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# 139930
Project: 2027.01, Tronox LLC Henderson,
560 West Lake Mead Drive, Henderson, NV
Client COC ID: 02027.01.2153

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.: 139930

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

Date Sampled: 8/23/2001 4:06PM

Customer ID: TRNX26
Customer PO: 2027.001
Received: 8/27/2010 11:10AM
EMS LAB No: 139930
Date Prepared: 8/31/2010 12:17PM
Analysis Date: 9/1/2010 10AM

Report Date: September 22, 2010

NIOSH 7402/ISO

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

EMS Laboratory Number:	139930		Mass of Respirable Dust on Filter:	122	µg
Customer Sample Number:	SSAM7-08-0.00BPC		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:	124	
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-79.6g	Soil % Moisture	1.0	%
	Air Flow Rate Through ME Opening of Dust Generator:	1370	
Not Used	Air Flow Rate Through IST Opening of Dust Generator:	100	
Used in Tumbler	Estimate Total Air Flow Through Elutriator:	1470	

Analytical Sensitivity: 2.71E+06 Structure /g PM 10 Limit of Detection: 8.11E+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/mm^2	Conc. Str/g PM10	Lower Limit Str/g PM10	Upper Limit Str/g PM10
Asbestos Structures>5um, ≤10um	ADX/CD	2	2	1.72	5.41E+06	6.56E+05	1.96E+07
Asbestos Structures>5um, ≤10um (Chrys)	CD	2	2	1.72	5.41E+06	6.56E+05	1.96E+07
Asbestos Structures>5um, ≤10um (Amph)	ADX	0	0	0	0	0	8.11E+06
Asbestos Structure >10um (Long)	ADX/CD	1	1	0.86	2.71E+06	6.84E+04	1.51E+07
Asbestos Structure >10um (Chrys)	CD	1	1	0.86	2.71E+06	6.85E+04	1.51E+07
Asbestos Structure >10um (Amph)	ADX	0	0	0	0	0	8.11E+06
Total Protocol Asbestos Structures	ADX/CD	3	3	2.58	8.12E+06	1.68E+06	2.37E+07
Protocol Asbestos Structures (Chrys)	CD	3	3	2.58	8.12E+06	1.68E+06	2.37E+07
Protocol Asbestos Structures (Amph)	ADX	0	0	0	0	0	8.11E+06
Total Protocol Non Asbestos Structures	**NAM**	5	5	4.29	1.35E+07	1.19E+07	3.16E+07

Approved by Technical Director

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NIOSH 7402/ISO

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Pasadena, CA 91105
626-568-4065

Client:	Derrick Willis, Tronox LLC-Henderson	**Filter Type:**	MCE 385 mm^2
Report number :	139930	**Magnification:**	9200
Sample number:	SSAM7-08-0.00BPC	**Grid Opening Dimension: mm^2**	0.0094
Project:	2027.001/Tronox LLC Henderson, 560 W. Lake Mead Dr.,	**Grid Loading:**	Moderate

Elutriation Date: 8/31/2010 by Joel Paruli
Preparation Date: 9/1/2010 by Joel Paruli
Analysis Date: 9/1/2010 by Radha Singh

Asbestos Structures>5um. ≤10um (Chrys)	2
Asbestos Structures>5um. ≤10um (Amph)	0
Asbestos Structure >10um (Chrys)	1
Asbestos Structure >10um (Amph)	0
Protocol Asbestos Structures (Chrys)	3
Protocol Asbestos Structures (Amph)	0

Grid Openings	124
Mass - ug	122
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	C23	None Detected										
1A	C26	None Detected										
1A	E23	None Detected										
1A	E26	None Detected										
1A	E31	MD11	1		38	175	4.13	19.02				
1A		MF		1	1	175	0.11	19.02	CD	CHRYSOTILE		
1A	E34	None Detected										
1A	F31	None Detected										
1A	F34	None Detected										
1A	G33	None Detected										
1A	G36	None Detected										
1A	E44	None Detected										
1A	F41	None Detected										
1A	F44	None Detected										
1A	C54	None Detected										
1A	F51	None Detected										
1A	F54	None Detected										
1A	G51	None Detected										
1A	G54	None Detected										
1A	H53	None Detected										
1A	H56	None Detected										
1A	F61	None Detected										
1A	F64	F			0.5	52	0.05	5.65				Non Asbestos
1A	G61	None Detected										
1A	G64	None Detected										
1B	C23	None Detected,										
1B	C26	None Detected										
1B	E23	None Detected										
1B	E26	None Detected										
1B	E31	None Detected										
1B	E34	None Detected										
1B	F31	None Detected										
1B	F34	None Detected										
1B	G33	None Detected										
1B	G36	None Detected										
1B	H33	None Detected										
1B	H36	None Detected										
1B	C41	None Detected										
1B	C44	None Detected										
1B	E41	None Detected										
1B	E44	None Detected										
1B	F41	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				
1B	F51	None Detected										
1B	F54	None Detected										
1B	G51	None Detected										
1B	G53	F			12.5	215	1.36	23.37				Non Asbestos
1B	C53	None Detected										
1B	C56	F			1	100	0.11	10.87				Non Asbestos
1B	E61	None Detected										
1B	E64	None Detected										
1C	E23	None Detected										
1C	E26	None Detected										
1C	F23	None Detected										
1C	F26	None Detected										
1C	F31	None Detected										
1C	F34	None Detected										
1C	G31	None Detected										
1C	G34	None Detected										
1C	E33	None Detected										
1C	E36	None Detected										
1C	F33	None Detected										
1C	F36	None Detected										
1C	E41	MD11			35	70	3.80	7.61				
1C		MF			1.5	70	0.16	7.61				Non Asbestos
1C	E44	MD11	2		35	110	3.80	11.96				
1C		MF		2	1.5	85	0.16	9.24	CD	CHRYSOTILE		
1C	F41	F	3	3	0.5	85	0.05	9.24	CD	CHRYSOTILE		
1C	F44	None Detected										
1C	G41	None Detected										
1C	G44	None Detected										
1C	H43	None Detected										
1C	H46	MD11			120	130	13.04	14.13				
1C		MF			8	130	0.87	14.13				Non Asbestos
1C	C51	None Detected										
1C	C54	None Detected										
1C	E51	None Detected										
1C	F64	None Detected										
1C	C61	None Detected										
1C	C64	None Detected										
1D	C23	None Detected										
1D	C26	None Detected										
1D	E23	None Detected										
1D	E26	None Detected										
1D	F23	None Detected										
1D	F26	None Detected										
1D	F31	F			1	55	0.11	5.98				Non Asbestos
1D	F34	None Detected										
1D	G31	F			0.5	68	0.05	7.39				Non Asbestos
1D	G34	None Detected										
1D	H31	None Detected										
1D	C41	None Detected										
1D	C44	F			8.5	55	0.92	5.98				Non Asbestos
1D	E41	None Detected										
1D	E44	None Detected										
1D	F41	None Detected										
1D	F44	None Detected										
1D	C54	None Detected										

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117 W. Bellevue Drive
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626-568-4065

Report Number:	
Sample number:	

Analyzed by:	
Date of Analysis:	

Grid ID	Grid Opening	Structure Type	Structure Number				Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total			Width	Length				
1D	E51	None Detected										
1D	E54	None Detected										
1D	F51	None Detected										
1D	C64	None Detected										
1D	E61	None Detected										
1D	E64	None Detected										
1E	E23	None Detected										
1E	E26	None Detected										
1E	F26	None Detected										
1E	G23	None Detected										
1E	G26	None Detected										
1E	C31	None Detected										
1E	C34	None Detected										
1E	E31	None Detected										
1E	E34	None Detected										
1E	F31	None Detected										
1E	F34	None Detected										
1E	G31	None Detected										
1E	G36	None Detected										
1E	H33	None Detected										
1E	H36	None Detected										
1E	G41	None Detected										
1E	G44	None Detected										
1E	H41	None Detected										
1E	H44	None Detected										
1E	F51	None Detected										
1E	F54	None Detected										
1E	E61	None Detected										
1E	E64	None Detected										
1E	F61	None Detected										
1E	F64	None Detected										

115-90

ount (Page of) NIOSH 7402/ISO

Prep Time: 630 900

port number : 139930
mple number: SSAM7-08-0.00 BPC
e name: Northgate
mple Description: 122 : mg

Filter Type: PC 385 mm2
Date Sample was Run: 8/31/10

Magnification: 9,200 X

eparation date: 9/1/10 By JAP
alysis date: 9-1-10 By
(A): ADX, ADQ

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

d 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
A	C2-3							
	C2-6							
	E2-3							
	E2-6							
	E3-1				MD11	38	175	EDS anysis
					MF	1	171	
	E3-4							
	F3-1					5		
	F3-4							
	G3-3							
	G3-6							
	E4-4							
	F4-1							
	F4-4							
	G4-4							
	E5-1							
	F5-4							
	G5-1							
	G5-4							
	H5-3							
	H3-6							
	E6-1							
	E6-4				F	0.1	52	Non asb.
	G6-1							
	G6-4							
B	C2-3							
	C2-6							
	E2-3							
	E2-6							
	E3-1							

-10A (2002)

TEM Asbestos Structure Count (Page of)

Report number: 139930 SAMPLE NO: SSAM7-08-0.00BPC X 9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
	F3-4							
	F3-1							
	F3-4							
	G3-3							
	G3-6							
	H3-3							
	H3-6							
	C4-1							
	C4-4							
	E4-1							
	E4-4							
	F4-1							
	F4-1							
	F4-4							
	G5-1							
	G5-3				F	12.5	25	Nonasb
	C5-3							
	C5-6				E	1	100	Nonasb
	E6-1							
	E6-4							
1C	F2-3							
	F2-6							
	F2-3							
	F2-6							
	F3-1							
	F3-4							
	H3-1							
	H3-4							
	E3-3							
	F3-6							
	E3-3							
	F3-6							
	E4-1				MD11	35	70	Nonasb
					MF	1.5	70	
	F4-4				MD11	35	110	Chrysa.
					MF	0.5	85	

TEM Asbestos Structure Count (Page of)

Report number: 139930 SAMPLE NO: SSAM7-08-0.00BPC X 9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
	F4-1				F	0.5-	8.5-	Chrys
	F4-4							
	H4-1							
	H4-4							
	H4-3							
	H4-6				MDII	120	130	Nanob.
					MF	8	130	1F
	C5-1							
	C5-4							
	F5-1							
	F6-4							
	C6-1							
	C6-4							
LD								
	C23							
	C2-6							
	F2-3							
	F2-6							
	F2-2							
	F2-6							
	F3-1				F-	1	55-	Nanob,
	F3-4							
	G3-1				F-	0.5-	68	Nanob,
	G3-4							
	H3-1							
	C4-							
	C4-4				F-	8.5-	55	Nanob
	F4-1							
	F4-4							
	F4-1							
	F4-4							
	C5-4							
	F5-1							
	F5-4							
	F5-1							
	C6-4							
	F6-1							
	F6-4							

TEM Asbestos Structure Count (Page of)

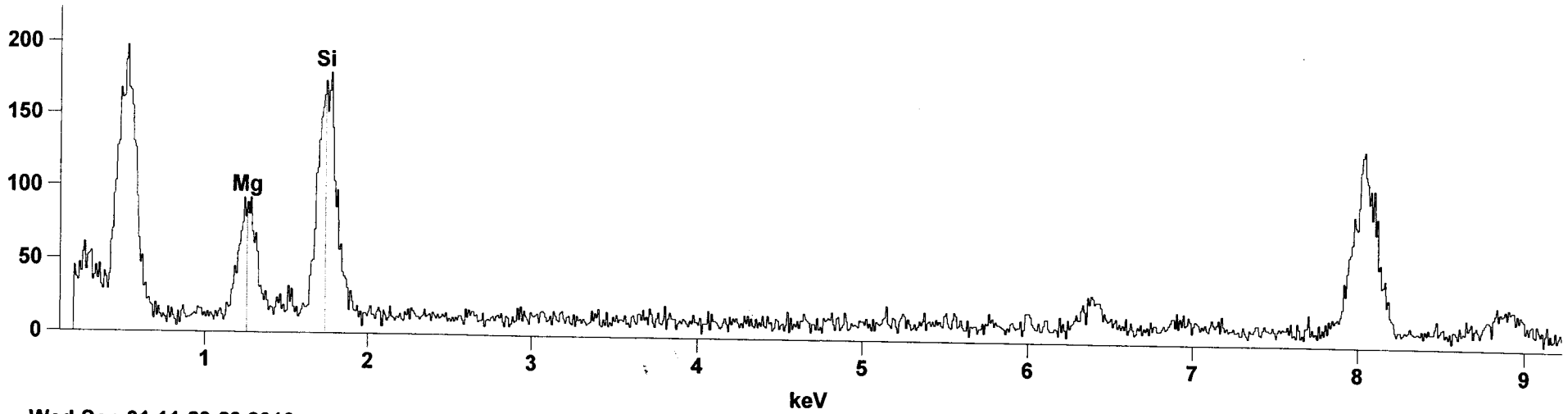
Report number: 139930 SAMPLE NO: SSAM7-08-0.00BPC X 9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
1F	F2-3							
	F2-6							
	F2-6							
	G2-3							
	G2-6							
	C3-1							
	C3-4							
	E3-1							
	E3-4							
	F3-1							
	F3-4							
	G3-1							
	G3-6							
	H3-3							
	H3-6							
	G4-1							
	G4-4							
	H4-1							
	H4-4							
	F5-1							
	F5-4							
	F6-1							
	F6-4							
	F6-1							
	F6-4							

Project: New Project

Full scale counts: 206

139930-SSAM7-08-000 BPC-A-E3 1-



Wed Sep 01 11:29:23 2010
Gaussian Fit With Standards Chi Squared:3.245
Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

Live Time:53.5 sec.
Acc.Voltage: 100.0 kV
Take Off Angle: 35.0 deg.
Detector: Det B- Quantum

Quantitative Results 139930-SSAM7-08-000 BPC-A-E3 1-

Element Line	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg K	1150	48.40	---	52.01	+/- 1.58
Si K	2207	51.60	---	47.99	+/- 1.09
Total		100.00		100.00	

#137865
#137491

MOISTURE CONTENT

8-27-10

#137865 - SSAL6-01-0.33 BPC

dish wt:	31.47 g	
sample + dish	131.72	- 31.47 = 100.25 g (initial wt.)
9:15 - 10:15	126.45	- 31.47 = 94.98
11:00 - 12:00	126.44	- 31.47 = 94.97 (Final wt.)

$$\%\ \text{Moisture} = 100 \times \frac{100.25 - 94.97}{94.97} = 5.56\ \%$$

#137491 - RSAM7-1.00 BPC

dish wt. C -	31.45 g	
sample + dish -	131.86	- 31.45 = 100.41 g (initial wt.)
9:15 - 10:15 -	129.08	- 31.45 = 97.63
11:00 - 12:00 -	129.04	- 31.45 = 97.59 (Final wt.)

$$\%\ \text{Moisture} = 100 \times \frac{100.41 - 97.59}{97.59} = 2.9\ \%$$

9-1-10

BP

#139930
#SSAM7-08-000BPC

dish wt.	19.24 g	
dish + samp.	119.18	(initial wt. 99.94)
6:00 - 7:00	118.28	(99.04 g)
10 - 11	118.24	(99.00 - final wt)

$$100 \times \frac{99.94 - 99.00}{99.00} = 0.95\ \%$$

#139931 - #SSAQ6-01-0.00BPC

dish wt.	31.44	
dish + samp.	131.98	(initial wt. 100.54)
6:50 - 7:50	125.14	(93.7)
10-11	124.11	(92.67 - Final

$$100 \times \frac{100.54 - 92.67}{92.67} = 8.49\ \%$$

#139930
#SSAQ5-07-0.00 BPC

dish wt.	31.47
dish + samp.	131.22 (init. wt - 99.75)
	124.34 (92.87)
	124.31 (92.84)

$$100 \times \frac{99.75 - 92.84}{92.84} = 7.44\ \%$$

#139931 - #SSAL5-07-0.00BPC

	35.11
	135.72 (100.61)
	128.38 (93.27)
	128.35 (93.24)

$$100 \times \frac{100.61 - 93.24}{93.24} = 7.90\ \%$$

Elutriator Data

Date: 8/31/10 Client: Northgate

Lab #: 139930

Sample ID: SSAM7-08-0.005PE Sample weight (g): 79.6

Time air flow started: 800 Tumbler rpm: 30 / 45

IST Flowmeter (mL/min): 100 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	1000	180	0.03385	0.02426	9.59	30		
2	1030		0.02741	0.02413	3.28	15		
3	1045		0.02634	0.02441	3.93	25		
4	1110		0.02779	0.02422	3.57	30		
5	1140		0.02999	0.02408	5.91	40		
6	1220		0.03193	0.02421	7.72	40		
7	1300			0.02424				
8								

OK!
loss 20%
loss 30%
loss 25%
loss 20%
OK

	S.Time	End Time						Dep. Rate	Estiimate
1	1055	1110		4.399	4.349	0.050	15		
2	1129	1138		4.378	4.310	0.068	12		
3	1157	1217		4.529	4.407	0.122	20		
4	1225	1255		4.468	4.346	0.122	30		
5	~~1255~~								
6									
7									
8									

* 45 RPM Raise @ 1125

* 60 RPM Raise @ 1155

EMS Laboratories Inc.
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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: 8/27/2010 11:10AM
EMS LAB No: 139930
Date Prepared: 9/1/2010 10:10AM
Analysis Date: 9/2/2010 10AM

Report Date: September 27, 2010

Date Sampled: 8/23/2010 11:22

NIOSH 7402/ISO

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

EMS Laboratory Number:	139930		Mass of Respirable Dust on Filter:	167	µg
Customer Sample Number:	SSAQ5-07-0.00BPC		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:	93	
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-75.4g			Soil % Moisture	7.4	%
			Air Flow Rate Through ME Opening of Dust Generator:	1370	
Not Used			Air Flow Rate Through IST Opening of Dust Generator:	100	
Used in Tumbler			Estimate Total Air Flow Through Elutriator:	1470	

Analytical Sensitivity: 2.64E+06 Structure /g PM 10 Limit of Detection: 7.90E+06 Structure /g PM 10

Test For Uniformity (Chi-Square results)

		Counts			Poisson 95% Confidence Interval		
Structure Class	**Min ID Level Required**	**Primary Str.**	**Total Str.**	**Density** St/mm^2	**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	7.90E+06
Asbestos Structures>5um, ≤10um (Chrys)	CD	0	0	0	0	0	7.90E+06
Asbestos Structures>5um, ≤10um (Amph)	ADX	0	0	0	0	0	7.90E+06
Asbestos Structure >10um (Long)	ADX/CD	0	0	0	0	0	7.90E+06
Asbestos Structure >10um (Chrys)	CD	0	0	0	0	0	7.90E+06
Asbestos Structure >10um (Amph)	ADX	0	0	0	0	0	7.90E+06
Total Protocol Asbestos Structures	ADX/CD	0	0	0	0	0	7.90E+06
Protocol Asbestos Structures (Chrys)	CD	0	0	0	0	0	7.90E+06
Protocol Asbestos Structures (Amph)	ADX	0	0	0	0	0	7.90E+06
Total Protocol Non Asbestos Structures	NAM	1	1	1.14	2.64E+06	6.7E+04	1.47E+07

Approved by Technical Director

EMS Laboratories

NIOSH 7402/ISO

117 W. Bellevue Drive
Pasadena, CA 91105
626-568-4065

Client:	Derrick Willis, Tronox LLC-Henderson	**Filter Type:**	MCE 385 mm^2
Report number :	139930	**Magnification:**	9200
Sample number:	SSAQ5-07-0.00BPC	**Grid Opening Dimension: mm^2**	0.0084
Project:	2027.001/Tronox LLC Henderson, 560 W. Lake Mead Dr.,	**Grid Loading:**	Moderate

Elutriation Date: 9/1/2010 by Joel Paruli
Preparation Date: 9/2/2010 by Joel Paruli
Analysis Date: 9/2/2010 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	93
Mass - ug	167
Anlytical sensitivity	

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	C31	None Detected										
1A	C34	None Detected										
1A	E31	None Detected										
1A	E34	None Detected										
1A	F33	None Detected										
1A	F36	None Detected										
1A	C44	None Detected										
1A	E41	MD11			60	112	6.52	12.17				Non Asbestos
1A	F44	None Detected										
1A	F43	None Detected										
1A	F46	None Detected										
1A	F51	None Detected										
1A	F54	None Detected										
1A	E61	None Detected										
1A	E64	F			8	52	0.87	5.65				Non Asbestos
1A	G53	None Detected										
1A	G56	MD11			80	110	8.70	11.96				Non Asbestos
1A		MF			0.5	80	0.05	8.70				
1A	H43	None Detected										
1A	H33	None Detected										
1B	C23	None Detected										
1B	C26	None Detected										
1B	E23	None Detected										
1B	C34	None Detected										
1B	F34	None Detected										
1B	G31	None Detected										
1B	G34	None Detected										
1B	H33	None Detected										
1B	F41	None Detected										
1B	F44	None Detected										
1B	G41	None Detected										
1B	C51	None Detected										
1B	C54	None Detected										
1B	E51	None Detected										
1B	E54	None Detected										
1B	F51	None Detected										
1B	G53	None Detected										
1B	G56	None Detected										
1B	F61	None Detected										
1B	F64	None Detected										
1C	C26	None Detected										
1C	E23	None Detected										
1C	E26	None Detected										
1C	F23	None Detected										

EMS Laboratories

NIOSH 7402/ISO
117 W. Bellevue Drive
Pasadena, CA 91105
626-568-4065

Report Number:	
Sample number:	

Analyzed by:	
Date of Analysis:	

Grid ID	Grid Opening	Structure Type	Structure Number				Dimensions (µm)		Level of ID	Mineral Type	Image Number	Structure Comments
			Primary	Total			Width	Length				
1C	C31	None Detected										
1C	C34	None Detected										
1C	F31	MD11			35	230	3.80	25.00				Non Asbestos, Double
		MB			2.5	230	0.27	25.00				
1C	E34	None Detected										
1C	B41	None Detected										
1C	B44	None Detected										
1C	C41	None Detected										
1C	C44	None Detected										
1C	E41	None Detected										
1C	E44	None Detected										
1C	F43	None Detected										
1C	F46	None Detected										
1C	E51	None Detected										
1C	E54	None Detected										
1C	F53	None Detected										
1C	F56	None Detected										
1D	C23	None Detected										
1D	C26	None Detected										
1D	E23	None Detected										
1D	E26	None Detected										
1D	C31	None Detected										
1D	C34	None Detected										
1D	E31	None Detected										
1D	C33	None Detected										
1D	E33	None Detected										
1D	E36	None Detected										
1D	C41	None Detected										
1D	C44	None Detected										
1D	F41	None Detected										
1D	F44	None Detected										
1D	F43	None Detected										
1D	F46	None Detected										
1D	G51	None Detected										
1D	G54	None Detected										
1E	C23	None Detected										
1E	C26	None Detected										
1E	C31	None Detected										
1E	C34	None Detected										
1E	E34	None Detected										
1E	F31	None Detected										
1E	F34	None Detected										
1E	G31	None Detected										
1E	H51	None Detected										
1E	E41	None Detected										
1E	E44	None Detected										
1E	F43	None Detected										
1E	F46	None Detected										
1E	E51	None Detected										
1E	E54	None Detected										
1E	F51	None Detected										

MOISTURE CONTENT

#137865
#137491

8-27-10

#137865 - SSAL6-01-0.33 BPC

dish wt:	31.47 g	
sample + dish	131.72	- 31.47 = 100.25 g (initial wt.)
9:15 - 10:15	126.45	- 31.47 = 94.98
11:00 - 12:00	126.44	- 31.47 = 94.97 (Final wt.)

$$\%\ \text{moisture} = 100 \times \frac{100.25 - 94.97}{94.97} = 5.56\ \%$$

#137491 - RSAM7-1.00 BPC

dish wt. C -	31.45 g	
sample + dish -	131.86	- 31.45 = 100.41 g (initial wt.)
9:15 - 10:15 -	129.08	- 31.45 = 97.63
11:00 - 12:00 -	129.04	- 31.45 = 97.59 (Final wt.)

$$\%\ \text{moisture} = 100 \times \frac{100.41 - 97.59}{97.59} = 2.9\ \%$$

9-1-10

BP

#139930
#SSAM7-08-000BPC

dish wt.	19.24 g	
dish + samp.	119.18	(initial wt. 99.94)
6:00 - 7:00	118.28	(99.04 g)
10 - 11	118.24	(99.00 - final wt)

$$100 \times \frac{99.94 - 99.00}{99.00} = 0.95\ \%$$

#139931 - #SSAQ6-01-0.00BPC

dish wt.	31.44	
dish + samp.	131.98	(initial wt. 100.54)
6:50 - 7:50	125.24	(93.8)
10 - 11	124.11	(92.67 - Final

$$100 \times \frac{100.54 - 92.67}{92.67} = 8.49\ \%$$

#139930
#SSAQ5-07-0.00 BPC

dish wt.	31.47
dish + samp.	131.22 (init. wt - 99.75)
	124.34 (92.87)
	124.31 (92.84)

$$100 \times \frac{99.75 - 92.84}{92.84} = 7.44\ \%$$

#139931 - #SSAL5-07-0.00BPC

	35.11
	135.72 (100.61)
	128.38 (93.27)
	128.35 (93.24)

$$100 \times \frac{100.61 - 93.24}{93.24} = 7.90\ \%$$

Elutriator Data

Date: 9/1/10 (1) Client: Northgate

Lab #: 139930

Sample ID: SSAQ5-07-0.00BPC Sample weight (g): 75.4

Time air flow started: 635 Tumbler rpm: 30

IST Flowmeter (mL/min): 100 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	835	190	0.02618	0.02444	1.74	30		
2	905		0.02919	0.02410	5.09	15		
3	920		0.03060	0.02421	6.39	25		
4	945		0.02902	0.02422	4.80	20		
5	1005		0.02865	0.02428	4.37	25		
6	1030							
7								
8								
S-Time	End time						Dep. Rate	Estiimate
1 930	941		4.438	4.298	0.140	11		
2 951	1004		4.483	4.364	0.119	13		
3 1010	1027		4.420	4.253	0.167	17		
4				~~4.343~~				
5								
6								
7								
8								

loss 90% OK OK

loss 5% OK

TEM ASBESTOS ANALYSIS

Client: Sand blank
Sample No.: 8/25/10

EMS Lab No. _____
Page _____ of _____

RECEIVING

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

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

LEVEL OF ANALYSIS
Chrysotile: CD – CDQ
Amphibole: ADX ADXQ

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 0.94
No. of G.O. to Analyze 200

PREP

DIRECT PREP ☐
INDIRECT PREP ☐

Volume 10 liters
Working Volume _____ ml
Weight _____ grams
Ashed Area _____ %

Prepared By JAP.
Date 8/26/10

ANALYSIS

MICROSCOPE (copy)
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: _____
Screen Magnification: 21,000 X
Camera Constant: 21.2
Accelerating Voltage: 100KV
Beam Current: 10 μA
K-Factor: 1.4
Analyst [signature] Date 8/26/10

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
C23		N/A																							
C26																									
E23																									
E26																									
F23																									
F26																									
H23																									
H26																									
C3-1																									
C3-4																									
E3-1																									
E3-4																									
F3-1																									

TEM - 1A (1-06)

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. 8/25/10

EMS Lab No. _____
Page 2 of _____

RECEIVING

ANALYSIS

Grid Address: A
Screen Magnification: 9/a X
Camera Constant: 28-2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Radle Date 8/26

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
E3-4		NM																							
G3-1																									
G3-4																									
B3-1																									
B3-4																									
E3-1																									
C3																									
C3-6																									
E3-2																									
E3-6																									
F3-3																									
B3-6																									
G3-3																									
G3-6																									
B3-3																									

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. 8/25/10

EMS Lab No. _____
Page 3 of _____

RECEIVING

ANALYSIS

Grid Address: A
Screen Magnification: 4,200 X
Camera Constant: 28.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Rath Date 8/26/10

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
IB6		NAD																							
K3-3																									
CA-1																									
CH-4																									
IE4-1																									
IE4-4																									
F4-1																									
IF4-4																									
H4-1																									
CH4-4																									
IB10																									
CH-3																									
CH-6																									
IE4-3																									
IE4-6		↓																							

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. 8/25/10

EMS Lab No. _____
Page 1 of _____

RECEIVING

ANALYSIS

Grid Address: B
Screen Magnification: 9100 X
Camera Constant: 28.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Radha Date 8/26/10

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		NAD																							
C3-4																									
E3-1																									
E3-4																									
F3-1																									
F3-4																									
G3-1																									
G3-4																									
1B-1																									
1B-4																									
C3 3																									
C3 6																									
E3 3																									
E3 6																									
F3 3																									

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 EMS Lab No. _____
Sample No. 8/25/10 Page 2 of _____

RECEIVING

ANALYSIS

Grid Address: B
Screen Magnification: 11KV X
Camera Constant: 28.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Nath Date 8/20

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
F4-3		NAD																							
F4-6																									
G4-3																									
G4-6																									
H4-3																									
H4-6																									
E5-1																									
E5-4																									
F5-1																									
F5-4																									
G5-1																									
G5-4																									
H5-1																									
H5-4																									
I5-1																									

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. 8/25/10

EMS Lab No. _____
Page 3 of _____

RECEIVING

ANALYSIS

Grid Address: B
Screen Magnification: 9100 X
Camera Constant: 25.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Radke Date 8/26/10

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
C5-6		NSM																							
E5-3																									
E5-6																									
I5-3																									
I5-6																									
W3																									
W5-6																									
I-5-3																									
C6-1																									
C6-4																									
E6-1																									
E6-4																									
I6-1																									
I6-4																									
W6-1		↓																							

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. 8/25/10

EMS Lab No. _____
Page 1 of _____

RECEIVING

ANALYSIS

Grid Address: C
Screen Magnification: 9,200 X
Camera Constant: 28.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.14
Analyst Radha Date 8/26/10

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
C2-3		NAD																							
C26																									
E23																									
E26																									
F23																									
F26																									
G2 3																									
G20																									
H23																									
B34																									
C31																									
C34																									
E31																									
F34																									
I31																									

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 EMS Lab No. _____
Sample No. 8/25/10 Page 2 of _____

RECEIVING

ANALYSIS

Grid Address: C
Screen Magnification: 9100 X
Camera Constant: 28.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Radley Date 8/20/10

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
B3-6		MM																							
C3-3																									
C3-6																									
E3-3																									
E3-6																									
F3-3																									
F3-6																									
G3-3																									
G3-6																									
I3-3																									
I3-6																									
C4-1																									
C4-4																									
E4-1																									
E4-4		4																							

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. 8/25/10

EMS Lab No. _____
Page 3 of _____

RECEIVING

ANALYSIS

Grid Address: C
Screen Magnification: 9,100X
Camera Constant: 28.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Nadle Date 8/26/10

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
E4-4		NAD																							
G4-1																									
G4-4																									
H4-1																									
H4-4																									
C5-4																									
E5-1																									
E5-4																									
F5-1																									
F5-4																									
W5-1																									
W5-4																									
H5-1																									
H5-4																									
K5-1																									

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, EMS Lab No. _____
Sample No. 8-2540 Page 2 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: D
Screen Magnification: 9,900 X
Camera Constant: 25.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Jade Date 8/26/10

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
F4Q		NAD																							
G4-1																									
G4-Q																									
H4-1																									
H4Q																									
C5-1																									
C5-Q																									
E5-1																									
E5-Q																									
F5-1																									
F5-Q																									
G5-1																									
G5-Q																									
H5-1																									
H5-Q																									

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. 8-25-10

EMS Lab No. _____
Page 1 of _____

RECEIVING

ANALYSIS

Grid Address: D
Screen Magnification: 9,100X
Camera Constant: 28.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Radha Date 8/26/10

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
B3-4		NOD																							
E3-1																									
E3-4																									
F3-1																									
F3-4																									
G3-1																									
G3-4																									
B-1																									
B-4																									
B4-4																									
C4-1																									
C4-4																									
E4-1																									
E4-4																									
F4-1		V																							

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. 8-25-10

EMS Lab No. _____
Page 3 of _____

RECEIVING

ANALYSIS

Grid Address: D
Screen Magnification: 9,000X
Camera Constant: 2.52
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.4
Analyst Jadle Date 8/26/10

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																									
I5-3																									
I5-6																									
G5-3																									
G5-6																									
H5-3																									
H5-6																									
C6-1																									
C6-4																									
E6-1																									
E6-4																									
I6-1																									

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 EMS Lab No. _____
Sample No. 8-25-10 Page 1 of _____

RECEIVING

ANALYSIS

Grid Address: E
Screen Magnification: 9 100 X
Camera Constant: 2k2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 1.9
Analyst Radke. Date 8/26/10

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
C2-3		NAD																							
C2-6																									
E23																									
E26																									
E23																									
E26																									
G2-3																									
G26																									
B4																									
C3-1																									
C3-4																									
E31																									
E34																									
G31																									
E30		"																							

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 EMS Lab No. _____
Sample No. 8-25-10 Page 2 of _____

RECEIVING

ANALYSIS

Grid Address: E
Screen Magnification: 9,400 X
Camera Constant: 28.2
Accelerating Voltage: 100KV
Beam Current: 10 µA
K-Factor: 14
Analyst Renee Date 8/26/10

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
E4-4		NAD																							
E4-1																									
E5-1																									
E5-4																									
E6-1		↓																							

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)

Spot Size Measurements

Scope: H-600B

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: 8.1 **mm**

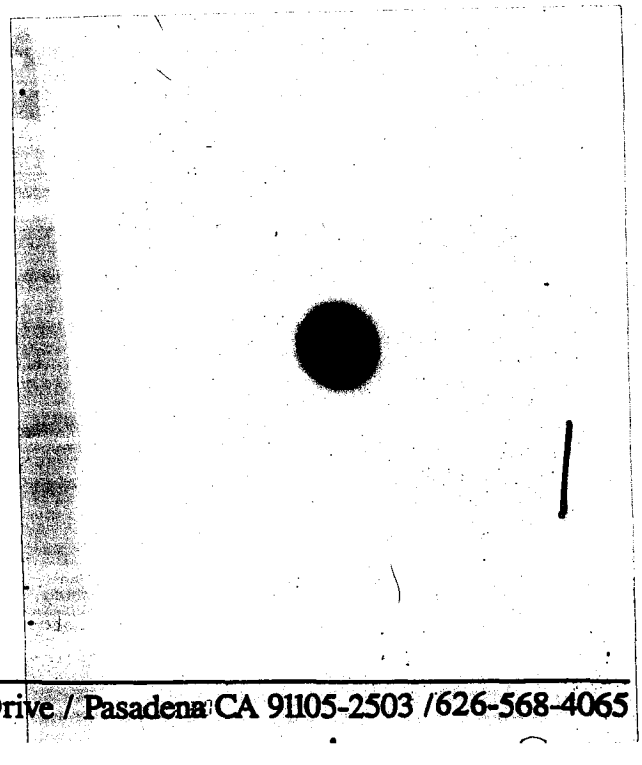
Longest diameter: 9 **mm**

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 H600B

Measured and Calculated by RJ 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

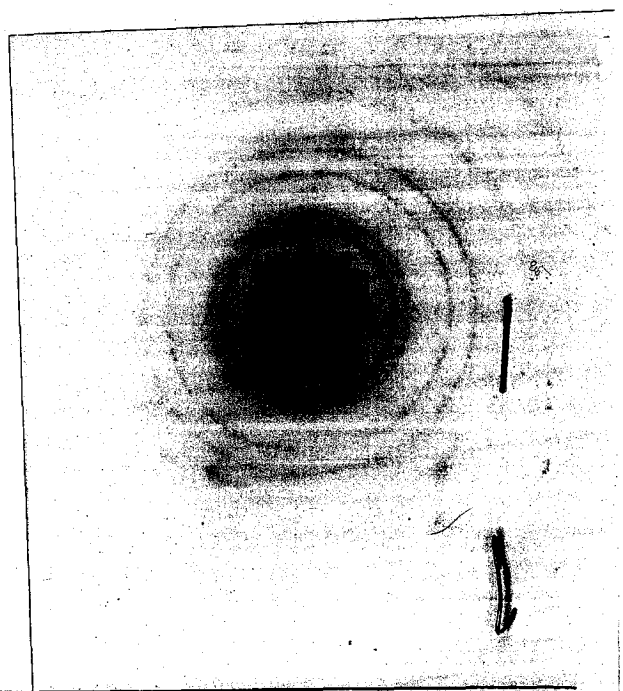
Average Camera Constant = 28.3

* 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 3mo

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	53 1/16 – 19,260	51 1/2 – 9180	
2	53 1/16 – 19,260	51 5/12 – 9,270	
3	53 1/16 – 19,080	51 5/12 – 9,270	
4	53 1/16 – 19,080	51 1/2 – 9,180	
5	53 5/16 – 19,260	51 1/2 – 9,180	
6		51 1/2 – 9,180	
7	ave 19,200		
8		ave 9,200	
9			
10			
	AVERAGE:		

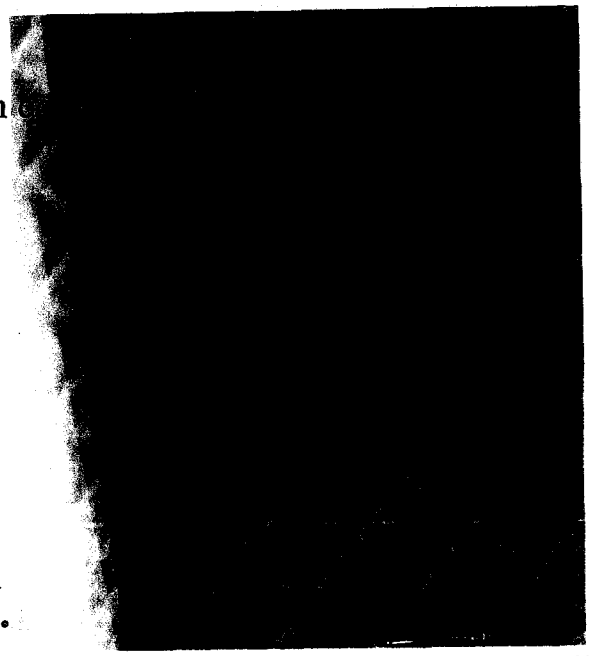
OPERATING VOLTAGE 100 KV

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

		RUN 1		RUN 2		RUN 3		RUN 4		RUN 5		RUN 6	
		I(Si)=	22860	I(Si)=	12101	I(Si)=	15953	I(Si)=	16554	I(Si)=	16203	I(Si)=	7464
n	Cn	In	Kn	In	Kn	In	Kn	In	Kn	In	Kn	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

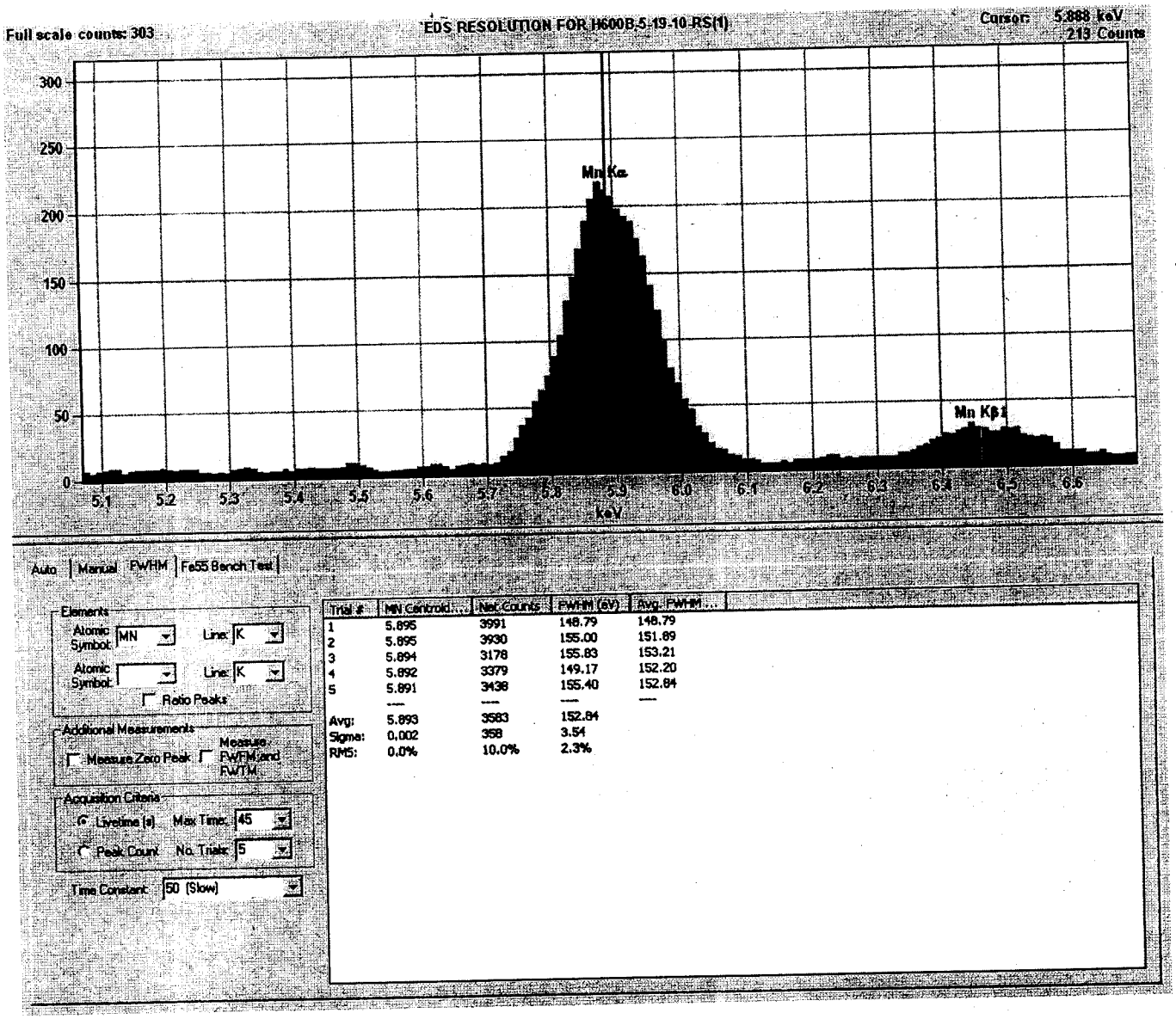
K(Mg)/K(Fe) < 1.5

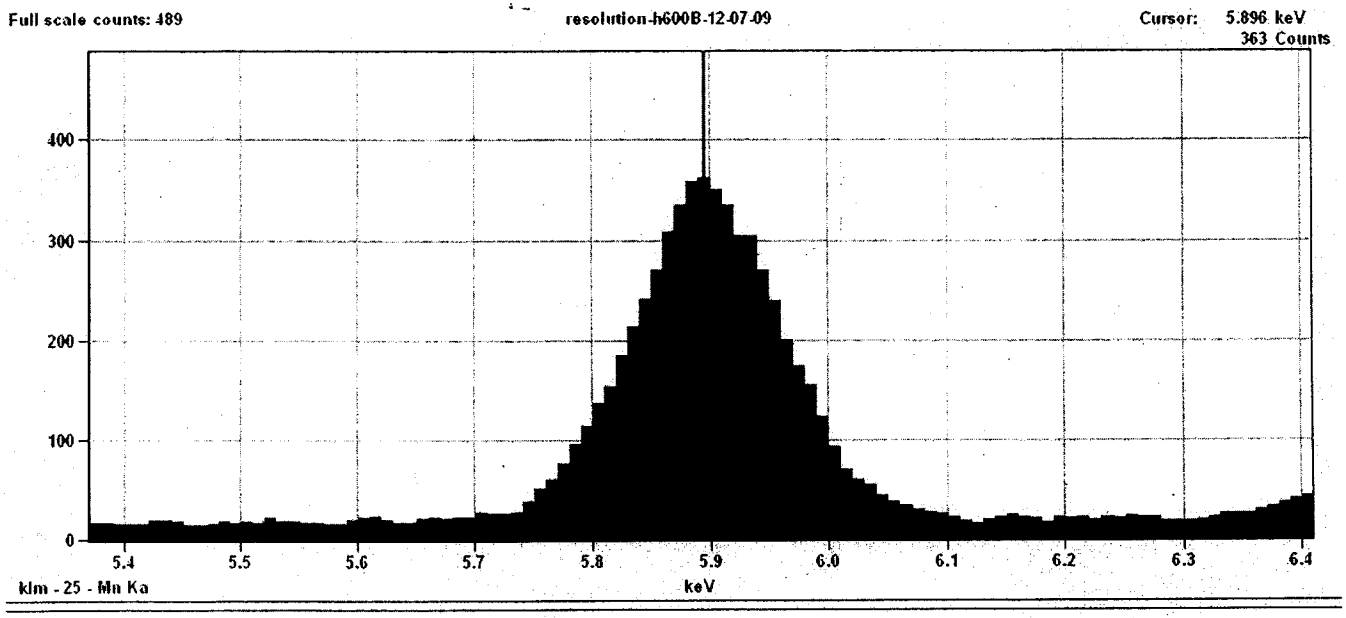
stdev <10% for Mg, Al, Si, Fe
stdev <20% for Na
wrt mean value of k-factor wrt Si

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


Full scale counts: 303
EDS RESOLUTION FOR H600B 5-19-10 RS(1)
Cursor: 5.888 keV
213 Counts
Mn Kα
Mn Kβ1
300
250
200
150
100
50
0
5.1
5.2
5.3
5.4
5.5
5.6
5.7
5.8
5.9
6.0
6.1
6.2
6.3
6.4
6.5
6.6
keV
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%	

139930

Laboratory Submittal Form

Date:	Time:	Relinquished by:	
Client:	Northgate Environmental Mgmt, Inc.	Date of Shipment:	
Address:	24411 Ridge Route Drive, Suite 130	Shipped from:	Carrier:
	Laguna Hills, CA 92653	Client P.O. No:	
Telephone:	949-375-7004	Client Project ID:	TRONOX LLC Henderson
Contact:	Cindy Arnold		
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:	Other:	Sample Preservatives:	
Number of Samples:	4	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
1	SSAM7-08-0.00BPC		TEM	
2	SSAM7-08-0.33BPC	SEE ATTACHMENT	HOLD	
3	SSAQ5-07-0.00BPC			
4	SSAQ5-07-0.33BPC		HOLD	
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				

For EMS Only

139930

Laboratory Number:		Received by:	Time: 11:10
Date of Package Delivery:	8/27/2010	Shipping Bill Retained?	NONE
Condition of Package on Receipt:	OK	Condition of Custody Seal:	NONE
Number of Samples:	4 (3 cont. per sample)	Chain of Custody Signature:	
Disposition of Samples:	EMS LABS	Misc. Info:	SF 7/06

134900

northgate
environmental management, inc.
24411 Ridge Route Drive, Suite 130
Laguna Hills, California 92653

CHAIN-OF-CUSTODY / Analytical Request Document
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate.

COP

Page: 1 of 1
Cooler # of

COC # 02027.01.2153
Total # of Samples: 4 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 Bellvue Dr	Project #	2027.01	Address:	PO Box 55
	Pasadena, CA 91105	Site Address	560 W Lake Mead Pkwy	City/State.	Henderson, NV 89009 Phone #: (949) 260-8293
Lab PM:	Tony Kolk	City	Henderson State, Zip NV, 89015	PO #	
Phone/Fax:	626-568-4065	Site PM Name	Derrick Willis	Send EDD to	Frank.Hagar@ngem.com
Lab PM email	ak-olk@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.	Analysis: PhB-Asbestos
	SSAM7-08-0.00BPC	SSAM7-08	SO	C	N	08/23/2010	16:06	3		X
	SSAM7-08-0.33BPC	SSAM7-08	SO	C	N	08/23/2010	16:09	3		H
	SSAQ5-07-0.00BPC	SSAQ5-07	SO	C	N	08/23/2010	11:22	3		X
	SSAQ5-07-0.33BPC	SSAQ5-07	SO	C	N	08/23/2010	11:31	3		H

Regular | Rush | X | Mark One

Preservative: Filter | UNPRES

Additional Comments/Special Instructions:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Patrick Ferringer NGEM	8/25/10	1159	SAN NGEM	8/25/10	1159
SAN NGEM	8/25/10	1159			

Sample Receipt Conditions

	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SHIPPED BY: SAMPLER NAME & SIGNATURE

Company:
Tracking #:

PRINT Name of SAMPLER: Patrick Ferringer, NGEM
SIGNATURE of SAMPLER: Patrick Ferringer DATE Signed: 8-25-10 Time: 1159

Temp in OC | Samples on Ice? | Sample intact? | Trip Blank?