

Strategy for Further Assessment of Vermiculite Ore Asbestos Sites

September 30, 2008

I. Background:

The Agency is committed to developing a strategy by the end of FY08 for conducting further assessments of vermiculite ore asbestos sites:

"We agree it would be prudent to take another look at the completed site assessments to determine whether some of the previously assessed sites may benefit from a reassessment. EPA is currently developing a strategy (in Fiscal Year 2008) to reassess, as necessary, and prioritize these sites."

- OSWER Response to Senator Lieberman on GAO Report findings, signed by Lyons Gray, CFO on 4/14/08

The purpose of this document is to present a broad strategy for prioritizing the further assessment of vermiculite sites that are potentially contaminated with asbestos-contaminated ore from Libby, Montana.

Since 2000, EPA has evaluated over 271 sites believed to have received asbestos-contaminated ore from Libby, MT. To date, EPA lead Removal Actions have been completed at 13 sites and a Removal Action at an additional site began this year. An additional 6 cleanups were led by the state of jurisdiction or the responsible party.

In general, prior cleanups have been performed if sampling results indicated the presence of asbestos in amounts greater than 1 percent (based on the percentage area in a microscopic field) in soils or debris or greater than 0.1 asbestos fibers per cubic centimeter of air. The 1 percent definition came from applying the definition of asbestos containing material (ACM) in the National Emission Standard for Hazardous Air Pollutants (NESHAP). NESHAP considers ACM to be material containing more than 1 percent asbestos as analyzed by polarized light microscopy (PLM).

An OSWER 2004 Directive (9345.4-05), "Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups" indicated that the 1 percent definition should not be used for assessing potential human health hazards from asbestos contaminated soils at hazardous waste sites, and that a risk-based, site-specific action level is appropriate when evaluating response actions for asbestos.

Since the 2004 Directive, a number of developments have occurred, enabling the issuance of our vermiculite sites strategy, including the following:

- Sampling and analytical methods have improved, as well as our understanding of exposure pathways and the degree to which exposures may represent a public health hazard. For instance, sampling at multiple sites has shown that even when soils are non-detect by PLM, concentrations of asbestos in air via activity based sampling (ABS) may result in unacceptable health risks.
- The TRW Asbestos Committee has completed a technical document, "Framework for Investigating Asbestos-Contaminated Superfund Sites" which presents a recommended process for investigating and characterizing the potential for human exposure from asbestos contaminated outdoor soil and indoor dust at Superfund removal and remedial sites.
- Findings from the draft ATSDR National Asbestos Exposure Review Phase 1 Summary Report and information from assessments conducted to date suggest former exfoliation facilities as the primary subset of sites of concern for further assessment. At these sites, asbestos-contaminated soils and residual asbestos fibers in indoor dust should be the main areas of investigation.

II. Rationale for Targeting Future Assessments:

An estimated 105 exfoliation facilities in the US received vermiculite ore from the Libby mine. Because environmental contamination is more likely, exfoliation facilities (both former and current) that are thought to have received asbestos-contaminated ore from Libby, MT are of primary concern for further assessments.

- The materials handling and processing steps at exfoliation facilities generated dust and waste rock which are the principal forms of contamination to indoor surfaces and soil, respectively. Waste rock can have high concentrations of pure tremolite asbestos (in the range of 40 - 80 percent asbestos content) that can break apart into respirable fibers.
- From an analysis of shipping records, it is estimated that exfoliation facilities received over 95% of the asbestos-contaminated vermiculite ore shipped from the Libby mine. Shipments were often received in bulk via railcar.

Because environmental asbestos contamination is less likely, non-exfoliation facilities should not be specifically targeted via a national strategy for follow-up activities. However, if historical information (e.g., past sampling results) suggest a need for further assessment, regions should address these sites within the context of their regional removal priorities. There are an estimated 166 non-exfoliation facilities in the US that received vermiculite ore from the Libby mine.

- Non-exfoliation facilities represent relatively low volumes of vermiculite ore and handling and processing steps at these facilities are generally less likely to generate vermiculite contamination in dust or exterior soil.

- The non-exfoliation sites received less than 5% of the estimated total weight of vermiculite ore shipped from the Libby mine. The non-exfoliation sites also had fewer material handling and processing steps (e.g., receiving shipments as bagged product vs. in bulk via railcar).
 - For instance, at gypsum wallboard manufacturing facilities (the largest grouping of non-exfoliation sites), the vermiculite ore was commonly transferred directly from bags to hoppers where it was blended with gypsum and other additives. Exposure to Libby amphibole fibers would likely be limited to workers who had direct contact with the vermiculite through opening bags, equipment maintenance or cleaning. Libby amphibole contamination was likely not widespread throughout the facility or the surrounding areas.

Although former exfoliation facilities are specifically targeted for future assessment, regional programs may continue to assess non-exfoliation sites based on regional priorities.

III. Targeted Universe of Exfoliation Sites:

Table 1 - Libby Ore Vermiculite Exfoliation Sites

Region	No. Sites	EPA Visit	EPA Sampling	EPA Removal	Other Removal	ATSDR Visit
Region 1	3	3	2	0	1	1
Region 2	9	9	3	1	0	2
Region 3	8	8	6	1	1	3
Region 4	22	17	11	1	0	2
Region 5	19	19	11	2	0	4
Region 6	18	18	3	0	0	2
Region 7	7	7	5	0	0	2
Region 8	5	5	5	4	0	2
Region 9	11	11	8	4	1	6
Region 10	3	3	3	0	3	3
Totals	105	100	57	13	6	27

Attachment A provides a list of all the exfoliation sites by Region.

IV. Application of a Site Assessment Framework:

The Technical Review Workgroup Asbestos Committee has developed guidance, "Framework for Investigating Asbestos-Contaminated Superfund Sites" which recommends a risk-based, site-specific process for assessing asbestos sites addressed under CERCLA response authority. Key messages from the framework include:

- No national default screening numbers are available for asbestos concentrations in soil or indoor dust.

- A site-specific, risk-based air action level for asbestos may be obtained using activity-based sampling (ABS).

Consistent with the National Contingency Plan and other EPA guidance, the Framework may be applied to the assessment and evaluation of sites that are presently under investigation, and sites that had been formerly addressed using the 1% rule.

For sites in which some consideration of asbestos has already occurred, the Framework may be entered from a step other than Step 1, depending upon the data that are available for the site. Also, no further action decisions or decisions to take a removal action may be made at the completion of any of the steps within the Framework

The Framework covers six basic steps from data review through response action. The steps are described below **and presented as a flow chart in Attachment C.**

Step 1) Review historical and current site data

- The first step in the Framework is to review all existing asbestos information available at the site in order to determine whether the site requires further evaluation for asbestos. The types of information that should be reviewed include data on past operations at the site as well as any past or current measurements or visual observations.
- If a thorough review of available site data provides a clear indication that asbestos is not present, then no further action to address asbestos is needed. If the available information indicates that asbestos is, or may reasonably be expected to be, present (and it is not being addressed by another authority, see Section 2 of the Framework), or if the data are insufficient to form a clear conclusion, then proceed to Step 2.

Step 2) Has there been (or is there a threat of) a release to the environment?

- All available information should be reviewed to determine if a release of asbestos to the environment has occurred due to human activities, or if a release may be likely in the future.
- If it is determined that there has been a release and a response is appropriate, then one may either proceed directly to a response action (see Step 6), or proceed to Step 3 to further characterize potential exposure.

Step 3) Is human exposure likely under current or future site conditions?

- Evaluate whether a complete human exposure pathway exists at or near the site under current or reasonably anticipated future site conditions. This should be achieved by developing a conceptual site model consistent with the National

Contingency Plan (NCP) and existing Superfund guidance and may include review or collection of PLM soil data. PLM soil data is semi-quantitative and non-detect by PLM without other mitigating factors does not support a no action decision. Note: When the asbestos content of soil is low (e.g., <1% by PLM) the fraction of particles that are asbestos is so small as to make accurate quantification very difficult.

- If a complete human exposure pathway does not exist, typically no further evaluation of asbestos would be necessary. If it has been determined that a complete exposure pathway to contaminated outdoor soil or contaminated indoor dust exists under current conditions, or may reasonably be expected to occur in the future, it may be appropriate either to undertake a response action (see Step 6), or to proceed with further investigation of potential exposures at the site (Step 4).

Step 4) Preliminary (screening level) environmental sampling

- Evaluate if human exposure levels are likely to be below a level of concern even under high-end exposure conditions. If exposures are judged to be below an air action level for asbestos at this step, then further investigation generally would not be needed under present site conditions. If exposures from this high-end evaluation are of potential concern (i.e., exceed the air action level), then a response action may be taken or more detailed investigation may be appropriate. Performing an exposure pathway assessment may involve review or collection of screening level activity based sampling (ABS) as appropriate. Refer to framework Sep 4 for details on screening level ABS.

Step 5) Environmental sampling: Site-specific activity based sampling (ABS) for indoor and outdoor scenarios

- Step 5 is intended to provide sufficient information about exposures from indoor and outdoor sources to ensure that reliable risk assessment and risk management decisions can be based on the most informative and appropriate data.
- The recommended tool for obtaining such data is normally ABS. The chief difference between ABS data obtained in Step 5 and the preliminary ABS data obtained in Step 4 is that, in Step 5, the samples should be representative in time and space, and should be representative of the range of different disturbance activities that may occur at the site over the duration of the exposure scenarios.

Step 6) Response Action and/or Institutional Controls

- Response actions may be implemented either under removal or remedial authority, and may include a wide variety of different activities to eliminate or reduce the potential for current exposures that pose an unacceptable risk (e.g., remove, cap, fence, etc.).

V. Implementation Strategy:

OEM requests that each region plan and initiate assessments of vermiculite exfoliation sites identified in Attachment A following the Framework described above. The activities should be pursued within existing budget levels and coordinated with state, tribal and local governments. In addition, regions may identify additional sites of concern which may be added to the regional assessment plan. Attachment B contains a list of sites identified as non-exfoliation vermiculite sites. Prioritization of the universe of vermiculite sites in each region should be considered in the context of the full scope of the region's removal priorities.

The regions should individually determine the appropriate personnel to execute this project. Utilizing the guidance in the Framework, supporting documents and available training, the region should conduct assessments for these sites in the usual manner, under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) following established regional work planning processes.

Regions should contact state, tribal and local agencies to notify them of potential site assessments and solicit their participation in site activities where field work is anticipated. In particular, regions should work closely with local public health authorities and the Agency for Toxic Substances and Disease Control (ATSDR) where existing data suggest the potential for human health impacts.

Regions should report progress to OEM Headquarters quarterly on the status of sites identified in the regional plan with regard to application of the Framework and any decision on the site (e.g., determination of no further action, Action Memorandum). A standard reporting format for these updates is included as Attachment D. Quarterly reporting should begin during the third quarter of FY09.

The extent, magnitude and timing of any subsequent cleanup actions will depend on the assessment of threat and risk, resource availability, and other regional priorities. Regions will conduct these activities in accordance with existing Superfund removal procedures. The estimated time for completion will depend on the authority and type of cleanup actions required.

The TRW Asbestos Committee is available to respond and provide support to the Regions and other stakeholders in the use of this strategy.

VI. Next Steps:

This strategy document outlines the national approach and rationale for conducting further assessments. Following are next steps to support implementation of the strategy:

- Develop and issue supporting guidance document providing more detail on application of the Framework to vermiculite sites and expectations on regional follow through. (end of 2nd Quarter FY09)
- Refine up-to-date site lists and status reports for the total universe of sites with input from regions and OSRTI (ongoing)
- Develop and deliver training on application of the Framework and other assessment particulars. (during OSC Readiness 2009 and Ongoing)
- Implement assessment strategy and track regional progress (beginning 3rd Quarter FY09)

Attachment A – 105 Vermiculite Exfoliation Sites

Region	Vermiculite Facilities (exfoliation)	Address	City	State	Zip Code
1	WRG/Zonolite	62 Whittemore Ave	Cambridge	MA	02140
1	Zonolite Co/WR Grace	Wemelco Way	Easthampton	MA	01027
1	Zonolite Co/WR Grace	PO Box 117	Billerica	MA	01862
2	American Vermiculite Products Corp	1- 41 Jacobus Avenue Tomkins Tidewater Terminal , Bldg. # 35	South Kearney	NJ	07032
2	FE Schundler & Co, Inc	45-15 Vernon Blvd	Long Island	NY	11101
2	Schundler Co	150 Whitman Ave	Metuchen	NJ	08840
2	The Carborundum Co (Unifrax Corp.)	1625 Buffalo Ave. (2351 Whirlpool St.)	Niagara Falls	NY	14303
2	Vermiculite Industrial Corp	Gilligan St, Bldg 8 (Navy Area)	Port Newark	NJ	07114
2	Zonolite Co/WR Grace	35 Industrial Drive	Hamilton Township	NJ	08619
2	Zonolite Co/WR Grace	226 Water Street	Albany	NY	12207
2	Zonolite Co/WR Grace	One Clay St	Utica	NY	13501
2	Zonolite Co/WRG	Dunn Road	Brutus	NY	13166
3	Hyzer and Lewellen	662 Belmont Ave	Southampton	PA	18966
3	J.P. Austin (A-Tops Mfg)	1060 24th St	Beaver Falls	PA	15010
3	Therm-o-Rock/Allied Block Chemical, Inc	1 Pine St	New Eagle	PA	15067
3	Vermiculite Products Co/WR Grace	1911 Kenilworth Ave NE	Washington, DC (also, Kenilworth/Beaver Heights, MD)	DC	20019
3	Zonolite Co/WR Grace	23rd & PA RR	Pittsburgh (Sharpsburg)	PA	15215
3	Zonolite Co/WR Grace	12th & Factory St	Ellwood City	PA	16117
3	Zonolite Co/WR Grace	12340 Conway Rd	Beltsville (Muirkirk)	MD	20705
3	Zonolite Co/WR Grace	202 E Cherry St	New Castle	PA	16102
4	American Vermiculite Minerals Incorporated		Spruce Pine	NC	28777
4	Anitox Corp	955 Hurricane Shoals Rd (or 1855 Anitox Rd, Buford?)	Lawrenceville	GA	30043
4	Anitox Corp	1855 Anitox Rd	Buford	GA	30519
4	Palmetto Vermiculite Co/Enoree Minerals	13101 Hwy 221	Woodruff	SC	29388
4	Southern Vermiculite			NC	28734
4	Southern Zonolite Co/WR Grace	1530 E Adams St	Jacksonville	FL	32202
4	Southern Zonolite Co/WR Grace	2800 5th Ave S	Birmingham	AL	35233
4	Southern Zonolite/Verilite Co.	6211 N 56th St.	Tampa	FL	33610
4	Verilite/Schmeizer Sales	3401 E 3rd Ave	Tampa	FL	33605
4	WR Grace	26383 Hwy. 221	Enoree	SC	29335
4	WR Grace	1050 SE 5th St	Hialeah	FL	33010
4	WR Grace (Schmeizer Sales)	Hannah Ave	Tampa	FL	33610
4	WRG	Box 546	Savannah	GA	
4	Zonolite Co/WR Grace	830 Hwy 25 Bypass	Traveller's Rest	SC	19690
4	Zonolite Co/WR Grace	1701 Prospect St	High Point	NC	27260
4	Zonolite Co/WR Grace	1167 Zonolite PI NE	Atlanta	GA	30340
4	Zonolite Co/WR Grace	1200 NW 15th Ave	Pompano Beach	FL	33069

Region	Vermiculite Facilities (exfoliation)	Address	City	State	Zip Code
4	Zonolite Co/WR Grace	35th and 3rd Ave (3401 N. 3rd Ave)	Tampa	FL	33605
4	Zonolite Co/WR Grace	2601 Commerce Blvd	Irondale	AL	35210
4	Zonolite Co/WR Grace	4061 Powell Ave	Nashville	TN	37204
4	Zonolite Co/WR Grace Wilder Plant	112 North St	Wilder	KY	41071
4	Zonolite Co/WRGrace/Seaboard Vermiculite	1700 NW 1st Court	Boca Raton	FL	33432
5	BF Nelson Mfg	401 Main St, NE	Minneapolis	MN	55413
5	Certain Teed Prod/ Diversified Insulation Twin Cities Wholesale Supply	459 Harding St NE	Minneapolis	MN	55413
5	FE Schundler & Co	504 Railroad St	Joliet	IL	60436
5	FE Schundler & Co/Mica Pellets, Inc	1008 Oak St	De Kalb	IL	60115
5	International Vermiculite Co/Thermic Refractories/Thermal Ceramics	115 E Mound St	Girard	IL	62640
5	Koos, Inc	4500 13th Court	Kenosha	WI	53140
5	Koos, Inc	2000 DeKovan Ave	Racine	WI	53403
5	MacArthur Co	936 Raymond Ave	St Paul	MN	55114
5	NForcer (Zonolite Co/WR Grace)	14300 Henn St	Dearborn	MI	48120
5	O.M. Scott Assoc Co, Inc.	14111 Scottslawn Rd	Marysville	OH	43040
5	PVP Industries, Inc.	Box 129 9819 Penniman Rd	N Bloomfield	OH	44450
5	Strong-Lite Products Corp	444 Shipyard Rd	Seneca	IL	61360
5	Vermiculite Indust Corp	PO Box 11999, Pittsburgh, PA 15228 E. Taggart St. (Plant: WRGrace, E. Palestine, OH)	E Palestine	OH	44413
5	W. R. Grace	12345 S Marshfield	Calumet Park	IL	60827
5	W. R. Grace/Const Products Division	Grand Ave District Yard	Milwaukee	WI	53213
5	Western Mineral Products (WRG)	1720 Madison St NE	Minneapolis	MN	55413
5	Western Mineral Products Co (WRG)	525 W Oregon St	Milwaukee	WI	53204
5	Wyodak Chem Co.	4600 E 71st St	Cleveland	OH	44125
5	Zonolite Co/WR Grace	603 Fenton Lane W	West Chicago	IL	60185
6	Filter Media Co	W. 10 St	Reserve	LA	70084
6	Isolatek International	3340 Bingle Rd	Houston	TX	77055
6	Scott's Co/Hyponex	3713 Hwy 32 N	Hope	AR	71801
6	Solico, Inc	5119 Edith Blvd NE	Albuquerque	NM	87107
6	Southern Mineralite Co/WR Grace	2933 Dauphine St	New Orleans	LA	70117
6	Southwest Vermiculite Co	1822 N First St	Albuquerque	NM	87102
6	Strong-Lite Products	4418 Emmitt Sanders Rd	Pine Bluff	AR	71601
6	Texas Lightweight Products	117 N Britain Rd	Irving	TX	75060
6	Texas Vermiculite Co	State Hwy 29	Burnet	TX	78611
6	Texas Vermiculite Co (WRG 1975)	2651 Manila Rd	Dallas	TX	75212
6	Texas Vermiculite Co (WRG)	354 Blue Star St	San Antonio	TX	78204
6	The Tri-Lite Corp	2624 Link Rd	Houston	TX	77009
6	Vermiculite Products, Inc	3025 Maxroy St	Houston	TX	77008
6	Volite Co	Box 122, N Hwy 16	Llano	TX	78643
6	Voluntary Purchasing Co.	Highway 82 West	Bonham	TX	75418

Region	Vermiculite Facilities (exfoliation)	Address	City	State	Zip Code
6	Zonolite Co/WR Grace	4729 River Rd	New Orleans	LA	70121
6	Zonolite Co/WR Grace	Dixie Rd	Little Rock	AR	72115
6	Zonolite Co/WR Grace/TX, OK Vermiculite	200 N Wisconsin Ave	Oklahoma City	OK	73117
7	Diversified Insulation/Shelter Shield/WRG	4814 Fiber Lane	Wellsville	KS	66092
7	Dodson Manufacturing Co	1463 Barwise St	Wichita	KS	67214
7	Eagle-Picher Lead Co Insulation Division	1220 NW Murphy Ave	Joplin	MO	64801
7	J.J. Brouk	1367 S Kingshighway Blvd	St Louis	MO	63110
7	Western Mineral Products Co/Douglas	3520 South I Street	Omaha	NE	68107
7	Zonolite Co/WR Grace	5100 Manchester Ave	St Louis	MO	63110
7	Zonolite Co/WR Grace	515 Madison St	Kansas City	MO	64105
8	Intermountain Insulation Co	733 West 800 South	Salt Lake City	UT	84101
8	Robinson Insulation Co	1771 19th Ave SW	Minot	ND	58701
8	Robinson Insulation Co	12th St N and River Dr	Great Falls	MT	59401
8	Vermiculite Intermountain	333 W 100 St	Salt Lake City	UT	84101
8	Western Mineral Products Co (WRG)	111 S Navajo St	Denver	CO	80223
9	Arabian American Oil	22 Battery Street	San Francisco	CA	24111
9	Ari-Zonolite/Buster's Street Rods	6960 52nd Ave	Glendale	AZ	
9	CA Zonolite/Divers Insul/WRG/Steeler Inc	6851 Smith Ave	Newark	CA	94560
9	California Zonolite Co/WR Grace	5440 San Fernando Rd	Los Angeles	CA	90039
9	California Zonolite Co/WR Grace	208 Jibboom St	Sacramento	CA	95814
9	La Habra Products, Inc	1631 W Lincoln Ave	Anaheim	CA	92805
9	Solomon's Mines/Diversified Insulation WRG	4200 W Glenrosa Ave	Phoenix	AZ	85019
9	Therm-o-Rock Ind	6732 W Willis Rd	Chandler	AZ	85226
9	U.S. Gypsum Co	100 1st St	Gerlach/Empire	NV	89405
9	Vermiculite of Hawaii Inc.	842A Mapunpuna St	Honolulu	HI	96819
9	WRG/Diversified Insul.	2502 S Garnsey St	Santa Ana	CA	92707
10	Supreme Perlite Co	4600 North Suttle Rd	Portland	OR	97217
10	Vermiculite - NW, Inc (WR Grace)	1318 Maple St	Spokane	WA	99201
10	Vermiculite NW, Inc (WR Grace)	2303 N Harding Ave	Portland	OR	97227

Attachment B – 166 Vermiculite Non-Exfoliation Sites

Region	Vermiculite Facilities (non-exfoliation)	Address	City	State	Zip Code
1	Advance Coating Company	Depot Road	Westminster	MA	01473
1	California (Stucco) Products Corp	169 Waverly Street, Cambridge, MA (plant in Hingham)	Hingham	MA	02043
2	Celotex Corp.	1 River Rd	Edgewater	NJ	07020
2	Distillation Products Industries	2255 Mt. Read Blvd., Bldg. 308	Rochester	NY	14615
2	FlintKote Co. (Currently Georgia Pacific Gypsum Corp.)	1101 South Front St.	Camden	NJ	08103
2	Garlok Sealing Technologies Inc.	1666 Division Street	Palmyra	NY	14522
2	Heemsoth-Kerner Corporation	595 River Road, c/o European Container Service	Edgewater	NJ	07020
2	Knowlton Specialty Paper Prod (also, F. Hyde & Co, and Filtration Sciences Corp.)	213 Factory St	Watertown	NY	13601
2	National Gypsum Company	325 Delaware Avenue	Buffalo	NY	14202
2	Paul Marsh Inc	654 Madison Ave	NY	NY	10021
2	Rapid Industrial Plastic	13 Linden Ave East	Jersey City	NJ	07305
2	U.S. Gypsum	561 Richmond Terrace	Staten Island	NY	10301
2	Venezuela Lines c/o Red Hook Marine Terminal	Foot of Hamilton Street	Brooklyn	NY	11231
2	Vermipeat, Ltd.	c/o Judson Sheldon Intl., Port of Newark	Newark	NJ	
2	W. R. Grace	Insular Hwy 845, Km 0.5 Cupey Bajo	Rio Piedras	PR	00926
2	Wards Natural Science Establishment Inc.	P.O. Box 1712	Rochester	NY	14692
3	Allied Chemical Dye (possibly Honeywell/Allied Signal/Celotex Corp)	3600 Grays Ferry Ave	Philadelphia	PA	19146
3	Bestwall/LaFarge Gypsum	Terminal Drive	Port of Wilmington	DE	19801
3	Celotex Corporation	State Route #92	Harding	PA	19146
3	Certaineed Corp.	All Power Rd	Conshohocken	PA	19428
3	Onduline-USA (aka NuLine Industries)	4900 Ondura Road	Fredericksburg	VA	22407
3	Harbison-Walker Refractories Co	600 Bigler Rd	Clearfield	PA	16830
3	Planttabbs Corp.	Aylesbury Road	Timonium	MD	21093
3	U.S. Steel/Duquesne Works	Route 837	Duquesne	PA	15110
3	U.S. Steel/Fairless Works	1 Fairless Works	Fairless Hills	PA	19030
3	Vermiculite Products Co	631 Equitable Bldg	Baltimore	MD	21202
3	Virginia Vermiculite Mine	14093 Louisa Rd	Louisa	VA	23093
3	W. R. Grace Baltimore	c/o U.S. Lines-American Argasy, Shed 31, Dundalk Dock Marine Terminal 2700 Broening Highway	Baltimore	MD	21224
3	W. R. Grace Const Prod Div	c/o SS McLean, Sea Girt Terminal 2600 Broening Highway	Baltimore	MD	21224
3	W. R. Grace Const Prod Div	c/o SS Atlantic Segs, Shed 8, Dundalk Marine Terminal 2700 Broening Highway	Baltimore	MD	21224
4	American Vermiculite Co.		Roan Mountain	TN	37687
4	Bestwall Gypsum/Georgia Pacific	1 Union St	Brunswick	GA	31520
4	Carolina Vermiculite Div, VA Vermiculite	255 River Farm Road	Woodruff	SC	29388

Region	Vermiculite Facilities (non-exfoliation)	Address	City	State	Zip Code
4	Carolina Wholesale Florist	3015 Beechtree Dr	Sanford	NC	27330
4	Jim Walter Research Group	10301 Ninth St N	St Petersburg	FL	33716
4	P.B. Lassiter, Babcock& Wilcox Co. Thermal Ceramics Old Savannah Company	2102 Old Savannah Rd	Augusta	GA	30906
4	Patterson Vermiculite Co	1302 Patterson Rd	Enoree	SC	29335
4	Raybestos Manhattan	O'Hear Ave and Grace St	N. Charleston	SC	29406
4	Robert Smith Co		Dyer	TN	38330
4	Robert Smith Company	925 North 28th St	Birmingham	AL	35203
4	Temple Gypsum		Memphis	TN	
4	US Steel Corp	5700 Valley Rd	Fairfield	AL	35604
4	US Steel Corp Ensley Blast Furnace		Ensley	AL	
5	3-M	1050 Hazel St, Bldg 410 Dock 91-105	St Paul	MN	55119
5	3-M, Chemolite,	Building 17P County Rd 19	Cottage Grove	MN	55133
5	Al-Par Peat Co	5900 Henderson Rd,	Elsie	MI	48831
5	American Can Co. Research Center	433 N. Northwest Hwy.	Barrington	IL	60010
5	Bestwall Gypsum	68 Baker Blvd	Akron	OH	44301
5	Bestwall Gypsum	619 College Ave	Grand Rapids	MI	49501
5	BIMAC	345 E. Main St	Milan	MI	48160
5	Carboline Co. Distribution Center	2162 Heller Road,	Alpha	OH	45301
5	Celotex Corp	795 S. Plasterbed Rd, PO Box 280 Old Rte 2 East	Port Clinton	OH	43452
5	Cleveland Builders Supply Co/ Cleveland Gypsum Co. Perlite Plant	1276 W 3rd St / 2146 West third St.	Cleveland	OH	44113
5	Dearborn Chem	300 Genesee St	Lake Zurich	IL	60047
5	Dr. Tim Johnson, Minnesota Mining & Mfg., Co.	Building 53-3 367 Grove Street	St Paul	MN	55101
5	Dynamic Air Inc.	(c/o Vern Huballa) 1125 Willow Lake Blvd	St Paul	MN	55110
5	Eli Lilly Co.	K 406 Bldg 333, 1355 S White Rd.	Indianapolis	IN	46226
5	Exomet/Examet	Hwy 585	Smithville	OH	
5	General Mills	1 General Mills Blvd	Minneapolis	MN	
5	GM Tech Center	E 12 Mile & Mound Rds	Warren	MI	48091
5	Gold Bond Bldg Prod/National Gypsum	U.S. Highway No 50	Shoals	IN	47581
5	Grand Rapids Gypsum	PO Box 1672 or 7440 Clyde Park Ave	Grand Rapids	MI	49501
5	H.B. Fuller Co	2727 Kinney Ave NW	Grand Rapids	MI	49544
5	Inland Steel Corp	2621 W 15th Place	Chicago	IL	60608
5	Kalo Inoculant Co	525 Kentucky St	Quincy	IL	62301
5	Loyd. A. Fry Roofing/Owens Corning	5824 Archer Road	Summit	IL	60501
5	Midwest Rubber	745 Norton Ave	Barberton	OH	44203
5	Nawrocki Insulation Inc.	unknown	Minneapolis	MN	
5	Net Ocean c/o Freight A-Ranger	5500 West 47th Street	Chicago	IL	60638
5	P&H, Inc.	unknown		MN	
5	Paxam Corp.	1320 SW Monarch	Peoria	IL	61602
5	Perfect Seal/Bemis Corp	unknown	Mankato	MN	
5	Steel Services	11426 S Perry St	Chicago	IL	60628
5	Swift & Co Agri Chem Division	150 Marble Street	Calumet City	IL	60409
5	Topex Co.	2516 W 3rd St	Cleveland	OH	44111

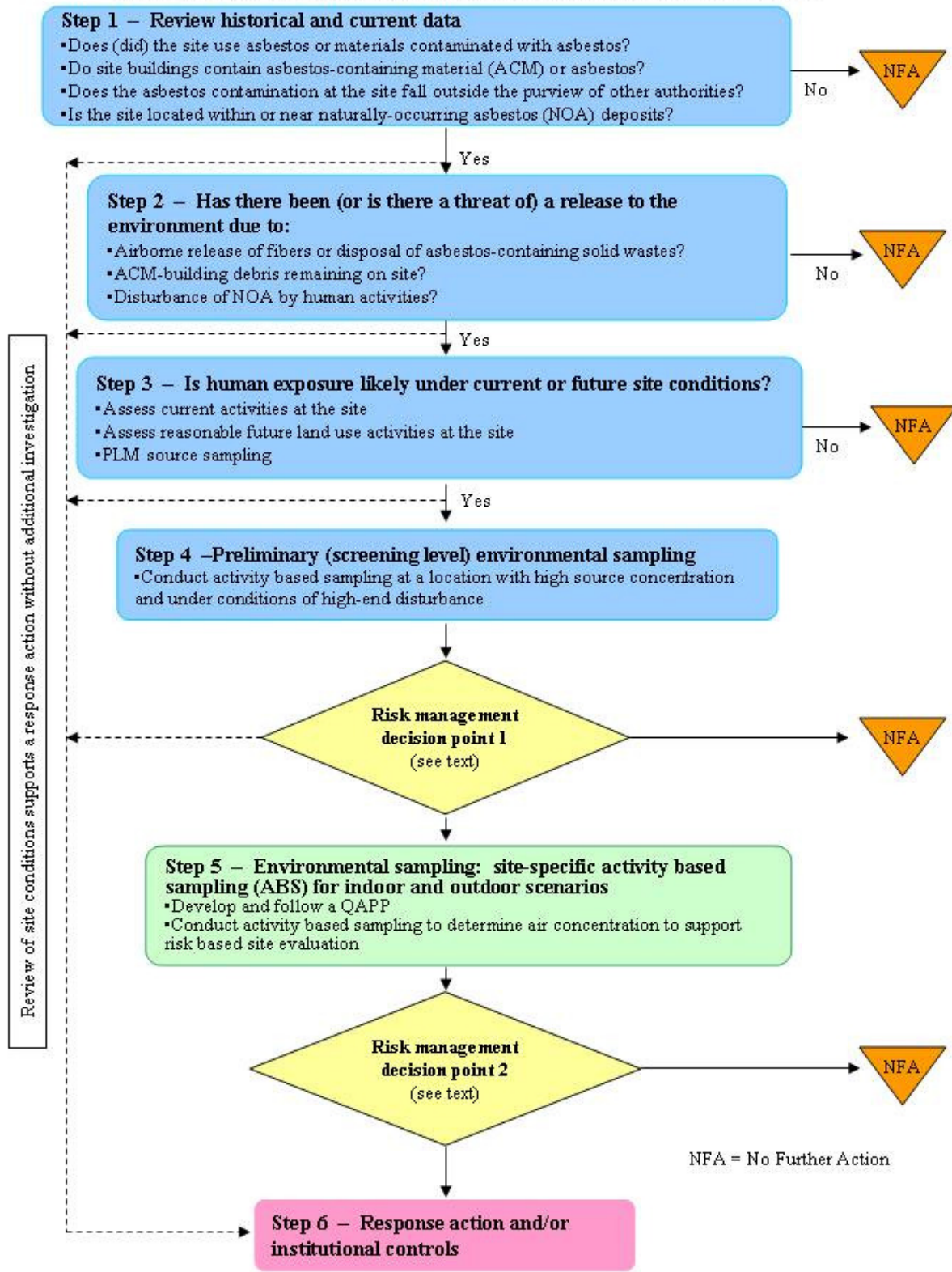
Region	Vermiculite Facilities (non-exfoliation)	Address	City	State	Zip Code
5	U. S. Gypsum Co	121 Lake St	Gypsum	OH	43433
5	U. S. Gypsum Co.	Willow Valley or State Road 650?	Shoals	IN	47581
5	U.S. Gypsum Co.	301 Riley Rd/ 3501 Canal St	East Chicago	IN	46312
5	U.S. Gypsum Company	2 Division St	River Rouge	MI	48218
5	U.S. Steel Corp.	1 N Broadway	Gary	IN	46402
5	U.S. Steel Corp. (South Works)	3426 E 89 St	Chicago	IL	60617
5	Van Packer/Flintkote Co (also as Voluntary Purchasing Co.)	1 Mill St	Buda	IL	61314
5	W.L. Spencer Mfg., Corp.	1693 N Water St	Milwaukee	WI	53202
5	Wormald International	111 Muskin Drive	Walkerton	IN	46574
5	Zonolite/WR Grace	4725 Olson Memorial Hwy	Golden Valley	MN	55422
6	Almasol Corp.	1628 Rogers Road	Fort Worth	TX	76107
6	American Gypsum	1000 N Hill Rd	Bernalillo	NM	87004
6	American Gypsum Co/Centex	7715 Tiburon St	Albuquerque	NM	87103
6	American Perlite Co.	128 Railroad Ave	Gilliam	LA	71029
6	Bestwall Gypsum	7800 Almonaster Rd	New Orleans	LA	70126
6	C. Gartenmann & Co. c/o GF Tujague, Inc.(M G Maher)	365 Canal St	New Orleans	LA	70112
6	Celotex Corp./Three Rivers/Southwest Gypsum	5 miles SW of Hamlin	Hamlin	TX	79520
6	CMI Texas, Inc.	2600 E. San Jose St.	Laredo	TX	78043
6	Cron Chemical	6015 Murphy Ave	Houston	TX	77033
6	Diercks Forests Inc. (Weyerhaeuser)	794 Hwy 369 N	Nashville	AR	71852
6	European Vermiculite Corp. c/o Southern Stevedoring Company	7325 S Harbor Dr	Houston	TX	77011
6	Flintkote Company Eskota	FM 1856 at 120 on Eskota	Sweetwater	TX	79556
6	Georgia Pacific Corp/Bestwall Gypsum	Hwy 287	Quanah	TX	79252
6	Material Aislantes	SA Marcella at Corpus Christi Rd	Laredo	TX	78040
6	National Gypsum Co	832 County Rd 311	Rotan	TX	79546
6	Republic Gypsum Company	Hwy 62 Box Drive C	Duke	OK	73532
6	Republic Gypsum/Housing/ Kaiser Co.	Interstate-25	Rosario	NM	
6	Southwest Vermiculite Co	1212 13 St	Lubbock	TX	79401
6	Temple Gypsum Company (c/o Customer Siding)	1000 North 7th St	West Memphis	AR	72301
6	Texas Gypsum	unknown	El Paso	TX	
6	Texas Gypsum Company	104 County Line Rd	Irving	TX	75061
6	U.S. Gypsum	225 Regal Row	Dallas	TX	75247
6	U.S. Gypsum Co	1 USG Rd. E. Hwy 80	Sweetwater	TX	79556
6	U.S. Gypsum Company	Hwy 51a	Southard	OK	73770
6	U.S. Gypsum Company	1201 Mayo Shell Road	Galena Park	TX	77547
6	Universal Maritime Service/Sealand Terminal	919 E Barbours Cut Blvd	Laporte	TX	77571
6	WR Grace	225 Elmira	San Antonio	TX	78212
7	Celotex Corp.	2109 Quail Ave	Fort Dodge	IA	50501
7	E.M. Peat Mfg., Co.	33 S 25th Street	Council Bluffs	IA	51501
7	Georgia Pacific/Best Wall Gypsum Div	PO Box 187	Blue Rapids	KS	66411
7	Georgia Pacific/Bestwall	2374 Mill Rd	Fort Dodge	IA	50501
7	M.A. Bell	217 Lombard St	St Louis	MO	63102
7	Mallinckrodt Chemical Co.	123 Destrehan St	St Louis	MO	63107
7	National Gypsum	2829 180th St	Fort Dodge	IA	50501

Region	Vermiculite Facilities (non-exfoliation)	Address	City	State	Zip Code
7	U.S. Gypsum Co, Sperry	13425 210th St	Sperry	IA	52650
8	Basin Electric Corp.	3901 Highway 200 A	Stanton	ND	58571
8	Big Horn Gypsum Co/Celotex	P.O. Box 590; 88 Road 2AB	Cody	WY	82414
8	Colorado Kansas Seed Co.	401 E. Beech St.,	Lamar	CO	81052
8	Flintkote/Fireboard Paper/Johns-Manville	Hwy 120 at Adobe Siding	Florence	CO	81226
8	Georgia Pacific/Bestwall	200 South State St	Sigurd	UT	84657
8	Georgia Pacific/Bestwall Gypsum Div	2120 Lane 16 1/2	Lovell/Himes	WY	82431
8	Herbert Palmer	Route 3	Thermopolis	WY	82443
8	Insuplast, Inc	1st & Water Street	Canon City	CO	81212
8	International Vermiculite Co.	2401 East 40th Ave	Denver	CO	80205
8	Minnkota Power	Milton Young Power Station, 5 miles east and 3 miles south of Center, ND	Center	ND	58530
8	Moats' Residence	1308 Second Ave. NW	Great Falls	MT	59404
8	U.S. Gypsum Co	81 N. State	Sigurd	UT	84657
8	U.S. Gypsum Company	Heath Star Route	Lewistown	MT	59457
9	Adams & Co.	Spur 9177	Chino	CA	91710
9	Al-Lube Division of Far Best Corp.	928 Allen Ave	Glendale	CA	91201
9	Argo Seed Company	761 Sanburn Rd S	Salinas	CA	93905
9	Big Horn Gypsum Co.		San Mateo	CA	94401
9	Domtar/Kaiser Gypsum America Inc.	1401 Water St	Long Beach	CA	90802
9	Domtar/Kaiser Gypsum Inc.	Willow Ave	Antioch	CA	94509
9	Flintkote Co, Gypsum Prod Div		Arden	NV	
9	Flintkote Co/Blue Diamond		Niles	CA	
9	Foseco	17 St & Rochester	Cucamonga	CA	91730
9	GE		San Bernardino	CA	
9	Germian's Seed Company	4820 East 50th Street	Los Angeles	CA	90058
9	H.B. Fuller Co.	57 S Linden Ave	San Francisco	CA	94102
9	James Hardie Gypsum	26300 La Alameda	Mission Viejo	CA	92691
9	MV Inc., c/o Santa Fe		Richmond	CA	
9	National Gypsum/Gold Bond Bldg Prod	1850 W 8th St	Long Beach	CA	90813
9	National Gypsum/Gold Bond Bldg Prod	1040 Canal Blvd	Richmond	CA	94800
9	Pabco Gypsum/Johns-Manville/Fiberboard c/o Their Siding	1973 N Nellis Blvd	Las Vegas	NV	
9	Pabco/CA Gypsum Co./Fireboard Paper	37851 Cherry St	Newark	CA	94560
9	Pryor Giggey Co.	12393 Slavsén Ave	Whittier	CA	90606
9	Pryor Giggey Co.	10000 Santa Fe Springs Road	Santa Fe	CA	
9	Riley Ruminant Nutrient		Tucson	AZ	
9	Southwest Grease Company	19530 South Alameda	Compton	CA	90221
9	Three V Nursery c/o Santa Fe Railroad		Richmond	CA	
9	U.S. Gypsum Co.		Plaster City	CA	92269
9	U.S. Gypsum Company	9306 Sorensen Ave	Santa Fe Springs	CA	90670
10	Domtar Gypsum Company	1240 Alexander Ave	Tacoma	WA	98421
10	Fibrous Glass Products, Inc.	3808 N Sullivan Rd	Spokane	WA	99216
10	Kaiser Gypsum	5931 East Margnau Way S	Seattle	WA	98134
10	Uni-West	5 South Spokane St	Seattle	WA	98134
10	Vermiculite-Norwest Inc.	P.O. Box A	Auburn	WA	98001

Region	Vermiculite Facilities (non-exfoliation)	Address	City	State	Zip Code
10	Western Industrial Supply	16300 SW 72nd Ave	Portland	OR	97223
10	WR Grace c/o Karl Schroff & Assoc		Seattle	WA	
10	X-Cell	5436 South Washington	Tacoma	WA	98409

Attachment C

Recommended Asbestos Site Assessment Framework



Attachment D – DRAFT - Regional Vermiculite Site Report Form -DRAFT

Site Name: _____

Site Location (City/State): _____

Lat/Long Coordinates: _____

Site Description (brief overview of known past and current activities at the site):

<include summaries and data from previous investigations>

Application of the Decision-Support Framework (indicate completion of steps and provide summary findings if applicable):

- Step 1 (Data Review) - <insert comments on site history that suggests need for evaluation of asbestos, the type of asbestos is associated with site, under what authority is the site being addressed.>
- Step 2 (Release Determination) - <insert comments related to documenting the uncontrolled release (or potential for uncontrolled release) of asbestos due to human activities. Additional documentation is necessary for ACM in buildings and naturally occurring asbestos (see framework for details).
- Step 3 (Exposure Determination) - <insert comments related to CSM, current and anticipated future land use, and human pathway assessment.>
- Step 4 (Preliminary Screening) - <insert comments related to documenting the evaluation (locations, disturbance activity and air concentration) of human exposure levels and how these relate the level of concern for the site. >
- Step 5 (Environmental Sampling) - <insert comments related to CSM and ABS activities used to assess exposure. This includes a complete SAP and QAPP for the ABS events. The site specific risk management criterion should also be documented.>
- Step 6 (Response Action) - <insert comments related to authority under which the response action was taken, the type of response (including any institutional controls).>

Further Action: Yes No

Plans for Further Action: