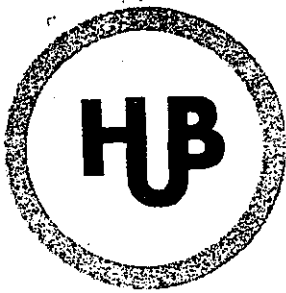


# HUB TESTING LABORATORY, INC.

Environmental Testing Service



95 Beaver Street – Waltham, MA 02453  
(781) 893-8330 (781) 893-4414 (fax)

January 2, 2001

Report for: Haverhill Public Schools  
4 Summer St.  
Haverhill, MA 01830-5877

Attention: Mr. Ed Dufresne  
Designated Person

Project: Constantino Middle School  
Haverhill, MA

Scope: Hub Testing Laboratory investigated the possible contamination of the Constantino School during the installation of wiring in the building. There was concern that the electrical contractors had disrupted ACM on nearby structures. Hub collected and analyzed air, wipe, and bulk samples to investigate this concern and confirm the presence or absence of surface and ambient contamination as well as the composition of material on structural elements on the first and second floors.

Methodology: Analysis for the presence of asbestos in the bulk and wipe samples was performed using Polarized Light Microscopy (PLM) EPA/600/R-93/116, July 1993. Transmission electron microscopy (TEM) analysis was performed on the air samples by NIOSH Method 7402.

Results: **BULK SAMPLES**

<u>Sample I.D.</u>	<u>Material/Location</u>	<u>Composition</u>	<u>%</u>
13202-1	Exposed I beam running over door frame outside stairwell Color: brown	Chrysotile Mineral Chip Vermiculite	10 30 60
13202-2	Spray on walls outside Rm 36	Mineral Chip	100
13202-3	Thick overspray outside Rm 36	Chrysotile Mineral Chip Vermiculite	trace 40 60

<u>Sample I.D.</u>	<u>Material/Location</u>	<u>Composition</u>	<u>%</u>
13202-4	Thinner overspray outside Rm 36	Mineral Chip	100
13202-5	Debris on top of CT outside Rm 36	Chrysotile Mineral Chip Vermiculite	10 40 50
13202-6	Plaster & chicken wire outside Rm 34	Mineral Chip	100
13202-7	Spray-on beam outside RM 34	Chrysotile Mineral Chip Vermiculite	15 35 50
13202-8	Spray-on on casing around beam outside Rm 37	Mineral Chip	100
13202-9	Spray-on on I beam outside Rm 37	Chrysotile Mineral Chip Vermiculite	10 30 60
13202-26	Exposed I beam near office Color: Gray	Chrysotile Mineral Chip Vermiculite	15 35 60
13202-27	Wall mortar outside Rm 260	Mineral Chip	100
13202-28	Beam outside Rm 162	Mineral Chip Vermiculite	20 80

#### WIPE SAMPLES

<u>Sample I.D.</u>	<u>Material/Location</u>	<u>Composition</u>
13202-10	Room 34 Color: Gray	Cellulose Fiber Glass Mineral Chip Vermiculite
13202-11	Outside Rm 36 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues

<u>Sample I.D.</u>	<u>Material/Location</u>	<u>Composition</u>
13202-12	Outside Rm 37 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues
13202-13	Outside Teachers Room Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Vermiculite Opagues
13202-14	Outside Rm 39 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues
13202-15	Outside Rm 42 Color: Gray	Cellulose Fiber Glass Synthetic Mineral chip Opagues
13202-16	Room 35 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues
13202-17	Outside Rm 16 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues
13202-18	Outside Rm 12 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Vermiculite Opagues

<u>Sample I.D.</u>	<u>Material/Location</u>	<u>Composition</u>
13202-19	Outside Rm 218 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Vermiculite Opagues
13202-20	Outside Rm 2 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues
13202-21	Junction of halls 270 & 273 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues
13202-22	Outside Court Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues
13202-23	Outside Greenhouse Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues
13202-24	Outside Rm 8 Color: Gray	Cellulose Fiber Glass Synthetic Mineral Chip Opagues
13202-25	Rm 274/Library	Cellulose Fiberglass Synthetic Mineral Chip Opagues

### AIR SAMPLES

<u>Sample I.D.</u>	<u>Material/Location</u>	<u>Composition</u>
13202-29	Corridor 235, SE Rm 17, 1 <sup>st</sup> Fl	NSD
13202-30	Corridor 235, S Library, 1 <sup>st</sup> Fl	NSD
13202-31	Corridor 321, S Room 40, 2 <sup>nd</sup> Fl	NSD
13202-32	Corridor 321, S Room 36, 2 <sup>nd</sup> Fl	NSD
13202-33	Junction, Corridor 200/131, 1 <sup>st</sup> Fl	NSD

NSD - No Structures Detected  
NVLAP Code: 102079-0

Comments: The air samples showed no detectable amount of asbestos in the areas around where the wiring was being installed. None of the wipe samples from surfaces near the work areas contained asbestos.

Upon further observation of materials located above the ceiling tiles it was observed that there were two spray-applied materials. Bulk samples were taken from these two main types of material in the school. One was a fireproofing material and the other a cementitious mortar. "I" beams are covered with sprayed-on fireproofing that contains asbestos. Above the ceiling tiles inside classrooms or along hallways, the "I" beams are either exposed or encased by a chicken wire mesh covered with non-asbestos containing cementitious mortar. This mortar is an extension of the block walls for firestop purposes. For this reason the beams may or may not be exposed above the ceilings dependent upon where the beams lay in relation to the walls below.

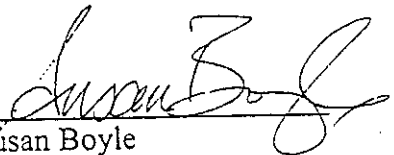
For example, the E-W "I" beam below the deck of second floor, north-facing classrooms (Rooms 36-42) is encased with mortar, but the N-S beam along the hall outside Room 34 is exposed above the ceiling. Encased beams have a small space between the beam and casing. "I" beams exposed in hallways, such as in the second floor stairwell (west) and near the office, are not encased.

On the first and second floors above the ceiling tiles in the corridors the majority of the "I" beams near the ceiling tiles which had

been removed are located behind this cementitious mortar, which does not contain asbestos.

All wipe samples collected indicated the absence of asbestos in the dust. Samples were collected from areas other than the floors since by the time the samples were collected and Hub had been called in the hallways had been swept, washed and waxed by the custodial and maintenance staff. Sample locations were are such as the topside of fire pull boxes, the top edge of lockers, door frames etc. beneath missing tiles.

As a cautionary measure, ceiling tile debris located in waste baskets recovered from the wiring installation process and dry mop heads for both the first and second floor were placed in plastic bags and taken from the school.

  
Susan Boyle  
Vice President



FULL SERVICE ENVIRONMENTAL LABORATORIES

**SCILAB BOSTON, INC.**

8 SCHOOL STREET  
WEYMOUTH, MA 02189

TEL: (781) 337-9334 • FAX: (781) 337-7642

December 29, 2000

HUB TESTING  
Attn: Ms. Boyle  
95 Beaver Street  
Waltham, MA 02453

RE: HUB TESTING  
Job Number 500122502  
P.O. # Boyle  
Ambient Air Consentino

Dear Ms. Boyle:

Enclosed are the results for TEM fiber analysis of the following HUB TESTING samples received at SCILAB on Thursday, December 28, 2000, for a 24 hour turnaround:

12258-1T, 12258-2T, 12258-3T, 12258-4T, 12258-5T

The 5 air samples were sent to SciLab via hand delivered. These samples were prepared according to TEM EPA Level II.

Table I represents a summary of all pertinent information used for the structure (fiber) density and concentration calculations. Included are the size of each structure counted, the structure density and concentration, type of fibrous material detected and the analytical sensitivity, which represents the concentration by the detection of one structure in the TEM structure count. Copies of the Fiber Count Sheets are included. These data sheets contain information for structure length/width, structure type, structure morphology and pertinent information on EDS, SAED and photography.

This report relates ONLY to the sample analysis expressed as structure density. SciLab assumes no responsibility for customer supplied data such as "sample location" or "air volume sampled". This report must not be used to claim product endorsement by SciLab, NVLAP or any agency of the U. S. Government. The National Institute of Standards and Technology Accreditation requirements, mandates that this report must not be reproduced, except in full with the approval of the laboratory.

SciLab appreciates this opportunity to serve your organization. Please contact us for any further assistance or questions.

Sincerely,

Todd Nardozzi  
NVLAP Approved Signatory

SciLab Job #: 500122502

Client Name: HUB TESTING

Table I

Summary of Transmission Electron Microscopy (TEM) Results for Asbestos (air)

Ambient Air Consentino

SciLab Sample #	Client Sample #	Dilution Factor	Air Filtered (liters)	Area Analyzed (sq. mm.)	* Analytical Sensitivity (struc/cc air)	Asbestos Structures Detected (Microns)			Structure Density (struc/sq. mm.)		Structure Concentration (struc/cc air)		Type of Asbestos
						0.5-5.0	>5.0	Total	>5.0	Total	>5.0	Total	
01	12258-1T Corridor 235, SE Room 17, 1st Floor		819	.100	0.0047	0.0	0.0	0.0	<10	<10	<0.0047	<0.0047	NSD
02	12258-2T Corridor 235, S Library, 1st Floor		765	.100	0.0050	0.0	0.0	0.0	<10	<10	<0.0050	<0.0050	NSD
03	12258-3T Corridor 321, S Room 40, 2nd Floor		819	.100	0.0047	0.0	0.0	0.0	<10	<10	<0.0047	<0.0047	NSD
04	12258-4T Corridor 321, S Room 36, 2nd Floor		7650	.100	0.0005	0.0	0.0	0.0	<10	<10	<0.0005	<0.0005	NSD
05	12258-5T Junction, Corridor 200/131, 1st Floor		808	.100	0.0048	0.0	0.0	0.0	<10	<10	<0.0048	<0.0048	NSD

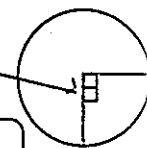
\* concentration represented by the detection of 1 structure  
 \*\* not analyzed  
 NSD: No Asbestos Structures Detected

Reviewed By: *Ramuckara*



# TEM Asbestos (air) Count Sheet

sample area analyzed



<u>Client Name:</u> HUB TESTING		<u>Volume (liters):</u> 819.0
<u>Job #:</u> 500122502		<u>Filter Type / Filter Area:</u> MCE 385 mm <sup>2</sup>
<u>Lab Sample #:</u> 01		<u>Grid Opening Size:</u> 0.01003
<u>Client Sample #:</u> 12258-1T		<u>Area Examined:</u> 0.10030 mm <sup>2</sup>
<u>Received:</u> 12/28/2000	19:30:00	<u>Magnification:</u> 20,000
<u>Date Analyzed:</u> 12/29/2000		<u>Accelerating Voltage:</u> 100 KeV
<u>Scope #:</u>		

Analysis Performed by: *Sandhya Gunasekara*  
 Sandhya Gunasekara

Location	Grid Opening	Fiber	Length $\mu$ M	Width $\mu$ M	Fiber Type	Morphology	EDS	Orient.	SAED	Photo
B2-4/1B	1	NSD							<input type="checkbox"/>	
B2-4/1C	2	NSD							<input type="checkbox"/>	
B2-4/1E	3	NSD							<input type="checkbox"/>	
B2-4/1F	4	NSD							<input type="checkbox"/>	
B2-4/1G	5	NSD							<input type="checkbox"/>	
B3-4/3C	6	NSD							<input type="checkbox"/>	
B3-4/3E	7	NSD							<input type="checkbox"/>	
B3-4/3F	8	NSD							<input type="checkbox"/>	
B3-4/3G	9	NSD							<input type="checkbox"/>	
B3-4/3H	10	NSD							<input type="checkbox"/>	

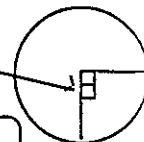
NSD: No Asbestos Structures Detected

Comments

	Structure Density (str/mm <sup>2</sup> )	Concentration (str/cc air)	Grid Evaluation
Total Grid Openings: 10			
Chrysotile Asbestos Structures: 0	<10	<0.0047	<input checked="" type="checkbox"/> Grid Openings Covered > 50%
Amphibole Asbestos Structures: 0	<10	<0.0047	<input checked="" type="checkbox"/> Intact Grid Opening > 50%
Asbestos Structures $\geq$ 5 microns: 0	<10	<0.0047	<input checked="" type="checkbox"/> Undissolved Filter < 10%
Total Non-Asbestos Structures:			<input checked="" type="checkbox"/> Folded Replica < 50%
Total Asbestos Structures: 0	<10	<0.0047	<input checked="" type="checkbox"/> Filter Loading < 10%
Analytical Sensitivity: 10		0.0047	<input checked="" type="checkbox"/> Particulate Even

# TEM Asbestos (air) Count Sheet

sample area analyzed



<u>Client Name:</u> HUB TESTING		<u>Volume (liters):</u> 765.0
<u>Job #:</u> 500122502		<u>Filter Type / Filter Area:</u> MCE 385 mm <sup>2</sup>
<u>Lab Sample #:</u> 02		<u>Grid Opening Size:</u> 0.01003
<u>Client Sample #:</u> 12258-2T		<u>Area Examined:</u> 0.10030 mm <sup>2</sup>
<u>Received:</u> 12/28/2000	19:30:00	<u>Magnification:</u> 20,000
<u>Date Analyzed:</u> 12/29/2000		<u>Accelerating Voltage:</u> 100 KeV
<u>Scope #:</u>		

Analysis Performed by: Sandhya Gunasekara  
Sandhya Gunasekara

Location	Grid Opening	Fiber	Length $\mu\text{M}$	Width $\mu\text{M}$	Fiber Type	Morphology	EDS	Orient.	SAED	Photo
B4-5/6E	1	NSD							<input type="checkbox"/>	
B4-4/4C	2	NSD							<input type="checkbox"/>	
B4-4/4H	3	NSD							<input type="checkbox"/>	
B4-5/4C	4	NSD							<input type="checkbox"/>	
B4-5/4H	5	NSD							<input type="checkbox"/>	
B5-5/4B	6	NSD							<input type="checkbox"/>	
B5-5/4C	7	NSD							<input type="checkbox"/>	
B5-4/6B	8	NSD							<input type="checkbox"/>	
B5-4/6C	9	NSD							<input type="checkbox"/>	
B5-4/4C	10	NSD							<input type="checkbox"/>	

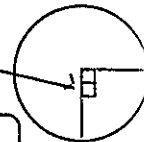
NSD: No Asbestos Structures Detected

Comments

	Structure Density (str/mm <sup>2</sup> )	Concentration (str/cc air)	<u>Grid Evaluation</u>
Total Grid Openings: 10			
Chrysotile Asbestos Structures: 0	<10	<0.0050	<input checked="" type="checkbox"/> Grid Openings Covered > 50%
Amphibole Asbestos Structures: 0	<10	<0.0050	<input checked="" type="checkbox"/> Intact Grid Opening > 50%
Asbestos Structures $\geq$ 5 microns: 0	<10	<0.0050	<input checked="" type="checkbox"/> Undissolved Filter < 10%
Total Non-Asbestos Structures:			<input checked="" type="checkbox"/> Folded Replica < 50%
Total Asbestos Structures: 0	<10	<0.0050	<input checked="" type="checkbox"/> Filter Loading < 10%
Analytical Sensitivity: 10		0.0050	<input checked="" type="checkbox"/> Particulate Even

# TEM Asbestos (air) Count Sheet

sample area analyzed



<u>Client Name:</u> HUB TESTING		<u>Volume (liters):</u> 819.0
<u>Job #:</u> 500122502		<u>Filter Type / Filter Area:</u> MCE 385 mm <sup>2</sup>
<u>Lab Sample #:</u> 03		<u>Grid Opening Size:</u> 0.01003
<u>Client Sample #:</u> 12258-3T		<u>Area Examined:</u> 0.10030 mm <sup>2</sup>
<u>Received:</u> 12/28/2000	19:30:00	<u>Magnification:</u> 20,000
<u>Date Analyzed:</u> 12/29/2000		<u>Accelerating Voltage:</u> 100 KeV
<u>Scope #:</u>		

Analysis Performed by: Sandhya Gunasekara  
Sandhya Gunasekara

Location	Grid Opening	Fiber	Length $\mu$ m	Width $\mu$ m	Fiber Type	Morphology	EDS	Orient.	SAED	Photo
C1-4/4B	1	NSD							<input type="checkbox"/>	
C1-4/4C	2	NSD							<input type="checkbox"/>	
C1-4/4E	3	NSD							<input type="checkbox"/>	
C1-4/4F	4	NSD							<input type="checkbox"/>	
C1-3/4E	5	NSD							<input type="checkbox"/>	
C2-5/6C	6	NSD							<input type="checkbox"/>	
C2-5/6E	7	NSD							<input type="checkbox"/>	
C2-5/6F	8	NSD							<input type="checkbox"/>	
C2-5/6G	9	NSD							<input type="checkbox"/>	
C2-5/6H	10	NSD							<input type="checkbox"/>	

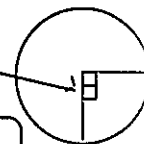
NSD: No Asbestos Structures Detected

Comments

	Structure Density (str/mm <sup>2</sup> )	Concentration (str/cc air)	<u>Grid Evaluation</u>
Total Grid Openings: 10			<input checked="" type="checkbox"/> Grid Openings Covered > 50%
Chrysotile Asbestos Structures: 0	<10	<0.0047	<input checked="" type="checkbox"/> Intact Grid Opening > 50%
Amphibole Asbestos Structures: 0	<10	<0.0047	<input checked="" type="checkbox"/> Undissolved Filter < 10%
Asbestos Structures $\geq$ 5 microns: 0	<10	<0.0047	<input checked="" type="checkbox"/> Folded Replica < 50%
Total Non-Asbestos Structures:			<input checked="" type="checkbox"/> Filter Loading < 10%
Total Asbestos Structures: 0	<10	<0.0047	<input checked="" type="checkbox"/> Particulate Even
Analytical Sensitivity:	10	0.0047	

# TEM Asbestos (air) Count Sheet

sample area analyzed



<u>Client Name:</u> HUB TESTING		<u>Volume (liters):</u> 7 650.0
<u>Job #:</u> 500122502		<u>Filter Type / Filter Area:</u> MCE 385 mm <sup>2</sup>
<u>Lab Sample #:</u> 04		<u>Grid Opening Size:</u> 0.01003
<u>Client Sample #:</u> 12258-4T		<u>Area Examined:</u> 0.10030 mm <sup>2</sup>
<u>Received:</u> 12/28/2000	19:30:00	<u>Magnification:</u> 20,000
<u>Date Analyzed:</u> 12/29/2000		<u>Accelerating Voltage:</u> 100 KeV
<u>Scope #:</u>		

Analysis Performed by: Sandhya Gunasekara

Location	Grid Opening	Fiber	Length $\mu\text{M}$	Width $\mu\text{M}$	Fiber Type	Morphology	EDS	Orient.	SAED	Photo
C3-4/4C	1	NSD							<input type="checkbox"/>	
C3-4/4E	2	NSD							<input type="checkbox"/>	
C3-4/4F	3	NSD							<input type="checkbox"/>	
C3-4/4G	4	NSD							<input type="checkbox"/>	
C3-4/4H	5	NSD							<input type="checkbox"/>	
C4-4/4C	6	NSD							<input type="checkbox"/>	
C4-4/4E	7	NSD							<input type="checkbox"/>	
C4-4/4F	8	NSD							<input type="checkbox"/>	
C4-4/4G	9	NSD							<input type="checkbox"/>	
C4-4/4H	10	NSD							<input type="checkbox"/>	

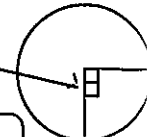
NSD: No Asbestos Structures Detected

**Comments**

	Structure Density (str/mm <sup>2</sup> )	Concentration (str/cc air)	Grid Evaluation
Total Grid Openings: 10			
Chrysotile Asbestos Structures: 0	<10	<0.0005	<input checked="" type="checkbox"/> Grid Openings Covered > 50%
Amphibole Asbestos Structures: 0	<10	<0.0005	<input checked="" type="checkbox"/> Intact Grid Opening > 50%
Asbestos Structures $\geq 5$ microns: 0	<10	<0.0005	<input checked="" type="checkbox"/> Undissolved Filter < 10%
Total Non-Asbestos Structures:			<input checked="" type="checkbox"/> Folded Replica < 50%
Total Asbestos Structures: 0	<10	<0.0005	<input checked="" type="checkbox"/> Filter Loading < 10%
Analytical Sensitivity: 10		0.0005	<input checked="" type="checkbox"/> Particulate Even

# TEM Asbestos (air) Count Sheet

sample area analyzed



<u>Client Name:</u> HUB TESTING		<u>Volume (liters):</u> 808.0
<u>Job #:</u> 500122502		<u>Filter Type / Filter Area:</u> MCE 385 mm <sup>2</sup>
<u>Lab Sample #:</u> 05		<u>Grid Opening Size:</u> 0.01003
<u>Client Sample #:</u> 12258-5T		<u>Area Examined:</u> 0.10030 mm <sup>2</sup>
<u>Received:</u> 12/28/2000	19:30:00	<u>Magnification:</u> 20,000
<u>Date Analyzed:</u> 12/29/2000		<u>Accelerating Voltage:</u> 100 KeV
<u>Scope #:</u>		

Analysis Performed by: *Sandhya Gunasekara*  
 Sandhya Gunasekara

Location	Grid Opening	Fiber	Length $\mu\text{M}$	Width $\mu\text{M}$	Fiber Type	Morphology	EDS	Orient.	SAED	Photo
C5-4/4B	1	NSD							<input type="checkbox"/>	
C5-4/4C	2	NSD							<input type="checkbox"/>	
C5-4/4E	3	NSD							<input type="checkbox"/>	
C5-4/4F	4	NSD							<input type="checkbox"/>	
C5-5/4C	5	NSD							<input type="checkbox"/>	
D1-4/6C	6	NSD							<input type="checkbox"/>	
D1-4/6E	7	NSD							<input type="checkbox"/>	
D1-4/6F	8	NSD							<input type="checkbox"/>	
D1-4/6G	9	NSD							<input type="checkbox"/>	
D1-4/6H	10	NSD							<input type="checkbox"/>	

NSD: No Asbestos Structures Detected

Comments

	Structure Density (str/mm <sup>2</sup> )	Concentration (str/cc air)	Grid Evaluation
Total Grid Openings: 10			
Chrysotile Asbestos Structures: 0	<10	<0.0048	<input checked="" type="checkbox"/> Grid Openings Covered > 50%
Amphibole Asbestos Structures: 0	<10	<0.0048	<input checked="" type="checkbox"/> Intact Grid Opening > 50%
Asbestos Structures $\geq$ 5 microns: 0	<10	<0.0048	<input checked="" type="checkbox"/> Undissolved Filter < 10%
Total Non-Asbestos Structures:			<input checked="" type="checkbox"/> Folded Replica < 50%
Total Asbestos Structures: 0	<10	<0.0048	<input checked="" type="checkbox"/> Filter Loading < 10%
Analytical Sensitivity: 10		0.0048	<input checked="" type="checkbox"/> Particulate Even

