EMS Laboratories
117 W. Bellevue Drive
Pasadena, CA 91105

NARRATIVE

July 8, 2010

Derrick Willis
Tronox LLC-Henderson
560 West Lake Mead
Henderson, NV 89015

SDG/EMS# 138054
Project: 2027.001, Tronox LLC Henderson,
560 West Lake Mead Drive, Henderson, NV
Client COC ID: 02027.01.2132

REFERENCE:	DAS Case No. 0769F	TDD No.: 07-10-0012
	Task No. 0361	P. O. No.: 0063941
	Tronox Project# 2027.01	NGE Tracking# 03
	AUI Task# 6	

EMS REPORT NO.: 138054

When the samples are analyzed in the TEM the recorded data includes the dimensions of the respirable fibers of the regulated asbestos types, namely, chrysotile, Amosite (cummingtonite/grunerite), tremolite, actinolite, crocidolite, and anthophylite. The fibers of importance are those included in the protocol fiber classification. The width of the protocol fibers is <0.4 um and the length is divided into two groups, 5 to 10 um and long fibers >10 um. The 95% Poisson Confidence interval for the observed concentration of fibers is also calculated. Other asbestos fibers and non-asbestos fibers with protocol dimensions are noted in the counting sheet. The problem regarding the loss of particles on polycarbonate filters has been eliminated except for very alkaline particles. There is no evidence that asbestos fibers are lost

EMS Laboratories Inc.
117 West Bellevue Drive, Pasadena, CA 91105
Phone: 626-568-4065 Fax: 626-796-5282
Email: akolk@emslabs.com

Attn: Derrick Wills
Tronox-LLC-Henderson
PO Box 55
Henderson, NV 89009

Phone: (947) 375-7004

Project: Tronox LLX Henderson, 560 W. Lake Mead Dr., Henderson, NV/2027.001

Customer ID: TRNX26
Customer PO: 2027.001
Received: 5/28/2010 9:55AM
EMS LAB No: 138054
Date Prepared: 6/11/2010 11:03AM
Analysis Date: 6/14/2010 8:30AM

Report Date: July 27, 2010

Date Sampled: 5/26/2010 11:40

NIOSH 7402/ISO

DRAFT, MODIFIED ELUTRIATOR METHOD FOR THE DETERMINATION OF ASBESTOS IN SOILS AND BULK MATERIAL METHOD

EMS Laboratory Number:	138054		Mass of Respirable Dust on Fiber:	154	
Customer Sample Number:	SSAR3-01-0.00BPC		Area of collection filter:	385	mm^2
Minimum Level of Analysis (chrysotile):	CD		Grid openings area:	0.0094	mm^2
Minimum Level of Analysis (amphibole):	ADX		Grid Openings Analyzed:	104	
Magnification used for fiber counting:	9,200	x	Min. Str. Length/Max Str. Diameter:	>5/<0.4	microns
Aspect ratio for fiber definition:	3:1				
			Analyst(s):	Radha Singh	
Dust Generator - Total Dried Sample Weight-77.1g			Soil % Moisture	8.3	%
			Air Flow Rate Through ME Opening of Dust Generator:	1370	
Not Used			Air Flow Rate Through IST Opening of Dust Generator:	130	
Used in Tumbler			Estimate Total Air Flow Through Elutriator:	1500	

Analytical Sensitivity: 2.56E+06 Structure /g PM 10 Limit of Detection: 7.66E+06 Structure /g PM 10

Test For Uniformity (Chi-Square results)

Structure Class	Min ID Level Required	Counts Primary Str.	Counts Total Str.	Poisson 95% Confidence Interval Density St/mm²	Conc. Str/g PM10	Lower Limit Str/g PM10	Upper Limit Str/g PM10
Asbestos Structures>5um, ≤10um	ADX/CD	0	0	0	0	0	7.66E+06
Asbestos Structures>5um, ≤10um (Chrys)	CD	0	0	0	0	0	7.66E+06
Asbestos Structures>5um, ≤10um (Amph)	ADX	0	0	0	0	0	7.66E+06
Asbestos Structure >10um (Long)	ADX/CD	0	0	0	0	0	7.66E+06
Asbestos Structure >10um (Chrys)	CD	0	0	0	0	0	7.66E+06
Asbestos Structure >10um (Amph)	ADX	0	0	0	0	0	7.66E+06
Total Protocol Asbestos Structures	ADX/CD	0	0	0	0	0	7.66E+06
Protocol Asbestos Structures (Chrys)	CD	0	0	0	0	0	7.66E+06
Protocol Asbestos Structures (Amph)	ADX	0	0	0	0	0	7.66E+06
Total Protocol Non Asbestos Structures	NAM	1	1	1.02	2.56E+06	0.064E+06	1.43E+07

Approved by Technical Director

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Client:	Derrick Willis, Tronox LLC-Henderson	**Filter Type:**	MCE 385 mm^2
Report number :	138054	**Magnification:**	9200
Sample number:	SSAR3-01-0.00BPC	**Grid Opening Dimension: mm^2**	0.0094
Project:	2027.001/Tronox LLC Henderson, 560 W. Lake Mead Dr.,	**Grid Loading:** Moderate	

Elutriation Date: 6/11/2010 by Joel Paruli
Preparation Date: 6/11/2010 by Joel Paruli
Analysis Date: 6/14/2010 by Radha Singh

Asbestos Structures>5um, ≤10um (Chrys)	0
Asbestos Structures>5um, ≤10um (Amph)	0
Asbestos Structure >10um (Chrys)	0
Asbestos Structure >10um (Amph)	0
Protocol Asbestos Structures (Chrys)	0
Protocol Asbestos Structures (Amph)	0

Grid Openings	**104**
Mass - ug	**154**
Anlytical sensitivity	[redacted]

Grid ID	Grid Opening	Structure Type	Structure Number		Dimensions - mm		Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total	Width	Length	Width	Length				
1A	C33	None Detected										
1A	C36	None Detected										
1A	E33	None Detected										
1A	E36	None Detected										
1A	F33	None Detected										
1A	F36	None Detected										
1A	F34	None Detected										
1A	G31	None Detected										
1A	G34	None Detected										
1A	C36	None Detected										
1A	E26	None Detected										
1A	F23	None Detected										
1A	F26	None Detected										
1A	G23	None Detected										
1A	C41	None Detected										
1A	C44	None Detected										
1A	E41	None Detected										
1A	E44	None Detected										
1A	F41	None Detected										
1A	F44	None Detected										
1B	C41	None Detected										
1B	C44	None Detected										
1B	E41	None Detected										
1B	E44	None Detected										
1B	C33	None Detected										
1B	C36	None Detected										
1B	E33	None Detected										
1B	E36	None Detected										
1B	F33	None Detected										
1B	C23	None Detected										
1B	C26	None Detected										
1B	E23	None Detected										
1B	E26	None Detected										
1B	F23	None Detected										
1B	F26	None Detected										
1B	F41	None Detected										
1B	F44	None Detected										
1B	G41	None Detected										
1B	G44	None Detected										
1B	H41	None Detected										
1B	H44	None Detected										
1C	C23	None Detected										
1C	C26	None Detected										
1C	E23	None Detected										
1C	E26	None Detected										
1C	F23	F		1	58		0.11	6.30				Non Asbestos

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Report Number:	[redacted]
Sample number:	[redacted]

Analyzed by:	[redacted]
Date of Analysis:	[redacted]

Grid ID	Grid Opening	Structure Type	Structure Number				Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total			Width	Length				
1C	F26	None Detected										
1C	G23	None Detected										
1C	G26	None Detected										
1C	H23	None Detected										
1C	F31	None Detected										
1C	F34	None Detected										
1C	G31	None Detected										
1C	G34	None Detected										
1C	K31	None Detected										
1C	K34	None Detected										
1C	G41	None Detected										
1C	G44	None Detected										
1C	H41	None Detected										
1C	H44	None Detected										
1C	K41	None Detected										
1C	F51	None Detected										
1C	F54	None Detected										
1D	C33	None Detected										
1D	C36	None Detected										
1D	E33	None Detected										
1D	E36	None Detected										
1D	F33	None Detected										
1D	F36	None Detected										
1D	E23	None Detected										
1D	E26	None Detected										
1D	F23	None Detected										
1D	F26	None Detected										
1D	C41	None Detected										
1D	C44	None Detected										
1D	E41	None Detected										
1D	E44	None Detected										
1D	F41	None Detected										
1D	C51	None Detected										
1D	C54	None Detected										
1D	E51	None Detected										
1D	E54	None Detected										
1D	F51	None Detected										
1E	C46	None Detected										
1E	E43	None Detected										
1E	E46	None Detected										
1E	F43	None Detected										
1E	F46	None Detected										
1E	C33	None Detected										
1E	C36	None Detected										
1E	E33	None Detected										
1E	E36	None Detected										
1E	F33	None Detected										
1E	C23	None Detected										
1E	C26	None Detected										
1E	E23	None Detected										
1E	E26	None Detected										
1E	F23	None Detected										
1E	F26	None Detected										

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Report Number:	[redacted]
Sample number:	[redacted]

Analyzed by:	[redacted]
Date of Analysis:	[redacted]

Grid ID	Grid Opening	Structure Type	Structure Number				Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total			Width	Length				
1E	G23	None Detected										
1E	C51	None Detected										
1E	C54	None Detected										
1E	E51	None Detected										
1E	E54	None Detected										

Elutriator Data

Date: 6/11/10 Client: Northgate

Lab #: 138054

Sample ID: SSAR3-01-0.00 BPC Sample weight (g): ~~77.1~~ 77.1

Time air flow started: 600 Tumbler rpm: 45

IST Flowmeter (mL/min): 130 ME Flowmeter (mL/min): 1370

Filter No.	Start Time	Tested flow rate (mL/min)	Final Filter Wt (mg)	Initial Filter Wt (mg)	Dust Weight (mg)	Time Value (min)	Avg. rate of deposition (ug/min)	Optimal time (min)
1	800	135	0.05025	0.02458	25.67	30		
2	830		0.03491	0.02464	10.27	20		
3	850		0.04169	0.02463	17.06	15		
4	905		——	0.02431	——	20		
5	925		0.03395	0.02448	9.47	15		
6	940		——	0.02442	——	15		
7	955		0.03557	0.02949	11.08	15		
8	1010		0.04103	0.02438	16.65	25	Discard	

* Blown out. No good

* Blown out again.

	Time					SP		Dep. Rate		Estiimate
PC-1	915	918 1/2		4.690	4.513	~~3 1/2~~	3 1/2	77	51	55
-2	932	935.20		4.590	4.477	~~3.20~~	3.20	113	34	55
-3	1000	1005.15	4.647	~~4.765~~	4.439	~~5.15~~	5.15	208	40	55
-4	1027	031.30		4.765	4.558	~~4.30~~	4.30	207	46	55
-5	1059	1103.10		4.760	4.606	~~4.10~~ 154	4.19	154	37	55
-6										
-7										
-8										

← To TEM

CONTINUATION OF RUN 6/11/10

Page 2

Elutriator Data

Date: 6-11-10 Client: Nanosafe

Lab #:

Sample ID: SAME as Page 1

Sample weight (g):

Time air flow started:

Tumbler rpm:

IST Flowmeter (mL/min):

ME Flowmeter (mL/min):

Filter No.	Start Time	Tested flow rate (mL/min)	Final Filter Wt (mg)	Initial Filter Wt (mg)	Dust Weight (mg)	Time Value (min)	Avg. rate of deposition (ug/min)	Optimal time (min)
9	1035	135	0.04349	0.02488	1861	30		
10	1105			0.02497				
11								
12								

Time							Dep. Rate	Estiimate

6-9-10

SSAS8-01-0.00 BPC Rush

dish wt.	19.24
dish + sample	119.66 (initial sample wt. 100.42 g)
8:40 - 7:40	117.98 - 19.24 = 98.74
8:30 - 9:30	117.94 - 19.24 = 98.70 g (Final wt.)

% Moisture → $100 \times \frac{100.42 - 98.7}{98.7} = 1.74\%$

138054 # SSAR3-01-0.00 BPC Rush

dish wt.	31.48	dish + sample	131.44 ; initial wt. 99.96 g
6-9-10 7:40	123.83 - 31.48 = ~~92.0345~~ g BP		92.35 g
8:30 - 9:30	~~123.48~~ 123.78 - 31.48 =		92.30 Final wt

% moist. → $100 \times \frac{99.96 - 92.30}{92.30} = 8.3\%$

137821 # SSAP8-01-0.00 BPC

dish wt.	31.45 g	
dish + samp.	131.62 - 31.45 = 100.17 g	(initial wt.)
6-9-10 7:40	127.39 - 31.45 = 95.94	
8:30 - 9:30	127.35 - 31.45 = 95.90 g	final wt

% moist → $100 \times \frac{100.17 - 95.90}{95.90} = 4.45\%$

BP

Copy

Start prep: 12:00 pm
Stop prep: 2:30 pm

Grid Openings
104

Count (Page of) NIOSH 7402/ISO

Report number : 138054
Sample number: SSAR3-01-0.00 BPC
File name: Northgate
Sample Description: 154 mg

Filter Type: MCE 385 mm2
Date Sample was Run: 6-11-10

Magnification: 9,200 X

Preparation date: 6/11/10 By JAP
Analysis date: 6-14-10 By PS
(A): ADX, ADQ

Grid opening dimension:0.0094 mm²
Level of Analysis: (C): CD, CDX

Analysis time: 8:30 to 10:45 am

Grid loading Moderate Condition of Grid

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
1A	C3							
	C3-6							
	E3-8							
	E3-6							
	E3-3							
	E3-4							
	E3-4							
	G3-1						S	
	G3-4							
	C2-6							
	E2-6							
	E2-3							
	E2-8							
	G2-3							
	C4-1							
	C4-4							
	E4-1							
	E4-4							
	E4-4							
1B	C4-1							
	C4-4							
	E4-1							
	E4-4							
	C3							
	C6							
	E2-3							
	E3-6							
	E3-3							
	E-3							

TEM Asbestos Structure Count (Page of)

Report number: 138054 SAMPLE NO: SSAR3-01-0.00BPC X 9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
	C2-6							
	E2-3							
	E2-6							
	F2-3							
	F2-6							
	G4-1							
	G4-4							
	H4-1							
	H4-4							
	I4-1							
	I4-4							
14	C2-3							
	C2-6							
	E2-3							
	E2-6							
	F2-3				F	1	58	Nm ash.
	F2-6							
	G2-3							
	G2-6							
	I2-3							
	E3-1							
	E3-4							
	G3-1							
	G3-4							
	I3-1							
	I3-4							
	G4-1							
	G4-4							
	H4-1							
	H4-4							
	K4-1							
	E5-1							
	E5-4							
11	C3-3							

TEM Asbestos Structure Count (Page of)

Report number: 138054 SAMPLE NO: SSAR3-01-0.00 BPC X 9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
	C3-6							
	E3-2							
	E3-6							
	E3-3							
	E3B							
	E2-3							
	E2-6							
	F23							
	F26							
	C4-1							
	C4-4							
	E4-1							
	E4-4							
	E4-1							
	C5-1							
	C5-4							
	E5-1							
	E5-4							
	IC5-1							
1E	C4-6							
	1E4-3							
	E4B							
	E4-3							
	F4B							
	C3-3							
	C3-6							
	1E3-3							
	E3-1							
	E3-3							
	C2-3							
	C2-6							
	F23							
	F26							
	F2-3							
	F2-6							
	G2-3							

C5-1
C5-4
F5-1
F5-4

Filter Lot Blank

Count (Page of) NIOSH 7402/ISO

Prep Time: NA

Report number: 137022 Filter Blank 1
Sample number: 00105200
File name: Northgate
Sample Description: NA mg

Filter Type: MCE 385 mm2
Date Sample was Run: NA

Magnification: 9,200 X

Preparation date: 6/8/10 By JAP
Analysis date: 6/9/10 By AC

Grid opening dimension: 0.0094 mm²
Level of Analysis: (C): CD, CDX

(A): ADX, ADQ

Grid loading Very Light Condition of Grid Broad

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
A	C26							
	E23							
	E24							
	E22							
	F26							
	C33							
	C31							
	F24					5		
	E31							
	E34							
	F31							
	F34							
	G31							
	G34							
	H31							
	B44							
	C41							
	C44							
	E41							
	E44							
	F41							
	F44							
	G41							
	G44							
	H41							
	H44							
	K41							
	K44							
	C51							
30	C54							
	E51							
	E54							

TEM-10A (2002)

Count (Page 2 of) NIOSH 7402/ISO

Report number : 137822 Filter Blank1
Sample number: 00105200
File name: Northgate
Sample Description: NA mg

Filter Type: MCE 385 mm2 Prep Time: NA
Date Sample was Run: NA

Magnification: 9,200 X

Preparation date: 6/8/2010 By JAP
Analysis date: By

Grid opening dimension:0.0094 mm^2
Level of Analysis: (C): CD, CDX

(A): ADX, ADQ

Grid loading Condition of Grid

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	F51							
	F54							
	G51							
	G54							
	H51							
	H54							
	K51							
	G61							
B	C26							
	E23							
	E26							
	F22							
	F26							
	G22							
	C26							
	B36							
	C32							
	C36							
	E32							
	E36							
	E33							
	E36							
	H33							
	H36							
	K33							
	K36							
	B46							
	C43							
	C46							
	C63							
	E46							
	E43							

Count (Page 7 of) NIOSH 7402/ISO

Report number : 137822 Filter Blank1
Sample number: 00105200
File name: Northgate
Sample Description: NA mg

Filter Type: MCE 385 mm2 Prep Time: NA
Date Sample was Run: NA

Magnification: 9,200 X

Preparation date: 6/8/2010 By JAP
Analysis date: By

Grid opening dimension:0.0094 mm^2
Level of Analysis: (C): CD, CDX

(A): ADX, ADQ

Grid loading Condition of Grid

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	F46							
	G43							
	G46							
	H43							
	H46							
	K43							
	K46							
	C53							
	C56							
	E53							
	E56							
	F53							
	F56							
	G53							
	G56							
	H53							
C	B24							
	C31							
	C34							
	E31							
	E34							
	F31							
	F34							
	G31							
	G34							
	H31							
	H34							
	B41							
	B44							
	C41							
	C44							
	E41							

TEM -10A (2002)

Count (Page 4 of) NIOSH 7402/ISO

Report number :	137822 Filter Blank1	Filter Type: MCE 385 mm2	Prep Time: NA
Sample number:	00105200	Date Sample was Run: NA	
File name:	Northgate		
Sample Description:	NA mg	Magnification: 9,200 X	
Preparation date:	6/8/2010 By JAP	Grid opening dimension:0.0094 mm^2	
Analysis date:	By	Level of Analysis: (C): CD, CDX	
	(A): ADX, ADQ		
Grid loading	Condition of Grid		

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	E44							
	F41							
	F44							
	G41							
	G44							
	H41							
	H44							
	K41							
	B51							
	B54							
	C51							
	C54							
	E51							
	E54							
	F51							
	F54							
	G51							
	G54							
	H51							
	H54							
	C61							
	C64							
	E64							
	E61							
B	C23							
	C26							
	E23							
	E26							
	F23							
	G23							
	G26							
	H23							

TEM -10A (2002)

D grid torn when replaced in grid box

Count (Page 5 of) NIOSH 7402/ISO

Report number : 137822 Filter Blank1
Sample number: 00105200
File name: Northgate
Sample Description: NA mg

Filter Type: MCE 385 mm2 Prep Time: NA
Date Sample was Run: NA

Magnification: 9,200 X

Preparation date: 6/8/2010 By JAP
Analysis date: By

Grid opening dimension:0.0094 mm^2
Level of Analysis: (C): CD, CDX

(A): ADX, ADQ
Grid loading Condition of Grid

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	B3b							
	C3a							
	C3b							
	E3a							
	E3b							
	F3a							
	F3b							
	G3a							
	G3b							
	H3a							
	H3b							
	B4b							
	C4a							
	C4b							
	E4a							
	E4b							
	F4a							
	F4b							
	G4a							
	G4b							
	H4a							
	H4b							
	K4a							
	K4b							
	B5b							
	C5a							
	C5b							
	E5a							
	E5b							
	F5a							
	F5b							
	G5a							

Count (Page 6 of 7) **NIOSH 7402/ISO**

Report number :	137822 Filter Blank1	Filter Type: MCE 385 mm2	Prep Time: NA
Sample number:	00105200	Date Sample was Run: NA	
File name:	Northgate		
Sample Description:	NA mg	Magnification: 9,200 X	

Preparation date: 6/8/2010 By JAP — Grid opening dimension:0.0094 mm^2

Analysis date: By — Level of Analysis: (C): CD, CDX

(A): ADX, ADQ

Grid loading Very Light — Condition of Grid Good

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
E	B3 1							
	B3 4							1 org fiber bundle <5μ
	C3 1							
	C3 4							
	E3 1							
	E3 4							
	F3 1							
	F3 4							
	G3 1							
	G3 4							
	H3 1							
	H3 4							
	B4 1							
	B4 4							
	C4 1							
	C4 4							
	E4 1							
	E4 4							
	F4 1							
	F4 4							
	G4 1							
	G4 4							
	H4 1							
	H4 4							
	K4 1							
	K4 4							
	B5 4							
	C5 1							
	C5 4							
	E5 1							
	E5 4							
	F5 1							

TEM-10A (2002)

Count (Page 7 of 7) NIOSH 7402/ISO

Report number : 137822 Filter Blank1 Filter Type: MCE 385 mm2 Prep Time: NA
Sample number: 00105200 Date Sample was Run: NA
File name: Northgate
Sample Description: NA mg Magnification: 9,200 X

Preparation date: 6/8/2010 By JAP Grid opening dimension:0.0094 mm^2
Analysis date: By Level of Analysis: (C): CD, CDX
(A): ADX, ADQ
Grid loading Condition of Grid

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	E54							
	G51							
	C54							
	H51							
	H54							
	K51							
	E61							
	E64							

TEM -10A (2002)

TEM ASBESTOS ANALYSIS

Client: Sand blank
Sample No.: 5-12-10

EMS Lab No. _____
Page _____ of _____

RECEIVING

TYPE OF SAMPLE
Air ☐ Water ☐
Soil ☐ Bulk ☐
Other Sand

METHOD OF ANALYSIS
EPA 600/4-83-043 ☑ ISO ☐

LEVEL OF ANALYSIS
Chrysotile _____
Amphibole _____

ASPECT RATIO
3:1 ☐ 5:1 ☐

EPA/600/R-94/134 100.1 ☐ 100.2 ☐

LENGTHS
All Sizes (EPA) ☐
(μm) ≥0.5 ☐
≥1.0 ☐
≥5.0 ☐
≥10.0 ☐
PCM Range* ☐
*(≥0.25 μm width ≥5.0 μm length)

FILTER TYPE / AREA (mm±)
MCE ☐ 385 ☐
PC ☐ 314 ☐
MCN ☐ 1017 ☐
Other _____

PORE SIZE
0.45 μm ☐ 0.8 μm ☐
0.1 μm ☐ 0.22 μm ☐
Other _____

G.O. Area (mm²) 0.0 0.094
No. of G.O. to Analyze 200
67/grid

PREP

DIRECT PREP ☐
INDIRECT PREP ☐

Volume _____ liters
Working Volume _____ ml
Weight 50 grams
Ashed Area _____ %

Prepared By JAP
Date 5/12/10

ANALYSIS

MICROSCOPE
H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☑
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☑

Grid Address: A
Screen Magnification: 9200 X
Camera Constant: 2x3
Accelerating Voltage: 100KV
Beam Current: 10 μA
K-Factor: 1.4
Analyst Kadh Date 5/13/10

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	AIX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
C23		NM																							
C26																									
E23																									
E26																									
G23																									
G26																									
H23																									
H26																									
C3-1																									
C34		1=	4.5	7.5	✓																				Si
E31																									
E34																									
F31																									
F34																									

TEM - 1A (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Condition of the Grid: ☐ Good ☐ Scrappy ☐ Undissolved Filter ☐ Folded ☐

EMS LABORATORIES 117 West Bellevue Drive • Pasadena, California 91105-2548 • (626) 568-4065

TEM ASBESTOS ANALYSIS

Client Sand blank
Sample No. 5-12-10

EMS Lab No. _____
Page 2 of _____

RECEIVING

ANALYSIS

Grid Address: A
Screen Magnification: _____ X
Camera Constant: _____
Accelerating Voltage: 100KV
Beam Current: _____ µA
K-Factor: _____

Analyst _____ Date _____

MICROSCOPE

H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☒
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM

Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☒

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
G3-1		NAD																							
G3-4																									
H3-1																									
H3-4																									
C3-3																									
C3-6																									
E3-3																									
E3-6																									
F3-3																									
F3-6																									
G3-3																									
G3-6																									
H3-3																									
H3-6																									
K3-3		↓																							

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Condition of the Grid: ☐ Good ☐ Scrappy ☐ Undissolved Filter ☐ Folded ☐

TEM ASBESTOS ANALYSIS

Client Sand blank
Sample No. 5-1270

EMS Lab No. _____
Page 3 of _____

RECEIVING

ANALYSIS

Grid Address: A
Screen Magnification: _____ X
Camera Constant: _____
Accelerating Voltage: 100KV
Beam Current: _____ µA
K-Factor: _____
Analyst Rdk Date 5-13-10

MICROSCOPE
- H600A - Serial No. 542-36-01 ☐
- H600B - Serial No. 542-05-06 ☐
- H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
- Kevex - Model No. 3200-0106-0365 ☐
- Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
C4-1		ND																							
C4-4																									
B4-1																									
E4-4																									
F4-1																									
F4-4																									
G4-1																									
G4-4																									
H4-1																									
H4-4																									
K4-1																									
K4-4																									
E43																									
E 43																									
E43																									

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Condition of the Grid: ☐ Good ☐ Scrappy ☐ Undissolved Filter ☐ Folded ☐

TEM ASBESTOS ANALYSIS

Client Sand blank
Sample No. 5-12-10

EMS Lab No. _____
Page 4 of _____

RECEIVING

ANALYSIS

Grid Address: A
Screen Magnification: _____ X
Camera Constant: _____
Accelerating Voltage: 100KV
Beam Current: _____ µA
K-Factor: _____

MICROSCOPE
H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☐
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☐

Analyst Radle Date 5-13-10

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
G43		NAM																							
G46																									
H43																									
H46																									
K43																									
K46																									
ES-3																									
ES-4																									
FS-3																									
FS-4																									
GS-3																									
GS-4																									
HS-3		L	6.5	80	✓																				Si
HS-4		NAM																							
KS-3																									

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Condition of the Grid: ☐ Good ☐ Scrappy ☐ Undissolved Filter ☐ Folded ☐

TEM ASBESTOS ANALYSIS

Client Sand blk
Sample No. S-12-10

EMS Lab No. _____
Page 5 of _____

RECEIVING

ANALYSIS

Grid Address: A
Screen Magnification: _____ X
Camera Constant: _____
Accelerating Voltage: 100KV
Beam Current: _____ µA
K-Factor: _____
Analyst Radke Date 5-13-10

MICROSCOPE
- H600A - Serial No. 542-36-01 ☐
- H600B - Serial No. 542-05-06 ☐
- H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
- Kevex - Model No. 3200-0106-0365 ☐
- Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
C5-3		NAD																							
C5-6																									
E5-3																									
E5-6																									
F5-3																									
F5-6																									
H5-3																									
H5-6																									

OBSERVATIONS:

Clean ☐					
Debris: ☐	Very Light ☐	Light ☐	Moderate ☐	Heavy ☐	Very Heavy ☐
Gypsum: ☐	Very Light ☐	Light ☐	Moderate ☐	Heavy ☐	Very Heavy ☐
Condition of the Grid: ☐	Good ☐	Scrappy ☐	Undissolved Filter ☐	Folded ☐	

TEM - 1B (1-08)

TEM ASBESTOS ANALYSIS

Client Sand blank
Sample No. S-12-10

EMS Lab No. _____
Page 1 of _____

RECEIVING

ANALYSIS

Grid Address: B
Screen Magnification: 9,200 X
Camera Constant: 28.3
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 14
Analyst Radh Date 5/18/10

MICROSCOPE
H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☐
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
C23		N/A																							
C26																									
E23																									
E26																									
I23																									
I26																									
G23																									
G26																									
H23																									
C34																									
C34																									
E34																									
E34																									
F34																									
F34		↓																							

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

TEM ASBESTOS ANALYSIS

Client: Sand blank
Sample No.: S-12-10
EMS Lab No.: _____
Page: 1 of _____

RECEIVING

ANALYSIS

Grid Address: B
Screen Magnification: 9,200 X
Camera Constant: 28.3
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst: Radh Date: 5/18/10

MICROSCOPE

H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☐
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM

Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
G3-4		NOM																							
G5-4																									
B3-4																									
B5-4																									
G3-3		F	2.5	13.0	V																				Si
G3-6		NOM																							
E33																									
E3-6																									
F33																									
F3-6																									
G3-3																									
G5-6																									
B5-3																									
B2-6																									
V3-4																									

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

TEM ASBESTOS ANALYSIS

Client Sand blank
Sample No. S-12-10

EMS Lab No. _____
Page 7 of _____

RECEIVING

ANALYSIS

Grid Address: B
Screen Magnification: 9,200 X
Camera Constant: 28.3
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Radh Date 5/18/10

MICROSCOPE
- H600A - Serial No. 542-36-01 ☐
- H600B - Serial No. 542-05-06 ☐
- H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
- Kevex - Model No. 3200-0106-0365 ☐
- Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
C4-1		NAM																							
C4-4																									
E4-1																									
E4-4																									
F4-1																									
F4-4																									
G4-1																									
G4-4																									
H4-1																									
H4-4																									
K4-1																									
K4-4																									
C4C																									
E4-3																									
E4-6		4																							

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

TEM ASBESTOS ANALYSIS

Client Sand blank
Sample No. S-12-10

EMS Lab No. _____
Page 4 of _____

RECEIVING

ANALYSIS

Grid Address: B
Screen Magnification: 9,200 X
Camera Constant: 28.3
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Radh Date 5/18/10

MICROSCOPE -
H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☐
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
E43		W>D																							
E46																									
G43																									
G46																									
I43																									
I46																									
K43																									
K46		F	25	130	✓																				S1
C5-1		F>D																							
C5-4																									
E5-1																									
E5-4																									
F5-1																									
F5-4																									
G5-1		D																							

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

TEM ASBESTOS ANALYSIS

Client Sand blank EMS Lab No. _____
Sample No. S-12-10 Page 5 of _____

RECEIVING

ANALYSIS

MICROSCOPE
- H600A - Serial No. 542-36-01 ☐
- H600B - Serial No. 542-05-06 ☐
- H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
- Kevex - Model No. 3200-0106-0365 ☐
- Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Address: B
Screen Magnification: 9,200 X
Camera Constant: 28.3
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Radh Date 5/18/10

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
G5-4		NAD																							
B5-4																									
H5-4																									
K5-1																									
B6-1																									
E6-4																									
F6-1																									
F6-4																									
G6-1																									

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

TEM ASBESTOS ANALYSIS

Client Sand bank
Sample No. 5-12-10

EMS Lab No. _____
Page 1 of _____

RECEIVING

ANALYSIS

Grid Address: C
Screen Magnification: 9200 X
Camera Constant: 28.3
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Rodk Date 5/13/10

MICROSCOPE
H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☐
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
E23																									
E26																									
F23																									
F26																									
G23		F	1.5	52	✓																				F1
G26																									
H23																									
H26																									
C31																									
C34																									
F31																									
F34																									
F37		F	3.5	55	V																				S1
F54																									
G37																									

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☒ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Condition of the Grid: ☐ Good ☐ Scrappy ☐ Undissolved Filter ☐ Folded ☐

TEM ASBESTOS ANALYSIS

Client Sand bank
Sample No. 5-1240

EMS Lab No. _____
Page 2 of _____

RECEIVING

ANALYSIS

Grid Address: C
Screen Magnification: 9200 X
Camera Constant: 283
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Rad Date 5/13/10

MICROSCOPE
H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☐
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
G3-4		NSD																							
H3-1																									
H3-4																									
K3-1																									
K3-4																									
C3-3																									
C3-6																									
E3-3																									
E3-6																									
F3-3																									
F3-6																									
G3-3																									
G3-6																									
H3-3																									
H3-6		10																							

TEM - 1B (1-08)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

TEM ASBESTOS ANALYSIS

Client Sand Bank
Sample No. 5-12-10

EMS Lab No. _____
Page 3 of _____

RECEIVING

ANALYSIS

Grid Address: C
Screen Magnification: 9200 X
Camera Constant: 283
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Rad Date 5/13/10

MICROSCOPE
H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☐
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
K33		NAD																							
K36																									
C4-7																									
C4-4																									
E4-7																									
E4-4																									
F4-1																									
F4-4																									
G4-7																									
G4-4																									
H4-1																									
H4-4																									
K4-1																									
K4-4																									
E3		↓																							

TEM - 1B (1-06)

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

TEM ASBESTOS ANALYSIS

Client Sand Bank
Sample No. 5-12-10

EMS Lab No. _____
Page 4 of _____

RECEIVING

ANALYSIS

MICROSCOPE
- H600A - Serial No. 542-36-01 ☐
- H600B - Serial No. 542-05-06 ☐
- H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM
- Kevex - Model No. 3200-0106-0365 ☐
- Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Address: C
Screen Magnification: 9200 X
Camera Constant: 28.3
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Radu Date 5/13/10

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
E4-6		non																							
F4-3																									
F4-6																									
G4-3																									
G4-6																									
H4-3		F	2	65	V																				Si
H4-6		non																							
I4-3																									
I4-6																									
J4-3																									
J4-6																									
K4-3																									
K4-6																									
L4-3																									
L4-6																									
M5-1																									

TEM - 1B (1-06)

OBSERVATIONS: Clean ☐ Debris: ☐ Gypsum: ☐ Very Light ☐ Very Light ☐ Light ☐ Light ☐ Moderate ☐ Moderate ☐ Heavy ☐ Heavy ☐ Very Heavy ☐ Very Heavy ☐

TEM ASBESTOS ANALYSIS

Client Sand Bank
Sample No. 5-1240

EMS Lab No. _____
Page 5 of _____

RECEIVING

ANALYSIS

Grid Address: C
Screen Magnification: 9200 X
Camera Constant: 283
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Rodh Date 5/13/10

MICROSCOPE

H600A - Serial No. 542-36-01 ☐
H600B - Serial No. 542-05-06 ☐
H600C - Serial No. 542-24-03 ☐

ENERGY DISPERSIVE X-RAY SYSTEM

Kevex - Model No. 3200-0106-0365 ☐
Kevex - Model No. 3600-0206-0146 Quantum System ☐

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	Fiber Classification NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Analysis Na	Mg	Si	Ca	Fe	Comments
W-4		CHRY																							
1-5-1																									
1-5-4																									
K-5-1																									
E-5-3																									
E-5-6																									
E-5-3																									
E-5-6																									
W-5-3																									
W-5-6																									

OBSERVATIONS:

Clean ☐
Debris: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum: ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

TEM - 1B (1-06)

: **Count (Page 1 of) NIOSH 7402/ISO**

Report number : 137822 Filter Blank2
Sample number: LOT 00105200
File name: Northgate
Sample Description: NA mg

Filter Type: MCE 385 mm2 Prep Time: NA
Date Sample was Run: NA

Magnification: 9,200 X

Preparation date: 6/8/2010 By JAP
Analysis date: 7/9/10 By

Grid opening dimension:0.0094 mm^2
Level of Analysis: (C): CD, CDX

(A): ADX, ADQ

Grid loading Very Right Condition of Grid Good

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
A	C2 3							
	C2 6							
	E2 3							
	E2 6							
	F2 3							
	F2 6							
	G2 3							
	G2 6							
	H2 3							
	H2 6							
	B3 6							
	C3 3							
	C3 6							
	E3 3							
	E3 6							
	F3 3							
	F3 6							
	G3 3							
	G3 6							
	H3 3							
	H3 6							
	K3 3							
	K3 6							
	E4 3							
	E4 6							
	F4 3							
	F4 6							
	G4 3							
	G4 6							
	H4 3							
	H4 6							
	K4 3							

TEM -10A (2002)

Count (Page 1 of) NIOSH 7402/ISO

Report number :	137822	Filter Blank2	Filter Type: MCE 385 mm2	Prep Time: NA
Sample number:	00105200		Date Sample was Run: NA	
File name:	Northgate			
Sample Description:	NA	mg	Magnification: 9,200 X	
Preparation date:	6/8/2010	By JAP	Grid opening dimension:0.0094 mm^2	
Analysis date:		By	Level of Analysis: (C): CD, CDX	
		(A): ADX, ADQ		
Grid loading		Condition of Grid		

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	K4							
	B5							
	C53							
	C56							
	E53							
	E56							
	F53							
	F56							
B	C23							
	C26							
	E23							
	E26							
	F23							
	F26							
	C31							Organic
	E34							
	E31							
	F34							
	F31							
	E34							
	B36							
	C33							
	C36							
	E33							
	E36							
	F33							
	F36							
	B44							
	C41							
	C44							
	C41							
	E44							

TEM -10A (2002)

Count (Page 2 of) NIOSH 7402/ISO

Report number :	137822	Filter Blank2	Filter Type: MCE 385 mm2	Prep Time: NA
Sample number:	00105200		Date Sample was Run: NA	
File name:	Northgate			
Sample Description:	NA	mg	Magnification: 9,200 X	
Preparation date:	6/8/2010	By JAP	Grid opening dimension:0.0094 mm^2	
Analysis date:		By	Level of Analysis: (C): CD, CDX	
		(A): ADX, ADQ		
Grid loading		Condition of Grid		

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	F41							
	F44							
	G41							
	G44							
	H41							
	H44							
	B46							
	C43							
	C46							
	E43							
	E46							
	F43							
	F46							
	G43							
	G46							
	F56							
C	E21							
	E24							
	F21							
	B26							
	C23							
	C26							
	E23							
	E26							
	F23							
	F26							
	G23							
	G26							
	H23							
	H26							
	B36							
	C33							

TEM-10A (2002)

Count (Page 4 of) NIOSH 7402/ISO

Report number : 137822 Filter Blank2
Sample number: 00105200
File name: Northgate
Sample Description: NA mg

Filter Type: MCE 385 mm2 Prep Time: NA
Date Sample was Run: NA

Magnification: 9,200 X

Preparation date: 6/8/2010 By JAP
Analysis date: By

Grid opening dimension:0.0094 mm^2
Level of Analysis: (C): CD, CDX

(A): ADX, ADQ

Grid loading Condition of Grid

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	C36							
	E33							
	E36							
	F33							
	F66							
	G33							
	G36							
	H33							
	H36							
	K33							
	B43							Org
	B46							
	C43							
	C46							
	E43							
	E46							
	F43							
	F46							
	G43							
	G46							
	H43							
	H46							
	K43							
	C52							
	C56							
D	E21							
	E24							
	E21							
	B34							
	C31							
	C34							
	E31							

TEM-10A (2002)

: Count (Page of) NIOSH 7402/ISO

Report number : 137822 Filter Blank2
Sample number: 00105200
File name: Northgate
Sample Description: NA mg

Filter Type: MCE 385 mm2 Prep Time: NA
Date Sample was Run: NA

Magnification: 9,200 X

Preparation date: 6/8/2010 By JAP
Analysis date: By

Grid opening dimension:0.0094 mm^2
Level of Analysis: (C): CD, CDX

(A): ADX, ADQ

Grid loading Condition of Grid

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	F34							
	F31							
	F34							
	G31							
	G34							
	H31							
	H34							
	B44							
	E41							
	E44							
	F41							
	F44							
	G41							
	G44							
	H41							
	H44							
	K41							
	K44							
	B54							
	C51							
	C54							
	E51							
	E54							
	F51							
	F54							
	B56							
	C53							
	C56							
	E53							
	E56							
	F53							
	F56							

TEM -10A (2002)

Count (Page 1 of) NIOSH 7402/ISO

Report number : 137822 Filter Blank1 Filter Type: MCE 385 mm2 Prep Time: NA
Sample number: 00105200 Date Sample was Run: NA
File name: Northgate
Sample Description: NA mg Magnification: 9,200 X

Preparation date: 6/8/2010 By JAP Grid opening dimension:0.0094 mm^2
Analysis date: By Level of Analysis: (C): CD, CDX
(A): ADX, ADQ
Grid loading Condition of Grid

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
6	G23							
	C26							
	E23							
	E26							
	F23							
	F26							
	G23							
	G26							
	H23							
	H26							
	B36							
	C33							
	C36							
	E33							
	E36							
	F33							
	F36							
	G33							
	B46							
X	C46							
	E43							
	E46							
	F43							
	F46							
	G43							
	G46							
	H43							
	H46							
	K43							
	F56							
	F53							
	F66							

TEM -10A (2002)

Count (Page of) NIOSH 7402/ISO

Report number : 137822 Filter Blank2
Sample number: 00105200
File name: Northgate
Sample Description: NA mg

Filter Type: MCE 385 mm2 Prep Time: NA
Date Sample was Run: NA

Magnification: 9,200 X

Preparation date: 6/8/2010 By JAP
Analysis date: By

Grid opening dimension:0.0094 mm^2
Level of Analysis: (C): CD, CDX

(A): ADX, ADQ

Grid loading Condition of Grid

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	C53							
	C56							
	H53							
	H56							
	K53							
	C64							
	E61							
	E64							
	F61							
	F64							

TEM -10A (2002)

Spot Size Measurements

Scope: #60B

Date: May 2010

Name: RS

Conditions of Measurements

High Voltage: 100K

Beam Current: 10 μA

Magnification: 19,200

Condenser Aperture Size: #2

Measurements from a photo 8.5

Shortest diameter: 8.0 **mm**

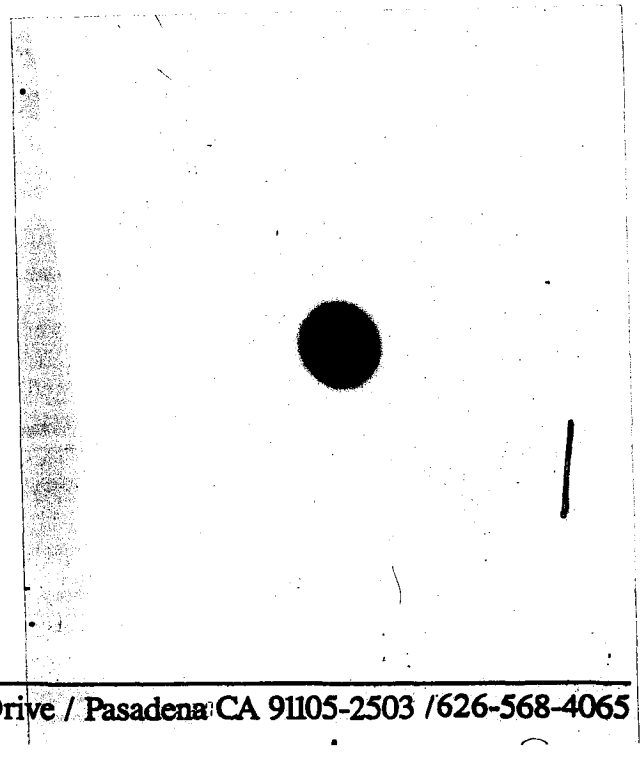
Longest diameter: 9 **mm**

Average: 8.75 **mm**

Spot Size Calculation

$$\text{Spot size in } \mu m = \frac{(\text{average spot size in mm}) \times 1000\ \mu m \times 0.4125}{\text{Magnification}}$$ 188

Note: 1.65/4 = 0.4125 (see the Hitachi Fax)



TEM CAMERA CONSTANT DETERMINATION

TEM H6aB

Measured and Calculated by [illegible] Date May 2010

Camera Constant (mm A) = D (mm) X 1/2 X d (A)

where D (mm) is the diameter of a gold ring and

d (A) is the d-spacing in Angstroms for a particular reflection

CC (1*) = (24.1 mm) X 1/2 x 2.355 = 28.37

CC (2*) = (27.8 mm) X 1/2 x 2.039 = 28.34

CC (3*) = (39.3 mm) X 1/2 x 1.442 = 28.34

CC (4*) = (45.9 mm) X 1/2 x 1.230 = 28.23

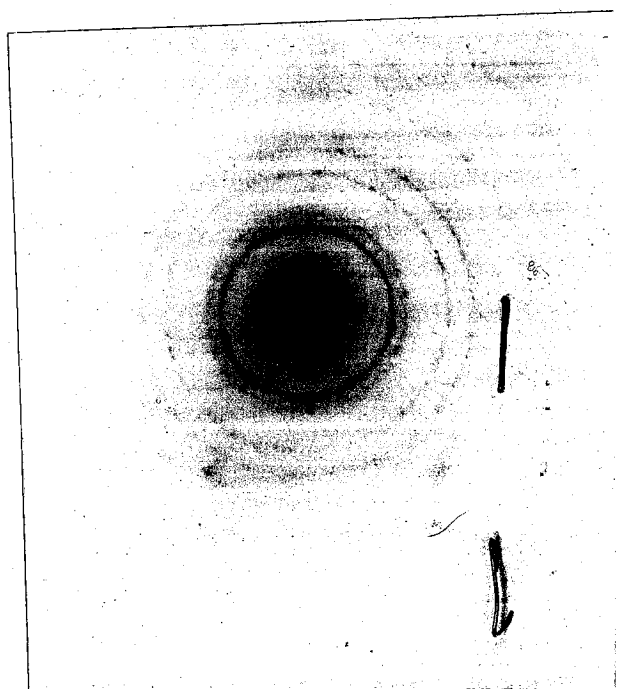
Average Camera Constant = 28.3

* 1 is the first largest diameter ring. 2 the second, etc.

Average Camera Constant = (CC<1> = ...= CC<n>) X 1/n

For gold:

d(A)	nk1
2.355	(111)
2.039	(200)
1.442	(220)
1.230	(311)
1.1774	(222)



08/07/01
csl

DATE: May 2010

A-600/B-600/C-600

WEEKLY CALIBRATION 3m

MONTHLY CALIBRATION 3mth

AFTER SERVICE CALIBRATION___

BY: R

	Measurement	Number of Spacing Flourescent Screen Magnification	Distance (mm)	Number of Spacing Film Magnification
	25,000X		12,000X	
1	3 5/16	19,260	5 1/2	9180
2	3 5/16	19,260	5 1/2	9,270
3	3 5/16	19,080	5 1/2	9,270
4	3 5/16	19,080	5 1/2	9,180
5	3 5/16	19,260	5 1/2	9,180
6			5 1/2	9,180
7	ave	19,200		
8			ave	9,200
9				
10				
	AVERAGE:			

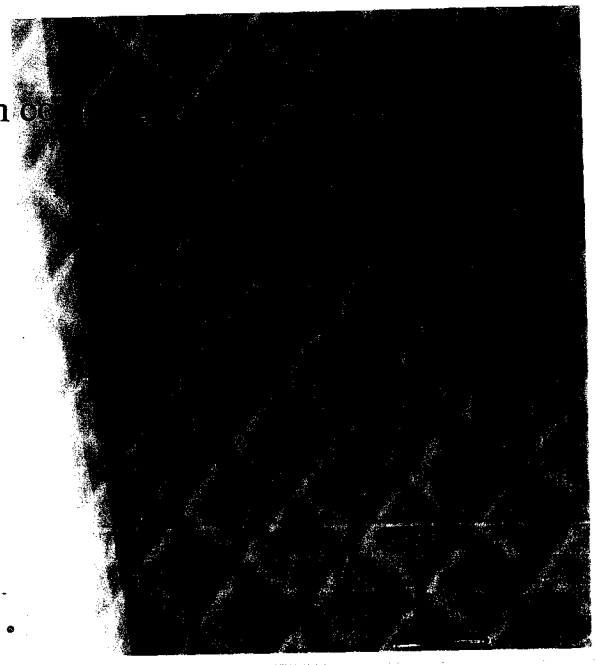
OPERATING VOLTAGE 100 KV

54, 864 lines/inch or 2,160 lines/mm or 0.463μm/line

28, 800 lines/inch or 1,134 lines/mm or 0.882μm/line

15, 240 lines/inch or 600 lines/mm or 1.67μm/line

16.94 μm for one bar and one opening for Ni screen on



EM CALIBRATION 2
992)

K= [Cn/C(Si)] / [In/I(Si)]
C(Si)= 18.74

n	Cn	RUN 1 I(Si)= 22860 In	Kn	RUN 2 I(Si)= 12101 In	Kn	RUN 3 I(Si)= 15953 In	Kn	RUN 4 I(Si)= 16554 In	Kn	RUN 5 I(Si)= 16203 In	Kn	RUN 6 I(Si)= 7464 In	Kn
Na	1.81	1694	1.3034	1095	1.0674	986	1.5627	1133	1.4112	1004	1.5587	395	1.8251
Mg	7.57	6992	1.3207	3738	1.3077	4447	1.4491	4902	1.3641	4714	1.3885	1983	1.5205
Al	6.54	7768	1.027	4152	1.0171	5455	1.0206	5761	1.0028	5708	0.9906	2576	1.0112
Si	18.74	22860	1	12101	1	15953	1	16554	1	16203	1	7464	1
K	0.97	1453	0.8144	827	0.7574	1311	0.6299	1333	0.6428	1195	0.7018	584	0.6615
Ca	8.26	6570	1.5336	3406	1.566	5845	1.203	5222	1.3973	4998	1.4289	2852	1.1535
Ti	3.02	2235	1.6483	1170	1.6668	1821	1.4118	1867	1.4289	1753	1.4895	928	1.2962
Mn	0.14	10	17.078	22	4.1092	12	9.9316	29	4.2645	2	60.523	22	2.5346
Fe	9.51	5898	1.9669	2935	2.0923	4934	1.6408	4856	1.73	4473	1.8383	2351	1.6111
O	43.83			7849	3.6059	7051	5.2917	10526	3.6783	9433	4.0174	3333	5.2377

** NVLAP REQUIREMENTS **
1.0 < K(Na) wrt Si < 4.0
1.0 < K(Mg) & K(Fe) wrt Si < 2.0
1.0 < K(Al) & K(Ca) wrt Si < 1.75

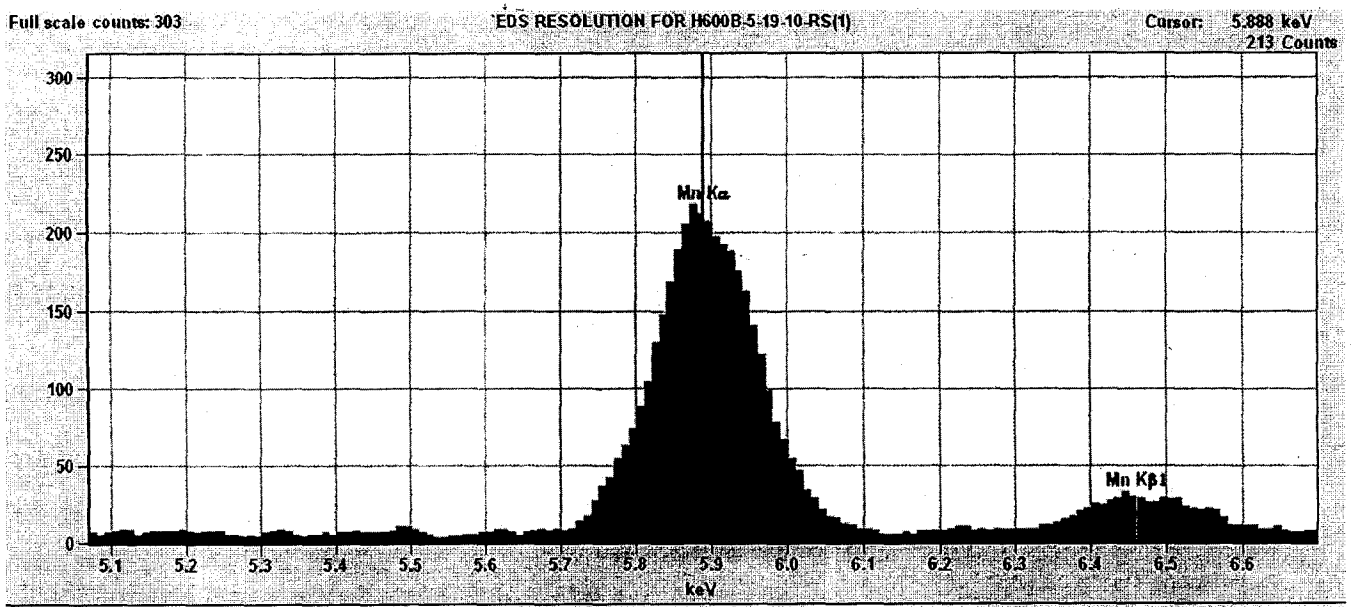
K(Mg)/K(Fe) < 1.5

stdev <10% for Mg, Al, Si, Fe
stdev <20% for Na
wrt mean value of k-factor wrt Si

SCOPE B

RUN 7		RUN 8		RUN 9		RUN 10		RUN 11		RUN 12		RUN 13	
I(Si)=	12627	I(Si)=	4491	I(Si)=	15830	I(Si)=	14684	I(Si)=	25368	I(Si)=	25374	I(Si)=	4628
In	Kn	In	Kn	In	Kn	In	Kn	In	Kn	In	Kn	In	Kn
849	1.4365			950	1.6094	982	1.4442	1543	1.5879	1542	1.5893		
3523	1.4478	1332	1.362	4331	1.4765	4325	1.3715	7480	1.37	7479	1.3705	1213	1.5412
4458	0.9885	1569	0.9989	5717	0.9663	5043	1.0162	9260	0.9561	9260	0.9563	1556	1.038
12627	1	4491	1	15830	1	14684	1	25368	1	25374	1	4628	1
1099	0.5947	415	0.5601	1505	0.5444	1185	0.6414	2315	0.5672	2318	0.5666	363	0.6599
4553	1.2224	1818	1.0888	6257	1.1151	4602	1.4064	9813	1.1394	9832	1.1375	1754	1.163
1480	1.3749	563	1.2855	1994	1.2794	1703	1.3895	3188	1.2823	3196	1.2794	510	1.4624
4	23.583	13	2.5808	7	16.894			25	7.5806			6	5.7624
3889	1.6477	1422	1.6027	5899	1.3618	4371	1.7048	8840	1.4563	8884	1.4494	1497	1.5689
6102	4.8398	1894	5.5458	5950	6.2225	9471	3.6262	35609	1.6662	13315	4.4571	2045	5.293

SCOPE B



Auto | Manual | FWHM | Fe55 Bench Test

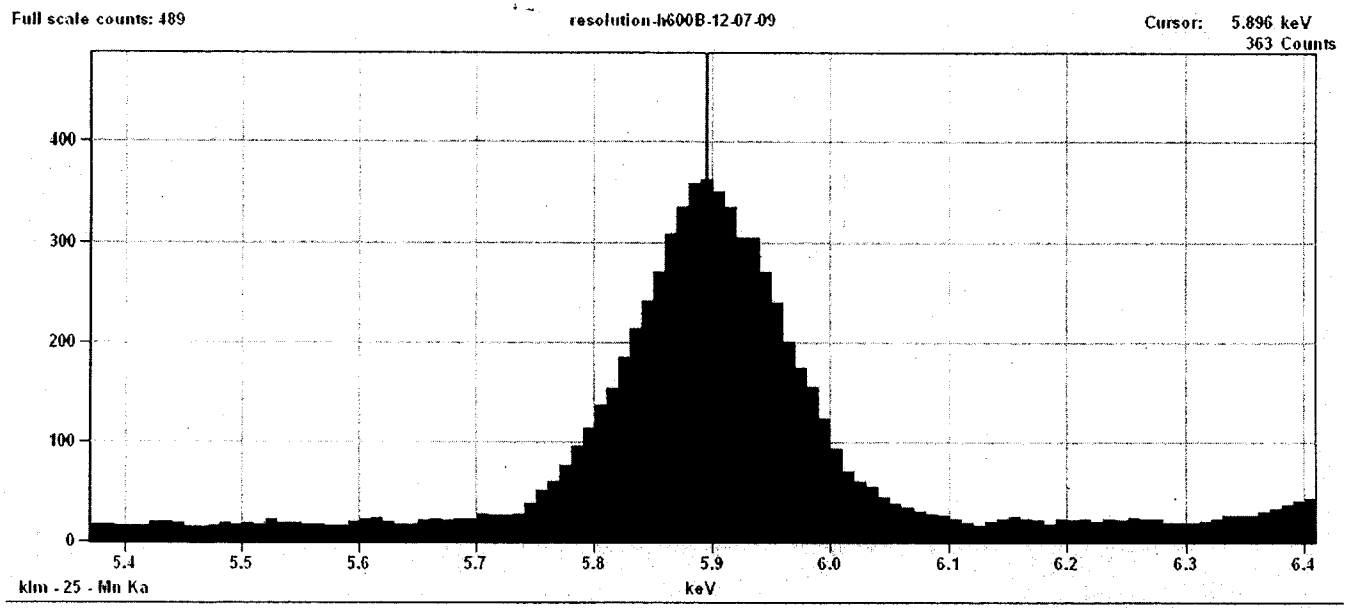
Elements
Atomic Symbol: MN Line: K
Atomic Symbol: Line: K
Ratio Peaks

Additional Measurements
Measure Zero Peak
Measure FWFM and FWTM

Acquisition Criteria
Livetime (s) Max Time: 45
Peak Count No. Trials: 5

Time Constant: 50 (Slow)

Trial #	MN Centroid...	Net Counts	FWHM (eV)	Avg. FWHM ...
1	5.895	3991	148.79	148.79
2	5.895	3930	155.00	151.89
3	5.894	3178	155.83	153.21
4	5.892	3379	149.17	152.20
5	5.891	3438	155.40	152.84
	---	---	---	---
Avg:	5.893	3583	152.84	
Sigma:	0.002	358	3.54	
RMS:	0.0%	10.0%	2.3%	



Auto | Manual | FWHM | Fe55 Bench Test

Elements

Atomic Symbol: Mn Line: K

Atomic Symbol: Line: K

Ratio Peaks

Additional Measurements

Measure Zero Peak Measure FWFM and FWTM

Acquisition Criteria

Livetime (s) Max Time: 50

Peak Count No. Trials: 5

Time Constant: 50 (Slow)

Trial #	Mn Centroid ...	Net Counts	FWHM (eV)	Avg. FWHM ...
1	5.896	1277	126.16	126.16
2	5.900	5295	151.73	138.95
3	5.897	6460	146.02	141.30
4	5.898	5560	146.26	142.54
5	5.899	5291	133.62	140.76
	----	----	----	----
Avg:	5.898	4776	140.76	
Sigma:	0.001	2014	10.52	
RMS:	0.0%	42.2%	7.5%	

138054

Laboratory Submittal Form

Date:	Time:	Relinquished by:	
Client:	Northgate Environmental	Date of Shipment:	
Address:	1100 Quail Street, Suite 102	Shipped from:	Carrier:
	Newport Beach, CA 92660	Client P.O. No:	02027.01.2132
Telephone:	949-260-9293	Client Project ID:	Tronox LLC
Contact:	Derrick Willis		

Results via: ☐ Fax No: ☐ Email address: ☐ Verbal

(Complete written reports will follow all analyses, in addition to any prior verbal, fax, or email results)

Turnaround Time:		Sample Preservatives:	
Number of Samples:	2 (3 each)	Sampler's Name:	
Date & Time of Sample Collection:		Holding Times:	Signature:

Type: ☐ Water ☐ Waste Water ☐ Soil ☐ Filter ☐ Impinger ☐ Sorbent Tube ☐ Other

EMS Only	Client Sample No.	Description/Location	Analysis	Volume/ Weight
138051-0.0	SSAR3-01-0.00BPC		Elutriator	
33	SSAR3-01-0.33BPC	Hold	"	
3				
4				
5				
6				
7		**SEE ATTACHMENT**		
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				

For EMS Only

Laboratory Number:	138054	Received by:	Time: 9:55
Date of Package Delivery:	5/28/2010	Shipping Bill Retained?	yes
Condition of Package on Receipt:	OK	Condition of Custody Seal:	yes
Number of Samples:	2 (3 each)	Chain of Custody Signature:	
Disposition of Samples:	EMS LABS	Misc. Info:	SF 7/06

northgate
environmental management, inc.

1100 Quail Street, Suite 102
Newport Beach, CA 92660 (949) 260-9293

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate.

138054

Page: 1 of 1
Cooler # 1 of 1

COC # 02027.01.2132

Total # of Samples: 2 Event Complete?

Required Ship to Lab:		Required Project Information:		Required Invoice Information:	
Lab Name:	EMS Laboratories, Inc.	Site ID #:	TRONOX LLC. HENDERSON	Send Invoice to:	
Address:	117 W Bellevue Dr	Project #	2027.01	Address:	PO Box 55
	Pasadena, CA 91105	Site Address	560 W Lake Mead Drive	City/State.	Henderson, NV 89009
Lab PM:	Tony Kolk	City	Henderson	State, Zip	NV, 89015
Phone/Fax:	626-568-4065	Site PM Name	Derrick Willis	Send EDD to	Frank.Hagar@ngem.com
Lab PM email	akolk@emslabs.com	Phone/Fax:	(949)375-7004	CC Hardcopy report to	PDF Electronic Version Only -- FTP Upload
Applicable Lab Quote #:		Site PM Email:	derrick.willis@ngem.com	CC Hardcopy report to	

ITEM #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	MATRIX CODE	G=GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	Comments/Lab Sample I.D.	Filtered	Preservative	Analysis	Rush	Mark One
												PhB-Asbestos		
1	SSAR3-01-0.00BPC	SSAR3-01	SO	G	N	05/26/2010	11:40	3		N	UNPRES	X	X	
2	SSAR3-01-0.33BPC	SSAR3-01	SO	G	N	05/26/2010	11:50	3	Hold			H		

ORB
5-27-2010

Additional Comments/Special Instructions:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Francisco Barron	05/27	10:19	EMS Labs	5/28/10	9:55

SHIPPING INFO	SAMPLER NAME AND SIGNATURE
Fed-Ex Company:	PRINT Name of SAMPLER: Francisco Barron
Tracking #:	SIGNATURE of SAMPLER: Francisco Barron — DATE Signed: 05/27 — Time: 10:19

Sample Receipt Conditions	Temp in °C	Samples on Ice?	Sample intact?	Trip Blank?
	Y/N	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N	Y/N

SAMPLE LOG-IN SHEET

Lab Name: EMS Labs		Page 1 of 1	
Received By (Print name): Meaghan Truong		Log in Date: 5-28-10	
Received By (Signature): MTruong			
	Sample Delivery Group No.		

Remarks	EPA SAMPLE #	Corresponding Sample Tag#	Corresponding Assigned Tag#	Remarks Condition of Sample, Shipment etc.
	138051	SSAR3-01-0.0BPC	138051-00	Good
1. Custody Seal(s) (Present/Absent) Intact/Broken	138051	SSAB-01-0.33BPC	138051-33	Good
2. Custody Seal Nos 580024, 580023				
3. Chain of Cutody Records (Present/Absent)				
4. Traffic Reports or Packing List (Present/Absent)				
5. Air Bill Air Bill Sticker (Present/Absent)				
6. Air Bill No. 7935 8399 3888				
7. Sample Tags (Present/Absent)				
Sample Tag Numbers (Listed/Not Listed)				
8. Sample Condition (Intack/Broken/Leaking) Chain of Custody				
9. Does information on custody records, traffic reports and sample tags agree? (yes/no)				
10. Date Received by Lab 5-28-10				
11. Time Received 9:55				
Sample Transfer				
Fraction / Fraction				
Area / Area				
By / By				
On / On				

Contract Client and Attach Records of Resolution

Received By MTruong Logbook No.

Date 5-28-10 Logbook Page No.

FORM DC-1