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Bulk Material Sample Collection

Collection of bulk material samples is conducted by Building Inspectors/Investigators licensed on the federal, state and local levels. Prior to sample collection, the inspector examines all available prior asbestos surveys, blueprints, drawings, construction records and all other information provided by the Owner and his representatives to facilitate the identification of ACM. A visual inspection of the designated areas is conducted to determine the location, amount and condition of suspected ACM. The inspection includes an investigation of the location and type of HVAC system, and the proximity of the HVAC system to suspected ACM to determine the potential for dissemination of airborne fibers throughout the HVAC system. The inspector performs the following during the inspection:

1. Identify all homogenous areas of friable suspected ACM.
2. Touch all suspected ACM to determine whether they are friable.
3. Assess and document the current condition and potential of suspected ACM.
4. Quantify and document (in linear/square feet) amounts of suspected ACM

During the inspection, the representative bulk material samples are collected by the inspector in accordance with the following procedures:

Surfacing Material - Samples are be collected in a statistically random manner that is representative of the homogenous area as follows:

1. At least three bulk samples shall be collected from each homogenous area that is 1000 square feet or less, unless otherwise directed.
2. At least five bulk samples are collected from each homogenous area that is greater than 1000 square feet, but less than 5000 square feet, unless otherwise directed.
3. At least seven bulk samples are be collected from each homogenous area that is greater than 5000 square feet, unless otherwise directed.

Thermal System Insulation - At least three samples are collected in a randomly distributed manner from each homogenous area of thermal insulation that is not assumed to be ACM.

1. In addition at least one bulk sample is collected from each homogenous area of patched thermal insulation that is not assumed to be ACM.

Miscellaneous Material - In a manner sufficient to determine whether the material is ACM or not ACM, bulk samples are collected from each homogenous area of miscellaneous material that is not assumed to be ACM.

Bulk samples will be collected in accordance with the following protocols and in strict with all other applicable regulations and guidelines on the federal, state and local levels:

ALL BULK SAMPLES OF SUSPECTED ASBESTOS-CONTAINING MATERIALS MUST BE COLLECTED IN A MANNER THAT PREVENTS OR MINIMIZES THE GENERATION OF AIRBORNE PARTICULATE MATTER. PERSONAL PROTECTIVE EQUIPMENT SHALL BE USED IN ACCORDANCE WITH TEG'S SAFETY POLICY. EVERY EFFORT SHALL BE MADE TO ENSURE THAT SAMPLING LOCATION IS LEFT IN PRE-SAMPLING CONDITION.

1) Bulk Sampling Equipment Inventory:
   - 6-mil Sample Bags
   - Sample Labels
   - Core Samplers
   - Stanley Knife
   - Scalpel and Blades
   - Chisel (for Floor Tile Samples)
   - Amended Water (in Sprayer Bottle)
   - Wet-wipes
   - Asbestos-contaminated Waste Container (i.e. 6-mil zip lock bags)

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- 6-mil Plastic Drop Cloth
- Duct Tape
- Silicone Sealant
- Marker Pens
- Flashlight
- Warning Signs
- HEPA Vacuum
- Personal Protective Equipment:
  a. Full body single use coveralls with hood and foot covers.
  b. Rubber gloves
  c. ½-face air purifying respirator with HEPA filters
  d. Hard hat
- 6-mil ACM Disposal Bags for Contaminated Coveralls/Gloves, etc.
- Spray Paint (Orange)
- Appropriate Sample Logs and Chain of Custody Forms

2) Preparation of Sampling Area:
   - If possible, the proposed sampling area is isolated from unauthorized/unprotected persons.
   - Carpeting and other horizontal surfaces are covered with a dropcloth to protect against contamination.

3) Sample Collection:
   - NOTE: Sampling locations selected should be representative of the suspect material and randomly distributed throughout the suspect material.
   - NOTE: Pieces of material or debris that have fallen or been dislodged from the main body of suspect material are not to be considered representative samples.
   - Prior to any material disturbance, the proposed sample location is treated with amended water and allowed sufficient time for saturation of the amended water into the substrate of the suspect material.
   - A pre-cleaned core sampler is be used to obtain a representative sample of the suspect material (through to the substrate) and the sample is deposited in an appropriately labeled sample bag.
   - Surfaces damaged by sample collection are repaired using patching compound and silicone sealant. The sampling location is identified with the Sample ID Number which is written on duct tape affixed to the sampling location.

4) Decontamination:
   - In order to prevent cross-contamination between samples, core samplers and other sampling devices are wet-wiped after each use. Contaminated tissues are placed in the asbestos waste container.

5) Documentation:
   - Sampling logs and chain of custody forms are generated in accordance with standard procedures.

6) Debris:
   - Any debris released during sample collection is cleaned-up using wet-wipes and/or HEPA vacuum methods as required. Contaminated wet-wipes are placed in the asbestos waste container.

Throughout the inspection, the inspector makes notations on Asbestos Inspection Forms and upon completion of the site visit, has documentation of the following:

- The type (e.g. surfacing, thermal system insulation, other or "miscellaneous" and method of material application) of ACM indicated in the Request
- Evidence of debris on horizontal surfaces
- Hanging material
- Cracking
- Dislodged chunks and scrapings

For each site, information regarding the accreditation of the personnel who performed the inspection, sample

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analysis and report preparation is also provided. This information is documented as follows:

1. Name and Address
2. Category of Accreditation
3. Date and Certificate of Accreditation (including the sponsor of the training course and the date and location)
4. State of Accreditation and Accreditation Number
5. Name, Address, Accreditation and Certification of Each Analytical Laboratory Used

Polarized Light Microscopy

Bulk samples collected for polarized light microscopy analysis are analyzed at Taylor Environmental Group's in-house AIHA, NVLAP and ELAP accredited optical microscopy laboratory. Upon receipt of test items at the laboratory, the Taylor Environmental Group Chain of Custody and Request for Analysis documents is generated for all test item batches. If the test items have been collected by Taylor field staff then a Chain of Custody document will have already been generated along with the Request for Analysis and the Daily Monitoring documents.

Upon receipt of test items the Chain of Custody shall have the following information recorded:

1. Client Name
2. Project Location
3. Analyst & Method of Analysis
4. Number of Test Items in the Batch
5. List of Client Test Item Identification Numbers
6. Relevant Comments
7. STAT (Priority) Yes or No
8. Sampler's Signature (if possible) and Date
9. Carrier's Signature (if applicable) and Date

During the log-in procedure the Chain of Custody document is signed and dated by the log-in clerk. The Chain of Custody document remains with the appropriate batch of test items through preparation and analysis at which times it will be continually updated by all personnel who perform any action on the test items.

Upon receipt of test items, the appropriate Taylor Environmental Group Inc. Request for Analysis document is initiated if not already done by a Taylor field technician. All Request for Analysis documents have the following information recorded:

1. Client Name and Address
2. Project Location
3. Date Received
4. Client Test Item Identification Numbers
5. Type of Analysis (if not already stated by document)
6. Origin of Test Item (if applicable)
7. Test Item Volume (if applicable)

During the log-in process the corresponding laboratory numbers shall be added to this document. At the completion of sample log-in the pink copy of the Request for Analysis is removed and remains with the test items.

At the completion of analysis of the test items the corresponding analytical results are transferred to the yellow and white copies of the document. The analyst initials and dates this document in the appropriate spaces provided.

The Request for Analysis is then signed and dated by the Laboratory Director for approval.

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After the test items are accepted for analysis and all the above mentioned paperwork is initiated, the test items are recorded in the laboratory Log book with the following information:

1. The Unique and Sequential Seven Digit Laboratory Identification Numbers.
2. Client Name
3. Analyst
4. Number of Test Items in the Batch
5. Time Received
6. Date Received
7. Log-in Clerk's Initials
8. Comments (with respect to test item condition & all pertinent information)

After approval of all analysis data the completion date is noted in the sample log book and laboratory paperwork is stored in the laboratory's main file system.

At the start of each working shift, the PLM microscopes are calibrated according to the following procedures:

1. Kohler-Type Illumination
2. Polar Alignment
3. Concentric Alignment

The results of these calibrations are recorded in the PLM Daily Calibration Log.

Bulk samples are analyzed by EPA "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" U.S. EPA 600/R-93/116, July 1993 (59 FR 542, Jan. 5, 1994; and 59 FR 38970, Aug. 1, 1994).

Test equipment and reagents for bulk asbestos identification test items are as follows:

1. Stereo-Microscope with Variable Magnification and Light Source
2. HEPA Filtered Safety Hood
3. Polarized Light Microscope with the Following Attachments:
    a) binocular/trinocular head w/10x eyepieces
    b) cross-hair and chalky point array reticules
    c) built-in halogen light source
    d) 10x, 40x objectives
    e) 10x central/annular stop dispersion staining objectives
    f) polarizer and analyzer, placeable at 90 degrees to each other
    g) 360 degree rotatable stage
    h) substage condenser with iris diaphragm
    i) 45 degree accessory slot
    j) retardation plate 500-550 nm
4. Mounting Oils with Refractive Indices of 1.460 to 1.720 in Increments of 0.004
5. Dispersion Oils with Refractive Indices of 1.55, 1.605, 1.680 and 1.700
6. Appropriate Utensils, Slides and Cover Slips

Upon receipt of test items into the laboratory from the log-in area, test items and corresponding paperwork are inspected for correct documentation. Before any action is performed on the test items the analyst signs and dates the corresponding Chain of Custody. The analyst inspects all test items to determine whether or not they can be analyzed using the requested test method. The analyst also inspects the test item for moisture. If it is determined that the test item is wet, a representative portion is transferred to a clean glass petri-dish and placed in the convection oven. The test item should remain in the oven for 20 minutes at 110 degrees Celsius. This process is repeated if necessary and noted on the corresponding Chain of Custody and Request for Analysis documents.

The preparation of test items is handled in the following manner:

1. Clean a slide with lens tissue. Label the slide with the appropriate laboratory identification number.
2. Examine the test item under the stereo-microscope at various magnifications. Make a mental note as to suspected asbestos type(s) contained in the test item. Record the following data on the

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Request for Analysis document.
   a) Homogeneity
   b) Color
   c) Fibrous nature

3. Place approximately 1.5 ml. of appropriate mounting oil on the cleaned slide. Using clean tweezers, transfer a representative portion of the test item, approximately one cubic millimeter, to the slide. Gently tweeze apart the slide subsample of the test item in the oil.
4. Place a clean number 2 cover slip on the preparation. Press gently on the cover slip with a clean eraser to spread out the subsample.

Bulk samples of building materials collected for asbestos identification are first examined for homogeneity and preliminary fiber identification at low magnification. Positive identification of suspect fibers is made by analysis of subsamples using polarized light microscopy and dispersion staining techniques. Identification is made on the basis of comparing the known physical and optical characteristics of the various types of asbestos with those of the suspect material.

The upper detection limit of the method is given as 100% asbestos and the lower limit as 1%. Organic constituents of bulk samples may interfere with the identification and quantitation of the asbestos mineral content. Spray-on binder materials may coat fibers and affect the color or identity. Fine particles of other materials may also adhere to fibers to an extent sufficient to cause confusion in identification. Procedures that may be used for the removal of interferences are presented in the method.

From the PLM bench sheet the following information shall be transferred to the Taylor Environmental Group PLM Request for Analysis document:

1. Date Analyzed
2. Homogeneity
3. Color
4. Fibrous Nature
5. Type(s) and Percentage(s) of Asbestos Fibers
6. Type(s) and Percentage(s) of Non-asbestos Fibers
7. Type(s) and Percentage(s) of Non-fibrous Components
8. Relevant Comments
9. Analyst's Signature

Upon completion of analysis and documentation by the analyst, the PLM bench sheet and Request for analysis along with the Chain of Custody are submitted to the Laboratory Director or Senior Laboratory Technician for approval. Once approved the Laboratory Director or Senior Laboratory Technician signs and dates the PLM Request for analysis document.

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