EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
856-303-2500
www.EMSL.com

Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 00:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-05-00003	Air volume:	10800	Liters
EMSL Sample Number:	041422412-0001	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	68	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	N/A N/A	Analyst:	P. Harrison	

Analytical Sensitivity: **0.000040** **Structure/cc** **Limit of Detection:** **0.000119** **Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Structures (All)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *None Detected*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

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Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0001	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-05-00003	Grid Box :	0414-Tetra Tech-07: F	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/07/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	15%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
F1	J5	None Detected								
F1	J7	None Detected								
F1	J9	None Detected								
F1	I10	None Detected								
F1	I8	None Detected								
F1	I6	None Detected								
F1	I4	None Detected								
F1	H3	None Detected								
F1	H5	None Detected								
F1	H7	None Detected								
F1	H9	None Detected								
F1	G10	None Detected								
F1	G8	None Detected								
F1	G6	None Detected								
F1	G4	None Detected								
F1	F5	None Detected								
F1	F7	None Detected								
F1	F9	None Detected								
F1	E10	None Detected								
F1	E8	None Detected								
F1	E6	None Detected								
F1	E4	None Detected								
F1	D3	None Detected								
F1	D5	None Detected								
F1	D7	None Detected								
F1	D9	None Detected								
F1	C10	None Detected								
F1	C8	None Detected								
F1	C6	None Detected								
F1	C4	None Detected								
F1	B3	None Detected								
F1	B5	None Detected								
F1	B7	None Detected								
F1	B9	None Detected								
F1	A10	None Detected								
F1	A8	None Detected								
F1	A6	None Detected								
F1	A4	None Detected								

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ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0001	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-05-00003	Grid Box :	0414-Tetra Tech-07: F	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/07/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	15%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
F4	A10	None Detected								
F4	A8	None Detected								
F4	A6	None Detected								
F4	B1	None Detected								
F4	B3	None Detected								
F4	B5	None Detected								
F4	B7	None Detected								
F4	B9	None Detected								
F4	C10	None Detected								
F4	C8	None Detected								
F4	C6	None Detected								
F4	C4	None Detected								
F4	C2	None Detected								
F4	D1	None Detected								
F4	D5	None Detected								
F4	D7	None Detected								
F4	D9	None Detected								
F4	E10	None Detected								
F4	E8	None Detected								
F4	E6	None Detected								
F4	E4	None Detected								
F4	E2	None Detected								
F4	F3	None Detected								
F4	F5	None Detected								
F4	F7	None Detected								
F4	F9	None Detected								
F4	G10	None Detected								
F4	G8	None Detected								
F4	G6	None Detected								
F4	G4	None Detected								

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Customer ID: MAXI57
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Received: 8/4/2014 8:40
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Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-06-00003	Air volume:	10800	Liters
EMSL Sample Number:	041422412-0002	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	68	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	N/A N/A	Analyst:	P. Harrison	

Analytical Sensitivity: **0.000040** **Structure/cc** **Limit of Detection:** **0.000119** **Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Structures (All)	**CD/ADX**	**0**	-	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *None Detected*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

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Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

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Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0002	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-06-00003	Grid Box :	0414-Tetra Tech-07: F	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/07/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	10%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
F4	A10	None Detected								
F4	A8	None Detected								
F4	A6	None Detected								
F4	A4	None Detected								
F4	B1	None Detected								
F4	B3	None Detected								
F4	B5	None Detected								
F4	B9	None Detected								
F4	C10	None Detected								
F4	C8	None Detected								
F4	C6	None Detected								
F4	D9	None Detected								
F4	E10	None Detected								
F4	E8	None Detected								
F4	E6	None Detected								
F4	E4	None Detected								
F4	F1	None Detected								
F4	F3	None Detected								
F4	F7	None Detected								
F4	F9	None Detected								
F4	G10	None Detected								
F4	G8	None Detected								
F4	G6	None Detected								
F4	G4	None Detected								
F4	G2	None Detected								
F4	H3	None Detected								
F4	H5	None Detected								
F4	J3	None Detected								
F4	J7	None Detected								
F4	J9	None Detected								
F5	J1	None Detected								
F5	J3	None Detected								
F5	J5	None Detected								
F5	J9	None Detected								
F5	I10	None Detected								
F5	I8	None Detected								
F5	I6	None Detected								
F5	I4	None Detected								

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International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0002	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-06-00003	Grid Box :	0414-Tetra Tech-07: F	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/07/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	10%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
F5	I2	None Detected								
F5	H3	None Detected								
F5	H5	None Detected								
F5	H7	None Detected								
F5	H9	None Detected								
F5	G10	None Detected								
F5	G6	None Detected								
F5	G4	None Detected								
F5	G2	None Detected								
F5	F1	None Detected								
F5	F3	None Detected								
F5	F5	None Detected								
F5	F7	None Detected								
F5	F9	None Detected								
F5	E10	None Detected								
F5	E6	None Detected								
F5	E4	None Detected								
F5	E2	None Detected								
F5	D3	None Detected								
F5	D5	None Detected								
F5	D7	None Detected								
F5	D9	None Detected								
F5	C4	None Detected								
F5	B1	None Detected								
F5	B3	None Detected								
F5	B5	None Detected								
F5	B7	None Detected								
F5	A4	None Detected								
F6	A10	None Detected								
F6	B9	None Detected								

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EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-07-00003	Air volume:	10440	Liters
EMSL Sample Number:	041422412-0003	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	70	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	68.00 Random	Analyst:	P. Harrison	

Analytical Sensitivity: 0.000040 Structure/cc **Limit of Detection: 0.000119 Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	2	-	2.16	0.000080	0.000000 -	0.000251
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**2**	**-**	**2.16**	**0.000080**	**0.000000 -**	**0.000251**
Total PCMe Structures (All)	**CD/ADX**	**2**	**-**	**2.16**	**0.000080**	**0.000000 -**	**0.000251**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	2	2.16	0.000080	0.000000 -	0.000251
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**2**	**2.16**	**0.000080**	**0.000000 -**	**0.000251**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**2**	**2.16**	**0.000080**	**0.000000 -**	**0.000251**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *Actinolite*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

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Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

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Comment: Samples were collected on 0.8 um filters.

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Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0003	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-07-00003	Grid Box :	0414-Tetra Tech-07: F	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	68.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/08/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	25%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
F9	A10	None Detected								
F9	A8	None Detected								
F9	A6	None Detected								
F9	A4	None Detected								
F9	A2	MD11	1		10.1	1.8	ADX	Actinolite	4450	
F9	A2	MF		1	7.3	0.3	ADX	Actinolite		
F9	B5	None Detected								
F9	B7	None Detected								
F9	B9	None Detected								
F9	C10	None Detected								
F9	C8	None Detected								
F9	C6	None Detected								
F9	C4	None Detected								
F9	C2	None Detected								
F9	D1	None Detected								
F9	D3	None Detected								
F9	D5	None Detected								
F9	D7	None Detected								
F9	D9	None Detected								
F9	E10	None Detected								
F9	E8	None Detected								
F9	E6	None Detected								
F9	E4	None Detected								
F9	E2	None Detected								
F9	F1	None Detected								
F9	F3	None Detected								
F9	F5	None Detected								
F9	F7	None Detected								
F9	F9	None Detected								
F9	G10	None Detected								
F9	G8	None Detected								
F9	G6	None Detected								
F9	G2	None Detected								
F9	H1	None Detected								
F9	H3	None Detected								
F9	H5	None Detected								
F9	H7	None Detected								
F9	H9	None Detected								

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Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0003	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-07-00003	Grid Box :	0414-Tetra Tech-07: F	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	68.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/08/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	25%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
F9	I10	None Detected								
F9	I8	None Detected								
F9	I6	None Detected								
F9	I4	None Detected								
F9	J1	None Detected								
F9	J5	None Detected								
F9	J9	None Detected								
F10	A7	None Detected								
F10	A5	None Detected								
F10	A3	None Detected								
F10	A1	None Detected								
F10	B2	None Detected								
F10	B4	None Detected								
F10	B6	None Detected								
F10	B8	None Detected								
F10	B10	None Detected								
F10	C9	None Detected								
F10	C7	None Detected								
F10	C5	None Detected								
F10	C3	None Detected								
F10	C1	None Detected								
F10	D2	None Detected								
F10	D6	None Detected								
F10	D8	None Detected								
F10	D10	None Detected								
F10	E9	None Detected								
F10	E7	None Detected								
F10	E3	None Detected								
F10	E1	None Detected								
F10	F4	None Detected								
F10	F6	None Detected								
F10	F8	None Detected								
F10	F10	F	2	2	13.4	0.7	ADX	Actinolite		

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International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Structure Sketch Sheet for Direct Data Entry

EMSL Order ID: 041422412-0003 **Client:** Tetra Tech

Client Sample: *BC-AA-07-00003* Page 1 of 1

Primary Structure # 1 	Primary Structure # 2 	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Structure #	Structure #	Structure #	Structure #

Analyst: _____ Date: 8/8/14 Scope: 04-03

200 Route 130 North Cinnaminson, NJ 08077
www.emsl.com

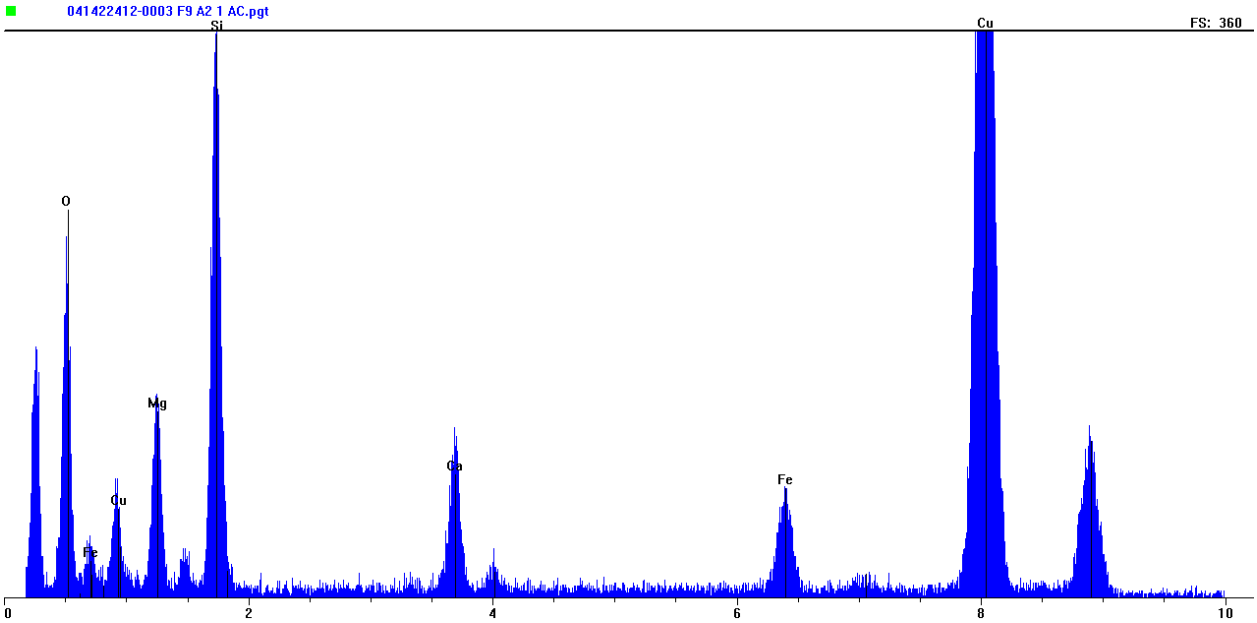
Energy Dispersive X-Ray Analysis
Quantitative Spectra & Data

EMSL ANALYTICAL, INC.

File: L:\EDS Spe...Spectra\Scope 04-03\2014\041422412-0003 F9 A2 1 AC.pgt
Collected: August 08, 2014 08:29:13

Report: Friday, August 08, 2014

Live Time:	684.41	Count Rate:	83	Dead Time:	0.92 %
Beam Voltage:	20.00	Beam Current:	2.00	Takeoff Angle:	31.00
Thickness limit:	27340.26				



Element	Line	keV	CL Ratio	Wt%	At%	At Prop	Compound	Cmpd Wt%
Mg	KA1	1.254	1.4000	13.61	13.19	6.1	MgO	22.56
Si	KA1	1.740	1.0000	30.94	25.97	11.9	SiO	48.56
Ca	KA1	3.691	1.1000	10.57	6.22	2.9	CaO	14.79
Fe	KA1	6.403	1.3900	10.95	4.62	2.1	FeO	14.08
Cu	KA1	8.046	0.0000	0.00	0.00	0.0		
O	KA1	0.523	0.0000	33.93	50.00	23.0		
Total			**0.0000**	**100.00**	**100.00**	**46.0**	**Total**	**100.00**

Element	Line	Gross (cps)	BKG (cps)	Net (cps)	P:B Ratio
Mg	KA1	2.7	0.3	2.4	7.6
Si	KA1	8.0	0.3	7.7	24.0
Ca	KA1	2.7	0.3	2.4	8.2
Fe	KA1	2.2	0.3	2.0	6.8
Cu	KA1	26.7	0.4	26.3	71.5
O	KA1	3.9	0.2	3.6	15.1

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number: 041422412 **Date:** Aug 08, 2014

Image Number: 04450

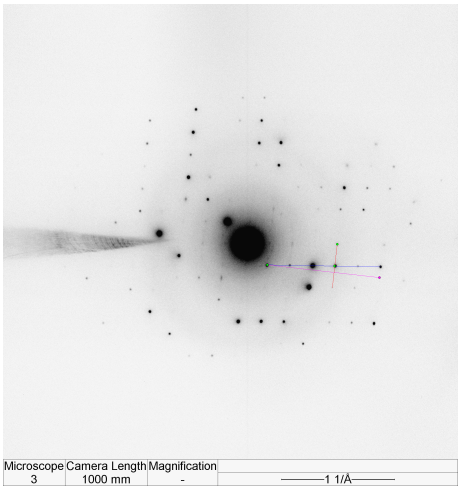
Reference / Sample Number: 0003

Preliminary ID: ACTINOLITE

Camera Constant: 1.959e-003 **1/A Pixels**

Calibration Reference: 080614-04-03-04447_C

	Measured	Reference	-5%	+5%
Inter-row Spacing:	**5.023**	5.278	**5.014**	**5.542**
d2 or hk0 (Camera K/zero row dist.):	**5.177**	5.099	**4.844**	**5.354**
d1 or hkl (Camera K/slant vector dist.):	**5.004**	4.931	**4.684**	**5.178**
Ratio of hk0/hkl:	**1.034**	1.034	**0.982**	**1.086**
Vector Angle:	**84.61**	85.120	**80.864**	**89.376**



From SAED Reference Book, "unknown" diffraction pattern was found to be that of: **ACTINOLITE**

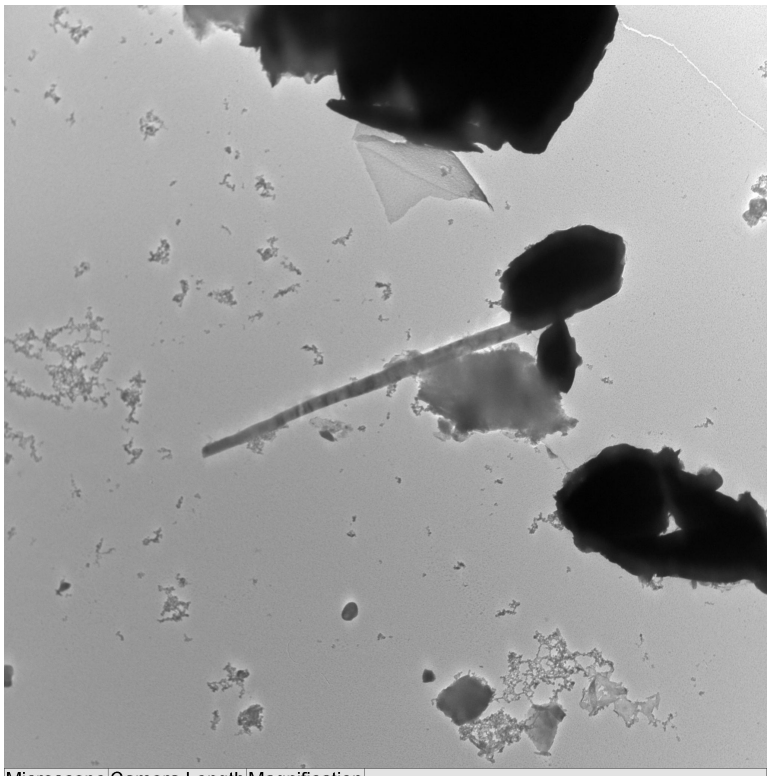
With a Zone Axis of: [**3-14**]

Preliminary Identification was:

X	CORRECT
	INCORRECT

EMSL Analytical, Inc.

Photomicrograph Report



Microscope	Camera Length	Magnification	
3	-	10000 x	—2 µm—

Micrograph Information

Sample ID:	0003
Order ID:	041422412
Image Number:	04451
Mineral Type:	ACTINOLITE
Date:	8/8/2014
Magnification:	10000
Microscope:	3

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
856-303-2500
www.EMSL.com

Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 00:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-08-00003	Air volume:	10800	Liters
EMSL Sample Number:	041422412-0004	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	68	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	58.00 Random	Analyst:	F. Craig	

Analytical Sensitivity: **0.000040** **Structure/cc** **Limit of Detection:** **0.000119** **Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	9	-	10.03	0.000357	0.000163 -	0.000679
PCMe Structures (NRA)	ADX	1	-	1.11	0.000040	0.000000 -	0.000188
Total PCMe Structures (Regulated)	**CD/ADX**	**9**	**-**	**10.03**	**0.000357**	**0.000163 -**	**0.000679**
Total PCMe Structures (All)	**CD/ADX**	**10**	**-**	**11.14**	**0.000397**	**0.000190 -**	**0.000730**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	7	7.80	0.000278	0.000112 -	0.000573
PCMe Fibers and Bundles (NRA)	ADX	-	1	1.11	0.000040	0.000000 -	0.000188
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**7**	**7.80**	**0.000278**	**0.000112 -**	**0.000573**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**8**	**8.91**	**0.000318**	**0.000137 -**	**0.000626**
Non Asbestos Mineral Structures	NAM	4	4	-	-	- -	-

Asbestiform Minerals Present: *Actinolite, Non-Regulated, Amphibole*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

Concentrations and 95% Confidence Intervals are based on a Poissonian distribution. Structure counts above 31 may be better expressed with a Gaussian distribution. EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced except in full without written approval of EMSL. EMSL is not responsible for sample collection activities or analytical limitations. Interpretation and use of results are the responsibility of the client.

Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041422412-0004	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-08-00003	Grid Box :	0414-TetraTech-07: G	Analyst(s):	F. Craig
Chi² Test for Uniformity:	58.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/07/2014 & 08/08/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
G1	I1	None Detected								
G1	I3	None Detected								
G1	I5	MD11	1		7.1	4.75	ADX	Actinolite		
G1	I5	MF		1	7.1	0.24	ADX	Actinolite	010448D	
G1	I7	None Detected								
G1	I9	MD11	2		10.6	7.05	ADX	Actinolite		
G1	I9	MF		2	9.4	1.08	ADX	Actinolite		
G1	H8	None Detected								
G1	H6	MD11	3		17.6	9.4	ADX	Actinolite		
G1	H6	MF		3	11.4	2.14	ADX	Actinolite	010450D	
G1	H4	None Detected								
G1	H2	None Detected								
G1	G1	None Detected								
G1	G3	None Detected								
G1	G5	MD11	0		16.6	3.33	ADX	Actinolite		
G1	G5	MF		0	10	0.96	ADX	Actinolite	010452D	
G1	G5	MD11	4		8.4	7.05	NAM	Non Asb. Mineral		
G1	G5	MF		4	6	0.72	NAM	Non Asb. Mineral		
G1	G7	MD11	5		7.4	2.538	ADX	Actinolite		
G1	G7	MF		5	7.4	1.68	ADX	Actinolite		
G1	G9	None Detected								
G1	F10	None Detected								
G1	F8	MD11	6		19.5	1.1	ADX	Actinolite		
G1	F8	MF		6	19.5	1	ADX	Actinolite		
G1	F6	None Detected								
G1	F4	None Detected								
G1	F2	None Detected								
G1	E1	None Detected								
G1	E3	None Detected								
G1	E5	MD11	7		5.2	1.56	ADX	Actinolite		
G1	E5	MF		7	5.2	1.2	ADX	Actinolite	010454D	
G1	E7	None Detected								
G1	E9	None Detected								
G1	D10	None Detected								
G1	D8	MD11	8		21.9	7.1	NAM	Non Asb. Mineral		
G1	D8	MF		8	6.6	1.68	NAM	Non Asb. Mineral		
G1	D8	MD11	9		6.6	5.71	NAM	Non Asb. Mineral		

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041422412-0004	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-08-00003	Grid Box :	0414-TetraTech-07: G	Analyst(s):	F. Craig
Chi² Test for Uniformity:	58.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/07/2014 & 08/08/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
G1	D8	MF		9	5.9	1.2	NAM	Non Asb. Mineral		
G1	D6	None Detected								
G1	D4	MD11	10		6.6	1.5	ADX	Non Reg.Amph.		
G1	D4	MF		10	6.6	1	ADX	Non Reg.Amph.	010458D	
G1	D2	None Detected								
G1	C1	None Detected								
G1	C3	None Detected								
G1	C5	None Detected								
G1	C7	None Detected								
G1	C9	None Detected								
G1	B10	None Detected								
G1	B8	None Detected								
G1	B6	None Detected								
G1	B4	None Detected								
G1	B2	None Detected								
G2	I3	MD11	11		7.3	1.56	NAM	Non Asb. Mineral		
G2	I3	MF		11	7.3	1.2	NAM	Non Asb. Mineral		
G2	I5	None Detected								
G2	I7	None Detected								
G2	I9	None Detected								
G2	H10	None Detected								
G2	H8	None Detected								
G2	H6	None Detected								
G2	H4	None Detected								
G2	H2	None Detected								
G2	G1	None Detected								
G2	G3	None Detected								
G2	G5	None Detected								
G2	G7	None Detected								
G2	G9	None Detected								
G2	F10	None Detected								
G2	F8	None Detected								
G2	F6	None Detected								
G2	F4	None Detected								
G2	F2	None Detected								
G2	E1	MC11	12	12	11.9	10.7	ADX	Actinolite	010461D	
G2	E3	None Detected								
G2	E5	MD11	13		23.8	9.5	ADX	Actinolite		

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041422412-0004	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-08-00003	Grid Box :	0414-TetraTech-07: G	Analyst(s):	F. Craig
Chi² Test for Uniformity:	58.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/07/2014 & 08/08/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
G2	E5	MF		13	10.5	1.32	ADX	Actinolite		
G2	E7	MD11	14		27.3	19	ADX	Actinolite		
G2	E7	MF		14	23.8	1	ADX	Actinolite	010463D	
G2	E9	None Detected								
G2	D10	None Detected								
G2	D8	None Detected								
G2	D6	None Detected								
G2	D4	None Detected								
G2	D2	None Detected								

200 Route 130 North
Cinnaminson, NJ 08077

ISO 10312

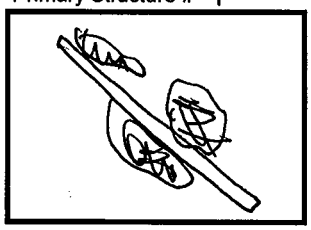
International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Structure Sketch Sheet for Direct Data Entry

EMSL Order ID: 041422412-0004 **Client:** Tetra Tech

Client Sample: *BC-AA-08-00003* Page 1 of 1

Primary Structure # 1



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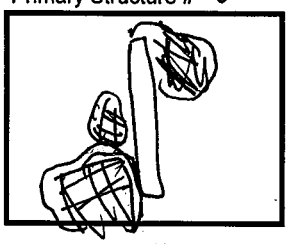

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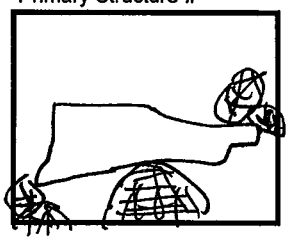
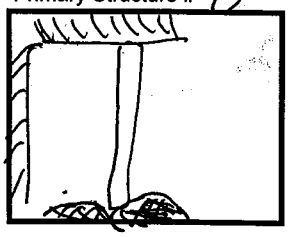


Primary Structure # 0



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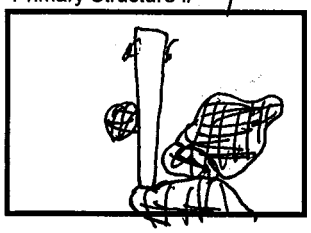

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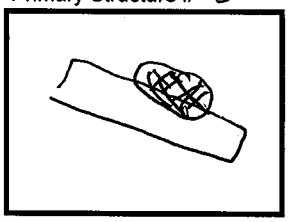

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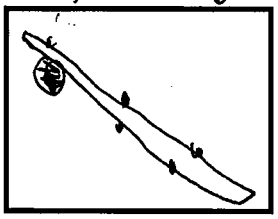

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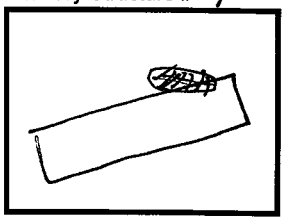
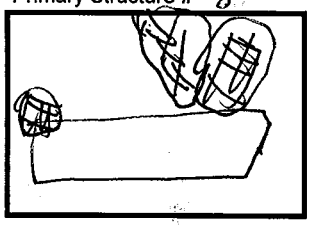


Primary Structure # 8



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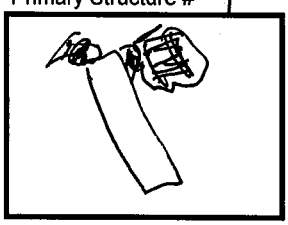
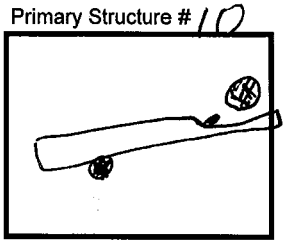
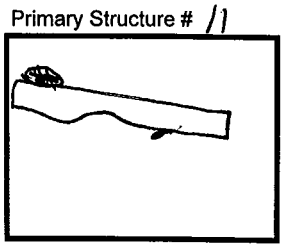


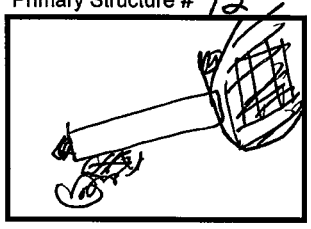
Primary Structure # 10



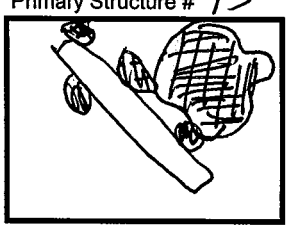
Primary Structure # 11



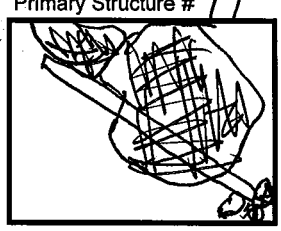
Primary Structure # 12



Primary Structure # 13



Primary Structure # 14



Primary Structure #

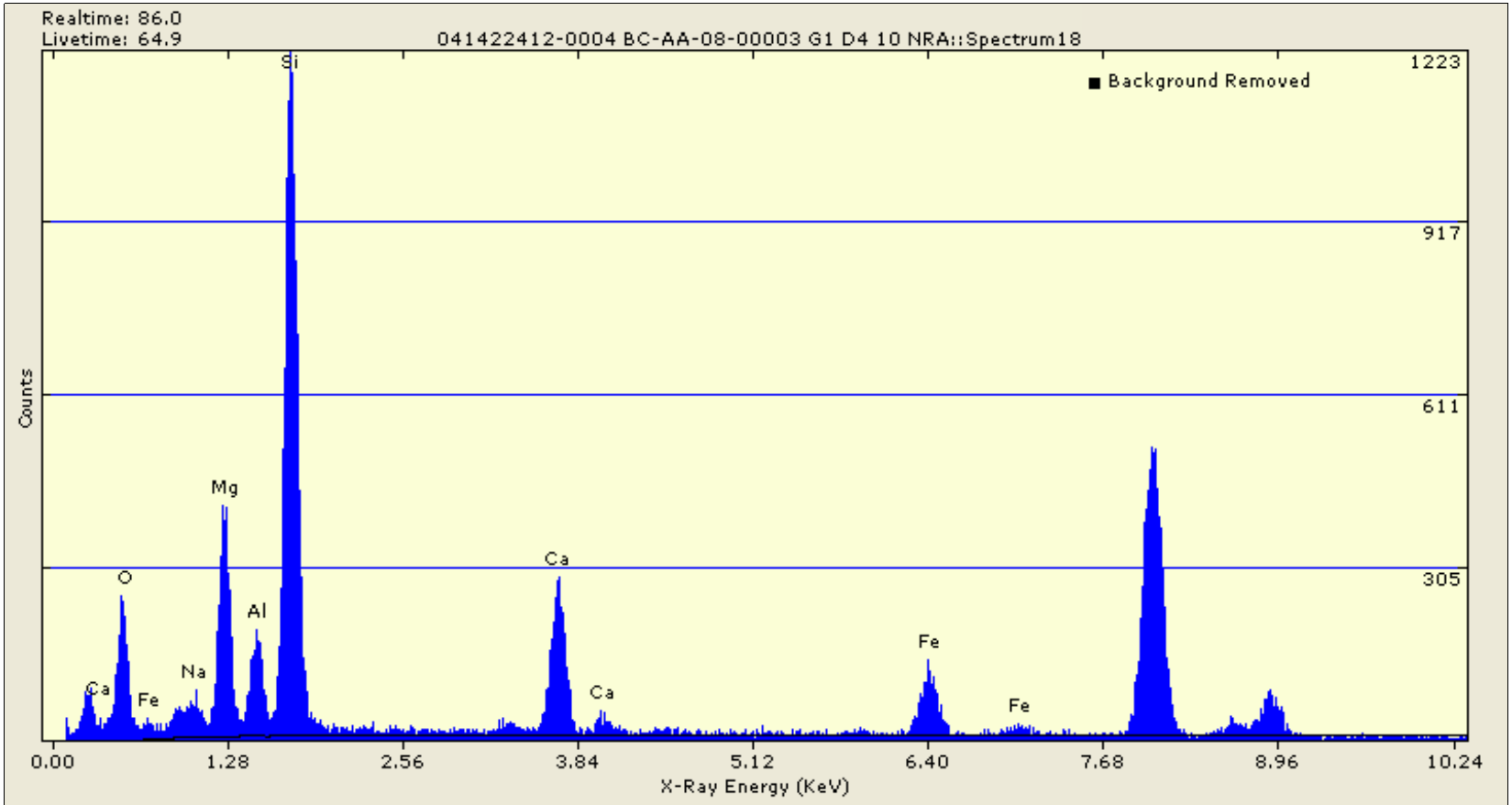
Structure #

Structure #

Structure #

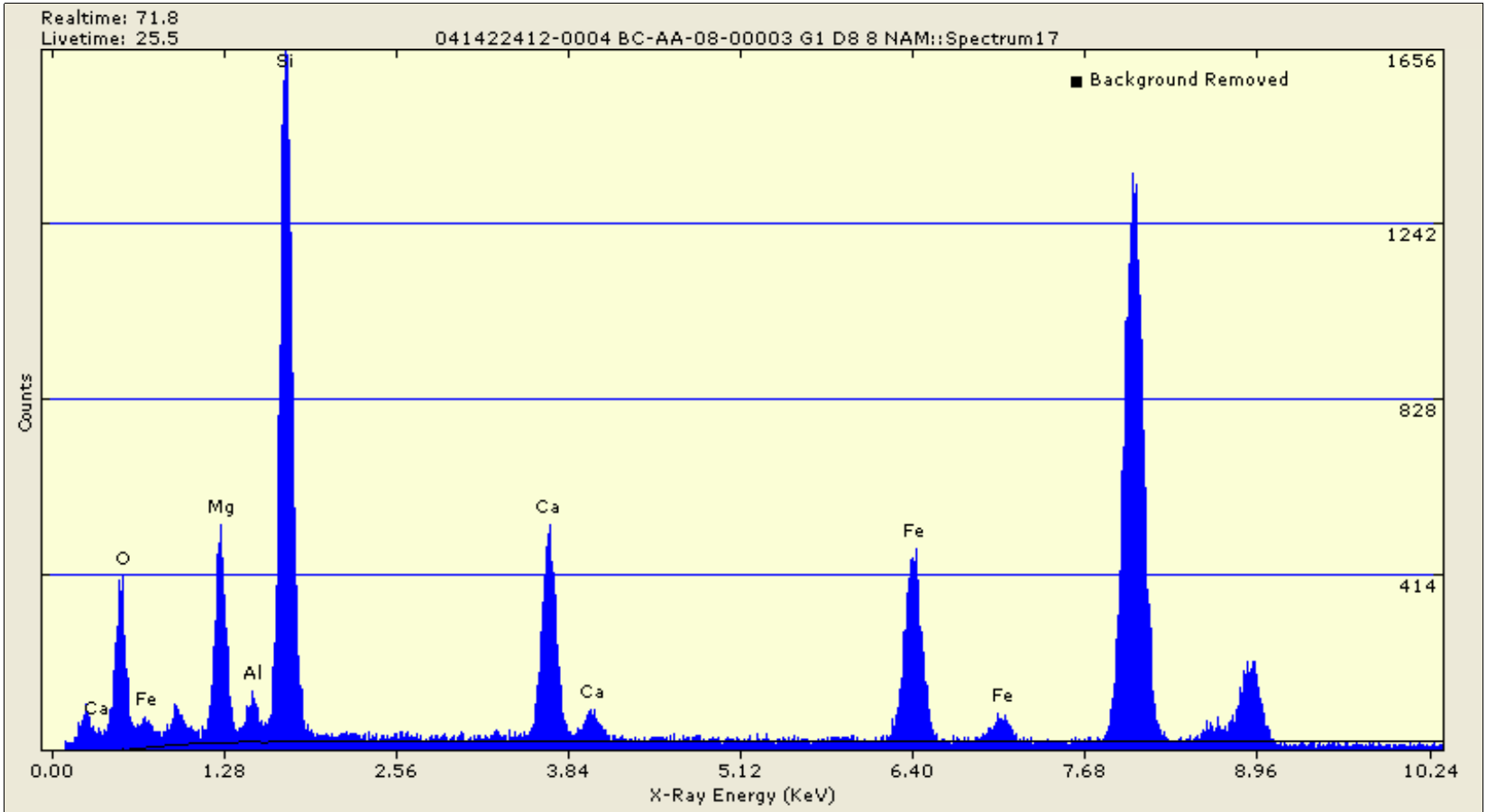
Structure #

Analyst: FZ Date: 8/8/14 Scope: 04 01



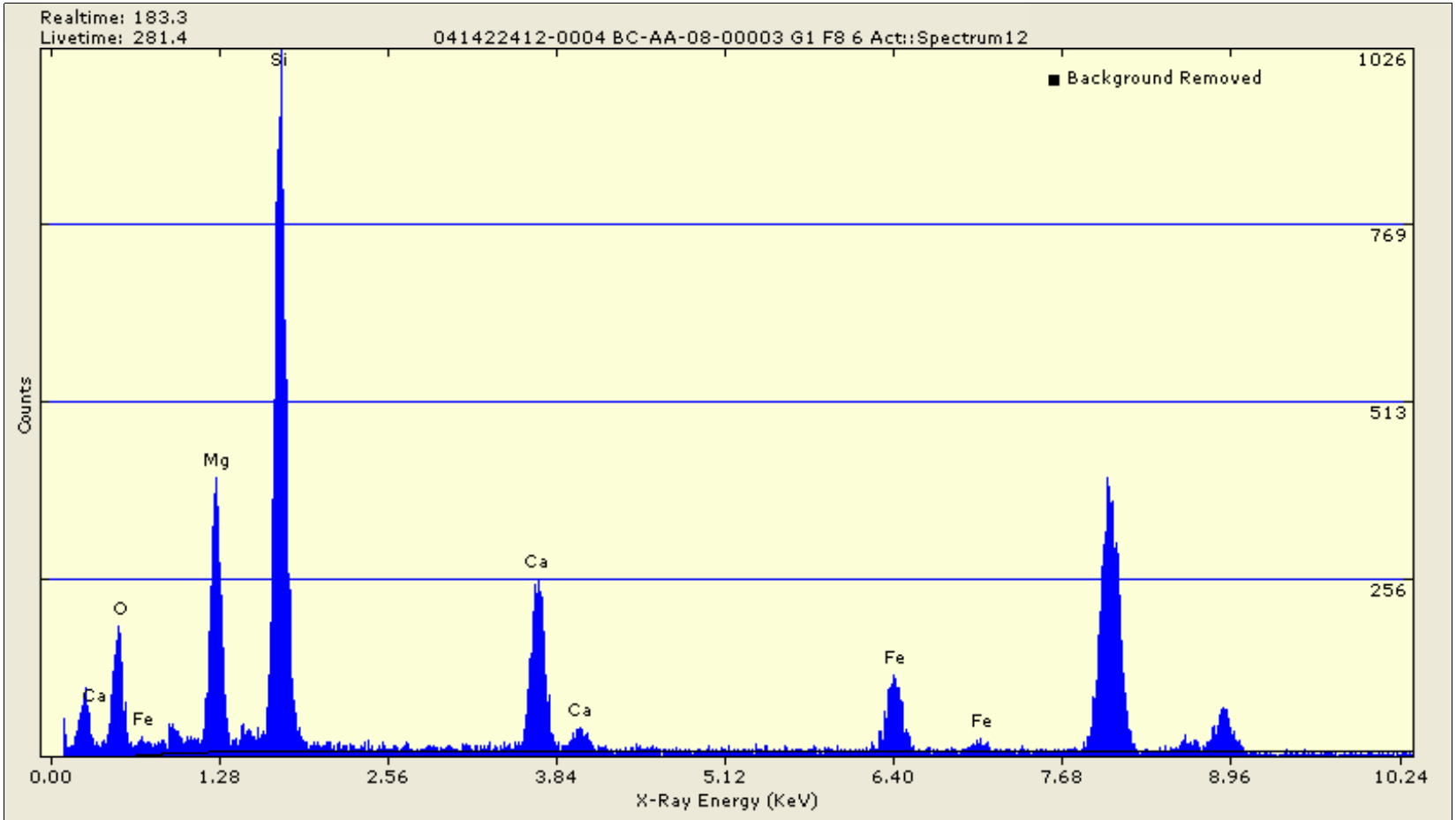
Quantitative Results for Spectrum18
Analysis: Thin Film Method: Standardless
Acquired 07-Aug-2014, 100.0 KeV @10 eV/channel

Element	Weight %	Std. Dev.	Atomic %	Oxide %		Cations	k-Ratio	Intensities	FWHM (eV)	ROI (net)
Oxygen	46.20	0.46	61.15	0.00		0.0000	0.0000	0.0	80.5	1858.55
Sodium	1.16	0.01	1.07	1.56	(Na2O)	0.4020	0.0207	281.4	87.2	501.23
Magnesium	9.35	0.09	8.15	15.51	(MgO)	3.0649	0.1715	2861.8	90.8	3062.76
Aluminum	3.88	0.04	3.04	7.32	(Al2O3)	1.1441	0.0709	1308.7	93.8	1460.54
Silicon	28.27	0.28	21.32	60.48	(SiO2)	8.0174	0.4804	10110.4	96.9	10167.88
Calcium	6.99	0.07	3.69	9.78	(CaO)	1.3886	0.0684	2593.9	118.5	2690.65
Iron	4.16	0.04	1.58	5.35	(FeO)	0.5930	0.0328	1225.9	143.1	1281.88
Total	100.00			100.00		14.6101				



Quantitative Results for Spectrum17
Analysis: Thin Film Method: Standardless
Acquired 07-Aug-2014, 100.0 KeV @10 eV/channel

Element	Weight %	Std. Dev.	Atomic %	Oxide %		Cations	k-Ratio	Intensities	FWHM (eV)	ROI (net)
Oxygen	43.62	0.90	60.84	0.00		0.0000	0.0000	0.0	80.4	2991.94
Magnesium	8.00	0.07	7.35	13.27	(MgO)	2.7782	0.1518	3685.1	90.8	3752.12
Aluminum	1.38	0.01	1.15	2.62	(Al2O3)	0.4329	0.0250	703.3	93.7	848.26
Silicon	26.56	0.22	21.11	56.83	(SiO2)	7.9790	0.4644	14293.9	96.9	14152.08
Calcium	8.86	0.07	4.93	12.39	(CaO)	1.8642	0.0891	4947.0	118.5	5086.76
Iron	11.58	0.10	4.63	14.89	(FeO)	1.7488	0.0929	5135.9	143.1	5226.71
Total	100.00			100.00		14.8031				



Quantitative Results for Spectrum12
Analysis: Thin Film Method: Standardless
Acquired 07-Aug-2014, 100.0 KeV @10 eV/channel

Element	Weight %	Std. Dev.	Atomic %	Oxide %		Cations	k-Ratio	Intensities	FWHM (eV)	ROI (net)
Oxygen	45.63	0.51	60.87	0.00		0.0000	0.0000	0.0	80.5	1388.98
Magnesium	12.58	0.14	11.05	20.86	(MgO)	4.1743	0.2316	2954.9	90.8	2957.86
Silicon	28.61	0.32	21.74	61.21	(SiO2)	8.2150	0.4921	7853.7	96.9	7992.77
Calcium	8.67	0.10	4.62	12.13	(CaO)	1.7441	0.0856	2469.9	118.5	2582.99
Iron	4.50	0.05	1.72	5.79	(FeO)	0.6502	0.0394	1019.1	143.1	1201.01
Total	100.00			100.00		14.7836				

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number:	041422412	**Date:**	Aug 07, 2014
Indexing of Image Number:	010448	**Scope #:**	04 - 01
Reference / Sample No:	0004-04-01	**By:**	F Craig
Preliminary ID:	ACTINOLITE		
Using Camera Constant of:	2.947e-003 **1/A Pixels**		
Determined from Reference:	AuCal-080514_10433		

Measured Inter-Row Spacing:	**128.63**	Pixels
Mean Distance between spots on Center row (d2):	**37.54**	Pixels
Mean Distance between spots on slant vector (d1):	**128.15**	Pixels

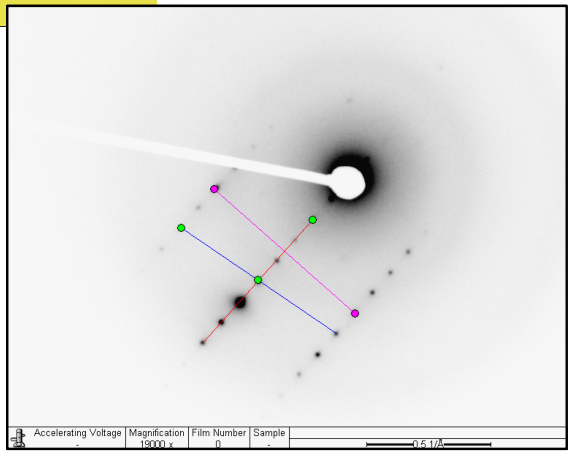
	Calculated	Ref	-5%	+5%
Inter-row Spacing (Angstroms):	2.638	**2.639**	*2.507*	*2.771*
d2 or hk0 (Camera K/zero row dist.):	9.039	**9.040**	*8.588*	*9.492*
d1 or hk1 (Camera K/slant vector dist.):	2.648	**2.644**	*2.512*	*2.776*
Ratio of hk0/hkl:	3.414	**3.419**	*3.248*	*3.590*
Angle of Slant Vector (Measured):	82.4	**81.570**	*77.491*	*85.648*

From SAED Reference Book, "unknown" diffraction pattern was found to be that of: Actinolite **By:** F Craig

Miller Indice hk0: (0 2 0)

Miller Indice hkl: (-1 1 2)

With a Zone Axis of: [2 0 1]



Preliminary Identification was: X CORRECT

INCORRECT

Percent accuracy to date: 100 %

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number:	041422412	**Date:**	Aug 07, 2014
Indexing of Image Number:	010458	**Scope #:**	04 - 01
Reference / Sample No:	0004-04-01	**By:**	F Craig
Preliminary ID:	NRA		
Using Camera Constant of:	2.947e-003	**1/A Pixels**	
Determined from Reference:	AuCal-080514_10433		

Measured Inter-Row Spacing: **64.71** Pixels

Mean Distance between spots on Center row (d2): Pixels

Mean Distance between spots on slant vector (d1): Pixels

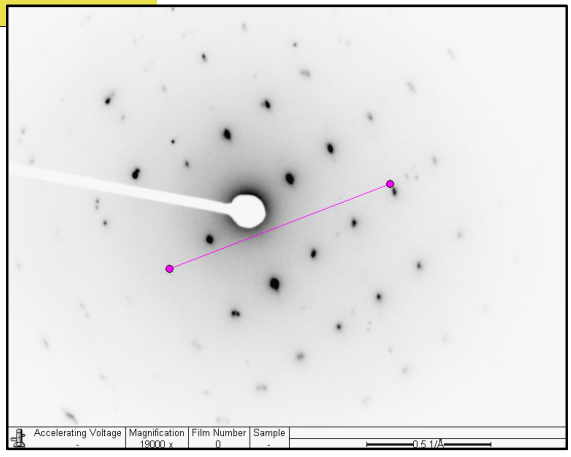
	Calculated	Ref	-5%	+5%
Inter-row Spacing (Angstroms):	5.244	**5.300**	*5.035*	*5.565*
d2 or hk0 (Camera K/zero row dist.):	N/A	**N/A**	-	-
d1 or hk1 (Camera K/slant vector dist.):	N/A	**N/A**	-	-
Ratio of hk0/hkl:	N/A	**N/A**	-	-
Angle of Slant Vector (Measured):	N/A	**N/A**	-	-

From SAED Reference Book, "unknown" diffraction pattern was found to be that of: NRA (Hornblende) **By:** F Craig

Miller Indice hk0: ( )

Miller Indice hkl: ( )

With a Zone Axis of: [**N/A**]



Preliminary Identification was: X CORRECT

INCORRECT

Percent accuracy to date: 100 %

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
856-303-2500
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Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 00:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-09-00003	Air volume:	10440	Liters
EMSL Sample Number:	041422412-0005	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	70	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	N/A N/A	Analyst:	F. Craig	

Analytical Sensitivity: **0.000040** **Structure/cc** **Limit of Detection:** **0.000119** **Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Structures (All)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Non Asbestos Mineral Structures	NAM	1	1	-	-	- -	-

Asbestiform Minerals Present: *None Detected*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

Concentrations and 95% Confidence Intervals are based on a Poissonian distribution. Structure counts above 31 may be better expressed with a Gaussian distribution. EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced except in full without written approval of EMSL. EMSL is not responsible for sample collection activities or analytical limitations. Interpretation and use of results are the responsibility of the client.

Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041422412-0005	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-09-00003	Grid Box :	0414-TetraTech-07: G	Analyst(s):	F. Craig
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/12/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
G7	B10	None Detected								
G7	B8	None Detected								
G7	B6	None Detected								
G7	B4	None Detected								
G7	B3	None Detected								
G7	B2	None Detected								
G7	C1	None Detected								
G7	C3	None Detected								
G7	C5	None Detected								
G7	C7	None Detected								
G7	C9	None Detected								
G7	D8	None Detected								
G7	D6	None Detected								
G7	D4	None Detected								
G7	D2	None Detected								
G7	E1	None Detected								
G7	E3	None Detected								
G7	E5	None Detected								
G7	E7	None Detected								
G7	E9	MD11	1		6.3	3.56	NAM	Non Asb. Mineral		
G7	E9	MF		1	6.3	1.44	NAM	Non Asb. Mineral	010472D	
G7	F10	None Detected								
G7	F8	None Detected								
G7	F6	None Detected								
G7	F4	None Detected								
G7	F10	None Detected								
G7	G3	None Detected								
G7	G5	None Detected								
G7	G7	None Detected								
G7	G9	MD11	0		40.8	16.63	NAM	Non Asb. Mineral		
G7	G9	MF		0	40.8	2.38	NAM	Non Asb. Mineral		
G7	H10	None Detected								
G7	H8	None Detected								
G7	H6	None Detected								
G7	H4	None Detected								
G7	H2	None Detected								
G7	I5	None Detected								

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041422412-0005	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-09-00003	Grid Box :	0414-TetraTech-07: G	Analyst(s):	F. Craig
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/12/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
G7	I9	None Detected								
G8	I9	None Detected								
G8	I7	None Detected								
G8	I5	None Detected								
G8	I3	None Detected								
G8	H2	None Detected								
G8	H4	None Detected								
G8	H6	None Detected								
G8	H8	None Detected								
G8	H10	None Detected								
G8	G7	None Detected								
G8	G5	None Detected								
G8	G3	None Detected								
G8	F2	None Detected								
G8	F4	None Detected								
G8	F6	None Detected								
G8	F8	None Detected								
G8	F10	None Detected								
G8	E9	None Detected								
G8	E7	None Detected								
G8	E5	None Detected								
G8	E3	None Detected								
G8	D2	None Detected								
G8	D4	None Detected								
G8	D6	None Detected								
G8	D8	None Detected								
G8	D10	None Detected								
G8	C7	None Detected								
G8	C5	None Detected								
G8	C3	None Detected								
G8	B2	None Detected								
G8	B4	None Detected								
G8	B6	None Detected								
G8	B8	None Detected								
G8	B10	None Detected								
G8	A9	None Detected								

200 Route 130 North
Cinnaminson, NJ 08077

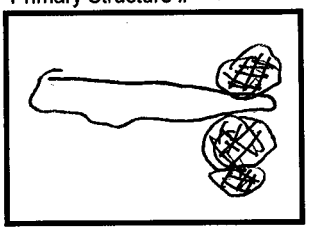
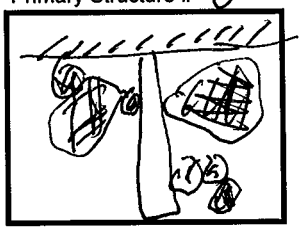
ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

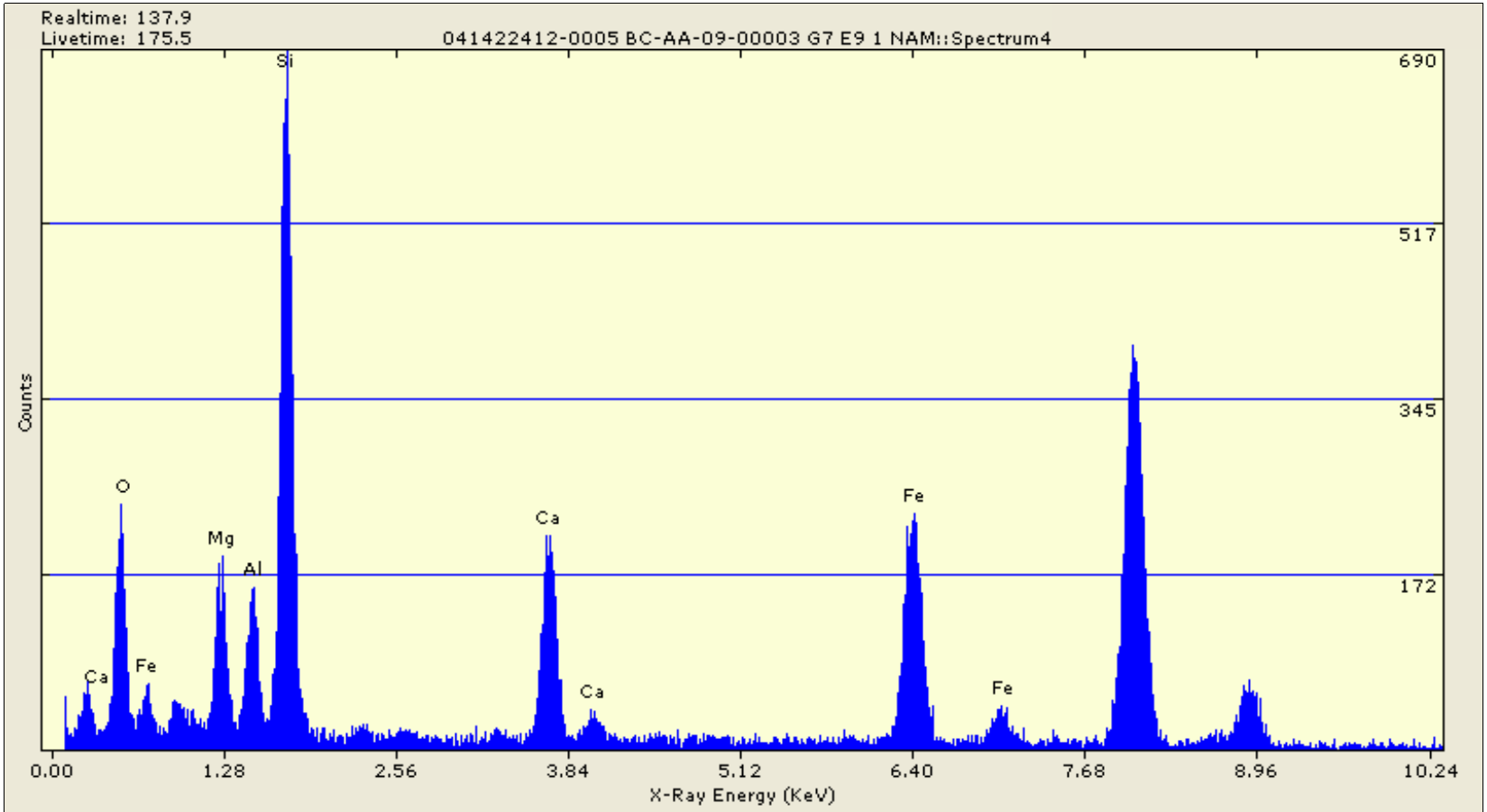
Structure Sketch Sheet for Direct Data Entry

EMSL Order ID: 041422412-0005 **Client:** Tetra Tech

Client Sample: *BC-AA-09-00003* Page 1 of 1

Primary Structure # 1 	Primary Structure # 0 	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Structure #	Structure #	Structure #	Structure #

Analyst: PL Date: 8/12/14 Scope: 04 01



Quantitative Results for Spectrum4
Analysis: Thin Film Method: Standardless
Acquired 12-Aug-2014, 100.0 KeV @10 eV/channel

Element	Weight %	Std. Dev.	Atomic %	Oxide %		Cations	k-Ratio	Intensities	FWHM (eV)	ROI (gross)
Oxygen	42.35	0.59	60.31	0.00		0.0000	0.0000	0.0	95.8	1726.33
Magnesium	6.39	0.09	5.99	10.60	(MgO)	2.2854	0.1139	1225.9	104.7	1465.93
Aluminum	5.28	0.07	4.46	9.98	(Al2O3)	1.7001	0.0936	1117.1	107.3	1323.92
Silicon	22.66	0.32	18.38	48.48	(SiO2)	7.0110	0.3695	5079.1	110.1	5877.56
Calcium	8.39	0.12	4.77	11.74	(CaO)	1.8196	0.0788	1952.7	129.4	2151.57
Iron	14.92	0.21	6.09	19.19	(FeO)	2.3213	0.1129	2756.8	152.2	2795.77
Total	100.00			100.00		15.1375				

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
856-303-2500
www.EMSL.com

Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 00:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-10-00003	Air volume:	10440	Liters
EMSL Sample Number:	041422412-0006	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	70	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	N/A N/A	Analyst:	P. Harrison	

Analytical Sensitivity: **0.000040** **Structure/cc** **Limit of Detection:** **0.000119** **Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Structures (All)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *None Detected*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

Concentrations and 95% Confidence Intervals are based on a Poissonian distribution. Structure counts above 31 may be better expressed with a Gaussian distribution. EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced except in full without written approval of EMSL. EMSL is not responsible for sample collection activities or analytical limitations. Interpretation and use of results are the responsibility of the client.

Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0006	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-10-00003	Grid Box :	0414-Tetra Tech-07: G	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/11/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	25%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
G9	J3	None Detected								
G9	J9	None Detected								
G9	I2	None Detected								
G9	I4	None Detected								
G9	H1	None Detected								
G9	G2	None Detected								
G9	F1	None Detected								
G9	F3	None Detected								
G9	E2	None Detected								
G9	E4	None Detected								
G9	E6	None Detected								
G9	E9	None Detected								
G9	D5	None Detected								
G9	D3	None Detected								
G9	D1	None Detected								
G9	C2	None Detected								
G9	C6	None Detected								
G9	B3	None Detected								
G10	I1	None Detected								
G10	I3	None Detected								
G10	I5	None Detected								
G10	I7	None Detected								
G10	H6	None Detected								
G10	G1	None Detected								
G10	G3	None Detected								
G10	G5	None Detected								
G10	F8	None Detected								
G10	F6	None Detected								
G10	F2	None Detected								
G10	E1	None Detected								
G10	E3	None Detected								
G10	E7	None Detected								
G10	D6	None Detected								
G10	D4	None Detected								
G10	D2	None Detected								
G10	C1	None Detected								
G10	C3	None Detected								
G10	C5	None Detected								

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0006	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-10-00003	Grid Box :	0414-Tetra Tech-07: G	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/11/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	25%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
G10	C7	None Detected								
G10	C9	None Detected								
G10	B4	None Detected								
G10	B2	None Detected								
G10	A1	None Detected								
G10	A3	None Detected								
G10	A5	None Detected								
G11	A1	None Detected								
G11	A3	None Detected								
G11	A5	None Detected								
G11	A7	None Detected								
G11	B8	None Detected								
G11	B6	None Detected								
G11	B4	None Detected								
G11	B2	None Detected								
G11	C1	None Detected								
G11	C3	None Detected								
G11	C5	None Detected								
G11	C7	None Detected								
G11	C9	None Detected								
G11	D8	None Detected								
G11	D6	None Detected								
G11	D4	None Detected								
G11	D2	None Detected								
G11	E1	None Detected								
G11	E5	None Detected								
G11	E7	None Detected								
G11	E9	None Detected								
G11	F8	None Detected								
G11	F4	None Detected								
G11	F2	None Detected								
G11	G1	None Detected								

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856-303-2500
www.EMSL.com

Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 00:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-11-00003	Air volume:	10440	Liters
EMSL Sample Number:	041422412-0007	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	70	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	N/A N/A	Analyst:	P. Harrison	

Analytical Sensitivity: **0.000040** **Structure/cc** **Limit of Detection:** **0.000119** **Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Structures (All)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *None Detected*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

Concentrations and 95% Confidence Intervals are based on a Poissonian distribution. Structure counts above 31 may be better expressed with a Gaussian distribution. EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced except in full without written approval of EMSL. EMSL is not responsible for sample collection activities or analytical limitations. Interpretation and use of results are the responsibility of the client.

Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0007	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-11-00003	Grid Box :	0414-Tetra Tech-07: H	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/08/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	15%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
H1	A4	None Detected								
H1	A6	None Detected								
H1	A8	None Detected								
H1	A10	None Detected								
H1	B9	None Detected								
H1	B7	None Detected								
H1	B5	None Detected								
H1	C6	None Detected								
H1	C10	None Detected								
H1	D9	None Detected								
H1	D7	None Detected								
H1	D5	None Detected								
H1	E4	None Detected								
H1	E8	None Detected								
H1	E10	None Detected								
H1	F9	None Detected								
H1	F7	None Detected								
H1	F5	None Detected								
H1	G4	None Detected								
H1	H9	None Detected								
H1	H7	None Detected								
H1	H3	None Detected								
H1	I4	None Detected								
H1	I6	None Detected								
H1	J9	None Detected								
H1	J7	None Detected								
H1	J5	None Detected								
H1	J3	None Detected								
H2	A3	None Detected								
H2	A5	None Detected								
H2	A7	None Detected								
H2	A9	None Detected								
H2	B10	None Detected								
H2	B8	None Detected								
H2	B6	None Detected								
H2	B4	None Detected								
H2	C3	None Detected								
H2	C5	None Detected								

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ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0007	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-11-00003	Grid Box :	0414-Tetra Tech-07: H	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/08/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	15%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
H2	C9	None Detected								
H2	D8	None Detected								
H2	D4	None Detected								
H2	E3	None Detected								
H2	E5	None Detected								
H2	F4	None Detected								
H2	F2	None Detected								
H2	G3	None Detected								
H2	G5	None Detected								
H2	H8	None Detected								
H2	H4	None Detected								
H2	H2	None Detected								
H3	H1	None Detected								
H3	H3	None Detected								
H3	H5	None Detected								
H3	G6	None Detected								
H3	G4	None Detected								
H3	G2	None Detected								
H3	F1	None Detected								
H3	F3	None Detected								
H3	F5	None Detected								
H3	F7	None Detected								
H3	E6	None Detected								
H3	E4	None Detected								
H3	E2	None Detected								
H3	D1	None Detected								
H3	D3	None Detected								
H3	D5	None Detected								
H3	D7	None Detected								
H3	C6	None Detected								
H3	C2	None Detected								
H3	B1	None Detected								

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Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 00:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-12-00003	Air volume:	10800	Liters
EMSL Sample Number:	041422412-0008	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	68	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	65.00 Random	Analyst:	F. Craig	

Analytical Sensitivity: **0.000040 Structure/cc** **Limit of Detection:** **0.000119 Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	3	-	3.34	0.000119	0.000025 -	0.000308
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**3**	**-**	**3.34**	**0.000119**	**0.000025 -**	**0.000308**
Total PCMe Structures (All)	**CD/ADX**	**3**	**-**	**3.34**	**0.000119**	**0.000025 -**	**0.000308**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	3	3.34	0.000119	0.000025 -	0.000308
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**3**	**3.34**	**0.000119**	**0.000025 -**	**0.000308**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**3**	**3.34**	**0.000119**	**0.000025 -**	**0.000308**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *Actinolite*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

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Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

Concentrations and 95% Confidence Intervals are based on a Poissonian distribution. Structure counts above 31 may be better expressed with a Gaussian distribution. EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced except in full without written approval of EMSL. EMSL is not responsible for sample collection activities or analytical limitations. Interpretation and use of results are the responsibility of the client.

Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041422412-0008	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-12-00003	Grid Box :	0414-TetraTech-07: H	Analyst(s):	F. Craig
Chi² Test for Uniformity:	65.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/10/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
H5	B10	None Detected								
H5	B8	None Detected								
H5	B6	None Detected								
H5	B4	None Detected								
H5	C3	None Detected								
H5	C5	None Detected								
H5	C7	None Detected								
H5	C9	None Detected								
H5	D10	None Detected								
H5	D8	None Detected								
H5	D6	None Detected								
H5	D4	None Detected								
H5	E3	None Detected								
H5	E5	None Detected								
H5	E7	None Detected								
H5	E9	None Detected								
H5	F10	None Detected								
H5	F6	None Detected								
H5	F2	None Detected								
H5	G3	None Detected								
H5	G5	None Detected								
H5	G7	None Detected								
H5	G9	None Detected								
H5	H10	MD11	1		9.5	5.93	ADX	Actinolite		
H5	H10	MF		1	5.7	0.48	ADX	Actinolite		
H5	H8	None Detected								
H5	H6	MD11	2		9.8	2.4	ADX	Actinolite		
H5	H6	MF		2	5.1	1.2	ADX	Actinolite	010465D	
H5	H4	None Detected								
H5	H2	None Detected								
H5	I3	None Detected								
H5	I5	None Detected								
H5	I7	None Detected								
H5	I9	None Detected								
H5	J10	None Detected								
H5	J8	None Detected								
H5	J6	None Detected								
H5	J4	None Detected								

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ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041422412-0008	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-12-00003	Grid Box :	0414-TetraTech-07: H	Analyst(s):	F. Craig
Chi² Test for Uniformity:	65.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/10/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
H5	J2	None Detected								
H7	A9	None Detected								
H7	A7	None Detected								
H7	A3	None Detected								
H7	B2	None Detected								
H7	B4	None Detected								
H7	B6	None Detected								
H7	B8	None Detected								
H7	C9	None Detected								
H7	C7	None Detected								
H7	C5	None Detected								
H7	C3	None Detected								
H7	C1	None Detected								
H7	D2	None Detected								
H7	D4	None Detected								
H7	D6	None Detected								
H7	D8	None Detected								
H7	E9	None Detected								
H7	E7	None Detected								
H7	E5	None Detected								
H7	E3	None Detected								
H7	E1	None Detected								
H7	F2	None Detected								
H7	F4	None Detected								
H7	F6	None Detected								
H7	F8	None Detected								
H7	G9	None Detected								
H7	G7	None Detected								
H7	G5	None Detected								
H7	G3	None Detected								
H7	G1	None Detected								
H7	H6	F	3	3	9.5	1.2	ADX	Actinolite		

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International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Structure Sketch Sheet for Direct Data Entry

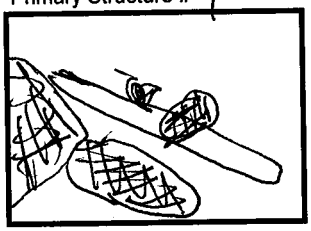
EMSL Order ID: 041422412-0008

Client: Tetra Tech

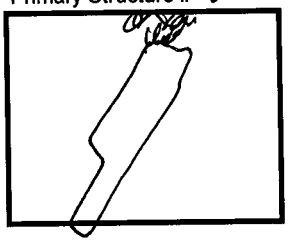
Client Sample: *BC-AA-12-00003*

Page 1 of 1

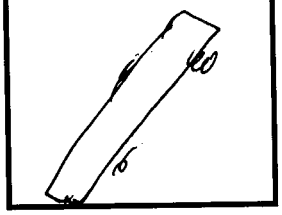
Primary Structure # 1



Primary Structure # 2



Primary Structure # 3



Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

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Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Structure #

Structure #

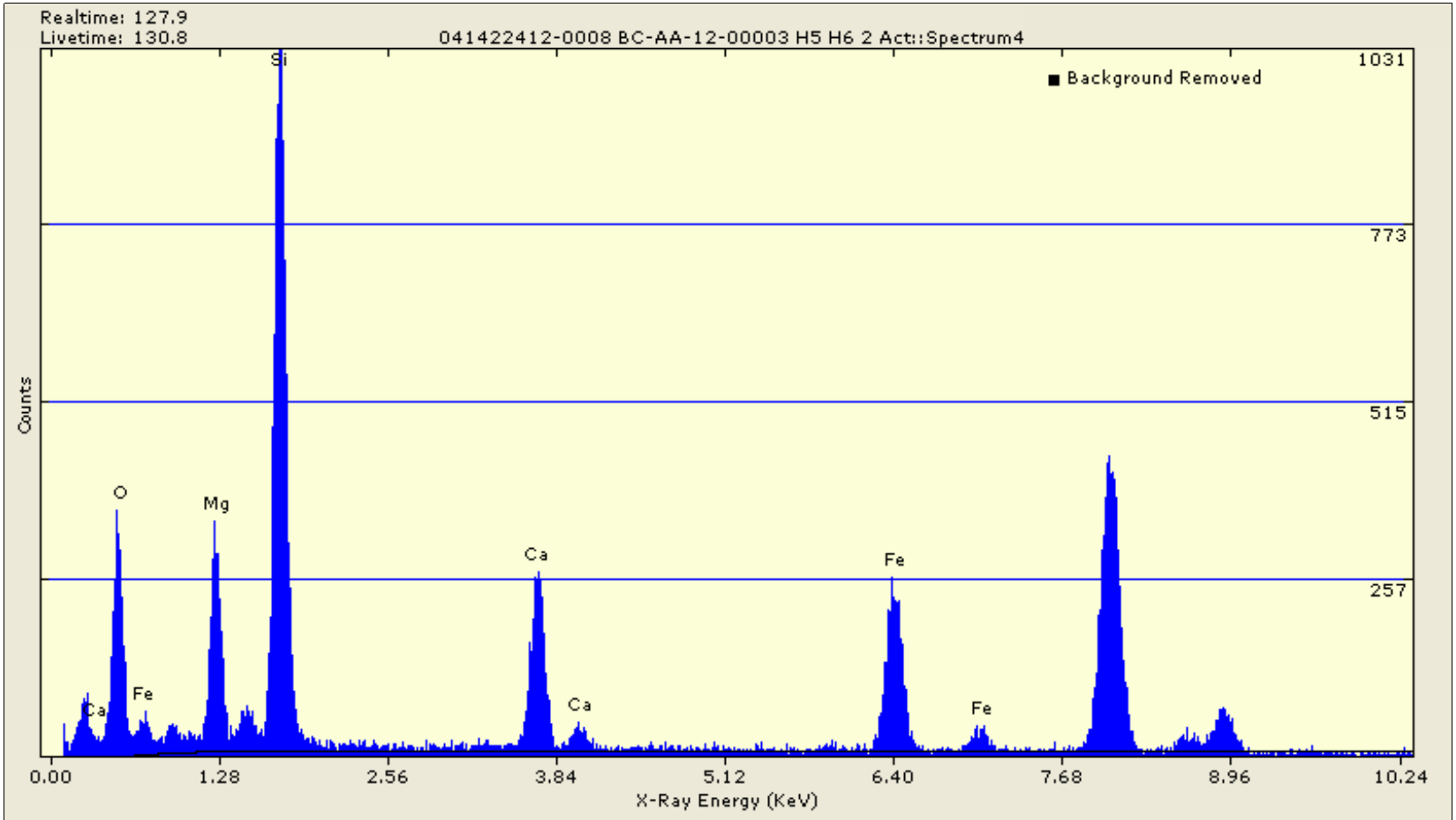
Structure #

Structure #

Analyst: FC

Date: 8/10/14

Scope: 04 01



Quantitative Results for Spectrum4
Analysis: Thin Film Method: Standardless
Acquired 10-Aug-2014, 100.0 KeV @10 eV/channel

Element	Weight %	Std. Dev.	Atomic %	Oxide %		Cations	k-Ratio	Intensities	FWHM (eV)	ROI (net)
Oxygen	44.19	0.48	61.07	0.00		0.0000	0.0000	0.0	80.4	2529.10
Magnesium	8.88	0.10	8.08	14.72	(MgO)	3.0417	0.1521	2317.0	90.8	2417.76
Silicon	28.13	0.30	22.14	60.17	(SiO2)	8.3388	0.4505	8559.2	96.9	8757.65
Calcium	8.10	0.09	4.47	11.34	(CaO)	1.6836	0.0738	2565.5	118.5	2639.75
Iron	10.70	0.12	4.24	13.77	(FeO)	1.5956	0.0793	2691.0	143.1	2795.12
Total	100.00			100.00		14.6597				

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number:	041422412	**Date:**	Aug 10, 2014
Indexing of Image Number:	010465	**Scope #:**	04 - 01
Reference / Sample No:	0005-04-01	**By:**	F Craig
Preliminary ID:	ACTINOLITE		
Using Camera Constant of:	2.947e-003	**1/A Pixels**	
Determined from Reference:	AuCal-080514_10433		

Measured Inter-Row Spacing:	**64.52**	Pixels
Mean Distance between spots on Center row (d2):	**66.68**	Pixels
Mean Distance between spots on slant vector (d1):	**75.64**	Pixels

	Calculated	Ref	-5%	+5%
Inter-row Spacing (Angstroms):	5.259	**5.278**	*5.014*	*5.542*
d2 or hk0 (Camera K/zero row dist.):	5.089	**5.099**	*4.844*	*5.354*
d1 or hk1 (Camera K/slant vector dist.):	4.486	**4.482**	*4.258*	*4.706*
Ratio of hk0/hkl:	1.134	**1.139**	*1.082*	*1.196*
Angle of Slant Vector (Measured):	57.4	**57.320**	*54.454*	*60.186*

From SAED Reference Book, "unknown" diffraction pattern was found to be that of: Actinolite **By:** F Craig

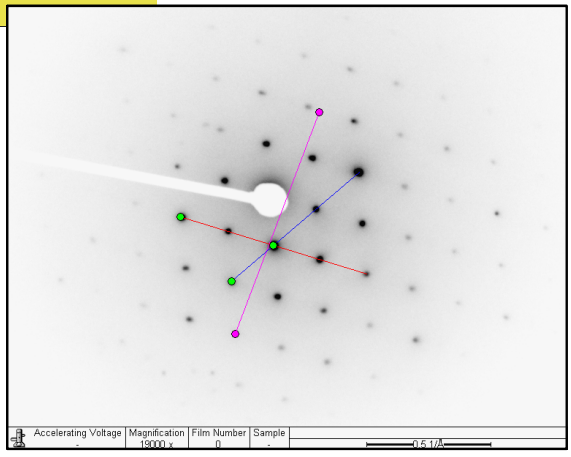
Miller Indice hk0: (**1 3 0**)

Miller Indice hkl: (**0 2 1**)

With a Zone Axis of: [**3 -1 2**]

Preliminary Identification was: X CORRECT

INCORRECT



Percent accuracy to date: 100 %

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Edward Surbrugg
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303 Irene Street
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Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 09:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-01-00008	Air volume:	10800	Liters
EMSL Sample Number:	041422412-0009	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	68	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	67.00 Random	Analyst:	F. Craig	

Analytical Sensitivity: **0.000040 Structure/cc** **Limit of Detection:** **0.000119 Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	1	-	1.11	0.000040	0.000000 -	0.000188
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**1**	**-**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
Total PCMe Structures (All)	**CD/ADX**	**1**	**-**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	1	1.11	0.000040	0.000000 -	0.000188
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**1**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**1**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
Non Asbestos Mineral Structures	NAM	1	1	-	-	- -	-

Asbestiform Minerals Present: *Actinolite*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

Concentrations and 95% Confidence Intervals are based on a Poissonian distribution. Structure counts above 31 may be better expressed with a Gaussian distribution. EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced except in full without written approval of EMSL. EMSL is not responsible for sample collection activities or analytical limitations. Interpretation and use of results are the responsibility of the client.

Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041422412-0009	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-01-00008	Grid Box :	0414-TetraTech-07: H	Analyst(s):	F. Craig
Chi² Test for Uniformity:	67.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/11/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
H9	J2	None Detected								
H9	J4	None Detected								
H9	J6	None Detected								
H9	J8	None Detected								
H9	I7	None Detected								
H9	I5	None Detected								
H9	I3	None Detected								
H9	I1	None Detected								
H9	H2	None Detected								
H9	H4	None Detected								
H9	H6	None Detected								
H9	H8	None Detected								
H9	G7	None Detected								
H9	G5	None Detected								
H9	G3	None Detected								
H9	G1	None Detected								
H9	F2	None Detected								
H9	F4	MD11	1		10	4.75	NAM	Non Asb. Mineral		
H9	F4	MF		1	6	1.68	NAM	Non Asb. Mineral		
H9	F6	None Detected								
H9	F8	None Detected								
H9	E7	None Detected								
H9	E5	None Detected								
H9	E3	None Detected								
H9	E1	None Detected								
H9	D2	None Detected								
H9	D4	None Detected								
H9	D6	None Detected								
H9	D8	None Detected								
H9	C7	None Detected								
H9	C5	None Detected								
H9	C3	None Detected								
H9	C1	None Detected								
H9	B2	MD11	2		16.6	5.94	ADX	Actinolite		
H9	B2	MF		2	16.6	0.84	ADX	Actinolite		
H9	B6	None Detected								
H9	B8	None Detected								
H10	I1	None Detected								

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ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041422412-0009	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-01-00008	Grid Box :	0414-TetraTech-07: H	Analyst(s):	F. Craig
Chi² Test for Uniformity:	67.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/11/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
H10	I3	None Detected								
H10	I5	None Detected								
H10	I7	None Detected								
H10	I9	None Detected								
H10	H8	None Detected								
H10	H6	None Detected								
H10	H4	None Detected								
H10	H2	None Detected								
H10	G1	None Detected								
H10	G3	None Detected								
H10	G5	None Detected								
H10	G7	None Detected								
H10	G9	None Detected								
H10	F8	None Detected								
H10	F6	None Detected								
H10	F4	None Detected								
H10	F2	None Detected								
H10	E1	None Detected								
H10	E5	None Detected								
H10	E7	None Detected								
H10	E9	None Detected								
H10	D8	None Detected								
H10	D6	None Detected								
H10	D4	None Detected								
H10	D2	None Detected								
H10	C1	None Detected								
H10	C3	None Detected								
H10	C5	None Detected								
H10	C7	None Detected								
H10	C9	None Detected								
H10	B8	None Detected								
H10	B6	None Detected								

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Cinnaminson, NJ 08077

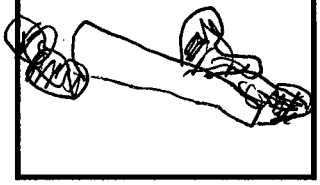
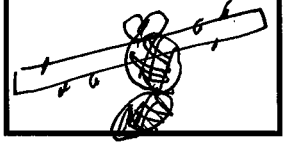
ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

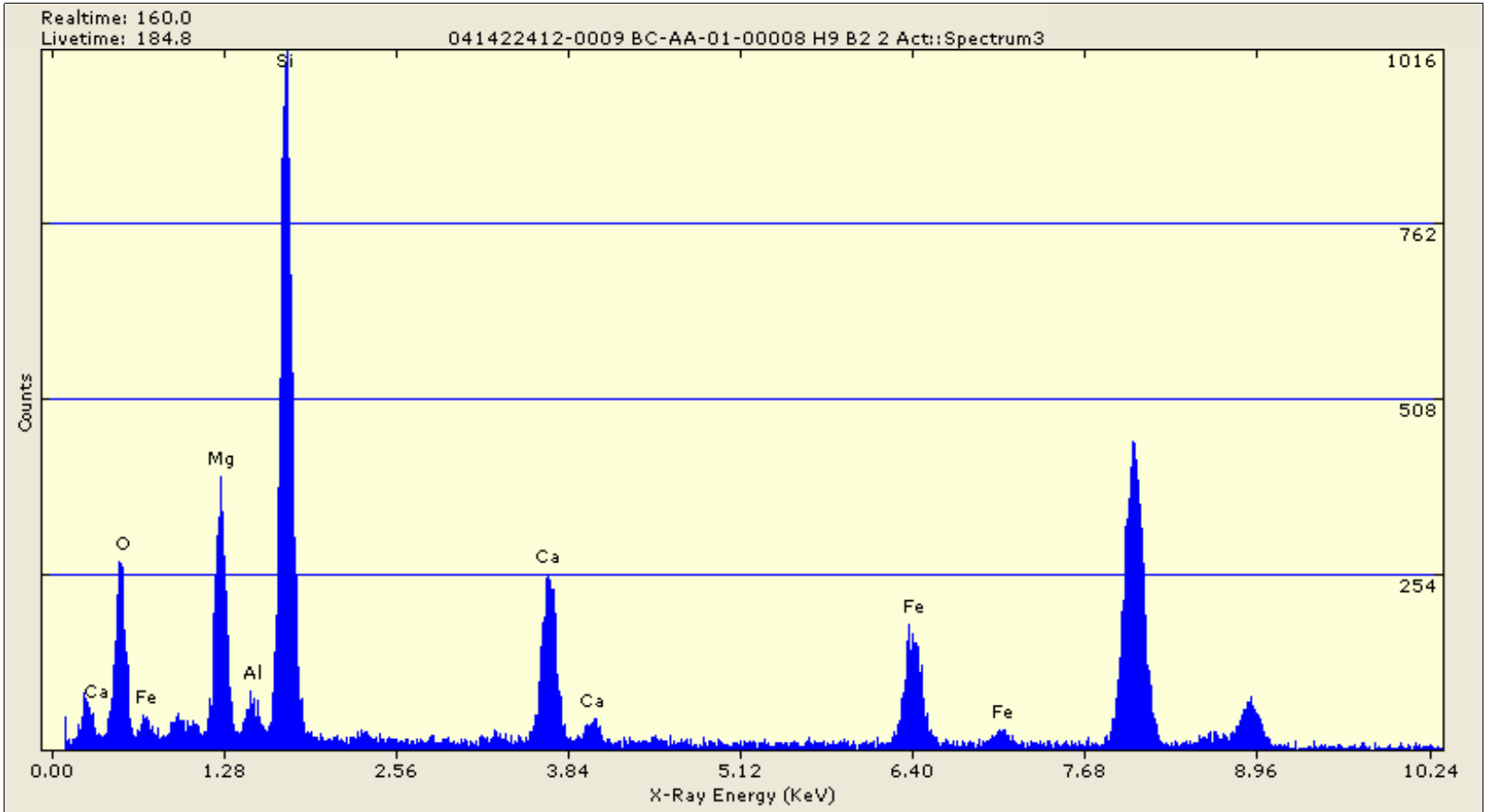
Structure Sketch Sheet for Direct Data Entry

EMSL Order ID: 041422412-0009 **Client:** Tetra Tech

Client Sample: *BC-AA-01-00008* Page 1 of 1

Primary Structure # 1 	Primary Structure # 2 	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Structure #	Structure #	Structure #	Structure #

Analyst: PL Date: 8/11/14 Scope: 04 01



Quantitative Results for Spectrum3
Analysis: Thin Film Method: Standardless
Acquired 11-Aug-2014, 100.0 KeV @10 eV/channel

Element	Weight %	Std. Dev.	Atomic %	Oxide %		Cations	k-Ratio	Intensities	FWHM (eV)	ROI (gross)
Oxygen	44.66	0.51	60.64	0.00		0.0000	0.0000	0.0	95.8	2140.81
Magnesium	11.10	0.13	9.92	18.41	(MgO)	3.7630	0.1897	2722.5	104.7	3145.52
Aluminum	1.84	0.02	1.49	3.49	(Al2O3)	0.5632	0.0323	499.2	107.3	613.40
Silicon	26.56	0.30	20.54	56.82	(SiO2)	7.7910	0.4198	7612.6	110.1	8669.95
Calcium	8.14	0.09	4.41	11.39	(CaO)	1.6739	0.0749	2422.7	129.4	2674.80
Iron	7.69	0.09	2.99	9.90	(FeO)	1.1348	0.0587	1817.8	152.3	1960.64
Total	100.00			100.00		14.9259				

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number:	041422412	**Date:**	Aug 14, 2014
Indexing of Image Number:	010480	**Scope #:**	04 - 01
Reference / Sample No:	0009-04-01	**By:**	F Craig
Preliminary ID:	ACTINOLITE		
Using Camera Constant of:	2.950e-003 **1/A Pixels**		
Determined from Reference:	AuCal-081214_10469		

Measured Inter-Row Spacing: **64.65** Pixels

Mean Distance between spots on Center row (d2): Pixels

Mean Distance between spots on slant vector (d1): Pixels

	Calculated	Ref	-5%	+5%
Inter-row Spacing (Angstroms):	5.243	**5.300**	*5.035*	*5.565*
d2 or hk0 (Camera K/zero row dist.):	N/A	**N/A**	-	-
d1 or hk1 (Camera K/slant vector dist.):	N/A	**N/A**	-	-
Ratio of hk0/hkl:	N/A	**N/A**	-	-
Angle of Slant Vector (Measured):	N/A	**N/A**	-	-

From SAED Reference Book, "unknown" diffraction pattern was found to be that of: Actinolite **By:** F Craig

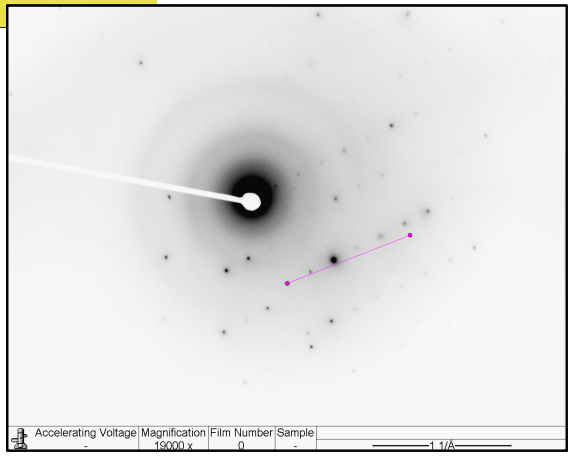
Miller Indice hk0: (X)

Miller Indice hkl: ( )

With a Zone Axis of: [N/A]

Preliminary Identification was: CORRECT

INCORRECT



Percent accuracy to date: 100 %

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
856-303-2500
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Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 09:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-03-00008	Air volume:	10800	Liters
EMSL Sample Number:	041422412-0010	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	68	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	67.00 Random	Analyst:	P. Harrison	

Analytical Sensitivity: **0.000040** **Structure/cc** **Limit of Detection:** **0.000119** **Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	1	-	1.11	0.000040	0.000000 -	0.000188
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**1**	**-**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
Total PCMe Structures (All)	**CD/ADX**	**1**	**-**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	1	1.11	0.000040	0.000000 -	0.000188
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**1**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**1**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *Actinolite*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

Concentrations and 95% Confidence Intervals are based on a Poissonian distribution. Structure counts above 31 may be better expressed with a Gaussian distribution. EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced except in full without written approval of EMSL. EMSL is not responsible for sample collection activities or analytical limitations. Interpretation and use of results are the responsibility of the client.

Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0010	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-03-00008	Grid Box :	0414-Tetra Tech-07: I	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	67.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/11/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	10%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
I1	J1	None Detected								
I1	J3	None Detected								
I1	J5	None Detected								
I1	J7	None Detected								
I1	I8	F	1	1	8.4	0.3	ADX	Actinolite	4453	
I1	I6	None Detected								
I1	I4	None Detected								
I1	I2	None Detected								
I1	H1	None Detected								
I1	H3	None Detected								
I1	H5	None Detected								
I1	H7	None Detected								
I1	G8	None Detected								
I1	G6	None Detected								
I1	G4	None Detected								
I1	G2	None Detected								
I1	F1	None Detected								
I1	F3	None Detected								
I1	F5	None Detected								
I1	F7	None Detected								
I1	E8	None Detected								
I1	E6	None Detected								
I1	E4	None Detected								
I1	E2	None Detected								
I1	D1	None Detected								
I1	D3	None Detected								
I1	D5	None Detected								
I1	D7	None Detected								
I1	C8	None Detected								
I1	C6	None Detected								
I1	C4	None Detected								
I1	B1	None Detected								
I1	B3	None Detected								
I1	B5	None Detected								
I1	B7	None Detected								
I1	A8	None Detected								
I1	A6	None Detected								
I1	A4	None Detected								

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ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0010	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-03-00008	Grid Box :	0414-Tetra Tech-07: I	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	67.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/11/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	10%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
I1	A2	None Detected								
I2	A10	None Detected								
I2	A8	None Detected								
I2	A6	None Detected								
I2	A2	None Detected								
I2	B5	None Detected								
I2	B7	None Detected								
I2	B9	None Detected								
I2	C10	None Detected								
I2	C8	None Detected								
I2	C4	None Detected								
I2	C2	None Detected								
I2	D1	None Detected								
I2	D5	None Detected								
I2	D7	None Detected								
I2	D9	None Detected								
I2	E10	None Detected								
I2	E8	None Detected								
I2	E6	None Detected								
I2	E4	None Detected								
I2	H10	None Detected								
I2	H8	None Detected								
I2	H6	None Detected								
I2	I5	None Detected								
I2	I3	None Detected								
I2	J10	None Detected								
I3	J3	None Detected								
I3	J9	None Detected								
I3	I8	None Detected								
I3	I6	None Detected								

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ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Structure Sketch Sheet for Direct Data Entry

EMSL Order ID: 041422412-0010 **Client:** Tetra Tech

Client Sample: *BC-AA-03-00008* Page 1 of 1

Primary Structure # 1 	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Structure #	Structure #	Structure #	Structure #

Analyst: _____ Date: 8/11/14 Scope: 04-03

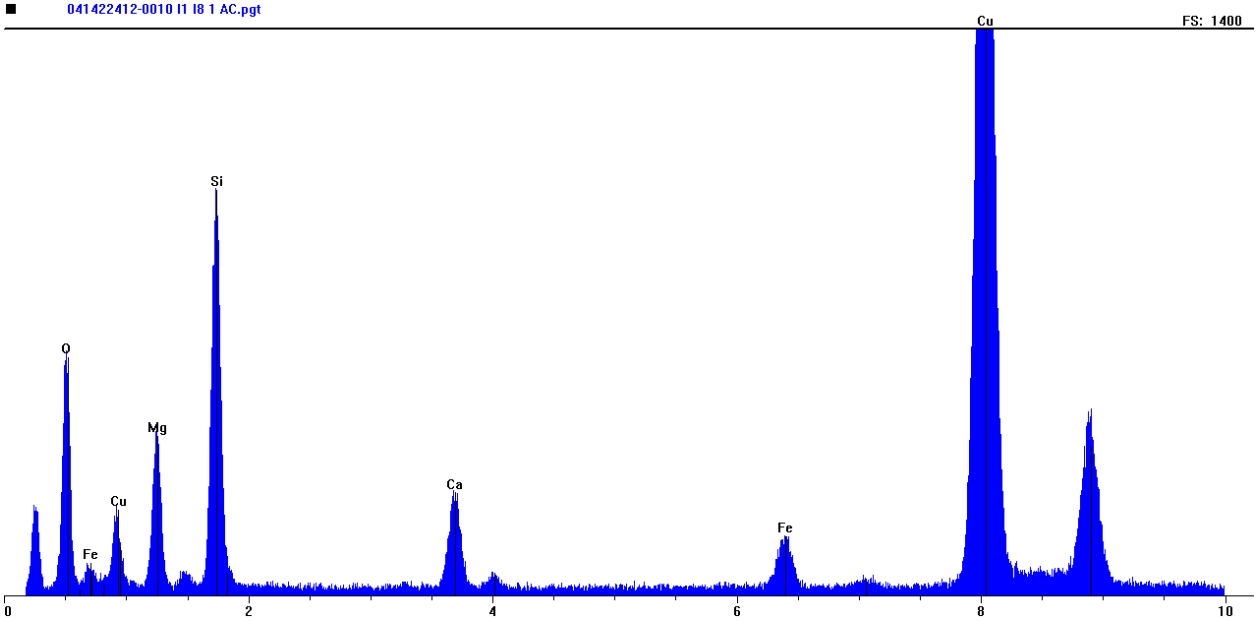
Energy Dispersive X-Ray Analysis
Quantitative Spectra & Data

EMSL ANALYTICAL, INC.

File: L:\EDS Spe...Spectra\Scope 04-03\2014\041422412-0010 I1 I8 1 AC.pgt
Collected: August 11, 2014 10:04:51

Report: Monday, August 11, 2014

Live Time:	43.42	Count Rate:	4578	Dead Time:	39.26 %
Beam Voltage:	20.00	Beam Current:	2.00	Takeoff Angle:	31.00
Thickness limit:	27445.97				



Element	Line	keV	CL Ratio	Wt%	At%	At Prop	Compound	Cmpd Wt%
Mg	KA1	1.254	1.4000	15.23	14.54	6.7	MgO	25.25
Si	KA1	1.740	1.0000	31.27	25.85	11.9	SiO	49.08
Ca	KA1	3.691	1.1000	10.32	5.98	2.7	CaO	14.43
Fe	KA1	6.403	1.3900	8.74	3.63	1.7	FeO	11.24
Cu	KA1	8.046	0.0000	0.00	0.00	0.0		
O	KA1	0.523	0.0000	34.45	50.00	23.0		
Total			**0.0000**	**100.00**	**100.00**	**46.0**	**Total**	**100.00**

Element	Line	Gross (cps)	BKG (cps)	Net (cps)	P:B Ratio
Mg	KA1	128.4	13.3	115.1	8.7
Si	KA1	344.6	13.8	330.8	23.9
Ca	KA1	113.0	13.8	99.2	7.2
Fe	KA1	86.1	19.6	66.5	3.4
Cu	KA1	1648.9	28.3	1620.6	57.2
O	KA1	164.1	7.6	156.5	20.7

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number: 0441422412 **Date:** Aug 11, 2014

Image Number: 04453

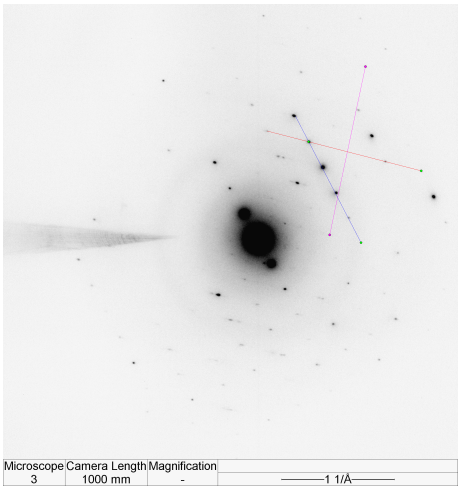
Reference / Sample Number: 0010

Preliminary ID: ACTINOLITE

Camera Constant: 1.965e-003 **1/A Pixels**

Calibration Reference: 081114-04-03-04452_C

	Measured	Reference	-5%	+5%
Inter-row Spacing:	**5.261**	5.278	**5.014**	**5.542**
d2 or hk0 (Camera K/zero row dist.):	**2.844**	2.806	**2.666**	**2.946**
d1 or hkl (Camera K/slant vector dist.):	**3.970**	4.026	**3.825**	**4.227**
Ratio of hk0/hkl:	**0.716**	0.697	**0.662**	**0.732**
Vector Angle:	**53.1**	55.150	**52.392**	**57.907**



From SAED Reference Book, "unknown" diffraction pattern was found to be that of: **ACTINOLITE**

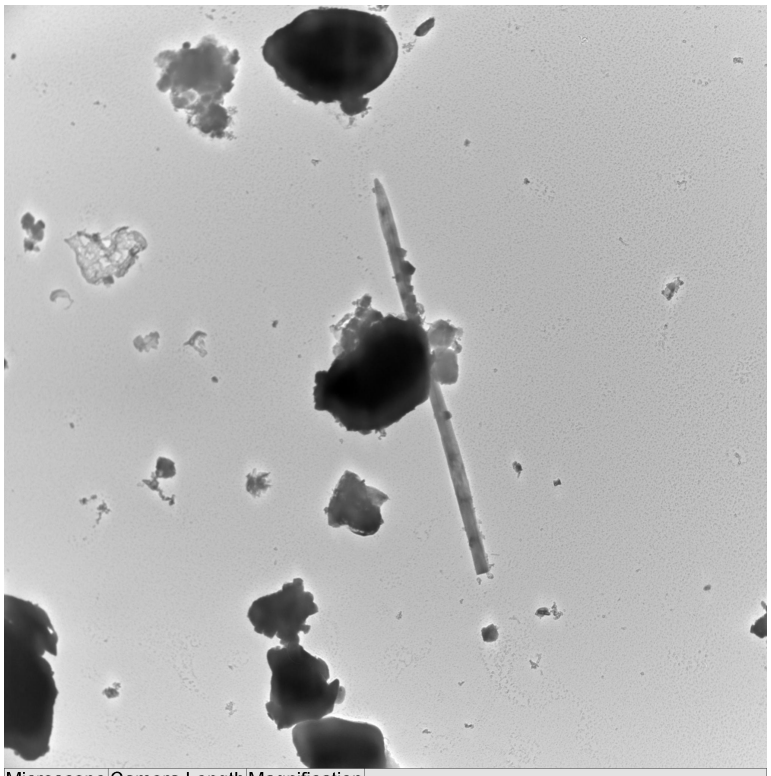
With a Zone Axis of: [**112**]

Preliminary Identification was:

X	CORRECT
	INCORRECT

EMSL Analytical, Inc.

Photomicrograph Report



Microscope	Camera Length	Magnification	
3	-	10000 x	—2 µm—

Micrograph Information

Sample ID:	0010
Order ID:	041422412
Image Number:	04454
Mineral Type:	ACTINOLITE
Date:	8/11/2014
Magnification:	10000
Microscope:	3

EMSL Analytical, Inc.
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www.EMSL.com

Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 10:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-04-00008	Air volume:	10800	Liters
EMSL Sample Number:	041422412-0011	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	68	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	N/A N/A	Analyst:	P. Harrison	

Analytical Sensitivity: **0.000040** **Structure/cc** **Limit of Detection:** **0.000119** **Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**0**	**-**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Structures (All)	**CD/ADX**	**0**	-	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**0**	**0.00**	**0.000000**	**0.000000 -**	**0.000119**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *None Detected*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

Concentrations and 95% Confidence Intervals are based on a Poissonian distribution. Structure counts above 31 may be better expressed with a Gaussian distribution. EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced except in full without written approval of EMSL. EMSL is not responsible for sample collection activities or analytical limitations. Interpretation and use of results are the responsibility of the client.

Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0011	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-04-00008	Grid Box :	0414-Tetra Tech-07: I	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/12/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
I5	A1	None Detected								
I5	A3	None Detected								
I5	A5	None Detected								
I5	B10	None Detected								
I5	B8	None Detected								
I5	B6	None Detected								
I5	B4	None Detected								
I5	B2	None Detected								
I5	C1	None Detected								
I5	C3	None Detected								
I5	C9	None Detected								
I5	D10	None Detected								
I5	D8	None Detected								
I5	E9	None Detected								
I5	F8	None Detected								
I5	G10	None Detected								
I5	I2	None Detected								
I5	J3	None Detected								
I5	J5	None Detected								
I5	J7	None Detected								
I6	J2	None Detected								
I6	J4	None Detected								
I6	J6	None Detected								
I6	J8	None Detected								
I6	J10	None Detected								
I6	I9	None Detected								
I6	I5	None Detected								
I6	I1	None Detected								
I6	H2	None Detected								
I6	H4	None Detected								
I6	H6	None Detected								
I6	H8	None Detected								
I6	H10	None Detected								
I6	G9	None Detected								
I6	G7	None Detected								
I6	G5	None Detected								
I6	G3	None Detected								
I6	G1	None Detected								

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ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0011	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-04-00008	Grid Box :	0414-Tetra Tech-07: I	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/12/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
I6	F2	None Detected								
I6	F4	None Detected								
I6	F6	None Detected								
I6	F10	None Detected								
I6	E9	None Detected								
I6	E7	None Detected								
I6	E5	None Detected								
I6	E3	None Detected								
I6	D2	None Detected								
I6	D4	None Detected								
I6	D6	None Detected								
I6	D10	None Detected								
I6	C9	None Detected								
I6	C7	None Detected								
I6	C5	None Detected								
I6	A2	None Detected								
I6	A4	None Detected								
I6	A6	None Detected								
I6	A10	None Detected								
I7	A8	None Detected								
I7	A10	None Detected								
I7	B9	None Detected								
I7	B7	None Detected								
I7	B5	None Detected								
I7	B3	None Detected								
I7	B1	None Detected								
I7	C6	None Detected								
I7	C8	None Detected								
I7	C10	None Detected								
I7	D9	None Detected								

200 Route 130 North
Cinnaminson, NJ 08077

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
856-303-2500
www.EMSL.com

Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 10:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	BC-AA-02-00008	Air volume:	10800	Liters
EMSL Sample Number:	041422412-0012	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	68	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	66.00 Random	Analyst:	P. Harrison	

Analytical Sensitivity: 0.000040 Structure/cc **Limit of Detection: 0.000119 Structure/cc**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration (Str/cc)	Poisson 95 % Confidence Interval LCL (Str/cc)	UCL (Str/cc)
PCMe Structures (Chrys)	CD	0	-	0.00	0.000000	0.000000 -	0.000119
PCMe Structures (Amph)	ADX	2	-	2.23	0.000079	0.000000 -	0.000250
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**2**	**-**	**2.23**	**0.000079**	**0.000000 -**	**0.000250**
Total PCMe Structures (All)	**CD/ADX**	**2**	**-**	**2.23**	**0.000079**	**0.000000 -**	**0.000250**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	1	1.11	0.000040	0.000000 -	0.000188
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**1**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**1**	**1.11**	**0.000040**	**0.000000 -**	**0.000188**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *Actinolite*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

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Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

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NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

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Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0012	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-02-00008	Grid Box :	0414-Tetra Tech-07: I	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	66.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/13/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
I9	A1	None Detected								
I9	A3	None Detected								
I9	A5	None Detected								
I9	A7	None Detected								
I9	A9	None Detected								
I9	B10	None Detected								
I9	B6	None Detected								
I9	B4	None Detected								
I9	B2	None Detected								
I9	C1	None Detected								
I9	C3	None Detected								
I9	C5	None Detected								
I9	D10	None Detected								
I9	D8	F	1	1	14.8	4	ADX	Actinolite	4455	
I9	D6	None Detected								
I9	D4	None Detected								
I9	D2	None Detected								
I9	E1	None Detected								
I9	E3	None Detected								
I9	E5	MC	2	2	16.8	4.5	ADX	Actinolite		
I9	E7	None Detected								
I9	E9	None Detected								
I9	F10	None Detected								
I9	F8	None Detected								
I9	F6	None Detected								
I9	F4	None Detected								
I9	F2	None Detected								
I9	G1	None Detected								
I9	G3	None Detected								
I9	G5	None Detected								
I9	G7	None Detected								
I9	G9	None Detected								
I9	H10	None Detected								
I9	H8	None Detected								
I9	H6	None Detected								
I9	H4	None Detected								
I9	H2	None Detected								
I9	I5	None Detected								

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ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0012	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-02-00008	Grid Box :	0414-Tetra Tech-07: I	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	66.00-Random	Pore Size (micron):	0.8	Analysis Date:	08/13/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	20%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
I9	I7	None Detected								
I9	I9	None Detected								
I9	J10	None Detected								
I9	J8	None Detected								
I9	J6	None Detected								
I10	A3	None Detected								
I10	A5	None Detected								
I10	A7	None Detected								
I10	A9	None Detected								
I10	B10	None Detected								
I10	B8	None Detected								
I10	B6	None Detected								
I10	B4	None Detected								
I10	B2	None Detected								
I10	C3	None Detected								
I10	C5	None Detected								
I10	C7	None Detected								
I10	C9	None Detected								
I10	D10	None Detected								
I10	D8	None Detected								
I10	D6	None Detected								
I10	D4	None Detected								
I10	E3	None Detected								
I10	E5	None Detected								
I10	E7	None Detected								
I10	E9	None Detected								
I10	F10	None Detected								
I10	F6	None Detected								
I10	F4	None Detected								
I10	F2	None Detected								

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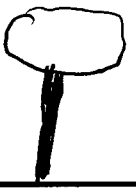
ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Structure Sketch Sheet for Direct Data Entry

EMSL Order ID: 041422412-0012 **Client:** Tetra Tech

Client Sample: *BC-AA-02-00008* Page 1 of 1

Primary Structure # 1 	Primary Structure # 2 	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Primary Structure #	Primary Structure #	Primary Structure #	Primary Structure #
Structure #	Structure #	Structure #	Structure #

Analyst: _____ Date: 8/13/14 Scope: 04-03

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Energy Dispersive X-Ray Analysis
Quantitative Spectra & Data

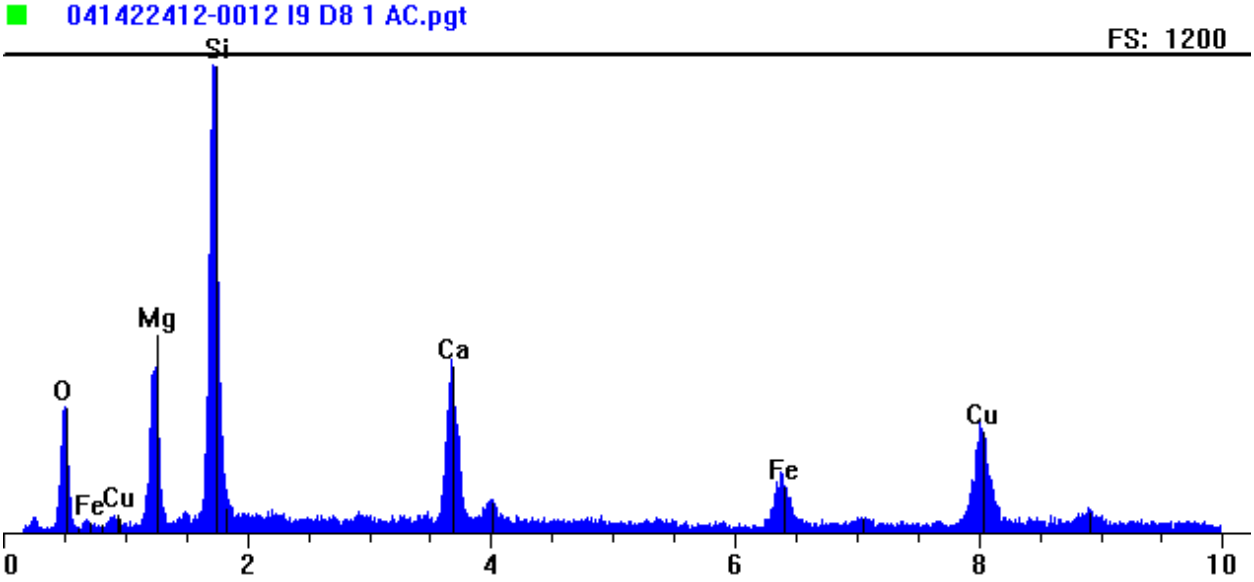
EMSL ANALYTICAL, INC.

File: L:\EDS Spe...Spectra\Scope 04-03\2014\041422412-0012 I9 D8 1 AC.pgt
Collected: August 13, 2014 08:15:52

Report: Wednesday, August 13, 2014

Live Time:	5.28	Count Rate:	20250	Dead Time:	78.01 %
Beam Voltage:	20.00	Beam Current:	2.00	Takeoff Angle:	31.00
Thickness limit:	24996.90				

041422412-0012 I9 D8 1 AC.pgt



Element	Line	keV	CL Ratio	Wt%	At%	At Prop	Compound	Cmpd Wt%
Mg	KA1	1.254	1.4000	14.39	13.74	6.3	MgO	23.85
Si	KA1	1.740	1.0000	30.84	25.50	11.7	SiO	48.41
Ca	KA1	3.691	1.1000	14.10	8.17	3.8	CaO	19.72
Fe	KA1	6.403	1.3900	6.22	2.59	1.2	FeO	8.01
Cu	KA1	8.046	0.0000	0.00	0.00	0.0		
O	KA1	0.523	0.0000	34.45	50.00	23.0		
Total			**0.0000**	**100.00**	**100.00**	**46.0**	**Total**	**100.00**

Element	Line	Gross (cps)	BKG (cps)	Net (cps)	P:B Ratio
Mg	KA1	1196.0	88.3	1107.7	12.6
Si	KA1	3458.9	134.7	3324.2	24.7
Ca	KA1	1548.6	167.4	1381.1	8.2
Fe	KA1	601.4	118.8	482.6	4.1
Cu	KA1	1326.5	136.4	1190.2	8.7
O	KA1	694.1	32.2	661.9	20.6

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number: 041422412 **Date:** Aug 13, 2014

Image Number: 04455

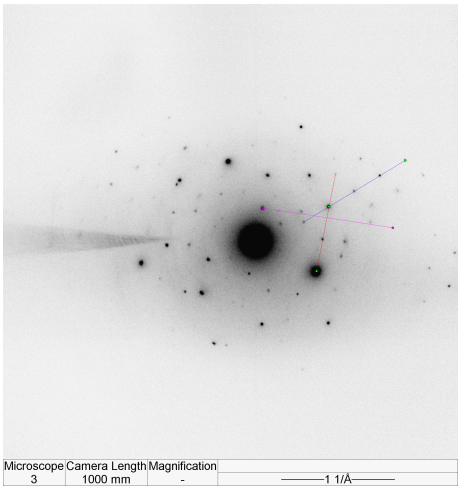
Reference / Sample Number: 0012

Preliminary ID: ACTINOLITE

Camera Constant: 1.965e-003 **1/A Pixels**

Calibration Reference: 081114-04-03-04452_C

	Measured	Reference	-5%	+5%
Inter-row Spacing:	**5.152**	5.278	**5.014**	**5.542**
d2 or hk0 (Camera K/zero row dist.):	**3.437**	3.385	**3.216**	**3.554**
d1 or hkl (Camera K/slant vector dist.):	**3.816**	3.706	**3.521**	**3.891**
Ratio of hk0/hkl:	**0.901**	0.913	**0.867**	**0.959**
Vector Angle:	**52.3**	53.390	**50.721**	**56.060**



From SAED Reference Book, "unknown" diffraction pattern was found to be that of: **ACTINOLITE**

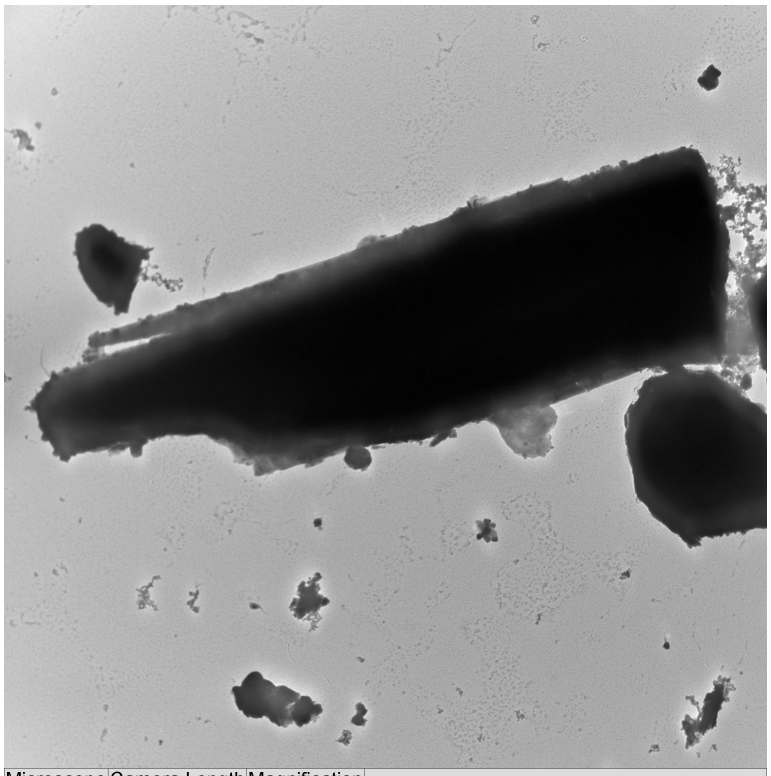
With a Zone Axis of: [**518**]

Preliminary Identification was:

X	CORRECT
	INCORRECT

EMSL Analytical, Inc.

Photomicrograph Report



Microscope	Camera Length	Magnification	
3	-	10000 x	—2 µm—

Micrograph Information

Sample ID:	0012
Order ID:	041422412
Image Number:	04456
Mineral Type:	ACTINOLITE
Date:	8/13/2014
Magnification:	10000
Microscope:	3

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
856-303-2500
www.EMSL.com

Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 07/30/2014 08:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	FIELD BLANK 073014	Air volume:	0	Liters
EMSL Sample Number:	041422412-0013	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	10	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	10,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	N/A N/A	Analyst:	P. Harrison	

Analytical Sensitivity: **7.575758** **Structure/ mm²** **Limit of Detection:** **22.651515** **Structure/ mm²**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration Str/ mm²	Poisson 95 % Confidence Interval LCL Str/ mm²	UCL Str/ mm²
PCMe Structures (Chrys)	CD	0	-	0.00	NA	0.000000 -	22.651515
PCMe Structures (Amph)	ADX	0	-	0.00	NA	0.000000 -	22.651515
PCMe Structures (NRA)	ADX	0	-	0.00	NA	0.000000 -	22.651515
Total PCMe Structures (Regulated)	**CD/ADX**	**0**	**-**	**0.00**	**NA**	**0.000000 -**	**22.651515**
Total PCMe Structures (All)	**CD/ADX**	**0**	**-**	**0.00**	**NA**	**0.000000 -**	**22.651515**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	NA	0.000000 -	22.651515
PCMe Fibers and Bundles (Amph)	ADX	-	0	0.00	NA	0.000000 -	22.651515
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	NA	0.000000 -	22.651515
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**0**	**0.00**	**NA**	**0.000000 -**	**22.651515**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**0**	**0.00**	**NA**	**0.000000 -**	**22.651515**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *None Detected*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

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Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

Concentrations and 95% Confidence Intervals are based on a Poissonian distribution. Structure counts above 31 may be better expressed with a Gaussian distribution. EMSL maintains liability limited to the cost of analysis. This report relates only to the samples reported above and may not be reproduced except in full without written approval of EMSL. EMSL is not responsible for sample collection activities or analytical limitations. Interpretation and use of results are the responsibility of the client.

Comment: Samples were collected on 0.8 um filters.

Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0013	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	FIELD BLANK 073014	Grid Box :	0414-Tetra Tech-07: P	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/06/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	1%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
P1	J3	None Detected								
P1	H4	None Detected								
P1	F8	None Detected								
P1	D5	None Detected								
P2	J5	None Detected								
P2	J3	None Detected								
P2	H3	None Detected								
P2	E8	None Detected								
P2	C6	None Detected								
P2	B3	None Detected								

200 Route 130 North
Cinnaminson, NJ 08077

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
856-303-2500
www.EMSL.com

Edward Surbrugg
Tetra Tech
303 Irene Street
Helena, MT 59601
Phone: 406-442-5588

Customer ID: MAXI57
Customer PO: NA
Received: 8/4/2014 8:40
Date Sampled: 08/04/2014 08:00
EMSL Order: 041422412
Report Date: 08/14/14

Project: NDOT NOA / 10353259

ISO 10312
International Standard for the Determination of Asbestos Fibers - Direct Transfer TEM - Modified for PCMe Analysis

Customer Sample Number:	LAB BLANK	Air volume:	0	Liters
EMSL Sample Number:	041422412-0014	Grid Opening Area:	0.0132	mm²
Minimum Level of analysis (chrysotile):	CD	Grid Openings Analyzed:	10	
Minimum Level of analysis (amphibole):	ADX			
Magnification used for fiber counting:	20,000			
Aspect ratio for fiber definition:	3:1			
Min Length/ Width to be counted (µm):	>5 / 0.25-none			
Area of collection filter (mm²):	385	Analysis Date:	08/04/2014	
Result of Chi² Test:	N/A N/A	Analyst:	P. Harrison	

Analytical Sensitivity: **7.575758** **Structure/ mm²** **Limit of Detection:** **22.651515** **Structure/ mm²**

Structure Class	Min ID Level	Primary Str.	Total Str.	Density Str/mm²	Concentration Str/ mm²	Poisson 95 % Confidence Interval LCL Str/ mm²	UCL Str/ mm²
PCMe Structures (Chrys)	CD	0	-	0.00	NA	0.000000 -	22.651515
PCMe Structures (Amph)	ADX	0	-	0.00	NA	0.000000 -	22.651515
PCMe Structures (NRA)	ADX	0	-	0.00	NA	0.000000 -	22.651515
Total PCMe Structures (Regulated)	**CD/ADX**	**0**	**-**	**0.00**	**NA**	**0.000000 -**	**22.651515**
Total PCMe Structures (All)	**CD/ADX**	**0**	**-**	**0.00**	**NA**	**0.000000 -**	**22.651515**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	NA	0.000000 -	22.651515
PCMe Fibers and Bundles (Amph)	ADX	-	0	0.00	NA	0.000000 -	22.651515
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	NA	0.000000 -	22.651515
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**0**	**0.00**	**NA**	**0.000000 -**	**22.651515**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**0**	**0.00**	**NA**	**0.000000 -**	**22.651515**
Non Asbestos Mineral Structures	NAM	0	0	-	-	- -	-

Asbestiform Minerals Present: *None Detected*

Explanation of Results

NRA = Non-Regulated Amphibole. A suspected mineral fiber that is a member of the Amphibole group, but is currently not regulated by the Federal governement as asbestos.

PCMe structure (modified)= A fibrous structure of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 um with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

PCMe Fiber or Bundle (modified) = A Fiber or Bundle of of aspect ratio > 3:1, longer than 5 um, and which has a diameter ≥ 0.25 microns with no upper width boundary. This definition has been modified from the method to meet the client's project requirements.

Concentration (Reg) = include all federally regulated asbestos types. Currently Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite

Concentration (all) = include all federally regulated asbestos types (Chrysotile, Amosite, Actinolite, Tremolite, Anthophyllite and Crocidolite) and any Non-regulated Amphiboles

Min ID Level = the minimum level of analysis that must have been met to be included in the reportable structure count. If any fibrous structure did not meet the minimum ID level, it would not be included in the concentration.

NAM = Non Asbestos Mineral. A mineral fiber that has been rejected from being either Amphibole or Chrysotile

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Robyn Denton
Approved Signatory

ISO 10312

International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041422412-0014 LB	GO area (mm²):	0.0132	Mag.	20,000
Customer Sample:	LAB BLANK	Grid Box :	0414-Tetra Tech-07: J	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	08/06/2014
Project ID:	NDOT NOA / 10353259			Particulate Loading:	1%

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Length	Width				
J5	B5	None Detected								
J5	D1	None Detected								
J5	F3	None Detected								
J5	H9	None Detected								
J5	I1	None Detected								
J7	A5	None Detected								
J7	D1	None Detected								
J7	F1	None Detected								
J7	G7	None Detected								
J7	J2	None Detected								

200 Route 130 North
Cinnaminson, NJ 08077

Asbestos Chain of Custody

EMSL Order Number (*Lab Use Only*): 041422412

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Company: TETRA TECH	**EMSL-Bill to:** ☒ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 7 West 6th AVE STE 612	
City: HELENA **State/Province:** MT	**Zip/Postal Code:** 59601 **Country:** USA
Report To (Name): Ed Surbrugg	**Telephone #:** 406-441-3296
Email Address: Edward.Surbrugg@tetratech.com	**Fax #:** 406-442-7182 **Purchase Order:**
Project Name/Number: NDOT NOA / 103S3259	**Please Provide Results:** ☐ Fax ☒ Email ☐ Mail
U.S. State Samples Taken: —	**Connecticut Samples:** ☐ Commercial ☐ Residential

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☒ 1 Week ☐ 2 Week

*For TEM Air 3 hr through 6 hr, please call ahead to schedule. *There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

PCM - Air ☐ Check if samples are from NY
- ☐ NIOSH 7400
- ☐ w/ OSHA 8hr. TWA

PLM - Bulk (reporting limit)
- ☐ PLM EPA 600/R-93/116 (<1%)
- ☐ PLM EPA NOB (<1%)

Point Count
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)

Point Count w/Gravimetric
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
- ☐ NYS 198.1 (friable in NY)
- ☐ NYS 198.6 NOB (non-friable-NY)
- ☐ NIOSH 9002 (<1%)

TEM – Air ☐ 4-4.5hr TAT (AHERA only)
- ☐ AHERA 40 CFR, Part 763
- ☐ NIOSH 7402
- ☐ EPA Level II
- ☒ ISO 10312 sensitivity to 0.000004

TEM - Bulk
- ☐ TEM EPA NOB
- ☐ NYS NOB 198.4 (non-friable-NY)
- ☐ Chatfield SOP
- ☐ TEM Mass Analysis-EPA 600 sec. 2.5

TEM – Water: EPA 100.2
- Fibers >10µm ☐ Waste ☐ Drinking
- All Fiber Sizes ☐ Waste ☐ Drinking

TEM- Dust
- ☐ Microvac - ASTM D 5755
- ☐ Wipe - ASTM D6480
- ☐ Carpet Sonication (EPA 600/J-93/167)

Soil/Rock/Vermiculite
- ☐ PLM CARB 435 - A (0.25% sensitivity)
- ☐ PLM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - C (0.01% sensitivity)
- ☐ TEM Qual. via Filtration Technique
- ☐ TEM Qual. via Drop-Mount Technique

Other:
- ☐

☐ **Check For Positive Stop – Clearly Identify Homogenous Group** **Filter Pore Size (Air Samples):** ☒ 0.8µm ☐ 0.45µm

Samplers Name: BECKI DANO **Samplers Signature:**

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
BC-AA-05-00003	Site 5	10,800 L	7-30-14 0000
BC-AA-06-00003	Site 6	10,800 L	7-30-14 0000
BC-AA-07-00003	Site 7	10,440 L	7-30-14 0000
BC-AA-08-00003	Site 8	10,800 L	7-30-14 0000
BC-AA-09-00003	Site 9	10,440 L	7-30-14 0000
BC-AA-10-00003	Site 10	10,440 L	7-30-14 0000
BC-AA-11-00003	Site 11	10,440 L	7-30-14 0000
BC-AA-12-00003	Site 12	10,800 L	7-30-14 0000

Client Sample # (s): — **Total # of Samples:** 13 (DH)

Relinquished (Client): **Date:** 7-31-14 **Time:** 1200

Received (Lab): FX **Date:** 8/4/14 **Time:** 8:40

Comments/Special Instructions:

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Chain of Custody

EMSL Order Number *(Lab Use Only)*:

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 786-5974

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
BC-AA-01-00008	Site 1	10,800 L	7/30/14 0925
BC-AA-03-00008	Site 3	10,800 L	7/30/14 0945
BC-AA-04-00008	Site 4	10,800 L	7/30/14 1002
BC-AA-02-00008	Site 2	10,800 L	7/30/14 1030
FieldBlank073014	Field Blank	—	7/30/14 0843

RECEIVED
EMSL
CINNAMINSON, N.J.
2014 AUG -4 A 10:29

***Comments/Special Instructions:**