



July 27, 2011

Fisheries and Oceans Canada
867 Lakeshore Road
Burlington, ON L7R 4A6

Email: brian.phoenix@dfo-mpo.gc.ca

Attention: Mr. Brian Phoenix
Technical Inspector Burlington

**Re: Occupational Hygiene Survey of Potential Asbestos and Mercury Exposures
on the CCGS Limnos, July 2011
Pinchin File: 67004**

On July 5, 2011, Sean Bieman, CRSP, of our firm conducted an air monitoring survey of potential asbestos and mercury exposures on the CCGS Limnos Coast Guard vessel. The objectives of the survey were to measure airborne contaminant levels during normal operations and evaluate the results of testing against regulated occupational exposure limits (OELs). This report summarizes the survey activities, the results of air monitoring, and our conclusions regarding exposure potential.

SURVEY METHODS

The sampling strategy was dictated by Fisheries and Oceans Canada, CCGS Limnos Mercury and Asbestos Assessment, Spec # 706.11, dated May 10, 2011. The chemical agents monitored, the sources of potential exposure, the sampling and analytical methods, and the sampling strategy are summarized in Table 1.

Table 1. Summary of the Air Monitoring Strategy.			
Agent Monitored	Source of Exposure	Sampling and Analytical Method	Sample Description
Asbestos	Historical asbestos-containing materials present on the vessel	NIOSH 7400	Five long-term area samples
Mercury	Historical mercury-containing materials present on the vessel	Direct Reading Instruments	Short-term area measurements in the Laboratory and Engine Room areas

Prior to conducting the survey, Mr. Bieman met with and discussed the sampling strategy with Mr. Larry White, worker representative of the Work Place Health and Safety Committee. The survey was then performed during typical day shift operating and environmental conditions. Most doors were open during the monitoring period. General mechanical heating, ventilation, and air conditioning (HVAC) systems were operating during the monitoring period.

The air samples of asbestos were taken and analyzed in accordance with the procedures published in the National Institute for Occupational Safety and Health (NIOSH), *Manual of Analytical Methods*, specifically *NIOSH Method 7400*. A blank sample (i.e. a collection filter which had no workplace air drawn through it) was also submitted for quality control purposes. The samples and blanks were analyzed by Bureau Veritas North America Inc. an American Industrial Hygiene Association (AIHA) accredited laboratory. All air sampling pumps used were calibrated before and after the monitoring survey.

It should be noted that NIOSH Method 7400 (the standard accepted workplace method for fibre sampling) relies on a “fibre count”. This means that all fibres within a size range are counted and included in the results. The results are not specific to asbestos and can include fibreglass and any other fibres in the specified size range.

Three of the samples that indicated the presence of “fibres” were further analyzed via NIOSH Method 7402. This method, using a transmission electron microscope, allows for characterization of the fibre type (e.g. specific determination of the presence of asbestos fibres).

Short-term air samples of mercury were taken using a Jerome 431-X Mercury Vapour Analyzer. This instrument was in calibration and was operated as per the manufacturers specifications.

OCCUPATIONAL EXPOSURE LIMITS

The agents monitored during this survey and their respective OELs are presented in Table 2 and in the tables of results. These values are reported in units of *milligrams of the agent per cubic meter of air (mg/m³)* or *fibres per cubic centimetre of air (f/cc)*.

Exposures to chemical agents on the CCGS Limnos are regulated under Part X of the Canada Occupational Health and Safety Regulations (made under Part II of the Canada Labour Code). The Regulations state that: “An employee shall be kept free from exposure to a concentration of an airborne chemical agent, other than grain dust or airborne chrysotile asbestos, in excess of the value for that chemical agent adopted by the American Conference of Governmental Industrial Hygienists (ACGIH), in its publication entitled Threshold Limit Values and Biological Exposure Indices, dated 1994-1995, as amended from time to time”.

Table 2: Occupational Exposure Limits	
Agent Monitored	Occupational Exposure Limit
Asbestos	1 f/cc TWA (Chrysotile) 0.1 f/cc TLV (Other forms)
Mercury	0.025 mg/m ³ TLV

RESULTS AND CONCLUSIONS

The results are presented in Tables A1 to A3 of Appendix A. The results of the long-term air samples are presented as Average Airborne Concentrations as measured over the sampling period.

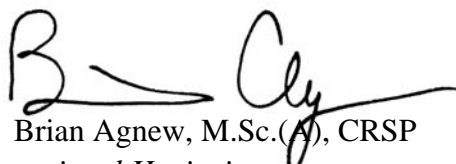
The results indicate that airborne concentrations of all agents monitored were below their respective OELs on all samples collected under the operating and environmental conditions of July 5, 2011. No asbestos fibres were detected on any of the samples.

It was reported that all mercury and asbestos-containing materials were removed from the vessel. Based on this information and the fact that neither were detected during this survey, no further monitoring is recommended.

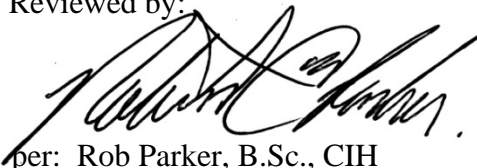
We wish to express our appreciation to the workers of CCGS Limnos who were involved with or participated in this survey. If you or the Work Place Health and Safety Committee require additional information on this report, or other matters, please do not hesitate to call.

Pinchin Environmental Ltd.

Prepared by:


per: Brian Agnew, M.Sc.(A), CRSP
Occupational Hygienist
Occupational Health & Safety
bagnew@pinchin.com

Reviewed by:


per: Rob Parker, B.Sc., CIH
Senior Occupational Hygienist
Occupational Health & Safety
rparker@pinchin.com

APPENDIX A
RESULTS OF AIR MONITORING
JULY 2011

Table A1: Results of Asbestos Monitoring via NIOSH Method 7400			
Sample Number	Sample Description	Sample Duration (minutes)	Average Airborne Concentration (f/cc)
1	Crew's Mess – above counter by coffee maker Area sample	8:32 am - 2:42 pm (370)	None Detected (less than 0.0026)
2	Officer's Mess – aft side at side table Area sample	8:34 am - 2:45 pm (371)	None Detected (less than 0.0026)
3	Control Room above control panels Area sample	8:38 am - 2:46 pm (368)	0.0036
4	Starboard Thrust Compartment Area sample	8:40 am - 2:47 pm (367)	0.0052
5	Engine Room above SSG1 Area sample	8:41 am - 2:49 pm (368)	0.0052
6	Blank Sample Taken for quality control	---	None Detected
Exposure Limits: 1 f/cc TWA – Chrysotile 0.1 f/cc TLV – Other forms			
Notes: TWA = 8-hour time-weighted average TLV=Threshold Limit Value f/cc = asbestos fibres per cubic centimetre of air			

Table A2: Results of Asbestos Monitoring via NIOSH Method 7402			
Sample Number	Sample Description	Sample Duration (minutes)	Average Airborne Concentration (f/cc)
1	Control Room above control panels Area sample	8:38 am - 2:46 pm (368)	None Detected (less than 0.00059)
2	Starboard Thrust Compartment Area sample	8:40 am - 2:47 pm (367)	None Detected (less than 0.00060)
3	Engine Room above SSG1 Area sample	8:41 am - 2:49 pm (368)	None Detected (less than 0.00059)
Exposure Limits: 1 f/cc TWA – Chrysotile 0.1 f/cc TLV – Other forms			
Notes: TWA = 8-hour time-weighted average TLV=Threshold Limit Value f/cc = asbestos fibres per cubic centimetre of air			

Table A3: Results of Short-Term Mercury Monitoring			
Sample Number	Measurement Description	Time of Sampling	Airborne Concentration (mg/m ³)
Laboratory			
1	Forward Workbench by Electrical Panel	9:20 am 11:00 am 1:00 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
2	Sink at Forward Workbench	9:21 am 11:01 am 1:01 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
3	Aft Workbench	9:23 am 11:02 am 1:02 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
4	Sink at Aft Workbench	9:25 am 11:03 am 1:03 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
5	Computer Work Station – Aft Side	9:27 am 11:04 am 1:04 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
6	Starboard Side Sink by Fumehood	9:29 am 11:05 am 1:05 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
7	Floor Level at Centre of Laboratory	9:31 am 11:06 am 1:06 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
8	Forward Side by Reagent Rack	9:33 am 11:08 am 1:07 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
Engine Room			
9	Control Room	9:40 am 11:15 am 1:12 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
10	At ME1	9:42 am 11:16 am 1:13 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
11	At ME2	9:44 am 11:17 am 1:14 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
12	At SSG1	9:46 am 11:18 am 1:15 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
13	At SSG2	9:48 am 11:19 am 1:16 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
14	At Walkway to Exit Door	9:50 am 11:20 am 1:17 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
Outdoors			
16	On Main Deck	9:35 am 11:11 am 1:10 pm	None Detected (less 0.001) None Detected (less 0.001) None Detected (less 0.001)
Exposure Limit: 0.025 mg/m ³ TLV			
Notes: mg/m ³ = milligrams of the agent per cubic meter of air TLV = Threshold Limit Value.			

APPENDIX B
JEROME MERCURY VAPOR ANALYZER
CALIBRATION CERTIFICATE



ARIZONA INSTRUMENT LLC

3375 N. Delaware Street, Chandler, AZ 85225 • (602) 470-1414 • (800) 528-7411 • www.azic.com

Exclusive Manufacturer of Computrac® Moisture Analyzers and Jerome® Toxic Gas Analyzers

Certification of Instrument Calibration

Pinchin Environmental
875 Main Street Unit 11
Hamilton, ON L8S 4R1

This is to certify that the Jerome X431 0002 Gold Film Mercury Analyzer, Serial Number 1441, with Sensor Number 2-3-23-4A, was calibrated with standard units traceable to NIST.

Calibration Status as Received: **Out of Calibration**

		Actual	Calibration Gas	Allowable Range
Incoming:	Level 1	0.096 mg/m3 Hg	0.102 mg/m3 Hg	0.097 - 0.107 mg/m3 Hg
	RSD %	2.82		<5%
Outgoing:	Level 1	0.102 mg/m3 Hg	0.102 mg/m3 Hg	0.097 - 0.107 mg/m3 Hg
	RSD %	0.95		<3%
	Level 2	mg/m3 Hg	0.025 mg/m3 Hg	0.020 - 0.030 mg/m3 Hg
	SD			<0.005 mg/m3 Hg
	Level 3	mg/m3 Hg	0.010 mg/m3 Hg	0.005 - 0.015 mg/m3 Hg
	SD			<0.005 mg/m3 Hg

Calibration Status as Left: **In Calibration**

Estimated Uncertainty of Calibration System: 3.5%

Calibration Date: 28-Dec-2010

Recalibration Date: 27-Dec-2011

Temperature °F: 75.30

% Relative Humidity: 26.60

Approved By: _____

Date Approved: 29-Dec-2010

Title: Michael Attwood - Quality Control

Equipment Used:

Permeation Tube: 498-30368 NIST#: D3609-96

Calibration Date: 29-Apr-2010 Calibration Date Due: 29-Apr-2011

DynaCalibrator: MU-772 NIST#: 10-1962

Calibration Date: 15-Oct-2010 Calibration Date Due: 15-Oct-2011

Digital Multimeter: 408312 NIST#: 7000701

Calibration Date: 28-Jul-2010 Calibration Date Due: 28-Jul-2011

Flowmeter: 256213-2 NIST#: 18030c

Calibration Date: 19-Mar-2010 Calibration Date Due: 19-Mar-2011

Calibration Procedure Used: 730-0041

Arizona Instrument certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy are traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY within the limitations of the Institute's calibration services, or have been derived from accepted values of natural physical constraints, or have been derived by the ratio type of self-calibration techniques.

Disclaimer: Any unauthorized adjustments, removal or breaking of QC seals, or other customer modifications on your Jerome Analyzer WILL VOID this factory calibration. Because any of the above acts could affect the calibration and readings of the instrument, their certification will no longer be valid and, further, Arizona Instrument LLC WILL NOT be responsible for any liabilities created as a result of using the instrument after such adjustments, seal removal, or modifications. As long as a functional test is within range, according to the procedure outlined in the Operator's Manual, the instrument is performing correctly.

APPENDIX C
ANALYTICAL RESULTS
JUNE 2011



July 15, 2011

Sean Bieman
PINCHIN ENVIRONMENTAL
470 Weber St N Unit 103
Waterloo, ON N2L 6J2

Bureau Veritas Work Order No. A1107094

Reference: 67004

Dear Sean Bieman:

Bureau Veritas North America, Inc. received 6 samples on July 12, 2011 for the analyses presented in the following report.

The results apply only to the samples analyzed in this project. Please note that any unused portion of the samples will be discarded after a thirty-day holding period, unless you have requested otherwise.

We appreciate the opportunity to assist you. If you have any questions concerning the report, please contact the analyst whose name appears on the report or myself at (770) 499-7701.

Sincerely,

Alan M. Segrave, P.G.

Director, Laboratory Services

Electronic signature authorized through password protection

Bureau Veritas North America, Inc.

Health, Safety, and Environmental Services

3380 Chastain Meadows Parkway, Suite 300
Kennesaw, GA 30144

Main: (770) 499-7701

Fax: (770) 499-7511

www.us.bureauveritas.com



CASE NARRATIVE

Date: 15-Jul-11

CLIENT: PINCHIN ENVIRONMENTAL

Project: 67004

Work Order No A1107094

PHASE CONTRAST MICROSCOPY NIOSH 7400 METHOD "A" COUNTING RULES

The results of this report relate only to the samples listed in the body of this report.

Unless otherwise noted below, the following statements apply: 1) all samples were received in acceptable condition, 2) all quality control results associated with this sample set were within acceptable limits and/or do not adversely affect the reported results, and 3) the industrial hygiene results have been blank corrected as follows:

If a single field blank is submitted the data set is blank corrected. If multiple field blanks are submitted then the average is used to blank correct the data set. If field blanks are not submitted then the laboratory process blank is used to correct the data set. In all cases if field blank values are > 5 fibers/mm² the client is notified.

Samples are analyzed for fibers using the microscopic techniques currently specified by the National Institute for Occupational Safety and Health (NIOSH) Manual of Analytical Methods (Fourth Edition) Volume I, Method 7400, 1994. The technique consists of the following steps: a wedge-shaped section of each filter is carefully excised and mounted on a standard microscope slide, using the acetone vapor/triacetin method (or equivalent method) to render the filter transparent. Fibers are defined as those particles observable on the surface of the filter section having length-to-width aspect ratios equal to or greater than 3:1. Fibers meeting this criterion are counted using a binocular microscope equipped with 10 X eyepieces, a 40 X objective, and phase contrast illumination. Walton-Beckett (G-22) fields, selected at random on the sample, are examined and fibers longer than 5 micrometers are counted until either of two conditions is satisfied:

1. A minimum of 100 fibers is counted in 20 or more fields.
2. A maximum of 100 fields is examined.

Results of the microscopic analyses are used in conjunction with field sampling data (measured flowrates and duration of sampling) to calculate airborne fiber concentrations corresponding to each sample in units of fibers longer than 5 micrometers per cubic centimeter (cc) of air (fibers > 5 μ m in length/cc) and fibers longer than 5 micrometers per squared millimeter (mm²) of filter area (fiber > 5 μ m in length/mm²). (AIHA -100651, NYSDOH -11645).



CLIENT: PINCHIN ENVIRONMENTAL

Project: 67004

Work Order No A1107094

References

"Asbestos and Other Fibers by Phase Contrast Microscopy (PCM)"- Manual 7400 - NIOSH Manual of Analytical Methods, 4th Edition, U.S. Department of HHS, NIOSH Publ. 94-113, 1994 (PCM).



ANALYTICAL RESULTS

Date: 15-Jul-11

CLIENT: PINCHIN ENVIRONMENTAL

Work Order No.: A1107094

Client Reference: 67004

Sample Type: Air

Date Received: 07/12/2011

Method Reference: NIOSH 7400A

Report Date: 07/15/2011

RL (fibers/mm2): 5.0

Analyst: JP

Lab ID	Sample Identification	Date Sampled	Date Analyzed	Air Volume (liters)	Fiber Concentration		
					(fibers/mm2)	(fibers/filter)	(fibers/cc)
001	216829 FB	07/05/2011	07/15/2011	0	<5.0	<1,900	---
002	216832	07/05/2011	07/15/2011	739	<5.0	<1,900	<0.0026
003	216838	07/05/2011	07/15/2011	751	<5.0	<1,900	<0.0026
004	216796	07/05/2011	07/15/2011	742	6.9	2,600	0.0036
005	216802	07/05/2011	07/15/2011	735	10	3,800	0.0052
006	216825	07/05/2011	07/15/2011	742	10	3,800	0.0052

Microscope Documentation

Instrument	Manufacturer	Model	Field Area (mm ²)	Calibration Date
PCM 2	Olympus	BH-2	0.008014	1/3/2011

Laboratory Sr Values

Jon Perrenoud (JP)

Range	Sr
0 - 20	0.364
20 - 50	0.136
50 - 100	0.134
> 100	0.129

Laboratory

Range	Sr
0 - 20	0.303
20 - 50	0.136
50 - 100	0.0784
> 100	0.158

Analyst(s) Name/Date:

7/15/2011

For Bureau Veritas Use Only
Bureau Veritas Lab Project No.



**BUREAU
VERITAS**

Detroit Lab
22345 Roethel Drive
Novi, MI 48375
(800) 806-5887
(248) 344-1770
FAX (248) 344-2655

Atlanta Lab
3380 Chastain Meadows Pky., Suite 300
Kennesaw, GA 30144
(800) 252-9919
(770) 499-7500
FAX (770) 499-7511

Chicago Lab
95 Oakwood Road
Lake Zurich, IL 60047
(888) 576-7522
(847) 726-3320
FAX (847) 726-3323

All 07094

RUSH ANALYSIS

CONTACT LAB IN ADVANCE

Need Results by: _____

Charges Authorized? ☐ Yes ☒ No

(If yes, Initial here)

☐ Email Results sbilerman@pinchun.com ☐ Fax

[illegible]

(Client Signature **MUST** Accompany Request)

Page 1 of 1

Bureau Veritas North America, Inc.

Phase Contrast Microscopy (PCM) Summary

Run ID PCM 2_110715D

Date: 15-Jul-11

Seq No	Sample ID	Client SampID	Test Code	Sample Typ	Analysis Date	RPDref
68784	A1107094-001A	216829 FB	N7400A	Samp	7/15/2011 4:26:3	0
Fields	Fibers	Blk Corrected Fibers/Field	Fiber Density	Filter Concentration	Air Volume (L)	Concentration (fibers/cc)
100	0	0	0	0	0	0

Seq No	Sample ID	Client SampID	Test Code	Sample Typ	Analysis Date	RPDref
68785	A1107094-002A	216832	N7400A	Samp	7/15/2011 4:26:3	0
Fields	Fibers	Blk Corrected Fibers/Field	Fiber Density	Filter Concentration	Air Volume (L)	Concentration (fibers/cc)
100	3	0.03	3.74345	1441.227851	739	0.002

Seq No	Sample ID	Client SampID	Test Code	Sample Typ	Analysis Date	RPDref
68786	A1107094-003A	216838	N7400A	Samp	7/15/2011 4:26:3	0
Fields	Fibers	Blk Corrected Fibers/Field	Fiber Density	Filter Concentration	Air Volume (L)	Concentration (fibers/cc)
100	4	0.04	4.99127	1921.637135	751	0.0026

Seq No	Sample ID	Client SampID	Test Code	Sample Typ	Analysis Date	RPDref
68787	A1107094-004A	216796	N7400A	Samp	7/15/2011 4:26:3	0
Fields	Fibers	Blk Corrected Fibers/Field	Fiber Density	Filter Concentration	Air Volume (L)	Concentration (fibers/cc)
100	5.5	0.055	6.86299	2642.251061	742	0.0036

Seq No	Sample ID	Client SampID	Test Code	Sample Typ	Analysis Date	RPDref
68788	A1107094-005A	216802	N7400A	Samp	7/15/2011 4:26:3	0
Fields	Fibers	Blk Corrected Fibers/Field	Fiber Density	Filter Concentration	Air Volume (L)	Concentration (fibers/cc)
100	8	0.08	9.98253	3843.274270	735	0.0052

Seq No	Sample ID	Client SampID	Test Code	Sample Typ	Analysis Date	RPDref
68789	A1107094-006A	216825	N7400A	Samp	7/15/2011 4:26:3	0
Fields	Fibers	Blk Corrected Fibers/Field	Fiber Density	Filter Concentration	Air Volume (L)	Concentration (fibers/cc)
100	8	0.08	9.98253	3843.274270	742	0.0052

Seq No	Sample ID	Client SampID	Test Code	Sample Typ	Analysis Date	RPDref
68790	MB-21218		N7400A	MBLK	7/15/2011 4:26:3	0
Fields	Fibers	Blk Corrected Fibers/Field	Fiber Density	Filter Concentration	Air Volume (L)	Concentration (fibers/cc)
100	0	0	0	0	0	0

Seq No	Sample ID	Client SampID	Test Code	Sample Typ	Analysis Date	RPDref
68791	A1107094-006A		N7400A	REP	7/15/2011 4:26:3	68789
Fields	Fibers	Blk Corrected Fibers/Field	Fiber Density	Filter Concentration	Air Volume (L)	Concentration (fibers/cc)
100	7	0.07	8.73471	0	0	0



July 26, 2011

Mr. Rob Parker
PINCHIN ENVIRONMENTAL
285 Weber Street
Waterloo, ON

Bureau Veritas Work Order No. A1107183

Reference: 67004

Dear Mr. Rob Parker:

Bureau Veritas North America, Inc. received 3 samples on July 21, 2011 for the analyses presented in the following report.

The results apply only to the samples analyzed in this project. Please note that any unused portion of the samples will be discarded after a thirty-day holding period, unless you have requested otherwise.

We appreciate the opportunity to assist you. If you have any questions concerning the report, please contact the analyst whose name appears on the report or myself at (770) 499-7701.

Sincerely,

Kuntal Parikh

Senior Microscopist

Electronic signature authorized through password protection

Bureau Veritas North America, Inc.

Health, Safety, and Environmental Services

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CASE NARRATIVE

Date: 26-Jul-11

CLIENT: PINCHIN ENVIRONMENTAL

Project: 67004

Work Order No A1107183

METHOD FOR ANALYSIS OF AIRBORNE ASBESTOS FIBERS USING TRANSMISSION ELECTRON MICROSCOPY (TEM) BY THE NIOSH 7402 METHOD

The results of this report relate only to the samples listed in the body of this report.

Unless otherwise noted below, the following statements apply: 1) all samples were received in acceptable condition, 2) all quality control results associated with this sample set were within acceptable limits and/or do not adversely affect the reported results, and 3) the industrial hygiene results have not been blank corrected unless otherwise noted.

Upon receipt in the laboratory, filters are transferred to a glass slide with a drop of dimethyl formamide/acetic acid clearing solution. After clearing, the filters are carbon coated in a vacuum evaporator. Portions of the cleared/coated filters are excised and placed on 200-mesh copper TEM grids in a wick-type solutional washer containing 100% acetone.

Three grids are placed consecutively in the TEM for examination so that 40 grid openings or 100 fibers are counted. Grid openings are examined at 500-1,000X magnification. Asbestos structures containing fibers which meet a >3:1 length:width aspect ratio, a diameter greater than 0.25 micrometers, and a length greater than 5 micrometers are identified using morphology, selected area electron diffraction, and energy-dispersive x-ray spectroscopy. Fibers are sized (length and width) and are identified as chrysotile, amphibole, ambiguous, or non-asbestos. Use a higher magnification of 10,000X to determine fiber dimensions and countability of fibers under the acceptance criteria above. Fibers partially obscured by the grid bar at the edge of the field of view and are longer than 2.5 um are counted as "half-fibers".

Results are reported as total asbestos fibers per square millimeter of filter and asbestos fibers per cubic centimeter of air (asbestos fibers/cc). Reporting limits and analytical sensitivities are based on detecting a half-fiber.

The Kennesaw, Georgia lab is accredited by NVLAP –Lab Code 101125-0.

References

"Asbestos Fibers by Transmission Electron Microscopy (TEM)", Method 7402, Issue 2, August 15, 1994, NIOSH Manual of Analytical Methods, 4th Edition.



ANALYTICAL RESULTS

Client: PINCHIN ENVIRONMENTAL

Client Reference No.: 67004

Work Order No.: A1107183

Date: 26-Jul-11

Analytical Method: TEM -NIOSH 7402 PROTOCOL (Modified)

Date Received: 7/21/2011 2:00:44 PM

Grid Opening Size: 0.011 mm²

Report Date: 7/26/2011 1:43:04 PM

Clayton ID	A1107183-001A	A1107183-002A	A1107183-003A
Client ID	216796	216802	216825
Air Vol (L)	742	735	742
No Openings Analyzed	40	40	40
LOD (Fibers/mm ²)	1.1	1.1	1.1
Asbestos Fibers			
Chrysotile	0	0	0
Amosite	0	0	0
Crocidolite	0	0	0
Actinolite-Tremolite	0	0	0
Anthophyllite	0	0	0
Total Asbestos			
Count	0	0	0
Fibers/mm ²	< 1.1	< 1.1	< 1.1
Fibers/cc	< 0.00059	< 0.00060	< 0.00059
Non-Regulated Amphiboles			
Count	0	0	0
Fibers/mm ²	< 1.1	< 1.1	< 1.1
Fibers/cc	< 0.00059	< 0.00060	< 0.00059
All Other Types			
Count	2	3	4
Fibers/mm ²	4.6	6.8	9.1
Fibers/cc	0.0024	0.0036	0.0047
Total Fibers, All Types			
Count	2	3	4
Fibers/mm ²	4.6	6.8	9.1
Fibers/cc	0.0024	0.0036	0.0047
Equivalent PCM Count			
PCM Conc. (Fibers/cc)	0.0036	0.0052	0.0052
Fiber Ratio	0.0%	0.0%	0.0%
Equivalent PCM (Fibers/cc)	0	0	0

MCEF: Mixed Cellulose Ester Filter

f/cc: Fibers per cubic centimeter of air collected.

f/mm²: Fibers per square millimeter

<: Result is less than the indicated limit of detection.

"--" : No Results (Air Volume is 0)

Note 1: Fibers counted met a $\geq 3:1$ (length:width) aspect ratio and were $\geq 5.0\mu\text{m}$ in length and $\geq 0.25\mu\text{m}$ in width.

Analyst(s) Name/Date:  7/26/2011



ANALYTICAL RESULTS

Client: PINCHIN ENVIRONMENTAL

Client Reference No.: 67004

Work Order No.: A1107183

Date: 26-Jul-11

Analytical Method: TEM -NIOSH 7402 PROTOCOL (Modified)

Date Received: 7/21/2011 2:00:44 PM

Sample Type: Air

Report Date: 7/26/2011 1:43:04 PM

Grid Opening Size: 0.011 mm²

Lab Sample No.	Client Sample Identification	Date Sampled	Air Vol. (L)	Filter	EFA (mm ²)	Analysis Date	Analyst	Grid Box Identification
A1107183-001A	216796	07/15/11 @ 12:00 am	742	MCE Filter, .8um	385	07/26/11 @ 11:31 am	JP	07-22-11D-1

Analysis	Grid Openings Counted	Reporting Limit (f/mm ²)	Total Asbestos (f/mm ²)	Fibers Counted			Total Asbestos				95 % Confidence Limit	
				Chrysotile	Amphibole	Total	Chrysotile (f/cc)	Amphibole (f/cc)	Total (f/cc)	Sensitivity (f/cc)	Low	High
Asbestos	40	1.1	< 1.1	0	0	0	< 0.00059	< 0.00059	< 0.00059	0.00059	0	< 0.0041

TEM Count Details

Rec	Grid	Grid Opening ID	Count	Length (um)	Width (um)	Structure ID	Structure Type	EDS	Mass (ng)
1	A1	C4A	1	12.01	0.53	Organic	Fiber	Organic	0.002690
2	A1	C4C	0	0.00	0.00	None Detected			0
3	A1	E4A	0	0.00	0.00	None Detected			0
4	A1	E4C	0	0.00	0.00	None Detected			0
5	A1	F4A	0	0.00	0.00	None Detected			0
6	A1	F4C	0	0.00	0.00	None Detected			0
7	A1	G4A	0	0.00	0.00	None Detected			0
8	A1	G4C	0	0.00	0.00	None Detected			0
9	A1	H4A	0	0.00	0.00	None Detected			0
10	A1	H4C	0	0.00	0.00	None Detected			0
11	A1	H4D	0	0.00	0.00	None Detected			0
12	A1	H4B	0	0.00	0.00	None Detected			0
13	A1	G4D	0	0.00	0.00	None Detected			0
14	A1	G4B	0	0.00	0.00	None Detected			0
15	A2	C4A	0	0.00	0.00	None Detected			0



ANALYTICAL RESULTS

Client: PINCHIN ENVIRONMENTAL

Client Reference No.: 67004

Work Order No.: A1107183

Date: 26-Jul-11

Analytical Method: TEM -NIOSH 7402 PROTOCOL (Modified)

Date Received: 7/21/2011 2:00:44 PM

Sample Type: Air

Report Date: 7/26/2011 1:43:04 PM

Grid Opening Size: 0.011 mm²

TEM Count Details

Rec	Grid	Grid Opening ID	Count	Length (um)	Width (um)	Structure ID	Structure Type	EDS	Mass (ng)
16	A2	C4C	0	0.00	0.00	None Detected			0
17	A2	E4A	0	0.00	0.00	None Detected			0
18	A2	E4C	0	0.00	0.00	None Detected			0
19	A2	F4A	0	0.00	0.00	None Detected			0
20	A2	F4C	0	0.00	0.00	None Detected			0
21	A2	G4A	0	0.00	0.00	None Detected			0
22	A2	G4C	1	14.02	0.67	Organic	Fiber	Organic	0.004905
23	A2	H4A	0	0.00	0.00	None Detected			0
24	A2	H4C	0	0.00	0.00	None Detected			0
25	A2	H4D	0	0.00	0.00	None Detected			0
26	A2	H4B	0	0.00	0.00	None Detected			0
27	A2	G4D	0	0.00	0.00	None Detected			0
28	A2	G4B	0	0.00	0.00	None Detected			0
29	A3	C4A	0	0.00	0.00	None Detected			0
30	A3	C4C	0	0.00	0.00	None Detected			0
31	A3	E4A	0	0.00	0.00	None Detected			0
32	A3	E4C	0	0.00	0.00	None Detected			0
33	A3	F4A	0	0.00	0.00	None Detected			0
34	A3	F4C	0	0.00	0.00	None Detected			0
35	A3	G4A	0	0.00	0.00	None Detected			0
36	A3	G4C	0	0.00	0.00	None Detected			0
37	A3	H4A	0	0.00	0.00	None Detected			0
38	A3	H4C	0	0.00	0.00	None Detected			0
39	A3	H4D	0	0.00	0.00	None Detected			0



ANALYTICAL RESULTS

Client: PINCHIN ENVIRONMENTAL

Client Reference No.: 67004

Work Order No.: A1107183

Date: 26-Jul-11

Analytical Method: TEM -NIOSH 7402 PROTOCOL (Modified)

Date Received: 7/21/2011 2:00:44 PM

Sample Type: Air

Report Date: 7/26/2011 1:43:04 PM

Grid Opening Size: 0.011 mm²

TEM Count Details

Rec	Grid	Grid Opening ID	Count	Length (um)	Width (um)	Structure ID	Structure Type	EDS	Mass (ng)
40	A3	H4B	0	0.00	0.00	None Detected			0

Total Fibers: 2

Total Mass: 0.007595

TEM Microscope Documentation

Accelerating

Instrument	*Magnification	Voltage	Calibration Date
TEM 2/D686	14982x	100 KeV	7/17/2011

*Magnification = Calibrated screen magnification at 15,000X. For ISO Method 10312 the calibrated screen magnification is at 20,000X



ANALYTICAL RESULTS

Client: PINCHIN ENVIRONMENTAL

Client Reference No.: 67004

Work Order No.: A1107183

Date: 26-Jul-11

Analytical Method: TEM -NIOSH 7402 PROTOCOL (Modified)

Date Received: 7/21/2011 2:00:44 PM

Sample Type: Air

Report Date: 7/26/2011 1:43:04 PM

Grid Opening Size: 0.011 mm²

Lab Sample No.	Client Sample Identification	Date Sampled	Air Vol. (L)	Filter	EFA (mm ²)	Analysis Date	Analyst	Grid Box Identification
A1107183-002A	216802	07/15/11 @ 12:00 am	735	MCE Filter, .8um	385	07/26/11 @ 11:31 am	JP	07-22-11D-1

Analysis	Grid Openings Counted	Reporting Limit (f/mm ²)	Total Asbestos (f/mm ²)	Fibers Counted			Total Asbestos				95 % Confidence Limit	
				Chrysotile	Amphibole	Total	Chrysotile (f/cc)	Amphibole (f/cc)	Total (f/cc)	Sensitivity (f/cc)		
Asbestos	40	1.1	< 1.1	0	0	0	< 0.00060	< 0.00060	< 0.00060	0.00060	0	< 0.0042

TEM Count Details

Rec	Grid	Grid Opening ID	Count	Length (um)	Width (um)	Structure ID	Structure Type	EDS	Mass (ng)
1	B1	C4A	0	0.00	0.00	None Detected			0
2	B1	C4C	0	0.00	0.00	None Detected			0
3	B1	E4A	0	0.00	0.00	None Detected			0
4	B1	E4C	0	0.00	0.00	None Detected			0
5	B1	F4A	0	0.00	0.00	None Detected			0
6	B1	F4C	0	0.00	0.00	None Detected			0
7	B1	G4A	0	0.00	0.00	None Detected			0
8	B1	G4C	1	10.01	0.53	Cellulose	Fiber	Cellulose	0.002242
9	B1	H4A	0	0.00	0.00	None Detected			0
10	B1	H4C	1	30.04	0.47	Organic	Fiber	Organic	0.00515
11	B1	H4D	0	0.00	0.00	None Detected			0
12	B1	H4B	0	0.00	0.00	None Detected			0
13	B1	G4D	0	0.00	0.00	None Detected			0
14	B1	G4B	0	0.00	0.00	None Detected			0
15	B2	C4A	0	0.00	0.00	None Detected			0



ANALYTICAL RESULTS

Client: PINCHIN ENVIRONMENTAL

Client Reference No.: 67004

Work Order No.: A1107183

Date: 26-Jul-11

Analytical Method: TEM -NIOSH 7402 PROTOCOL (Modified)

Date Received: 7/21/2011 2:00:44 PM

Sample Type: Air

Report Date: 7/26/2011 1:43:04 PM

Grid Opening Size: 0.011 mm²

TEM Count Details

Rec	Grid	Grid Opening ID	Count	Length (um)	Width (um)	Structure ID	Structure Type	EDS	Mass (ng)
16	B2	C4C	0	0.00	0.00	None Detected			0
17	B2	E4A	0	0.00	0.00	None Detected			0
18	B2	E4C	0	0.00	0.00	None Detected			0
19	B2	F4A	0	0.00	0.00	None Detected			0
20	B2	F4C	0	0.00	0.00	None Detected			0
21	B2	G4A	0	0.00	0.00	None Detected			0
22	B2	G4C	1	9.34	0.67	Organic	Fiber	Organic	0.00327
23	B2	H4A	0	0.00	0.00	None Detected			0
24	B2	H4C	0	0.00	0.00	None Detected			0
25	B2	H4D	0	0.00	0.00	None Detected			0
26	B2	H4B	0	0.00	0.00	None Detected			0
27	B2	G4D	0	0.00	0.00	None Detected			0
28	B2	G4B	0	0.00	0.00	None Detected			0
29	B3	C4A	0	0.00	0.00	None Detected			0
30	B3	C4C	0	0.00	0.00	None Detected			0
31	B3	E4A	0	0.00	0.00	None Detected			0
32	B3	E4C	0	0.00	0.00	None Detected			0
33	B3	F4A	0	0.00	0.00	None Detected			0
34	B3	F4C	0	0.00	0.00	None Detected			0
35	B3	G4A	0	0.00	0.00	None Detected			0
36	B3	G4C	0	0.00	0.00	None Detected			0
37	B3	H4A	0	0.00	0.00	None Detected			0
38	B3	H4C	0	0.00	0.00	None Detected			0
39	B3	H4D	0	0.00	0.00	None Detected			0



ANALYTICAL RESULTS

Client: PINCHIN ENVIRONMENTAL

Client Reference No.: 67004

Work Order No.: A1107183

Date: 26-Jul-11

Analytical Method: TEM -NIOSH 7402 PROTOCOL (Modified)

Date Received: 7/21/2011 2:00:44 PM

Sample Type: Air

Report Date: 7/26/2011 1:43:04 PM

Grid Opening Size: 0.011 mm²

TEM Count Details

Rec	Grid	Grid Opening ID	Count	Length (um)	Width (um)	Structure ID	Structure Type	EDS	Mass (ng)
40	B3	H4B	0	0.00	0.00	None Detected			0

Total Fibers: 3

Total Mass: 0.010662

TEM Microscope Documentation

Accelerating

Instrument	*Magnification	Voltage	Calibration Date
TEM 2/D686	14982x	100 KeV	7/17/2011

*Magnification = Calibrated screen magnification at 15,000X. For ISO Method 10312 the calibrated screen magnification is at 20,000X



ANALYTICAL RESULTS

Client: PINCHIN ENVIRONMENTAL

Client Reference No.: 67004

Work Order No.: A1107183

Date: 26-Jul-11

Analytical Method: TEM -NIOSH 7402 PROTOCOL (Modified)

Date Received: 7/21/2011 2:00:44 PM

Sample Type: Air

Report Date: 7/26/2011 1:43:04 PM

Grid Opening Size: 0.011 mm²

Lab Sample No.	Client Sample Identification	Date Sampled	Air Vol. (L)	Filter	EFA (mm ²)	Analysis Date	Analyst	Grid Box Identification
A1107183-003A	216825	07/15/11 @ 12:00 am	742	MCE Filter, .8um	385	07/26/11 @ 11:31 am	JP	07-22-11D-1

Analysis	Grid Openings Counted	Reporting Limit (f/mm ²)	Total Asbestos (f/mm ²)	Fibers Counted			Total Asbestos				95 % Confidence Limit	
				Chrysotile	Amphibole	Total	Chrysotile (f/cc)	Amphibole (f/cc)	Total (f/cc)	Sensitivity (f/cc)	Low	High
Asbestos	40	1.1	< 1.1	0	0	0	< 0.00059	< 0.00059	< 0.00059	0.00059	0	< 0.0041

TEM Count Details

Rec	Grid	Grid Opening ID	Count	Length (um)	Width (um)	Structure ID	Structure Type	EDS	Mass (ng)
1	C1	C4A	0	0.00	0.00	None Detected			0
2	C1	C4C	0	0.00	0.00	None Detected			0
3	C1	E4A	0	0.00	0.00	None Detected			0
4	C1	E4C	0	0.00	0.00	None Detected			0
5	C1	F4A	0	0.00	0.00	None Detected			0
6	C1	F4C	1	6.01	0.67	Organic	Fiber	Organic	0.002102
7	C1	G4A	1	15.35	1.33	Cellulose	Fiber	Cellulose	0.021487
8	C1	G4C	0	0.00	0.00	None Detected			0
9	C1	H4A	0	0.00	0.00	None Detected			0
10	C1	H4C	0	0.00	0.00	None Detected			0
11	C1	H4D	0	0.00	0.00	None Detected			0
12	C1	H4B	0	0.00	0.00	None Detected			0
13	C1	G4D	0	0.00	0.00	None Detected			0
14	C1	G4B	0	0.00	0.00	None Detected			0
15	C2	C4A	0	0.00	0.00	None Detected			0



ANALYTICAL RESULTS

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Client Reference No.: 67004

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Grid Opening Size: 0.011 mm²

TEM Count Details

Rec	Grid	Grid Opening ID	Count	Length (um)	Width (um)	Structure ID	Structure Type	EDS	Mass (ng)
16	C2	C4C	0	0.00	0.00	None Detected			0
17	C2	E4A	0	0.00	0.00	None Detected			0
18	C2	E4C	0	0.00	0.00	None Detected			0
19	C2	F4A	0	0.00	0.00	None Detected			0
20	C2	F4C	0	0.00	0.00	None Detected			0
21	C2	G4A	1	6.67	0.53	Organic	Fiber	Organic	0.001495
22	C2	G4C	0	0.00	0.00	None Detected			0
23	C2	H4A	0	0.00	0.00	None Detected			0
24	C2	H4C	0	0.00	0.00	None Detected			0
25	C2	H4D	0	0.00	0.00	None Detected			0
26	C2	H4B	0	0.00	0.00	None Detected			0
27	C2	G4D	0	0.00	0.00	None Detected			0
28	C2	G4B	0	0.00	0.00	None Detected			0
29	C3	C4A	0	0.00	0.00	None Detected			0
30	C3	C4C	0	0.00	0.00	None Detected			0
31	C3	E4A	0	0.00	0.00	None Detected			0
32	C3	E4C	0	0.00	0.00	None Detected			0
33	C3	F4A	0	0.00	0.00	None Detected			0
34	C3	F4C	0	0.00	0.00	None Detected			0
35	C3	G4A	0	0.00	0.00	None Detected			0
36	C3	G4C	0	0.00	0.00	None Detected			0
37	C3	H4A	0	0.00	0.00	None Detected			0
38	C3	H4C	1	6.34	0.67	Organic	Fiber	Organic	0.002219
39	C3	H4D	0	0.00	0.00	None Detected			0



ANALYTICAL RESULTS

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Client Reference No.: 67004

Work Order No.: A1107183

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Date Received: 7/21/2011 2:00:44 PM

Sample Type: Air

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Grid Opening Size: 0.011 mm²

TEM Count Details

Rec	Grid	Grid Opening ID	Count	Length (um)	Width (um)	Structure ID	Structure Type	EDS	Mass (ng)
40	C3	H4B	0	0.00	0.00	None Detected			0

Total Fibers: 4

Total Mass: 0.027302

TEM Microscope Documentation

Accelerating

Instrument	*Magnification	Voltage	Calibration Date
TEM 2/D686	14982x	100 KeV	7/17/2011

*Magnification = Calibrated screen magnification at 15,000X. For ISO Method 10312 the calibrated screen magnification is at 20,000X

Analyst(s) Name/Date:

7/26/2011