



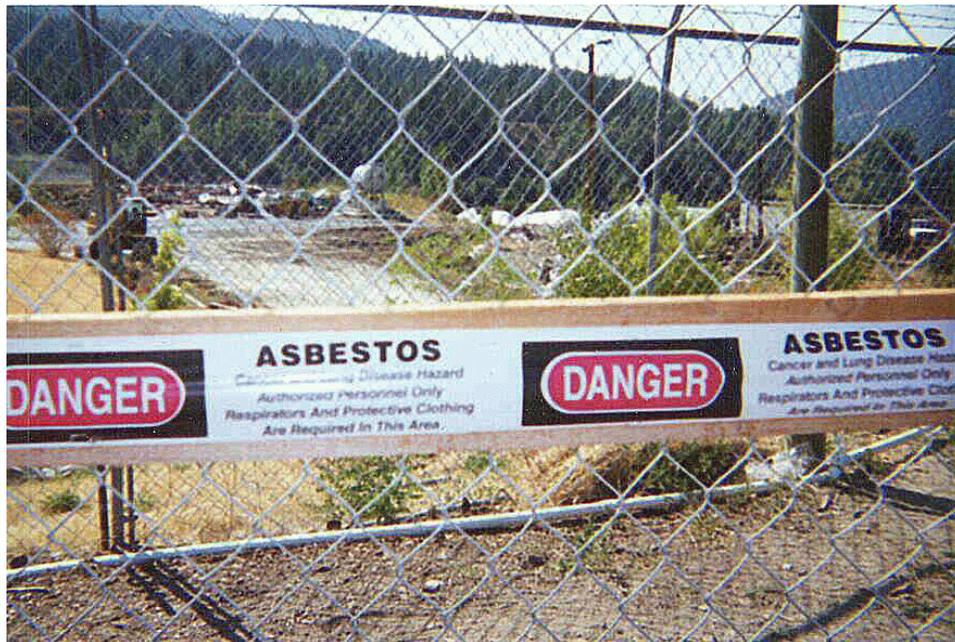
Office of Inspector General

Report

EPA's Actions Concerning Asbestos-Contaminated Vermiculite in Libby, Montana

2001-S-7

March 31, 2001



**Former Site of Screening Plant and Tree Nursery and
Current Superfund Removal Site**

**On the tape: Asbestos
Cancer and Lung Disease Hazard
Authorized Personnel Only
Respirators And Protective Clothing
Are Required In This Area**

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Office of Research and Development

Office of Enforcement and Compliance Assurance

Photographs were courtesy of: Region 8 and Mel and Lerah Parker.

Picture on the cover: This is a picture of W. R. Grace's former screening plant location which a family moved onto in 1993 and owned and operated a tree nursery. Currently, this site is being cleaned up by EPA's Superfund removal program. See more pictures and details on page 9 and page 18 of this report.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE INSPECTOR GENERAL

March 31, 2001

MEMORANDUM

SUBJECT: EPA's Actions Concerning Asbestos-Contaminated Vermiculite
in Libby, Montana
Report 2001-S-7

TO: Christine Todd Whitman
The Administrator

In response to the June 27, 2000, request from three Environmental Protection Agency (EPA) offices, this is a report concerning the EPA's actions related to asbestos-contaminated vermiculite that was mined near Libby, Montana. The report reviews EPA's involvement and identifies barriers, some of which still exist, that may have prevented additional action to protect the health of those living near the mine. It also contains recommendations for additional EPA actions which I believe are necessary to address the risks posed by asbestos, vermiculite, and other asbestos-contaminated materials.

This report describes issues and recommendations the Office of Inspector General (OIG) believes will help protect human health and the environment from exposure to asbestos. As such, it represents the opinion of the OIG. Final determinations on matters in the report will be made by EPA managers in accordance with established EPA resolution procedures. Accordingly, the issues described in this report do not necessarily represent the final EPA position and are not binding upon EPA in any enforcement proceedings brought by EPA or the Department of Justice.

I have no objection to the further release of this report to the public. I would appreciate a response to the report within 90 days of the report date. The response should include an action plan with milestone dates for planned corrective actions. Please track all corrective actions in the Management Audit Tracking System.

Report 2001-S-7

My staff and I appreciate the cooperation and courtesy of the EPA staff with whom we met during the review. We would be glad to discuss the results of our review and our recommendations in detail, if needed. Should you or your staff have any questions regarding the report, please call me at 202-260-3137 or Frances E. Tafer at 202-260-2824.

/S/

Nikki L. Tinsley

cc: Michael Shapiro, Acting Assistant Administrator for
Solid Waste and Emergency Response
Stephen Johnson, Acting Assistant Administrator for
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Jack McGraw, Acting Regional Administrator, Region 8
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EXECUTIVE SUMMARY

INTRODUCTION

In November 1999, the media ran a series of newspaper articles which reported that miners and their families in the area of Libby, Montana died or became ill from exposure to asbestos-contaminated vermiculite ore, which has been mined near Libby since the 1920s. Subsequently, the media reported that Environmental Protection Agency (EPA) officials knew about the exposure to asbestos and the dangers it posed, but did not take any action. Following these articles, EPA officials requested that we conduct this review. Specifically, we sought to determine:

- ❑ What actions EPA took to address the asbestos exposure to citizens in Libby.
- ❑ Barriers EPA faced, and may continue to face, in addressing the issue.

RESULTS IN BRIEF

Although EPA made attempts to address contaminant asbestos exposure like that in Libby, those attempts did not result in regulations or other controls that might have protected the citizens of Libby. EPA has only recently taken specific action to address the asbestos exposure at Libby. Currently, EPA is focusing on an aggressive Superfund cleanup at Libby and other sites that received vermiculite from Libby. EPA is not currently addressing prevention of exposures at other asbestos or asbestos-contaminated ore, rock, and mineral processing sources and related facilities, such as beneficiation, exfoliation, textile, and manufacturing plants, that use and process asbestos or contaminant asbestos.

While EPA is making decisions to address serious public health issues, such as asbestos-contaminated vermiculite, EPA continues to face barriers. These barriers prevented EPA from sufficiently addressing asbestos-contaminated vermiculite at Libby. EPA's efforts were hampered by fragmented authority and jurisdiction within EPA and between it and other agencies. Also, EPA was hindered internally by ineffective communication. EPA's ability to determine the degree of human health risk associated with asbestos-contaminated vermiculite was also impeded by limitations of science, technology, and health effects data. Furthermore, EPA did not place emphasis on dealing with asbestos-contaminated vermiculite due to funding constraints and competing priorities. For example, a 1983 letter sent by an EPA official stated "... asbestos-contaminated vermiculite is considered a lower priority at this time than problems posed by friable asbestos-containing materials in school buildings and commercial and industrial uses of asbestos."

EPA did not issue regulations under air and toxic substances statutes that could have protected Libby citizens from exposure to asbestos-contaminated vermiculite. According to EPA, other issues, such as asbestos in schools and commercial asbestos products, were given higher priority.

If barriers, such as fragmented authority and jurisdiction coupled with ineffective communications, had not existed, EPA might have done more to address asbestos-contaminated vermiculite in the Libby area and other similar situations. However, these barriers hindered EPA's actions, and many of the barriers may still exist and affect EPA's actions today.

RECOMMENDATIONS

In addition to the continuing response actions related to Libby, we recommend that EPA, in partnership with other Federal organizations and states, assess asbestos or asbestos-contaminated ore, rock, and mineral processing sources and facilities (and immediate surrounding areas) that may be similar although unrelated to Libby. Should the Libby-related work and/or these assessments find concerns regarding human health and the environment, we recommend that EPA determine short and long-term actions necessary to protect human health and the environment. In particular, we recommend that EPA consider the need for:

- Removal or remedial action under the Superfund program;
- Regulation of contaminant asbestos under the Clean Air Act;
- Regulation of asbestos in ambient air under the Clean Air Act;
- Regulation of products contaminated with asbestos under the Toxic Substances Control Act; and/or
- Statutory changes to address asbestos and asbestos-contaminated materials.

We also recommend that EPA document the decisions reached and supporting rationale for the options above and any other decisions or options considered.

AGENCY RESPONSE

On March 27, 2001, the Acting Assistant Administrator for Solid Waste and Emergency Response provided a consolidated EPA response with suggested changes to the draft report. Because of the size of the response we did not include it in its entirety in this report, but can provide it to you upon request. We have, however, excerpted pertinent parts in Appendix 4 with our comments.

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ABBREVIATIONS

ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
EPA	Environmental Protection Agency
MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emissions Standard for Hazardous Air Pollutants
OIG	Office of Inspector General
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
ORD	Office of Research and Development
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act
TSCA	Toxic Substances Control Act

CHAPTER 1

INTRODUCTION

This report presents the results of our review of the Environmental Protection Agency's (EPA) actions to address asbestos-contaminated vermiculite in Libby, Montana. We performed this review in response to a June 27, 2000, letter to the Inspector General from EPA's former Assistant Administrator for Solid Waste and Emergency Response; the former Acting Assistant Administrator for Prevention, Pesticides, and Toxic Substances; and the former Acting Regional Administrator for Region 8. This request was also endorsed by Congressional officials from Montana. Following media reports starting in November 1999 that workers and their families in the Libby area died or became ill from exposure to asbestos-contaminated vermiculite, EPA requested that we conduct this review. There were reports that EPA was aware of the situation and had not taken action.

OBJECTIVES

Our objectives were to determine:

- What actions EPA took to address the asbestos exposure to citizens in Libby.
- Barriers EPA faced, and may continue to face, in addressing the issue.

SCOPE AND METHODOLOGY

We reviewed past and present EPA activities relative to asbestos-contaminated vermiculite in Libby. We conducted our review from July 2000 through January 2001. The review focused on the activities of several EPA offices. Even though we examined some correspondence between EPA and W. R. Grace & Company (Grace), the owner/operator of the Libby mine since 1963, we focused our attentions on EPA activities and not those of Grace.

Given the nature of this request - a review of historical events spanning more than 20 years - we did not perform all of the activities normally required by professional audit standards, such as certain aspects of planning the review, gaining an understanding of the management controls, and evaluating compliance with laws and regulations.

Appendix 1 presents additional information on the scope and methodology.

BACKGROUND

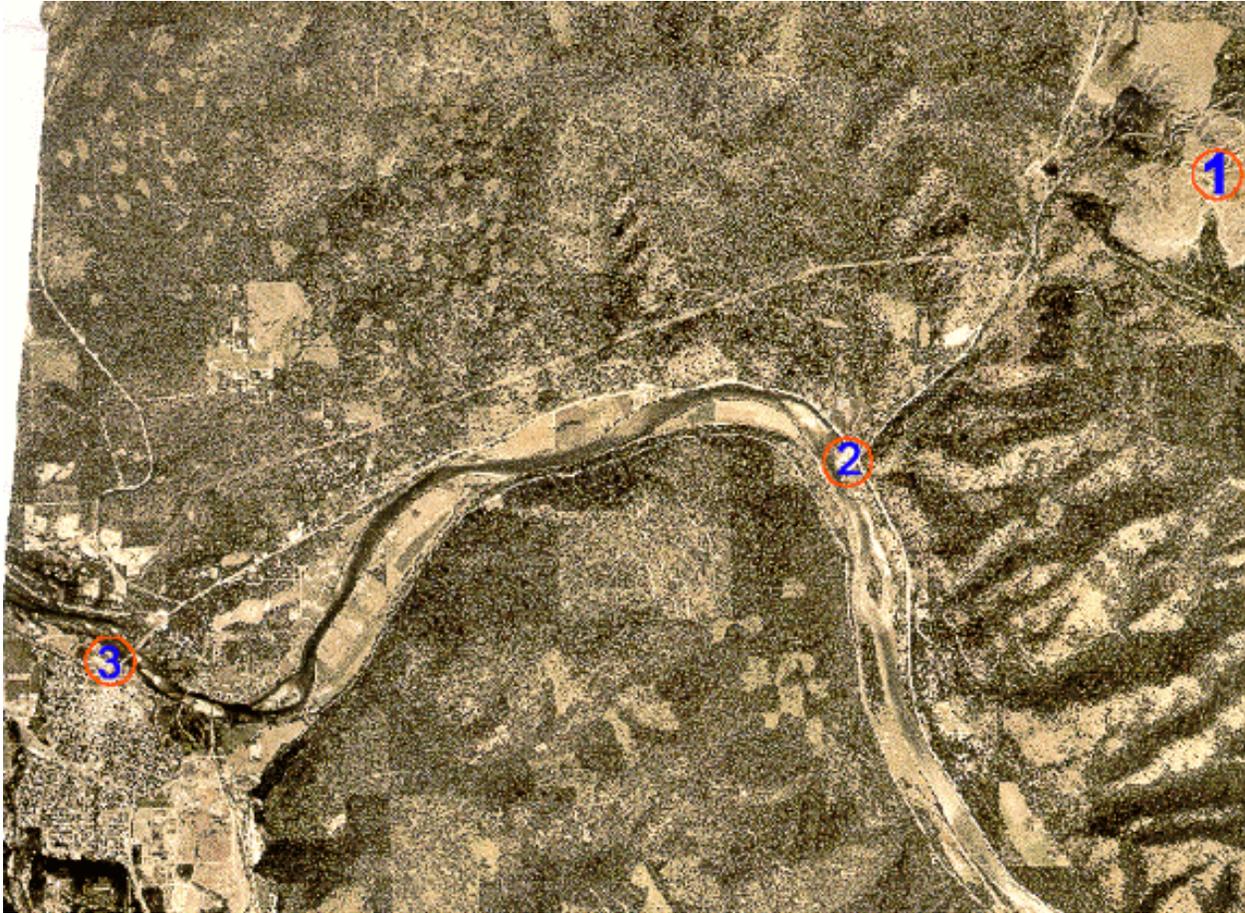
Libby and the Grace Mine

Libby, Montana is a small city of approximately 3,000 residents. In 1881, the mineral vermiculite was discovered on a hill located about ten miles northeast of Libby, and vermiculite mining began in the 1920s. Grace owned and operated the mine from 1963 until its closing in the early 1990s. While in operation, the mine produced approximately 80% of the world's supply of vermiculite. Vermiculite has been used in building insulation, fireproofing, and as a soil conditioner.

On the mine property, the vermiculite ore was milled and beneficiated (partially cleaned) of impurities. These impurities included another mineral, a toxic form of naturally-occurring asbestos called tremolite asbestos. After the milling process, the ore was taken to three locations that were either in or near Libby:

- ❑ A screening plant where the ore was graded, transported by conveyor belt over the Kootenai River, and shipped by railroad to other processing plants around the country.
- ❑ An exfoliating (expanding) plant, which operated from the 1920s until its demolition in 1949. At this plant, it is believed that the beneficiated ore was heated until it expanded, then placed into bags for shipping.
- ❑ A second exfoliating and export plant operated from the 1950s until 1990.

As the ore was mined and processed, dust that included tremolite asbestos was released into the air. Workers inhaled the asbestos fibers and some contracted asbestosis, a lung disease which can be fatal. Workers also contracted lung cancer, a cancer of the lung lining called mesothelioma, and other asbestos-related diseases. Diseases stemming from the exposure to asbestos may not be apparent until 30 years after the initial exposure. Even though the Libby mine closed in the early 1990s, many residents, including former workers, have been recently diagnosed with asbestos-related diseases. In addition, a mortality study by the Agency for Toxic Substances and Disease Registry (ATSDR), for the 20-year period ending in 1998, showed that mortality in the Libby community resulting from asbestosis was approximately 40-60 times higher than expected. ATSDR is currently studying lung disease within the Libby community and has released interim results. The final results of the study are expected in mid 2001.



Aerial View of W.R. Grace & Company Facilities

Key

- 1 Location of W.R. Grace & Company mine and mill on Vermiculite Mountain
- 2 Location of screening plant
- 3 Location of exfoliation/export plant
(Location of another exfoliation plant is unknown)

Governmental Agencies' Initial Involvement with Libby Mine

The first governmental agency to visit the Libby mine was the Montana State Board of Health, which was enforcing the state's Industrial Hygiene Act of 1939. This agency began inspecting the mine in 1941 and found problems with the amount of dust generated by the activity. In a 1956 inspection report, asbestos was identified as a component of the dust in the mine and, in the opinion of the state inspector, exceeded the guidelines for asbestos. In a 1962 report, the asbestos was identified as tremolite. By this time, state officials were consulting with the Federal Department of Health, Education, and Welfare about the asbestos. The Montana State Board of Health and its successor agencies continued to inspect the mine for air violations.

By 1961 the Federal Department of the Interior, Bureau of Mines, had begun performing inspections at Libby. In October 1971, the Bureau of Mines issued a notice to Grace about the excessive asbestos dust. However, in October 1975, the Mining Enforcement and Safety Administration (the successor to the Bureau of Mines) terminated the notice following the installation of a new wet mill by Grace to control excess dust.

EPA's Statutory Authorities and Associated Offices

In 1970, EPA was created with a mission to protect the environment and public health. For our review, we evaluated EPA's authority under four major laws:

- ❑ Clean Air Act (originally enacted in 1970), administered by EPA's Office of Air and Radiation.
- ❑ Toxic Substances Control Act (originally enacted in 1976), administered by EPA's Office of Prevention, Pesticides, and Toxic Substances.
- ❑ Resource Conservation and Recovery Act (originally enacted in 1976), administered by the Office of Solid Waste and Emergency Response.
- ❑ Comprehensive Environmental Response, Compensation, and Liability Act (or Superfund) (originally enacted in 1980), also administered by the Office of Solid Waste and Emergency Response.

Details on these laws are in Appendix 2.

In addition, EPA's Office of Enforcement and Compliance Assurance oversees compliance with U.S. environmental laws and encourages the regulated community to focus on pollution prevention. EPA's Office of Research and Development is responsible for the research and development needs of the EPA's operating programs. EPA regional offices are responsible for implementing, or overseeing states' implementation of environmental laws within their jurisdiction. EPA's Region 8 includes Montana.

CHAPTER 2

EPA ACTIONS

Although EPA made attempts to address contaminant asbestos exposure like that in Libby, those attempts did not result in regulations or other controls that might have protected the citizens of Libby. EPA has only recently taken specific action to address the asbestos exposure at Libby. Currently, EPA is focusing on an aggressive Superfund cleanup at Libby and other sites that received Libby vermiculite. EPA is not currently addressing prevention of exposures at other asbestos or asbestos-contaminated ore, rock, and mineral processing sources and related facilities, such as beneficiation, exfoliation, textile, and manufacturing plants, that use and process asbestos or contaminant asbestos.

EPA was prevented by various barriers from sufficiently addressing asbestos-contaminated vermiculite. Fragmented authority and jurisdiction with other agencies and within EPA, combined with ineffective communication, made taking actions difficult. Limitations of science, technology, and health effects data provided impediments in EPA's determining the degree of health risk at Libby. Furthermore, due to funding constraints and competing priorities, EPA did not place emphasis on dealing with asbestos-contaminated vermiculite. For example, a 1983 letter sent by an EPA official stated "... asbestos-contaminated vermiculite is considered a lower priority at this time than problems posed by friable asbestos-containing materials in school buildings and commercial and industrial uses of asbestos."

Following is a discussion, by statute, of the options available to EPA and the actions taken. In Chapter 3, we discuss the barriers encountered by EPA in dealing with asbestos-contaminated vermiculite.

CLEAN AIR ACT

In 1973, EPA issued the first regulation controlling emissions from asbestos-processing facilities and other sources of asbestos. The regulation, the National Emissions Standard for Hazardous Air Pollutants (NESHAP) for asbestos covers milling to produce commercial asbestos, manufacturing, and fabrication products that contain commercial asbestos; renovation and demolition of structures containing regulated asbestos-containing material; and asbestos waste disposal requirements. The asbestos NESHAP does not regulate materials (such as quarried rock and gravel) having asbestos as a contaminant or the mining of ores contaminated with asbestos, such as the vermiculite mined at Libby.

In the early 1970s, little was known about the extent and effects of contaminant asbestos. Thus, EPA focused on commercial asbestos products (materials containing asbestos that gave the product its value), such as asbestos brake linings. EPA officials said that once they finished the commercial asbestos NESHAP, they intended to revisit the area of contaminant asbestos and, if needed, regulate it under a separate NESHAP. According to EPA, a separate NESHAP for

contaminant asbestos would have regulated emissions from beneficiation processes and exfoliation plants, such as those operated near the Libby mine.

In March 1987, the Office of Air and Radiation evaluated 88 earth materials and concluded in a report, "Asbestos in Earth Materials," that vermiculite was one of four materials, in addition to asbestos itself, that had a high possibility of containing asbestos. For three years following that report, the Office of Air and Radiation pursued steps toward regulation by requesting information from industry (including the mine at Libby), conducting preliminary source assessments for vermiculite, and completing human exposure models (estimates of risk to human health). In early 1990, an Office of Air and Radiation project status report stated that "further investigation in contaminant vermiculite is necessary." However, the effort to regulate contaminant asbestos ended because resources were needed to implement the Clean Air Act Amendments of 1990, including development of NESHAPs for more than 150 national categories of industrial sources, emitting any of 188 hazardous air pollutants. Because EPA continues to learn about adverse health effects from contaminant asbestos, we believe EPA should reconsider regulating contaminant asbestos emissions from sources, such as exfoliation and beneficiation processes.

While EPA regulates environmental emissions of commercial asbestos through the NESHAP, it does not have a National Ambient Air Quality Standard (NAAQS) for asbestos. Ambient air is the unconfined portion of the atmosphere, that is, open air. According to EPA's February 1985 "Exposure Assessment for Asbestos-Contaminated Vermiculite," exposure to asbestos-contaminated vermiculite occurs via ambient air near the sources. However, a local official told us that the air in Libby was not tested for asbestos because there was no ambient air standard for asbestos. Therefore, asbestos exposure could not be detected and assessed for potential adverse health effects.

We believe that EPA should reconsider the need for regulation for contaminant asbestos (NESHAP) and consider regulation for asbestos in ambient air (NAAQS) under the Clean Air Act.

TOXIC SUBSTANCES CONTROL ACT

Under the Toxic Substances Control Act (TSCA), EPA may take a variety of actions to reduce the risk posed by a particular chemical substance. During the early 1980s, EPA considered asbestos-contaminated vermiculite for such action, and generated several reports on the subject. However, none of them triggered immediate action under TSCA. Except for a 1991 health assessment, little was done about vermiculite under TSCA between 1983 and 1999. In 2000, EPA released a study of asbestos in gardening products containing vermiculite.

EPA's Authority Under TSCA

TSCA was enacted in 1976 to protect human health and the environment from unreasonable risk of injury that may be posed by the manufacture, processing, distribution in commerce, use, or disposal of chemical substances and mixtures. TSCA provides EPA with various tools for identifying chemicals that pose an unreasonable risk and for mitigating those risks. For example, EPA may require the use of warning labels; limit or prohibit the manufacture, use, distribution, and disposal of chemical substances; and/or commence judicial action to enforce TSCA's provisions.

EPA Explored Possibilities in the Early 1980s

In November 1978, a commercial user of vermiculite from the Libby mine reported to both EPA and the Occupational Safety and Health Administration (OSHA) that the user's employees were suffering adverse health effects. The user surmised that the problems may have been related to the asbestos in the vermiculite. In a 1980 letter to Grace, EPA's Office of Pesticides and Toxic Substances (the predecessor to the current Office of Prevention, Pesticides, and Toxic Substances) stated that EPA was concerned about the risk to human health resulting from asbestos contamination of vermiculite. Thus, EPA decided to perform an analysis to determine whether EPA should initiate a regulatory investigation to control the material under the TSCA.

This analysis was to be a multistage process that would provide a basis for initiating suitable regulatory actions under TSCA or other relevant authorities. At the end of each stage, a decision would be made regarding whether to continue on to the next stage. EPA could decide at any given stage to: drop the chemical from consideration due to low hazard potential, subject it to testing requirements to fill critical data gaps, or refer it to another program or agency that has the authority to deal with any apparent hazards.

Between June 1980 and August 1982, the analysis resulted in a series of reports related to asbestos-contaminated vermiculite. Appendix 3 lists some of these reports and provides related information. Most of the reports indicated that there was a lack of data on both exposure to asbestos-contaminated vermiculite and its adverse health effects. Further, the reports identified problems in sampling, analysis, and reproducibility of data regarding low levels of asbestos in vermiculite which made it difficult to acquire data on exposure and health effects. None of the reports triggered EPA to take immediate action under TSCA.

In August 1982, EPA completed a draft disposition paper regarding asbestos-contaminated vermiculite. The paper concluded that there were significant adverse health effects associated with past occupational exposure probably caused by inhalation of the asbestos that contaminated the vermiculite. The paper also stated that the public was generally unaware that vermiculite was likely to be contaminated with asbestos. In addition, it stated that there was no regulatory control of consumer use, and some consumer uses may pose a significant health hazard. EPA officials were unable to find a "final" version of the disposition paper. The disposition paper proposed

recommendations that addressed testing uncontaminated vermiculite, disseminating information on the activities of various Federal agencies, and measuring the level of consumer exposure to asbestos in selected vermiculite products. Although these recommendations could have helped EPA address Libby, we found no documentation to confirm that EPA intended to implement the recommendations.

Except for a 1991 health assessment discussed in Appendix 3, EPA did little about vermiculite under TSCA between 1983 and 1999. In 1983, EPA's Acting Assistant Administrator for Pesticides and Toxic Substances stated in a letter that "... asbestos-contaminated vermiculite is considered a lower priority at this time than problems posed by friable asbestos-containing materials in school buildings and commercial and industrial uses of asbestos." The reasons given in the letter for the lower priority were that EPA believed that the vermiculite industry had made improvements toward worker safety and lowering asbestos content in vermiculite products. This was based, in part, on an EPA study that found that the amount of asbestos fibers in vermiculite were reduced during the beneficiation process.

In summary, despite the initial effort to study the issue, EPA took no regulatory action to control asbestos-contaminated vermiculite under TSCA during this period.

Recent TSCA Action

In January 2000, due to citizens' concerns, EPA started sampling and analyzing lawn and garden products that contained vermiculite to determine whether they were contaminated with asbestos. The results showed that some vermiculite products currently on the market contain asbestos. EPA's report, "Sampling and Analysis of Consumer Garden Products That Contain Vermiculite" (EPA 744-R-00-010, Aug 2000), concluded that vermiculite-containing garden products present a minimal health risk to consumers.

Additional Actions Needed

As noted above, most of the prior reports indicated that there was a lack of data on both exposure to asbestos-contaminated vermiculite and its adverse health effects; and there were problems getting such data. Some of these data gaps may be filled by the gardening products study and the work described in the "Superfund" section below. With the updated information, we believe that EPA should consider the need for regulation of products contaminated with asbestos under TSCA. EPA may also consider statutory changes if such a regulation under TSCA is not practicable.

RESOURCE CONSERVATION AND RECOVERY ACT

The disposal of the asbestos-contaminated vermiculite ore waste from the Grace mine at Libby was exempt from the hazardous waste requirements under the Resource Conservation and Recovery Act (RCRA). In 1980, Congress amended RCRA to temporarily exempt from the

hazardous waste regulation (Subtitle C) solid waste from ore and mineral extraction, beneficiation, and processing. The amendment directed EPA to develop hazardous waste regulations for such waste material or determine whether the exemption should continue.

In 1985, EPA reported to Congress that mining waste exhibits hazardous characteristics, waste management practices have caused environmental damage, and the range of risk from mining waste is broad. However, in 1986, EPA published a regulatory determination stating that RCRA regulation over extraction and beneficiation waste was “unwarranted because mining wastes tend to be disposed of in arid climates, facilities and wastes were located in sparsely populated areas where human contact is minimal, and waste volumes are high.” This determination, upheld in court challenges, remains in effect.

SUPERFUND

Although wastes from ore and mineral extraction are excluded from hazardous waste requirements under RCRA, contamination from these wastes can be addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund. Mining companies may be liable under CERCLA for the release or threat of release of hazardous substances into the environment.

CERCLA Section 103(c) Applicability to the Libby Mine

After December 11, 1980, CERCLA Section 103(c) required that owners of a facility that stored, treated, or disposed of known hazardous substances or had a suspected release of such substances should notify EPA within 180 days. After facilities notify EPA, CERCLA requires that EPA conduct a preliminary assessment of the facility within one year of notification. Although asbestos is a hazardous substance under CERCLA, according to EPA, Grace did not notify EPA under this section. Thus, the Libby mine and the screening and expanding plants could not have been considered for Superfund action.

Recent Superfund Actions

In November 1999, EPA staff went to Libby and met with state and local officials to learn about the situation and determine next steps. EPA conducted an initial inspection of the former mine and processing facilities, held interviews, and collected samples. The preliminary assessment and site inspection results confirmed that there were a large number of current and historic cases of asbestos-related diseases centered around Libby. The results also showed that high amounts of asbestos-



Screening Plant Removal Site

contaminated vermiculite remained at the screening plant, the export plant, the mine's tailings pile/pond, and in residential and shared community areas.

From December 1999 through April 2000, EPA collected samples of air, dust, soil, and insulation to: (1) determine whether there was a need for response actions in residential and shared community areas in and around Libby, (2) characterize the extent and severity of asbestos contamination, and (3) determine the risk to human health. The greatest emphasis was placed on the collection and analysis of air samples. Most of the air samples were collected using a stationary air monitor located in the principal living areas of residential homes. The preliminary testing results revealed tremolite asbestos fibers in some samples.



Export Plant Removal Site

In June 2000, removal actions were started at the screening and export plants.

In December 2000, EPA identified 243 sites that may have received vermiculite from Libby, and started to perform evaluations on each site. EPA found that approximately 6 to 8 percent of the 243 sites that had been evaluated as of December were actively processing vermiculite, and further response actions were needed on 16 of the sites. EPA is working with the Mine Safety and Health Administration (MSHA) to identify additional asbestos-contaminated sites not associated with Libby.

In 2001, EPA plans to conduct additional residential sampling in Libby to more specifically measure any asbestos exposure during residents' routine activities. EPA also plans to measure asbestos levels in the air and compare those measurements to data collected from the stationary air monitors at the same location. The data will be used to help assess health risks to people who engaged in the activities reviewed during the study.

Additional Actions Needed

Although we concentrated our efforts on asbestos-contaminated vermiculite, it came to our attention that other types of mines and related processing operations (such as beneficiation, exfoliation, textile, and manufacturing plants) are also at risk for contaminant-asbestos exposure. Such exposures could be causing asbestos-related diseases near the mines and operations. Currently, ATSDR is completing the medical testing of individuals in Libby, and the preliminary

results of the testing show that people are becoming ill who had no apparent occupational exposure. EPA officials told us that ATSDR is also starting a nationwide study of cancer registry data to identify unusual spikes or clusters of cancer. For such clusters, ATSDR will determine if there is any relationship with asbestos. The information from these ATSDR studies, when combined with the information to be provided by MSHA on additional asbestos-contaminated sites, could be evaluated by EPA in order to assess and address sites unrelated to Libby that may pose a significant risk to human health.

The EPA evaluation and any subsequent actions may take significant resources and may not be consistent with standard operating procedures of the Superfund program, which does not typically conduct active site discovery. We believe that EPA should partner with other Federal organizations and states to leverage resources to assess asbestos and asbestos contamination.

CONCLUSION

EPA did not issue regulations under air and toxic substances statutes that could have protected Libby citizens from exposure to asbestos-contaminated vermiculite. According to EPA, other issues (such as asbestos in schools, commercial asbestos products, and implementation of the Clean Air Act Amendments of 1990), were given higher priority. More recently, EPA began actions at Libby under its Superfund program to sample air, dust, soil, and insulation, and to clean up contaminated sites. Additionally, EPA's Superfund program is currently evaluating, and if necessary, addressing 243 sites across the country that received asbestos-contaminated ore or vermiculite from Libby. We believe EPA's actions are commendable and should continue. However, we believe there may be other mines and related processing operations, similar to but unrelated to Libby, where citizens' health and the environment could be affected.

RECOMMENDATIONS

In addition to the continuing response actions related to Libby, we recommend that EPA, in partnership with other Federal organizations and states, assess asbestos or asbestos-contaminated ore, rock, and mineral processing sources and facilities (and immediate surrounding areas) that may be similar although unrelated to Libby. Should the Libby-related work and/or these assessments find concerns regarding human health and the environment, we recommend that EPA determine short and long-term actions necessary to protect human health and the environment. In particular, we recommend that EPA consider the need for:

- Removal or remedial action under the Superfund program;
- Regulation of contaminant asbestos under the Clean Air Act through NESHAP(s);
- Regulation of asbestos in ambient air under the Clean Air Act through a NAAQS;
- Regulation of products contaminated with asbestos under the Toxic Substances Control Act; and/or

- ❑ Statutory changes to address asbestos and asbestos-contaminated materials.

CHAPTER 3

BARRIERS EPA FACED IN ADDRESSING ASBESTOS-CONTAMINATED VERMICULITE

EPA's attempts to address contaminant asbestos were met with barriers -- factors that hindered EPA's mission to protect human health and the environment. If these barriers had not existed, EPA might have done more about asbestos-contaminated vermiculite in the Libby area. To the extent these barriers still exist, they may hinder future EPA efforts to prevent or alleviate similar problems at mine sites like Libby. The chief barriers were:

- Fragmented authority and jurisdiction;
- Ineffective communications within EPA;
- Limitations of science, technology, and health effects data; and
- Competing priorities for funding.

In October 2000, EPA established an Asbestos Coordination Team to serve as EPA's focal point to deal with asbestos contamination.

FRAGMENTED AUTHORITY AND JURISDICTION

Multiple Federal agencies have control over specific, often overlapping aspects of asbestos regulation. Each agency uses the statutes and regulations that it administers as legal authority to act, and these authorities sometimes cause agencies to differ with each other. In addition, several program offices within EPA share responsibility for asbestos regulation based on the existing legal framework and do not always sufficiently coordinate their efforts.

Multiple Federal Agencies Regulate Various Aspects of Asbestos

The Federal laws related to asbestos (see Appendix 2) provide Federal agencies with authority to regulate specific -- yet often overlapping -- aspects relating to asbestos. For example, the Department of Labor regulates occupational and construction activities involving asbestos through OSHA, under the Occupational Safety and Health Act, and the mining of asbestos through the Mine Safety and Health Administration, under the Mine and Nonmetallic Mine Safety Act. However, the authority of the Department of Labor does not cover state and local government employees. Thus, EPA regulates asbestos construction activities when state and municipal employees are doing the work. In addition, EPA regulates environmental emissions of asbestos (not as a contaminant) but does not have an ambient (in the air) standard for asbestos.

Differing regulatory authorities sometimes necessitated discussions between agencies to resolve their authority to regulate a specific asbestos use and process. For example, EPA officials said that when they began to work on the first asbestos NESHAP, it included drilling at mines.

However, EPA removed drilling at mines from the NESHAP because EPA and MSHA jointly decided that mining activities fell under MSHA's purview.

Different Federal Definitions of Asbestos

The approach to defining "asbestos" varies among agencies, often depending on the agency's mission. As early as 1977, several Federal agencies with responsibility for regulating asbestos were working separately toward a definition of asbestos. The agencies generally agreed the definition should be mineralogically correct and reflect health concerns. However, they could not agree on a specific definition, and continue to use different ones. For example:

- ❑ OSHA's proposed definition reflected its concern for the health aspects of asbestos and was based on experimental findings associated with fiber structure.
- ❑ The Consumer Products Safety Commission's definition was based on mineralogical composition that defines asbestos as "a group of mineral fibers composed of hydrated silicates, oxygen, hydrogen, and other elements such as... tremolite asbestos."
- ❑ EPA's definition specifies asbestos as asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite, anthophyllite, and actinolite-tremolite.

Different Governmental Standards for Asbestos

Different values are applied by various agencies, and within EPA itself, to regulate asbestos. Consequently, multiple Federal standards exist for asbestos, depending on the target population (i.e., miners, industrial workers, the general public, and sensitive populations such as children) and the agency or office having the authority to promulgate regulations protecting each population. Four of the most common standards are listed below, followed by the threshold limit values recommended by the American Conference of Governmental Industrial Hygienists, a professional organization of occupational health and safety specialists who work for governmental entities.

Entity	Values
EPA (NESHAP)	No visible emissions
EPA (Asbestos Hazard Emergency Response Act)	0.01 fibers per cubic cm. (Reoccupancy only)
OSHA	0.1 fibers per cubic cm.
Mine Safety and Health Administration	2.0 fibers per cubic cm.
American Conference of Governmental Industrial Hygienists (as of 1995)	0.5 fibers per cubic cm. (Amosite) 0.2 fibers per cubic cm. (Crocidolite) 2.0 fibers per cubic cm. (Chrysotile) 2.0 fibers per cubic cm. (Other forms)

Multiple Offices Within EPA Implement Different Authorities

Within EPA, the following offices implement programs related to asbestos regulation and enforcement, as noted in Chapter 1 and Appendix 2.

Office	Authority
Office of Prevention, Pesticides, and Toxic Substances	Manages the toxic substances program implementing TSCA
Office of Air and Radiation	Manages the air program implementing the Clean Air Act
Office of Solid Waste and Emergency Response	Implements RCRA and Superfund programs
Office of Water	Manages the water programs implementing the Clean Water Act and Safe Drinking Water Act
Office of Enforcement and Compliance Assurance	Oversees enforcement activities, which are performed primarily by the regional EPA offices or delegated state offices
Office of Research and Development	Conducts both basic research under its own auspices and research for other program offices at their request

When multiple organizations implement different authorities regarding a single issue, effective communications are essential. However, this did not always occur, as discussed below.

INEFFECTIVE COMMUNICATIONS WITHIN EPA

The problems with fragmented authority and jurisdiction within EPA might have been overcome by more effective communication. There were breakdowns in communications between program and regional offices, and between program offices and the Office of Research and Development. Furthermore, program offices did not sufficiently document decisions, and there was insufficient

communication within EPA regarding whether the Libby mine should have been designated a Superfund site.

Communication Between Program and Regional Offices

The program offices at EPA headquarters, which generally develop program regulations and guidance, rely on the regional offices to implement Federal environmental laws. In doing so, the regional offices work with state, interstate, and local agencies; industry; and academic institutions. Good communications between the headquarters and field segments of EPA are essential to the accomplishment of EPA's mission. However, Region 8 officials said they were not aware of important information from Headquarters about the asbestos-contaminated vermiculite.

From 1977 through 1985, a predecessor of the Office of Prevention, Pesticides, and Toxic Substances (OPPTS) generated several reports regarding asbestos-contaminated vermiculite. An internal OPPTS memorandum stated the intent to distribute the reports throughout EPA, and OPPTS staff believed they did so. Further, OPPTS staff said regional officials were informed about activity in the toxic substances program through regular visits, EPA publications, and newsletters.

Region 8 officials, however, said they did not become aware of the reports until 1999 when the media brought the asbestos health-related problems in Libby to their attention. We found evidence that Region 8 officials knew about at least one of the OPPTS reports. According to a 1984 letter, an official in Headquarters was forwarding the June 1980 "Priority Review Level 1 - Asbestos-contaminated Vermiculite" to Region 8. According to date stamps, the Region 8 Air and Hazardous Materials Division received this letter on November 7, 1984, and it was also received by the Region 8 Montana office on November 15, 1984. The letter stated that the report discloses:

... there is evidence that asbestos is present in vermiculite obtained from W. R. Grace & Company's Libby, Montana, mine, a major domestic supplier of vermiculite, and that the health problems experienced by the employees of one processor of vermiculite from the Libby mine (O. M. Scott & Sons) are comparable with those associated with asbestos exposure.

Communication Between Program Offices and Office of Research and Development

To obtain research and technical assistance, program officials must work closely with the Office of Research and Development (ORD). According to ORD officials, ORD annually solicited requests for research from program offices and decided which projects it could undertake based on budget, importance to regulatory development, ORD strategic planning, and other considerations. However, we found that the Office of Air and Radiation expected ORD to take the lead in developing and updating asbestos sampling and analysis protocols. It appeared that the ORD and the Office of Air and Radiation both waited for the other to act first.

Documentation of Decisions Within Program Offices

It appears that many of the decisions by EPA officials about asbestos-contaminated vermiculite made years ago were not adequately documented, which is a barrier to continuity and accountability. Because such decisions and their rationale were often not documented, it was difficult to reconstruct exactly what happened and why.

In one instance in 1981, OPPTS issued a decision paper with various recommendations regarding regulatory proceedings under TSCA for asbestos-contaminated vermiculite. However, EPA officials could not locate documentation to indicate what actions they took regarding the recommendations.

In another instance, a 1980 memorandum stated that vermiculite did not merit regulation under section 4(f) of TSCA. If that section had applied, EPA would have put on a “fast track” an analysis to determine whether to start a regulatory investigation to control vermiculite under TSCA. The reason for the decision was not documented in the memorandum, and because it happened so long ago, the OPPTS official who had signed the 1980 memorandum said he could not recall exactly why EPA determined section 4(f) did not apply.

Also, in a third instance, as discussed in the “Clean Air Act” section, Office of Air and Radiation officials said the effort to regulate contaminant asbestos ended because resources were needed to implement the Clean Air Act Amendments of 1990. However, there was no documentation available to confirm this was the reason.

To ensure continuity and accountability, we believe EPA should adequately document decisions, including the rationale.

Communication Related To Enforcement Actions

With better communications regarding enforcement actions, EPA officials would have had the opportunity to consider a Superfund action sooner than 1999, when the mine site received media attention.

In March 1992, the State of Montana, which was delegated EPA’s air enforcement program, conducted an inspection in Libby based on a citizen complaint. The citizen had observed a Grace employee, who was not wearing a mask, walking out of a building which was being demolished and which the complainant believed to be contaminated with asbestos. Montana state officials conducted an inspection of the facility and found that the facility had not notified EPA prior to demolishing a building contaminated with asbestos, as required. EPA referred the violation to the U.S. Department of Justice, and in September 1994, Grace was fined \$510,000 for the violation.

In addition, one of the state air inspectors relayed concerns about other possible violations from the 1992 inspection to a state official involved with Superfund. However, we found no evidence

that the concerns were evaluated, that an evaluation resulted in further action by the state, or that EPA was notified of any potential concerns. We believe the concerns raised in the letter should have been referred to the Superfund program.

Also, in 1994 and again in 1996, a Libby citizen sent letters to EPA stating that a family with children was living on the site of the former screening facility. (The family had moved onto the property in October 1993.) Further, the family was operating a tree nursery with greenhouses that contained large fans for ventilation and air. The citizen also expressed concern about dust from a road next to the site that contained asbestos. The citizen was concerned that the family and their customers were being exposed to asbestos in the air. (According to a news article, in May 2000, EPA found widespread contamination at the site and the family was ordered to leave their home and belongings because of asbestos contamination.)



Road Dust Near the Tree Nursery (1996) and Former Screening Plant and the Current Superfund Removal Site

Both of the letters from the citizen notified EPA of the threat of a release. In responding to the 1994 letter, EPA referred the concerns to the state which inspected the facility for violations of the Clean Air Act. In responding to the 1996 letter, EPA stated its assumption that the state was overseeing the facility. CERCLA requires that EPA conduct a preliminary assessment within one year after the receipt of the notification of a release of a hazardous substance. We found no documentation that EPA conducted such an assessment, which may have initiated an earlier Superfund action. We believe the concerns raised in the 1994 letter should have been referred to the Superfund program.

LIMITATIONS OF SCIENCE, TECHNOLOGY AND HEALTH EFFECTS DATA

Limitations of science and technology represented another barrier EPA faced in determining how to protect Libby's citizens from asbestos-related diseases. As part of its mission, EPA intends that efforts to reduce environmental risk should be based on the best available scientific information. Regarding asbestos in general and asbestos-contaminated vermiculite in particular, the technology for identifying the presence and amount of asbestos has limitations, even though it is progressing. EPA also needs information that connects exposure to specific concentrations of asbestos with adverse health effects. It is usually the responsibility of the industry to obtain and provide such data to EPA. Grace, which was a major supplier of vermiculite, provided EPA with significant health effects information on asbestos-contaminated vermiculite in 1986.

Another complicating factor in determining health effects of asbestos exposure is the lengthy latency period. The latency period is the time from the first exposure until the onset of identifiable symptoms, and this latency period for asbestos-related cancers averages 20 years. However, fibrosis (asbestosis) can manifest itself much sooner. Because of the latency period for asbestos-related diseases, many people had already been exposed before the danger was confirmed. When this lengthy latency period is combined with the difficulty in detecting the often invisible fibers, many people may be exposed without realizing it.

Identification of Asbestos

Asbestos is a mineral in the form of fibers that can be microscopic in size and can split into even smaller fibers (fibrils). This splitting can continue down to the molecular level. When fibers become airborne, they can remain suspended in the air indefinitely. Consequently, asbestos may be found in samples of air or in samples of other solid material, such as asbestos-contaminated vermiculite. The asbestos fibers must be identified as such and counted or otherwise quantified.

Asbestos that is a small fraction of solid material (that is, in bulk samples) is especially hard to sample and measure. This was recently demonstrated during OPPTS' efforts to measure asbestos in garden products containing vermiculite. There was a great deal of variability in the observed results. OPPTS found that, in some cases, one sample of a product indicated the presence of asbestos while another sample from the same product did not. OPPTS believed the variability was due to various factors, such as: (1) the asbestos content of the vermiculite products appears to be close to the limit of detection; (2) only a small portion (0.01 grams) of each product is actually viewed under the microscope; (3) the bagged product is not evenly mixed; (4) different processing facilities use different dust removal techniques; and (5) the asbestos content of vermiculite ore from different mines and even within the same mine varies.

Measurement of Asbestos

Because much of asbestos is invisible to humans, a microscope is needed to see the fibers and fibrils, and how much is seen depends on the type of microscope. Initially, EPA had no agreement on the protocols for sampling and analyzing asbestos fibers or for identifying asbestos in bulk samples, and different methods were used. For example:

- ❑ The Office of Research and Development helped develop a protocol for polarized light microscopy, an inexpensive optical method for identifying asbestos fibers (about \$35 per sample in the 1980s). This method is limited because it counts only a small fraction of the total fibers that are large enough to identify using an optical microscope (about 5%). Costs have since diminished to about \$5 per sample.
- ❑ Another optical analysis method, used for counting fiber concentrations in an air stream, is phase contrast microscopy. This method is also inexpensive and has significant limitations,

since it is intended for counting fibers and does not distinguish between asbestos fibers and other non-asbestos fibers of similar size.

- ❑ Transmission electron microscopy is more efficient than the other two alternatives noted, since it can identify fibers at 30,000 times magnification, as compared to 400 times with an optical microscope. However, in 1985, there were only nine such instruments in the United States, most of which were used at hospitals for medical research. Samples had cost about \$1,000 each to analyze, and took a week or more to prepare and analyze. The costs have since diminished to about \$100 each, and turnaround time is now about six hours. However, even this method has a limitation inherent in sampling - it cannot identify, to a statistical certainty, concentrations less than 1% in a bulk sample.

Even when asbestos fibers can be detected, a question arises about which of the fibers, fibrils, or pieces should be counted. The analysis of a sample could limit the count to fibers of a certain size and shape. The size and shape are significant because some fibers are thought to more adversely affect health than others. When EPA was revising the asbestos NESHAP, industry officials opposed including contaminant asbestos, and debated about the size and shape of fibers and their relative health effects. EPA officials said that, at the time, they could not refute such arguments and, therefore, EPA limited the standard to commercial asbestos.

Sampling location can be an additional problem. For example, according to former Grace employees, Grace regularly sampled the air around the mine and related facilities because of Mine Safety and Health Administration requirements. However, the air elsewhere in the county was not tested for asbestos. Because there was no standard for asbestos in the ambient air, no funds were available for such sampling, even though it would have been useful in assessing the potential for health effects (e.g., in a risk assessment), or in assessing the association with health effects (e.g., in an epidemiological analysis of the exposed population).

Health Effects Data

EPA did not receive health effects data from Grace until 1986. Generally, EPA cannot regulate a substance under TSCA unless studies demonstrate an unreasonable risk to human health or the environment. TSCA gives EPA the means to identify harmful substances. With some exceptions, anyone who makes or uses a chemical substance or mixture must first inform EPA, and must develop adequate data on the substance's effect on human health and the environment. If adequate data do not exist about a substance believed to be harmful, EPA may require testing to develop data on the health and environmental effects of the substance. Regardless, anyone who learns that a substance they make, use, or distribute presents a substantial risk of injury to health or the environment must immediately inform EPA. EPA has interpreted these requirements to mean that it will not routinely perform tests on substances covered under TSCA. Instead, EPA usually relies on those who make or use a substance to develop adequate data on the substance's effect on human health and the environment.

As early as the 1960s, requests had been made to Grace by both governmental and non-governmental entities for information relative to asbestos-contaminated vermiculite. Grace notified EPA in 1983 that it commissioned mortality and morbidity studies of its workers at the Libby mine, and gave the results to EPA in 1986. These were the first major studies on the health effects of asbestos-contaminated vermiculite that the industry provided to EPA. These studies indicated that there was an increasing likelihood of adverse health effects with increasing duration of exposure.

COMPETING PRIORITIES FOR FUNDING

EPA was faced with many issues of concern at the same time as asbestos-contaminated vermiculite. EPA had to consider funding and resources for a large number of issues during the time it became aware of the potential need for action in Libby.

EPA Resources

Resources come to EPA through appropriation laws passed by Congress. They are based on an annual budget proposal prepared by EPA officials, combined with those of other Executive agencies, and presented to Congress by the President. The budget proposal defines the goals and objectives toward which the EPA intends to work during the upcoming fiscal year, and the resources (both dollars and staffing) the EPA believes are necessary to accomplish these goals and objectives. When preparing a budget proposal, officials are given a target amount that is generally based on funding levels authorized at the time. Resources may be reallocated to increase some programs, decrease others, and add new programs.

Funding Justifications

The justifications given to Congress for the EPA budgets of the early 1980s described the activities undertaken by the toxic substances program. Since it was a relatively new program, much of the effort was focused on establishing the program. The budget justifications also showed that the EPA was performing work to comply with court-imposed schedules related to the program.

Other Priorities

Budget justifications identified some specific chemicals being addressed by the program, and included asbestos as a priority for the toxic substances program. However, asbestos-contaminated vermiculite was not identified as part of that priority, since emphasis was placed in other areas. This was confirmed in a June 1983 letter from EPA's toxic substances program in response to questions about a September 1982 EPA report on asbestos-contaminated vermiculite. The letter stated, "... asbestos contaminated vermiculite is considered a lower priority at this time than problems posed by friable asbestos-containing materials in school buildings and commercial and industrial uses of asbestos." The reasoning given in the letter was that:

...Under a contract to OTS [EPA Office of Toxic Substances], Midwest Research Institute examined the asbestos content of vermiculite ore from one mine in Libby, Montana, and two mines in Enoree, South Carolina. The study found that the ore from the mines does contain asbestos fibers, and that the South Carolina vermiculite contains substantially less asbestos than the ore from Montana. The study also found that the beneficiation process for separating the vermiculite from the ore is effective in reducing the content of asbestos fibers in the vermiculite. Analysis of bulk samples by electron microscopy found asbestos fibers were less than one percent of the total mass after ore beneficiation. The vermiculite industry has been concerned about asbestos and has made significant improvements toward worker safety and lowering asbestos content in vermiculite products.

At the time, actions by the industry to address health and environmental concerns would have significantly impacted EPA funding decisions. According to the budget justification for the toxic substances program in fiscal 1984, working with industry to reduce risk was the first choice.

...EPA will take maximum advantage of opportunities to influence industry or user groups to reach negotiated agreements for risk reduction so that, risk can be reduced in a more timely manner than through more time-consuming rulemaking procedures. EPA will quickly document the cases which require no action because the risks are already being adequately managed. EPA will reserve regulatory controls for those instances where conflicting market forces and other factors make negotiated control infeasible.

Changing priorities also impacted EPA's progress on a NESHAP for contaminant asbestos. As discussed in Chapter 2, this effort was underway in 1990 when the Clean Air Act was significantly amended and EPA shifted resources to the maximum available control technology standards. Consequently, efforts to develop the contaminant asbestos NESHAP ended.

Few EPA resources are currently directed to work on asbestos-related problems. Asbestos does not directly appear among EPA's performance goals. Currently, EPA does not have plans or funds to regulate asbestos as a contaminant. However, EPA considers asbestos as a contaminant as only a small piece of EPA's current investigation. EPA also believes the risk management of asbestos, as a whole, will continue to be part of an ongoing public dialogue with states, industry, consumers, and other affected stakeholders.

ASBESTOS COORDINATION TEAM MAY ADDRESS SOME BARRIERS

In October 2000, EPA established an Asbestos Coordination Team to provide a comprehensive overview of actions needed to address asbestos. The Office of Solid Waste and Emergency Response and OPPTS have responsibility for leading the team. Team leaders indicated their charge was to:

...Mitigate the risks to human health and the environment as a result of environmental exposure to asbestos and to work in collaboration with relevant Federal agencies and other stakeholders to:

- Continue to utilize consistent approaches to assess, cleanup, and reduce risks of exposure to asbestos;*
- Implement regulations and develop appropriate policies; and*
- Increase knowledge and enhance awareness by the public and relevant stakeholders about asbestos and the activities of the Agency.*

The team's two major goals are to develop a national communications strategy that ensures all of EPA is providing the same message to the public, and to identify actions that can be taken to address future asbestos exposures.

After reviewing the team's initial plans, we provided team members several suggestions to enhance their effectiveness. The team concurred with our suggestions and plans to implement them. These suggestions were:

- (1) Develop a clear charter that outlines measurable goals for outcomes to include milestones and target dates.
- (2) Elevate the Office of Air's involvement to a co-chair status with the Office of Solid Waste and Emergency Response and OPPTS. This will reflect that the Clean Air Act is a key authority in addressing current and future asbestos issues.
- (3) Document decisions in writing, along with meeting minutes, to track the team's decision-making process.
- (4) Develop a strong Federal council or workgroup with other agencies to help accomplish a consistent government approach to the contaminant asbestos issue.

CONCLUSION

We found barriers to EPA actions to protect human health and the environment from asbestos, asbestos-contaminated vermiculite, and other asbestos-contaminated ore, rock, and mineral processing sources and facilities. If barriers, such as fragmented authority and jurisdiction coupled with ineffective communications, had not existed, EPA might have done more to address asbestos-contaminated vermiculite in the Libby area and other similar situations. However, these barriers hindered EPA's actions, and many of the barriers may still exist and affect EPA's actions today. We believe that statutory changes may be needed to overcome these barriers and allow a unified governmental approach toward addressing concerns about asbestos.

We also believe that the Asbestos Coordination Team, with representatives from various EPA offices, provides a means for effective communications among offices. The Agency's response describes technological advancements in analytic capabilities for asbestos. In addition to these actions, we believe EPA should take additional actions to prevent similar exposures at other mines and facilities, such as those mentioned in this chapter and at the end of Chapter 2.

RECOMMENDATION

We recommend that EPA document the decisions reached and supporting rationale for the options at the end of Chapter 2 and any other decisions or options considered.

SCOPE AND METHODOLOGY

Scope

We reviewed past and present Environmental Protection Agency (EPA) activities relative to the asbestos in Libby. We conducted our review from July 2000 through January 2001. The review focused on the activities of several EPA offices as discussed below. Even though we examined some correspondence between EPA and W. R. Grace & Company during the review, we focused our attentions on EPA activities, and not those of Grace.

We focused our review on EPA activities relative to the statutes under which EPA may regulate or control asbestos. While EPA currently has no regulations that apply directly to asbestos-contaminated vermiculite, it does regulate asbestos as a chemical substance. These asbestos regulations fall primarily under two statutes, the Toxic Substances Control Act (TSCA) and the Clean Air Act. To a lesser degree, asbestos is regulated under the Clean Water Act, the Safe Drinking Water Act, and the Resource Conservation and Recovery Act. Asbestos is also a hazardous substance under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). However, CERCLA is not designed to prevent pollution, but rather to clean up sites contaminated from past use of hazardous substances. We limited our review to EPA activities under TSCA, Clean Air Act, Resource Conservation and Recovery Act, and CERCLA.

Scope Limitations

This review was not an investigation or an audit performed in accordance with government audit standards. Specifically, we did not: perform certain aspects of planning the review, gain an understanding of the management controls, or evaluate compliance with laws and regulations. We are providing recommendations to promote accountability; however, we can not substantiate all of the elements of a finding, such as the cause for certain conditions.

Our work was limited by several major factors, some of which were:

- A great deal of time has passed--10, 20, and even 30 or more years, in some cases--since the events took place that we were asked to review. While we found much information, we believe great gaps exist in documentation and testimonial information available. We may not have reviewed or found all information or documentation that exists.
- While we were asked to determine EPA actions, often EPA actions depended upon or were influenced by other actions from both government and private sources

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outside of EPA. We did not confirm information we gathered regarding actions of outside sources because we chose to focus our attention on EPA.

- Where we use information from testimonial sources (interview results), opinions may have varied on critical issues, and we are not certain we obtained all viewpoints.
- While we have examined some correspondence between EPA and Grace, we did not review any of Grace's activities.

Despite these limitations, we believe the information contained in this report adequately summarizes key events.

Methodology

To accomplish our objectives, we conducted site visits, analyzed documents, and interviewed current and former staff/contractors in the following offices:

- Office of Prevention, Pesticides, and Toxic Substances
- Office of Solid Waste and Emergency Response
- Office of Air and Radiation
- Office of Enforcement and Compliance Assurance
- Office of Research and Development
- Region 8 - Denver, Colorado
- Region 8 - Montana Operations Office
- Region 8 - Libby Community Information Center
- Montana State - Department of Environmental Quality (and its predecessors)
- Lincoln County, Montana.

We held town meetings in Libby where we encouraged an exchange of information. We also interviewed Libby citizens who willingly came forward to speak with us.

We made site visits and reviewed documents obtained in conjunction with the current Superfund asbestos cleanup activity in Libby. We toured the Superfund site located at the former screening plant of Grace. We also reviewed selected Region 8 documents which were obtained pursuant to the authority of Section 104 of CERCLA.

We coordinated with the Offices of Inspector General from other Federal agencies which we believed may have also had a role in addressing the asbestos in Libby. Specifically, we coordinated with the Offices of Inspector General from the Department of Labor, Department of Health and Human Services, and the Consumer Products Safety Commission. The Department of

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Labor Office of Inspector General has also conducted a review of the asbestos in Libby focusing on the activities of the Mine Safety and Health Administration. The Department of Labor Office of Inspector General issued its report, entitled "Evaluation of MSHA's Handling of Inspections at the W. R. Grace & Company Mine in Libby, Montana," report number 2E-06-620-0002, on March 22, 2001.

FEDERAL STATUTES RELATED TO ASBESTOS

Statute	Agency/Jurisdiction
<p><u>Toxic Substances Control Act (TSCA)</u>, 15 U.S.C. §§ 2601-2692. Under TSCA, the regulation of asbestos is limited to the following three areas:</p> <ol style="list-style-type: none"> 1. Asbestos in Schools: Pursuant to the Asbestos Hazard Emergency Response Act in 1986, which became part of TSCA, school districts are required to inspect for asbestos and abate asbestos hazards. 40 CFR 763.80-99. 2. Worker Protection: Under the authority of TSCA , rules cover state and local government workers engaged in asbestos abatement who fall outside the scope of OSHA’s worker-asbestos regulations. 40 CFR 763.120-126. 3. Certain Asbestos-Containing Products: Certain asbestos-containing products (e.g., insulation, felt, and paper products containing asbestos), none of which are associated with vermiculite, were phased out by regulations. 40 CFR 763.160-179. 	<p>Environmental Protection Agency (Office of Prevention, Pesticides, and Toxic Substances)</p>
<p><u>Clean Air Act</u>, 42 U.S.C. §§ 7401-7671.</p> <p>Emissions of asbestos to the ambient air are controlled under § 112 of the Clean Air Act (which declares asbestos a hazardous air pollutant), 42 U.S.C. § 7412. The regulations implementing this section set emission standards known as the National Emission Standards for Hazardous Air Pollutants (NESHAPs). The NESHAP for asbestos specifies control requirements for most asbestos emissions, including work practices to be followed to minimize the release of asbestos fibers during handling of asbestos waste materials. The standards apply to: (1) fabricating or manufacturing a variety of commercial asbestos or asbestos-containing materials, (2) asbestos mills, (3) removing regulated asbestos-containing materials from buildings during demolition/renovation, and (4) disposal of asbestos-containing materials. 40 CFR 61.</p>	<p>Environmental Protection Agency (Office of Air and Radiation)</p>

FEDERAL STATUTES RELATED TO ASBESTOS

Statute	Agency/Jurisdiction
<p><u>Clean Water Act</u>, 33 U.S.C. §§ 1251-1387.</p> <p>Asbestos effluent levels from asbestos manufacturing point sources are regulated. 40 CFR 427.</p>	<p>Environmental Protection Agency (Office of Water)</p>
<p><u>Resource Conservation And Recovery Act (RCRA)</u>, 42 U.S.C. §§ 6901-6992.</p> <p>Subtitle C of RCRA establishes standards for the management of hazardous waste, specifically, the generation, transport, and treatment and/or storage of hazardous waste. Asbestos is not regulated as a hazardous waste under RCRA Subtitle C. Rather, the disposal of asbestos is regulated as a non-hazardous solid waste under Subtitle D of RCRA. RCRA Subtitle D regulations govern solid waste disposal facilities (such as municipal landfills) and impose general siting and operating procedures to protect human health and the environment. While there are no RCRA regulations that refer to asbestos specifically, RCRA gives states responsibility for developing specific solid waste regulations based on the general Federal requirements. A number of states do have specific requirements for the disposal of asbestos-containing wastes, and many have designated the waste as hazardous.</p>	<p>Environmental Protection Agency (Office of Solid Waste and Emergency Response)</p>
<p><u>Safe Drinking Water Act</u>, 42 U.S.C. §§ 300f-300j.</p> <p>Asbestos in drinking water is regulated under the Act, which sets a maximum contaminant level for asbestos. 40 CFR 141.62.</p>	<p>Environmental Protection Agency (Office of Water)</p>

FEDERAL STATUTES RELATED TO ASBESTOS

Statute	Agency/Jurisdiction
<p><u>Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund)</u>, 42 U.S.C. § 9601-9675</p> <p>CERCLA provides for the clean up of contamination from past waste disposal activities. It provides no cleanup standards but, rather, incorporates by reference cleanup standards from other environmental laws.</p>	<p>Environmental Protection Agency (Office of Solid Waste and Emergency Response)</p>
<p><u>Occupational Safety and Health Act</u>, 15 U.S.C. §§ 651-678</p> <p>The regulations promulgated under this Act are established to protect workers handling asbestos or asbestos-containing products. The current regulations include a maximum workplace airborne asbestos concentration limit of 0.1 fibers/cc on an 8-hour time weighted average basis. The standards include requirements for respiratory protection and other safety equipment, and work practices to reduce indoor dust levels. 29 CFR 1910.</p>	<p>Department of Labor (Occupational Safety and Health Administration)</p>
<p><u>Metal and Nonmetallic Mine Safety Act</u>, 30 U.S.C. §§ 801-962</p> <p>The regulations issued under this act limit exposure of miners to asbestos. The regulation sets limits for allowable exposure to miners. The standards are 2 fibers/cc on an 8-hour time weighted average basis, and a ceiling limit of 10 fibers/cc in any 60-minute period. 30 CFR 71.702.</p>	<p>Department of Labor (Mine Safety and Health Admin- istration)</p>
<p><u>Consumer Products Safety Act</u>, 15 U.S.C. §§ 2051-2083</p> <p>Two consumer products containing asbestos were banned -- spackling compounds and artificial embers. 16 CFR 1304, 1305. Neither product is associated with the vermiculite industry.</p>	<p>Consumer Products Safety Commission</p>

FEDERAL STATUTES RELATED TO ASBESTOS

Statute	Agency/Jurisdiction
<p>In 1986, the Consumer Products Safety Commission issued an enforcement policy that has the effect of requiring warning labels on certain products that contain asbestos (such as asbestos paper and gaskets) not associated with vermiculite. No rulemaking has been made beyond the policy statement.</p>	
<p><u>Federal Hazardous Substances Act</u>, 15 U.S.C. §§ 1261-77</p> <p>Asbestos in clothing is banned except for thermal protection. 16 CFR 1500</p>	<p>Consumer Products Safety Commission</p>
<p><u>Hazardous Materials Transportation Act</u>, 49 U.S.C. §5101,</p> <p>The transportation of asbestos is controlled by Department of Transportation standards as to how asbestos-containing products must be packaged. 49 CFR 173.216. The regulations apply to products that have commercial value because of their asbestos content.</p>	<p>Department of Transportation</p>

KEY DOCUMENTS(Dates in *italics* are draft or interim documents.)

Date	Title	Key Points
Apr 1973	Asbestos NESHAP issued	First asbestos NESHAP covers emissions from asbestos-processing facilities, which included milling, manufacturing, and fabrication processes that make asbestos products, as well as demolition.
Oct 1975	Asbestos NESHAP revised	Renovation and disposal of waste were added to the asbestos NESHAP.
Jan 1977	Asbestos Fibers in Discharges from Selected Mining and Milling Activities	Sampling was done of water around Grace's Libby mine in June 1975. Tailings included asbestiform amphibole fibers, but are contained in tailing ponds. Streams above the mine have high levels of naturally occurring asbestos.
Nov 1978	TSCA informational submission from O.M. Scott & Sons	Manufacturer of lawn care products tells EPA & OSHA that employees have lung problems believed to be related to Montana vermiculite.
Jun 1980	Priority review level 1 - asbestos-contaminated vermiculite	Report notes that the adverse health effects may extend beyond the workplace. However, exposure and health effects information is needed, as well as information on risks related to consumer use of products. Further, an analysis of pre-regulatory controls should be started.
<i>Nov 1980</i>	Analysis of Vermiculite Substitutes	The study identifies adequate substitutes for vermiculite for each of its uses.
Nov 1980	EPA letter to Grace	EPA notifies Grace that it is conducting an analysis to determine whether to start a regulatory investigation to control asbestos-contaminated vermiculite under TSCA.

KEY DOCUMENTS(Dates in *italics* are draft or interim documents.)

Date	Title	Key Points
Feb 1981	Decision Paper for Asbestos-Contaminated Vermiculite	Adverse health effects among workers are believed to be associated with the presence of asbestos as a contaminant. Recommendations: Gather more information (although there are technical problems in doing so); pursue voluntary controls with industry; and pursue a rule under TSCA requiring labeling of asbestos-contaminated vermiculite.
Aug 1981	Control Techniques Document; Assessment Control of Chrysotile Asbestos Emissions from Unpaved Roads	Office of Air and Radiation published in the Federal Register guidance for local, state and Federal authorities on roadway contamination.
<i>Sep 1981</i> <i>Sep 1982</i>	Collection, Analysis & Characterization of Vermiculite Samples for Fiber Content and Asbestos Contamination	Sampling was done at the Libby mine in October 1980. Air and bulk samples had asbestos (i.e., tremolite or actinolite) in varying amounts. The report also states, "Because of a shift of priorities within EPA, the scope of the task was reduced."
<i>Feb 1982</i> <i>Feb 1985</i>	Exposure Assessment for Asbestos-Contaminated Vermiculite	Exposure to asbestos-contaminated vermiculite is an occupational and consumer concern, and occurs via ambient air near point sources. Definitive data were lacking in many areas of this study.

KEY DOCUMENTS(Dates in *italics* are draft or interim documents.)

Date	Title	Key Points
<i>Aug 1982</i>	Disposition Paper for Asbestos-Contaminated Vermiculite	This draft paper concludes there are significant adverse health effects associated with past occupational exposure, probably from inhalation of asbestos. Some consumer uses may pose a significant health hazard, but actual exposure measurements are currently lacking. The public is generally unaware that vermiculite is likely to contain asbestos. TSCA is the proper authority for addressing the matter. The paper makes five recommendations: measuring consumer exposure; possible voluntary programs for reducing the level of contamination and labeling of vermiculite containing asbestos; providing information on related Federal actions; and testing vermiculite for biological activity.
Mar 1983	Notice about studies	Grace informs EPA that studies of Libby workers are underway.
Jun 1983	Acting Assistant Administrator for Pesticides and Toxic Substances (predecessor to OPPTS) letter to Congressman	EPA sends a letter explaining why asbestos-contaminated vermiculite was a lower priority for regulation under TSCA, "... asbestos-contaminated vermiculite is considered a lower priority at this time than problems posed by friable asbestos-containing materials in school buildings and commercial and industrial uses of asbestos."
Mar 1984	EPA internal memo	Office of Research and Development memo indicated there was EPA oversight regarding asbestos. It discusses limits of some microscopes and the "absurdity" of the "no visible-emission" requirement for the asbestos NESHAP.

KEY DOCUMENTS(Dates in *italics* are draft or interim documents.)

Date	Title	Key Points
Nov 1984	Emerging Chemical Project Asbestos	OPTS (predecessor of OPPTS) staff contacted a variety of Agency personnel in an attempt to provide Region 8 with information concerning the hazards associated with the use of certain asbestos substitutes. The exercise identified a 1980 report (PRL -1 Report) that stated "... there is evidence that asbestos is present in vermiculite obtained from W. R. Grace & Company's Libby, Montana, mine, a major domestic supplier of vermiculite, and that the health problems experienced by the employees of one processor of vermiculite from the Libby mine (O. M. Scott & Sons) are comparable with those associated with asbestos exposure."
Mar 1986	McGill University studies [Note: Libby workers were briefed on these results in September 1985.]	Grace provides EPA with the results of the McGill University studies on mortality/morbidity. The reports concluded that there is increased risk of illness based on exposure. The longer the exposure, the more likely there will be health problems.
Oct 1986	Notification to EPA	Grace notified EPA that it was a private land disposal site. EPA assigned the facility an identification number.
Mar 1987	Asbestos In Earth Materials	The Office of Air Quality and Planning Standards report evaluated 88 earth materials for the possibility that they contained asbestos. Vermiculite was one of four that had a high possibility of containing asbestos.
May 1987	Asbestos Contaminated Roads As A Nationally Significant Issue	A large portion of the roads across the country may have some form of asbestos contamination due to the fact that serpentine

KEY DOCUMENTS(Dates in *italics* are draft or interim documents.)

Date	Title	Key Points
		rock or similar material is being used as an aggregate when the roads are constructed. Initiation of a Superfund action to address a potential release of asbestos from these roads could set a precedent. Contaminated roads must be considered a nationally significant issue and actions to address these roads will require the concurrence of the Assistant Administrator for Solid Waste and Emergency Response.
Mar 1989	Guidance on Non-National Priorities List Removal Actions Involving Nationally Significant or Precedent Setting Issues	The guidance identifies non-National Priorities List removal actions that may be nationally significant or precedent setting and establishes procedures for requesting Headquarters concurrence. Removals involving asbestos when it is the principal contaminant of concern require Headquarters concurrence because action levels for response have not yet been set.
Jan 1990	Monthly Project Status (for contaminant asbestos)	The Preliminary Assessment Branch of Office of Air Quality Planning and Standards “feels that further investigation in contaminant vermiculite is necessary.”
May 1990	Environmental Asbestos Assessment Manual - Superfund Method for the Determination of Asbestos in Ambient Air, Interim Version	EPA establishes a method under Superfund for determining asbestos in ambient air.
Sep 1991	Health Assessment Document for Vermiculite	The number of workers exposed was quantified. Non-occupational exposure to vermiculite is high. The weight of evidence for asbestos-contaminated vermiculite is sufficient to show a causal relationship for increased lung cancer in miners and millers.

KEY DOCUMENTS(Dates in *italics* are draft or interim documents.)

Date	Title	Key Points
Mar 1992	State Inspection Report of Grace Mine in Libby (based on a citizen complaint)	The report noted that demolition had been underway at the site for 1½ years. Samples were collected and pictures taken. The inspectors observed what they believed was asbestos-contaminated materials, and concluded that the facility appears to be out of compliance with 40 CFR 61.145(b), which requires notification.
Jul 1992	Published list of industrial source categories for hazardous air pollutants	Asbestos processing is listed as one of the source categories for regulation under the 1990 amendments to the Clean Air Act.
Sep 1993	Documenting an Asbestos CERCLA Violation	The guidance notes that inspectors should evaluate the applicability of CERCLA during asbestos NESHAP inspections. It is intended to make inspectors aware of how CERCLA may apply to asbestos NESHAP projects and to provide guidelines for gathering evidence when a potential asbestos CERCLA violation is encountered.
Sep 1994	Department of Justice Press Release	Grace agreed to pay a \$510,000 penalty to settle a Clean Air Act complaint that alleges the company improperly demolished several asbestos-contaminated buildings at its Libby mine.
Nov 1994	Citizen letter to EPA Region 8 official in Denver, CO	The letter reports that a home/business with a child's swing set in the yard is located on contaminated land. The citizen had written "a letter to those living their (sic), to warn them of hazard to asbestos exposure and told them if they have any doubts to contact EPA." The letter also reported concerns about dust from the nearby road being a hazard. The citizen requested confidentiality.

KEY DOCUMENTS(Dates in *italics* are draft or interim documents.)

Date	Title	Key Points
Apr 1995	Memorandum from Region 8 official to citizen (responding to the letter of November 1994)	The State of Montana "...inspected the former W. R. Grace property on January 31, 1995. During their inspection they found no apparent violations of the Clean Air Act. Neither the State nor EPA plan any action based on this inspection."
Nov 1995	Revision to published list of industrial source categories	Asbestos processing facilities were removed from a list of source categories that may be regulated under the 1990 amendments of the Clean Air Act.
Nov 1996	Citizen letter to EPA official in Washington, DC	The letter thanked EPA for an award received because of a referral to EPA regarding a NESHAP violation. It reported that a family with children had moved onto a site that was contaminated with asbestos.
Jun 2000	Superfund Pollution Report	A removal action starts in Libby.
Aug 2000	Sampling and Analysis of Consumer Garden Products That Contain Vermiculite	Testing of 54 gardening products that contained vermiculite showed that a few contained asbestos, but (with 6 exceptions) the risk of exposure was minimal.
Dec 2000	Mortality From Asbestosis in Libby	The Agency for Toxic Substances and Disease Registry study of death certificates showed that, for the 20-year period reviewed, mortality in Libby from asbestos was about 40 to 60 times higher than expected. Mesothelioma mortality was also elevated.

AGENCY RESPONSE AND OIG COMMENTS

March 27, 2001

MEMORANDUM

SUBJECT: Response to OIG Draft Report: "EPA Actions Concerning Asbestos-Contaminated Vermiculite in Libby, Montana"

FROM: Michael H. Shapiro /signed/
Acting Assistant Administrator
for Solid Waste and Emergency Response

TO: Frances E. Tafer, Audit Manager
Headquarters Audit Division

This memorandum and the attachment transmit the consolidated response from the Offices of Solid Waste and Emergency Response (OSWER), Research and Development (ORD), Prevention, Pesticides, and Toxic Substances (OPPTS), and Air and Radiation (OAR) on the factual accuracy of the information and the feasibility of the suggestions contained in the subject Office of Inspector General (OIG) draft report. The Office of Enforcement and Compliance Assurance and Region 8 reviewed the report, and they have no comments. We appreciate the opportunity to respond to this report. We also wish to express our thanks to the Headquarters Audit Division for the amount of time and hard work they invested in this audit process.

Each office has provided comments on their respective sections, as described below. The OAR provided their comments on the attached OIG draft report in bold and italicized text. **[OIG note: The draft report referred to here is not included in this final report. Thus, many of the references to page numbers mentioned in the Agency's response will not correspond with the page numbers in this report. We summarized and addressed these comments in this Appendix.]**

I. General/Specific Comments

A. OSWER Comments

1. We find the report to be somewhat unclear in its suggestions to the Agency. The report concludes that “ineffective communication” has been a problem for the Agency regarding asbestos. It would be helpful if the report would include specific suggestions for how the Agency should address this issue.

OIG Comment: We agree. We suggest that the Agency focus on improved communication among programs on related issues such as asbestos. Agency officials have already agreed to address specific suggestions in the section of the report entitled, “Asbestos Coordination Team May Address Some Barriers.” In recent discussions with Agency officials, OSWER staff suggested the creation of an Assistant Administrator level committee, similar to the “ONE” (OSHA, NIOSH, and EPA) committee, to deal with communication regarding waste issues.

2. Page (i) - The report suggests that EPA should “assess and address, as appropriate, other asbestos-contaminated mines and related facilities similar but unrelated to Libby.” More specificity in this suggestion would be helpful to the Agency.

OIG Comment: We agree. We added more specific language to the report to help clarify the types of facilities, such as beneficiation, exfoliation, textile, and manufacturing plants, that should be assessed and addressed. We also discussed this issue with OSWER staff.

3. Page (i) - It is unclear what criteria the OIG is suggesting that EPA should use to determine whether EPA should pursue a NESHAPs, ambient air standard or TSCA designation for asbestos.

OIG Comment: We agree. We believed that after EPA completes its assessments of the facilities mentioned above, it would have the criteria needed to evaluate the need for regulation. Also, health studies, such as that being currently conducted by ATSDR, and other data provided by other agencies will help clarify the criteria to be used in the Agency’s evaluation.

4. Page 7 - What is the reference for the 1982 draft disposition paper that is mentioned in the second paragraph.

OIG Comment: The August 1982 Draft “Disposition Paper for Asbestos-Contaminated Vermiculite,” referenced in Appendix 3 of this report, concludes that there are significant adverse health effects associated with past occupational exposure, probably from inhalation of asbestos.

5. Page 9 - Same comments as on page (i), above.

OIG Comment: Please see responses to comments on page (i) above.

6. Page 20 - The conclusions given on the bottom of this page are vague and unclear. It is not possible to determine what specific actions EPA should take in response to this conclusion.

OIG Comment: We agree. We have added specifics into the report at appropriate places in order to provide more details. Additionally, we clarified our draft report conclusions in this report in order to match our review results more closely to the suggestions which we have made into recommendations. Also, we identified the specific actions EPA may take in the recommendation sections in this report.

7. The report was written with few specifics. There are areas where the OIG indicates that the EPA changed priorities (Executive Summary pg1), but did not provide any citation to support this finding. This statement is repeated several times throughout the report.

OIG Comment: We agree and are providing additional detail here and in the report. In Appendix 3, the OIG provides a detailed list of the key documents identified in this report. Specifically, the September 1982 report entitled, “Collection, Analysis, and Characterization of Vermiculite samples for Fiber Content and Asbestos Contamination” states there was a shift in priorities at EPA and the scope of this study was reduced.

Also, EPA sent a June 1983 letter to a congressman explaining why asbestos-contaminated vermiculite was a lower priority than problems posed by asbestos in schools and commercial and industrial uses of asbestos.

B. ORD Comments

1. The draft report is reasonable, and we concur with the suggestions. We have several detailed comments which will sharpen the technical accuracy of the report relative to the scientific aspects of asbestos. These detailed comments are included in the attached draft report (pg21).

OIG Comment: We reviewed ORD comments and included appropriate changes in this report.

C. OPPTS Comments

1. Since our joint request in June of 2000 asking for your review of this issue, OPPTS has implemented many of the suggestions in your report and continues to take further steps to help resolve the situation in Libby, Montana.

OIG Comment: We commend EPA for its efforts to respond to our suggestions with respect to the Asbestos Coordination Team.

II. Comments on Factual Accuracy

A. OSWER Comments

1. Chapter 2 - Conclusions and Suggestions - The OIG states that “we believe that EPA should assess and address, as appropriate, any other asbestos-contaminated mines(s) and related facility similar to Libby.” This statement is confusing to OSWER since we provided the OIG with our plan to screen all of the known Libby asbestos-vermiculite processing facilities, have placed this screening (which includes necessary removal actions) as a high priority for OSWER and the regions, and have inspected all of the remaining vermiculite mines in the United States. In the same chapter, the OIG report notes these actions. We believe that the Superfund program has met its requirements with our nationwide screening and cannot see what other actions we can pursue under CERCLA with the current base of information.

OIG Comment: We disagree that the Superfund program has met its requirements with regard to the nationwide screening. We believe that there may be additional areas similar but unrelated to Libby that may be at risk for contaminant asbestos exposure, such as beneficiation, exfoliation, textile, and manufacturing plants, that should be assessed and addressed. We understand from discussions with OSWER officials that this effort will take significant resources. Also, we understand that such an effort is not consistent with standard operating procedures in that the Superfund program does not typically conduct an active site discovery program. We believe that the Superfund program, along with other offices in EPA, can partner with other Federal organizations and states to leverage resources to assess asbestos or asbestos-contamination. Resources may be more easily obtained and communication could be more easily facilitated through top-level interactions. These are some of the reasons we have elevated our recommendations in this report to the level of the Administrator.

2. Chapter 3 - Ineffective Communications Within EPA - This chapter describes communications from various state offices and people in the Libby, Montana area to EPA. The OIG has described these and the resulting activities as ineffective communication within EPA. A detailed reading supports the finding that communications were fragmented, but hardly ineffective, if the letters were relayed to the proper office. The referenced 1994 letter did result in a State of Montana inspection of the facility because the potential violations were airborne particulates regulated by OAQPS.

OIG Comment: We agree that communication was fragmented in that the citizen letters stayed within one office at EPA. However, the letters should have been

referred to the Superfund office and were not. Thus, communication was ineffective because issues needed to be addressed by multiple offices.

This chapter also describes the limitations to the existing science but neglects to include the improvements being addressed by OERR and Regional scientists. OERR and Region 8 have begun a program to improve analytic capability for asbestos fibers using Scanning Electron Microscopy (SEM). SEM methods for asbestos and vermiculite were developed by the US Geologic Survey (USGS). EPA offices, in conjunction with the USGS and the National Institute of Standards and Technology (NIST), are working to develop a national sample of bulk asbestos, which can be measured using SEM techniques. OERR has recently concluded a series of laboratory audits for commercial laboratories that have existing analytical capability for asbestos using Phase Light Microscopy (PLM), Phase Contrast Microscopy (PCM) or Transmission Electron Microscopy (TEM) techniques. These audits will reduce the number of errors for samples of bulk material and airborne emissions that need to be analyzed as a result of the on-going efforts at Libby and elsewhere in the country. Finally, in response to the comment on Health Effects Data, it should be noted that OSWER and ORD are sponsoring an International health Conference on Asbestos in May 2000. This conference is designed to be the kickoff of the reassessment of the IRIS data base and will target many of the issues surrounding asbestos toxicity.

OIG Comment: We commend EPA for its efforts to address the limitations to existing science, which is one of the barriers mentioned in our report.

While not specifically an EPA issue, it should be noted that the Agency for Toxic Substances and Disease Registry (ATSDR) has completed an initial phase of study of lung disease within the Libby community. The results of this study will have major results on the calculation of risk from exposure to asbestos in general and perhaps the tremolite asbestos particle in particular.

OIG Comment: We agree and have added this information to the Background section of this report.

The concluding paragraph in this chapter again recommends that EPA consider additional mitigation to prevent similar situations as those found in Libby. We restate our argument that Superfund has undertaken a national effort to uncover any other "Libby" sites through its national screening program.

OIG Comment: We agree that the Superfund program has undertaken a national effort to uncover any other "Libby" sites through its national screening program. We believe that there may be additional areas similar but unrelated to Libby that may be at risk for contaminant asbestos exposure, such as beneficiation, exfoliation, textile, and manufacturing plants, that should be assessed and addressed. For a more complete response, please see our response to A. 1. above.

B. OPPTS Comments

1. Page (i) - Executive Summary (Results in Brief: first para.) - It would be helpful for the OIG to clarify the relative authority and responsibility of EPA and MSHA with regard to mine workers.

OIG Comment: We agree that it would be helpful to clarify the relative authority and responsibility of EPA and MSHA with regard to mine workers and have added more information here. We also added this information regarding EPA's and MSHA's authority and responsibilities in Chapter 3 under the section entitled "Fragmented Authority and Jurisdiction" and in Appendix 2 of this report.

The Department of Labor regulates occupational and construction activities involving asbestos through OSHA, under the Occupational Safety and Health Act, and the mining of asbestos through the Mine Safety and Health Administration, under the Mine and Nonmetallic Mine Safety Act. However, the authority of the Department of Labor does not cover state and local government employees. Thus, EPA regulates asbestos construction activities when state and municipal employees are doing the work.

2. Page (i) - Executive Summary (Results in Brief: second para.) - Addressing potential risks from high levels of asbestos in schools and in products was given high priority, since there was evidence that children and other sensitive sub-populations could be exposed. Addressing potential risks from low levels of asbestos in vermiculite products was not viewed as critical, since EPA believed that asbestos exposure in these products was relatively low and because the science was still being developed to determine if these low levels presented a risk.

OIG Comment: We acknowledge your comment and believe we addressed this information in the draft and this report.

3. Page 2 - Background (second para.) - All asbestos is naturally occurring and, based on currently available data, EPA believes that all forms present comparable hazard. There is, however, an ongoing science review of tremolite asbestos.

OIG Comment: We acknowledge your comment and are aware that EPA is further studying this issue.

4. Page 6 - Toxic Substances Control Act (TSCA) (second para.) - While EPA may regulate occupational safety and health, the Department of Labor has primacy on these matters and EPA must coordinate its efforts with them.

OIG Comment: We agree and believe that this is a reason that effective communication (within EPA and among Federal agencies) is necessary.

5. Page 7 - Toxic Substances Control Act (Additional Actions; first para.) - The Libby mine was in operation from the 1920s and exposure by the 1980s had already created a high level of asbestos-related disease. The occupational exposures at the mine in Libby were well known prior to 1982 and in fact prior to 1976 when TSCA was enacted. Consequently, the recommendations in EPA's draft August 1982 disposition paper most likely would not have helped to address the situation in Libby.

OIG Comment: We disagree and believe that implementing the recommendations in this disposition paper would have produced information useful in pursuing regulation under TSCA, which would have potentially benefitted the citizens of Libby. For example, the first recommendation was to perform a study to measure the level of consumer exposure to asbestos in selected products, which is what EPA did with regard to gardening products in the year 2000. We believe that if such a study had been completed in the early 1980s, the level of consumer exposure would have been higher than that found in the 2000 study. We believe this because in the 1980s there was more vermiculite from Libby on the market (i.e., the Libby mine provided 80% of the supply) and it had substantially more asbestos in vermiculite than from other sources. Thus, the tested level of consumer exposure to asbestos from vermiculite would have been higher. Finally, the vermiculite from Libby was found in only one of the samples in the 2000 study.

6. Page 11 - Fragmented Authority and Jurisdiction (second para.) - EPA's regulation of asbestos construction work by state and municipal employees does not overlap OSHA jurisdiction, since OSHA was not given the statutory authority to regulate state and local government employees. EPA's rule applies where OSHA-approved standards do not exist. In addition, EPA regulates asbestos construction *activities* performed by state and municipal employees, not *uses*.

OIG Comment: We agree and added the following information regarding regulation of construction work in Chapter 3 under the section entitled "Fragmented Authority and Jurisdiction" and in Appendix 2 of this report.

The Department of Labor regulates occupational and construction activities involving asbestos through OSHA, under the Occupational Safety and Health Act, and the mining of asbestos through the Mine Safety and Health Administration, under the Mine and Nonmetallic Mine Safety Act. However, the authority of the Department of Labor does not cover state and local government employees. Thus,

EPA regulates asbestos construction activities when state and municipal employees are doing the work.

7. Page 12 - Different Government Standards for Asbestos (chart) - The chart should include EPA's Asbestos Worker Protection rule, which incorporates the OSHA permissible exposure limit of 0.1 f/cc. The Asbestos Hazard Emergency Response Act (AHERA) regulations have an air clearance (reoccupancy) standard of either 0.01 f/cc or not statistically different from outdoor air, depending on the analytical method.

OIG Comment: We agree and have made the correction to the chart and clarified that the AHERA regulation is for clearance only.

8. Page 17 - Health Effects Data - Prior to the existence of TSCA, there were some 78,000 chemicals (existing) on the market, including asbestos. EPA has and may require test data on these chemicals under section 4 of TSCA. Chemicals manufactured after TSCA was enacted (new chemicals) must submit data to the EPA before they may be manufactured or distributed in commerce (section 5 of TSCA). If a manufacturer or processor discovers that a substance may pose a substantial risk to health or the environment, they are required to report under section 8(e) of TSCA.

OIG Comment: We agree with your comment and, exclusive of the first sentence, the information is paraphrased in the "Health Effects Data" section in this report without reference to the TSCA section numbers.

9. Page 19 - Other Priorities (last para.) - Asbestos as a contaminant is only a small piece of EPA's investigation. The risk management of asbestos, as a whole, will continue to be part of an ongoing public dialogue with states, industry, consumers, and other affected stakeholders.

OIG Comment: We acknowledge your comment and added it to the "Other Priorities" section of Chapter 3.

10. Page 20 - EPA Established Asbestos Coordination Team (ACT) (last para. #4) - The ACT will work to resolve conflicts within different regulations, but statutory conflicts are much more difficult to resolve.

OIG Comment: We acknowledge your comment and agree that statutory conflicts may be harder to resolve. However, statutory changes may provide for a more unified governmental approach toward addressing concerns about asbestos.

III. Comments on Feasibility of Suggestions

A. OPPTS Comments

1. OAR is in a better position than OPPTS to comment on the feasibility of the first two suggestions that involve revised air standards for asbestos. The intent of the third suggestion that asbestos be designated as a contaminant under TSCA is not clear, since there is no TSCA contaminant list.

OIG Comment: We agree that the third suggestion was not clear and we revised the suggestion from the draft report and made it a recommendations in this report.

IV. Comments on Barriers EPA EncounteredA. OPPTS Comments

1. In addition to the establishment of the ACT, whose charge is correctly characterized in the draft report, additional activities are being developed to address the barriers identified in Chapter 3 of the draft report. These include: 1) through the ONE (OSHA, NIOSH, and EPA) committee, keeping NIOSH and OSHA informed of our current activities associated with vermiculite home attic insulation; 2) regional conference calls (both toxics and air); and 3) helping to organize and participate in a national conference addressing the limitations and strengths of the current analytical methods for measuring and assessing the risks of asbestos.

OIG Comment: We commend EPA for its efforts to address the communications and science barriers mentioned in our report.

Again, we are committed to help resolve the situation in Libby, Montana. We appreciate the effort the OIG has put into this report. If you have any questions and/or require additional information, please contact the following persons on their respective program areas: Johnsie Webster, OSWER (202-260-4475); Lek Kadeli, ORD (202-564-6700); Tom Simons, OPPTS (202-260-3991); and Debbie Stackhouse, OAR (919-541-5354) or Jeffrey Clark, OAR (919-541-5619).

Several comments and changes were incorporated into a copy of our draft report, which is not included in this report. We reviewed all comments, made appropriate changes to the report, and addressed the following comments below.

V. OAR and ORD Draft Report Comments and Additional Information

OAR Comment: Did the IG make an attempt to review the Grace Commission's records? Several decisions arising from that commission are presented here, and yet are not tied together for the purposes of this report.

OIG Comments: The Office of Inspector General did not review the Grace Commission's records. Limitations on the scope of our review are listed in Appendix 1.

The Agency also provided additional information to various sections of our draft report. We reprinted selections below.

Additional Information:

Chapter 1, Background, Libby and the Grace Mine

The Agency for Toxic Substances and Disease Registry (ATSDR) conducted a medical testing program between July and November, 2000 to identify the asbestos-related health effects of participants exposed to asbestos from the vermiculite mine near Libby, Montana, and to refer these individuals for additional medical evaluation. Other important goals of the program are to

- (a) provide EPA with information needed to identify and eliminate current exposures to asbestos in the community;
- (b) identify the types of illnesses experienced by participants exposed to asbestos in order to better inform local physicians; and
- (c) provide the local health care community with an estimate of the additional resources necessary to address health care needs in the Libby area during the next 10–20 years.

Preliminary findings of federal health screenings over the summer showed 627 of 1,078 people tested positive for possible asbestos-related illness.

To date, the toxicity of vermiculite has not been completely studied; however, it is believed that the toxic effects associated with vermiculite exposure are related to the presence of asbestiform minerals present in vermiculite ore and released during mining and processing operations. Ore taken from the Libby mining operation has been documented to be contaminated with asbestiform minerals, including tremolite, actinolite, and others.

Inhalation of asbestos fibers from asbestiform minerals suspended in air can result in lung diseases, such as asbestosis, mesothelioma, and lung cancer. The risk of developing any one of these diseases depends upon many factors; including the type of fiber, level of exposure, duration of exposure, and smoking history of the exposed individual.

The preliminary results of ATSDR study showed that the incidence of asbestosis in the Libby community was approximately 40-60 times higher than the National average. The report included only 1,078 participants, or 18% of the total number of participants in the medical testing program. Final results of the study may vary from these preliminary results.

Chapter 3, Fragmented Authority and Jurisdiction, Multiple Federal Agencies Regulate Various Aspects of Asbestos

During the early 1980's EPA began working on a comprehensive revision to the rule. At that time, they were required to do the revision under the risk analysis method. This method was required by the Vinyl Chloride Court Case Decision, which ruled that any revision by EPA that would increase the stringency of the standard would have to undergo a risk analysis and have documentation of the benefit of the change. Since EPA did not already have the supporting documentation for a risk benefit analysis, management decided to wait until the new Clean Air Act was revised so that further action would not fall under the requirements imposed by the Vinyl Chloride decision. In the meantime, the Regions wanted EPA to codify determinations into the rule revision for demolition and renovation practices. EPA made that revision by clearly stated in the preamble that they were only making administrative changes and that not doing anything that would increase the stringency of the standard, since to do so would trigger a risk-based rule.

Chapter 3, Limitations of Science and Technology, Identification of Asbestos

Asbestos minerals fall into two groups or classes—serpentine and amphibole. Serpentine asbestos contains the mineral *chrysotile*. There are 2 distinct minerals in the amphibole class: *anthophyllite* and *crocidolite*, and 2 mineral series in the amphibole class: the *actinolite-tremolite* series and the cummingtonite-grunerite series (*amosite*). Some minerals may occur in both fibrous and non-fibrous habits, such as minerals in the tremolite-actinolite series and in the cummingtonite-grunerite series. The fibrous form of a mineral in the cummingtonite-grunerite series is *amosite*. Minerals in the tremolite-actinolite series that are fibrous are not referred to by a distinct name implying a fibrous habit. If a mineral in the tremolite-actinolite series is non-fibrous, it does not cleave (easily break) along the planes of the fibers (a fibrous “habit”), but cleaves in fragments. The broken non-fibrous minerals in the tremolite-actinolite series are called “cleavage fragments”, an issue that is discussed later in this report.

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