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ASBESTOS CONTAINING MATERIAL RE-INSPECTION BUILDING 31 VOLUME 3 CNC  
CHARLESTON SC  
2/15/2000  
BAT ASSOCIATES, INC.

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**Volume 3**

**Asbestos-Containing Material Re-inspection  
For Building 31  
Charleston Naval Shipyard  
Charleston, South Carolina**

Contract No. N2467-96-D-0998  
Delivery Order No. 0013

*Prepared for:*

Department of the Navy  
Southern Division  
NAVFACENGCOM  
2305 Eagle Drive  
North Charleston, SC 29419

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*Prepared by:*

BAT Associates, Inc.  
5151 Brook Hollow Parkway  
Suite 250  
Norcross, Georgia 30071  
(770) 242-3908

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## TABLE OF CONTENTS

		<u>Page</u>
1.0	Executive Summary	1
2.0	Building Inspection Information Form	3
3.0	Introduction	4
4.0	Sampling Methodology	5
5.0	Asbestos Inventory and Assessment	8
6.0	Summary of Sample Analysis Results	9
7.0	Results of Quality Control Sampling	11
8.0	Physical Assessment of Identified ACM	12
9.0	Hazard Assessment of Identified ACM	26
10.0	Preliminary Cost Estimate for Removal of Identified ACM	38
11.0	Conclusions	39

### Appendices

Appendix A	Sample and ACM Location Drawings
Appendix B	Photographic Documentation of Identified ACM
Appendix C	Personnel and Laboratory Accreditations
Appendix D	Laboratory Analysis Results

### List of Tables and Figures

Table 1.0	Summary of Identified ACM	1
Table 2.0	Recommended Response Actions	2
Table 3.0	Summary of Identified Suspect ACM	8
Table 4.0	Summary of Sample Analysis Results	9
Table 5.0	Validation of Quality Control Sampling	11
Figure 1.0	Decision Tree Diagram For Hazard Assessment	27



BAT recommends the following management actions for the identified ACM in Building 31 in Table 2.0.

**Table 2.0**  
**Recommended Response Actions**

<b>HA No.</b>	<b>Material Description</b>	<b>Recommended Response Action</b>
2	Floor Tile, 12 x12" off-white with brown streak w/ black mastic	Removal prior to renovation or demolition
3	Floor Tile, 9" x 9" black w/ black mastic	Removal prior to renovation or demolition
4	Floor Tile, 9" x 9" red w/ black mastic	Removal prior to renovation or demolition
5	Floor Tile, 12" x 12" floral green w/ black mastic	Removal prior to renovation or demolition
6	Floor Tile, 12" x 12" black w/ black mastic	Removal prior to renovation or demolition
7	Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic	Removal prior to renovation or demolition
8	Floor tile, 12" x 12" brown w/ black mastic	Removal prior to renovation or demolition
18	Pipe Fitting Insulation, 3" white with canvas wrap on steam	Removal prior to renovation or demolition
20	Pipe Fitting Insulation, 3" white with canvas wrap on domestic water	Removal prior to renovation or demolition
21	Pipe Insulation, 12" with metal wrap	Removal prior to renovation or demolition

Other suspect ACM not identified could be present in areas of the building inaccessible to the asbestos building inspectors. For example, materials could exist in walls and other locations where access could only be gained by demolition of the building. Also, other materials currently not recognized by the asbestos building inspection industry could exist.

The total estimated cost for the removal of the identified and/or assumed ACM in Building 31 is approximately \$108,000. See Section 10.0 for a break down of the preliminary cost estimate for the removal of the identified or assumed ACM.

## 2.0 BUILDING INSPECTION INFORMATION FORM

**Building Name:** Barracks  
**Building Number:** 31  
**Facility:** Charleston Naval Shipyard  
**Building Area (square footage):** 35,880  
**Year Built:** 1959  
**Building Type:** Living Quarters  
**No. of Floors in Building:** Three  
**Purpose of ACM Survey:** Re-Inspection  
**Facility Unit Identification Code (UIC):** N/A

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**Building Contact:** Mr. Matthew Humphrey  
**Contact's Telephone No.:** (843) 743-9985  
**Building Survey Date(s):** November 24, 1999 and January 28, 2000

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**Asbestos Inspector's Name:** Mr. Jason McGlashan and Mr. Foshie Bell  
**Asbestos Inspector's Accreditation No:** GA2900  
**Inspection Company:** BAT Associates, Inc.  
**Company Telephone No.** (770) 242-3908

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### 3.0 INTRODUCTION

BAT Associates, Inc. (BAT) was retained by the U.S. Department of the Navy, Southern Division (SouthDiv), Naval Facilities Engineering Command (NAVFACENGCOM) to perform an asbestos-containing material (ACM) re-inspection of all buildings located at the Charleston Naval Shipyard in Charleston, South Carolina. The purpose of this re-inspection was to:

1. Perform a comprehensive ACM re-inspection of 34 buildings in accordance with Federal and U.S. Navy requirements;
2. Assess the condition of previously identified friable and non-friable ACM; and
3. Provide a preliminary cost estimate for the removal of identified ACM.

The re-inspection was performed in accordance with the Navy's Asbestos Facility Inventory/Assessment Protocol (NEESA 70.2-010) and the U.S. Environmental Protection Agency's (USEPA) Asbestos Hazard Emergency Response Act (AHERA) and the Asbestos School Hazard Abatement Reauthorization Act (ASHARA).

The results of the re-inspection survey are presented in 24 separate volume reports. This report describes the results for Building 31.

This re-inspection survey was performed by Mr. Jason McGlashan and Mr. Foshie Bell, under the direct supervision of Mr. Douglas J. Milton, CIH, on November 24, 1999 and January 28, 2000. Mr. McGlashan is an accredited building inspector. Mr. Bell is an accredited asbestos building inspector and management planner. Mr. Milton, a Certified Industrial Hygienist, is an accredited asbestos inspector, management planner, and project designer.

This report discusses the sampling methodology used during the re-inspection and assessment (Section 4.0); a list of all identified suspect materials (Section 5.0); a summary of the bulk sample analysis results (Section 6.0); results of quality control sampling; (Section 7.0); physical assessments of the identified ACM (Section 8.0); a hazard assessment of the identified ACM (Section 9.0); preliminary cost estimates for removal (Section 10.0); and conclusions (Section 11.0). Appendix A contains drawings identifying the location of collected bulk samples and the locations of identified ACM. Appendix B contains photographic documentation of identified ACM. Appendix C contains personnel and laboratory accreditations. Appendix D contains laboratory analysis results.

The assessment protocol for ACM involved three distinct steps:

1. Performed preliminary walk-through of the building to identify suspect ACM and to determine the amount of suspect ACM, to define the number of samples to be collected, to identify access problems (e.g., collection of samples in a limited access pipe chase below the building), and to determine the degree of personal protection necessary for the bulk sample collection.

2. Visually inspected the building for ACM to identify the location of the suspect ACM and to determine if the material was friable or non-friable. Suspect materials were then categorized according to the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) for asbestos as: Category I non-friable materials, Category II non-friable materials, and Regulated (friable) Asbestos-Containing Materials (RACM).
3. Collected bulk samples for the analysis for asbestos content (see Section 4.0, *Sampling Methodology*, for details).

#### 4.0 SAMPLE METHODOLOGY

Representative, randomly selected bulk samples were collected in accordance with the Navy's and AHERA sampling protocol, as described in 40 CFR 313.31, and in accordance with BAT's contract requirements. Bulk samples were collected from homogenous areas (materials) in a manner that minimized any release of airborne asbestos fibers. A homogeneous area (material) is defined as a material uniform in size, color and texture.

The minimum number of samples collected from each homogeneous area was as follows:

1. *Friable Spray-Applied or Trowel-Applied Material* (including plaster)
  - a. Less than or equal to 1,000 Square Feet (S.F.) = 3 samples
  - b. Greater than 1,000 S.F and less than or equal to 5,000 S.F. = 5 samples
  - c. Greater than 5,000 = 7 samples
2. *Pipe and Duct Insulation*
  - a. Three samples per homogeneous area of insulation.
3. *Elbows, Valves, Fittings, and Connection Mud*

Three representative samples from each type of insulated elbow, valve, fitting, and connection mud.
4. *Boiler, Tanks, and Furnaces*

A minimum of 3 samples per unit.
5. *Patchwork*

Patchwork is defined as a patch or repair to existing material based on the following quantities:

- a. Surfacing material patches are limited to a maximum of 6 S.F.
- b. Pipe and duct insulation patches are limited to a maximum of 6 Linear Feet (L.F.) or 6 S.F.
- c. Boiler, tank, and furnace patches are limited to 6 S.F.

If the patchwork exceeded the limits prescribed above, it was sampled according to the homogeneous area protocol in items 1 to 4 above. If a material qualifies as patchwork, a single sample was collected per patch.

6. *Ceiling or Acoustical Tile*

3 samples

7. *Miscellaneous Friable Material*

3 samples

8. *Non-Friable Material*

Non-friable materials for purpose of this survey included Transite-type panels, floor tiles, floor tile mastic, and other miscellaneous materials.

Minimum of 3 samples.

The procedures followed for collection of each bulk sample is outlined briefly below:

1. The accredited inspector collecting the sample was equipped with the appropriate personal protective equipment. This included a half-mask air-purifying respirator, protective gloves and protective eyewear.
2. The surface of the material being sampled was wetted with amended water (containing a surfactant to aid penetration) mist to lessen the risk of fiber release during sampling.
3. Each sample was extracted using the appropriate equipment, (e.g., a sample container, knife, core borer). Care was taken to insure that all layers of the suspect materials, down to the substrate, were included in the sample.
4. Each sample was placed in an individual container, which was then sealed and labeled with a unique identification number which was also recorded on the sample data log-in sheet.

5. After each sample was collected, the area immediately surrounding the sampling location was inspected for debris and wet-cleaned as necessary to lessen the risk of an airborne fiber release.
6. All necessary data were recorded on the BAT Suspect Material Inventory Form including sample number, sample location, type of suspect material, name of inspector collecting the sample and other relevant information.
7. Samples were then transported to Cape Environmental Management Inc. (CAPE) Asbestos Laboratories in Atlanta, Georgia, for Polarized Light Microscopy (PLM) analysis. The CAPE Asbestos Laboratory participates in the National Voluntary Laboratory Assurance Program (NVLAP) for the analysis of asbestos content in suspect materials. CAPE's NVLAP Laboratory Code is 102111-0.
8. BAT collected duplicate samples during the collection of primary bulk sampling for quality control (QC) purposes. QC samples were collected at ten percent of the bulk sample locations. They were assigned unrelated sample identification numbers and analyzed by Analytical Environmental Services, Inc. (AES). AES participates in the National Voluntary Laboratory Assurance Program (NVLAP) for the analysis of asbestos content in suspect materials. AES's NVLAP Laboratory Code is 102033-0.
9. Upon receipt by the laboratory, the samples were logged in and assigned a unique laboratory identification number. The laboratory analyzed the samples in accordance with 40 CFR 313.87 subpart F. Copies of the laboratory accreditations for both laboratories may be found in Appendix C.

## 5.0 ASBESTOS INVENTORY AND ASSESSMENT

Table 3.0 describes the suspect ACM identified in and around Building 31.

**Table 3.0**  
**Summary of Identified Suspect ACM**

HA No.	Description of Suspect ACM	Location of Suspect ACM	AHERA Category of Material
1	Floor Tile, 12" x 12" green with white streaks w/ black mastic	First floor, lobby, main office and day room (under carpet)	N/A
2	Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic	First floor, east wing rooms and corridor (over HA # 3)	Misc.
3	Floor Tile, 9" x 9" black w/ black mastic	First floor, east wing rooms and corridor (under HA # 2)	Misc.
4	Floor Tile, 9" x 9" red w/ black mastic	First floor, bag room	Misc.
5	Floor Tile, 12" x 12" floral green w/ black mastic	First floor, stairwell # 1 (over HA # 6)	Misc.
6	Floor Tile, 12" x 12" black w/ black mastic	Below HA # 5, 7, and 8	Misc.
7	Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic	First floor, west wing rooms and corridor (over HA # 6)	Misc.
8	Floor Tile, 12" x 12" brown w/ black mastic	Second floor, in room by stairwell # 1; throughout the third floor	Misc.
9	Cove Base, brown with brown mastic	Throughout the building	N/A
10	Drywall, on walls	Throughout the building	N/A
11	Joint Sealer Compound, on drywall on walls	Throughout the building	N/A
12	Ceiling tile, 2' x 2' white suspended with rough texture	First floor, room 112	N/A
13	Ceiling Tile, 2' x 4' white suspended groove and pinhole (old)	Majority of rooms	N/A
14	Ceiling Tile, 2' x 4' white suspended groove and pinhole (new)	Majority of rooms	N/A
15	Ceiling Tile, 2' x 2' white suspended groove and pinhole (old)	Majority of corridors	N/A
16	Ceiling Tile, 2' x 2' white suspended groove and pinhole (new)	Majority of corridors	N/A
17	Pipe Insulation, 3" white with canvas wrap on domestic water	All floors, in walls behind all water fixtures	N/A
18	Pipe Fitting Insulation, 3" white with canvas wrap on domestic water	All floors, in walls behind all water fixtures	TSI
20	Pipe Fitting Insulation, 3" white with canvas wrap on steam	Piping to all wall mounted radiators	TSI
21	Pipe Insulation, 6" main steam	In crawl space and between buildings 31 and 32	TSI
22	Window Glazing, gray on interior	On all interior windows	N/A
23	Tank Insulation, hot water	In exterior mechanical room	N/A

HA No.	Description of Suspect ACM	Location of Suspect ACM	AHERA Category of Material
24	Roofing, built-up	Roof	N/A

**Notes:** Misc. = Miscellaneous Material N/A = Not Applicable

## 6.0 SUMMARY OF SAMPLE ANALYSIS RESULTS

Table 4.0 contains a summary of the bulk sample analysis results for suspect ACM identified in this building. Sample identification numbers do not necessarily match the building number since barracks 31, 32, 33, 34, 35, and 36 are of similar construction, have the same square footage, and the same construction date and were inspected as one unit.

All thermal system insulation (TSI), if present, was classified as friable material. As long as the outer covering remains intact and is in good condition the TSI can be considered non-friable (29 CFR 313.85). Ceiling tile, if asbestos is present was considered a friable material. However, if non-friable materials are drilled, sawed, ground or otherwise physically or mechanically disturbed, they may release asbestos fibers to the environment and therefore would be considered a friable material.

According to AHERA protocol, all samples within a homogeneous area must have an asbestos content of one percent or less by weight using Polarized Light Microscopy (PLM) analysis before the material can be categorized as non-asbestos-containing. If one sample is determined as asbestos-containing using PLM analysis, the entire homogeneous area must be classified asbestos-containing.

**Table 4.0  
 Summary of Sample Analysis Results**

HA No.	Sample ID No.	Suspect Material Description	Asbestos Content	Friability
1	32-4-1, 32-4-2, 32-4-3	Floor Tile, 12" x 12" green with white streaks w/ black mastic	NAD	N/A
2	31-2-1	Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic	Tile = 10% chrysotile, Mastic = 1-2% chrysotile	Friable
3	31-5-1	Floor Tile, 9" x 9" black w/ black mastic	Tile = 7% chrysotile, Mastic = 2% chrysotile	Friable
4	32-6-1, 32-6-2, 32-6-3	Floor Tile, 9" x 9" red w/ black mastic	Tile = NAD, Mastic = 3% chrysotile	Non
5	31-5-1a, 31-5-2a, 31-5-3a	Floor Tile, 12" x 12" floral green w/ black mastic	Tile = NAD, Mastic = 3% chrysotile	Non
6	31-6-1, 31-6-2, 31-6-3	Floor Tile, 12" x 12" black w/ black mastic	Tile = NAD, Mastic = 3% chrysotile	Non
7	32-5-1, 32-5-2, 32-5-3	Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic	Tile = 10% chrysotile, Mastic = 1-2% chrysotile	Friable
8	31-8-1, 31-8-2, 31-8-3	Floor Tile, 12" x 12" brown w/ black mastic	Tile = 3% chrysotile, Mastic = NAD	Friable

HA No.	Sample ID No.	Suspect Material Description	Asbestos Content	Friability
9	31-9-1, 31-9-2, 31-9-3	Cove Base, brown with brown mastic	NAD	N/A
10	31-10-1, 31-10-2, 31-10-3	Drywall, on walls	NAD	N/A
11	31-11-1, 31-11-2, 31-11-3	Joint Sealer Compound, on drywall on walls	NAD	N/A
12	31-12-1, 31-12-2, 31-12-3	Ceiling tile, 2' x 2' white suspended with rough texture	NAD	N/A
13	31-13-1, 31-13-2, 31-13-3	Ceiling Tile, 2' x 4' white suspended groove and pinhole (old)	NAD	N/A
14	31-6-1, 31-6-2, 31-6-3	Ceiling Tile, 2' x 4' white suspended groove and pinhole (new)	NAD	N/A
15	31-7-1, 31-7-2, 31-7-3	Ceiling Tile, 2' x 2' white suspended groove and pinhole (old)	NAD	N/A
16	31-16-1, 31-16-2, 31-16-3	Ceiling Tile, 2' x 2' white suspended groove and pinhole (new)	NAD	N/A
17	31-2-1, 31-2-2, 31-2-3	Pipe Insulation, 3" white with canvas wrap on domestic water	NAD	N/A
18	33-3-1, 33-3-2, 33-3-3	Pipe Fitting Insulation, 3" white with canvas wrap on steam	15-20% chrysotile, 15-20% amosite	Friable
20	Assume	Pipe Fitting Insulation, 3" white with canvas wrap on domestic water	Assumed to contain asbestos due to inaccessibility of the material in walls	Friable
21	Exterior Pipe-32	Pipe Insulation, 12" with metal wrap	Layer 1= 15% amosite, Layer 2= NAD	Friable
22	36-4-1, 36-4-2, 36-4-3	Window Glazing, gray on interior	NAD	N/A
23	B31-S1, B31-S2, B31-S3	Tank Insulation, hot water	NAD	N/A
24	36-15-1, 36-15-2, 36-15-3	Roofing, built-up	NAD	N/A

**Notes:** NAD = No Asbestos Detected N/A = Not Applicable

## 7.0 RESULTS OF QUALITY CONTROL SAMPLING

The purpose of quality control (QC) sampling was to ensure reproducibility of the primary laboratory analysis results. Duplicate samples were collected for ten percent of the total building samples for QC purposes.

**Table 5.0**  
**Validation of Quality Control Sampling**

<b>Sample I.D. No.</b>	<b>Primary Laboratory Analysis Results</b>	<b>QC Laboratory Analysis Results</b>
31-5-1QC	Tile = NAD, Mastic = 3% chrysotile	Tile = NAD, Mastic = 3% chrysotile
31-10-1QC	NAD	NAD

**Notes:**        QC = Quality Control        NAD = No Asbestos Detected

No discrepancies between primary laboratory and quality control laboratory bulk sample analysis were noted.

## 8.0 PHYSICAL ASSESSMENT OF IDENTIFIED ACM

The following sections contain a summary of the methodology BAT specialists used to conduct the physical assessment for this building. This methodology was developed in accordance with USEPA AHERA re-inspection requirements contained in 40 CFR Part 313.85.

### 1. Physical Assessment for Friable ACM.

#### A. **Condition.** Friable ACM were assigned to one of the following categories based on a visual inspection and touch test:

##### 1) **Significantly Damaged Condition.** Material which met one or both of the following characteristics:

- a. Ten percent (10%) or more of the material in the functional space is crumbled, blistered, or is hanging from the surface, deteriorated, showing adhesive failure, water stained, gouged or marred, and the damage is evenly distributed.
- b. Twenty-five percent (25%) or more of the material in the functional space is crumbled, blistered, or is hanging from the surface, deteriorated, showing adhesive failure, water stained, gouged or marred, and the damage is localized.

##### 2) **Damaged Condition.** Material which met one or both of the following characteristics:

- a. The surface is crumbling, blistered, water stained, gouged or marred, or otherwise damaged on less than ten percent (10%) of the material in the functional space (but material is too damaged to be characterized as good condition) and the damage is evenly distributed.
- a. The surface is crumbling, blistered, water stained, gouged or marred, or otherwise damaged on twenty-five percent (25%) or more of the material in the functional space (but material is too damaged to be characterized as good condition) and the damage is localized.

##### 3) **Good Condition.** Material with very limited, or no visible damage or deterioration.

#### B. **Potential for Disturbance.** Friable ACM were assigned to one of the following categories based on a visual inspection and assessment of surroundings:

- 1) **Potential for Significant Damage.** Material which met one or more of the following conditions:
  - a. High potential for Contact. Service workers are in the vicinity of the material more than once each week or the material is in a public area and is accessible to building occupants.
  - b. High Potential for Vibration. Loud motors or engines present in the vicinity of the material or there are intrusive noises or easily sensed vibrations from surrounding area, such as nearby highways or airports.
  - c. High Potential for Air Erosion. High velocity air moving across or against material.
  
- 2) **Potential for Damage.** Material which met one or more of the following conditions for potential for significant damage:
  - a. Moderate Potential for Contact. Service workers are in the vicinity of the material at least once each month, but less than once each week or the material is in a room or office and is accessible to the occupants.
  - b. Moderate Potential for Vibration. Motors or engines present but not obtrusive or occasional loud noise in the vicinity of the material.
  - c. Moderate potential for Air Erosion. Noticeable movement of air across or against material, but not high in velocity.
  
- 3) **Low Potential for Damage.** Material which met one or more of the following conditions and met none of the conditions for potential for significant damage or potential for damage:
  - a. Low Potential for Contact. Service workers are in the vicinity of the material less than once each month or the material is visible but not accessible to the building occupants in the course of normal activity.
  - b. Low Potential for Vibration. None of the conditions for high or moderate potential for vibration are met.
  - c. Low Potential for Air Erosion. None of the conditions for high or moderate potential for air erosion are met.

## 2. Physical Assessment for Thermal ACM.

A. **Condition.** Thermal ACMs were assigned to one of the following categories based on a visual inspection:

1) **Significantly Damaged Condition.** Material which met one or both of the following characteristics:

- a. Missing jackets, crushed, heavily gouged, or punctured insulation on equal to or greater than ten percent (10%) of the material in the functional space, and the damage is evenly distributed.
- b. Missing jackets, crushed, heavily gouged, or punctured insulation on equal to or greater than twenty-five percent (25%) of the material in the functional space, and the damage is localized.

2) **Damaged Condition.** Material which met one or both of the following characteristics:

- a. Missing jackets, crushed, heavily gouged, or punctured insulation on less than ten percent (10%) of the material in the functional space, and the damage is evenly distributed.
- b. Missing jackets, crushed, heavily gouged, or punctured insulation on greater than twenty-five percent (25%) of the material in the functional space, and the damage is localized.

3) **Good Condition.** Material with very limited, or no visible damage or deterioration.

B. **Potential for Disturbance.** Thermal ACMs were assigned to one of the following categories based on a visual inspection and assessment of surroundings:

1) **Potential for Significant Damage.** Material which met one or more of the following conditions:

- a. **High Potential for Contact.** Service workers are in the vicinity of the material more than once each week or the material is in a public area and is accessible to building occupants.
- b. **High Potential for Vibration.** Loud motors or engines present in the vicinity of the material or there are intrusive noises or easily sensed vibrations from surrounding area, such as a nearby highway or airport.

- c. **High Potential for Air Erosion.** High velocity air moving across or against the material.
- 2) **Potential for Damage.** Material which met one or more of the following conditions and met none of the conditions for potential for significant damage.
- a. **Moderate Potential for Contact.** Service workers are in the vicinity of the material at least once each month but less than once each week or the material is in a room or office and is accessible to the occupants.
  - b. **Moderate Potential for Vibration.** Motors or engines present but not obtrusive or occasional loud noise in the vicinity of the material.
  - c. **Moderate Potential for Air Erosion.** Noticeable movement of air across or against material, but not high in velocity.
- 3) **Low Potential for Damage.** Material which met one or more of the following conditions and met none of the conditions for potential for significant damage or potential for damage:
- a. **Low Potential for Contact.** Service workers are in the vicinity of the material less than once per month or the material is visible but not accessible to the building occupants in the course of normal activity.
  - b. **Low Potential for Vibration.** None of the conditions for high or moderate potential for vibration are met.
  - c. **Low Potential for Air Erosion.** None of the conditions for high or moderate potential for air erosion are met.

**PHYSICAL ASSESSMENT DATA FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 31-2-1

**HOMOGENEOUS AREA No.:** 2

**TYPE OF MATERIAL:** Surfacing TSI X Other

**Description:** Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 3,290 SF

**CONDITION:**

**Percent Damage:** 5-7 % Damage Localized Distributed

**Type of Damage:** Deterioration Water Physical

**DESCRIPTION:**

**Overall Rating:** Good X Fair Poor

**POTENTIAL FOR DISTURBANCE:**

**Frequency of Potential Contact:** X High Moderate Low

**Description:** Material is located in high traffic areas.

**Influence of Vibration:** High Moderate X Low

**Description:** None identified.

**Potential for Air Erosion:** High Moderate X Low

**Description:** None identified.

**OVERALL RATING:** X Potential for Significant Damage Potential for Damage Low Potential for Damage

**COMMENTS:** Material should be removed prior to renovation or demolition.

**PHYSICAL ASSESSMENT DATA FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 31-5-1

**HOMOGENEOUS AREA No.:** 3

**TYPE OF MATERIAL:** Surfacing TSI  Other

**Description:** Floor Tile, 9" x 9" black w/ black mastic

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 3,400 SF

**CONDITION:**

**Percent Damage:** 5-7 % Damage Localized Distributed

**Type of Damage:** Deterioration Water Physical

**DESCRIPTION:**

**Overall Rating:** Good  Fair Poor

**POTENTIAL FOR DISTURBANCE:**

**Frequency of Potential Contact:**  High Moderate Low

**Description:** Material is located in high traffic areas.

**Influence of Vibration:** High Moderate  Low

**Description:** None identified.

**Potential for Air Erosion:** High Moderate  Low

**Description:** None identified.

**OVERALL RATING:**  Potential for Significant Damage Potential for Damage Low Potential for Damage

**COMMENTS:** Material should be removed prior to renovation or demolition.

**PHYSICAL ASSESSMENT DATA FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 32-6-1, 32-6-2, 32-6-3

**HOMOGENEOUS AREA No.:** 4

**TYPE OF MATERIAL:** Surfacing TSI  Other

**Description:** Floor Tile, 9" x 9" red w/ black mastic

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 55 SF

**CONDITION:**

**Percent Damage:** 5-7 % Damage Localized Distributed

**Type of Damage:** Deterioration Water Physical

**DESCRIPTION:**

**Overall Rating:** Good  Fair Poor

**POTENTIAL FOR DISTURBANCE:**

**Frequency of Potential Contact:**  High Moderate Low

**Description:** Material is located in high traffic areas.

**Influence of Vibration:** High Moderate  Low

**Description:** None identified.

**Potential for Air Erosion:** High Moderate  Low

**Description:** None identified.

**OVERALL RATING:**  Potential for Significant Damage Potential for Damage Low Potential for Damage

**COMMENTS:** Material should be removed prior to renovation or demolition.



**PHYSICAL ASSESSMENT DATA FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 31-6-1, 31-6-2, 31-6-3

**HOMOGENEOUS AREA No.:** 6

**TYPE OF MATERIAL:** Surfacing TSI X Other

Description: Floor Tile, 12" x 12" black w/ black mastic

Approximate Amount of Asbestos-Containing Material (Linear or Square Foot): 11,400 SF

**CONDITION:**

Percent Damage: 5-7 % Damage Localized Distributed

Type of Damage: Deterioration Water Physical

**DESCRIPTION:**

Overall Rating: Good X Fair Poor

**POTENTIAL FOR DISTURBANCE:**

Frequency of Potential Contact: X High Moderate Low

Description: Material is located in high traffic areas.

Influence of Vibration: High Moderate X Low

Description: None identified.

Potential for Air Erosion: High Moderate X Low

Description: None identified.

**OVERALL RATING:** X Potential for Significant Damage Potential for Damage Low Potential for Damage

**COMMENTS:** Material should be removed prior to renovation or demolition.







**PHYSICAL ASSESSMENT DATA FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** Assumed to contain asbestos

**HOMOGENEOUS AREA No.:** 20

**TYPE OF MATERIAL:** Surfacing  TSI  Other

**Description:** Pipe Fitting Insulation, 3" white with canvas wrap on domestic water

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 300 EA

**CONDITION:**

**Percent Damage:** UNK % Damage Localized Distributed

**Type of Damage:** Deterioration Water Physical

**DESCRIPTION:**

**Overall Rating:** UNK Good Fair Poor

**POTENTIAL FOR DISTURBANCE:**

**Frequency of Potential Contact:** High Moderate  Low

**Description:** Material is located in walls.

**Influence of Vibration:** High Moderate  Low

**Description:** None identified.

**Potential for Air Erosion:** High Moderate  Low

**Description:** None identified.

**OVERALL RATING:** Potential for Significant Damage Potential for Damage  Low Potential for Damage

**COMMENTS:** Material should be removed prior to renovation or demolition.

**PHYSICAL ASSESSMENT DATA FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** Exterior Pipe-32

**HOMOGENEOUS AREA No.:** 21

**TYPE OF MATERIAL:** Surfacing  TSI  Other

**Description:** Pipe Insulation, 12" with metal wrap

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 80 LF

**CONDITION:**

**Percent Damage:** 10 % Damage Localized  Distributed

**Type of Damage:**  Deterioration Water Physical

**DESCRIPTION:**

**Overall Rating:** Good  Fair  Poor

**POTENTIAL FOR DISTURBANCE:**

**Frequency of Potential Contact:**  High Moderate Low

**Description:** Material is located in high traffic areas.

**Influence of Vibration:**  High Moderate Low

**Description:** Weathering.

**Potential for Air Erosion:**  High Moderate Low

**Description:** Weathering.

**OVERALL RATING:**  Potential for Significant Damage Potential for Damage Low Potential for Damage

**COMMENTS:** Material should be removed prior to renovation or demolition.

## 9.0 HAZARD ASSESSMENT OF IDENTIFIED ACM

AHERA describes a hazard assessment as "the means of collecting and considering whatever data were necessary for the management planner to make an informed, responsible recommendation to the LEA [Local Education Agency] consistent with response action requirements". As stated in AHERA, there is no single assessment method that is required in the regulations.

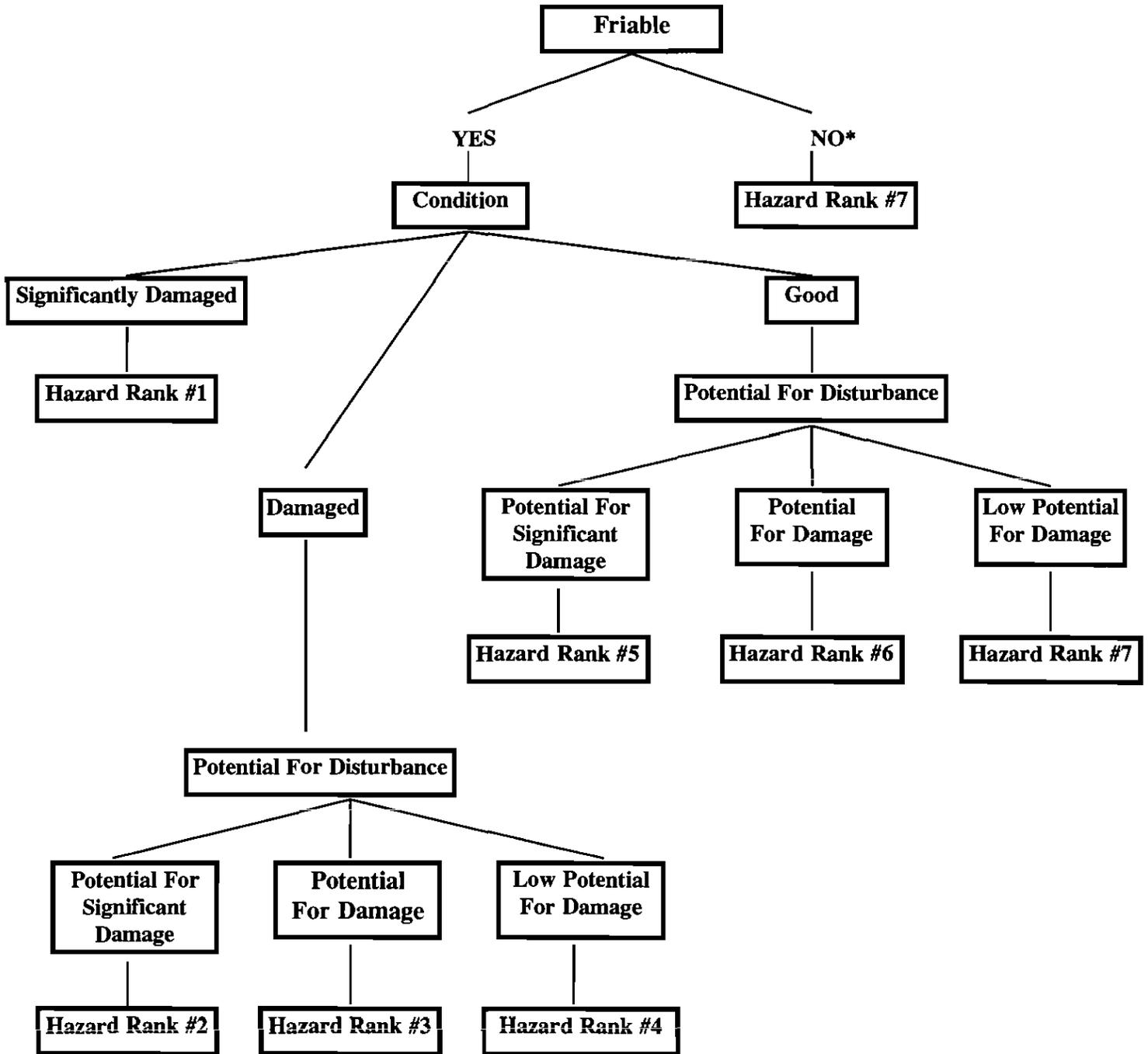
BAT adopted for this re-inspection one of the four general classes of hazard assessment models considered during the AHERA rule-making process. This method for hazard assessment is a modified decision tree as detailed in the USEPA, *Guidance for Assessing and Managing Exposure to Asbestos in Buildings*, or the *Pink Book*. Based on the physical assessment responses documented in the field, the BAT Management Planner proceeded through the decision tree process depicted in Figure 1.0 on the following page.

Only the identified and/or assumed asbestos-containing materials were assessed for hazards.

All of the identified and/or assumed asbestos-containing materials observed in this building were in good condition on the day of the survey.

**Figure 1.0 Decision Tree Diagram For Hazard Assessment**

Hazard rank #1 are materials of highest concern, and hazard rank #7 are the materials least likely to release asbestos fibers to the work area.



\*Miscellaneous materials that are considered non-friable were placed in the Hazard Rank #8 category, which is in good condition with a low potential for damage.



**HAZARD ASSESSMENT AND RESPONSE ACTION DATA  
FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 31-5-1

**HOMOGENEOUS AREA No.:** 3

**TYPE OF MATERIAL:** Surfacing TSI  Other

**Description:** Floor Tile, 9" x 9" black w/ black mastic

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 3,400 SF

**Approximate Recommended Response Action Cost:**

**HAZARD ASSESSMENT**

**RESPONSE ACTION RECOMMENDATION**

- |   |   |
|---|---|
| (1) Significantly damaged   | <input checked="" type="checkbox"/> (1) Removal |
| <input checked="" type="checkbox"/> (2) Damaged plus potential for significant damage | (2) Encapsulation                               |
| (3) Damaged plus potential for damage   | (3) Enclosure                                   |
| (4) Damaged plus low potential for damage   | (4) Repair                                      |
| (5) ACM (good condition) with potential for significant damage                        | (5) Operations and Maintenance Program          |
| (6) ACM (good condition) with potential for damage                                    |   |
| (7) Any remaining friable ACM or friable suspect ACM                                  |   |
| (8) Non-friable ACM   |   |

**COMMENTS:** Material should be removed prior to renovation or demolition.

**HAZARD ASSESSMENT AND RESPONSE ACTION DATA  
FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 32-6-1, 32-6-2, 32-6-3

**HOMOGENEOUS AREA No.:** 4

**TYPE OF MATERIAL:** Surfacing TSI  Other

**Description:** Floor Tile, 9" x 9" red w/ black mastic

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 110 SF

**Approximate Recommended Response Action Cost:**

**HAZARD ASSESSMENT**

**RESPONSE ACTION RECOMMENDATION**

- |   |   |
|---|---|
| (1) Significantly damaged   | <input checked="" type="checkbox"/> (1) Removal |
| <input checked="" type="checkbox"/> (2) Damaged plus potential for significant damage | (2) Encapsulation                               |
| (3) Damaged plus potential for damage   | (3) Enclosure                                   |
| (4) Damaged plus low potential for damage   | (4) Repair                                      |
| (5) ACM (good condition) with potential for significant damage                        | (5) Operations and Maintenance Program          |
| (6) ACM (good condition) with potential for damage                                    |   |
| (7) Any remaining friable ACM or friable suspect ACM                                  |   |
| (8) Non-friable ACM   |   |

**COMMENTS:** Material should be removed prior to renovation or demolition.

**HAZARD ASSESSMENT AND RESPONSE ACTION DATA  
FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 31-5-1a, 31-5-2a, 31-5-3a

**HOMOGENEOUS AREA No.:** 5

**TYPE OF MATERIAL:** Surfacing TSI  Other

**Description:** Floor Tile, 12" x 12" floral green w/ black mastic

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 11,400 SF

**Approximate Recommended Response Action Cost:**

**HAZARD ASSESSMENT**

**RESPONSE ACTION RECOMMENDATION**

- |   |   |
|---|---|
| (1) Significantly damaged   | <input checked="" type="checkbox"/> (1) Removal |
| <input checked="" type="checkbox"/> (2) Damaged plus potential for significant damage | (2) Encapsulation                               |
| (3) Damaged plus potential for damage   | (3) Enclosure                                   |
| (4) Damaged plus low potential for damage   | (4) Repair                                      |
| (5) ACM (good condition) with potential for significant damage                        | (5) Operations and Maintenance Program          |
| (6) ACM (good condition) with potential for damage                                    |   |
| (7) Any remaining friable ACM or friable suspect ACM                                  |   |
| (8) Non-friable ACM   |   |

**COMMENTS:** Material should be removed prior to renovation or demolition.



**HAZARD ASSESSMENT AND RESPONSE ACTION DATA  
FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 32-5-1, 32-5-2, 32-5-3

**HOMOGENEOUS AREA No.:** 7

**TYPE OF MATERIAL:** Surfacing TSI  Other

**Description:** Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 4,065 SF

**Approximate Recommended Response Action Cost:**

**HAZARD ASSESSMENT**

**RESPONSE ACTION RECOMMENDATION**

- |   |   |
|---|---|
| (1) Significantly damaged   | <input checked="" type="checkbox"/> (1) Removal |
| <input checked="" type="checkbox"/> (2) Damaged plus potential for significant damage | (2) Encapsulation                               |
| (3) Damaged plus potential for damage   | (3) Enclosure                                   |
| (4) Damaged plus low potential for damage   | (4) Repair                                      |
| (5) ACM (good condition) with potential for significant damage                        | (5) Operations and Maintenance Program          |
| (6) ACM (good condition) with potential for damage                                    |   |
| (7) Any remaining friable ACM or friable suspect ACM                                  |   |
| (8) Non-friable ACM   |   |

**COMMENTS:** Material should be removed prior to renovation or demolition.

**HAZARD ASSESSMENT AND RESPONSE ACTION DATA  
FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 31-8-1, 31-8-2, 31-8-3

**HOMOGENEOUS AREA No.:** 8

**TYPE OF MATERIAL:** Surfacing TSI X Other

**Description:** Floor Tile, 12" x 12" brown w/ black mastic

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 7,330 SF

**Approximate Recommended Response Action Cost:**

**HAZARD ASSESSMENT**

**RESPONSE ACTION RECOMMENDATION**

- |  |  |
|--|--|
| (1) Significantly damaged                                      | <u>X</u> (1) Removal                   |
| <u>X</u> (2) Damaged plus potential for significant damage     | (2) Encapsulation                      |
| (3) Damaged plus potential for damage                          | (3) Enclosure                          |
| (4) Damaged plus low potential for damage                      | (4) Repair                             |
| (5) ACM (good condition) with potential for significant damage | (5) Operations and Maintenance Program |
| (6) ACM (good condition) with potential for damage             |  |
| (7) Any remaining friable ACM or friable suspect ACM           |  |
| (8) Non-friable ACM  |  |

**COMMENTS:** Material should be removed prior to renovation or demolition.

**HAZARD ASSESSMENT AND RESPONSE ACTION DATA  
FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** 33-3-1, 33-3-2, 33-3-3

**HOMOGENEOUS AREA No.:** 18

**TYPE OF MATERIAL:** Surfacing  TSI  Other

**Description:** Pipe Fitting Insulation, 3" white with canvas wrap on steam

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 375 EA

**Approximate Recommended Response Action Cost:**

**HAZARD ASSESSMENT**

**RESPONSE ACTION RECOMMENDATION**

- |   |   |
|---|---|
| (1) Significantly damaged   | <input checked="" type="checkbox"/> (1) Removal |
| (2) Damaged plus potential for significant damage                         | (2) Encapsulation                               |
| <input checked="" type="checkbox"/> (3) Damaged plus potential for damage | (3) Enclosure                                   |
| (4) Damaged plus low potential for damage                                 | (4) Repair                                      |
| (5) ACM (good condition) with potential for significant damage            | (5) Operations and Maintenance Program          |
| (6) ACM (good condition) with potential for damage                        |   |
| (7) Any remaining friable ACM or friable suspect ACM                      |   |
| (8) Non-friable ACM   |   |

**COMMENTS:** Material should be removed prior to renovation or demolition.

**HAZARD ASSESSMENT AND RESPONSE ACTION DATA  
FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** Assumed to contain asbestos

**HOMOGENEOUS AREA No.:** 20

**TYPE OF MATERIAL:** Surfacing  TSI  Other

**Description:** Pipe Fitting Insulation, 3" white with canvas wrap on domestic water

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 300 EA

**Approximate Recommended Response Action Cost:**

**HAZARD ASSESSMENT**

**RESPONSE ACTION RECOMMENDATION**

- |  |   |
|--|---|
| (1) Significantly damaged                                      | <input checked="" type="checkbox"/> (1) Removal |
| (2) Damaged plus potential for significant damage              | (2) Encapsulation                               |
| (3) Damaged plus potential for damage                          | (3) Enclosure                                   |
| (4) Damaged plus low potential for damage                      | (4) Repair                                      |
| (5) ACM (good condition) with potential for significant damage | (5) Operations and Maintenance Program          |
| (6) ACM (good condition) with potential for damage             |   |
| (7) Any remaining friable ACM or friable suspect ACM           |   |
| (8) Non-friable ACM  |   |

**COMMENTS:** Material should be removed prior to renovation or demolition.

**HAZARD ASSESSMENT AND RESPONSE ACTION DATA  
FOR IDENTIFIED ACM**

**BUILDING:** Charleston Naval Shipyard, Building Number 31

**SAMPLE NUMBER(S):** Exterior Pipe-32

**HOMOGENEOUS AREA No.:** 21

**TYPE OF MATERIAL:** Surfacing                       TSI                      Other

**Description:** Pipe Insulation, 12" with metal wrap

**Approximate Amount of Asbestos-Containing Material (Linear or Square Foot):** 80 LF

**Approximate Recommended Response Action Cost:**

**HAZARD ASSESSMENT**

**RESPONSE ACTION RECOMMENDATION**

- |   |   |
|---|---|
| (1) Significantly damaged   | <input checked="" type="checkbox"/> (1) Removal |
| <input checked="" type="checkbox"/> (2) Damaged plus potential for significant damage | (2) Encapsulation                               |
| (3) Damaged plus potential for damage   | (3) Enclosure                                   |
| (4) Damaged plus low potential for damage   | (4) Repair                                      |
| (5) ACM (good condition) with potential for significant damage                        | (5) Operations and Maintenance Program          |
| (6) ACM (good condition) with potential for damage                                    |   |
| (7) Any remaining friable ACM or friable suspect ACM                                  |   |
| (8) Non-friable ACM   |   |

**COMMENTS:** Material should be removed prior to renovation or demolition.

### 10.0 PRELIMINARY COST ESTIMATE FOR REMOVAL OF IDENTIFIED ACM

The following is a preliminary cost estimate for the abatement (removal) of identified ACM in Building 31. This estimate is based on removing all of the materials during the same project. It does not include the cost of replacement materials. The cost estimate includes, project surveillance, air monitoring, and disposal of materials. These costs are estimates only; BAT made no attempt to obtain bids from removal contractors for this work, however, the average unit costs of three asbestos abatement contractors were used to develop the preliminary removal costs. Additionally, quantities noted are based upon engineering measurements. BAT recommends the use of architectural measurements for more accurate quantification.

Material Description	Unit Cost (\$)	Quantity	Total Abatement Cost (\$)
Floor Tile (multi-layers) with Mastic	2.78	14,922 SF	41,483
Pipe Insulation (25-30 feet above ground)	5.25	80 LF	420
Pipe Fitting Insulation (including demo of walls)	32.59	675 EA	22,000
Handling Cost	25.00	96 EA	2,400
Mobilization	300.00	3 EA	900
Waste Disposal Cost	<u>50.00</u>	<u>7 CY</u>	<u>350</u>
Removal Subtotal			67,553
IH Supervision and Monitoring			<u>8,500</u>
Project Subtotal			76,053
Contingency (42%)			<u>31,942</u>
<b>Project Total</b>			<b>107,995</b>

SF = Square Feet    LF = Linear Feet    EA = Each    CY = Cubic Yard

## 11.0 CONCLUSIONS

Inspection of Building 31 and confirmatory laboratory bulk sample analysis of selected samples identified the following materials with asbestos concentrations greater than one percent.

<u>Identified ACM</u>	<u>Quantity</u>	<u>NESHAP Category</u>
Floor Tile, 12 x12" off-white with brown streak w/ black mastic	3,290 SF	Category I, non-friable
Floor Tile, 9" x 9" black w/ black mastic	3,400 SF	Category I, non-friable
Floor Tile, 9" x 9" red w/ black mastic	55 SF	Category I, non-friable
Floor tile, 12" x 12" floral green w/ black mastic	55 SF	Category I, non-friable
Floor Tile, 12" x 12" black w/ black mastic	11,400 SF	Category I, non-friable
Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic	4,065SF	Category I, non-friable
Floor tile, 12" x 12" brown w/ black mastic	7,330 SF	Category I, non-friable
Pipe Fitting Insulation, 3" white with canvas wrap on steam	300 EA	Regulated, friable
Pipe Insulation, 12" with metal wrap	80 LF	Regulated, friable

The following materials were not sampled in order to avoid disrupting their integrity, and they were assumed to contain asbestos:

<u>Assumed ACM</u>	<u>Quantity</u>	<u>NESHAP Category</u>
Pipe Fitting Insulation, 3" white with canvas wrap on domestic water	375 EA	Regulated, friable

Other suspect ACM not identified could be present in areas of the building inaccessible to the asbestos-building inspectors. For example, material could exist in walls and other locations where access could only be gained by demolition of the building. Also, other materials currently not recognized as ACM by the asbestos building inspection industry could exist.

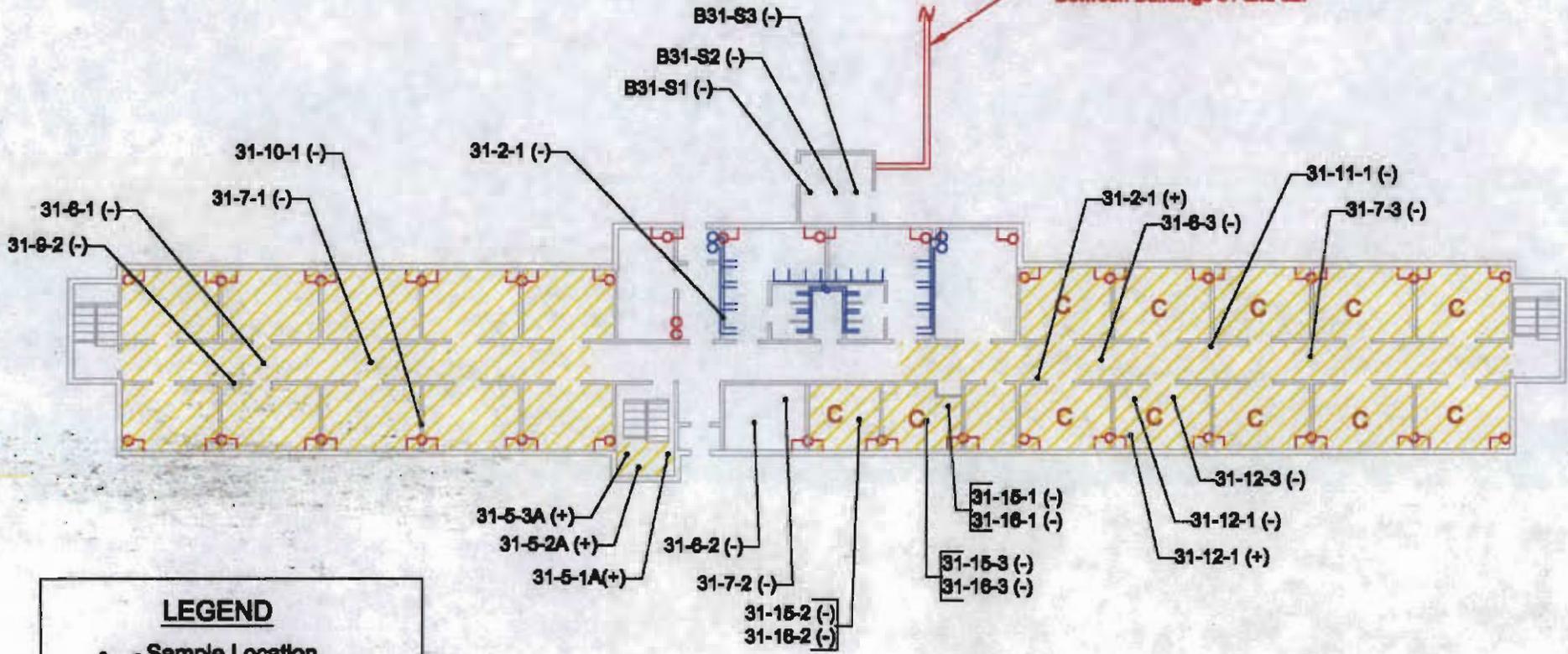
Rooms that were inaccessible to the asbestos-building inspectors have been identified on the drawings of the building in Appendix B, *Sample and ACM Location Drawings*.

EPA rules governing the application, removal and disposal of ACM were promulgated under NESHAP [40 CFR 61 Part M]. NESHAP requires the building owner or asbestos removal contractor to notify EPA when a building containing ACM is to be renovated, ACM is to be removed, or the building is to be demolished. At least 20 days notification is required "...if less than 260 linear feet of asbestos pipe covering or 160 square feet of asbestos material are removed during building renovation". Ten days notification is required when the amount is greater than 260 linear feet or 160 square feet of friable ACM.

**APPENDIX A**

**SAMPLE AND ACM LOCATION DRAWINGS**

12" Asbestos-Containing  
Steam Pipe Insulation  
Between Buildings 31 and 32.



**LEGEND**

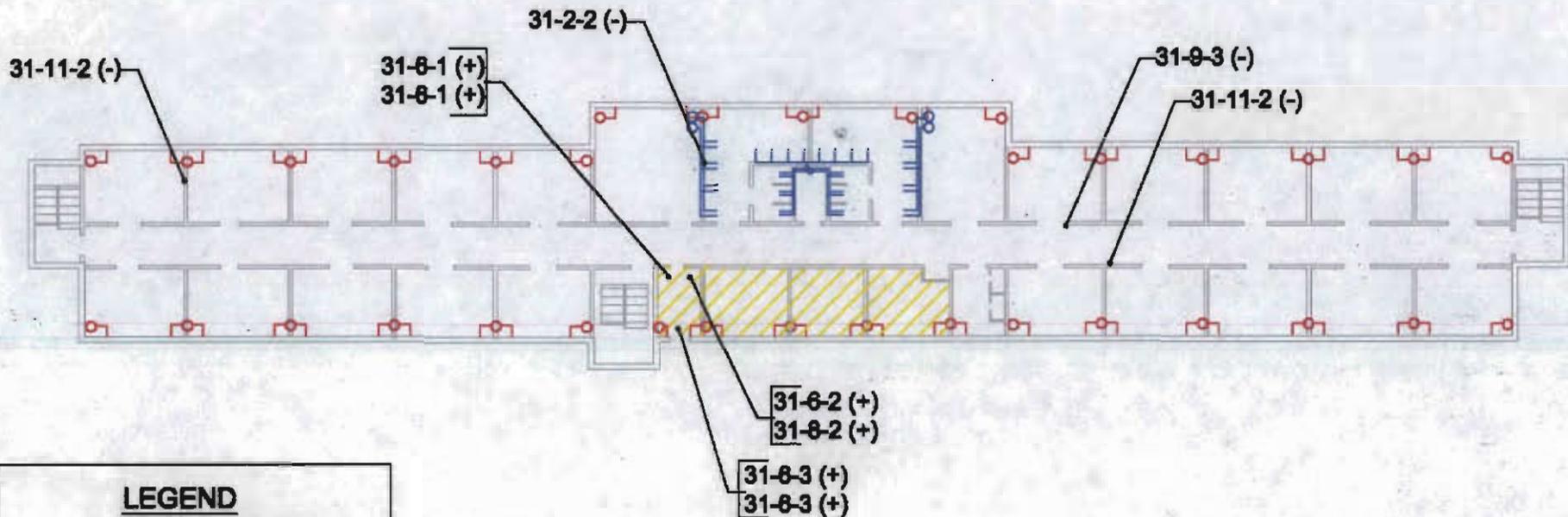
- - Sample Location
- (-) - Non-Asbestos-Containing Sample Location
- (+) - Asbestos-Containing Sample Location
- Asbestos-Containing Floor Tile and Mastic
- Asbestos-Containing Pipe Fitting Insulation on Riser and Branches to Radiator
- Asbestos-Containing Pipe Fitting Insulation on Domestic Water (Inaccessible in Walls)
- C - Under Carpet

**BUILDING 31**  
**FIRST FLOOR**

Sample and Asbestos-Containing  
Material Locations



**BAT Associates, Inc.**  
ENVIRONMENTAL, HEALTH & SAFETY SERVICES  
5151 BROOK HOLLOW PARKWAY, SUITE 250  
NORCROSS, GA 30071

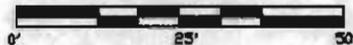


### LEGEND

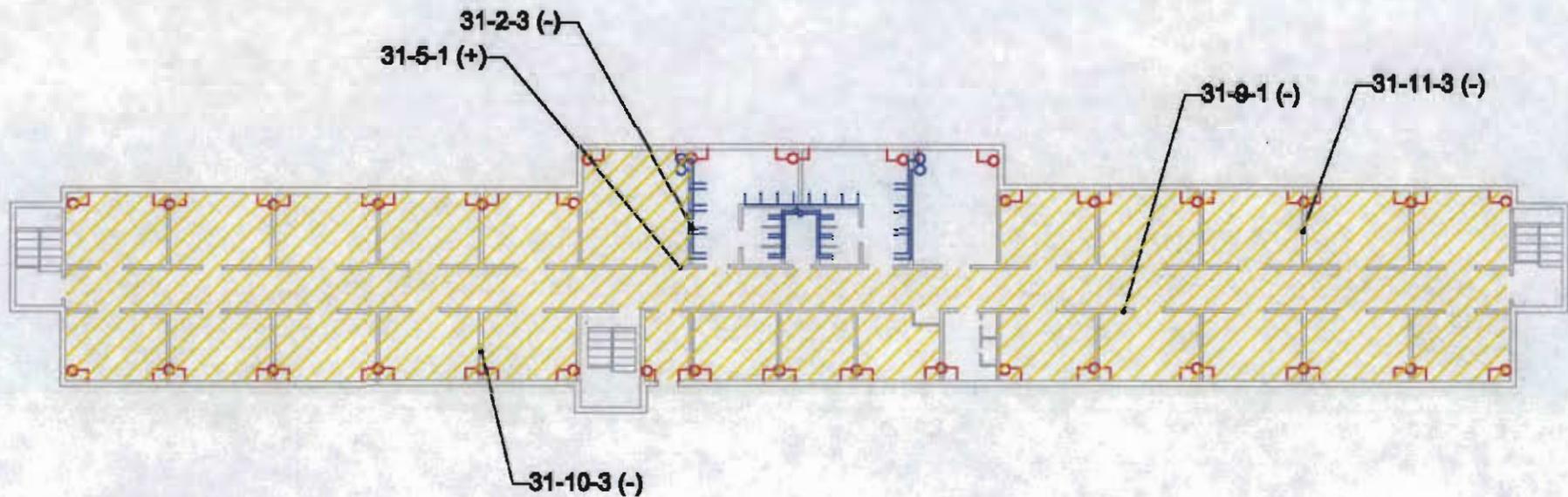
- - Sample Location
- (-) - Non-Asbestos-Containing Sample Location
- (+) - Asbestos-Containing Sample Location
-  - Asbestos-Containing Floor Tile and Mastic
-  - Asbestos-Containing Pipe Fitting Insulation on Riser and Branches to Radiator
-  - Asbestos-Containing Pipe Fitting Insulation on Domestic Water (Inaccessible in Walls)

## BUILDING 31 SECOND FLOOR

Sample and Asbestos-Containing  
Material Locations



**BAT Associates, Inc.**  
ENVIRONMENTAL, HEALTH & SAFETY SERVICES  
5151 BROOK HOLLOW PARKWAY, SUITE 250  
NORCROSS, GA 30071

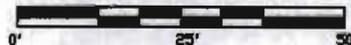


**LEGEND**

- - Sample Location
- (-) - Non-Asbestos-Containing Sample Location
- (+) - Asbestos-Containing Sample Location
-  - Asbestos-Containing Floor Tile and Mastic
-  - Asbestos-Containing Pipe Fitting Insulation on Riser and Branches to Radiator
-  - Asbestos-Containing Pipe Fitting Insulation on Domestic Water (Inaccessible in Walls)

**BUILDING 31  
THIRD FLOOR**

Sample and Asbestos-Containing Material Locations



**BAT Associates, Inc.**  
 ENVIRONMENTAL, HEALTH & SAFETY SERVICES  
 5151 BROOK HOLLOW PARKWAY, SUITE 250  
 NORCROSS, GA 30071

**APPENDIX B**

**PHOTOGRAPHIC DOCUMENTATION  
OF IDENTIFIED ACM**



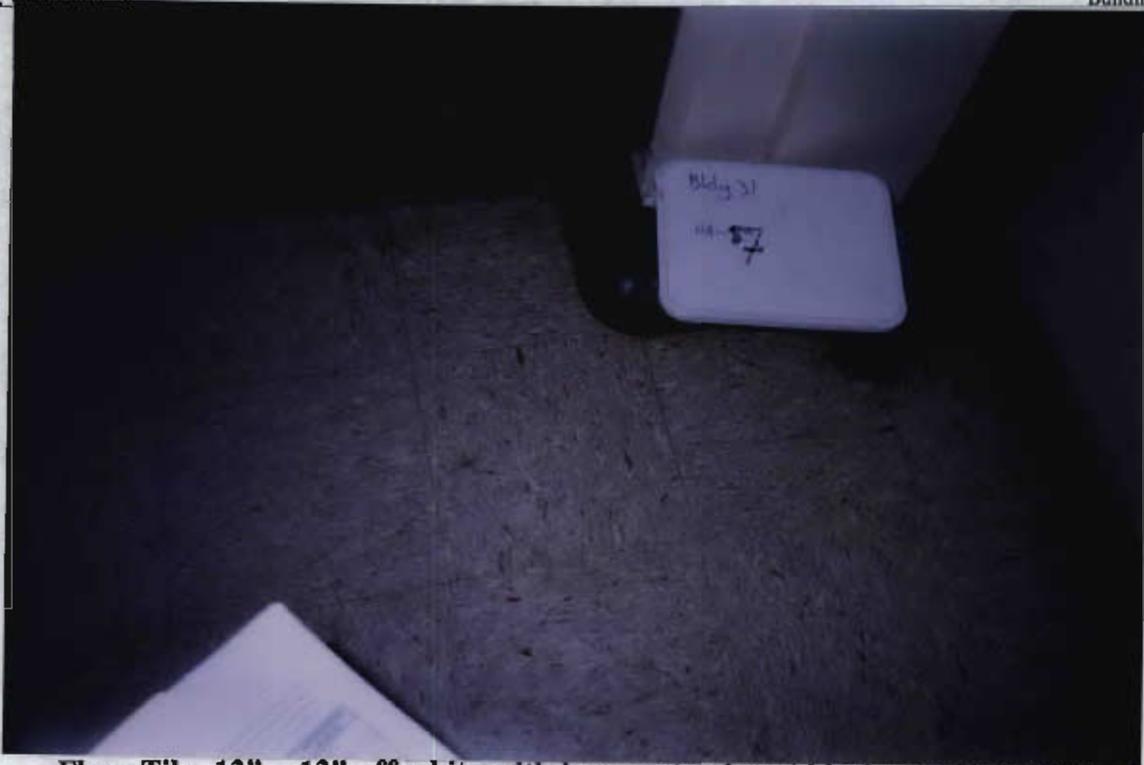
**Pipe Insulation, 12" with metal wrap, HA # 21**



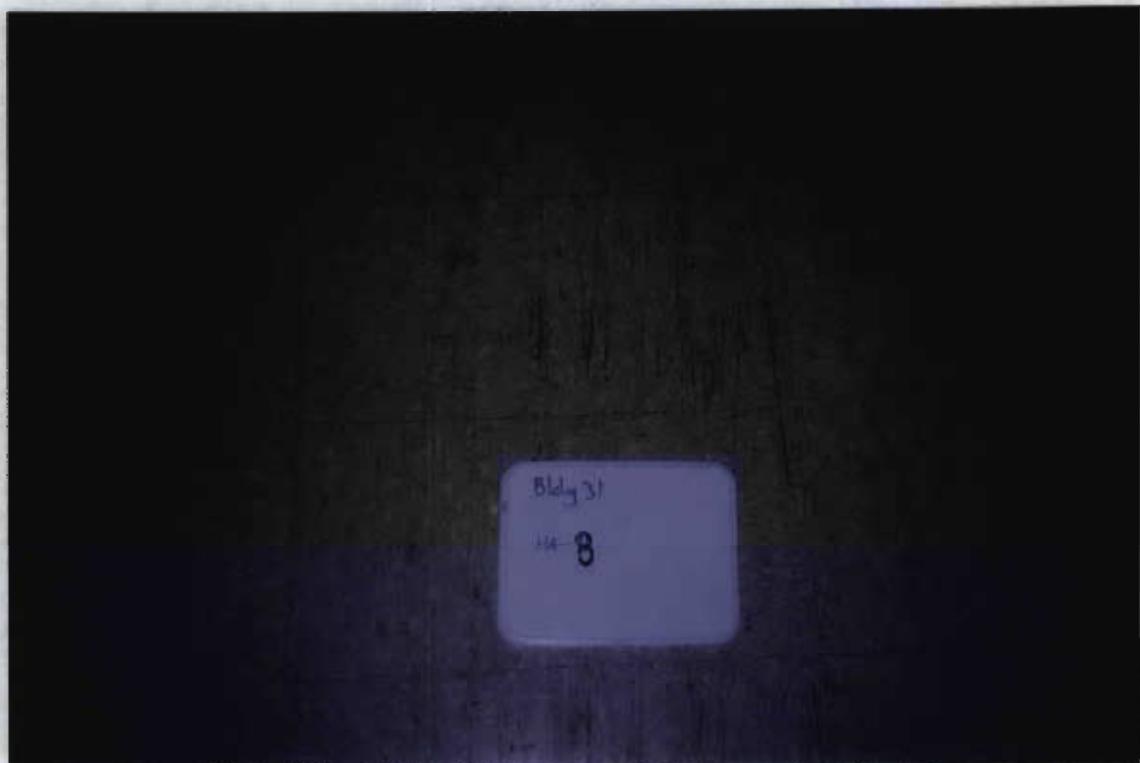
Pipe Fitting Insulation, 3" white with canvas wrap on steam, HA # 18

**INACCESSIBLE IN WALLS**

Pipe Fitting Insulation, 3" white with canvas wrap on domestic water, HA # 25



**Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic, HA # 7**



**Floor Tile, 12" x 12" brown w/ black mastic, HA # 8**



**Floor Tile, 9" x 9" red w/ black mastic, HA # 4**



**Floor Tile, 12" x 12" floral green w/ black mastic, HA # 5**

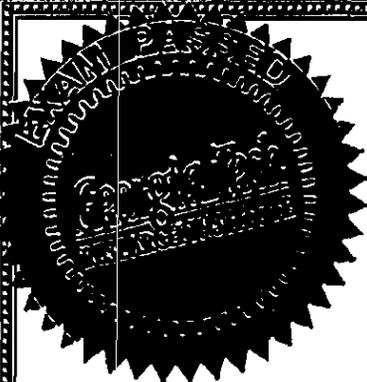
**Floor Tile, 12" x 12" off-white with brown streaks w/ black mastic, HA # 2**



**Floor Tile, 9" x 9" black w/ black mastic, HA # 3**

**APPENDIX C**

**PERSONNEL AND LABORATORY ACCREDITATIONS**



# The Georgia Institute of Technology

This is to certify that

## Foshie Bell

has attended an EPA-approved half-day Continuing Education Course entitled:

### **Inspecting Buildings for Asbestos Containing Materials (Annual Refresher Course for Building Inspectors)**

as required by the Federal EPA AHERA Model Accreditation Plan for re-accreditation as a Building Inspector for Asbestos (TSCA Title II).

Georgia Tech Research Institute  
Electro-Optics, Environment and Materials Laboratory  
Atlanta, GA 30332  
Phone: (404) 894-7430; FAX: (404) 894-1267

August 26, 1998

Dates of Attendance

August 26, 1999

Expiration Date

149-64-0385

Social Security Number

Myrtle I. Turner, CET  
Course Director  
2900

Certificate Number

---

---

# The Environmental Institute

---

---

---

## Douglas J. Milton

---

Social Security Number - 266-55-7179

*Has completed coursework and satisfactorily passed*

*an examination that meets all criteria required for*

*EPA/AHERA/ASHARA (TSCA Title II) Approved Reaccreditation*

*and NESHAP Regulations Training*

***Asbestos in Buildings: Inspector & Management***

***Planner Refresher***

December 15, 1999

Course Date

6398

Certificate Number

December 15, 1999

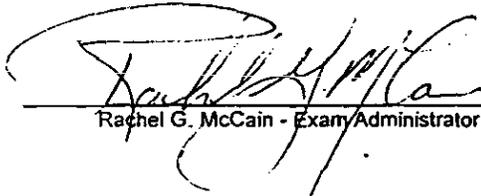
Examination Date

December 14, 2000

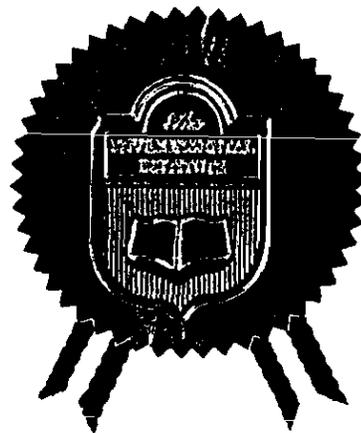
Expiration Date



Tod A. Dawson - Course Director

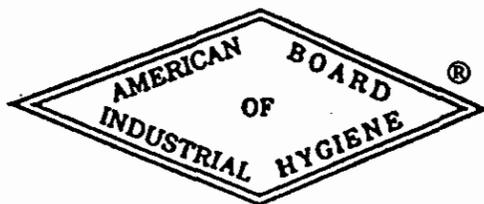


Rachel G. McCain - Exam Administrator



TEI - 1300 Williams Drive, Suite E - Marietta, Georgia 30066 - (770) 427-3600

The  
American Board of Industrial Hygiene®  
ABIH®



organized to improve the practice of Industrial Hygiene  
proclaims that

**Douglas J. Milton**

having met all requirements through  
education, experience and examination,  
is hereby certified in the

**COMPREHENSIVE PRACTICE  
of  
INDUSTRIAL HYGIENE**

and has the right to use the designations

**CERTIFIED INDUSTRIAL HYGIENIST**

**CIH**

November 12, 1997

date

A handwritten signature in cursive script, reading "J. Kenneth Cronin".

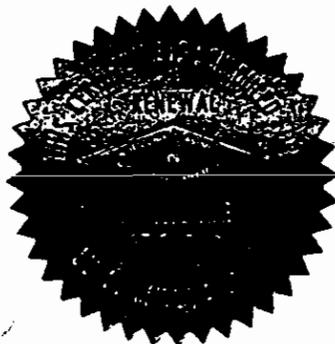
Chair ABIH

CP 7612

certificate  
number

A handwritten signature in cursive script, reading "Robert T. Conner".

Secretary ABIH





South Carolina Department of Health and Environmental Control

ASBESTOS ABATEMENT LICENSE

No. 22860

This certifies that

*Douglas J Milton*

266-NEB-7179

doing business as *B A T Associates, Inc*

has satisfactorily completed the training required by South Carolina Regulation No. 61-86.1 and the EPA Model Accreditation Plan, 40 CFR 763 Subpart E Appendix C, for the category of

*Consultant/Management Planner*

The holder of this license shall comply with all the requirements of said Regulation.

This License, License Number, or any Representation thereof, is not transferable to any other licensee or company. Use of this License is only authorized for the licensee and Company whose name appears hereon and shall expire one year from

09/24/98.

The holder of this license is qualified in accordance with requirements of the Asbestos Hazard Emergency Response Act of 1986 (AHERA) to perform as an abatement Building Inspector.

07/28/99

ORIGINAL

07/28/99 14:31



*Richard D. Sharpe*

Richard D. Sharpe, Director  
Air Compliance Management Division  
Bureau of Air Quality  
South Carolina Department of Health & Environmental Control

CR-001128



South Carolina Department of Health and Environmental Control

ASBESTOS ABATEMENT LICENSE

No. 22859

This certifies that

*Douglas J Milton*

266-BOJ-7179

doing business as *B A T Associates, Inc*

has satisfactorily completed the training required by South Carolina Regulation No. 61-86.1 and the EPA Model Accreditation Plan, 40 CFR 763 Subpart E Appendix C, for the category of

*Consultant/Building Inspector*

The holder of this license shall comply with all the requirements of said Regulation.

This License, License Number, or any Representation thereof, is not transferable to any other licensee or company. Use of this License is only authorized for the licensee and Company whose name appears hereon and shall expire one year from

09/23/98.

07/28/99

ORIGINAL

07/28/99 14:28



*Richard D. Sharpe*

Richard D. Sharpe, Director  
Air Compliance Management Division  
Bureau of Air Quality  
South Carolina Department of Health & Environmental Control

CR-001128



United States Department of Commerce  
National Institute of Standards and Technology

**NVLAP**<sup>®</sup>

ISO/IEC GUIDE 25:1990  
ISO 9002:1987

**Certificate of Accreditation**



**ANALYTICAL ENVIRONMENTAL SERVICES, INC.**  
ATLANTA, GA

*is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:*

**BULK ASBESTOS FIBER ANALYSIS**

September 30, 2000

*Effective through*

A handwritten signature in black ink, appearing to read "James L. Galt".

*For the National Institute of Standards and Technology*

**NVLAP Lab Code: 102033-0**

United States Department of Commerce  
National Institute of Standards and Technology

NVLAP<sup>®</sup>



ISO/IEC GUIDE 25:1990  
ISO 9002:1987

Certificate of Accreditation

CAPE ENVIRONMENTAL MANAGEMENT, INC.  
ATLANTA, GA

*is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:*

**BULK ASBESTOS FIBER ANALYSIS**

June 30, 2000

Effective through

A handwritten signature in black ink, appearing to read "James L. Galt".

For the National Institute of Standards and Technology

NVLAP Lab Code: 102111-0

**APPENDIX D**

**LABORATORY ANALYSIS RESULTS**

**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L80ZZ.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 31-5-1 LAB ID: 928071  
SAMPLE INFO: DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO  
APPEARANCE: BLACK HARD SILTY TO GRANULAR (FT) WITH FIBERS AND BROWN MASTIC

**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYBOTILE	7	CELLULOSE		VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS		PERLITE		SAND/AGGR.	20
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	5
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	68

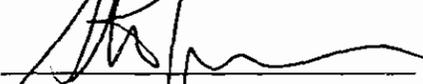
COMMENTS: **2% CHRYBOTILE IN MASTIC**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92 ) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY.  
REPORT 1 OF 1

ANALYST

  
ALEKSEY REZNIK

QUALITY CONTROL

  
STEVE JARVIS



**ANALYTICAL ENVIRONMENTAL SERVICES, INC.**  
 3125 Marjan Drive  
 Atlanta, GA 30340  
 Tel: (770) 457-8177  
 Fax: (770) 457-8188

AES Job Number: B212  
 Page 68 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3438  
 Client Sample ID: 32-2-1  
 Location: Not given

Sample Description: Green hard compact partly granular with fibers, glue and paint.

All percentages given below are visually estimated by volume

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	
Tremolite:		Aggregates:	45
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:	1	Aluminum:	
Mineral Wool:		Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	1	Glue:	3
Animal Hair:		Binders:	50
Antigorite:			

COMMENTS: Paint included as binder.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

All percentages given are by volume visually estimated. All analyses are performed in accordance with the EPA "Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116, July 1993." This report must not be reproduced except in full with the approval of Analytical Environmental Services, Inc. These test results apply only to the samples actually tested. The refractive index was determined by using "Rapidly and Accurately Determining Refractive Indices of Asbestos Fibers by Using Dispersion Staining Method" by Shu-Chun Su, Ph.D.

**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
 PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
 PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
 SAMPLE FIELD ID: 31-2-1 LAB ID: 928086  
 SAMPLE INFO: DATE ANALYZED: 1/10/00

SAMPLE DESCRIPTION

LAYERED: NO

APPEARANCE: GRAY SOFT POWDERY TO FIBROUS WITH CANVAS AND PAINT

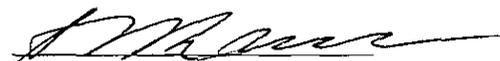
RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYCOTILE		CELLULOSE	25	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS	20	PERLITE		SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	55

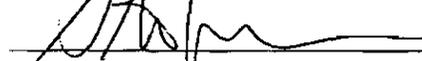
COMMENTS:

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST

  
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STEVE JARVIS

**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
 PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
 PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
 SAMPLE FIELD ID: 31-2-2 LAB ID: 928087  
 SAMPLE INFO: DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO  
 APPEARANCE: GRAY SOFT POWDERY TO FIBROUS WITH CANVAS AND PAINT

**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYBOTILE		CELLULOSE	25	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS	10	PERLITE		SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	65

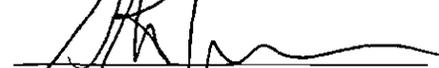
**COMMENTS:**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST

  
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PLM IS NOT CONSISTENTLY RELIABLE IN DETECTING SMALL CONCENTRATION OF ASBESTOS IN FLOOR TILES AND SIMILAR NON-FRIABLE MATERIALS. QUANTITATIVE TEM IS CURRENTLY THE ONLY METHOD THAT CAN BE USED TO GET THE CONCLUSIVE ASBESTOS CONTENT. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL AND NOT WITHOUT WRITTEN APPROVAL OF THE LABORATORY. THIS REPORT SHALL NOT BE USED TO CLAIM ENDORSEMENT BY NVLAP OR ANY AGENCY OF U.S. GOVERNMENT

**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME:	BAT ASSOCIATES	LAB JOB NO:	B9334-2
PROJECT NAME:	CHARLESTON NSY / 971001-13.03	DATE RECEIVED:	12/16/99
PROJECT NO:	L802Z.000	REPORT ISSUED:	1/13/00
SAMPLE FIELD ID:	31-2-3	LAB ID:	928088
SAMPLE INFO:		DATE ANALYZED:	1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO

APPEARANCE: GRAY SOFT POWDERY TO FIBROUS WITH CANVAS AND PAINT

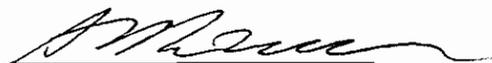
**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYBOTILE		CELLULOSE	25	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS	10	PERLITE		SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	65

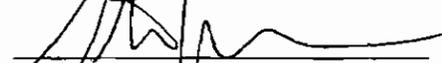
**COMMENTS:**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 783, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
  
SAMPLE FIELD ID: 31-5-1 LAB ID: 928071  
SAMPLE INFO: DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO  
APPEARANCE: BLACK HARD SILTY TO GRANULAR (FT) WITH FIBERS AND BROWN MASTIC

**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS	NONFIBROUS COMPONENTS	OTHER COMPONENTS	
CHRYSTOLE	7	CELLULOSE	VERMICULITE/MICA	BITUMEN/TAR	
AMOSITE		GLASS FIBERS	PERLITE	SAND/AGGR.	20
CROCIDOLITE		SYNTHETICS	EXPANDED GLASS	GLUE/CAULK	5
TREMOLITE		WOLLASTONITE	SYNTHETIC FOAM	VINYL	
ACTINOLITE		TALC	ALUMINUM/METAL	CORK	
ANTHOPHYLLITE			FOAM RUBBER	LATEX/RUBBER	
				PAINT/OTHER	68

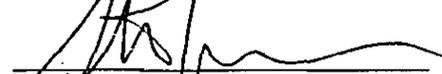
COMMENTS: 2% CHRYSTOLE IN MASTIC

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

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PLM IS NOT CONSISTENTLY RELIABLE IN DETECTING SMALL CONCENTRATION OF ASBESTOS IN FLOOR TILES AND SIMILAR NONFRIABLE MATERIALS. QUANTITATIVE TEM IS CURRENTLY THE ONLY METHOD THAT CAN BE USED TO GET THE CONCLUSIVE ASBESTOS CONTENT. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, AND NOT WITHOUT WRITTEN APPROVAL OF THE LABORATORY. THIS REPORT SHALL NOT BE USED TO CLAIM ENDORSEMENT BY NVLAP OR ANY AGENCY OF U.S. GOVERNMENT.

**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
 PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
 PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
 SAMPLE FIELD ID: 31-5-2 LAB ID: 928072  
 SAMPLE INFO: DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO

APPEARANCE: RED HARD SILTY TO GRANULAR (FT) WITH FIBERS AND BROWN MASTIC

**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYSTOLE	10	CELLULOSE		VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS		PERLITE		SAND/AGGR.	20
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	2
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	68

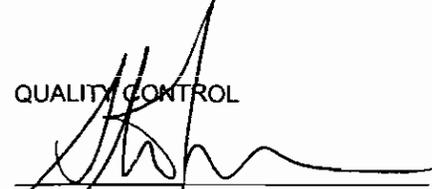
COMMENTS: **2% CHRYSTOLE IN MASTIC**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 31-5-3 LAB ID: 928073  
SAMPLE INFO: DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO

APPEARANCE: RED HARD SILTY TO GRANULAR (FT) WITH FIBERS AND BROWN MASTIC

**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYSTOTILE	8	CELLULOSE		VERMICULITE/MICA	3	BITUMEN/TAR	
AMOSITE		GLASS FIBERS		PERLITE		SAND/AGGR.	20
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	3
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	66

COMMENTS: 2% CHRYSTOTILE IN MASTIC

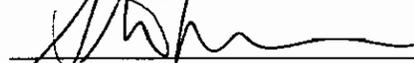
SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST



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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 31-6-1 LAB ID: 928074  
SAMPLE INFO: DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO

APPEARANCE: GRAY SOFT FIBROUS TO GRANULAR TO POWDERY WITH PAINT

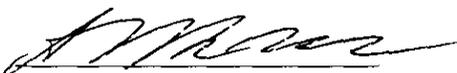
**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYCOTILE		CELLULOSE	30	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS	30	PERLITE	30	SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	10

**COMMENTS:**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 31-6-2 LAB ID: 928075  
SAMPLE INFO: DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO  
APPEARANCE: GRAY SOFT FIBROUS TO GRANULAR TO POWDERY WITH PAINT

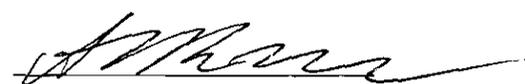
**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYSTOLE		CELLULOSE	30	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS	30	PERLITE	25	SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	15

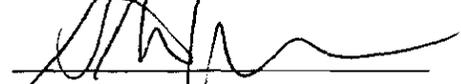
**COMMENTS:**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1.92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST

  
ALEKSEY REZNIK

QUALITY CONTROL

  
STEVE JARVIS

**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
 PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
 PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
 SAMPLE FIELD ID: 31-6-3 LAB ID: 928076  
 SAMPLE INFO: \_\_\_\_\_ DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO  
 APPEARANCE: GRAY SOFT FIBROUS TO GRANULAR TO POWDERY WITH PAINT

**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYBOTILE		CELLULOSE	25	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS	25	PERLITE	35	SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	15

**COMMENTS:**

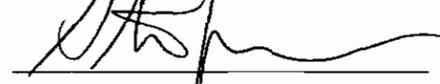
SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST



ALEKSEY REZNIK

QUALITY CONTROL



STEVE JARVIS

PLM IS NOT CONSISTENTLY RELIABLE IN DETECTING SMALL CONCENTRATION OF ASBESTOS IN FLOOR TILES AND SIMILAR NON-FRIABLE MATERIALS. QUANTITATIVE TEM IS CURRENTLY THE ONLY METHOD THAT CAN BE USED TO GET THE CONCLUSIVE ASBESTOS CONTENT. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, AND NOT WITHOUT WRITTEN APPROVAL OF THE LABORATORY. THIS REPORT SHALL NOT BE USED TO CLAIM ENDORSEMENT BY NVLAP OR ANY AGENCY OF U.S. GOVERNMENT.

**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 31-7-1 LAB ID: 928077  
SAMPLE INFO: \_\_\_\_\_ DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO  
APPEARANCE: GRAY SOFT FIBROUS TO GRANULAR TO POWDERY WITH PAINT

**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYCOTILE		CELLULOSE	35	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS	25	PERLITE	30	SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	10

**COMMENTS:**

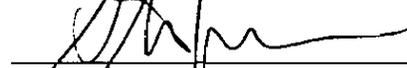
SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST



ALEKSEY REZNIK

QUALITY CONTROL



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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 31-7-2 LAB ID: 928078  
SAMPLE INFO: DATE ANALYZED: 1/10/00

SAMPLE DESCRIPTION

LAYERED: NO  
APPEARANCE: GRAY SOFT FIBROUS TO GRANULAR TO POWDERY WITH PAINT

RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYBOTILE		CELLULOSE	35	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS	25	PERLITE	30	SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	10

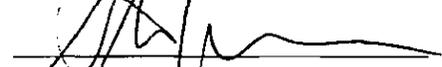
COMMENTS:

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ANALYST

  
ALEKSEY REZNIK

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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
 PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
 PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
 SAMPLE FIELD ID: 31-7-3 LAB ID: 928079  
 SAMPLE INFO: \_\_\_\_\_ DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO  
 APPEARANCE: GRAY SOFT FIBROUS TO GRANULAR TO POWDERY WITH PAINT

**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYBOTILE		CELLULOSE	30	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE		GLASS FIBERS	30	PERLITE	30	SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	10

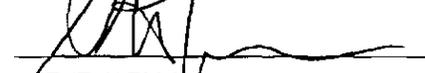
**COMMENTS:**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92 ) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
  
SAMPLE FIELD ID: 31-8-1 LAB ID: 928080  
SAMPLE INFO: DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO

APPEARANCE: BROWN HARD RESILIENT TO GRANULAR (FT) WITH BLACK MASTIC

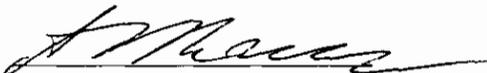
**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYBOTILE	<1	CELLULOSE	3	VERMICULITE/MICA		BITUMEN/TAR	3
AMOSITE		GLASS FIBERS		PERLITE		SAND/AGGR.	30
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	64

COMMENTS: **NO ASBESTOS DETECTED IN BLACK MASTIC**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST

  
ALEKSEY REZNIK

QUALITY CONTROL

  
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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 31-8-2 LAB ID: 928081  
SAMPLE INFO: \_\_\_\_\_ DATE ANALYZED: 1/10/00

SAMPLE DESCRIPTION

LAYERED: NO  
APPEARANCE: BROWN HARD RESILIENT TO GRANULAR (FT) WITH BLACK MASTIC

RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYSTOLE	1	CELLULOSE	3	VERMICULITE/MICA		BITUMEN/TAR	4
AMOSITE		GLASS FIBERS		PERLITE		SAND/AGGR.	35
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	57

COMMENTS: **NO ASBESTOS DETECTED IN BLACK MASTIC**

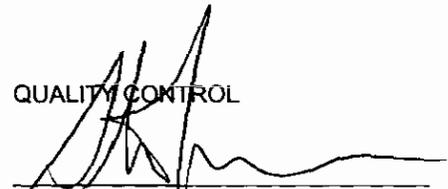
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ANALYST



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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 31-8-3 LAB ID: 928082  
SAMPLE INFO: \_\_\_\_\_ DATE ANALYZED: 1/10/00

SAMPLE DESCRIPTION

LAYERED: NO

APPEARANCE: BROWN HARD RESILIENT TO GRANULAR (FT) WITH BLACK MASTIC

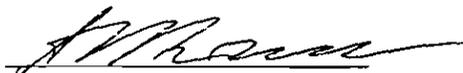
RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYBOTILE	3	CELLULOSE	2	VERMICULITE/MICA		BITUMEN/TAR	3
AMOSITE		GLASS FIBERS		PERLITE		SAND/AGGR.	30
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	62

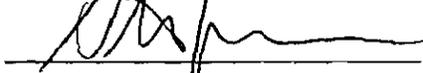
COMMENTS: **NO ASBESTOS DETECTED IN BLACK MASTIC**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST

  
ALEKSEY REZNIK

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**ANALYTICAL ENVIRONMENTAL SERVICES, INC.**  
 3125 Marjan Drive  
 Atlanta, GA 30340  
 Tel: (770) 457-8177  
 Fax: (770) 457-8188

AES Job Number: B212  
 Page 139 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name:	B A T Associates, Inc.	Project Number	971001
Project Name:	Charleston Naval Shipyard	AES Lab ID:	3509
Client Sample ID:	31-9-1		
Location:	Not given		

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder. -

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

*S. Arkhipov*  
 Svetlana Arkhipov

QCAlyst:

*Andrew Pittman*  
 Andrew Pittman

All percentages given are by volume visually estimated. All analyses are performed in accordance with the EPA "Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116, July 1993." This report must not be reproduced except in full with the approval of Analytical Environmental Services, Inc. These test results apply only to the samples actually tested. The refractive index was determined by using "Rapidly and Accurately Determining Refractive Indices of Asbestos Fibers by Using Dispersion Staining Method" by Shu-Chun Su, Ph.D.



**ANALYTICAL ENVIRONMENTAL SERVICES, INC.**  
 3125 Marjan Drive  
 Atlanta, GA 30340  
 Tel: (770) 457-8177  
 Fax: (770) 457-8188

AES Job Number: B212  
 Page 140 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3510  
 Client Sample ID: 31-9-2  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder. -

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Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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 Fax: (770) 457-8188

AES Job Number: B212  
 Page 141 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3511  
 Client Sample ID: 31-9-3  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder. -

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Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 142 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3512  
 Client Sample ID: 31-10-1  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder. -

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Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 143 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name:	B A T Associates, Inc.	Project Number	971001
Project Name:	Charleston Naval Shipyard	AES Lab ID:	3513
Client Sample ID:	31-10-2		
Location:	Not given		

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder. -

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

All percentages given are by volume visually estimated. All analyses are performed in accordance with the EPA "Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116, July 1993." This report must not be reproduced except in full with the approval of Analytical Environmental Services, Inc. These test results apply only to the samples actually tested. The refractive index was determined by using "Rapidly and Accurately Determining Refractive Indices of Asbestos Fibers by Using Dispersion Staining Method" by Shu-Chun Su, Ph.D.



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 Fax: (770) 457-8188

AES Job Number: B212  
 Page 144 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc.  
 Project Name: Charleston Naval Shipyard  
 Client Sample ID: 31-10-3  
 Location: Not given

Project Number: 971001  
 AES Lab ID: 3514

Sample Description: Gray soft fibrous to perlitic.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	
Mineral Wool:	35
Fiberglass:	
Cellulose:	25
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	30
Aggregates:	
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	
Resilient Material:	
Glue:	
Binders:	10

**COMMENTS:**

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: **B212**  
 Page 145 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: **B A T Associates, Inc.**  
 Project Name: **Charleston Naval Shipyard** Project Number: **971001**  
 Client Sample ID: **31-11-1** AES Lab ID: **3515**  
 Location: **Not given**

Sample Description: **Gray soft fibrous to perlitic with paint.**

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: **Paint included as binder. -**

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 146 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3516  
 Client Sample ID: 31-11-2  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder. -

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAnalyst:

Andrew Pittman

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AES Job Number: B212  
 Page 147 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3517  
 Client Sample ID: 31-11-3  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder. -

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 148 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3518  
 Client Sample ID: 31-12-1  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	
Mineral Wool:	35
Fiberglass:	
Cellulose:	25
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	30
Aggregates:	
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	
Resilient Material:	
Glue:	
Binders:	10

COMMENTS: Paint included as binder. -

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAnalyst:

Andrew Pittman

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AES Job Number: B212  
 Page 149 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3519  
 Client Sample ID: 31-12-2  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder. -

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAAnalyst:

Andrew Pittman

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AES Job Number: B212  
 Page 150 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3520  
 Client Sample ID: 31-12-3  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder. -

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 151 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3521  
 Client Sample ID: 31-13-1  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	30
Aggregates:	
Styrofoam:	

NON-ASBESTOS FIBERS	
Synthetics:	
Mineral Wool:	35
Fiberglass:	
Cellulose:	25
Animal Hair:	
Antigorite:	

OTHERS	
Aluminum:	
Bitumen:	
Resilient Material:	
Glue:	
Binders:	10

COMMENTS: Paint included as binder.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAAnalyst:

Andrew Pittman

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 Page 152 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3522  
 Client Sample ID: 31-13-2  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	
Mineral Wool:	35
Fiberglass:	
Cellulose:	25
Animal Hair:	
Antigorite:	

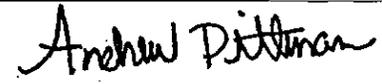
NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	30
Aggregates:	
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	
Resilient Material:	
Glue:	
Binders:	10

COMMENTS: Paint included as binder.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk-Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:   
 Svetlana Arkhipov

QCAAnalyst:   
 Andrew Pittman

All percentages given are by volume visually estimated. All analyses are performed in accordance with the EPA "Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116, July 1993." This report must not be reproduced except in full with the approval of Analytical Environmental Services, Inc. These test results apply only to the samples actually tested. The refractive index was determined by using "Rapidly and Accurately Determining Refractive Indices of Asbestos Fibers by Using Dispersion Staining Method" by Shu-Chun Su, Ph.D.



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AES Job Number: B212  
 Page 153 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3523  
 Client Sample ID: 31-13-3  
 Location: Not given

Sample Description: Gray soft fibrous to perlitic with paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	30
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	35	Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	10
Antigorite:			

COMMENTS: Paint included as binder.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 154 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3524  
 Client Sample ID: 71 13-16-1  
 Location: (150) Not given

Sample Description: Light gray semi-hard silty with fibers and paint.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:		Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	1	Glue:	
Animal Hair:		Binders:	99
Antigorite:			

COMMENTS: Paint included as binder.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 155 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3525  
 Client Sample ID: 31-16-2  
 Location: Not given

Sample Description: Dark gray semi-hard silty with fibers.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:		Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	1	Glue:	
Animal Hair:		Binders:	99
Antigorite:			

COMMENTS:

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 156 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name:	B A T Associates, Inc.	Project Number	971001
Project Name:	Charleston Naval Shipyard	AES Lab ID:	3526
Client Sample ID:	31-16-3		
Location:	Not given		

Sample Description: Dark gray semi-hard silty with fibers.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:		Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	1	Glue:	
Animal Hair:		Binders:	99
Antigorite:			

COMMENTS:

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 33-3-1 LAB ID: 928056  
SAMPLE INFO: DATE ANALYZED: 1/10/00

SAMPLE DESCRIPTION

LAYERED: NO  
APPEARANCE: WHITE SOFT POWDERY TO FIBROUS WITH CANVAS AND PAINT

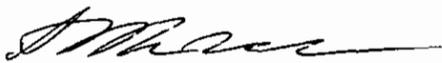
RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYSTOLE	15	CELLULOSE	20	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE	15	GLASS FIBERS		PERLITE		SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	50

COMMENTS:

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. 1 (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST



ALEKSEY REZNIK

QUALITY CONTROL



STEVE JARVIS

**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 33-3-2 LAB ID: 928057  
SAMPLE INFO: \_\_\_\_\_ DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO

APPEARANCE: WHITE SOFT POWDERY TO FIBROUS WITH CANVAS AND PAINT

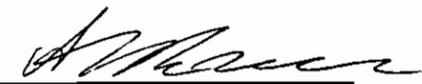
**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYSTOLITE	20	CELLULOSE	20	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE	15	GLASS FIBERS		PERLITE		SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	45

**COMMENTS:**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST

  
ALEKSEY REZNIK

QUALITY CONTROL

  
STEVE JARVIS

**POLARIZED LIGHT MICROSCOPY (PLM)  
BULK SAMPLE ANALYSIS REPORT**

CLIENT NAME: BAT ASSOCIATES LAB JOB NO: B9334-2  
PROJECT NAME: CHARLESTON NSY / 971001-13.03 DATE RECEIVED: 12/16/99  
PROJECT NO: L802Z.000 REPORT ISSUED: 1/13/00  
SAMPLE FIELD ID: 33-3-3 LAB ID: 928058  
SAMPLE INFO: \_\_\_\_\_ DATE ANALYZED: 1/10/00

**SAMPLE DESCRIPTION**

LAYERED: NO

APPEARANCE: WHITE SOFT POWDERY TO FIBROUS WITH CANVAS AND PAINT

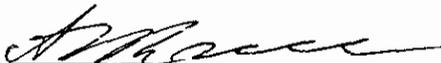
**RESULT OF ANALYSIS IN VOLUME PERCENTAGE (BY VISUAL ESTIMATE)**

ASBESTOS FIBERS		NONASBESTOS FIBERS		NONFIBROUS COMPONENTS		OTHER COMPONENTS	
CHRYBOTILE	20	CELLULOSE	15	VERMICULITE/MICA		BITUMEN/TAR	
AMOSITE	20	GLASS FIBERS		PERLITE		SAND/AGGR.	
CROCIDOLITE		SYNTHETICS		EXPANDED GLASS		GLUE/CAULK	
TREMOLITE		WOLLASTONITE		SYNTHETIC FOAM		VINYL	
ACTINOLITE		TALC		ALUMINUM/METAL		CORK	
ANTHOPHYLLITE				FOAM RUBBER		LATEX/RUBBER	
						PAINT/OTHER	45

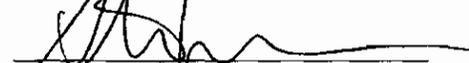
**COMMENTS:**

SAMPLE WAS ANALYZED BY PLM USING DISPERSION STAINING TECHNIQUES IN ACCORDANCE WITH U.S. EPA METHOD 40CFR Ch. I (7-1-92) PT. 763, SUBPT. F, APP. A. LAST CALIBRATION OF EQUIPMENT WAS PERFORMED ON: 1/10/00 FOR ALL HETEROGENEOUS AND LAYERED SAMPLES EASILY SEPARATED INTO SUBLAYERS, EACH LAYER IS ANALYZED SEPARATELY. REPORT 1 OF 1

ANALYST

  
ALEKSEY REZNIK

QUALITY CONTROL

  
STEVE JARVIS



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AES Job Number: B212  
 Page 23 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3393  
 Client Sample ID: Exterior Pipe - 32  
 Location: Not given

Sample Description: Layered: 1) Light brown semi-hard fibrous with aluminum; 2) Gray soft powdery to fibrous.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	15
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	
Mineral Wool:	
Fiberglass:	
Cellulose:	5
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	
Styrofoam:	

OTHERS	
Aluminum:	5
Bitumen:	
Resilient Material:	
Glue:	
Binders:	75

COMMENTS: Layer #2 contains 15% amosite. Layer #1 does not contain asbestos.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Svetlana Arkhipov

All percentages given are by volume visually estimated. All analyses are performed in accordance with the EPA "Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116, July 1993." This report must not be reproduced except in full with the approval of Analytical Environmental Services, Inc. These test results apply only to the samples actually tested. The refractive index was determined by using "Rapidly and Accurately Determining Refractive Indices of Asbestos Fibers by Using Dispersion Staining Method" by Shu-Chun Su, Ph.D.



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 3125 Marjan Drive  
 Atlanta, GA 30340  
 Tel: (770) 457-8177  
 Fax: (770) 457-8188

AES Job Number: B212  
 Page 26 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3396  
 Client Sample ID: B31-S1  
 Location: Not given

Sample Description: Layered: 1) Red semi-hard silty to woven; 2) Gray semi-hard silty to fibrous; 3) Light gray semi-hard fibrous.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	
Mineral Wool:	2
Fiberglass:	95
Cellulose:	
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	
Resilient Material:	
Glue:	
Binders:	3

COMMENTS:

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

*S. Arkhipov*  
 Svetlana Arkhipov

QCAlyst:

*S. Arkhipov*  
 Svetlana Arkhipov

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AES Job Number: **B212**  
 Page 27 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc.  
 Project Name: Charleston Naval Shipyard  
 Client Sample ID: B31-S2  
 Location: Not given  
 Project Number: 971001  
 AES Lab ID: 3397

Sample Description: Layered: 1) Red semi-hard silty to woven; 2) Gray semi-hard silty to fibrous; 3) Light gray semi-hard fibrous.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	2	Bitumen:	
Fiberglass:	95	Resilient Material:	
Cellulose:		Glue:	
Animal Hair:		Binders:	3
Antigorite:			

**COMMENTS:**

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

*S. Arkhipov*  
 Svetlana Arkhipov

QCAAnalyst:

*S. Arkhipov*  
 Svetlana Arkhipov

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AES Job Number: B212  
 Page 28 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3398  
 Client Sample ID: B31-S3  
 Location: Not given

Sample Description: Light gray soft powdery to fibrous.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	5
Mineral Wool:	
Fiberglass:	
Cellulose:	20
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	
Resilient Material:	
Glue:	
Binders:	75

**COMMENTS:**

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst

*S. Arkhipov*  
 Svetlana Arkhipov

QCAAnalyst

*S. Arkhipov*  
 Svetlana Arkhipov

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AES Job Number: B212  
 Page 74 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name:	B A T Associates, Inc.	Project Number	971001
Project Name:	Charleston Naval Shipyard	AES Lab ID:	3444
Client Sample ID:	32-4-1		
Location:	Not given		

Sample Description: Dark green hard compact partly granular with fibers and glue.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	1
Mineral Wool:	
Fiberglass:	
Cellulose:	1
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	45
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	
Resilient Material:	
Glue:	3
Binders:	50

**COMMENTS:**

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAnalyst:

Andrew Pittman

All percentages given are by volume visually estimated. All analyses are performed in accordance with the EPA "Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116, July 1993." This report must not be reproduced except in full with the approval of Analytical Environmental Services, Inc. These test results apply only to the samples actually tested. The refractive index was determined by using "Rapidly and Accurately Determining Refractive Indices of Asbestos Fibers by Using Dispersion Staining Method" by Shu-Chun Su, Ph.D.



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AES Job Number: B212  
 Page 75 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3445  
 Client Sample ID: 32-4-2  
 Location: Not given

Sample Description: Dark green hard compact partly granular with fibers and glue.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	1
Mineral Wool:	
Fiberglass:	
Cellulose:	1
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	45
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	
Resilient Material:	
Glue:	1
Binders:	52

COMMENTS:

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst

Svetlana Arkhipov

QCAlyst

Andrew Pittman

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AES Job Number: B212  
 Page 76 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3446  
 Client Sample ID: 32-4-3  
 Location: Not given

Sample Description: Dark green hard compact partly granular with fibers and glue.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	
Tremolite:		Aggregates:	45
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:	1	Aluminum:	
Mineral Wool:		Bitumen:	
Fiberglass:		Resilient Material:	
Cellulose:	1	Glue:	1
Animal Hair:		Binders:	52
Antigorite:			

COMMENTS:

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: **B212**  
 Page 133 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc.  
 Project Name: Charleston Naval Shipyard  
 Client Sample ID: 31-2-1  
 Location: Not given  
 Project Number: 971001  
 AES Lab ID: 3503

Sample Description: Red hard compact partly granular with fibers and glue.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	10
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	1
Mineral Wool:	
Fiberglass:	
Cellulose:	1
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	45
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	
Resilient Material:	
Glue:	3
Binders:	40

COMMENTS: Floor tile contains 10% chrysotile. Glue contains 1-2% chrysotile.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAAnalyst:

Andrew Pittman

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AES Job Number: B212  
 Page 136 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3506  
 Client Sample ID: 31-5-1  
 Location: Not given

Sample Description: Light green hard compact partly granular with fibers and bitumen.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	1
Mineral Wool:	
Fiberglass:	
Cellulose:	1
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	45
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	3
Resilient Material:	
Glue:	
Binders:	50

COMMENTS:

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAnalyst:

Andrew Pittman

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AES Job Number: B212  
 Page 80 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3450  
 Client Sample ID: 32-6-1  
 Location: Not given

Sample Description: Red hard compact partly granular with fibers, bitumen and glue.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	<1
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	3
Mineral Wool:	
Fiberglass:	
Cellulose:	2
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	40
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	2
Resilient Material:	
Glue:	2
Binders:	51

COMMENTS: Bitumen contains 3% chrysotile. Floor tile and glue do not contain asbestos.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAAnalyst:

Andrew Pittman

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 Tel: (770) 457-8177  
 Fax: (770) 457-8188

AES Job Number: B212  
 Page 81 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3451  
 Client Sample ID: 32-6-2  
 Location: Not given

Sample Description: Red hard compact partly granular with fibers, bitumen and glue.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:	<1	Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	
Tremolite:		Aggregates:	40
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:	3	Aluminum:	
Mineral Wool:		Bitumen:	2
Fiberglass:		Resilient Material:	
Cellulose:	2	Glue:	2
Animal Hair:		Binders:	51
Antigorite:			

COMMENTS: Bitumen contains 3% chrysotile. Floor tile and glue do not contain asbestos.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

All percentages given are by volume visually estimated. All analyses are performed in accordance with the EPA "Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116, July 1993." This report must not be reproduced except in full with the approval of Analytical Environmental Services, Inc. These test results apply only to the samples actually tested. The refractive index was determined by using "Rapidly and Accurately Determining Refractive Indices of Asbestos Fibers by Using Dispersion Staining Method" by Shu-Chun Su, Ph.D.



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AES Job Number: B212  
 Page 82 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3452  
 Client Sample ID: 32-6-3  
 Location: Not given

Sample Description: Red hard compact party granular with fibers, bitumen and glue.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	<1
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	3
Mineral Wool:	
Fiberglass:	
Cellulose:	2
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	40
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	2
Resilient Material:	
Glue:	2
Binders:	51

COMMENTS: Bitumen contains 3% chrysotile. Floor tile and glue do not contain asbestos.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAAnalyst:

Andrew Pittman

All percentages given are by volume visually estimated. All analyses are performed in accordance with the EPA "Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116, July 1993." This report must not be reproduced except in full with the approval of Analytical Environmental Services, Inc. These test results apply only to the samples actually tested. The refractive index was determined by using "Rapidly and Accurately Determining Refractive Indices of Asbestos Fibers by Using Dispersion Staining Method" by Shu-Chun Su, Ph.D.



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AES Job Number: **B212**  
 Page 77 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number: 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3447  
 Client Sample ID: 32-5-1  
 Location: Not given

Sample Description: Gray hard compact partly granular with fibers, bitumen and glue.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	5
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	1
Mineral Wool:	
Fiberglass:	
Cellulose:	1
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	45
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	3
Resilient Material:	
Glue:	1
Binders:	44

COMMENTS: Floor tile contains 5% chrysotile. Bitumen contains 10% chrysotile. Glue does not contain asbestos.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 47 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc.  
 Project Name: Charleston Naval Shipyard Project Number: 971001  
 Client Sample ID: 36-15-1 AES Lab ID: 3417  
 Location: Not given

Sample Description: Layered: 1) Black semi-hard bitumenous; 2) Black semi-hard bitumenous to fibrous; 3) Brown soft fibrous to perlitic.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	
Mineral Wool:	5
Fiberglass:	
Cellulose:	30
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	5
Aggregates:	
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	60
Resilient Material:	
Glue:	
Binders:	

COMMENTS:

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

All percentages given are by volume visually estimated. All analyses are performed in accordance with the EPA "Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-93/116, July 1993." This report must not be reproduced except in full with the approval of Analytical Environmental Services, Inc. These test results apply only to the samples actually tested. The refractive index was determined by using "Rapidly and Accurately Determining Refractive Indices of Asbestos Fibers by Using Dispersion Staining Method" by Shu-Chun Su, Ph.D.



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AES Job Number: B212  
 Page 48 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc.  
 Project Name: Charleston Naval Shipyard  
 Client Sample ID: 36-15-2  
 Location: Not given  
 Project Number: 971001  
 AES Lab ID: 3418

Sample Description: Layered: 1) Black semi-hard bitumenous; 2) Black semi-hard bitumenous to fibrous; 3) Brown soft fibrous to perlitic.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	5
Tremolite:		Aggregates:	
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:	5	Bitumen:	60
Fiberglass:		Resilient Material:	
Cellulose:	30	Glue:	
Animal Hair:		Binders:	
Antigorite:			

COMMENTS:

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 49 of 183 Total Samples  
 Wednesday, February 09, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc.  
 Project Name: Charleston Naval Shipyard Project Number: 971001  
 Client Sample ID: 36-15-3 AES Lab ID: 3419  
 Location: Not given

Sample Description: Layered: 1) Black semi-hard bitumenous with aggregates; 2) Black semi-hard bitumenous to fibrous.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS		NON-FIBROUS MATERIALS	
Chrysotile:		Vermiculite:	
Amosite:		Biotite:	
Crocidolite:		Mica:	
Anthophyllite:		Perlite:	
Tremolite:		Aggregates:	10
Actinolite:		Styrofoam:	
NON-ASBESTOS FIBERS		OTHERS	
Synthetics:		Aluminum:	
Mineral Wool:		Bitumen:	65
Fiberglass:		Resilient Material:	
Cellulose:	25	Glue:	
Animal Hair:		Binders:	
Antigorite:			

COMMENTS:

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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AES Job Number: B212  
 Page 41 of 183 Total Samples  
 Thursday, February 10, 2000



**BULK SAMPLE ANALYSIS**

Client Name: B A T Associates, Inc. Project Number 971001  
 Project Name: Charleston Naval Shipyard AES Lab ID: 3411  
 Client Sample ID: 36-4-1  
 Location: Not given

Sample Description: Gray hard compact partly granular with fibers, bitumen and glue.

**All percentages given below are visually estimated by volume**

ASBESTOS FIBERS	
Chrysotile:	3
Amosite:	
Crocidolite:	
Anthophyllite:	
Tremolite:	
Actinolite:	

NON-ASBESTOS FIBERS	
Synthetics:	1
Mineral Wool:	
Fiberglass:	
Cellulose:	1
Animal Hair:	
Antigorite:	

NON-FIBROUS MATERIALS	
Vermiculite:	
Biotite:	
Mica:	
Perlite:	
Aggregates:	45
Styrofoam:	

OTHERS	
Aluminum:	
Bitumen:	3
Resilient Material:	
Glue:	2
Binders:	45

COMMENTS: Floor tile contains 3 % chrysotile. Bitumen contains 5 % chrysotile. Glue does not contain asbestos.

It is certified by the signatures below that the laboratory identified is accredited by the National Institute of Standards and Technology for Polarized Light Microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Quality Assurance Program, Laboratory 102082-0.

Microanalyst:

Svetlana Arkhipov

QCAlyst:

Andrew Pittman

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# BAT

BAT Associates, Inc.  
ENVIRONMENTAL, HEALTH & SAFETY SERVICES

5151 Brook Hollow Pkwy., Suite 250  
Norcross, GA 30071  
Phone: (770) 242-39031  
Fax: (770) 242-3912

## CHAIN OF CUSTODY FORM

BAT PROJECT CONTACT <b>DOUGLAS J. MILTON</b>	
BAT JOB NAME <b>Charleston Naval Shipyard</b>	BAT JOB NO. <b>971001</b> TASK NO. <b>13.03</b>
ANALYSIS REQUESTED <input checked="" type="checkbox"/> PLM <input type="checkbox"/> PCM <input type="checkbox"/> AAS For Lead Content <input type="checkbox"/> OTHER _____	
CHECK ONE: <input type="checkbox"/> ROUTINE <input checked="" type="checkbox"/> ROUTINE - FAX (HANDWRITTEN) AS SOON AS POSSIBLE <input type="checkbox"/> RUSH - FAX (HANDWRITTEN) AS SOON AS POSSIBLE	
SAMPLE ID	SAMPLE ID
1. 31-2-1	16. 31-12-1
2. 31-2-2	17. 31-12-2
3. 31-2-3	18. 31-12-3
4. 31-5-1	19. 31-13-1
5. 31-5-2	20. 31-13-2
6. 31-5-3	21. 31-13-3
7. 31-9-1	22. 31-16-1
8. 31-9-2	23. 31-16-2
9. 31-9-3	24. 31-16-3
10. 31-10-1	25.
11. 31-10-2	26.
12. 31-10-3	27.
13. 31-11-1	28.
14. 31-11-2	29.
15. 31-11-3	30.
SPECIAL INSTRUCTIONS: <i>Analyze each homogeneous area tile position</i>	
Relinquished by: <i>Forster Bell</i>	Received by: <i>Jennystar Ross</i>
Date: <i>1/31/00</i> Time: <i>1357</i>	Date: <b>FEB 01 2000</b> Time: _____

*21100 NAU 4 BILL RATE*

D/A I

BAT Associates, Inc.  
ENVIRONMENTAL, HEALTH & SAFETY SERVICES

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Norcross, GA 30071  
Phone: (770) 242-39033  
Fax: (770) 242-3912

### CHAIN OF CUSTODY FORM

BAT PROJECT CONTACT		DOUGLAS J. MILTON	
BAT JOB NAME		Charleston Naval Shipyard	BAT JOB NO. 971001
			TASK NO. 13.03
ANALYSIS REQUESTED <input checked="" type="checkbox"/> PLM <input type="checkbox"/> PCM <input type="checkbox"/> AAS For Lead Content <input type="checkbox"/> OTHER _____			
CHECK ONE: <input type="checkbox"/> ROUTINE			
		<input checked="" type="checkbox"/> ROUTINE - FAX (HANDWRITTEN)	AS SOON AS POSSIBLE
		<input type="checkbox"/> RUSH - FAX (HANDWRITTEN)	AS SOON AS POSSIBLE
SAMPLE ID		SAMPLE ID	
1. Exterior Pipe-32		16. B35-S1	
2. Exterior Pipe-34		17. B35-S2	
3. Exterior Pipe-36		18. B35-S3	
4. B31-S1		19.	
5. B31-S2		20.	
6. B31-S3		21.	
7. B32-S1		22.	
8. B32-S2		23.	
9. B32-S3		24.	
10. B33-S1		25.	
11. B33-S2		26.	
12. B33-S3		27.	
13. B34-S1		233.	
14. B34-S2		29.	
15. B34-S3		30.	
SPECIAL INSTRUCTIONS: <i>Analyze each homogeneous area tied positive</i>			
Relinquished by: <i>Forbie Bell</i>		Received by: <i>Jimmeyan Ross</i>	
Date: <i>1/33/00</i>	Time: <i>1357</i>	Date: <b>FEB 01 2000</b>	Time:

*2/1/00* NAVY BILL rate

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Fax: (770) 242-3912

## CHAIN OF CUSTODY FORM

BAT PROJECT CONTACT		DOUGLAS J. MILTON	
BAT JOB NAME		BAT JOB NO. 971001	TASK NO. 13.03
Charleston Naval Shipyard			
ANALYSIS REQUESTED <input checked="" type="checkbox"/> PLM <input type="checkbox"/> PCM <input type="checkbox"/> AAS For Lead Content <input type="checkbox"/> OTHER _____			
CHECK ONE: <input type="checkbox"/> ROUTINE			
<input checked="" type="checkbox"/> ROUTINE - FAX (HANDWRITTEN) AS SOON AS POSSIBLE			
<input type="checkbox"/> RUSH - FAX (HANDWRITTEN) AS SOON AS POSSIBLE			
SAMPLE ID		SAMPLE ID	
1. 32-2-1		16. 32-7-1	
2. 32-2-2		17. 32-7-2	
3. 32-2-3		18. 32-7-3	
4. 32-3-1		19. 32-8-1	
5. 32-3-2		20. 32-8-2	
6. 32-3-3		21. 32-8-3	
7. 32-4-1		22. 32-11-1	
8. 32-4-2		23. 32-11-2	
9. 32-4-3		24. 32-11-3	
10. 32-5-1		25.	
11. 32-5-2		26.	
12. 32-5-3		27.	
13. 32-6-1		28.	
14. 32-6-2		29.	
15. 32-6-3		30.	
SPECIAL INSTRUCTIONS: <i>Analyze each homogeneous area tile positive</i>			
Relinquished by: <i>Ashie Bell</i>		Received by: <i>Jennifer Ross</i>	
Date: <i>1/31/00</i>	Time: <i>1357</i>	Date: <i>FEB 01 2000</i>	Time:

*2/1/00 NAUW BILL RATE*

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Fax: (770) 242-3912

## CHAIN OF CUSTODY FORM

BAT PROJECT CONTACT		DOUGLAS J. MILTON	
BAT JOB NAME		Charleston Naval Shipyard	BAT JOB NO. 971001
		TASK NO. 13.03	
ANALYSIS REQUESTED <input checked="" type="checkbox"/> PLM <input type="checkbox"/> PCM <input type="checkbox"/> AAS For Lead Content <input type="checkbox"/> OTHER _____			
CHECK ONE: <input type="checkbox"/> ROUTINE			
		<input checked="" type="checkbox"/> ROUTINE - FAX (HANDWRITTEN)	AS SOON AS POSSIBLE
		<input type="checkbox"/> RUSH - FAX (HANDWRITTEN)	AS SOON AS POSSIBLE
SAMPLE ID		SAMPLE ID	
1. 33-4-1		16.	
2. 33-4-2		17.	
3. 33-4-3		18.	
4. 33-5-1		19.	
5. 33-5-2		20.	
6. 33-5-3		21.	
7. 33-8-1		22.	
8. 33-8-2		23.	
9. 33-8-3		24.	
10. 33-9-1		25.	
11. 33-9-2		26.	
12. 33-9-3		27.	
13. 33-11-1		28.	
14. 33-11-2		29.	
15. 33-11-3		30.	
SPECIAL INSTRUCTIONS: <i>Analyze each homogeneous area till positive</i>			
Relinquished by: <i>Foshie Bell</i>		Received by: <i>Jennylyn Ross</i>	
Date: <i>1/33/00</i> Time: <i>1:57</i>		Date: <i>FEB 01 2000</i> Time:	

*2/1/00* NAUy BII rate

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BAT Associates, Inc.

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5151 Brook Hollow Pkwy., Suite 250

Norcross, GA 30071

Phone: (770) 242-39034

Fax: (770) 242-3912

## CHAIN OF CUSTODY FORM

BAT PROJECT CONTACT		DOUGLAS J. MILTON	
BAT JOB NAME		Charleston Naval Shipyard	BAT JOB NO. 971001
		TASK NO. 13.03	
ANALYSIS REQUESTED <input checked="" type="checkbox"/> PLM <input type="checkbox"/> PCM <input type="checkbox"/> AAS For Lead Content <input type="checkbox"/> OTHER _____			
CHECK ONE: <input type="checkbox"/> ROUTINE			
<input checked="" type="checkbox"/> ROUTINE - FAX (HANDWRITTEN) AS SOON AS POSSIBLE			
<input type="checkbox"/> RUSH - FAX (HANDWRITTEN) AS SOON AS POSSIBLE			
SAMPLE ID		SAMPLE ID	
1. 36-4-1		16.	
2. 36-4-2		17.	
3. 36-4-3		18.	
4. 36-5-1		19.	
5. 36-5-2		20.	
6. 36-5-3		21.	
7. 36-15-1		22.	
8. 36-15-2		23.	
9. 36-15-3		24.	
10. 36-16-1		25.	
11. 36-16-2		26.	
12. 36-16-3		27.	
13.		28.	
14.		29.	
15.		30.	
SPECIAL INSTRUCTIONS: <i>Analyze each homogeneous area tile positive</i>			
Relinquished by: <i>Joshie Bell</i>		Received by: <i>Jennette Ross</i>	
Date: <i>1/33/00</i> Time: <i>1357</i>		Date: <i>FEB 01 2000</i> Time:	

21100

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Page 1 of 4

**PLM ANALYSIS ASBESTOS SUMMARY \***

CLIENT NAME: **BAT ASSOCIATES** PROJECT NO: **00003.000.000**  
 PROJECT NAME: **CHARLESTON NSY / 971001-13.03** LAB JOB NO: **B0018** DATE RCVD: **2/1/00**

SAMPLE LAB ID	SAMPLE FIELD ID	LAYER NUMBER	APPEARANCE	LOCATION / DESCRIPTION	% ASBESTOS (COMMENTS)
1 1017	76-1-1QC		BROWN HARD RESILIENT TO GRANULAR WITH FIBERS AND BLACK MASTIC		5%CHR (8% CHRYSOTILE IN BLACK MASTIC)
2 1018	76-4-1QC		LT GRAY HARD RESILIENT TO GRANULAR WITH BLACK MASTIC AND YELLOW GLUE		3%CHR (5% CHRYSOTILE IN BLACK MASTIC NO ASBESTOS DETECTED IN YELLOW GLUE)
3 1019	76-8-1QC		WHITE POWDERY TO GRANULAR		-
4 1020	76-9-1QC		WHITE SOFT FIBROUS WITH PAINT		-
5 1021	76-12-1QC		GRAY SOFT FIBROUS TO GRANULAR TO POWDERY WITH PAINT		-
6 1022	76-15-1QC		BLACK SOFT BITUMINOUS TO FIBROUS		-
7 1023	76-15-1QC		BROWN SOFT FIBROUS WITH PAINT		-
8 1024	76-21-1QC		BLACK BITUMINOUS TO POWDERY WITH FIBERS		3%CHR
9 1025	76-23-1QC		BLUE HARD SILTY TO GRANULAR WITH MIXTURE OF MASTICS		-
10 1026-1	31-5-1QC	1 (of 2)	GREEN HARD RESILIENT TO GRANULAR		-
11 1026-2	31-5-1QC	2 (of 2)	BLACK MASTIC WITH FIBERS		3%CHR
12 1027	31-10-1QC		GRAY SOFT FIBROUS TO GRANULAR TO POWDERY WITH PAINT		-
13 1028	32-2-1QC		GREEN HARD RESILIENT TO GRANULAR WITH WHITE MASTIC		-
14 1029	32-3-1QC		TAN HARD RESILIENT TO GRANULAR WITH BLACK MASTIC		-
15 1030	33-5-1QC		DARK GRAY HARD RESILIENT TO GRANULAR WITH FIBERS AND BLACK MASTIC		5%CHR (3% CHRYSOTILE IN BLACK MASTIC)
16 1031	34-3-1QC		TAN HARD RESILIENT TO GRANULAR WITH BLACK MASTIC		-

\* If box "QC" is not checked, these results are provided before full QC is completed and therefore could be changed.

QC

"-" = NO ASBESTOS DETECTED

02/14/00 MON 11:59 FAX 770 908 7200

CAPE ENVIRO.

007

# BAT

BAT Associates, Inc.  
 ENVIRONMENTAL, HEALTH & SAFETY SERVICES

5151 Brook Hollow Pkwy., Suite 250  
 Norcross, GA 30071  
 Phone: (770) 242-3908  
 Fax: (770) 242-3912

## CHAIN OF CUSTODY FORM

BAT PROJECT CONTACT		DOUGLAS J. MILTON	
BAT JOB NAME	Charleston Naval Shipyard	BAT JOB NO. 971001	TASK NO. 13.03
ANALYSIS REQUESTED		<input checked="" type="checkbox"/> PLM <input type="checkbox"/> PCM <input type="checkbox"/> AAS For Lead Content <input type="checkbox"/> OTHER	
CHECK ONE:	<input type="checkbox"/> ROUTINE <input checked="" type="checkbox"/> ROUTINE - FAX (HANDWRITTEN) <input type="checkbox"/> RUSH - FAX (HANDWRITTEN)	AS SOON AS POSSIBLE AS SOON AS POSSIBLE	
SAMPLE ID		SAMPLE ID	
1. 76-1-1QC		16. 34-4-1QC	
2. 76-4-1QC		17. 34-6-1QC	
3. 76-8-1QC		18. 34-5-1QC	
4. 76-9-1QC		19. 36-4-1QC	
5. 76-12-1QC		20. BAT199-2-1QC	
6. 76-15-1QC		21. BAT199-1-1QC	
7. 76-16-1QC		22. BAT199-4-1QC	
8. 76-21-1QC		23. BAT199-5-1QC	
9. 76-23-1QC		24. BAT199-7-1QC	
10. 31-5-1QC		25. BAT199-10-1QC	
11. 31-10-1QC		26. BAT199-17-1QC	
12. 32-2-1QC		27.	
13. 32-3-1QC		28.	
14. 33-5-1QC		29.	
15. 34-3-1QC		30.	
SPECIAL INSTRUCTIONS: <del>Additional lead recovery in 3090</del>			
Relinquished by: <i>Joshie Bell</i>		Received by: <i>[Signature]</i>	
Date: 12/29/99	Time:	Date: 2/1/00	Time: 2:30

43400 (CB)  
 21100