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PROJECT SURVEILLANCE SERVICES AND AIR MONITORING DURING REMOVAL OF  
ASBESTOS-CONTAINING MATERIAL QUARTER 760 CNC CHARLESTON SC  
10/1/2000  
BAT ASSOCIATES, INC.

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**Project Surveillance Services and Air Monitoring  
During Removal of Asbestos-Containing Material  
at the  
North Charleston Naval Base: Quarter 760  
North Charleston, South Carolina**

Contract Number: N62467-96-R-<sup>0998</sup>0098

***Prepared for:***

Department of the Navy  
Southern Division  
NAVFACENCOM  
2155 Eagle Drive  
North Charleston, South Carolina 29411

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*DC-0015*

***Prepared by:***

BAT Associates, Inc.  
5151 Brook Hollow Parkway, Suite 250  
Norcross, Georgia 300071  
Contact Person: Mr. Douglas J. Milton, CIH  
770/242-3908

October 2000

# BAT

**BAT Associates, Inc.**

Environmental, Health & Safety Services

5151 Brook Hollow Parkway, Suite 250

Norcross, GA 30071

(770) 242-3908 • FAX (770) 242-3912

e-mail: batassoc@mindspring.com

October 30, 2000

Department of the Navy  
Southern Division  
NAVFACENGCOM  
2155 Eagle Drive  
North Charleston, South Carolina 29411

**Attention: Mr. Archie Browder**

**References: Contract Number: N62467-96-R-0098**

**Subject: Closure Report for Project Surveillance and Air Monitoring  
North Charleston Naval Base: Quarter 760  
North Charleston, South Carolina**

Dear Mr. Browder:

BAT Associates, Inc. (BAT) has completed project surveillance and air monitoring activities for the above referenced project. Results of the project indicated that the project site is ready for re-occupancy. A copy of the closure report accompanies this cover letter. Within the report is detailed information concerning project-related activities from start to finish.

Thank you, for the opportunity to work with you on this project. Should you have any questions, please feel free to contact us.

Sincerely,  
Bat Associates, Inc.

DeArna Parker  
Project Industrial Hygienist

Douglas J. Milton, CIH  
Director of Health and Safety

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## EXECUTIVE SUMMARY

BAT Associates, Inc. (BAT) was retained by the Department of the Navy Southern Division NAVFACENGCOCOM (SouthDiv.) to perform project surveillance and air monitoring services before, during, and after the removal of asbestos-containing materials (ACM) at the North Charleston Naval Base. Project activities were centered around Quarter 760 (hereinafter referred to as the Project Site). Work scheduled at the Project Site included the crawl space area of Quarters 760.

Cape Environmental Management Inc. (Abatement Contractor) was retained by SouthDiv to perform the asbestos removal, disposal, and clean up at the Project Site. Ms. DeArna Parker, Project Industrial Hygienist, performed on-site project surveillance and air monitoring for BAT and the Navy. The Contractor was represented by Mr. Mayro Hidalgo, Project Supervisor.

The following paragraphs summarize the information in the report.

1. Project activities began on September 9, 2000 and were completed on September 26, 2000. A brief pause in work activities occurred on September 13, 2000, due to notification issues. Work activities promptly recommenced on September 14, 2000. The scope of work for abatement activities included the removal of asbestos-containing pipe insulation and asbestos-contaminated soil from the crawl space area.
2. BAT performed on-site fiber counting air monitoring and analysis using Phase Contrast Microscopy (PCM). All air sample collection and fiber counting were executed in accordance to the National Institute of Occupational Safety and Health (NIOSH) 7400 Method.

Eighty-eight (88) air samples were collected during the course of the project. Air samples included background samples, work area samples (inside the work containment), critical area samples (outside the work area samples), and final clearance air samples (Refer to Appendix A).

BAT collected seven final clearance air samples (including field blanks) and evaluated the air samples using PCM. All final clearance air samples indicated airborne fiber concentrations of less than 0.010 fibers per cubic centimeter of air (<0.010 f/cc). The work area successfully met "release criteria", which included a final visual inspection and final clearance air testing.

## **1.0 PURPOSE**

The purpose for the asbestos abatement activities was to: 1) remove and properly dispose of previously identified friable ACM inside the crawl space area, and 2) properly clean the work area prior to an anticipated property transfer. SouthDiv initiated an asbestos remediation program to accomplish the aforementioned goals.

## **1.1 BACKGROUND INFORMATION**

A previously performed asbestos survey of the Project Site identified asbestos-containing pipe insulation on inoperative pipes (Thermal Systems Insulation/TSI) and asbestos-contaminated soil inside the crawl space area of Quarter 760.

## **SEQUENCE OF WORK**

Sections 1.2.1 through 1.2.6 describe the activities executed by the Contractor during the asbestos abatement and BAT's project surveillance activities. Sections 2.0 and 3.0 describe activities performed by BAT while conducting air sample and soil sample collections.

### **1.2.1 Work Area Isolation**

The Abatement Contractor performed relevant enclosure activities to ensure isolation of the work area in accordance with regulatory requirements. Proper warning signs were posted at the entrance of the regulated area (work area) to prevent entry by unauthorized persons. The work area was isolated from the unprotected public by separation and usage of temporary critical barriers over doorways, perimeter vent ways, ceiling penetrations, and/or other openings. Temporary critical barriers were constructed of 6 millimeter thick (6-mil) polyethylene sheeting and installed using spray glue and duct tape.

A personal decontamination facility (PDF) was constructed and used by the Contractor's workers and other work area visitors to dispose of used coveralls and rinse themselves of any dust or debris prior to leaving the clean side of the PDF. The PDF was located at the entrance to the work area and consisted of three primary chambers: 1) dirty room, 2) decontamination shower, and 3) clean room. Each chamber of the PDF was segmented via overlapping curtains constructed of 6-mil polyethylene sheeting.

A waste load out was constructed and used by the Contractor's workers to rinse off any dust and debris off equipment prior to leaving the work area. The waste load out was located on the west side of the Project Site.

## **1.2.2 Asbestos Removal Procedures**

The Contractor used wet removal methods as the primary engineering control during the removal, disposal, and cleaning process of the asbestos-containing and asbestos-contaminated materials. The Contractor wetted the materials with an amended water solution before initiating removal and continued wetting the materials throughout the removal process. Other engineering controls used to supplement the wet removal methods included the use of negative pressure differential machines. Negative pressure differential machines extracted potentially contaminated air from the work area, filtered the air through High Efficiency Particulate Absolute (HEPA) filters, and exhausted the filtered air to the outside environment. These machines were located throughout the work areas.

During the removal activities, BAT systematically monitored the filtered exhaust from the negative pressure differential machines for asbestos fiber concentrations. BAT collected air samples representative of the filtered exhaust and evaluated samples via fiber counting (see Section 2.0). All samples indicated that the filtered exhaust were lower than the airborne fiber concentration required to meet release criteria (0.010 f/cc).

### **Gross Removal of Friable TSI**

The Abatement Contractor's workers donned full-face powered air purifying respirators (P.A.P.R.), hooded disposable cellulose suits with booties, protective footwear, and hand coverings during the gross removal of TSI. The Abatement Contractor's workers utilized hand-held tools to cut TSI wrapping and lowered the material from the substrate onto the plastic floor sheeting (drop cloth) below or directly into the 6-mil. Thick, properly labeled asbestos bags. In circumstances where the material had to be lowered a drop cloth, a worker promptly containerized the removed materials in 6-mil. Thick, properly labeled asbestos bags. Removed materials were kept in a wetted state prior to placing the materials in disposal bags.

### **Gross Removal of Asbestos Contaminated Soil**

The Contractor's workers donned full-face (P.A.P.R.) during the gross removal of the asbestos contaminated soil. Other (PPE) included hooded disposable coveralls with booties, protective footwear and gloves.

The Contractor used a trailer-mounted vacuum (Vac truck) equipped with a HEPA filter to vacuum out approximately 1 inch to 4 inches of soil from within the crawl space. The soil was containerized in a three chambered non-permeable bladder bag which was lined inside a transport dumpster. Mr. Larry Hopkins, of Cross Construction Corp, operated the Vac truck.

### **1.2.3 Disposal of Contaminated Liquid**

Asbestos-contaminated shower water, resulting from the PDF and EDF was handled in accordance with regulatory requirements. The Contractor collected all water in the showers area. Water was filtered through the Contractor's 3-filter shower filtration unit. The effluent was passed through a 10-micron, 5-micron, and 3-micron filtration system. After filtration, the water was discharged into the public sewage system as filtered effluent.

### **1.2.4 Site Visitation**

During the removal and clean-up activities, no site visitation from SouthDiv or any regulatory agencies were observed.

### **1.2.5 Pre-Abatement and Final Visual Inspection**

BAT performed a pre-abatement visual inspection of the work area prior to the start of asbestos removal activities. Final visual inspections were performed by the BAT specialist upon completion of asbestos removal and detailed cleaning. Ms. DeArna Parker, an accredited Asbestos Inspector in accordance with Asbestos Hazard Emergency Response Act (AHERA), performed the visual inspections.

The pre-abatement visual inspection was performed by Ms. Parker and Mr. Hidalgo (Abatement Contractor's Site Supervisor) upon completion of work area preparations. During the visual evaluations, the negative pressure differential machines, and PDF shower were functioning properly. No breaches in the critical barriers were observed.

BAT performed a final visual inspection at the completion of the asbestos removal and work area clean-up. Ms. Parker performed the final visual inspection of the work area in conformance with practices and procedures consistent with the American Society for Testing and Material (ASTM) and in the Navy's Scope-of-Work and Third Party Monitoring specification. The visual inspection included, but was not limited to, a visual review of all horizontal and vertical surfaces for visible accumulation of asbestos dust and/or asbestos-contaminated debris. Additionally, the soil's surface was inspected for visible ACM material, after scarification of the surface. The Contractor promptly cleaned areas of visible residual dust and/or debris identified by BAT during the inspection.

Results of the final visual inspection did not identify visible accumulations of asbestos-containing or asbestos-contaminated dust or debris. In preparation for final clearance air testing, the Contractor encapsulated abated surfaces within the work area with a penetrating encapsulant to lock-down unseen fibers.

### **1.2.6 Post-Abatement Inspection**

BAT performed a post-abatement visual inspection with the Contractor in the work areas. Locations identified to contain residual ACM after the removal of critical barriers (normally behind duct tape) were HEPA vacuumed and wet wiped until visually clean.

## **2.0 AIR SAMPLE COLLECTION**

BAT collected daily air samples from outside the work area, inside the work area, and at the exhaust points of negative pressure differential machines. Air samples were collected on 25 millimeter, 0.8 micron pore size mixed cellulose ester filter cassettes with 50 millimeter, non-conductive cowls. Air samples were collected at an approximate flow rate of 0.5 liters per minute (LPM) to 16.0 LPM, as per NIOSH 7400 Method. The sampling pumps were calibrated before and after each sampling period using a high volume Rotometer. The Rotometer was calibrated using a primary calibration standard prior to its on site usage.

Air samples were fiber counted using Phase Contrast Microscopy (PCM) by Ms. Parker. Ms. Parker has successfully completed the National Institute for Occupational Safety and Health (NIOSH) 582 course, *Sampling and Evaluating Airborne Asbestos Dust*, and has successfully participated in the Proficiency Analytical Testing (PAT) program.

### **2.1 Daily Air Samples**

Airborne fiber concentrations at critical barriers and at negative pressure differential exhaust points did not exceed 0.010 f/cc of air during the removal or cleaning process. Although there are no Federal or state regulations governing the concentration of airborne fibers inside work areas, it is noteworthy that during removal activities airborne fiber concentrations, on average, were maintained at or below final clearance thresholds. An airborne fiber concentration of 0.010 f/cc (by PCM) is the EPA-recommended re-occupancy concentration following an asbestos response action. The Occupational Safety and Health Administration (OSHA) instructs that a concentration of 0.100 f/cc is a permissible exposure to airborne asbestos for an 8-hour time weighted average. Photocopies of the Fiber Counting reports are included in Appendix A: *PCM- Fiber Counting Results*.

## **2.2 Final Clearance Air Testing**

After the abatement work was completed and prior to collecting final clearance air samples, the negative air pressure differential machines were used to evacuate any residual airborne fibers, and reduce the moisture in the work area.

A non-aggressive final clearance air testing protocol was used inside the crawl space area to avoid filter overload with dirt and dust debris on sampling cassettes.

BAT collected five final clearance air samples at the Project Site using high volume pumps and 25 millimeter, 8-micron air filter cassettes. Filters were fiber counted via PCM. All samples indicated airborne fiber concentrations <0.010 f/cc.

## **3.0 FINAL CLEARANCE SOIL SAMPLE COLLECTION**

Prior to the collected of final clearance air samples, BAT collected nine soil samples from the surface of the crawl space area using rigid containers. Each container was uniquely labeled and recorded on a chain-of-custody form prior to submission for analysis.

The soil samples were forwarded to an independent laboratory, Analytical Environmental Services (AES), for analysis using Polarized Light Microscopy (PLM). AES, located in Atlanta, Georgia, is an accredited laboratory registered with the American Industrial Hygiene Association. AES is a successful participant of the National Institute of Standards and Technology (NIST)/AIHA sponsored National Voluntary Laboratory Accreditation Program (NVLAP #1020820)

All soil samples were analyzed for the presence and estimated quantity of asbestos. Analysis was conducted using PLM and dispersion staining techniques. Samples were analyzed in accordance with the EPA "Method for the Detection of Asbestos in Bulk Building Materials", EPA/600/R-93/116, July 1993. All samples were identified to contain <10% asbestos as per the National Emission Standard for Hazardous Air Pollutants (NESHAP). One of the nine soil samples as identified to contain 3% asbestos. EPA defines an asbestos material as any material containing greater than 1% asbestos.

BAT required the Abatement Contractor to remove soil in a 12-inch radius around the area that the 3% asbestos-contaminated soil was collected. A visual re-inspection identified no suspect ACM.

## **4.0 DATA EVALUATION**

All critical barriers, work area, and negative pressure differential exhaust point air fiber concentrations were <0.010 f/cc of air. An airborne fiber concentration of 0.010 f/cc, is the EPA recommended airborne fiber concentration level for re-occupancy. No residual

dust or debris was noted upon completion of the final visual inspections. Final clearance air samples indicated airborne fiber concentrations of less than the EPA re-occupancy standard of 0.010 f/cc. Soil conditions were identified to be free of visible ACM, during the time of the final visual inspection.

## **5.0 CONCLUSION**

Based on BAT's field observations, visual inspections, and fiber counting results, the asbestos abatement activities have been performed in conformance to the project work plan and applicable Federal and state regulations. With the conclusion of removal and cleaning activities, BAT informed SouthDiv of the successful final clearance air results. Soil identified in the crawl space was scarified and no visual signs of ACM were observed. Soils may not be considered decontaminated of ACM.

## **6.0 RECOMMENDATIONS**

Based on BAT's field observations, the following recommendations should be considered:

- 1) Write an ACM operations and maintenance plan (O&M) including the soil located in the crawl space. The O&M Plan should be maintained until the soil is:
  - a) Enclosed with a permanent non-permeable barrier (i.e. concrete) or
  - b) Removed down to a non-permeable foundation.
- 2) Include the crawl space in the facility's non-permit confined space entry program. Within the program and specific to this site, a "buddy system" should be required.

## **7.0 LIMITATIONS**

The conclusions presented in this report are based on: 1) visual observations performed during and after asbestos removal and final cleaning; 2) the results of fiber counting of collected air samples; and 3) the results of final clearance air samples evaluated via PCM. Airborne fiber concentrations will vary between sample locations. BAT's assessment of the performance of the work performed by the Asbestos Contractor is a professional opinion, arrived at through the methods and procedures accepted by the industry. No warranty is expressed or implied.

This report has been prepared on behalf of the Southern Division of the Navy and their

## **7.0 LIMITATIONS**

The conclusions presented in this report are based on: 1) visual observations performed during and after asbestos removal and final cleaning; 2) the results of fiber counting of collected air samples; and 3) the results of final clearance air samples evaluated via PCM. Airborne fiber concentrations will vary between sample locations. BAT's assessment of the performance of the work performed by the Asbestos Contractor is a professional opinion, arrived at through the methods and procedures accepted by the industry. No warranty is expressed or implied.

This report has been prepared on behalf of the Southern Division of the Navy and their authorized affiliates. Should any other person, partnership, or corporation desire to rely upon this report, it will be necessary for BAT Associates, Inc., to update it for the new user.

## **APPENDIX A**

### **PCM - Fiber Counting Results**

### BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

Date: 9-9-00

Quarter: 760

Type: Background Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-01	BG:	3040.0	0.001	0.001	0.010	< 0.010
971001-15-02	BG:	3040.0	0.001	0.001	0.010	< 0.010
971001-15-03	BG:	3040.0	0.001	0.001	0.010	< 0.010
971001-15-04	BG:	3040.0	0.001	0.001	0.010	< 0.010
971001-15-05	BG:	3040.0	0.001	0.001	0.010	< 0.010
971001-15-06	Field Blank	N/A	N/A	N/A	N/A	0.0 f/cc
971001-15-07	Field Blank	N/A	N/A	N/A	N/A	0.0 f/cc

*Ashie Bell*  
Analyst's Signature

Douglas J. Milton, CIH  
Laboratory Manager

**Legend:**

BG - Background    IWA - Inside Work Area    FC - Final Clearance    MFC - Measured Fiber Concentration    LOD - Limit of Detection  
LOQ - Limit of Quantification    RFC - Reported Fiber Concentration

## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9-14-00

QUARTER: 760 (1 of 2)

TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-08	OWA: In house	1,925.0	0.001	0.001	0.016	< 0.016
971001-15-09	OWA: Clean Room	662.4	0.000	0.003	0.046	< 0.046
971001-15-10	IWA: 5' from Dirty Km	290.0	0.051	0.007	0.106	0.051
971001-15-11	IWA: 30' in work area	294.0	0.024	0.007	0.105	0.024
971001-15-12	OWA: Neg Air Exhaust	658.8	0.000	0.003	0.047	< 0.047
971001-15-13	Field Blank	N/A	N/A	N/A	N/A	0.0 f/m <sup>2</sup>
971001-15-14	IWA: 5' from Dirty Km					Pump Failure
971001-15-15	IWA: 30' in work area					Pump Failure
971001-15-16	OWA: Clean Room					Pump Failure
971001-15-17	OWA: Neg Air					Pump Failure

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## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9-14-00QUARTER: 760 (L of L)TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-18	OWA: In House					Pump Failure
971001-15-19	Field Blank	N/A	N/A	N/A	N/A	D.D. Filter
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						

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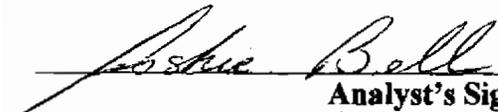
## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9-15-00

QUARTER: 760/D

TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-20	OWA: Clean Room	1,053.0	0.001	0.002	0.029	<0.029
971001-15-21	OWA: Neg Air Exhaust	1,041.0	0.000	0.002	0.029	<0.029
971001-15-22	OWA: In House Conference Room	1,035.0	0.000	0.002	0.029	<0.029
971001-15-23	IWA: AT Perimeter Wall	832.6		0.003	0.037	Var: Onload
971001-15-24	IWA: AT Perimeter Wall	832.6		0.003	0.037	Var: Onload
971001-15-25	Field Blank	N/A	N/A	N/A	N/A	0.0 f/m <sup>2</sup>
971001-15-26	Field Blank	N/A	N/A	N/A	N/A	0.0 f/m <sup>2</sup>
971001-15-						
971001-15-						
971001-15-						

  
Analyst's Signature

Douglas J. Milton, CIH  
Laboratory Manager

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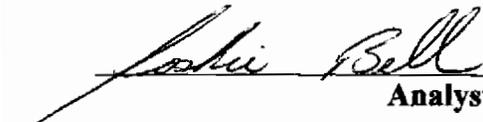
## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9-18-00

QUARTER: 760 142

TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-27	IWA: Dirty Room	280.0	0.068	0.008	0.110	0.068
971001-15-28	IWA: In Crawl Space	275.8	0.004	0.008	0.112	
971001-15-29	OWA: Office @ Porch	1,660.0	0.000	0.001	0.018	<0.018
971001-15-30	OWA: Load Out (Dirty Side)	812.5	0.001	0.003	0.038	<0.038
971001-15-31	OWA: Clean Room	800.3	0.001	0.003	0.038	<0.038
971001-15-32	OWA: Negative Air Machine	VOID: Pump Failure				
971001-15-33	IWA: Dirty Room	213.6	0.002	0.010	0.145	<0.145
971001-15-34	IWA: In Crawl Space	216.0	0.022	0.010	0.145	0.022
971001-15-35	OWA: Load Out	586.5	0.002	0.004	0.052	<0.052
971001-15-36	OWA: Office @ Porch	1,257.6	0.003	0.002	0.024	0.003

  
Analyst's Signature

Douglas J. Milton, CIH  
Laboratory Manager

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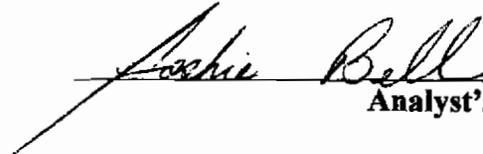
## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9-18-00

QUARTER: 760 2 of 2

TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-37	OWA: Clean Room	645.0	0.004	0.003	0.048	< 0.048
971001-15-38	IWA: Dirty Room	219.6	0.013	0.010	0.141	< 0.141
971001-15-39	IWA: In Control Space	216.0	0.015	0.010	0.144	0.015
971001-15-40	Field Blank					0.0 <sup>f</sup> / <sub>mm<sup>2</sup></sub>
971001-15-41	Field Blank					0.0 <sup>f</sup> / <sub>mm<sup>2</sup></sub>
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						

  
Analyst's Signature

Douglas J. Milton, CIH  
Laboratory Manager

**Legend:**

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## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9.19.00QUARTER: 760 1 of 2TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-42	OWA: CLEAN ROOM/DECON AM	802.5	0.001	0.003	0.038	< 0.038
971001-15-43	IWA: DIRTY ROOM/DECON	388.5	0.003	0.006	0.079	< 0.079
971001-15-44	IWA: CRAWLSPACE	384	0.007	0.006	0.080	0.080
971001-15-45	OWA: CONF. ROOM	1565	0.000	0.001	0.019	< 0.019
971001-15-46	OWA: N.A.M. EXHAUST	484	0.000	0.004	0.064	< 0.064
971001-15-47	OWA: WASTE LOAD OUT ↓	942	0.000	0.002	0.032	< 0.032
971001-15-48	OWA: CLEAN ROOM PM	712.5	0.001	0.003	0.043	< 0.043
971001-15-49	IWA: DIRTY ROOM	420	0.005	0.005	0.073	< 0.073
971001-15-50	IWA: CRAWL SPACE	352.5	0.007	0.006	0.087	< 0.087
971001-15-51	OWA: CONF. ROOM ↓	1420	0.000	0.002	0.021	< 0.021



Analyst's Signature

Douglas J. Milton, CIH

Laboratory Manager

**Legend:**

BG - Background IWA - Inside Work Area OWA - Outside Work Area FC - Final Clearance MFC - Measured Fiber Concentration LOD - Limit of Detection

LOQ - Limit of Quantification RFC - Reported Fiber Concentration

## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9.19.00QUARTER: 760 2 OF 2TYPE: Backgrounds (Daily) Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-52	OWA: N.A.M. EXHAUST PM	604	0.000	0.003	0.051	<0.051
971001-15-53	OWA: WASTE LOAD OUT	897	0.000	0.002	0.034	<0.034
971001-15-54	OWA: VAC TRUCK INTAKE	684	FILTER OVER LOAD		—	VOID
971001-15-55	LAB BLANK	—	—	—	—	0.00
971001-15-56	FIELD BLANK	—	—	—	—	0.00
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						

  
 Analyst's Signature

 Douglas J. Milton, CIH  
 Laboratory Manager
**Legend:**

BG - Background IWA - Inside Work Area OWA - Outside Work Area FC - Final Clearance

MFC - Measured Fiber Concentration LOD - Limit of Detection

LOQ - Limit of Quantification

RFC - Reported Fiber Concentration

## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9.20.00

QUARTER: 760 10F2

TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-57	OWA: CLEAN ROOM / DECON AM	675	0.001	0.003	0.046	<0.004 <0.045 (FB)
971001-15-58	IWA: DIRTY ROOM / DECON	375	0.003	0.006	0.082	<0.007 <0.082 (FB)
971001-15-59	IWA: CRAWL SPACE	250	0.009	0.009	0.124	<0.011 <0.124 (FB)
971001-15-60	OWA: CONF. ROOM	1325	0.000	0.002	0.023	<0.002 <0.023 (FB)
971001-15-61	OWA: N.A.M. EXHAUST	516	0.002	0.004	0.060	<0.005 <0.060 (FB)
971001-15-62	OWA: WASTE LOAD OUT	980	0.001	0.003	0.040	<0.004 <0.039 (FB)
971001-15-63	OWA: VAC TRUCK INTAKE ↓	369	0.001	0.006	0.084	<0.004 <0.084 (FB)
971001-15-64	OWA: CLEAN ROOM PM	832.5	0.000	0.003	0.037	<0.003 <0.037 (FB)
971001-15-65	IWA: DIRTY ROOM ↓	454.5	0.006	0.005	0.068	<0.006 <0.068 (FB)
971001-15-66	IWA: CRAWL SPACE ↓	301	0.010	0.007	0.102	0.010



Analyst's Signature

Douglas J. Milton, CIH

Laboratory Manager

**Legend:**

BG - Background    IWA - Inside Work Area    OWA - Outside Work Area    FC - Final Clearance    MFC - Measured Fiber Concentration    LOD - Limit of Detection  
 LOQ - Limit of Quantification    RFC - Reported Fiber Concentration

## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9-20-00

QUARTER: 760 ZDF2

TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-67	OWA: CONF. ROOM PM	1650	0.000	0.001	0.018	<0.018
971001-15-68	OWA: N.A.M. EXHAUST	668	0.001	0.003	0.046	<0.046
971001-15-69	OWA: WASTE LOAD OUT	993	0.000	0.002	0.031	<0.031
971001-15-70	LAB BLANK	—	—	—	—	0.00 f/m <sup>3</sup>
971001-15-71	FIELD BLANK	—	—	—	—	0.00 f/m <sup>3</sup>
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						

<0.018 (C)  
<0.046 (C)  
<0.031 (C)  
0.00 f/m<sup>3</sup> (C)  
0.00 f/m<sup>3</sup> (C)

  
Analyst's Signature

Douglas J. Milton, CIH  
Laboratory Manager

**Legend:**

- BG – Background    IWA – Inside Work Area    OWA – Outside Work Area    FC – Final Clearance    MFC – Measured Fiber Concentration    LOD – Limit of Detection
- LOQ – Limit of Quantification    RFC – Reported Fiber Concentration

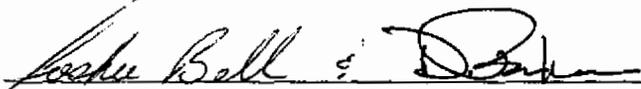
## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9-21-00

QUARTER: 760 142

TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-72	CLEAN ROOM / DECON	1,822.5	0.004	0.001	0.017	0.004
971001-15-73	DIRTY ROOM / DECON	360	0.039	0.060	0.086	<0.086
971001-15-74	CRAWL SPACE	240	0.007	0.009	0.129	<0.129
971001-15-75	CONF. ROOM	3,258.0	0.002	0.001	0.009	0.002
971001-15-76	N.A.M. EXHAUST	1,615.5	0.008	0.001	0.019	0.008
971001-15-77	WASTE LOAD OUT	1,817.5	0.004	0.001	0.017	0.004
971001-15-78	VAC INTAKE	384.8	0.005	0.006	0.080	<0.080
971001-15-79	DIRTY ROOM / DECON	427.5	0.011	0.005	0.072	0.011
971001-15-80	CRAWL SPACE	369.2	0.009	0.006	0.083	0.009
971001-15-81	LAB BLANK					0.0 f/m <sup>2</sup>

  
Analyst's Signature

Douglas J. Milton, CIH  
Laboratory Manager

**Legend:**

BG - Background    IWA - Inside Work Area    OWA - Outside Work Area    FC - Final Clearance    MFC - Measured Fiber Concentration    LOD - Limit of Detection  
LOQ - Limit of Quantification    RFC - Reported Fiber Concentration

## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9.21.00

QUARTER: 760 2 of 2

TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15- 82	FIELD BLANK					0.0 <sup>f</sup> / <sub>mm<sup>2</sup></sub>
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						
971001-15-						

  
Analyst's Signature

Douglas J. Milton, CIH  
Laboratory Manager

**Legend:**

BG - Background IWA - Inside Work Area OWA - Outside Work Area FC - Final Clearance MFC - Measured Fiber Concentration LOD - Limit of Detection  
LOQ - Limit of Quantification RFC - Reported Fiber Concentration

## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9-25-00

QUARTER: HQ 1/2

TYPE: Backgrounds, Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-83	OWA: CLEAN ROOM	1118.4	0.000	0.002	0.027	< 0.027
971001-15-84	OWA: CONFERENCE ROOM	1210.0	0.000	0.002	0.025	< 0.025
971001-15-85	OWA: WASTE LOAD OUT	1161.6	0.001	0.002	0.026	< 0.026
971001-15-86	OWA: NEG AIR EXHAUST	1057.5	0.000	0.002	0.029	< 0.029
971001-15-87	FIELD BLANK					0.0 f/mm <sup>2</sup>
971001-15-88	FIELD BLANK					0.0 f/mm <sup>2</sup>
971001-15-						
971001-15-						
971001-15-						
971001-15-						

Ashley Bell (for) D. PARKER  
Analyst's Signature

Douglas J. Milton, CIH  
Laboratory Manager

**Legend:**  
 BG - Background    IWA - Inside Work Area    OWA - Outside Work Area    FC - Final Clearance    MFC - Measured Fiber Concentration    LOD - Limit of Detection  
 LOQ - Limit of Quantification    RFC - Reported Fiber Concentration

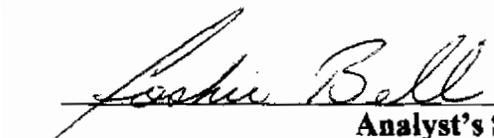
## BAT Associates, Inc. Field Sample Data Form Fiber Counting Using Phase Contrast Microscopy

DATE: 9-26-00

QUARTER: 760 1 of 2

TYPE: Backgrounds Daily Clearance

Sample ID	Sample Location	Volume (L)	MFC (f/cc)	LOD (f/cc)	LOQ (f/cc)	RFC (f/cc)
971001-15-93	FC: CRAWL SPACE DRYRM	3,056.0	0.001	0.001	0.010	0.001
971001-15-94	FC: CRAWL SPACE CENTER	3,056.0	0.000	0.001	0.010	< 0.010
971001-15-95	FC: CRAWL SPACE 3 <sup>rd</sup> GEARING	3,056.0	0.001	0.001	0.010	< 0.010
971001-15-96	FC: CRAWL SPACE WASTE LOAD OUT	3,056.0	0.001	0.001	0.010	< 0.010
971001-15-97	FC: CRAWL SPACE VAC. HOLE INTAKE	3,056.0	0.000	0.001	0.010	< 0.010
971001-15-98	FIELD BLANK					0.02 <sup>f</sup> /mm <sup>2</sup>
971001-15-99	FIELD BLANK					0.02 <sup>f</sup> /mm <sup>2</sup>
971001-15-						
971001-15-						
971001-15-						

  
Analyst's Signature

Douglas J. Milton, CIH  
Laboratory Manager

**Legend:**

BG - Background    IWA - Inside Work Area    OWA - Outside Work Area    FC - Final Clearance    MFC - Measured Fiber Concentration    LOD - Limit of Detection  
LOQ - Limit of Quantification    RFC - Reported Fiber Concentration

## **APPENDIX B**

### **PLM – Soil Sample Results**

BAT ASSC FES, INC.  
Chain-of-Custody

31915

10 of 2

No 007

Project #		Project Name/Location				No. of Containers	Parameters				REMARKS
971001-15-03		North Charleston Shipyard / 760									
Samplers: (signature)											
<i>Lashie Bell</i>											
Station #	Date	Time	C o m p	G r a b	Station Location						
Soil-01	9-21-00	2001		X	Coordinate: <sup>(IN PERIMETER)</sup> F2	1 of 10					PLM - Analysis
Soil-02	9-21-00	2003		X	Coordinate: <sup>PERIMETER</sup> E1	2 of 10					PLM - Analysis
Soil-03	9-21-00	2009		X	Coordinate: <sup>PERIMETER</sup> E6	3 of 10					PLM - Analysis
Soil-04	9-21-00	2012		X	Coordinate: <sup>PERIMETER</sup> D-6	4 of 10					PLM - Analysis
Soil-05	9-21-00	2010		X	Coordinate: <sup>PERIMETER</sup> F	5 of 10					PLM - Analysis
Soil-06	9-21-00	2000		X	Coordinate: <sup>PERIMETER</sup> A	6 of 10					PLM - Analysis
Soil-07	9-21-00	2013		X	Coordinate: <sup>IN PERIMETER</sup> D3	7 of 10					PLM - Analysis
Soil-08	9-21-00	2014		X	Coordinate: <sup>IN PERIMETER</sup> E4	8 of 10					PLM - Analysis
Soil-09	9-21-00	2015		X	Coordinate: <sup>IN PERIMETER</sup> C1	9 of 10					PLM - Analysis
Relinquished by: (signature)		Date	Time	Received by: (Signature)		Relinquished by: (Signature)		Date	Time	Received by: (Signature)	
<i>Lashie Bell</i>		9-27-00	0816								
Relinquished by: (signature)		Date	Time	Received by: (Signature)		Relinquished by: (Signature)		Date	Time	Received by: (Signature)	
Relinquished by: (signature)		Date	Time	Received for laboratory by: (Signature)		Date	Time	Remarks:			
				<i>Andrew Thomas</i>		9/23/2000	2:30 PM				

Distribution: Original Accompanies Shipment. Copy returned with Report.

BAT ASSC IES, INC.  
Chain-of-Custody

2 of 2

210''  
No J08

Project #		Project Name/Location				No. of Containers	Parameters				REMARKS
971001-15.03		North Charleston Shipyard / 760									
Samplers: (signature)											
<i>Ashley Bell</i>											
Station #	Date	Time	C o m p	G r a b	Station Location						
Soil-10	9-21-00	2:00 PM		X	(IN PERIMETER) D-2 POSITION/coord. 10 of 10						PLM - Analysis
Relinquished by: (signature)		Date	Time	Received by: (Signature)		Relinquished by: (Signature)		Date	Time	Received by: (Signature)	
<i>Ashley Bell</i>		9-22-00	0816								
Relinquished by: (signature)		Date	Time	Received by: (Signature)		Relinquished by: (Signature)		Date	Time	Received by: (Signature)	
Relinquished by: (signature)		Date	Time	Received for laboratory by: (Signature)		Date	Time	Remarks:			
<i>Ashley Bell</i>				<i>Ashley Bell</i>		9/23/02	2:30 PM				

Distribution: Original Accompanies Shipment. Copy returned with Report.



**ANALYTICAL ENVIRONMENTAL SERVICES, INC.**  
**Bulk Sample Summary Report**



Client Name: **B A T Associates, Inc.**  
 Project Name: **North Charleston Shipyard / 760**  
 Project Number: **971001-15.03**

GAS Job Number: **B3196**  
 Saturday, September 23, 2000

Client ID	AES ID	Location	Asbestos Mineral Percentage						Comments
			CH	AM	CR	AN	TR	AC	
Soil-01	30001	Perimeter-F2	<1						Asbestos fibers were found as a possible contaminant.
Soil-02	30002	Perimeter-E1	3						Layer #2 contains 30% chrysotile. Layer #1: No asbestos detected.
Soil-03	30003	Perimeter-E6	<1						Asbestos fibers were found as a possible contaminant.
Soil-04	30004	Perimeter-D6	<1						Asbestos fibers were found as a possible contaminant.
Soil-05	30005	Perimeter-F	<1						Asbestos fibers were found as a possible contaminant.
Soil-06	30006	Perimeter-A	<1						Asbestos fibers were found as a possible contaminant.
Soil-07	30007	Perimeter-D3	<1						Asbestos fibers were found as a possible contaminant.
Soil-08	30008	Perimeter-E4							No asbestos detected.
Soil-09	30009	Perimeter-C1	<1						Layer #1: Asbestos fibers were found as a possible contaminant. Layer #2: No asbestos detected.

Note: CH=chrysotile, AM=amosite, CR=crocidolite, AC=actinolite, TR=tremolite, AN=anthophyllite.  
 For comments on the samples, see the individual analysis sheets.

PLM is not consistently reliable in detecting small concentrations of asbestos in floor tiles and similar nonfriable materials. Quantitative TEM is currently the only method that can be used to determine the conclusive asbestos content.

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. All percentages given are by visually estimated volume. 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.

Microanalyst: Andrew Pittman  
 Andrew Pittman

QC Analyst: Svetlana Arkhipov  
 Svetlana Arkhipov



**ANALYTICAL ENVIRONMENTAL SERVICES, INC.**  
**Bulk Sample Summary Report**



Client Name: **B A T Associates, Inc.**  
 Project Name: **North Charleston Shipyard / 760**  
 Project Number: **971001-15.03**

GAS Job Number: **B3196**  
 Saturday, September 23, 2000

Client ID	AES ID	Location	Asbestos Mineral Percentage						Comments
			CH	AM	CR	AN	TR	AC	
Soil-10	30010	Perimeter-D2	<1						Asbestos fibers were found as a possible contaminant.

Note: CH=chrysotile, AM=amosite, CR=crocidolite, AC=actinolite, TR=tremolite, AN=anthophyllite.  
 For comments on the samples, see the individual analysis sheets.

PLM is not consistently reliable in detecting small concentrations of asbestos in floor tiles and similar nonfriable materials. Quantitative TEM is currently the only method that can be used to determine the conclusive asbestos content.

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Microanalyst: *Andrew Pittman*  
 Andrew Pittman

QC Analyst: *S. Arkhipov*  
 Svetlana Arkhipov

## **APPENDIX C**

### **Photographic Documentation**



**PHOTO 1:** View of the HEPA Vac Machine prior to the beginning of the asbestos abatement.



**PHOTO 2:** View of the PDF. Note the Danger signs posted, also the barrier tape demarcating the work area.



**PHOTO 3:** View of the waste load out located on the west side of the Project Site. Note Danger signs posted also one of the Negative Air Machine that was in use.



**PHOTO 4:** Pictured is one of the Contractor's workers wearing a full-faced PAPR, two disposable suit, rubber boots and gloves



**PHOTO 5:** View of inside crawl space. Note the fiberglass insulation debris.



**PHOTO 6:** View of inside crawl space. Note the asbestos-containing material around the bricks on ground along with fiberglass insulation.



**PHOTO 7:** Piping insulated with asbestos-containing materials prior to abatement.



**PHOTO 8:** Piping after asbestos-containing material was abated.

## **APPENDIX D**

### **Professional Certification**



ASBESTOS ABATEMENT LICENSE

No. 23145

This certifies that

*De Arna C. Parker*

*249-ACP-8980*

doing business as *B A T Associates, Inc.*

has satisfactorily completed the training required by South Carolina Regulation No. 61-86.1 for the category of

*Air Sampler*

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

*06/14/00.*

09/12/00

09/12/00 11:21

ORIGINAL



*Richard D. Sharpe*

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

CR-001126

Medical University of South Carolina  
College of Health Professions  
Program in Environmental Health Sciences

19 Hagood Avenue, Charleston, South Carolina 29425 (843) 792-5315

*Certifies that*

DEARNA P. PARKER

*Attended and Satisfactorily Completed  
Supervision of Asbestos Abatement Refresher  
conducted June 14, 2000 through June 14, 2000  
and passed an exam on June 14, 2000.*

SR27120-02983

Certificate Number

8

Contact Hours

249-33-8980

ID Number



T.A. Rowland, III

Program Director

June 14, 2000

Exam Date

June 13, 2001

Certificate Expires



T. A. Rowland III

Instructor



Medical University of South Carolina  
College of Health Professions  
Program in Environmental Health Sciences

19 Hagood Avenue, Charleston, South Carolina 29425 (843) 792-5315

*Certifies that*

DEARNA P. PARKER

*Attended and Satisfactorily Completed*  
*Inspecting for Asbestos in Buildings Refresher*  
*conducted August 10, 2000 through August 10, 2000*  
*and passed an exam on August 10, 2000.*

IR27120-02526

Certificate Number

4

Contact Hours

249-33-8980

ID Number



T.A. Rowland, III  
Program Director

August 10, 2000

Exam Date

August 9, 2001

Certificate Expires



T. A. Rowland III  
Instructor

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:*

**AIRBORNE ASBESTOS FIBER ANALYSIS**

September 30, 2001

Effective through

*David F. Alderman*

For the National Institute of Standards and Technology

NVLAP Lab Code: 102082-0