Trip Report - August 2006 Sampling Event
WRG4 Vermiculite Site
Removal Site Evaluation
Ellwood City, Lawrence County, Pennsylvania

TDD No: W13-008-06-07-005

Contract: EP-S3-05-03
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Region III

START - West

Superfund Technical Assessment and Response Team - West

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1.0 INTRODUCTION

On March 15, 2006, U.S. Environmental Protection Agency (EPA) Region III, Enforcement On-Scene Coordinator (OSC) Debbie Lindsey tasked TechLaw, Inc. (TechLaw) to conduct a removal site evaluation for the WRG4 Vermiculite Site, located in Ellwood, Lawrence County, Pennsylvania. The initial tasking was assigned under the Superfund Technical Assessment and Response Team (START) - West Contract No. EP-S3-05-03, Technical Direction Document (TDD) Number W03-001-06-01-005. The current tasking, which includes completion of this trip report, is assigned under TDD Number W13-008-06-07-005. The OSC directed START to develop a sampling plan for collecting surface and subsurface soil samples in order to delineate asbestos contamination at the site. The objective of the sampling event was to further characterize the level of vermiculite contamination at the Site and determine if there is a threat to public health and the environment from exposure to tremolite asbestos fibers. Previous soil and air sampling was conducted at the site by Ecology & Environment, Inc., during October 2000 and November 2002 under EPA Contract No. 68-S3-00-01.

2.0 BACKGROUND

2.1 Location

The WRG4 Vermiculite Site is located at 12th Street and Factory Avenue in Ellwood City, Lawrence County, Pennsylvania approximately 40 miles northwest of Pittsburgh, Pennsylvania. The area bounding the site consists of residential, commercial, and industrial use properties. The property is bordered to the north by the former B & O Railroad and now operates as the Beaver and Ellwood Railroad; to the east by a power company service office and a luggage factory; to the west by the Moose Lodge; and to the south by residential homes. Connoquenessing Creek is located approximately 2,000 feet beyond the property to the west and 1,000 feet beyond the property to the north. Access to the property is not restricted other than the presence of some fencing along Factory Street . Coordinates of the Site at the approximate middle of the site are 40◦ 51' 34.44" north latitude and 80◦ 18' 0.03" west longitude (Figure 1, Site Location Map).

2.2 Site Description

The Site is situated on approximately two acres of land and is comprised of a brick building with a metal corrugated roof on a partially asphalted and gravel lot. The interior of the building appears to have been modified a number of times over

the years and it is difficult to identify facility features that are characteristic of a vermiculite expansion operation. An abandoned railroad spur was located on the north side of the building. W.R. Grace reported that historical documents indicate the presence of a railroad spur on the south side of the property between the building and Factory Street which has either been removed or covered over. The Site is owned by a trucking company for short term storage and currently for sale. A machine shop is located in the rear of the building (START, 2006).

2.3 Information on Vermiculite

Vermiculite is the mineralogical name given to hydrated laminar magnesium-aluminum-ironsilicate which resembles mica in appearance. All vermiculite ores contain a range of other materials that were found along with the vermiculite in the rock. Vermiculite ores from some sources have been found to contain asbestos minerals, but asbestos in not intrinsic to vermiculite and only a few ore bodies have been found to contain more than trace amounts. Vermiculite is produced from ore mined throughout the world. In the United States, mines are located in Montana, South Carolina and Virginia. When subject to higher temperatures, vermiculite has the unusual property of exfoliating or expanding up to 20 times its original size. The expanded vermiculite is used in many commercial and consumer applications (EPA, August 2000).

2.4 Information on Asbestos

Asbestos is a generic term for a group of six naturally-occurring, fibrous silicate minerals widely used in commercial products. Asbestos minerals fall into two groups or classes: serpentine asbestos and amphibole asbestos. Serpentine asbestos, which includes the mineral chrysolite, a magnesium silicate mineral, possesses relatively long and flexible crystalline fibers which are capable of being woven. Amphibole asbestos, which includes the minerals actinolite, amosite, anthophyllite, crocidolite and tremolite, form crystalline fibers that are substantially more brittle than serpentine asbestos. Asbestos is of potential health concern because chronic inhalation exposure to excessive levels of asbestos fibers suspended in air can result in lung diseases such as asbestosis, mesothelioma, and lung cancer (Gee, Vincent, date unknown).

2.5 Asbestos at the Libby, Montana Mine

The crude Libby vermiculite ore was sold to processors, who used a process called "benefication," which basically separated vermiculite mineral from the ore. Information provided to EPA indicates that the benefication process took place in Libby, Montana. The processed ore was then sold to product manufacturers nationwide, who converted it into commercial vermiculite by a process called "exfoliation" or "expansion." EPA developed a list of vermiculite expansion

facilities nationwide that are believed to have operated since 1953. The list compiles information from the U. S. Geological Survey and W. R. Grace. The EPA determined which of these facilities actually received vermiculite from the Libby mine and initiated investigations to determine whether there are any health or environmental concerns at these sites (Zorzi, Howard. May 2001).

2.6 Site Investigation History

As a result of EPA's investigation at the W.R. Grace mine in Libby, Montana, the EPA initiated an evaluation of current and former vermiculite facilities in the United States which received ore from the Libby mine. The W.R. Grace/ Zonolite Co. facility (e.g. WRG4 Vermiculite Site or "Site") in Ellwood City, Pennsylvania was reported by the EPA to have received vermiculite ore from the Libby mine and operated as an exfoliating facility from approximately 1954 to 1969.

An initial assessment was conducted at the WRG4 Vermiculite Site on October 31, 2000, by the EPA Region III START-South Contractor (RAI) who was accompanied by an EPA On-Scene Coordinator. During that site visit, two bulk samples were collected. The results of the October 2000 sampling revealed the presence of tremolite asbestos fibers at concentrations of 2% in one of the bulk samples. The results for the other sample was non-detect. The one sample where detection was noted was collected outside of the facility in a pile which appeared to contain nonexpanded vermiculite. The non-detect sample was collected from the housing of a ventilation fan in a storage room (Voss, Chris, August 2001). EPA decided to conduct additional sampling based on the presence of tremolite in the sample collected at the facility and reports that the facility received vermiculite ore from the Libby, MT mine.

In May of 2002, EPA conducted additional sampling at the WRG4 Vermiculite Site. Five surface samples and one subsurface sample were collected from the soils surrounding the former vermiculite facility. Samples were initially analyzed using the Transmission Electron Microscopy (TEM) method. The TEM analysis indicated that one sample was identified as containing total asbestos structures, which represents all asbestos structures (fibers, bundles, cluster, and matrix). Five samples were reported as including respirable non-regulated amphibole structures indicative of the Libby ore and referred to as the "Libby Amphiboles".

In August of 2002, representatives from EPA, ATSDR, the Pennsylvania Department of Health, and W.R. Grace conducted a site visit to review the existing data in support of ATSDR's public health evaluation of the Site. As a result, it was determined by EPA and ATSDR that the TEM analysis may not have assessed larger asbestos bundles due to magnification or weight. It was also determined during this visit that air sampling data would be beneficial. Subsequently, Polarized Light Microscopy (PLM) analysis was performed on the

samples using NIOSH method 9002 for asbestos fibers. Results of the PLM analysis indicated that three of the six samples were non-detect. However, asbestos fibers (actinolite/tremolite) were reported in the remaining three samples at a concentration of less than one percent (<1%).

In November of 2002, based on the determination made during the August Site visit, EPA collected two air samples from inside the building. Both air samples were reported as non-detect for asbestos fibers utilizing TEM analysis (START, September 2003).

In September of 2005, ATSDR released a Health Consultation for the Site as part of the National Asbestos Exposure Review (NAER) project. The consultation indicated that not enough information is known about how often people came in contact, or about how they came in contact with Libby asbestos from the plant (ATSDR, September 2005). Following the release of this document, ATSDR was contacted by a former resident who described a playground that was located near the plant during its operation. According to the resident, vermiculite waste materials were piled near the playground, and that children may have had contact with them. Since this facility received vermiculite from Libby, Montana, it was likely that some of the waste vermiculite material was contaminated with amphibole asbestos. It was determined that further review of the Site may be necessary.

In March of 2006, EPA, ATSDR, and various state and local health officials visited the Site and conducted a public meeting to address health concerns associated with asbestos exposure. Numerous residents recollected playing at the above mentioned playground, and were able to convey other historic details pertaining to W.R. Grace/Zolonite operations at the Site. EPA and ATSDR determined that further delineation of the vermiculite ore was necessary (START, 2006).

3.0 SITE ACTIVITIES

3.1 Subcontract Preparation, Mobilization, and Initial Site Meeting

Sampling preparation first involved the procurement of site access which was handled directly by the OSC. Once START received confirmation of site access dates from the OSC, a START Request for Proposal for a Geoprobe® subcontract (direct-push technology sampling services) was completed and released for bid. The subcontract was awarded to Terra Probe, Incorporated (TPI) based out of New Hope, Pennsylvania.

The OSC requested that START provide a geologist to conduct lithologic logging of the soil cores/samples collected during the sampling event. Prior to the week of the sampling event, the START geologist prepared the lithologic logs and researched the expected natural soil classifications in the vicinity of the site. START procured a report from the Natural Resources Conservation Service (NRCS) SoilMap® website. The NRCS is a division of the United States Department of Agriculture. The NRCS SoilMap® report is enclosed with this trip report as Attachment 1, WRG4 SoilMap® Report.

Prior to the sampling event, TPI contacted the Pennsylvania One-Call System, Inc., (PA One-Call) to request a utility search and mark-out of the areas to be sampled at the site as required by the subcontract scope of work. The PA One-Call reported the mark-out request to the appropriate utilities and provided START a list of the potentially affected utility companies.

On August 14th, 2006, the OSC and START mobilized to the site. Upon arrival, START tested the emergency route to the hospital and held a safety meeting. Following the safety meeting, the OSC and START met at the site to perform a pre-sampling reconnaissance at the site. During this time it was observed that someone was working in the site building (now leased machine shop building). The OSC informed this person of the sampling to occur beginning the following day. The OSC next met with Todd Sarver, representative of the Moose Lodge, and reviewed with him where the samples were expected to be collected at that time. Following this meeting, the OSC and START walked the site and placed sample flags to mark preliminary sample locations. These locations were considered to be areas that the Geoprobe® unit could access without difficulty.

3.2 Site Conditions and Observations

Weather conditions observed during the sampling event were as follows (data from http://weatherunderground.com)

Date	High/Low °F	Weather Conditions Observed	Precipitation
8/14/06	82/73	Mostly Cloudy, Windy, Light Rain Late	Trace
8/15/06	80/68	Mostly Cloudy	None
8/16/06	84/60	Partly Cloudy	None
8/17/06	86/62	Mostly Cloudy	None
8/18/06	80/68	Mostly Cloudy	None

3.3 Soil Sampling Activities

From August 15 to August 18, 2006, START collected surface samples from both surface-only and Geoprobe® sample locations. Beginning on August 15, 2006, continuous subsurface soil samples were collected with the Geoprobe® 2.125-inch diameter by 4-foot length stainless steel Macro-Core® sampler that was directly pushed into the ground. Each core sampler was lined with a dedicated acetate liner. Once extracted from the stainless steel core, a grooving tool was used to cut the acetate liners lengthwise. Geologic parameters of all borehole soil cores retrieved for sampling were logged by a START geologist who was present for the duration of the sampling operations. Each core sample was then homogenized within an aluminum pan dedicated per sample interval. At each location, a surface sample was collected from the 0 to 12-inch depth interval with a dedicated trowel or scoop. Up to two additional samples were collected from a depth interval based on visual or VOC (field monitoring instrument) screening results. Copies of the geologic data logs are included in Attachment 2, Geologic Logs. Photographic documentation of the sampling event is provided in Attachment 3, Sampling Event Photographs. Continuous soil cores were collected until the depth of native, non-disturbed soil was encountered, or until refusal was met. The sample intervals were also dictated by the amount of soil recovery in the cores collected from depth.

Once homogenized, the soil samples were placed in the appropriate sample jars to be analyzed for Asbestos by Polarized Light Microscopy (PLM), NIOSH Method 9002. START collected a total of 48 soil samples, which included 26 surface (0 to 12-inch) samples, 18 depth samples (various depth as indicated above), and four duplicate samples from the 26 soil sampling locations surrounding the former vermiculite facility. The Geoprobe® unit was used to collect samples from 17 of the 26 sample locations. START used hand tools, particularly a slambar-driven split core sampler, to collect samples from the remaining nine sampling locations due to access limitations of the Geoprobe® unit. Other than the addition of the slambar-driven split core sampler, all samples were collected as indicated in the site-specific sampling plan. Also, all samples were handled and packaged in accordance with START TechLaw Standard Operating Procedures (SOP's) as indicated in the site-specific sampling plan. A list of sample locations and associated sample depths can be found below in Table 1, Soil Sample Locations.

3.4 Sampling Locations

Sample identification numbers, sample location description and longitude/latitude coordinates of all sample locations are summarized below in Table 1, Soil Sample Locations. Longitude and latitude coordinates were recorded with a handheld Garmin GPS III Plus global positioning system unit. The sample locations have been plotted on a sample location map and are shown in Figure 2 - Site Location Map.

Table 1
Soil Sampling Locations

Sample ID	Type of Sample/Purpose	Soil Depth	Latitude	Longitude	Date/Time
01SS01	Surface sample at Location 01/Contamination delineation	0-12 in.	40.85944	-80.30217	8-15-06 09:15
01SB01	Subsurface sample at Location 01/Contamination delineation	9-11 ft.	40.85944	-80.30217	8-15-06 10:05
02SS01	Surface sample at Location 02/Contamination delineation	0-12 in.	40.85965	-80.30205	8-15-06 11:05
02SB01	Subsurface sample at Location 02/Contamination delineation.	7-11 ft.	40.85965	-80.30205	8-15-06 11:30
03SS01	Surface sample at Location 03/Contamination delineation	0-12 in.	40.85974	-80.30189	8-15-06 13:40
03SB01	Subsurface sample at Location 03/Contamination delineation	3-5 ft.	40.85974	-80.30189	8-15-06 13:55
03SB02	Subsurface sample at Location 03/Contamination delineation	9 ft.	40.85974	-80.30189	8-15-06 14:20
04SS01	Surface sample at Location 04/Contamination delineation	0-12 in.	40.85984	-80.30154	8-15-06 15:05
04SB01	Subsurface sample at Location 04/Contamination delineation	5-7 ft.	40.85984	-80.30154	8-15-06 15:25
05SS01	Surface sample at Location 05/Contamination delineation	0-12 in.	40.85991	-80.30130	8-15-06 16:00
05SB01	Subsurface sample at Location 05/Contamination delineation	4-6 ft.	40.85991	-80.30130	8-15-06 16:30
05SB02	Subsurface sample at Location 05/Contamination delineation	17-18 ft.	40.85991	-80.30130	8-15-06 17:40
06SS01	Surface sample at Location 06/Contamination delineation	0-12 in.	40.84559	-80.30118	8-15-06 18:40
06SB01	Subsurface sample at Location 06/contamination delineation	3-5 ft.	40.85959	-80.30118	8-15-06 18:55
06SB02	Subsurface sample at Location 06/Contamination delineation	10-11 ft.	40.85959	-80.30118	8-15-06 19:15
07SS01	Surface sample at Location 07/Contamination delineation	0-12 in	40.85966	-80.30082	8-15-06 19:30
07SB01	Subsurface sample at Location 07/Contamination delineation	2-3'	40.85966	-80.30082	8-15-06 19:50

08SS01	Surface sample at Location 08/Contamination delineation	0-12 in.	40.86005	-80.30090	08-16-06 09:30
08SB01	Subsurface sample at Location 08/Contamination delineation	5-7 ft.	40.86005	-80.30090	08-16-06 11:30
09SS01	Surface sample at Location 09/Contamination delineation	0-12 in.	40.85949	-80.30090	08-16-06 14:00
10SS01	Surface sample at Location 10/Contamination delineation	0-12 in.	40.85966	-80.30054	08-16-06 15:50
10SB01	Subsurface sample at Location 10/contamination delineation	11-12 ft.	40.85966	-80.30054	08-16-06 16:30
11SS01	Surface sample at Location 11/Contamination delineation	0-12 in.	40.85943	-80.29992	08-16-06 17:05
12SS01	Surface sample at Location 12/Contamination delineation	0-12 in.	40.85963	-8029995	08-16-06 17:40
13SS01	Surface sample at Location 13/Contamination delineation	0-12 in.	40.86020	-80.29938	8-16-06 18:30
14SS01	Surface sample at Location 14/Contamination delineation	0-12"	40.86016	-80.29959	8-17-06 08:30
14SB01	Subsurface sample at Location 14/Contamination delineation	11-12 ft.	40.86016	-80.29959	8-17-06 09:10
15SS01	Surface sample at Location 15/Contamination delineation	0-12 in.	40.85989	-80.29974	8-17-06 10:20
16SS01	Surface sample at Location 16/Contamination delineation	0-12 in.	40.86008	-80.29994	8-17-06 13:10
17SS01	Surface sample at Location 17/Contamination delineation	0-12 in.	40.86010	-80.30012	8-17-06 14:47
17SB01	Subsurface sample at Location 17/Contamination delineation	3-4 ft.	40.86010	-80.30012	8-17-06 15:10
50SB01	Field duplicate of 17SB01	3-4 ft.	40.86010	-80.30012	8-17-06 15:10
18SS01	Surface sample at Location 18/Contamination delineation	0-12 in.	40.86018	-80.30026	8-17-06 15:25
19SS01	Surface sample at Location 19/Contamination delineation	0-12 in.	40.85942	-80.30228	8-17-06 15:05
19SB01	Subsurface sample at Location 19/Contamination delineation	1.5-2 ft.	40.85942	-80.30228	8-17-06 16:00
20SS01	Surface sample at Location 20/Contamination delineation	0-12 in.	40.85942	-80.30231	8-17-06 17:00

51SS01	Field duplicate of 20SS01	0-12 in.	40.85942	-80.30231	8-17-06 17:10
21SS01	Surface sample at Location 21/Contamination delineation	0-12 in.	40.85984	-80.30206	8-17-06 17:30
52SS01	Field duplicate of 21SS01	0-12 in.	40.85984	-80.30206	8-17-06 17:40
22SS01	Surface sample at Location 22/Contamination delineation	0-12 in.	40.85998	-80.30177	8-17-06 18:00
23SS01	Surface sample at Location 23/Contamination delineation	0-12 in.	40.85938	-80.30196	8-18-06 08:45
23SB01	Subsurface sample at Location 23/Contamination delineation	2.5-3.5 ft.	40.85938	-80.30196	8-18-06 09:10
53SB01	Field duplicate of 23SB01	2.5-3.5 ft.	40.85938	-80.30196	8-18-06 09:15
24SS01	Surface sample at Location 24/Contamination delineation	0-12 in.	40.85991	-80.30183	8-18-06 10:00
25SS01	Surface sample at Location 25/Contamination delineation	0-12 in.	40.86011	-80.30077	8-18-06 10:48
25SB01	Subsurface sample at Location 25/Contamination delineation	2-3 ft.	40.86011	-80.30077	8-18-06 10:54
26SS01	Surface sample at Location 26/Contamination delineation	0-12 in.	40.86013	-80.30064	8-18-06 10:34
26SB01	Subsurface sample at Location 26/Contamination delineation	2-3.2 ft.	40.86013	-80.30064	8-18-06 10:42

3.5 Soil Sample Collection Summary

At each sampling location, the top layer of soil or debris was removed if necessary. The surface sample was then collected from the first 0-12 inches of surface soil material. For the subsurface sample collected, the START geologist determined the sample depth based on a visual inspection of the cores. Subsurface samples were collected where vermiculite ore and/or a potentially asbestos related non-native material was encountered. The soil/material to be sampled was subsequently homogenized and placed into sample jars as per the site-specific sampling plan. Sample location descriptions can be found in Attachment 3, Sampling Event Photographs.

4.0 ANALYTICAL RESULTS

4.1 Methods for Measuring Asbestos Content

A number of different analytical methods can be used to evaluate asbestos content in soil and other bulk materials. Each method varies in its ability to measure fiber characteristics such as length, width and mineral type. Asbestos content in soil and bulk material samples is commonly determined using polarized light microscopy (PLM), a method which uses polarized light to compare refractive indices of minerals and can distinguish between asbestos and nonasbestos fibers and between different types of asbestos. The PLM method can detect fibers with lengths greater than approximately 1 micrometer (~1 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. If asbestos is found during the PLM analysis, the types of asbestos present and their relative percentages are reported (ATSDR, 1999).

4.2 Types of Asbestos Fibers

Vermiculite that was mined in Libby, Montana contains amphibole asbestos with a characteristic composition including tremolite, actinolite, richterite and winchite. This material is also referred to as Libby asbestos. PLM analysis can be used to help classify the five different type of regulated amphibole asbestos fibers that may be present including amosite, crocidolite, tremolite, anthophylite and actinolite.

PLM analysis does not typically identify the non-regulated amphibole structures. The non-regulated amphiboles represent a newer class of amphibole categories that have been identified by USEPA Region 8 in conjunction with the Libby, MT project. These include richterite and winchite and also termed the "Libby Amphiboles". These amphiboles are currently not classified as regulated asbestos but may be taken into consideration if a risk assessment and exposure modeling is conducted. It should be noted for information purposes that samples collected during the 2002 assessment were analyzed using both PLM and TEM method and two samples (WRG4-SS4 and WRG4-SBS5) were reported as including respirable non-regulated amphibole structures using the TEM method.

4.3 PLM Analysis of Samples

Laboratory analytical services were procured via the EPA Client Services Team (CST). Samples collected during the week of August 15th, 2006, were shipped to EMSL Analytical, Inc. in Westmont, NJ on August 23rd, 2006, via Federal Express. Samples were received at EMSL Analytical on August 24th, 2006.

Soil samples were analyzed in accordance with the Contract Laboratory Program (CLP) Statement of Work (SOW) by Polarized Light Microscopy (PLM) using NIOSH method 9002 for asbestos fibers. Data validation was performed by Region III Environmental

Services Assistance Team (ESAT) contractor Lockheed Martin Environmental Services, Ft. Meade, MD. Validation reports and data summaries for the PLM analysis may be found in Attachment 4, Analytical Data.

The PLM analysis results provide information on the percent of asbestos and type of asbestos identified in the sample. PLM analytical results for 24 of the 48 total soil samples (including duplicates) collected in August of 2006 were reported as non-detect. Tremolite asbestos fibers were reported as present in the remaining 24 samples. Levels of asbestos fibers were reported between a range of < 0.25% and 1.75% with the following breakdown:

- 24 samples had results of non-detect for asbestos fibers
- 13 samples had results of tremolite asbestos at levels < 0.25%
- 7 samples had results of tremolite asbestos at levels between 0.25% - < 1.0%
- 4 samples had results of tremolite asbestos at levels between 1.00% - 1.75%

PLM analytical results for the soil samples are summarized below in Table 2, PLM Analytical Results. Non-detect results are not listed in the table.

Table 2
PLM Analytical Results

Sample No.	DAS Sample Number	PLM Analysis Result
01SS01	R32577-02	< 0.25% tremolite
01SB01	R32577-01	0.25% tremolite
02SS01	R32577-04	< 0.25% tremolite
02SB01	R32577-03	< 0.25% tremolite
03SB01	R32577-05	0.50% tremolite
04SS01	R32577-09	< 0.25% tremolite
04SB01	R32577-08	1.75% tremolite
05SS01	R32577-12	0.62% tremolite
05SB01	R32577-10	1.25% tremolite
06SB01	R32577-13	0.25% tremolite
07SB01	R32577-16	< 0.25% tremolite
08SS01	R32577-19	0.50% tremolite

19SS01	R32577-34	< 0.25% tremolite
20SS01	R32577-35	< 0.25% tremolite
21SS01	R32577-36	< 0.25% tremolite
22SS01	R32577-37	< 0.25% tremolite
23SB01	R32577-41	< 0.25% tremolite
25SS01	R32577-45	0.50% tremolite
25SB01	R32577-44	1.25% tremolite
26SS01	R32577-47	1.0% tremolite
26SB01	R32577-46	< 0.25% tremolite
51SS01 duplicate	R32577-39	< 0.25% tremolite
52SS01 duplicate	R32577-40	< 0.25% tremolite
53SB01 duplicate	R32577-48	0.50% tremolite

4.4 Breakdown of Analytical Results by Geographical Area

The assessment was conducted to complete delineation of potential vermiculite contamination at the former W.R. Grace property as well as on the adjacent properties including the former playground area now occupied by the Moose Lodge and the property currently occupied by the Ellwood City Borough Electrical Shop.

4.4.1 Former Playground Area/Moose Lodge

The former playground area, also referred to as the "West End Playground" was located where the current Moose Lodge is now present. Information received during a March 2006 public workshop indicated that shiny vermiculite material covered the playground area as well as covering the embankment behind the playground and former vermiculite plant. Currently, the former playground area is covered with an asphalt parking lot and an estimated 6,400 square foot building. Access to the property is unrestricted and there is evidence that the hillside behind the Moose Lodge is used by all terrain vehicles for recreational purposes. Other signs of trespassing are also present.

Five (5) soil borings were collected at the perimeter of the parking lot to assess if vermiculite and/or waste rock is present under and around the parking lot. Soil borings were not collected within the area of the parking lot in order to maintain the integrity of the asphalted area. Soil borings S01 through S04 were noted as having visual identification of a mica ore (vermiculite) and fibers throughout the top 8 feet of the borings. Soil boring S01 indicated the mica ore to be present down to approximately 14 feet and soil boring S02 indicated the mica ore at 11 feet. The remaining soil profiles for S01 through S04 were a mixture of gravel, sand, slag and fill. The fifth soil boring (S23) was collected by a hand auger close to Factory Street and visually showed a few flakes of mica (vermiculite) in the surface sample. Analytical results for the samples indicated tremolite asbestos at levels of < 0.25% in the four surface samples collected at the perimeter of the parking lot and tremolite asbestos levels ranging from < 0.25% to 1.75% for samples collected at depth. Analytical data for soil boring S23 collected near Factory Street indicated non-detect for the surface sample and < 0.25% for a sample collected at 2.5 - 3.5 feet below ground surface. These findings are consistent with reports that vermiculite and/or waste rock may have covered the playground area and are now covered by the asphalt parking lot.

Five (5) soil borings were collected on the hillside behind the Moose Lodge property. Due to the terrain, the borings were collected by a hand auger or split core and slam bar. Mica ore was reported as being visible in boring S19. Surface samples were collected from the five soil borings. Analytical results for the samples indicated tremolite asbestos at levels of < 0.25% in all five of the surface samples. A subsurface soil sample was collected at soil boring S019 and analytical results indicated non-detect for asbestos. Summary of the analytical results for the former Playground Area (current Moose Lodge property) is provided in Table 3.

Table 3
PLM Analytical Results
for the Former Playground Area
(Current Moose Lodge property)

Sample #	SS01	SB01	SB02	Comments
Sample 01	< 0.25 %	0.25 % (9-11 ft)	not sampled	Sample collected at perimeter of parking lot. Surface covered with vegetation. Mica ore (vermiculite) and fibers observed at depths to 14 ft.
Sample 02	< 0.25 %	< 0.25 % (7-11 ft)	not sampled	Sample collected at perimeter of parking lot. Surface covered with overgrown vegetation. Mica ore (vermiculite) and fibers observed at depths to 11 ft.

Sample 03	N.D.	0.50 % (3-5 ft)	N.D. (9 ft)	Sample collected at perimeter of parking lot. Surface covered with overgrown vegetation. Mica ore (vermiculite) and fibers observed at depths to 6 ft.
Sample 04	< 0.25 %	1.75 % (5-7 ft)	not sampled	Sample collected at perimeter of parking lot and border of former vermiculite facility property. Surface covered with overgrown vegetation. Mica ore (vermiculite) and fibers observed at depths to 6 ft.
Sample 19	< 0.25 %	N.D. (1.5-2 ft)	not sampled	Sample collected approx. 25 ft west of S01 on hillside to the east of the Moose Lodge. Mica flakes (vermiculite) observed at surface.
Sample 20	< 0.25 %	not sampled	not sampled	Sample collected approx. 75 ft west of S02 on hillside to the east of the Moose Lodge. (Duplicate sample 51SS01).
Sample 21	< 0.25 %	not sampled	not sampled	Sample collected approx. 55 ft to the northwest of S03 on hillside behind the Moose Lodge. (Duplicate sample 52SS01).
Sample 22	< 0.25 %	not sampled	not sampled	Sample collected approx. 100 ft to the north of S03 on bottom of hillside behind the Moose Lodge.
Sample 23	N.D.	< 0.25 % (2.5-3.5 ft)	not sampled	Sample collected near western corner of Moose Lodge near Factory Street. Mica flakes (vermiculite) observed at the surface. (Duplicate sample 53SB01).
Sample 24	N.D.	not sampled	not sampled	Sample collected approx. 70 ft to the north of S03 on hillside behind the Moose Lodge. Material similar to fill material located around S03 consisting of dirt/concrete/asphalt.

SS - surface sample collected at 0 - 12 inches

4.4.2 Former Vermiculite Expansion Facility

The former vermiculite expansion facility occupies approximately 2 acres with the land being partially covered by asphalt and compacted gravel areas and overgrown vegetation and also includes an estimated 32,000 square foot building. Samples were collected on the perimeter of the property, in areas where former operations may have occurred, or in areas where the vermiculite and/or waste rock could have been placed.

In the eastern portion of the property which is covered with the compacted gravel and asphalt, sampling was limited to only one sample in order to maintain the integrity of the covered area. The results from the sample collected in this area will be interpreted as being representative for the area covered by the compacted gravel and asphalt. Nine (9) soil borings were collected within the former vermiculite expansion facility borders and four (4) soil borings were collected on the hillside behind the expansion plant. Access to the facility is unrestricted with fencing only present along Factory Avenue. There is evidence that the hillside behind the former vermiculite facility is used by all terrain vehicles for recreational purposes. Illegal dumping and other signs of trespassing are also present.

Samples S05 and S08 were collected from the berm on the east side of the property. The berm appeared to consist of vermiculite and/or waste rock, other debris and overgrown vegetation. Soil borings S05 and S08 were noted as having visual identification of a mica ore (vermiculite) and fibers throughout the top 6 feet of the borings. Visual identification of white fibers was also reported in the 9-10 foot depth interval in boring S05. The remaining soil profiles for S05 and S08 were a mixture of slag, clay and silty sand. Analytical results for the surface samples indicated tremolite asbestos at levels of 0.62% in S05 and 0.50% in S08. Analytical results for the subsurface samples reported tremolite asbestos at 1.25% in S05 (5-6 foot depth interval) and non-detect for S08. Analytical results from samples collected from the berm area during the 2000 and 2002 investigations reported tremolite asbestos at levels of 2.0% and < 1.0%, respectively.

Boring S06 was collected from the area covered by the asphalt and compacted gravel. Visual identification of a mica ore (vermiculite) and fibers were reported throughout the top 4 feet of the boring. Visual identification of mica and white fibers was also reported in the 9-10 foot depth interval. The remaining soil profile for S06 indicated a mixture of silt, sand, gravel and clay. Analytical results for the surface sample were non-detect. Analytical results for the subsurface samples reported tremolite asbestos at 0.25% in the 3-4 foot depth interval and non-detect in the 10-11 foot depth interval.

Borings S07, S10 and S12 were collected in an area on the southern side of the vermiculite expansion building. This area was identified as the location where the vermiculite ore was brought in by a railroad spur and hand shoveled into the furnaces, as well as an area which may have contained stockpiles of the vermiculite ore. The area was covered with overgrown vegetation at the time of sample collection. Soil borings S07 and S10 were noted as having visual identification of a mica ore (vermiculite) and fibers in the 2-3 foot interval in S07 and in the 1-2 foot interval in S10. The remaining soil profiles for S07 and S10 were a mixture of silt, sand, clay and gravel. Soil boring S12 did not have any visual identification of mica ore of fibers in the boring. The surface samples were reported as being an organic loam and topsoil. Analytical results for the surface samples in S07, S10 and S12 were all non-

detect. Analytical results for the subsurface samples collected in S07 and S10 reported tremolite asbestos at < 0.25% in S07 and non-detect in S10.

Borings S09 and S11 were collected along the Factory Street side of the property in a grassy area sloping up to the perimeter fencing. Neither boring indicated visual evidence of mica ore or fibers. The surface samples were reported as being an organic soil with the remaining soil profile described as sand and silt with native soil encountered at approximately 8 feet. Analytical results for the surface samples of S09 and S11 were non-detect. No subsurface samples were collected. Samples collected from this area during the 2002 investigation also reported non-detect for asbestos.

Borings S16 and S17 were collected from the northwestern corner of the building behind the former loading dock area. Soil boring S16 indicated no visual evidence of mica ore or fibers. The surface sample was reported as being an organic topsoil and slag with the remaining soil profile described as slag and organic rich material. Analytical results for the S16 surface sample was non-detect. No subsurface samples were collected for boring S16. Soil boring S17 was noted as having visual identification of a mica ore (vermiculite) and fibers in the 3-4 foot interval and a fiber cluster in t he 5-6 foot interval. The remaining soil profile for S17 was a mixture of vegetated slag and sandy silt loam. Analytical results for soil boring S17 were both non-detect for the surface and subsurface samples.

Three (3) soil borings were collected on the hillside behind the former vermiculite expansion plant. Due to the terrain, the borings were collected by a hand auger or split core and slam bar to an average depth of 2 - 3 feet. Soil boring S18 was collected on the hillside behind the loading dock side of the building (east side). Analytical results for the surface and subsurface samples collected from boring S18 were all non-detect. Soil borings S25 and S26 were collected on the hillside behind the current machine shop side of the building. Mica ore (vermiculite) was reported as being visible in boring S26. Analytical results for the surface samples reported tremolite asbestos at 0.50% in S25 and 1.00% in S26. Analytical results for the subsurface samples collected from S25 and S26 reported tremolite asbestos at 1.25% in S25 and <0.25% in S26, respectively. A Summary of the analytical results for the former Zonolite/W.R. Grace vermiculite expansion facility is provided in Table 4.

Table 4
PLM Analytical Results
for the Former Zonolite/W.R. Grace Facility

Sample #	SS01	SB01	SB02	Comments
Sample 05	0.62 %	1.25 % (4-6 ft)	N.D. (17-18 ft)	Sample collected from berm on the northwestern side of the property. Surface covered with vegetation and debris. Mica ore (vermiculite) and fibers observed at depths to 6 ft and also from 8-10 ft.
Sample 06	N.D.	0.25 % (3-5 ft)	N.D. (10-11 ft)	Sample collected from asphalted and gravel area on the western side of the property. Mica ore (vermiculite) and fibers observed at depths to 4 ft and also from 9-10 ft.
Sample 07	N.D.	< 0.25 % (2-3 ft)	not sampled	Sample collected from area near the southwestern corner of building. Surface covered with overgrown vegetation. Mica ore (vermiculite) and fibers observed at 2-3 ft interval.
Sample 08	0.50 %	N.D. (5-7 ft)	not sampled	Sample collected from berm area near the northwestern corner of building. Surface covered with overgrown vegetation and debris. Mica ore (vermiculite) and fibers observed at depths to 6 ft.
Sample 09	N.D.	not sampled	not sampled	Sample collected from south western corner of property near fencing on Factory Street. No visible mica or fibers observed.
Sample 10	N.D.	N.D. (11-12 ft)	not sampled	Sample collected from area approx. 25 ft in front of the southern side of the building. Surface covered with overgrown vegetation. Fibers and mica ore (vermiculite) observed at 1-2 ft interval.
Sample 11	N.D.	not sampled	not sampled	Sample collected from south eastern corner of property near fencing on Factory Street. No visible mica or fibers observed.

Sample 12	N.D.	not sampled	not sampled	Sample collected from area near the southeastern corner of building. Surface covered with overgrown vegetation. No visible mica or fibers observed.
Sample 16	N.D.	not sampled	not sampled	Sample collected from the northeast corner of building and metal shed. No visible mica or fibers observed.
Sample 17	N.D.	N.D. (3-4 ft)	not sampled	Sample collected from behind the northeast corner of building. Mica ore (vermiculite) and fibers observed at 3-4 ft and 5-6 ft interval. (Duplicate sample 50SB01).
Sample 18	N.D.	not sampled	not sampled	Sample collected on hillside behind east side of building. Approx. 15-20 ft from building. No visible mica or fibers observed.
Sample 25	0.50 %	1.25 % (2-3 ft)	not sampled	Sample collected approx. 6 feet from back of building on the western side.
Sample 26	1.00 %	< 0.25 % (2-3.2 ft)	not sampled	Sample collected approx. 12 feet from back of building on the western side. Visible mica ore observed .

SS - surface sample collected at 0 - 12 inches

4.4.3 Ellwood City Borough Electrical Shop

The Ellwood City Borough Electrical Shop is located to the east of the former vermiculite plant. EPA does not know the type of activities which may have occurred on the property of the Electrical Shop between 1954 and 1969 when the vermiculite expansion facility was in operation. Three (3) soil borings were collected on the property to assess if vermiculite and/or waste rock maybe present.

Soil borings S13 and S14 were collected in the back of the property approximately 3 feet from the utility pole fencing. Neither boring indicated visual evidence of mica ore or fibers. The surface samples were reported as being a gravelly loam, slag and sand. The remaining soil profiles for S13 and S14 are described as slag, gravel and sand. Analytical results for the surface samples of S13 and S14 were non-detect. The subsurface analytical result for S14 was non-detect. No subsurface sample was collected for S13.

Soil boring S15 was collected near the back gate of the Electrical Shop in between the Borough property and the former vermiculite expansion facility. The boring did not show visual evidence of mica ore or fibers. The surface sample was reported as being a gravel fill with the remaining soil profile described as slag, gravel, sand, rock fragments and clay. Analytical results for the surface sample of S15 was non-detect. No subsurface sample was collected for S15. Summary of the analytical results for the Ellwood City Borough Electrical Shop property is provided in Table 5.

Table 5
PLM Analytical Results
for the Ellwood City Borough Electrical Shop

Sample #	SS01	SB01	Comments
Sample 13	N.D.	not sampled	Sample collected from back north eastern side of the property near utility pole fencing. No visible mica or fibers observed.
Sample 14	N.D.	N.D. (11-12 ft)	Sample collected from back north western side of the property near utility pole fencing. No visible mica or fibers observed.
Sample 15	N.D.	not sampled	Sample collected near the back gate of the Electrical Shop - in between the two properties. No visible mica or fibers observed.

SS - surface sample collected at 0 - 12 inches

5.0 CONSULTATION WITH ATSDR

The OSC requested a public health opinion on the soil sampling analytical results as presented in this Trip Report from the ATSDR. ATDSR's Record of Activity (AROA) identifies the following issues involving asbestos levels in soils:

1. There are no established regulatory or health based standards to guide the determination of acceptable asbestos concentrations in surface soil or subsurface soils.
2. It is extremely difficult to predict airborne concentrations based on asbestos concentrations in the soil.
3. In looking at Phase Light Microscopy results, it is important to note that 1% is not a health-based level, but instead represents the practical detection limit in the 1970s when OSHA regulations were created. Studies have shown that disturbing soil containing < 1% amphibole asbestos, however, can suspend fibers at levels of health concern.

4. The 2005 ATSDR health consultation identified past aerial photography and site conditions that indicated that occult asbestos contaminated exfoliation waste rock could be present on the site, and that if disturbed, could result in exposure to airborne asbestos. The current sample results confirm the presence of asbestos contaminated vermiculite waste rock at this site. Although the majority of this site is covered with asphalt, gravel or vegetation, ATSDR does note that this does not constitute a long term control for the site. The vegetation is currently overgrown since the site is not occupied. Furthermore, there are areas where asbestos was detected where community members could have access, such as along the ATV trail and along the berm surrounding the north and east of the facility. As Libby asbestos generally does not break down in the environment at an appreciable rate, management of the buried waste material should be handled in a manner that provides some level of assurance that the material will never be disturbed through activities such construction or redevelopment.
5. The 2007 ATSDR health consultation also noted that ATSDR staff members observed vermiculite waste materials on the slope between the former vermiculite expansion property and the nearest residential home. Therefore, assessment of the residential property to the south of sample location 19, 01 and 23 should also be done.

The ATSDR concluded that the Site could pose a public health hazard if buried/covered asbestos contaminated waste rock were aggressively disturbed and asbestos fibers were released to the air and recommends the removal and/or containment of asbestos containing material on-site as well as further assessment of adjacent residential property for asbestos containing material.

6.0 FUTURE ACTIONS

The OSC to proceed with an Action Memorandum documenting the need to take a removal action and request for funds under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The OSC to also proceed with the enforcement process and identification of any Potentially Responsible Parties.

7.0 REFERENCES

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ATTACHMENTS:

1 - WRG4 SoilMap® Report
2 - Geologic Logs
3 - Sampling Event Photographs
4 - Analytical Data - PLM Analysis