

Health Consultation

Review of Vermiculite Findings and Community Investigation

Former W.R. Grace Facility
(a/k/a North Little Rock Auto Salvage)
600 Dixie Lane
North Little Rock, Pulaski County, AR 72114

EPA FACILITY ID: ARN000607042
AFIN Number: 60-02502

Prepared by
Arkansas Department of Health

JUNE 19, 2012

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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SUMMARY

INTRODUCTION

In the residential area surrounding the Former W.R. Grace Facility in North Little Rock, ADH/ATSDR's top priority is to ensure that the community has the best information possible to safeguard its health and prevent people from coming in contact with harmful toxic substances.

CONCLUSION

Investigations are focused on asbestos-containing vermiculite from Libby, MT, that was processed at this site in the past. ADH/ATSDR cannot currently conclude whether community members who have contact with asbestos-containing vermiculite waste products (through soil or ambient air) in the area surrounding the Former W.R. Grace Facility have been exposed to levels of asbestos that could potentially harm people's health. However, ADH/ATSDR will continue to review data as they become available in order to further evaluate potential exposure to Libby asbestos.

BASIS FOR DECISION

Currently, there is not enough information to make a decision regarding community members' exposure to asbestos. The likelihood of developing health problems from exposure to asbestos depends on the duration, intensity, and frequency of the exposure. There are other factors as well, including size and type (mineralogy) of fibers to which a person is exposed, and personal risk factors such as smoking history, history of lung disease, and genetic susceptibility. Every time asbestos-containing vermiculite or waste rock is stirred up, asbestos fibers may be released into the air. However, being exposed to asbestos does not necessarily mean that a person will develop health problems.

NEXT STEPS

Several environmental and public health actions are needed concerning the Former W.R. Grace Facility, including: further sampling to characterize the full extent of contamination in the surrounding community; remediation and/or removal actions; and community education to promote awareness for those concerned with possible past, present, or future asbestos exposure and

subsequent health related issues.

**FOR MORE
INFORMATION**

If you have concerns about your health, you should contact your health care provider. You can also call ATSDR at 1 – 800 – CDC – INFO, or the Arkansas Department of Health at 501-661-2936 and ask for information on the Former W.R. Grace Facility in North Little Rock, AR.

Statement of Issues

In response to a request from the U.S. Environmental Protection Agency (EPA) Region 6, the Arkansas Department of Health (ADH) evaluated preliminary asbestos soil sampling data. The samples were collected from the Former W.R. Grace Facility and the surrounding Dixie Community in North Little Rock, AR. Under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), ADH has prepared this health consultation to determine if potential exposures to asbestos-contaminated soil exist and, if so, could exposures result in harm to the people in the surrounding community.

In addition to evaluating the current sampling information, ADH reviewed information related to activities at this site that may have resulted in exposures to workers and the surrounding community in the past.

History

In Libby, MT, from the 1920s through the early 1990s, W.R. Grace and other entities related to W.R. Grace or preceding it in interest (“the mining companies”) mined, processed, and shipped millions of tons of vermiculite ore to approximately 244 sites across the United States. This included the Former W.R. Grace Facility site in North Little Rock, AR. While in operation, the Libby mine may have produced 80% of the world’s supply of vermiculite [1]. Vermiculite is generally used for insulation, as a lightweight aggregate in construction materials, and as a soil additive for gardening. Vermiculite also has many other industrial uses, including as a fireproofing material, an absorbent, and a filter medium [2].

Flakes of raw vermiculite are mica-like in appearance and contain water molecules within their internal structure. During processing when the flakes are heated rapidly at a temperature of 900 degrees Celsius (900° C) or higher, the water flashes into steam, and the flakes expand into accordion-like particles. The color, which can range from black and various shades of brown to yellow for the raw flakes, changes upon expansion to gold or bronze. This expansion process is called exfoliation, and the resulting lightweight material is chemically inert, fire resistant, and odorless. Expanded and unexpanded vermiculite from Libby had many commercial applications. Expanded (exfoliated by high temperatures) vermiculite included loose fill insulation, fertilizer carrier, and concrete aggregate. Unexpanded Libby vermiculite concentrate has been found in gypsum wallboard, joint compound, cinder blocks, and many other building products.

During mining and processing operations, asbestos fibers were released into the ambient air, that is, the air in and around the facilities. Consequently, many workers were regularly exposed to high asbestos-fiber concentrations. The majority of confirmed past exposures have been occupational. On-going investigations are focused on evaluating the presence of vermiculite

and/or asbestos in the communities surrounding sites that processed asbestos-containing vermiculite in the past. Health screening activities and other investigations within the Libby, MT community (where the vermiculite mine is located) have detected elevated levels of diseases related to asbestos exposure, such as asbestosis (a non-cancer lung disorder), mesothelioma, and lung cancer [1].

Background

The Former W.R. Grace Facility, also known as the North Little Rock Auto Salvage site, is located at 600 Dixie Lane, North Little Rock, Pulaski County, AR (refer to map in Appendix A). The site, located in a mixed commercial/industrial and residential area of town, is an abandoned vermiculite ore processing (*i.e.*, exfoliating) facility [3]. Possibly a former brick processing plant initially, the W.R. Grace Zonolite Company (originating from Libby, MT) bought the North Little Rock plant in the 1950's. Historical aerial photos from 1943 depict the four large silos on the property, indicating industrial use (it is unknown whether it was used for brick processing or vermiculite processing at this time because no documents have been found) [3, 4]. During the time that this property was used by the W. R. Grace Zonolite Company, there was a warehouse, shed, loading dock, and the four silos on the property [4].

From 1953 to 1989, approximately 85,050 tons of raw vermiculite were documented to be shipped to the North Little Rock plant from Libby, MT [3]. Shipping records from the North Little Rock plant site, however, were not found prior to the 1960's. Anecdotal evidence suggests that during operations, the vermiculite ore was delivered from the W.R. Grace Zonolite Mine in Libby, MT, by rail car, received at the North Little Rock plant, then unloaded and transported to the top of the storage silos by conveyor belt or bucket elevator. After the vermiculite plant was closed (based on documented shipments ceasing), the site became North Little Rock Auto Salvage, where hundreds of used tires and automobile parts were stored. The plant is currently not being used for any industrial purpose.

The site is adjacent to an industrial business still in operation, as well as Union Pacific Railroad property, farmland, and residential properties. The site is not secured by fencing; however, a gate blocks the front entrance. The site is also located close to a switching area for the railroad. Evidence of trespassers has been noted on the property. In the summer of 2011, a fire burned down a structure near the east end of the facility, but left the three-story warehouse intact [4].

Contaminant of Concern: Asbestos Overview

Asbestos is a general name applied to a group of silicate minerals consisting of thin, separable fibers in a parallel arrangement. Asbestos minerals fall into two classes: serpentine and amphibole. Serpentine, or chrysotile, asbestos has relatively long and flexible crystalline fibers, and it is the predominant type of asbestos used commercially. Amphibole asbestos minerals are

brittle and have a rod- or needle-like shape. Amphibole minerals regulated as asbestos by EPA and OSHA includes five classes:

- fibrous tremolite,
- actinolite,
- anthophyllite,
- crocidolite,
- amosite.

Other amphibole minerals, such as winchite and richterite, can also exhibit fibrous asbestiform properties. Asbestos fibers do not have any detectable odor or taste. They do not dissolve in water or evaporate, and they are resistant to heat, fire, and chemical and biological degradation [5].

The vermiculite that was mined at Libby, MT contains amphibole asbestos, with a characteristic composition including tremolite, actinolite, richterite, and winchite; this material is referred to as Libby asbestos in this health consultation. Raw vermiculite ore from Libby is estimated to contain up to 21–26% fibrous asbestos; note this reference pertains to mined material, not the vermiculite concentrate processed at the North Little Rock facility [2]. Samples of the various grades of unexpanded vermiculite (after being concentrated and milled) shipped from the Libby mine contained 0.3% - 7.0% fibrous tremolite-actinolite (by mass); this was the type shipped to the North Little Rock facility [2]. For most of the Libby mine's operation, the asbestos was considered a byproduct of little value and was not used commercially. The mined vermiculite ore was processed to remove unwanted materials and then sorted into various grades or sizes of vermiculite that were then shipped to sites across the nation for expansion (exfoliation), or used as a raw material in manufactured products [5].

Discussion

Evaluating the health effects of exposure to Libby asbestos requires both extensive knowledge of exposure pathways and access to toxicity data. The toxicological information currently available is limited, so the exact level of health concern for different sizes and types of asbestos remains uncertain. However, Libby amphibole is now known to cause asbestos-related disease, and all vermiculite from Libby is presumed to be contaminated with Libby amphibole. Data have shown that any disturbance of waste rock or vermiculite containing trace levels of Libby amphibole may result in air concentrations of concern. While Libby asbestos-containing vermiculite waste rock has been found on and around the Former W.R. Grace site, exposure pathway information for the North Little Rock facility is limited or unavailable (in regard to past exposures). Specific data limitations include:

- Limited information on past concentrations of Libby asbestos in ambient air on-site and around the North Little Rock facility.
- Unclear data on how and how often people came in contact with Libby asbestos from the processing facility, since most exposures happened long ago. This information is necessary to estimate accurate exposure doses.
- Insufficient information about how some vermiculite materials, such as waste rock, were handled or disposed. As a result, identifying and assessing potential exposures is difficult.

Given these limitations, a quantitative evaluation of the public health implications of past operations at this site is not possible. Instead, a qualitative assessment of potential public health implications is presented in this health consultation.

Exposure to asbestos is determined by examining human exposure pathways. An exposure pathway has five parts:

1. A source of contamination (e.g., hazardous compound(s) from a processing plant),
2. An environmental medium such as air, soil, or water that can hold or move the contamination,
3. A point at which people come in contact with a contaminated medium such as a residential yard or public park,
4. An exposure route, such as inhalation of (or breathing) airborne asbestos fibers, and
5. A population who could come in contact with the contaminants.

An exposure pathway is eliminated if at least one of the five parts is missing and will not occur in the future. For a completed pathway, all five parts must exist and exposure to a contaminant must have occurred, is occurring, or will occur.

The vermiculite ore processed in North Little Rock contained asbestos, which can become airborne and inhaled. After reviewing information from Libby and from facilities that processed vermiculite from Libby, ATSDR has identified *potential* exposure pathways that apply, in general, to all of the vermiculite processing facilities, including the Former W.R. Grace Facility in North Little Rock, AR. All of these pathways have a common source (vermiculite from Libby) and a common route of exposure (inhalation). A summary of all exposure pathways can be found on Table 1, Appendix B. Although asbestos ingestion and dermal (skin) exposure pathways could exist, health risks from these pathways are minor in comparison to those resulting from inhalation exposure to asbestos. Therefore, this health consultation does not evaluate the ingestion or absorption (dermal contact) pathways.

Past exposure pathway scenarios that are considered a complete pathway include occupational exposure for the workers at the North Little Rock facility during the 1950's – 1980's and their

family members from exposure to asbestos particles brought home on shoes and clothing. Evidence suggests Libby asbestos exposures from processing facilities were a public health hazard [1]. Currently, since the site is no longer in use the worker exposure pathway is incomplete, and the future exposure pathway is expected to be eliminated pending cleanup of the site by the EPA. Those pathways considered to be complete past pathways were exposure to airborne asbestos brought home by workers from their clothing, as well as trespassers disturbing on-site piles of contaminated vermiculite. However, the present and future exposures for these scenarios will be eliminated since the vermiculite-processing plant no longer operates at this location, and the EPA intends to cleanup all asbestos-containing vermiculite waste product found during the sampling process.

Another past occupational exposure that may represent a potentially complete pathway was for workers that worked on the property when it became North Little Rock Auto Salvage. Vermiculite or waste rock may still have been present in on-site soil, and may have had the potential to become airborne if disturbed due to activity. The present and future pathway status of this occupational scenario is eliminated since North Little Rock Auto Salvage is no longer in business at this site, and the EPA intends to cleanup all asbestos-containing vermiculite waste product found during the sampling process.

Past, present, and/or future exposures to asbestos in the soil of on-site and off-site areas is possible for commercial, residential and/or public recreational areas surrounding the Former W.R. Grace Facility that contain Libby asbestos in the soil. The likelihood of these exposures is increased when the soils are disturbed and asbestos is released into the air.

Information about what occurred during the period when the plant processed the asbestos-contaminated vermiculite remains incomplete. Whether people who were living near the site when it was in operation were exposed to asbestos is not known. Also unknown is whether those currently living nearby are being exposed to asbestos from “waste rock” (un-popped, or unexpanded, vermiculite) which may have been used in the community for various purposes such as fill, driveway surfacing or soil amendments. However, EPA is in the process of further sampling to better understand current community exposures.

Recently, the EPA Region 6 On-Scene Coordinators have commenced activities at and around the Former W.R. Grace Facility to investigate where asbestos may have migrated, either through air deposition or through use as fill material (EPA initially visited the site on February 17, 2000, but no samples were considered warranted at that time [6]). No documented company records have been found to indicate the amount of fill material that might have been distributed throughout the community from the Former W.R. Grace Facility [4]. In the summer of 2011, EPA began soil sampling on-site, on several residential yards in close proximity to the site, and in Conley Park, which is located within a half-mile radius of the facility. Conley Park is

approximately 6.2 acres, and is located in the middle of the residential community. EPA representatives that spoke with community members regarding the park indicated that the park is widely used by the neighborhood residents for baseball and football games, play areas, and outdoor socials and picnics [4].

Both grab and composite soil samples were collected from designated grids (approximately 352 grids total). Hundreds of soil samples were collected on- and off-site from 1 inch to 72 inches below ground surface (bgs) between the following intervals (all measured in inches bgs): 0" – 1"; 1" – 6"; 0" – 6"; 6" – 12"; 12" – 24"; 24" – 36"; 36" – 48"; 48" – 60"; or 60" – 72" [7]. These samples were analyzed by either polarized light microscopy or transmission electron microscopy.

Asbestos content in soil and bulk material samples is commonly determined using polarized light microscopy (PLM), a method that uses polarized light to compare refractive indices of minerals and can distinguish between asbestos and non-asbestos fibers and between different types of asbestos. The PLM method can detect fibers with lengths greater than ~1 micro meter (μm), widths greater than ~0.25 μm , and aspect ratios (length to width ratios) greater than 3. Detection limits for PLM methods are typically 0.25%–1% asbestos [8].

Transmission electron microscopy (TEM) is a more sensitive method that can detect smaller fibers than light-microscopic techniques, so more precise data can be collected on fiber length and diameter distribution. TEM can be used to determine mineral characteristics in bulk materials that may become airborne and is used to determine asbestos fibers in the optically visible range. This method is typically the most common for measuring asbestos in ambient air or inside buildings, since TEM can visualize fibers of all sizes [8].

Soil Sample Results

The Former W.R. Grace Facility site, various residential yards, and the public park were divided into sample grids, and soil samples were taken in July 2011 to determine where the asbestos contamination “hot spots” (*i.e.*, high concentration areas) were located. Samples were collected from three depths (0 – 1, 1 – 6, and 6 – 72 inches) and analyzed using PLM methods. Data collected from all on-site soil grids indicate that from 0" – 1" (zero to one inches) bgs: 10 grids contained no asbestos; 31 grids contained trace asbestos (greater than 0%, but less than 0.25%); 18 grids contained greater than 0.25% but less than 1.0% asbestos; and 6 grids contained greater than 1.0% asbestos. The grid lay outs and detected hot spots for depths of 0 – 1 and 6 – 72 inches were provided by EPA and can be found in Appendix C. Note: the areas where the highest concentrations (hot spots) of asbestos were detected on-site were closest to the former processing areas near the railroad and loading docks.

EPA collected samples from all grids at all three depths. Data collected from on-site soil grids indicate that from 1" – 6" (one to six inches) bgs: 13 grids contained no asbestos; 11 grids contained trace asbestos (greater than 0%, but less than 0.25%); 8 grids contained greater than 0.25% but less than 1.0% asbestos; and 6 grids contained greater than 1.0% asbestos.

Using PLM methods, data collected from on-site soil grids indicate that from 6" – 72" (six to seventy-two inches) bgs: 8 grids contained no asbestos; 1 grid contained greater than 0.25% but less than 1.0% asbestos; and 2 grids contained greater than 1.0% asbestos.

Three hot spots were found off-site close to the facility. At a residential yard near the site, one grid soil sample contained asbestos at trace amounts (greater than 0%, but less than 0.25%), and one grid soil sample contained greater than 0.25% but less than 1.0% asbestos. Asbestos was detected in another yard at concentrations greater than 0.25% but less than 1.0% asbestos. The third area where amounts of asbestos were detected in the soil was found in Conley Park located on Sam Evans Drive, which is within a half-mile radius of the Former W.R. Grace Facility (refer to map in the Appendix for street locations).

A 50 x 50 foot grid in the park's baseball field was sampled, and asbestos was detected at levels as high as 2% in one of the grids sampled at 1" – 6" bgs. No asbestos was detected in any of the samples taken at the 0" – 1" bgs depth [3]. This leads EPA officials to believe that the asbestos found in the park areas did not migrate through air deposition; rather, parts of the baseball field may have been filled with material containing asbestos wastes. EPA has put up a chain-link barrier fence around the perimeter of this 50 x 50 foot area. EPA is conducting further sampling in the park, residential properties not previously sampled, and a public school (Redwood Early Childhood Center for infants through 4-year-olds), which contains a public playground area. All locations are within close proximity to the Former W.R. Grace Facility in North Little Rock. EPA will use PLM methodology and Activity Based Sampling (ABS) to test for asbestos within the community. ABS will better detect an accurate level of public exposure to the remaining asbestos, since it simulates outdoor activities such as yard work or children playing in the dirt. EPA also stated that their agency will oversee removal action at this site and the surrounding community for any soils containing asbestos at a level of 0.25% or higher [3]. This phase of sampling began January 12, 2012, and ADH is awaiting certified laboratory data results in order to review for public health effects.

Community Health Concerns

The ADH attended a public meeting held by EPA Region 6 On-Scene Coordinators on December 8, 2011, at the St. Stephen Baptist Church on 902 East E Street, North Little Rock. Along with the North Little Rock mayor and city council members, personnel from the Arkansas Department of Environmental Quality, local news media, and several area residents were in

attendance. Residents expressed concern of the possible health effects of asbestos-contaminated soil around the Former W.R. Grace Facility site and subsequent clean-up efforts. During the meeting, residents told of past or present medical conditions and were uncertain if any of these conditions could be related to asbestos exposure. The general concern of the community centered on possible adverse health effects that might occur if people were exposed to asbestos-containing vermiculite, should the contaminated property not be properly cleaned-up. The citizens attending the meeting also expressed interest in creating a neighborhood panel to represent the Dixie Community, as well as voicing informal requests for some type of public document explaining an assessment of the clean-up and removal process taking place in their area. This health consultation document addresses some of these concerns. See Appendix D for the informational fact sheets developed by ADH/ATSDR specific to the North Little Rock community. These were the same fact sheets (along with the ATSDR ToxFAQs Asbestos Fact Sheet) that were distributed at the public meeting in December 2011.

Child Health Considerations

In communities faced with soil contamination, the many physical differences between children and adults may require special emphasis. Children could be at greater risk than adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults; this means they breathe dust, soil, and vapors closer to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Additionally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Therefore, adults need as much information as possible to make informed decisions regarding their children's health.

This health consultation evaluates children's exposure to asbestos-contaminated soil samples from the Former W.R. Grace Facility and surrounding community based on the factors listed above. Children who previously lived near the site may have been exposed to asbestos-containing wastes while the plant was operating. Children could have been exposed from dust carried home on the clothing of a parent who worked on the property. Children may have been exposed to airborne asbestos emissions from the plant, in dust carried into homes from these emissions, or from use of the vermiculite wastes as fill at residential and public properties. Ongoing exposure could be occurring in locations where vermiculite wastes were used as fill. However, the extent of these exposures, and the potential health effects, remain difficult to determine at this time. Future ABS results from the EPA should be helpful in evaluating the current health risks for children living around this site. EPA will identify and remove any hazardous asbestos levels found in public recreational areas, residential yards and on-site.

Health Outcome Data

Since area residents expressed health concerns, the ADH Cancer Epidemiology Section evaluated lung cancer and mesothelioma (cancers that may be caused by asbestos exposure) data for Pulaski County and compared it with the cancer data for the state of Arkansas. After a statistical evaluation of cancer incidence and mortality rates in Pulaski County and the state of Arkansas, it was revealed that there is no significant difference to indicate elevated lung cancer cases or mesothelioma cases when comparing health outcome data. Results of this evaluation can be seen in Appendix E.

Since the causes of cancer are multi-factorial in origin and the risk of developing cancer depends on an individual's past and current health status, genetic make-up, and/or lifestyle choices, this represents a limitation to an evaluation of this nature. Limitations also include relative population size, the lack of historical information relative to each individual cancer case, and the inability to track population mobility. The state of Arkansas was chosen as the reference population to assess possible excesses of diagnosed cancer in Pulaski County. County level data was the best readily available resource to explore possible elevated risk in the surrounding area. However, the geographic unit (county level) available to evaluate the health outcome data is a limitation in this type of analyses given that the size of the exposed population is much smaller than the county level population.

Conclusions

ADH/ATSDR concludes that past inhalation exposure to asbestos fibers in indoor and/or outdoor air for workers at the Former W.R. Grace Facility in North Little Rock between 1953 and 1989 could harm people's health. In the past, workers' families (including children) are also likely to have been exposed to Libby asbestos through asbestos contaminated shoes or clothing. This past exposure for facility workers and their families is a potential public health hazard.

Insufficient information exists to determine the extent to which people living nearby this site were exposed in the past from Libby asbestos in ambient and indoor air or the waste piles. Any risk of adverse health effects from these past pathways would, however, be small compared to the past occupational and worker take-home pathways. There is not enough information to determine if current or future exposures to asbestos are a public health concern. Every time vermiculite or waste rock is stirred up, asbestos fibers may be released into the air. However, being exposed to asbestos does not necessarily mean that a person will develop health problems.

ADH/ATSDR cannot currently conclude whether community members who have contact with asbestos-containing vermiculite waste products (through soil or ambient air) in or surrounding the area near the Former W.R. Grace Facility have been exposed at levels that might harm

people's health. A statistical evaluation of cancer incidence and mortality rates revealed that there is no significant difference to indicate elevated lung cancer cases or mesothelioma cases in Pulaski County as compared to the state of Arkansas.

Exposure to asbestos, depending on the duration (*i.e.*, how long), intensity or concentration (*i.e.*, how much), and frequency (*i.e.*, how often), may increase these residents' risk of asbestos related diseases. There are other factors as well, including size and type (mineralogy) of fibers to which a person is exposed, and personal risk factors such as smoking history, history of lung disease, and genetic susceptibility. In order to fill data gaps and identify any additional possible exposures, EPA will use PLM methodology and ABS to further detect asbestos within the community.

Recommendations

For the Former W.R. Grace Facility in North Little Rock, AR, ADH/ATSDR recommends the following:

- Characterize the extent of contamination in the surrounding community and mitigate exposures of health concern.
- Promote awareness and encourage former workers and their household contacts to inform their regular physician about their exposure to asbestos. If former workers or their household contacts are concerned or symptomatic, they should be encouraged to see a physician who specializes in asbestos-related lung diseases.
- Provide public information to educate and increase community awareness about potential residual asbestos remaining near or at the site.

Public Health Action Plan

The purpose of the Public Health Action Plan (PHAP) is to ensure that this health consultation not only identifies any public health hazards, but also provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. The PHAP implemented by ADH/ATSDR with regards to the Former W.R. Grace Facility is as follows:

Completed Actions

- ADH responded to a request from EPA Region 6 to evaluate data for public health implications.
- ADH conducted a site visit (November 16, 2011) along with an EPA On-Scene Coordinator and the EPA Contractor (see Appendix F for site photos).

- ADH attended the public meeting held by EPA (December 8, 2011) and answered questions regarding potential adverse health effects of asbestos-contaminated soils.
- ADH/ATSDR assessed surface and subsurface soil data.
- ADH hosted a free flu shot clinic for area residents (December 20, 2011). This was part of the community health education outreach efforts, as requested by residents (who voiced respiratory concerns) at the public meeting.

Future Activities

- ADH/ATSDR will provide public health evaluation of future environmental data and assistance to federal and state agencies as needed or requested.
- ADH/ATSDR will continue to educate the public and address community member's requests in regards to this site, as needed or requested.
- ADH will review the additional sampling data provided by EPA, and write a follow-up health consultation document.

REPORT PREPARATION

This Health Consultation for the Former W.R. Grace Facility (a.k.a. North Little Rock Auto Salvage) was prepared by the Arkansas Department of Health (ADH) under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented.

Authors

Health Assessor

Ashley Whitlow, M.S.
Arkansas Department of Health
4815 West Markham, Mail Slot 32
Little Rock, AR 72205

Cancer Registry

Abby Holt, MPH
Arkansas Department of Health
4815 West Markham, Mail Slot 32
Little Rock, AR 72205

State Designated Reviewer

Lori Simmons, M.S.
Arkansas Department of Health
4815 West Markham, Mail Slot 32
Little Rock, AR 72205

ATSDR Technical Project Officer

Jeff Kellam, M.S.
Technical Project Officer
Division of Community Health Investigations



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Appendix A: Site Map

Figure 1. Map of Former W.R. Grace Facility: 600 Dixie Lane, North Little Rock 72114



-  Site Boundary
-  Former Warehouse Area

Appendix B: Exposure Pathway Scenarios

Table 1. Completed and Potentially Completed Exposure Pathway Scenarios Involving Asbestos-Contaminated Environmental Media Related to the Former W.R. Grace Facility in North Little Rock, AR

| Pathway Name | Exposure Scenario(s) | Past Pathway Status | Present Pathway Status | Future Pathway Status |
|---------------------|--|----------------------------|-------------------------------|------------------------------|
| Occupational | Former workers exposed to airborne Libby asbestos during handling and processing of contaminated vermiculite | Complete | Not applicable | Not applicable |
| | Workers exposed to airborne Libby asbestos from residual contamination inside former processing buildings | Complete | Eliminated | Eliminated |
| Household Contact | Household contacts exposed to airborne Libby asbestos brought home on former W.R. Grace workers' clothing | Complete | Not applicable | Not applicable |
| On-site Waste Piles | Community members (particularly children) playing in or otherwise disturbing on-site piles of contaminated vermiculite or waste rock | Potential | Eliminated | Eliminated |
| On-site Soils | Current on-site workers and contractors during clean-up, or community members disturbing contaminated on-site soils (residual contamination, buried waste) | Not applicable | Potential | Potential |
| Ambient Air | Community members or nearby workers exposed to airborne fibers of contaminated vermiculite | Potential | Eliminated | Eliminated |
| Residential Outdoor | Community members using contaminated vermiculite or waste material at home (for gardening, paving driveways, fill material) | Potential | Potential | Potential |

Appendix C: Figures of Sampling Grids

Figure 2. Grid Layout for EPA Soil Sample Collections (0 – 1 inch) at the Former W.R. Grace Facility



Figure 3. Grid Layout for EPA Soil Sample Collections (6 – 72 inches) at the Former W.R. Grace Facility



**Appendix D: ADH/ATSDR Informational Fact Sheets on
Asbestos Exposure and the North Little Rock, AR Community**



Asbestos Exposure and Your Health



Introduction

Who should read this?

Read this fact sheet if you or someone you know may have been exposed to asbestos:

- In the workplace
- By living with a worker exposed to asbestos
- In the natural environment
- By living, working, playing or attending school near a plant when it was processing Libby vermiculite, like the former W.R. Grace site
- Living in Libby, Montana when its vermiculite mine was operating
- In consumer products that contain asbestos

Asbestos

Asbestos defined:

Asbestos is the name of a group of similar minerals that can separate into long and thin fibers. The fibers are so small that you cannot see them.

Health effects of asbestos exposure:

Asbestos can cause health problems when it is breathed into the lungs. Continued exposure increases the amount of fibers that stay in the lungs. Fibers embedded in lung tissue over time may result in lung diseases such as pleural disease (the lining of the chest wall), asbestosis, lung cancer, or mesothelioma.

Important!

Being exposed to asbestos does not mean you will develop health problems! Asbestos has been used widely in the United States; nearly everyone has been exposed to very low levels of asbestos at some time in their lives. However, most people do not become ill from such exposures. Many things need to be considered when evaluating whether you are at

risk for health problems from asbestos exposure. A doctor can help you find out if you have health problems from asbestos exposure.

**Detecting
asbestos
related
health
problems**

Identify:

Asbestos-related conditions can be difficult to identify. Healthcare providers usually identify the possibility of asbestos exposure and related health conditions, like lung and pleural disease, by taking a thorough medical history. This includes looking at the person's medical, work, cultural, and environmental history.

Diagnose:

After a doctor suspects an asbestos-related health condition, he or she can use a number of tools to help make the actual diagnosis. Some of these tools are physical examination, chest x-ray and pulmonary function tests. Your doctor may also refer you to a specialist who treats diseases caused by asbestos.

**What to do
if you have
been
exposed to
asbestos**

Take Action:

- Tell your doctor. Even if you don't feel sick, tell your doctor that you might have been exposed to asbestos. Most people don't show any signs or symptoms of asbestos-related disease for 10 to 20 years or more after exposure. Only a doctor can tell if you have any health problems due to asbestos exposure. Your doctor may refer you to a specialist who treats diseases caused by asbestos.
- Show this fact sheet to your doctor. The information might be helpful in evaluating your health risk.
- Quit smoking. If you are a smoker, quit smoking. Smoking combined with asbestos exposure greatly increases the risk of getting lung cancer.
- Get regular influenza (flu) and pneumonia shots. Regular shots help decrease the chance of lung infections.

**Where you
can get more
information**

Contact ADH or ATSDR:

Agency for Toxic Substances and Disease Registry (ATSDR)

For more information on asbestos exposure and your health, please call

1-800-CDC-INFO (1-800-232-4676) or visit our Web site at

www.atsdr.cdc.gov/asbestos

Arkansas Department of Health (ADH)

Environmental Epidemiology

4815 West Markham Street, Slot-32

Little Rock, AR 72205 * 501-661-2893



Arkansas Department of Health

4815 West Markham Street • Little Rock, Arkansas 72205-3867 • Telephone (501) 661-2000

Governor Mike Beebe

Paul K. Halverson, DrPH, FACHE, Director and State Health Officer

Arkansas Department of Health (ADH) Actions for the North Little Rock, former W.R. Grace Site Community

- ADH is working with the environmental and other public health agencies (like Environmental Protection Agency (EPA), Arkansas Department of Environmental Quality (ADEQ), & the Agency for Toxic Substances and Disease Registry (ATSDR)) to best assess your community.
- ADH will review all available sample results and health-related information for your community.
- ADH will write a report in partnership with ATSDR, called a health consultation, based on our findings for your community.

For more information, please contact:
Arkansas Department of Health (ADH)
Environmental Epidemiology
4815 West Markham Street, Slot-32
Little Rock, AR 72205 * 501-661-2893

Appendix E: Health Outcome Data

Using the Arkansas Department of Health (ADH) Arkansas Central Cancer Registry (ACCR) data, cancer incidence for primary sites of lung and mesothelioma were calculated from 1997 through 2008 for zip code 72114, Pulaski County, and statewide. When reviewing the distribution of lung cancer in Pulaski County from 1997 through 2008, zip code 72114 only represents approximately 2-3% of all the lung cancers diagnosed in the county. Therefore, Pulaski County was used as the exposure area because when a more defined area of exposure via zip code was examined, the case count number was too low and displayed too much variance. The state of Arkansas was chosen as the reference population to assess possible excesses of diagnosed cancer in Pulaski County.

Age-adjusted rates allow comparisons between populations without the influence of age. A diagnosed-to-expected ratio was calculated by dividing the number of cases diagnosed in the area by the number of expected cases. This ratio is called a standardized incidence ratio (SIR). The SIR compares the crude rate observed in Pulaski County to an expected rate calculated from age-specific rates for all of Arkansas. A SIR of one indicates that the number of cancer cases diagnosed in Pulaski County is the same as the number of cancer cases expected. If the SIR is greater than one, more cancer cases than expected were diagnosed in Pulaski County.

To determine if the number of diagnosed cases is significantly greater than the expected number, a confidence interval (CI) was calculated for each SIR. The CI has a lower (minimum) value and high (maximum) value. A 95% CI is the range of estimated SIR values that includes the true SIR value with 95% certainty. The rate of lung cancer was 4% higher (SIR = 1.04) in Pulaski County when compared to the Arkansas state-rate. The rate of mesothelioma was 22% higher (SIR = 1.22) in Pulaski County when compared to the Arkansas state-rate. The rates were different than the Arkansas rates; however, the values were not significant since the 95% CI includes 1.00 (lung = 1.0 – 1.07; mesothelioma = 0.82 – 1.76). Differences of cancer cases in Pulaski County relative to the state do not indicate exposure route or exposure duration. See Table 1 for specific results.

| Cancer Type | Arkansas Overall | | Pulaski County | | | | |
|----------------------------|------------------|-------------------------------|----------------|----------------|-------------------------------|------|-------------|
| | Cases | Age-Adjusted Rate per 100,000 | Expected Cases | Observed Cases | Age-Adjusted Rate per 100,000 | SIR* | 95% CI * |
| Lung & Bronchus | | | | | | | |
| 1997 - 2008 | 29,417 | 81.4 | 3,411.9 | 3,549 | 83.3 | 1.04 | 1.00 – 1.07 |
| Mesothelioma | | | | | | | |
| 1997 - 2008 | 176 | 0.5 | 23.7 | 29 | 0.6 | 1.22 | 0.82 – 1.76 |

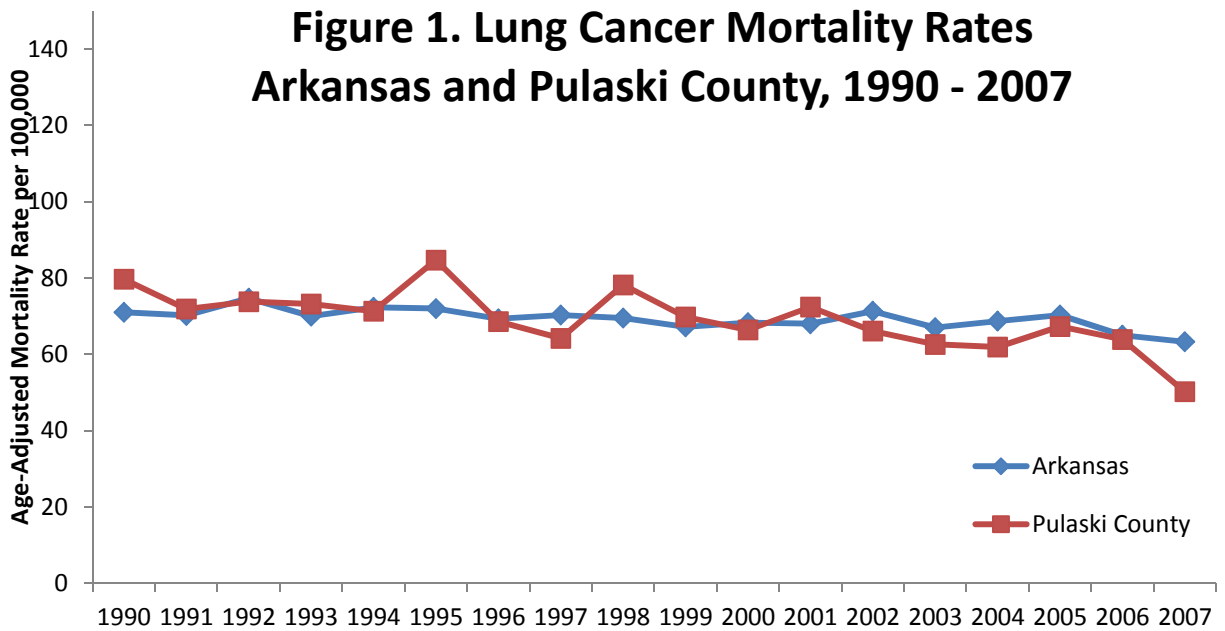
Source: Arkansas Central Cancer Registry, 2011

* SIR denotes Standardized Incidence Ratio, 95% CI denotes 95% Confidence Intervals.

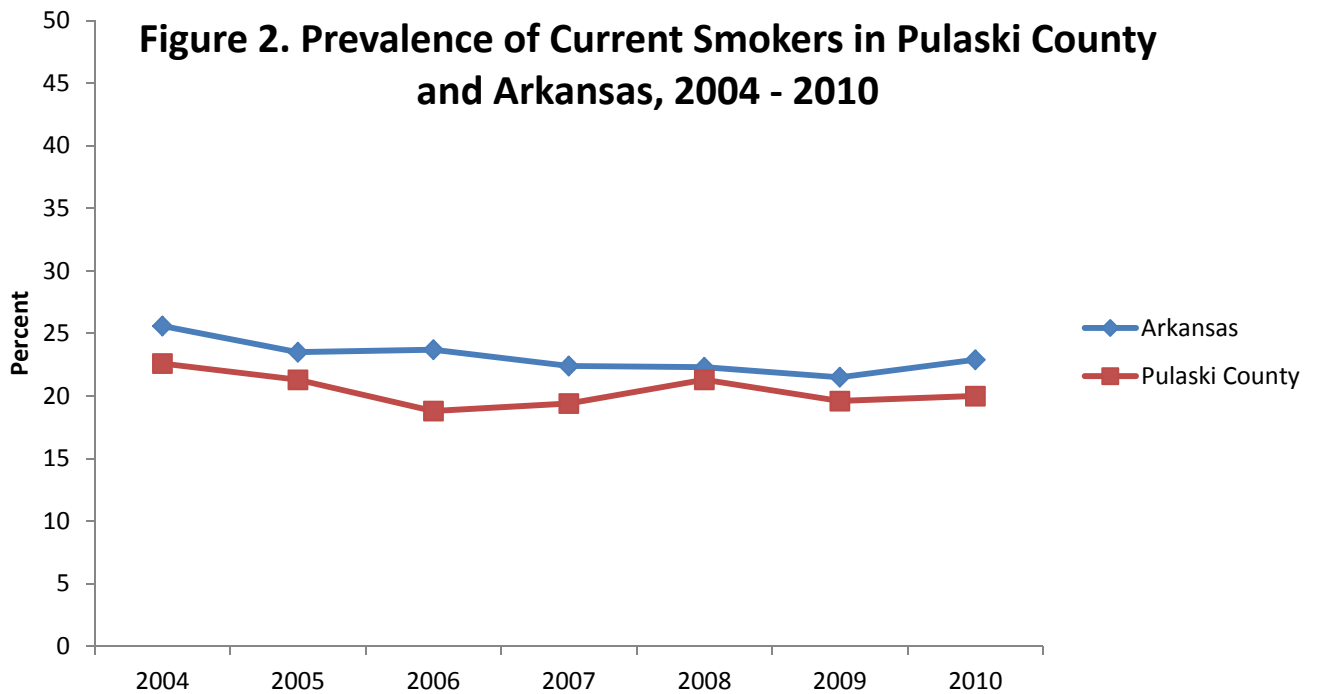
Cancer is the second leading cause of death in the United States, following heart disease. Cancers may be caused by a variety of factors acting alone or together, usually over a period of many years. Although some cancers may be linked to environmental causes, scientists estimate that most cancers are due to factors related to how people live, or lifestyle factors which increase the risk for cancer, including: smoking cigarettes, drinking alcohol heavily, and/or having an unhealthy diet. A family history of cancer may also increase a person's chances of developing cancer.

Since the causes of cancer are multi-factorial in origin and the risk of developing cancer depends on an individual's past and current health status, genetic make-up, and/or lifestyle choices, this represents a limitation to an evaluation of this nature. Limitations also include relative population size, the lack of historical information relative to each individual cancer case, and the inability to track population mobility. The state of Arkansas was chosen as the reference population to assess possible excesses of diagnosed cancer in Pulaski County. County level data was the best readily available resource to explore possible elevated risk in the surrounding area. However, the geographic unit (county level) available to evaluate the health outcome data is a limitation in this type of analyses given that the size of the exposed population is much smaller than the county level population.

Lung cancer mortality rates observed from 1990 through 2007 in Pulaski County and Arkansas show trends similar to the case counts. As shown in Figure 1, with the exception of 1995 and 1998, the age-adjusted lung cancer mortality rates in Pulaski County have remained at or below the state lung cancer mortality rates. This could be due to the relatively similar smoking rates in Pulaski County compared to the state, as shown in Figure 2.



Source: Arkansas Data from Health Statistics Branch



Source: Behavioral Risk Factor Surveillance System

Appendix F: Site Photographs

All pictures taken by Arkansas Department of Health on November 16, 2011.



View of entrance to the Former W. R. Grace Facility, past two sets of rail road tracks. Gate can be closed and locked to prevent automobile access.



West side of the former loading dock and warehouse at the Former W.R. Grace Facility.

All pictures taken by Arkansas Department of Health on November 16, 2011.



View of west end of warehouse at the Former W.R. Grace Facility.



View of four on-site storage silos behind the warehouse at the Former W.R. Grace Facility.

All pictures taken by Arkansas Department of Health on November 16, 2011.



Examples of the raw vermiculite ore (top) and expanded (*i.e.*, exfoliated) vermiculite (bottom) found on the surface at the Former W.R. Grace site.

All pictures taken by Arkansas Department of Health on November 16, 2011.



EPA contractors collecting soil samples at nearby Conley Park.