Asbestos Workshop

Focus on Response Action

TEST RESULTS
Below are key findings of a soon-to-be-released U.S. Environmental Protection Agency report about what got into North Toledo's air when the Stickney Recycling landfill's fire was at its worst from May 2 to May 4:

- Particulate matter (the federal Occupational Safety and Health Administration threshold is 5.00 mg per meter): 5.63 mg per meter in the Toledo Assembly Complex parking lot at 1:50 a.m. on May 4. On the site of the landfill, it got as high as 48.00 (nearly 10 times higher than the OSHA threshold) on May 3. Particulate levels were within OSHA limits at other off-site locations.

- Asbestos (the OSHA threshold is 0.1 fibers per cubic centimeter): The highest reading was 0.003 per cubic centimeter on May 2. Two areas downwind from the fire were examined, both east of the site and in the vicinity of Stickney Avenue, between Chrysler Drive and I-75. Follow-up testing showed the fibers that were detected were not asbestos. Samples were drawn for more than four hours at one site and more than seven hours at another.

- Heavy metals: No detection.

Volatile organic compounds: Trace amounts of acetone, benzene, propene, styrene, and chloromethane. None beyond OSHA standards.

- Total sampling sites: Nine off-site, four on-site.

SOURCE: Betsey Nightingale, U.S. Environmental Protection Agency

THE BLADE
Three primary EPA statutes address asbestos

- **Clean Air Act (CAA)**
  - Asbestos NESHAP (1970s - demolition and renovation)
    - administrative, civil and criminal authority
- **Toxic Substances Control Act (TSCA)**
  - AHERA (1986 - abatement of asbestos in schools)
  - EPA Worker Protection Rule
- **CERCLA/Superfund (1980)**
  - hazardous substance, pollutant or contaminant
  - extremely broad - not limited to fiber type
- **OSHA** is primarily responsible for worker health and safety
  - 0.1 f/cc (down from 5 f/cc in 1970s) as 8 hour TWA (note that this standard has a risk of 3,400 in 1,000,000)
  - 1 f/cc as 30-minute STEL


- Referred to as “CERCLA” or “Superfund”
- Provides for EPA authority to cleanup uncontrolled hazardous waste sites
- Failure to comply with NESHAP or improper handling, storage, or disposal of asbestos may result in NPL listing
- Activities could be in either the Removal or Remedial Programs
Region 4 has been dealing with a variety of “botched NESHAPs” projects.

These are sites where asbestos wasn’t removed (or wasn’t removed properly) prior to demolition activities or buildings were abandoned leaving asbestos in bad conditions.

The presence of asbestos at these sites greatly complicates cleanup efforts.

Asbestos: Common Removal Scenarios

- Scenario 1. Collapsed/damaged building with ACM
- Scenario 2. Intact building in the way
- Scenario 3. Burial of ACM/asbestos
- Scenario 4. Naturally occurring asbestos (NOA)
Scenario 1: Collapsed/Damaged Building with ACM

- Typical Causes:
  - Fire
  - Structurally unsound
  - Demolition started/completed without following NESHAP procedures
Scenario 1: Collapsed/Damaged Building with ACM

- NESHAP provision for damaged building: "Condemned per government order"
- Some NESHAP provisions do not need to be followed.
- ACM does not need to be removed from building/debris because of safety concerns.
- Handle and dispose of demolition debris as ACM:
  - Bulk removal (i.e., equipment)
  - Wet methods
  - Transport waste in plastic-lined trucks/containers (i.e., a "burrito wrap")
  - Air monitoring
Cass Avenue Site

- Fire in July 2017 at vacant historic building known as Clemens Mansion
- Two-story building built in 1859, including 40,000 square feet of living space
- Cause of fire unknown

Cass Avenue Site

- Fire-related debris scattered throughout residential neighborhood to the north, reaching over ¾ mile away
- Middle school 300 feet east of the Clemens Mansion
- Concerns by residents regarding potential for asbestos-containing debris
Asbestos Workshop

Cass Avenue Site

- Four samples collected by START for analysis via PLM
- All samples contained asbestos (chrysotile) at up to 20%

Asbestos Workshop

Cass Avenue Site

- Property owner hired contractor to remove asbestos-containing material (ACM)
- Wetted material to limit presence of airborne asbestos during removal
Cass Avenue Site

- Structural material removed by hand from properties within identified smoke plume area
- Vacuums with HEPA filters used to recover small debris

Cass Avenue Site

- Recovered ACM placed in plastic bags
- Disposed of at Republic Services landfill in Roxanna, IL
Cass Avenue Site

- Air sampling conducted by START at 12 locations
- High-traffic areas: near gardens, along sidewalks, play areas
- Equipment used: marine batteries, sampling pumps, fence posts or tripods, tubing with MCE filter cassettes
Cass Avenue Site

- Sampling pumps calibrated at 4-6 liters per minute
- Operated for 7-10 hours per sample
- Each sample comprised 1,000-3,000 liters of air
- TEM analysis for asbestos performed on 108 samples
- No asbestos detected

Cass Avenue Site

- Activity-based sampling performed following the cleanup
- Mowing, gardening, sweeping, walking
- Air sampling at four nearby locations
- No asbestos detected
Scenario 2: Intact Building in the Way

- Contaminated soil needs to be excavated as part of the removal action, but a building/structure is in the way
- Examples:
  - Dry cleaning building, wood treatment facility, mine/mill structure
- Follow regular NESHAP process if possible
  - Survey for ACM (AHERA-Certified Building Inspector)
  - If present, use an asbestos abatement contractor to remove the ACM prior to demolition.

Scenario 3: Burial of ACM/Asbestos

- Similar scenarios: soil contaminated with asbestos
- Does the asbestos-contaminated soil needs to be removed?
  - If so, follow bulk removal methods:
    - Keep contaminated material wet
    - Use bulk removal techniques (equipment, burrito wraps)
    - Air monitoring
- Control methods:
  - Capping/fencing/warning signs
- Similar best practices during construction/disturbance of contaminated soil:
  - Keep material wet, air monitoring, etc.

Scenario 4: Naturally Occurring Asbestos (NOA)
Asbestos Workshop


North Ridge Estates Site

22 families lived in the footprint of a former marine recuperation barracks. Most of the residents left the site in June of 2006 following a settlement with the developer.
North Ridge Estates Site

“Air Cell” Insulation

- Pre-formed, cardboard-like insulation.
- Lower heat applications (hot water pipes, radiators).
- Banned in 1975 for manufacturing.
- Some relatively intact pieces found on-site.

Intact Air Cell
North Ridge Estates Site

Asbestos Workshop

Piece of Damaged Corrugated-type Pipe Insulation Found on Residential Parcel
North Ridge Estates

Asbestos Workshop

“Mag Block”
Magnesium Calcium Silicate Insulation

- Typically pre-formed.
- Used for high temperature applications (boilers, piping).
- Banned in 1975 for manufacturing.
- On-site – heavily weathered.
ACM pipe insulation on ground...

North Ridge Estates Site

...Next to swing set
Asbestos Workshop

North Ridge Estates Site

NRE is a residential development. We wanted to know if children playing outdoors had unsafe exposures to asbestos fibers from ACM in soil.

Asbestos Workshop

North Ridge Estates Sites

Activity-Based Sampling/Child Playing
North Ridge Estates Site

➢ Activity-Based Sampling/Weed-Whacking: NRE residents specifically asked if it was safe to trim weeds in the forest fire-prone area.

➢ Rototilling
North Ridge Estates Site

Ambient air monitoring

North Ridge Estates

One of Two Current Repositories at North Ridge Estates
North Ridge Estates Site

Asbestos Workshop

Asbestos Workshop
Asbestos- SOP 2084

- OSWER Directive 9345.4
- Goal-assess asbestos exposure from contaminated soils via modeling/monitoring
- Models inconclusive
- Monitoring preferred
- Activity-Based Sampling (ABS)
- Exposure varies by activities performed AND
- Site-specific soil type

Four Major Phases

- Background investigation,
- Soil sampling/characterization,
- Activity Based Sampling (ABS)
- Risk Assessment
Personal Monitoring - Asbestos

- Collection of personal air samples over exposure period of interest
- Samplers serve as surrogates for population at risk
- Similar to industrial hygiene-style workplace exposure monitoring used for evaluating lead and pesticides

Background – Cleanup versus Risk-Based –

- 1% in soil historically used as clean-up level – NOT risk-based
- August 2004 Cook memo rescinded 1%
  - Regions should develop risk-based, site-specific action levels based on air concentrations
  - “an accurate exposure value could only be determined through site sampling techniques that generate [airborne] fibers from soil”
Why Doesn’t 1% Work?

- Asbestos NOT uniformly distributed in soil
  - 2 aliquots of same soil sample can yield vastly different asbestos concentrations (ND to > 1%)
- Risk assessment CANNOT predict inhalation exposure & risk from soil concentration using 1% because
  - soils w/ asbestos levels below 1% can create high risk inhalation exposures when disturbed
  - “1 percent threshold for asbestos in soil/debris . . . may not be protective of human health in all instances”

Outline of the DRAFT Framework

Step 1 – Review historical and current data

Step 2 – Has there been (or is there a threat of) a release?

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

Step 4 – Preliminary (screening level) environmental sampling
  Conduct activity based sampling at a location with high source level and under conditions of high-end disturbance.

Step 5 – Environmental sampling: site-specific ABS for indoor and outdoor scenarios
  Following a QAPP, conduct activity based sampling to determine air concentration to support risk based site evaluation.

Risk Management Decision Point 1

Risk Management Decision Point 2

Step 6 – Implement response action and/or institutional controls

*NFA = No Further Action.
Step 1 – Review historical and current data
Does (did) the site use asbestos or materials contaminated with asbestos?
Do site buildings contain asbestos-containing material (ACM) or asbestos?
Does the asbestos contamination at the site fall outside the purview of other authorities?
Is the site located within or near naturally-occurring asbestos (NOA) deposits?

- Historic documents from facility operations
- Products that facility produced
- Visual inspection of facility
- Review of previous environmental sampling that may have occurred
- Interview current people who work on the site or live nearby

Step 2 – Has there been (or is there a threat of) a release?
Airborne release of fibers or disposal of asbestos-containing solid wastes
ACM-building debris remains on site
Disturbance of NOA by human activities (e.g., construction)

- Commercial operations that transported or received products that contained asbestos
- Asbestos-containing building materials in poor condition
- Disturbance of soil that contains naturally occurring asbestos
- Potential for release into environment and/or deposition in indoor environments
Step 3 – Is human exposure likely under current or future site conditions? Are human exposure pathways currently present and complete?

- Begin with current receptors that may come in contact with contaminated materials
  - Workers, trespassers, recreational activities, nearby residential buildings
- Estimate potential future uses of the property
- Generally, a pathway would be considered to be complete unless there is no activity possible at the site or if the contaminated media is unavailable for contact (e.g., under pavement)

Step 4 – Preliminary (screening level) environmental sampling

- Collect environmental data using a generic activity-based sampling method
  - Raking or a site-specific activity is preferred method for outdoor
  - Air sampling with fans is preferred method for indoor
- May also collect soil samples for determination of % asbestos to better characterize nature and extent of contamination
Outcome 1 - No asbestos detected in screening samples or asbestos concentrations below risk-based level of concern
- May lead to no further evaluation
Outcome 2 - Asbestos detected above risk-based level of concern
- May lead to further investigation or response action

Step 5 – Environmental sampling: site-specific activity based sampling (ABS) for indoor and outdoor scenarios
Following a QAPP, conduct activity based sampling to determine air concentration to support risk based site evaluation

- Collect more site-specific data to determine appropriate response
  - Use of actual site-specific scenarios that are expected to occur on the site (RME)
  - Samples collected over a larger area and/or frequency of sampling increases to obtain a better estimate of site-wide exposures
- Outcome 1 – Estimates of exposure **below** risk-based level of concern
  - No further evaluation recommended
- Outcome 2 – Estimates of exposure are **above** risk-based level of concern
  - Remedial action recommended
- Outcome 3 – Estimates of exposure do not provide adequate level of comfort
  - Additional evaluation may be needed

**Step 6 – Implement response action and/or institutional controls**

- Variety of options are available
  - Remove soil or contaminated material
  - Install a permanent cap over the contaminated areas
  - Place institutional controls on the property that restrict use (and therefore exposure) to the contaminated areas
  - Combination of above
Key Recommendations:
The Framework

- Is risk-based investigation of exposure
- Is applicable to removal and remedial sites
- Addresses outdoor and indoor exposures
- Uses the latest sampling analytical methodologies
- Allows users to take response action at any point in the process

Activity-Based Air Sampling - Asbestos

- Generic activity-based sampling scenario
  - Raking
  - Weed whacking/cutting
Activity-Based Air Sampling - Asbestos

➢ Site-Specific Activity-Based sampling scenario
  • ATV riding

Activity-Based Air Sampling - Asbestos

➢ Site-Specific Activity-Based sampling scenario
  • Child playing in dirt
Activity-Based Air Sampling - Asbestos

➢ Site-Specific Activity-Based sampling scenario
  • Agricultural
  • Landscaping

Activity-Based Air Sampling - Asbestos

➢ Site-Specific Activity-Based sampling scenario
  • Walking with stroller
Activity-Based Air Sampling - Asbestos

- Site-Specific Activity-Based sampling scenario
  - Jogging
  - Bicycling
  - Basketball
  - Hiking