



## **MEMORANDUM**

TO: Zonolite/W.R. Grace Facility Site File

cc: John McKeown, On-Scene Coordinator (OSC), U.S. Environmental Protection Agency (EPA) Region I, Emergency Planning and Response Branch (EPRB)

FROM: Carolyn Imbres, Site Leader, Weston Solutions, Inc. (WESTON®), Superfund Technical Assessment and Response Team III (START) *CEL*

DATE: 26 February 2010

THRU: Eric Ackerman, Project Leader, START

RE: Indoor Sampling Activities. Zonolite/W.R. Grace Facility, Easthampton, Massachusetts. TDD Number (No.) 01-08-11-0009; Task No. 0487; Document Control (DC) No. R-5851.

### **INTRODUCTION**

On 13 October 2009, U.S. Environmental Protection Agency (EPA) Region I On-Scene Coordinator (OSC) John McKeown and Weston Solutions, Inc. (WESTON®), Superfund Technical Assessment and Response Team III (START) members Carolyn Imbres and Robert Sharp mobilized to the Zonolite/W.R. Grace Facility (the site) located in Easthampton, Hampshire County, Massachusetts (MA). The primary purpose of the site visit was to conduct a reconnaissance of the on-site building and to determine future indoor sampling locations. Based on the results of the reconnaissance, EPA determined that sampling of indoor dust and bulk material for asbestos content was needed to determine if further actions, including removal activities, are warranted at the site. On 22 December 2009, EPA OSC McKeown and START members Imbres and Sharp mobilized to the site to collect dust and bulk samples from the inside of the on-site building.

### **SITE DESCRIPTION**

The site is located at 19 Wemelco Way, in a mixed residential and commercial area of Easthampton, Hampshire County, MA (see Attachment A, Figure 1, Site Location Map) [1]. The geographic coordinates, as measured from the approximate center of the site, are 42° 15' 13.7" north latitude and 72° 41' 24.2" west longitude. The site consists of a former Zonolite facility plant building (the building), which is an approximately 15,000-square-foot (ft<sup>2</sup>) structure predominantly consisting of a one-story, open warehouse area. Additional site features include a paved parking lot along the northwestern side of the building, a thickly vegetated/wooded area to



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the east of the building, and a portion of a former rail line. A high-pressure underground gas line bisects the site to the east of the building. An unnamed stream is located along the eastern edge of the site. The site is bordered by Wemelco Way to the west, D.O.S. Concrete Construction Co. (D.O.S.) to the north, the former rail line that runs northeast-to-southwest to the south, and a hayfield to the east (see Attachment A, Figure 2, Site Diagram) [2, 3]. The site is currently owned by Oldon Limited Partnership (Oldon). D.O.S. personnel use a portion of the warehouse to store and cut concrete. The site is accessible and lacks fences or gates.

### **SITE BACKGROUND**

From 1963 through August 1992, the site was operated as a vermiculite exfoliation plant by Grace Construction Products, a unit of W.R. Grace & Company (WRG). Products made at the site from exfoliated vermiculite included Zonolite attic insulation and Monokote spray-on fireproofing material [4]. Based on a review of WRG shipping invoices, approximately 183,255 tons of vermiculite, which had originated from a mine in Libby, Montana (MT), were processed at the site from February 1966 to September 1984 [4]. Vermiculite from the Libby, MT mine is known to contain a characteristic composition of asbestos minerals, including winchitite, richterite, and tremolite, which is collectively known as "Libby asbestos" or the "Libby amphibole" [5]. Production using vermiculite from sources other than Libby, MT continued from 1984 until 1992, at which time exfoliation processes ceased. Woodard & Curran, Inc. Environmental Services (W&C), who was hired by Remedium Group (a subsidiary of WRG) to conduct environmental investigations of the site, concluded that vermiculite was transported to the site by railway, processed and bagged within the building, and then loaded into trucks for shipping [6]. During exfoliation operations conducted at the site, Massachusetts Department of Environmental Protection (MassDEP) personnel responded on several occasions to complaints from nearby residences of dust and odors generated by on-site operations [4]. It was reported that prior to termination of exfoliation processes in 1992, WRG removed all manufacturing equipment from the building and had the building washed down. Based on available information, the building remained vacant from 1992 to 1997. In 1997, the building was leased to J.P. Stevens Elastomerics (JPS). During site investigations, W&C noted that JPS employees infrequently visited the building to load and unload products.

Initial sampling conducted on site included the collection of clearance indoor air samples by WRG in 1992. Results of these indoor air clearance samples revealed levels of fibers ranging from 0.0006 to 0.008 fibers per cubic centimeter (f/cc). Bulk asbestos sampling of the floor, walls, and insulation of the building was conducted by Con-Test Analytical Laboratories, on behalf of JPS, in 2000. In May 2000, EPA and START collected 12 soil samples from 0 to 1.5 feet below ground surface (bgs) at locations east of the building and on the rail bed [7]. In May 2000, prior to the soil sampling, former employees of WRG identified an approximately 200- by 300-foot area east of building where asbestos materials were buried (the disposal area) [4]. Asbestos analysis of the 12 soil samples by Polarized Light Microscopy (PLM) indicated asbestos concentrations of up to 9.8% in the disposal area, as well as asbestos concentrations of



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up to 2.2% on the rail bed [7]. In May 2000, based on these initial soil sampling results, MassDEP issued a Notice of Responsibility/Notice of Response Actions to WRG [4].

From September 2000 through April 2001, MassDEP and W&C conducted additional site investigations to determine the extent of asbestos contamination on site and at adjacent properties. These investigations included the collection of soil, sediment, and air samples for asbestos analysis. A total of 147 surface soil samples (0 through 3 inches bgs) were collected generally every 50 feet on an approximately 1,000- by 400-foot grid, which spanned the site, the rail bed, and properties to the north, east, and west of the site. In addition, 29 near-surface soil samples (3 inches through 2 feet bgs) and 72 subsurface soil samples (2 through 10 feet bgs) were collected from on-site locations as well as from off-site portions of the rail bed. Three sediment samples were collected from the stream that flows under the railroad track at the eastern corner of the site. During these investigations, personal and ambient air samples were collected by either ATC Associates, Inc. or FLI Environmental, Inc. personnel [4].

Results of surface soil samples analyzed by PLM revealed trace asbestos concentrations (less than 1% by volume) at locations throughout the site, at off-site locations along the rail bed, and at locations on four adjacent properties. Asbestos was detected at levels above 1% in surface soil samples collected from one location along the off-site portion of the rail bed, at a concentration of 3.3%, as well at several on-site locations (predominantly in the former disposal area), at concentrations up to 9.8%. Asbestos was detected in subsurface soil samples collected from the former disposal area at concentrations up to 4.4% by PLM [up to 15% by transmission electron microscopy (TEM)], and at trace concentrations down to 10 feet bgs. The maximum 30-minute (min) short-term exposure limit (STEL) and 8-hour time-weighted average (TWA) permissible exposure limit (PEL) fiber concentrations detected in personal air samples collected during on- and off-site sample collection activities were 0.114 f/cc and 0.018 f/cc, respectively. Analytical results of ambient air samples indicated a maximum fiber concentration of 0.007 f/cc [4].

In June 2001, MassDEP classified the site as a Tier II site. During site visits conducted by Massachusetts Department of Public Health (MA DPH) in 2002 and 2003, personnel observed evidence of recreational activity, including all-terrain vehicle (ATV) use, along the rail bed, and observed “pieces of vermiculite and asbestos” in surface soil along the rail bed, both east and west of the building, as well as in the disposal area [4].

In December 2006, the Agency for Toxic Substances and Disease Registry (ATSDR), as part of its National Asbestos Exposure Review (NAER), published a Health Consultation that evaluated the public health effects associated with exfoliation operations at the site [4]. As part of the Health Consultation, MA DPH and ATSDR reviewed historical air monitoring data records from 1974 through 1991, as well as current site conditions, to determine past, present, and future potential pathways for human exposure. As a result of its health consultation, ATSDR classified the site as an “indeterminate public health hazard”, and MA DPH recommended that air



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sampling be conducted during future remediation or development activities to evaluate potential exposure to workers and the community.

In 2004, EPA Office of Solid Waste and Emergency Response (OSWER) issued Directive Number 9345.4-05, which indicated that a risk-based, site-specific action level is appropriate in evaluating response actions for asbestos-contaminated sites [8]. Furthermore, in an October 2008 Memorandum, OSWER concluded that vermiculite exfoliation facilities that are believed or known to have received asbestos-contaminated ore from Libby, MT, are of primary concern for assessment of potentially asbestos-contaminated soils and indoor dust [9].

On 18 November 2008, to address the new guidelines set forth in the OSWER directives, EPA requested START to assist in evaluating or re-evaluating five sites in MA identified during the NAER to either be alleged or known to have processed asbestos-contaminated vermiculite ore from Libby, MT, including the site. As a result, in April 2009, START generated a Preliminary Assessment (PA) Report for the site [10]. The PA report summarized previous site investigations and current activities related to the site, including EPA's ongoing coordination with MassDEP, the City of Easthampton, Massachusetts Highway Department (MHD), and property owners, regarding plans for clean-up and development of the site.

On 22 May 2009, as a result of the PA and multiple interviews and discussions with representatives of MassDEP, City of Easthampton personnel, and property owners, EPA issued a Site Investigation (SI) Closure Memorandum. The EPA SI Closure Memorandum stated that the presence of amphibole asbestos in surface soil poses an imminent and substantial endangerment to human health, thereby warranting a time-critical Removal Action at the site [11].

## **SITE ACTIVITIES**

On 13 October 2009, EPA OSC McKeown and START members Imbres and Sharp mobilized to the site to conduct a reconnaissance of the interior of the building to determine the scope of a future indoor sampling event. Site Health and Safety Coordinator (SHSC) Imbres conducted a tailgate health and safety meeting, and START personnel signed the site-specific health and safety plan (HASP), which was prepared as a separate document, entitled *Weston Solutions, Inc. Region I START Site Health and Safety Plan for the Zonolite/W.R. Grace Facility, Easthampton, Hampshire County, Massachusetts* [12]. Additional personnel on site included Oldon representative Tim Mulhern of Shatz, Schwartz, and Fentin; Oldon environmental consultant Kevin O'Reilly of O'Reilly, Talbot, and Okun; EPA Enforcement Coordinator Tina Hennessy; and MassDEP representatives Lisa Jones and Cathy Wanat.

START personnel established a support zone and calibrated the air monitoring instruments, which included a MultiRae Plus unit [with lower explosive limit (LEL), oxygen (O<sub>2</sub>), carbon monoxide (CO), hydrogen sulfide (H<sub>2</sub>S), and volatile organic compound (VOC) detectors], and a Ludlum Model 19A radiation meter [13]. Ambient air conditions were recorded in the HASP as



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follows: LEL = 0%; O<sub>2</sub> = 20.9%; CO = 0 parts per million (ppm); H<sub>2</sub>S = 0 ppm; VOC = 0 ppm; and radiation = 8-10 micro Roentgens per hour (μR/hr). Air monitoring was conducted for the duration of the reconnaissance, and no levels above background were observed.

Upon entering the building through a door along the southwestern side of the building, START observed two carpeted rooms located off a tiled hallway: a 12- by 10-foot room containing a table and shelf (Office #2), and a 12- by 14-foot empty room (Office #1). A small, tiled kitchenette was observed off Office #1. Three tiled bathrooms were observed along the southeastern portion of the building: a 12- by 19.5-foot bathroom (Bathroom #1); and two smaller bathrooms with a total dimension of 16- by 6-feet (collectively referred to as Bathroom #2). EPA and START observed a small amount of suspected vermiculite material on the floor of Bathroom #1. EPA and START accessed the main warehouse area through a door in Office #1, and noted that a second door leading to the warehouse was located at the end of the hallway. Within the warehouse, a small area, which was partitioned with polyethylene sheeting, contained a work bench and pieces of concrete. Based on information provided by the property owner, this area is used by D.O.S. to cut concrete in the construction of countertops and sinks. The warehouse was observed to have a concrete floor and to be primarily empty, containing some miscellaneous building supplies (*e.g.*, wooden pallets), a basketball hoop, large pieces of cardboard, several plastic chairs, and various pieces of concrete. A staircase located in the southern portion of the warehouse was observed to lead to a small kitchen/breakroom with a linoleum floor. A small office was observed toward the rear, northern portion of the warehouse. A ramp in the eastern corner of the building led to an approximately 34- by 69-foot area (referred to as the loading area), which is recessed approximately 2.5 feet and contains a higher ceiling compared to the rest of the warehouse. A shallow ledge is located along the walls of the warehouse, approximately 5 feet above the floor.

Based on the results of the reconnaissance, EPA determined that the collection of microvacuum samples of settled dust, and bulk samples of the suspected vermiculite material observed in Bathroom #1, was needed to determine whether asbestos contamination was present inside the building.

On 22 December 2009, EPA OSC McKeown and START members Imbres and Sharp mobilized to the site to conduct indoor sampling. Additional personnel on site included O'Reilly, Talbot, and Okun representative Robert Kirchherr, and MassDEP representative Lisa Jones. START and EPA conducted a brief walk-through of the building to determine sampling locations. EPA and START observed a small amount of suspected vermiculite material, as well as broken pieces of ceiling tile, on the floor of Bathroom #2. It was observed that a tile was missing from the drop ceiling overhead, and a suspected vermiculite layer was observed above the gypsum board within the drop ceiling. EPA OSC McKeown requested that START collect one sample of the bulk suspected vermiculite material observed on the floors of Bathroom #1 (sample BA-01) and Bathroom #2 (sample BA-02 and duplicate sample BA-03). No suspected vermiculite material or compromised ceiling tiles were observed throughout the remainder of the building.



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OSC McKeown selected seven locations for microvacuum dust samples. All microvacuum dust samples were collected using low-flow sampling pumps that were calibrated prior to and following sample collection. Microvacuum dust samples were composite samples consisting of three 100-square-centimeter (cm<sup>2</sup>) aliquots, each collected over a duration of 2 minutes. Microvacuum samples were collected from the following surfaces and locations: the floor of Office #1 (two aliquots) and Office #2 (one aliquot) (sample AS-01); the floor (two aliquots) and ledge (one aliquot) of the loading area (sample AS-02); the floor of the small office within the warehouse (sample AS-03); the ledge along the western wall of the warehouse (sample AS-04); the ledge along the eastern wall of the warehouse (sample AS-05); the floor in the northern portion of the warehouse (AS-06); and the floor in the southern portion of the warehouse, excluding the area partitioned off for concrete cutting operations (sample AS-07). In addition, START collected one field blank and one lot blank for quality control purposes. During sampling activities in the loading area, START observed apparent fragments of broken light bulbs on the floor. See Attachment A, Figure 3, Sample Location Diagram, for dust and bulk sample locations.

START sampling activities were performed in accordance with the site sampling and analysis plan (SAP), which was prepared by START as a separate document, entitled *Sampling and Analysis Plan for the Zonolite/W.R. Grace Facility Site, Easthampton, Hampshire County, Massachusetts* [14]. START personnel photodocumented site conditions during the indoor reconnaissance and sampling activities (see Attachment C, Photodocumentation Log).

START personnel generated a chain-of custody (COC) record using EPA SCRIBE sample database software to document the samples from the time of collection through transportation and analysis. All samples were sent to Materials Analytical Services, LLC (MAS) in Suwanee, Georgia, for asbestos analysis via American Society for Testing and Materials (ASTM) D-5755-03, "Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy"; or via EPA/600/R-93/116, "Method for the Determination of Asbestos in Bulk Building Materials", using the point counting technique to reach a detection limit of 0.25% (see Attachment D, Chain-of-Custody Record).

On 12 January 2010, START received the analytical data results from MAS [15]. These data are summarized in Attachment B (Tables 1 and 2). Complete analytical results are presented in Attachment E (Analytical Data). START conducted a Tier I validation of the analytical data for the dust and bulk samples. Data validation results are included in a separate memorandum, dated 15 January 2010 [16].



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## **ANALYTICAL DATA SUMMARIES**

### **Dust Samples**

Analytical results of dust samples revealed the presence of chrysotile, tremolite, and Libby amphibole asbestos. Asbestos was detected in six dust samples via Transmission Electron Microscopy-EPA Superfund Method (TEM-EPASM), at the following concentrations: chrysotile [190 to 30,000 structures per square centimeter ( $\text{s}/\text{cm}^2$ )]; tremolite ( $13,000 \text{ s}/\text{cm}^2$ ); and Libby amphibole ( $190 \text{ to } 38,000 \text{ s}/\text{cm}^2$ ). The total concentration of asbestos detected in dust samples by TEM-EPASM ranged from 0 to  $64,000 \text{ s}/\text{cm}^2$ , with the maximum concentration of  $64,000 \text{ s}/\text{cm}^2$  detected in sample AS-02, which was collected from the warehouse loading area. Phase Contrast Microscopy Equivalent (PCME) results revealed asbestos in three dust samples, at the following concentrations: chrysotile ( $190 \text{ s}/\text{cm}^2$ ); tremolite ( $13,000 \text{ s}/\text{cm}^2$ ); and Libby amphibole ( $15,000 \text{ and } 26,000 \text{ s}/\text{cm}^2$ ). The total PCME concentration of asbestos detected in dust samples ranged from 0 to  $39,000 \text{ s}/\text{cm}^2$ , with the maximum concentration of  $39,000 \text{ s}/\text{cm}^2$  detected in sample AS-02. Chrysotile was the only asbestos mineral type detected in sample AS-01, collected from the floor of Office #1 and #2, while Libby amphibole and tremolite asbestos were detected in samples collected from the warehouse areas. See Attachment B, Table 1, for a summary of analytical results of dust samples.

### **Bulk Samples**

Analytical results of bulk samples revealed trace levels (less than the method detection limit of 0.25% by volume) of tremolite/actinolite asbestos in sample BA-02 and duplicate sample BA-03. According to the laboratory report, one small bundle of Libby amphibole tremolite/actinolite was observed in each of these two samples. No asbestos was detected in sample BA-01. See Attachment B, Table 2, for a summary of analytical results of bulk samples.



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## REFERENCES

- [1] MassGIS (Massachusetts Geographic Information Systems). 1995. Scanned USGS Topographic Quadrangle Images, Image Numbers 101890, 105890, 101886, and 105886. Available from [http://www.mass.gov/mgis/im\\_quad.htm](http://www.mass.gov/mgis/im_quad.htm). Internet accessed 16 February 2009.
- [2] MassGIS. 2009. Accessors' Parcels data. Available from <http://www.mass.gov/mgis/ftpparcels.htm>. Internet accessed 22 October 2009.
- [3] Google Earth. 2009. Aerial of 19 Wemelco Way, Easthampton, Massachusetts. Internet accessed 22 October 2009.
- [4] Massachusetts Department of Public Health (MA DPH), Center for Environmental Health, Environmental Toxicology Program, and the Agency for Toxic Substances and Disease Registry (ATSDR). 2006. Health Consultation, Former Zonolite Facility. 15 December.
- [5] ATSDR. 2006. Summary Report, Exposure to Asbestos-Containing Vermiculite from Libby, Montana, at 28 Processing Sites in the United States. 29 October.
- [6] Woodard & Curran, Inc. Environmental Services [W&C]. 2001. Summary of Field Investigations and Discussion of Remedial Options, W.R. Grace & Co. – Conn., Wemelco Way, Easthampton. June.
- [7] Weston Solutions, Inc. 2000. Letter to Ms. Christine Clark, Regional Sample Control Center, US EPA, Subject: Case No. 0346F; Sample Delivery Group (SDG) No. D01484, EMSL Analytical, Inc., Former Zonolite Facility Site, Easthampton, Massachusetts. 20 June.
- [8] U.S. Environmental Protection Agency (US EPA) Office of Solid Waste and Emergency Response (OSWER) Directive 9345.4-05. 2004. Memorandum to Superfund National Policy Managers, Regions 1-10 RE: Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups. 10 August.
- [9] US EPA OSWER. 2008. Memorandum to Regional Superfund Division Directors and Regional Removal Program Managers RE: Strategy for Further Assessment of Vermiculite Ore Asbestos Sites. 14 October.
- [10] Weston Solutions, Inc. 2009. Removal Program Preliminary Assessment Report for the Zonolite/W.R. Grace Facility Site, Easthampton, Hampshire County, Massachusetts, 10 February 2009. April.





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#### **REFERENCES (CONCLUDED)**

- [11] US EPA. 2009. Site Investigation Closure Memorandum, Zonolite/W.R. Grace Easthampton Site, 19 Wemelco Way, Easthampton, Massachusetts. 22 May.
- [12] Weston Solutions, Inc. Site Health and Safety Plan for the Zonolite/W.R. Grace Facility, Easthampton, Hampshire County, Massachusetts.
- [13] Weston Solutions, Inc. July 2005. Standard Operating Procedure for Ludlum Model 19 MicroR Meter, SOP No. WSI/S3-027, Superfund Technical Assessment and Response Team III (START), Wilmington, MA.
- [14] Weston Solutions, Inc. 2009. Sampling and Analysis Plan for the Zonolite/W.R. Grace Facility Site, Easthampton, Hampshire County, Massachusetts. 16 December.
- [15] Material Analytical Services, LLC. 2010. PLM and TEM Analytical Results, prepared for Weston Solutions, Inc., Client No. 0806F, MAS Project Number M50355. 8 January.
- [16] Weston Solutions, Inc. 2010. Letter to Ms. Christine Clark, US EPA New England Regional Laboratory, Subject: Case No. 0806F; Sample Delivery Group (SDG) No. D24191, Materials Analytical Services, LLC, Zonolite Co./WR Grace, Easthampton, Massachusetts. 15 January.

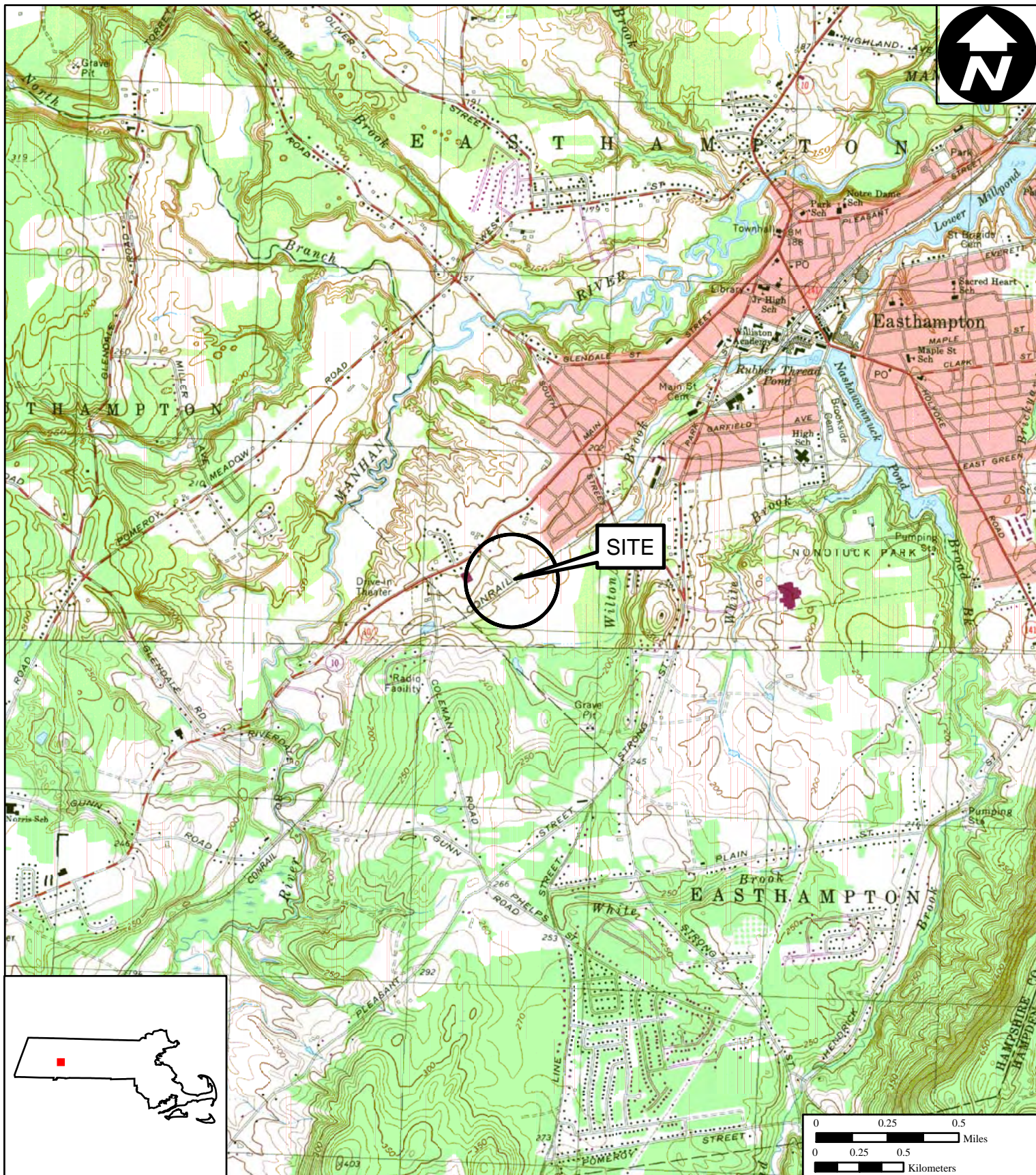
## Attachments

## Attachment A

### Figures

Figure 1	Site Location Map
Figure 2	Site Diagram
Figure 3	Sample Location Diagram





**Figure 1**

**Site Location Map**

**Zonolite/W.R. Grace Facility  
19 Wemelco Way  
Easthampton, Massachusetts**

**EPA Region I  
Superfund Technical Assessment and  
Response Team (START) III  
Contract No. EP-W-05-042**

**TDD Number:** 08-11-0009  
**Created by:** C. Imbres  
**Created on:** 16 February 2009  
**Modified by:** C. Imbres  
**Modified on:** 9 March 2009

**Data Sources:**

Topos: MassGIS/USGS  
Quadrangle Name(s): Easthampton, Southamton  
All other data: START



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**Figure 2**

Site Diagram

Zonolite/W.R. Grace Facility

19 Wemelco Way  
Easthampton, Massachusetts

EPA Region I  
Superfund Technical Assessment and  
Response Team (START) III  
Contract No. EP-W-05-042

TDD Number: 01-08-11-0009  
Created by: C. Imbres  
Created on: 22 October 2009  
Modified by: C. Imbres  
Modified on: 17 February 2010

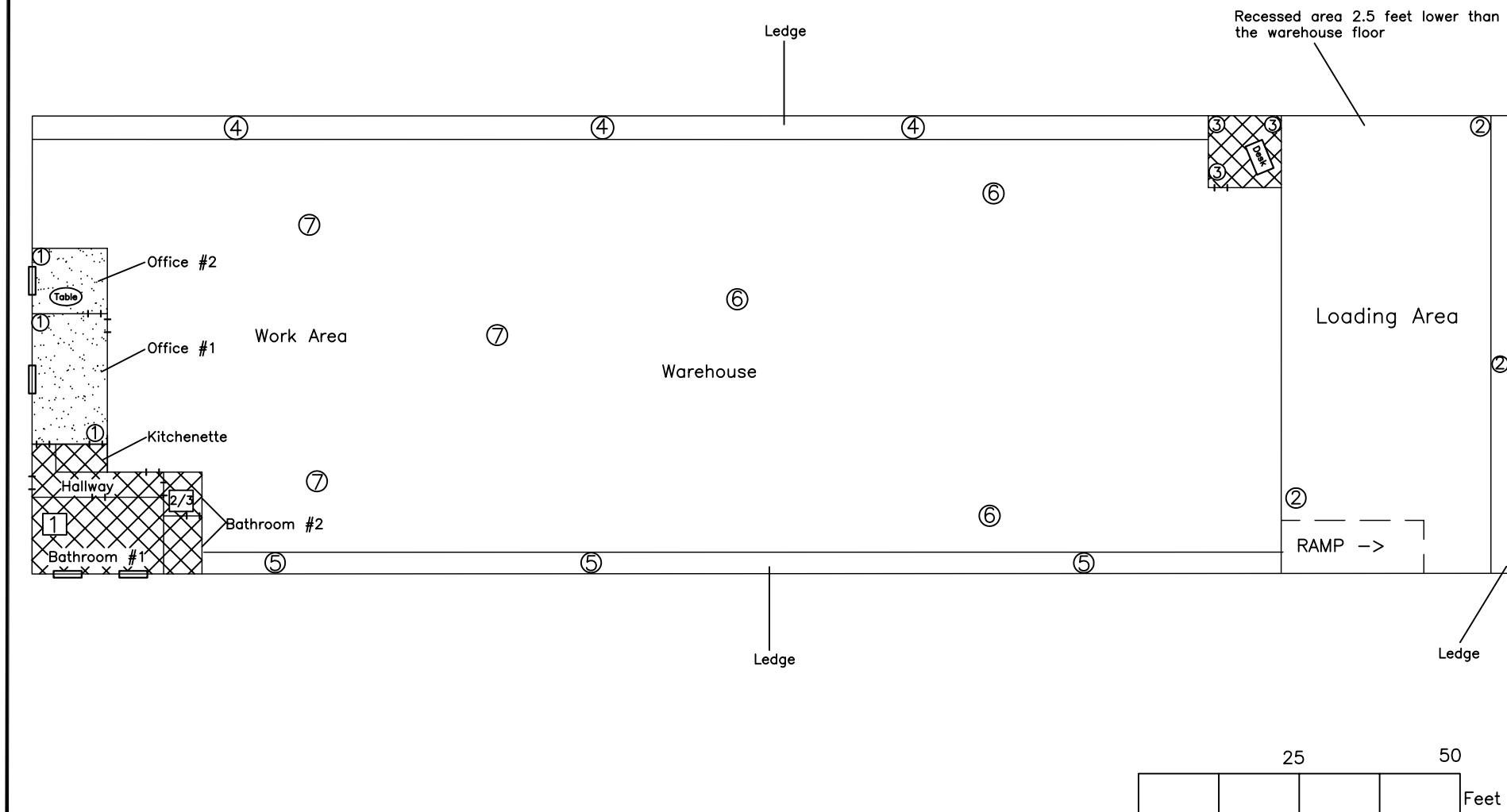
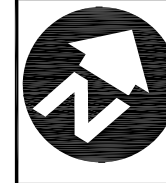
**Legend**

- Site Boundary
- Building
- Wemelco Way
- Parking Lot
- Rail Bed
- Hayfield

0 50 100 Feet

**Data Sources:**  
Imagery: Google Earth  
Parcel Data: Massachusetts Geographic Information Systems (MassGIS)  
All other data: START





### LEGEND

- ⊗ = Composite Microvacuum Dust Sample: AS-0X
- ⊠ = Bulk Sample: BA-0X
- ⏏ = Window
- ↑ = Doorway
- ▨ = Carpeted Floors
- ▤ = Tiled Floors
- = Concrete Floors

### FIGURE 3

#### SAMPLE LOCATION DIAGRAM

ZONOLITE/ W.R. GRACE FACILITY  
EASTHAMPTON, MASSACHUSETTS

EPA Region I  
Superfund Technical Assessment and  
Response Team (START) III  
Contract No. EP-W-05-042

TDD Number: 01-08-11-0009  
Created by: D. Willette  
Created on: 15 January 2010  
Modified by: C. Imbres  
Modified on: 17 February 2010

SOURCES: START field notes.



Attachment B

Tables

Table 1	Dust Sample Results
Table 2	Bulk Sample Results

TABLE 1

**DUST SAMPLE RESULTS  
ZONOLITE/W.R. GRACE FACILITY  
EASTHAMPTON, MASSACHUSETTS**

Scribe No.	Laboratory No.	Scribe Location	Sample Type	Sample Collection	Sample Area	Total TEM-EPASM No. of Structures	Total TEM-EPASM Structures Mineral Type	Conc. of Total TEM-EPASM Structures/cm <sup>2</sup>	PCME No. of Structures	PCME Structures Mineral Type	Conc. of Total PCME Structures/cm <sup>2</sup>	Sensitivity (1/cm <sup>2</sup> )	Sample Location
D24191	M50355-001	AS-01	Dust	Composite	300 cm <sup>2</sup>	6	Chrysotile	1,100	1	Chrysotile	190	1.90E+02	Floor of office areas (Office #1 and #2).
D24192	M50355-002	AS-02	Dust	Composite	300 cm <sup>2</sup>	1 1 3	Chrysotile Tremolite Libby Amphibole	13,000 13,000 38,000	1 2	Tremolite Libby Amphibole	13,000 26,000	1.30E+04	Floor and ledge of warehouse loading area.
D24193	M50355-003	AS-03	Dust	Composite	300 cm <sup>2</sup>	8 7	Chrysotile Libby Amphibole	30,000 26,000	4	Libby Amphibole	15,000	3.70E+03	Floor of small office inside warehouse area.
D24194	M50355-004	AS-04	Dust	Composite	300 cm <sup>2</sup>	2 2	Chrysotile Libby Amphibole	2,400 2,400	0 0	None None	NA NA	1.20E+03	Ledge along western wall of warehouse area.
D24195	M50355-005	AS-05	Dust	Composite	300 cm <sup>2</sup>	0	None	NA	0	None	NA	1.9E+02	Ledge along eastern wall of warehouse area.
D24196	M50355-006	AS-06	Dust	Composite	300 cm <sup>2</sup>	1 1	Chrysotile Libby Amphibole	190 190	0 0	None None	NA NA	1.9E+02	Floor in northern portion of warehouse area.
D24197	M50355-007	AS-07	Dust	Composite	300 cm <sup>2</sup>	2	Chrysotile	1,500	0	None	NA	7.6E+02	Floor in southern portion of warehouse area.
D24198	M50355-008	AS-08	Field Blank	Grab	NA	0	None	NA	0	None	NA	Blank	Field Blank.
D24199	M50355-009	AS-09	Lot Blank	Grab	NA	0	None	NA	0	None	NA	Blank	Lot Blank.

**Notes:**

No. = Number

NA = Not applicable

TEM-EPASM = Transmission Electron Microscopy-U.S. Environmental Protection Agency Superfund Method

PCME = Phase Contrast Microscopy Equivalent

cm<sup>2</sup> = square centimeters

Dust samples were analyzed by ASTM D-5755-03 "Standard Test Method for Microvacuum

Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy", by Materials

Analytical Services, LCC, in Suwanee, Georgia.

conc. = concentration



TABLE 2

**BULK SAMPLE RESULTS  
ZONOLITE/W.R. GRACE FACILITY  
EASTHAMPTON, MASSACHUSETTS**

Scribe Number	Laboratory Number	Scribe Location	Sample Type	Sample Collection	PLM Asbestos Result (Est. Vol. %)	PLM Asbestos Mineral Type	Method Detection Limit	Sample Location	Sample Description	Laboratory Comments
D24200	M50356-001	BA-01	Bulk	Grab	0	None	0.25%	Floor of large bathroom (Bathroom #1).	Gold to dark brown. Flakes and books as well as remnants of plaster, gypsum board, and paint materials.	No asbestos observed after eight fields of view.
D24201	M50356-002	BA-02	Bulk	Grab	Trace	Tremolite/Actinolite	0.25%	Floor of small bathroom (Bathroom #2).	Gold to dark brown. Flakes and books as well as remnants of ceiling tile.	One small bundle of "Libby Amphibole" tremolite/actinolite observed in sample.
D24202	M50356-003	BA-03	Bulk	Grab	Trace	Tremolite/Actinolite	0.25%	Duplicate of D24201	Gold to dark brown. Flakes and books as well as remnants of ceiling tile.	One small bundle of "Libby Amphibole" tremolite/actinolite observed in sample.

**Notes:**

Est. Vol. % = Estimated Volume Percent

PLM = Polarized Light Microscopy

Bulk samples were analyzed by EPA/600/R-93/116 "Method for Determination of Asbestos in Bulk Building Materials" using the point counting technique to reach a detection limit of 0.25%, by Materials Analytical Services, LLC in Suwanee, Georgia.

Attachment C

Photodocumentation Log

**PHOTODOCUMENTATION LOG**  
**Zonolite/W.R. Grace Facility • Easthampton, Massachusetts**



**SCENE:** View of the southern side of the on-site building. Photograph taken facing northeast.

**DATE:** 04 February 2009

**TIME:** 0731 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M22



**SCENE:** View of the eastern side of the on-site building. Photograph taken facing west.

**DATE:** 04 February 2009

**TIME:** 0742 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M22



**PHOTODOCUMENTATION LOG**  
**Zonolite/W.R. Grace Facility • Easthampton, Massachusetts**



**SCENE:** View of the entrance on the western side of the on-site building. Photograph taken facing north.

**DATE:** 04 February 2009

**TIME:** 0744 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M22



**SCENE:** View of Office Number (No.) 2, located in the western portion of the building. One aliquot of composite microvacuum sample AS-01 was collected in the corner of the room.

**DATE:** 13 October 2009

**TIME:** 1028 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** Nikon Coolpix 4600

**PHOTODOCUMENTATION LOG**  
**Zonolite/W.R. Grace Facility • Easthampton, Massachusetts**



**SCENE:** View of Bathroom No. 1, a large bathroom located in the southeastern portion of the building, in which bulk sample BA-01 was collected.

**DATE:** 13 October 2009

**PHOTOGRAPHER:** C. Imbres

**TIME:** 1029 hours

**CAMERA:** Nikon Coolpix 4600



**SCENE:** View of a partitioned area in the warehouse area of the building, used for cutting countertops (the work area).

**DATE:** 13 October 2009

**PHOTOGRAPHER:** C. Imbres

**TIME:** 1031 hours

**CAMERA:** Nikon Coolpix 4600



**PHOTODOCUMENTATION LOG**  
**Zonolite/W.R. Grace Facility • Easthampton, Massachusetts**



**SCENE:** View of the loading area, located in the northern portion of the building.

**DATE:** 13 October 2009

**TIME:** 1035 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** Nikon Coolpix 4600



**SCENE:** View of the kitchen located above the work area, in the warehouse portion of the building.

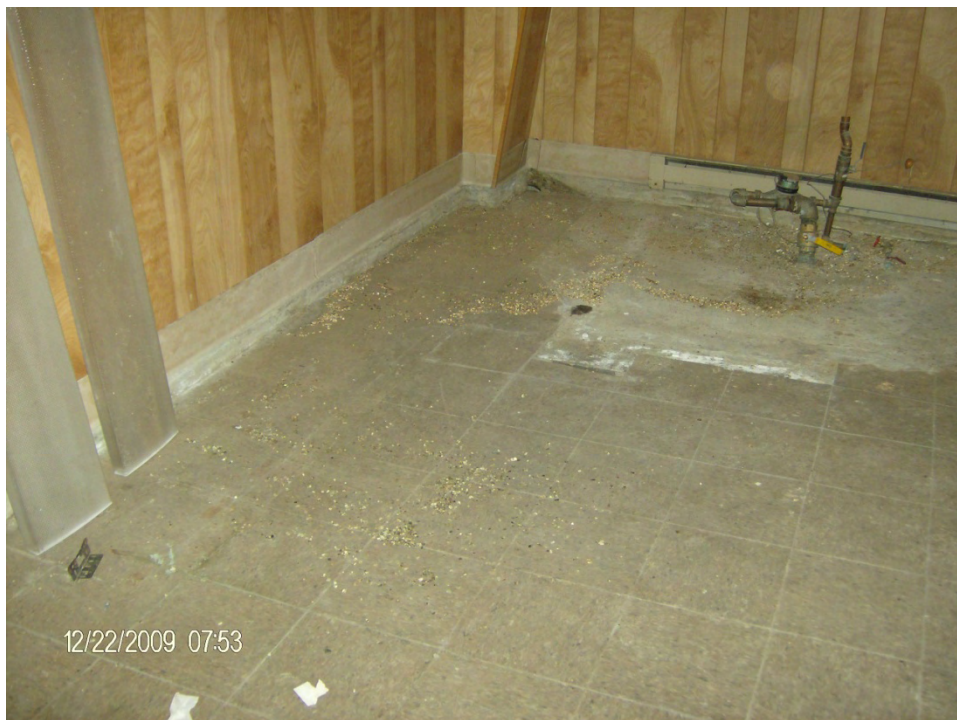
**DATE:** 13 October 2009

**TIME:** 1039 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** Nikon Coolpix 4600

**PHOTODOCUMENTATION LOG**  
**Zonolite/W.R. Grace Facility • Easthampton, Massachusetts**



**SCENE:** View of suspected vermiculite material on the floor of Bathroom No. 1. Bulk sample BA-01 consisted of this material. Note that the time stamp on some photographs is incorrect.

**DATE:** 22 December 2009

**PHOTOGRAPHER:** C. Imbres

**TIME:** 0845 hours

**CAMERA:** HP Photosmart M425



**SCENE:** View of suspected vermiculite material and fallen ceiling tiles on the floor of Bathroom No. 2, located adjacent to Bathroom No. 1. Bulk sample BA-02 and duplicate sample BA-03 consisted of this material.

**DATE:** 22 December 2009

**PHOTOGRAPHER:** C. Imbres

**TIME:** 0905 hours

**CAMERA:** HP Photosmart M425



**PHOTODOCUMENTATION LOG**  
**Zonolite/W.R. Grace Facility • Easthampton, Massachusetts**



**SCENE:** View of suspected vermiculite material used as ceiling insulation in the ceiling of Bathroom No. 2.

**DATE:** 22 December 2009

**TIME:** 0905 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M425



**SCENE:** View of the warehouse portion of the building. Microvacuum dust samples AS-06 and AS-07 were collected from the floor of the warehouse.

**DATE:** 22 December 2009

**TIME:** 0915 hours

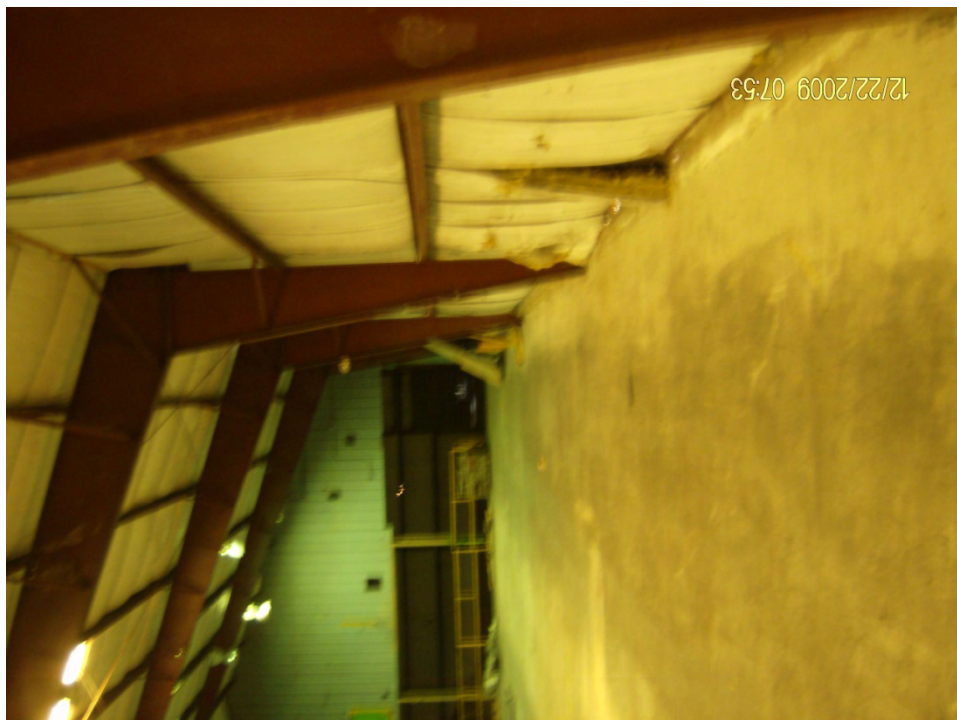
**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M425



**PHOTODOCUMENTATION LOG**  
**Zonolite/W.R. Grace Facility • Easthampton, Massachusetts**

**TOP**



**SCENE:** View of the eastern wall of the warehouse. Microvacuum dust sample AS-05 was collected from the ledge along the wall.

**DATE:** 22 December 2009

**TIME:** 1025 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M425



**SCENE:** View of the exterior of a small office located adjacent to the loading area, in the warehouse portion of the building. Microvacuum dust sample AS-03 was collected from the floor of this office.

**DATE:** 22 December 2009

**TIME:** 0945 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M425

**PHOTODOCUMENTATION LOG**  
**Zonolite/W.R. Grace Facility • Easthampton, Massachusetts**



**SCENE:** View of the entrance to the small office located adjacent to the loading area, in the warehouse portion of the building. Note that the second story area above the office was inaccessible.

**DATE:** 22 December 2009

**TIME:** 0945 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M425



**SCENE:** View of the interior of the small office located adjacent to the loading area, in the warehouse portion of the building.

**DATE:** 22 December 2009

**TIME:** 0950 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M425



**PHOTODOCUMENTATION LOG**  
**Zonolite/W.R. Grace Facility • Easthampton, Massachusetts**



**SCENE:** View of the floor of the warehouse. Microvacuum samples AS-06 and AS-07 were collected from the floor of the warehouse.

**DATE:** 22 December 2009

**TIME:** 1100 hours

**PHOTOGRAPHER:** C. Imbres

**CAMERA:** HP Photosmart M425

Attachment D

Chain-of-Custody Record

Chen

**Sampler Signature:**

START, Andover, MA

EPA Contract Number: EP-W-05-042

DAS No. 0806F

## CHAIN OF CUSTODY RECORD

Site #: R01-091222JM

**Contact Name:** John Burton

**Contact Phone: (978) 552-2130**

**No: R01-091222JM-12/23/09-0001**

DateShipped: 12/23/2009

Lab: MAS

Lab Phone: (770) 866-3200

[illegible]

## SAMPLES TRANSFERRED FROM

**CHAIN OF CUSTODY #**

Special Instructions: 2-week TAT requested. Please send results to John Burton.

[illegible]

Attachment E

Analytical Data

Materials Analytical Services, LLC PLM and TEM Analytical Results

**ATLANTA**  
Corporate Headquarters  
3945 Lakefield Court  
Suwanee, GA 30024  
(770) 866-3200 FAX (770) 866-3259

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## PLM and TEM Analytical Results

Weston Solution, Inc.  
Client No. 0806F

MAS Project Number  
M50355

Prepared For:

John C. Burton  
Lead Chemist/Principal Project Scientist  
Weston Solutions, Inc.  
Superfund Technical Assessment and Response Team  
3 Riverside Drive  
Andover, MA 01810

Prepared by:

Michael D. Mount  
MAS, LLC  
3945 Lakefield Court  
Suwanee, GA 30024

January 8, 2010

**ATLANTA**  
Corporate Headquarters  
3945 Lakefield Court  
Suwanee, GA 30024  
(770) 866-3200 FAX (770) 866-3259



January 8, 2009

John C. Burton  
Lead Chemist/Principal Project Scientist  
Weston Solutions, Inc.  
Superfund Technical Assessment and Response Team  
3 Riverside Drive  
Andover, MA 01810

**RE: TEM Dust and PLM Bulk Sample Report**  
**Project Name: R01-091222JM**  
**Case No. 0806F**  
**MAS Project No.: M50355**

Dear Mr. Burton:

Materials Analytical Services, LLC (MAS) has completed the analysis of the nine dust samples and three bulk samples that were received at MAS, LLC on December 28, 2009. The dust samples were analyzed as requested by ASTM D-5755-03 "Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy" and the bulk samples were analyzed by EPA/600/R-93/116 "Method for the Determination of Asbestos in Bulk Building Materials" using the point counting technique to reach a detection limit of 0.25%.

Enclosed is the hard copy validated data package along with an electronic copy of the NADES and a PDF copy of the hard copy.

The results relate only to the specific items analyzed. No partial reproduction of this report may be made without the consent of MAS, LLC. This report may not be used to imply product endorsement or certification by MAS, LLC, the National Voluntary Laboratory Accreditation Program (EPA), or the U.S. Government.

MAS appreciates this opportunity to have been of service to you. We look forward to working with you on future projects.

Sincerely,

Michael D. Mount, CIH, OHST  
TEM / Project Manager



**1**

Case Narrative & Summaries

**2**

TEM NADES & Bench Forms  
for Dust & Bulk Sample Report

**3**

PLM Report Forms  
for Dust & Bulk Sample Report

**4**

Completed Chain of Custody Form

**5**

# **SECTION 1**



**CASE NARRATIVE**  
**Client No. 0806F**  
**01/08/2010**

Project DAS0806F consisted of nine microvac dust samples for asbestos concentrations by transmission electron microscopy (TEM) analysis and 3 bulk samples of vermiculite were submitted for asbestos concentration by polarized light microscopy analysis (PLM). The dust samples were analyzed as requested by ASTM D-5755-03 "Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Surface Loading" and the bulk samples were analyzed by EPA/600/R-93/116 "Method for the Determination of Asbestos in Bulk Building Materials" using the point counting technique to reach a detection limit of 0.25%.

The analysis of the 9 dust samples yielded asbestos concentrations that ranged from "no asbestos detected" to 56,000 asbestos structures per square centimeter of sampled area (s/cm<sup>2</sup>). Both chrysotile and "Libby Amphibole" (tremolite – actinolite / richterite - winchite) varieties were detected. The 3 bulk samples detected "Libby Amphibole" with concentrations no asbestos observed to trace amounts (< 0.25%).

QC / QA samples were performed on the TEM analyses in the form of a recount same (same sample counted by same analyst). The results of this analysis are presented in the table below:

Client Sample No.	Lab Sample No.	Asbestos type / %	Analyst	Asbestos type / % (QC)	Analyst	% Match	QC Type
D24192	M50355-002	Chrysotile / 1 LA / 4	MAM	Chrysotile / 1 LA / 4	MAM	100	Recount Same
LA = Libby Amphibole							

Quality Control / Assurance (QC / QA) samples are performed on the bulk PLM samples at a rate of 10% of the total samples analyzed by MAS in the form of replicate analysis (same sample with the same analyst) and duplicate analysis (same sample with a different analyst). The results of these analyses are presented in the table below:

Client Sample No.	Lab Sample No.	Asbestos type / %	Analyst	Asbestos type / % (QC)	Analyst	% Match	QC Type

**NOTE: None performed on these samples due to the low total count.**

Blank samples were performed on blank filters for TEM in the form of lab blanks. The results of these analyses are presented in the table below:

Sample No.	Analyst	Asbestos type / % (QC)	Acceptance	QC Type
TEM M50355 - 000	MAM	None Detected	Yes	Lab Blank



Client Name: Weston Solutions Date: 01/08/10  
 Project Name: 0806F  
 Project No.: R01-091222JM

**MAS Project No. M50355**

The following summarizes the TEM analytical results for the 9 dust samples that were submitted on 12/28/09.

**TEM Analysis Summary - Method ASTM D5755-03**

MAS Sample No.	Client Sample ID	Client Sample Description	Area (cm <sup>2</sup> )	GOs Anal	GO Area (mm <sup>2</sup> )	Filter Vol. (mls)	No. of Asb. Str.	Conc. (str./cm <sup>2</sup> )	Comments
M50355-001	D24191	P0001-BD01-01, AS-01	300	4	0.0115	50	6	1.1E+03	
M503355-002	D24192	P0001-BD01-02, AS-02	300	10	0.0113	0.3	5	6.4E+04	
M503355-002 RS	D24192	P0001-BD01-02, AS-02	300	10	0.0113	0.3	5	6.4E+04	QC - Recount w/ same analyst
M50355-003	D24193	P0001-BD01-03, AS-03	300	10	0.0116	1.0	15	5.6E+04	
M50355-004	D24194	P0001-BD01-04 AS-04	300	10	0.0120	3	4	4.8E+03	
M50355-005	D24195	P0001-BD01-05, AS-05	300	4	0.0112	50	ND	5.7+02	
M50355-006	D24196	P0001-BD01-06, AS-06	300	4	0.0116	50	2	3.7E+02	
M50355-007	D24197	P0001-BD01-07, AS-07	300	10	0.0114	5	2	1.5E+03	
M50355-008	D24198	P0001-BD01-08, AS-08	0	10	0.0114	50	ND	NA	Blank
M50355-009	D24199	P0001-BD01-09, AS-09	0	10	0.0116	50	ND	NA	Blank
M50355-000	NA	NA	0	10	0.0116	50	ND	NA	Lab Blank

ND = No Asbestos Detected  
 < = less than the detection limit of the method  
 NA = Not Applicable

MAS, LLC  
3945 LAKEFIELD COURT  
SUWANEE, GA 30024  
(770) 866-3200

Client: Weston Solutions, Inc.  
Job Name: Andover, MA Site R01-091222JM  
Job Number: R01-091222JM-12/23/09-0001  
Reviewer: Michael D. Mount



Summary of Results of analysis by Polarized Light Microscopy (PLM)

CLIENT #	MAS ID # - SPL #	COMMENTS	MATERIAL	ANALYSIS
D24200	M50356-001	X = Materials detected. No asbestos observed after eight fields of view.	bulk	NO ASBESTOS OBSERVED
D24201	M50356-002	X = Materials detected. No points out of 400 points contained asbestos. One small bundle of "Libby Amphibole tremolite/actinolite observed in sample.	bulk	< 0.25 Trace% Trem/Actinolite
D24202	M50356-003	X = Materials detected. No points out of 400 points contained asbestos. One small bundle of "Libby Amphibole tremolite/actinolite observed in sample.	bulk	< 0.25 Trace% Trem/Actinolite

The samples were analyzed in accordance with EPA document 600/R-93/116, "Method for the Determination of Asbestos in Bulk Building Materials". The method detection limit is 0.25%. This report relates only to items tested as received, and may not be used to claim endorsement or certification by MAS, LLC, the National Voluntary Laboratory Accreditation Program (EPA), or the U.S. Government. This report may not be reproduced except in full without the approval of MAS, LLC, (NVLAP # 101235).

# SECTION 2



**TEM NADES and Bench Forms**

**For**

**Dust and Bulk Sample Report**

**Site No.: R01-091222JM**

**Client No. 0806F**

**MAS Project No.: M50355**

National Asbestos Data Entry Spreadsheet (NADES) for Air & Dust Analysis by Superfund TEM

Enter Site or Project Name Here:

State/Federal Site or Project Identifier:

R01-091222JM

0806F

Site/Project Identifier Code:

0806F

Laboratory name:

MAS

Instrument:

JEOL 1200EX#4

Voltage (kV):

100

Magnification:

20 K

Grid opening area (mm<sup>2</sup>):

0.0115

Scale: 1L =

1.000

Scale: 1D =

1.000

Filter Size (mm):

25.000

Filter Pore Size (um):

0.450

Method SOP (Revision No.):

5755.03

Grid Storage Location:

7728.000

Client Sample Number:

D24191

Date received by lab:

12/28/09

Lab Job Number:

M50355

Lab Sample Number:

M50355-001

Chain of Custody Number:

91222JM-12/23/09-001

Number of grids prepared:

3

Prepared by:

ddmount

Preparation date:

12/29/09

Preparation Type:

Indirect

Primary filter area (mm<sup>2</sup>):

385

Secondary Filter Area (mm<sup>2</sup>):

1297

F- factor: (proposed value shown, cell formula can be over-written if necessary)

0.500

Filter Status:

Analyzed

Analyzed by:

M.Motamedi

Analysis date:

12/31/09

Indirect Prep, Not Ashed

Fraction of primary filter used

1

Total resuspension volume (mL)

100

Volume applied to secondary filter (mL)

50

F-factor

0.500

Indirect Prep, Ashed

Fraction of primary filter used

Total resuspension volume, pre-ashing (mL)

Volume applied to filter for ashing (mL)

Fraction of filter that was ashed

Volume used to resuspend ashed residue (mL)

Volume applied to secondary filter (mL)

F-factor

COMMENTS

☐ Check box if this sample was analyzed using more than one instrument, by more than one analyst, or across multiple analysis dates





National Asbestos Data Entry Spreadsheet (NADES) for Air & Dust Analysis by Superfund TEM  
ANALYTICAL REPORT

SAMPLE/ANALYSIS INFORMATION				ANALYSIS PARAMETERS	
Field Sample Number	D24191	Lab Sample Number	M50355-001	Effective filter area (mm <sup>2</sup> )	1297
Media	Dust	Preparation	Indirect	F-factor	5.00E-01
Sample Type	Field Sample	Sample Status	Analyzed	Grid opening area (mm <sup>2</sup> )	0.0115
Dust Collection Area (300		Analysis Date	#####	# GOs counted	4
QA Sample Type	Not QC	Method SOP	5755.03	Sensitivity (1/cm2)	1.9E+02
Stopping Rule(s): GO = 10, Structures = 100, Sensitivity = 1.00E+03					

Desired Confidence Interval (%): 95

Number of Structures with Fatal Data Entry Errors 0  
(Structures with fatal errors are excluded from calculations below)

Mineral Class	Number of Structures (a)	Loading on Filter (b) (s/mm <sup>2</sup> )	Dust Loading (c) (s/cm2)	95% Confidence Interval	
<b>Total TEM-EPASM Structures</b>					<b>Binning Rule Description:</b>
Total Asbestos	6	1.3E+02	1.1E+03	4.1E+02 - 2.5E+03	Apply to fibers (F) only: L ≥ 0.5um, AR ≥ 3
Total Chrysotile (CH)	6	1.3E+02	1.1E+03	4.1E+02 - 2.5E+03	
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	No restrictions for other structure types.
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
<b>PCM Equivalent Structures (PCME)</b>					<b>Binning Rule Description:</b>
Total Asbestos	1	2.2E+01	1.9E+02	4.8E+00 - 1.0E+03	Apply to all structures where Total column > 0:
Total Chrysotile (CH)	1	2.2E+01	1.9E+02	4.8E+00 - 1.0E+03	
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	L > 5um, W ≥ 0.25um, AR ≥ 3
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
<b>AHERA (d) Structures</b>					<b>Binning Rule Description:</b>
Total Asbestos	6	1.3E+02	1.1E+03	4.1E+02 - 2.5E+03	Apply to fibers (F) only: L ≥ 0.5um, AR ≥ 5
Total Chrysotile (CH)	6	1.3E+02	1.1E+03	4.1E+02 - 2.5E+03	
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	No restrictions for other structure types.
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
<b>Berman Crump (2003) Structures</b>					<b>Binning Rule Description:</b>
Total Asbestos	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	Apply to all structures where Total column > 0: L > 10um, W ≤ 0.4um
Total Chrysotile (CH)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Total Amphibole	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
actinolite (AC)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
amosite (AM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
anthophyllite (AN)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
crocidolite (CR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
tremolite (TR)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Libby amphibole (LA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
other amphibole (OA)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
other mineral class (OM)	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Solid Soln: Amosite	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	
Solid Soln: Trem-Act	0	0.0E+00	0.0E+00	0.0E+00 - 6.9E+02	

(a) Based on countable structures only

(b) Loading on Filter (s/mm<sup>2</sup>) = N structures / (GOs Counted \* GO Area)

(c) Air Concentration (s/cc) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Air Volume \* 1000)

Dust Loading (s/cm2) = (N structures \* EFA) / (GOs Counted \* GO Area \* F-factor \* Dust Collection Area)

(d) Yamate results are expected to be similar to AHERA, but use of AHERA for Yamate may be biased low due to the exclusion of structures &lt;0.5um.

Enter Site or Project Name Here:		R01-091222JM-12/23/09-0001		Site/Project Identifier Code: 0806F	
State/Federal Site or Project Identifier:		Case: 0806F			

Laboratory name:	MAS	Client Sample Number:	D24191
Instrument:	JEOL 1200EX	Date received by lab:	12/28/09
Voltage (KV):	100	Lab Job Number:	M50355
Magnification:	20 K	Lab Sample Number:	M50355-001
Grid opening area (mm <sup>2</sup> ):	0.0115	Chain of Custody Number:	R01-091222JM-12/23/09-0001

Scale: 1L =	1.000	Sample Type: (FS=Field Sample, FB=Field Blank, LT=Lot Blank, QC=Lab QC)	field sample
Scale: 1D =	1.000	QC Sample Type: (Not QC, LB=Lab Blank, RS=Recount Same, RD, Recount Diff., RP=Reprep., VA=Verified Analysis, IL=Interlab)	not qc
Filter Size (mm):	25.000	Media: (Air, Dust, N/A)	dust
Filter Pore Size (um):	0.45	Air volume (L) or dust area (cm <sup>2</sup> ):	300
Method SOP (Revision No.):	5755.030		
Grid Storage Location:	7728		

Number of grids prepared:	3
Prepared by:	ddmout
Preparation date:	12/29/09
Preparation Type: (D=Direct, I=Indirect, IA=Indirect, ashed)	indirect
Primary Filter Area (mm <sup>2</sup> ):	385
Secondary Filter Area (mm <sup>2</sup> ):	1297
F- factor:	
Filter Status: (A=Analyzed, O=Overloaded, D=Damaged, M=Missing, C=Cancelled)	analyzed
Analyzed by:	<i>[Signature]</i>
Analysis date:	12/31/09

Indirect Prep, Not Ashed		
1	Fraction of primary filter used	
100	Total resuspension volume (mL)	
50	Volume applied to secondary filter (mL)	

Indirect Prep, Ashed		
	Fraction of primary filter used	
	Total resuspension volume, pre-ashing (mL)	
	Volume applied to filter for ashing (mL)	
	Fraction of filter that was ashed	
	Volume used to resuspend ashed residue (mL)	
	Volume applied to secondary filter (mL)	

Location: P0001-BD01-01 Sub Location: AS-01

If sample was analyzed using more than one TEM instrument, enter TEM instrument details below.

Instrument #2	Instrument #3
Instrument:	
Voltage (KV):	
Magnification:	

If sample was analyzed by more than one analyst or across multiple analysis dates, enter analysis details below.

Analyst #2	Analyst #3
Analyzed by:	
Analysis date:	

IMPORTANT NOTE: If this sample was analyzed using more than one instrument, by more than one analyst, or across multiple analysis dates, be sure to complete the column labeled "Multiple" when entering raw structure results for each grid opening.

COMMENTS

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Preparation Type	indirect
Analysis Date	12/31/09

[illegible]

(a) Enter dimensions either in absolute units (um) or in screen units. If reported as screen units, confirm that the Length & Dimension Scales are set as appropriate.

(a) Enter dimensions either in absolute units (mm) or in

(b) See Annex D of ISO 10312 for identification codes.

(c) Valid Mineral Types:

AC	actinolite
AM	amosite
AN	anthophyllite

LA	Libby amphibole
OA	other amphibole
NAM	non-asbestos ma

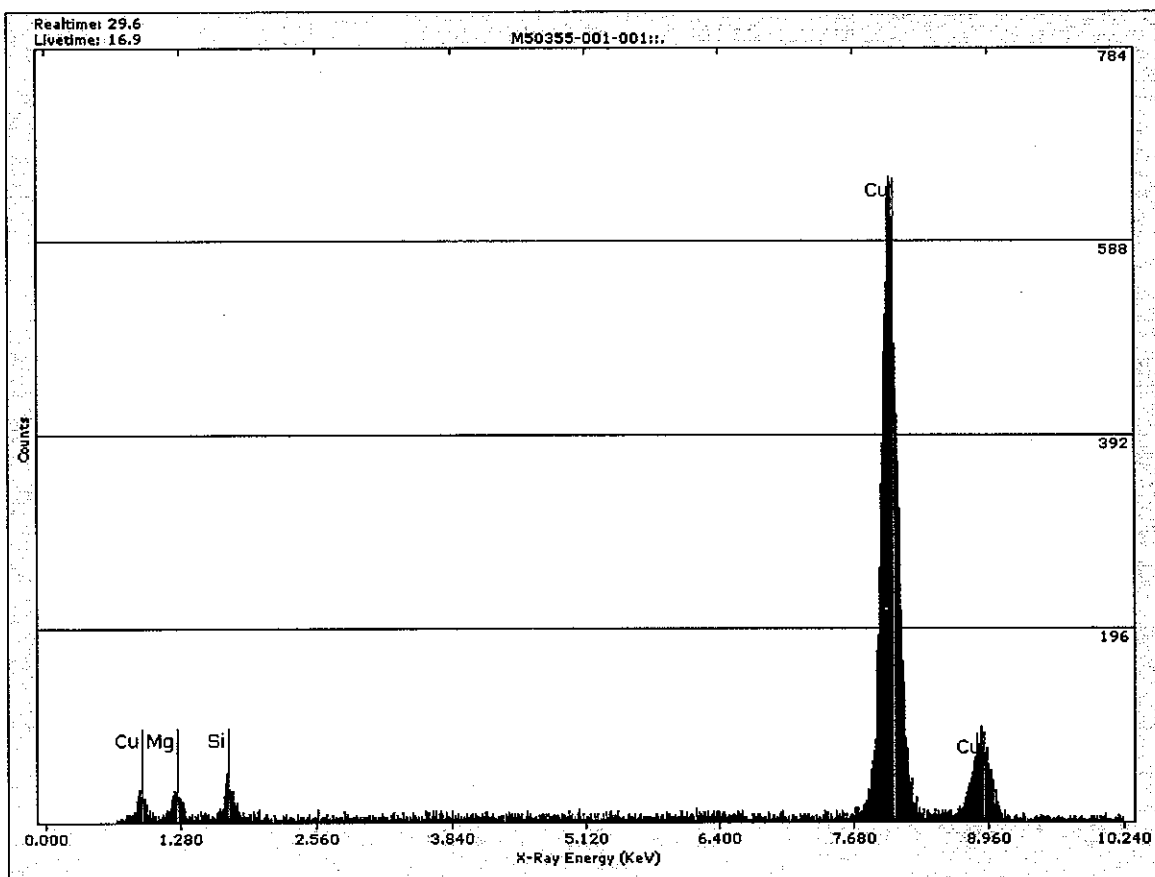
OM  
Amosite  
Trem-Act

other mineral type  
Solid solution series  
Solid solution series

(specify in "other mineral description" section)  
Amosite, cummingtonite-grunerite  
Tremolite-Actinolite

tion" field)

(d) Populate this field only if sample was analyzed using more than one instrument, by more than one analyst, or across multiple analysis dates.





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