

Review of Air Monitoring Data at Asbestos-In-Soil Sites

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HALEY
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Agenda

- 1 Why this study? Challenges of asbestos in soil
- 2 The data management process
- 3 Results summary
- 4 Next Steps

The many challenges of managing asbestos in soil

- Lack of clear and consistent guidance: Requirements and expectations have varied over time, between BWSC and BAW, and between regions
- Incredibly common in historical building materials, but when to consider asbestos a potential site contaminant of concern?
- Potential for significant unexpected cost and project delay
- Non-Traditional Work Plan requires separate asbestos designer licensure and extended timeline for BAW approval, yet lots of redundancy with RAM Plan and BWSC
- Limited (and costly) soil disposal options, far outside of MA
- Substantial onsite soil management requirements: Dust control, perimeter monitoring, worker PPE. Does the data indicate this level of concern is warranted?
- Little opportunity for risk-based site closure
- Public perception of high risk (workers in respirators and Tyvek suits, fence postings, asbestos warning tape, etc.)



Challenges of asbestos in soil – worker safety



- Tyvek suits and respirators can be hazardous in warm weather
- Work inside tents can exacerbate hazardous conditions (City of Cambridge asbestos ordinance)
 - 105 degrees in April!
- PPE enforcement challenges
 - Are workers being exposed?

LSPA Professional Practice Grant- Why?

Do airborne asbestos data indicate that the soil management policies, which are strict, costly, and unsustainable, are warranted?

Or do the data suggest policy changes may be appropriate?

Where is the data from?



- 14 disposal sites in NERO
– 13,480 samples
- Perimeter and personal air monitoring data
- Collected by 6 different asbestos monitors
- Samples collected over a span of nine years: October 2014-December 2023

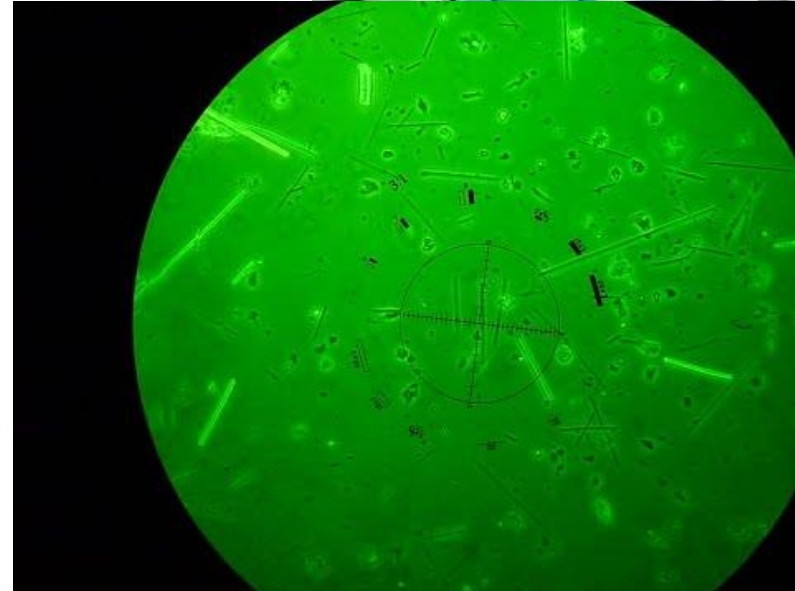
Site variety



- Site size: exclusion zone area varied from approx. 0.5 acre to 7.4 acres
- Variety of conceptual site models and sources of asbestos (fibers vs. debris)
- Types of asbestos: chrysotile (primarily), amosite, tremolite
- Asbestos concentrations in soil (where sampled): ND to 21.96%
 - 6 of 14 sites tested soil
 - 8 of 14 sites with ACM debris (no soil testing)

How is airborne asbestos collected and analyzed?

- Air sampling device (perimeter or personal badge) with a mechanical pump
- Collects a measured volume of air through a filter
- Examine the filter using Phase Contrast Microscopy (PCM) by NIOSH 7400 method
 - This method reports total fibers (not asbestos specific)
 - Count the number of fibers present per cubic centimeter of air
- Perimeter data is typically analyzed onsite 2x per day
- Compared to action levels
 - Personal: OSHA PEL = 0.1 fibers/cc
 - Perimeter: MA DLS clean air criteria = 0.01 fibers/cc



Labor intensive data entry

- Varying data report format
 - Laboratory data reports: EDDs, PDFs, scans
 - Word documents
 - PDFs
 - Photos of handwritten logs
 - Results embedded in emails
- Manual entry of 13,840 data points by H&A Staff into Excel
 - Manual QA/QC of Excel data
 - 300 labor hours!
- Data loaded from Excel into Equis database; queries in Equis

Client Name and Address: _____

Office Use Only	Sample No.	Time Pump On	Time Pump Off	Sample Time (minutes)	Flow Rate (liters)	Flow Rate (liters)	Volume (liters)	Total Fibers / Fields	Net Fibers / Fields	Fibers/cc
	001									
	002									
	03	8:02AM	11:05AM	183	6.7	6.7	1226.1	18		0.003
	04	8:04AM	11:07AM	183	6.7	6.7	1226.1	18		0.003
	05	8:07AM	11:10AM	183	6.7	6.7	1226.1	18		0.003
	06	8:07AM	11:10AM	183	6.7	6.7	1226.1	18		0.003
	07	11:07AM	2:07PM	182	6.7	6.7	1219.4	15		0.003

Sampling/Analytical Method: NIOSH 7400 TEM (AHERA) Rotometer #: _____

Sample Description: SAMPLE TYPE: Background Area Aggressive Clearance Post-abatement Area Field Blank

[Please complete each item] SAMPLE LOCATION

ACTIVITY: During Prep During Gross Removal During Glovebag Removal After Removal
 During Fine Cleaning During Dismantling

25 mm Cassette Type: 0.8µm 0.45µm Cassette Mfr.: _____ Microscope Make/No.: Olympus CR1

Net Fiber Count (NFC) = TPC - BFC Fibers/cc = [NFC/(fibers/fields) × 385] + [1000 × L × 0.00785]

Analyst: _____ Date: _____ AAR Certification #: 9.00

Relinquished by: _____ Date: _____ Received by: _____ Date: _____

Office Use Only (initials): Cates Checked _____ Proofed _____ Blank Corrected Y N

Client Name and Address: _____ Project Site: _____ Project Number: _____

Date: _____ Shift: _____ State Certification #: _____

Office Use Only	Sample No.	Time Pump On	Time Pump Off	Sample Time (minutes)	Flow on	Flow off	Volume (liters)	Total Fibers / Fields	Net Fibers / Fields	Fibers/cc
	001									
	002									
	01	10:17AM	11:57AM	115	4.5	4.5	517.5	100		0.003
	02	10:27AM	11:57AM	175	4.5	4.5	787.5	100		0.003
	03	10:47AM	12:07PM	175	4.5	4.5	787.5	1100		0.004
	04	10:57AM	12:37PM	175	10.0	10.0	1750	1100		0.003
	05	11:07AM	12:07PM	159	4.5	4.5	715.5	1100		0.003

Sampling/Analytical Method: NIOSH 7400 TEM (AHERA) Rotometer #: _____

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Data statistics: perimeter samples



- 11,022 samples from 13 sites
 - 515 days of sampling
- ND to 0.035 fibers/cc
 - Compare to action level:
MA DLS clean air criteria = 0.01 fibers/cc
 - 95th Percentile for all perimeter monitoring:
0.0050 fibers/cc
 - Only 6 exceedances out of 11,022 samples
 - Total fibers using PCM
 - Additional TEM analysis performed;
all concluded the fibers to be non-asbestos

Data statistics: personal samples



- Sampling pumps worn by abatement workers inside exclusion zone, in close proximity to soil disturbing work
- 2,818 samples from 3 sites
 - 381 days of sampling
 - 2 non-tented sites: 1,267 samples
 - 1 tented site (Cambridge Asbestos Ordinance): 1,551 samples
- Results: ND to 0.24 fibers/cc
 - Compare to action level: OSHA PEL = 0.1 fibers/cc
 - 95th Percentile for all personal monitoring: 0.075 fibers/cc
 - Only 1 exceedance out of 2,818 samples
 - Total fibers using PCM
 - Follow-up TEM analysis was not available/ conducted (worker wearing PPE incl. respirator)

What do the data show?

- Typical dust control measures are working
- No offsite receptor exposure
- Very little (to no?) onsite worker exposure; possibly even without PPE

Which leads to these questions:

- Considering abundant evidence of no offsite receptor exposure, could flexibility on perimeter monitoring data be appropriate?
- Considering abundant evidence of limited/ no airborne asbestos even within exclusion zone, could Tyvek suits be eliminated?
- Are there other options for management of soil with low levels of asbestos consistent with common urban fill (i.e., daily cover at state landfills?)



Asbestos in soil is different than asbestos inside buildings

- Natural moisture content of soil and adhesion to soil
- Outdoor air dilution factor
- Typically lower concentration of asbestos in the materials being disturbed



Next steps

- White paper to be reviewed and edited by LSPA before submission to MassDEP
- Last call: seeking activity-based sampling (ABS) data!
 - Evaluation of exposure *without* dust control
- Asbestos in soil background study?
 - Building materials are common debris in urban fill
 - Asbestos is a naturally occurring mineral in New England
 - Potential for airborne deposition of asbestos near transportation corridors (brake pads)



Other comments

- TEM (Transmission Electron Microscope) analysis of personal data would be helpful
 - To confirm whether total airborne fibers are asbestos
- Standardized collection and data tabulation practices would be helpful
 - Recommend data be submitted daily to DEP Bureau of Air and Waste via electronic form



LSPA Asbestos in Soil Workgroup

- In response to request from membership
- Planning to begin meetings in early 2025. Look out for LSPA email for dates/ invitation.
- Proposing to develop Q&A/ best practices for work at asbestos in soil sites
- Interested? Reach out to be added to the workgroup
 - Lars Andresen (Tighe & Bond), Chair, landresen@tighebond.com
 - Paul McKinlay (Weston & Sampson), mckinlayp@wseinc.com
 - Kate Dilawari (Haley & Aldrich), kdilawari@haleyaldrich.com



Thank you!



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