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: 6/27/2014 9:45
Date Sampled: 06/26/2014 08:00
EMSL Order: 041418296
Report Date: 07/07/14

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-01-00005	Air volume:	10800	Liters
EMSL Sample Number:	041418296-0001	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:	06/27/2014	
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 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:	041418296-0001	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-01-00005	Grid Box :	0414-Tetra Tech-06: A	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	06/30/2014
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				
A1	A10	None Detected								
A1	A8	None Detected								
A1	A6	None Detected								
A1	A4	None Detected								
A1	A2	None Detected								
A1	B3	None Detected								
A1	B5	None Detected								
A1	B7	None Detected								
A1	B9	None Detected								
A1	C10	None Detected								
A1	C8	None Detected								
A1	C6	None Detected								
A1	C4	None Detected								
A1	D3	None Detected								
A1	D5	None Detected								
A1	D7	None Detected								
A1	E10	None Detected								
A1	E8	None Detected								
A1	E6	None Detected								
A1	E4	None Detected								
A1	E2	None Detected								
A1	F3	None Detected								
A1	F7	None Detected								
A1	F9	None Detected								
A1	G10	None Detected								
A1	G8	None Detected								
A1	G6	None Detected								
A1	G4	None Detected								
A1	G2	None Detected								
A1	H3	None Detected								
A1	H5	None Detected								
A1	H7	None Detected								
A1	H9	None Detected								
A2	J8	None Detected								
A2	J6	None Detected								
A2	I5	None Detected								
A2	I7	None Detected								
A2	H6	None Detected								

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Bench Sheet Data

Client:	Tetra Tech			Scope:	JEOL-1200-EX (04-03)
EMSL Sample ID:	041418296-0001	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-01-00005	Grid Box :	0414-Tetra Tech-06: A	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	06/30/2014
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				
A2	F4	None Detected								
A2	E2	None Detected								
A2	E7	None Detected								
A2	D6	None Detected								
A2	C7	None Detected								
A2	C4	None Detected								
A2	A4	None Detected								
A3	J10	None Detected								
A3	J8	None Detected								
A3	J6	None Detected								
A3	J4	None Detected								
A3	J2	None Detected								
A3	I1	None Detected								
A3	I3	None Detected								
A3	I7	None Detected								
A3	I9	None Detected								
A3	H10	None Detected								
A3	H8	None Detected								
A3	H6	None Detected								
A3	H4	None Detected								
A3	H2	None Detected								
A3	G1	None Detected								
A3	G3	None Detected								
A3	G5	None Detected								
A3	G7	None Detected								
A3	G9	None Detected								
A3	F10	None Detected								
A3	F8	None Detected								
A3	F6	None Detected								
A3	F4	None Detected								

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Customer ID: MAXI57
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Received: 6/27/2014 9:45
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EMSL Order: 041418296
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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-03-00005	Air volume:	10800	Liters
EMSL Sample Number:	041418296-0002	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:	06/27/2014	
Result of Chi² Test:	64.00 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	4	-	4.46	0.000159	0.000043 -	0.000407
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**4**	**-**	**4.46**	**0.000159**	**0.000043 -**	**0.000407**
Total PCMe Structures (All)	**CD/ADX**	**4**	**-**	**4.46**	**0.000159**	**0.000043 -**	**0.000407**
PCMe Fibers and Bundles (Chrys)	CD	-	0	0.00	0.000000	0.000000 -	0.000119
PCMe Fibers and Bundles (Amph)	ADX	-	5	5.57	0.000199	0.000064 -	0.000463
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**5**	**5.57**	**0.000199**	**0.000064 -**	**0.000463**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**5**	**5.57**	**0.000199**	**0.000064 -**	**0.000463**
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.

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Comment: Samples collected on 0.8 um filters.

Robyn Denton
Approved Signatory

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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:	041418296-0002	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-03-00005	Grid Box :	0414-TetraTech-06: B	Analyst(s):	F. Craig
Chi² Test for Uniformity:	64.00-Random	Pore Size (micron):	0.8	Analysis Date:	06/30/2014 & 07/01/2014
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				
B3	B10	None Detected								
B3	B8	MD11	1		14.1	7.2	NAM	Non Asb. Mineral		
B3	B8	MF		1	14.1	2.27	NAM	Non Asb. Mineral	010336M	
B3	B6	None Detected								
B3	B4	None Detected								
B3	C3	None Detected								
B3	C5	None Detected								
B3	C7	None Detected								
B3	C9	None Detected								
B3	D10	None Detected								
B3	D8	MD22	2		42.4	21.38	ADX	Actinolite		
B3	D8	MF		2	37.6	1.44	ADX	Actinolite		
B3	D8	MB		3	9.4	1.2	ADX	Actinolite	010337D	
B3	D6	None Detected								
B3	D4	None Detected								
B3	E3	None Detected								
B3	E5	None Detected								
B3	E7	None Detected								
B3	E9	None Detected								
B3	F10	None Detected								
B3	F8	None Detected								
B3	F6	MD11	3		7.2	2.35	ADX	Actinolite		
B3	F6	MF		4	5.7	1.44	ADX	Actinolite	010339D	
B3	F4	None Detected								
B3	G9	None Detected								
B3	G7	None Detected								
B3	G5	None Detected								
B3	G3	None Detected								
B3	H4	None Detected								
B3	H6	MC11	4	5	16.6	15.4	ADX	Actinolite	010342D	
B3	H8	None Detected								
B3	H10	None Detected								
B3	I9	None Detected								
B3	I7	None Detected								
B3	I5	None Detected								
B3	I3	None Detected								
B3	J4	None Detected								
B3	J6	None Detected								

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Bench Sheet Data

Client:	Tetra Tech			Scope:	04-01
EMSL Sample ID:	041418296-0002	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-03-00005	Grid Box :	0414-TetraTech-06: B	Analyst(s):	F. Craig
Chi² Test for Uniformity:	64.00-Random	Pore Size (micron):	0.8	Analysis Date:	06/30/2014 & 07/01/2014
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				
B3	J8	None Detected								
B3	J10	None Detected								
B4	A1	None Detected								
B4	A3	None Detected								
B4	A5	None Detected								
B4	A7	None Detected								
B4	A9	None Detected								
B4	B10	MD11	5		12.8	3.6	ADX	Actinolite		
B4	B10	MF		6	10.6	0.72	ADX	Actinolite		
B4	B8	None Detected								
B4	B6	None Detected								
B4	B4	None Detected								
B4	B2	None Detected								
B4	C1	None Detected								
B4	C3	None Detected								
B4	C5	None Detected								
B4	C7	None Detected								
B4	C9	None Detected								
B4	D10	None Detected								
B4	D8	None Detected								
B4	D6	None Detected								
B4	D4	None Detected								
B4	D2	None Detected								
B4	E1	None Detected								
B4	E3	None Detected								
B4	E5	None Detected								
B4	E7	None Detected								
B4	E9	None Detected								
B4	F10	None Detected								
B4	F8	None Detected								
B4	F6	None Detected								
B4	F4	None Detected								
B4	F2	None Detected								
B4	G3	None Detected								
B4	G5	None Detected								

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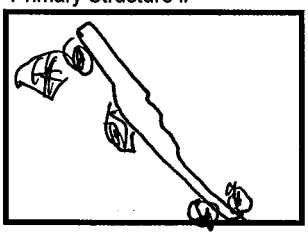
Structure Sketch Sheet for Direct Data Entry

EMSL Order ID: 041418296-0002 **Client:** Tetra Tech

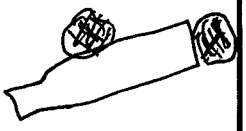
Client Sample: *BC-AA-03-00005* Page 1 of 1

Primary Structure # 1

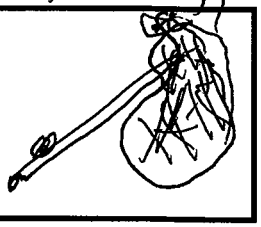


Primary Structure # 2

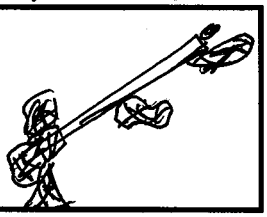
Primary Structure # 3



Primary Structure # 4



Primary Structure # 5



Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

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Primary Structure #

Primary Structure #

Primary Structure #

Structure #

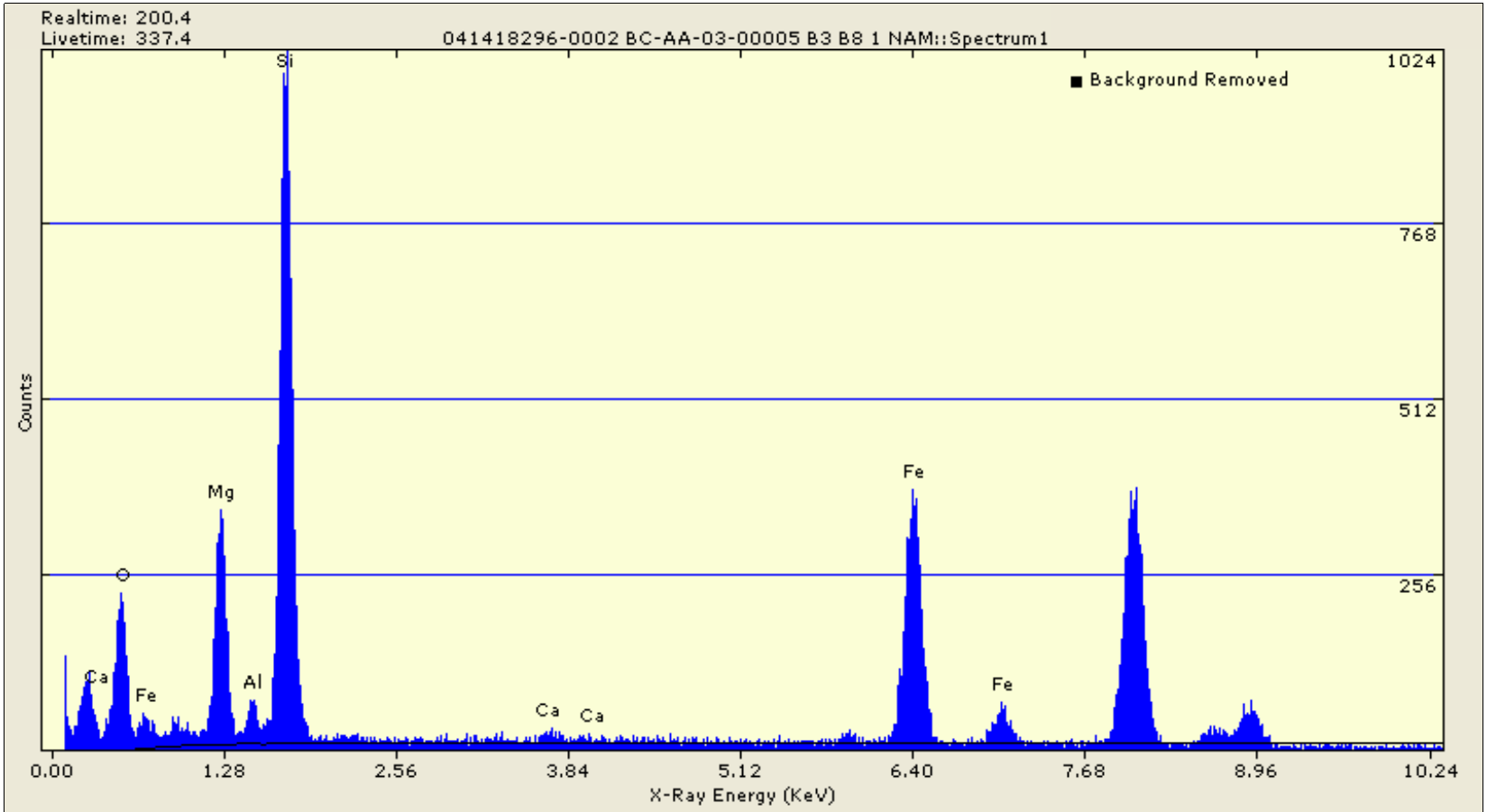
Structure #

Structure #

Structure #

Analyst: FC Date: 7/1/14 Scope: 01 04 07

7/11/14



Quantitative Results for Spectrum1
Analysis: Thin Film Method: Standardless
Acquired 30-Jun-2014, 100.0 KeV @10 eV/channel

Element	Weight %	Std. Dev.	Atomic %	Oxide %		Cations	k-Ratio	Intensities	FWHM (eV)	ROI (net)
Oxygen	44.24	0.49	61.21	0.00		0.0000	0.0000	0.0	86.2	1788.29
Magnesium	10.17	0.11	9.26	16.86	(MgO)	3.4791	0.1887	2572.5	95.9	2633.47
Aluminum	1.33	0.01	1.09	2.52	(Al2O3)	0.4112	0.0248	372.5	98.7	487.33
Silicon	27.74	0.31	21.86	59.34	(SiO2)	8.2146	0.4731	8184.6	101.7	8351.14
Calcium	0.23	0.00	0.13	0.32	(CaO)	0.0474	0.0045	70.2	122.5	162.51
Iron	16.29	0.18	6.46	20.96	(FeO)	2.4260	0.1313	3971.5	146.4	4368.16
Total	100.00			100.00		14.5784				

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number:	041418296	**Date:**	Jun 30, 2014
Indexing of Image Number:	010337	**Scope #:**	04 - 01
Reference / Sample No:	0002-04-01	**By:**	F Craig
Preliminary ID:	ACTINOLITE		
Using Camera Constant of:	2.943e-003 **1/A Pixels**		
Determined from Reference:	AuCal-062414_10304		

Measured Inter-Row Spacing:	**64.38**	Pixels
Mean Distance between spots on Center row (d2):	**135.05**	Pixels
Mean Distance between spots on slant vector (d1):	**75.66**	Pixels

	Calculated	Ref	-5%	+5%
Inter-row Spacing (Angstroms):	5.278	**5.278**	*5.014*	*5.542*
d2 or hk0 (Camera K/zero row dist.):	2.516	**2.497**	*2.372*	*2.622*
d1 or hk1 (Camera K/slant vector dist.):	4.491	**4.487**	*4.263*	*4.711*
Ratio of hk0/hkl:	0.560	**0.557**	*0.529*	*0.585*
Angle of Slant Vector (Measured):	58.2	**57.380**	*54.511*	*60.249*

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

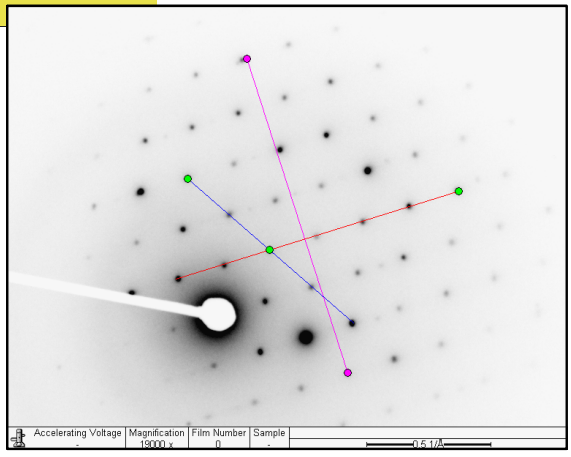
Miller Indice hk0: (1 7 0)

Miller Indice hkl: (0 2 1)

With a Zone Axis of: [7 -1 2]

Preliminary Identification was: X CORRECT

INCORRECT



Percent accuracy to date: 100 %

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ISO 10312
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Customer Sample Number:	BC-AA-04-00005	Air volume:	10800	Liters
EMSL Sample Number:	041418296-0003	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:	06/27/2014	
Result of Chi² Test:	85.20 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	10	-	11.14	0.000397	0.000190 -	0.000730
PCMe Structures (NRA)	ADX	0	-	0.00	0.000000	0.000000 -	0.000119
Total PCMe Structures (Regulated)	**CD/ADX**	**10**	**-**	**11.14**	**0.000397**	**0.000190 -**	**0.000730**
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	-	10	11.14	0.000397	0.000190 -	0.000730
PCMe Fibers and Bundles (NRA)	ADX	-	0	0.00	0.000000	0.000000 -	0.000119
Total PCMe Fibers and Bundles (Regulated)	**CD/ADX**	**-**	**10**	**11.14**	**0.000397**	**0.000190 -**	**0.000730**
Total PCMe Fibers and Bundles (All)	**CD/ADX**	**-**	**10**	**11.14**	**0.000397**	**0.000190 -**	**0.000730**
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 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:	041418296-0003	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-04-00005	Grid Box :	0414-Tetra Tech-06: C	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	85.20-Random	Pore Size (micron):	0.8	Analysis Date:	07/01/2014 & 07/02/2014
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				
C1	A9	None Detected								
C1	A7	None Detected								
C1	A3	None Detected								
C1	B2	F	1	1	9.3	0.7	ADX	Actinolite	4407	
C1	B6	F	2	2	14.5	1	ADX	Actinolite		
C1	B8	None Detected								
C1	C7	None Detected								
C1	C5	None Detected								
C1	C1	None Detected								
C1	D4	None Detected								
C1	D6	None Detected								
C1	D8	None Detected								
C1	E9	None Detected								
C1	E7	None Detected								
C1	E5	None Detected								
C1	E3	None Detected								
C1	E1	F	3	3	12.3	2.1	ADX	Actinolite		
C1	F2	F	4	4	12.6	3	ADX	Actinolite		
C1	F4	None Detected								
C1	F6	None Detected								
C1	F8	None Detected								
C1	G9	None Detected								
C1	G7	F	5	5	6.6	1.5	ADX	Actinolite		
C1	G5	None Detected								
C1	G3	None Detected								
C1	G1	None Detected								
C1	H2	None Detected								
C1	H6	MC11	6	6	16.8	8	ADX	Actinolite		
C1	H8	None Detected								
C1	I7	None Detected								
C1	I5	None Detected								
C1	I3	None Detected								
C1	I1	None Detected								
C1	J2	None Detected								
C1	J4	None Detected								
C1	J6	None Detected								
C1	J8	None Detected								
C2	J10	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:	041418296-0003	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-04-00005	Grid Box :	0414-Tetra Tech-06: C	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	85.20-Random	Pore Size (micron):	0.8	Analysis Date:	07/01/2014 & 07/02/2014
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				
C2	J8	None Detected								
C2	J6	None Detected								
C2	J4	None Detected								
C2	J2	None Detected								
C2	I1	None Detected								
C2	I3	None Detected								
C2	I5	None Detected								
C2	I7	None Detected								
C2	I9	None Detected								
C2	H10	None Detected								
C2	H8	None Detected								
C2	H6	None Detected								
C2	H4	F	7	7	5.7	1.4	ADX	Actinolite		
C2	H4	F	8	8	9.2	1.5	ADX	Actinolite		
C2	G3	None Detected								
C2	G5	F	9	9	6	0.7	ADX	Actinolite		
C2	G5	F	10	10	6.8	0.4	ADX	Actinolite		
C2	G7	None Detected								
C2	G9	None Detected								
C2	F10	None Detected								
C2	F8	None Detected								
C2	F6	None Detected								
C2	F4	None Detected								
C2	F2	None Detected								
C2	E3	None Detected								
C2	E5	None Detected								
C2	E7	None Detected								
C2	D10	None Detected								
C2	D8	None Detected								
C2	D6	None Detected								
C2	C5	None Detected								
C2	C3	None Detected								

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ISO 10312

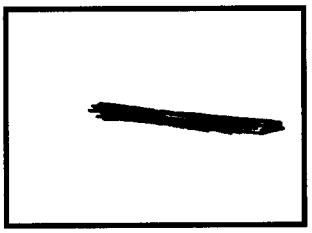
International Standard for the Determination of Asbestos Fibers-Direct Transfer Transmission Electron Microscopy

Structure Sketch Sheet for Direct Data Entry

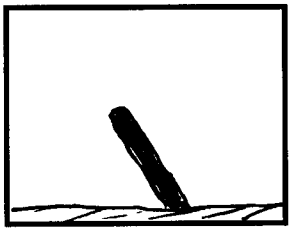
EMSL Order ID: 041418296-0003 **Client:** Tetra Tech

Client Sample: BC-AA-04-00005 Page 1 of 1

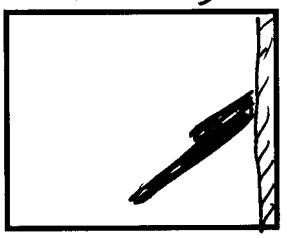
Primary Structure # 1



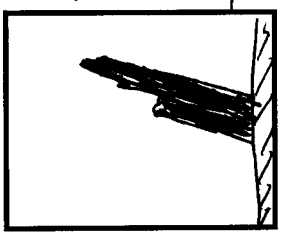
Primary Structure # 2



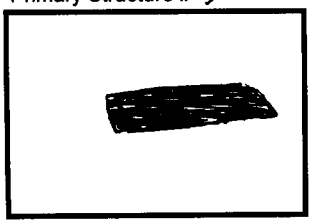
Primary Structure # 3



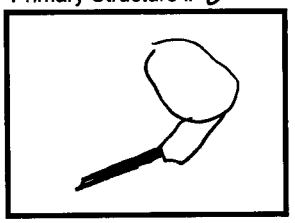
Primary Structure # 4



Primary Structure # 5

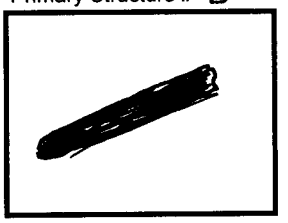


Primary Structure # 6

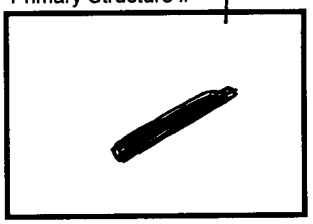


Primary Structure # 7

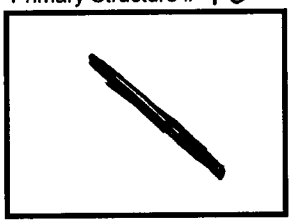
Primary Structure # 8



Primary Structure # 9



Primary Structure # 10



Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Primary Structure #

Structure #

Structure #

Structure #

Structure #

Analyst: Date: 7/6/14 Scope: 04-03

Energy Dispersive X-Ray Analysis
Quantitative Spectra & Data

EMSL ANALYTICAL, INC.

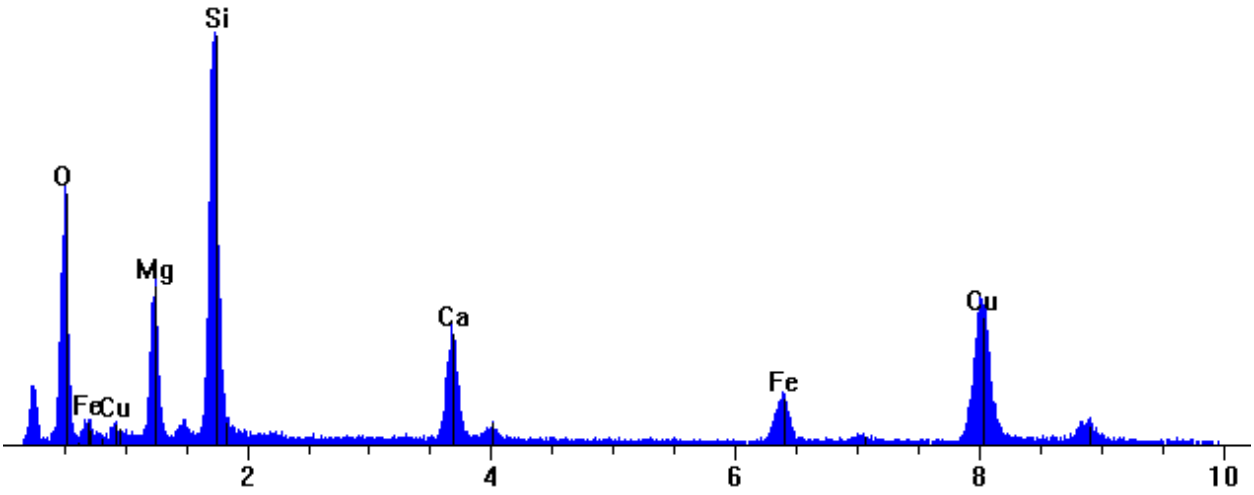
File: L:\EDS Spe...Spectra\Scope 04-03\2014\041418296-0003 C1 B2 1 AC.pgt
Collected: July 01, 2014 12:21:45

Report: Tuesday, July 01, 2014

Live Time:	19.66	Count Rate:	5349	Dead Time:	39.02 %
Beam Voltage:	20.00	Beam Current:	2.00	Takeoff Angle:	31.00
Thickness limit:	27281.24				

041418296-0003 C1 B2 1 AC.pgt

FS: 1400



Element	Line	keV	CL Ratio	Wt%	At%	Compound	Cmpd Wt%	ChiSquared
Mg	KA1	1.254	1.8100	16.36	15.48	MgO	27.12	4.30
Si	KA1	1.740	1.0000	31.07	25.47	SiO	48.78	1.86
Ca	KA1	3.691	1.0500	10.56	6.07	CaO	14.78	2.79
Fe	KA1	6.403	1.3500	7.25	2.99	FeO	9.33	1.01
Cu	KA1	8.046	0.0000	0.00	0.00			1.90
O	KA1	0.523	0.0000	34.76	50.00			23.82
Total				**100.00**	**100.00**	**Total**	**100.00**	**9.24**

Element	Line	Gross (cps)	BKG (cps)	Overlap (cps)	Net (cps)	P:B Ratio
Mg	KA1	289.3	28.5	0.0	260.8	9.1
Si	KA1	931.4	34.6	0.0	896.8	25.9
Ca	KA1	317.3	27.0	0.0	290.3	10.7
Fe	KA1	174.6	19.5	0.0	155.0	7.9
Cu	KA1	583.2	24.9	0.0	558.3	22.4
O	KA1	425.4	16.0	0.0	409.4	25.6

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number: 041418296 **Date:** Jul 01, 2014

Image Number: 04407

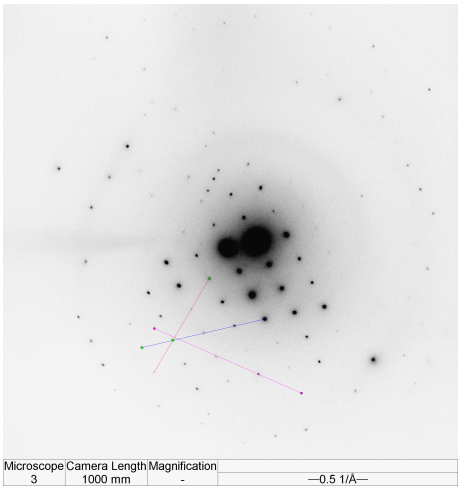
Reference / Sample Number: 0003

Preliminary ID: ACTINOLITE

Camera Constant: 1.875e-003 **1/A Pixels**

Calibration Reference: 063014-04-03-04404_C

	Measured	Reference	-5%	+5%
Inter-row Spacing:	**5.162**	5.278	**5.014**	**5.542**
d2 or hk0 (Camera K/zero row dist.):	**3.274**	3.127	**2.971**	**3.283**
d1 or hkl (Camera K/slant vector dist.):	**3.744**	3.706	**3.521**	**3.891**
Ratio of hk0/hkl:	**0.875**	0.844	**0.802**	**0.886**
Vector Angle:	**47.3**	49.150	**46.692**	**51.608**



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

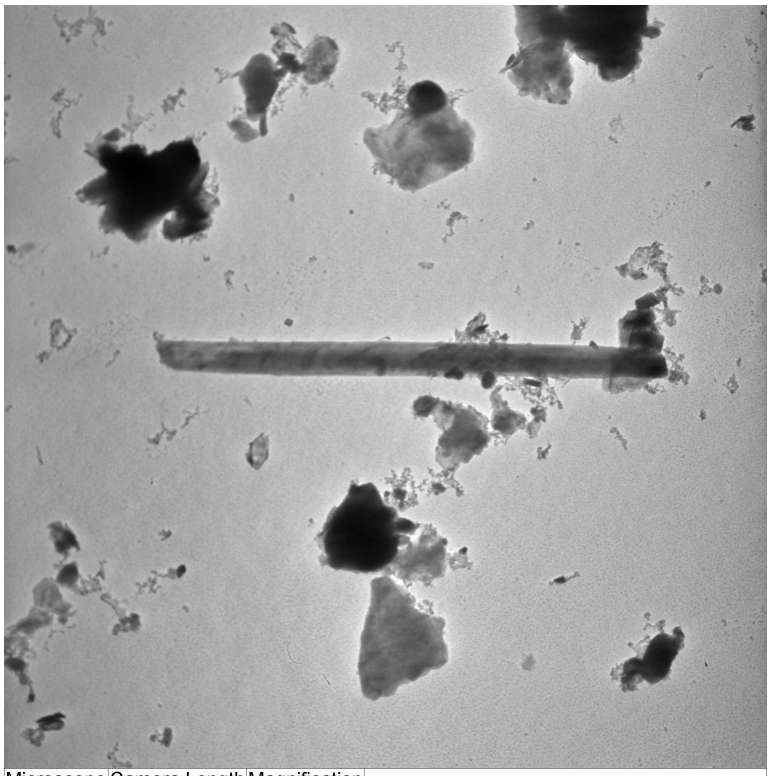
With a Zone Axis of: [**-1-3-5**]

Preliminary Identification was:

X	CORRECT
	INCORRECT

EMSL Analytical, Inc.

Photomicrograph Report



Microscope	Camera Length	Magnification	
-	-	-	500 Pixel

Micrograph Information

Sample ID:	041418296
Order ID:	0003
Image Number:	04408
Mineral Type:	ACTINOLITE
Date:	7/1/2014
Magnification:	10,000
Microscope:	04-03

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: 6/27/2014 9:45
Date Sampled: 06/26/2014 09:00
EMSL Order: 041418296
Report Date: 07/07/14

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-02-00005	Air volume:	10800	Liters
EMSL Sample Number:	041418296-0004	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:	06/27/2014	
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 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:	041418296-0004	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-02-00005	Grid Box :	0414-Tetra Tech-06: D	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	67.00-Random	Pore Size (micron):	0.8	Analysis Date:	07/02/2014 & 07/03/2014
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				
D1	B10	None Detected								
D1	C6	None Detected								
D1	C3	None Detected								
D1	A1	None Detected								
D1	C1	None Detected								
D1	D2	None Detected								
D1	D9	None Detected								
D1	E5	None Detected								
D1	F4	None Detected								
D1	G1	None Detected								
D1	G5	None Detected								
D1	G7	None Detected								
D1	H6	None Detected								
D1	H2	None Detected								
D1	I1	None Detected								
D1	I3	None Detected								
D1	I9	None Detected								
D1	J8	None Detected								
D1	J4	None Detected								
D1	J2	None Detected								
D2	J10	None Detected								
D2	J8	None Detected								
D2	I9	None Detected								
D2	I5	None Detected								
D2	H8	None Detected								
D2	H4	None Detected								
D2	H2	None Detected								
D2	G3	None Detected								
D2	F2	None Detected								
D2	F4	None Detected								
D2	F8	None Detected								
D2	E7	None Detected								
D2	E5	None Detected								
D2	E3	None Detected								
D2	E1	None Detected								
D2	D6	None Detected								
D2	D8	None Detected								
D2	D10	None Detected								

200 Route 130 North
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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:	041418296-0004	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	BC-AA-02-00005	Grid Box :	0414-Tetra Tech-06: D	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	67.00-Random	Pore Size (micron):	0.8	Analysis Date:	07/02/2014 & 07/03/2014
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				
D2	C9	None Detected								
D2	C7	None Detected								
D2	C5	None Detected								
D2	C3	None Detected								
D2	B4	None Detected								
D2	B6	None Detected								
D2	B8	None Detected								
D2	A9	None Detected								
D2	A7	None Detected								
D2	A5	None Detected								
D2	A1	None Detected								
D3	A10	None Detected								
D3	A8	None Detected								
D3	A6	None Detected								
D3	A4	None Detected								
D3	B1	None Detected								
D3	B7	None Detected								
D3	C10	None Detected								
D3	C6	None Detected								
D3	C4	None Detected								
D3	D5	None Detected								
D3	D9	None Detected								
D3	E10	None Detected								
D3	F1	None Detected								
D3	F3	F	1	1	21.4	4.6	ADX	Actinolite		
D3	F7	None Detected								
D3	F9	None Detected								
D3	G10	None Detected								
D3	G8	None Detected								
D3	G6	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: 041418296-0004 **Client:** Tetra Tech

Client Sample: *BC-AA-02-00005* Page 1 of _____

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: 7/3/04 Scope: 04-03

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

Energy Dispersive X-Ray Analysis
Quantitative Spectra & Data

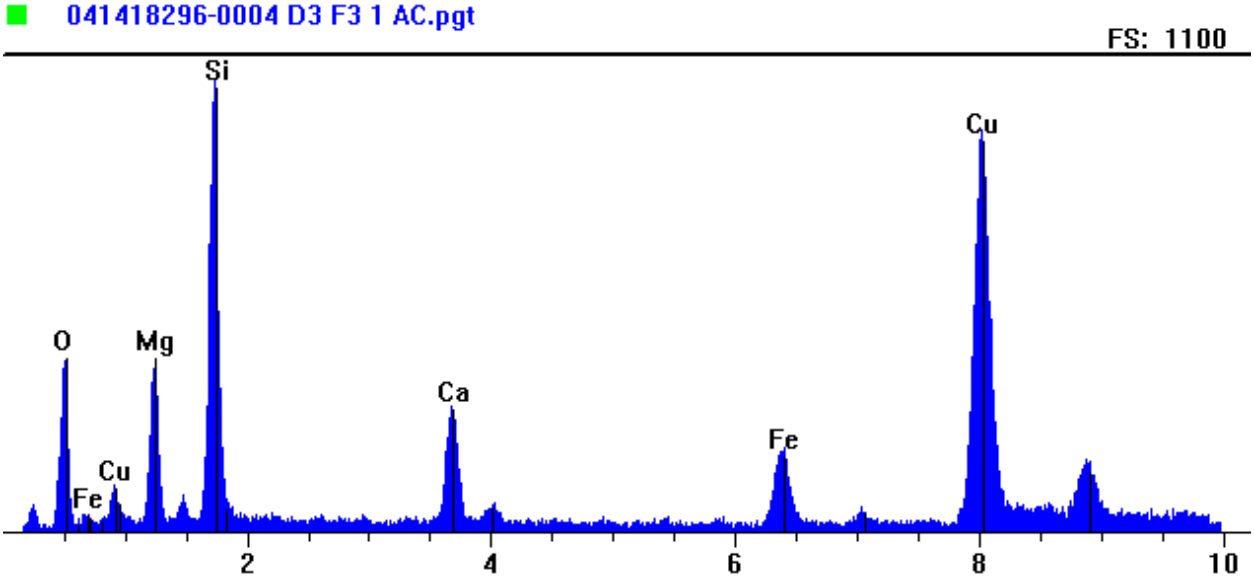
EMSL ANALYTICAL, INC.

File: L:\EDS Spe...Spectra\Scope 04-03\2014\041418296-0004 D3 F3 1 AC.pgt
Collected: July 03, 2014 12:36:34

Report: Thursday, July 03, 2014

Live Time:	23.33	Count Rate:	5586	Dead Time:	51.37 %
Beam Voltage:	20.00	Beam Current:	2.00	Takeoff Angle:	31.00
Thickness limit:	27992.90				

041418296-0004 D3 F3 1 AC.pgt



Element	Line	keV	CL Ratio	Wt%	At%	Compound	Cmpd Wt%	ChiSquared
Mg	KA1	1.254	1.8100	16.66	16.01	MgO	27.62	1.36
Si	KA1	1.740	1.0000	28.45	23.67	SiO	44.66	1.62
Ca	KA1	3.691	1.0500	10.21	5.95	CaO	14.29	1.25
Fe	KA1	6.403	1.3500	10.44	4.37	FeO	13.44	1.10
Cu	KA1	8.046	0.0000	0.00	0.00			4.57
O	KA1	0.523	0.0000	34.24	50.00			13.25
Total				**100.00**	**100.00**	**Total**	**100.00**	**4.51**

Element	Line	Gross (cps)	BKG (cps)	Overlap (cps)	Net (cps)	P:B Ratio
Mg	KA1	226.3	22.1	0.0	204.2	9.3
Si	KA1	659.7	28.3	0.0	631.4	22.3
Ca	KA1	242.6	26.7	0.0	215.8	8.1
Fe	KA1	198.2	26.6	0.0	171.7	6.5
Cu	KA1	1058.7	44.3	0.0	1014.4	22.9
O	KA1	193.7	9.5	0.0	184.2	19.4

AMPHIBOLE SAED INDEXING FORM

EMSL Order Number:	041418296	**Date:**	Jul 03, 2014
Indexing of Image Number:	04409	**Scope #:**	04-03
Reference / Sample No:	0004	**By:**	P Harrison
Preliminary ID:	ACTINOLITE		
Using Camera Constant of:	1.876e-003 **1/A Pixels**		
Determined from Reference:	L4-04-03-04404_CamCor		

Measured Inter-Row Spacing: **96.99** Pixels

Mean Distance between spots on Center row (d2): **284.60** Pixels

Mean Distance between spots on slant vector (d1): **174.88** Pixels

	Calculated	Ref	-5%	+5%
Inter-row Spacing (Angstroms):	5.496	**5.278**	*5.014*	*5.542*
d2 or hk0 (Camera K/zero row dist.):	1.873	**1.808**	*1.718*	*1.898*
d1 or hk1 (Camera K/slant vector dist.):	3.048	**2.942**	*2.795*	*3.089*
Ratio of hk0/hkl:	0.614	**0.615**	*0.584*	*0.646*
Angle of Slant Vector (Measured):	34.01	**35.330**	*33.563*	*37.096*

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

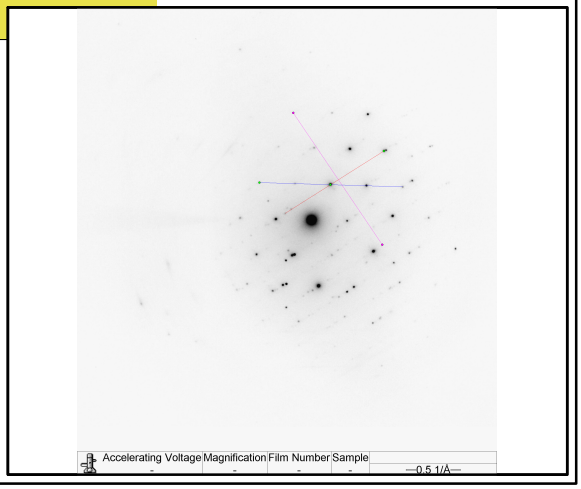
Miller Indice hk0: (**0 10 0**)

Miller Indice hkl: (**-1 5 1**)

With a Zone Axis of: [**101**]

Preliminary Identification was: x CORRECT

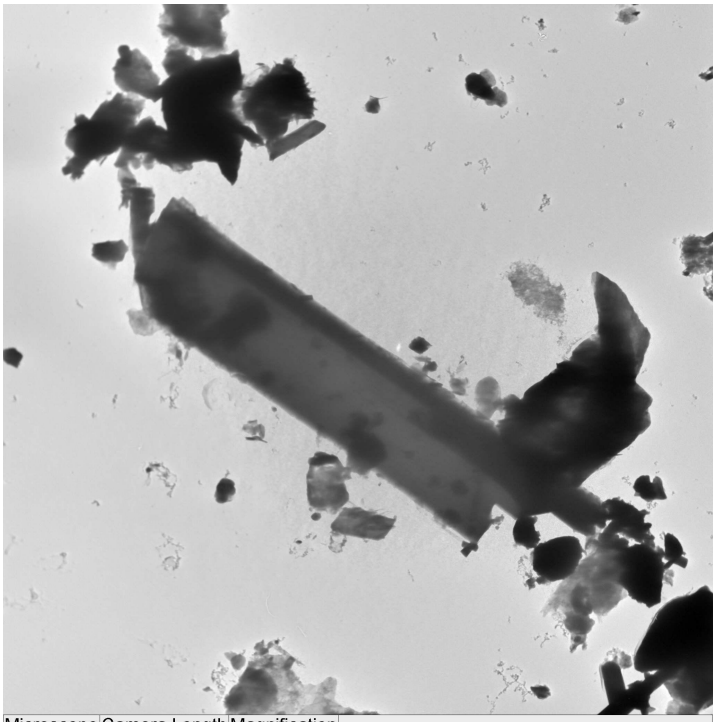
INCORRECT



Percent accuracy to date: 100 %

EMSL Analytical, Inc.

Photomicrograph Report



Microscope	Camera Length	Magnification	
3	-	5000 x	——5 µm——

Accelerating Voltage	Magnification	Film Number	Sample	
-	-	-	-	———500 Pixel———

Micrograph Information

Sample ID:	0004
Order ID:	041418296
Image Number:	04410
Mineral Type:	ACTINOLITE
Date:	7/3/2014
Magnification:	5000
Microscope:	04-03

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: 6/27/2014 9:45
Date Sampled: 06/26/2014 09:00
EMSL Order: 041418296
Report Date: 07/07/14

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 062614	Air volume:	0	Liters
EMSL Sample Number:	041418296-0005	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:	06/27/2014	
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

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 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:	041418296-0005	GO area (mm²):	0.0132	Mag.	10,000
Customer Sample:	FIELD BLANK 062614	Grid Box :	0414-Tetra Tech-06: E	Analyst(s):	P. Harrison
Chi² Test for Uniformity:	N/A	Pore Size (micron):	0.8	Analysis Date:	06/30/2014
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				
E1	B9	None Detected								
E1	C8	None Detected								
E1	C4	None Detected								
E1	G3	None Detected								
E1	I8	None Detected								
E2	J6	None Detected								
E2	D1	None Detected								
E2	A2	None Detected								
E3	J3	None Detected								
E3	C6	None Detected								

200 Route 130 North
Cinnaminson, NJ 08077

OrderID: 041418296

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Chain of Custody

EMSL Order Number (*Lab Use Only*): 041418296

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**
Street: 7 West 6th Ave, Suite 612	*Third Party Billing requires written authorization from third party*
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: 103S3259	**Please Provide Results:** ☐ Fax ☒ Email ☐ Mail
U.S. State Samples Taken: NA	**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 0.00004

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: Brett Dunn **Samplers Signature:**

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
BC-AA-01-00005	Site 1	10,800 L	6/26/14 0858
BC-AA-03-00005	Site 3	10,800 L	6/26/14 0917
BC-AA-04-00005	Site 4	10,800 L	6/26/14 0935
BC-AA-02-00005	Site 2	10,800 L	6/26/14 0954
Field Blank-002604	Field Blank	NA	6/26/14 0954

Client Sample # (s): - **Total # of Samples:** 5

Relinquished (Client): **Date:** 6/26/14 **Time:** 1500

Received (Lab): MAMoore **Date:** 6/27/14 **Time:** 9:45 am

Comments/Special Instructions:

RECEIVED JUN 27 2014 EMSL INC.