

**ZONOLITE PLACE REMOVAL ACTION
AIR MONITORING WORK PLAN
VERMICULITE EXFO W.R. GRACE GAO 144 SITE
1167 ZONOLITE PLACE NORTHEAST
ATLANTA, DEKALB COUNTY, GEORGIA 30306**

PREPARED BY:

A handwritten signature in black ink, appearing to read 'Rrs', with a long horizontal flourish extending to the right.

ROBERT BRAWNER, CHMM #13495

TABLE OF CONTENTS

1. INTRODUCTION 2

2. GOVERNANCE 2

3. PURPOSE..... 3

4. SCOPE OF WORK SUMMARY 3

5. METEOROLOGICAL MONITORING..... 4

6. LABORATORY ANALYTICAL METHOD 4

7. LABORATORY ANALYTICAL QUALITY CONTROL..... 5

8. INSTRUMENT CALIBRATION 6

9. ASBESTOS ACTION LIMITS 6

10. BACKGROUND AIR SAMPLING 6

11. PERSONNEL AIR SAMPLE 7

12. SPOT-CHECK AIR SAMPLE 7

13. AMBIENT AIR SAMPLE 8

14. ACTIVITY BASED AIR SAMPLE 8

15. INVESTIGATION DERIVED WASTE 9

16. AIR SAMPLE DOCUMENTATION..... 9

17. AIR SAMPLE HANDLING..... 10

Appendix I - Summary of Laboratory Analytical Methods

Appendix II - Hazard Communication (Asbestos)

1. INTRODUCTION

The subject property and/or area of concern is comprised of an approximately 16-acre parcel at 1167 Zonolite Place NE, Atlanta, DeKalb County, Georgia, 30306 (Site). The eastern portion of the Site is occupied by the Atlanta Soto Zen Center, with its remainder being partially overgrown woodland. The Site is bordered by light-industrial and commercial businesses to the north and to the east. Peachtree Creek runs along the south and west sides of the Site. Residential communities are located to the south, west and north of the Site.

In 1950, Southern Zonolite Company built the former vermiculite expansion plant at the Site. In 1957, Southern Zonolite Company merged with the Zonolite Company. In 1963, the assets of the Zonolite Company were acquired by W.R. Grace (Grace). Grace continued to operate the expansion plant at the Site until 1970. According to Grace, the parcel was deeded to R.W. Sterrett in 1983. Since then, DeKalb County has assumed ownership of a large part of the original property while other entities own the other parts. The Site received between 499 and 1,225 tons of vermiculite concentrates from the Grace vermiculite mine in Libby, Montana.

In the spring of 2010, EPA and EPA's Superfund Technical Assistance and Response Team (START) contractor conducted activity based air sampling and bulk material sampling at the Site. On November 12, 2010, EPA and START conducted a removal evaluation at the Site in response to an initiative to investigate vermiculite facilities that received vermiculite concentrate from the Grace vermiculite mine in Libby, Montana. In April 2011, Grace and the EPA entered into an Administrative Settlement Agreement and Order on Consent for Removal Action to excavate to native soil an elevated area measuring approximately 175 feet by 250 feet.

2. GOVERNANCE

Asbestos containing materials (ACMs) and asbestos fiber in air concentrations at the Site are regulated by the following:

- United States Occupational Safety and Health Administration (OSHA) Asbestos in the Construction Industry (29 CFR 1926.1101);
- OSHA Asbestos in General Industry (29 CFR 1910.1001);
- OSHA Respiratory Protection (29 CFR 1910.134);
- EPA National Emission Standard for Hazardous Air Pollutants (NESHAP) Control of Emissions, Waste Management & Disposal (40 CFR 61 subpart M);
- EPA Model Accreditation Plan: Certified Persons and Specifications (40 CFR 763, appendix C of subpart E);
- EPA Worker Protection: Protects Asbestos Workers Excluded from OSHA (40 CFR 763, subpart G);
- Georgia Asbestos Safety Act (OCGA 12-12-1).
- Georgia Environmental Protection Division (EPD) Rules Chapter 391-3-14, Asbestos Removal and Encapsulation.

3. PURPOSE

This work plan has been developed to describe air monitoring to be carried out by an outside company during the removal action at the Site. It has been designed to: verify that ambient air outside of the work area remains uncontaminated; protect removal action personnel; and protect the general public.

This air monitoring work plan also sets forth airborne fiber levels both inside and outside the work area, including post abatement airborne asbestos fiber concentrations, and describes the action required if an action level is met or exceeded.

The following documents have been reviewed while preparing this scope of work:

- EPA, *Asbestos Hazard Emergency Response Act (AHERA) “Asbestos in schools” (40 CFR 763, subpart E)* dated 1986;
- US Army Environmental Center, *Dust Control Guidance and Technology Selection Key* dated 1999;
- US Army Corps of Engineers, *Asbestos Abatement Air Monitoring Standard Scope of Work (EP 1110-1-23)* dated January 31, 1999;
- EPA, *Framework for Investigating Asbestos-Contaminated SUPERFUND Sites (OSWER Directive #9200.0-68)* dated September 2008;
- EPA, *Standard Operating Procedures for Activity Based Air Sampling for Asbestos (SOP2084)* dated May 10, 2007;
- TetraTech, Inc., *Draft Sampling and Analysis Plan, Aggressive Air and Activity-Based Air Sampling Event for Vermiculite Expo W.R. Grace GAO 144* dated November 17, 2009;
- URS, *Draft Quality Assurance Project Plan for Zonolite Place Removal Action, Atlanta, Georgia* dated June 2011;
- URS, *Draft Removal Action Work Plan for Zonolite Road, Atlanta, Georgia* dated June 2011.

4. SCOPE OF WORK SUMMARY

The removal action will involve excavation of ACMs at the Site until native soil is encountered. ACMs will be removed using mechanical equipment, and will be transported from the Site in sealed, leak-proof containers. Engineering controls (proper wetting and implementation of dust suppression measures) by the removal action contractor will be critical to the air monitoring work plan’s effectiveness.

Air monitoring will be performed at the Site during the planned removal action by an outside company independent of Grace. The air monitoring will include:

- Collection of air samples prior to the initiation of the removal action, from both on-Site and off-Site locations, to document background asbestos fibers in air concentrations;

- Collection of daily air samples from personnel breathing zones during the removal action to document OSHA regulatory compliance;
- Collection of daily air samples outside the removal action's regulated areas to protect the ambient air and the general public;
- Collection of activity based air samples (ABS) performed to determine that the Site cleanup goal for air (0.02 fibers per cubic centimeter[f/cc]) has been met;
- Preparation of a final report documenting all activities performed during this scope of work.

A summary of the air sampling methodologies is presented on Table 1 of Appendix A and sample equipment specifications are provided in Appendix B.

5. METEOROLOGICAL MONITORING

A portable meteorological station will be located on-Site during the removal action. Real-time data, including wind speed, wind direction, temperature, and atmospheric pressure will be available for review on the meteorological station display panel. These meteorological parameters can be measured in various ways, and may be measured during this field effort using the following instrumentation: wind speed and direction may be measured using a combination wind vane and anemometer; temperature may be measured using a thermistor; and atmospheric pressure may be measured using a manifold absolute pressure (MAP) sensor.

In particular, the wind direction and wind speed data will be used to establish: staging locations for personnel and the decontamination station; background sampling locations; perimeter air sampling locations; and activity-based perimeter air sampling locations. Meteorological data will also be stored for later retrieval and use when evaluating the fixed laboratory data.

6. LABORATORY ANALYTICAL METHOD

Transmission electron microscopy (TEM) will be used to confirm the presence of asbestos fibers. The Site cleanup goal for air is 0.02 F/cc. These methods can use the phase contrast microscopy (PCM) criteria of greater than 5 μm and an aspect ratio of greater than 3 to 1 for identifying fibers. In combination with other techniques, TEM methods can specifically identify asbestos fibers versus other kinds of fibers (fiberglass, rock wool, etc.) and have a much greater ability to detect shorter and thinner asbestos fibers.

Laboratory analysis using TEM will identify and determine asbestos fiber concentrations using TEM methodology based on either International Organization for Standardization (ISO) International Standard, ISO 10312 (1995(E)), Ambient Air – Determination of Asbestos Fibers – direct-transfer TEM Methodology (Appendix D). All asbestos structures/fibers observed meeting ISO 10312 criteria will be counted, described and recorded per the National Asbestos Data Entry Spreadsheet (NADES) for Superfund TEM (NADES Version 12 or most current version). The analytical sensitivity limits required for this project are 0.001 structures or fibers per cubic centimeter (F/cc) for ambient air sampling.

ABS air samples will be collected under conditions which may be very dusty. In order to minimize interference of sample collection by airborne dust clogging the filters, the recommended filter for TEM analysis with a pore size of 0.45 µm is being replaced with a PCM filter with pore size of 0.8 µm. Previous asbestos investigations have indicated that available filter cassettes (and cowls) with these filters will be adequate for collecting the asbestos fibers under dusty conditions.

PCM results are reported on a mass-per-volume basis, or f/cc. Laboratory analysis using PCM will identify and determine asbestos fiber concentrations using PCM methodology based on the National Institute for Occupational Safety and Health (NIOSH) 7400 Method as amended May 15, 1995.

Laboratory analysis will be performed by EMSL Analytical, Inc. (EMSL) located in Cinnaminson, New Jersey. EMSL participates in a QA/QC program that complies with the appropriate EPA guidance and has a documented Quality System that complies with ANSI/ASQC E- 4 1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), "EPA Requirements for Quality Management Plans (QA/R-2) (EPA/240/B-01/002, March 2001)," and the EPA Region 4 Standard Operating Procedures and Quality Assurance Manual (May 1996), or equivalent documentation as determined by EPA.

7. LABORATORY ANALYTICAL QUALITY CONTROL

A field quality control program shall be implemented to assure conformance with data quality protocols established by EPA. The field quality control program is normally comprised of additional collected field quality control samples. A performance sample will not be submitted for analysis. The performance sample employs a known concentration of asbestos on a filter that is submitted to measure the analytical accuracy.

Lot blanks are samples of the collection media, from the same manufacturer's lot as those being used for sample collection, submitted to the laboratory for analysis to detect potential contamination or issues with the sampling media. A minimum of two lot blanks will be submitted for each different lot of asbestos air filter cassettes that are used.

Field blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures. At least two field blanks or ten percent of the total samples, whichever is greater, shall be submitted for each 24-hour set of investigative samples. Top covers shall be removed from the field blank cassettes, stored in a clean area (e.g., closed bag or box) during sampling, and replaced onto the field blank cassettes when sampling is completed.

8. INSTRUMENT CALIBRATION

Instruments requiring calibration will be used in the field; therefore, field calibration procedures apply. All air sampling pumps will need to be calibrated using air flow gauge(s) calibrated with a primary air flow standard. Flow rate measurements will be obtained periodically during air sampling to ensure proper pump operation, as well as before and after air sample collection.

During flow rate measurement, both before and after sample collection, it is important to use the filter cassette for collecting the actual air sample; this is especially important for the after-sample-collection flow rate measurement because loading of dust and other material during the sampling may have altered the flow rate.

9. ASBESTOS ACTION LIMITS

In the event all the listed action limits, see attached table, are exceeded during the removal action, all work at the Site will stop until engineering controls are upgraded to limit dust generation. EPA has established a Site specific cleanup goal for air of 0.02 F/cc by TEM analysis described in Section 6.0.

10. BACKGROUND AIR SAMPLING

Three background air sampling events will be performed prior to the initiation of the removal action. A total of six air samples will be obtained during each event and analyzed using TEM. Two air samples will be obtained in the removal action area and four air samples will be obtained from outside the removal area in the four cardinal directions. If possible, two of the four cardinal direction samples should be obtained from off-Site.

Each sampling train will consist of an high flow rate air pump operated at a high flow rate of 10 liters per minute (L/min) for a minimum of 480 minutes, with an attached 25-millimeter (mm) diameter, 0.8 micrometer (μm) micro cellulose ester membrane (MCE) filter cassette, will be mounted on a 4 to 5 foot-tall cassette tripod stand. The inlet cap of the filter cassette will be removed (so that it is open-faced) during air sampling activities; the cassette will be positioned downward and perpendicular to the wind direction. The flow rate of the air sampling train created from this assembly will be measured before and after air sample collection using a rotameter.

To the degree possible, the locations selected for the background air samples will be free of known asbestos contamination. The background air asbestos level should reflect the concentration of asbestos in the air for the environmental setting in the vicinity of the Site and will be used to help evaluate whether a release from the Site has occurred during the removal action. The background air asbestos level does not necessarily represent historical, pre-release conditions or conditions in the absence of influence from potential sources at the Site. A background air asbestos level may or may not be less than the analytical detection limit, and if it is greater than the detection limit (and therefore detectable), it will account for variability in local asbestos air concentrations.

Once obtained, background air samples will be submitted to the analytical laboratory for TEM analysis under standard chain of custody procedures.

11. PERSONNEL AIR SAMPLE

Personnel air sampling will be conducted to document potential, worker exposure to asbestos during the removal action and to comply with applicable OSHA regulations. It will be performed daily for 480 minutes or the duration of work (whichever is longer) on two removal action workers, a technician and an equipment operator.

Personnel air samples will be collected from the breathing zones of removal action workers. The breathing zone can be visualized as a hemisphere approximately 6 to 9 inches around an individual's face. Breathing zone air samples provide the best approximation of the concentration of contaminants in the air that an individual may actually breathe. Each removal action worker, wearing the appropriate PPE, will be fitted with a battery-operated, personnel pump set at 3.0 L/min. The pump will be secured to the removal action worker so that its inlet is within the breathing zone. The sampling train will consist of an appropriate portable air sampling pump with an attached 25-mm diameter, 0.8 μm MCE filter cassette. The inlet cap filter cassette will be removed (so that it is open-faced) during air sampling and the cassette will be positioned downward. Cassettes will be replaced as necessary to prevent overloading due to airborne dust.

Once obtained, personnel air samples will be submitted to the analytical laboratory for TEM analysis under standard chain of custody procedures.

12. SPOT-CHECK AIR SAMPLE

Periodic air samples will be performed to ensure or "spot-check" that engineering controls are being properly maintained. These spot checks will initially be performed the first six days of the removal action, then as necessary thereafter. A total of five air samples will be obtained during each spot-check and analyzed using PCM. One air sample will be obtained in the removal action area and four air samples will be obtained from outside the removal area in the four cardinal directions.

Each sampling train will consist of a high flow rate air pump operated at a high flow rate of 10 liters per minute (L/min) for a minimum of 120 minutes, with an attached 25-millimeter (mm) diameter, 0.8 micrometer (μm) micro cellulose ester membrane (MCE) filter cassette, will be mounted on a 4 to 5 foot-tall cassette tripod stand. The inlet cap of the filter cassette will be removed (so that it is open-faced) during air sampling activities; the cassette will be positioned downward and perpendicular to the wind direction. The flow rate of the air sampling train created from this assembly will be measured before and after air sample collection using a rotameter.

Initially, spot-check air samples will be field analyzed by PCM on-Site by a NIOSH-582 certified individual.

13. AMBIENT AIR SAMPLE

A total of five, ambient air samples will be obtained during each day of the removal. The air samples will be collected from the perimeter of the removal action and will be analyzed using TEM. The ambient air samples will be obtained from the removal action's perimeter in the four cardinal directions, with two of the five air sample locations placed downwind.

Each sampling train will consist of an high flow rate air pump operated at a high flow rate of 10 L/min for a minimum of 480 minutes or the duration of work (whichever is longer), with an attached 25mm diameter, 0.8 µm MCE filter cassette mounted on a 4 to 5 foot-tall cassette tripod stand. The inlet cap of the filter cassette will be removed (so that it is open-faced) during air sampling activities; the cassette will be positioned downward and perpendicular to the wind direction. The flow rate of the air sampling train created from this assembly will be measured before and after air sample collection using a rotameter.

Once obtained, ambient air samples will be submitted to the analytical laboratory for TEM analysis under standard chain of custody procedures.

14. ACTIVITY BASED AIR SAMPLE

ABS will be conducted to simulate human exposure to asbestos during raking activities at the Site. A total of six air samples will be obtained during the ABS event and analyzed using TEM. During an event, air samples will be collected from the breathing zones of the ABS event participants and from both upwind and downwind areas. The purpose of the ABS event is to verify ACMs have been removed from the Site, and that human re-occupancy will not result in elevated airborne asbestos fibers after completion of the removal action.

During each event, air samples will be collected from the breathing zones of event participants for a minimum of 360 minutes aggregated from three separate, 120 minute activities (raking). The breathing zone can be visualized as a hemisphere approximately 6 to 9 inches around an individual's face. Breathing zone air samples provide the best approximation of the concentration of contaminants in the air that an individual may actually breathe. Each event participant, wearing the appropriate personal protective equipment (PPE), will be fitted with two sampling pumps, one set at a low flow rate of 3.0 L/min and the other set at a higher flow rate of 10.0 L/min. The pumps will be contained within a backpack or harness, with the filter cassettes secured to the participants shoulder straps so that their inlets are within the participant's breathing zone. Both the high and low flow rate sampling trains will consist of an appropriate portable air sampling pump with an attached 25-mm diameter, 0.8 µm MCE filter cassette. The inlet caps of both the low and high flow rate filter cassettes will be removed (so that they are open-faced) during air sampling and the cassettes will be positioned downward.

Three participants will be involved in an ABS event, and each of the participants will don appropriate PPE and will be ready to relieve the preceding participant from the activity before a personnel exchange is made. The original participant will stop the activity, remove the backpack or harness containing the sampling trains and pass it to the relief participant. The original participant should assist the relief participant with donning and adjusting the backpack (or

harness) and adjusting the location of the filter cassettes so that they are within the new participant's breathing zone. The exchange should take less than 60 seconds, however, during the exchange, the pumps and event clock should be stopped until the activity resumes.

In addition to air sampling of the personal breathing space of the event participants, air samples will also be collected around the perimeter of each activity at upwind and downwind locations to assess the impact of the activity on the ambient air. There will be two sampling pump assemblies at each location, one set at a low flow rate of 3.0 L/min and the other set at a higher flow rate of 10.0 L/min. The flow rate sampling train for both pumps will consist of an appropriate portable air sampling pump with an attached 25-mm diameter, 0.8 µm MCE filter cassette. The inlet caps of both the low and high flow rate filter cassettes will be removed (so that they are open-faced) during sampling and the cassettes will be positioned downward and perpendicular to the wind direction. The low and high flow rate filter cassettes set up at each sampling location will be mounted as close to each other as possible on a 4 to 5-foot tall cassette tripod stand. Perimeter samples will be collected for the duration of each ABS event.

Once obtained, ABS air samples will be submitted to the analytical laboratory for TEM analysis under standard chain of custody procedures. ABS sampling personnel will be provided by the air monitoring contractor.

15. INVESTIGATION DERIVED WASTE

Air sampling activities are not anticipated to produce investigation-derived wastes (IDW.)

16. AIR SAMPLE DOCUMENTATION

Each air sample will be identified with an adhesive label bearing a unique sample identification number. Air sampling data sheets will be used to record all sampling information. Information in the datasheets will include, at a minimum, the following:

- Location and activity being conducted during air sample collection;
- Date and time of collection;
- Air sample description including, if necessary, the name of the personnel wearing the sampling equipment;
- Description of temperature and general weather conditions;
- The unique sample identification number for each air sample.

Data sheets will be completed, signed, and dated by the recorder. All logs will be written with waterproof ink. Corrections to data entered will be made by crossing out the error with a single horizontal line, initialing the correction, and entering the correct information. Crossed-out information shall be readable.

Chain of custody procedures will be used to maintain and document sample collection and possession. During the sampling process, an EPA Region 4 Chain-of-Custody Record form will be completed. The completed Chain-of-Custody Record will accompany all air samples and will be signed as required as each air sample package recipient receives and relinquishes possession of the air sample package.

17. AIR SAMPLE HANDLING

The air sample filter cassettes will be carefully packaged and shipped to the analytical laboratory using standard methodology. All air samples, including blanks shall be shipped upright, with the non-conductive cowl attached, and in a rigid container with packing material to prevent jostling or damage. Untreated polystyrene foam shall not be used in the shipping container as electrostatic forces may cause fiber loss from the sample filter.

Plastic coolers will be used for sample shipment for convenience. All previous labels will be removed from the cooler and its drain plug(s) will be sealed with tape. Sample documentation will be enclosed in sealed plastic bags taped to the underside of the cooler lid.

Coolers will be secured with packing tape and custody seals as described below:

- Tape the cooler lid with strapping tape, encircling the cooler several times.
- Place chain of custody seals on two sides of the lid (one in front and one on the side).
- Place "This Side Up" arrows on the sides of the cooler.

The coolers will then be manually transported and/or shipped to the laboratory by overnight courier the day sample collection is completed.

APPENDIX I

SUMMARY OF ANALYTICAL METHODS

Table 1 - Summary of Laboratory Analytical Methods

| Air Sample Type | Purpose | Analytical Method | Pump Type | Filter Type | Flow (L/min) | Minimum Duration | Action Limit (F/cc) | Frequency | Number of Samples | Samples per Event |
|---------------------------------------|---|----------------------|---|---|--------------|---|---------------------|---|---|-------------------------------|
| Background Air Sample | Establish background asbestos fiber in air concentrations in removal action, Site perimeter, and off-Site | TEM (ISO 13012 1995) | Gillian Aircon-2 High Volume Air Sampler (or similar specification) | 0.8 micrometer, 25-mm mixed cellulose ester | 10 | 480 minutes | *0.02 | 3 separate days prior to initiating removal action | 2 in removal action, 4 outside removal action, 2 off-Site (if possible) | 6 |
| Personnel Air Sample | OSHA Compliance | TEM (ISO 13012 1995) | SKC-224 pcr8 (or similar specification) | 0.8 micrometer, 25-mm mixed cellulose ester | 3 | The greater of either (1) 400 minutes or (2) total duration of work day | *0.02 | Daily | As needed to prevent overload | As needed to prevent overload |
| Ambient Air Sample | Protect ambient air outside of the removal action | TEM (ISO 13012 1995) | Gillian Aircon-2 High Volume Air Sampler (or similar specification) | 0.8 micrometer, 25-mm mixed cellulose ester | 10 | The greater of either (1) 400 minutes or (2) total duration of work day | *0.02 | Daily | 5 outside removal action in cardinal directions, with 2 obtained downwind | 5 |
| Spot Check Air Sample | Ensure engineering controls are functioning properly | PCM (NIOSH 7400) | Gillian Aircon-2 High Volume Air Sampler (or similar specification) | 0.8 micrometer, 25-mm mixed cellulose ester | 10 | 120 minutes | *0.02 | As necessary | 1 in removal action, 4 outside removal action in cardinal directions | 5 |
| Activity Based Air Sample (High Flow) | Verify completion of removal action | TEM (ISO 13012 1995) | Gillian Aircon-2 High Volume Air Sampler (or similar specification) | 0.8 micrometer, 25-mm mixed cellulose ester | 10 | 360 minutes aggregated from three, separate 120 minute activity events | *0.02 | As necessary to verify compliance with action limit | 1 upwind of activity, 1 downwind of activity, and 1 one personnel | 3 |
| Activity Based Air Sample (Low Flow) | Verify completion of removal action | TEM (ISO 13012 1995) | SKC-224 pcr8 (or similar specification) | 0.8 micrometer, 25-mm mixed cellulose ester | 3 | 360 minutes aggregated from three, separate 120 minute activity events | *0.02 | As necessary to verify compliance with action limit | 1 upwind of activity, 1 downwind of activity, and 1 one personnel | 3 |

* Site specific action limit determined by EPA, calculated using NADES for Superfund TEM (version 12 or most current)

APPENDIX II

HAZARD COMMUNICATION (ASBESTOS)

A

Asbestos

| | | | | |
|---|--|---|-----------------------------|---------------------------|
| Formula: Hydrated mineral silicates | | CAS#: 1332-21-4 | RTECS#: C16475000 | IDLH: Ca [N.D.] |
| Conversion: DOT: 2212 171 (blue, brown); 2590 171 (white) | | | | |
| Synonyms/Trade Names: Actinolite, Actinolite asbestos, Amosite (cummingtonite-grunerite), Anthophyllite, Anthophyllite asbestos, Chrysotile, Crocidolite (Riebeckite), Tremolite, Tremolite asbestos | | | | |
| Exposure Limits: NIOSH REL: Ca See Appendix A See Appendix C OSHA PEL: [1910.1001] [1926.1101] See Appendix C | | | | |
| Physical Description: White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite) fibrous, odorless solids. | | | | |
| Chemical & Physical Properties: MW: Varies BP: Decomposes Sol: Insoluble FLP: NA IP: NA Sp.Gr: ? VP: 0 mmHg (approx) MLT: 1112°F (Decomposes) UEL: NA LEL: NA Noncombustible Solids | | Personal Protection/Sanitation (see Table 2): SKin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: Daily | | |
| Incompatibilities and Reactivities: None reported | | Respirator Recommendations (see Tables 3 and 4): NIOSH ☒: ScbaF: Pd, Pp/SaF: Pd, Pp: AScba Escape: 100F/ScbaE See Appendix E (page 351) | | |
| Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Ing, Con SY: Asbestosis (chronic exposure): dysp, interstitial fib, restricted pulm function, finger clubbing; irrit eyes; [carc] TO: Resp sys, eyes [lung cancer] | | First Aid (see Table 6): Eye: Irr immed Breath: Fresh air | | |

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Some may burn but none ignite readily.
- Containers may explode when heated.
- Some may be transported hot.

HEALTH

- Inhalation of material may be harmful.
- Contact may cause burns to skin and eyes.
- Inhalation of Asbestos dust may have a damaging effect on the lungs.
- Fire may produce irritating, corrosive and/or toxic gases.
- Some liquids produce vapors that may cause dizziness or suffocation.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".
- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **Small Fire**
 - Dry chemical, CO₂, water spray or regular foam.
- **Large Fire**
 - Water spray, fog or regular foam.
 - Do not scatter spilled material with high pressure water streams.
 - Move containers from fire area if you can do it without risk.
 - Dike fire-control water for later disposal.
- **Fire Involving Tanks**
 - Cool containers with flooding quantities of water until well after fire is out.
 - Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
 - ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent dust cloud.
- Avoid inhalation of asbestos dust.
- **Small Dry Spill**
 - With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Small Spill

- Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Cover powder spill with plastic sheet or tarp to minimize spreading.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air. • Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

SPI Supplies Division

Structure Probe, Inc.

P.O. Box 656 West Chester, PA 19381-0656 USA

Phone: 1-(610)-436-5400 Fax: 1-(610)-436-5755

E-mail: spi3spi@2spi.com

WWW: <http://www.2spi.com>

Manufacturer's CAGE: 1P573



Material Safety Data Sheet

SPI #02701-AB, 02701A-AB Chrysotile "B" and SPI#02740-AB, 02740A-AB Chrysotile "B" Asbestos Standards

Section 1: Identification

Date Effective..... January 8, 2009
(most recent revision)

Chemical family..... Hydrous silicates of magnesia

Emergencies

Contacting CHEMTREC:

24 Hour Emergency Use Only #'s.....

Worldwide phone: 1-(703)-527-3887

Worldwide FAX: 1-(703)-741-6090

Toll-free phone: 1-(800)-424-9300 USA only

Product or Trade Name.... Chrysotile asbestos fiber

Emergency Overview:

Chrysotile asbestos is a known human carcinogen.

Section 2: Composition

| Name | CAS # | EC# | Approximate Weight % |
|------------|------------|-------------|----------------------|
| Chrysotile | 12001-29-5 | 650-013-006 | >99.99% |

Confirmed carcinogen by ACGIH, IARC, OSHA AND NTP.

Section 3: Hazard Identification

Potential Health Effects:

Acute: Overexposure to breathing asbestos may cause asbestosis, pulmonary fibrosis, mesothelioma, other lung disorders or cancer. Handling of materials and smoking or eating prior to washing could be hazardous. Medical examination and x-rays are required to determine signs & symptoms of exposure.

Routes of exposure: Inhalation, Skin contact, Ingestion

Medical Conditions Aggravated by Exposure:

Pulmonary disease

Occupational Exposure Limits:

TLV: 0.1 fiber/cc (as TWA)

A1 (ACGIH 1998. For fibers longer than 5µm with an aspect ratio equal to or greater than 3:1 as determined at 400-450X magnification by the membrane filter method).

Incompatibilities:

Strong oxidizers, strong acids, and bases

Route of entry: Inhalation, Skin contact, Ingestion

Target organs: Lungs

Symptoms:

There are not acute signs or symptoms associated with asbestos. Diseases associated with over exposure are chronic, generally taking from 10 to 40 years to become apparent.

Section 4: First Aid Measures

Eyes: In case of contact, immediately flush eyes with copious amounts of flowing water for at least 15 minutes, retracting eye lids often. Get medical attention immediately. Contact lenses should not be worn when working with this product.

Skin: Wash skin thoroughly with mild soap and water. Flush with copious amounts of water for 15 minutes.

Inhalation: Move the exposed person to fresh air at once. Support breathing. If symptoms persist contact physician.

Ingestion: Get medical aid immediately.

Section 5: Fire Fighting Measures

Flammability classification: Not classified.

Heat resistant up to 500°C; is completely decomposed at a temperature of 1000°C.

Flash Point/Method: Not known

Auto-Ignition Temperature: Not determined

Flammable Limits: Lower: Not applicable
Upper: Not applicable

Extinguishing Media: Water, Foam, Dry Chemical

Unusual Fire Hazards: Toxic gases and asbestos particulate may be Released in a fire.

Firefighting procedures/instructions:

Use NIOSH approved self-contained breathing apparatus and full protective equipment.

Properties that could increase fire or explosion hazard:

Combustibility of this material results from paraffin lubrication.

Section 6: Accidental Release Measures

Use HEPA vacuum wet methods when feasible. Use appropriate personal protection for clean-up personnel.

Section 7: Handling and Storage

Storage and handling:

Store in well-sealed container in cool, dry area.

Section 8: Exposure Controls and Personal Protection

ANSI approved eye wash and deluge shower should be available in the work area.

Personal Protective Equipment (PPE):

Eye/Face Protection: ANSI 87.1 approved chemical safety glasses with side shield.

Protective gloves: Rubber gloves

Protective clothing: Wear protective clothing to prevent skin contact. Do NOT take working clothes home.

Respiratory Protection:

Wear NIOSH approved respirator in accordance with 29CFR1910.1001.

Other: Wash prior to eating, drinking, or smoking. Avoid ingestion or breathing of dust.

Section 9: Physical and Chemical Properties

Appearance: white or gray fibrous solid

Color: white or gray

pH: Not applicable

Odor: None

Vapor Pressure: Not applicable

Vapor Density (Air=1): Not available

Boiling Point/Range: Not available

Melting Point/Range: Decomposes above 500°C

Specific Gravity: 2.2 to 2.6 g/cc

Solubility in water: None

Softening Point: Not determined

Molecular Formula: $Mg_3Si_2H_4O_6/Mg_3(Si_2O_5)(OH)_4$

Molecular Weight: 277

%Volatile by Volume: Not determined

Evaporation Rate (n-butyl acetate = 1): Not available

Viscosity: Not available

Section 10: Stability and Reactivity

Chemical Stability: The product is stable under normal use conditions.

Conditions to Avoid:

Prevent dispersion of dust. Avoid all contact. Avoid airborne concentrations at or above OSHA PEL.

Incompatibility (materials to avoid):

Strong oxidizers, strong acids, and bases.

Hazardous Products of Decomposition:
None known

Reactions with Air and Water:
Avoid airborne concentrations at or above OSHA PEL.

Section 11: Toxicological Information

RTECS# CI3478500

Section 12: Ecological Information

None available

Section 13: Disposal Considerations

Bury waste in solid landfill as required in 29CFR1910.1001. Comply with applicable OSHA, Federal, State and Local regulations.

Section 14: Transport Information

Proper Shipping Name: White asbestos (chrysotile)

DOT Hazard Class: 9

UN/NA ID: UN2590

Packing Group: III

Labels: 9

Marine Pollutant: No information

DOT Status: Not Regulated

Section 15: Regulatory Information

United States:

TSCA

This product is listed under the TSCA Inventory.

CERCLA:

This product has an RQ of 1 pound under CERCLA.

SARA:

Section 313

This product is listed under SARA Section 313.

California Prop. 65:

Asbestos a known carcinogen under California Prop. 65.

US Statements:

Confirmed carcinogen. Target organs: Lung

European/International Regulations:

European Labeling in Accordance with EC Directives

Hazard Symbols: T Toxic

Risk Phrases:

R23 Toxic by Inhalation

R45 May cause cancer

R48 Danger of serious damage to health by prolonged exposure

R49 May cause cancer by inhalation

Safety Phrases:

S53 Avoid exposure â€" obtain special instructions before use

S45 In case of accident, or if you feel unwell, seek medical advice immediately (show the label where possible.)

Canada

This product has a WHMIS classification of D2B.

DSL/NDSL

This product is listed on the DSL List and is not listed on the NDSL List.

Section 16: Other Information

If this product should be used in ways that are outside of the intended applications in scanning electron microscope

laboratories, and if it is going to be formulated into some other system, so that it becomes just another component of that other system, read the MSDS sheets for the other components before blending as the resulting mixture may have the hazards of all of its parts.

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