



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# 138491  
Project: 2027.01, Tronox LLC Henderson,  
560 West Lake Mead Drive, Henderson, NV  
Client COC ID: 02027.01.2133

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.: 138491

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 anthophyllite. 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  
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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: 6/18/2010 9:56AM  
 EMS LAB No: 138491  
 Date Prepared: 7/14/2010 12:05PM  
 Analysis Date: 7/16/2010 10AM

Report Date: August 5, 2010

Date Sampled: 5/11/2010 8:53

**NIOSH 7402/ISO**

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

EMS Laboratory Number: 138491	Mass of Respirable Dust on Filter: 161	µg
Customer Sample Number: SSAQ4-03-1.00BPC	Area of collection filter: 385	mm <sup>2</sup>
Minimum Level of Analysis (chrysotile): CD	Grid openings area: 0.0094	mm <sup>2</sup>
Minimum Level of Analysis (amphibole): ADX	Grid Openings Analyzed: 91	
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-76g	Soil % Moisture	6.7	%
Not Used	Air Flow Rate Through ME Opening of Dust Generator:	1370	
Used in Tumbler	Air Flow Rate Through IST Opening of Dust Generator:	100	
	Estimate Total Air Flow Through Elutriator:	1470	

Analytical Sensitivity: 2.80E+06 Structure /g PM 10      Limit of Detection: 8.37E+06 Structure /g PM 10

Test For Uniformity (Chi-Square results)

Structure Class	Min ID Level Required	Counts		Density Str/mm <sup>2</sup>	Conc. Str/g PM10	Poisson 95% Confidence Interval	
		Primary Str.	Total Str.			Lower Limit Str/g PM10	Upper Limit Str/g PM10
<b>Asbestos Structures &gt;5um, ≤10um</b>	ADX/CD	29	29	33.9	8.11E+07	5.40E+07	1.16E+08
Asbestos Structures >5um, ≤10um (Chrys)	CD	13	13	15.2	3.64E+07	1.90E+07	6.22E+07
Asbestos Structures >5um, ≤10um (Amph)	ADX	16	16	18.7	4.48E+07	2.60E+07	7.27E+07
<b>Asbestos Structure &gt;10um (Long)</b>	ADX/CD	11	11	12.9	3.08E+08	1.50E+07	5.51E+07
Asbestos Structure >10um (Chrys)	CD	8	8	9.4	2.24E+07	9.60E+06	4.41E+07
Asbestos Structure >10um (Amph)	ADX	3	3	3.5	8.39E+06	1.70E+06	2.45E+07
<b>Total Protocol Asbestos Structures</b>	ADX/CD	40	40	46.8	1.12E+08	8.00E+07	1.52E+08
Protocol Asbestos Structures (Chrys)	CD	21	21	24.5	5.87E+07	3.60E+07	8.98E+07
Protocol Asbestos Structures (Amph)	ADX	19	19	22.2	5.31E+07	3.20E+07	8.30E+07
<b>Total Protocol Non Asbestos Structures</b>	NAM	3	3	3.5	8.40E+07	1.70E+06	8.37E+06

  
 Approved by Technical Director



**NIOSH 7402/ISO**

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

<b>Client:</b>	Derrick Willis, Tronox LLC-Henderson	<b>Filter Type:</b>	PC 385 mm <sup>2</sup>
<b>Report number :</b>	138491	<b>Magnification:</b>	9200
<b>Sample number:</b>	SSAQ4-03-1.00BPC	<b>Grid Opening Dimension: mm<sup>2</sup></b>	0.0084
<b>Project:</b>	2027.001/Tronox LLC Henderson, 560 W. Lake Mead Dr.,	<b>Grid Loading:</b>	

**Elutriation Date:** 7/14/2010 by Joel Paruli  
**Preparation Date:** 7/15/2010 by Joel Paruli  
**Analysis Date:** 7/16/2010 by Radha Singh  
 Asbestos Structures >5um, ≤10um (Chrys) 13  
 Asbestos Structures >5um, ≤10um (Amph) 16  
 Asbestos Structure >10um (Chrys) 8  
 Asbestos Structure >10um (Amph) 3  
 Protocol Asbestos Structures (Chrys) 21  
 Protocol Asbestos Structures (Amph) 19

**Grid Openings** 91  
**Mass - ug** 161  
**Analytical 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	C34	F			10	70						Non Asbestos
		F			10	68	1.09	7.39				Non Asbestos
1A	E34	MD11	1		80	110	8.70	11.96		Tremolite/Actinolite		
		MF		1	2.5	110	0.27	11.96		Tremolite/Actinolite		
1A	F31											
1A	F34											
1A	G31											
1A	G34	F			5	105	0.54	11.41		Tremolite/Actinolite		
		F	2	2	2.5	72	0.27	7.83		Tremolite/Actinolite		
1A	H31	F			6.5	80	0.71	8.70		Tremolite/Actinolite		
1A	C33											
1A	C36	MD11	3		38	120	4.13	13.04	CD	CHRYSOTILE		
		MF		3	0.5	110	0.05	11.96	CD	CHRYSOTILE		
1A	E33											
1A	F33	MD11			22	80	2.39	8.70		Tremolite/Actinolite		
		MF			8	55	0.87	5.98		Tremolite/Actinolite		
1A	F36											
1A	G33	F	4	4	1	52	0.11	5.65		Tremolite/Actinolite		
1A	G36	F			1.5	65	0.16	7.07				Non Asbestos
		MD11	5		40	170	4.35	18.48	CD	CHRYSOTILE		
		MB		5	2	170	0.22	18.48	CD	CHRYSOTILE		
		MD11	6		12	140	1.30	15.22	CD	CHRYSOTILE		DOUBLE
		MF		6	0.5	110	0.05	11.96	CD	CHRYSOTILE		
1A	H33	F	7	7	2	49	0.22	5.33		Tremolite/Actinolite		
1A	F41	F	8	8	1	58	0.11	6.30	CD	CHRYSOTILE		
1A	F44	F	9	9	2.5	68	0.27	7.39		Tremolite/Actinolite		
		MD11	10		40	92	4.35	10.00		Tremolite/Actinolite		
		MF		10	2.5	92	0.27	10.00		Tremolite/Actinolite		
1A	G41	MD11	11		15	75	1.63	8.15		Tremolite/Actinolite		
		MF		11	2.5	75	0.27	8.15		Tremolite/Actinolite		
		F			10	100	1.09	10.87		Tremolite/Actinolite		
1B	C31											
1B	C34											
1B	E34											
1B	F31	F			15	50	1.63	5.43				Non Asbestos
1B	F34											
1B	G33	F	12	12	2.5	62	0.27	6.74		Tremolite/Actinolite		
		F	13	13	1	80	0.11	8.70		Tremolite/Actinolite		
1B	G36											
1B	C44	MD11	14		40	150	4.35	16.30	CD	CHRYSOTILE		
		MF		14	1	115	0.11	12.50	CD	CHRYSOTILE		
		B	15	15	1.5	65	0.16	7.07	CD	CHRYSOTILE		
		MD11	16		30	85	3.26	9.24		Tremolite/Actinolite		
		MF		16	3	85	0.33	9.24		Tremolite/Actinolite		



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					
		MD11			70	140	7.61	15.22		Tremolite/Actinolite	
		MF			12.5	110	1.36	11.96		Tremolite/Actinolite	
1B	E43	F			30	190	3.26	20.65		Tremolite/Actinolite	
1B	E46	B	17	17	1.5	80	0.16	8.70	CD	CHRYSTILE	
		MD11			130	190	14.13	20.65		Tremolite/Actinolite	
		MF			8.5	70	0.92	7.61		Tremolite/Actinolite	
		MD11	18		65	72	7.07	7.83	CD	CHRYSTILE	
		MF		18	1	68	0.11	7.39	CD	CHRYSTILE	
1B	F43										
1B	F46	F	19	19	1	110	0.11	11.96	CD	CHRYSTILE	DOUBLE
1B	G43										
1B	G46										
1B	G51										
1B	G54	B			8	52	0.87	5.65			Non Asbestos
1B	C61										
1B	C64	MD11	20		20	78	2.17	8.48	CD	CHRYSTILE	
		MF		20	1	55	0.11	5.98	CD	CHRYSTILE	
1B	E61										
1B	E64										
1C	B36	MD11	21		18	90	1.96	9.78	CD	CHRYSTILE	
		MF		21	1	50	0.11	5.43	CD	CHRYSTILE	
		F			22.5	120	2.45	13.04			Non Asbestos
1C	C33										
1C	C36	MD11			40	210	4.35	22.83	CD	CHRYSTILE	
		MB			5	160	0.54	17.39	CD	CHRYSTILE	
1C	E33										
1C	E36										
1C	F33	MD11			40	70	4.35	7.61		Tremolite/Actinolite	
		MF			8	70	0.87	7.61		Tremolite/Actinolite	
1C	F36	MD11	22		70	100	7.61	10.87		Tremolite/Actinolite	
		MF		22	1	100	0.11	10.87		Tremolite/Actinolite	
1C	G33	F	23	23	1	50	0.11	5.43	CD	CHRYSTILE	
1C	G36										
1C	G41	MD11			15	70	1.63	7.61		Tremolite/Actinolite	
		MF			4	55	0.43	5.98		Tremolite/Actinolite	
		MD11	24		35	90	3.80	9.78	CD	CHRYSTILE	
		MF		24	1	80	0.11	8.70	CD	CHRYSTILE	
1C	G44										
1C	H43	MD21			80	130	8.70	14.13	CD	CHRYSTILE	
		MB			7.5	130	0.82	14.13	CD	CHRYSTILE	
		MD11	25		100	135	10.87	14.67		Tremolite/Actinolite	
		MF		25	2.5	70	0.27	7.61		Tremolite/Actinolite	
		MD11			20	95	2.17	10.33		Tremolite/Actinolite	
		MF			5.5	95	0.60	10.33		Tremolite/Actinolite	
1C	E51	MD11	26		75	220	8.15	23.91	CD	CHRYSTILE	
		MB		26	2	135	0.22	14.67	CD	CHRYSTILE	
1C	E54										
1C	F53	MD11			120	190	13.04	20.65		Tremolite/Actinolite	
		MB			5.5	145	0.60	15.76		Tremolite/Actinolite	
1C	G53										
1C	G56	F			12.5	105	1.36	11.41		Tremolite/Actinolite	
1C	H53	MD11	27		15	92	1.63	10.00		Tremolite/Actinolite	
		MF		27	2	92	0.22	10.00		Tremolite/Actinolite	
1D	B34	F			5	62	0.54	6.74		Tremolite/Actinolite	



**NIOSH 7402/ISO**

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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	Length					
1D	C31	MD11	28		22	112	2.39	12.17		Tremolite/Actinolite		
		MF		28	3.5	112	0.38	12.17		Tremolite/Actinolite		
		MD11	29		30	55	3.26	5.98	CD	CHRYSOTILE		
		MF		29	1.5	50	0.16	5.43	CD	CHRYSOTILE		
1D	C34	F			10	55	1.09	5.98		Tremolite/Actinolite		
		MD11			50	80	5.43	8.70				Non Asbestos
		MF			8	80	0.87	8.70				Non Asbestos
		MD11			18	110	1.96	11.96		Tremolite/Actinolite		
		MF			8	110	0.87	11.96		Tremolite/Actinolite		
1D	E31											
1D	E34	F	30	30	0.5	50	0.05	5.43	CD	CHRYSOTILE		
1D	F31											
1D	G33	F			8	70	0.87	7.61		Tremolite/Actinolite		
1D	G44	F	31	31	0.5	55	0.05	5.98		Tremolite/Actinolite		
1D	H41											
1D	H44											
1D	F43											
1D	F46	F	32	32	1	85	0.11	9.24	CD	CHRYSOTILE		
1D	C51											
1D	C54											
1D	E51											
1D	E54											
1D	B56	MD11			60	85	6.52	9.24		Tremolite/Actinolite		
		MF			5	85	0.54	9.24		Tremolite/Actinolite		
1D	C56											
1E	B36	MD11	33		60	330	6.52	35.87	CD	CHRYSOTILE		
		MF		33	1	240	0.11	26.09	CD	CHRYSOTILE		
		MD11	34		50	120	5.43	13.04	CD	CHRYSOTILE		
		MF		34	0.5	75	0.05	8.15	CD	CHRYSOTILE		
1E	C33	F	35	35	1	65	0.11	7.07		Tremolite/Actinolite		
1E	C36	F	36	36	1	80	0.11	8.70	CD	CHRYSOTILE		
1E	E33											
1E	E36	F			1.5	75	0.16	8.15				Non Asbestos
		F	37	37	2.5	72	0.27	7.83		Tremolite/Actinolite		
1E	C41											
1E	C44											
1E	E41											
1E	E44											
1E	F41	MD11	38		20	220	2.17	23.91	CD	CHRYSOTILE		
		MB		38	2	220	0.22	23.91	CD	CHRYSOTILE		
1E	F44	F			1	52	0.11	5.65				Non Asbestos
		F			4	120	0.43	13.04		Tremolite/Actinolite		
1E	G44	MD11	39		30	60	3.26	6.52		Tremolite/Actinolite		
		MF		39	3	60	0.33	6.52		Tremolite/Actinolite		



**NIOSH 7402/ISO**

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626-568-4065

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	H41	F		5	75	0.54	8.15			Non Asbestos
1E	F51	F		8.5	60	0.92	6.52			Tremolite/Actinolite
1E	G51	F		7.5	55	0.82	5.98			Tremolite/Actinolite
1E	G54	MD11		38	110	4.13	11.96			Tremolite/Actinolite
		MF		9	110	0.98	11.96			Tremolite/Actinolite
1E	H51	MD11	40	40	85	4.35	9.24			Tremolite/Actinolite
		MF		2	80	0.22	8.70			Tremolite/Actinolite
		MD11		20	75	2.17	8.15			Non Asbestos
		MF		3	60	0.33	6.52			Non Asbestos

Elutriator Data

Date: 7/14/10

Client: Northgate

Lab #: 138491

Sample ID: SSA04-03-1.00 PPC Sample weight (g): 76

Time air flow started: 800

Tumbler rpm: 30

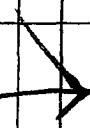
IST Flowmeter (mL/min): 100

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	1000	170	0.03861	0.02514	13.47	30		
2	1030		0.03401	0.02484	9.17	15		
3	1045		0.03004	0.02494	5.03	20		
4	1105		0.03628	0.02533	10.95	15		
5	1120		0.03362	0.02571	7.91	25		
6	1145		0.03129	0.02489	6.35	15		
7	1200		0.02904	0.02522	3.82	25		
8	1225							
Time							Dep. Rate	Estimate
1	1055	1059 1/2	4.300	4.162	0.138	9 1/2	8)	85
2	1112	1117 1/2	4.583	4.468	0.115	5 1/2		
3	1132	1139	4.594	4.506	0.088	<del>4 1/2</del> 7		
4	1205	1218	4.371	4.210	0.161	13		
5								
6								
7								
8								

30% loss  
20% loss  
50% loss  
5% loss  
loss 30%  
5% loss  
60% loss

prep 7/15/10



#138491

## Moisture Content

49

7-20-10

#SSAQ4-03-1.00 BPC

Dish wt.	31.45 g
Dish + samp.	131.45 g
Initial wt.	100.64 g
after 1 hr	125.76 - 31.45 = 94.31 g
after 1 more hr	125.75 - 31.45 = 94.30 g (Final wt.)

$$\% \text{ moisture} \rightarrow 100 \times \frac{100.64 - 94.30}{94.30} = 6.72\%$$

#SSAQ4-03-1.00 BPC-FD

Dish wt.	31.49 g
dish + samp.	131.71 g
Initial wt.	100.22 g
after 1 hr	125.45 g
after 1 more hr	125.41 (Final wt.)
	<u>31.49</u> 93.92 g

$$\% \text{ Moisture} \rightarrow 100 \times \frac{100.22 - 93.92}{93.92} = 6.71\%$$

SP



85-9-0

Prep Time: 1030-1300

Count (Page of ) NIOSH 7402/ISO

Report number: 138491  
 Sample number: SSAQ4-03-1-00 BPC  
 Site name: Northgate  
 Sample Description: 1 mg

Filter Type: PC 385 mm<sup>2</sup>  
 Date Sample was Run: 7/14/10  
 Magnification: 9,200 X

Preparation date: 7/13/10 By JAP  
 Analysis date: 7-16-10 By Re  
 (A): ADX, ADQ  
 Condition of Grid Grided

Grid opening dimension: 0.0094 mm<sup>2</sup>  
 Level of Analysis: (C): CD, CDX

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
1A	C3-4	1			F	10	70	Non ash S1
	F				F	10	68	
	E3-4	1			MDII	80	110	Tremo/Actino EDS #1
	MI				MI	2.5	110	
	F3-1							
	E3-4							
	G3-4							
	G3-4	2			F	5	105	Tremo/Actino EDS #2
		3			F	2.5	72	Tremo/Actino EDS #3
	H-1	4			F	6.5	80	Tremo/Actino EDS #4
	C3-3							
	C3-6	5			MDII	3.8	120	Chryso EDS #5
	MI				MI	0.5	110	
	E3-3							
	E3-3	6			MDII	2.2	80	Tremo/Actino EDS #6
	F				MI	8	55	
	E3-6							
	G3-3	7			F	1	52	Tremo/Actino EDS #7
	G3-6	8			F	1.5	65	Non ash
		9			MDII	40	170	Chryso. EDS #8
		10			MB	2	170	
					MDII	12	140	double Chryso
					MI	0.5	110	
	I3-3	11			F	2	49	Tremo/Actino EDS #9
	Ku-1	12			F	1	58	Chryso. #3548
	P4-4	13			F	2.5	68	Tremo/Actino
		14			MDII	40	92	Tremo/Actino #3549
					MI	2.5	92	
	L4-1	15			MDII	15	75	Tremo/Actino
					MI	2.5	75	
		16			F	10	100	Tremo/Actino

TEM Asbestos Structure Count (Page of )

Report number: 138491

SAMPLE NO: SSA04-03-1.00 BPC

X 9,200

Grid	Grid	Number of structures	Number of structures	Class	Type of	Width	Length	Comments
	Opening	primary	Total		Structure	Mm	Mm	
1B	C3-1							
	C3-4							
	E3-4							
	E3-1			1	E	15	50	Non asb.
	E3-4							
	613-3	1			E	25	62	Tremo / Actino.
		2			E	1	80	Tremo / Actino
	613-6							
	C4-4	3			MD11	40	150	Chryso.
					MF	1	115	
		4			B	1.5	65	Chryso.
		5			MD11	30	85	Tremo / Actino
					MI-	3	85	
		6			MD11	70	140	Tremo / Actino
					MI-	12.5	110	
	E4-3	7			E	30	190	Tremo / Actino
	E4-6	8			B	1.5	80	chryso.
		9			MD11	130	190	Tremo / Actino
					MF	8.5	70	
		10			MD11	65	72	Chryso.
					MF	1	68	
	F4-3							
	F4-6	11			E	1	110	Chryso. doubled
	G4-3							
	G4-6							
	G5-1							
	G5-4	12			B	8	52	Non asb.
	G6-1							
	G6-4	13			MD11	20	78	Chryso.
					ME	1	55	
	E6-1							
	E6-4							
1C	B3-6	1			MD11	15	90	Chryso.
					ME	1	50	
					E	22.5	120	Non asb.
	C3-3							

TEM Asbestos Structure Count (Page of )

Report number: 138491

SAMPLE NO: SSA04-03-1-00 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	2			MD11	40	210	Chryso.
					MB	5	160	
	E3-3							
	E3-6							
	E3-3	3			MD11	100	70	Tremo / Actino.
					MF	8	70	
	E3-6	4			MD11	70	100	Tremo.
					MF	1	100	
	G3-3	5			F	1	50	chryso.
	G3-6							
	G4-1	6			MD11	15	70	Tremo / Actino.
					MF	4	55	
		7			MD11	35	90	chryso
					MF	1	80	
	G4-4							
	H4-3	8			MD21	80	130	chryso.
					MB	7.5	130	
		9			MD11	100	135	Tremo / Actino
					MF	2.5	70	
		10			MD11	20	95	Tremo / Actino
					MF	5.5	95	
	E5-1	11			MD11	75	220	chryso.
					MB	2	135	
	E5-4							
	F5-3	12			MD11	120	190	Tremo / Actino
					MF	5.5	145	
	G5-3							
	G5-3							
	H5-6	13			F	12.5	105	Tremo / Actino
	H5-3	14			MD11	65	92	Tremo / Actino
					MF	2	92	
ID	B3-4	1			F	5	62	Tremo. / Actino
	C3-1	2			MD11	22	112	Tremo / Actino
					MF	3.5	112	
		3			MD11	30	55	chryso.
					MF	1.5	50	
	C3-4	4			F	10	55	Tremo. / Actino
					MD11	50	80	Non ash.
					MF	8	80	

EM Asbestos Structure Count (Page of )

Report number: 138491

SAMPLE NO: SSA04-03-1-00 BPC

X 9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
		3			MDII MI-	18 8	110 110	Tremo / Achro
	E3-1							
	E3-4	6			F	0.5	50	Chryso.
	E3-1							
	L3-3	7			R	8	70	Tremo / Achro
	G4-4	8			R	0.5	55	Tremo / Achro
	H4-1							
	H4-4							
	K4-3							
	L4-6	9			F	1	85	Chryso.
	C5-1							
	C5-4							
	E5-1							
	E5-4							
	L5-6	10			MDII MI-	60 5	85 85	Tremo / Achro
	K5-6							
IE	B3-6	1			MDII MI-	60 1	330 240	Chryso.
		2			MDII MI-	50 0.5	120 75	Chryso.
	C3-3	3			R	1	65	Tremo / Achro
	C3-6	4			F	1	80	Chryso.
	E3-3							
	E3-6	5			R	1.1	75	Non ash.
		6			R	2.5	72	Tremo / Achro
	C4-1							
	C4-4							
	E4-1							
	E4-4							
F4	MDII	7			MDII MI-	20 2	220 220	Chryso
	K4-4	8			R	1	52	Non ash
					F	4	120	Tremo
	G4-4	9			MDII	30	60	tremo.

MI- 3 60



ELECTRON DIFFRACTION ANALYSIS

EMS LAB NO. 138491

SAMPLE NO. SSA 04-03-1.00 BPC

CLIENT Norngok

GRID A

DATE ANALYZED 7-16-10

PHOTO NO. 3549

Camera Constant (CC) 28.3

K-Factor for Mg 1.4

EDS PEAK AREA RATION

Na      Mg      Si      Ca      Fe      Other     

DIFFRACTION DATA - AMPHIBOLES

d<sub>1</sub> 9.13 Å

R<sub>1</sub> 3.1 mm

d<sub>2</sub> 5.34 Å

R<sub>2</sub> 5.35 mm

d<sub>1</sub>/d<sub>2</sub> 1.71 Å

θ (<R<sub>1</sub>R<sub>2</sub>) 73°

Zone Axis [101]

Fiber Identification ACTINOLITE

DIFFRACTION DATA - CHRYSOTILE

(002)/ (004)      /     

R<sub>1</sub> =     

(020)     

R<sub>2</sub> =     

(110)     

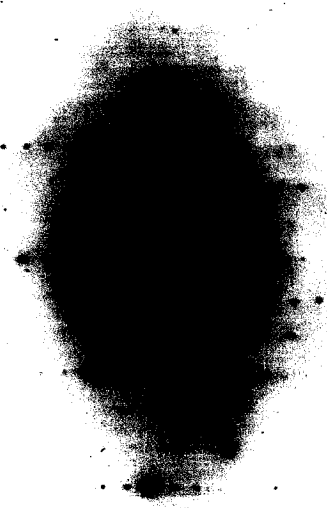
R<sub>3</sub> =     

Layer Lines     

02/13/06  
ah

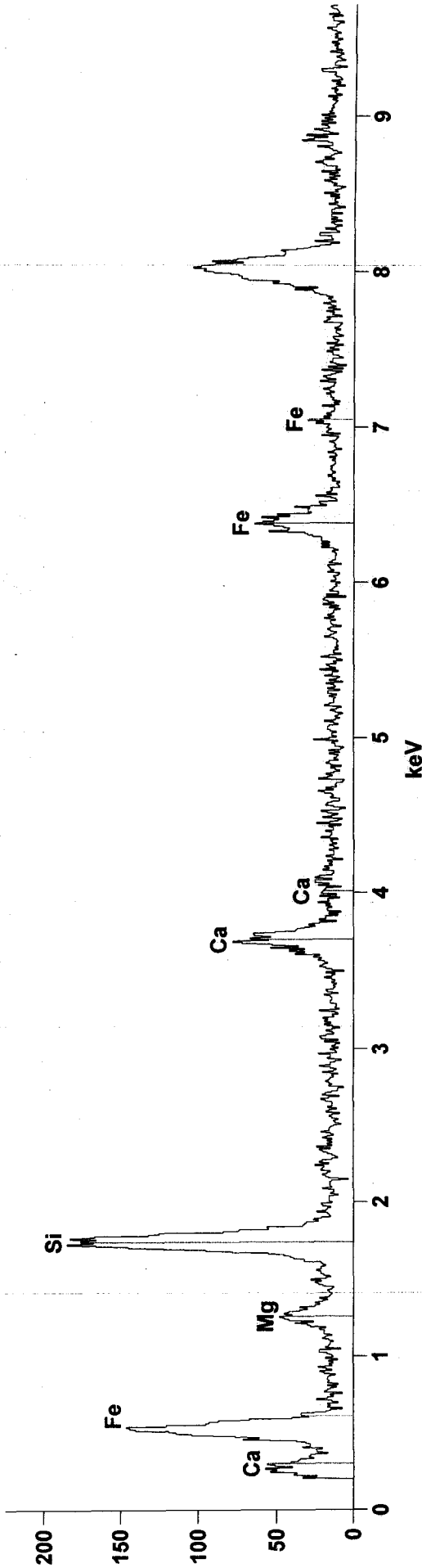
TEM CALIBRATION 13A  
(1994)

88803549



Full scale counts: 208

138491-SSAQ4-03-100-E(1)



Live Time: 37.4 sec.

Mon Jul 19 07:47:16 2010  
 Gaussian Fit With Standards Chi Squared: 4.074  
 Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

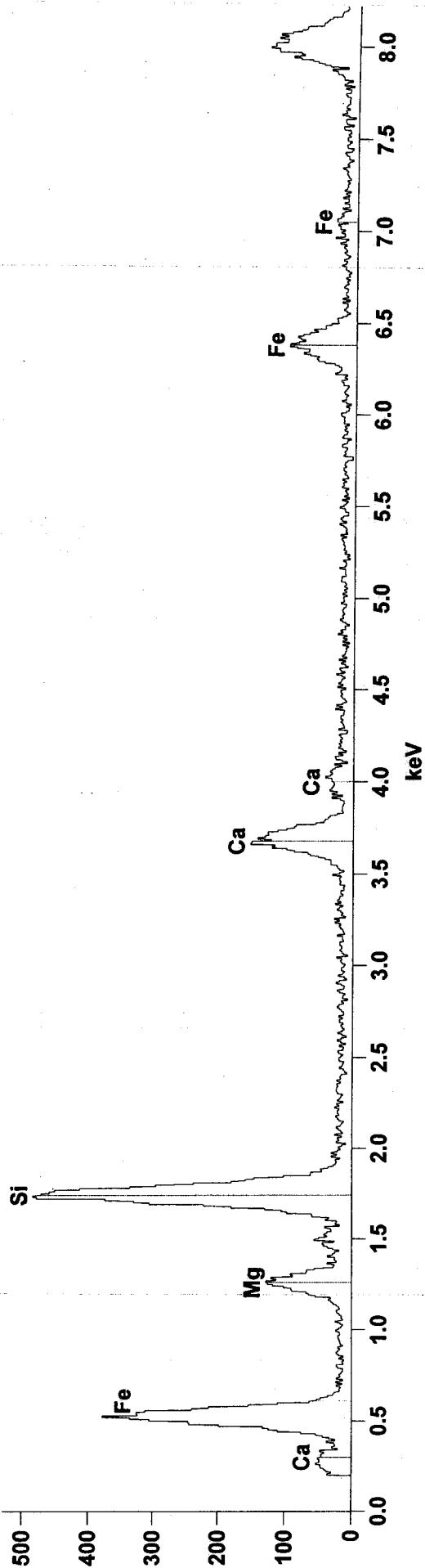
Quantitative Results 138491-SSAQ4-03-100-E(1)

Element	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg	325	13.24	---	17.58	+/- 1.14
Si	1666	48.47	---	55.71	+/- 1.44
Ca	576	20.11	---	16.20	+/- 0.84
Ca*	465	---	---	---	---
Fe	481	18.19	---	10.52	+/- 0.66
Fe*	318	---	---	---	---
Total		100.00		100.00	

\* -- Standard Unavailable

Full scale counts: 489

138491-SSAQ4-03-1-A-GO-F3-4 #-01



Live Time: 82.4 sec.

Thu Jul 15 14:21:36 2010  
 Gaussian Fit With Standards Chi Squared: 4.442  
 Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

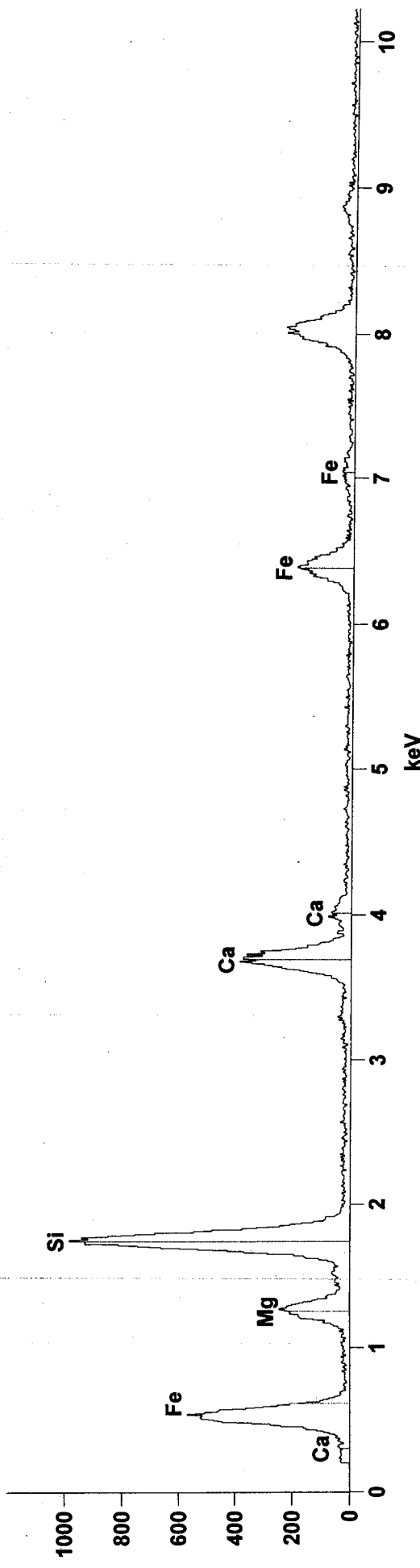
Quantitative Results 138491-SSAQ4-03-1-A-GO-F3-4 #-01

Element	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg	1344	15.43	---	20.10	+/- 0.60
Si	5934	48.65	---	54.87	+/- 0.75
Ca	2120	20.86	---	16.48	+/- 0.41
Ca*	8240	---	---	---	---
Fe	1414	15.07	---	8.55	+/- 0.28
Fe*	329	---	---	---	---
Total		100.00		100.00	
* -- Standard Unavailable					



Full scale counts: 1108

138491-SSAQ4-03-100-A-G3-4-#02



Live Time: 24.3 sec.

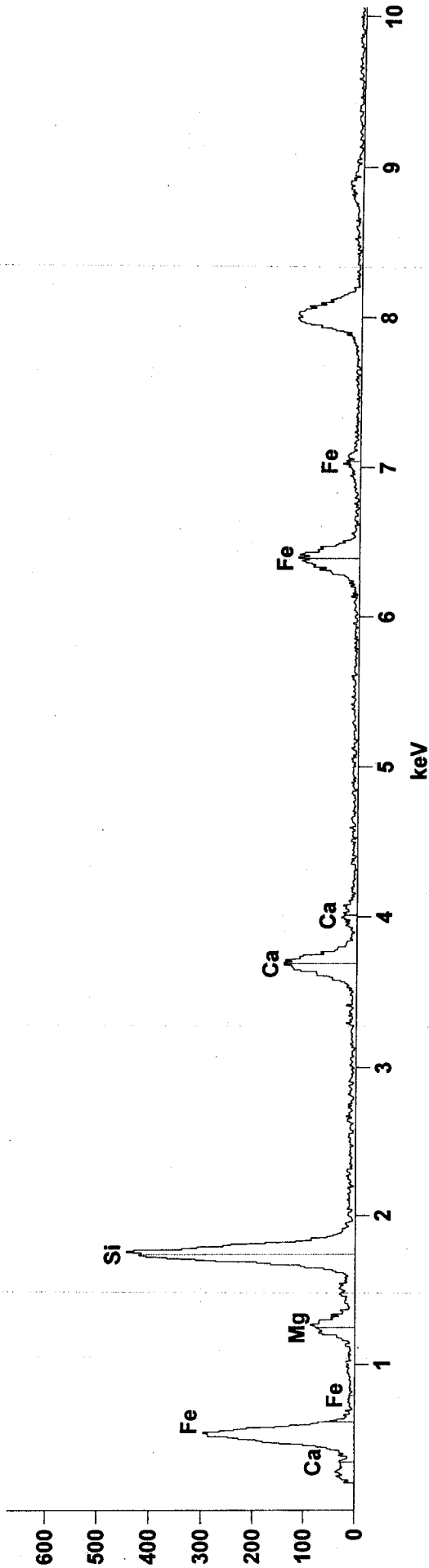
Fri Jul 16 07:00:02 2010  
 Gaussian Fit With Standards Chi Squared: 16.784  
 Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

Quantitative Results 138491-SSAQ4-03-100-A-G3-4-#02

Element	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg	2941	14.01	---	18.48	+/- 0.38
Si	13716	46.68	---	53.27	+/- 0.49
Ca	6177	25.23	---	20.17	+/- 0.28
Ca*	1034	---	---	---	---
Fe	3183	14.08	---	8.08	+/- 0.16
Fe*	940	---	---	---	---
Total		100.00		100.00	
* -- Standard Unavailable					

Full scale counts: 624

138491-SSAQ4-03-100-A-G3-4-#03



Fri Jul 16 07:02:35 2010

Gaussian Fit With Standards Chi Squared: 9.450

Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

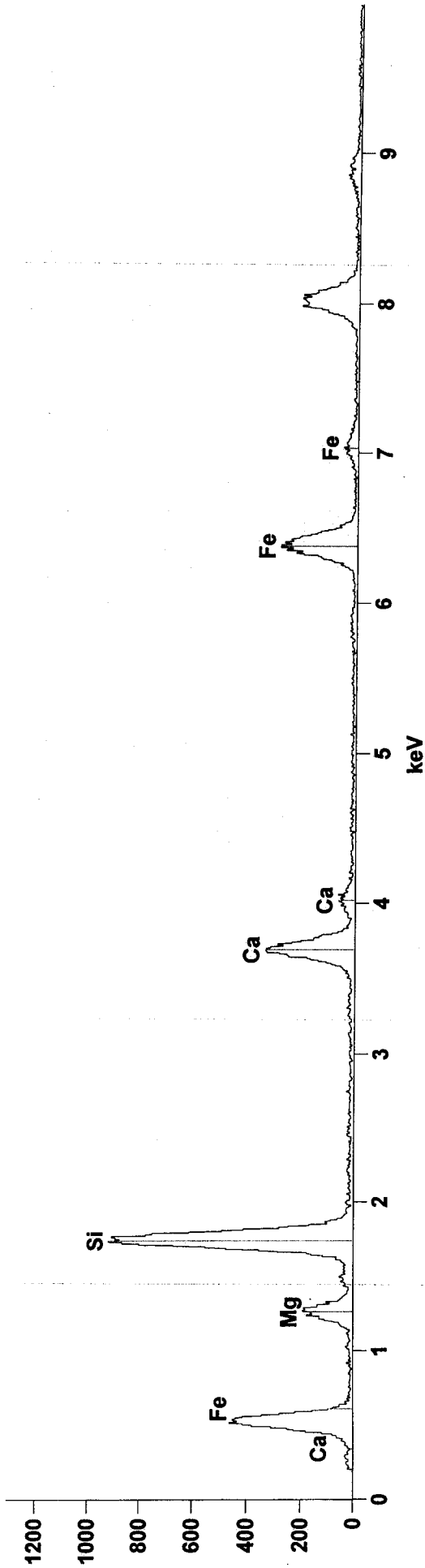
Quantitative Results 138491-SSAQ4-03-100-A-G3-4-#03

Element	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg	784	10.14	---	13.97	+/- 0.55
Si	4927	45.51	---	54.26	+/- 0.80
Ca	1979	21.94	---	18.33	+/- 0.44
Ca*	348	---	---	---	---
Fe	1867	22.42	---	13.44	+/- 0.33
Fe*	64	---	---	---	---
Total		100.00		100.00	

\* -- Standard Unavailable

Full scale counts: 1208

138491-SSAQ4-03-100--A-H3-1#04



Fri Jul 16 07:06:05 2010

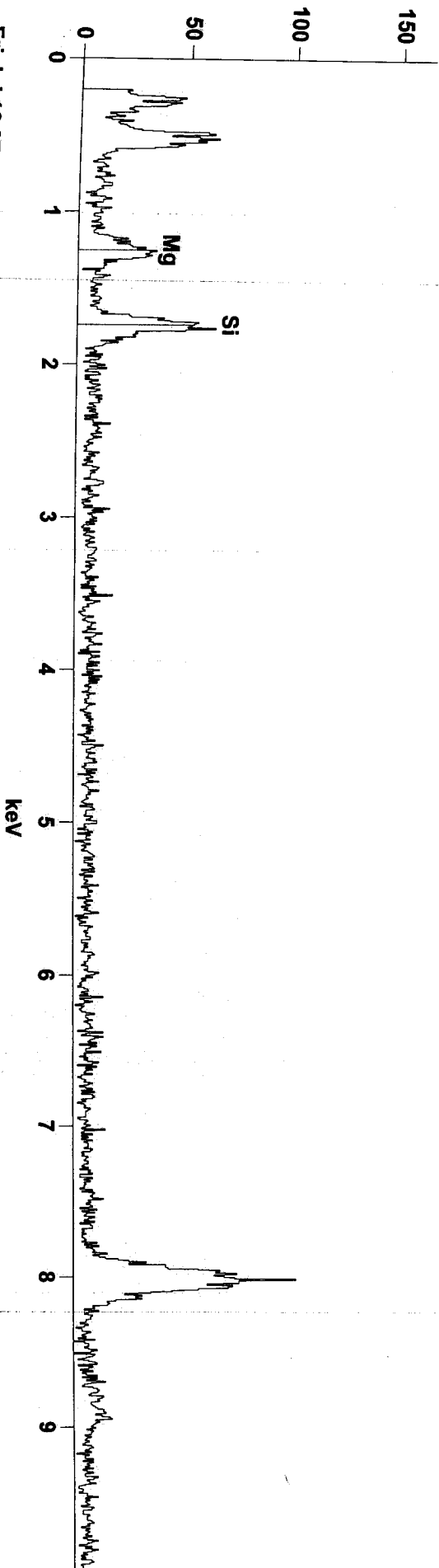
Gaussian Fit With Standards Chi Squared: 5.843

Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

Quantitative Results 138491-SSAQ4-03-100--A-H3-1#04

Element	Net Counts	Weight % Error	Atom % Error
Mg	1930	10.32	14.38 +/- 0.36
Si	11351	43.34	52.26 +/- 0.52
Ca	4815	22.06	18.64 +/- 0.29
Ca*	4332	---	---
Fe	4891	24.28	14.72 +/- 0.23
Fe*	232	---	---
Total		100.00	100.00

\* - Standard Unavailable



Fri Jul 16 07:11:19 2010  
Gaussian Fit With Standards Chi Squared:1.076  
Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

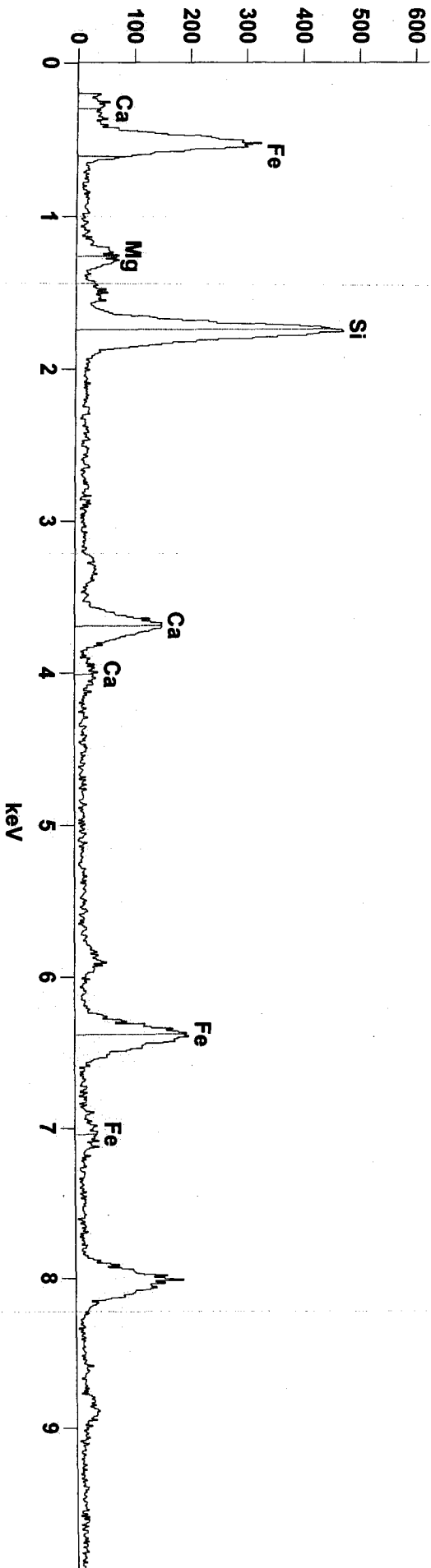
Live Time:88.9 sec.

Quantitative Results 138491-SSAQ4-03-100-A-C3-6-#05

Element	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg	301	44.29	---	47.88	+/- 3.18
Si	530	55.71	---	52.12	+/- 2.46
Total		100.00		100.00	

Full scale counts: 576

138491-SSAQ4-03-100--A-F3-3#06

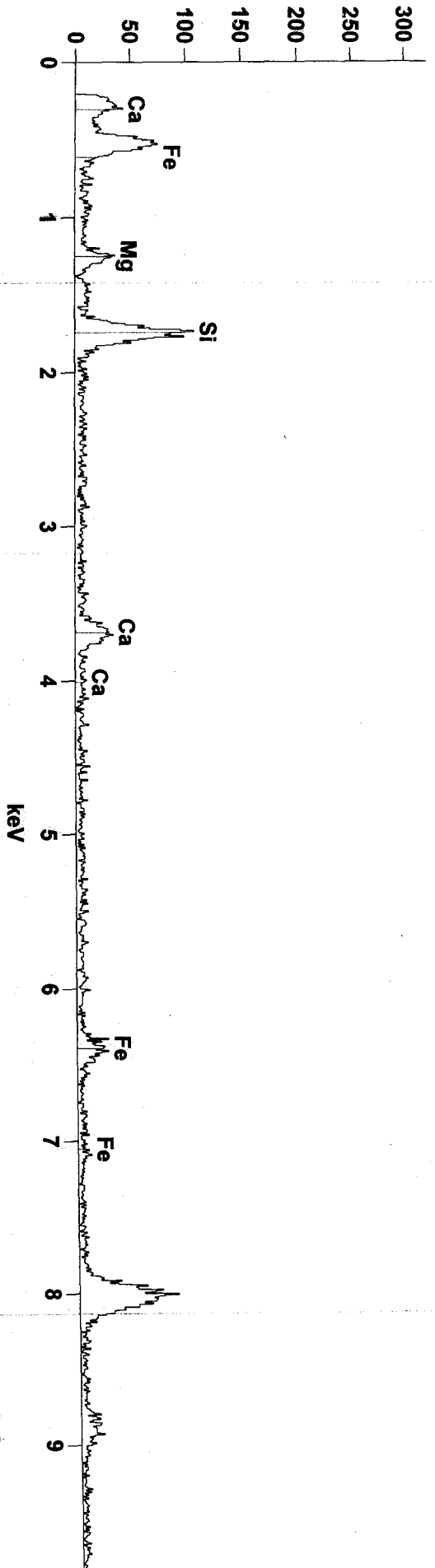


Fri Jul 16 07:52:25 2010  
 Gaussian Fit With Standards Chi Squared:4.973  
 Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

Live Time:38.9 sec.

Quantitative Results 138491-SSAQ4-03-100--A-F3-3#06

Element	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg	673	6.65	---	9.64	+/- 0.46
Si	6059	42.79	---	53.64	+/- 0.73
Ca	2302	19.51	---	17.14	+/- 0.41
Ca*	3169	---	---	---	---
Fe	3383	31.06	---	19.58	+/- 0.38
Fe*	210	---	---	---	---
Total		100.00		100.00	
*-- Standard Unavailable					

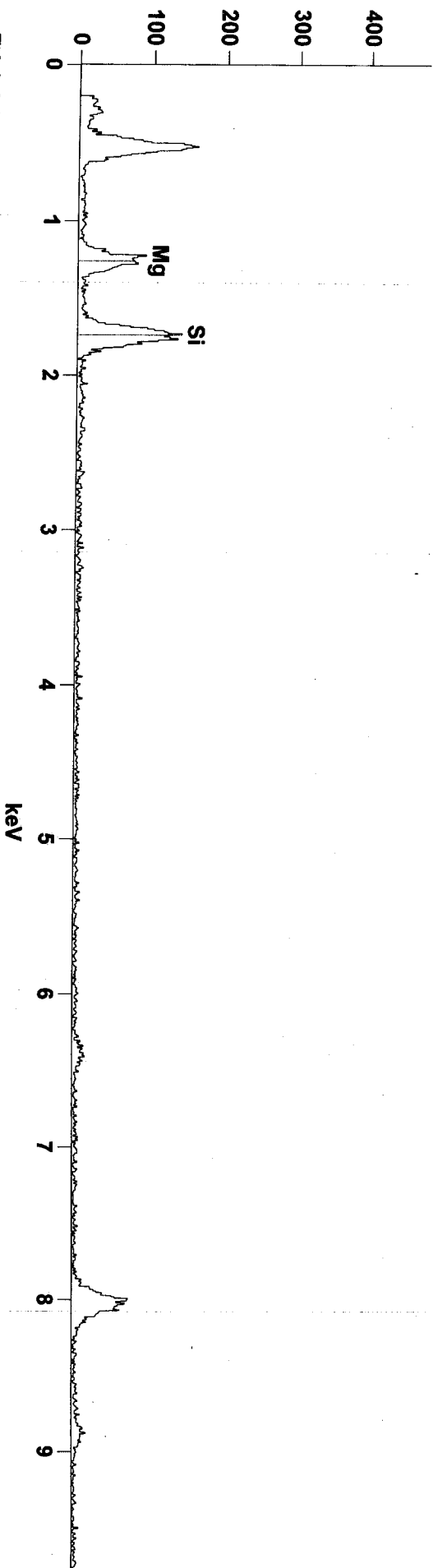


Quantitative Results 138491-SSAQ4-03-100-A-G3-3-#7

Element	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg	165	12.72	---	16.94	+/- 1.85
Si	878	48.36	---	55.72	+/- 2.03
Ca	317	20.95	---	16.92	+/- 1.17
Ca*	347	---	---	---	---
Fe	251	17.97	---	10.42	+/- 0.83
Fe*	43	---	---	---	---
Total	100.00	---	---	100.00	---
* -- Standard Unavailable					

Full scale counts: 444

138491-SSAQ4-03-100-A-G3-6-#08



Fri Jul 16 08:08:00 2010  
 Gaussian Fit With Standards Chi Squared:1.050  
 Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

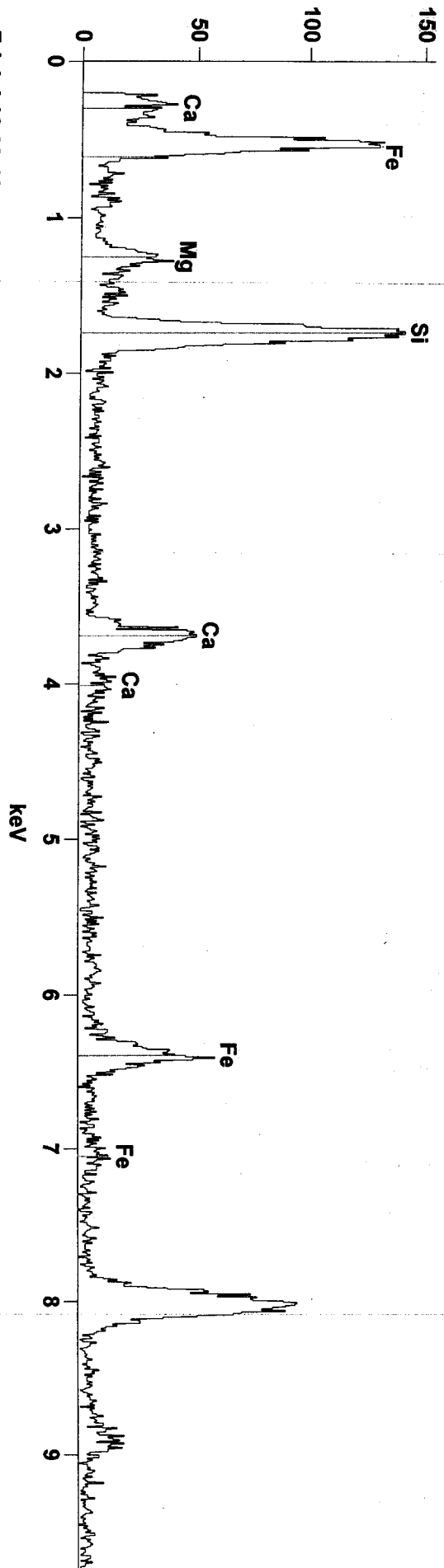
Live Time:51.4 sec.

Quantitative Results 138491-SSAQ4-03-100-A-G3-6-#08

Element	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg	812	42.82	--	46.39	+/- 1.71
Si	1518	57.18	--	53.61	+/- 1.41
Total	100.00			100.00	

Full scale counts: 143

138491-SSAQ4-03-100-A-H3-3-#09



Fri Jul 16 08:12:52 2010  
 Gaussian Fit With Standards Chi Squared:2.884  
 Correction Method: Cliff-Lorimer (MBTS) w/o Absorbance

Live Time:65.4 sec.

Quantitative Results 138491-SSAQ4-03-100-A-H3-3-#09

Element	Net Counts	Weight %	Weight % Error	Atom %	Atom % Error
Mg	272	10.42	---	14.23	+/- 1.05
Si	1736	47.50	---	56.15	+/- 1.42
Ca	600	19.70	---	16.32	+/- 0.76
Ca*	1438	---	---	---	---
Fe	629	22.38	---	13.30	+/- 0.59
Fe*	120	---	---	---	---
Total		100.00		100.00	
* -- Standard Unavailable					



Filter Lot Blank

Count (Page of ) NIOSH 7402/ISO

Prep Time: NA

Report number: 137822 Filter Blank 1  
 Sample number: 0005200  
 File name: Northgate  
 Sample Description: NA mg

Filter Type: NCE 385 mm<sup>2</sup>  
 Date Sample was Run: NA  
 Magnification: 9,200 X

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

Grid opening dimension: 0.0094 mm<sup>2</sup>  
 Level of Analysis: (C): CD, CDX

Grid loading: Very Light Condition of Grid: Good  
 (A): ADX, ADQ

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
A	C26							
	E27							
	E26							
	F22							
	F26							
	G22							
	C31							
	C24					S		
	E31							
	E34							
	F28							
	F24							
	G31							
	G24							
	H31							
	B184							
	C41							
	C44							
	E41							
	E44							
	F44							
	F44							
	G41							
	G44							
	H41							
	H44							
	V41							
	X44							
	C51							
	C54							
	E51							
	E54							

Count (Page 1 of 1 ) 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<sup>2</sup>  
 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
	F51							
	F54							
	G51							
	G54							
	H51							
	H54							
	K51							
	G61							
B	C26							
	E23							
	E26							
	F23							
	F26							
	G23							
	G26							
	H23							
	C33							
	C36							
	E33							
	E36							
	F33							
	F36							
	H33							
	H36							
	K33							
	K36							
	P46							
	C43							
	C46							
	E43							
	E46							
	F43							

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<sup>2</sup>  
 Analysis date: By ( A ): ADX, ADQ Level of Analysis: (C): CD, CDX  
 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							
C	H53							
	B34							
	C31							
	C34							
	E31							
	E34							
	F31							
	F34							
	G31							
	G34							
	H31							
	H34							
	B41							
	B44							
	C41							
	C44							
	E41							
	E44							

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<sup>2</sup>  
 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							
	F44							
	F44							
	G41							
	G44							
	H44							
	H44							
	K41							
	B51							
	B54							
	C51							
	C54							
	E51							
	E54							
	F51							
	F54							
	G51							
	G54							
	H51							
	H54							
	C61							
	C61							
	E64							
	E61							
B	C23							
	C26							
	E23							
	E26							
	F23							
	G23							
	G26							
	H23							

TEM-10A (2002)

0 grid torn where replaced in grid bag

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<sup>2</sup>  
 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
	B36							
	C33							
	C36							
	E33							
	E36							
	F33							
	F36							
	G33							
	G36							
	H33							
	H36							
	I43							
	C43							
	C46							
	E43							
	E46							
	F43							
	F46							
	G43							
	G46							
	H43							
	H46							
	K43							
	K46							
	B56							
	C53							
	C56							
	E53							
	E56							
	F53							
	F56							
	G53							

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<sup>2</sup>  
 Analysis date: By (A): ADX, ADQ Level of Analysis: (C): CD, CDX

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
E	B31							
	B34							
	C31							
	C34							
	E31							
	K34							
	K31							
	E34							
	C31							
	C34							
	H31							
	H34							
	B41							
	B44							
	C41							
	C44							
	E41							
	E44							
	F41							
	F44							
	G41							
	G44							
	H41							
	H44							
	K41							
	K44							
	B54							
	C51							
	C54							
	E51							
	E54							
	F51							
	F54							

*orig. filter sample C54*







# TEM ASBESTOS ANALYSIS

Client Sand Blank  
 Sample No. S-12-10

EMS Lab No. \_\_\_\_\_  
 Page 2 of \_\_\_\_\_

**MICROSCOPE**

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

**ENERGY DISPERSIVE X-RAY SYSTEM**

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

## RECEIVING

## ANALYSIS

Grid Address: A  
 Screen Magnification: X  
 Camera Constant: \_\_\_\_\_  
 Accelerating Voltage: 100KV  
 Beam Current: \_\_\_\_\_  $\mu$ A  
 K-Factor: \_\_\_\_\_  
 Analyser: \_\_\_\_\_

Date: \_\_\_\_\_

TEM - 1B.(1-08)

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification										EDS Analysis				Comments						
			Width	Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADK	AQ	ADQ	AZQ		AZZ	Na	Mg	Si	Ca	Fe
U3-1		N30																							
U3-4																									
1B-1																									
1B-4																									
Q3-3																									
E3-6																									
E3-3																									
E3-8																									
U3-3																									
U3-6																									
1B-5																									
1B-8																									
U3-3																									

**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 ASBESTOS ANALYSIS

Client Sand blck  
 Sample No. 5-12-70

EMS Lab No. \_\_\_\_\_  
 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
- Error - Model No. 3200-0106-0365
- Error - Model No. 3600-0206-0146
- Quantum System

Grid Address: A  
 Screen Magnification: X  
 Camera Constant: \_\_\_\_\_  
 Accelerating Voltage: 100KV  
 Beam Current: 10A  
 K-Filter: \_\_\_\_\_  
 Analyser: Pentec

Date 5-13-70

TEM - 1B.(1-06)

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification										EDS Analysis					Comments						
			Width	Length	NAW	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ		Na	Mg	Si	Ca	Fe	
CS-2		W19																								
CS-6																										
ES-3																										
ES-6																										
ES-3																										
ES-6																										
NS-3																										
NS-6																										
NS-3																										
NS-6																										

**OBSERVATIONS:**

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

# TEM ASBESTOS ANALYSIS

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

**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**

- Everex - Model No. 3200-0106-0363
  - Everex - Model No. 3500-0206-0146
- Quantum System

Grid Address: B  
 Screen Magnification: 9,200 X  
 Camera Constant: 28.2  
 Accelerating Voltage: 100KV  
 Beam Current: 10  $\mu$ A  
 E-Field: 14  
 Analyt: Radlr  
 Date: 5/18/10

TEM - 1B (1-08)

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification												EDS Analysis				Comments						
			Width	Length	NAM	TM	CM	CD	OQ	CMQ	CDQ	UF	AD	AX	ADK	AQ	ADQ	AZQ	AZZ	Na		Mg	Si	Ca	Fe		
L23		W29																									
C26																											
E23																											
E26																											
L26																											
L23																											
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L23																											
L26																											

- OBSERVATIONS:**
- Clean
  - Debris:
  - Gypsum:
  - Very Light
  - Light
  - Moderate
  - Heavy
  - Very Heavy



# TEM ASBESTOS ANALYSIS

Client Sand blank  
 Sample No. S-12-10

EMS Lab No. 7  
 Page 1 of 1

**MICROSCOPE**

- H600A - Serial No. 542-36-01
- H600B - Serial No. 542-05-06
- H600C - Serial No. 542-24-03
- ENERGY DISPERSIVE X-RAY SYSTEM
- Error - Model No. 300-0106-0365
- Error - Model No. 300-0206-0146 Quantum System

**RECEIVING**

**ANALYSIS**

Grid Address: B  
 Screen Magnification: 9,200 X  
 Camera Constant: 28.2  
 Accelerating Voltage: 100KV  
 Beam Current: 10  $\mu$ A  
 K-Ratio: 1.4  
 Analyt: Radln

Date: 5/18/10

TEM - 1B (1-08)

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification											EDS Analysis					Comments					
			Width	Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADK	AQ	ADQ	AZQ	AZZ	Na		Mg	Si	Ca	Fe	
CH1		N59																								
CH1																										
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# TEM ASBESTOS ANALYSIS

Client Sand blank  
 Sample No. S-12-10

EMS Lab No. \_\_\_\_\_  
 Page 4 of \_\_\_\_\_

**RECEIVING**

**SIXTIN**

**MICROSCOPE**

- H600A - Serial No. 542-36-01
- H600B - Serial No. 542-05-06
- H600C - Serial No. 542-24-03
- ENERGY DISPERSIVE X-RAY SYSTEM
- Leves - Model No. 3200-0106-0365
- Leves - 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  $\mu$ A  
 K-Factor: 1.4

Analyst Radh Date 5/18/10

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification										EDS Analysis					Comments						
			Width	Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADK	AQ	ADQ	AZQ	AZZ		Na	Mg	Si	Ca	Fe	
R43		W29																								
R46																										
G43																										
G48																										
L45																										
M46																										
N43																										
N49						25	130																			
G51																										
L54																										
E51																										
R52																										
F57																										
R510																										
W57																										

**OBSERVATIONS:**

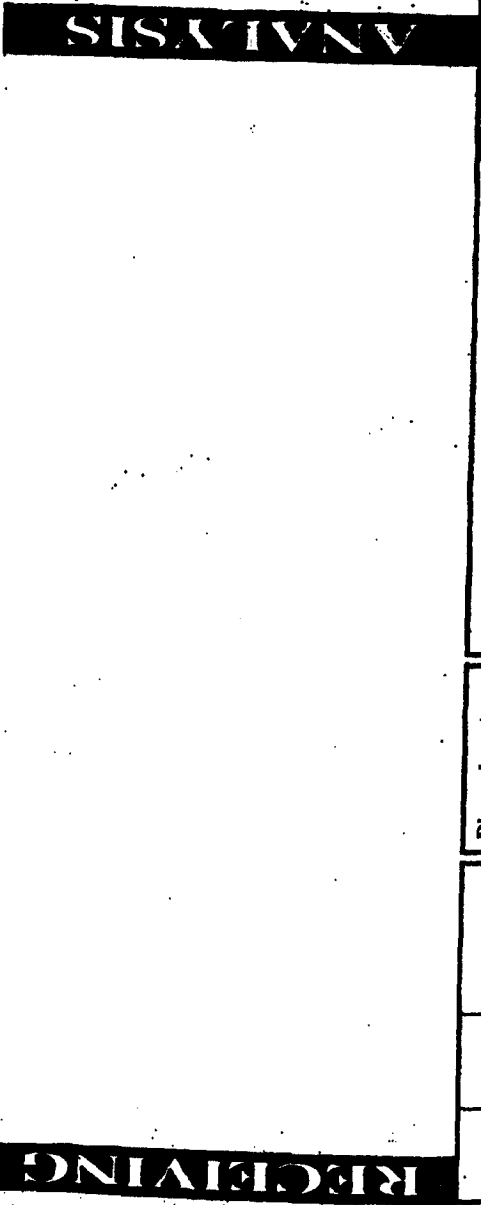
Clean  Debris:  Gypsum:

Very Light  Light  Moderate  Heavy  Very Heavy



# TEM ASBESTOS ANALYSIS

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



- 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. 3601-0206-0146 Quantum System

Grid Address B  
 Screen Magnification 9,200 X  
 Camera Constant 28.2  
 Accelerating Voltage 100KV  
 Beam Current 10  $\mu$ A  
 F-Factor 1.4

Analyst Radu Date 5/18/10

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification												EDS Analysis					Comments				
			Width	Length	NAM	TM	CM	CD	XX	CHG	CDG	UF	AD	AX	ADK	AQ	ADQ	AZQ	AZZ	Na	Mg		Si	Ca	Fe	
G5-3A																										
B5-7		N/D																								
H5-4																										
V5-1																										
B6-1																										
L6-5A																										
R6-7																										
R6-4																										
G6-1																										

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. 5-12-70

EMS Lab No. \_\_\_\_\_  
 Page \_\_\_\_\_ of \_\_\_\_\_

**RECEIVING**

**SISKINN**

- 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: 4200 X  
 Camera Constant: 2825  
 Accelerating Voltage: 100KV  
 Beam Current: 10  $\mu$ A  
 K-Factor: 1.4

Analyst Reddy Date 5/13/10

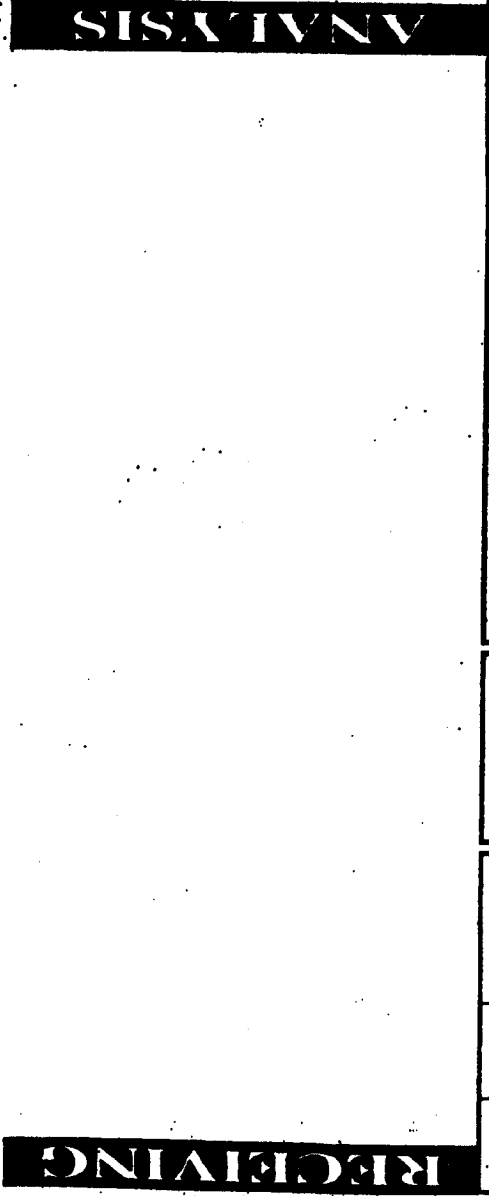
Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification											EDS Analysis					Comments						
			Width	Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADK	AQ	ADQ	AZQ	AZZ	Na		Mg	Si	Ca	Fe		
E23																											
E24																											
E25																											
R25																											
W25		P	1.5	52																							
W26																											
H23																											
H28																											
G31																											
G30																											
T83																											
R30																											
F31		F	3.5	55																							
F30																											
G37																											

- OBSERVATIONS:**
- Clean
  - Debris:
  - Gypsum:
  - Condition of the Grid:
- Very Light  Moderate  Heavy  Very Heavy   
 Very Light  Moderate  Heavy  Very Heavy   
 Light  Moderate  Heavy  Very Heavy   
 Light  Moderate  Heavy  Very Heavy

# TEM ASBESTOS ANALYSIS

Client Sand Bank  
 Sample No. 5-1270

EMS Lab No. 2 of       
 Page     



**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. 3200-0106-0263
- Kevex - Model No. 3600-0206-0146  
Quantum System

Grid Address: C  
 Screen Magnification: 9200 X  
 Camera Constant: 283  
 Accelerating Voltage: 100KV  
 Beam Current: 10  $\mu$ A  
 K-Factor: 1.4

Analyst Reddy Date 5/13/10

Grid Opening	Structure Number	Structure	Dimensions (mm)			Fiber Classification											EDS Analysis					Comments						
			Width	Length		NAM	TM	CM	CD	CO	CMQ	CDQ	UF	AD	AX	AIX	AQ	ADQ	AZQ	AZZ	Na		Mg	Si	Ca	Fe		
U34		NSD																										
U35																												
U36																												
U37																												
U38																												
U39																												
U40																												

- Clean  
 Debris:  
 Gaseous:
- Very Light  
 Light  
 Moderate  
 Heavy  
 Very Heavy

**OBSERVATIONS:**

AV

# TEM ASBESTOS ANALYSIS

Client Sand Bank  
 Sample No. 5-12-10

EMS Lab No. \_\_\_\_\_  
 Page 3 of \_\_\_\_\_

**RECEIVING**

**SIXTY-NINE**

- 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: 283  
 Accelerating Voltage: 100KV  
 Beam Current: 10  $\mu$ A  
 X-Factor: 1.4

Analyst Radh Date 5/13/10

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification											EDS Analysis					Comments						
			Width	Length	NAM	TM	CM	CD	CO	CMQ	CDQ	UF	AD	AX	ADK	AQ	ADQ	AZQ	AZZ	Na		Mg	Si	Ca	Fe		
K33		W-10																									
K36																											
C41																											
C42																											
F27																											
F44																											
F45																											
F46																											
G47																											
G48																											
H41																											
M49																											
K41																											
K42																											
K43																											

- OBSERVATIONS:**
- Clean
  - Debris:  Very Light  Light  Moderate  Heavy  Very Heavy
  - Curved:  Very Light  Light  Moderate  Heavy  Very Heavy







TEM-10A (2002)

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	R42							
	B31							
	C53							
	C56							
	E53							
	E56							
	C53							
	C56							
	E53							
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	F33							
	F36							
	B42							
	C44							
	C47							
	C49							
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	F33							
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ITEM-10A (2002)

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							
	B41							
	B44							
	C41							
	C43							
	C42							
	E43							
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	F23							
	F26							
	G23							
	G26							
	H23							
	H26							
	F23							
	F26							
	G23							
	G26							
	H23							
	H26							
	F23							
	F26							
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	F23							
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	H23							
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	F23							
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	G23							
	G26							
	H23							
	H26							
	F23							
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	G26							
	H23							
	H26							
	F23							
	F26							
	G23							
	G26							
	H23							
	H26							
	F23							
	F26							
	G23							
	G26							
	H23							
	H26							
	F23							
	F26							
	G23							
	G26							
	H23							
	H26							
	F23							
	F26							
	G23							





ITEM-10A (2002)

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
	C13							
	C21							
	E23							
	E26							
	E27							
	E28							
	E29							
	E30							
	E31							
	E32							
	E33							
	E34							
	E35							
	E36							
	E37							
	E38							
	E39							
	E40							
	E41							
	E42							
	E43							
	E44							
	E45							
	E46							
	E47							
	E48							
	E49							
	E50							
	E51							
	E52							
	E53							
	E54							
	E55							
	E56							
	E57							
	E58							
	E59							
	E60							

Count (Page ) of ) NIOSH 7402/ISO

Report number : 137822 Filter Blank1

Sample number: 00105200

File name: Northgate

Sample Description: mg NA

Preparation date: 6/8/2010 By JAP

Analysis date:

Grid opening dimension: 0.0094 mm<sup>2</sup>

Level of Analysis: (C): CD, CDX

Magnification: 9,200 X

Date Sample was Run: NA

Filter Type: MCE 385 mm2

Prep Time: NA

Grid loading

Condition of Grid (A): ADX, ADQ



**Spot Size Measurements**

Scope: #60B  
Date: May 2010  
Name: R

Conditions of Measurements

High Voltage: 100K  
Beam Current: 10  $\mu$ A  
Magnification: 19,200  
Condenser Aperture Size: #2

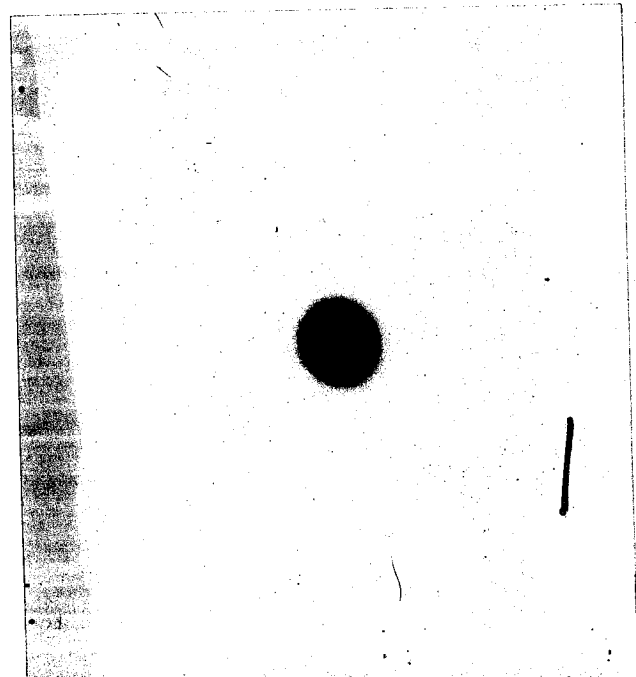
Measurements from a photo 8.5

Shortest diameter: 8.5 mm  
Longest diameter: 9 mm  
Average: 8.75 mm

Spot Size Calculation

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

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



## TEM CAMERA CONSTANT DETERMINATION

TEM H600B

Measured and Calculated by PS Date May 2010

$$\text{Camera Constant (mm A)} = D (\text{mm}) \times 1/2 \times d (\text{A})$$

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

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

$$\text{CC (1*)} = ( 24.1 \text{ mm}) \times 1/2 \times 2.355 = 28.34$$

$$\text{CC (2*)} = ( 27.8 \text{ mm}) \times 1/2 \times 2.039 = 28.34$$

$$\text{CC (3*)} = ( 39.3 \text{ mm}) \times 1/2 \times 1.442 = 28.34$$

$$\text{CC (4*)} = ( 45.9 \text{ mm}) \times 1/2 \times 1.230 = 28.3$$

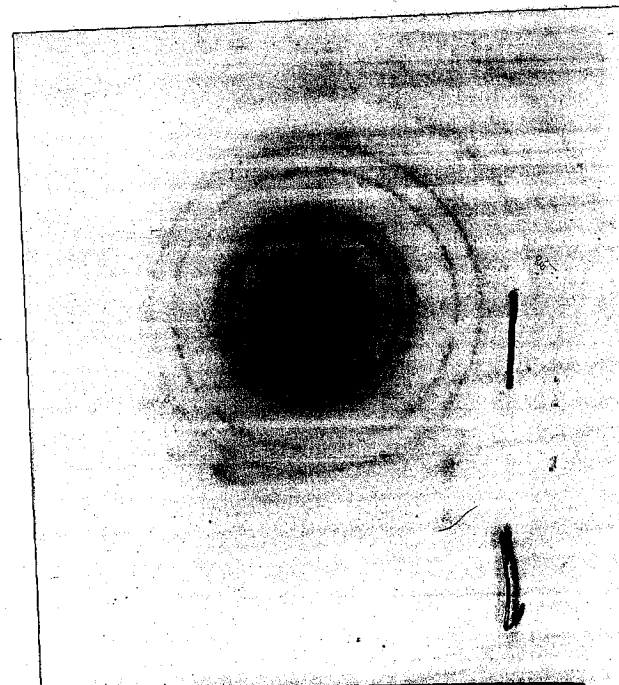
$$\text{Average Camera Constant} = \sqrt{28.3}$$

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

$$\text{Average Camera Constant} = (\text{CC} \langle 1 \rangle = \dots = \text{CC} \langle n \rangle) \times 1/n$$

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  
 WEEKLY CALIBRATION 3m  
 MONTHLY CALIBRATION 3m  
 AFTER SERVICE CALIBRATION \_\_\_\_\_

A-600/B-600/C-600

BY: PL

Measurement	Number of Spacing Flourescent Screen Magnification	Distance (mm)	Number of Spacing Film Magnification
1	<del>25,000x</del> 53.5/6 - 19,260	12,000x 51/12 -	9,180
2	53.5/6 - 19,260	51.5/12 -	9,270
3	53/6 - 19,080	51.5/12 -	9,270
4	53/6 - 19,080	51/12 -	9,180
5	53.5/6 - 19,260	51/12 -	9,180
6		51/12 -	9,180
7	ave 19,200		
8		ave 9,200	
9			
10			
AVERAGE:			

OPERATING VOLTAGE 100 KV

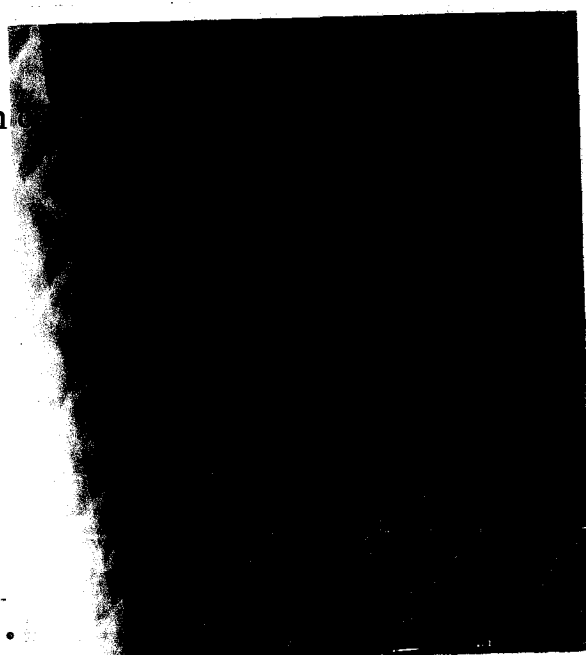
54,864 lines/inch or 2,160 lines/mm or 0.463µm/line

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  
 1992)





# SCOPE B

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

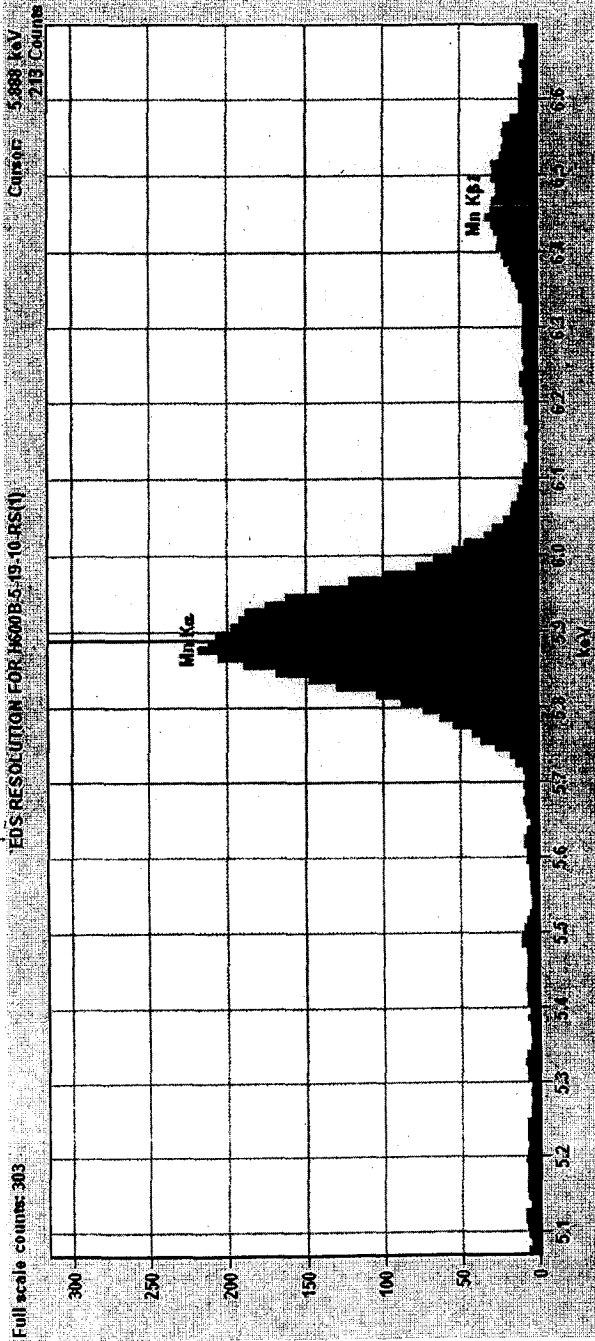
n	Cn	RUN 1		RUN 2		RUN 3		RUN 4		RUN 5		RUN 6	
		I(Si)=	In	I(Si)=	In	I(Si)=	In	I(Si)=	In	I(Si)=	In	I(Si)=	In
Na	1.81	1694	1.3034	1095	1.0674	986	1.5627	1133	1.4112	1004	1.5587	395	1.8251
Mg	7.57	6992	1.3207	3738	1.3077	4447	1.4491	4902	1.3641	4714	1.3885	1983	1.5205
Al	6.54	7768	1.027	4152	1.0171	5455	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





Peak #	Min. Centroid (eV)	Max. Centroid (eV)	FWHM (eV)	Area (Counts)	Height (Counts)	Ratio (%)
1	5.095	5.095	148.79	3991	148.79	148.79
2	5.095	5.095	155.00	3930	151.89	151.89
3	5.094	5.094	155.83	3178	153.21	153.21
4	5.092	5.092	149.17	3379	152.20	152.20
5	5.091	5.091	155.40	3438	152.04	152.04
Avg:		5.093	152.04	3583	3.54	3.54
Sigma:		0.002	3.54	358	10.0%	10.0%
RMS:		0.0%	2.3%	10.0%	2.3%	2.3%

Auto | Manual | FWHM | FWHM | FWHM | FWHM

Elements

Atomic Symbol:  Line:

Atomic Symbol:  Line:

Ratio Peaks

Additional Measurements

Measure Zero Peak  Measure FWHM  Measure RMS

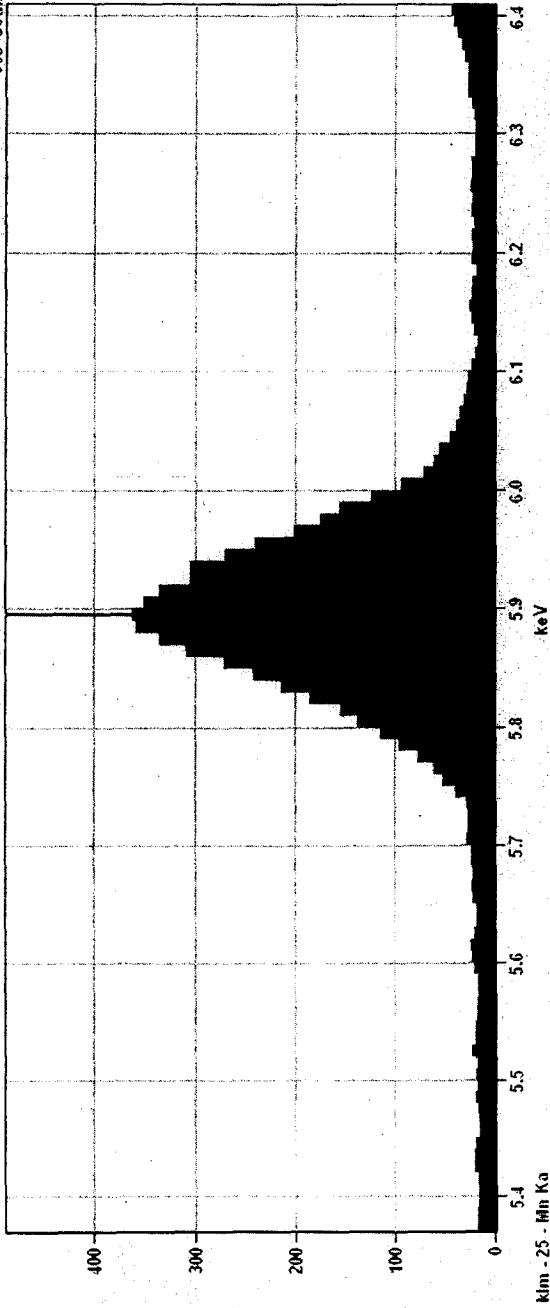
Acquisition Options

LiveTime (s)  Max Time:

Peak Count  No. Traces:

Time Constant:  (Slow)

Full scale counts: 489  
 resolution-h6008-12-07-09  
 Cursor: 5.896 keV  
 363 Counts



Auto | Manual | FWHM | Fe55 Bench Test |

Elements  
 Atomic Symbol: Min [K] Line: [K]  
 Atomic Symbol: [ ] Line: [K]  
 Ratio Peaks

Additional Measurements  
 Measure Zero Peak  Measure FWHM and FWTM

Acquisition Criteria  
 Lifetime (s) Max Time: [50]  
 Peak Count No. Trials: [5]  
 Time Constant: [50] (Slow)

Trial #	Min 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	5231	133.62	140.76
Avg:				140.76
Sigma:				10.52
RMS:				7.5%

138491



Laboratory Submittal Form

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Relinquished by: \_\_\_\_\_  
 Client: Northgate Environmental Management Date of Shipment: \_\_\_\_\_  
 Address: 1100 Quail Street, Suite 102 Shipped from: \_\_\_\_\_ Carrier: \_\_\_\_\_  
 Newport Beach, CA 92660 Client P.O. No: \_\_\_\_\_  
 Telephone: 949-260-9293 Client Project ID: 02027.01.2133  
 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: Standard Sample Preservatives: \_\_\_\_\_  
 Number of Samples: 5 (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			
138491-1	1	SSAQ4-03-1.00BPC	Elutriator
	2	SSAQ4-03-1.00BPC_FD	
	3	SSAQ4-03-1.50BPC	HOLD
	4	RSAM7-0.67BPC	
	5	RSAM7-1.00BPC	HOLD
	6		
	7	SEE ATTACHMENT	
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		

Laboratory Number: 138491 Received by: *[Signature]* Time: 9:56  
 Date of Package Delivery: 6/18/2010 Shipping Bill Retained? Yes  
 Condition of Package on Receipt: OK Condition of Custody Seal: Yes  
 Number of Samples: 5 (3 each) Chain of Custody Signature: *[Signature]*  
 Disposition of Samples: EMS LABS Misc. Info: SF 7/06

