I could barely see. Never in 20 years was I given any protective clothing or respiration equipment.

When I would excavate the vermiculite to begin the processing, I would see veins running everywhere through the ground of whitish-gray fibrous material that was much lighter than the surrounding rock and sometimes almost fluffy in consistency. A lot of this fibrous material ended up in the waste rock, and a lot of it ended up going into the process that put it into the downstream product.

I have samples of this stuff in the jars here in front of me, as you can see.

For as long as I can remember, there have always been rumors in our community that the vermiculite that we were handling was contaminated with tremolite asbestos.

The company owners assured the workers and the people of the community that this was not true and that we were safe. No one thought the company would lie to us, especially since one of the owners was former Deputy Administrator of the EPA for Air and Water Safety in the Nixon administration.

As a result of all this, we put our fears aside and continued to work unprotected.

I know now that the tests conducted by W.R. Grace Company going back to the 1950's showed heavy concentrations of tremolite asbestos in the Louisa deposit. W.R. Grace controlled the deposit before Virginia Vermiculite took it over.

Only 20 percent of the material we dig up becomes usable vermiculite ore. That leaves 80 percent of every ton of excavated earth as waste rock that is accumulated at the plant site. Each year, we produce up to 50,000 tons of vermiculite. This leaves 200,000 tons of waste rock that must be disposed of annually. The management of Virginia Vermiculite decided that a good solution to this problem would be to give it away to the public as free gravel.

For 22 years, I watched people come in with their own trucks to be loaded with this waste rock, or management would send dump trucks full of waste rock out each day to be dumped on people's driveways, parking lots, public areas such as the local library and the fairgrounds. Usually about 100 to 300 tons of this material was given away every day. As I told you before, all this waste rock contained large quantities of white-grayish fibrous material.

In the fall of 1999, I began to see all the news about how the vermiculite workers and their families were dying in Libby, MT from exposure to tremolite asbestos. This scared all the workers at the plant, but management continued to tell us that we had nothing to worry about and that there was no tremolite in the Virginia deposit.

Some months later, an inspection team from MSHA showed up to check for asbestos exposure. They seemed shocked at what they found. I heard someone say, "This looks more like an asbestos mine than a vermiculite mine."

It turned out that the white-gray fibrous material that we had been working in for all these years was indeed tremolite asbestos—the same as the Libby, MT plant—and citations were issued against the company because of the worker exposure.

MSHA's tests later showed the tremolite to be in a concentration of up to 99 percent. The inspectors said the workers needed to be in protective clothing, use respirators, have dust-free cabs on all equipment, and have onsite showers and other decontamination

equipment provided. They also made management put red flags and orange cones out to mark the dozens of veins of asbestos that criss-crossed the property. These veins range in size from less than an inch to one which is 6 feet high and 2 feet wide. Usually, the best-quality vermiculite is under and around these deposits of asbestos.

Management was visibly annoyed at having these rich parts of the deposit off-limits.

As I understand it, management told MSHA they agreed to all of MSHA's safety requirements. However, management actually ignored the safety requirements, and most of them have never been carried out. The red flags and orange cones were set out to mark the asbestos veins, but no protective clothing or respirators were ever issued to the men, and there is almost no protective equipment in place.

Since January, however, MSHA and the EPA seem to have lost interest in the tremolite asbestos problems at Virginia Vermiculite, and management seems to appreciate this. For example, on Inauguration Day 2001, the bosses at the plant were joyful and ordered all the red flags and orange cones removed from the barricaded areas where the asbestos veins were, and the workers were told to excavate through the asbestos veins as they always had before. I have a couple of photographs here, if you are interested.

When the plant manager ordered this, I heard him say: "We do not have to worry about MSHA anymore. From now on, they will be behind us every step of the way. They will not cause us any more problems." Once again, all the tremolite went into the product for downstream consumers of garden and lawn products, medicated powders, fire board, brake shoes, aggregates, and numerous other common products.

Everyone talks about what a tragedy Libby, MT was and how it can never happen again. Well, it is happening right now. It is happening under your noses just 2 hours from where you are sitting. We are not dead yet, because the mining in Libby began 25 years before they started in Virginia—but it is coming.

The end of the incubation period for asbestos disease is almost at hand. All the plant workers since 1978 have been exposed, and hundreds of people in the town and county are being exposed daily. It is probably already too late for most of us, but you need to shut this mine down and require the company to thoroughly decontaminate the mine and mill site. You also need to require the company to disclose every location where they spread their waste rock and to clean up those sites, too. This is the only way to protect all those who have been exposed and do not know it.

Thank you for your time. I have appreciated coming here.

Senator MURRAY. Thank you very much, Mr. Pinter. [Applause.] We will not have any outbursts from the audience, please.

[The prepared statement of Mr. Pinter may be found in additional material.]

Senator MURRAY. Mr. Gumble.

Mr. GUMBLE. Senator Murray, my name is Ned Gumble, and I am the manager of Virginia Vermiculite. I have been there since it was first started in the late seventies, and I am familiar with all aspects of its operation.

We got into business and our deposit was brought on line as a result of the Libby situation and customers opting to or stating that they would not buy Libby material ever again.

We currently meet the OSHA airborne standard of 0.1 fibers per cc for all workplace exposure, and even though we are regulated under MSHA with a two-fiber standard, we apply the OSHA standards in our own continuous testing program.

As an attachment to my testimony, I have included a history of all of our OSHA airborne monitoring.

With regard to the allegation on the rocks spread throughout the community, as a result of this MSHA inspection which we received late last fall, other agencies were called in to take a look at exposure possibilities within the community, and EPA sent a team in—they have been there several times—not only to monitor or take a look at potential asbestos contamination in this waste rock, but they also did a parallel study to that work which was done in Libby in terms of sampling dust in surrounding homes.

EPA results on numerous rock samples throughout the community—no asbestos detected. The parallel study on dust samples—no asbestos detected.

As a point of reference, when EPA did their test work in Libby, MT looking at dust exposure in the town of Libby, they found exposures and quantities of tremolite in 11 out of 32 homes. Mind you, these homes are miles away from the mine. When EPA came to Virginia to test in our area, the closest home is within 100 yards of active mining activity, and there was no asbestos detected.

In addition, we have undergone a set of health screening for all of our employees recently. Last year, our employees received lung examinations by the University of Virginia Health System, their Division of Pulmonary and Critical Care Medicine. The results of these examinations are also included as an attachment and were negative for all employees tested. Mr. Pinter refused to participate.

We do have occasional thin veinlets of fibrous material in our deposit. We brought in Mr. Addison to address this issue, as he suggested, and based on that consultation, he spent time going through our entire deposit and advised us on procedures for dealing with these minor occurrences and also thoroughly trained all of our employees on asbestos issues.

To step back in time, in August of 2000, we received the third investigation into our operation by the Mine Safety and Health Administration in the year 2000. This investigation was allegedly triggered by an employee complaint. As a result of that, MSHA found no violation of MSHA's or OSHA's employee exposure standards. However, MSHA did release prematurely inaccurate results to the Seattle Post Intelligencer regarding this investigation. At that point, MSHA gave us two "housekeeping" citations regarding asbestos. At this time, MSHA took samples of our product and found no asbestos in our vermiculite products. In their prior two visits that year, they also sampled our product and found no asbestos detectable in our vermiculite products.

Once MSHA reviewed the appropriate test results that it did have in its possession in September of 2000 but withhold when they released the results to Seattle Post Intelligencer, and when they retested our operation later in 2000, they withdrew those cita-

tions. I have included also as an attachment a chronology of all these events as well as communications with MSHA in this regard.

I guess in closing, I would like to say several things. First of all, I would like to supplement my testimony with a letter from our employees who have had the opportunity to review Mr. Pinter's allegations against us. That will be a supplement.

Second, I would like to make a very brief point about our product. You today, as well as other Senators and panel members, have spoken about asbestos banning and what we might do in this country in that regard. For the last 5 years, we have been shipping material to Denmark, one of the countries named which has banned asbestos products. Every time we ship to that country, we send a composite sample of the shipment which is precertified by their Institute of Occupational Medicine. We have never failed in getting a shipment certified in Denmark.

Second, I guess I would like to speak from the heart for a minute and put a little perspective on Libby, MT, which I think has been lacking here.

EPA did a study on asbestos concentration in Libby, MT in the late eighties. It is also an attachment to my testimony. You will find in there that they cited asbestos concentrations in the ore fed to their plant up as high as 20 percent, which I think is high. On average, I understand the number is 2 to 3 percent, but that is the quantity of asbestos interspersed throughout that entire deposit.

In Virginia, we have some discrete veinlets of material, the sum total of which would not fit on my briefcase from a surface area standpoint.

Senator MURRAY. Mr. Gumble, I have allowed you to go two and a half minutes over time. If you could summarize now, I would appreciate it.

Mr. GUMBLE. OK. Test work of the quantity of fibers in our raw material is less than 10 parts per million, some 2,000 to 3,000 times less than in Libby, MT. As an attachment, I have also listed information showing historical fiber exposures to employees in Montana, and those exposures were based on a NIOSH study done in the late eighties. Exposure levels in the fifties and sixties were in the hundreds of fibers per cc.

Senator MURRAY. Please sum up.

Mr. GUMBLE. We have adopted a standard of 0.1 fiber per cc.

Senator MURRAY. Thank you. You can submit your entire testimony, Mr. Gumble. Thank you very much.

Mr. GUMBLE. Thank you.

[The prepared statement of Mr. Gumble, with attachments, may be found in additional material.]

Senator MURRAY. I have several questions, and then I will turn it over to Senator Reed for his questions.

Mr. Gumble, let me just ask you, isn't it true that since MSHA conducted its inspection last August, your company, Virginia Vermiculite, has acknowledged the presence of tremolite asbestos at your mine?

Mr. GUMBLE. Yes, that is true. I mean, we acknowledged it prior to MSHA.

Senator MURRAY. In your testimony, you said that MSHA withdrew its citations. Wouldn't it be more accurate to say that MSHA

entered into a negotiated settlement with your company which included your company taking additional measures to protect workers?

Mr. GUMBLE. Yes. They vacated the citations as a result of that; correct.

Senator MURRAY. As a result of the negotiations; thank you.

Mr. Addison, you are a spokesperson for Virginia Vermiculite; correct?

Mr. ADDISON. I am an independent consultant with interests related to the vermiculite industry in general as well as many other industries.

Senator MURRAY. I was curious—you are from the United Kingdom, and they have banned asbestos. Do you find that peculiar?

Mr. ADDISON. We have a prohibition on asbestos, and I am not here to argue for or against the prohibition on asbestos. But I would say that to some extent, a prohibition on asbestos might be just as effective as, for example, a prohibition on carbon dioxide. Asbestos is a natural material that occurs in the environment, almost everywhere on the surface of this planet, so to ban it in the strict sense is pointless. You may prohibit its use in certain materials, and I would support that.

Senator MURRAY. Dr. Lemen, let me ask you a question. How do you explain the fact that the United States still has not banned asbestos or contact with asbestos, unlike so many other countries in the world?

Dr. LEMEN. I firmly believe that the United States should ban asbestos, and they have had the opportunity. Unfortunately, when EPA took that step, and it got into litigation, it was overturned by a Federal court. I think that the U.S. Government should follow the rest of these countries and immediately go into action to ban the use of asbestos in consumer products and the importation of asbestos, and I think the United States is very far behind the line in doing this action.

Senator MURRAY. Thank you.

Dr. Harbut, right now, the Federal Government only regulates six forms of asbestos. Would you recommend that the Government expand its definition, and if so, could you tell us how?

Dr. HARBUT. Sure. I think, my suggestion is that a committee of very informed people about asbestos-caused diseases and those diseases which look like asbestos or asbestosis, which are excluded from the definition because of governmental fiat adopted in the last 30 years, should be looked at. And the diseases should be judged from their clinical presentation, pathological presentation, and back up from there, and then determine what minerals cause the illness.

I also agree that the fibers should be banned. If I may, I thought Mr. Addison was making an argument for the legalization of marijuana there for a moment—it is a natural substance, it grows on trees, it occurs in the environment. I think that that argument does not hold water. There are many, many naturally-occurring substances ranging from arsenic to asbestos which are known to poison people, so I think a ban is certainly not unreasonable, number one, and number two, I think that the definition should be broadened.

Senator MURRAY. Thank you.

Dr. Whitehouse, you have talked about your treatment of a number of people who were exposed in Libby, MT, and we heard Senator Baucus talk earlier about the tremendous personal grief that has occurred in that community. In your opinion, what should Congress and this administration do to ensure that what happened in Libby, MT never happens again?

Dr. WHITEHOUSE. I think that first, they should ban the use of asbestos in consumer products and in most products—there may be some special uses, but for the most part, it should be banned.

I think there should be a regulatory effort concerning all these contaminants that may be present in other compounds. What Dr. Harbut said about diseases that look like asbestosis probably are various forms of asbestos-related diseases, but may be similar compounds, and in fact some of the cleavage fragments that were discussed may be problematic as well. So I think the Government should regulate this stuff very tightly; this is obviously present throughout the country.

Senator MURRAY. Thank you.

Mr. Pinter, just to give you a chance to respond—did things change at the mine after MSHA issued the notice of violations last August?

Mr. PINTER. Not that I know of, ma'am. The only thing that I saw that they did was verify the veins of asbestos. And they were supposed to comply with full-quality air control cabs, and when I left, there were only two pieces of equipment out of about 20 that had any environmental cabs on them; and we never did get any respirators. The only thing we were issued was 3M dust collector respirators, which State on them that they are not for asbestos use. No showers—well, they have one shower there, but it is not a decontamination shower—no protective clothing. It just went on like they usually mined, so they never really did do anything that MSHA suggested.

Senator MURRAY. Thank you.

Mr. Biekkola, when did you first suspect that you were being exposed to asbestos at Cleveland Cliff Iron?

Mr. BIEKKOLA. Probably in the mid-sixties.

Senator MURRAY. So 30-some years ago.

Mr. BIEKKOLA. Yes.

Senator MURRAY. Mr. Pinter, you have worked 22 years at the mine?

Mr. PINTER. Twenty-2 years and 3 months.

Senator MURRAY. Did you ever wear protective equipment?

Mr. BIEKKOLA. When the room or the building got so white, dusty, and cloudy that you could not see the lights very well, they would come out with the cloth respirators, which we know today are not adequate for filtering asbestos fibers. And then, if you could find the box, it was loaded with dust, and you did not want to use it anyway.

Senator MURRAY. Did you ever worry that you might be bringing that home to your family?

Mr. BIEKKOLA. We had showers right at work, but yes, there was a thought of the clothing that we would bring home daily or every

other day to get cleaned up. And they did not furnish any protective clothing other than a pair of gloves; that was all.

Senator MURRAY. Senator Baucus discussed a number of families—Dr. Whitehouse, I assume you know the same—workers who brought asbestos home from work and infected their families, or children who played in the vermiculite in schoolyards, etc. You mentioned a number of your friends who have passed away. Did any of their families have that kind of exposure?

Mr. BIEKKOLA. In that area, the doctors would not even mention that the miners were asbestos victims. They did not want to——

Senator MURRAY. The doctors that you went to?

Mr. BIEKKOLA. They did not want to. It was a closed—they never talked about it.

Senator MURRAY. Dr. Whitehouse, can you explain that?

Mr. BIEKKOLA. There are very few asbestos cases listed out of—there are three mines up there, and it is heavily mined, and there are heavy, heavy deaths.

Dr. WHITEHOUSE. Actually, in Libby, the first time that Grace was told about the asbestos was actually—or, actually, the original Zonolite Corporation was told in the fifties about people with abnormal x-rays. The radiologists in Libby were aware of the problem and tried to bring it to their attention for a long time. A physician by the name of Dr. Rick Irons tried to bring it to Grace's attention in the late seventies and basically left town because of all the clamor that occurred over that.

I think the doctors were aware of it, but I don't think they recognized the significance of it at the time.

Senator MURRAY. I see.

Senator Reed?

Senator REED. Thank you very much, Madam Chairman.

Mr. Addison, you have examined closely the Virginia mine. Have you ever had the occasion to examine the mines in Libby or in that area?

Mr. ADDISON. No. I have seen the material, and I have seen analytical reports, and I recognize the description of 28 percent asbestos in material prior to processing and 2 to 3 percent after processing in Libby. That is so different from the situation in Louisa that it just does not bear comparison.

Senator REED. It is different in the concentration of the asbestos—that is the key difference?

Mr. ADDISON. Not just the concentration but the distribution of the asbestos.

Senator REED. In terms of the veins that run through.

Mr. ADDISON. My understanding is that Libby had a pervasive asbestos content throughout the whole ore body. That is not the situation in Louisa, where it is constrained to discrete veins.

Senator REED. Right, but you are making some inferences since you have not examined Libby specifically.

Mr. ADDISON. I am relying upon descriptions of the Libby ore that I have seen in the literature.

Senator REED. Dr. Whitehouse, you seem to suggest in your testimony that, from your research and your data, there is no safe level of exposure—at least, that is the inference I received. Is that a fair inference from your testimony?

Mr. ADDISON. Basically, in a sense, I guess it is, because I have a fair number of patients from Libby for whom I cannot find the exposure. I know they have asbestos. Their exposure—they did not play in the ball fields, they did not play on the railroad tracks, they did not have it in their homes, they did not have it in their garden—they only lived in Libby. There must have been a period of time when there was significant airborne exposure in Libby which does not exist now.

I would tell you that what Mr. Addison said about levels of asbestos in the mine and in the finished product are accurate from what I know also, that it was 2 to 3 percent in the shipped material.

Basically, then, if you do not know what the number is that it takes to get this, and you have a disease that takes 30 years to show up, the only safe course is to say "I do not want anything to do with it."

Senator REED. But let me ask the question: Given what you have seen from Libby and given the fact that there is a difference certainly in the concentration and maybe the distribution, you would be at least suspicious of the potential development of significant asbestosis around the Virginia mine; is that fair?

Dr. WHITEHOUSE. I do not have enough information that I would even want to comment on that.

Senator REED. Fine.

Dr. Lemen, from your perspective, or Dr. Harbut?

Dr. LEMEN. I would say that given the situation around Virginia, they can expect, in my opinion, maybe not the magnitude of Libby but a similar situation to occur after sufficient latency for disease to develop. And I think that to cease that mining situation would be the only alternative way to prevent that.

Senator REED. Dr. Harbut?

Dr. HARBUT. The only thought I have is the following. You have to remember that OSHA permissible exposure limits are negotiated limits between a number of interested parties, and they are adopted knowing that some people will get sick at those levels.

Senator REED. I will just raise another question, which is that a lot of this is the definition of how much exposure is valid, etc. Can you comment, Dr. Harbut, Dr. lemen, and Dr. Whitehouse—should we be moving to a more rigorous standard by OSHA—or, MSHA in this case—and you might also comment on the contrast between MSHA and OSHA—different standards, same Government.

Dr. HARBUT. That is an extremely good point. I think part of the issue is that much of the asbestos discussion over the last 3 years has been sort of politically and economically motivated, at least in its details, rather than health and disease motivated.

My suggestion would be to look at the disease processes, look at the other issues surrounding the pathophysiology of exposure to the asbestos fiber, or asbestiform fibers, or fibers which behave like asbestos, and work from there, rather than identifying the fibers and working backward to its human health effects. It is a lot easier to identify people who have had exposure who are sick and their disease processes and trace back than it is the other way around.

That having been said, I think that the MSHA levels are definitely way too high, based on—I examined a couple hundred miners in the Upper Peninsula of Michigan 10 years ago, and we found a penetration in these high-seniority miners of about 60 percent with asbestosis. MSHA identified no asbestos that broke any rules in any of those mines. So we basically had a case of people with asbestosis, but because MSHA said the asbestos was not high enough to worry about, I guess they did not.

Senator REED. Dr. Lemen?

Dr. LEMEN. When I was at NIOSH, we tried to get MSHA to lower their standard to come into compliance with what the OSHA standard was. NIOSH in 1976 recommended the 0.1 based on the fact that we knew that it still would cause disease, but we said that a ban was the only way to eliminate disease. NIOSH said that 25 years ago. For MSHA to continue with their standard is outrageous, and a lot of mines are going to develop disease as a result of that.

Senator REED. Dr. Whitehouse, do you have a comment about the definitions and the standards?

Dr. WHITEHOUSE. No, not really. I am not much of a mineralogist. I am more of a practicing physician, so I do not deal very much with levels. I basically agree with Dr. Harbut and Dr. Lemen, though.

Senator REED. I am tempted to talk about kidney stones, but I will not.

Thank you all very much. I want to thank Mr. Biekkola and Mr. Pinter for their testimony, and Mr. Gumble as well. It is extremely difficult to come up here and talk about an issue which is highly personal—your company, your lives, your positions—and we all appreciate it, because you add something very important, an element of immediacy. Expert witnesses are helpful, but they do not have that sense of immediacy, so I thank you.

Senator MURRAY. Thank you very much, Senator Reed.

We will include a statement from Senator Kennedy for the record.

We also have statements from Senators Wellstone and Clinton.

[The prepared statements of Senators Kennedy, Wellstone, and Clinton follow:]

PREPARED STATEMENT OF SENATOR KENNEDY

I commend Senator Murray for calling this hearing on the dangers of asbestos for workers and consumers and this important issue of workplace safety. As we all know, exposure to this substance causes asbestosis, an often fatal breathing problem. It also causes lung and other cancers.

The vast majority of Americans believe that asbestos was banned many years ago. In fact, it is estimated that 3,000 different types of commercial products—from paper products and brake linings to floor tiles and insulation—still contain asbestos. Day in and day out, countless men, women, and children are still being exposed to this deadly substance, with serious consequences for their health and their very lives.

Clearly, we need to do more to guarantee the protection that is long overdue from this serious public health danger. Our colleague,

Senator Baucus, will testify today about a particularly troubling case. Hundreds of miners, their family members, and other citizens of Libby, Montana have become sick or have died from exposure to the asbestos that contaminated the ore in a local mine.

The contamination that started in Libby didn't end there. The ore was shipped to processing facilities throughout the United States, including a plant that produced attic insulation in Easthampton, Massachusetts from 1964 to 1984. Last month, nine of a dozen soil samples collected at the site showed detectable levels of asbestos. Five of the samples had levels significantly higher than one percent, the maximum level that EPA says is acceptable.

Asbestos is obviously a continuing national problem that affects all our states. I welcome this hearing, and I look forward to the testimony of our witnesses.

PREPARED STATEMENT OF SENATOR WELLSTONE

Madam Chair, I want to thank you for organizing these hearings today. We are focusing today on a deadly serious problem—exposure of workers and other members of the public to serious health risks from exposure to asbestos.

As Chair of the Subcommittee with jurisdictional responsibility for protecting worker health and safety, I am extremely concerned about the problems of asbestos contamination in the workplace. I also know first-hand, from the experience of residents in my home State of Minnesota, how far the tentacles of asbestos contamination can reach. Thousands of residents in Minneapolis are potentially at risk from a facility that processed asbestos-laden vermiculite from the W.R. Grace Mine in Libby, Montana. And, unfortunately, this is only one of many sites around the country experiencing this dreadful contamination.

We must do everything we can to end this devastating problem. asbestos contamination is not a thing of the past—far from it. Asbestos contamination is real. It is killing and injuring countless numbers of people.

I welcome the opportunity to hear today from the Federal Agencies responsible for addressing the problem of asbestos contamination. I will listen with interest to their suggestions for how we can rationalize our regulatory framework for dealing with asbestos contamination. It is difficult to understand, for example, why the Mine Safety and Health Administration should have a standard that is 200 times weaker than that used by the Occupational Safety and Health Administration. And I want to hear from this Federal Panel about the training on asbestos-related issues that they believe it is important for their inspectors to have. It's also important for us to hear whether our laws are currently tough enough to deal with this deadly problem—or do we need legislation to help us put an end to asbestos contamination in our workplaces, our homes, and our neighborhoods.

I also look forward to hearing from our panel of workers and scientific experts. It is terribly important that we—and the American public—understand the full impact that asbestos contamination can have. This is not an abstract problem. Asbestos contamination causes tremendous harm—we need to tell that story.

And we need to know how it could have happened that in many work sites the problem of asbestos contamination escaped discovery for so very long—and with such deadly affects. How could so much time have passed without workers and residents being notified of the risks associated with asbestos. how can we avoid such a public health disaster in the future?

Madam Chair, again I commend you for organizing these important hearings. and I look forward to working with you on much needed solutions.

Thank you.

PREPARED STATEMENT OF SENATOR CLINTON

I would like to thank Senator Murray for requesting and chairing this hearing today on the important issue of asbestos contamination and workplace safety. Senator Murray's leadership on this issue is to be applauded.

Sitting on both the HELP committee and the Committee on Environment and Public Works, I have come to appreciate the impacts our environment can have on our health and the health of our families—whether it is the air we breathe, the water we drink, the food we eat, the products we use. And whether we are talking about the general environment around us, our home environment, our work environment, or our children's school environment—these can all, without a doubt, have an impact on our health.

I don't think I have to tell anyone here how much skepticism there is out there when it comes to environmental health issues—and rightfully so, in many cases. The problem often is that we don't have enough information. We don't have the facts we need to make concrete connections between our health and the things in our environment that may be making us sick.

I am pleased to say that we are making progress in this area. With the mapping of the human genome, and other new genetic and scientific tools we've recently developed or discovered, we are now on the verge of making some major environmental health discoveries. And it is only then, when we are able to replace the fear with the facts, that we will truly be able to tackle our most pressing environmental health challenges.

Now, the topic of today's hearing—asbestos—is somewhat different from a lot of other environmental health concerns. Because in the case of asbestos, there are clear, indisputable links that have already been identified between asbestos exposure and human health. We know for a fact that exposure to asbestos causes asbestosis, mesothelioma and other lung cancers, and pleural plaques.

In fact, elevated death rates for lung cancer in coastal areas of Georgia, Virginia and northeastern Florida and Louisiana were linked to shipyard workers' exposure to asbestos during World War 11.

We were able to make this connection between asbestos exposure and elevated cancer rates in these shipyard workers because we had good cancer data. And we had that data because we were tracking cancer incidence rates.

I think we need more tracking efforts like this in order to be able to better identify and address environmental health risks. That is

why I have put forward an eight-point plan to address our environmental health challenges, including:

• Establishing a national tracking system for chronic diseases that may be linked to the environment;

• Placing environmental health officers in every state's public health department; and

• Creating a chronic disease rapid-response force that would bring environmental, scientific and health experts into potential disease clusters, including those revealed by the national tracking system.

I plan to introduce legislation to create a national health tracking network with my colleague Harry Reid and others after the recess. And I am hopeful that we will have a hearing on these broader environmental health issues in this Committee. We have already had two such hearings in the Environment Committee—one in Fallon, Nevada, and one on Long Island.

The key is, however, that once we have the information, once we know that there is something in our environment that is making people sick, we need to properly address that threat to human health.

Most people believe that we've taken care of the asbestos problem—that it is a problem of the past. And why wouldn't they? As I mentioned before, we know asbestos causes cancer and other health problems, so of course we must be taking care of it. Right?

Well, I look forward to hearing from today's witnesses about whether or not we are doing all that can and should be done to address the environmental health threats posed by asbestos exposure.

While I know that we are taking a number of steps at the federal level, I am concerned that we may not be doing enough. And I am not just concerned about the workplace, I am also concerned about schools and whether they are safe for kids—including threats posed by asbestos in older, "sick" schools around the country.

I believe we need more information about all of the possible health and educational impacts that school environments have on our children. I was pleased to pass an amendment to the education bill to study this issue and learn more about what effect mold in ventilation systems or asbestos in buildings have on students' health and cognitive abilities.

And it appears that we may need more information about all of the possible health impacts of asbestos and asbestos-like compounds in the workplace. For example, in New York, there have been hundreds of claims filed by talc mine workers found to have workrelated respiratory disabilities. Documents show that miners, millers, and mine supervisors in New York have died or are dying from disease caused by fibers—mostly asbestos—in their lungs."

And there is at least one facility in New York that we know received materials from the vermiculite mine in Libby that we will hear more about today. This site has been referred to OSHA for further action.

So again, I think these environmental and workplace issues are vitally important. I want to thank Senator Murray for calling today's hearing. I am sorry that I am not able to stay longer, but I will be reviewing all of the testimony presented today.

Thank you.

Senator MURRAY. Again, thank you to all of our panelists who have travelled some distance to be here today and for your expertise. We appreciate your helping us get a better picture of asbestos and the concerns that we have in this country.

I will go back to what I said at the beginning of the hearing. I, like most Americans, thought asbestos was banned at least a decade ago. I think we have a lot to learn, and I think we have a lot to look at in the near future.

Thank you very much.

[Additional material follows:]

ADDITIONAL MATERIAL

PREPARED STATEMENT OF SENATOR BURNS

Mr. Chairman, Let me begin by thanking you and the committee for holding this hearing on asbestos in the workplace and its' implications for workers and their families. This is a vitally important issue generally and, as you know, it is an immediate and on-going issue for my constituents in Libby, Montana.

It is because of the on-going nature of the problem that I thank you for this opportunity to speak before your committee. For the past two years, the EPA has been in Libby assessing the levels of raw asbestos contamination from a former vermiculite mine and has begun the job of cleaning up the area. I am concerned about the length of time being taken as well as the costs associated with that cleanup effort. At the conclusion of this fiscal year, it is estimated that the EPA will have spent some $30 million. I would like to hear from EPA just how far along in the process we are and would like as well a realistic estimate of how much time and expense is envisioned to complete the job of cleaning up the mine site and, more importantly, the community.

Additionally, both the Governor of Montana and I have asked EPA for a report on the economic implications of designating Libby a "Superfund" site. Currently, the work is being done under emergency status and the EPA has made it clear that, to assure long-term funding to continue the cleanup process, it would be best to put Libby on the National Priorities List (NPL) or "Superfund" list. It seems to me that the EPA has had abundant opportunity over the years to assess the economic consequences of such a designation but we still haven't gotten much information from the agency. I have the Governors' most recent request for answers and would appreciate her letter being entered into the record. Comments from the EPA coordinator in Libby indicate a preference to establish Libby as a Superfund site but the final decision should be made by all concerned with a complete understanding of the impacts that the designation brings to this community and its' citizens.

I am not interested in assigning blame to the tragedy in Libby. I must add that, considering the role EPA has had in the current tragedy facing Libby and it's citizens, it is not too much to expect that the Agency go the extra mile in doing everything it can to make Libby whole again with the least possible negative impact. When I first was made aware of the asbestos situation in Libby, we asked the EPA for background and discovered the Agency was in Libby in the 1970's and, although it was noted by EPA that there was a significant health risk from exposure to the raw asbestos fibers at the mine, little or nothing was done to protect the workers. A recent report from the Inspector Generals Office of the EPA confirms that EPA was not responsive to the workers or the community and that is very much part of the problem facing these folks today.

Asbestosis and the other diseases that result from exposure sometimes don't reveal themselves for twenty or thirty years. The inaction of the state and federal agencies charged with protecting workers have contributed to the problem and those very agencies now need to fix the problem with the absolute least harm to those they failed originally.

Mr. Chairman, I note with interest that the Agency for Toxic Substances and Disease Registry (ATSDR) is not testifying before this committee today. To obtain a better understanding of the health impact on workers and communities exposed to vermiculite-related asbestos, I respectfully suggest this committee visit with the ATSDR. That agency will soon release the results of a comprehensive screening of some 6,000 people from the Libby area to determine the effects of exposure in the work place and in the community at large. While the briefing may be specific to raw asbestos exposure, there are more than enough exposure sites throughout the country to make the information pertinent to your oversight of workers health.

I will continue to monitor the situation in Libby with my emphasis being on the health and economic welfare of its' citizens. That means with an eye on those whose charge was and remains cleaning up the town and, to the extent possible, improving the quality of life for all its citizens.

Thank you again, Mr. Chairman, for providing this forum.

PREPARED STATEMENT OF SENATOR MAX BAUCUS

I would like to thank you Senator Murray and Chairman Kennedy for holding this hearing on such an important issue and for allowing me to testify before the Committee today.

I sincerely hope that the attention directed to the tragedy at Libby, Montana by the distinguished members of this Committee will help ensure that no other community in this nation will ever suffer the same fate as the people of Libby.

Although the intense national attention focused on the town of Libby has not always been welcomed by residents in the community, I know that Senator Murray and the Committee called this hearing so that we can better understand what the federal government can do to make sure its citizens, particularly workers and their families, are protected from exposure to asbestos.

As many of you may know, hundreds of people in the small town of Libby in Northwestern Montana have sickened or died because of their exposure to asbestos contaminated vermiculite. Hundreds more will sicken or die. The vermiculite came from a mine owned and operated by WR Grace & Co. At its peak, the mine produced nearly 80% of the world's supply of vermiculite.

Mining and related activities at the mine released asbestos fibers into the air around Libby. Mine waste contaminated with asbestos was used all over the town, in the high school track, in local yards and an elementary school skating rink. The workers brought the dust home on their clothes and exposed their families. Many of those workers have died from asbestos related diseases. Many of their children and other family members are sick from asbestos. This is a terrible, terrible tragedy that has devastated this community.

And the worst, the very worst part about this tragedy is that, not only could WR Grace have done more to protect its workers and warn them of the dangers of asbestos, we in the federal government could have done more. As the Committee will explore with some of our witnesses today, the EPA could have done more, the Mine Safety and Health Administration could have done more. But not until a tragedy on the scale of Libby, Montana slaps us in the face do we react.

I have fought hard to focus the attention of EPA and other agencies on Libby because these people deserve our very best efforts to make their town whole and healthy again. The EPA in Montana has put a lot of time and resources towards cleaning up the town. The agency has put some terrific people on the ground to do what they can to protect residents from further exposure to asbestos.

But, as the field hearing I held back in February of 2000 highlighted, getting Libby, Montana a clean bill of health involves some big hurdles—time, expense, the sheer size of the problem. Not only has the legacy of the Grace mine taken its toll in human lives and suffering, but it is costing millions.

And, it will cost millions more and cost more lives—asbestos related illnesses take up to 40 years to show up. Despite the hard and dedicated work of local, state and other health officials, the victims in Libby face tremendous hurdles getting access to health care and treatment. The cost is simply crippling to some families.

Secretary Thompson did release an additional $100,000 this year to help the residents of Libby get adequate treatment, at my insistence. Also, the Agency for Toxic Substances and Disease Registry (ATSDR), which has already screened thousands of residents for asbestos related illnesses, will screen an additional 2,000 residents.

But, despite this continuing federal support for the citizens of Libby, the size and scale of the Libby tragedy shows us that we could have done far more. The government policies and regulations we currently have in place didn't protect the workers, their families or the other residents in Libby, Montana from the deadly hazards of asbestos. That's a hard reality, and it should raise a lot of red flags about where, when and how the government regulates asbestos in this country today.

It's high time we seriously re-considered the scientific and public health evidence that has been available for decades about the dangers of asbestos. It's out there, and it's time we put it to use protecting our citizens. Because as Senator Murray noted in her opening statement, asbestos is still widely used in this country, in a variety of forms and a variety of places. Frankly, I don't know why some of the agencies here today haven't already acted—what more proof of the continuing dangers posed by asbestos do they need than Libby, Montana?

I remain strongly committed to working to ensure residents of Libby and Lincoln County receive the help they need to make their homes and community safe for them, their children and grandchildren. Part of that commitment is making sure Libby never, never happens again.

I look forward to hearing the testimony of witnesses gathered here today. Hopefully, they can shed light on why Libby happened and what we learned from it. Thank you again Senator Murray, Mr. Chairman, and to all of the distinguished members of this Committee for allowing me to testify today.

One final note, I have invited the EPA Administrator, Christine Todd Whitman to attend an Environment and Public Works field hearing or town meeting in Montana this fall, to make sure that Libby continues to receive the attention and resources it requires to make the community whole.

I would like to extend an open invitation to Senators Murray and Chairman Kennedy, and any other interested members of this Committee to attend that hearing. Thank you again.

PREPARED STATEMENT OF DAVID D. LAURISKI

Mr. Chairman and Members of the Committee, I am pleased to appear before you today to discuss the ongoing efforts of the Mine Safety and Health Administration (MSHA) to promote miners' safety and health. At the outset, I want to tell you that I am honored and humbled to have been nominated by President Bush and confirmed by the Senate to the position of Assistant Secretary of Labor for Mine Safety and Health. Having spent virtually all of my life and career associated with the mining industry, it is a privilege for me to serve the American people, Secretary Chao, and President Bush in this important capacity. We will do everything we can to improve upon the tremendous advances in safety and health in the mining industry that have occurred in the past 30 years. The programs, policies, and initiatives of this Administration will be devoted to protecting the more than 350,000 miners working at the Nation's approximately 15,000 mining operations.

In my first 2½ months as Assistant Secretary, I have been continually impressed with the knowledge and dedication of the more than 2,000 MSHA employees. I have met, both at headquarters and in the field, the MSHA employees who work in our enforcement, education, training, or technical support activities, as well as those who work in meeting our programming, equipment and budgetary, and personnel needs. I challenge anyone to find another group of employees with a greater sense of mission.

This hearing focuses on workplace safety and asbestos contamination. These are extremely important issues that present us with many opportunities. First, however, I would to give you some insights into my general approach and objectives for MSHA.

In addition to meeting with the MSHA staff throughout the country, I've met with miners and operators, representatives of industry and labor organizations, State Grant representatives, and a myriad of other members of the mining community. The meetings have had two objectives: to hear first hand from everyone about their safety and health issues and concerns; and to set goals. If we are to continue to make progress in improving miners' safety and health, I believe it is vitally important to establish goals. The Secretary and I have challenged our own staff and our stakeholders to work with us to reduce mining industry fatalities by 15 percent each year over the next four years and to reduce the non-fatal days lost (NFDL) injury rate by 50 percent by 2005. In addition, we are currently working to establish specific health goals as well. I believe that these goals are achievable, as long as we have the commitment and help of everyone associated with our industry.

I have shared with the MSHA staff my priorities and expectations, and would like to share them with you. Mining in the 21st century presents us with new opportunities. If we are to continue the success of the past, we must find new and creative approaches to protecting safety and health. I am firmly committed to carrying out our responsibilities under the Federal Mine Safety and Health Act of 1977 (the Mine Act). But, as both the Secretary and I have said, investments in up-front prevention, through compliance assistance, education, training, and other outreach activities are critical if we are to move off the plateau that we have seemed to reach in the past few years. In this regard, I have asked MSHA staff, miners, mine operators, as well as representatives of the mining and labor associations, to think creatively. I am firmly committed to hearing the thoughts, suggestions, and ideas of our stakeholders. I can assure you that all will be consulted, and that we will make the most reasoned, informed decisions possible, all with miners' safety and health enhancements as our focus.

Since my appointment, two final rules to protect miners' health have become effective. These rules address both underground coal and metal and nonmetal miners' exposure to diesel particulate matter (dpm). The rule protecting underground coal miners from exposure to dpm, which was not challenged, became effective in May 2001. The metal and nonmetal rule, which was challenged, became effective earlier this month, on July 5, 2001. 1 would like to thank those industry, labor and government representatives who worked to reach the partial settlement agreement in the metal and nonmetal diesel particulate litigation. This settlement agreement, I believe, shows how we can work with our stakeholders in the best interest of miners' safety and health.

Beginning last week, and continuing through August, MSHA is holding a series of outreach seminars across the country to help miners and mine operators comply with the metal and nonmetal diesel particulate rule. These seminars are part of our concerted effort to use all of the tools available under the Mine Act to enhance miners' health and safety. Providing the metal and nonmetal mining community with knowledge of the rule at the beginning of the process is critical to their ability to understand and comply with the rule.

This approach, addressing demonstrated safety and/or health issues using the most effective and efficient tools, and providing the mining community with the benefit of our reasoning and expertise, will be our standard operating procedure.

I would like to devote the remainder of my testimony to MSHA's work to protect miners from exposure to asbestos.

MSHA's asbestos regulations date to 1967. At that time, the Bureau of Mines (MSHA's predecessor) used a 5 mppcf (million particles per cubic foot of air) standard. In 1969, the Bureau proposed a 2 mppcf and 12 fibers/ml standard, which was promulgated in 1969. In 1970, the Bureau proposed to lower the standard to 5 fibers/ml, which was promulgated in 1974. MSHA issued its current standard of 2 fibers/ml at the end of 1978. Since enactment of the Mine Act, MSHA has conducted regular inspections at both surface and underground operations at metal and nonmetal mines. During its inspections, MSHA routinely takes samples, which are analyzed for compliance with its standard.

In briefings with the MSHA staff, I was advised of the issues surrounding vermiculite mining in Libby, Montana and elsewhere. I was pleased to learn that the Agency had taken steps to determine current miners' exposure levels to asbestos, including taking samples at all existing vermiculite, taconite, talc, and other mines to determine whether asbestos was present and at what levels. Since the Spring of 2000, MSHA has taken almost 900 samples at more than 40 operations employing more than 4,000 miners. During our sampling events, the MSHA staff also discussed with the miners and mine operators the potential hazards of asbestos and the types of preventive measures that could be implemented to reduce exposures. These efforts continue today.

MSHA also keeps in frequent contact with its sister Agency, OSHA, and others, including the Environmental Protection Agency, the National Institute for Occupational Safety and Health, which has mine health and safety research responsibilities, and the United States Geological Survey, to ensure that our staff is aware of and involved in discussions concerning asbestos related issues. I expect the MSHA staff to keep up with the science and ongoing research activities, as well as other Agencies' experiences concerning asbestos. I can assure you that we will continue to act responsibly, and take action when the facts demonstrate that it is necessary to protect miners' safety and health.

I have read the Office of the Inspector General's (OIG) "Evaluation of MSHA's Handling of Inspections at the W.R. Grace & Company Mine in Libby, Montana," which was issued in March. The report does contain five major recommendations, and I can assure you that we are diligently working to address the issues raised in those recommendations.

The OIG recommended that MSHA lower its existing permissible exposure limit for asbestos to a more protective level, and address take-home contamination from asbestos. It also recommended that MSHA use Transmission Electron Microscopy to analyze fiber samples that may contain asbestos. We are currently considering these recommendations, which would involve rulemaking. I appreciate the review and analyses conducted by the OIG, and am giving considerable thought to their recommendations as we work toward our decisions. Please be assured that I share your conviction that miners' health must be protected, and certainly miners should not be exposed to contaminants at hazardous levels. Our objective is to ensure that our actions will address the underlying health issues that led to the OIG's recommendations, and that whatever course of action we take, miners and their families are not over-exposed to harmful substances as a consequence of their decision to work in the mining industry.

The OIG also recommended that the Agency remind its staff of the Mine Act's prohibition on giving advance notice of inspections. Section 103(a) of the Mine Act states, in part that: ". . . In carrying out the requirements of this subsection, no advance notice of an inspection shall be provided to any person. . . . I am pleased to report that MSHA recently reissued a memorandum to the Agency's metal and nonmetal enforcement personnel reminding them of this provision. We will be happy to provide the Committee with a copy of this reminder.

MSHA's inspectors undergo thorough training at the National Mine Health and Safety Academy in Beckley, West Virginia. We train our inspection staff not only in the requirements of the Mine Act and the implementing regulations, but also in the Agency's inspection procedures and policies. In addition to continuing to train and retrain our inspectors in the prohibition on giving advance notice, we will remind our employees of their responsibilities and inspection procedures annually.

A fifth recommendation in the OIG's report dealt with training the MSHA inspectors and other health professionals on asbestos-related matters. On April 17–19, 2001, MSHA held a training session for its metal and nonmetal health staff at our National Mine Health and Safety Academy. The training, which was attended by

industrial hygienists and other health specialists, covered the major health issues currently facing MSHA and the mining industry, including miners' exposure to asbestos. Included in this training were discussions of asbestos case studies, a review of the Libby experience, as well as sampling and analytic methodologies. The individuals who received this training are providing similar training to other inspection personnel in their respective district and field offices. In addition, as we reported to the OIG, MSHA has established a committee to develop specific training on asbestos-related matters for its inspectors.

Education and training are critical to promoting miners' safety and health. They provide mine operators and miners with the knowledge to take needed actions to prevent injuries and illnesses. Sharing our knowledge and information with the mining public and other interested parties is part of our education and training efforts. In this regard, MSHA has several items on its home page concerning asbestos, including our health regulations, a discussion of sampling procedures for airborne contaminants, and a program information bulletin reminding the mining industry of the potential health hazards from exposure to asbestos fibers. In addition, we are working to consolidate these materials and other information regarding asbestos on a single site on our home page.

The Mine Act, in my view, gives MSHA all the tools necessary to protect miners' safety and health. The history of miners' safety and health over the past 25–30 years demonstrates the statute's effectiveness. The Libby experience is, of course, troubling. More effective and efficient use of the Mine Act's enforcement, education, training and technical support authorities will help us to achieve even greater improvements in our industry. These provisions, as well as those outlining our rulemaking authorities and responsibilities, provide us with the necessary framework to ensure miners are appropriately protected from harmful contaminants, including asbestos.

In conclusion, Mr. Chairman, I have devoted my life to miners' safety and health, and I am passionate about this important work. My thirty years associated with this industry have taught me many valuable lessons, the most important of which is that safety and health improvements demand creative ideas from everyone involved. We at MSHA have a number of challenges and opportunities facing us, and among the most important is our obligation to protect miners from over-exposure to asbestos. However, I am sure that with the involvement of miners, mine operators, as well as their representatives, we will protect and improve miners' safety and health.

Mr. Chairman, other members of the Committee, that concludes my prepared remarks. I would be happy to answer your questions.

PREPARED STATEMENT OF R. DAVIS LAYNE

Mr. Chairman, Members of the Committee, I appreciate this opportunity to testify today on how the Occupational Safety and Health Administration (OSHA) protects workers from the dangers of asbestos exposure. Asbestos can cause a variety of serious health effects including asbestosis, mesothelioma and lung cancer. Asbestos-related diseases have a variable latency period, often extending from 10 to 40 years from initial exposure to onset of illness.

The Occupational Safety and Health Act of 1970 (the OSH Act) gives the Secretary of Labor authority over all working conditions of employees engaged in business affecting commerce, except those conditions with respect to which other Federal agencies exercise statutory authority to prescribe or enforce regulations affecting occupational safety or health. The OSH Act also provides that States may operate their own occupational safety and health programs under a plan approved by the Secretary. A 1979 Memorandum of Understanding between the Mine Safety and Health Administration (MSHA) and OSHA delineates the division of jurisdiction between the two agencies.

Since OSHA's inception in 1971, the Agency has used its authority for standard-setting, enforcement, and compliance assistance to protect workers from the threat of asbestos. In fact, there has been more rulemaking activity involving asbestos than any other hazard regulated by OSHA. Between 1971 and 1994, OSHA issued two emergency temporary standards, three major notices of proposed rulemaking, three final rules, and 31 Federal Register notices related to asbestos.

Indeed, the final asbestos rule issued in June 1972 was the Agency's first comprehensive standard. This regulation reduced the permissible exposure limit (PEL) to an eight-hour, timeweighted average of two fibers per cubic centimeter of air, with a maximum ceiling of 10 fibers at any one time. The standard became fully effective in July 1976. The asbestos standard served as a model for subsequent OSHA health regulations because it not only set a PEL but included requirements for protective measures such as engineering controls, personal protective equipment,

air or exposure monitoring, medical surveillance, work practices, labels, waste disposal, and recordkeeping.

In June of 1986, due to new scientific evidence regarding the carcinogenicity of asbestos, the PEL was lowered to an eight-hour, time-weighted average of 0.2 fibers per cubic centimeter of air. Separate standards were issued for general industry and construction, with the same level of protection. The rules provided for engineering controls, work practices, personal protective equipment, decontamination, communication of hazards to workers, regulated areas, housekeeping procedures, recordkeeping and employee training.

In August 1994, to provide even better worker protection, OSHA published two final asbestos standards: one for general industry and one for construction. It also added shipyards as a covered industry. The PEL was reduced to 0.1 fibers per cubic centimeter. Work practices and engineering controls required under the 1994 standard should, however, further reduce the risk to workers. All employers are required to communicate information about asbestos hazards to all potentially affected employees at a worksite. In addition, employers must provide training and education on asbestos exposure.

To prevent spreading asbestos outside the workplace, OSHA's standards require the employer to provide the employees protective clothing and ensure that the employees remove the contaminated clothing before leaving the workplace. To enhance the protection, employers must provide showers and separate clean change rooms for dressing into clean clothing.

The standard also addresses exposures during automobile brake and clutch work and roofing work. A mandatory appendix specifies the engineering controls and work practices to be followed during this work activity. It requires that engineering controls and good work practices be implemented at all times during brake servicing. In addition, employers must provide training on asbestos hazards to all brake and clutch repair workers.

In 1992, OSHA reviewed available relevant evidence concerning the health effects of nonasbestiform tremolite, anthophyllite and actinolite, and examined the feasibility of various regulatory options. These three minerals are regulated in 29 CFR 1910.1000 by a Permissible Exposure Limit of five milligrams per cubic meter of respirable dust. OSHA determined that there was insufficient evidence to support a finding that exposed workers would be at a significant risk from those substances if they were not regulated in the asbestos standard.

OSHA enforces the current asbestos standard through its inspection program. Asbestos is examined during routine, random or targeted inspections, though they are primarily conducted in response to complaints from employees, or as a result of referrals from Federal or State agencies. Regardless of the reason for the complaint or referral, OSHA compliance officers search for evidence of real or potential asbestos exposure. Since October 1995, OSHA has cited employers for violations of its asbestos standards 15,691 times. There were almost 3,000 inspections conducted by Federal or State OSHA programs in which violations of the standard were cited, including violations found in residential and commercial construction, auto repair facilities such as brake shops, and hotels. As recently as June 21, OSHA inspected a major lawn products company for the presence of asbestos. Samples of vermiculite and vermiculite ore were found to be free of asbestos in this instance; OSHA compliance officers, nevertheless, remain alert to the threat of asbestos exposure.

In addition to enforcement, OSHA provides compliance assistance to employers and employees to help them understand the dangers of asbestos, and what can be done to minimize the threat. OSHA's Web page connects computer users to concise and easy-to-read publications on asbestos, which are available to the public free of charge. Pamphlets explain the requirements of the standard for both general industry and construction. Included in each is a list of sources of assistance. OSHA's Web page also includes reports, links to other Web sites, slides, and information about taking samples and controlling exposure to asbestos.

OSHA offers an intensive course covering the recognition and control of asbestos at its Training Institute in Illinois. OSHA recently held a training session for the Department of Labor's Region V employees, to maintain the strength of the Agency's capabilities to address asbestos hazards, and plans to expand this training to other regions.

OSHA has also developed software that can be downloaded from its Web site to provide interactive expert advice for building owners, managers and lessees, as well as for contractors of building renovation, maintenance, and housekeeping services. Once installed on a computer, the software asks questions about a building site. It then asks follow-up questions based on answers, and produces a report on responsibilities under the asbestos rules.

OSHA's on-site consultation program, which is free and available to employers in all 50 states, provides expert assistance on asbestos. Consultants identify asbestos in the workplace and explain methods for reducing exposure. Over the last five years, state consultants took 859 asbestos samples from 162 small businesses for laboratory analysis. These employers, who formerly did not realize that there was asbestos in their workplaces, were able to protect their workforce after these consultation visits.

OSHA works closely with other agencies to ensure that jurisdictions are clearly defined. OSHA also actively coordinates with other Federal agencies on asbestos and asbestos-related issues. The OMNE Committee, composed of representatives from OSHA, MSHA, the National Institute for Occupational Safety and Health (NIOSH), and the Environmental Protection Agency (EPA), meets monthly to exchange information about mutual areas of concern. In addition, the various Federal agencies with jurisdiction over the regulation or research of asbestos, including OSHA, MSHA, the Consumer Products Safety Commission, EPA, NIOSH and others, frequently communicate to share information about proposed and on-going research activities and other matters related to asbestos.

OSHA also has requested technical assistance from NIOSH to determine potential asbestos exposure from working with materials that contain vermiculite. In response to this request, NIOSH has conducted investigations in horticultural facilities to determine potential exposure to employees from asbestos-contaminated vermiculite used with potting soil in lawn and garden products. In addition, NIOSH is in the process of investigating exposures at vermiculite exfoliation plants. A report from NIOSH is expected by the end of this year. OSHA is also in the process of reviewing a study that was performed by EPA to determine the extent of homeowner exposure to asbestos from vermiculite used as insulation in housing, such as Zonolite. OSHA also participated with EPA in the Asbestos Health Effects Conference, held in San Francisco in May of this year. This was an international meeting to improve the scientific foundation for assessing the health risks related to asbestos. OSHA will continue to participate in this and other scientific fora to aid in determining the adequacy of the current OSHA rule.

As the above activities indicate, OSHA has continuous and multifaceted programs in place to address the health hazards to workers created by asbestos, both in production and as a contaminant. These programs apply to all workplace settings covered by the OSH Act, and are intended to protect all workers, including those who process and work with materials potentially contaminated with asbestos, such as Zonolite insulation and lawn or garden products. OSHA coordinates many of these activities with other agencies.

OSHA believes its current statutory authorities are sufficient to carry out its responsibilities. Given its broad mission to protect workers from all types of occupational hazards, over the years the Agency has devoted a significant portion of its resources to the health effects caused by asbestos exposure, and will continue to do so.

This concludes OSHA's formal remarks. I will be pleased to answer any questions the Committee may have.

PREPARED STATEMENT OF KATHLEEN M. REST

Mr. Chairman and members of the Committee, on behalf of the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention, I am pleased to provide this testimony addressing the current scientific knowledge about health risks to workers from exposure to airborne asbestos.

BACKGROUND

Asbestos is a term that is generally used in referring 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 asbestos-containing materials by the early 1970s. 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 asbestos, actinolite asbestos, and anthophyllite asbestos. These

six minerals are regulated by the Occupational Safety and Health Administration (OSHA), the Mine Safety and Health Administration (MSHA) and the Environmental Protection Agency (EPA). Five of the six asbestos minerals were used commercially (actinolite asbestos was not) and, as a consequence, it has been possible to observe and characterize their adverse health effects on 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 alveolar 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—a 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.

It is not known exactly how asbestos fibers cause disease. What is known is that the fibers, too fine to be seen by the human eye, can become airborne during various industrial processes or from handling asbestos-containing materials. These microscopic fibers can be inhaled and/or swallowed. As much as 50 percent or more of inhaled asbestos fibers remain lodged in the lungs, where it is almost impossible for the body to dispose of 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 the diseases mentioned previously. 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 which can determine the risk of adverse health effects.

EXPOSURE TO ASBESTOS IN THE WORKPLACE

Workplace exposure to asbestos remains a serious occupational health problem in the United States, with both vast numbers of workers at risk due to past occupational exposures and many other workers experiencing ongoing occupational exposures. Since the beginning of World War II, as many as eight million workers have been exposed to asbestos. Although the number of newly exposed workers has declined sharply since the development of regulatory standards in the 1970s, there are still substantial numbers of workers with continuing exposure. In 1991, NIOSH estimated that nearly 700,000 workers in general industry remained potentially exposed to asbestos, but that estimate did not include mining, railroad work, agriculture, and several other industry sectors.

The U.S. Geological Survey reports that asbestos continues to be imported for use in friction products (e.g., brakes and clutches), roofing products, gaskets, and thermal insulation. Construction workers involved in the renovation or demolition of buildings that contain asbestos are at particular risk of asbestos exposure. Many workers in the relatively new asbestos removal industry are potentially exposed, relying on personal protective equipment and other methods for limiting inhalation of asbestos fibers. Industrial maintenance personnel are also at risk when they repair equipment, sometimes in enclosed spaces, that is insulated with asbestos-containing material, as are automotive service personnel involved in brake and clutch repair work.

In addition, "take-home" exposures—involving family members of workers who bring asbestos home on their hair, clothing, or shoes—is also a well-recognized hazard and was addressed in a 1995 NIOSH report to Congress.

Because of the hazardous nature of asbestos, approaches to consider for control of exposure include the substitution of less hazardous materials and the labeling of all asbestos-containing materials so that required exposure controls can be implemented.

ONGOING RESEARCH INTO ASBESTOS EXPOSURE

NIOSH currently is assessing workers' asbestos fiber exposure at selected horticultural operations that are using vermiculite, and at operations that expand vermiculite ore. 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. NIOSH will complete asbestos exposure assessments at two expansion plants for each ore supplier, along with a number of horticultural sites. We expect the field study to conclude by the end of calendar year 2001. At present, field sampling has been completed at four expansion plants and three horticultural operations.

Options under consideration for future research activities include identifying and characterizing other downstream uses of fiber-contaminated vermiculite that have not been previously recognized.

TRACKING OF WORK-RELATED ASBESTOSIS DEATHS

NIOSH, using data from death certificates, has been tracking asbestosis mortality in the United States. Deaths associated with asbestosis increased from fewer than 100 annually in 1968 to more than 1200 per year in 1998, the most recent year for which final national data are available. In approximately one-third of these deaths, asbestosis was reported as the underlying, or main, cause of death, a proportion that has not changed appreciably over time, In the other two thirds of deaths, asbestosis was reported to have contributed but not caused the death. Death certificate data indicate that workers in the "ship and boat building and repairing" industry and "insulation workers" appear to have experienced the greatest risk of asbestosis. It also shows, however, that elevated asbestosis mortality is associated with a wide-ranging variety of other occupations and industry sectors.

Among the occupations with significantly elevated asbestosis mortality are: insulation workers; plumbers; sheet metal workers; plasterers; heating/air-conditioning/refrigeration mechanics; electricians; welders; chemical technicians; mechanics and repairers; stevedores; masons; furnace and kiln operators; painters; construction workers; and janitors and cleaners. Please note that the fact that an occupation (or industry sector) has "significantly elevated asbestosis mortality" does not mean that all workers in the occupation or industry sector are exposed to asbestos.

The other industry sectors with significantly elevated asbestosis mortality include, but are not limited to: nonmetallic mineral products; construction materials and industrial chemicals; petroleum refining; tires and other rubber products; aluminum production, hardware, plumbing, and heating supplies; construction; electric power generation; railroads; glass products; building material retailing; paper manufacturing; and steelmaking.

Asbestosis mortality is a delayed phenomenon which reflects exposures that typically occurred decades earlier. To better describe more recent exposures, NIOSH recently prepared and published a summary of data describing the results of asbestos samples collected and reported by OSHA and MSHA inspectors in their agencies' centralized data systems. Over the decade-long period from 1987 to 1996, Federal occupational safety and health inspectors reported an average of about 600 air samples for asbestos each year, although the annual number of reported samples declined by about 50% for each agency during that decade. (Not all collected samples are reported into the centralized data systems.) In the construction industry, nearly 7% of the samples indicated asbestos fiber concentrations exceeding the applicable OSHA or MSHA permissible exposure limit (PEL), and the average asbestos fiber concentration of all samples was about one-half the PEL. In the industry classified as "miscellaneous nonmetallic mineral and stone products," (which includes sites regulated by OSHA and MSHA) over 30% of asbestos samples exceeded the exposure limit (either OSHA's or MSHA's, as applicable) and the asbestos Construction workers involved in the renovation or demolition of buildings that contain asbestos are at particular risk of asbestos exposure. Many workers in the relatively new asbestos removal industry are potentially exposed, relying on personal protective equipment and other methods for limiting inhalation of asbestos fibers. Industrial maintenance personnel are also at risk when they repair equipment, sometimes in enclosed spaces, that is insulated with asbestos-containing material, as are automotive service personnel involved in brake and clutch repair work.

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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 tremoliteferroactinolite 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.

CHALLENGES TO PREVENTING ASBESTOS EXPOSURE: AREAS OF POSSIBLE ADDITIONAL RESEARCH

There are other fibrous minerals that technically do not fall within either the current regulatory or the NIOSH definition of asbestos, even though fiber shape, size, and durability indicate their potential to induce health effects similar to those of the six regulated asbestos minerals. The inclusion of only six specified fibers within the asbestos regulations may create a false sense of security that those mineral fibers that are not included are without risk. Clearly, other fibers may act in the same way as the regulated fibers and pose significant health risk, and mixtures of fibers may be lethal as well.

Based on epidemiological studies, it is clear that occupational exposure to mineral fibers that contaminate vermiculite from Libby, Montana, caused high rates of asbestos-related diseases among exposed workers. The fibers that contaminate vermiculite from Libby include tremolite, one of the minerals within the definition of asbestos as currently regulated. Some evidence indicates that only 10 to 20% of the fibrous mineral content of the Libby vermiculite was tremolite. A much higher proportion—80 to 90%—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.

Another example of a mineral that can produce asbestos-related diseases but is neither regulated as asbestos nor classified as asbestos under NIOSH's current scientific definition, is erionite. Erionite is a known human carcinogen, and environmental exposures outside the U.S. have been associated with an increased risk of malignant mesothelioma and lung cancer. (We are unaware of any occupational exposure to erionite in the U.S.)

Additional research possibilities which may be considered include efforts to better determine physical and/or chemical characteristics affecting toxicity of these naturally occurring mineral fibers as well as durable manufactured fibers. Direct evidence by which to attribute particular health effects to each possible fiber type is not currently available; obtaining such evidence is another area under consideration for future research. Epidemiological studies of people exposed to naturally occurring or manufactured fibers would provide important new information and are also under consideration for future research, along with animal toxicologic studies to help supply needed information if epidemiologic studies are not feasible.

In addition, further research is under consideration in the areas of exposure measurement and analysis of fibers. Although asbestos is comprised of fibers of many diameters and lengths, risk assessments and exposure assessments are based on air concentrations of fibers detectable by a technique called phase contrast microscopy. This method leaves an undetermined number of asbestos fibers in each sample uncounted because they are too thin for detection. Because of this measurement bias, asbestos exposure risks are currently based only on fibers large enough to be detected. More sensitive methods are currently available, but these methods could benefit from better standardization. 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.

CONCLUSION

In summary, we know much about the adverse health effects caused by the inhalation of asbestos fibers. Many exposures or potential exposures have been identified, and appropriate precautions are used when workers are handling or working around these materials. Increased understanding of the health effects of fibrous minerals that fall just outside the existing definitions of asbestos will help us find ways to provide appropriate protection for workers exposed to those materials. Further identification and tracking of potential exposures to fibercontaminated vermiculite and other contaminated materials that may be identified will help us assure that no one is unknowingly exposed to these materials. While information is being gathered, public health prudence guides us to reduce known exposures to these potentially hazardous fibrous minerals.

PREPARED STATEMENT OF MICHAEL H. SHAPIRO

Good afternoon Madam Chairman and members of the committee. My name is Michael Shapiro, the Acting Assistant Administrator for EPA's Office of Solid Waste and Emergency Response. I am pleased to appear today to discuss EPA's efforts to clean up asbestos contamination in Libby, Montana and the Agency's efforts to identify related sites nationwide. I want to make clear that EPA views the Libby asbestos site as one of the most significant Superfund sites nationally. The Agency is committed to working with our partners to take all steps necessary to protect human health and the environment in Libby and related locations.

Libby is a small town of about 2,600 residents in northwest Montana. For more than 60 years, a mine operated in Libby, which produced 80 percent of the world's vermiculite. The vermiculite was shipped around the country for use as a soil conditioner and in the manufacture of insulation and packing materials. The mine and processing facilities in Libby employed roughly 2000 workers from 1924 to 1991.

One of the substances in the Libby vermiculite ore was asbestos. Asbestos contamination resulting from mining and processing operations has led to serious public health concerns among members of the Libby community.

EPA is working closely with other Federal and state agencies to address the asbestos contamination and public health concerns in Libby and other communities across the country. The response to potential asbestos contamination is a multi-agency effort. EPA, The Agency for Toxic Substances and Disease Registry (ATSDR) and the U.S. Public Health Service (PHS) established an emergency response team on November 22, 1999 to begin environmental and medical investigations in Libby.

EPA is focusing on site investigation and cleanup activities in Libby using Superfund authority. The Agency is also using Superfund to assess the need for cleanup at other locations across the country where vermiculite ore was mined or shipped. Thus far, EPA has committed more than $30 million for the investigation and cleanup in Libby.

In June of 2000 EPA initiated or provided oversight of cleanup at 2 heavily contaminated former processing areas in Libby. The Agency has also started the cleanup of a mining road, town park facilities, a high school track and several residences.

In addition to Libby, EPA identified 243 locations around the country that may have mined or received vermiculite. As of early July, EPA completed initial evaluations of possible asbestos contamination at 216 of these facilities. Thus far, we have determined that 17 locations require response by EPA and other federal or state agencies.

One example is the Western Minerals site in Minneapolis, Minnesota, which processed over 118,000 tons of vermiculite ore from Libby between 1937 and 1989. Since September of 2000, EPA and the state of Minnesota have been sampling and removing asbestos contamination at the former plant site and nearby residential yards. An ATSDR-funded health survey is being conducted by the Minnesota Department of Health to determine the magnitude of the health impacts to former workers and nearby residents.

In March of 2001, EPA's Office of Inspector General issued a report which focused on EPA's activities in Libby, as well as EPA's broader role in regulating asbestos. The report concludes that EPA should continue its cleanup efforts in Libby. The report also emphasizes the importance of cross-agency coordination to address potential asbestos contamination associated with mining and other operations unrelated to Libby.

EPA will continue to work closely with the Mine Safety and Health Administration, the Occupational Safety and Health Administration, the National Institute for Occupational Safety and Health, ATSDR and the PHS to protect public health in Libby, Montana and any other community that may be threatened by asbestos contamination from vermiculite ore. EPA is also coordinating closely with our Federal

and state partners to identify additional asbestos contamination that may require cleanup under Superfund.

Thank you for the opportunity to appear today. I will be pleased to answer questions from the committee relating to the cleanup of Libby, Montana and related locations across the country.

PREPARED STATEMENT OF RICHARD LEMEN, M.D.

Thank you for inviting me to discuss this very important topic of asbestos and disease with you here today. My name is Dr. Richard Lemen. I am retired from the United States Public Health Service where I was Deputy Director and Acting Director of the National Institute for Occupational Safety and Health (NIOSH). When I retired I also was an Assistant Surgeon General in the United States Public Health Service. I have spent my entire career, since 1970, studying the epidemiology of asbestos related diseases and have conducted numerous epidemiology studies, written many scientific papers, advised the World Health Organization, various other national governments, and have testified before Congress on several occasions concerning the health risks from exposure to asbestos. My CV, which I have supplied, the Committee will give you further information if you so desire concerning my studies on asbestos.

FACTS

In the United States it is estimated that between 189,000 and 231,000 deaths have occurred since 1980 due to workplace exposure to asbestos. Another 270,000 to 330,000 deaths are expected to occur over the next 30 years and for those workers exposed, over a working lifetime, to the current Occupational Safety and Health Administration (OSHA) standard of 0.1 fibers/cc 3.4/1000 workers will die as a result of asbestos related diseases. Given that the National Institute for Occupational Safety and Health (NIOSH) estimates, as of 1990, the latest figures available, that some 363,000 men and 32,000 women are exposed at work, the future mortality from asbestos related disease will continue to occur well into this new millennium.

If deaths of workers exposed to asbestos in the United States at the current occupational standard are anywhere near the magnitude just expressed, what then would be the magnitude of disease and death to the countless number of unsuspecting consumers using asbestos containing products? These products include such things found in the home as lamp sockets, floors, cat box fill, braking mechanism in washing machines, furnaces, dishwasher, and other products.

Why then is any form of asbestos still allowed in commercial products within the United States, or the rest of the world for that matter? The Environmental Protection Agency produced a list of at least 44 suspected asbestos-containing materials. Within their list were cement pipes, used still for the transport of portable drinking water, friction products such as brakes, to name just two widely used commercial products. Imports of asbestos containing products still arrive into the United States each year and include such things as asbestos-containing corrugated sheet, sheet panels, tubes & pipes, brake linings, where imports alone have gone up in the last 4 years from $59 million in 1996 to $89 million in 2000. Asbestos textile products are still coming into the US such as yarn & thread, cord & string, knitted material, clothing and they appear to be increasing each year according to the United States Geological Survey (USGS).

The most recent Criteria Document from the World Health Organization's (WHO) International Programme for Chemical Safety (lPCS) states in 1998 that no threshold has been identified for carcinogenic risks. This is consistent with the WHO's earlier conclusion in 1989 "[The human evidence has not demonstrated that there is a threshold exposure level for lung cancer or mesothelioma, below which exposure to asbestos dust would not be free of hazard to health." The WHO recognizes what NIOSH concluded 25 years ago, in 1976, that ". . . (only a ban can assure protection against carcinogenic effects of asbestos)".

Asbestos is a term for industrial and commercial use rather than a mineralogical term. The principle commercial forms of asbestos fall into two mineral groups. The most widely exploited has been the mineral named chrysotile which fits into the serpentine mineral group accounting for over 98% of commercial asbestos usage. The other principle mineral group, the amphiboles, contains amosite, crocidolite and anthophyllite. Other asbestiform minerals that fall into the amphibole mineral group are tremolite and actinolite, which occur in nature though they are rarely used, as large deposits are rare. Tremolite has been found as a contaminant of most commercial deposits of chrysotile and some talc. Tremolite has also been found as a contaminant of other minerals such as vermiculite while actinolite has been found as a contaminant of amosite from South Africa.

Asbestos has been responsible for a massive epidemic of disease and death since its commercial exploitation primarily beginning at the turn of this century. As we enter the new millennium we do not want to promote the myth, as is currently promoted by parties interested in the continued commercial exploration of chrysotile, that only one mineral group of asbestos, the amphiboles, were responsible for the disease and death associated with asbestos usage?

The fact that Austria, Belgium, England, The Czech Republic, Chile, Denmark, El Salvador, Finland, France, Germany, Iceland, Italy, Latvia, the Netherlands, New Zealand, Norway, Poland, Saudi Arabia, Sweden, and Switzerland have all banned asbestos, leads us to recognize that these countries feel the safe use of all forms of asbestos is not attainable and that alternative materials posing less risk to public health are desirable.

Further substantiation that asbestos cannot be used safely comes from the most recent International Programme for Chemical Safety Environmental Health Criteria 203-Chrysotile Asbestos. The document concluded "Exposure to chrysotile asbestos poses increased risks for asbestosis, lung cancer and mesothelioma in a dose dependent manner. No threshold has been identified for carcinogenic risks." It further warn us that "Some asbestos-containing products pose particular concern and chrysotile use in these circumstances is not recommended." "Construction materials are of particular concern for several reasons. The construction industry workforce is large and measures to control asbestos are difficult to institute. In-place building materials may also pose risks to those carrying out alterations, maintenance and demolition. Minerals in place have the potential to deteriorate and create exposures."

The conclusions of the IPCS are very consistent with the evaluation of 'the amphibole hypothesis carried out by Stayner, Dankovic and myself in 1996. However, there are still, today others that claim chrysotile asbestos is not as harmful as the amphiboles and can be used safely and should not be banned. We are at a point in the history of asbestos usage where chrysotile is the predominant type asbestos produced and consumed in the world today; it constituted about 98.5% of US consumption in 1992. While it is true that asbestos consumption has declined in both the US and Europe, sales to other countries (e.g., Southeast Asia, South America, and Eastern Europe) has, increased based on its usage in construction materials, the very materials that IPCS has warned against using. A review of the lung burden, epidemiologic, toxicologic, and mechanistic studies, lead to the conclusion that chrysotile asbestos exposure carries an increased risk of both lung cancer and mesothelioma. and that the hypothesis that these observations may be attributable to trace amounts of tremolite, an amphibole, a contaminant of the chrysotile may seem to be primarily of academic interest, because chrysotile exposures to workers and the public are also contaminated with tremolite.

CONTROVERSY OVER ASBESTOS FIBER TYPES (AMPHIBOLE HYPOTHESIS)

The primary evidence for the amphibole hypothesis comes from pathologic studies in which lung burdens were measured. However, interpretation of these studies is hampered by the fact that chrysotile lung burdens are a poor reflection of integrated exposures and the fact that chrysotile exposure is highly correlated with lung burden of the amphiboles (e.g., tremolite). In addition, that pattern of asbestos fiber deposition in the lung does not appear to be consistent with the pattern of deposition in the target tissue (i.e., pleura). A review of 92 consecutive cases of mesotheliorna found that even while only 28.3% of the asbestos fiber type in the lung was chrysotile, it was the major fiber type identified in the mesothelial tissue itself. These findings further suggest that lung burden analysis for determining fiber type in mesothelioma etiology may not be appropriate and that determining predominate fiber type in the mesothelial tissue is the more rational determinant.

Some, with an interest in promoting the use of asbestiform materials in commercial products such as brakes, lawn products, talcs, and other uses want exemptions because they say their products contain cleavage fragments, which are not asbestiform. The facts are that cleavage fragments are almost never found in pure form and usually grow along with asbestos fibers in the same ore series. In fact asbestiform particles of the right size can cause disease and are therefore biologically active. It has been reported that Libby Montana vermiculite miners and the New York talc miners show the occurrence of asbestos related cancers, which can be explained no other way than their contamination with tremolite or with other particles of appropriate size to induce disease. These diseases are not going to be limited to just the miners, but will pass on to the consumer of these vermiculite and talc containing commercially available products. These are just two examples of consumer products containing deadly particles. There should be an all out

effort by the Consumer Product Safety Commission (CPSC), the Environmental Protection Agency (EPA) and any other governmental agency whose mission is to protect the public's health to identify and order removal of such cancer causing particles.

HISTORY

I am attaching to my testimony a more detailed chronology of the usage, diseases, risks of disease and regulatory activities for asbestos, which are contained, in my "Asbestos Timetables". But I would like to give you a brief few highlights from that history.

The use of asbestos dates back thousands of years when asbestos fibers were being incorporated into pottery as early as 2500 B.C. The modem industry dates from about 1880, when asbestos was used to make heat and acid resistant fabrics. By the late 1800's and early 1900's the use of asbestos was being widely advertised. Johns-Manville ran full-page advertisements in several publications, like the January 13, 1906 issue of The Saturday Evening Post saying "Serves More People in More Ways than any Institution of its kind in the World." Highlights in the production history of asbestos include its use as heat insulation as early as 1866; asbestos cement used as a boiler covering in 1870; commercial production of asbestos insulation materials in 1874; the first processing of Canadian asbestos into textiles in the U.S. in 1890; asbestos cement production in the U.S. began in 1903; flat asbestos cement board was produced in the U.S. in 1904; asbestos was first used as a brake lining in 1906; the first pipe making machines were imported into the U.S. in 1928; and asbestos spraying first began in tunnels in 1932.

Lung Disease

The first recorded case of asbestosis was reported, in London, by a Charing Cross Hospital physician Dr. Montague Murray, in 1906. It is interesting to note that Adelaide Anderson, Lady inspector of Factories included asbestos among the dusts known to cause injury to man, in a 1902 publication on dangerous industries in England. In 1912 the American Association for Labor Legislation mentioned asbestos related disease in their Industrial Diseases, as did the government of Canada Department of Labour. In 1918, American and Canadian insurance companies would not insure asbestos workers due to the un-healthful conditions in the industry. The first complete description of asbestosis, including the naming of the disease and a description of "curious bodies", observed in lung tissue, appeared in 1924 and 1927 respectively. In 1930 the first case of asbestosis in the United States was reported and in the same year it was reported that "asbestos bodies" were found in the sputum of asbestos exposed workers. By 1930 it was clearly recognized that people exposed to asbestos dust developed the disease "asbestosis. In 1933 a report even carried the case of asbestosis in a 10-year-old rough-haired terrier dog used as a atter in an asbestos factory. A study reported in 1936 asserted that continued exposure to asbestos could increase the fibrosis (lung scaring) in existing asbestotics and reported some evidence that asbestosis develops more rapidly in younger persons. In the early 1960's reports of asbestos related disease began to be reported in persons not directly exposed to asbestos, but who resided with asbestos workers or lived near sources of asbestos. Asbestosis is a progressive disease which can continue to worsen even after secession of exposure.I21Asbestosis is not specific to humans and has occurred in animals other than under experimental situations. Besides the terrier described above, reports have described asbestosis in donkeys hauling asbestos ore. Environmentally induced asbestosis has also been found in field rats living in and around an asbestos mill and also in baboons living near an asbestos mill.

Cancer of the lung & mesothelioma

In 1935, in the United States and in the United Kingdom, reports of asbestos exposure with lung cancer appeared in the scientific literature. German physicians began calling lung cancer an occupational disease of asbestos workers. Epidemiological evidence in 1955, showed a ten-fold excess of lung cancers in those United Kingdom asbestos textile workers who had been employed before 1930, thus establishing the epidemiological link between asbestos exposure and lung cancer.

Between 1943–1946 reports of pleural (chest) and peritoneal (abdominal) tumors (mesotheliomas) associated with asbestos exposures appeared. In 1960 a major study of miners, millers, and transporters of asbestos and of non-mining residents found 47 cases of pleural mesothelioma, occurring between 1956 and 1960, one part of South Africa, the northwestern portion of the Cape Province, known to have many asbestos mines. Their study confirmed epidemiologically an association between exposure to abestos and mesothelioma. The fact that environmental exposures were also occurring demonstrated the fact that low-level, non occupational ex-

posures to asbestos could be hazardous. The first studies in the United States, to report mesothelioma with asbestos exposure were of factory workers, in 1963 and in 1964, of insulation workers.

With all of the scientific data and knowledge about asbestos, why is it still allowed in commercial products for general consumer usage, such as brakes, lawn products, cement pipes and others? We have seen the toil on workers mining asbestos, manufacturing asbestos, and using asbestos containing products. What will be the toil on the American consumer if asbestos continues to be allowed in commercially available products and American workplaces? Now is the time for the United States to join the growing list of Nations that have banned the further importation and use of asbestos. Asbestos related diseases are a result of human exploitation and only through stopping such exploitation can we take them away. Many responsible industries have taken this action, while others have not. Unfortunately, because some industries are unwilling to take such action for what ever reason, it is up to the Government to act. Asbestos is a deadly substance and has been known to be so for almost 100 years and we know that suppression of the asbestos containing dust will not work, as no thresholds for cancer can be established, and that even at the lowest standards to date excessive disease and death will continue to occur, there is no choice but to BAN this deadly substance, ASBESTOS, from commercial use if we are to stop this continuing epidemic of disease and death. I conclude by quoting the very eminent British public health statistician, Sir Bradford Hill who said in 1965—and I might add this still applies today: "All scientific work is incomplete—whether it be observational or experimental. All scientific work is liable to be upset or modified by advancing knowledge. That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone action that it appears to demand at a given time."

That time is now and the action we must take is clear.

PREPARED STATEMENT OF MR. JOHN ADDISON

I am an independent scientific consultant working in the field of mineralogy and health. I was the Head of the Mineralogy Group at the Institute of Occupational Medicine, Edinburgh, for fifteen years. The IOM is one of the foremost charitable research organizations in the world. My responsibilities there ranged from the analytical measurement of dusts in the occupational environment, including all of the asbestos minerals, to characterization of asbestos and other minerals used in carcinogenicity testing, and the determination of asbestos in human and animal tissue samples.

For about the last 20 years I have been a member of the UK Health and Safety Executive, Working Group that has developed and drafted the formal methods that are currently used in the UK for identification of asbestos in bulk samples and in airborne dusts. I am recognized internationally as an expert on the asbestos minerals and have testified previously in US Federal hearings with respect to the definition of asbestos in OSHA regulations, and in particular to the issues related to the non-asbestos forms of amphibole minerals.

There are many complex issues involved in the measurement of asbestos in dust and bulk samples, but one of the most important distinctions that must be made is that between the asbestos minerals in the amphibole mineral group and their normal non-asbestos analogues; these are minerals with effectively the same chemical composition, but with subtly different crystal structures that lead to the very different physico-chemical properties, and different toxicological behavior. These differences have led to the clear distinction being made between asbesti form amphiboles and their non-asbestos analogues in the regulatory framework for asbestos in the USA, UK and much of the rest of Europe. One very important aspect of the issue is that all of the arnphibole minerals have the property of forming crystal fragments that may meet the size definition of a regulatory fiber, but that does not mean that these fragments are asbestos, nor does it mean that they have the toxicological properties of asbestos. Within this context it was entirely appropriate that the fiber counts performed by OSHA for regulatory purposes discriminated between the cleavage fragment fibers of amphiboles and true asbestos fiber. Such a distinction is not only appropriate, but is essential for the proper regulation of large numbers of industrial rock and mineral procedures within the USA since many of these contain amphibole minerals that will naturally produce cleavage fragment fibers that meet the regulatory size criteria. These also are not asbestos.

Having previously advised The Vermiculite Association on issues related to amphibole and asbestos minerals, I was invited by Mr. Ned Gumble of Virginia Venniculite to assist him when it became apparent that there were possible asbestos outcrops within the ore-body of the mine. Over the past two years I have spent

about 15 days working at the mine, inspecting the ore body and personally explaining to every member of staff the health effects of asbestos, methods of identification, airborne dust monitoring and many other aspects of asbestos science.

I confirmed for Virginia Vermiculite that a tremolite asbestos variety, did indeed occur as thin veins within the ore body, but these were not persistent and only sparsely developed in terms of the whole mass of ore. Since the thin tremolite veins could be recognized by an experienced operator, they could be removed when encountered and would not contribute to worker dust exposure during processing. Even if the tremolite asbestos veins had simply been mixed in with the ore material for processing it is unlikely that the tremolite asbestos would have been detected by conventional US asbestos methods. Other small occurrences of an actinolite asbestos also appeared to be found at the margins of intrusive masses of granitic rock that are found cutting the main rock mass of the deposit. Once again these asbestos occurrences were not persistent and only sparsely developed. Since granitic rocks have no value as a vermiculite ore they would not normally be disturbed, nor would there be any value in their processing.

Towards the end of my visits I recommended that Virginia Vermiculite should request a visit from Dr. Malcolm Ross, probably the leading authority in the world on asbestos minerals, and formerly of the US Geological Survey. He confirmed all that I had found, and furthermore suggested that such asbestos occurrences are widespread throughout the Appalachian Mountains and the Piedmont areas. In these circumstances it is almost impossible to exclude absolutely the possibility of asbestos occurring in any mineral or rock development, but that does not mean that all such developments should cease, only that sufficient care and attention must be paid to the proper management of the asbestos problems. It is clear to me that in their considerable efforts to identify their problems, to manage the asbestos in their mine, and to minimize the possible health effects on their workers, Virginia Vermiculite have set an excellent example.

PREPARED STATEMENT OF MR. GEORGE BIEKKOLA

Senator Murray and members of the committee, my name is George Biekkola from L'Anse, Michigan. I'm 67 years old, and I have asbestosis.

I began working for the Cleveland Cliff Iron Company in Michigan in 1964. After almost 30 years on the job, I had to retire early—because of my disability.

I've got to tell you—this isn't how I planned to spend my retirement.

I'm married, I have four children, and five beautiful grandchildren.

I'm an active person. I coached little league and youth hockey. For several years, I volunteered my time and helped our community build a new recreation center. Currently, I'm a crew leader in the Americorps program at Camp Alberta.

I like being able to do things for myself. But these days, when the lawn needs to be mowed or the snow needs to shoveled, I can't do it. I just don't have the strength because my lungs are filled with asbestos fibers and they are scarred from years of exposure.

My doctor tells me that I only have two-thirds the lung capacity I used to have. My heart already has to work overtime to distribute oxygen through my body. I can't exert myself.

I have be very careful that I don't catch pneumonia or any lung condition—because my lungs aren't able to fight off infections.

As I said, this isn't how I thought I'd be spending my retirement. I thought my wife and I would buy a motor home and travel out West. I pictured myself up in the mountains hunting deer.

But today, even if I could afford it, my body wouldn't be able to take it. If I exert myself too much, I begin to feel a burning in my thighs. They're the largest muscles and the ones that become depleted of oxygen first.

This isn't how I thought I'd be spending my retirement, but when I think about the other guys I worked with—I guess I came out lucky.

Like my friend Dale Roberts. He was an electrician. We used to eat lunch together. He was so excited to retire. He was going to help his son run a portable saw mill. He was a healthy guy. He retired in 1992. Six months later, he was dead. The asbestos cancer wrecked his left lung. He went into the hospital, and a week later, he was dead.

I'm also luckier than my friend Joe Brogan. Joe and I carpooled to work together. Joe retired, and I think it was two weeks later—he too was dead of asbestosis.

Senators, I could give you more names. In fact, when I finally took the mining company to court a few years ago, I brought with me a stack of a few hundred death certificates.

I didn't know about the dangers of asbestos. I didn't know the toll it was taking on my lungs and my life. I'm here today to tell you my story so that maybe someone else working in a mine—or a brake shop—or a factory—won't lose the things I have lost; Won't lose the things those men and their families have lost.

Because it takes 20 to 30 years for the scarring in the lungs to show up on an x-ray, many people aren't aware of the problem.

Most Americans think asbestos is no longer a danger. But they're wrong. Today many types of asbestos and asbestos-like fibers are still used in manufacturing and are still ruining the health of workers like me.

Companies will tell you asbestos is not a problem—just like they told me. "Go back to work George. There's nothing to worry about," they said.

Senators, they lied. We need to worry about asbestos—and we need our government to protect us—because businesses—on their own—won't always do the right thing.

As I mentioned, I started working for the Cleveland Cliff Iron Company in 1964. Over the years, I worked in three mines: the Humboldt, Republic and Tilden. I started as a hard rock driller. I drilled through the rock. Often that rock had veins of asbestos—a grey, flaky, smooth material.

Sometimes you would be breathing the raw asbestos that you just drilled through. The dust would get all over you—in your face—in your mouth—down your throat. You couldn't help it. There wasn't safety equipment. If you were lucky you'd come across a paper mask like this one. But even with a mask on, at the end of the day, you'd blow your nose and all this black dust would come out.

Because my job didn't pay much, I worked overtime whenever I could and that exposed me to even more asbestos. Whether I was repairing the giant kilns or working in the crushers, I was often surrounded by clouds of white dust—clouds of asbestos.

Eventually, I became trained in electronics, and I worked in the mines and factories repairing equipment. Often, that equipment was wrapped in asbestos to insulate it from the heat. I brought some examples with me. Here is an asbestos gasket. And here is a piece of thermalcouple wire, which is covered in asbestos. I handled these throughout my job.

In 1987, the mining company had many of us x-rayed. My x-ray showed asbestos in my lungs, but the company doctor and a lung specialist told me not to worry about it.

Around 1990, 1 went to see Dr. Michael Harbut. He told me the truth about my asbestosis, and he told me get out of the mine.

I went back to the company with this information. I thought they'd put me on compensation. Instead they rejected his report and said—your job is here, be at work tomorrow. And that was that.

Later, I went to the Mayo Clinic in Rochester, Minnesota for several days of tests. I brought those results back with me to the mine. The personnel man laughed and pushed it away. He said, throw that in the basket because its just a bunch of garbage.

Because of my disability, I retired at age 60. Today, I can't do the things I want to do for myself and my family.

Because it takes a long time for asbestosis to appear, in the coming months a lot of workers are going to diagnosed. I just wish the company would be more responsive to those workers and their families and not wait until those workers have died.

I hope that this Committee will make sure that what happened to me won't happen to anyone else. Please raise the safety standards and keep a better eye on these companies. Help spread the word about the dangers of asbestos.

Workers like me are counting on you to protect us. Please don't let us down.

Thank you.

PREPARED STATEMENT OF MICHAEL R. HARBUT, M.D.

My name is Michael Harbut. I am a Doctor of Medicine and a teacher at the Wayne State University School of Medicine in Detroit, Michigan. I'm also a Past Chair of the Occupational and Environmental Health Section of the American College of Chest Physicians and am a Board Member (as Congressman Bruce Vento) of the Mesothelioma Applied Research Foundation.

Each year I have approximately 3200 "contacts" with patients who are ill as a result of their occupational or environmental exposures. Hundreds of these patients have asbestos-related diseases or cancers. Most of them die before they were meant to. My remarks, therefore today, are not only from the perspective of a physician who knows that much of the sickness and death that he daily confronts was pre-

ventable, in honesty, I'm also angry at the industry and its friends in high places who have allowed this carnage to occur.

I want to speak briefly about what asbestos fibers are and what they do when inhaled. Now, it is quite commonly known that asbestos fibers cause scarring of the lung and lung cancer. What is less commonly known is that persons with significant asbestos exposure have an increased overall death rate from all cancers. Asbestos fibers are microscopic airborne needles, which penetrate the delicate tissue of the lung and have been identified in every organ of the body.

Anywhere from a handful of years to decades later, persons with asbestos related disease develop a thickening on the covering of their lungs, their smaller airways become narrowed, and then the membrane over which oxygen passes to the bloodstream becomes thickened, increasing the work of breathing. They become short of breath at climbing a few stairs, they can't walk from the shopping center lot to the store without stopping and before too long, and any exertion can cause a profound shortness of breath. Many patients ascribe the symptoms to "just growing old." If they do seek medical attention, a diagnosis of asbestosis is rarely rendered. There are several reasons for this.

Firstly, even for trained physicians, it can be a tough diagnosis to make. Notwithstanding the mass tort litigation where an asbestosis diagnosis may be less than reliable, a real asbestosis diagnosis made by a real doctor just doesn't happen that often. One of the reasons is that sometimes there are problems in identifying the asbestos fibers, one of the reasons why we are here today.

Even if a patient has all the clinical signs and symptoms of asbestosis, there is sometimes inadequate data to confirm the presence of what the Government has decided constitutes an asbestos fiber. These are sometimes called asbestiform fibers and in some cases, the inhaled dust may contain a percentage of asbestos below what was previously believed to be harmful or may be regulated as a 49 particulate not otherwise classified."

To illustrate this, please see the x-rays I've brought. The first demonstrates a normal lung, the second a patient with early, but definite asbestosis. You'll see that the third is quite similar to the second, demonstrating what appears to be early, definite asbestosis, but when we ashed this patient's left lung after it was transplanted, we found no asbestos fibers, but we did find a number of "cousins" of asbestos. This x-ray also shows what the inhaled dusts have done to the surviving lung over a period of 10 years. The fifth film shows also what appears to be an early, but definite asbestosis in a miner from Michigan's Upper Peninsula. He wasn't given this diagnosis by the courts, however, because his exposures fell below MSHA's notice. The next film shows an advanced asbestosis in a Steelworker and the last film demonstrates asbestosis in an Autoworker who made brake shoes.

Diagnoses are also not made for insurance reasons. Once a patient receives a diagnosis of asbestosis, it's a fair bet the doctor and hospital will have a very hard time getting paid for care; the patient can be thrust into a compensation system that rarely rules in his/her favor; and the patient's ability to acquire health or life insurance is severely impaired.

So not only have these patients been assaulted by the fibers, they are assaulted by the law. They are also assaulted by funding policies for research. As an example, for every 6 breast cancer deaths, the National Cancer Institute is funding a study. There is one study funded for every 80 mesothelionia deaths. Mesothelioma is the relentless cancer of the covering of the lungs and intestines caused by asbestos which is usually found at autopsy, but when discovered before death, confers an average life expectancy of 6 months. A death from a fiber inhaled 40 years earlier.

In my remaining moments before you I'd like to make a few suggestions which I think would help alleviate illness, suffering and preventable death in our generations and those of our children.

Firstly, the Government should convene a panel of scientists and clinicians who know a lot about asbestos, it's cousins and the disease they cause. One requirement of membership of physicians would be that they have treated at least 100 persons with asbestos-related disease over the previous 5 years. The panel would study all diseases which present clinically as does the 2001 brand of asbestosis, identify the precise fibers causing them, and recommend their appropriate regulation.

The panel would also look at the health, compensation and insurance issues growing out of asbestos and asbestiform exposures and make appropriate recommendations.

Finally, the Government should immediately encourage the refocus of at least some of its resources on the prevention, early diagnosis and someday, cure of asbestosis and mesothelioma. Prevention actually is an easy one. Just ban the use of asbestos in the United States, as have nations all over the world.

For decades, the society, the Courts and much of the Government have regarded asbestosis as a legal inconvenience. My patients and I ask you to understand that to them and their families, asbestosis means disease and death.

PREPARED STATEMENT OF ALAN WHITEHOUSE, M.D.

My name is Dr. Alan Whitehouse. I am a chest physician/pulmonologist from Spokane, Washington, board certified in internal medicine and chest diseases and have been practicing pulmonary medicine in Spokane since 1969. Spokane is 160 miles from Libby, Montana, and is the primary referral source for patients with lung disease from the Libby area and much of Western Montana. I have been privileged and saddened to have taken care of many people from Libby who have asbestosis.

Libby was the site of the W.R. Grace Corporation vermiculite mine, located about 6 miles from Libby. Libby itself is nestled in the valley of' the Cabinet Mountains of Northwestern Montana, a relatively uninhabited site except for Libby. The mine employed several thousand people through the years and was originally operated by the Zonolite Corporation and purchased by W.R. Grace in 1963.

Vermiculite is an insulating compound, which has very common usage for insulation, soil conditioning and in fertilizers. The ore body of the W.R. Grace mine also, unfortunately, contained up to 27% tremolite asbestos. Tremolite is an asbestos, that falls in the category of amphiboles as opposed serpentine asbestos, such as chrysotile, which is the commercial variety of asbestos.

The insulating material, vermiculite, is produced by heating the ore or "popping it" after attempts are made to separate the tremolite asbestos from the ore body itself. This compound, which many of you are familiar with is a very light, airy compound, which has excellent insulating properties.

Unfortunately, all of the tremolite asbestos cannot be separated from the vermiculite itself and the great majority of vermiculite that was produced as a commercial product for insulation purposes contained significant amounts of tremolite asbestos. Both the partially refined ore and the relatively finished product known as Zonolite, which was the vermiculite insulating material, was sent throughout the country. The ore was sent to approximately 60 expansion plants where it was popped or expanded and made into the vermiculite insulating material. Unfortunately the finished product contained significant quantities of tremolite asbestos and was shipped throughout the country for various forms of insulation from both Libby and the 60 ore expansion plants.

Evidence in animal research indicates that tremolite is much more toxic than chrysotile and my own patient data on a large number of patients with both forms of asbestosis would confirm the same. It creates an intense inflammation of the lining around the lung called the pleura as well as producing fibrosis and scarring within the lung itself. There is a latency period from the time of exposure of anywhere from 15 to 40 years from the time of last exposure. It frequently begins with what are called pleural plaques, which are areas of thickening or scarring of the pleura.

It may be scattered or may be confluent around the surface of the lung. These may become very diffuse thickening of this lining of the lung, which results in the inability of the lung to expand, somewhat like you would see an orange peel around an orange.

There may also be scarring in the framework of the lung, called the interstitium, which is the framework that supports the air sacs. When this becomes scarred, it prevents the lung from expanding and also prevents gas exchange of oxygen and carbon dioxide. People that have progressive asbestosis die of a variety of illnesses. One of the most common is lung cancer. Additionally, about 3% will die of mesothelioma, which is a cancer of the lining of the lung. Many will die of respiratory failure, which is basically a form of suffocation due to inability to oxygenate your body properly.

Unfortunately, vermiculite with this contaminate, tremolite asbestos, was scattered throughout the entire Libby area. It was present around an expansion plant, near downtown Libby. It was present along all the rail lines where the Great Northern, Northern Pacific and subsequently the Burlington Northern passed. It was loaded into rail cars at the Burlington Northern both in town and in other sites near Libby. It was used throughout the community as a soil conditioner. It was placed on the playground of the schools to help condition the track. It was placed in large quantities in the ballfield and was worked on a daily or every other day basis for long periods of time in the process of keeping the grounds suitable for playing baseball.

It was available free to the community to use in attic insulation and many of the homes in Libby are insulated with vermiculite. The children played in the piles of

vermiculite for many years. A favorite was to pile vermiculite on the rail line and wait for the train to come by, which would cause a swirling cloud of dust. They would also jump from ropes into large piles of vermiculite similar to what you did when you jumped in leaf piles when you were a child. These were fairly heavy exposures to asbestos but unfortunately there is also a significant number of people that have asbestos related disease in whom the only source of asbestos that you can find is that they lived in Libby, Montana, and neither played in it as a child nor were employed by Grace or lived with families of miners

Through the years, especially since 1980, I have seen a number of miners that had worked in the plant who had asbestosis. It was thought until the last 5–7 years that this disease had been confined to the miners. There were several family members who obtained asbestosis from the dusty clothing the miners brought home from work, but beginning 10 years ago I began to see more patients who were family members of the miners and had developed fairly severe asbestosis and some had actually died of it. In the last 5 years I have seen an alarming number of patients from Libby who had no direct exposure to the mine or to the miners who had asbestosis but obtained the disease from living in Libby, Montana.

These included children who played in the vermiculite, those who had worked around the rail lines, a number of railroad workers for the Burlington Northern, a number of loggers who had logged in the woods around the W.R. Grace mine property, men who worked in the lumber mill where they had used vermiculite insulation on the plywood dryers, people who lived next to the expansion plant or the storage bins and people who just lived near downtown Libby who could not be identified as having a significant other exposure.

I have been collecting a data base for a number of years and currently have 396 cases in that data base. They range all the way from patients with a few pleural plaques to people who have died of this disease. About 200 of these are miners, 93 are family members of miners, but 103, or approximately 25% of these patients are people who have never worked for Grace and whose exposure was environmental only in Libby. 24 of my patients have died in the last 3 years and 5 of these were people who only had the environmental exposure. One was a family member, 18 were miners.

It is clear from this data that people can obtain severe asbestosis with what would appear to be relatively minimal exposures to tremolite.

As you may know, there has been a screening study done by EPA and ATSDR, which is a branch of the CDC, screening approximately 6000 people in Libby who had lived within 6 miles of the town or the mine.

Initially it appears as if there are between 20 and 30% of these x-rays that are abnormal, although final numbers are not available at this point. Some of these patients show up in my case series. The rest of them are being seen in the Center for Asbestos, Related Diseases in Libby, which is being Supervised by Dr. Brad Black, a very competent Libby physician. These numbers from reviewing x-rays in Libby with Dr. Black are going to be close to being correct and so there will likely be another 1500 people with abnormal x-rays added to my 400 and there will be another 2000 to 3000 people screened again this summer.

It is easily conceivable there will be 2000 people in the Libby environs who have abnormal chest x-rays ranging all the way from a few pleural plaques to diffuse pleural thickening to interstitial asbestosis and going on to death.

Asbetosis is a progressive disease. It is no(known whether everybody that has pleural plaques will develop severe disease or not. it is clear that over 100 of my patients have severe disease and that about 75% of my patients with even mild disease are having progressive loss of pulmonary function taking into the consideration the changes in their function that goes along with age. This 75% are losing approximately 3-5% of their lung function per year over and beyond what would be expected from aging. These are people with only mild disease and whose pulmonary function studies are greater than 80% of predicted. This data suggests that the majority of people who have an abnormal chest x-ray in Libby are going to progress to fairly significant or fatal asbestos related diseases.

It is clear that you can get asbestosis from what was thought to be a minimal exposure. Tremolite is a considerably more toxic fiber than chrysotile and it may not take nearly as much exposure to get severe disease. Tremolite is a contaminate in some of the chrysotile and has been found in some brake linings that have been studied recently. Temolite is present in many places throughout the nation in the attic insulation where Zonolite was used. It is still, unclear how severe a problem this is, although the data from Libby would suggest that it may not take much exposure to get asbestosis. I have one patient whose only exposure to tremolite was from their attic insulation.

I would urge this panel to recommend there be a considerable review of how we deal with and regulate all forms of asbestos in this country. We have huge amounts of asbestos present throughout this nation. It is being used commercially and it does not appear from the data we have from Libby there is anything such as a *safe level* of asbestos in the air. It may very well be we are still contaminating large numbers of people, particularly with tremolite or other amphiboles without actually knowing it.

The W.R. Grace Corporation was very well aware of the extent of the asbestos contamination of their miners and of the town of Libby throughout the entire period of operation of tile mine. There may be other similar places in this country where a significant amount of asbestos contamination is occurring either known or unknown.

Because of the long latency period of asbestosis, it is likely we are going to continue to see new cases of asbestosis or rapid progression of the disease occurring as late as the year 2030.

PREPARED STATEMENT OF DAVID PINTER

Members of the Senate, Ladies and Gentlemen, my name is David Pinter of Louisa, Virginia. Before I quit two months ago out of fear for my health, I worked for Virginia Vermiculite for more than 22 years.

I was a heavy equipment operator and mechanic and worked every day excavating and loading vermiculite for processing at the plant. I also loaded and distributed the waste rock that was left over at the end of the processing and several times a week I hauled the processed ore through the town of Louisa to dump it at an uncovered stockpile near the of town or load it on box cars to be shipped all over the country. Every day I worked in clouds of dust doing each part of my job. Some days the dust was so thick I could barely see. Never in the 22 years was I given any protective clothing or respiration equipment.

When I would excavate the vermiculite to begin the processing, I would see veins running everywhere through the ground of whitish-grey fibrous material that was much lighter than the surrounding rock and sometimes almost fluffy in consistency. A lot of this fibrous material ended up in the waste rock and a lot of it ended up going into the process that put it into the downstream product. I have samples of this stuff in the jars sitting here in front of me.

For as long as can remember, there have always been rumors in our community that the vermiculite we were handling was contaminated with tremolite asbestos.

The company owners. assured the workers and the people of the community that this was not true and that we were safe. No one thought the company would lie to us and, as a result, all of us put our fears aside and continued to work unprotected. I now know that tests conducted by the W.R. Grace Company going back to the 1950's showed heavy concentrations of tremolite asbestos in the Louisa deposit. W.R. Grace controlled this deposit before Virginia Vermiculite took it over.

Only 20% of the material we dig up becomes useable vermiculite ore. That leaves 80% of every ton of excavated earth as waste rock that accumulates at the plant site. Each year we produced up to 50,000 tons of vermiculite. This left 200,000 tons of waste rock that had to be disposed of annually. The management of Virginia Vermiculite decided that a good solution to this problem would be to give it away to the public as free gravel. For 22 years I watched people come in with their own trucks to be loaded with this waste rock, or management would send dump trucks full of waste rock out each day to be dumped on peoples' driveways, parking lots, and in public areas such as the local library and fairgrounds. Usually about 100–300 tons of this material was spread around Louisa County and the neighboring counties each day. As I told you before, all of this waste rock contained large quantities of the whitish- gray fibrous material.

In the fall of 1999, I began to see all the news about how the vermiculite workers and their families were dying in Libby, Montana from exposure to tremolite asbestos. This scared all the workers at the plant, but management continued to tell us we had nothing to worry about and that there was no tremolite in the Virginia deposit.

Some months later, an inspection team from MSHA showed up to check for asbestos exposure. They seemed shocked at what they found. I heard someone say "This looks more like an asbestos mine than a vermiculite mine". It turned out that the white-gray fibrous material we have been working in all these years was indeed tremolite asbestos the same as at Libby, Montana, and citations were issued against the Company because of the worker exposure. The MSHA tests later showed the tremolite to be in concentrations of up to 99%. The inspectors said the workers needed to be in protective clothing, use respirators, have dust free cabs on all equip-

ment and have on-site showers and other decontaminating equipment provided. They also made management put red flags and orange cones out to mark the dozens of veins of asbestos which criss-cross the property. These veins range in size from less than an inch to one which is six feet high and two feet wide. Usually the best quality vermiculite is under and around these asbestos veins. Management was visibly annoyed at having these rich parts of the deposit "off-limits".

As I understand it, management told MSHA they agreed to all of MSHA's safety requirements. However, management actually ignored the safety requirements and most of them have never been carried out. The red flags and orange cones were set out to mark the asbestos veins, but no protective clothing or respirators were ever issued to the men and there is almost no protective equipment in place.

Since January, however, MSHA and EPA seem to have lost interest in the tremolite asbestos problems at Virginia Vermiculite and management seems to appreciate this. For example, on Inauguration Day, 2001, the bosses at the plant were joyful and ordered all the red flags and orange cones removed from the barricaded area where the asbestos veins were and the workers were told to excavate through the asbestos as they always had before. When the plant manager ordered this I heard him say "We don't have to worry about MSHA any more. From now on they'll be behind us every step of the way. They won't cause us any more trouble." Once again, all the tremolite went into the product for down stream consumers of garden and lawn products, medicated powders, fire board, brake shoes, aggregate and numerous other common products

Everyone talks about what a tragedy Libby, Montana was and how it can never happen again. Well it, is happening again right now. it is happening under your noses just two hours from where you are sitting. We are not dead yet because the mining in Libby began 25 years before they started in Virginia, but it is coming. The end of the incubation period for asbestos disease is almost at hand. All the plant workers since 1978 have been exposed and hundreds of people in the town and county are being exposed daily. It is probably already too late for many of us, but you need to shut this mine down, and require the company to thoroughly decontaminate the mine and mill site. You also need to require the company to disclose every location where they spread their waste rock and to clean up those sites too. This is the only way to protect all those who have not yet been exposed.

RICHMOND, VA,
July 27, 2001.

Hon. PATTY MURRAY,
U.S. Senate,
Washington, DC.

DEAR SENATOR MURRAY: My name is Joseph Heller. I am 53 years old. I am a lifetime resident of Richmond, Virginia. Last year, I was diagnosed with mesothelioma, an incurable cancer caused by exposure to asbestos.

Beginning in 1965 and continuing until last year, I have worked either as an automotive mechanic or parts man. Those have been my only trades, and the only way in which I know I was exposed to asbestos. In 1973, I began working as a mechanic at an Oldsmobile dealership in Richmond. Ever since 1973, I have worked primarily for General Motors dealerships, either Oldsmobile or Pontiac. Until 2000, I was very proud to be a GM mechanic. In fact, despite my diagnosis with mesothelioma last year, I attempted to return to work but was unable to perform my job without becoming exhausted. I have always loved working on cars, and not being able to work for a living or do what I enjoy depresses me everyday.

During my career as an automotive mechanic and parts man, I do not recall ever being warned about the dangers of asbestos. I do not recall ever seeing an asbestos warning on boxes of Bendix brake linings I used between 1965–1972, nor do I recall such warnings on boxes of GM brakes between 1973 and 2000. From 1973 until 2000, I went to several GM mechanic training classes, and was never warned in any of those GM mechanic training classes about the dangers of asbestos. I have since learned that Bendix (now Honeywell company) and GM have both known since at least the 1960s that exposure to asbestos causes mesothelioma, and that GM was aware of the overall dangers of asbestos since at least the 1940s. I worked for a Bendix distributor, Richmond Battery, from 1965–1972 and again for a short time in the late 1970s–early 1980s. I would have thought that both Bendix and GM would have been inclined to at least tell their distributors and dealership mechanics about the extreme dangers involved with the handling, manipulation, and installation of their brake and/or clutch linings. I received no such warning from either Bendix or GM, despite the nature of my employment, which brought me in nearly

daily contact with their asbestos-containing friction materials. As a result of those exposures, I now have only a short time to live.

I now understand that some brake manufacturers, including Bendix and GM, began putting cautionary labels on their brake packaging in the mid 1970s. Although I don't recall such labels, the cautionary labels evidently stated something about the need to avoid creating dust and that the dust could cause potential bodily injury. I learned this when I was cross-examined in a deposition by Bendix and GM lawyers recently (which lasted over 7 hours). Such warnings are inadequate for two reasons: 1. The labels do not inform of the danger of using such products, and 2. There is no mention of cancer or potential death from breathing dust from such products.

Such ridiculous cautionary warnings also ignore the obvious to anyone who has done professional mechanic work in the past: It is impossible not to have some dust released when doing brake or clutch work, no matter how careful you are. Beginning in the mid-1970s, I was trained not to blow out the brake drum with an airhose anymore, and I was also told not to grind brake linings. It was not explained to me why such procedures were implemented at my GM/Oldsmobile dealership in the 1970s, but I followed them. Still, dust is released when you remove drum brake covers, disc brake assemblies, clutch housing assemblies, and new brakes or clutches from boxes. Some dust is unavoidable with brake and clutch work. As I understand my disease, doctors do not know how much exposure to asbestos it takes to cause mesothelioma. If that is true, why do brake and clutch product manufacturers still use asbestos in some of their friction materials when alternatives are available and they know some dust is unavoidable in using their friction products? Isn't the possibility of getting mesothelioma enough reason to completely eliminate the use of asbestos in friction materials altogether?

Senator Murray, I live everyday with a time bomb. I wait for the day my mesothelioma begins to spread throughout my body and cause the pain and extreme shortness of breath that will eventually lead to an excruciating death. I fear it, and there's nothing I can do to stop it. I've already endured 4.5 months of chemotherapy that overwhelmed me with exhaustion, sleepless nights, and nausea. Perhaps you can do something, though, to make sure no other people working as automotive mechanics get this terrible disease.

I thank you for your time.

Sincerely,

JOSEPH T. HELLER.

RESPONSE TO QUESTIONS OF SENATORS KENNEDY AND MURRAY FROM EPA

1. (A) How has EPA used the experience of Libby, Montana to correct current exposure threats and to prevent a tragedy like this from happening anywhere else?

(B) What are the results of EPA's inspections of the three other vermiculite mines and other mines where asbestiform fibers may be present?

(C) Has EPA relied on transmission electron microscopy for these tests, as recommended in the Inspector General's report?

(A) EPA has used the experience of Libby, Montana, to supplement its standard operating procedures under the Superfund site evaluation process. EPA Regions have responded to potentially contaminated sites using a cross-office, multimedia, integrated program approach to site evaluation and response. As part of this effort, EPA Headquarters has coordinated closely with the Regions, other EPA program offices, and other federal partners to conduct regular meetings, track the progress of site reviews, and ensure that current exposure threats are being addressed by the most appropriate authority.

EPA is working with other federal, state, and local authorities in efforts to consider locations and industries other than Libby, Montana which might pose similar threats to public health and the environment. EPA's Office of Solid Waste and Emergency Response (OSWER) is collaborating with the Mine Safety and Health Administration (MSHA), Occupational Safety and Health Administration (OSHA), the National Institute of Occupational Safety and Health (NIOSH), Agency for Toxic Substances and Disease Registry (ATSDR), Consumer Product Safety Commission (CPSC), states, and other partners who can provide or analyze information about public health and environmental contamination.

ATSDR and EPA have determined that a review of county health data may be a useful tool to identify other asbestos-contaminated sites like Libby. EPA will closely monitor this effort once it is initiated to appropriately direct resources to sites with serious public health impacts.

(B) With respect to EPA's investigations of additional vermiculite mines, we have confirmed the following results:

Louisa, VA: EPA conducted field sampling in Louisa, VA, at the Virginia Vermiculite Mine, LLC in May 2001. Samples were collected in and around residences in the area of the mine and along roadsides and rail sidings. MSHA also collected samples on site to determine potential exposure for workers.

MSHA samples identified limited, highly concentrated and discrete deposits of amphibole asbestos material in the mine. The amount of contaminant as a percentage of the total ore/aggregate volume appears to be extremely low. EPA samples did not identify any measurable levels of asbestos fibers migrating off site. Therefore, Superfund has determined that no further program action is warranted.

Carolina Vermiculite, SC: EPA visited the site and took samples on June 6, 2001. Lab personnel collected samples from the mine/ore body, from the processor, waste "slime," and beneficiated (concentrated) vermiculite product. No measurable levels of asbestos fibers were detected in the samples. Superfund has determined that no further program action is warranted.

WR Grace/Enoree, SC: EPA visited the site and sampled on June 6, 2001. Lab personnel collected samples from several mine sites and different ore deposits, from the processor, waste "slime," and finished product. No measurable levels of asbestos fibers were detected in the samples. Superfund has determined that no further program action is warranted.

With respect to non-vermiculite mines and industries, OSWER is working with MSHA, OSHA, NIOSH, ATSDR, CPSC, US Geological Survey, states, and other partners to explore the potential universe of mining and mine-related sites with asbestos contamination.

(C) EPA has relied on transmission electron microscopy for these tests as recommended in the EPA Inspector General's report. In a guidance memo from July 2000, OERR established a national protocol to analyze bulk samples for asbestos using a combination of Polarized Light Microscopy (PLM) and Transmission Electron Microscopy (TEM). In addition, OSWER has audited the labs which are performing these evaluations to ensure consistency and reliability of analytical results.

(2) In a June 28, 2001 memo from you to EPA Inspector General Nikki Tinsley, you wrote that EPA will develop an Action Plan For determining a need for a NESHAP for contaminated asbestos. Has that Action Plan been finalized? Does EPA still believe the Action Plan will be completed by January of 2002?

EPA's Office of Air Quality Planning and Standards (OAQPS) is currently developing the asbestos NESHAP Action Plan. EPA still expects the asbestos NESHAP Action Plan will be completed by January of 2002. We will be glad to meet with you to discuss any questions you may have regarding the Action Plan.

(3) EPA participated in an Asbestos Health Effects Conference in May of this year. Can EPA please summarize some of the key findings that came out of this conference?

In May of 2001, EPA organized an international asbestos health effects conference, along with co-sponsors from the National Institute of Occupational Safety and Health (NIOSH), Agency for Toxic Substances and Disease Registry (ATSDR), Mining Safety and Health Administration (MSHA), and California EPA. The conference was organized to review the state of the science on asbestos health effects and served as the first step in EPA's update of our toxicity assessment for asbestos. A number of discussions at the conference focused on the importance of asbestos fiber dimensions and fiber type in relationship to asbestos-related disease.

EPA will use information gathered at the conference to update the Agency's asbestos toxicity assessment. As a first step in this process, EPA currently is updating the cancer risk assessment methodology for asbestos. This draft risk updated assessment methodology will be submitted for independent external peer review in 2002. We will be glad to meet with you to discuss any specific questions you may have about the conference or the update of EPA's toxicity assessment for asbestos.

(4) Are the other nine regions of EPA taking full advantage of the expertise on contaminant asbestos that Region 8 has developed because of its work on Libby? If so, how?

Starting in January, 2000, EPA HQ began to plan, coordinate, and conduct biweekly meetings for this project. Invitations were sent to all EPA Regions, representatives of EPA program offices, and other parties to ensure thorough sharing of information and experience. This coordination effort included guidance documents to the Regions on national standards for site identification, assessment, and priority-setting; sample collection and analysis; and other relevant issues.

As we gathered additional information on the asbestos contamination in Libby, related processing facilities and likely contaminated areas, EPA HQ made certain that the information was shared with all of our collaborators and partners in for appro-

priate follow-up. In addition, EPA organized an international asbestos health effects conference to review the state of the science on asbestos (see response to third question, above).

(5) The Committee has concerns that the inspections EPA has undertaken so far are too limited In particular, the ¼ mile radius in which EPA is currently undertaking inspections could be increased to a radius such that all contaminated areas are included Please let the Committee know if EPA will agree to expand its inspections in this manner. If EPA does not agree to expand its inspections, please include in your response a detailed explanation of the Agency's reasons for declining to do so.

EPA HQ is not aware of a specific ¼ mile radius limit to the inspections conducted as part of this effort. The Regions have collected bulk and soil samples in areas surrounding the facilities or in places where workers, residents or business records indicate that waste may be located. EPA does not believe that any EPA Region has failed to consider evidence of contamination which may be present more than ¼ mile from the facility under investigation.

RESPONSE TO QUESTIONS OF SENATOR WELLSTONE FROM EPA

1. I want to ensure continued aggressive efforts to clean up the areas in Minneapolis, Minnesota, that have been contaminated as a result of the operations of the Western Mineral products plant located at 1720 Madison Street. Do I have your assurances that EPA will continue its work until all contaminated properties are cleaned up?

Yes. EPA has been working closely with the State of Minnesota to address all contaminated properties associated with the Western Mineral Products Plant at 1720 Madison Street in Minneapolis. This work is projected to continue for at least the next fiscal year. In addition, EPA understands that ATSDR and the State plan to evaluate the potential health impacts of this contamination on the residents and former workers at this facility.

2. The Committee has reviewed information indicating EPA originally investigated 61 sites in Region 5 for contamination from Libby vermiculite, but EPA determined only the Western Minerals site requires further action. Is EPA aware of any other sites in Minnesota that should be investigated for asbestos exposure from the Libby vermiculite mine or from elsewhere? If so, please let me know where these sites are and what EPA's proposed course of action with respect to these sites will be. Are there any sites in Minnesota that have been called to EPA's attention as possibly at risk of asbestos contamination, but which EPA has declined to investigate? If so, please supply the location of these sites and EPA's reasons for declining to investigate.

In December 1999, EPA Region 8 notified EPA HQ of concerns about asbestos contamination in the vermiculite ore from Libby, Montana. EPA HQ began a process to identify exfoliators and other facilities which used vermiculite ore. EPA gathered data from the US Geological Survey (USGS), Bureau of Mines, W.R. Grace, and other sources. Regional investigation narrowed the possible list and corrected the errors in this data until we were able to complete a national list of 244 potentially contaminated facilities.

EPA has identified 61 sites in Region 5 which processed or used vermiculite ore. Following an initial review of these sites, EPA determined that 14 of the 61 sites warranted collection of asbestos samples. After reviewing the sampling results, EPA determined that 10 of the 14 sites did not require further action. Three of the 14 sites are still under investigation, and one of the 14 sites is currently undergoing a response action (Western Minerals).

A total of 13 out of the 61 sites in Region 5 are located in Minnesota. Region 5 took samples at 3 of these (B.F. Nelson, Western Minerals, and Certain Teed/Diversified Insulated.) EPA is not aware of any vermiculite processing facility in Region 5 or Minnesota with a high likelihood of asbestos contamination which EPA has declined to investigate.

August 14, 2001.

Sen. PATTY MURRAY,
Senate Health, Education, Labor and Pensions Committee,
U.S. Senate, Washington, DC.

DEAR SENATOR MURRAY: I am enclosing the following statement for inclusion in the record of the hearing on asbestos and asbestos contaminated products held on July 31, 2001.

My name is Mary Gazaille. My husband, Donald, and I live at 13124 Louisa Road, Louisa, Virginia, across from the vermiculite mining site. We have researched the

matter and have studied documentation regarding the asbestos contamination of Virginia Vermiculite and are concerned about this exposure to air-borne asbestos and wanted reassurance that our family was in no danger.

Some time last year, EPA employees came to test our property for asbestos contamination. We were later told that their results indicated that there was none present although very little detail was given to us. We were not satisfied with this inspection because it was clear that their testing of our property was inadequate.

Despite my protests to these inspectors that our home had just been remodeled on the interior and that the windows were kept sealed at all times because of the heat/air conditioning system, they took most of their samples from inside our house. This included from the top of a brand new refrigerator, a freshly painted bedroom and so on. We explained to them that the likely place where they would find asbestos dust blowing from across the street would be on the exterior of our property, including the driveway, out-buildings and such. For reasons that we cannot understand, they refused to take any samples from the areas where they would have obtained meaningful results. We also asked them to set up an air monitoring device in our field across from the mine to capture the dust that was spreading from the mining operation to our property, and from the trucks on the road to our property. Again they refused. I have spoken with some of my neighbors and find that they experienced the same disinterest in doing any meaningful investigation on these properties. We have since read accounts in the press promoted by Virginia vermiculite that the area around the mine and the adjacent property owners are "safe". This is extremely misleading and I feel that it is important for you to know the truth about what happened.

In addition, although we asked EPA for a detailed report on their studies of the area, none has been forthcoming.

It was the impression of my husband and myself that they were more interested in not finding any asbestos dust than in actually finding it and protecting the public health.

Thank you very much for including this in the record.

Very truly yours,

MARY GAZAILLE.

RESPONSE TO QUESTIONS OF SENATORS KENNEDY AND MURRAY FROM DAVID D. LAURISKI

1. In your testimony, you said MSHA has taken samples at all existing vermiculite, taconite, talc and other mines to determine if asbestos is present and at what levels, which has meant almost 900 samples at more then 40 operations. Did you find asbestos concentrations above MSHA's standard at any of these operations? If so, which ones and what are you doing to protect miners? What type of technology did you use to measure the samples? Was it the most powerful technology, TEM? Did you find concentrations of asbestos below MSHAs standard but above OSHA's stricter standard of 0.1 fiber per cubic centimeter? If so, what are you doing at these mines to protect workers in the interim, or will miners have to wait until MSHA lowers its standard to be protected at the level OSHA deems appropriate?

Response. To date, MSHA has not found actual asbestos concentrations above either the MSHA permissible exposure limit (PEL) or the OSHA PEL at the more than 40 operations where almost 900 environmental samples were taken. I would note that MSHA is continuing to conduct sampling at mines known to have a potential for asbestos contamination.

MSHA is using three methods to analyze its collected samples. The environmental samples are analyzed using the procedures of the National Institute for Occupational Safety and Health (NIOSH) Analytical Method 7400A using Phase Contrast Microscopy (PCM). When air sample fiber results indicate a reading over the OSHA PEL, the filter membrane is re-analyzed to determine if the fibers are asbestos using the NIOSH Transmission Electron Microscopy (TEM) method 7402. To date, approximately 17 percent of the recent PCM fiber results have required further TEM analysis. However, as stated earlier, none of the TEM results have indicated an asbestos fiber result over the OSHA PEL.

In addition to airborne fiber sampling, MSHA analyzed bulk ore samples using the U.S. Environmental Protection Agency (EPA) Polarized Light Microscopy (PLM) method ID 600/R–93/116. The bulk ore samples were visually inspected for fibrous material that potentially could be asbestiform. mineral. At several mines, the analysis of the bulk samples indicated the presence of asbestos; however, concurrent air sampling did not indicate overexposures.

Whenever bulk sampling and/or analysis reveals the presence of asbestos, MSHA informs mine management and workers of its presence and the importance of compliance with MSHA standards (30 CFR 56/57.5001) designed to protect the miners from exposure to asbestos. Many operators already avoid or specifically remove any visible asbestos streaks or veins that they encounter while mining, MSHA reemphasizes the importance of this practice.

2. Why didn't MSHA lower its standard for exposure to asbestos when OSHA lowered it in 1986 and 1994?

Response. I was confirmed as Assistant Secretary in May 2001. 1 cannot speak to the decisions made by my predecessors. However, I can assure you that we are committed to ensuring that miners' health is appropriately protected and are considering this matter with the highest level of attention.

3. You indicate in your response to the I.G.'s [Inspector General's] report that you will be presented with options on a process to solicit input from affected stakeholders. Have you received those recommendations? Do you know how you are going to proceed? Do you have a time frame for achieving a resolution based upon these recommendations?

Response. Yes, I have received these options. I will be meeting with other DOL personnel to determine the best course of action. I want to assure you that we will act as expeditiously as possible. In the interim, MSHA will continue to conduct sampling at mines known to have potential for asbestos, and will continue to analyze the sample to evaluate miner's exposure against both the MSHA and OSHA PELs.

4. In 1989, MSHA issued a proposed rule to lower its standard from 2 fibers per cubic centimeter to 0.2 fibers per cubic centimeter. Why wasn't this rule ever finalized?

Response. I cannot comment on the decisions made by my predecessors. However, we are dedicated to the goal of miners' safety and health.

5. Also in 1989, MSHA proposed rules to address take home contamination and exposure to asbestos. Why wasn't this rule ever promulgated?

Response. Again, it would be inappropriate for me to speculate about decisions made by my predecessors. I can, however, express our strong interest in addressing this issue prospectively.

6. You state in your testimony that the "Libby experience is, of course troubling." How do you explain what happened there? How can you ensure this Committee that what happened in Libby won't happen again, or that it isn't currently happening right now in one of the many mining communities in this country? When you read the accounts of what happened in Libby, what was your reaction?

Response. I was deeply troubled by the Libby story. My first concern is to make sure that mines today are protected from similar situations. We also want to do what we can to help the affected individuals and their families. MSHA has, along with other Agencies, met with members of the Libby community to understand and respond to their concerns. I, along with the Assistant Secretary for OSHA, have travelled to Libby to meet with community members personally.

MSHA has already taken a number of steps to protect the health of today's miners who may be exposed to asbestos. We are sampling at all mines, and are having the samples analyzed for comparison with both the MSHA and OSHA PEL. Although MSHA does not have the authority to take enforcement actions based on the OSHA PEL, we are advising both mine operators and miners of the OSHA PEL, and recommending that they should strive to achieve that level. In addition, we are working with other involved Agencies to prevent any future occurrences.

7. With respect to the permissible exposure limits (PEL) for asbestos, it is our understanding that MSHA's PEL is 2.0 fibers per cubic centimeter, while OSHA's PEL is 0.1 fiber per cubic centimeter. We also understand that, according to the recent I.G.'s report, between 1978 and 1998 MSHA took more than 160 samples at the Libby, Montana vermiculite mine, only two of which exceeded a threshold of 2.5 fibers per cubic centimeter. Yet we believe that nearly 200 people in Libby, Montana have died from asbestos-related disease. Does this not suggest to you the current MSHA PEL for asbestos fails to protect miners, their families, and other member of the community from asbestos-related disease? Will MSHA be proposing a rule to lower the asbestos PEL?

Response. Asbestos related lung disease can take decades to develop. Before MSHA's 2.0 fiber standard took effect in 1978, miners in Libby were exposed to much higher concentrations of asbestos, as indicated by sampling records—over 100 fibers per cubic inch in some instances. Some miners almost certainly received additional exposures outside the mine as did others in the community. All of these exposures undoubtedly have contributed to the high incidence of lung disease. The 2.0 fiber standard is more protective than what came before. However, the scientific community and MSHA recognize that individuals exposed to 2 f/cc are at greater

risk of developing asbestos related disease than those exposed to lower levels. MSHA data indicate that current mining exposures are far below the regulation level of 2 f/cc. As we study the factors involved in the Libby experience, MSHA will integrate the findings into any future rulemaking activities. In the interim, however, we will continue to analyze samples, evaluating against both the MSHA and OSHA PELs.

8. We also have serious concerns about the issue of advance notice of inspections to mine operators. Such advance notice is prohibited under Section 103(a) of the Mine Act. And it seems evident that such advance notice—or even miners' perception that operators are being given advance notice—threatens to undermine MSHA's integrity. We assume you agree that this is a serious problem. You indicated that you will do an annual reminder to enforcement personnel about this prohibition. How will you follow up to know whether inspectors are adhering to this requirement? Do you have any benchmarks that you will be using to determine whether your directive—and the law—are being obeyed? Do you intend to send this annual reminder for coal as well as metal/nonmetal mine personnel?

Response. First, I must state for the record that the Agency has not found evidence that inspectors are giving advance notice. We take such allegations seriously and promptly conduct an investigation. Even the perception some miners may have regarding this issue impacts our overall effectiveness.

We are committed to upholding the Mine Act. MSHA will issue an annual reminder to both coal and metal and nonmetal enforcement personnel to renew and ensure our commitment to the requirements of the Mine Act. Our supervisors and managers oversee the activities of our inspectors, which includes accompanying them on their inspections, and monitoring comments from industry and labor. With improved communication between MSHA and its stakeholders, violations of this kind would be quickly detected.

9. As you reflect on the situation in Libby, Montana, or the situation in the Virginia Vermiculite mine that Mr. David Pinter has testified about, if you were the mine operator, and the core drilling showed the presence of tremolite asbestos on the property, what actions would you take to protect the miners who work there?

Response. We believe that it is critical for mine operators to ensure that the miners at their operations are aware of the hazards of asbestos, their location at the mine, and the measures to take to avoid exposure. Some of the most effective methods to control airborne asbestos include the use of water to suppress dust and the use of air conditioned equipment cabs, and enclosures to separate miners from dusty environments. MSHA currently requires protective equipment/clothing to be provided to miners where hazards, such as asbestos, are present, and visible delineation (posting) of areas that contain asbestos.

MSHA developed an asbestos information card, which our inspectors provide to miners and mine operators. In addition, we have directed our inspectors to encourage operators to lower exposures consistent with the OSHA PEL.

10. Does MSHA have regulations or requirements for mine operators to follow if core drilling identifies the presence of asbestiform minerals?

Response. In addition to our concentration limit for asbestos, MSHA has performance-oriented regulations which are triggered by the presence of a hazard in the workplace, regardless of whether or not a specified limit is exceeded. Title 30 CFR 56/57.15006 requires the mine operator to provide protective equipment and clothing when certain hazards are present. Title 30 CFR 56/57.20011 requires operators to barricade or post warning signs with appropriate information at all approaches to areas where health or safety hazards exist that are not immediately obvious to employees.

11. Does MSHA have access to core drilling records (kept by mine operators) to ensure that miners are informed about asbestos hazards in the ore? if not, should MSHA be given this access? If you do not agree that MSHA should be given this access, please explain.

Response. MSHA does not have access to the mine operator's core drilling results. However, when the presence of asbestos at the mine is suspected, MSHA inspectors take bulk samples of the material which are sent to a laboratory for analysis. These samples are analyzed and concurrent air sampling is conducted. This process is explained more fully in the response to question 1.

12. How many miners in the U.S. are potentially exposed to asbestiform minerals through the mining process?

Response. As of June 2001 there were more than 8,000 miners working at mines that produce asbestos, taconite (iron ore), talc and vermiculite. These operations have the highest potential for the occurrence of asbestiform minerals. However, since the spring of 2000 we have not found any actual overexposures, according to either the MSHA or the OSHA PEL.

13. In the last two years, how many mining operations has MSHA sampled for asbestos exposure?

Response. In the last two years, MSHA has conducted 205 inspections at 170 mining facilities during which samples for asbestos analysis were collected. These include MSHA's regular sampling activities as well as those conducted during the special emphasis program initiated in the spring of 2000. This is several times more than was done in the two years preceding our awareness of the situation in Libby.

14. If a mine is found to have an overexposure to asbestos under MSHA's current standard, what is the monetary penalty against the mine?

Response. The Federal Mine Safety and Health Act of 1977 (Mine Act) contains six criteria to be used in determining civil penalty amounts. These criteria include:

- The operator's history of previous violations;
- The appropriateness of the penalty to the size of the business;
- Whether the operator was negligent;
- The effect on the operator's ability to continue in business; and
- The gravity of the violation and the operator's demonstrated good faith in attempting to achieve rapid compliance after notification of a violation.

These criteria are used in developing penalty amounts based on the regular assessments process described in Title 30 CFR Part 100. Those regulations also outline MSHA's single penalty assessment criteria and the special assessment criteria and procedures. The Mine Act's criteria and MSHA's implementing regulations are designed to arrive at a proposed civil penalty that serves as a deterrent, but also is specific to the operation.

15. Where does MSHA send its samples for asbestos analysis? How much does it cost and how long does it take to get results back?

Response. MSHA in past years has contracted with several different laboratories for asbestos analysis. MSHA currently sends its asbestos samples to Reservoir Environmental Services, Inc. 2059 Bryant Street, Denver, CO 80211. The cost for a bulk sample is $12 each for Polarized Light Microscopy analysis and $50 each for TEM analysis. The cost of Phase Contrast Microscopy (PCM) for air samples is currently $10 and their TEM analysis is $60. MSHA has been working with the current contractor to determine if the turn around time can be improved. If this is not possible, MSHA will use other laboratories.

16. EPA staff working on the Libby situation have gained tremendous expertise over the last 2 years. How will MSHA coordinate with EPA staff to utilize their expertise about asbestiform minerals at the mining operations?

Response. MSHA has worked closely with EPA on this important issue. Last year EPA and MSHA staff met with members of the Libby community to address their concerns. Later we sponsored an Asbestos Health Effects Conference in May 2001 along with EPA, NIOSH and the Agency for Toxic Substances and Disease Registry, to discuss the current status and needs for research on this topic. MSHA staff met with other agencies following the May meeting. In all sessions, there is a free and open exchange of information. In addition, there is a standing committee of OSHA, NIOSH, EPA, and MSHA (the OMNE Committee) which meets at least quarterly to discuss areas of common interest. Asbestos is often a discussion topic at these meetings. MSHA will continue this cooperative interchange with EPA and other agencies.

DEPARTMENT OF HEALTH AND HUMAN SERVICES, PUBLIC HEALTH SERVICE,
Washington, DC, October 17, 2001.

Hon. EDWARD M. KENNEDY,
Chairman, Committee on Health, Education, Labor and Pensions, U.S. Senate, Washington, DC.

Hon. PATTY MURRAY,
Committee on Health, Education, Labor and Pensions, U.S. Senate, Washington, DC.

DEAR SENATORS KENNEDY AND MURRAY. Thank you for providing the National Institute for Occupational Safety and Health (NIOSH) the opportunity to testify on matters of workplace safety and asbestos contamination at the hearing of the Senate Committee on Health, Education, Labor and Pensions on July 31, 2001. We are pleased to respond to the follow-up questions posed in your letter of August 8, 2001, as listed below. I understand that the questions you included from Senator Paul Wellstone are being addressed separately by the Department of Health and Human Services and the Agency for Toxic Substances and Disease Registry.

1. In your testimony, you said that in 1991, NIOSH estimated that nearly 700, 000 workers in general industry remained potentially exposed to asbestos, not in-

cluding mining, railroad work, agriculture and several other industry sectors. Does this estimate include mechanics?

Response. This estimate includes mechanics who worked in general industry, but not those who worked in mining and agriculture. The general industry category does include the retail trade and service sectors, so the estimate would include auto mechanics working at dealerships and repair shops. Our estimate is based on data NIOSH developed as part of our National Occupational Exposure Survey (NOES) conducted early in the 1980s. The NOES assessed patterns of use and exposure for general industry but excluded large segments of some significant sectors, such as mining and agriculture. To derive the 1990 estimate of 700,000 workers potentially exposed to asbestos, we used the 1980s asbestos use patterns from NOES and multiplied that fraction by the 1990s employment statistics for the covered industrial sectors. Thus, mechanics in the industrial sectors not included in the NOES were not included in our estimate. A new patterns-of-use survey similar to the NOES would be needed to develop a more accurate current assessment of the number of mechanics and other workers potentially exposed to asbestos.

2. NIOSH also stated that the average number of samples taken by federal occupational safety and health inspectors declined by about 50 percent between 1987 and 1996. Why did the number of inspections go down?

Response. The number of samples recorded and reported in centralized databases to which we have access declined over the period 1987 to 1996. This does not necessarily mean that the number of inspections defined. As noted in our testimony, not all samples collected by OSHA are reported into the canalized databases. The decline we reported is based on the number of samples collected and reported by OSHA inspectors, and does not necessarily equate to the number of inspections that were carried out.

3. In your testimony, you said much of the vermiculite from Libby appears to have been contaminated with asbestiform minerals which are not currently regulated. Doesn't this suggest that perhaps the federal government should expand its definition of asbestos to include these other minerals?

Response. The dust particles to which workers were exposed at the mine in Libby, Montana, included both fibrous minerals that meet the current regulatory definition of asbestos and others that do not. In our study. From the 1980s we observed significant excesses of asbestos-related diseases in this exposed workforce. Because the exposure was to a complex mixture of fibers, including some that meet the regulatory definition of asbestos, it is not possible to attribute the cause of disease to any one particular fiber type. In such mixed fiber exposure settings, public health prudence suggests that workers may be best protected if exposures to all of these fiber types were reduced. Further discussion regarding the definition of asbestos is included in our response to Question 5, below.

4. NIOSH is currently conducting asbestos exposure assessments at vermiculite expansion plants and a number of horticultural sites. Does NIOSH have any test results back from this field sampling? If so, what are the findings? If not, when does NIOSH expect to have these results?

Response. At present, there are no test results to report from our investigations at expansion plants and horticultural sites. The field sampling efforts are continuing and are expected to be completed by the end of calendar year 2001. NIOSH will prepare and disseminate reports of findings after laboratory results are completed and analyzed.

5. In your testimony, you indicated NIOSH considers "cleavage fragments" within its definition of "asbestos." Shouldn't, MSHA, OSHA and EPA do the same?

Response. NIOSH has presented testimony to the Department of Labor (OSHA) that recommends including in fiber counts the cleavage fragments from the non-asbestos form (massive) habits of the six regulated asbestos minerals and other minerals in the same solid-solution series when they meet the shape and size criteria for being a fiber. NIOSH has provided the EPA with similar recommendations.

6. Is NIOSH currently conducting any epidemiological studies of people exposed to naturally occurring or manufactured fibers? Does NIOSH have plans to conduct these studies, and if so, when will they begin and when will results be available?

Response. NIOSH is conducting updates and re-analyses of the mortality experience of workers from the former Libby, Montana, facility and of workers at a textile plant that used chrysotile asbestos to produce textiles in South Carolina. In addition to adding more years of follow-up to these studies, NIOSH is attempting to improve its estimates of fiber exposures at these facilities using electron microscopy. The primary objective of these analyses is to seek a better understanding of how fiber characteristics (e.g., dimension and fiber type) influence the risk of respiratory cancer and non-malignant respiratory diseases. Another objective is to determine the impact of short-duration exposures among workers who were only transiently exposed

at the plants. Both of these studies were recently initiated, and results are not expected for at least two years.

7. Does NIOSH currently have any plans to conduct research to better determine physical and or chemical characteristics affecting toxicity of asbestiform minerals?

Response. The epidemiologic studies described above should provide a better understanding of fiber characteristics, that affect toxicity. Also, NIOSH has been conducting animal exposure studies to evaluate short-term response to length-classified fibers. Most of this work is completed, and publication of findings is anticipated in the near future.

8. Is NIOSH currently considering additional work to improve and standardize the methods for asbestos fiber measurement? If so, what is the status of this work and when will it be completed?

Response. There is no current research activity underway at NIOSH for changing the methods for asbestos fiber measurement. Some promising work currently is going on in Japan to develop an image analysis system. NIOSH is preparing to reanalyze samples from the South Carolina textile cohorts using transmission electron microscopy (TEM) to better define the exposures at these locations using more sensitive methods than the optical microscopy techniques used when the original epidemiology studies were done. This information will help determine which fiber indices predict disease in workers.

9. To follow-up on the last sentence of your testimony, do you think MSIHA's and/or OSHA's exposure limits need to be lowered? Does the federal government's definition of asbestos need to be expanded to ensure better protection for workers and consumers? Should asbestos be banned altogether?

Response. In prior testimony to the DOL, NIOSH urged that the goal be to eliminate exposures to asbestos fibers or, where they cannot be eliminated, to limit them to the lowest possible concentration. With regard to exposure limits, the NIOSH Recommended Exposure Limit (REL) is 0.1 f/cm^3, a limit based on the lowest level that can currently be detected in air. We have in the past recommended a single exposure limit of 0.1 f/cm^3 applicable to all workers.

More than a decade ago, NIOSH broadened its definition of asbestos and recommended that DOL revise the asbestos regulations to do the same. The NIOSH definition includes additional mineral fibers beyond the six traditionally specified as asbestos. In assessing asbestos exposures, NIOSH also recommends counting cleavage fragments that meet dimensional criteria as fibers.

In response to your question regarding a ban, occupational safety and health practice is based on a hierarchy of controls, and substitution is at the top of the hierarchy. It is an important option for prevention. NIOSH recommendations often address substitution where feasible, and NIOSH has in the past recommended this approach for asbestos. Since the OSH Act authorizes OSHA to establish feasible exposure levels, but does not specifically authorize an outright ban of any particular substance from the workplace, NIOSH has focused its asbestos recommendations to DOL on control of hazards to workers.

The greatest current risk of asbestos related disease for U.S. workers is likely to come from exposure to respirable fibers in uncontrolled maintenance, repair, or demolition of structures or products where asbestos is already in place. Similarly, exposure to naturally-occurring forms of asbestos materials will continue to pose a problem in mining and other mineral-extraction or tunneling activities. This risk will remain whether or not there is a ban on future use.

While additional information about asbestos exposure is being gathered, we believe reducing or eliminating known asbestos exposures is the best way to protect worker and public health.

Once again, I appreciate the opportunity to address your questions concerning this important public health matter. NIOSH remains committed to protecting the life and health of every U.S. worker. Should you have further questions, please do not hesitate to contact me.

Sincerely yours,

R. DeLon Hull, Ph.D.
Acting Deputy Director for Program

THE FACTS ABOUT SCOTTS, W.R. GRACE, AND VERMICULITE

• Scotts consistently provided a safe workplace that met or exceeded OSHA and EPA standards. The company strictly complied with all government regulations and relied on OSHA standards to determine workplace safety.

• For many years, W.R. Grace apparently knew that the vermiculite it was supplying to Scotts from its Libby, Montana mine was contaminated with asbestos and

intentionally failed to inform its customers, including Scotts, until the advent of OSHA regulations in the early 1970's. (See 7/9/01 *New York Times* article about efforts of W.R. Grace to hide asbestos contamination.)

• Once it became clear to Scotts that there were potential health problems associated with the vermiculite supplied by W.R. Grace, it acted prudently and responsibly to protect its workers.

Early 1970's—The Company immediately and voluntarily began a comprehensive air-monitoring program and significantly upgraded the dust collection systems at its Marysville facility to ensure worker safety.

Mid 1970's—Scotts voluntarily implemented an annual physical program that included chest x-rays, and pulmonary function tests for associates at the Marysville facility.

Mid 1970's—Scotts initiated a series of well-documented worker communications to keep associates informed of issues related to asbestos-contaminated vermiculite. The Company maintained frequent communication with its associates on the subject over the next decade.

1978—Despite the fact that dozens of companies were using vermiculite, Scotts was the first and only company to contact the EPA and OSHA when three associates' lung problems worsened and another became sick. It did so on a completely voluntary basis. Scotts informed the regulators that there may be a possible connection between its sick workers and asbestos-contaminated vermiculite—despite no scientific connection at that point.

1980—Scotts voluntarily stopped accepting ore from the Libby mine, even though it was still on the market, met EPA standards, and was used by W.R. Grace in its own products. (The *New York Times* 7/9/01 article on Grace's efforts to hide asbestos contamination says, in reference to Scotts: "[In 1980] The company insisted on switching to vermiculite that Grace mined in South Carolina, which was apparently uncontaminated." Grace did not close the Libby mine until ten years later, in 1990.

1980—Scotts required its new vermiculite vendors to certify that ore shipped to its facilities was free from contamination. Grace continued to sell the Libby ore and utilize ore in its own products for another decade.

• Scotts has been widely acknowledged by the EPA and OSHA and applauded in private reports as the catalyst for alerting the government to the problems with vermiculite which led to numerous investigations into the ore in the late 1970's and the 1980's. These investigations culminated in 1980 EPA draft regulations. While these regulations were never implemented, Scotts was commended by the EPA in 1980 for its actions.

• There is an important distinction between workplace hazards and product hazards. Scotts has regularly tested its products for safety. All Scotts products have been and continue to be asbestos-free and safe for customers. According to the EPA, Scotts' and other gardening companies' products "do not pose significant health risks." All Scotts products are safe for sale and use in the marketplace.

• Scotts stopped using contaminated ore from the Libby mine in 1980. Vermiculite was purchased after 1980 from other sources and was certified by suppliers as asbestos-free. Scotts also regularly tested for asbestos. During the 1980's and 1990's, Scotts began to reduce its reliance on asbestos-free vermiculite as better alternatives became available that were more environmentally friendly. By 1998, Scotts had eliminated 75% of its asbestos-free vermiculite usage. Today, asbestosfree vermiculite is used by Scotts only in a few professional gardening products.

RESPONSE TO QUESTIONS OF SENATOR KENNEDY FROM JOHN L. HENSHAW

1. Has OSHA considered lowering its standard below the current level of .1 fibers per cubic centimeter?

In 1994, OSHA lowered the Agency's standard for asbestos to the lowest feasible level, 0.1 fibers per cubic centimeter as an 8-hour time-weighted average over the working day. The Agency also added a short-term excursion limit of 1 fiber per cubic centimeter averaged over a 30-minute period, and added several ancillary provisions that the Agency found would lower employee exposures even further. However, the extent to which these ancillary provisions would lower exposures below the Permissible Exposure Limits (PELs) could not be quantitatively measured. Thus, OSHA's PELs for asbestos are constrained by feasibility, which means that the regulated community is not technologically and economically able to meet a lower PEL. Even so, OSHA's PELs for all forms of asbestos remain the lowest in the world.

2. What technology does OSHA rely on to measure asbestos fibers? Is it Transmission Electron Microscopy?

No, OSHA does not rely on Transmission Electron Microscopy (TEM). OSHA uses Phase Contrast Microscopy (PCM) (because it is inexpensive and it measures the as-

bestos concentration in the same way that was used in the development of a risk assessment model for asbestos Permissible Exposure Limit (PEL). OSHA used scientific data of health effects, including death and disease, that was based entirely on light microscopy, largely Phase Contrast Microscopy (PCM). It was the only reliable data available at the time and remains so because adequate studies relating health effects to exposures measured by TEM have not been done. However, the Agency may use TEM to identify fibers if there is a question whether or not the fibers are asbestos.

3. How does OSHA ensure compliance with existing regulations at the thousands of auto body shops throughout the country where mechanics are working on brakes that may contain asbestos?

OSHA ensures compliance by enforcing the General Industry Standard (29 CFR 1010.100 1) Construction Industry Standard (29 CFR 1926.1101) and Shipyards Standard (29 CFR 1915.1001) through its inspection program. These standards require employers to ensure that employee exposures do not exceed 0.1 fibers/cubic centimeter of air (f/cc) as an eight-hour, time-weighted average (TWA). In addition, OSHA has set mandatory Work Practices and Engineering Controls for Automotive Brake and Clutch Inspection, Disassembly, Repair and Assembly. These requirements apply when any brake work is done, regardless of the exposure levels. OSHA estimated that compliance with these mandatory work practices and engineering controls will result in the average asbestos exposure to be 0.003 fibers/cc.

Inspections are conducted in response to complaints from employees, or as a result of referrals from other sources such as, but not limited to, law enforcement and the news media. OSHA also targets establishments for inspection through its site specific targeting program, National Emphasis Programs, and Local Emphasis Programs. While these targeting programs do not focus specifically on asbestos, any potential asbestos exposure in a workplace is investigated and evaluated as part of these inspections

4. OSHA currently only regulates six forms of asbestos. Does OSHA believe current science warrants expanding or changing its authority to cover minerals which may also pose health threats but do not meet the strict definition of asbestos?

Under the OSH Act, OSHA has the authority to regulate occupational exposure to hazardous substances that pose a significant risk of material impairment of health if there are technologically and economically feasible ways for employers to provide protection from these risks. In 1992 (57 FR 24310), OSHA made a determination that the scientific evidence did not support the regulation of non-asbestiform minerals of the type referred to in your question. OSHA does not believe that the science available at this time warrants initiation of Sec. 6(b)(5) rule making to address these substances. However, the Agency continues to closely monitor new scientific findings on these substances closely while also actively participating in research and review of the evidence conducted by Federal, national and international scientific organizations (such as the National Institute for Occupational Safety and Health, the National Toxicology Program and the International Agency for Research on Cancer).

5. How does OSHA, as the primary organization responsible for protecting worker safety, explain what happened in Libby, Montana?

The Occupational Safety and Health Act of 1970 provides the Secretary with authority over all working conditions of employees except those conditions with respect to which other Federal agencies exercise statutory authority to prescribe or enforce regulations affecting occupational safety and health. The Secretary has delegated this authority to OSHA.

The Federal Mine Safety and Health Act of 1977 provides the Secretary of Labor with authority over all working conditions of employees engaged in underground and surface mining as well as related operations such as milling. The Secretary has delegated this authority to the Mine Safety and Health Administration (MSHA). A Memorandum of Understanding between MSHA and OSHA, concluded in 1979, details the respective jurisdictions of the two agencies. The general principle is that on mine sites and milling operations, DOL will apply provisions of the Federal Mine Safety and Health Act. Whenever the mining law does not cover hazards at mill or mine sites (e.g. hospitals on mining sites), or where there are no existing MSHA standards, the OSH Act will apply. Thus, OSHA is generally precluded from enforcing its regulations in workplaces such as the mine at Libby, Montana.

6. In Mr. Layne's testimony, he stated that since October 1995, OSHA cited employers for violations of its asbestos standards 15,691 times. What percentage is this of the total number of inspections? Does OSHA consider this to be an acceptable level of noncompliance?

From Fiscal Year 1996 through Fiscal Year 2001 (Oct. 2000–June 2001), OSHA conducted 190,971 total inspections. These inspections generated 427,786 total viola-

tions. Of those totals, 3000 inspections and 15,691 violations involved asbestos. Therefore, approximately 2% of inspections and 4% of violations were asbestos related.

OSHA does not consider any level to be an acceptable noncompliance level. We strive for 100% compliance.

OFFICE OF THE GOVERNOR,
STATE OF MONTANA,
Helena, MT, July 2, 2001.

CHRISTINE TODD WHITMAN,
Administrator, Environmental Protection Agency, Washington, DC.

DEAR ADMINISTRATOR WHITMAN: I understand that the Environmental Protection Agency is considering placing the town of Libby, Montana on the Superfund National Priorities List (NPL). I am writing to ask for your assistance in providing me with additional information that is needed to evaluate the best course of action for the town.

First, before we even discuss designation of Libby as an NPL site, it is essential that I understand the scientific basis for such a decision. I would like a briefing on the current federal rules that govern environmental measurement of and exposure to asbestos and its remediation so that the Libby situation can be assessed in the context of currently established federal practices. I need to be assured that those rules have been applied to Libby as they apply in other such situations across the country. In order to provide this information in a timely way, I would request that a senior staff member from EPA headquarters who has not been involved directly in the Libby matter brief me on these issues. I want to make sure I have an objective understanding of the Libby situation so that I can fairly advise and respond to the people in the community. It would be most useful if this briefing could take place as soon as possible.

As a part of any briefing on the listing of Libby as a superfund site due to the asbestos problems, I would also like to be briefed on state obligations associated with such listing. I am concerned about the potential for Montana having to meet a 10 percent match requirement for expenses not recoverable from WR Grace. I also want to fully understand what Montana's long-term operations and maintenance obligations might be, should cost recovery from WR Grace not be possible.

Second, after this review has been completed, and if indeed the available information confirms EPA's current assessment, I would request that you provide me with information about the implications of designating the town of Libby a Superfund NPL site. I understand that in the past the Environmental Protection Agency has designated communities, either municipalities or large residential areas, as priorities for Superfund cleanup, including such locations as Globe, Arizona and Times Beach, Missouri. In order that I might make a considered judgment and advise my constituents as to the best option to proceed with programs to protect their health and welfare, it would be useful to have an evaluation of past situations in which entire towns or large residential and/or commercial communities, or at least large segments of such areas, have been placed on the National Priorities List, I would like to understand better how the NPL designation may affect the value of real estate, including residential and commercial establishments, within the Superfund site area, and the ability to transfer or mortgage such properties. If the effects of listing an area on the NPL result in negative impacts like difficulty setting properties within the NPL area, reduction in fair market value of such properties and extra costs to protect buyers from potential Superfund liability. How long have such negative impacts lasted? Do communities so designated recover from these burdens associated with placement on the National Priorities List and, if so, how long does recovery take?

Additionally, to the extent that property values are adversely affected by placement on the NPL, to what degree are homeowners and business people able to recover a reasonable fair market value for their properties if they choose to or are required to sell that property during the period in which cleanup is taking place? To what extent has the ability of home and business owners to refinance or take loans on their property been affected. If EPA puts a municipality or large commercial/residential area on the National Priorities List, is it authorized to purchase the homes and commercial establishments which are adversely affected thereby? At what price—pre-listing fair market value? And, if so, what is the history of the effect of that acquisition on the fair market value of those properties? Finally, in your view, if such actions are possible, are there sufficient resources in the Superfund program to acquire the homes and businesses in Libby, Montana?

It is essential that I have as complete an understanding as possible of the federal rules regarding asbestos exposure and cleanup as well as the implications of placing a municipality or a large residential/commercial area on the National Priorities List in order to consult with your Agency in the decision-making process with respect to Libby. I would therefore greatly appreciate your responses to this inquiry as soon as possible so that I may factor them into my evaluation of the best course of action for the residents of Libby.

Sincerely,

JUDY MARTZ,
Governor.

U.S. SENATE,
Washington, DC, March 27, 2001.

Hon. JAMES M. JEFFORDS,
Chairman, Committee on Health, Education, Labor, and Pensions, U.S. Senate, Washington, DC.

Hon. EDWARD M. KENNEDY,
Ranking Member, Committee on Health, Education, Labor, and Pensions, U.S. Senate, Washington, DC.

DEAR SENATORS JEFFORDS AND KENNEDY: In February and March of this year, the *Wall Street Journal* ran two articles containing the incorrect, but widely held belief, that asbestos has been banned. However, as you may know, asbestos has not been banned. Asbestos is still used in the United States to manufacture roofing materials, automotive brakes, gaskets and other consumer products. According to the U.S. Geological Survey, in 1999 alone, the United States consumed 15,000 metric tons of asbestos, mostly chrysotile from Canada. The fact that the *Wall Street Journal* would make this mistake twice in two months indicates the extent of this misperception about asbestos.

Some of the confusion about asbestos may stem from the fact that in 1989, the Environmental Protection Agency (EPA) promulgated regulations to implement a phased-in ban on asbestos in consumer products. The agency had been working on these rules for a decade, and the ban received a lot of attention. In 1991, the 5th Circuit Court of Appeals overturned EPA's regulations, and the Bush Administration did not appeal the decision. Unfortunately, most people are unaware of the Court of Appeals' decision and the resultant reversal of EPA's ban.

There is considerable evidence suggesting many other consumer products contain asbestos as a contaminant of vermiculite, talc and taconite. Most infamous, perhaps, is Libby, Montana, where 192 people have died from exposure to asbestos from the vermiculite mine there, and 375 people are currently suffering from fatal diseases caused by this exposure. Last year, Senator Max Baucus (D-MT) held a hearing on Libby, Montana before the Senate Environment and Public Works Committee.

This week, the Inspectors General of the EPA and Department of Labor are releasing their reports about why people in Libby were exposed to harmful concentrations of asbestos in vermiculite, despite many federal programs and requirements intended to protect miners, their families and residents. These reports also include specific recommendations, such as lowering the Mine Safety and Health Administration's (MSHA's) asbestos exposure limit for miners to meet the Occupational Safety and Health Administration's (OSHA's) standard, which is 20 times more stringent. I look forward to reviewing these reports as soon as they become available.

The EPA is also investigating consumer products that contain vermiculite from Libby, such as Zonolite insulation and some lawn and garden products. The agency is concerned about workers exposed to asbestos-tainted vermiculite during manufacturing, as well as consumer exposure to these products.

Recent test results indicate automobile mechanics are routinely exposed to unsafe concentrations of asbestos when they work on brakes. Last November, the Seattle Post-Intelligencer found asbestos concentrations ranging between 17 and 62 percent of dust collected from six out of seven gas stations visited in the Seattle. The newspaper found similar results in Boston and other major cities. The EPA and OSHA recommend specific work practices and engineering controls to protect mechanics from asbestos in brakes, but the Seattle P.I.'s investigation found these practices are rarely followed.

We know exposure to asbestos causes asbestosis, mesothelioma and cancer. Disease caused by exposure to asbestos usually does not appear until decades later. I am very concerned American workers and consumers, most of whom believe asbestos was banned back in the 1980s, are still being unwittingly exposed to this deadly substance.

I am writing to request that the Senate Committee on Health, Education, Labor and Pensions hold hearings on asbestos during the first session of the 107th Congress as part of our oversight responsibility on work place safety. I would like an update from federal agencies (EPA, OSHA, MSHA, and the National Institute for Occupational Safety and Health) on current efforts to protect workers and consumers from exposure to asbestos. I would also like to explore which materials are regulated and the health effects of non-regulated minerals similar to the six characterized as asbestos.

I understand this is not a new issue. Decades after the dangers of asbestos were first identified, there are thousands of pages of federal and state regulations intended to protect people from amosite, chrysotile, crocidolite, tremolite, anthophyllite and actinolite. And we have made some progress because of these rules, regulations and programs. But these efforts failed the people of Libby, Montana, and it appears they are still failing some workers and consumers in the United States.

We need to make sure governments have the resources necessary to implement regulations currently on the books. We need to further explore protecting people from exposure to airborne minerals which are not technically categorized as "asbestos," but which look, function, and may be just as harmful as asbestos. We should also review our methodologies for defining, detecting and measuring asbestos to ensure consistency across agencies. Finally, I believe we need to revisit the question of banning asbestos in consumer products altogether.

Thank you very much for your attention to this matter. Please feel free to contact me directly about this, or to have the appropriate staff person contact Ms. Anna Knudson, Legislative Assistant, by calling 202–224–2621. Thank you again.

Sincerely,

PATTY MURRAY,
U.S. Senator.

BUILDING AND CONSTRUCTION TRADES DEPARTMENT, AMERICAN FEDERATION OF LABOR—CONGRESS OF INDUSTRIAL ORGANIZATIONS,
Washington, DC, July 31, 2000.

Hon. EDWARD M. KENNEDY,
Committee on Health, Education, Labor and Pensions, U.S. Senate, Senate Dirksen Office Building, Washington, DC.

DEAR CHAIRMAN KENNEDY: On behalf of the more than 3 million workers represented by the national and international unions affiliated with the Building and Construction Trades Department, AFL–CIO, I am writing to you about the exposure of construction workers to asbestos and asbestos-contaminated construction materials. About 10,000 workers are expected to die in the United States each year for the next 10 years from asbestosis and cancers caused by past exposure to asbestos. Over 25% of these deaths will be in construction.

These past exposures were mostly due to the installation of asbestos-containing fireproofing, roofing and flooring materials, insulation (in pipes, ducts, boilers, attics), and cement pipe and cement sheet products. However, construction workers are still being exposed to asbestos today. The major problem is not due to installation of asbestos-containing products, but exposure to asbestos resulting from disturbing or removing asbestos that is already present in buildings. This is especially true of buildings built before 1980, but can also be true of later buildings containing insulation and other construction materials which were reformulated to contain vermiculite and other materials which are contaminated with asbestos.

Construction workers continue to be exposed to asbestos because of mischaracterization, or total lack of characterization in structures that were built prior to 1980. Many times the wide variety of asbestos containing materials (ACM) are unknown to the individuals that plan the additions, modifications, or demolition of said structures. Sometimes ACM carries a non-asbestos label due to changes in threshold limit values that have taken place as a result of new information.

A construction worker's exposure to asbestos can take place while he or she is doing a number of different jobs. Examples of different types of worker exposure are: renovating or demolishing old buildings, removing old insulation, repairing old boilers, removing old insulated ductwork, installing new wiring or repairing old wiring in attics or above drop ceilings and, when disturbing insulation and asbestos siding for renovation activities.

The problem is that these construction workers often do not know when they are exposed to asbestos. Many workers have not received even basic training in asbestos awareness. They do not realize the wide range of products that can contain asbestos.

Most have heard about the insulation/asbestos relationship, but they are unaware that this silent killer can be found in floor tile, shingles and siding, older wire covering, and sometimes even the mastic or tar that covers the roof. When untrained workers disturb this material it is spread through the air to many parts of the job site. Many undocumented workers are unable to address even this basic concern because they have no "rights" due to their undocumented status.

It is not infrequent for contractors to knowingly ignore the requirements for the proper handling of ACM. These contractors do not remove or dispose of ACM in a proper manner. They pocket the cost of training, permitting and disposal fees. Often they work at night and use temporary or undocumented workers to avoid being detected. These contractors flourish by offering low cost ACM removal. Confusion is also generated by manufacturers' claims that chrysotile asbestos is not as hazardous as other forms of asbestos or that the concentration of asbestos is so low that it is not a hazard.

In summary, I respectfully submit the following recommendations to the committee to keep workers safe from asbestos exposure:

• *Increased asbestos awareness training for workers.* Even though OSHA requires initial training of workers who can be exposed to asbestos, with follow-up annual refresher training, most construction workers have not been trained in how to work safely when disturbing or removing asbestos. The Center to Protect Workers' Rights and several Building Trades affiliates train workers who can be exposed to asbestos at EPA's Superfund sites and at Department of Energy nuclear weapons facilities. I believe that there is a great need for more funding to train asbestos-exposed construction workers.

• *Adequate medical screening.* Because of the mobile nature of the construction workforce, it is difficult to provide adequate medical screening to determine when construction workers are experiencing asbestos-related health problems. Further, most state workers' compensation systems don't compensate occupational diseases caused by asbestos. As a result, the burden of paying medical costs falls on the worker and any health insurance plan, not the employer. I believe that legislation is necessary to ensure that construction workers can obtain proper medical surveillance and not be burdened with the medical costs if they do become ill from asbestos exposure.

• *License and bond ACM removal companies.* A step in the right direction would be to strengthen the licensing requirement for all companies and individuals that both characterize and remove ACM. This licensing process would be coupled with the posting of a sufficient bond to cover all default and liability issues. All structures built prior to 1980 need to be characterized prior to any permits being issued for modifications or demolitions. All contracts for ACM removal should require the successful bidder to participate in a registered apprenticeship program that provides asbestos awareness education of all workers, both apprentice and journeyman, with specialized training for the individuals that work with ACM. Finally, I suggest increasing the amount of enforcement of existing asbestos standards, coupled with debarment of anyone who knowingly violates the asbestos regulations on removal and disposal.

I am pleased that the Senate is taking another look at the issue of workers unknowingly being exposed to asbestos. The Building Trades and Construction Department stands ready to work with the committee to remedy this problem.

With kind personal regards, I am

Sincerely yours,

EDWARD C. SULLIVAN,
President.

STATEMENT OF MICHAEL MCCANN, PHD, CIH

I am a certified industrial hygienist with a doctorate in chemistry and since 1974 have specialized in the health and safety hazards of arts and crafts materials. In 1977, I formed the Center for Safety in the Arts, a not-for-profit organization, which I headed for almost 20 years. In 1992, we received a Mayor's Very Special Arts New York City Special Citation for our work. I am a consultant to art schools and art departments in schools and colleges. I have lectured and written extensively on art hazards, including the books Artist Beware, Health Hazards Manual for Artists, and Art Safety Procedures for Art Schools and Art Departments. In the early 1980's, I testified on the hazards of art and crafts materials at a Congressional Committee hearing and a New York State Assembly hearing. In 1980, I helped prepare comments on the use of asbestos-contaminated talc and vermiculite for the Consumer

Product Safety Commission for their Proposed Rulemaking on Asbestos in Consumer Products.

Many artists, art teachers, and art students—including children—are exposed to asbestos-contaminated talc and vermiculite. Workers in the pottery and ceramics industries are also exposed.

Talc is a common additive to clays and pottery glazes which are used for making pottery. Many potters, art schools and college art departments—and even some secondary school art departments—purchase powdered clay, talc, and other ingredients to mix up their own clay and glazes. During the mixing process, these powders can be inhaled. The pottery glazes are often sprayed to apply them to the pottery before firing in a kiln to give a glazed finish. After firing, the glazed pottery is often sanded, which creates a dust which can be inhaled. I have even observed elementary school children sanding glazed pottery made with talc-containing glazes.

One of the main sources of talc used in pottery has been the R.T. Vanderbilt Company, sold under the trade name NYTAL. This talc comes from mines in Gouveneur, New York. A quarter of a century ago, NIOSH studies found that talc from these mines were contaminated with both anthophyllite and tremolite asbestos, and that miners of this talc had high rates of asbestos-related cancers.

In 1979, Audrey R. Eichelmann, a ceramicist in Port Ewan, New York, developed mesothelioma, an incurable cancer caused almost exclusively by exposure to asbestos. She had never worked knowingly with asbestos, and her only possible exposure came from sanding and finishing porcelain dolls and other pottery that contained asbestos-contaminated talc. Audrey Eichelmann died on August 14, 1981 as a result of her cancer.

Vermiculite is also used in art as an additive in clay, plastic resins, and plaster as a filling or texturing ingredient. Artist and art students can be exposed to the dust from the vermiculite when they add it to these art materials. Asbestos contamination in some vermiculites is well established. Studies have shown, for example, that talc produced by W.R. Grace in Libby, Montana is contaminated with asbestos and that talc miners in Libby have high rates of asbestos-related cancers.

There are asbestos-free talcs and vermiculites. Unfortunately, the only way schools and artists have of determining whether their talc or vermiculite is asbestos-free is from information provided by manufacturers on labels and Material Safety Data Sheets. However, this information is often not reliable. For example, Vanderbilt has constantly denied that its talc contains asbestos and W.R. Grace has denied that its vermiculite contains dangerous levels of asbestos.

Even requesting analysis data from the manufacturer is not reliable. In one instance, I requested analytical data from a Texas talc supplier. The data provided stated that there was no detectable asbestos. However, the analytical method used had a detection limit of 5% asbestos. So this talc could have contained 4% asbestos and the testing method would not have detected it. It is not practical for artists or schools to have their own analysis performed.

What is the solution to this problem? There are asbestos-free talcs and vermiculites. I believe legislation is needed to ban asbestos-contamination in these and other consumer products. This ban should also require manufacturers to use state-of-the-art analytical techniques that can detect low levels of asbestos.

PREPARED STATEMENT OF BARRY CASTLEMAN

INTRODUCTION

Thank you for inviting me to comment on the status of asbestos problems in the US and the world. I am trained in chemical and environmental engineering, and have a Doctor of Science degree from the Johns Hopkins School of Public Health. I have spent the past 30 years working on asbestos as a public health problem. I have been a consultant to numerous agencies of the US government and other governments, international bodies, and environmental groups dealing with a wide range of public health issues. I have also testified in civil litigation in the US, on the history of asbestos as a public health problem and the reasons for failures to properly control its hazards.

WHY BAN ASBESTOS?

Around 30 years ago, new federal agencies were created to deal with such things as asbestos (EPA, OSHA, NIOSH, CPSC). Looking back, we can see that one lesson of the past 30 years of asbestos regulation is that nothing works better than a ban.

• There are still over 1000 OSHA asbestos citations/yr. in recent years including a brake plant still dry-sweeping more than 25 years after this was forbidden by first OSHA regulations.

• Some manufacturers facing specific product bans have waited until the day the ban took effect to stop selling the products, even products associated with substantial long-term liabilities. I shudder to think how long Georgia-Pacific would have taken to stop selling asbestos-containing drywall patching compounds if the Natural Resources Defense Council had not pressed the government (CPSC) to ban those products.

• The EPA ban on asbestos-containing sprayed fireproofing insulation was for some reason finally issued with a loophole allowing such products to be sold if they had less than 1% asbestos in them. Even I only learned in recent months that this scientifically unjustified tolerance enabled WR Grace to continue marketing sprayed products with just under 1% asbestos in them, marketed by the company as "asbestos-free" for many years after the EPA rules took effect.

I am not saying the EPA regulations justified WR Grace selling that attic insulation as "asbestos-free". Grace should at least have warned consumers of the presence of asbestos in the product from a mine that was originally called the Vermiculite and Asbestos Corporation when it opened back in 1919. 1 think that there should be personal, criminal liability for selling such products without warnings to consumers in the 1970s and 1980s. The history of asbestos product marketing is unfortunately replete with stories of what many people might regard as toxic corporate crime.

But my main subject here is regulation, not incarceration.

There is no safe variety of asbestos, and international and US authorities have repeatedly stated that there is no safe level of exposure to asbestos. It is impossible and unnecessary to try to control the hazards to workers from asbestos in automotive brake shoes and linings in new cars. Sweden led the world in showing in the 1980s that cars and trucks would stop just as surely with asbestos-free brakes. They started with replacement brakes for older cars and by 1987 added the requirement that new cars could not be sold in Sweden with asbestos brakes. In 1996, France decided to ban asbestos, and asbestos-cement construction product plants had to either convert to non-asbestos substitutes or shut down. The A–C plants converted to safer substitutes, and now use cellulose, fibrous glass, and/or polyvinyl alcohol fibers.

Starting with the Nordic countries, many leading nations in the control of occupational and environmental hazards have banned asbestos. By 1999, all the leading economic powers of Europe had banned asbestos, and the European Union had in place a deadline of 2005 for all member countries (and countries that want to join the European Union). Meanwhile, most of the countries of Asia and Latin America continue to use lots of asbestos, although they are wising up.

THE EPA'S ATTEMPT TO BAN ASBESTOS IN THE USA

The EPA tried to phase out the use of asbestos here in regulations published in 1989. All major uses of asbestos would have been banned in three groups, the last by 1997. When this was challenged in court, the rules were overturned because the court blamed EPA for not looking into a crystal ball and performing a quantitative risk analysis for all the substitute products that would replace the asbestos ones. EPA was miffed that the court laid such a burden on the agency and later wrote, "EPA believes the court made significant legal errors in interpreting the Toxic Substances Control Act (TSCA) and in substituting its judgment for that of EPA in balancing the costs and benefits of the asbestos-containing products banned by the rule." Nonetheless, EPA did not appeal the court decision, and 10 years later we still have asbestos products manufactured in and imported into the United States.

EPA attempted to get agreement of the auto manufacturers to phase out the use of asbestos in 1992, after the court overturned the ban rule. Though the initial response was encouraging, the auto companies scattered when the asbestos industry threatened an antitrust suit. So asbestos parts are still used in some new vehicles to this day, despite leading auto makers' assurances to EPA in 1992 that they could still meet the deadlines of the overturned ban/phase-out rule.

WITHOUT A BAN IN THE US, ASBESTOS PRODUCTS CONTINUE TO BE IMPORTED

At least one US-based corporation has a plant in Mexico making asbestos-containing gaskets. If these products are among the gaskets imported into the US from Mexico, they would amount to a circumvention of OSHA and EPA asbestos regulations (with the associated costs these regulations entail). The consequent savings to the manufacturer (in fixed and operating costs, insurance, and liabilities) would con-

stitute an unfair advantage in that the lowering of production costs (i.e., the increase in profits) occurs at the expense of the Mexican workers, environment, and taxpayers. This "externalization of costs" that by right should be part of the costs of production borne by the manufacturer constitutes an unfair advantage over US manufacturers of safer, asbestos-free gaskets.

In 1998, I visited a plant of a company called Teadit in Brazil, where I saw workers using punch presses and power saws on asbestos gasket materials without any local exhaust ventilation to capture the dust. One of the customers for the Teadit gaskets at that time was General Motors in Brazil. Teadit now has an office in Houston and offers asbestos gaskets made in Brazil in the US. You can buy punched gaskets from their distributor with no warning labeling.

Once asbestos gaskets are imported, they constitute a hazard to workers and consumers in the US. Quite possibly, by the time anyone gets sick from these products in the US, there won't be any corporate entity left standing to cover the liabilities from the death and disease caused by these products.

The US continues to import substantial amounts of asbestos-cement construction materials, asbestos brake shoes and linings, and other asbestos products. In the year 2000, the US imported over 50,000 metric tons of asbestos-cement articles and over 200 tons of asbestos textile products (yarn, thread, clothing)—these hazardous products are not even made in the US anymore, they haven't been for many years. The asbestos-cement products are mainly construction materials whose handling, transport, installation (with cutting, drilling, etc.), renovation, and demolition expose countless US workers and other citizens to hazardous occupational and environmental hazards. This is unnecessary contamination of the living environment. No doubt, it is largely unrecognized asbestos exposure; and even when it is identified as asbestos exposure, it is from a practical point of view uncontrollable by merely trying to enforce regulations on asbestos use. Asbestos textile products are generally made now only in the poorer countries, they are hazardous both to manufacture and to use. China, South Africa, Brazil, Mexico, and Korea are leading suppliers of these commodities imported in recent years by the US.

Included as an "asbestos" product import category is brake linings and pads, whose importation rose from $59 million in 1996 to $89 million in 2000. In the brake friction products category, leading exporters have included Brazil and Mexico. It is likely that some of the products included in this historically asbestos product classification are now asbestos-free, since we also have imported these products from Germany and Denmark in 2000, countries where asbestos has long been banned. *But unless and until the International Trade Commission creates separate commodity numbers for asbestos- and asbestos-free brake products we have no way of knowing the true extent and trend of asbestos product imports of this type.* The same is true for the $9 million worth of "asbestos articles and friction material used in aircraft" the US imported in 2000. Even some of the asbestos-cement product import categories are defined broadly enough to encompass non-asbestos fiber-cements using such things as cellulose fibers ("or the like").

The only trade-neutral way to stop the continuing importation of asbestos products is to ban the manufacture, use, and importation of asbestos products in the US.

THE WTO ASBESTOS DECISION

The World Trade Organization authorized national bans on asbestos in a case whose appellate decision was announced in March of 2001. Canada, which exports almost all of the asbestos it mines to the Third World, had challenged the ban on asbestos in France as an unfair trade measure. In the end, even the free trade fundamentalists at the WTO had to agree that "controlled use" of asbestos was unrealistic, that no level of exposure could be considered free from the risk of cancer, and that safer substitutes were available. The US, which usually sides with parties urging the elimination of barriers to trade, in this case agreed that France was justified in banning asbestos. I was a scientific advisor to the European Commission in defending the French ban at the WTO (for further details, see "The WTO Asbestos Case and Its Health and Trade Implications" at www.ibas.btinternet.co.uk).

AUTO MAKERS LACK GLOBAL POLICY ON ASBESTOS

In 1998, I learned that General Motors was using asbestos-containing engine gaskets in new cars made in Brazil. I contacted a knowledgeable GM engineer named in a 1992 GM response to the EPA's effort to obtain a voluntary phase-out of asbestos by the car manufacturers. He explained that GM had converted to substitute materials in North America about 5 years earlier. At that time, GM was still using asbestos brakes on new Chevrolet Cavaliers and Pontiac Sunbirds, and had no plan to change before 2002. By 1998, most of the cars and even replacement brake parts

sold by GM and the other auto makers in Europe had to be asbestos-free. I decided to ask each of the "Big 3" US auto makers if they had a global policy for eliminating asbestos parts.

The corporate public relations people at GM, Ford, and Chrysler were unwilling to answer my letters, and I persisted with follow-up telephone calls. I also wrote letters to senior management executives during the past year. When Chrysler merged with Daimler-Benz, I wrote to James Thomas, Director of Health, Safety, and Environmental Affairs, that perhaps the merger with the German firm (Germany banned asbestos in 1994) would be accompanied by a recognition that international double standards in occupational and environmental health are unacceptable, at least in the case of asbestos. When the New York Times editorialized ("Ford Motor's Environmental Candor") that Ford Chairman William Ford appeared eager to make cars that were more socially acceptable, I wrote to him to ask if Ford had a global policy to eliminate asbestos. Four months later, after being asked in a deposition by a Ford lawyer if I had ever followed up on my original letter, I sent another note to Chairman Ford. When GM Vice Chairman Harry Pierce had a letter published in the New York Times about "Getting Religion on Corporate Ethics", I politely wrote to ask him if GM had a global asbestos elimination policy.

I have received only responses to the effect that, since I am listed as an expert witness in some product liability lawsuits brought by brake mechanics with asbestos diseases against the auto companies for things that occurred in the past, the companies refuse to answer any of my questions. Though I neither regarded these inquiries as having anything to do with litigation nor was I paid for my work on this, it made no difference to the corporate officials and lawyers who have discussed this with me in phone calls and depositions. One even threatened me with some unnamed legal action if I persisted in trying to contact corporate officials.

Maybe it would help get these and the rest of the giant automotive companies to stop using asbestos if the US market for cars, trucks, and replacement parts was made asbestos-free by an act of Congress. If all these countries below can ban asbestos, surely the US can, too.

ASBESTOS BANS

DATE AND EVENT

1983—Iceland introduces ban (with exceptions) on all types of asbestos (updated in 1996).

1984—Norway introduces ban (with exceptions) on all types of asbestos (revised 1991).

Mid–1980s—El Salvador bans asbestos.

1986—Denmark bans (with exceptions) chrysotile asbestos.

1986—Sweden introduces the first of a series of bans (with exceptions) on various uses of chrysotile.

1988—Hungary bans amphibole asbestos minerals.

1989—Switzerland bans crocidolite, amosite and chrysotile (some exceptions).

1990—Austria introduces ban on chrysotile (some exceptions).

1991—The Netherlands introduces the first bans (with exceptions) on various uses of chrysotile.

1992—Italy introduces ban on chrysotile (some exceptions until 1994).

1993—Germany introduces ban (with minor exemptions) on chrysotile, amosite and crocidolite having been banned previously. The sole derogation remaining is for chrysotile-containing diaphragms for chlorine-alkali electrolysis in already existing installations. These will be banned as of 2011. Finland bans all forms of asbestos including chrysotile.

1996—France introduces ban (with exceptions) on chrysotile.

1997—Poland bans asbestos.

1998—Belgium introduces ban (with exceptions) on chrysotile. Saudi Arabia bans asbestos. Lithuania issues first law restricting asbestos use; ban 2004.

1999—UK bans chrysotile (with minor exemptions).

2000—Ireland bans chrysotile (with exceptions).

2000/2001—Brazil—the four most populous states ban asbestos as well as many towns and cities.

2001—Latvia bans asbestos (asbestos products already installed must be labeled). Chile bans asbestos.

2002—Spain and Luxembourg plan to ban chrysotile, crocidolite and amosite having been banned under earlier EU directives.

2003—Australian asbestos ban takes effect.

2005—Hungary expects to ban chrysotile. E.U. members Portugal and Greece deadline for Bans. Slovak Republic expects to adopt EU asbestos restrictions.

Other countries that have banned asbestos, for which ban dates are being sought: New Zealand, Czech Republic, Slovenia.

STATEMENT OF GARY F. COLLINS

Mr. Chairman, I want to thank you for the opportunity to submit my testimony by writing to the committee on the extremely important issues of work place safety and asbestos contamination.

Almost 35 years ago, my father, Donald E. Collins, went to work for the O.M. Scotts company thinking that he had found a job that could support his family. Instead, he ended up with a condition that would eventually kill him. In 1977, he was diagnosed with bilateral pleural effusions on his lungs. He had a lung biopsy performed at Ohio State University Medical Center. After the biopsy, he then underwent a left thoracotomy and a left lung decortication.

In 1978, my father once again went into the Ohio State University Medical Center and had a right lung decortication. After the first lung operation, the doctors suspected that he had been exposed to asbestos. In 1981, he had a triple bypass surgery on his heart. What my father had was asbestosis, an incurable thickening and scarring of the lungs, which gradually suffocates a person. The asbestosis aggravated his heart disease, forcing his heart to work harder to extract oxygen. In November of 1986 my father passed away. His death certificate states that he died of pulmonary fibrosis which can be attributed to the asbestosis.

My father worked for the O.M. Scotts Company from December, 1966 through May, 1974. The employees of the Scotts Co. were notified around 1976 that there was a possible asbestos contamination at the plant. However, others, including my father, were not notified until November, 1979, almost 3 years after the first employees had been notified.

The O.M. Scotts Company's actions during this period are inexcusable. The Company was fatally slow in notifying those individuals who were risking their health because of the asbestos contamination. The reason I believe that the O.M. Scotts company was slow in contacting these people was because of money. If it were publicized that the Scotts Co. was using asbestos in their fertilizer, which was sold to individuals and companies nationwide, the financial loss would have been tremendous.

I personally do not think O.M. Scotts cared that there was asbestos in the vermiculite that they were using. It was cheap and easy to use. They were covered under the Ohio Workers Compensation so they couldn't be sued. They neither worried nor cared about the effects it had on their workers.

In 1981, my father and Lloyd Gordon, another worker from Scotts, sued the O.M. Scotts Company and W.R. Grace and Co. for $5.9 million. However, we ended up with much less. We settled for approximately $200,000. We received a check for $50,000 immediately after we settled the case. We then received monthly checks of $500 that arrived each month for ten years. The rest of the money came at specified times over the next 20 years. The attorney's fees took most of the original lump sum. Of $50,000, the attorneys took $46,000.

After going through the two lung operations and the open heart surgery, my father rarely complained about what happened to him. He thought it more important to focus on the more positive aspects in life. The fact that he was still alive after going through the operations and the complications of surgery, such as, double pneumonia, was enough for him.

Before my father was afflicted with asbestosis, he was my coach in little baseball and football. This continued after and during his operations. His dedication to his son never wavered. He also took over the duties as Cub Scout Master for my cub pack. My father enjoyed these things. He felt like he was giving to the community, like his father had.

In 1977, in the midst of his operations, my father started college at Columbus Technical Institute, now known as Columbus State Community College. He used his GI Bill to get an Associates Degree in drafting. My father, while getting his degree, had his two lung operations. His surgeries were scheduled during times when school was on a break so he wouldn't miss any class time. Although he worked hard to get his degree, he never got to use it. My father was declared 100 percent disabled, barring him from doing any work where he would be covered under Workers Compensation. The only job my father could get was working 3rd shift as a security guard, part-time, so that it wouldn't interfere with his disability benefits.

During all this, my father continued to coach little league baseball. This was his life. In many ways, he saw it as a way to teach kids the fundamental aspects of baseball, but also the simple things in life that matter. My father was more than just a coach to many kids, to some he was a big brother, to others he was their only father figure. He loved being around the baseball field and the kids.

My father never let anyone, except my mother and I, know about the day-to-day pain he endured. From his chest hurting from the operations to the shortness of breath that would plague him, he quietly suffered. He didn't want anyone's sympathy; he just wanted to be treated like any other normal human being. When my father had to take his oxygen tanks with him to the ball field, he would explain to the kids what he was wearing so they would understand. He would tell them that it was something to help him breath because of his operations, and he would show them his scars. He was very patient with them. All of the parents who had kids on my fathers baseball teams would help explain to their kids what my father had gone through.

My mother and I seamed to grow stronger as individuals and grow closer during my father's illness. We both went through his pain with him. When we were at home, there were times when he would do nothing but sleep because the amount of work it took to just breath would wear him out. Hot and humid days were especially tough on him; because of the thickness of the air, it was hard for me to breathe—I know it had to be ten times harder on him.

My father and I would go through kind of a nightly routine. I would massage his back and rub vitamin E into his scars. I was the only person I think he allowed to touch them because he was so sensitive in those areas, even years after the operations.

I think my mother and I didn't really look at how the asbestos caused us any pain, but we did go through his pain with him. I used to get sympathy pains sometimes in my chest when his chest was hurting. My father didn't let what happened to him at Scotts slow down his life any. I think he was just as busy with his illness as he would have been had he not been stricken with the asbestosis. Don't get me wrong—this disease reduces the body it has entered down to a shell of what it use to be. It leaves them with little or no strength at all, and they need help with things that they once could do on their own.

Asbestosis strangles the body. My father, in layman's terms, died from lack of oxygen in the blood stream, which eventually suffocates the brain, and causes death. There is nothing that can be done to help a person who gets asbestos on their lungs, except a lung transplant. The chances of living a long life with new lungs is just as promising as living a long life with lungs that have been operated on, once they have been cleared of the asbestos; however, they still have scar tissue on them. They may have removed the asbestos from my fathers lungs, but the damage was done. The scar tissue did the rest of the damage. It caused him to work harder to get more oxygen into his blood, which caused him to have a heart attack in 1981.

My mother and I learned a lot from my father after his death in November 1986. He taught us to live our lives to their fullest now because you never know what is going to happen to you. My mother helped at the church with the youth group. I joined the Air Force and served my country like my father had in the early 1960's in the Army. We both lived our lives to the fullest after his death. My mother passed away 10 years after my father of pancreatic cancer. When she found out that she had the disease, it was in the last states, and it was diagnosed as incurable. She did the same thing my father did. She did all that she could do to the best of her ability until she was no longer capable of doing so.

I have dedicated most of my life to working in state and local government. I have been the Mayor of Unionville Center, Ohio, which is the birthplace of Vice-President Charles Fairbanks. When I took over as Mayor, I had one goal in mind: to help the people of my village. That is what I did because that is what my father would have done. The greatest pleasure I get out of life is to help those who are unable to themselves and be an active part of society. I learned this through watching my father do the same thing.

How does all of this tie back into why asbestos is bad? Look at what my father did in his short period of time here on earth. Now, imagine what he could have done for his family and his community if he were still here, and he had not died from asbestos on his lungs. The same goes for all of the families that have been affected by the asbestos. What differences would they have made in today's society had they been able to contribute? I know it would have been substantial.

Currently, I serve as a Senior Fiscal Analyst for the Oklahoma House of Representatives. One of my responsibilities is to determine the fiscal impact of bills. I approach this job in much the same way. What is the cost efficiency of using a material that harms someone versus not using it? I think the impact is beyond com-

prehension. There is no dollar figure you can put on any one human life. However, the companies who mine and continue to use vermiculite do this everyday. They are saying a human life is worth this amount to use, and they are willing to pay that price. They do not understand the implications of their actions. They do not understand what it is like to lose someone because someone else decided that it was not a harmful product. They do not understand, and they will not understand until it happens to them.

I would like to thank the Committee for allowing me the chance to submit this written testimony. I would also like to thank Senator Murray for bringing forward such a very important topic that needs to be resolved soon, before more people are harmed by the affects of asbestos.

STATEMENT OF JAMES FITE

Senator Patricia Murry and Committee Members, my name is James Fite; I am a founder and the current National Secretary of the White Lung Association. Victims of asbestos disease and their families formed the WLA in 1979. For over twenty years we have educated the general public to the hazards of asbestos exposure. We have testified before several Senate, House and regulatory agency hearings on the hazards of asbestos. We have thousands of members through the United States, Our lives are our testimony.

In the interest of time I will dispense with the horror and misery, which asbestos victims must endure. Do not be deceived to think that the compensation system or the tort system brings us justice. Over 80% of insurance and company funds paid for asbestos liability lands in the hands of non-victims. Please do not bother to shed crocodile tears for our fate; we have seen it all before. What we want is sincere action on behalf of the people.

If you want to help asbestos victims, the people of the United States and the environment, please ban asbestos and assure that asbestos victims receive compensation.

Each year more people apply for compensation for their asbestos related disease. Each of the "funds" set up for victims has been exhausted because the courts ignored the evidence presented by the White Lung Association and underestimated the amount of people who have been diseased and disabled by asbestos exposure. This problem is not going away, it is getting worse. As terrible as our experience with asbestos has been, our society has not seen the worst yet. Please act to ban asbestos and adequately compensate the millions of its victims.

BAN ASBESTOS IN THE UNITED STATES

The asbestos form minerals should have never been taken from the earth. Asbestos has killed over a million people in the United States. We continue to spend billions of dollars a year cleaning up for the past use of asbestos. Each year, over 250,000 sick people or their families, file claims for compensation for asbestos-related disease. Yet this horrible substance is still being distributed through our society. Asbestos used today will guarantee the deaths of thousands of our children and grand-children. Why does this madness continue? Why doesn't the United State congress join with Europe and over a dozen other countries in banning all uses of asbestos?

Until 1980, the U.S. industry placed 700,000 thousand tons of asbestos in over three thousand different building and machine parts. This was done each year. Many times the asbestos was only part of the mixture of glue, plaster, cement, paper, rope, gasket, break, pad or paint. Asbestos killed the workers who made and installed these products. As these products were used, the asbestos escaped to pollute everyone's environment. Now innocent children and adults, who have no occupational contact with asbestos, are getting deadly mesothelioma cancer. Asthma, lung infections like bronchititus, heart attacks, cancers/infections throughout the body are increasing as a result of asbestos exposure. Ninety-percent of autopsies in New York City showed asbestos related lung changes and fibers of asbestos. The ages ranged from 1–78.

Recently a national scandal erupted in Libby, Montana. Thousands of people, including children, are found to have asbestos related disease or are under constant monitoring due to asbestos exposure from the vermiculite mine. Vermiculite, known by the EPA to contain up to 14% deadly asbestos, is still allowed to be sold as attic insulation and potting soil. Now nursery workers, rail road workers and others are dying from asbestos disease due to their exposure to vermiculite. The EPA could have stopped this in 1984 but failed to do so. This example is one of thousands that

show the "controlled use" of asbestos is not possible without spreading disease and death. Asbestos use in any form is deadly. Asbestos must be ban. The United States must forbid any company from exporting or importing asbestos. All contaminated areas must be cleaned properly. All asbestos victims must be fully compensated. This tragedy has gone on far too long. The asbestos industry represents only a fraction of 1% of the business community. Its assets and those of its insurers offer the basis for funding the solutions. No real solutions can be provided without first banning asbestos. The ban must include decontamination programs and compensation programs. The U.S. uses less than 25,000 tons of asbestos each year and there are many suitable and safe substitutes.

PAUL SAFCHUCK,
President, White Lung Association.

TESTIMONY OF
MR. NED K. GUMBLE

I manage Virginia Vermiculite's Louisa County mine and am familiar with its operations since the mine began operation in 1979. Our deposit was brought into production to replace the Libby deposit because we can produce a product that is not contaminated with asbestos. We meet the OSHA 0.1 fibers/cc standard. While we are regulated by MSHA, we apply the OSHA standards in our own continuous testing program. Our test results, including government results, are at Attachment 1.

EPA in late 2000 took dust samples from building surfaces and bulk samples in and around our mine. The dust samples represent a history of accumulation of dust from the mine. Some of the samples were taken within 300 feet of our mining. These EPA results were released in January 2000 and were negative. They are at Attachment 2. In addition, EPA took samples of waste rock which we have provided for local farmers and the local landfill. No asbestos was found in this material. Last year our employees received lung examinations by the University of Virginia Health System, Division of Pulmonary and Critical Care Medicine. The results of these examinations are at Attachment 3 and were negative for all employees tested. Mr. Pinter refused to participate in this examination.

We have occasional thin veinlets of fibrous material in our deposit. The first veinlet in our active mining area was uncovered in early 2000. We immediately covered this material with careful monitoring of our employees and the ambient air. All results showed no fiber exposures. In April of 2000, we engaged Mr. John Addison of the UK, a world-recognized asbestos expert. He inspected our entire deposit, advised us on appropriate procedures for dealing with these occasional veinlets, and thoroughly trained all of our employees on asbestos issues.

In August 2000 MSHA conducted a "swat team" examination of our mine, allegedly triggered by an employee complaint. MSHA found no violation of MSHA's or OSHA's employee exposure standards. However, MSHA released premature and inaccurate results to the Seattle Post Intelligencer. MSHA also gave us two "housekeeping" citations. At this time, MSHA took three

product samples and found no asbestos in our vermiculite products. Once MSHA reviewed the appropriate test results that it had in its possession in September 2000 but had inexplicitly suppressed, and retested our mine in December 2000, it withdrew its citations. At Attachment 4 is a chronology, newsclips, and a letter from MSHA on these events.

The MSHA "leak" caused hardship to our employees and harmed our business. All test results show our mine is not in any way comparable to Libby, a mine shut over a decade ago. EPA's dust analysis at Libby found fibers eight miles from the mine. (See Libby data at Attachment 5.) EPA found no fibers at or adjacent to our mine. I can address this further if it would be helpful to your Committee.

ATTACHMENT 1

BULK ASBESTOS TEST AND ANALYSIS AT VIRGINIA VERMICULITE LTD. (INITIAL TESTING)

	Raw Ore From Mine			Finished Product		
	Findings	Lab	Remarks	Findings	Lab	Remarks
November 1976	No Asbestos Detected	UNC	Drill Sample	--	--	--
November 1976	No Asbestos Detected	McCrone	Drill Sample No.9	--	--	--
	No Asbestos Detected	McCrone	Drill Sample No. 3	--	--	--
	No Asbestos Detected	McCrone	Drill Sample No. 1 (Massive Actinolite)	--	--	--
December 3, 1979	No Asbestos Detected	McCrone	Mill Feed	--	--	--
	--	--	--	No Asbestos Detected	McCrone	Dryer Feed
	--	--	--	No Asbestos Detected	McCrone	Stack Exhaust
November 9, 1982 Sample October 31, 1984 Report	--	--	--	Grade 3 less than background level of chrysotile <0.001 ppm and not statistically significant amphibole.	Chatfield Ontario Research Foundation	Amphiboles massive by fibrousity index.
				Grade 4 As Above	As Above	As Above
				(Note: Expanded Grade 3 and 4 showed no chrysotile or amphibole fibers intercalated between plates of vermiculite.)		

BULK ASBESTOS TEST AND ANALYSIS AT VIRGINIA VERMICULITE LTD.
(TESTING SINCE 1989)

	Raw Ore From Mine			Finished Product		
	Findings	Lab	Remarks	Findings	Lab	Remarks
May 3, 1989	No Asbestos Detected	McCrone	Mill Feed - VF	No Asbestos Detected	McCrone	Concentrate - VC
July 8, 1992	No Asbestos Detected	AMA	Pit Sample Zone 16	--	--	--
	No Asbestos Detected	AMA	Pit Sample Zone 18	--	--	--
	No Asbestos Detected	AMA	Pit Sample Zone 15	--	--	--
August 19, 1994	--	--	--	No Asbestos Detected	AMA	Grade 4
May 15, 1996	--	--	--	Asbestos Free	Skamol Denmark	Grade 4 - 1ppm fiber content (not identified as asbestos)
August 8, 1998	--	--	--	No Fibers Detected	Skamol Denmark	Grade 4
July 1, 1999	--	--	--	No Asbestos Detected	AMA	Grade 2
	--	--	--	No Asbestos Detected	AMA	Grade 3
	--	--	--	No Asbestos Detected	AMA	Grade 4
	--	--	--	No Asbestos Detected	AMA	Grade 5

BULK ASBESTOS TEST AND ANALYSIS AT VIRGINIA VERMICULITE LTD.
(TESTING SINCE 1989 - CONTINUED - page 2)

	Raw Ore From Mine			Finished Product		
	Findings	Lab	Remarks	Findings	Lab	Remarks
November 27, 1999	--	--	--	No Asbestos Detected	National Institute of Occupational Health-Denmark	Grade #4
February 15, 2000	No Asbestos Detected	OSHA	Pit Sample	No Asbestos Detected	OSHA	Dryer Feed
	No Asbestos Detected	OSHA	Pit Sample	No Asbestos Detected	OSHA	Finished Product
	No Asbestos Detected	OSHA	Ore Stockpile	No Asbestos Detected	OSHA	Rafter Dust in Dry Mill
	No Asbestos Detected	OSHA	Mill Feed	--	--	--
March 10, 2000	No Asbestos Detected	OSHA	Mill Stockpile	No Asbestos Detected	OSHA	Dryer Discharge
	--	--	--	No Asbestos Detected	OSHA	Dry Mill Dust
	--	--	--	No Asbestos Detected	OSHA	Grade 4 Storage
	--	--	--	No Asbestos Detected	OSHA	Railroad Storage
	--	--	--	No Asbestos Detected	OSHA	Railroad Storage
	--	--	--	No Asbestos Detected	OSHA	Loader Air Filter
	--	--	--	No Asbestos Detected	OSHA	Dust at Rail Siding
	--	--	--	No Asbestos Detected	OSHA	Spillage on Rail Tracks
	--	--	--	No Asbestos Detected	OSHA	Spillage on Rail Tracks

BULK ASBESTOS TEST AND ANALYSIS AT VIRGINIA VERMICULITE LTD.
(TESTING SINCE 1989 - CONTINUED - page 3)

	Raw Ore From Mine			Finished Product		
	Findings	Lab	Remarks	Findings	Lab	Remarks
March 7 & 31, 2000	No Asbestos Detected	EMSL	Mill Feed	No Asbestos Detected	EMSL	Dryer Discharge
	No Asbestos Detected	EMSL	Mill Feed	No Asbestos Detected	EMSL	Grade 2
	--	--	--	No Asbestos Detected	EMSL	Grade 3
	--	--	--	No Asbestos Detected	EMSL	Grade 4
	--	--	--	No Asbestos Detected	EMSL	Grade 5
March 27, 2000	No Asbestos Detected	Institute of Occupational Medicine - Edinburgh	Pit Stockpile	No Asbestos Detected	Institute of Occupational Medicine - Edinburgh	Finished Product
	No Asbestos Detected	Institute of Occupational Medicine - Edinburgh	Pit Sample	No Asbestos Detected	Institute of Occupational Medicine - Edinburgh	Dust in Dry Mill
	No Asbestos Detected	Institute of Occupational Medicine - Edinburgh	Pit Sample	--	--	--
	No Asbestos Detected	Institute of Occupational Medicine - Edinburgh	Mill Stockpile	--	--	--
	No Asbestos Detected	Institute of Occupational Medicine - Edinburgh	Wet Mill Spillage	--	--	--

BULK ASBESTOS TEST AND ANALYSIS AT VIRGINIA VERMICULITE LTD.
(TESTING SINCE 1989 - CONTINUED - page 4)

	Raw Ore From Mine			Finished Product		
	Findings	Lab	Remarks	Findings	Lab	Remarks
August, 2000	MSHA did not do any analysis of representative mill feed or pit samples. MSHA did analyze selected individual rock samples (flagged by VVL to NOT be mined) and detected asbestos in 7 of 12 samples.			No Asbestos Detected	OSHA	Dust in Dry Mill
				No Asbestos Detected	OSHA	Finished Product
				No Asbestos Detected	OSHA	Finished Product
November 27, 2000	--	--	--	Asbestos Free	Skamol Denmark	Grade 4
December 12, 2000	--	--	--	No Asbestos Detected	Institute of Occupational Medicine - Edinburgh	Grade 5
	--	--	--	No Asbestos Detected	Institute of Occupational Medicine - Edinburgh	Grades 3 & 4

AIRBORNE FIBER TESTS
ON EMPLOYEES AT VIRGINIA VERMICULITE LTD.

Date	U. S. Department of Labor Results (MSHA)	Tested Employee	Test Results
March 20, 1984	In Compliance	Lab/Packman in Plant	MSHA did not analyze or identify fibers if results were below 2 fibers.
August 11, 1987	In Compliance	Mill supervisor	Zero Fibers Counted
August 25, 1988	In Compliance	Working Foreman	Zero Fibers Counted
March 30, 1989	In Compliance	Front End Loader Operator	Zero Fibers Counted
March 7, 1990	In Compliance	Front End Loader Operator	Quartz
	In Compliance	Flotation Operator	Quartz
August 1, 1990	In Compliance	Front End Loader Operator	Zero Fibers Counted
March 5, 1991	In Compliance	Front End Loader Operator	Zero Fibers Counted
October 4, 1992	In Compliance	Front End Loader Operator	Zero Fibers Counted
June 29, 1994	In Compliance	Bobcat & Bagger in Plant	Zero Fibers Counted
September 27, 1995	In Compliance	3 Employees	Nuisance Dust
August 30, 1995	In Compliance	4 Employees	Respirable Dust
February 12, 1997	In Compliance	Supervisor	Zero Fibers Counted
	In Compliance	Loader Operator	Zero Fibers Counted
	In Compliance	Quality Lab Tech	Zero Fibers Counted
	In Compliance	Production Lab Tech	Zero Fibers Counted
	In Compliance	Dozer Operator	Zero Fibers Counted
April 16, 1998	In Compliance	Lab Tech	Zero Fibers Counted
	In Compliance	Plant Operator	Zero Fibers Counted
	In Compliance	Shop Mechanic	Zero Fibers Counted
	In Compliance	Shop Worker	Zero Fibers Counted
	In Compliance	Plant Operator	Zero Fibers Counted
April 22, 1999	In Compliance	Flotation Operator	Zero Fibers Counted
	In Compliance	Loader Operator	Zero Fibers Counted
	In Compliance	Supervisor	0.01 Fibers/cc Counted
	In Compliance	Supervisor	Zero Fibers Counted
	In Compliance	Millwright	0.01 Fibers/cc Counted
February 18, 2000	In Compliance	Truck Driver	Zero Fibers Counted
	In Compliance	Truck Driver	Zero Fibers Counted
	In Compliance	Excavator Operator	Zero Fibers Counted
	In Compliance	Crusher Operator	Zero Fibers Counted
	In Compliance	Loader Operator	Zero Fibers Counted
	In Compliance	Supervisor	Zero Fibers Counted
March 9, 2000	In Compliance	Maintenance Worker	Zero Fibers Counted
	In Compliance	Maintenance Worker	Zero Fibers Counted
August, 2000	In Compliance	28 Employee Tests	See Attached
December, 2000	In Compliance	5 Employee Tests	See Attached

MSHA Preliminary Results
August 14-17, 2000

Employee/Location	PCM Results (Fibers/ML)	TEM Analysis	Comments
R L / stockpile (P-9)	0.20 (0.050 SWA)[1]	R.J. Lee: Non-Detect for Asbestos	See Attached Test Report
G M / mill (P-11)	0.12 (0.024 SWA)[1]	R.J. Lee: Asbestos Absent	See Attached Test Report
L / plant/pit (P-13)	0.12	R.J. Lee: Asbestos Absent	See Attached Test Report
H / pit/loadout (M-1)	0.12 (0.079 SWA)[1]	R.J. Lee: Asbestos Absent	See Attached Test Report
G M / mill	0.098	Not Required	Total Fiber Count See Attached Email
M G / pit	0.044	Not Required	Total Fiber Count See Attached Email
H S / mill pit	0.032	Not Required	Total Fiber Count See Attached Email
D J / plant area	0.065	Not Required	Total Fiber Count See Attached Email
S / plant/pit	0.033	Not Required	Total Fiber Count See Attached Email
B / plant	0.025	Not Required	Total Fiber Count See Attached Email
F / pit	0.094	Not Required	Total Fiber Count See Attached Email
R G / pit	0.039	Not Required	Total Fiber Count See Attached Email
J / maintenance/mill	0.037	Not Required	Total Fiber Count See Attached Email
B / mill	0.009	Not Required	Total Fiber Count See Attached Email
H / float/mill	0.024	Not Required	Total Fiber Count See Attached Email
R G / pit operator	0.026	Not Required	Total Fiber Count See Attached Email

MSHA Preliminary Results
August 14-17, 2000
(continued)

Employee/Location	PCM Results (Fibers/ML)	TEM Analysis	Comments
M / pit truck	0.026	Not Required	Total Fiber Count See Attached Email
P / pit loadout	0.055	Not Required	Total Fiber Count See Attached Email
B / plant/maintenance	0.012	Not Required	Total Fiber Count See Attached Email
M / pit truck	0.037	Not Required	Total Fiber Count See Attached Email
E / plant supervisor	0.049	Not Required	Total Fiber Count See Attached Email
D / dozer/grader	0.145	Not Done	Total Fiber Count See Attached Email
D / reclamation	0.043	Not Required	Total Fiber Count See Attached Email
R G / excavation	0.041	Not Required	Total Fiber Count See Attached Email
RH / truck	0.052	Not Required	Total Fiber Count See Attached Email
G / pit truck	0.056	Not Required	Total Fiber Count See Attached Email
P / stockpile loader	0.056	Not Required	Total Fiber Count See Attached Email
A T / pit/lab	0.084	Not Required	Total Fiber Count See Attached Email

[1]MSHA Chapter A III A requires zero exposure during unsampled periods for SWA calculations.

Ned Gumble

From: John Addison <addiscon@globalnet.co.uk>
To: Ned Gumble.Vaverm <vaverm@louisa.net>
Sent: Monday, October 16, 2000 2:41 PM
Attach: 5 Camp at Intu Africa.JPG
Subject: OSHA counts

Hi Ned,
I spoke to Dan Crane a couple of minutes ago. He confirms that all previous counts used a discrimination against non-asbestos fibres in your samples, as they would for most rock industry samples, and that for the most recent set they had been asked (he can't or won't say by whom) to count everything according to the rules. Hence the higher fiber counts.
I thanked him and we parted on very good terms.
I like the articles in the press.
Hope all is going well with the customers.
Regards to all,
John

Note: Dan Crane runs OSHA Lab in Utah.

MSHA Results
December 19, 2000

Employee/Location	PCM Results NIOSH 7400A (Fibers/cc)		TEM Results NIOSH 7402 (structures/cc)		TEM Results AHERA (structures/cc)	
	TWA	SWA	TWA	SWA	TWA	SWA
Supervisor / pit	0.0840	0.0430	0.0087	0.0045	0.0087	0.0045
Quality Controller / pit	0.0590	0.0250	0.0110	0.0045	0.0220	0.0090
Truck Driver / pit	0.0170	0.0100	BDL	BDL	BDL	BDL
Bulldozer Operator / pit	0.0100	0.0060	BDL	BDL	BDL	BDL
Backhoe Operator / pit	BDL	BDL	BDL	BDL	BDL	BDL

BDL = Below Detectable Level
TWA = Time Weighted Average
SWA = Shift Weighted Average

Note: These PCM tests, using NIOSH 7400A, do not distinguish between amphibole fibers (either cleavage fragments or true fibers) and other 3 to 1 aspect ratio particles. These TEM tests, using NIOSH 7402, count both cleavage fragments and true fibers. The TEM AHERA tests count shorter structures (0.5 to 5.0 microns) as well as those counted under NIOSH 7402. These AHERA tests also do not distinguish between cleavage fragments and true fibers.

ATTACHMENT 2

Polrep #3
Louisa Mine site
(Virginia Vermiculite Ltd.)
14093 Louisa Road
Route 22, P.O. Box 70
Louisa, VA 23093

Attn: RRC

Event: Removal Assessment

1. Situation: 1/10/01

2. Since late 1999, the Virginia Vermiculite Mine in Louisa, VA was one of the 24 sites in Region 3 that were under investigation by the EPA national task force resulting from the W. R. Grace mine in Libby, Montana and the asbestos exposure from its operations over the years. OSC Jarvala visited the Louisa facility in early 2000 to meet the manager, tour the facility and arrange for sampling in the future. In August 2000, the Mine Safety and Health Administration (MSHA), in response to an anonymous complaint allegedly from site employees, conducted a surprise sampling event at the Louisa mine, and after analysis of the samples reported high levels of asbestos fibers in several bulk samples, as well as positive fiber results from air samples taken from various locations in the workplace. Based on these sample results, MSHA was quoted in news articles as being concerned with worker safety and off site impacts from operations. MSHA also requested support from EPA during a phone call to the RA on 10/6/00. It should be noted that all previous sampling at this facility by MSHA and the facility itself resulted in non detectable levels of asbestos fibers.

2. Actions Taken:

1. Pursuant to a removal assessment conducted by OSC Zickler and the START contractor, and in conjunction with the protocols developed by Region 8 for evaluating off site impacts, samples of dust from nearby residential homes were obtained to screen for tremolite asbestos contamination. In addition, bulk samples from the road just outside the active mining area and at several waste disposal locations, and representative background dust and road samples were collected. Analytical results from those samples, which were taken on 12/4-6/00, have been received from the EMSL lab. They indicate non detection of asbestos fibers in any of the samples, based on PLM and TEM analyses. These results have been provided to the mine operator, MSHA, Louisa County officials and the individual residents.

2. A response to the FOIA request was provided to the FOIA coordinator for distribution. The analytical results mentioned above were not available at the time of the response, but have since been provided to the FOIA coordinator.

3. MSHA has taken samples from inside certain process locations, and from several individual plant employees/operators. Analytical results are pending.

III. Future Plans:

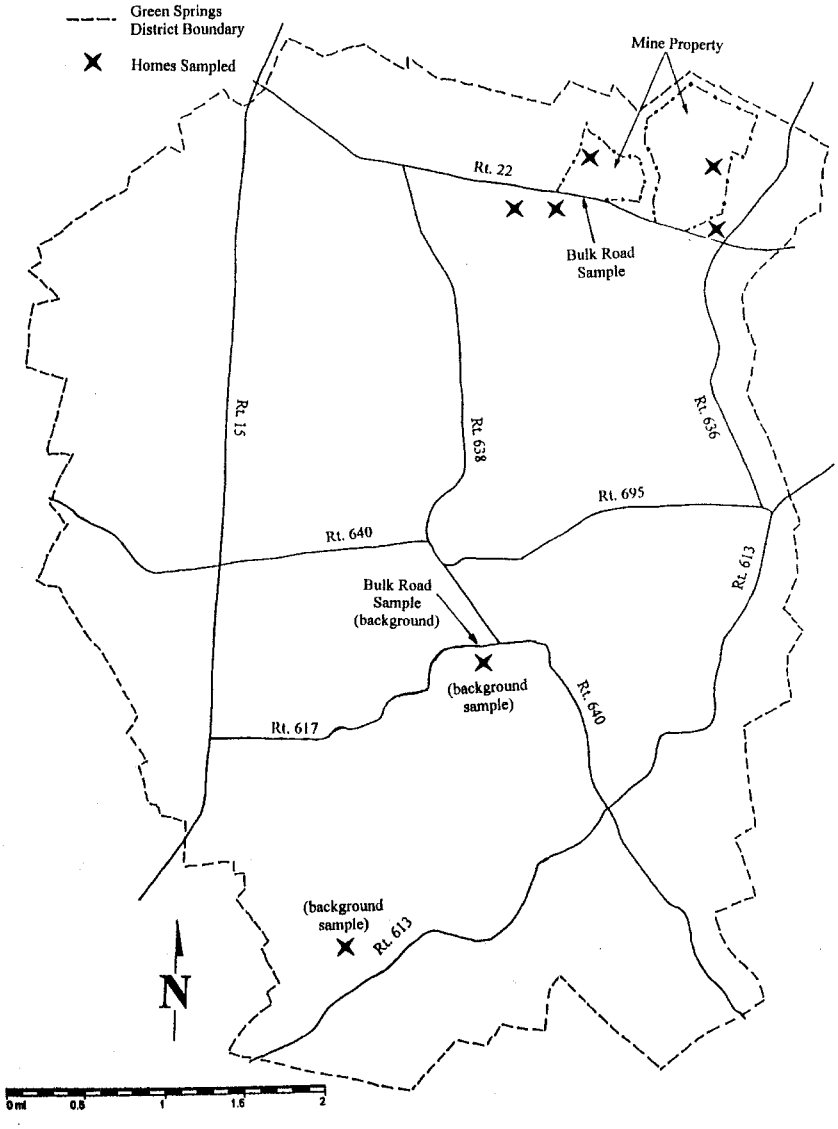
1. Based on the analytical results recently obtained from EMSL, no further sampling is currently planned by the OSC. Because no evidence exists of asbestos fibers accumulating outside the mine boundaries, there is no rationale for EPA to undertake additional off site ambient air sampling.

2. MSHA currently plans to conduct additional testing at the site (within the workplace) sometime in the future. The OSC will continue to monitor their plans and participate with them as necessary, based on their request for assistance.

3. Case pends.

Mike Zickler, OSC
US EPA Region III
Philadelphia, PA 19103

(215) 814-2792


Green Springs
District Boundary
Homes Sampled
Mine Property
Rt. 22
Bulk Road
Sample
Rt. 15
Rt. 638
Rt. 636
Rt. 695
Rt. 640
Rt. 613
Bulk Road
Sample
(background)
(background
sample)
Rt. 640
Rt. 617
(background
sample)
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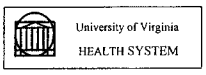

ATTACHMENT 3

DIVISION OF PULMONARY & CRITICAL CARE MEDICINE

Program in Occupational Lung Disease

Phone: 804-924-5210
Fax: 804-924-9682
MD Referral: 800-552-3723
Patient Access: 800-251-3627

Director

Steven M. Koenig, M.D.
Assoc. Professor of Medicine
924-5210

Clinical Trials Coordinator

Terri Haram, CRC
982-1578

Phone Numbers

Appointments
804-924-5210
Clinical Trials
804-982-1578
Pulmonary Function Lab
804-924-5381

January 24, 2001

Ned Gumble
General Manager
Virginia Vermiculite, LTD
14093 Louisa Road
P.O. Box 70
Louisa, Virginia 23093

Dear Mr. Gumble:

The following is a summary of the evaluation performed on the workers from Virginia Vermiculite, LTD in December, 2000 as well as of the results.

As you are aware, my credentials include board certification in Internal Medicine, Pulmonary Medicine, Critical Care Medicine and Sleep Medicine. I am Director of the Occupational Lung Disease Clinic at the University of Virginia and have evaluated hundreds of patients with lung diseases related to exposures in the workplace. As part of my evaluation, I obtained a detailed history and a thorough physical examination, focusing on aspects related to occupational lung diseases such as asbestosis.

All workers underwent spirometry (lung function testing) at the pulmonary function laboratory at the University of Virginia. These tests were performed and I interpreted the results according to American Thoracic Society guidelines.

All workers also had a Chest X-ray (PA and lateral) taken in the radiology department at the University of Virginia. Three physicians, a board certified radiologist, Dr. Kevin R. Cooper, a B reader and I, interpreted each Chest X-ray. A B- reader must pass an examination that tests his ability to interpret Chest X-rays according to the International Labor Organization (ILO) Classification of the radiographic appearance of pneumoconioses such as asbestosis. The B-reader has specific expertise in interpreting Chest X-rays of workers exposed to occupational dusts and fibers such as asbestos.

Private Clinics, 6th. Floor; P. O. Box 800546, Charlottesville, VA. 22908-0546

Based on this evaluation, not a single worker at Virginia Vermiculite LTD had Chest X-ray or pulmonary function test evidence of asbestos-related pleural or parenchymal (asbestosis) disease due to exposures at Virginia Vermiculite.

Sincerely,

Steven M. Koenig, M.D.
Associate Professor of Medicine
Director, Occupational Lung Disease Program

ATTACHMENT 4

Events at VVL for the Year 2000

Background:
MSHA has conducted air testing for asbestos at VVL since 1984. Due to increased press coverage from Libby, MT about asbestos contamination in vermiculite deposits, MSHA has conducted air sampling three times this year at VVL – once in February, once in March, and again in August. VVL has also started its own internal air sampling program.

The air samples taken by MSHA in Feb., Mar. and in previous years were analyzed using a count that discriminated against non-asbestos fibers and resulted in non-detect readings. This discriminating count performed for MSHA samples is standard practice for most rock industry air samples.

The air samples taken in August of this year were analyzed using a non-discriminating count – a new procedure for MSHA. This count resulted in readings that were higher than non-detect, but still well below MSHA's limit of 2 f/cc. Most samples (25 out of 30) were also below OSHA's limit of 0.1 f/cc.

Chronology:

1979 – 1999	MSHA air samples (1984-1999) at VVL show zero fibers counted. Bulk samples taken by both VVL and MSHA (1979-1999) also show no asbestos detected.
Late 1999 / Early 2000	Because of increased press coverage about Libby, MT, VVL looks closely at its deposit and discovers suspect material that may contain fibrous asbestos minerals. The suspect material is usually found in thin veinlets that are less than ¼" wide. These veinlets are very isolated in the pit and are definitely not similar to the Libby deposit, where asbestos was mixed throughout the vermiculite ore. Since all bulk testing of both raw ore and finished product has shown no asbestos detected, VVL decides to continue its current mining practice, and avoid these areas.
Early February 2000	VVL sends bulk samples (mined ore, products, dry mill dust, etc.) to IOM (Institute of Occupational Medicine) to determine asbestos content. IOM analytical method limits are 100 times below current US standard test limits (TEM). All VVL samples came back at less than 0.001% (10 ppm). Note: Currently in the US, products must be labeled as "containing asbestos" if the product contains 0.1% or more of asbestos.
February 15, 2000	MSHA takes air samples as part of regular inspection. All samples show zero fibers counted.
March 2, 2000	MSHA issues Program Information Bulletin on Potential Exposure to Airborne Asbestos on Mining Properties. In this bulletin MSHA gives examples of how to ensure miners are not exposed to asbestos (examples include marking seams that may contain asbestos so this

material is not processed; keeping suspect areas wet; etc.). MSHA also states that their limit is 2 fibers/cc, but they urge companies to achieve the OSHA lower exposure limit of 0.1 f/cc.

Early March 2000	VVL contracted with OSHA certified consultant, Ringneck Consulting Services for personal and area air sampling and bulk sampling to determine if we met stricter OSHA guidelines. This work resulted in a "Negative Exposure Assessment" in accordance with the requirements of OSHA 29 CFR 1926.1101. This negative assessment states that hazard signs, respirator and other PPE use, and hygiene facilities are not required at the facility. VVL adopts a company policy of meeting the stricter OSHA limit of 0.1 f/cc. VVL also decides to change its current mining practice by inspecting the pit for veinlets and flagging any suspect material found (as MSHA suggested in their bulletin).
March 10, 2000	MSHA takes more air samples. MSHA comes back to resample because during an interview with McAteer, a *Seattle PI* reporter asks what MSHA is doing about the asbestos problem in Louisa, VA. All samples show zero fibers counted.
April 17-21, 2000	Mr. John Addison, a world-renown asbestos expert and geologist, visits VVL for consultation on the potential presence of asbestos in VVL's deposit. The week was spent defining asbestos minerals and other fibers, surveying suspect pit areas, examining samples under microscopes, reviewing process flowsheets, and talking to employees about health and safety concerns. Mr. Addison confirmed that some of the veinlets in the mine contained asbestos, "but that most of the amphiboles to be found in the mine were not of the asbestos types." Mr. Addison did not find any asbestiform material in samples taken from the wet mill, dry mill, and stockpiles. Mr. Addison concluded that "the risks to the workers were not significantly higher than those of other hard rock mineral workers," and that the risks were "probably lower, given the wet process method used." As a result of Mr. Addison's visit, VVL's program of inspection and flagging is greatly expanded. In the new mining program, the flagged veinlets are wasted, meaning the material is dug out of the ground and hauled to an inactive pit. The material is than buried and covered with topsoil for reclamation. VVL decides not to determine if the suspect material is actually asbestos or not – the new policy is to waste <u>all</u> suspect material. By wasting all suspect material, this material will not enter the processing plant and will not reach the final products. VVL also starts the new program to allay workers' health concerns. Mr. Addison agreed that VVL's policy of "remov[ing] the vein material from the production process was confirmed as useful for the reassurance of the workers, and to reduce even further the possibility of asbestos

	entering the product, even though none had ever previously been found in it." Workers are reassigned and retrained so that more time can be spent inspecting the mine.
Late April 2000	VVL decides to start its own air sampling program. Two air sampling pumps and supplies are purchased.
May 8, 2000	Two VVL employees attend an air sampling training program.
May 10, 2000	VVL initiates air sampling of employees.
May – July 2000	Several personal air samples are taken over the next few months. Filters are sent out to a certified lab for analysis. Lab does non-discriminating counts and for the first time, VVL gets air sampling results that are higher than non-detect, but still well below MSHA's limit of 2 fibers/cc. VVL talks to affected employees and explains that count is not zero because a different counting method is used. Air sampling program continues.
August 14 – 17, 2000	After receiving an anonymous complaint, MSHA comes to VVL for the third time this year. MSHA brings in a three-person team of special investigators and takes 30 personal air samples, 10 area air samples, and 48 bulk samples. MSHA team shows up at 6 p.m., after VVL management leaves, and begins sampling that night. Air sampling is done at a very high flowrate for a mixed-dust atmosphere (2.5 lpm vs. the usual 1.4 lpm). MSHA's team will not talk to VVL management. VVL has no opportunity to tell MSHA what the company has been doing to ensure that workers are not exposed to potential asbestos fibers.
October 2 – 3, 2000	MSHA officials return to VVL with partial results from the August testing. They apologize for taking so long, but they say they have overwhelmed the lab where the samples were sent for analysis. They say that several people are asking for the test results, and even though they do not have complete results, they want to release what they do have. They talk to all employees in two groups. They say that the air sampling shows dangerously high levels of asbestos in the workplace (even though all 30 samples were below the limit of 2 f/cc and 25 of the 30 were below the OSHA limit of 0.1 f/cc on a PCM non-discriminating count). They say that workers are at risk. They say that bulk samples from the pit contain 80 to 90% asbestos (even though these samples were not representative of the ore body). Employees are visibly shaken by this news. Some are wary of MSHA officials, but some are now questioning the company's honesty. MSHA issues VVL two citations because of the "hazards" found at the operation. MSHA offers all employees health screenings, to include chest x-rays.

Fortunately, because VVL has initiated its own air sampling program, most employees understand why MSHA is not getting "zero fibers" as in the past. MSHA officials are asked the following questions by employees:

Q. Have the fibers counted in the air samples been positively identified as asbestos?
A. No. Only a PCM (optical) count was performed.

Q. Have you done further testing (TEM) to determine if the fibers counted are actually asbestos?
A. No.

Q. Do you plan on doing the further testing?
A. Yes.

Late October 3, 2000

After leaving VVL, MSHA officials show up at vermiculite mines in South Carolina for similar testing.

VVL management meets with MSHA officials in Arlington, VA and requests that MSHA not release information until VVL has time to comment on the findings (i.e. do TEM analysis, etc.) MSHA agrees to not release information prior to this happening.

October 4, 2000

Seattle Post Intelligencer breaks story that "Virginia miners at risk from asbestos." The story goes on to say that dangerously high levels of asbestos have been found in VVL's mine and that MSHA issued 3 citations to VVL (not true – we got only two... story was leaked to press before MSHA came to VVL and after MSHA decided not to issue a third citation).

McAteer is quoted in the article: "These findings point to the potential of a serious health problem and one that we have to be very active in trying to remedy. We have a problem there and we're going to deal with it."

October 5, 2000

Several Virginia papers pick up the *Seattle P-I* story.

VVL flooded with calls from concerned customers. Calls continue in following weeks.

Mid-October, 2000

Press coverage continues.

VVL continues air sampling program and gets similar count results to MSHA's August testing. VVL gets further testing (TEM) done and shows that most fibers counted by PCM (optical) methods are not true asbestos fibers.

VVL requests remainder of filters from MSHA's August testing. MSHA sends filters to VVL, and VVL sends them to R. J. Lee labs to get further analysis done. Lee calls VVL and says that they have already analyzed these samples for MSHA – in fact 4 samples were analyzed by TEM at Lee's lab in September (prior to MSHA telling VVL employees that this work had not been done). MSHA's own TEM results (that they did not share with VVL employees) show that in the 4 air samples analyzed by TEM, no asbestos was detected.

VVL demands all results (including TEM work) from MSHA and finally receives them. All results are posted for employees.

Mr. John Addison visits VVL for another week to help allay the workers new fears and to again study the process.

Mr. Mac Ross, USGS asbestos expert – retired, visits VVL and surveys the pit and plant. His comments are that VVL has done an excellent job finding suspect material in the pit, and that he did not see anything that he did not expect to see – thin veins of fibrous material. He states that material similar to what is found in VVL's pit can be found all throughout the Blue Ridge Mountains.

October 20, 2000

MSHA officials meet with VVL management to try to resolve the open citations. VVL for the first time gets to tell MSHA what the company has been doing to ensure that workers are not exposed to potential asbestos fibers. VVL states that it has complied with the MSHA Program Bulletin since it came out in March.

MSHA official has no idea that the company has its own wasting and air sampling programs. MSHA official was under the impression that suspect materials were flagged during Mr. Addison's first visit in April, and that nothing had been done since then. MSHA District Manager says he is still unaware that MSHA had done TEM analysis on any samples. VVL management explains that R. J. Lee lab did this work on 4 samples in September (prior to MSHA speaking with VVL and employees in early October).

VVL asks that MSHA vacate the two citations.

December 19, 2000

MSHA visits VVL for a fourth air sampling program of the year. Weather is cold and it starts to snow in mid-morning. MSHA puts air pumps in the wet mill, dry mill, and on employees involved in the "Wasting" process.

NOV 29 2000 WED 03:51 PM EVH FAX NO. 7032108641 P. 02/02
NOV.29.2000 3:03PM C & M CONV FAX A10 NO.775 P.2

U.S. Department of Labor

Office of the Solicitor
4015 Wilson Boulevard
Arlington, Va 22203

November 29, 2000

Timothy Biddle
Crowell & Moring
1001 Pennsylvania Ave. N.W.
Washington, DC 20004-2595

Re: Virginia Vermiculite Asbestos Sample Test Results

Dear Mr. Biddle:

My client has requested that I inform you of the results of MSHA's August 2000 tests of asbestos sampling conducted at the R.E. Sanson Mine and Mill located in Louisa, Virginia and operated by Virginia Vermiculite Ltd. MSHA testing revealed that no asbestos was found in samples of the customer product produced at the mine. MSHA's sampling for airborne asbestos fibers did not result in any samples demonstrating asbestos levels in excess of the MSHA regulatory limitations. Please let me know if you would like further clarification.

Sincerely,

Mark R. Malecki
Trial Attorney

VIRGINIA VERMICULITE

14093 Louisa Road P.O. Box 70 Louisa, Virginia 23093 (540) 967-2266 Fax (540) 967-2803

October 24, 2000

Mr. James R. Petrie
District Manager – Northeastern Region
Mine Safety and Health Administration
Thorn Hill Industrial Park
547 Keystone Drive, Suite 4
Warrendale, PA 15086-7573

Dear Jim,

Thank you and Dale St. Laurent for coming to our plant last Friday to discuss the two citations. I was pleased to finally have the opportunity to present to MSHA information on all the proactive measures we have been taking since MSHA issued its Program Information Bulletin on asbestos on March 2, 2000. As I emphasized during our meeting, we initiated a comprehensive program at that time to specifically and directly readdress asbestos issues at our operation. This program, in my mind, should be held as a prime example within the mining community in the United States of how a responsible company should act in addressing concerns raised by MSHA. The early October press coverage, triggered in part by comments by MSHA officials, has been just the opposite.

I agree with your statements that MSHA needs to clarify things with our employees. I hope that you understand my concerns that these employees be updated with facts and real answers. These are the same concerns we expressed to you and Mr. McKinney prior to your speaking with our people on October 2, 2000. I remain extremely troubled by the fact that, up until our meeting last Friday, you were unaware of the results of the TEM analysis that MSHA had received on cassettes sent to R. J. Lee on September 8 and 12, 2000. This makes no sense to me or to my employees. I am more troubled by the statements that Mr. McKinney made to one of my employees, statements that you apparently verified in interviewing this employee last Friday. These statements, in effect, lead this employee to believe that he would be guaranteed to get asbestosis from working here. The TEM analysis that R. J. Lee ran on the cassette from this employee came back as Non Detect for asbestos. This was the highest PCM reading from the August, 2000 sampling and, for this reason, Mr. McKinney took this employee aside to speak to him personally. Fortunately, because of the training all my employees have received since March of this year, this employee understands the difference between PCM and TEM analysis. This

is an understanding that Mr. McKinney apparently lacks. This does not mean that this employee is not confused.

The last concern I have has to do with the instructions that Dan Crane of the OSHA lab in Utah received regarding the counting techniques used in analyzing the cassettes from the August, 2000 sampling. Dan Crane confirmed that all previous counts used a discrimination against non-asbestos fibers in our samples, as they always have done for rock industry samples, and that for the most recent set he had been asked (by someone at MSHA) to count everything. My employees need to understand this.

Given these concerns, I feel that it is imperative for us to be given the opportunity to work with MSHA in developing the message that these employees receive. This is all we were asking you to do before you spoke with them on October 2, 2000. We are now dealing with the consequences with our work force, our customers, and the local community of not doing so then. I would hope that we could work together in achieving our common goal of protecting the health and safety of VVL's employees.

I just received the attached report from Malcolm Ross, the foremost expert on asbestos in the United States. I am also attaching his credentials for your files. In addition, I have attached the information I presented to you last Friday in discussing these citations.

In closing, I ask that MSHA vacate these two citations. It is the only just solution and will go a long way in mitigating the confusion and harm our company and employees have suffered as a result of this entire affair.

Sincerely yours,

Ned K. Gumble
General Manager

Cc: Earnest Teaster

Citation #770862
Part of 30CFR: 56.20011

"Areas where health or safety hazards exist that are not immediately obvious to employees shall be barricaded, or warning signs shall be posted at all approaches. Warning signs shall be readily visible, legible, and display the nature of the hazard and any protective action required."

1. "Asbestos is present" does not mean "health or safety hazards exist" provided that it is determined that exposure limits for airborne contaminants (56.5001) are not exceeded.

    a. MSHA limits are not exceeded; therefore this is not a hazard according to MSHA's authority.
    b. Of the 28 personal samples taken in August, 19 involved activities at the mine. The highest sample by PCM analysis (0.2 fibers/cc) was 10 times below MSHA's limit. This sample was quantified by MSHA (R. J. Lee) using TEM and was determined to be non-detect for asbestos.
    c. MSHA did specific personal air sampling while we were removing a veinlet and all involved employees were well below the OSHA limit (by PCM analysis alone—without further reduction after TEM).
    d. Even if MSHA were to adopt OSHA's limits, which we have accepted internally, all of these personal samples at the mine were below OSHA limits since OSHA requires TEM analysis for all samples above 0.1 fibers/cc. MSHA did TEM on 4 samples, 3 of which were activities at the mine. All of these samples showed the absence of asbestos.
    e. VVL brought an OSHA certified consultant, Ringneck Consulting Services, in on March 2, 2000 to determine if we met OSHA guidelines. Ringneck sampled employees working in the veinlet areas, performed area sampling at the property line perimeter, and tested bulk products. This work resulted in a "Negative Exposure Assessment" in accordance with the requirements of OSHA, 29 CFR 1926.1101. With an OSHA Negative Exposure Assessment, hazard signs, respirators and a respirator program, protective clothing, and hygiene facilities are not required.
    f. Previous MSHA testing (over the last 20 years, including two other test periods this year before August 2000) and the MSHA testing done during August 2000 further support this Negative Exposure Assessment determination.
    g. Barricading/Posting was not specifically addressed in MSHA's March 2, 2000 Program Information Bulletin on asbestos. All instructions/recommendations listed in this bulletin were specifically addressed by VVL during the March/April 2000 period.

Citation #770863
Part of 30CFR: 56.18002a

1. "The mine operator was not addressing potential asbestos hazards during the required workshift examination: workplaces were not examined each shift to identify areas containing asbestos."

    a. VVL directly addressed potential asbestos hazards, beginning before the MSHA directives of March 6,2000. Ringneck Consulting was brought in on March 2, 2000 that resulted in Negative Exposure Assessment determination.
    b. VVL began its flagging program at this approximate time, a specific program of continued inspection for fibrous material in the mined areas. This program was greatly expanded upon after the consultation visit by John Addison, an international asbestos expert and geologist, in April of 2000. The work place is examined many times each day by at least four people: Andy Taylor (lab supervisor), Richard Lenherr (mine manager), Ed Erickson (plant/quality manager), and Ray Gordon (excavator operator). John Addison specifically trained both Andy and Ed in microscope techniques. Andy's time was also redirected at this point to allow for more specific time concentrated on pit analysis. Additional lab help was brought in to allow for this. This flagging program has been ongoing since the John Addison visit.
    c. VVL sent samples to IOM in March of 2000 to determine the asbestos content of its mined ore, product, dry mill dust, etc. to detection limits 100 times below current US standard test limits (TEM). All these samples came back at less than 0.001% (10ppm).
    d. VVL instituted its own air testing program shortly after the visit by John Addison. VVL purchased air monitoring equipment (2 pumps) and sent two employees to school to get trained and certified in sampling techniques. This program has been ongoing since this time.
    e. John Addison specifically addressed potential asbestos hazards during his visit. All employees were informed of the existence of the veinlets, the precautions that are being taken and the precautions that must be taken by VVL and all employees during small group meetings with John.
2. "Employees were not notified of the locations where asbestos was found."

    a. False. All employees were given information about the small veinlets found in the mine during the discussions with John Addison. He also informed the employees that no asbestiform material was found in samples taken at the wet

mill, dry mill and stockpiles. Supervisors from the processing plant were taken to the mine to review the situation. All employees at the mine were informed of and instructed on the flagging program. All employees were told that we were setting up a program to avoid these "suspect" areas—any veinlets that were fibrous in nature, independent of whether they were truly asbestiform or not.

3. "Appropriate action was not taken to control employee exposure."
    a. False. See explanation of 56.200011 violation and the explanations thus far for this violation. The initial action taken was to determine employee exposure through outside consultants and labs and through our internal testing program. In addition, we internally adopted OSHA's limits as our guidelines.
    b. As a result of John Addison's consultation we started on a program to reduce dust in general. This program included installing air conditioning units on mining equipment, installing additional watering equipment at the processing plant, and installing a vacuum system in our screening plant (the most dusty location at our site.)

Secretary of Labor, Mine
Safety and Health Administration

&

Virginia Vermiculite, Ltd.

AGREEMENT

1. The Secretary of Labor, Mine Safety and Health Administration ("The Secretary") hereby vacates Citation Nos. 7708052 and 7708053. By vacating these citations the Secretary does not waive her authority in the future to require compliance with the mandatory health standards.

2. Virginia Vermiculite, Ltd. ("VVL") will, from the present date forward:

a) make respirators available to its miners as would be considered the "appropriate respirator" under 29 C.F.R. Section 1926.1101, if testing reveals levels at or above 0.1 asbestos fibers per cubic meter of air at VVL's mine; and

b) maintain climate control cabs on mobile equipment which is reasonably expected to encounter, or is used to handle, asbestos-containing material at VVL's mine.

3. This agreement resolves all claims arising out of the issuance of Citation Nos. 7708062 and 7708063 and the parties shall pay their own costs and legal fees arising out of these matters.

Mark R. Walecki
Trial Attorney
Attorney for the Secretary

Dated:

Timothy M. Biddle, Esq.
Attorney for Virginia Vermiculite, Ltd.

Dated: 2/19/01

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Oct 15, 2000

Asbestos level at mine disputed

Company asks for test results

BY CARLOS SANTOS
TIMES-DISPATCH STAFF WRITER

LOUISA - Virginia Vermiculite Ltd., its business hurt by the specter of a potential asbestos danger, is strongly protesting the testing procedures used by the federal Mine Safety and Health Administration to determine the presence of airborne asbestos fibers at the Louisa County mine.

After performing tests on bulk and air samples taken from the mine area, MSHA representatives earlier this month told the two dozen workers at the vermiculite mine the presence of asbestos posed a potentially significant health hazard.

"These findings point to the potential of a serious health problem and one that we have to be very active in trying to remedy," Davitt McAteer, the assistant labor secretary and head of MSHA, was quoted as saying in news reports that went across the country.

Those reports sent the company into a free fall.

"No doubt, our business is totally on the line," general manager Ned Gumble said of the company that has operated a small open pit mine for almost 20 years in Louisa County.

"MSHA unduly scared our employees and killed our business," Gumble said. "The implication to my customers is 'What the hell have you been sending me.'"

Vermiculite is a mica-like material used in potting soil, insulation and construction material such as drywall, plaster and fireproofing.

Mine officials say the mine is safe and free of dangerous levels of airborne asbestos fiber and that the MSHA findings support their contentions. They say MSHA - stung by its failure to protect mine workers at a vermiculite plant in Libby, Mont., where hundreds of workers were sickened by asbestos-tainted vermiculite over the past decades - is simply rattling its saber and ruining their business.

"In our minds, MSHA overreacted in this case based on pressure and criticism it received from its handling of the Libby mine," Gumble said.

McAteer said of the charge: "I find that so appalling."

What federal inspectors found after repeated testing at the Louisa mine was several samples of bulk ore highly contaminated by asbestos.

Gumble said the contaminated ore was found in thin veinlets in the open pit that had already been marked in April with red flags by the company with plans to have it removed. "Out of our eight acres, it's about one to two square feet of material which could be potentially dangerous," he said.

But asbestos is only dangerous if its fibers are airborne. Asbestos is a generic term used to describe six fibrous mineral silicates. It occurs naturally and is dangerous only when its microscopic fibers are inhaled or swallowed.

Company officials and other experts raised questions about how well MSHA's testing accurately reflected the level of airborne asbestos fibers at the mine. MSHA oversees the safety of workers in the country's 14,000 mines.

The only tests that MSHA cited publicly, on Oct. 4, count the generic presence of fibers and do not discriminate whether they are dangerous asbestos or non-hazardous fibers. The test uses an optical microscope to examine an air filter to count the fibers.

If sufficient fibers are counted, a more sophisticated test using an electron microscope is needed to specifically identify how many of the airborne fibers collected are asbestos.

MSHA did those electron microscope tests, called TEM or Transmission Electron Microscope, over the past few months on air samples taken from the Louisa mine, Sharon Ainsworth, a chemist at MSHA's lab in Pennsylvania, confirmed Thursday. She would not release the results of those tests. Virginia Vermiculite has written to MSHA demanding the test results.

McAteer said he thinks the TEM tests have been done but would not elaborate.

Bob Sansom, the principal owner of the Louisa mine, said MSHA workers told him and his employees earlier this month that the TEM tests were not done.

"I don't have any rational explanation why they didn't release the results," Sansom said. "It's appalling. It looks like they are trying to suppress the critical results. I have never heard of a federal agency doing that. I can't explain it."

Mike Hochella, a professor of geological science at Virginia Tech, said sophisticated tests are called for and certainly warranted in determining an accurate level of airborne asbestos fibers.

Using an electron microscope on airborne samples "needs to be done to specifically identify the material," Hochella said. "I am speaking as a scientist and have no interest in whether this company survives . . . But this is really tricky business."

In a written statement to The Times-Dispatch on Friday, McAteer said one air sample from the mine was analyzed using another method, called SEM or scanning electron microscope, and "asbestiform fibers were identified."

Hochella said using a SEM test, while not as sophisticated as the TEM tests, could be enough to raise concern if asbestiform fibers are identified.

John Addison, an asbestos expert hired by the Louisa company to study asbestos danger at the mine, said the SEM tests are meaningless if the fibers are not quantified and the criteria for identifying the fibers are not made known.

"You need to know what the criteria are for calling this asbestiform," Addison said.

Gumble said SEM is not an accepted method for definite determination of asbestos. "If you want to test for employee exposure, you have to do the TEM tests MSHA is withholding."

In testing for generic fibers in August, federal inspectors found that levels of airborne fibers at the mine were well below MSHA's legal limit of two fibers per cubic centimeter of air.

But several air samples registered above the Occupational Safety and Health Administration limit of .1 fiber per cubic centimeter. While MSHA can't cite those levels as a violation, it said it still considered them a potential health concern.

Based on its findings of asbestos in its bulk sampling, MSHA cited the company for two safety violations involving the lack of signs warning of asbestos danger and the failure to control employee exposure to asbestos.

"They made some very harsh statements," Gumble said. "Then they leaked the story to the [Seattle] newspaper though they told us we would be able to respond to these issues." McAteer denied that charge.

The Seattle Post-Intelligencer reported in a lengthy story the day after the MSHA visit that "dangerously high levels" of asbestos were found at the Louisa mine, one of only a handful in the country and the only vermiculite mine in Virginia.

The Seattle newspaper's interest in the Louisa mine came after its extensive reporting on the defunct, asbestos-laden vermiculite mine in Libby, Mont.

Andy Taylor, a worker at the Louisa mine, said the MSHA representatives "basically said it was dangerous here and that the asbestos posed a significant health hazard."

But Taylor, a quality control technician, said, "I'm pretty good at understanding how fibers are counted. . . . I believe I could go out and cut grass and see those fibers. . . . The bottom line with me is if I believed there was a significant health risk, I wouldn't work here."

Taylor said none of the company's two dozen workers has quit despite MSHA's dire warnings. "Among employees, the biggest fear is for their jobs," he said. "Not their health."

Gumble said his company hired a private lab to do the TEM testing on some samples collected by air pumps hooked to his workers in the past several weeks.

"The level of asbestos was below the level at which children are let back in schools after asbestos abatement programs," he said.

Gumble said at least one of his major customers, whom he refused to identify, has halted its vermiculite orders awaiting resolution of the issue.

MSHA had tested the Louisa mine for 20 years and found no detectable level of asbestos in the ore or in the air. But McAteer said a new sampling system turned up traces of airborne asbestos fibers at the mine.

But McAteer also said the mine could continue to operate safely.

"In the mining business, you work with risks all the time," he said earlier this month. "This goes to education and training. . . . We want them to be aware of the danger and how to cope with it. . . . Even modest levels of exposure to asbestos are potentially dangerous."

Gumble said MSHA, his company and even his customers have repeatedly tested for asbestos at the plant and at the open pit mine within sight of the processing plant.

The company leases 250 acres of land on which the eight-acre open pit is located. An excavator is used to load the loose vermiculite - mixed with dirt, rocks and other minerals - to take to its small, on-site processing plant. After the separation process, which uses water and chemicals, the pure vermiculite is mostly shipped by truck directly to the company's manufacturing customers. Most of the workers are involved in digging and hauling the vermiculite.

"Our goal is to make this mine as safe as possible," Gumble said. "I don't know why MSHA would come out here and make such a stir."

Contact Carlos Santos at (804) 295-9542 or csantos@timesdispatch.com

This story can be found at : http://www.timesdispatch.com/vametro/MGBBQVH1CEC.html

Friday, January 12, 2001

The Daily Progress

Section B

Region & State

Charlottesville, Virginia

➤ LOTTERY B2
➤ OBITUARIES B2
➤ COMICS B3

EPA finds no asbestos fibers outside mine

Louisa residents appear safe

By AUSTIN GRAHAM
Daily Progress staff writer

LOUISA — Louisa County residents living near the Virginia Vermiculite Ltd. mine off Route 22 are not being exposed to cancer-causing asbestos fibers, according to a report from the Environmental Protection Agency.

An EPA team took dust samples from seven residences near the mines between Dec. 12 and 14, and the agency's analysis "indicate non-detection of asbestos fibers in any of the samples," the report states. The results have been sent to Virginia Vermiculite, the Mine Safety and Health Administration, Louisa County officials and the residents whose homes were tested.

The report, released this week, came as welcome news for Virginia Vermiculite officials, who were cited by MSHA in November for inadequately protecting workers from asbestos in the mine. Robert L. Sanson, who owns the company and a similar one in South Carolina, has acknowledged that asbestos exists on his property, but he has long maintained that his employees handle it safely.

"We were very confident that [inspectors] were not going to find any fibers in the vicinity of the mine, and that confidence has been affirmed," Sanson said Thursday. "We're hopeful that this puts the whole issue behind us. There's no basis for any public concern about any fibers from our mine."

Sanson added that his business has been "significantly" damaged by the MSHA citations, but he declined to be more specific.

Michael Zickler, who oversaw the EPA sampling, said the December tests were part of a nation-wide study of vermiculite mines and related facilities. The fire-retardant ore has been the subject of national concern since it was revealed in 1999 that several miners — as many as 192, according to some estimates — have died as a result of exposure to asbestos in a vermiculite mine in Libby, Mont.

Zickler said, however, that the EPA's study only covers residences located near the mines and not the mining facility, and that it therefore does not contradict MSHA's November citations. MSHA will perform further studies on the mine in the future, Zickler said, but MSHA officials did not return phone calls Thursday.

The EPA study "should be reassuring to the residents," Zickler said. "[Asbestos] doesn't seem to be coming into homes; it doesn't seem to be coming off the trucks, accumulating on the roads. Whether you can extrapolate from that whether it's safe on the mine site, we'll have to wait and see. We'll be interested to see what [MSHA's] final results are."

Sanson said, however, that the EPA's findings still indicate that the mine is not an asbestos hazard. "The dust on those houses come, to some degree from the mine," Sanson said. "There is some overlap here."

But Mary Gazaille, whose house off Route 22 was one of the EPA's test sites, said she doubted the accuracy of the results.

"We felt that, if there's any contamination, that they should have set up some kind of testing station in the fields," Gazaille said. "Naturally, we hope that there isn't any contamination and that we're not being exposed to asbestos. But we just feel that the asbestos, if there is any on the property, is in the air outside, blowing through our fields."

Daily Progress
Charlottesville
1/27/01

Agency retracts asbestos citations

Company cleared after testing shows acceptable level of fibers

By AUSTIN GRAHAM
Daily Progress staff writer

LOUISA — The federal Mine Safety and Health Administration has retracted its October citations of Virginia Vermiculite Ltd., the mining company it had previously charged with inadequately protecting workers from cancer-causing asbestos.

The company received the citations in October, after MSHA tests indicated that there were unsafe levels of airborne asbestos fibers in four locations around the mine. Vermiculite, a fire-retardant ore, has been the subject of national concern since it was revealed in 1999 that several miners — as many as 192, according to some estimates — have died as a result of asbestos exposure in a vermiculite mine in Libby, Mont.

Virginia Vermiculite officials vigorously protested the findings and asked for follow-up tests. MSHA returned to the mine Dec. 19 and announced their findings Monday.

"The laboratory analyses confirm the presence of asbestos fibers at the operation, but no personal overexposure to asbestos was found," said Kathy Snyder, an MSHA spokeswoman. In light of the new results, the administration's secretary vacated the citations last week.

In exchange, Virginia

See ASBESTOS on A10

Asbestos

Continued from A1

Vermiculite has agreed to provide respirators for its workers if the amount of airborne asbestos fibers rises to unsafe levels, and to more carefully monitor its mobile equipment. Essentially, "the company agreed to do more than is required under MSHA standards to protect miners from possible overexposures," Snyder said.

But Robert L. Sansom, who owns Virginia Vermiculite and another mine in South Carolina, said Monday that his company's concessions should not distract attention from MSHA's reversal.

"That's their face-saving way of getting around [the fact that] they mishandled the testing," Sansom said.

"They bungled an inspection in August, issued these citations in early October ... and it turns out there isn't anything to the citations. Now they've vacated the citations; we certainly appreciate it. But that doesn't vacate the harm they've caused."

Ned Gumble, the mine's general manager who disputed the MSHA citations as soon as they were issued, said the latest test results confirm that his workers are safe.

"We were interested in the tests being done properly in the first place, and to go to more sophisticated testing in order to differentiate between what is truly a fiber and what isn't," Gumble said. "They went out and did additional testing and they showed no exposure above [Occupational Safety and Health Administration] limits to employees, so I think that played into their decision to vacate their citations."

Gumble said MSHA's citations and the bad publicity they generated have driven away customers and forced the company to both cut back its operating schedule and lay off workers. He expressed hope, however, that the asbestos controversy is drawing to a close.

"I think one thing MSHA will do is monitor us with greater frequency. Of course, they have monitored us with regularity since we've been in business. But I think they'll keep a closer eye on what's going on out here," Gumble said, adding that all of his workers have received precautionary chest X-rays and clean bills of health.

"We hope there is closure here. Those are ... very positive pieces of news for us, and the fact that we had clean health surveys on all our employees certainly made everybody here feel much more comfortable."

"They bungled an inspection in August, issued these citations in early October ... and it turns out there isn't anything to the citations. Now they've vacated the citations; we certainly appreciate it. But that doesn't vacate the harm they've caused."

Robert L. Sansom, owner of Virginia Vermiculite Ltd.

VIRGINIA VERMICULITE

P.O. Box 70 Louisa, Virginia 23093 (540) 967-2266 Fax (540) 967-2603

STATEMENT OF
ROBERT L. SANSOM

October 17, 2000

Fax (804) 295-1415
Mr. Carlos Santos
Richmond Times Dispatch
520 E. Main Street, #4
Charlottesville, VA 22902

Dear Mr. Santos:

We welcome your coverage of MSHA's activities at our vermiculite mine in Louisa County.

Permit me to state the following about Virginia Vermiculite's position:

(1) MSHA made statements to our employees and to the press, particularly the Seattle Post-Intelligencer, and others, that were not true and MSHA had the evidence that showed these statements were untrue. These statements implied that our employees were exposed to air bourne asbestos fibers when MSHA had in its possession test results that MSHA had contracted to be performed by an independent, properly accredited laboratory that showed this was not true. MSHA covered up these tests. MSHA's own procedures required electron microscope analysis of personal air monitors to confirm the presence of asbestos. MSHA's test results were completed by independent laboratories on September 8th and September 21st. Yet when MSHA officials visited our mine on October 2, 2000 these results were not revealed.

(2) Based on our 22 years of testing at Virginia Vermiculite, testing that had found no asbestos in the air or in our product, we received MSHA's October 2, 2000 results with skepticism. We asked for time to obtain splits of MSHA's air filter samples and have our own tests conducted. MSHA denied our request. We know now that MSHA had already leaked their erroneous results to the Seattle Post-Intelligencer. They could not stop the press.

(3) We may never have known about MSHA's "cover up" of the essential transmission electron microscope analysis except for the fact that on October 11th after receiving the split samples of MSHA's air filters we requested, we sent these split samples to the R.J. Lee Group, Inc., an independent, certified testing laboratory. To our astonishment, we were told on October 11th that this laboratory had already tested these samples by the required transmission electron microscope for MSHA. On

October 17, 2000
Page Two

October 12th I demanded that MSHA provide us with these results. I had made a previous request for all tests by MSHA at a meeting with MSHA on October 3, 2000, but I did not know of the existence of these specific TEM results at that time. MSHA had not provided any test results in response to my October 3, 2000 request. At 16:51 on Friday October 13, 2000, MSHA finally released the laboratory results it had received in September. These TEM results showed no air borne asbestos fibers in the personal air filters taken at VVL.

(4) Numerous tests of air bourne dust by MSHA showed the only standard MSHA is authorized to enforce (2 fibers/cc) was never approached by any air monitor. Moreover, no MSHA results properly analyzed by a transmission electron microscope (TEM) showed a violation of OSHA's 0.1 fibers/cc standard.

(5) In addition, MSHA sent bulk vermiculite samples of our products to two independent laboratories: USX Engineers and Consultants, Inc. and the R.J. Lee Group, Inc. Tests by these laboratories for MSHA detected no asbestos in Virginia Vermiculite's products.

(6) From the above facts it is clear to me that MSHA has waged a press campaign through the Seattle Post-Intelligencer against Virginia Vermiculite. (The Post-Intelligencer has coincidentally taken the position of the defendant in the anti-trust and Virginia Conspiracy Act litigation Virginia Vermiculite recently litigated as plaintiff in Federal Court in Charlottesville.) MSHA has made untrue statements to our employees that unnecessarily alarmed them when MSHA's own tests showed that Virginia Vermiculite's employees were not exposed to airborne asbestos and Virginia Vermiculite's products contain no asbestos.

Robert L. Sansom
President, Louisa Properties, Inc.
General Partner
Virginia Vermiculite, Ltd.

October 19, 2000

Mr. Ned Gumble
Virginia Vermiculite, LTD
P.O. Box 70
Louisa, Virginia 23093

Dear Mr. Gumble

Enclosed is my report titled "*Report of Assessment of Possible Asbestos Occurrence Within the Vermiculite Mining Properties of Virginia Vermiculite-LTD, Louisa, VA*". As you can see from the reading of the report I believe the asbestos health risk to the mine workers is so small as to be non-existent. Please let me know if you have any questions about this report or need further elaboration on any of the subject matter. I am also enclosing a copy of my Professional Technical Record for you files.

Very sincerely,

Malcolm Ross

Malcolm Ross, Ph.D.
Minerals and Health Consultant
1608 44th Street NW
Washington DC 20007
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Report of Assessment of Possible Asbestos Occurrence Within the Vermiculite Mining Properties of Virginia Vermiculite-LTD, Louisa, VA

Introduction. On October 13, 2000, I visited the Virginia Vermiculite mining properties located just north of Virginia route 22 and approximately 3 miles east of Boswells Tavern. I was met at the quarry by the mine manager, Mr. Ned Gumble, and by Mr. John Addison, a professional mineralogist who for the previous ten days had been carefully examining the quarry rocks for possible asbestos content. I toured the mining properties with Mr. Addison for several hours, inspecting the various types of rocks found within the quarry so as to make an independent evaluation of asbestos occurrence.

Geological Background. Virginia Vermiculite-LTD quarries vermiculite ore from an area known geologically as the Green Springs Pluton. These vermiculite-bearing rocks occur in a highly complex "mélange" of various types of granite (felsic rocks) and sedimentary rocks; the latter rocks were partially to totally recrystallized into biotite and amphibole-bearing igneous rocks (referred to geologically as amphibolites). These "metasedimentary" rocks were assimilated and recrystallized from the overlying Unit A of the Mine Run Complex (see D.L. Rossman, Virginia Division of Mineral Resources, Publication 107, 1991). In parts of the pluton, particularly in the north portion, the amphibolites are often highly altered, the hornblende-biotite assemblage reconstituted to a very soft ore containing much vermiculite (vermiculite is essentially a hydrated biotite). Within the vermiculite ore body can be found more pristine blocks of relatively unaltered amphibolite containing large crystal of hornblende amphibole. Although a complete mineralogical study has not to my knowledge been made of these rocks, my hand specimen examination suggests that non-fibrous actinolite amphibole may be associated with the hornblende and biotite. I detected no fibrous minerals within the altered and unaltered amphibolites. The ore body area of the Green Springs Pluton also contains numerous felsic (feldspar-rich) rocks that appear as dikes and small apophyses, the thickness of which varies from a few inches to a few feet. The intrusion of the felsic dikes may have been a factor in producing the alteration of the amphibolites to form vermiculite.

Asbestos Assessment. Within the ore body I suggest that the felsic dikes compose perhaps two or three percent of the total rock volume. Asbestos was not found within the vermiculite-bearing portion of the ore body, but rather as thin coatings on the contact surfaces between the felsic dikes and the altered amphibolite rock. The contact surfaces show evidence of shearing. These coatings vary in thickness from a fraction of an inch to over an inch. The coating are fibrous and were identified previously by Mr. Addison as tremolite asbestos on the basis of refractive indices determined by Dispersion Staining microscopy. Some of the fibrous material has a bluish cast suggesting the mineral may be a more sodic tremolite, perhaps even a richterite amphibole. I estimate that the fibrous minerals associated with the felsic dikes compose much less than one tenth of one percent of the total volume of rock with the mining area.

Asbestos Risk Mitigation. The mine manager has instituted a procedure so as to avoid quarrying much of the asbestos-bearing rock by discarding the felsic dike rocks and rocks close to the dikes. It is estimated that this action can eliminate eighty percent of the asbestos from the ore processed in the mill. Since there is very little asbestos in the quarry and since no crushing or blasting of the soft ore is necessary, I believe very little fiber will ever become airborne. I understand that previous air monitoring at the quarry gives no evidence of risk to airborne asbestos.

Formation of Mineral Fibers. Asbestos and other fibrous minerals are formed under very special conditions related to movement of crystallizing fluids within rock that is undergoing intense deformation, including faulting, shearing and dilation. "Slip fibers" are formed along the fault and shear planes, the fibers crystallizing as solutions move within the two rock faces that compose the shear or "slip" plane. "Cross fibers" occur within cracks formed when the rock undergoes tectonic stress, during which parallel cracks and fissures form open spaces in the rock. The fibers grow perpendicular to the walls of the cracks - thus "cross fiber". The conditions for fiber growth are found in many types of rocks, not just those bearing commercial asbestos. Rocks can be found all along the Appalachian front, from Nova

Scotia to Georgia that have undergone tectonic and hydrothermal activity and thus have a high probability of containing some form of mineral fiber.

Relative Abundance of Fibrous Minerals in Various Geologic Localities. I have examined numerous mining and construction sites, both on the east coast of the U.S. and Canadian and in Arkansas, Minnesota, and California. The serpentinite rocks of Canada and Vermont, which produce commercial chrysotile asbestos, have a fiber content that runs approximately five percent. Serpentinites found further south and mined for chromite and road material generally contain less than one percent chrysotile asbestos. For example, I have carefully examined the minerals within the Hunting Hill serpentinite quarry located in Rockville, Maryland. I estimate that chrysotile composes less than one percent of the rock and appears as thin (1/16th inch) cross fibers. The quarry came under intense scrutiny in the 1980's but since the air monitoring did not show an asbestos risk, the quarry continued to operate.

I also examined rocks from The Piney Branch Complex, a mélange having a complexity similar to the Green Springs Pluton. The Piney Branch Complex outcrops over a six square mile area, mostly in the prime real-estate area of Fairfax County, Virginia. During a visit to a County construction site in 1987 I found large amounts of actinolite asbestos within an amphibole schist. The actinolite fibers occurred in shear zones and along the slip planes formed during rock folding. Non-fibrous actinolite occurs in areas of the schist where there was no folding or shearing. I estimated that fiber content was more than two percent of the exposed rock. Procedures were developed by the Fairfax County Department of the Environment to ascertain risk to asbestos exposure and to institute work rules for the construction workers. This involved keeping dust levels low by water treatment at the site and when blasting use of protective gear. The County continued its real estate development, including construction of several County office buildings. Fairfax County presents an example of the sensible application of worker protection from asbestos health risk while maintaining a viable economy.

I also examined rocks within a major iron ore open pit mine in Minnesota. The rock type is "taconite"; a very hard highly metamorphosed quartz-magnetite-amphibole rock. The amphiboles within the hard ore are hornblende, actinolite, and grunerite - all non-fibrous. However, within the shear zones of the taconite a fibrous mineral was found. Chemical and X-ray analysis show the fibers to be a degraded actinolite. It is estimated that of the total rock volume within the twelve mile long pit, actinolite asbestos composed less than 0.01 percent. The mine is presently operating successfully under OSHA rules.

Conclusion. From my experience in examining other mine and construction activities where asbestos was present in the work environment, I find that the amount of asbestos present at the Virginia vermiculite quarry is very low as compared to many other locations. If the small amount of asbestos found in this quarry will prevent mining, then an extraordinary number of other mine and construction sites along the east and west coasts of the U.S. could also be considered unsafe.

Malcolm Ross

Malcolm Ross, Ph.D.
October 19, 2000
Minerals and Health Consultant
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Washington DC 20007
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E-mail: mrdrr@earthlink.net

MALCOLM ROSS, Ph.D.

PROFESSIONAL TECHNICAL RECORD

Address
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Scientific or technical specialties

a) Mineralogy b) Igneous and metamorphic Petrology c) Minerals and Health d) Health Policy

Education

School	Specializations	Dates Attended	Degree,Year
Utah State University	Zoology, Chemistry	9/47 - 6/51	B.S., 6/51
University of Maryland	Physical Chemistry	9/56 - 6/59	M.S., 6/59
Harvard University	Geology, Chemistry	9/59 - 6/62	Ph.D., 6/62

Membership in professional societies: Dates and significant offices held.

1) Mineralogical Society of America (1952-present), elected Fellow in 1959, Treasurer 1976-1980, Vice President 1990, President 1991.
2) Geological Society of America (1963-present), elected Fellow in 1979.
3) American Geophysical Union (1971-present).
4) American Association for the Advancement of Science (1965-present), elected Fellow in 1983.
5) Clay Minerals Society (1960-1980, 1988-1994).
6) Mineralogical Association of Canada (1989-present).
7) Geological Society of Washington (1956-present), Chairman of the Finance Committee in 1976.

Scientific and Public Service

Lectureships, symposia, invited conference participation.

1) March, 1965. Invited lecturer on the topic of the crystal chemistry of micas at the USGS Centers in Washington DC, Denver, and Menlo Park.
2) September 7-11, 1969. Invited lecturer "Pyroxene-Amphibole Symposium", V.P.I., Blacksberg, VA. Topic was "Chemical Reactions in Pyroxene Crystals".
3) August 26-September 7, 1972. Invited speaker at the 9th International Congress of Crystallography, Kyoto, Japan - gave two talks on mineralogy and crystal structure of rock-forming silicates.
4) November 13-15, 1972. Co-convener of a symposium on "Exsolution and Domain Structure in Minerals, Geological Society of America meeting, Minneapolis, Minnesota
5) October 29-30, 1981. Invited lecturer on asbestiform silicates for the Mineralogical Society of America Short Course on Amphiboles, Erlanger, Kentucky.
6) May 24-27, 1982. Invited speaker at the "World Symposium on Asbestos", Montreal, Quebec, Canada. Topic was the geological occurrences of asbestos
7) February-March, 1984. Distinguished Regional Lecturer, USGS, Geologic Division, 1983-1984. Gave a talk titled "The Dangers of Asbestos in Our Environment: Separating Fact from Fiction", Reston, VA, February 21, 1984; Denver, CO, March 13, 1984; Menlo Park, CA, March 15, 1984, Flagstaff, AZ, March, 19, 1984.
8) July 13-18, 1986. Plenary speaker, 14th General Meeting, International Mineralogical Association, Stanford, CA, "The Dangers of Asbestos in Our Environment: Fact and Fiction".
9) July 9-19, 1989. Co-convener at the 28th International Geological Congress, Washington, DC of a symposium titled "Alkaline Igneous Rocks and Carbonatites".
10) October 1988. Co-chairman of the Geological Society of America Forum on "Fibrous Minerals, Mining, and Disease", 1988 GSA Meeting, Denver, CO.
11) Feb. 28, 1991. Invited speaker at British Columbia's Mining Work Symposium - "Suspect Minerals and Human Health".
12) Oct. 22, 1992. Gave the Presidential address at the annual meeting of the Mineralogical Society of America, titled "Crystalline solution series and order-disorder within the natrolite mineral group".
13) Jan. 10, 1992. Invited talk at the Geophysical Laboratory, Washington DC, titled: "Crystalline solution series and order-

disorder within the natrolite mineral group".

14) May 5, 1992. Invited talk at the 28th Forum on the Geology of Industrial Minerals, titled: "The effect of regulations on asbestos and other designated mineral carcinogens on the vitality of the industrial minerals industries".
15) Sept. 29, 1992. Invited talk at the annual meeting of the American Association of Professional Geologists, titled: "Suspect minerals-an environmental concern?".
16) Nov. 3, 1992. Invited talk at the annual meeting of the Clay Minerals Society, titled: "Suspect minerals and human health".
17) Nov. 17, 1992. Invited talk at the Intertech conference - A Management perspective on Crystalline Silica, titled: "The sbestos fiasco - a model for crystalline silica?".
18) April 16, 1993. Invited lecturer on the health effects of mineral dusts for the Society of Economic Geologists Short Course on Environmental Geochemistry of Mineral Deposits.
19) Oct. 22-24, 1993. Invited lecturer on the health effects of mineral dusts other than asbestos for Mineralogical Society of America Short Course on Minerals and Health, Nantucket, MA.
20) Oct. 7-11, 1996. Invited lecturer for a course titled "Minerals and Health", eight lectures given at the Institute of Mineralogy and Petrology, University of Fribourg, Fribourg, Switzerland.
21) October 16, 1996. Invited lecturer at the Institute of Physics of the Globe at Paris, University of Paris, Paris, France. Title the lecture was " The United States Asbestos Abatement Program.
22) November 7-9, 1998. Co-organizer of National Academy of Sciences Colloquium, "Geology, Mineralogy, and Human Welfare, NAS Beckman Center, Irvine, CA.

Committees to render scientific judgment. Include scientific review panels, editorial boards, editorships, with dates. Include the capacity in which you served (chairman, subcommittee chairperson, member, observer, expert consultant, etc.).

1) Reviewer for National Science Foundation proposals. About two proposals per year, 5-10 hours work, average funding request about $75K (1965-present).
2) Member of the Roebling Medal Committee, Mineralogical Society of America, in 1970.
3) Associate Editor, The American Mineralogist, average about 30 manuscripts a year, many hours of work involved in editing (1982-1986).
4) USGS liaison to the National Academy of Sciences panel convened to evaluate the health hazards of the various types of asbestos minerals (1979-1982). In 1978 I contacted the NAS, to suggest that a panel be composed of geoscientists and medical scientists to investigate the problem of minerals and health since it then appeared that the issue would in the future have a very large impact on the U.S. economy. The panel was finally formed in 1979 and I was the USGS representative to the panel and was an advisor to the panel members.
5) Member of the USGS Analytical Instrument Committee, 1987-present. The Committee submitted two major reports to the Chief Geologist, one in 1988 and other in 1990 regarding the status of the USGS instrumentation.
6) On three member Committee to investigate a case of scientific fraud within a government organization and to inspect various files relating to the question of fraud. A report was written and submitted to the Director of the USGS.
7) Co-editor of a special issue of the journal *Lithos* (vol. 26, p.1-188, 1990) titled "Alkaline Igneous Rocks and Carbonatites".
8) Member of the U.S.G.S. Promotion Panel, Branch of Igneous and Geothermal Processes, March 12-16, 1990.
9) Member of the pyroxene nomenclature committee of the International Mineralogical Association, 1982-1988.
10) Chairman of the U.S.G.S. Promotion Panel, Branch of Igneous and Geothermal Processes, April 22-27, 1991.
11) Member of the U.S.G.S. Promotion Panel, Branch of Lithospheric Processes, March 8-10, 1994.

Other committees, special assignments, and administrative duties. Name organization, group, dates, and nature of contribution.

A) Principal Investigator, in the NASA lunar science program (1969-1974).

B) I gave briefings and was consultant to Officials in various government agencies and other organizations, including the National Academy of Sciences, the U.S. Dept. of the Interior, The Institutes of Health, the Environmental Protection Agency, the U.S. Congress, the National Bureau of Standards, the Bureau of Mines, etc. The subject of the briefings was on the health effects of the various types of asbestos. I also furnished information to hundreds of individuals, law firms, companies, etc. on the general subject of asbestos. The main purpose of the "asbestos" briefings" was to demonstrate that it was not necessary to remove most asbestos from schools and other buildings.

Honors, awards, recognition, elected membership.

1) Elected Fellow, Mineralogical Society of America, in 1959.

2) Elected Fellow, Geological Society of America, in 1979.
3) Received on March 19, 1979 from the National Aeronautics and Space Administration, a Special Recognition Certificate for scientific contributions as Principal Investigator in the lunar sample program.
4) Received the U.S. Department of the Interior's Superior Service Award in 1981 for extensive and effective efforts to emphasize the geoscience prospective in public-health issues relating to mineral fibers.
5) Elected Fellow, American Association for the Advancement of Science, in 1983.
6) Received cash award, Feb. 1986, for outstanding performance in 1984-85.
7) Received on September 26, 1986 the U.S. Department of the Interior's Distinguished Service Award in recognition of outstanding contributions to the understanding of the various health effects of the different types of asbestos minerals and application of this knowledge to the national interest.
8) Received on October 30, 1990 from the Mineralogical Society of America its Distinguished Public Service Medal. This award, first given in 1990, is for contributions by the recipient to the understanding of the health effects of the asbestos minerals and in promoting a rational national policy with regard to use and control of mineral fibers in the mines, mills, and non-occupational settings.
9) Received Cash Award on August 26, 1991 for Outstanding Performance, 1990-1991
10) Cited in Who'sWho in America, 1991 to present.
11) Cited in Who'sWho in Medicine and Healthcare, 1995 to present

Career experience: U.S. Geological Survey (1945-1995)

07/61 to 07/64 Physical chemist, Crystal Chemistry Project, Geologic Div., USGS, Washington DC. Solved the crystal structures of the torbernite group uranium minerals including abernathyite, meta- torbernite, various synthetic analogs of these minerals, and cesium uranyl sulfate by X-ray diffraction methods. Studied the crystal chemistry of the beryllium minerals, the crystallography of paragonite, and the mineralogy of a new uranyl carbonate. Utilized electron diffraction methods to obtain accurate unit cell constants for fine-grained minerals.

07/64 to06/74 Physical chemist, Geologic Div., USGS. As Project Leader of the Crystal Chemistry Project an extensive program was initiated to very accurately describe the structural nature of important rock-forming silicates. Seven new structure refinements of very high accuracy were made of tremolite, cummingtonite, Mn-cummingtonite, hornblende, richterite, and two gedrites. In addition to these crystal structure studies a detailed examination was made of the phase relationships of the chain silicates including studies of the nature of exsolution in pyroxenes and amphiboles in relation to their chemical compositions, crystal structure, and crystallization history. In 1969 a study of the lunar samples was initiated and the knowledge obtained by the parallel studies of terrestrial silicates was applied to the lunar minerals. An extensive study was started (with H. Takeda and David Wones) on polytypism in micas and a unique method was developed to analyze and describe the mica polytypes. An algorithm was invented to described the crystallography and crystal structure of all possible mica polytype crystal structures. The petrographic relationships of the minerals in the metamorphic rocks of the Gouverneur talc district, NY was completed.

07/74 to 04/77 Physical chemist, Mineral Investigations Project, Geologic Div., USGS, Washington DC. Investigations (with Peter Robinson, Howard Jaffe, and Gordon Nord) were started on metamorphic amphiboles from western Massachusetts. The anthophyllite- gedrite solvus was described for the first time and the solid solution series between these two minerals was delineated for the naturally Occurring minerals. The crystal structures of biotites that were reduced and then oxidized (addition and removal of hydrogen) were determined. This research led to a much clearer understanding of the role of hydrogen in the formation of H-bearing rock-forming minerals.

07/77 to 10/82 Physical chemist, Project leader Asbestiform Minerals Project, Geologic Div., USGS, Washington DC. Entered into a long term study of the geological occurrence of the various types of asbestos minerals, their abundances, their use and distribution in the environment, their health effects on man and in experimental animals, the Federal regulatory processes related to asbestos control and mitigation, the nature of the Federal definition of asbestos as it might relate to mining activities other than asbestos mining, and the social and economic consequences of State and Federal actions. In 1978 (reference no. 86 in my bibliography) I was the first to show the very strong correlation between exposure to crocidolite asbestos and a pronounced negative correlation between this disease and exposure to the very common chrysotile asbestos. This led to proposing the "fiber hypothesis" for asbestos-related disease and is the foundation for the conviction that exposure to chrysotile asbestos in schools and other non-occupational settings presents essentially zero health risk. To bring to the attention of the scientific community, the public, and political leaders I have given approximately 66 lectures and briefings (see 12b., 12c.) on the various aspects of the asbestos controversy. In addition to these project activities I serve as the USGS Asbestos Commodity Specialist. Work was continued on extending the "optimal phase boundary" concept to studies of the pyroxenes. Careful measurement of the orientation of pyroxene exsolution lamellae within the host pyroxenes were made thus establishing temperature-composition-orientation relationships for these minerals. These observations present a method of formulating new geothermometers and barometers.

10/82 to present Physical chemist, Geologic Div., USGS, Washington DC. From 1982 to1986 was a principal investigator, National Acid Precipitation and Assessment Program, also project leader of the Acid Rain Project (1982-1986), the Rock-forming Silicates Project (1982-1989), and the Alkaline Rocks and Carbonatites Project (1983-1992).

The acid rain research involved a cooperative effort with a consortium of about 20 investigators from several different research agencies. My first critical task was to take responsibility for selecting and procuring the various marbles and limestones that would used in our materials effects studies. Visits to the quarry site and cutting mills were made while the stone was being extracted from the quarries and cut into sized slabs and briquettes. Samples were placed at six stations where various atmospheric parameters (such as rainfall amount and chemistry, pH, and temperature) were continually monitored. The relationships between these parameters, the amount of dissolution of the marble and limestone samples, and the mineralogical changes were established. Characterization of the samples (with Elaine McGee and Daphne Ross) was accomplished by chemical analysis using electron microprobe, light optical, scanning electron microscopy, and X-ray diffraction techniques.

The Alkaline Rocks and Carbonatites Project (previously titled the Rock-forming Silicates Project) concentrated its research on the alkaline igneous rocks of the Magnet Cove igneous complex and the adjacent mineralized country rock shales and quartzites. I initially set up the Project's objectives; the immediate applied interest being the mode of origin of the titanium, vanadium, and niobium deposits in the mineralized country rocks. Marta Flohr joined me in this research program and has taken the lead in much of the work. Samples were collected in seven one week field trips. Also, a detailed map was made (in cooperation with the Arkansas Geological Commission) of the most important locality for sampling a large variety of fresh alkaline igneous rocks as well as contact metamorphosed country rocks. A complete geochemical and petrological examination was made of the igneous rocks and included a study of the secondary minerals formed on cooling from the primary melt temperatures. Various metasomatic processes, including metasomatism by later-stage Ca- and Na-rich carbonatitic fluids and low temperature alteration (lateritic processes), also caused replacement of previously formed minerals and released metals that were later deposited in the adjacent country rocks. Some of the important results of this investigation are given in section 15.

In this period I continued serving as the USGS commodity specialist on asbestos and also remained involved part time (30 percent) in various aspects of the asbestos controversy and in particular to how the Federal definition of asbestos is now affecting large segments of the U.S. mining industry not involved in asbestos mining (see section 15).

In 1992 and 1993 I became more and more involved with the issue of minerals and health due to an increased Division interest in environmental hazards and due to the fact that the common mineral quartz is now on the Federal carcinogen list. In 1992, I gave five invited talks on the health effects of mineral dusts and was engaged for several hours per week on the telephone responding to questions concerning this same subject.

In 1993 I spent nearly full time on health issues including preparing two long review papers on the health effects of mineral dusts for Mineralogical Society of America and Society of Economic Geologists short courses. In addition, I prepared three other papers and gave five talks on this general subject and started an investigation of the possible health effects that might be generated by dusts and water from the asbestos Superfund sites within the New Idria serpentinite of California.

Career experience since retirement from the U.S. Geological Survey

January 3, 1995. Formal retirement from the U.S. Geological Survey.

January 4, 1993 to present. Affiliated with The Science and Environmental Policy Project, 4084 University Drive, Fairfax City, VA 22030. Presently engaged in studies of public policy issues pertaining to mineral and geochemical effects on human health and global warming issues.

March 1, 1995 to present. Appointed Senior Scientist in the Environmental Effects Laboratory, Institute of Applied Sciences at Brooklyn College of the City University of New York. Research is directed towards analyzing various mine dusts and evaluating their possible effects on human health. Also, Private mineral consultant specializing in minerals and health issues

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www.deq.state.mt.us/Libby/Monthupdate.htm

ATTACHMENT 5

Department of Environmental Quality

Libby Environmental Health Update

Montana Home | DEQ Home

Directors Office | Centralized Svcs | Enforcement | Permitting | Planning | Compliance

Libby Environmental Health Update

From the

Montana Department of Environmental Quality

Department of Public Health and Human Services

Monday, March 20, 2000

To date, the state and federal team's investigation includes:

- Approximately 73 air sample results from 32 residences, two businesses, and two former processing areas were received and reviewed. Transmission electron microscopy analysis was used to count asbestos fibers (10-grid system count looking for fibers 5 microns [: =one-millionth of a meter] or greater).
- Results from the December air sampling event were released on January 31, 2000. Preliminary results indicate that two potential areas have relatively elevated levels of asbestos related fibers in the 5-10 micron range.
  - Two homes have elevated levels of asbestos fibers. Chrysotile (serpentine asbestos) was detected in one home and tremolite-actinolite fibers were detected in the other home. (The chrysotile is not related to the old vermiculite mine.)
  - The two former processing areas with elevated levels of tremolite-actinolite asbestos fibers present are the lumber facility at the former export plant and the plant nursery (Parker business and residence) at the former screening facility.
  - Of the remaining homes, 24 have trace levels of tremolite fibers. However, to make sure nothing was missed, these same samples were sent back to the laboratory to be re-tested with a more stringent analysis (lower detection limit) looking at fibers from 5 – 10 microns in length using a 30 grid count system.
- Results from the second sampling were received in early March. After evaluating the data the EPA determined that approximately 1/3 of the homes have elevated levels of fibers excluded from the specific indicator length fibers. For example, fibers which were detected to have a (less than) <5:1 ratio, a length <0.5: (microns) or a diameter of (greater than) >0.5: are not considered to be a health risk to residents. These shorter fibers have not been determined, at this point, to be dangerous. The health experts are still debating the dangers of these fibers.

When evaluating the data for those fibers that fall within the specific fiber ranges, the following is evident: (1) 7 homes have detectable fibers of tremolite/actinolite ranging from 1 fiber to 2 fibers per 30 grid opening counts; (2) 6 homes have detectable fibers of chrysotile fibers ranging from 1 fiber to 7 fibers per 30 grid opening counts; (3) one residential home has elevated levels of both forms of fibers; and (4) air samples collected from the Railroad Loading Facility (Screening Plant) and the Export Facility have elevated levels of tremolite/actinolite fibers.

The EPA has converted the individual fiber counts to actual concentrations. When these values are compared to the data results, only the Railroad Loading Facility (Screening Plant), the Export Facility and one residential home have elevated levels of tremolite/actinolite fibers. One home has been identified to have elevated levels of chrysotile.

- Surface dust samples were collected from the same residential homes used to collect indoor air samples. The March sampling results revealed 11 homes had detectable levels of actinolite/tremolite fibers present in the dust samples. The highest fiber count was 2 fibers per 10 grid opening count. These numbers have not been converted to concentrations at this point, but it is suspected that these levels do not pose a threat. In addition, these fibers are of the shorter length (0.5: - <5:) and are not considered a human health risk. The longer fibers are considered a risk.

Of interest in these samples is that more than half of the samples collected showed elevated levels of chrysotile fibers. The majority of the fibers detected were of the length 0.5 to <5: and at this point are not considered a human health risk.

Libby results showed 11 out of 32 homes had fibers in dust sampling. Homes are miles away from Libby verm. deposit. Identical testing by EPA in VA showed zero fibers & 2 of these homes are on mine site and within 100 yds of active mining.

COLLECTION, ANALYSIS AND CHARACTERIZATION OF VERMICULITE SAMPLES FOR FIBER CONTENT AND ASBESTOS CONTAMINATION

by

Gaylord R. Atkinson
Donna Rose
Ken Thomas
David Jones
E. J. Chatfield
John E. Going

TASK 32
FINAL REPORT

September 27, 1982

EPA Prime Contract No. 68-01-5915
MRI Project No. 4901-A32

Prepared for

U.S. Environmental Protection Agency
Office of Pesticides and Toxic Substances
Field Studies Branch
401 M Street, S.W.
Washington, D.C. 20460

Attn: Dr. Frederick Kutz, Project Officer
Mr. Thomas Dixon, Task Manager

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TABLE 1. SUMMARY OF OPTICAL MICROSCOPY/XRD ANALYSIS RESULTS

Sample[a]	Fibrous phases		Nonfibrous amphiboles	
	Estimated mass, %	Mineral types	Estimated mass, %	Mineral types
Libby Grace				
Grade 1, 270-I	4-6	Trem-actin	1-3	Trem-actin
Grade 2, 276-I	4-7	Trem-actin	3-5	Trem-actin
Grade 3, 259-I	2-4	Trem-actin	< 1	Trem-actin
Grade 4, 282-I	0.3-1	Trem-actin	1-3	Trem-actin
Grade 5, 264-I	2-4	Trem-actin	2-5	Trem-actin
Grade 5 (1-day), 267-I	2-5	Trem-actin	4-8	Trem-actin
			< 1	Anthophyllite
Head feed, 291-I	21-26	Trem-actin	6-9	Trem-actin
Extract, 294-I	1-4	Trem-actin	1-3	Trem-actin
Baghouse mill, 297-I	8-12	Trem-actin	2-6	Trem-actin
Screen plant, 288-I	2-5	Trem-actin	1-4	Trem-actin
S.C. Grace				
Grade 3, 430-I	< 1[b]	Mixed	2-4	Trem-actin
		Anthophyllite	< 1	Anthophyllite
		Trem-actin		
Grade 4, 433-I	< 1[b]	Mixed	1-3	Anthophyllite
		Anthophyllite	1-4	Trem-actin
		Trem-actin		
Grade 5, 427-I	< 1[b]	Mixed	4-6	Anthophyllite
		Anthophyllite	2-4	Trem-actin
		Trem-actin		
Mill feed (+100 mesh), 436-I	< 1	Mixed	1-3	Anthophyllite
		Anthophyllite	6-9	Trem-actin
		Trem-actin		
Grade 3, expanded, 439-I	< 1[b]	Mixed	< 1	Anthophyllite
		Anthophyllite	< 1	Trem-actin
		Trem-actin		
Grade 4, expanded, 442-I	< 1[b]	Mixed	< 1	Anthophyllite
		Anthophyllite	0.5-1	Trem-actin
		Trem-actin		
S.C. Patterson				
Ungraded, 573-I	< 1	Mixed	4-8	Anthophyllite
		Trem-actin	8-12	Trem-actin
		Anthophyllite		

a With the exception of Sample No. 267-I, all results are for composite samples.

b Fiber bundles were mixed phase materials--both anthophyllite and tremolite-actinolite were present.

American Journal of Industrial Medicine 11:1–14 (1987)

The Morbidity and Mortality of Vermiculite Miners and Millers Exposed to Tremolite–Actinolite: Part I. Exposure Estimates

H.E. Amandus, PhD, R. Wheeler, PE, J. Jankovic, MSPH, and J. Tucker, BS

The vermiculite ore and concentrate of a mine and mill near Libby, Montana, was found to be contaminated with fibrous tremolite–actinolite. Of 599 fibers (length greater than 5 μm and width greater than 0.45 μm) counted in eight airborne membrane filter samples, 96% had an aspect ratio greater than 10 and 16% had an aspect ratio greater than 50. Additionally, 73% of the fibers were longer than 10 μm, 36% were longer than 20 μm, and 10% were longer than 40 μm. Estimates of exposure before 1964 in the dry mill were 168 fibers/cc for working areas, 182 fibers/cc for sweepers, 88 fibers/cc for skipping, and 13 fibers/cc for the quality control laboratory. In 1964–1971, exposure estimates for these areas were 33, 36, 17, and 3 fibers/cc, respectively. Estimates of exposures in the mine before 1971 ranged from 9–23 fibers/cc for drillers and were less than 2 fibers/cc for nondrilling jobs. All 8-hr TWA job exposure estimates decreased from 1972–1976, and from 1977–1982 were less than 1 fiber/cc.

Key words: tremolite–actinolite, fiber type, fiber dimension, fiber–years exposure

INTRODUCTION

Vermiculite is a micaceous mineral with a ferromagnesium–aluminum silicate composition. It exfoliates when heated and has properties of high bulk, good thermal insulation, inert composition, fire-proof nature, and high absorption [U.S. Bureau of Mines, 1970]. Expanded vermiculite is used in construction materials (aggregates in plaster and concrete), agricultural products (potting soil, soil conditioner, nursery stock packing material, fertilizer, and a carrier for chemicals), and other industrial uses.

Vermiculite alone has not been associated with significant health effects; however, it has never been systematically studied epidemiologically. Vermiculite deposits in Montana and South Carolina are contaminated with fibrous tremolite–actinolite [Atkinson et al, 1982], and health effects from Montana vermiculite concentrate have been attributed to exposure to the asbestos fibers [Lockey et al, 1984]. Concern for exposure to the tremolite contaminating the Montana vermiculite concentrate has led

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304 291-4476

to (1) a cross-sectional study by Lockey et al [1984] of radiographic and pulmonary function findings in workers at an Ohio fertilizer plant that processed concentrate from South Africa and from the Libby, Montana, mine and mill; (2) a study by the Environmental Protection Agency of the asbestos content of the bulk and airborne dust in the Libby facility [Atkinson et al, 1982]; and (3) our studies of the mortality and morbidity of the Libby miners and millers [Amandus et al, 1987a,b]. In addition to our study, McDonald et al [1986b] have conducted a parallel but separate study of the Libby workers.

McDo
Unio.

Atkinson et al [1982] found fibrous tremolite-actinolite, nonfibrous tremolite-actinolite, and non fibrous anthophyllite in the raw ore and vermiculite concentrate from the Libby mill. The percentage by weight of fibrous tremolite-actinolite was approximately 21-26% in the raw ore sampled at the head feed of the mill, and 2-6% in the concentrate. Results from similar analyses by the company in 1984 indicated that the percentage by weight of fibers varied from 3.5-6.4% in the raw ore at the head feed, and from 0.4-1.0% in the concentrate [Wolter, personal communication].

The objective of our study was to estimate the exposure-response relationship between tremolite exposure, lung cancer, and asbestosis. The primary purposes of this paper are to: (1) estimate a ratio to convert respirable airborne dust exposure (million particles per cubic foot, mppcf) to fiber exposure (fibers per cubic centimeter, fibers/cc). (2) estimate the 8-hr TWA fiber exposure for jobs in each year of operation of the Libby facility. (3) characterize the type and dimension of fibers contaminating the Libby vermiculite concentrate.

(fibers/cc)

TABLE VII. Estimates of Fiber Exposure by Location–Operation and Year

Location–operation	Year									
	<50	50–59	60–63	64–67	68–70	71	72–74	75–76	77–79	80–82
High estimates										
Bus ride	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	0.0	0.0
Mine office	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5
Mine miscellaneous	1.6	1.6	1.6	1.6	1.6	1.6	1.6	0.8	0.8	0.8
Drilling	23.0	23.0	23.0	23.0	9.2	9.2	9.2	0.6	0.6	0.6
Mine nondrilling	2.6	2.6	2.6	2.6	2.6	2.6	2.6	0.6	0.6	0.6
Transfer point	2.2	2.2	2.2	2.2	2.2	2.2	2.2	0.6	0.6	0.6
Dry mill sweeping	182.1	182.1	182.1	35.9	35.9	35.9	19.0			
Dry mill	168.4	168.4	168.4	33.2	33.2	33.2	16.6			
Old wet mill nonmillwright		3.7	3.7	3.7	3.7	3.7	3.7			
Old and new wet mill millwright		7.0	7.0	7.0	7.0	7.0	7.0	0.6	0.6	0.6
New wet mill nonmillwright							3.2	2.0	0.8	0.8
Quality control lab	13.1	13.1	13.1	2.6	2.6	2.6	2.6	0.6	0.6	0.6
Service area by mill	1.9	1.9	1.9	3.8	1.9	1.9	1.9	0.2	0.2	0.2
Skip area	88.3	88.3	88.3	17.4	17.4	17.4	4.8	0.6	0.6	0.6
Concentrate hauling	5.5	5.5	5.5	5.5	5.5	5.5	5.5	0.4	0.4	0.4
River station binside	21.2	21.2	21.2	21.2	21.2	21.2	21.2	0.7	0.7	0.7
River conveyor tunnel	112.5	112.5	112.5	112.5	112.5	112.5	112.5	0.3	0.3	0.3
River office binside	10.6	10.6	10.6	10.6	10.6	10.6	10.6	0.2	0.2	0.2
Ore loading	82.5	27.7	10.7	10.7	3.2	3.2	3.2	0.2	0.2	0.2
River dock	116.9	42.5	17.0	17.0	17.0	5.1	5.1	0.5	0.5	0.5
Verxite plant	22.6	22.6	2.8	2.8	2.8					
Bagging plant	12.9	12.9	12.9	12.9	12.9	12.9	4.3	1.2	1.2	1.2
Downtown office building	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tails belt	7.3	7.3	7.3	7.3	7.3	7.3	7.3	0.7	0.7	0.7
Screen plant								0.5	0.5	0.5
Low estimates[a]										
Drilling	6.7	6.7	6.7	6.7	6.7	9.2	9.2	0.6	0.6	0.6
Ore loading	24.0	15.0	9.0	9.0	3.2	3.2	3.2	0.2	0.2	0.2
River dock	38.0	19.0	6.4	6.4	5.1	5.1	5.1	0.5	0.5	0.5
Bagging plant	4.6	4.6	4.6	4.6	4.6	4.6	4.3	1.2	1.2	1.2

[a]Low estimates are the same as high estimates for all other areas.

Note: MSHA std. is 2.0 Fibers/cc
OSHA std. is 0.1 Fibers/cc

July 31, 2001

We, the undersigned employees of Virginia Vermiculite, LTD., feel compelled to issue this statement after reading former employee David J. Pinter's testimony before the Senate Commitee on Health. We feel this testimony does not accurately portray the conditions at our workplace or how we have conducted business in our years of employment here.

Name	Length of Emploment
Steve F. Bibb	22 YEARS
Andrew B. Taylor	6 years
Hans Schamberg	1 year
Henry P. Smith	23 years
Lewis Walker	21 years
Randall Pugh	2 months
Patrick J. Jones	2 years 10 months
Randall A. Wolfley	10 years
Jim Downs	21 years
Ray C. Gordon Jr	22 ½ years
Cathy L. EVANS	3 years
Kelly M. Jancarter	3 months
Deanna Jablonski	3 years
Todd Jancarter	5 years

5/24/01 FEDERAL DISTRICT COURT WESTERN DIST. of VA.

malice, conspire with another party to injure the plaintiff." *Multi-Channel TV Cable Co. v. Charlottesville Quality Cable Operating Co.*, 108 F.3d 522, 527 (4th Cir. 1997) (emphasis added).

1. PURPOSE OF INJURING REPUTATION, TRADE, BUSINESS, OR PROFESSION

96. The evidence presented at trial established clearly and convincingly that Grace and HGSI undertook their concerted action intentionally and purposefully to injure VVL's business. Grace and HGSI intended that their actions cause VVL to go out of business in Virginia by preventing VVL from replenishing its diminishing reserves.

97. Although Grace and HGSI also harbored collateral, independent motives—Grace intended to receive a tax deduction and favorable public relations, and HGSI intended to preserve the Landmark—their shared purpose of injuring VVL in its business is sufficient to establish the requisite intent under the Virginia Conspiracy Act. *See Simmons*, 544 S.E.2d at 677 ("Code §§ 18.2-499 and -500 do not require a plaintiff to prove that a conspirator's primary and overriding purpose is to injure another in his trade or business.").

98. The court's finding that Grace and HGSI shared the joint intent of injuring VVL in its reputation, trade, business, and profession, is based on the following facts.

99. In the 1970s, Grace, VVL, and HGSI all converged upon Louisa County. For the two decades leading up to the donations, each mutually opposed the others' practices and interests in the District.

PROCEEDINGS OF JOINT MEETING OF

LOUISA COUNTY BOARD OF SUPERVISORS

AND PLANNING COMMISSION

Held at 7:30 P.M.

JANUARY 16, 1974

In The

LOUISA COUNTY HIGH SCHOOL AUDITORIUM

LOUISA, VIRGINIA

1 objective expertise all the pluses and minuses that Grace Company's
2 operation will offer to our community. Only then would the re-
3 sultant decision ease the consciences of all of us in our com-
4 munity.
5 -------
6
7 -- DAVID PINTER --
8 Mr. Pinter: My name is David Pinter and I've lived in
9 Louisa County now for about five years and first off I'd like to
10 say that most of the people that are involved in this tonight are
11 in their early or late fifties and they're really over the hill.
12 I'd like to bring that out because essentially from now on it's
13 not going to be just the old people in the meeting halls. It's
14 going to be people that are between twenty and twenty-five that
15 are going to be making the decisions around here and,therefore,
16 I feel that the younger generation is going to be left ... Louisa
17 County and that's the way I want it to be and another topic I
18 wanted to talk about is this past summer I worked at the Abe Smith
19 stone quarry and I drove a dump truck down there and the working
20 conditions were horrible and if you ever went up to the big hole
21 where you get the rock out of it, it's over 250 feet deep and
22 it's an ungodly sight when you look down into it. And those dust
23 conditions which we have talked about, there's so much dust down
24 there, it doesn't matter how much water you put on it because we
25 always have water in the plants right down there and you could not

keep the dust down no matter what you put on it. And the noise -- when you start up one of those big trucks, diesel engines, you can't hear yourself think, and dust - you can't see through it. You couldn't see five feet from you. And also another topic I'd like to bring up is the South Anna River. A few years ago - I'm not sure how many years ago because I didn't live here too long - the South Anna River was polluted by silk that either came from the Gordonsville Silk Factory or else Orange - I'm not sure where it's at - and it killed most of the fish population in the river and the only fish I know that are in there now are suckers that suck up all the dirt. It took away all the bass and so forth and good fishing and I also have another thing to bring up.

The people that come in to work in these mines, vermiculite mines or Abe Smith or whatever you have - they're of the lower class. They don't have any education because they can't go anywhere else and get a job and, when they go down in there, they can get into a truck and in a couple of minutes they can learn how to shift the gears and there's nothing to that.

And one other topic I'd like to bring up is that vermiculite mining in Louisa County to me is a loser. Thank you.

-- MRS. HOLLY HABER --

Mrs. Haber: I'm Mrs. Holly Haber. I'm just going to take about one minute's time, members of the Board of Supervisors,

148

Health Consultation

W. R. GRACE SITE
(a/k/a WR GRACE)

CAMBRIDGE, MIDDLESEX COUNTY, MASSACHUSETTS

EPA FACILITY ID: MAD001409150

MARCH 20, 2001

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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150

HEALTH CONSULTATION

W. R. GRACE SITE
(a/k/a WR GRACE)

CAMBRIDGE, MIDDLESEX COUNTY, MASSACHUSETTS

EPA FACILITY ID: MAD001409150

Prepared by:

Exposure Investigation and Consultation Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

Background and Statement of Issues

The Agency for Toxic Substances and Disease Registry (ATSDR) was requested by the U.S. Environmental Protection Agency, Region I (EPA) to review and comment on results from environmental sampling conducted at the W. R. Grace site in Cambridge, Massachusetts. Specifically, ATSDR was asked whether the asbestos contamination in the surface soil poses an immediate health threat under the current site conditions and usage [1].

The W. R. Grace Site consists of four parcels of land owned by four separate entities, they include; One Alewife Center, Russell Field Park, Alewife T Red Line Head House, and W.R. Grace [2]. The four parcels are treated as one site for public health impact, and encompass approximately 40 acres of land. The site is situated in a densely populated area with residential dwellings located within 200 yards [2]. The W. R. Grace portion of the site encompasses 27 acres and has been utilized for various industrial and commercial operations since the 1800's [2]. The site currently has two large buildings, an asphalt parking lot, open grassy areas, and a pond. One Alewife Center is located north of the Grace site. Russell Field Park and the Alewife T Red Line Head House are located east and southwest of the Grace site, respectively.

Use of asbestos at the Grace site may go back as far as the 1930's as part of a brake lining development program [2]. In addition, research and development activities for asbestos-containing fireproofing occurred in the 1960's and 1970's [2]. Due to past activities at the Grace portion of the site, surface and subsurface soil sampling were conducted in the late 1990's [2]. Samples were analyzed via Polarized Light Microscopy (PLM). Asbestos was detected in the soil at either trace amounts or percentage levels in 5.8% of the samples collected. Asbestos levels in the subsurface soil ranged up to 12% [2].

In the 1980's, soil was excavated at the Grace portion of the site while constructing a subway tunnel. The soil was stored temporarily at what is now Russell Field Park [2]. A layer of top soil up to 3-feet deep was subsequently placed over the park. The top soil served to level areas of the park and reduce the potential exposure to waste [2,3].

EPA conducted additional sampling in the Fall of 2000 to determine any immediate threat posed by asbestos contamination at the site. The sampling focused on asbestos contamination in the surface soil where fibers are likely to be released into the air. Previous sampling results were used to selected sampling locations in order to present a worst case scenario with respect to asbestos levels [3]. The EPA collected 52 surface soil samples from the site and analyzed them by PLM [2]. The EPA further analyzed 28 of the 52 samples using the more definitive Transmission Electron Microscopy (TEM) method [2]. During the sampling event, personal air samples were collected from some of the workers to monitor possible exposure to asbestos. All personal samples were analyzed by Phase Contrast Microscopy (PCM) [2]. One of the personal samples was additionally analyzed by TEM [3]. Three bulk samples were also taken from concrete boards present at the site and analyzed by PLM [2].

Asbestos Sampling Results

All 52 surface soil samples (0-3 inches) collected from the site showed asbestos concentrations less than 1%. Approximately 20% of the surface soil samples had a "trace" of asbestos (above the detection limit, but less than 1 estimated volume %) as reported by PLM analysis. TEM analysis of 28 of the surface soil samples verified the low PLM results. TEM asbestos concentrations were all $\leq 0.03\%$ by weight ("trace" levels) [2].

Three bulk analysis samples were taken from concrete board material present on site. The analysis showed the material to contain 15% chrysotile asbestos [2].

Results of personal air samples collected from the breathing zone of workers were all below the applicable OSHA worker standard of 0.1 fibers per cubic centimeter (f/cc). The PCM results ranged from 0.065 to 0.0034 f/cc [2]. TEM verification of the highest personal sampling result (0.065 f/cc) did not detect any asbestos fibers in the sample [3].

Discussion

Asbestos is a general term used to describe a group of six naturally occurring fibrous minerals. Asbestos was used extensively in commercial products due to its high tensile strength, flexibility, durability, and heat insulation properties [4]. However, adverse health effects began to be seen in miners, ship builders, and in other occupations where asbestos exposure occurred. Workers in these occupations displayed increased rates of lung cancer, malignant mesothelioma (a rare cancer affecting the lung lining and abdominal cavity), and pulmonary interstitial fibrosis (asbestosis). Exposure occurred from inhalation of the asbestos fibers, with effects not being manifested until 10 to 20 years or more following initial exposure [4].

Asbestos contamination is ubiquitous in our environment due to its use in brake linings, insulation, and other products. Since asbestos persists in the environment for very long periods of time, samples collected from the soil and air, particularly in urban areas, commonly detect low levels of asbestos fibers. The risk associated with these levels is based on the concentration inhaled and the length of exposure. Smoking, individual susceptibility, fiber type/characteristics, and other factors also play a role [4]. The quantified risk of developing lung cancer and mesothelioma (the most sensitive health endpoints) are based on data from occupational studies.

Past sampling activities at this site have identified asbestos contamination in the soil, particularly in the subsurface or asphalt-covered soil where concentrations have been detected as high as 12% [2]. This most recent sampling event was undertaken to assess the immediate risk to the public, and focused on identifying contamination at the surface where fibers are likely to be released into the air and inhaled. Sampling locations were not randomly selected, but were chosen based on previous sampling results and information provided by area residents to target areas of suspected contamination.

The results of all 52 surface soil samples analyzed by PLM were less than 1% for asbestos. The more definitive TEM analysis of the surface soil samples showed asbestos concentrations to be $\leq$ 0.03% (by weight). These results fall into the range of concentrations typically found in surface soils at urban areas throughout the country [4], and suggest that asbestos contamination is not present in the surface soil at levels that would pose a significant health risk. Sufficient concentrations of asbestos fibers, coupled with the right conditions (e.g. dry, windy, exposed soil, etc.) are required to generate air concentrations of health significance. The sampling results indicate that surface soil concentrations are not sufficient to generate significant ambient air levels, even if the environmental conditions are favorable. Indeed, the personal air monitors placed on workers engaged in activities at the site did not detect any asbestos fibers.

Previous sampling detected much higher asbestos levels below the surface. However, unless excavation or other intrusive activities occur at the site, this contamination does not pose an immediate health threat to the public. If site conditions do change such that the subsurface soils are brought to the surface, a re-assessment of the property would be warranted.

The concrete boards and chunks on site containing 15% asbestos are unlikely to pose a threat. The concrete is non-friable (cannot be crushed or pulverized by hand) [3], and the fibers are bound in the matrix. Soil samples purposely collected adjacent to the concrete did not detect any elevated fiber concentrations.

Child Health Initiative

ATSDR considers the unique susceptibility of children in the evaluation of all hazardous waste sites. Children may have higher levels of exposure since they are more likely to disturb fiber-laden soils while playing. They are also lower to the ground, and have faster breathing rates that may increase the level of exposure to asbestos. In addition, the long-term retention of asbestos fibers in the lung, and the long latency period between exposure and onset of asbestos-related respiratory disease (10 to 40 years), suggest that an individual exposed earlier in life may be at greater risk than those exposed later in life [4].

The levels of asbestos in the surface soil at this site are very low, and within the range of background for an urban environment [4]. Therefore, it is very unlikely that ambient asbestos concentrations could be generated at levels of concern for children.

Conclusions

1. Based on the sampling results provided, the asbestos levels present in the surface soils on site do not pose an immediate or long-term public health hazard.

2. Subsurface asbestos contamination does not pose an immediate health hazard as long as the waste remains buried, and is not brought to the surface.

Recommendations

Re-evaluate the public health impact of the site if conditions change where exposure to the subsurface soil can occur.

References

1. EPA Memorandum from Mary Ellen Stanton, EPA, To William Sweet, ATSDR, February 15, 2001.

2. Preliminary Assessment/Site Investigation Report for the W.R. Grace Site, Cambridge, MA, 22 August 2000 and 6 & 7 September 2000.

3. Verbal comments to ATSDR from Mary Ellen Stanton, EPA on March 13, 2001.

4. ATSDR Toxicological Profile for Asbestos.

155

Health Consultation

WESTERN MINERAL PRODUCTS SITE
(a/k/a WESTERN MINERAL PRODUCTS)

MINNEAPOLIS, HENNEPIN COUNTY, MINNESOTA

EPA FACILITY ID: MNN000508056

MAY 9, 2001

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

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157

HEALTH CONSULTATION

WESTERN MINERAL PRODUCTS SITE
(a/k/a WESTERN MINERAL PRODUCTS)

CITY OF MINNEAPOLIS, HENNEPIN COUNTY, MINNESOTA

EPA FACILITY ID: MNN000508056

Prepared by:

Minnesota Department of Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

FOREWORD

This document summarizes public health concerns at a hazardous waste site in Minnesota. It is based on a formal site evaluation prepared by the Minnesota Department of Health (MDH). A number of steps are necessary to do such an evaluation:

- Evaluating exposure: MDH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it's found on the site, and how people might be exposed to it. Usually, MDH does not collect its own environmental sampling data. We rely on information provided by the Minnesota Pollution Control Agency (MPCA), U.S. Environmental Protection Agency (EPA), and other government agencies, businesses, and the general public.

- Evaluating health effects: If there is evidence that people are being exposed - or could be exposed - to hazardous substances, MDH scientists will take steps to determine whether that exposure could be harmful to human health. The report focuses on public health - the health impact on the community as a whole - and is based on existing scientific information.

- Developing recommendations: In the evaluation report, MDH outlines its conclusions regarding any potential health threat posed by a site, and offers recommendations for reducing or eliminating human exposure to contaminants. The role of MDH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend actions to be taken by other agencies - including EPA and MPCA. However, if there is an immediate health threat, MDH will issue a public health advisory warning people of the danger, and will work to resolve the problem.

- Soliciting community input: The evaluation process is interactive. MDH starts by soliciting and evaluating information from various government agencies, the organizations responsible for cleaning up the site, and the community surrounding the site. Any conclusions about the site are shared with the groups and organizations that provided the information. Once an evaluation report has been prepared, MDH seeks feedback from the public. *If you have questions or comments about this report, we encourage you to contact us.*

Please write to: Community Relations Coordinator
Site Assessment and Consultation Unit
Minnesota Department of Health
121 East Seventh Place/Suite 220
Box 64975
St. Paul, MN 55164-0975

OR call us at: (651) 215-0916 *or* 1-800-657-3904
(toll free call - press "4" on your touch tone phone)

I. Summary of Background and History

The Western Mineral Products site is located on several parcels of land at 1719 and 1720 Madison Street NE, and 1801 and 1815 Jefferson Street NE in the city of Minneapolis, Minnesota. The site is located in a neighborhood of mixed land use, consisting of residential, commercial, and light industrial properties. The original site consists of a large brick building dating back to the early part of the 20th century, two storage silos, and a gravel parking lot. Several additions to the original brick building were added in the 1940s and 1950s. The location of the site is shown in Figure 1, and a site map is presented in Figure 2.

According to city of Minneapolis directories and other available records, the Western Mineral Products Company leased the site beginning in 1936, and owned the site outright from 1954 until 1963 (URS 2001). Western Mineral Products Company operated an insulation products manufacturing plant at the site. The plant processed vermiculite ore shipped primarily from a mine operated by the Zonolite Company, and located in Libby, Montana. In 1963, the Zonolite Company was acquired by W.R. Grace & Company (W.R. Grace), who in turn acquired the Western Mineral Products Company (and the site) in 1966. The plant was operated by W.R. Grace until 1989, when W.R. Grace closed the mine in Libby, Montana, and ceased processing vermiculite at the site. Vermiculite processing operations therefore occurred at the site from 1936 until 1989.

Vermiculite is generally used for insulation, as a lightweight aggregate in construction materials, and as a soil additive for gardening uses. Vermiculite also has many other industrial uses as a fireproofing material, absorbent, and filter medium (Vermiculite Association 2000). Over time, it became known that the vermiculite ore from the mine in Libby, Montana, from which the finished vermiculite was produced contained large amounts of naturally occurring asbestos. The general mineral type of asbestos in the ore is known as amphibole, which is different from the mineral type of asbestos (known as chrysotile) typically used in common commercial applications such as pipe insulation, siding, and brake linings. In April 2000, the U.S. Environmental Protection Agency (EPA) and the Minnesota Pollution Control Agency (MPCA), as part of a national evaluation of facilities that received ore from the mine in Libby, Montana, collected surface soil samples at the site. Through microscopic examination of the surface soil samples, it was found that amphibole asbestos was present at levels as high as 20% by volume at the former Western Mineral Products Company site (Ecology and Environment 2000). The EPA and MPCA requested that the Minnesota Department of Health (MDH) review the available information about the site, and develop conclusions and recommendations regarding potential public health implications of the asbestos contamination.

Geology/Hydrogeology

The site is located approximately one mile from the Mississippi River in Northeast Minneapolis. Due to the long use of the site for industrial purposes, it is likely that surface soils consist primarily of fill materials. Beneath the surface soils are glacial deposits, consisting of sand,

gravelly sand, and loamy sand overlain by thin deposits of silt, loam, or organic sediment. Beneath these glacial deposits (at a depth of 50 feet or more) is bedrock consisting of the Platteville and Glenwood Formations overlying the St. Peter Sandstone (URS 2000).

Shallow groundwater at the site (if present) is expected to flow west-southwest toward the Mississippi River. Groundwater in the regional aquifers below this is also expected to flow toward the Mississippi River.

Vermiculite Processing

Vermiculite is a non-fibrous silicate mineral used for many commercial and consumer applications. Its primary usefulness comes from its ability to expand (or 'exfoliate') up to 20 times its original size at high temperatures (EPA 1991). In addition to the properties described above, vermiculite also has a high cation-exchange capacity, making it useful for absorbing liquids or chemicals. The density of raw vermiculite ore is approximately 55 pounds per cubic foot, while the density of finished vermiculite is in the range of six to eight pounds per cubic foot (URS 2000a). The Western Mineral Products facility also produced a similar industrial product known as perlite, which is derived from a quartz-based mineral that is not known to contain asbestos.

The raw vermiculite ore mined in Libby, Montana, is estimated to have contained up to approximately 25% fibrous amphibole asbestos of the tremolite-actinolite-richterite-winchite solid solution series (hereafter referred to as "tremolite asbestos"). The raw ore was mined via open-pit mining methods, and then transferred to a milling (also known as a "beneficiation") operation to remove waste rock. The beneficiated ore (or "concentrate") was then screened into several size ranges (from #0, or coarse, to #5, fine) for processing into finished vermiculite in Libby or shipment, usually via rail, to a number of processing or "exfoliation" plants across the United States and Canada. Some studies have suggested that the different ore grades may have had varying asbestos contents, with smaller grades being more contaminated (EPA 1991). Other data suggest that the tremolite content was typically 2% - 6% in the various grades of ore (EPA 2000). Western Mineral Products was one of several known vermiculite exfoliation plants in Minnesota. Other businesses in the state are thought to have received vermiculite ore concentrate for various small industrial uses.

The Western Mineral Products facility received vermiculite ore concentrate via rail from the mining operation in Libby, Montana starting in 1937 (URS 2001). The concentrate was transported typically in open hopper cars (with an approximate capacity of 96 tons per car), and unloaded and conveyed into one of the two 45-foot high storage silos (URS 2000a). Boxcars were also reportedly used to transport the concentrate, and had to be unloaded by hand (MDH 2000). The quantity of vermiculite ore concentrate received from the mine in Libby ranged from over 8,500 tons in 1959 to less than 1,000 tons in 1988 according to W.R. Grace records (HRO 2000a). The quantities of ore shipped to the site from the mine in Libby, Montana for the time period of 1958 to 1988 are shown in Table 1. The quantity of ore shipped per year declined steadily from the early 1960s until the plant closed in 1989. In the 1970s, the Western Mineral

Products plant operated 24 hours per day, 5 days per week (approximately 250 days per year), and typically employed between 11 and 20 people, according to information submitted by W.R. Grace to the EPA (HRO 2000b).

The vermiculite ore concentrate was gravity fed into one of two expanding furnaces at a rate of up to 2,400 pounds (1.2 tons) per hour (HRO 2000c). The furnaces were located in the metal addition constructed in 1946 on the north side of the original brick building; prior to this one furnace was located on the second floor of the brick building (URS 2001). The furnaces heated the ore concentrate to a temperature of 2,000 degrees Fahrenheit, thus boiling the water trapped within the mineral and causing it to expand. The expanded vermiculite was then moved by augers or conveyors and passed through a device known as a "stoner," where the expanded vermiculite was separated from the unexpandable minerals, known as "stoner rock." The finished vermiculite was then cooled, dampened, and bagged in three, four, and six cubic foot paper or plastic bags for commercial or consumer use, or further screened into several size ranges for specific applications. Some of the processed vermiculite was mixed with other ingredients, including raw (likely chrysotile) asbestos to form various construction products. A schematic prepared by W.R. Grace of the plant process and material handling equipment as it existed in 1980 is shown in Figure 3 (HRO 2000c). Separate buildings located to the north and east of the expansion plant were used as a roof tile manufacturing plant and a product testing laboratory, respectively by Western Mineral Products.

The process of exfoliating vermiculite ore concentrate into finished vermiculite was reportedly a dusty one. Past employees have stated that dust was often visible in the air inside of the building, and that the windows were often closed (MDH 2000). A vent system was installed at the plant and consisted of a main vent header, branch headers, primary cyclone, fabric filter or bag house, and fan (URS 2000a). The vent system is shown in Figure 3. This system was installed in 1971; prior to that a vent system apparently existed, but its design, and whether or not any filters were present, is unknown. Mention is made of the use of furnace cyclone fines (particulate matter) in a product formulation from 1964, so these devices may have been in use prior to 1971. The bag house filters were installed in 1972. Several complaints were made to local government officials and the news media in the late 1960s and early 1970s alleging that dust from a roof vent was settling on area lawns, cars, and the inside of homes (URS 2000a). Excerpts from citizen complaints received by the City of Minneapolis over the years are presented in Appendix 1.

The 1970s vent system was designed to transport air at velocities of 3,000 to 4,000 feet per minute, and discharged to the outside air through two 24-inch diameter, 50-foot high stacks at a velocity of 1,600 feet per minute and a temperature of 230 degrees Fahrenheit (HRO 2000d). Particulate emissions were reported in 1977 to be up to 0.12 tons (240 pounds) per year for each furnace stack. Based on aerial photographs, the two stacks were located on or near the roof of the four-story metal addition on the north side of the original three-story brick building. A third, smaller stack vented dust from the product mixing operation. The 48-inch diameter low velocity cyclone was said to remove approximately 85% of the particulate matter from the collected air, while the bag house filter system was designed to remove 99% of the particulate matter from the

collected air. The estimated dust loading into the bag house filter was approximately 20 pounds per hour (URS 2000a).

As of 1986, the vermiculite processing operation generated several types of solid wastes, including the following (HRO 2000c):

- Stoner rock;
- Furnace bag house fines;
- Exfoliated vermiculite fine screenings;
- Mixer bag house fines; and
- Miscellaneous paper, pallets, and other trash.

According to mineral analyses conducted by W.R. Grace, the stoner rock contained between 2% and 10% friable (or easily crumbled) tremolite asbestos (assumed to be by weight). The furnace bag house fines were found to contain between 1% and 3% friable tremolite asbestos, while vermiculite fine screenings contained less than 0.5% friable tremolite asbestos (HRO 2000c). Until the 1970s, these waste materials were considered non-hazardous. The stoner rock, in particular, was placed in one or several piles outside the west end of the building and labeled "Free Crushed Rock." Local residents were encouraged to take the stoner rock to use on their properties, usually for fill, and neighborhood children were known to play on the piles. A 1978 photograph of the stoner rock pile published in the March 19, 2000, edition of the Minneapolis Star Tribune is attached as Figure 4. The disposition of other waste products for much of the facility's operational life is unknown. At some point during the late 1970s, the waste materials listed above from the facility reportedly began to be trucked to one or more landfills around the Twin City metro area for disposal (URS 2000a). The final vermiculite product may also have contained a small amount of residual tremolite asbestos (0.5% to 3%) according to a recent EPA study (EPA 2000a).

In 1989, W.R. Grace closed the plant and hired a contractor to remove the machinery and equipment from the site. All remaining vermiculite ore concentrate in the storage silos was reportedly removed at that time as well. The railroad spurs serving the site were removed in 1980 and 1989. The site was sold to the current owner, Madison Complex, Inc., in October of 1989, and is now the location of several small businesses and art studios. The majority of the site buildings are occupied by a single business manufacturing steel prison furniture.

Western Mineral Products Site Soil Contamination

In February and April of 2000, representatives of the EPA collected soil samples at the site for analysis for tremolite asbestos. In February of 2000, two soil samples were collected near the storage silos. Laboratory microscopic analysis of the samples showed they contained less than 1% tremolite asbestos by volume (see below for a discussion of analytical methods). In April of 2000, EPA staff again collected two soil samples from the site, one from the west side (OS-7) and one from the north side (OS-8) of the main plant building. Laboratory microscopic analysis of the soil samples showed tremolite asbestos was present at levels of 8% by volume in sample

OS-8 and 20% by volume in sample OS-7 (Ecology & Environment 2000). Other samples collected by MPCA staff showed similar results, indicating that the surface soils at the site are contaminated with tremolite asbestos. Tremolite asbestos is visible in many areas as small, whitish to grayish grains or bundles with a visible fibrous component. A close-up photograph of the surface soils at the site showing the visible grains of tremolite asbestos is attached as Figure 5.

EPA collected an additional 20 surface soil samples at the site in June 2000 to further characterize the tremolite asbestos contamination. Tremolite asbestos was found in all but two of the samples, at levels ranging from trace amounts to 12% by volume. Asbestos concentrations seemed to be highest in samples collected closest to the expansion plant building, especially where the stoner rock pile was located. The locations of the surface soil samples collected by EPA and the concentration of tremolite asbestos found are shown in Figure 6.

In October and December of 2000, Phase I and Phase II Investigations were conducted at the site by URS Corporation on behalf of W.R. Grace and the current property owners. The Phase I investigation consisted of a historical record search and property inspection. The Phase II investigation consisted of the collection of soil samples from 48 soil borings and ten test trenches for analysis for tremolite asbestos (URS 2001). Additional soil samples were collected from around the former storage silos by a sub-contractor for URS Corporation. Sediment samples from three of eight stormwater catch basins on the site were also collected; the remainder lacked sediment. The URS Corporation soil boring, test trench, and sediment sample locations are shown in Figure 7.

A total of 203 soil samples from the 48 soil borings were analyzed for asbestos content. Laboratory microscopic analysis of the samples identified asbestos in 95 of the 203 soil samples, at levels of up to 21.3%. The samples were collected at various depths, and asbestos was detected at depths of up to 4.5 feet below ground in some areas. The test trenches were typically two to four feet wide, ten feet long, and five to eight feet deep. Layers of vermiculite wastes and tremolite asbestos were easily visible in some of the trenches. Samples of these materials showed tremolite asbestos contents of up to 11%. Surface soil samples collected around the storage silos also showed asbestos contamination at levels up to 3.7%. Data from the analysis of soil samples from the soil borings and test trenches is presented in Table 2.

Tremolite asbestos was detected at a concentration of 1.4% in a sediment sample from catch basin CB-2, located on the western edge of the site. Stormwater and sediments from this catch basin ultimately discharge to the Mississippi River southwest of the site (URS 2001).

Soil Contamination at Neighboring Properties

In June of 2000, EPA began inspecting and collecting soil samples at residential properties in the neighborhood of the site. These properties were suspected of having tremolite asbestos contamination from use of the stoner rock or vermiculite waste from the site as fill materials, garden additives, or landscaping materials. This effort continued through the fall of 2000, and

focused on an area within an approximately one-quarter mile radius of the former Western Mineral Products site. All properties within this area, both public and private, were reportedly inspected. Selected properties outside this area were also inspected. The EPA also set up a hot line for residents of this or other areas who are concerned that their properties may be contaminated with vermiculite wastes. Residents can call this number to request an inspection.

As of November 2000, EPA staff (or other federal, state and local staff working on behalf of EPA) had inspected over 300 properties in the vicinity of the plant (EPA 2000b). Tremolite asbestos contamination is suspected or has been confirmed at a total of 49 of these properties, while an additional 98 properties are awaiting inspection or the results of laboratory microscopic analysis of soil samples. The majority of the properties where asbestos contamination was found are within a few blocks of the site. The locations of the impacted properties in relation to the site itself are shown in Figure 8. The presence of tremolite asbestos is usually confirmed via laboratory microscopic examination; the visual observation of tremolite asbestos fragments as shown in Figure 5 is considered adequate for determining if a property is contaminated.

Concentrations of tremolite asbestos in soils at the various residential properties ranged from non-detect in a few samples to 10% by volume, with the majority of samples in the 2% - 6% range (Weston 2001a). Laboratory microscopic analysis of the tremolite asbestos fragments themselves (as shown in Figure 5) repeatedly showed asbestos concentrations of up to 95%. Tremolite asbestos was also found in soil samples collected in several alleys behind impacted residential properties, indicating that the asbestos had been washed from driveways or gardens into the alleys.

Outdoor Air Samples

Contractors for the EPA have conducted ambient air sampling in selected areas around the site, as well as personal and work area air sampling during cleanups at the above-mentioned residential properties (Weston 2001b, 2001c). These samples were collected using high-volume air pumps equipped with filter cartridges capable of trapping asbestos fibers. Both the ambient air and work zone air samples were collected with the filters positioned at a height approximating the breathing zone of an adult. Notations of wind speed and direction were made during each sampling event. Air samples were analyzed using an electron microscopy method that is capable of very low detection limits (a brief discussion of asbestos analytical methods is presented later in this document). Airborne dust levels were also monitored during excavation activities using a real-time dust monitor.

The majority of the work zone air monitoring sample results were below the average laboratory detection limit of 0.0009 asbestos fiber structures per cubic centimeter of air (f/cc). Work zone monitoring was conducted during excavation activities at residential properties, as well as during vacuuming sediment from alleyways between residences (see below). The maximum level of airborne tremolite asbestos detected during work zone monitoring was 0.0096 f/cc. This level is just below the state of Minnesota standard for indoor air (applied after asbestos has been removed from the interior of a building) of 0.01 f/cc, and approximately one-tenth the current

workplace standard 0.1 f/cc. In general, airborne fibers were more often detected during excavation activities than during vacuuming of alleys. Possible explanations for the detections of tremolite fibers in air samples included unseasonably dry weather, above average temperatures and wind conditions, and potential mechanical disturbance of the asbestos materials as it was being excavated or vacuumed (Weston 2001b). Some of the sample results were marked as "overloaded;" this was the result of dust captured on the filter cartridge preventing an accurate fiber count. Real time dust measurements using the direct reading instrument were generally low.

Very low levels of asbestos fibers (identified as actinolite/tremolite) were found in 10 of 25 ambient or background air samples collected in the neighborhood surrounding the site (Weston 2001c). Samples were collected from 11 different locations around the site, as shown in Figure 9. Samples were collected on multiple days from four of the sampling locations. The highest asbestos concentration detected in ambient air was 0.0052 f/cc. While the samples are described as ambient or background, cleanup of residential properties may have been occurring near the various sampling sites and could have affected the results. Overall, there was no clear trend in the sampling results. The results of the ambient air samples are presented in Table 3.

Indoor Air and Dust/Debris Samples

In October of 2000, URS Corporation, on behalf of W.R. Grace, collected 35 ambient air samples both inside and outside the former Western Mineral Products building, and 13 personal air samples from employees of businesses inside the site buildings (URS 2000c). Laboratory microscopic analysis of the samples showed no asbestos levels in excess of the Minnesota indoor air standard of 0.01 f/cc. Very low numbers of asbestos fibers were found in 3 of the 48 air samples collected.

Forty-five (45) samples of debris and dust inside the former Western Mineral Products buildings were collected as a part of the Phase II Investigation conducted by URS in December of 2000 (URS 2001). The samples were collected in areas where work activities occurred, in areas most likely to be disturbed by work activities, or in areas where increased airflow or vibration could create airborne dusts. Low levels (below 0.3% by weight) of asbestos were found in seven of the 45 samples analyzed using polarized light laboratory microscopic analysis. Only one sample had an asbestos content greater than 1%, which is the regulatory level used to define an asbestos-containing material. This sample was collected from the top of a beam in a little used area of the site building, and had an asbestos content of 1.3%. Confirmation analysis using more sensitive electron microscopic methods detected tremolite asbestos in 25 of the 45 samples; the maximum concentration detected was 0.3% by weight.

Asbestos has been detected in several building products within the site buildings, such as floor tile, pipe insulation, textured plaster, and paint (URS 2000a). The asbestos found in these products was of the commercial (chrysotile) type. Dust samples collected by MDH during the demolition and removal of the vermiculite expansion equipment in 1989 detected low levels of asbestos. Trace amounts of tremolite asbestos have also been detected in samples of vermiculite

used as insulation in ceilings in the office portion of the building (Ecology & Environment 2000), and in soil and debris inside the storage silos and associated concrete storage vaults (URS 2001).

Site Visit

MDH staff conducted numerous visits to the Western Mineral Products site and surrounding neighborhoods during the summer and fall of 2000. The following observations have been made:

- The majority of the grounds of the former Western Mineral Products site have been covered by plastic sheeting at the direction of the MPCA, and temporary fencing has been erected along Jefferson Street NE. Soil piles on the east side of the Electramatic, Inc., property have also been covered. The gravel drive on the south side of the building has not been covered, however, and is still in use for site access and parking.
- Under the plastic sheeting, tremolite asbestos grains are visible, as in Figure 5. Other waste materials, such as stoner rock and vermiculite, are also visible in some areas.
- Very little of the original equipment used in the vermiculite exfoliating operation, other than the storage silos, is visible from the exterior of the buildings. The name "Western Mineral Products Company" is still visible on the south wall of the original three-story brick building, and signs reading "W.R. Grace, Construction Products Division" are visible in at least one other location.
- The area surrounding the site consists of a mixture of single-family and multi-family residential properties, commercial, and light industrial properties. Railroad tracks border the site on the east side. A number of schools, including Edison High School, are located within a few blocks of the site.
- MDH staff accompanied MPCA staff on a number of residential property inspections in the neighborhood of the site. Many of the property owners who requested inspections do not have readily identifiable asbestos waste on their properties, or have no knowledge of wastes from the site being hauled to their properties by previous owners. Stoner rock, vermiculite wastes, and tremolite asbestos were observed, however, in the garden of one property visited by MDH staff. The asbestos waste materials were readily observable at the ground surface.

II. Discussion

Asbestos Toxicology

Asbestos is primarily a human health hazard through the inhalation of asbestos fibers in air. Long-term human and animal exposure to asbestos fibers through inhalation is associated with a buildup of scar-like tissue in the lungs known as asbestosis, and with lung cancer and a cancer of the lining of the lung (or pleura) and other internal organs known as mesothelioma. Asbestosis is characterized by a gradual decline in respiratory function, coughing, and breathlessness. Both lung cancer and mesothelioma may be relatively symptomless until they reach an advanced stage. All three of the above conditions are typically diagnosed through chest X-rays and lung function tests. Evidence of asbestos exposure, in the form of pleural changes (such as a thickening of

pleural tissue, or the formation of pleural "plaques") can often be seen on chest X-rays even in the absence of disease. The time period between exposure to asbestos and the occurrence of lung disease or cancer is long, usually between ten and 40 years (ATSDR 1999).

The action by which asbestos fibers cause disease is believed to be through a combination of mechanisms including the generation of reactive oxygen species on fiber surfaces, the production of growth factors by the body in response to injury caused by asbestos fibers, or direct injury to cells in the respiratory tract (Brody 1993; Voytek et al. 1990, ATSDR 1999). Exposure to asbestos fibers in drinking water (or other routes of ingestion) may be associated with an increased risk of cancer in the gastrointestinal tract, although the statistical evidence for this association is weak (ATSDR 1999). Skin contact with asbestos fibers is not believed to pose a health risk, but may result in a localized reaction. The human epidemiological studies that have established the link between asbestos exposure and lung disease and cancer are occupational in nature. Environmental exposure to tremolite asbestos, however, has also been found to be associated with higher rates of mesothelioma, and in some cases lung cancer in several areas of the world where tremolite asbestos is naturally exposed at the ground surface (ATSDR 1999, Luce et al. 2000).

Once inhaled, some asbestos fibers reach deep into the lungs, while the majority are exhaled or become trapped in the mucous lining the airways and lungs and are subsequently coughed up and swallowed (ATSDR 1999). The size of an asbestos fiber is important in determining if it will reach deep into the lung, with the width of the fiber being more important than the length or the ratio of the two, known as the aspect ratio (Berman and Crump 1999). Once in the deep lung, asbestos deposition is heaviest at places where the air ducts branch. This is also the location where the body's response mechanisms are focused, and disease most often occurs. The fiber size also affects how rapidly asbestos fibers pass through the lung tissue and into the surrounding pleural tissue. Chemical, physical, and biological processes that result in the breakdown and removal of the asbestos fibers by the body also play a role in asbestos toxicity.

Animal studies have demonstrated that no single fiber characteristic (such as length, width, and mineral type) is predictive of toxicity, but that asbestos fiber toxicity is a function of a number of characteristics considered together (Berman et al. 1995). Many studies, however, indicate that fibers longer than 5.0 micrometers (μm), or 1/5,000 of an inch are more likely to cause injury to body tissues than shorter fibers (ATSDR 1999). Specifically, fibers in excess of 5 μm seem to be most strongly associated with lung cancer and mesothelioma, with toxicity increasing with increasing length such that fibers longer than 40 μm are estimated to be some 500 times more potent than fibers less than 40 μm in length (Berman et al. 1995). Fibers shorter than 5 μm in length may have a minimal contribution to the potential risk of disease.

Fiber width is also an important consideration relevant to potential effects, with smaller fiber widths more strongly associated with mesothelioma, and larger widths with lung cancer (ATSDR 1999). Larger, more complex asbestos structures may also be more strongly associated with lung cancer risk as opposed to mesothelioma risk, as they are more likely to be retained in the lung, as opposed to passing through lung tissue into the pleura.

The various mineral types (such as chrysotile, amphibole, etc.) are also important in the toxicity of asbestos, especially with regards to the induction of mesothelioma. Amphibole asbestos (the mineral type which includes tremolite) is thought to be more potent than chrysotile for the induction of mesothelioma. There appears to be less of a difference in relative potencies between asbestos mineral types for the induction of lung cancer (Berman et al. 1995). This may be related to the fact that chrysotile asbestos is more easily broken down into shorter fiber lengths than amphibole and removed by the body due, in part, to its chemical composition. Some studies have even suggested that over long periods of exposure to chrysotile asbestos, a "steady state" may be reached where removal mechanisms balance out the deposition of new asbestos fibers in the lung. This is not the case for amphibole asbestos, however, where studies indicate that due to its increased resistance to the body's breakdown processes, the total amount of amphibole asbestos in the lung increases continually with exposure, and no such "steady state" is reached (Berman and Crump 1999).

Cancer occurs in the body when particular cells undergo genetic alteration and then are stimulated to grow and divide. If the affected cells are chronically stimulated, enough genetic mutations may occur that the cell line eventually reaches a state where uncontrolled growth occurs, and tumors develop. It is important to note that either process may occur in the absence of the other, and they are not always linked. Agents that can produce genetic alterations are referred to as "cancer initiators," while agents that are capable of stimulating cell division are known as "cancer promoters." Berman and Crump in 1999 summarized several studies that showed asbestos is believed to be a promoter of lung cancer, and both a promoter and initiator of mesothelioma due to the fact that mesothelial cells have been shown to be more susceptible to genetic damage by asbestos. Cancer promotion by asbestos is caused by the death of cells through direct cell damage, which stimulates cell division to replace the dying cells. Initiation may be the indirect result of genetic damage from the production of reactive oxygen species on the surface of the asbestos fibers as the body attempts to break them down. Asbestos is therefore considered an epigenetic carcinogen, capable of indirectly initiating and directly promoting the development and growth of cancerous cells (Williams and Weisburger 1991).

Exposure to asbestos and cigarette smoking together have been shown to result in a substantially greater risk of lung disease, particularly asbestosis and lung cancer (ATSDR 1999). The risk of dying of lung cancer in smokers exposed to asbestos may be as much as ten times higher than the risk to non-smokers exposed to asbestos, and fifty times that of people who have not been exposed to asbestos and have never smoked. Several mechanisms may contribute to this seemingly multiplicative increase in risk, including a reduction in fiber removal efficiency in smokers, and the adsorption by asbestos fibers of cancer-causing chemicals found in cigarette smoke (ASTDR 1999).

Analytical Methods

Various types of microscopic analysis methods are used to detect asbestos in air, water, and bulk materials such as building products and soil. The most common method used to measure

asbestos in air, most often in an occupational setting, is by the use of phase-contrast microscopy (PCM). This method uses phase-contrast illumination to highlight fibrous structures collected on a filter through which a known volume of air has been passed. This method is relatively fast and inexpensive, but cannot distinguish between asbestos fibers and other fibrous materials. In addition, it is limited to fibers with a length greater than 5 μm and a thickness greater than 0.25 μm (ATSDR 1999). The PCM method (specifically National Institute of Occupational Safety and Health [NIOSH] Method 7400) is the method required by the federal Occupational Safety and Health Administration (OSHA) for determining compliance with workplace air standards. The current OSHA workplace Permissable Exposure Limit (PEL) is 0.1 f/cc, based on an 8-hour time-weighted average (OSHA 2000). Airborne asbestos fiber concentrations, as determined by the PCM method, were often used to assess asbestos exposure in the majority of the epidemiological studies conducted on asbestos workers.

Transmission electron microscopy (TEM) uses a high-energy electron beam to form an image of the sample material, and is often used in conjunction with PCM to confirm results. Much higher magnifications are possible than with PCM, and TEM can distinguish fibers less than 0.01 μm in diameter (Berman and Crump 1999). In addition, individual fibers can usually be analyzed via energy dispersive X-ray analysis (EDXA) to determine their mineral type. TEM analysis is slower and more expensive than PCM, but does yield valuable information on fiber types and sizes. There are several different methods used to prepare and count fibers; however, and results from different laboratories using different methods may not be directly comparable.

Both PCM and TEM methods are also typically used for the examination of water samples for asbestos. A different type of light microscopy, known as polarized light microscopy (PLM) is usually used for determining the asbestos content of bulk material samples such as pipe insulation. This method has some of the same limitations as PCM in terms of fiber identification and resolution limits. Methods for determining the asbestos content in soil samples include PLM and TEM, although there are limitations to these methods in terms of matrix interference and sample preparation. These methods typically produce a weight or volume percent estimate of asbestos in the soil sample, which is difficult to directly relate to a human health risk. A relatively new method, the Superfund Method for Determination of Releasable Asbestos in Soils and Bulk Materials involves the preliminary mechanical separation of respirable asbestos fibers from the soil or bulk material with subsequent analysis via TEM using specific fiber-counting methods (EPA 1997). The goal of this method is to produce a measurement of asbestos fibers in air from the disturbance of the soil that are in the size ranges that recent studies have shown may be the most toxicologically active.

Exposure Pathways

There are a number of potential exposure pathways, both past and present, through which people may have been exposed to asbestos-containing products and waste materials from the Western Mineral Products site. The pathway of greatest concern is the exposure by former workers at the site to dusts generated during the production and handling of vermiculite. Former workers at the site have reported that the operation was dusty and the ventilation poor. A city of Minneapolis

public health official expressed concerns about the effects of exposure to vermiculite dust by workers at the site in the early 1960s (MDH 2000). A 1977 internal W.R. Grace memorandum estimates that 28% of workers with over 10 years service exposed to ore concentrate from Libby, Montana, had contracted asbestosis (MDH 2000). Cases of asbestos related disease among former workers at the site have also been reported in the media (Gordon 2000). MDH staff are currently compiling a list of former workers at the site for possible follow-up.

Air samples collected at the plant in 1978 and analyzed using PCM methods show airborne asbestos fiber levels in excess of 5 f/cc in several areas of the plant, including near one of the vermiculite expanding furnaces and at the final product bagging station (HRO 2000e). Levels in the lunchroom, located 60 feet from the bagging operation, exceeded 3 f/cc. These levels were well in excess of the current occupational standard of 0.1 f/cc. The airborne asbestos levels near the Western Mineral Products vermiculite bagging station match closely the levels measured in the 1960s and 1970s at a similar bagging operation at the W.R. Grace vermiculite mine and processing facilities in Libby, Montana (Amandus et al. 1987).

Reference is also made in the same internal W.R. Grace memorandum to even higher asbestos fiber levels of 13.5 f/cc in the area where the stoner rock was collected in wheelbarrows for disposal. Equipment problems that contributed to a dust problem in the plant, such as the poor condition of one of the expanding furnaces and a leaking stoner vent hood, are also described. These problems were apparently corrected sometime in the late 1970s, as workplace air monitoring data from the 1980s generally shows asbestos levels at or below the current occupational standard. Prior to the early 1970s, workplace air monitoring for asbestos was not required. Consequently, there is no information available on the workers' potential exposure to airborne asbestos before that time.

The families of past workers may also have been exposed to asbestos-containing dusts from the plant carried home on the hair and clothing of workers. Several studies have associated this "paraoccupational" exposure with the development of asbestos-related respiratory diseases in the families of workers exposed to asbestos on the job (ATSDR 1999). The wife of one worker at the plant recalled in a legal deposition that her husband's clothes were often dusty when he came home from work (MDH 2000).

Although the facility was reportedly cleaned when the plant shut down in 1989, there still are small amounts of residual vermiculite wastes present. While the results of air monitoring in the facility show very low levels of asbestos in indoor air, handling or disturbance of residual wastes could present an exposure hazard. The results of dust samples collected at the site in December 2000 showed that the locations with the highest level of tremolite asbestos dust were found in areas of the former plant that are now not frequently occupied.

There are other past and present exposure pathways of concern for residents in the community surrounding the site. A conceptual model of these potential exposure pathways, adapted from the model proposed by EPA for use in Libby, Montana, is presented in Figure 10 (EPA 2000c). The pathways, listed in approximate order of concern include:

1. Past inhalation of tremolite asbestos fibers from having played in piles of waste stoner rock or vermiculite at the site, or having handled or removed these waste materials from the site.

2. Past inhalation of tremolite asbestos fibers in particulate emissions from the furnace stacks in ambient air in the area of the site, and from fugitive dusts released while the plant was running.
3. Inhalation of tremolite asbestos fibers released from the disturbance of stoner rock or vermiculite wastes remaining at the site after the plant ceased operating, or in wastes hauled from the site in the past, and still present at residential properties.
4. Past and present infiltration of asbestos-containing airborne dusts or particulates into homes or businesses.
5. Ingestion of asbestos from contaminated soil or indoor dust that has been disturbed, or from soil adhering to vegetables grown in contaminated areas.

Children playing in the piles of asbestos-contaminated stoner rock, or people removing, handling, or using the stoner rock or waste vermiculite for fill or other uses, were also exposed to tremolite asbestos. The stoner rock was estimated to contain between 2% and 10% friable tremolite asbestos (HRO 2000c). It was reported that air monitoring was conducted in the area of the plant where the stoner rock was loaded into wheelbarrows for disposal. The results showed fiber levels of 13.5 f/cc (HRO 2000e). This may indicate that handling of the stoner rock had the potential to release a significant amount of asbestos into the air in the immediate vicinity. Information from the investigation underway in Libby, Montana, where similar exposures occurred, may help to better qualitatively assess the health risk of such activities. A past study of asbestos related disease from exposure to tremolite asbestos cited a case of asbestosis and lung cancer in a man who lived near a vermiculite processing plant for the first 20 years of his life, and reportedly sometimes played in the piles of vermiculite tailings (Srebro and Roggli 1994). Tremolite asbestos fibers found in the lungs of this patient were long, and many exceeded 100 μm in length.

Based on information provided by W.R. Grace, including air emission reports submitted to the MPCA in the 1970s (HRO 2000d), it is apparent that tremolite asbestos fibers were present in the particulate emissions from the two exfoliating furnaces. Friable tremolite asbestos was present in the fine particulate matter from the process vent system at concentrations ranging from 1% to 3%. Given an estimated annual particulate emission rate of 480 pounds per year from the two furnace stacks for the time period after 1972 (based on data in a 1977 report), this equates to a potential emission rate of between 4.8 and 14.4 pounds of friable tremolite asbestos per year. Prior to1972, the average annual vermiculite processing rate was much higher, and the weighted average percentage of tremolite asbestos in the ore was higher (see Table 1). The emission rates were potentially higher in terms of quantity (due to the lack of baghouse filters) and tremolite concentration. To determine an asbestos concentration at the top of the stack, the following were used: standard conversion ratios; the stack emission data described above; and a plant operating schedule of 16 hours per day, 5 days per week, and 52 weeks per year (HRO 2000d). The result is a tremolite asbestos concentration of between 30.7 micrograms per cubic meter ($\mu g/m^3$) and

92.1 $\mu g/m^3$ in the emissions from the top of the stack while the expanding furnaces were in full operation. Assuming an asbestos fiber density of 3.3×10^7 fibers per milligram (EPA 1986), this would correspond to an approximate asbestos fiber concentration of between 1 f/cc and 3 f/cc. Other references indicate a lower average fiber density for tremolite asbestos in raw and beneficiated ore from Libby, Montana, in the range of 2.34×10^4 to 1.42×10^5 fibers per milligram (EPA 2000a). This would result in a much lower fiber concentration.

Additional asbestos emissions may have occurred from the smaller stack that vented the product mixing operation, where finished vermiculite was added to various products for construction applications. Fugitive dusts from the rail car unloading area, the waste stoner rock piles, or other outdoor product or waste handling operations also likely contributed to the overall tremolite asbestos emissions from the site. An EPA report on vermiculite estimated levels of asbestos of 0.0005 $\mu g/m^3$ in ambient air near exfoliation plants (EPA 1991).

The areal extent to which particulate emissions (including friable tremolite asbestos fibers) from the site may have spread into the surrounding community is not currently known. There are anecdotal reports and complaints of dust from the facility settling on cars and homes in the neighborhood as described in Appendix 1. Air dispersion models, such as the Industrial Source Complex (ISC3) model developed by EPA, may be useful in estimating or reconstructing tremolite asbestos fiber concentrations in the area surrounding the site while the plant was operating. Fugitive dust emissions can also be modeled, as can long-term deposition of asbestos fibers on the ground. It appears that adequate information on the stack emissions and product and waste handling practices is available for the development of such an air dispersion model.

Some exposure to tremolite asbestos has likely occurred from stoner rock or waste vermiculite remaining at the Western Mineral Products site after it closed in 1989, or removed from the site for use as driveway fill, landscape material, or in gardening. While the majority of the waste materials removed from the site were likely used at properties near the site, reports have been received of it being hauled as far away as Wisconsin. Asbestos fibers present in surface soils may be released into the air through the action of wind, or more likely by disturbing the asbestos in some way such as digging, raking, or driving vehicles over it. These exposures will be quite variable based on such factors as wind direction, moisture content of the soil, amount of disturbance, or type and frequency of vehicle traffic. Winter conditions would presumably greatly reduce the potential for exposure. Low levels of asbestos fibers were detected in air samples collected around cleanup work zones and in ambient air in the vicinity of the site. Analysis of soil samples using the Superfund Method for Determination of Releasable Asbestos in Soils and Bulk Materials could perhaps provide useful information about the amount of asbestos in soil that can be released to the air. There are also models available for estimating dust emissions from roadways or other surfaces disturbed by wind or mechanical action. The models can be adapted for use in estimating asbestos fiber emissions where asbestos-contaminated fill has been used (Berman 2000).

As anecdotal reports suggest, tremolite asbestos in particulate emissions from the plant, both during and after it was operating, may have infiltrated structures near the facility through open

windows, doors, or other routes of entry. This may have resulted in exposure to asbestos in indoor air. Dust containing asbestos may also settle out of the air, and subsequently be re-suspended in the indoor air through such activities as sweeping or vacuuming. Asbestos-containing dusts may also be tracked into homes or businesses from areas where waste stoner rock or vermiculite was used as fill. Household dust may thus serve as a continuing source of asbestos contamination in indoor air. The degree of such exposure will be extremely variable, depending on many individual factors.

Ingestion of tremolite asbestos from fruits, herbs or vegetables grown in soils contaminated with waste materials from the site is likely to be minimal, especially if the produce is washed. Some asbestos that is inhaled ultimately is swallowed as a result of the body's clearance mechanisms. The relationship between ingested asbestos and disease in humans is not well established.

EPA is in the process of conducting a series of exposure studies in Libby, Montana, that would be of use in assessing short-term exposure to asbestos at other vermiculite processing facilities such as the Western Mineral Products site (EPA 2000d).

Asbestos Risk Assessment

Human health risk from asbestos is primarily due to inhalation of asbestos fibers in the air. Currently, asbestos risk assessment is based on a risk from exposure to all types and sizes of asbestos fibers, and combines lung cancer and mesothelioma risk. The current cancer unit risk (that is, the cancer risk per asbestos fiber per cc of air inhaled over a lifetime) found on the EPA's Integrated Risk Information System (IRIS) is 0.23. If this unit risk is used to calculate a level of asbestos in air that could be considered "safe" using current risk assessment procedures, the calculated level would be 0.00004 f/cc, based on excess lifetime cancer risk of 1 in 100,000 (IRIS 2000). This level is far below the detection limit of 0.01 f/cc using the current PCM method (NIOSH method 7400) that is used to determine compliance with workplace standards for asbestos in air. The excess lifetime incremental cancer risk of 1 in 100,000 is the default level used in Minnesota.

The risk estimates listed in IRIS are based on PCM measurements, since historical exposure measurements in human epidemiological studies are based on estimates of either total particle counts or asbestos fiber counts as determined by PCM methods. As stated above, PCM methods do not distinguish between asbestos and non-asbestos fibers, and cannot determine asbestos mineral types. PCM methods, using light microscopy, also have a limited magnification range and therefore may miss small asbestos fibers. This could under-estimate actual asbestos exposures. However, this limitation may not be critical if fibers smaller than the effective detection limit have a minimal contribution to toxicity as previously described.

More recent scientific studies have suggested that fiber length and width may be critical factors in the causation of disease by asbestos. Evidence also suggests that mineral type also may play an important role, and that the risk for lung cancer and mesothelioma may not be the same. Using

the established methods of assessing risk may therefore not accurately reflect the actual risk from exposure to asbestos.

In an attempt to develop a risk assessment methodology that would make up for the shortcomings of the PCM-based risk criteria, EPA Region 9 engaged a contractor in the mid-1990s to conduct a thorough literature review and analysis, and develop an updated asbestos risk assessment protocol. The result was the "Methodology for Conducting Risk Assessments at Asbestos Superfund Sites" (Berman and Crump 1999a). This methodology is based on epidemiology data available up to 1989, as well as a limited number of documents up to 1994. The development of the protocol involved re-examining the exposure information (often collected using PCM methods) used in the existing epidemiological studies and attempting to correlate it with TEM methods. In some cases TEM analyses were conducted on the original samples collected for the epidemiological studies to attempt to come up with TEM exposure data that can be linked to the epidemiological data. It incorporates both animal and human potency estimates, with a resulting risk estimated based on fiber length, width, and mineral type. Lung cancer and mesothelioma risks are also estimated separately. The resulting risk assessment protocol provides both empirical and model-based approaches to asbestos risk assessment (Berman and Crump 1999b). EPA has proposed this protocol for use in evaluating human health risks from asbestos exposure in Libby, Montana (EPA 2000c). The protocol relies on the analysis of samples using TEM methods so that the mineral type and fiber sizes can be accurately determined, and fibers within asbestos structures (i.e. fiber bundles and clumps) can be appropriately counted.

There are a number of issues to be considered with regards to the use of the proposed EPA protocol. It has not yet undergone peer review, as required by the EPA Office of Research and Development. In addition, the methodology does not incorporate the results from research and epidemiological studies conducted after 1994. The use of past epidemiological studies where exposure information may be lacking, or was collected using PCM or even older methods, make the direct use of this data (and comparisons to TEM data) in the development of the protocol uncertain. Nevertheless, the proposed EPA asbestos risk assessment protocol represents the most comprehensive attempt to establish a systematic method for evaluating human health risk from asbestos exposure conducted to date. An update of the protocol is currently underway prior to a planned scientific peer review.

Response Actions at and Around the Site

A formal investigation of the former Western Mineral Products site is underway, focusing on soil contamination around the site buildings and residual dusts inside of the buildings. The investigation is being conducted on behalf of W.R. Grace by URS Corporation, and is being conducted under the oversight of the MPCA Voluntary Investigation and Cleanup (VIC) Program. The results of the investigation will be useful for assessing the potential risk from residual tremolite asbestos contamination at the site, and will be used to develop a response action, or cleanup plan, if cleanup of the site proves necessary (URS 2000b).

The EPA, through the Emergency Response Branch of the Superfund program, has focused on

investigation and removal of asbestos-contaminated wastes at residential properties around the site. These activities are focused on mitigating the potential threat to human health from exposure to the asbestos, and are not based on a detailed analysis of potential risk from that exposure. The removal activities include (EPA 2000e):

- Development of a site safety plan;
- Determining the horizontal extent of asbestos contamination at the impacted residential properties;
- Excavation and removal of asbestos-contaminated soils to a maximum depth of 18 inches;
- Installation of a synthetic liner at the base of each excavation;
- Removal and disposal of asbestos from the surface of paved alleys and driveways;
- Disposal of asbestos-contaminated soils at an approved off-site disposal facility;
- Personal and ambient air sampling during the removal activities;
- Engineering measures to control dust during cleanup;
- Analysis of soil samples using PLM and TEM methods; and
- Backfilling of excavated areas with clean fill and restoration of properties to original condition.

Asbestos contamination was determined based on visual observation, or confirmed via laboratory microscopic examination at a total of 49 properties around the site to date (Figure 7). Of these 49 properties, cleanup has been completed at 23. The nominal criterion used for cleanup is an asbestos contamination level of 1% or greater. Based on post-cleanup sampling, tremolite asbestos concentrations in excess of 1% appear to have been left in place at four of the properties (Weston 2001). No information was provided as to the locations or the depths of these samples. Asbestos contamination removal in paved alleys and driveways was accomplished using a large vacuum truck equipped with a High-Efficiency Particulate (HEPA) air filter, while traditional hand and mechanical excavation methods were used for soil removal. Cleanup of each property was estimated to take about 1.5 days. At this time, excavation of asbestos-contaminated soil below 18 inches in depth, or beneath paved surfaces or buildings, is not proposed. Soil contaminated with tremolite asbestos containing wastes may therefore still be present at some of these properties, and could be disturbed in the future.

Agency for Toxic Substance and Disease Registry (ATSDR) Child Health Initiative

ATSDR's Child Health Initiative recognizes that the unique vulnerabilities of infants and children make them of special concern to communities faced with contamination of their water, soil, air, or food. Children are at greater risk than adults from certain kinds of exposures to hazardous substances at waste disposal sites. They are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are smaller than most adults, which means they breathe dust, soil, and heavy vapors close to the ground. Children also weigh less, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth

stages. Most importantly, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care.

Children who lived in the community around the site were exposed to tremolite asbestos containing wastes while the plant was operating. Children were known to play on the piles of stoner rock or waste vermiculite, as Figure 4 vividly shows, and were reportedly allowed to even play inside the plant at times (Gordon 2000). Children may also have been exposed to asbestos in particulate emissions from the plant, or in dust carried into homes from air emissions or from use of the vermiculite wastes as fill at residential properties. Children could have been exposed from dust carried home on the clothing of a parent who worked at the plant. Ongoing exposure could be occurring in locations where vermiculite wastes were used as fill, and remain exposed at the ground surface. The extent of these exposures, and the potential health effects, are difficult to determine at this time. The long latency period (between 10 and 40 years) of asbestos-related diseases also places children at greater risk of developing disease earlier in life.

III. Conclusions

The Western Mineral Products plant located at 1720 Madison Street in Minneapolis processed vermiculite ore concentrate from the mine in Libby, Montana, into finished vermiculite products. Workers at the plant were exposed to levels of asbestos in excess of current occupational standards for much of the time period the plant was in operation, and cases of asbestos related disease have been reported in former workers. Particulate emissions from the two furnace stacks, as well as fugitive dusts from other outdoor operations, contained up to 3% or more friable tremolite asbestos. Waste materials from the vermiculite processing operation that contained up to 10% friable tremolite asbestos were placed in piles outside the building for use by local residents, and neighborhood children were known to play on these piles.

Approximately 50 properties around the former plant have been identified to date as contaminated with asbestos-containing wastes from the site. The U.S. EPA is in the process of removing asbestos-contaminated soil from these properties and adjoining alleys. These properties, as well as soils around the former plant itself, may have served as a continuous source of asbestos exposure since the plant ceased operations in 1989. Low levels of asbestos have been detected in some ambient air samples collected around the site. The extent of past and current exposures to tremolite asbestos from the site is difficult to estimate at this time based on available information.

Exposure to tremolite asbestos, particularly in workplace settings, has been associated with lung diseases including asbestosis, lung cancer, and mesothelioma. A contractor for the EPA has developed a promising new methodology for conducting risk assessments at Superfund sites that evaluates lung cancer and mesothelioma risk based on asbestos fiber sizes and mineral type. The methodology is in the process of being updated and peer reviewed by EPA for use in Libby, Montana where the contaminated ore was mined and elevated rates of death due to asbestos-related disease has been identified. Information on environmental exposures to asbestos that will

be of use in evaluating exposure at the Western Mineral Products site is also being collected in Libby, Montana.

Based on available information, past exposure to tremolite asbestos by workers in the plant, children who played on the piles of waste materials or vermiculite, and residents who lived near the site represents a public health hazard. Current exposure by residents in the area of the site to residual waste materials represents an indeterminate public health hazard.

IV. Recommendations

1. Activities currently underway by the MPCA and EPA to investigate, and if necessary clean up the contamination at the site and at residential properties around the site should continue. Interim measures, such as the covering of soils at the site with plastic and educating residents not to disturb suspected asbestos-contaminated soils should also be continued. Air monitoring during cleanup, and proper dust control measures should continue to be followed.
2. Cleanup of residential properties should be conducted so that asbestos concentrations in exposed soil are as close to background as possible, and at a minimum are below 1%.
3. If complete cleanup of all asbestos-contaminated soil or wastes is not conducted, deed notices, restrictions, or other institutional controls should be considered for any property where residual asbestos contamination is documented to remain in soil, or beneath driveways or other structures.
4. Samples from exposed soil at properties located near the site should be collected to determine if past air emissions from the plant have resulted in residual asbestos soil contamination. Dust samples should also be collected inside selected homes near the site to determine if residual contamination exists.
5. A search should be conducted for any additional historical information on the operation of the plant, or similar operations that may help assess exposures by workers or the public.
6. An air modeling study should be conducted to estimate the areal extent of asbestos-containing particulate emissions and deposition of fibers from the site while it was operating.
7. A more quantitative estimate should be attempted of potential asbestos fiber emissions and exposures from the use of asbestos-contaminated wastes from the plant as fill material.
8. A health study and/or screening of former workers at the site focusing on asbestos-related lung disease should be considered.
9. An exposure investigation of the community surrounding the site should be conducted, and pending the outcome, a health study should be considered.
10. Past and present residents of the area surrounding the site who are concerned about their potential exposure to asbestos-containing vermiculite wastes should be evaluated by their physicians, and if necessary be examined for the presence of asbestos-related lung disease. Educational materials and training should be developed and provided to local physicians and other medical personnel to assist them in this evaluation.
11. Former workers, local residents, and others interested in the site should be updated by the local, state, and federal government entities involved on a regular basis.
12. A Public Health Assessment should be prepared when additional exposure assessment

activities at the site and in Libby, Montana, have been completed, and the proposed EPA methodology for assessing asbestos-related risks has been revised and peer reviewed.

13. Information regarding other vermiculite exfoliation plants should be collected and reviewed to determine if similar exposures could have occurred in and around those facilities.

V. Public Health Action Plan

MDH's Public Health Action Plan for the site consists of continued consultation with state and federal agencies involved with the investigation and cleanup of the site and surrounding community, such as EPA and MPCA, and participation in public outreach activities. MDH also proposes to implement an exposure investigation of current and former residents of the area around the site, and develop a program for educating physicians and other medical personnel on the recognition of asbestos-related lung disease. Furthermore, MDH will prepare a public health assessment incorporating updated information from the investigation in Libby, Montana, and further investigation and exposure assessment activities at the Western Mineral Products site as discussed above. Further information on asbestos exposure may also be found on the MDH World Wide Web page at http://www.health.state.mn.us/divs/dpc/han/asbestos.html.

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CERTIFICATION

This Western Mineral Products Site Health Consultation was prepared by the Minnesota Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

Alan W. Yarbrough
Technical Project Officer, SPS, SSAB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Richard Gillig
Chief, State Programs Section, SSAB, DHAC, ATSDR

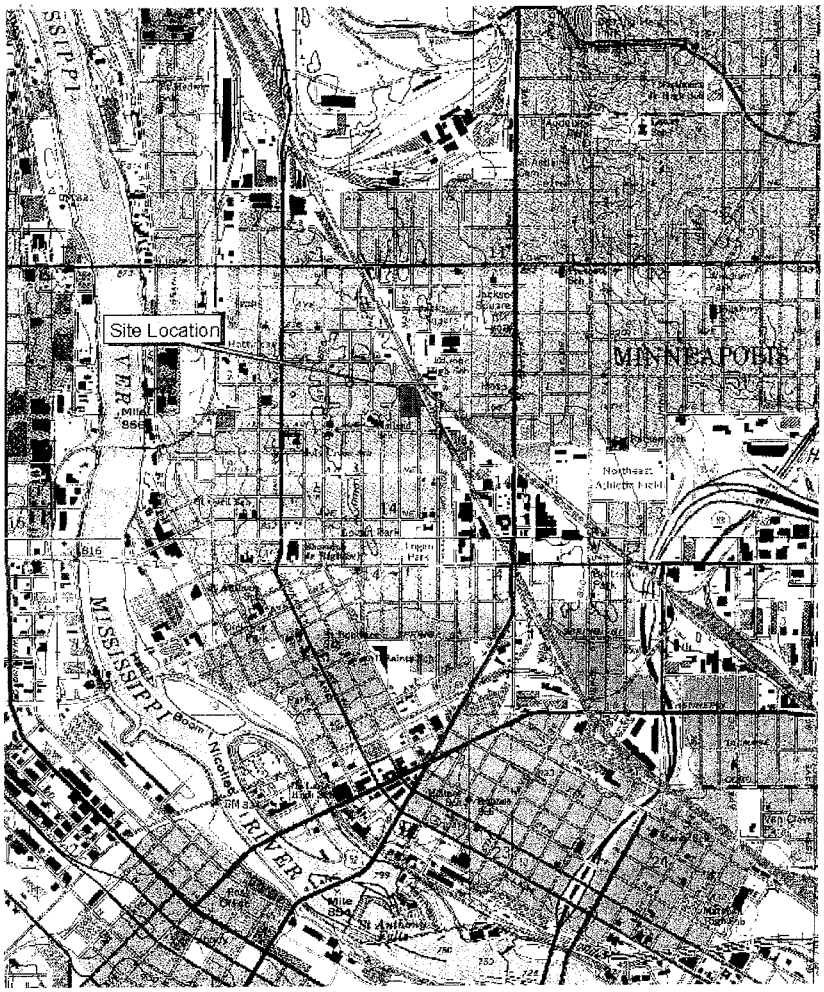

Figure 1: Western Mineral Products Site Location
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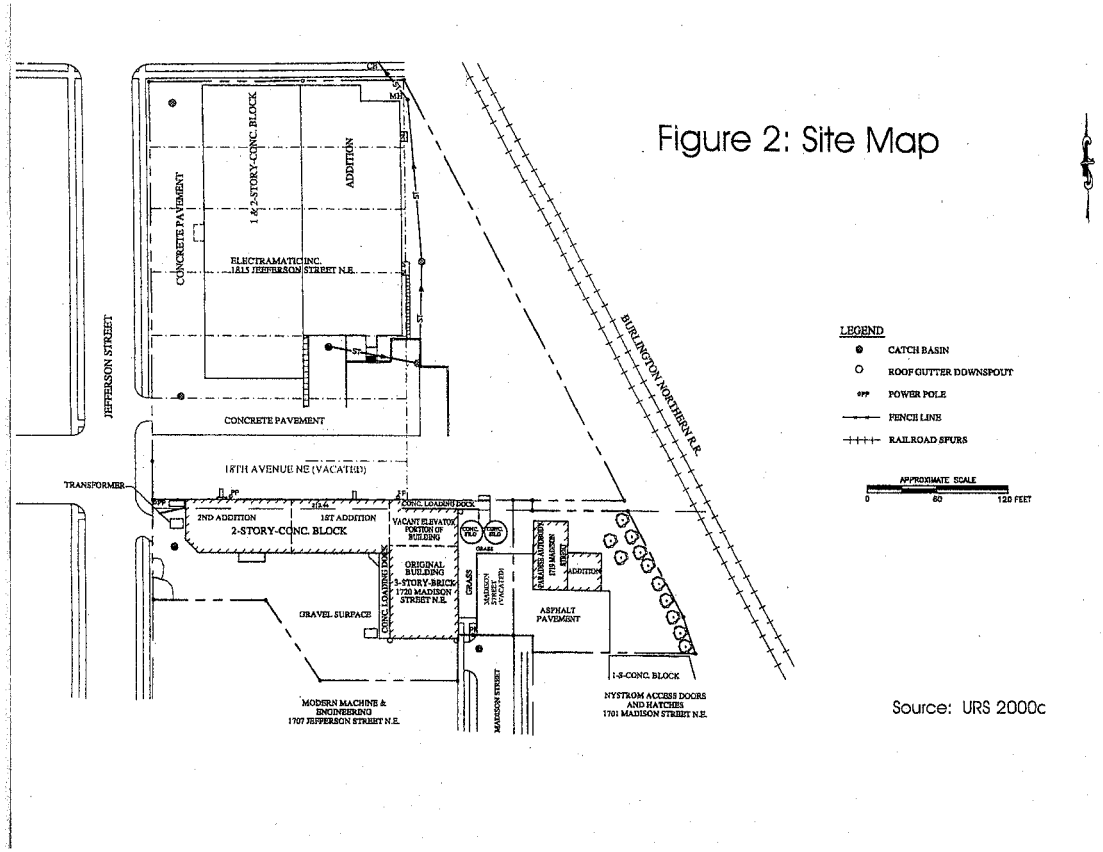
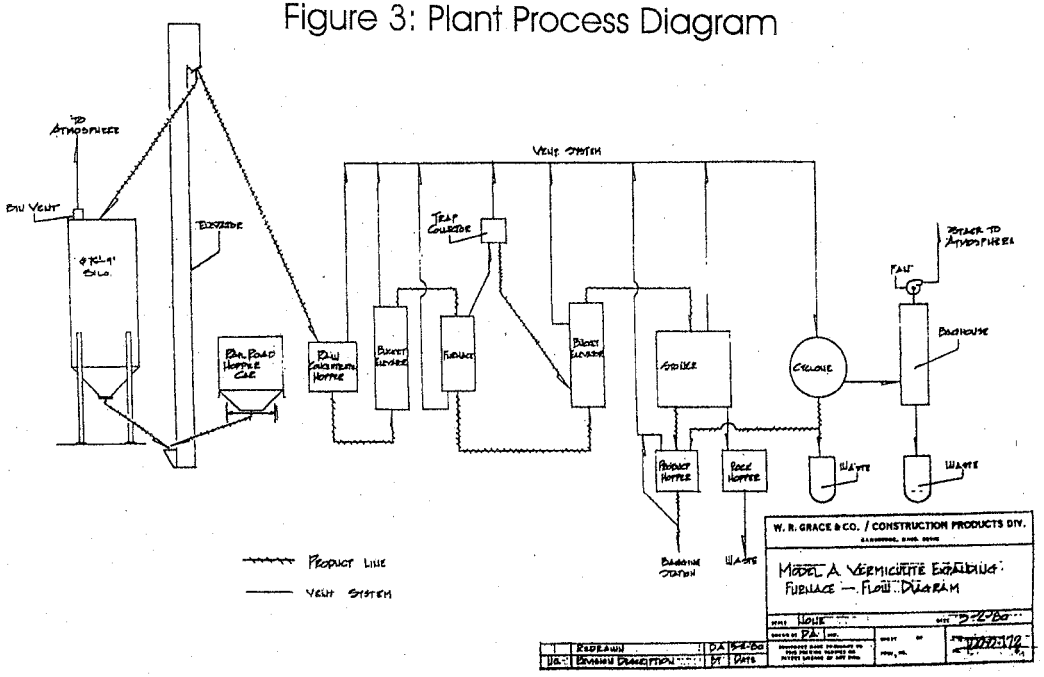


Figure 2: Site Map

Source: URS 2000c

Figure 3: Plant Process Diagram



Source: HRO 2000c

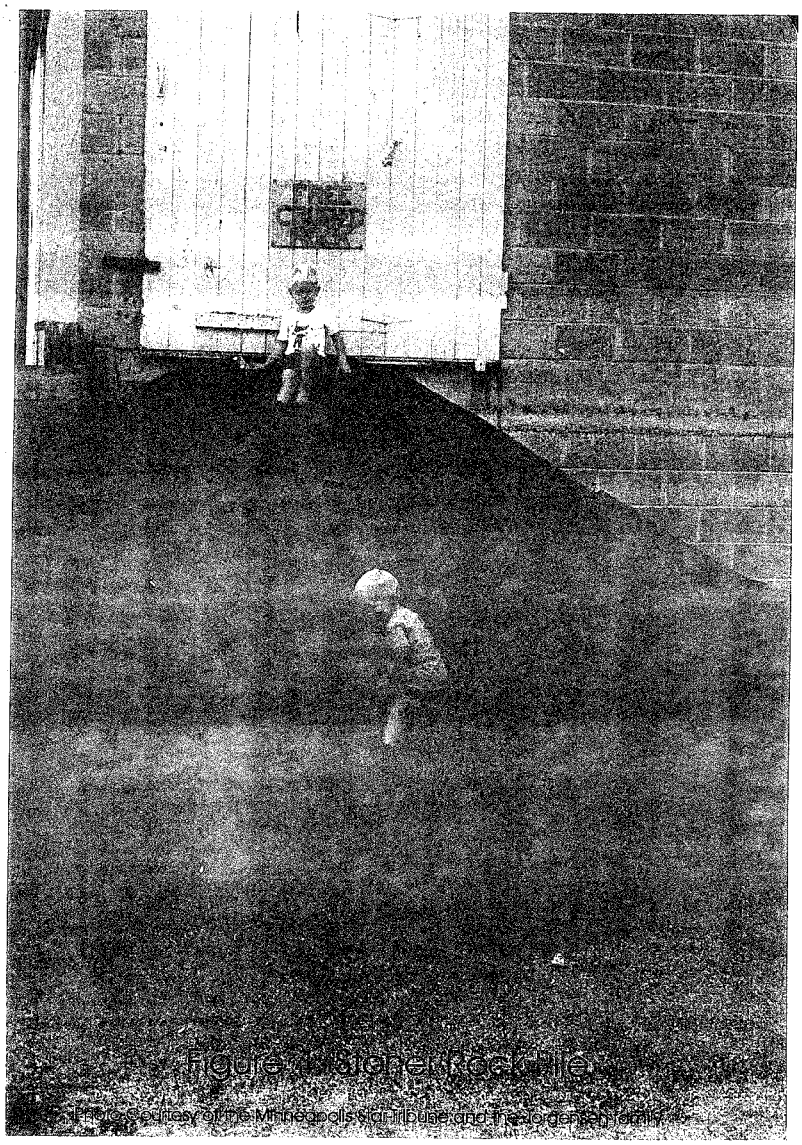


Figure 1: Sioux Rock Pile

Photo courtesy of the Minneapolis Star Tribune and Theodore Jensen family

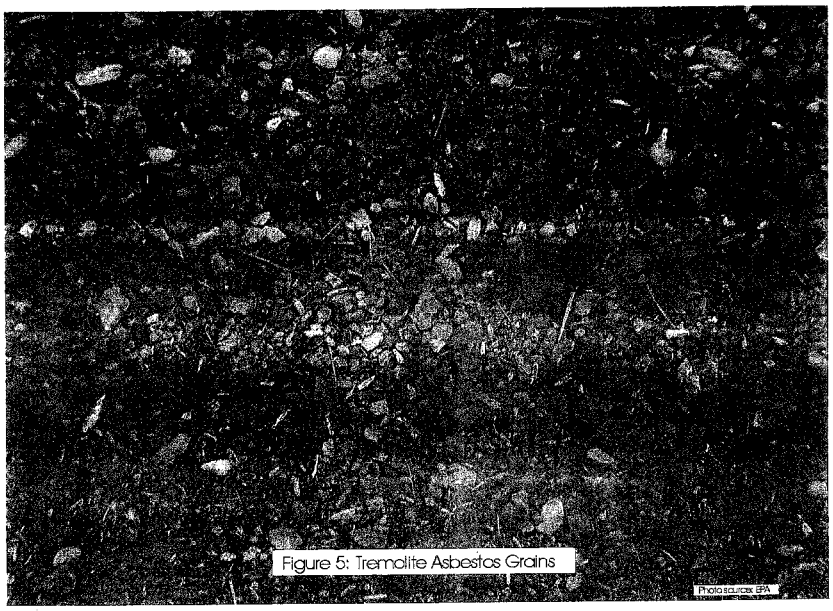
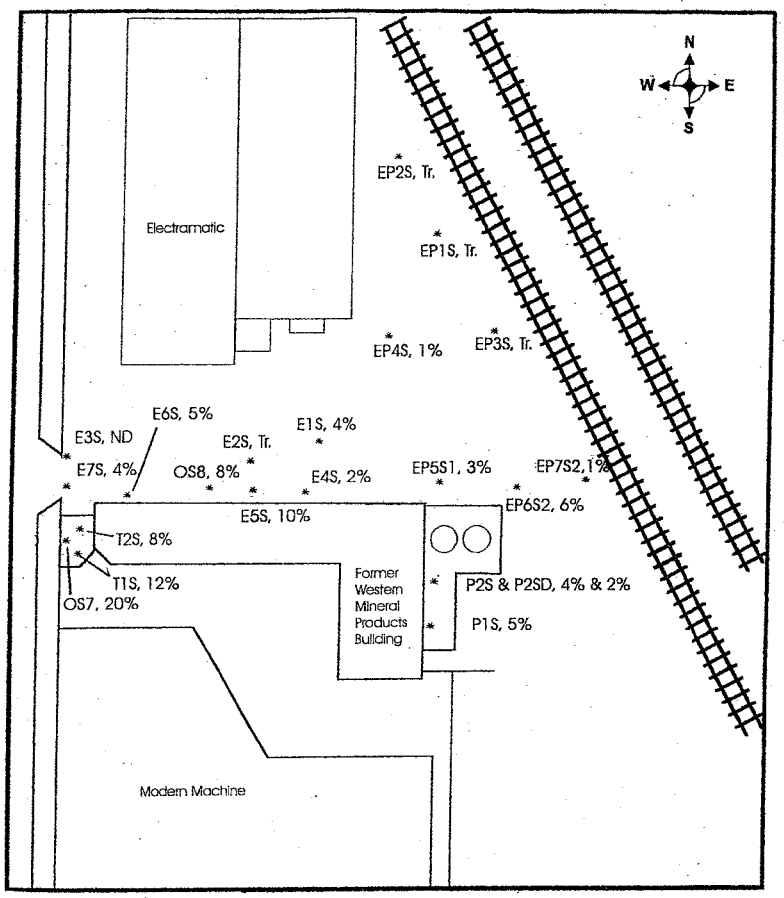


Figure 5: Tremolite Asbestos Grains



Source: Ecology & Environment 2000

* = Surface Soil Sample Location (Sample #, % Asbestos)
Tr. = Trace amount
ND = Non-Detect

Figure 6: Soil Sample Results

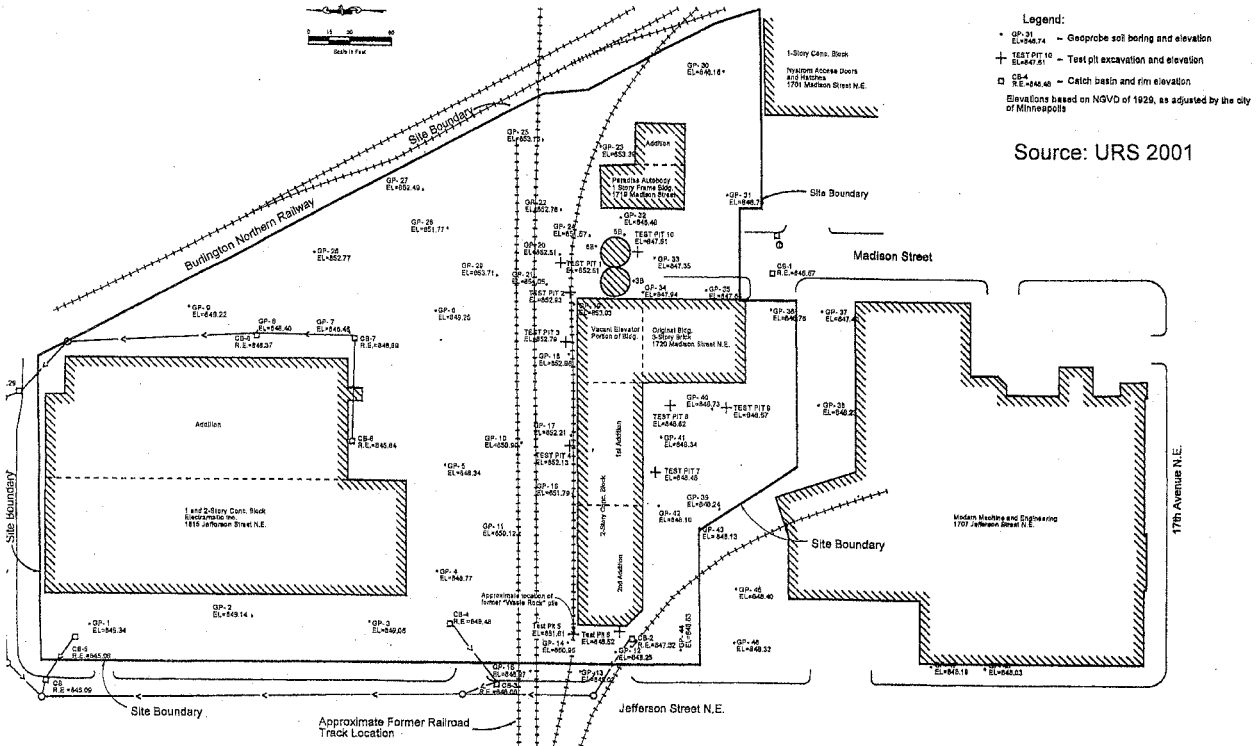
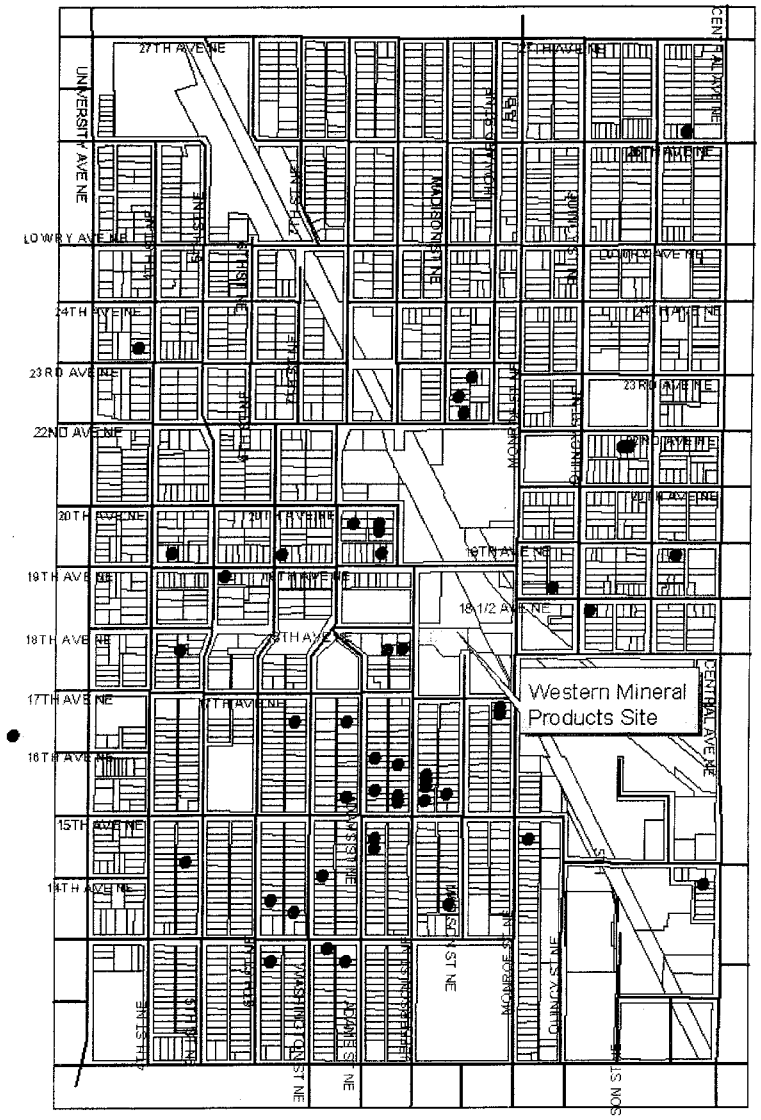


Figure 7: URS Soil Borings / Test Trenches


Western Mineral
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MONROE ST NE
QUINCY ST NE
MONROE ST NE
JEFFERSON ST NE
JACKSON ST NE
WASHINGTON

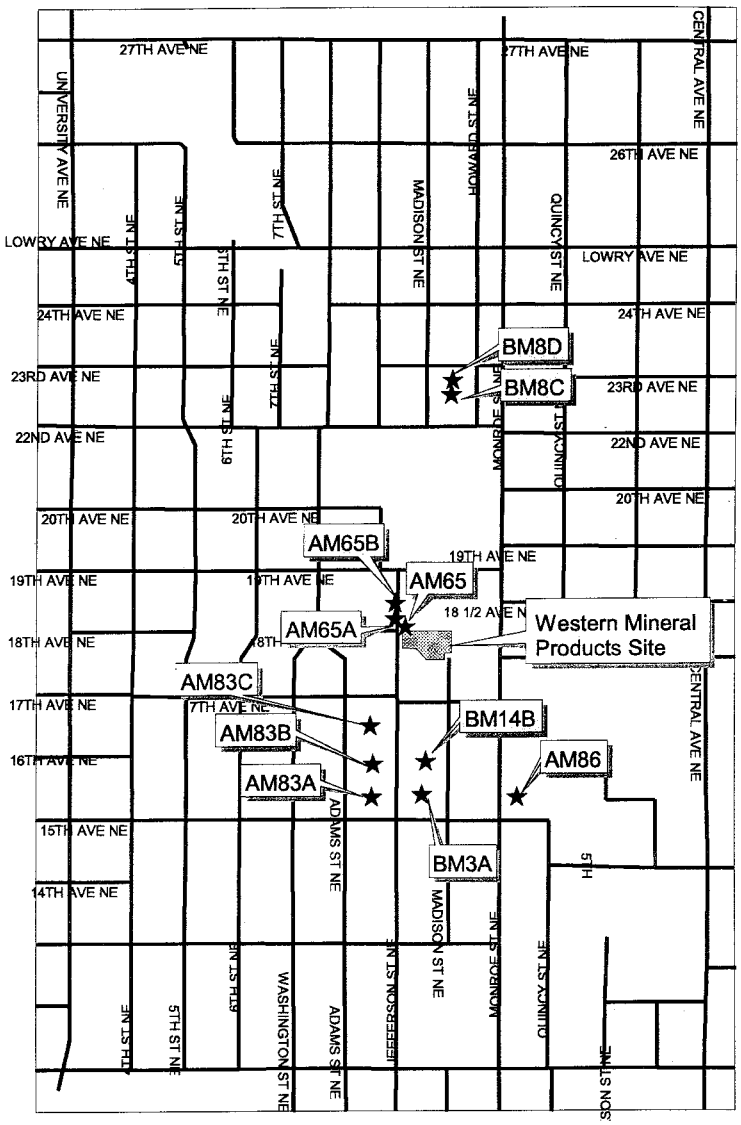

Figure 9: Ambient Air Monitoring Locations

N

0 0.1 0.2 0.3 0.4 0.5 Miles

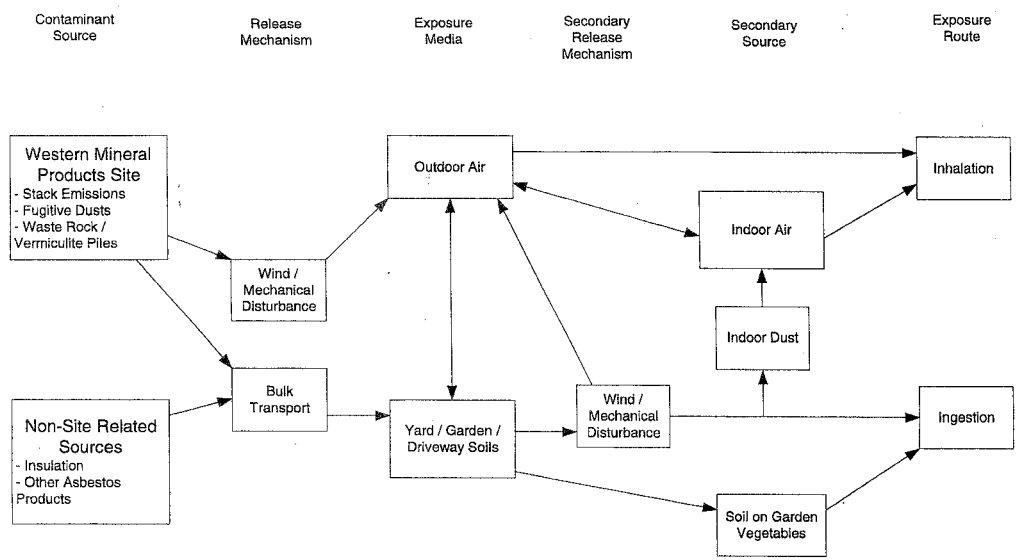

Figure 10: Conceptual Model of Exposure Pathways

Table 1

Beneficiated Ore Shipments from Libby, Montana to Minneapolis, MN
Tons per Year by Grade

Year	#0	#1	#2	#3	#4	#5	Total
1958	926	5,503	0	1,359	23		7,811
1959	942	5,743	160	1,861	32		8,738
1960	569	4,902	389	1,726	27		7,613
1961	924	4,042	204	1,482	49		6,701
1962	668	3,663	361	2,085	78		6,856
1963	411	2,958	2,152	1,700	39		6,556
1964	404	1,904	1,735	1,617	0		5,660
1965	324	1,582	1,427	1,509	183		5,025
1966	261	995	1,893	2,020	63		5,232
1967	161	892	1,705	2,301	0		5,059
1968	192	759	1,419	2,652	0		5,022
1969	456	1,061	1,252	1,776	163		4,708
1970	262	1,776	166	3,488	221		5,913
1971		1,621	195	2,445	34		4,295
1972		1,529	226	2,093	0		3,848
1973		2,096	161	2,691	0		4,948
1974		1,784	375	1,308	654		4,121
1975		1,256	343	1,064	1,076		3,739
1976		1,219	190	1,217	1,510		4,136
1977		2,137	254	627	1,816		4,834
1978		191	598	1,910	441		3,140
1979			1,424	2,464			3,888
1980			948	2,186			3,134
1981			759	2,188			2,947
1982			665	2,002			2,667
1983			1,046	2,195			3,241
1984			156	1,550			1,706
1985			162	2,156			2,318
1986			290	1,546			1,836
1987			259	1,581			1,840
1988			225	450			675
Totals:	6,500	47,613	21,139	57,249	6,409		138,207
Est. % Tremolite	(unk)	4-6	4-7	2-4	0.3-1	2-4	

(EPA 2000, data originally from Midwest Research Institute report, 1982.
EPA Report Number EPA 0717)

Average Tons per Year, 1958-1971: 6,085
Weighted Percentage of Tremolite in Ore: **4.38**

Average Tons per Year, 1972-1988: 3,119
Weighted Percentage of Tremolite in Ore: **3.52**

Source: HRO 2000a

Table 2

Soil Boring and Test Trench Analytical Results

Boring / Test Trench	Date Collected	Depth (feet)	Sample Interval, Inches	Asbestos Content, %	Vermiculite Content, %
GP-1	12/4/00	0-2	0-1.5	0	0
GP-1	12/4/00	0-2	4.5-5	0	0
GP-1	12/4/00	0-2	9.5-11	0	0
GP-1	12/4/00	2-4	45-48	0	0
GP-2	12/4/00	0.5-2	0-1.75	0	0
GP-2	12/4/00	0.5-2	5.25-7	0	0
GP-2	12/4/00	0.5-2	12.25-14	0	0
GP-2	12/4/00	2-4	33-36	0	0
GP-3	12/4/00	0-2	0-2	0	0
GP-3	12/4/00	0-2	6.25-8.5	**0.1**	1
GP-3	12/4/00	0-2	15-17	0	0
GP-3	12/4/00	2-4	33-36	0	0
GP-4	12/4/00	0-2	0-2	**0.1**	1
GP-4	12/4/00	0-2	6-8	0	0
GP-4	12/4/00	0-2	14-16	**0.001**	<1
GP-4	12/4/00	2-4	33-36	0	0
GP-5	12/4/00	0-2	0-2.25	**4.2**	1
GP-5	12/4/00	0-2	6.75-9	**0.04**	<1
GP-5	12/4/00	0-2	15.75-18.25	0	0
GP-5	12/4/00	2-4	29.5-32.5	0	<1
GP-6	12/4/00	0-2	0-2.25	**0.2**	<1
GP-6	12/4/00	0-2	7.5-9.75	**0.04**	<1
GP-6	12/4/00	0-2	17-19.5	**0.6**	<1
GP-6	12/4/00	2-4	33-36	**0.72**	1
GP-7	12/4/00	0-2	0-2.25	0	0
GP-7	12/4/00	0-2	6.25-8.5	0	0
GP-7	12/4/00	0-2	15-17	0	0
GP-7	12/4/00	2-4	45-48	0	0
GP-8	12/4/00	0-2	0.0.75	**0.008**	<1
GP-8	12/4/00	0-2	2.5-3.5	**0.002**	0
GP-8	12/4/00	0-2	6.5-7.5	**1.42**	<1
GP-8	12/4/00	2-4	45-48	0	0
GP-9	12/4/00	0-2	0-1.75	0	0
GP-9	12/4/00	0-2	4.5-6	0	0
GP-9	12/4/00	0-2	10.5-12	0	0
GP-9	12/4/00	2-4	33-36	0	0
GP-10	12/4/00	0-2	0-2.3	**0.2**	2
GP-10	12/4/00	0-2	7.25-9.5	**1.1**	10
GP-10	12/4/00	0-2	16.75-19	**0.003**	<1
GP-10	12/4/00	2-4	33-36	0	0
GP-11	12/4/00	0-2	0-1.5	**0.18**	<1
GP-11	12/4/00	0-2	4.5-6	**0.335**	<1
GP-11	12/4/00	0-2	10.5-12	**0.181**	<1
GP-11	12/4/00	2-4	33-36	**0.0157**	1-3
GP-11	12/4/00	4-6		0	<1
GP-12	12/5/00	0-2	0-2.5	**0.01**	<1
GP-12	12/5/00	0-2	7.75-10.5	**0.3**	2
GP-12	12/5/00	0-2	17.75-20.5	**0.5**	1
GP-12	12/5/00	2-4	29-32	**0.0145**	<1

Table 2

Soil Boring and Test Trench Analytical Results

Boring / Test Trench	Date Collected	Depth (feet)	Sample Interval, Inches	Asbestos Content, %	Vermiculite Content, %
GP-12	12/5/00	4-6		0	<1
GP-13	12/5/00	0-2	0-2	**0.033**	1
GP-13	12/5/00	0-2	6-8	**0.003**	0
GP-13	12/5/00	0-2	14-16	**0.0095**	<1
GP-13	12/5/00	2-4	33-36	0	0
GP-14	12/5/00	0-2	0-2.25	**0.7**	1
GP-14	12/5/00	0-2	7.25-9.75	**0.6**	5
GP-14	12/5/00	0-2	17-19.25	**0.8**	2
GP-14	12/5/00	2-4	33-36	**4.2**	95.8
GP-14	12/5/00	4-6		0	0
GP-15	12/5/00	0-2	0-2	**1.09**	3
GP-15	12/5/00	0-2	6.25-8.25	**0.46**	20
GP-15	12/5/00	0-2	14.38-16.25	0	0
GP-15	12/5/00	2-4	33-36	0	0
GP-16	12/5/00	0-2	0-1.9	**2.3**	55
GP-16	12/5/00	0-2	5.5-7.5	**1.31**	42
GP-16	12/5/00	0-2	13-15	**0.1**	30
GP-16	12/5/00	2-4	33-36	**0.03**	5
GP-16	12/5/00	4-6		0	0
GP-17	12/5/00	0-2	0-1.9	**3.4**	10
GP-17	12/5/00	0-2	5.5-7.4	**4.7**	10
GP-17	12/5/00	0-2	12.5-14.5	0	0
GP-17	12/5/00	2-4	24-27	0	20
GP-18	12/5/00	0-2	0-2	0	0
GP-18	12/5/00	0-2	5.75-7.75	0	0
GP-18	12/5/00	0-2	13.75-15.75	0	0
GP-18	12/5/00	2-4	33-36	0	0
GP-19	12/5/00	0-2	0-1.75	0	0
GP-19	12/5/00	0-2	5.25-7	**4.02**	96
GP-19	12/5/00	0-2	12-14	0	2-3
GP-19	12/5/00	2-4	33-36	0	10
GP-20	12/5/00	0-4	0-2.25	**0.1**	5
GP-20	12/5/00	0-4	7-9.25	0	0
GP-20	12/5/00	0-4	16.13-18.5	0	0
GP-21	12/5/00	0-2	0-2.25	**0.4**	<1
GP-21	12/5/00	0-2	7.25-9.25	**0.08**	<1
GP-21	12/5/00	0-2	14.8-18.25	**0.2**	<1
GP-21	12/5/00	2-4	33-36	**0.5**	99.5
GP-21	12/5/00	4-6		0	0
GP-22	12/5/00	0-2	0-1.75	**0.2**	<1
GP-22	12/5/00	0-2	4.9-6.5	0	0
GP-22	12/5/00	0-2	11.25-13	0	0
GP-22	12/5/00	2-4	33-36	**0.003**	90
GP-22	12/5/00	4-8		0	<1
GP-23	12/5/00	0-2	0-1.75	0	10
GP-23	12/5/00	0-2	4.9-6.5	0	<1
GP-23	12/5/00	0-2	11.25-13	0	0
GP-23	12/5/00	2-4	24-27	0	<1

Table 2

Soil Boring and Test Trench Analytical Results

Boring / Test Trench	Date Collected	Depth (feet)	Sample Interval, Inches	Asbestos Content, %	Vermiculite Content, %
GP-24	12/5/00	0-2	0-2	**0.8**	10
GP-24	12/5/00	0-2	5.75-7.75	**21.3**	64
GP-24	12/5/00	0-2	13.5-15.5	**1.2**	10
GP-24	12/5/00	2-4	33-36	**5.4**	35
GP-24	12/5/00	4-6		**0.139**	30
GP-24	12/5/00	6-8		0	0
GP-25	12/5/00	0-2	0-1.5	**0.04**	1
GP-25	12/5/00	0-2	4.75-6.4	**0.0998**	<1
GP-25	12/5/00	0-2	11-12.5	0	0
GP-25	12/5/00	2-4	33-36	0	0
GP-26	12/6/00	0-2	0-2.9	**0.04**	<1
GP-26	12/6/00	0-2	6.75-9	0	0
GP-26	12/6/00	0-2	15.9-18	0	0
GP-26	12/6/00	2-4	33-36	0	<1
GP-27	12/6/00	0-2	0-1.9	0	0
GP-27	12/6/00	0-2	5.75-7.5	0	0
GP-27	12/6/00	0-2	13.1-15.25	0	0
GP-27	12/6/00	2-4	33-36	0	<1
GP-28	12/6/00	0-2	0-2.25	**0.4**	<1
GP-28	12/6/00	0-2	7-9.25	0	0
GP-28	12/6/00	0-2	16.1-18.5	0	0
GP-28	12/6/00	2-4	33-36	**0.378**	<1
GP-28	12/6/00	4-6		0	0
GP-29	12/6/00	0-2	0-2.5	**1.508**	1-2
GP-29	12/6/00	0-2	7.5-9.75	**0.603**	0
GP-29	12/6/00	0-2	17.75-19.75	**0.176**	0
GP-29	12/6/00	2-4	33-36	**0.101**	<1
GP-29	12/6/00	4-6		0	0
GP-30	12/6/00	0-2	0-2.5	**0.002**	1
GP-30	12/6/00	0-2	7.5-10	**0.02**	<1
GP-30	12/6/00	0-2	17.5-20	0	<1
GP-30	12/6/00	2-4	33-36	0	0
GP-31	12/6/00	0-2	0-2.125	0	<1
GP-31	12/6/00	0-2	6.75-9	0	2
GP-31	12/6/00	0-2	15.9-18	0	0
GP-31	12/6/00	2-4	33-36	0	0
GP-32	12/6/00	0-2	0-1.9	**1.4**	10
GP-32	12/6/00	0-2	6-8	**1**	15
GP-32	12/6/00	0-2	14-16	**1.7**	3
GP-32	12/6/00	2-4	33-36	0	0
GP-33	12/6/00	0-2	0-2.5	**0.02**	0
GP-33	12/6/00	0-2	7-9.4	0	0
GP-33	12/6/00	0-2	16.25-18.75	0	0
GP-33	12/6/00	2-4	33-36	0	0
GP-34	12/6/00	0-4	0-1.9	**0.5**	20
GP-34	12/6/00	0-4	5.75-7.5	**0.02**	<1
GP-34	12/6/00	0-4	13-15	**0.03**	<1

Table 2

Soil Boring and Test Trench Analytical Results

Boring / Test Trench	Date Collected	Depth (feet)	Sample Interval, Inches	Asbestos Content, %	Vermiculite Content, %
GP-35	12/6/00	0-2	0-1.9	**0.6**	10
GP-35	12/6/00	0-2	4.25-6	**0.06**	2
GP-35	12/6/00	0-2	12.13-14	**0.03**	1
GP-35	12/6/00	2-4	33-36	0	0
GP-36	12/6/00	0-2	0-2.13	0	0
GP-36	12/6/00	0-2	6.75-9.125	0	0
GP-36	12/6/00	0-2	15.88-18.25	0	0
GP-36	12/6/00	2-4	36-39	0	<1
GP-37	12/6/00	0-2	0-1.9	0	0
GP-37	12/6/00	0-2	5.25-6.88	0	<1
GP-37	12/6/00	0-2	12.13-13.75	0	0
GP-37	12/6/00	2-4	33-36	0	0
GP-38	12/6/00	0-2	0-2.5	0	0
GP-38	12/6/00	0-2	7.5-9.75	0	<1
GP-38	12/6/00	0-2	17.75-19.75	0	0
GP-38	12/6/00	2-4	33-36	0	0
GP-39	12/6/00	0-2	0-2.13	**5.2**	1
GP-39	12/6/00	0-2	6.75-9	**0.5**	<1
GP-39	12/6/00	0-2	15.875	**0.1**	<1
GP-39	12/6/00	2-4	33-36	**0.003**	0
GP-39	12/6/00	4-6		0	0
GP-40	12/7/00	0-2	0-2.13	0	0
GP-40	12/7/00	0-2	6.75-9	0	0
GP-40	12/7/00	0-2	15.88-18	0	0
GP-40	12/7/00	2-4	33-36	**0.051**	2-3
GP-40	12/7/00	4-8		0	0
GP-41	12/7/00	0-2	0-2.25	0	0
GP-41	12/7/00	0-2	6.88-9.13	**0.05**	<1
GP-41	12/7/00	0-2	15.88-18.25	0	0
GP-41	12/7/00	2-4	37-40	**0.92**	1
GP-41	12/7/00	4-8		**0.3**	0
GP-42	12/7/00	0-2	0-2.25	**0.001**	<1
GP-42	12/7/00	0-2	6.88-9.13	**0.027**	1
GP-42	12/7/00	0-2	15.88-18.25	0	0
GP-42	12/7/00	2-4	33-36	0	0
GP-43	12/7/00	0-2	0-2.38	0	0
GP-43	12/7/00	0-2	7.13-9.5	**3.9**	10
GP-43	12/7/00	0-2	16.75-19	**0.2**	<1
GP-43	12/7/00	2-4	24-27	**0.038**	3-5
GP-43	12/7/00	4-7		0	0
GP-44	12/7/00	0-2	0-2.13	0	0
GP-44	12/7/00	0-2	6.25-8.5	**1.4**	10
GP-44	12/7/00	0-2	15-17	**1.2**	10
GP-44	12/7/00	2-4	33-36	0	0
GP-45	12/7/00	0-4	0-1.88	**0.8**	10
GP-45	12/7/00	0-4	5.25-7	0	0
GP-45	12/7/00	0-4	14.13-15.13	0	0
GP-46	12/7/00	0-2	0-1.88	0	0
GP-46	12/7/00	0-2	5.75-7.5	**1.5**	2

Table 2

Soil Boring and Test Trench Analytical Results

Boring / Test Trench	Date Collected	Depth (feet)	Sample Interval, Inches	Asbestos Content, %	Vermiculite Content, %
GP-46	12/7/00	0-2	13-15	**0.06**	<1
GP-46	12/7/00	2-4	24-27	0	1
GP-47	12/7/00	0-2	0-1.75	**0.1**	<1
GP-47	12/7/00	0-2	5-6.5	**0.7**	1
GP-47	12/7/00	0-2	11.25-13.25	**1.1**	4
GP-47	12/7/00	2-4	33-36	0	0
GP-48	12/7/00	0-4	0-2.75	**0.07**	<1
GP-48	12/7/00	0-4	7.88-10.5	**0.02**	<1
GP-48	12/7/00	0-4	18.25-20.75	0	<1
TP 1-1	12/7/00	0-2		**2.3**	
TP 1-2	12/7/00	5-6		0	
TP 2-1	12/7/00	2.5-3		**0.5**	
TP 2-2	12/7/00	0-2		**1.4**	
TP 3-1	12/7/00	0-1		**5.6**	
TP 3-2	12/7/00	2-3.5		**0.4**	
TP 4-1	12/7/00	0-1.5		**11**	
TP 4-2	12/7/00	2-2.5		**1.1**	
TP 5-1	12/7/00	2.5-4.5		**5.5**	
TP 5-2	12/7/00	4.5		**2.6**	
TP 6-1	12/8/00	0-0.5		**3**	
TP 6-2	12/8/00	0-0.5		**3.7**	
TP 7-1	12/8/00	1		**0.77**	
TP 7-2	12/8/00	3-4		**3.7**	
TP 8-1	12/8/00	2		**0.05**	
TP 8-2	12/8/00	3		**5.6**	
TP 9-1	12/8/00	0.5-1		**4.4**	
TP 9-2	12/8/00	0.7		**0.03**	
TP 10-1	12/8/00	2		**0.2**	
TP 10-2	12/8/00	2		**0.2**	

Samples analyzed using Polarized Light Microscopy (PLM), Method EPA/600/R-93/116

Source: URS 2001

Table 3
Ambient Air Sampling Results

Sample Location	Sample Date	Analytical Results (f/cc)	Total Asbestos Structures
BM3A	10/22/00	**0.0018**	2
BM8C	10/22/00	<0.0009	0
BM8D	10/22/00	<0.0009	0
BM14B	10/22/00	<0.0009	0
AM65A	10/31/00	**0.001**	1
AM65B	10/31/00	**0.0009**	1
AM65	10/31/00	**0.001**	1
AM83A	10/19/00	**0.0019**	2
	10/20/00	**0.0052**	5
	10/21/00	**0.0019**	2
	10/29/00	**0.001**	1
	10/31/00	<0.001	0
AM83B	10/19/00	<0.0009	0
	10/20/00	<0.001	0
	10/21/00	<0.0009	0
	10/29/00	<0.001	0
	10/31/00	<0.0009	0
AM83C	10/19/00	<0.0009	0
	10/20/00	<0.001	0
	10/21/00	**0.0009**	1
	10/29/00	<0.001	0
	10/31/00	<0.001	0
AM86	10/21/00	**0.0019**	2
	10/29/00	<0.001	0
	10/31/00	<0.0009	0

Bold indicates concentration above laboratory detection limit
Samples analyzed using TEM method, AHERA Protocol

Source: Weston 2001c

Appendix 1

City of Minneapolis Complaint Excerpts

August 1960:
"Dust is terrible – settles on everything. Considerable dust had settled on sidewalk and collected in curb in street. Visible dust up to two blocks down wind of plant."

May 1969:
"Last few years has been getting worse. They blow this stuff out at night. Brought in a sample of grass with white material mixed in it. Coats screens and windows. Even gets in thru windows and gets on pillows, etc. skin sensitive to it."

June 1969:
"Company has expanded over the years, that is why the dust problem has increased. The material comes out of their exhaust pipes and is from the process of making the insulation and also from the bagging operation. They do most of the bagging at night. Believes it to be a health hazard as it contains mica. Stings eyes and won't dissolve in the lungs. It is a waste product of their operation and they need dust collectors.....When this dust gets on windows and it rains, it makes the windows look like they have dirty mud on them. Seeps into the house and neighbors said it even covers their bed on occasion."

"Almost everyday of the week a white substance blows out of their roof vent creating a lot of dust particles in the air. Some days so thick looks like snow drifts on cars and ground. At lunch time if you are outside it blows in hair, eyes, and lungs. Gets in thru car vents. Just unbearable."

July 1969:
"Like a small snowstorm up there today, coming out of stack, ruining finish on his car, also others complain about the same thing."

September 1969:
"Zonolite is putting out as much dust as ever .....Also can see this white dust seven blocks from home...

July 1970:
"Noticed emissions from Zonolite, comes out so thick it looks like snow, comes into the house and makes the furniture white, is very gritty, permeates everything."

March 1971:
"Waves of dust coming out of Zonolite's stack. Hasn't been bad for a long time... but is overcast today and that is when the dust shows up the most."

April 1971:
"XYZ called, has a brand new camper truck, green – which is now all white because of Zonolites emissions.... There are dozens more who are getting this stuff all over their cars. It is like snow in the area. XYZ said they "wait" until it is cloudy before they blow the stuff out so people won't see it as much."

August 1971:
"Zonolite is driving them crazy – have to close windows, can't hang out sheets, sandy stuff flying all over, eyes burn, throat irritated, been especially bad the last 3 days. Materials gets on clean clothes, claims they run at night and it is very bad then too."

August 1971:
"Zonolite is blowing stuff out all the time, their eyes get full of it and burn, chests get clogged up, noses stuffed, grass gets full of the particles and when they mow the lawn, the air is choking with this stuff. So bad over the week-end, they could sit on their porch, couldn't even see the hi-rise 3 blocks away very good."

January 1974:
"Light dust coming from Zonolite, settling on cars."

August 1979:
"They burn something in the bldg as there is thick blue smoke coming out of the back part of the bldg. Haven't changed a bit over there, the ground surrounding the bldg are very messy, this flakes of stuff all over. Should be made to clean up their yard."

9:00 a.m.–12:00 p.m. Children (3 hours)
9:00 a.m.–9:45 a.m. Discussion of Current Definitions and their Interpretation (45 minutes)
NHRPAC Committee
9:45 a.m.–10:15 a.m. Children's Workgroup (30 minutes)
Alan Fleischman, M.D., Senior Vice President, NY Academy of Medicine, Clinical Professor of Pediatrics and Clinical Professor of Epidemiology & Social Medicine, Albert Einstein College, New York
10:15 a.m.–10:30 a.m. Break (15 minutes)
10:30 a.m.–11:45 a.m. Committee Discussion (1 hour, 15 minutes)
11:45 a.m.–12:00 p.m. The National Science Foundation and Human Subject Protections (15 minutes)
Rita Colwell, Ph.D., Director, National Science Foundation
12:00 p.m.–1:30 p.m. Lunch—on your own (1 hour, 30 minutes)
1:30 p.m.–3:00 p.m. Update: Social Science (1 hour, 30 minutes)
Felice Levine, Ph.D., Executive Officer, American Sociological Association (30 minutes)
Jeff Cohen, Ph.D., Director, Education, OHRP
Discussion (1 hour)
3:00 p.m.–3:15 p.m. Break (15 minutes)
3:15 p.m.–4:15 p.m. Public Comment (1 hour)
4:15 p.m.–5:00 p.m. Meeting Recap (45 minutes)
Review Recommendations:
Financial Relationships
Declaration of Helsinki
Genetics
Secondary Subjects
Children
Social Science
Mary Faith Marshall, Ph.D.
5:00 p.m. Thank You—Adjourn

Dated: March 20, 2001.

Greg Koski,

Director, Office for Human Research Protections.

[FR Doc. 01–7443 Filed 3–23–01; 8:45 am]

BILLING CODE 4150–17–M

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Agency for Toxic Substances and Disease Registry

[Program Announcement 01041]

Exposure to Tremolite Asbestos in Vermiculite Ore Site-Specific Health Activities; Notice of Availability of Funds

A. Purpose

The Agency for Toxic Substances and Disease Registry (ATSDR) announces the availability of fiscal year (FY) 2001 funds for a cooperative agreement program to conduct site-specific health activities related to human exposure to contaminated vermiculite ore at sites around the United States that received and/or processed ore from the mine in Libby, Montana.

This program addresses the "Healthy People 2010" focus area of Environmental Health. The purpose of the program is to assist public health agencies in conducting site-specific health activities related to human exposure to contaminated vermiculite ore at sites identified by the Environmental Protection Agency (EPA) as receiving and/or processing ore.

B. Eligible Applicants

Assistance will be provided only to public health agencies of States or their bona fide agents or instrumentalities. State organizations, including State universities, must establish that they meet their respective State legislature's definition of a State entity or political subdivision to be considered an eligible applicant.

Note: Public Law 104–65 states that an organization described in section 501(c)(4) of the Internal Revenue Code of 1986 that engages in lobbying activities is not eligible to receive Federal funds constituting an award, grant, cooperative agreement, contract, loan, or any other form.

C. Availability of Funds

Approximately $1,000,000 is available in FY 2001 to fund approximately 10 awards. It is expected that the average award will range from a maximum of $10,000 for the conduct of health statistics reviews to a maximum of $500,000 for epidemiologic investigations. It is expected that the awards will begin on or about either July 1, 2001 and will be made for a 12-month budget period within a project period of up to 3 years. Funding estimates may change.

Continuation awards within an approved project period will be made on the basis of satisfactory progress as evidenced by required reports and the availability of funds.

Use of Funds

Funds may be expended for reasonable program purposes, such as personnel, travel, supplies, and services. Funds for contractual services may be requested; however, the grantee, as the direct and primary recipient of PHS grant funds, must perform a substantive role in carrying out project activities and not merely serve as a conduit for an award to another party or provide funds to an ineligible party. Funds may not be used to purchase equipment.

D. Program Requirements

In conducting activities to achieve the purpose of this program, the recipient will be responsible for activities under 1. Recipient Activities, and ATSDR will be responsible for the activities listed under 2. ATSDR Activities.

1. Recipient Activities

a. For health statistics reviews: Analyze existing health outcome data of select asbestos-related diseases. Mortality data will be the most readily available data for asbestos-related diseases such as mesothelioma, lung cancer, and asbestosis, although cancer registry data should be utilized where available.

b. For epidemiologic investigations: Develop a protocol and conduct the recommended investigation. This protocol will undergo scientific peer review as required by ATSDR.

c. Provide proof by citing a State code or regulation or other State pronouncement under authority of law, that medical information obtained pursuant to the agreement will be protected from disclosure when the consent of the individual to release identifying information is not obtained.

d. Develop a mechanism for ongoing interaction with, and education of affected community.

2. ATSDR Activities

a. For the health statistics review: Make available to states both technical assistance and a standard protocol to use to analyze existing health outcome data of select asbestos-related diseases.

b. For epidemiologic investigations: Provide consultation and assist in monitoring the data; participate if requested in the study analysis and collaborate, if requested, in interpreting the study findings.

c. Conduct technical and peer review.

E. Application Content

In a narrative form, the application should include a discussion of areas under the "Evaluation Criteria" section of this announcement as they relate to the proposed program. These criteria serve as the basis for evaluating the application; therefore, omissions or incomplete information may affect the rating of the application. This program does not require in-kind support or matching funds, however, the applicant should describe any in-kind support in the application.

The narrative should be no more than 30 pages, double-spaced, printed on one-side, with 1" margins, and

unreduced fonts (font size 12 point) on 8½" by 11" paper. The pages must be clearly numbered, and a complete index to the application and its appendices must be included. The original and two copies of the application must be submitted unstapled and unbound.

F. Submission and Deadline

Application

Submit the original and two copies of PHS 5161–1 (OMB Number 0937–0189). Forms are available at the following Internet address: *www.cdc.gov/*. . . *Forms*, or in the application kit. The proposed timetable for receiving new applications and making awards is shown below:

Submission deadlines	Review dates	Award dates
May 1, 2001	June 1, 2001	July 1, 2001.
August 1, 2001	September 1, 2001	September 30, 2001.

On or before above dates, submit the application to the Grants Management Specialist identified in the "Where to Obtain Additional Information" section of this announcement.

Deadline: Applications shall be considered as meeting the deadline if they are either:

(1) Received on or before the deadline date; or

(2) Sent on or before the deadline date and received in time for submission to the independent review group. (Applicants must request a legibly dated U.S. Postal Service postmark or obtain a legibly dated receipt from a commercial carrier or U.S. Postal Service. Private metered postmarks shall not be acceptable as proof of timely mailing.)

Late Applications: Applications which do not meet the criteria in (1) or (2) above are considered late applications, will not be considered, and will be returned to the applicant.

G. Evaluation Criteria

Each application will be evaluated individually against the following criteria by an independent review group appointed by ATSDR.

1. Proposed Program (50 Percent)

The extent to which the application addresses (a) the approach, feasibility, adequacy, and rationale of the proposed project design; (b) the technical merit of the proposed project, including the degree to which the project can be expected to yield results that meet the program objective as described in the Background (attachment II) sections of this announcement and the technical merit of the methods and procedures (including quality assurance and quality control procedures) for the proposed project; (c) the proposed project timeline, including clearly established project objectives for which progress toward attainment can and will be measured; (d) the proposed community involvement strategy; (e) the proposed method to disseminate the results to State and local public health officials, community residents, and other concerned individuals and organizations; and (f) the degree to which the applicant has met the CDC Policy requirements regarding the inclusion of women, ethnic, and racial groups in the proposed research. This includes the proposed plan for the inclusion of both sexes and racial and ethnic minority populations for appropriate representation.

2. Program Personnel (30 Percent)

The extent to which the application has described (a) the qualifications, experience, and commitment of the principal investigator (or project director) and his/her ability to devote adequate time and effort to provide effective leadership; and (b) the competence of associates to accomplish the proposed activity, their commitment, and the time they will devote.

3. Applicant Capability and Coordination Efforts (20 Percent)

The extent to which the application has described (a) the capability of the applicant's administrative structure to foster successful scientific and administrative management of a study; (b) the capability of the applicant to demonstrate an appropriate plan for interaction with the community; (c) the suitability of facilities and (d) equipment available or to be purchased for the project.

4. Program Budget—(Not Scored)

The extent to which the budget is reasonable, clearly justified, and consistent with intended use of cooperative agreement/grant funds.

5. Human Subjects (Not Scored)

Does the application adequately address the requirements of Title 45 CFR Part 46 for the protection of human subjects?

H. Other Requirements

Technical Reporting Requirements

Provide CDC and ATSDR with original plus two copies of—

1. Annual progress reports;
2. Financial status report, no more than 90 days after the end of the budget period; and
3. final financial and performance reports, no more than 90 days after the end of the project period.

Send all reports to the Grants Management Specialist identified in the "Where to Obtain Additional Information" section of this announcement.

The following additional requirements are applicable to this program. For a complete description of each, see Attachment I in the application kit.

AR–1 Human Subjects Requirements
AR–2 Requirements for Inclusion of Women and Racial and Ethnic Minorities in Research
AR–7 Executive Order 12372 Review
AR–9 Paperwork Reduction Act Requirements
AR–10 Smoke-Free Workplace Requirements
AR–11 Healthy People 2010
AR–12 Lobbying Restrictions
AR–17 Peer and Technical Reviews of Final Reports of Health Studies—ATSDR
AR–18 Cost Recovery—ATSDR
AR–19 Third Party Agreements—ATSDR

I. Authority and Catalog of Federal Domestic Assistance Number

This program is authorized under section 104 (i)(1)(E), (7), (14) and (15) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 [42 U.S.C. 9604 (i)(1)(E)(6),(7),(14), and (15)]. The Catalog of Federal Domestic Assistance number is 93.161.

J. Where To Obtain Additional Information

A complete copy of the announcement may be downloaded from CDC's home page on the Internet at: *http://www.cdc.gov*. Click on "Funding" then "Grants and Cooperative Agreements." To receive

additional written information and to request an application kit, call 1-888-GRANTS4 (1-888-472-6874). You will be asked to leave your name and address and will be instructed to identify the Announcement number of interest.

If you have questions after reviewing the contents of all the documents, business management technical assistance may be obtained from: Nelda Y. Godfrey, Grants Management Specialist, Grants Management Branch, Procurement and Grants Office, Centers for Disease Control and Prevention, Room 3000, 2920 Brandywine Road, Atlanta, GA 30341-4146, Telephone number (770) 488-2722, E-mail address nag9@cdc.gov.

For program technical assistance, contact:

Sharon Campolucci, RN, MSN, Deputy Director, Division of Health Studies, Agency for Toxic Substances and Disease Registry, Executive Park, Building 4, Suite 2300, Atlanta, GA 30305, Telephone (404) 639-6200, E-mail Address *ssc1@cdc.gov*.

or

Maggie Warren, Funding Resource Specialist, Division of Health Studies, Agency for Toxic Substances and Disease Registry, 1600 Clifton Rd., NE., Mail Stop E-31, Atlanta, GA 30333, Telephone (404) 639-5114, E-mail Address *mcs9@cdc.gov*.

Dated: March 20, 2001.

Georgi Jones,

Director, Office of Policy and External Affairs, Agency for Toxic Substances and Disease Registry.

[FR Doc. 01-7347 Filed 3-23-01; 8:45 am]

BILLING CODE 4163-70-P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Administration for Children and Families

Preliminary Finding of No Significant Impact

AGENCY: Administration on Children, Youth and Families (ACYF), ACF, DHHS.

ACTION: Final Finding of No Significant Impact.

SUMMARY: The Administration for Children and Families published a Notice in the **Federal Register** on November 9, 2000, (65 FR 67377) notifying interested parties that a Draft Programmatic Environmental Assessment issued by ACF was available for review and comment. The document assessed the environmental impacts of activities undertaken by Head Start and Early Head Start grantees when purchasing, renovating or constructing child care facilities with grant funds. This document was prepared in accordance with the National Environmental Policy Act of 1969, as amended, the regulations of the Council on Environmental Quality (40 CFR 1500-1508), and the Revised General Administration Manual, HHS Part 30, Environmental Protection. ACF received no comments on the Draft Programmatic Environmental Assessment. ACF reviewed the conclusion of the Environmental Assessment (EA), and agreed with its findings.

In the **Federal Register** on January 25, 2001, (66 FR 7768) ACF invited public comment on a preliminary determination that regulates governing the purchase, construction and renovation of Head Start and Early Head Start child care centers. They will not have a significant impact on the quality of the human environment and that preparation of an environmental impact statement will not be necessary. ACF received no comments on the preliminary determination pertinent to the findings of the Environmental Assessment. ACF is therefore issuing a Final Finding of No Significant Impact by finding that regulations governing the purchase, construction and renovation of Head Start and Early Head Start child care centers will not have a significant impact on the quality of the human environment. ACF finds that the preparation of an environmental impact statement will not be necessary.

DATES: This finding is effective on March 26, 2001.

FOR FURTHER INFORMATION CONTACT: Douglas Klafehn, Acting Associate Commissioner, Head Start Bureau, Administration on Children, Youth and Families, P.O. Box 1182, Washington, DC 20013; (202) 205-8572.

SUPPLEMENTARY INFORMATION: Head Start and Early Head Start are authorized under the Head Start Act (42 U.S.C. 9801 *et seq.*). It is a national program providing comprehensive developmental services to low-income preschool children, primarily from age three to the age of compulsory school attendance, and their families.

Early Head Start programs enroll children from birth to three years old and pregnant women. To help enrolled children achieve their full potential, Head Start and Early Head Start programs provide comprehensive health, nutritional, educational, social and educational services. ACF has proposed amendments to existing Head Start regulations (45 CFR part 1309) to establish procedures for grantees to apply to use grant funds to cover the cost of constructing and making major renovations to Head Start and Early Head Start facilities and the steps necessary to protect the Federal interest in those facilities. The regulations at 45 CFR part 1309 currently establish procedures for grantees to request to use Head Start and Early Head Start grant funds to purchase facilities and to protect the Federal interest in those facilities. The authority for use of Head Start and Early Head Start grant funds to purchase, construct or undertake major renovations is found in Section 644 (f) and (g) of the Head Start Act.

ACF prepared and published for comment a Draft Environmental Assessment on November 9, 2000, (65 FR 67377). The alternatives assessed included the Proposed Action, which would include the full range of authorized activities including facility purchase, new construction and major renovation. The Alternative Action to the Proposed Action assessed a more restrictive alternative in which only minor construction and renovations would be conducted. The No Action Alternative under which only incidental alterations and renovations would be conducted was also assessed. The assessment considered the Proposed Action, Alternative Action and the No Action Alternative and the effects of each on water quality, air quality, noise, land use, transportation, waste management, human health and safety, soils, vegetation and wildlife, wetlands, cultural resources, socioeconomic factors, environmental justice, recreation, aesthetics, public services and utilities.

ACF has chosen to implement the Proposed Action. Environmental resources may be affected by implementing the Proposed Action and these impacts are analyzed in the Programmatic Environmental Assessment. Given the nationwide nature of this Assessment and the variety of possible environmental conditions, it was not deemed prudent to define the affected environment for all possible sites. Instead, the Assessment identifies circumstances, which may result in significant impacts, which must be avoided or mitigated when costs of purchasing, constructing or making major renovations to a Head Start facility are met with grant funds. In the course of implementing the Proposed Action, there will be some impacts to environmental resources. Most of these impacts, however, are expected to be minimal, largely due to mitigating measures during the site

U.S. Department of Labor

Office of the Solicitor
4015 Wilson Boulevard
Arlington, Va 22203

December 15, 2000

Ms. Anita Canovas
Assistant General Counsel
National Trust for Historic Preservation
1785 Massachusetts Avenue, N.W.
Washington, D.C. 20036

Dear Ms. Canovas:

This is in response to your request to clarify information contained in my November 29 letter to Mr. Timothy Biddle of Crowell & Moring. You posed several questions to the agency which we will attempt to answer.

You asked whether MSHA found asbestos at the Louisa Mine operated by Virginia Vermiculite, Ltd. MSHA did find asbestos at the Louisa facility. On August 14, 2000 three MSHA industrial hygienists were sent to investigate an allegation of the existence of a health hazard related to asbestos at the mine. They collected samples of ore and rock from several areas on the mine property. Twelve of the 20 samples of solid material from the site were found by testing to contain tremolite and actinolite forms of asbestos. The concentrations of tremolite asbestos and actinolite asbestos found in these solid samples varied from .05 to 99%.

You asked whether for workers and residents, how MSHA characterizes the hazard of tremolite/actinolite. Tremolite asbestos and actinolite asbestos are toxic substances for which exposure by miners is regulated. Exposure over these limitations may cause serious health risks for miners who are exposed to tremolite and actinolite. A potential hazard exists for any individual exposed to airborne concentrations of asbestos but the agency does not regulate exposure to these substances by non-miners. I am enclosing a copy of a program information bulletin which MSHA issued in March 2000 to all mine operators which addresses some of these points.

You asked whether MSHA has authority to regulate consumer products taken off mine property. MSHA does not regulate the contents of materials taken off mine property and MSHA does not characterize the risk to downstream users of Virginia

Vermiculite. MSHA inspectors did collect one sample of consumer product material as it was leaving the property. The laboratory analysis did not identify asbestos in this sample. MSHA is unable to state whether the sample was representative of all material produced at Virginia Vermiculite.

You asked the agency to describe the air samples in context of MSHA's exposure limit to tremolite and actinolite and that of the Occupational Safety and Health Administration's exposure limit to those substances. During the August investigation, industrial hygienists took samples of the air in areas where the miners were working. At MSHA's request, one of the airborne material samples was analyzed by the OSHA laboratory using a scanning electron microscope. The presence of asbestiform fibers was confirmed in this sample, but the amount of asbestos was not quantified. MSHA regulations prohibit any miner to be exposed to more than 2.0 fibers per cubic centimeter of air for an 8-hour work shift. However, the current Occupational Safety and Health Administration (OSHA) permissible exposure limit, sets the limit at 0.1 fibers per cubic centimeter. MSHA issues citations against mine operators only if MSHA's standards are violated.

MSHA issued two citations, dated October 2, 2000, to Virginia Vermiculite, Ltd. The first was for failure to barricade or post with warning signs areas where health hazards are present. These areas included both active workings and waste piles where samples of material showed the presence of asbestos. The second was for failure to address potential asbestos hazards during the required workplace examinations. Copies of the citations are attached.

Sincerely,

Mark Malecki
Trial Attorney

Enclosure

U.S. Department of Labor

Mine Safety and Health Administration
4015 Wilson Boulevard
Arlington, Virginia 22203-1984

ISSUE DATE: March 2, 2000

PROGRAM INFORMATION BULLETIN NO. P00-3

FROM: J. DAVITT McATEER
Assistant Secretary
for Mine Safety and Health

SUBJECT: Potential Exposure to Airborne Asbestos on Mining Properties

To whom does this bulletin apply?
This information applies to miners, mine operators, independent contractors and Mine Safety and Health Administration (MSHA) enforcement personnel.

What is the purpose of this bulletin?
This bulletin reminds the mining industry and MSHA enforcement personnel of the potential health hazards from exposure to airborne asbestos fibers. In recent weeks, there have been a series of news reports on asbestos-related illnesses among people living in one Montana mining community. These reports have raised concern about potential asbestos exposure for miners, their families and communities.

Background
The Montana case described above concerned a vermiculite mine which operated for over 50 years and closed in 1989. The vermiculite ore was known to contain tremolite asbestos, a rare type of asbestos. Over its years of operation, the mine released asbestos-containing dust into the community, and miners unknowingly carried the dust home on their clothing and in their personal vehicles. The U.S. Environmental Protection Agency (EPA) and other Federal and state government agencies are coordinating clean-up activities and providing medical examinations to the residents.

What is asbestos?
Asbestos is a generic term used to describe six fibrous mineral silicates: chrysotile, crocidolite, amosite, tremolite asbestos, anthophylite asbestos, and actinolite asbestos. Asbestos occurs naturally, and is found in seams or veins in some igneous or metamorphic rocks.

Asbestos is dangerous when its microscopic fibers become airborne and are inhaled or swallowed. The best way to prevent asbestos-related diseases is to avoid breathing these fibers.

How would miners be exposed to asbestos?
There are two ways that miners could be exposed to asbestos. The first is through the rock or ore being processed at the mine; the second is through commercial products at the mine that contain asbestos.

Where is asbestos found in rock or ore?
Asbestos occurs naturally and is found in seams or veins in some igneous or metamorphic rocks. Dust samples collected by MSHA have found asbestos fibers at primarily talc mines, vermiculite mines, and asbestos mines. MSHA believes that most miners in the United States are not at risk of exposure to asbestos; however, asbestos-containing rock does exist at a limited number of U.S. mining operations. At these operations, mine operators must ensure that asbestos-containing ore or rock is identified and measures are in place to protect miners from overexposure to asbestos-containing dust.

How would miners be exposed to asbestos in commercial products found at a mine?
Buildings or preparation plants at older mining operations may have asbestos-containing material, such as thermal insulation, fire-resistant construction materials, reinforced cement or industrial filters. Asbestos has been used in commercial products because it is resistant to heat and chemicals and has high tensile strength and flexibility.

Floor tiles, insulation or other sealed products containing asbestos are not inherently hazardous. However, if the material containing asbestos is torn, demolished or disturbed in any way, the asbestos fibers can become airborne and pose a health threat If an object contains asbestos or you suspect that it contains asbestos, you should consult with your MSHA District Manager in order to contact the EPA Regional Office. Depending on the location, condition and other factors related to the asbestos-containing product, EPA may recommend that it be repaired, enclosed, encapsulated or removed.

If you are planning to remove asbestos-containing material, for example, you are demolishing an old preparation plant, EPA requires you to have the project managed by a trained professional. There are also state laws that govern the safe handling and disposal of asbestos-containing material.

Why is asbestos a health hazard?
Asbestos consists of microscopic bundles of fibers that may

become airborne when material containing asbestos is disturbed. Once airborne, these fibers can be inhaled or swallowed and can cause significant health problems. These include:

Asbestosis: As asbestos fibers are inhaled, they become trapped in the lungs. An acid is produced by cells responding to the fibers. This acid may produce scars in the lung tissue surrounding the fiber. Scarring of the lungs may become so severe the lung cannot function properly. The latency period (meaning the time it takes for the disease to develop after exposure) can be 20-40 years.

Mesothelioma: This is a highly fatal cancer of the pleura (the outer lining of the lung) or the peritoneum (the lining of the abdominal wall). The only known cause of this form of cancer is exposure to asbestos. The latency period for this type of cancer can be 15-30 years.

Other forms of cancer: Exposure to asbestos can cause lung cancer, and may lead to cancers of the digestive system. The latency period for these cancers is also quite long. Smoking, together with asbestos exposure, makes an individual extremely susceptible to lung cancer. A smoker may be five times more likely to develop lung cancer than a nonsmoker who was also exposed to asbestos.

How do I ensure that miners are not exposed to asbestos at my operation?

The first step is to determine if the rock or ore you mine contains asbestos. If it does, you should have a plan in place to ensure that miners are protected from dust containing asbestos. Some operators mark seams that contain asbestos and they do not mine or process it. Other operators use water sprays and extra dust suppression methods so that asbestos-containing dust is not generated. If you are concerned that miners may be exposed to asbestos, please contact your local MSHA office for more information and assistance.

If asbestos is present, MSHA regulations prohibit any miner to be exposed to more than 2 fibers per cubic centimeter (one cubic centimeter equals one milliliter) of air for an 8 hour work shift (30 CFR 71.702, 56/57.5001(b)). However, the current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) is based on more recent scientific data and sets the limit at 0.1 fibers per cubic centimeter. Lower exposure limits do provide improved protection. MSHA therefore urges mine operators to achieve lower exposure limits and will work closely with miners and mine operators to minimize exposures and improve controls. MSHA is preparing to propose a new health

standard for asbestos which would lower the exposure limit to a more protective level.

In addition, miners need to be trained in the hazards associated with asbestos exposure and how to avoid it. If asbestos-containing dust is generated at your operation, you should establish proper clean-up and housekeeping measures to ensure that fibers do not become airborne. You should use water to suppress the dust and wet sweep or use a vacuum with a high-efficiency filter that is specifically designed to capture asbestos fibers. You should never use compressed air, a shovel, dry sweeping or other dry clean-up method to remove asbestos from the work area.

When asbestos-containing dust is generated that could contaminate miners' work clothes:

- Protective clothing that is disposable or has been appropriately cleaned should be provided each day.
- Work clothes should be vacuumed using a specially-designed asbestos vacuum before being removed.
- Respirators should be worn and not taken off until any asbestos-contaminated clothing is removed.
- Workers should not take clothing home with them.
- Shower and changing facilities should be provided for miners to ensure that asbestos is not carried into employees' homes.

Will a respirator protect me from airborne asbestos?
Respiratory protection can be used to prevent airborne asbestos from being inhaled. However, respirators must not be considered the primary control for exposure to airborne asbestos fibers. Respiratory protection should be used as a supplement to effective engineering controls. The critical issue is the proper engineering control of respirable dust and maintenance of these controls. This approach most effectively reduces exposures to not only asbestos fibers, but silica and other contaminants as well.

When respirators are required, you must use respirators approved by the National Institute for Occupational Safety and Health (NIOSH) as suitable to protect workers from asbestos fibers. Miners required to wear respirators must be properly fit-tested and trained. You must also establish a formal respiratory protection program that complies with ANSI Z88.2-1969.

If asbestos is present at my mining operation, what training on the hazards of asbestos should a miner have?
Training should include:

- the health hazards associated with exposure to asbestos;
- where asbestos is present in the work place;
- what controls have been installed to minimize exposure;
- how to use and maintain controls;
- proper use of personal protective equipment; and
- what to do if asbestos is accidently released from materials containing asbestos.

What is the authority for this bulletin?
30 CFR 48.11, 56/57.5001(b)/5002/5005/15006/18006, 70.305, 71.702, 72.710.

Who are the contact persons for this bulletin?
Metal and Nonmetal Mine Safety and Health, Health Division
Gene Autio, (703) 235-8307

Coal Mine Safety and Health, Health Division
Robert A. Thaxton, (703) 235-1358

Is this bulletin on the Internet?
This Program Information Bulletin may be viewed on the World Wide Web by accessing the MSHA home page (http://www.msha.gov) and then choosing "Statutory and Regulatory Information" and "Compliance Assistance Information." Additional information on asbestos and mineral fibers is also available in the "Introduction To Operator Air Sampling Programs" located at http://www.msha.gov/S&HINFO/OPRSAMP/COVER.HTM.

Who will receive this bulletin?
Program Policy Manual Holders
Mine Operators
Independent Contractors
Special Interest Groups

Virginia Vermiculite Samples

Date Sent	Lab	Sample#	Type	Results	
08/28/2000	OSHA	B38	Bulk	85% Tremolite	
		B40	Bulk	0.5% Tremolite	
		B41	Bulk	None Detected	
		B42	Bulk	None Detected	
		B45	Bulk	50% Tremolite	
		B46	Bulk	20% Tremolite	
		TOTAL - 6			
08/28/2000	OSHA	T-11	Air	0.043 f/cm3	Total fiber count performed
		T-12	Air*	0.078 f/cm3	Total fiber count performed
		T-13	Air*	0.43 f/cm3	Total fiber count performed
		T-14	Air	0.04 f/cm3	Total fiber count performed
		T-15	Blank		
		P-24	Air	0.067 f/cm3	Total fiber count performed
		P-16	Air*	0.16 f/cm3	Total fiber count -Asbestiform fibers present
		P-17	Air*	0.1 f/cm3	Total fiber count performed
		P-20	Air	0.03 f/cm3	Total fiber count performed
		P-21	Air	0.04 f/cm3	Total fiber count performed
		P-22	Air	0.043 f/cm3	Total fiber count performed
		P-23	Air	0.073 f/cm3	Total fiber count performed
		P-12	Air	0.064 f/cm3	Total fiber count performed
		P-13	Air*	0.093 f/cm3	Total fiber count performed
		P-18	Air*	0.14 f/cm3	Total fiber count performed
		P-15	Air	0.025 f/cm3	Total fiber count performed
		P-14	Air	0.033 f/cm3	Total fiber count performed
		P-19	Blank		
		T-6	Air	0.025 f/cm3	Total fiber count performed
		T-7	Air	0.026 f/cm3	Total fiber count performed
		T-8	Air	0.055 f/cm3	Total fiber count performed
		T-9	Air	0.012 f/cm3	Total fiber count performed
		T-10	Air	0.037 f/cm3	Total fiber count performed
		T-2	Blank		
		TOTAL - 24			
08/16/2000	OSHA	T-Blank	Blank		
		T-1	Air	0.005 f/cm3	Total fiber count performed
		T-2	Air	0.024 f/cm3	Total fiber count performed
		TA-1	Air-Area	0.032 f/cm3	Total fiber count performed
		TA-2	Air-Area	0.0059 f/cm3	Total fiber count performed
		M-Blank	Blank		
		M-1 *	Air	0.12 f/cm3	Total fiber count performed
		M-2 *	Air	0.094 f/cm3	Total fiber count performed
		M-3 *	Air	0.059 f/cm3	Total fiber count performed
		M-4 *	Air	0.037 f/cm3	Total fiber count performed
		TA-3 *	Air-Area	0.045 f/cm3	Total fiber count performed
		P-1 *	Air	0.058 f/cm3	Total fiber count performed
		P-2 *	Air-Area	0.0099 f/cm3	Total fiber count performed
		P-3 *	Air-Area	0.014 f/cm3	Total fiber count performed
		P-4 *	Air-Area	0.074 f/cm3	Total fiber count performed
		P-5 *	Air-Area	0.0059 f/cm3	Total fiber count performed
		P-6 *	Air	0.044 f/cm3	Total fiber count performed
		P-7 *	Air	0.032 f/cm3	Total fiber count performed
		P-9 *	Air	0.2 f/cm3	Total fiber count performed
		P-10 *	Air-Area	None detected	Total fiber count performed
		P-11 *	Air	0.12 f/cm3	Total fiber count performed
		B-1	Bulk	80% Tremolite	
		B-2	Bulk	80% Tremolite	
		B-3	Bulk	None detected	
		B-10	Bulk	None detected	
		B-17	Bulk	90% actinolite	
		B-19	Bulk	None detected	
		B-20	Bulk	None detected	
		B-24	Bulk	1% actinolite	
		B-26	Bulk	70% Tremolite/actinolite	
		B-27	Bulk	99% actinolite	
		B-31	Bulk	None detected	
		B-32	Bulk	99% Tremolite	
		B-34	Bulk	20% Tremolite	
		B-36	Bulk	None detected	
		TOTAL - 21 (air); 14 (bulk)			
09/05/2000	RJ Lee	B36	Bulk	None Detected	
Method-		B37	Bulk	None Detected	
EPA 600/R-93/116		B43	Bulk	Actinolite at >0.8 mm	
		B47	Bulk	None Detected	
	UEC-USX	B36	Bulk	None Detected	
Method -		B37	Bulk	None Detected	
EPA 600/M4-82-0		B43	Bulk	None Detected	
		B47	Bulk	None Detected	
		TOTAL - 4 (RJ Lee); 4 (UEC-USX)			
09/08/2000	RJ Lee	P-13	Air	TEM-absent	
Method- NIOSH 7402		P-18	Air	Not analyzed	
		P-16	Air	Not analyzed	
		P-17	Air	Not analyzed	
		P-23	Air	Not analyzed	
		T-12	Air	Not analyzed	
		T-13	Air	Not analyzed	
		TOTAL - 7			
09/12/2000	RJ Lee	P-9	Air	<0.0031f/cc	
Method- NIOSH 7402		P-11	Air	TEM-absent	
		M-1	Air	TEM-absent	
		TOTAL - 3			

Note: "B" denotes bulk samples

Note from OSHA lab: Method ID-191 was used on bulk samples; Method ID-160 was used on air samples

* consecutive samples

R. Stanson
Via Teasley
11/18/03

ine Citation/Order

U.S. Department of Labor
Mine Safety and Health Administration

ction I–Violation Data

Date Mo Da Yr	2. Time (24 Hr. Clock)		3. Citation/ Order Number
10/02/2000	1405		7708063

Served To	5. Operator
ed Gumble, general manager	VIRGINIA VERMICULITE LTD.

Mine	7. Mine ID
. E. SANSOM MINE & MILL	44-05101 (Contractor)

Condition or Practice — 8a. Written Notice (103g) ☐

'he mine operator was not addressing potential asbestos hazards during the 'equired workshift examinations. Workplaces were not examined each shift to .dentify areas containing asbestos, employees were not notified of the .ocations where asbestos was found, and appropriate action was not taken to :ontrol employee exposure.

See Continuation Form (MSHA Form 7000-3a) ☐

. Violation	A. Health ☐ Safety ☐ Other ☐	B. Section of Act	C. Part/Section of Title 30 CFR	56.18002a

ection II–Inspector's Evaluation

0. Gravity:

A. Injury or Illness (has) (is): No Likelihood ☐ Unlikely ☐ Reasonably Likely ☐ Highly Likely ☒ Occurred ☐

B. Injury or Illness could reasonably be expected to be: No Lost Workdays ☐ Lost Workdays Or Restricted Duty ☐ Permanently Disabling ☒ Fatal ☐

C. Significant and Substantial: Yes ☒ No ☐ — D. Number of Persons Affected: 010

11. Negligence (check one) A. None ☐ B. Low ☐ C. Moderate ☐ D. High ☒ E. Reckless Disregard ☐

12. Type of Action 104a — 13. Type of Issuance (check one) Citation ☒ Order ☐ Safeguard ☐

14. Initial Action A. Citation ☐ B. Order ☐ C. Safeguard ☐ D. Written Notice ☐ — E. Citation/ Order Number — F. Dated Mo Da Yr

15. Area or Equipment

16. Termination Due	A. Date Mo Da Yr	B. Time (24 Hr. Clock)	
	10/10/2000	1600	

Section III–Termination Action

17. Action to Terminate

18. Terminated	A. Date Mo Da Yr	B. Time (24 Hr. Clock)	

Section IV–Automated System Data

19. Type of Inspection (activity code)	20. Event Number	21. Primary or Mill	
09	0543475	P	

22. Signature William D. McKinney — 23. AR Number 1951

MSHA Form 7000-3, Mar 85 (revised) In accordance with the provisions of the Small Business Regulatory Enforcement Fairness Act of 1996, the Small Business Administration has established a National Small Business and Agriculture Regulatory Ombudsman and 10 Regional Fairness Boards to receive comments from small businesses about federal agency enforcement actions. The Ombudsman annually evaluates enforcement activities and rates each agency's responsiveness to small business. If you wish to comment on the enforcement actions of MSHA, you may call 1-888-REG-FAIR (1-888-734-3247), or write the Ombudsman at 500 W. Madison Street, Suite 1240, Chicago, Illinois 60661. Please note, however, that your right to file a comment with the Ombudsman is in addition to any other rights you may have, including the right to contest citations and proposed penalties and obtain a hearing before the Federal Mine Safety and Health Review Commission.

Mine Citation/Order

U.S. Department of Labor
Mine Safety and Health Administration

Section I—Violation Data

1. Date: Mo Da Yr 10/02/2000
2. Time (24 Hr. Clock): 1400
3. Citation/Order Number: 7708062
4. Served To: Ned Gumble, general manager
5. Operator: VIRGINIA VERMICULITE LTD.
6. Mine: R. E. SANSOM MINE & MILL
7. Mine ID: 44-05101 (Contractor)
8. Condition or Practice — 8a. Written Notice (103g) ☐

Areas of the mine where asbestos is present were not barricaded or posted with warning signs displaying the nature of the hazard and protective action required. These areas included both active workings and waste piles where rock containing asbestos had been discarded.

See Continuation Form (MSHA Form 7000-3a) ☐

9. Violation: A. Health ☐ Safety ☐ Other ☐; B. Section of Act; C. Part/Section of Title 30 CFR: 56.20011

Section II—Inspector's Evaluation

10. Gravity:
A. Injury or Illness (has) (is): No Likelihood ☐ Unlikely ☐ Reasonably Likely ☒ Highly Likely ☐ Occurred ☐
B. Injury or Illness could reasonably be expected to be: No Lost Workdays ☐ Lost Workdays Or Restricted Duty ☐ Permanently Disabling ☒ Fatal ☐
C. Significant and Substantial: Yes ☒ No ☐
D. Number of Persons Affected: 010

11. Negligence (check one): A. None ☐ B. Low ☐ C. Moderate ☒ D. High ☐ E. Reckless Disregard ☐

12. Type of Action: 104a
13. Type of Issuance (check one): Citation ☒ Order ☐ Safeguard ☐

14. Initial Action: A. Citation ☐ B. Order ☐ C. Safeguard ☐ D. Written Notice ☐
E. Citation/Order Number
F. Dated: Mo Da Yr

15. Area or Equipment

16. Termination Due: A. Date: Mo Da Yr 10/10/2000; B. Time (24 Hr. Clock): 1600

Section III—Termination Action

17. Action to Terminate

18. Terminated: A. Date: Mo Da Yr; B. Time (24 Hr. Clock)

Section IV—Automated System Data

19. Type of Inspection (activity code): 09
20. Event Number: 0543475
21. Primary or Mill: P

22. Signature: William D. McKinney
23. AR Number: 1951

MSHA Form 7000-3, Mar 85 (revised) In accordance with the provisions of the Small Business Regulatory Enforcement Fairness Act of 1996, the Small Business Administration has established a National Small Business and Agriculture Regulatory Ombudsman and 10 Regional Fairness Boards to receive comments from small businesses about federal agency enforcement actions. The Ombudsman annually evaluates enforcement activities and rates each agency's responsiveness to small business. If you wish to comment on the enforcement actions of MSHA, you may call 1-888-REG-FAIR (1-888-734-3247), or write the Ombudsman at 500 W. Madison Street, Suite 1240, Chicago, Illinois 60661. Please note, however, that your right to file a comment with the Ombudsman is in addition to any other rights you may have, including the right to contest citations and proposed penalties and obtain a hearing before the Federal Mine Safety and Health Review Commission.

[Whereupon, at 4:30 p.m., the committee was adjourned.]

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