



EMS Laboratories Inc.
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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: 9/22/2010 9:45AM
 EMS LAB No: 140411
 Date Prepared: 9/28/2010 9:39AM
 Analysis Date: 9/29/2010 10AM

Report Date:

Date Sampled: 9/14/2010 9:15AM

NIOSH 7402/ISO

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

EMS Laboratory Number: 140411	Mass of Respirable Dust on Filter: 175	µg
Customer Sample Number: SA113-0.00BPC	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: 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	Soil % Moisture	6.8	%
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: 2.57E+06 Structure /g PM 10 Limit of Detection: 7.70E+06 Structure /g PM 10

Test For Uniformity (Chi-Square results)

Structure Class	Min ID Level Required	Counts		Density Str/mm ²	Conc. Str/g PM10	Poisson 95% Confidence Interval	
		Primary Str.	Total Str.			Lower Limit Str/g PM10	Upper Limit Str/g PM10
Asbestos Structures >5um, ≤10um	ADX/CD	1	1	1.17	2.57E+06	6.51E+04	1.43E+07
Asbestos Structures >5um, ≤10um (Chrys)	CD	1	1	1.17	2.57E+06	6.51E+04	1.43E+07
Asbestos Structures >5um, ≤10um (Amph)	ADX	0	0	0	0	0	7.70E+06
Asbestos Structure >10um (Long)	ADX/CD	2	2	2.34	5.14E+06	6.23E+05	1.86E+07
Asbestos Structure >10um (Chrys)	CD	2	2	2.34	5.14E+06	6.23E+05	1.86E+07
Asbestos Structure >10um (Amph)	ADX	0	0	0	0	0	7.70E+06
Total Protocol Asbestos Structures	ADX/CD	3	3	3.51	7.72E+06	1.59E+06	2.25E+07
Protocol Asbestos Structures (Chrys)	CD	3	3	3.51	7.72E+06	1.59E+06	2.25E+07
Protocol Asbestos Structures (Amph)	ADX	0	0	0	0	0	7.70E+06
Total Protocol Non Asbestos Structures	NAM	2	2	2.34	5.14E+06	6.23E+05	1.86E+07


 Approved by Technical Director



NIOSH 7402/ISO

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

Client:	Derrick Willis, Tronox LLC-Henderson	Filter Type:	PC 385 mm ²
Report number :	I40411	Magnification:	9200
Sample number:	SA113-0.00BPC	Grid Opening Dimension: mm²	0.0094
Project:	2027.001/Tronox LLC Henderson, 560 W. Lake Mead Dr.,	Grid Loading:	Moderate

Elutriation Date: 9/28/2010 by Joel Paruli
Preparation Date: 9/28/2010 by Joel Paruli
Analysis Date: 9/29/2010 by Radha Singh
 Asbestos Structures >5um, ≤10um (Chrys) 1
 Asbestos Structures >5um, ≤10um (Amph) 0
 Asbestos Structure >10um (Chrys) 2
 Asbestos Structure >10um (Amph) 0
 Protocol Asbestos Structures (Chrys) 3
 Protocol Asbestos Structures (Amph) 0

Grid Openings 91
Mass - ug 175
Anlytical sensitivity

Grid ID	Grid Opennu	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										
	E23	None Detected										
	C31	None Detected										
	C34	None Detected										
	E31	None Detected										
	E34	None Detected										
	F31	None Detected										
	G33	F			18	110	1.96	11.96				Non Asbestos
	G36	None Detected										
	H33	None Detected										
	H36	None Detected										
	E41	None Detected										
	E44	None Detected										
	F41	None Detected										
	G43	None Detected										
	G46	None Detected										
	F51	None Detected										
	F54	None Detected										
	G51	None Detected										
G54	None Detected											
1B	E31	None Detected										
	E34	None Detected										
	F31	None Detected										
	F34	None Detected										
	G33	None Detected										
	G36	None Detected										
	H33	MD11			30	70	3.26	7.61				
		MF			1.5	55	0.16	5.98				Non Asbestos
	H36	None Detected										
	C41	None Detected										
	C44	None Detected										
	E41	None Detected										
	E44	None Detected										
	F41	None Detected										
	G43	None Detected										
	G46	None Detected										
	F51	None Detected										
	F54	None Detected										
	G51	None Detected										
1C	C26	None Detected										
	E23	None Detected										
	E26	None Detected										
	F23	None Detected										

Elutriator Data

Lab #: 140411

Sample ID: SA113-0.00 PPC

Time air flow started: 605

IST Flowmeter (mL/min): 100

Date: 9/28/10
JP

Client: Northgate

Sample weight (g): 75.5

Tumbler rpm: 30

ME Flowmeter (mL/min): 1970

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	805	190	0.0325	0.0250	7.45	30		30% loss
2	835		0.02999	0.02498	5.01	15		"
3	850		0.03058	0.02499	5.59	25		50% "
4	915		0.03359	0.02495	8.64	25		OK
5	940		0.03373	0.02492	8.81	25		OK
6	1005			0.02494				
7				0.02509				
8				0.02492				
ESTIMATE								
1	905			1.677		8		
2	921			4.708	175	18		
3	945			4.741		19		
4	1011			4.680				
5								
6								
7								
8								
9								
10								

prep: 9/28/10

* RAISE RPM TO 60

140411

2 soils for moisture content

53

9-24-10

140411

SA113-0.0 BPC

SSAN5-03-1.00 BPC

dish wt.

31.46 g

31.44

dish + s.

131.53 (init. wt. 100.07 g)

132.03 (100.59 g)

7:55 - 8:55

125.41 (93.95 g)

124.50 (93.06 g)

10:55 - 11:55

125.11 (93.65 g)

124.42 (92.98 g)

1 - 2:00

125.09 (93.63 Final wt.)

124.40 (92.96 g)

$$\% \text{ moist. } 100 \times \frac{100.07 - 93.63}{93.63} = 6.8\%$$

$$100 \times \frac{100.59 - 92.96}{92.96} = 8.2\%$$

BT

9-27-10

140525

SSAQ3-05-0.00 01 BPC

SSAQ3-04-0.0001 BPC

dish wt.

31.40

31.46

d + s

131.77 (initial wt. 100.31 g)

131.51 (100.05 g)

7:50 - 8:50

124.55 (93.09 g)

124.88 (93.42 g)

10:00 - 11:00

124.46 (93.00 g)

124.63 (93.17 g)

12:00 - 1:00

124.43 (92.97 g) Final wt.

124.62 (93.16 Final wt.)

$$\% \text{ moist. } 100 \times \frac{100.31 - 92.97}{92.97} = 7.9\%$$

$$100 \times \frac{100.05 - 93.16}{93.16} = 7.4\%$$

BT

Report number: 140411
 Sample number: SA113-0.00 BPC
 File name: Northgate
 Sample Description: 175 mg

Filter Type: PC 385 mm²
 Date Sample was Run: 9/28/10
 Magnification: 9,200 X

Preparation date: 9/28/10 By JAP
 Analysis date: 9/29/10 By RE
 (A): ADX, ADQ
 Grid loading: Moldack to heavy Condition of Grid: good

Grid opening dimension: 0.0094 mm²
 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	C2-3							
	E2-3							
	C2-4							
	E3-4							
	E3-4							
	K3-4							
	G3-3				E	185	110	Nonash.
	G3-6							
	I3-3							
	I3-6							
	E4-1							
	E4-4							
	E4-1							
	G4-3							
	G4-6							
	E5-1							
	E5-4							
	I5-1							
	I5-4							
	G5-3							
	G5-6							
1B	E3-1							
	E3-4							
	K3-1							
	K3-4							
	G3-3							
	G3-6							
	I3-3				MD11	MD13	70	Nonash.
	I3-6				MI-	1-1	55	
	G4-1							

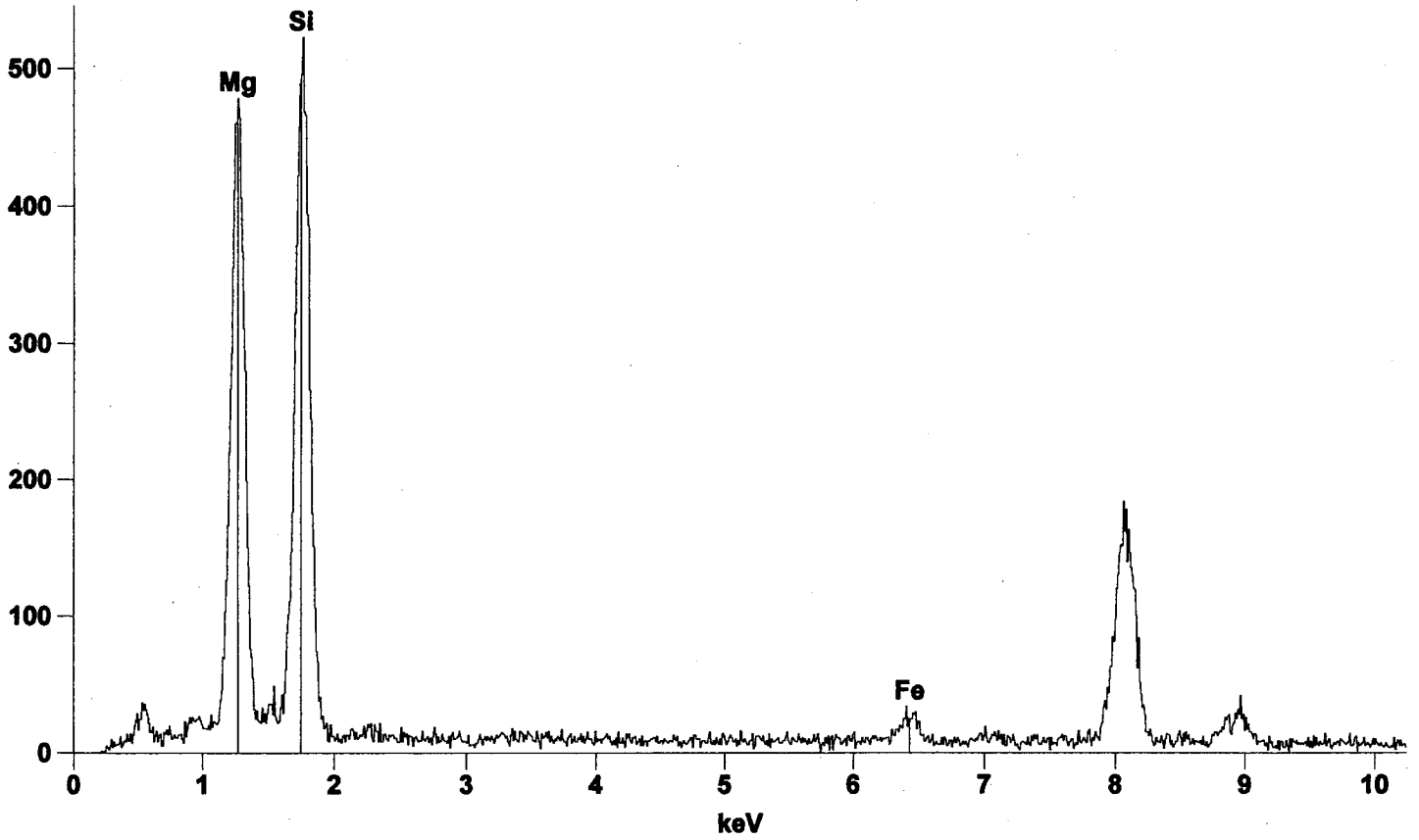
TEM Asbestos Structure Count (Page of)

Report number: 140411

SAMPLE NO: SA113 - 0.00 BPC

X 9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
1B	C4-4							
	E4-1							
	E4-4							
	E4-1							
	G4-3							
	G4-6							
	F5-1							
	F5-4							
	G5-1							
	1C	C2-6						
E2-3								
E2-6								
E2-3								
C3-1					M/DZ1	150	280	Chryso. EDs
					M/3	2	280	
C3-4								
E3-1								
E3-4								
E3-3					R	2	49	Non ash
E3-6								
C4-1								
C4-4								
E4-1								
E4-4								
1D	C2-3							
	C2-6							
	E2-3				M/D11	110	72	Chryso.
	E2-6				M/E	0.2	72	



Quantitative Results 140411-SA113-000BPC-C-C3-1

Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	5694	53.97	58.28	Mg	53.97
Si K	6439	43.24	40.41	Si	43.24
Fe K	382	2.80	1.31	Fe	2.80
Total		100.00	100.00		100.00



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 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:
 EMS LAB No: 140411
 Date Prepared: 9/24/2010 9:39AM
 Analysis Date: 9/24/2010 10AM

Report Date: October 6, 2010

Date Sampled: 9/14/2010 10:25AM

NIOSH 7402/ISO

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

EMS Laboratory Number: 140411	Mass of Respirable Dust on Filter: 178	µg
Customer Sample Number: SSAN5-03-1.00BPC	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: 61	
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	Soil % Moisture	8.2	%
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: 3.77E+06 Structure /g PM 10 Limit of Detection: 1.13E+07 Structure /g PM 10

Test For Uniformity (Chi-Square results)

Structure Class	Min ID Level Required	Counts		Density Str/mm ²	Conc. Str/g PM10	Poisson 95% Confidence Interval	
		Primary Str.	Total Str.			Lower Limit Str/g PM10	Upper Limit Str/g PM10
Asbestos Structures >5um, ≤10um	ADX/CD	59	59	102.9	2.23E+08	1.69E+08	2.87E+08
Asbestos Structures >5um, ≤10um (Chrys)	CD	53	53	92.4	2.00E+08	1.50E+08	2.61E+08
Asbestos Structures >5um, ≤10um (Amph)	ADX	6	6	10.5	2.26E+07	8.31E+06	4.93E+07
Asbestos Structure >10um (Long)	ADX/CD	42	42	73.2	1.58E+08	1.14E+08	2.14E+08
Asbestos Structure >10um (Chrys)	CD	31	31	54.1	1.17E+08	7.94E+07	1.66E+08
Asbestos Structure >10um (Amph)	ADX	11	11	19.2	4.15E+07	2.07E+07	7.42E+07
Total Protocol Asbestos Structures	ADX/CD	101	101	176.1	3.81E+08	3.10E+08	4.63E+08
Protocol Asbestos Structures (Chrys)	CD	84	84	146.5	3.17E+08	2.53E+08	3.92E+08
Protocol Asbestos Structures (Amph)	ADX	17	17	29.6	6.41E+07	3.74E+07	1.03E+08
Total Protocol Non Asbestos Structures	NAM	2	2	3.5	7.54E+06	9.14E+05	2.73E+07


 Approved by Technical Director



Client:	Derrick Willis, Tronox LLC-Henderson	Filter Type:	PC 385 mm ²
Report number :	140411	Magnification:	9200
Sample number:	SSAN5-03-1.00BPC	Grid Opening Dimension: mm²	0.0094
Project:	2027.001/Tronox LLC Henderson, 560 W. Lake Mead Dr.,	Grid Loading:	Moderate

Elutriation Date: 9/24/2010 by Joel Paruli
Preparation Date: 9/24/2010 by Joel Paruli
Analysis Date: 9/24/2010 by Radha Singh
 Asbestos Structures >5um, ≤10um (Chrys) 53
 Asbestos Structures >5um, ≤10um (Amph) 6
 Asbestos Structure >10um (Chrys) 31
 Asbestos Structure >10um (Amph) 11
 Protocol Asbestos Structures (Chrys) 84
 Protocol Asbestos Structures (Amph) 17

Grid Openings 61
Mass - ug 178
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	C23	MD11	1		25	60	2.72	6.52					
		MF		1	0.5	60	0.05	6.52	CD	Chrysotile			
		MD11	2		100	150	10.87	16.30					
1A	C26	MF		2	1.5	50	0.16	5.43		Amosite			
		MD11	3		15	55	1.63	5.98					
		MF		3	0.5	55	0.05	5.98	CD	Chrysotile			
1A	F31	F		4	0.5	78	0.05	8.48	CD	Chrysotile			
		MD11			60	90	6.52	9.78				Non Asbestos	
		MF			5	90	0.54	9.78					
1A	F34	MD11			160	280	17.39	30.43				Non Asbestos	
		MF			6.5	270	0.71	29.35					
		MD22	5		170	900	18.48	97.83				Crosses Grid Bar	
1A	G31	MF		5	3.5	420	0.38	45.65		Amosite			
		MB		6	3	120	0.33	13.04	CD	Chrysotile		Crosses Grid Bar	
		MD11			80	125	8.70	13.59					
1A	G34	MF			2.5	72	0.27	7.83					
		MD11			58	70	6.30	7.61	CD	Chrysotile			
		MF			1	58	0.11	6.30					
		MD11			130	200	14.13	21.74					
		MF			5	190	0.54	20.65		Amosite			
		MD11			110	230	11.96	25.00				Non Asbestos	
		MF			10	110	1.09	11.96					
1A	C41	MD11			150	180	16.30	19.57					
		MF		8	0.5	60	0.05	6.52	CD	Chrysotile			
		F		9	0.5	200	0.05	21.74	CD	Chrysotile		Crosses Grid Bar	
		MD21		9	70	185	7.61	20.11				Crosses Grid Bar	
1A	C44	MF		10	1	185	0.11	20.11	CD	Chrysotile		Crosses Grid Bar	
		MD11			80	920	8.70	100.00				Crosses Grid Bar	
		MB			5	920	0.54	100.00	CD	Chrysotile		Crosses Grid Bar	
		F		10	11	0.2	52	0.02	5.65	CD	Chrysotile		
1A	E41	MD11			12	85	1.30	9.24					
		MF		12	0.5	85	0.05	9.24	CD	Chrysotile			
		MD11			60	94	6.52	10.22					
		MF		13	3.5	94	0.38	10.22		Amosite			
		MD11			40	140	4.35	15.22					
		MF		14	2.5	110	0.27	11.96		Amosite			
		MD21		14		220	240	23.91	26.09				
		MF		15		1	110	0.11	11.96	CD	Chrysotile		
1A	E41	MD11			60	70	6.52	7.61					
		MF		16	1	70	0.11	7.61	CD	Chrysotile			
		MD11			90	230	9.78	25.00					
		MF		17	0.5	105	0.05	11.41	CD	Chrysotile			
1A	E41	MD11			35	90	3.80	9.78					
		MF		18	0.2	90	0.02	9.78	CD	Chrysotile			



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				
1A	E34	None Detected								
1A	G41	MD11	18	40	88	4.35	9.57			
		MF		19	1	62	0.11	6.74	CD	Chrysotile
		MD21	19	160	220	17.39	23.91			
		MF		20	0.5	100	0.05	10.87	CD	Chrysotile
		F	20	21	0.5	50	0.05	5.43	CD	Chrysotile
1B	C23	MD11	21	20	112	2.17	12.17			
		MF		22	1	100	0.11	10.87	CD	Chrysotile
1B	C26	MD11	22	22	155	2.39	16.85			
		MF		23	1	130	0.11	14.13	CD	Chrysotile
		MD11	23	85	115	9.24	12.50			
		MF		24	0.5	115	0.05	12.50	CD	Chrysotile
1B	E23	MD11	24	25	90	2.72	9.78			
		MF		25	0.5	90	0.05	9.78	CD	Chrysotile
		MD11	25	75	140	8.15	15.22			
		MB		26	2	140	0.22	15.22	CD	Chrysotile
		MD11	26	145	170	15.76	18.48			
		MF		27	0.5	110	0.05	11.96	CD	Chrysotile
1B	E26	MD11		60	790	6.52	85.87			Crosses Grid Bar
		MF		5.5	790	0.60	85.87			Amosite
		MD22	27	100	160	10.87	17.39			Crosses Grid Bar
		MF		28	0.5	90	0.05	9.78	CD	Chrysotile
		MF		5	85	0.54	9.24			Amosite
		MD11	28	10	100	1.09	10.87			
		MF		29	3	100	0.33	10.87		Amosite
		MD11	29	45	175	4.89	19.02			
		MF		30	0.5	150	0.05	16.30	CD	Chrysotile
		MD11	30	60	160	6.52	17.39			Crosses Grid Bar
		MF		31	0.5	120	0.05	13.04	CD	Chrysotile
1B	F31	MD11	31	115	190	12.50	20.65			
		MF		32	1	115	0.11	12.50		Amosite
1B	F34	F	32	33	1	80	0.11	8.70	CD	Chrysotile
		MD11		85	550	9.24	59.78			Crosses Grid Bar
		MF		5.5	550	0.60	59.78			Amosite
1B	G31	F		5.5	160	0.60	17.39			Crosses Grid Bar
		F	33	34	0.2	58	0.02	6.30	CD	Chrysotile
		F	34	35	2.5	75	0.27	8.15		Amosite
1B	H33	MD11		75	150	8.15	16.30			Non Asbestos
		MF		8	100	0.87	10.87			
		MD11		120	160	13.04	17.39			
		MF		5	120	0.54	13.04			Amosite
1B	C41	MD11	35	100	140	10.87	15.22			
		MF		36	1	140	0.11	15.22	CD	Chrysotile
		F	36	37	0.2	52	0.02	5.65	CD	Chrysotile
		MD11	37	90	170	9.78	18.48			
		MF		38	1	170	0.11	18.48	CD	Chrysotile
1B	E41	MD11	38	70	90	7.61	9.78			
		MF		39	1	90	0.11	9.78	CD	Chrysotile
		MD11		75	160	8.15	17.39			Non Asbestos
		MF		3.5	150	0.38	16.30			
1B	E44	MD21	39	60	70	6.52	7.61			
		MF		40	3.5	50	0.38	5.43		Amosite
		MD11	40	85	220	9.24	23.91			
		MF		41	1	220	0.11	23.91		Amosite
1B	F46	MD11	41	110	350	11.96	38.04			
		MF		42	3	160	0.33	17.39		Amosite



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	Area				
		MD11	42		20	190	2.17	20.65			
		MF		43	1.5	140	0.16	15.22	CD	Chrysotile	
		MD11	43		10	90	1.09	9.78			
		MF		44	1	80	0.11	8.70	CD	Chrysotile	
1C	C23	MD11	44		110	170	11.96	18.48			
		MF		45	0.2	110	0.02	11.96	CD	Chrysotile	
		F	45	46	1	78	0.11	8.48	CD	Chrysotile	
		MD11	46		120	140	13.04	15.22			
		MF		47	1	120	0.11	13.04	CD	Chrysotile	
		F	47	48	0.5	135	0.05	14.67	CD	Chrysotile	
1C	E34	MD11			100	380	10.87	41.30			Crosses Grid Bar
		MF			5.5	330	0.60	35.87		Amosite	
		MD11	48		15	52	1.63	5.65			
		MF		49	0.5	52	0.05	5.65	CD	Chrysotile	
1C	F31	F	49	50	1	85	0.11	9.24	CD	Chrysotile	
		F	50	51	1	80	0.11	8.70	CD	Chrysotile	
1C	F36	MD11	51		180	230	19.57	25.00			
		MF		52	0.5	110	0.05	11.96	CD	Chrysotile	
		F	52	53	1	70	0.11	7.61	CD	Chrysotile	
1C	G33	F	53	54	1	92	0.11	10.00	CD	Chrysotile	
1C	G36	F	54	55	0.5	70	0.05	7.61	CD	Chrysotile	
1C	C41	MD11	55		90	220	9.78	23.91			
		MF		56	1.5	220	0.16	23.91	CD	Chrysotile	
1C	C44	F	56	57	2	155	0.22	16.85		Amosite	
1C	E41	F	57	58	1	65	0.11	7.07	CD	Chrysotile	
		MD11	58		35	170	3.80	18.48			
		MF		59	1	72	0.11	7.83	CD	Chrysotile	
		F	59	60	0.5	55	0.05	5.98	CD	Chrysotile	
1C	E44	MD11	60		80	140	8.70	15.22			
		MF		61	3.5	140	0.38	15.22		Amosite	
1C	F41	MD11	61		10	70	1.09	7.61			
		MF		62	0.5	70	0.05	7.61	CD	Chrysotile	
1C	F44	MD11	62		30	75	3.26	8.15			
		MF		63	0.5	75	0.05	8.15	CD	Chrysotile	
		MD11	63		100	200	10.87	21.74			
		MF		64	1	125	0.11	13.59	CD	Chrysotile	
		F	64	65	0.5	50	0.05	5.43	CD	Chrysotile	
1D	C23	MD11	65		70	440	7.61	47.83			
		MF		66	1	440	0.11	47.83	CD	Chrysotile	
		MD11	66		100	160	10.87	17.39			
		MF		67	1	145	0.11	15.76	CD	Chrysotile	
1D	C26	MD11	67		160	300	17.39	32.61			
		MF		68	3.5	225	0.38	24.46		Amosite	
		F	68	69	1	52	0.11	5.65	CD	Chrysotile	
1D	E23	MD11	69		30	70	3.26	7.61			
		MF		70	0.5	70	0.05	7.61	CD	Chrysotile	
		MD11	70		52	55	5.65	5.98			
		MF		71	0.5	55	0.05	5.98	CD	Chrysotile	
		MD11	71		38	180	4.13	19.57			Crosses Grid Bar
		MF		72	1.5	180	0.16	19.57		Amosite	Crosses Grid Bar
1D	E34	None Detected									
1D	F31	MD11	72		25	62	2.72	6.74			
		MF		73	1	62	0.11	6.74	CD	Chrysotile	
		MD11			150	160	16.30	17.39			Non Asbestos
		MF			12	120	1.30	13.04			
		F	73	74	1	53	0.11	5.76	CD	Chrysotile	
1D	F34	MD11			100	300	10.87	32.61			
		MF			5	300	0.54	32.61		Amosite	
		F	74	75	0.2	88	0.02	9.57	CD	Chrysotile	



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	Width	Length				
		MD11	75		15	92	1.63	10.00				
		MF		76	0.2	92	0.02	10.00	CD	Chrysotile		
1D	G31	MD11	76		50	210	5.43	22.83				
		MF		77	1	170	0.11	18.48	CD	Chrysotile		
		MD11			150	320	16.30	34.78				Crosses Grid Bar
		MF			4.5	320	0.49	34.78		Amosite		Crosses Grid Bar
1D	G36	None Detected										
1D	C41	MD21	77		50	92	5.43	10.00				
		MF		78	1	92	0.11	10.00	CD	Chrysotile		
		MD11			15	62	1.63	6.74				
		MF			5.5	62	0.60	6.74		Amosite		
1D	F43	MD11	78		40	100	4.35	10.87				
		MF		79	1	70	0.11	7.61	CD	Chrysotile		
		MD21			100	200	10.87	21.74				
		MF			5.5	160	0.60	17.39		Amosite		
1D	F46	MD11			55	455	5.98	49.46				
		MF			7.5	455	0.82	49.46		Amosite		
		MD11	79		15	85	1.63	9.24				
		MF		80	1	85	0.11	9.24	CD	Chrysotile		
1D	G51	None Detected										
1D	F53	F	80	81	0.5	120	0.05	13.04	CD	Chrysotile		
1E	E23	MD11	81		100	140	10.87	15.2174				
		MF		82	0.2	80	0.02	8.70	CD	Chrysotile		
		F	82	83	0.2	50	0.02	5.43	CD	Chrysotile		
		F	83	84	0.5	52	0.05	5.65	CD	Chrysotile		
		MD11	84		18	78	1.96	8.48				
		MF		85	0.5	78	0.05	8.48	CD	Chrysotile		
1E	E34	MD21	85		30	80	3.26	8.70				
		MF		86	2	59	0.22	6.41		Amosite		
1E	F31	MD11			75	108	8.15	11.74				
		MF			7.5	108	0.82	11.74		Amosite		
1E	G31	None Detected										
1E	H33	MD11	86		8	65	0.87	7.07				
		MB		87	1.5	65	0.16	7.07	CD	Chrysotile		
		F			10	50	1.09	5.43				Non Asbestos
1E	H36	MD11	87		40	55	4.35	5.98				
		MF		88	2.5	55	0.27	5.98		Amosite		
1E	C44	MD11	88		100	190	10.87	20.65				
		MF		89	1	175	0.11	19.02	CD	Chrysotile		
		MD11	89		40	115	4.35	12.50				
		MB		90	2.5	115	0.27	12.50	CD	Chrysotile		
		MD11	90		40	90	4.35	9.78				
		MB		91	3.5	90	0.38	9.78		Amosite		
1E	E44	F			10	72	1.09	7.83		Amosite		
		MD11	91		45	105	4.89	11.41				
		MF		92	1	68	0.11	7.39		Amosite		
		F	92	93	0.2	50	0.02	5.43	CD	Chrysotile		
1E	C51	MD11	93		12	52	1.30	5.65				
		MF		94	0.5	55	0.05	5.98	CD	Chrysotile		
1E	E54	MD11			160	230	17.39	25.00				
		MF			5.5	165	0.60	17.93		Amosite		
		MD32	94		160	540	17.39	58.70				
		MF			5	530	0.54	57.61		Amosite		
		MF		95	1	80	0.11	8.70	CD	Chrysotile		
		F	95	96	0.2	65	0.02	7.07	CD	Chrysotile		
1E	F53	F	96	97	0.2	55	0.02	5.98	CD	Chrysotile		
1E	C64	MD11	97		160	280	17.39	30.43				
		MF		98	0.5	180	0.05	19.57	CD	Chrysotile		
		MD11	98		115	170	12.50	18.48				
		MF		99	0.5	170	0.05	18.48	CD	Chrysotile		
		F			4.5	100	0.49	10.87		Amosite		Crosses Grid Bar
1E	F64	MD11	99		38	94	4.13	10.22				
		MF		100	1	94	0.11	10.22	CD	Chrysotile		
		MD21	100		80	150	8.70	16.30				
		MF		101	0.5	55	0.05	5.98	CD	Chrysotile		

140411

2 soils

for moisture content

53

9-24-10

140411

SA-113-0.0 BPC

SSAMS-03-1.00 BPC

dish wt.

31.46 g

31.44

dish + s.

131.53 (init. wt. 100.07 g)

132.03 (100.59 g)

7:55 - 8:55

125.41 (93.95 g)

124.50 (93.06 g)

10:55 - 11:55

125.11 (93.65 g)

124.42 (92.98 g)

1 - 2:00

125.09 (93.63 final wt.)

124.40 (92.96 g)

% moist. $100 \times \frac{100.07 - 93.63}{93.63} = 6.8\%$

$100 \times \frac{100.59 - 92.96}{92.96} = 8.2\%$

Date: 9/24/10

Client: Northgate

Lab #: 140411

Sample ID: SSAN5-03-1.00 PPC Sample weight (g): 74.4

Time air flow started: 7:00

Tumbler rpm: 30

IST Flowmeter (mL/min): 100

ME Flowmeter (mL/min): 1370

Filter No.	Start Time & End 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/mln)	Optimal time (min)
1	9:00	190	0.03633	0.02450	11.83	30		
2	9:30		0.03420	0.02486	9.34	15		
3	9:45		0.03992	0.02507	14.85	15		
4	10:00		0.02679	0.02521	1.58	15		
5	10:15		0.03762	0.02477	12.85	15		
6	10:30		0.03467	0.02530	9.37	15		
7	10:45		0.02918	0.02508	4.10	15		
8	11:00		0.02790	0.02516	2.74	20		
ESTIMATE								
STime	End Time						Dep. Rate	Estimate
1	9:58		4.801	4.726	0.075	3		
2	10:05		4.759	4.616	0.143	5		
3	10:20		4.941	4.656	0.285	6		
4	10:32		4.714	4.621	0.093	8 1/2		
5	10:50		4.889	4.646	0.243	6		
6	11:08		4.823	4.648	0.225	6		
7	11:25		4.822	4.637	0.185	4 1/2		
8	11:40		4.806	4.628	0.178	4		
9								
10								

OK
30% loss
OK
95% loss
10% loss
2% loss
50% loss
90% loss

* RAISE RPM TO _____

Date: 9/24/10

Client: Northgate

Lab #: 140411

Sample ID: SSANS-203-1.00 PPC Sample weight (g):

Time air flow started: 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)
9	1120	190	0.04598	0.02494	21.04	25		
2	1145							
2								
4								
5								
6								
7								
8								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
Start Time	End Time						Dep. Rate	Estimate

* RAISE RPM TO 0

ELECTRON DIFFRACTION ANALYSIS

EMS LAB NO. 140411

SAMPLE NO. SSF11

CLIENT Normgatz

GRID A

DATE ANALYZED 9-28-10

PHOTO NO. 3572

Camera Constant (CC) 178.2

K-Factor for Mg 1.4

EDS PEAK AREA RATION

Na Mg Si Ca Fe Other

DIFFRACTION DATA - AMPHIBOLES

d₁ 9.40

R₁ 3.0

d₂ 5.64

R₂ 5.0

d₁/d₂ 1.67

θ (<R₁R₂) 90

Zone Axis 100

Fiber Identification AMOSITE

DIFFRACTION DATA - CHRYSOTILE

(002)/ (004) /

R₁ =

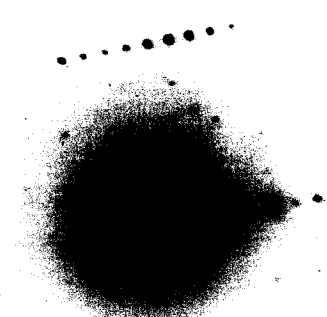
(020)

R₂ =

(110)

R₃ =

Layer Lines



02/13/06
sh

TEM CALIBRATION 13A
(1994)

Copy

Count (Page of) NIOSH 7402/ISO

Prep Time: 1200230

Report number: 140411
Sample number: SSANS-03-1.00 BPC
File name: Northgate
Sample Description: 178 mg

Filter Type: PC 385 mm2
Date Sample was Run: 9/24/10
Magnification: 9,200 X

Preparation date: 9/24/10 By JAP
Analysis date: By

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

Grid loading: Moderate to heavy Condition of Grid: 9wC
(A): ADX, ADQ

Grid	Grid Opening	Number of structures Primary	Number of structures Total	Class	Type of Structure	Width mm	Length mm	Comments
A	C23	1			MD11	25	60	Chryso. EDS
					MF	0.5	60	
		2			MD11	100	150	EDS amorph
					MF	1.5	50	
	C2-6	3			MD11	15	55	Chryso.
					MF	0.5	55	
					F	0.5	78	Chryso
					MD11	60	90	Non asb.
					MF	5	90	
	F3-1				MD11	160	280	Non asb. nodular
					MF	6.5	270	
	F3-4				MD12	170	900x	EDS amorph
					MF	3.5	420	
					MB	3	120x	chryso. EDS.
	G3-1				MD11	80	125	
					MF	2.5	72	
					MD11	58	70	Chryso.
					MF	1	58	
					MD11	130	200	amorph EDS
					MF	5	190	
					MD11	110	230	Non asb.
					MF	10	110	
	G3-4				MD11	150	180	chryso.
					MF	0.5	60	
					F	0.5	200x	Chryso.
					MD21	70	185x	Chryso
					MF	1	185x	
	C4-1				MD11	80	920x	chryso
					MB	5	920x	
					F	0.2	52	Chryso
	C4-4				MD11	12	85	chryso.
					MF	0.5	85	

all fibers which have x mark on the number is doubled

TEM Asbestos Structure Count (Page of)

Report number: 140411

SAMPLE NO: SSAN5-03-1.00 BPCX9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
					MD11	60	94	amorph
					MF	3.5	94	
					MD11	40	140	amorph # 3572 EDS
					MF	2.5	110	
	E41				MD21	220	240	Chryso.
					MF	1	110	
					MD11	60	70	chryso.
					MF	1	70	
					MD11	90	230	chryso.
					MF	0.5	105	
					MD11	3.5	90	chryso.
					MF	0.2	90	
	E3-4							
	G4-1				MD11	40	88	chryso.
					MF	1	62	
					MD21	160	220	chryso.
					MF	0.5	100	
					F	0.5	50	chryso
	IB C2-3				MD11	20	112	chryso.
					MF	1	100	
	C2-6				MD11	22	155	chryso.
					MF	1	130	
					MD11	85	115	chryso.
					MF	0.5	115	
	E2-2				MD11	25	90	chryso.
					MF	0.5	90	
					MD11	75	140	chryso.
					MB	2	140	
					MD11	105	170	chryso.
					MF	0.5	110	
	E2-6				MD11	60	790	EDS amorph
					MF	5.5	790	
					MD22	100	160	
					MF	0.5	90	chryso
					MF	5	85	amorph
					MD11	10	100	EDS amorph
					MF	3	100	

TEM Asbestos Structure Count (Page of)

Report number: 14041

SAMPLE NO: SSANS-03-1.00 BPCX 9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
					MDII	4.5	175	chryso.
					MF	0.5	150	
					MDII	60	160	chryso.
					MF	0.5	120	
	E3-1				MDII	115	190	amosic
					MF	1	115	
	E3-4				F	1	80	chryso.
					MDII	85	550	EDS amosic
					MF	5.5	550	
	G23-1				F	5.5	160	amosic
					F	0.2	58	chryso.
					F	2.5	75	amosic
	H3-3				MDII	75	150	Non ash.
					MF	8	160	
					MDII	120	160	amosic EDS
					MF	5	120	
	I4-1				MDII	140	140	chryso.
					MF	1	140	
					F	0.2	52	chryso.
					MDII	90	170	chryso.
					MF	1	170	
	K4-1				MDII	70	90	chryso.
					MF	1	90	
					MDII	75	160	Non ash.
					MF	3.5	150	
	L4-4				MDII	60	70	amosic
					MF	5.5	50	
					MDII	85	220	EDS amosic
					MF	1	220	
	M4-6				MDII	110	350	amosic
					MF	3	160	
					MDII	20	190	chryso.
					MF	1.5	140	
					MDII	10	90	chryso.
					MF	1	80	

TEM Asbestos Structure Count (Page of)

Report number: 140411

SAMPLE NO: SSANS-03-1.00 BPCX 9,200

Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments		
C	C2-3	1			MDII	110	170	chryso.		
					MF	0.2	110			
		2			R	1	78	chryso		
		3			MDII	120	140	chryso.		
					MF	1	120			
		4			R	0.5	135	chryso.		
		E3-4					MDII	100	380	Amosite EPS
							MF	5.5	330	
							MDII	11	52	chryso
							MF	0.5	52	
		E3-1					R	1	85	chryso.
							R	1	80	chryso.
E3-6					MDII	180	230	chryso.		
					MF	0.5	110			
					R	1	70	chryso.		
					R	1	92	chryso.		
G3-3					R	0.5	70	chryso.		
					R	0.5	70	chryso.		
G3-6					MDII	90	220	chryso.		
					MF	1.5	220			
C4-1					R	12	155	amosite		
					R	1	65	chryso.		
E4-1					MDII	35	170	chryso.		
					MF	1	72			
					R	0.5	55	chryso.		
					MDII	80	140	amosite		
E4-4					MF	3.5	140			
					MDII	10	70	chryso		
E4-7					MF	0.5	70			
					MDII	30	75	chryso.		
E4-4					MF	0.5	75			
					MDII	100	240	chryso		
					MF	1	125			
					R	0.5	50	chryso		
ID	C2-3	1			MDII	70	440	chryso.		
					MF	1	440			
		2			MDII	140	160	chryso		
					MF	1	145			

TEM Asbestos Structure Count (Page of)

Report number: 140411

SAMPLE NO: SSANS-03-1.00 BPCX 9,200

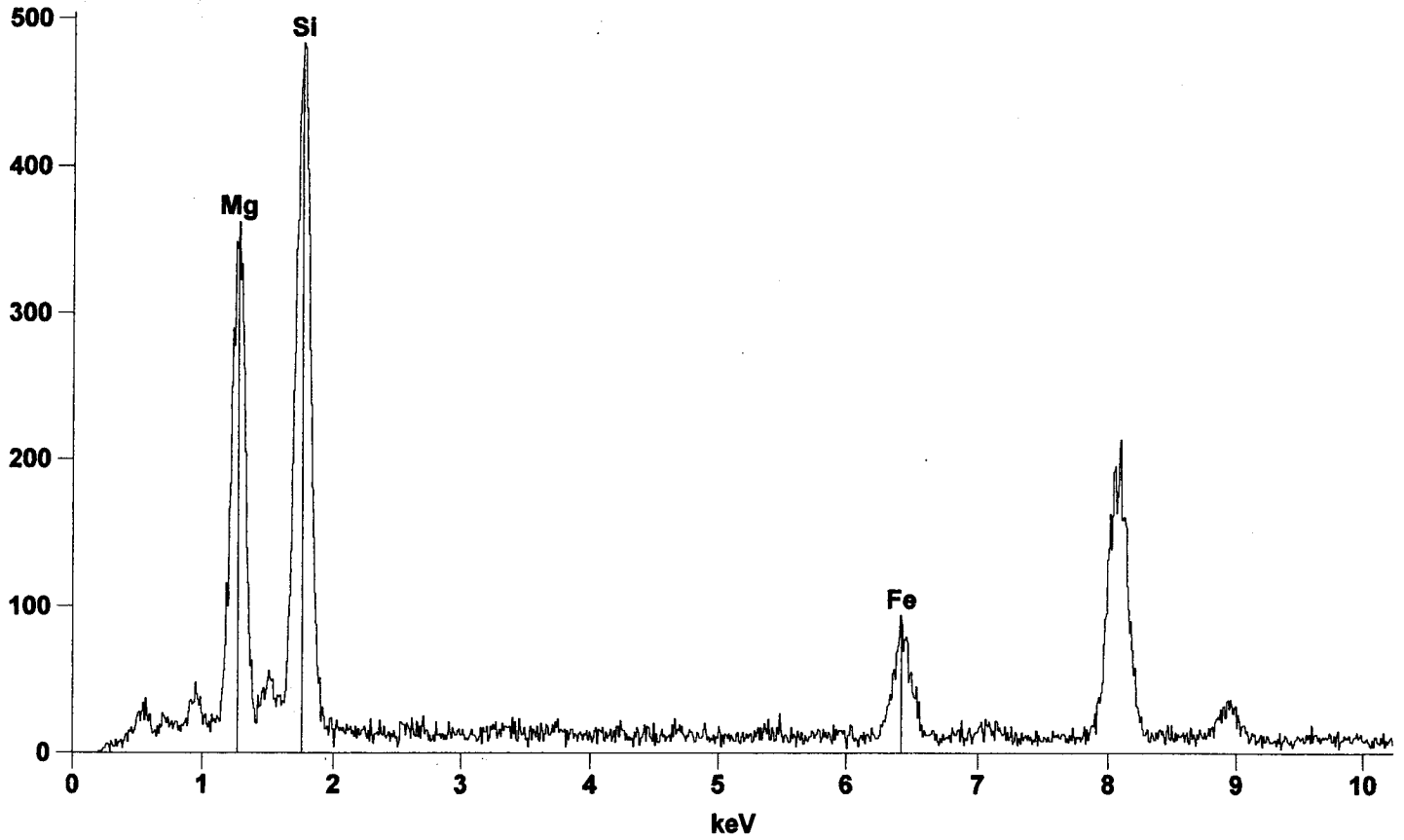
Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments		
D	E2-6				MD11	160	340	Amosite		
					MF	3.5	225			
					F	1	52	Chryso.		
E	E2-3				MD11	30	70	Chryso.		
					MF	0.5	70			
					MD11	5.2	55	Chryso.		
					MF	0.5	55			
					MD11	38	180	Amosite		
					MF	1.5	180			
E3	E3-1				MD11	25	62	Chryso.		
					MF	1	62			
					MD11	150	160	Non ash		
					MF	12	120			
F3	F3-4				F	1	53	Chryso.		
					MD11	100	300	Amosite		
					MF	5	300			
					F	0.2	88	Chryso.		
					MD11	15	92	Chryso.		
					MF	0.2	92			
G3	G3-1				MD11	50	210	Chryso.		
					MF	1	170			
					MD11	150	320	Amosite		
G3	G3-6				MF	4.5	300			
		H4	H4-1				MD21	50	92	Chryso.
							MF	1	92	
					MD11	15	62	Amosite		
F4	F4-3				MF	5.5	62			
					MD11	40	100	Chryso.		
					MF	1	70			
F4	F4-6				MD21	100	200	Amosite		
					MF	5.5	160			
					MD11	55	455	Amosite		
					MF	7.5	455			
H4	H4-7				MD11	25	85	Chryso.		
					MF	1	85			

TEM Asbestos Structure Count (Page of)

Report number: 140411

SAMPLE NO: SSANS-03-1.00 BPCX 9,200

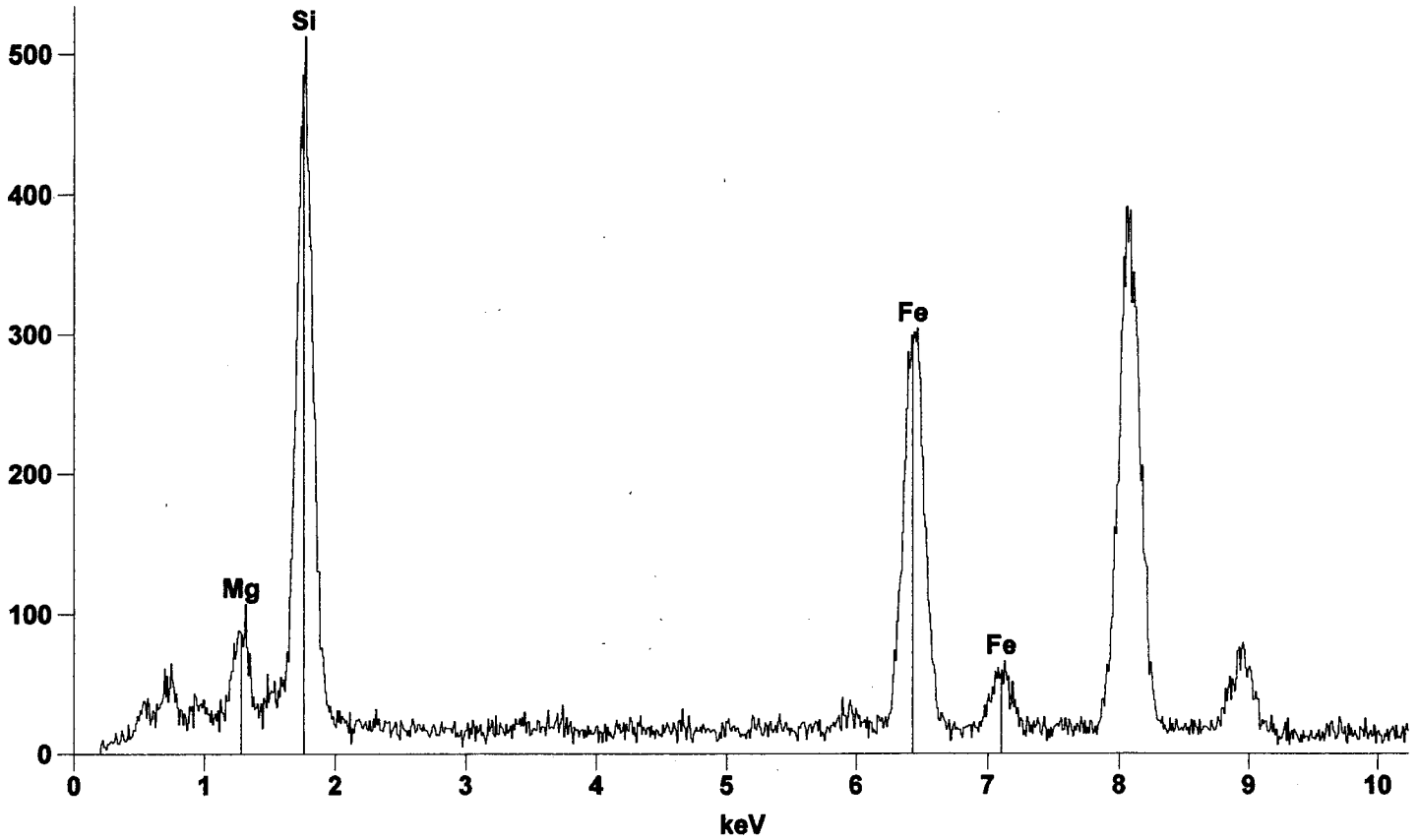
Grid	Grid Opening	Number of structures primary	Number of structures Total	Class	Type of Structure	Width Mm	Length Mm	Comments
D	F23				F	0.5	120	chryso
1E	F23				MD11	100	140	chryso
					MF	0.2	80	
					F	0.2	50	chryso
					F	0.5	52	chryso
					MD11	18	78	chryso
					MF	0.5	78	
	E34				MD21	30	80	amosite
					MF	2	59	
	F34				MD11	7.5	108	amosite
					MF	7.5	108	
	G3-1							
	H3-3				MD11	8	65	chryso
					MB	1.5	65	
					F	10	50	Nonashi
	I3-6				MD11	40	55	amosite
					MF	2.5	55	
	J4-4				MD11	100	190	chryso.
					MF	1	175	
					MD11	40	115	chryso.
					MB	2.5	115	
					MD11	40	90	amosite
					MB	2.5	90	
	K4#				F	10	72	amosite
					MD11	45	105	amosite
					MF	1	68	
					F	0.2	50	chryso.
	L5-1				MD11	12	52	chryso.
					MF	0.5	55	
	M5-4				MD11	160	230	amosite
					MF	5.5	165	
					MD32	160	540	amosite
					MF	5	530	
					MF	1	80	chryso
					F	0.2	65	chryso.
	N5-3				F	0.2	55	chryso.



Live Time:29.4 sec.

Quantitative Results 140411, SSAN5-03-0100 BPC, A-C2-3(1)

Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	4384	45.12	51.27	Mg	45.12
Si K	6059	44.18	43.44	Si	44.18
Fe K	1345	10.69	5.29	Fe	10.69
Total		100.00	100.00		100.00

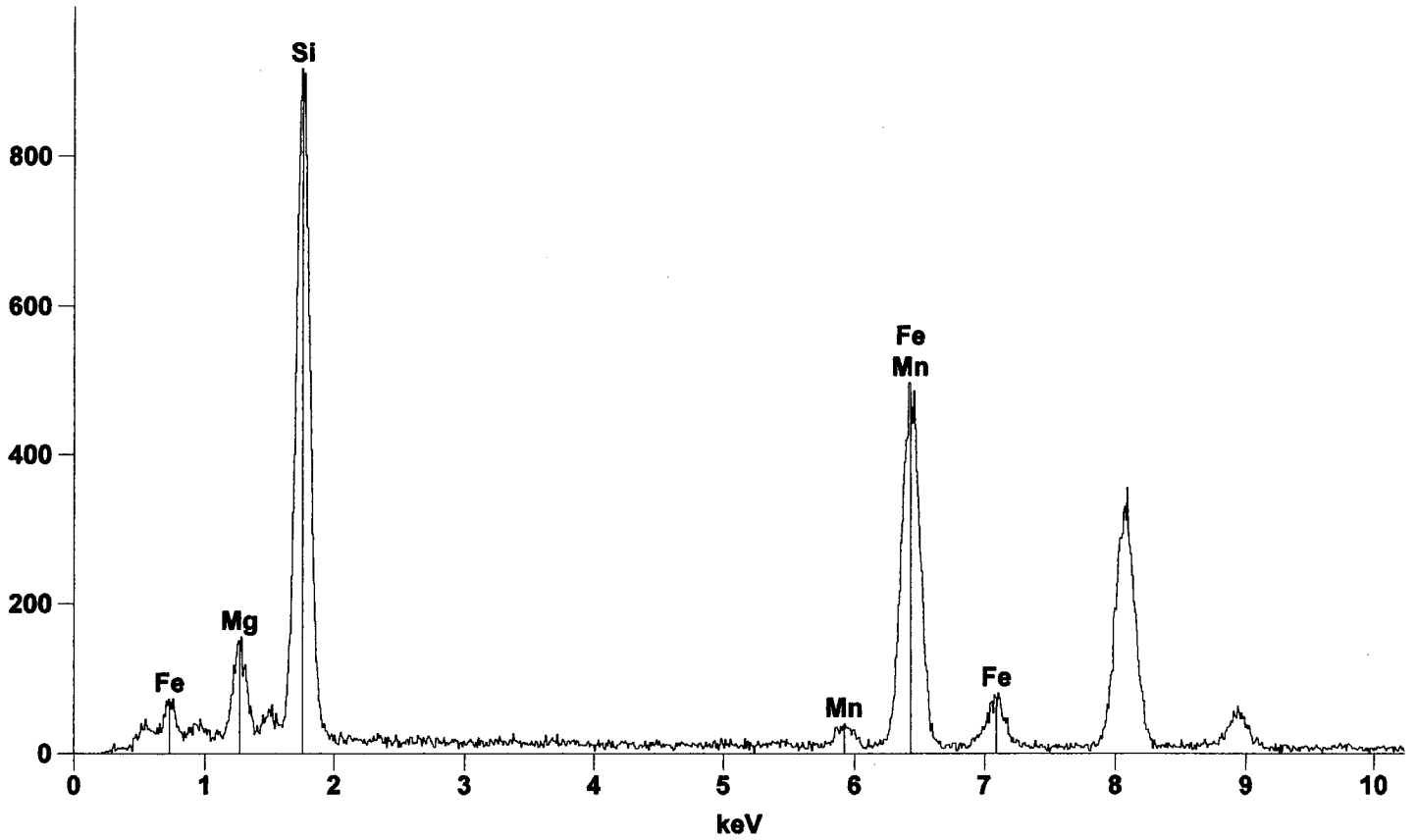


Live Time:26.8 sec.

Quantitative Results

140411, SSAN5-03-0100 BPC, A-C2-3

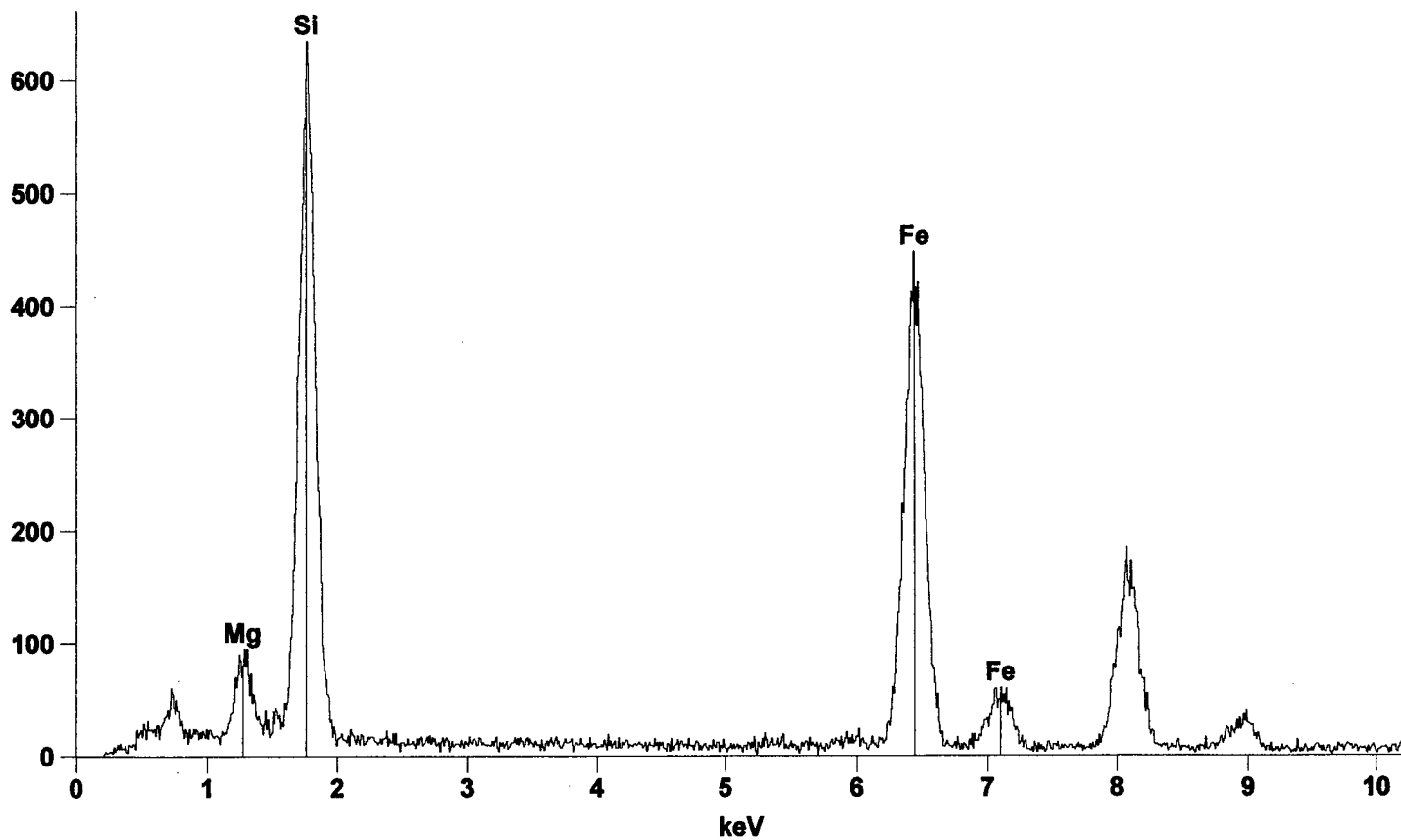
Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	967	9.26	13.60	Mg	9.26
Si K	6628	44.98	57.16	Si	44.98
Fe K	6187	45.76	29.24	Fe	45.76
Total		100.00	100.00		100.00



Live Time:45.0 sec.

Quantitative Results 140411, SSAN5-03-0100 BPC, A-G3-1

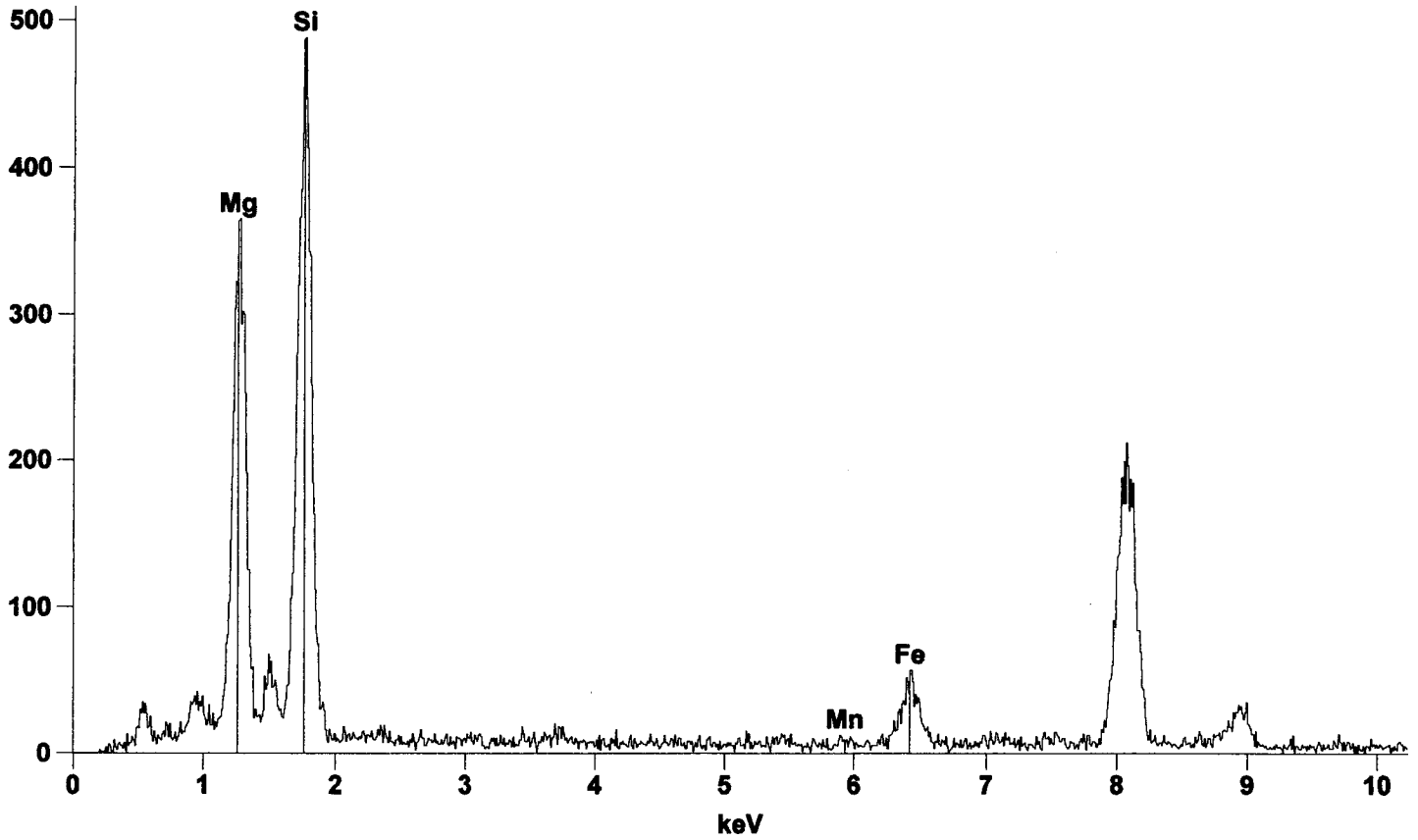
Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	1487	8.88	12.89	Mg	8.88
Si K	11183	47.34	59.44	Si	47.34
Mn K	433	1.96	1.26	Mn	1.96
Fe K	9064	41.82	26.41	Fe	41.82
Total		100.00	100.00		100.00



Live Time:13.2 sec.

Quantitative Results 140411, SSAN5-03-0100 BPC, A-F3-4

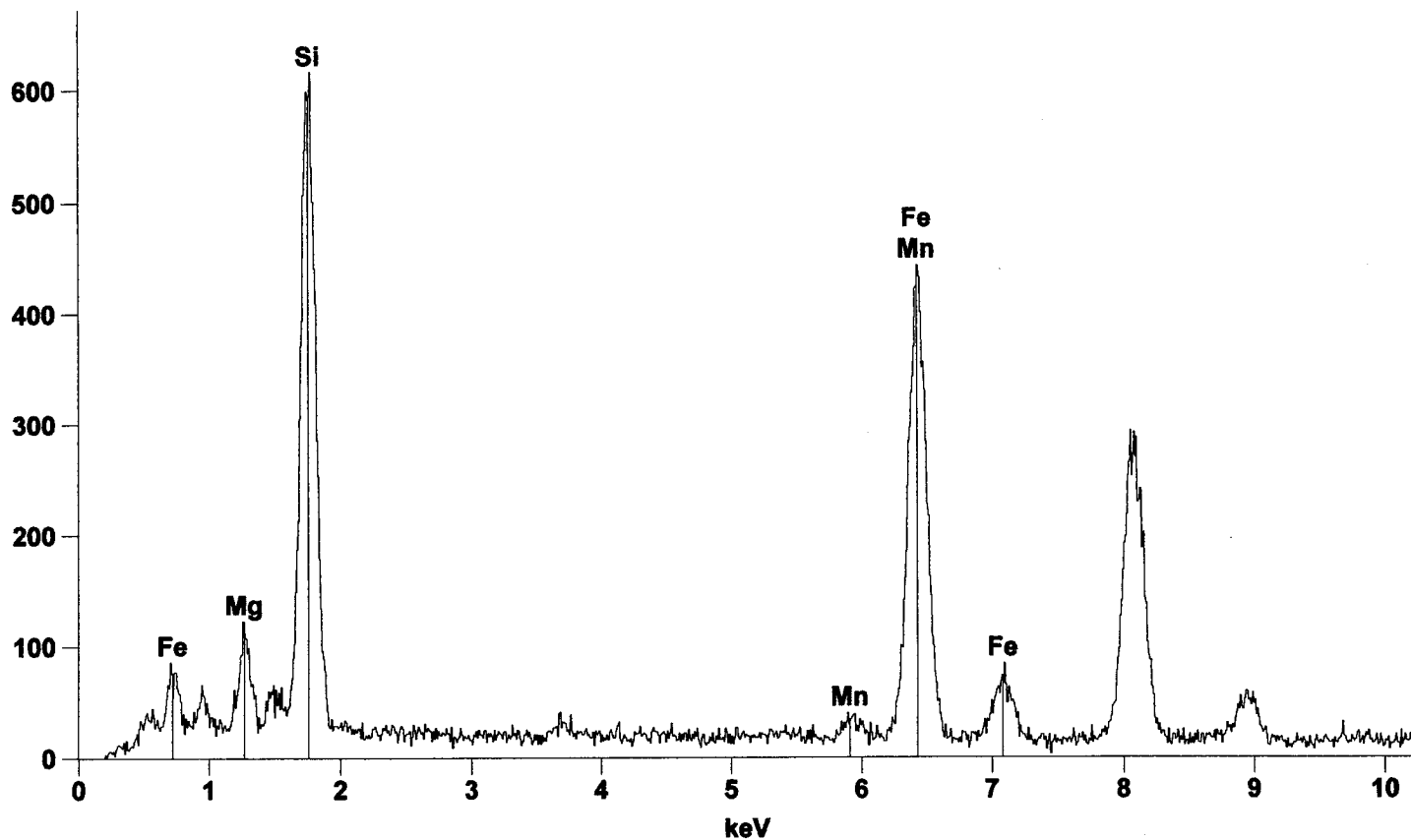
Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	983	7.18	10.78	Mg	7.18
Si K	8553	44.28	57.51	Si	44.28
Fe K	8602	48.54	31.71	Fe	48.54
Total		100.00	100.00		100.00



Live Time:27.7 sec.

Quantitative Results 140411, SSAN5-03-0100 BPC, A-F3-4(1)

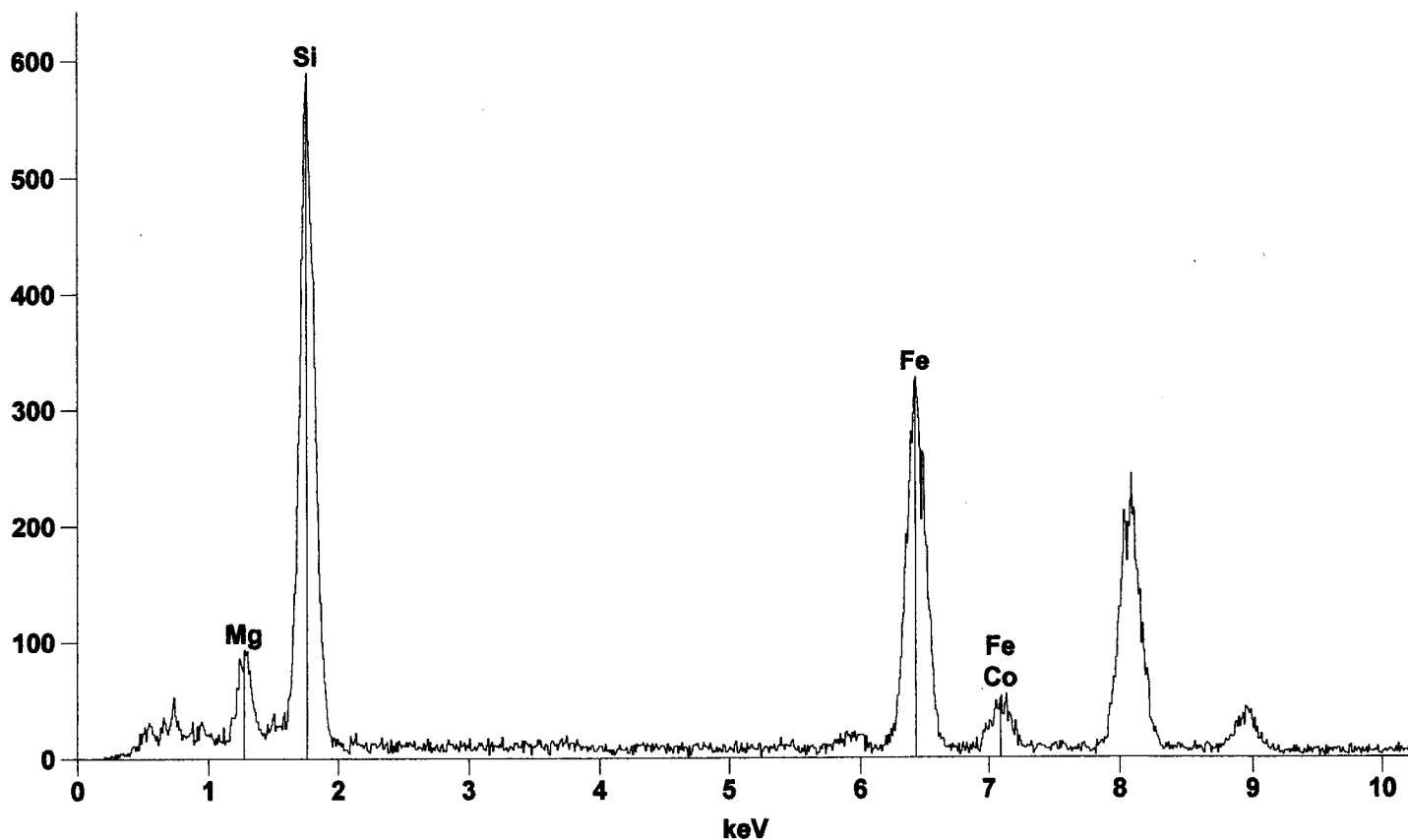
Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	4093	47.50	52.87	Mg	47.50
Si K	5511	45.31	43.64	Si	45.31
Mn K	54	0.48	0.23	Mn	0.48
Fe K	750	6.72	3.26	Fe	6.72
Total		100.00	100.00		100.00



Live Time:49.7 sec.

Quantitative Results 140411, SSAN5-03-0100 BPC, A-C4-4

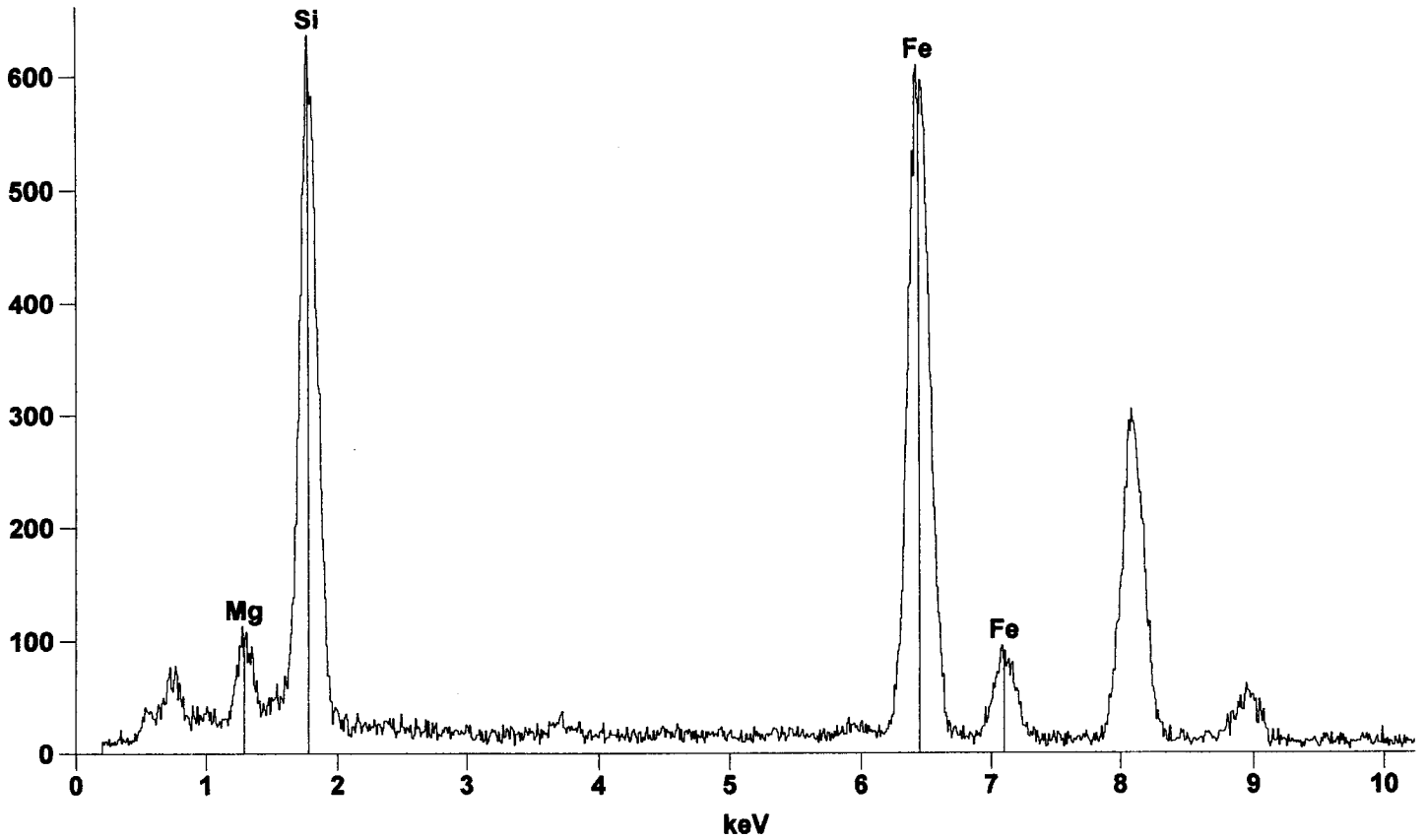
Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	853	6.69	10.17	Mg	6.69
Si K	7738	43.00	56.54	Si	43.00
Mn K	350	2.08	1.40	Mn	2.08
Fe K	7963	48.23	31.89	Fe	48.23
Total		100.00	100.00		100.00



Live Time:12.4 sec.

Quantitative Results 140411, SSAN5-03-0100 BPC, B-E2-6

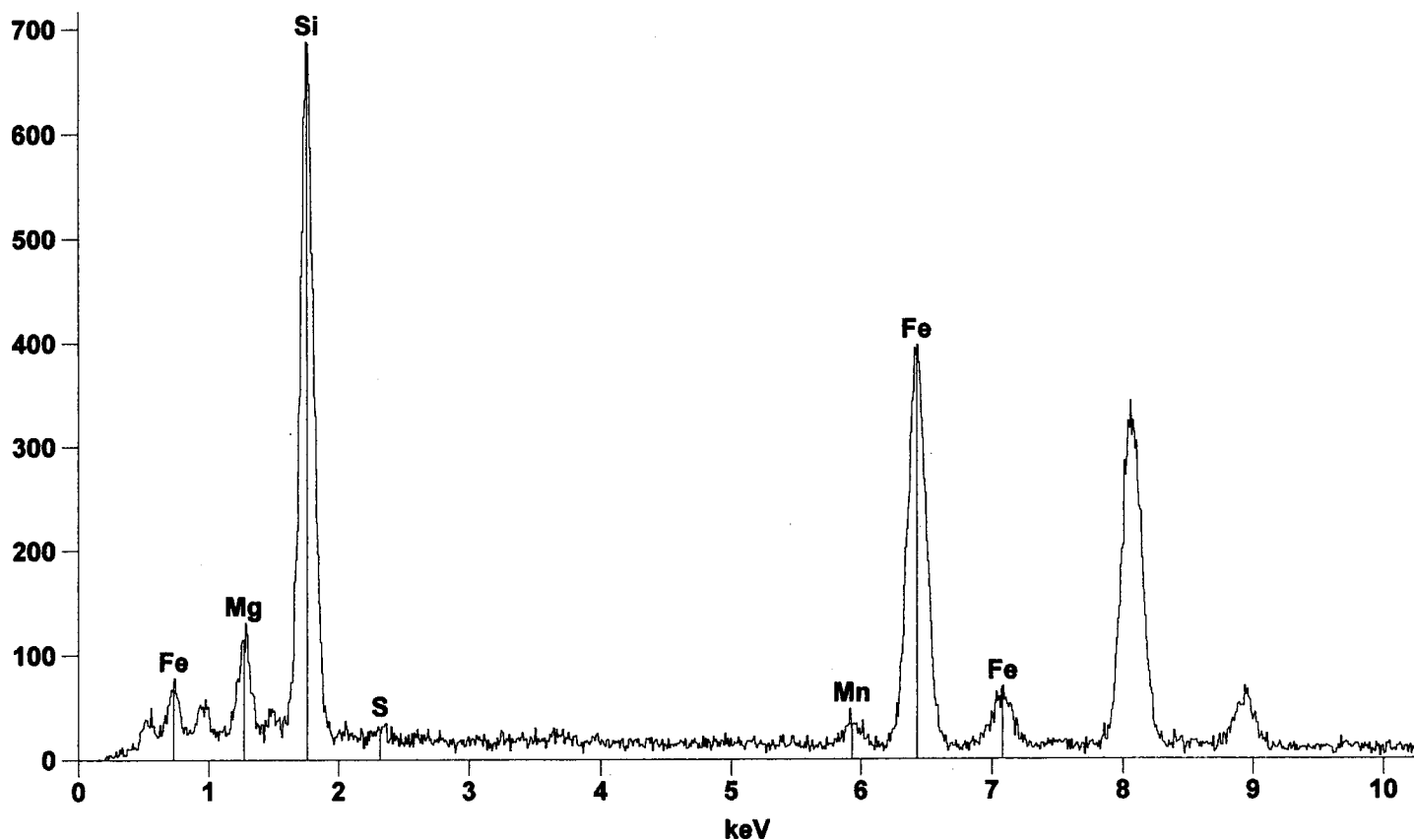
Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	1162	9.85	14.21	Mg	9.85
Si K	7827	46.99	58.68	Si	46.99
Fe K	6598	43.17	27.11	Fe	43.17
Co K	0	0.00	0.00		---
Total		100.00	100.00		100.00



Live Time:12.9 sec.

Quantitative Results 140411, SSAN5-03-0100 BPC, B-E2-6(1)

Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	809	5.47	8.92	Mg	5.47
Si K	7157	34.29	48.36	Si	34.29
Fe K	11534	60.24	42.72	Fe	60.24
Total		100.00	100.00		100.00

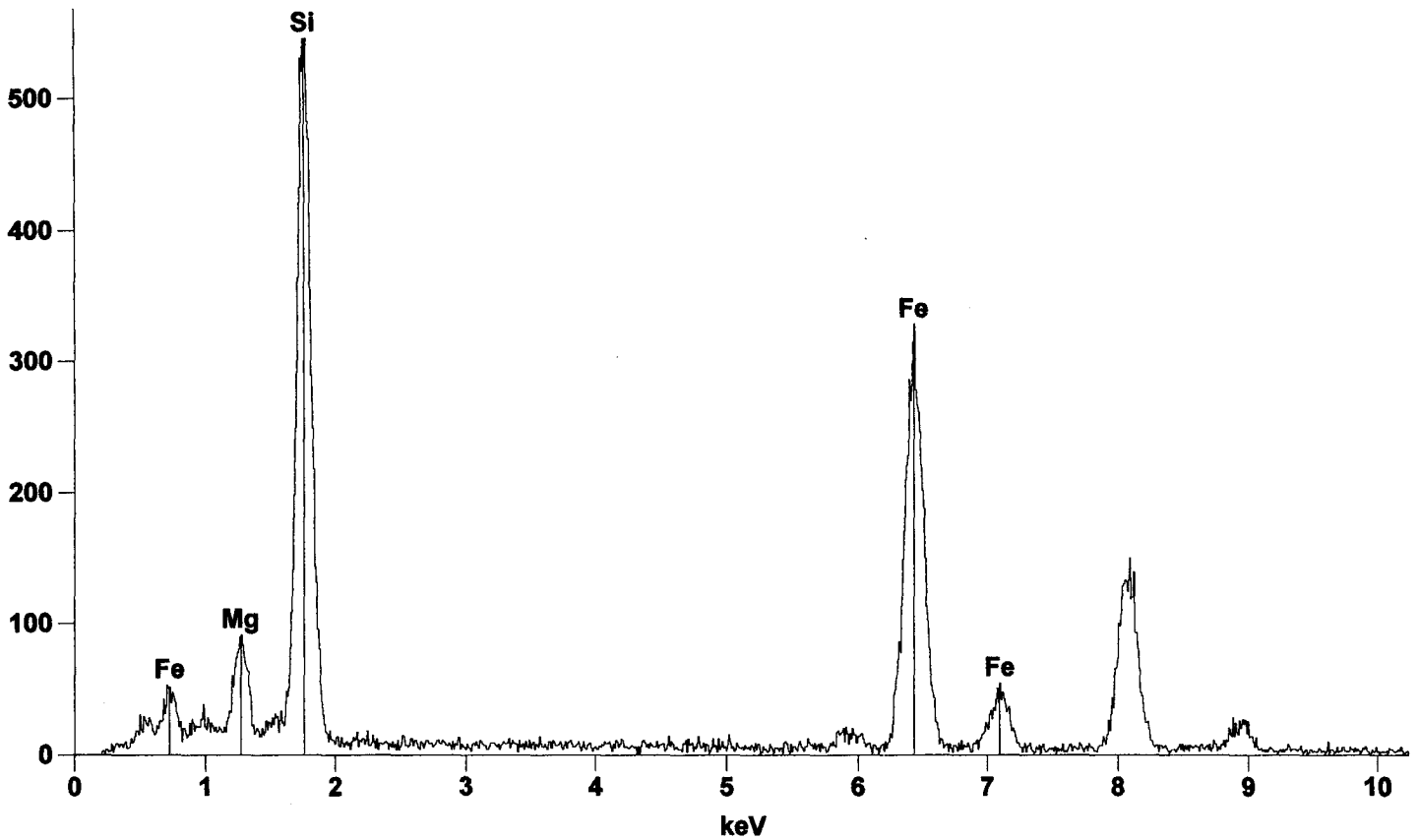


Live Time:62.3 sec.

Quantitative Results

140411, SSAN5-03-0100 BPC, B-E4-4

Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	1135	8.52	12.51	Mg	8.52
Si K	8491	45.15	57.38	Si	45.15
S K	186	0.99	1.11	S	0.99
Mn K	334	1.90	1.23	Mn	1.90
Fe K	7495	43.44	27.76	Fe	43.44
Total		100.00	100.00		100.00



Live Time:10.6 sec.

Quantitative Results 140411, SSAN5-03-0100 BPC, B-F3-4

Element Line	Net Counts	Weight %	Atom %	Formula	Compnd %
Mg K	909	8.53	12.47	Mg	8.53
Si K	7017	46.64	59.01	Si	46.64
Fe K	6188	44.83	28.52	Fe	44.83
Total		100.00	100.00		100.00

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 600/4-83-013 ISO
 LEVEL OF ANALYSIS
 Chrysotile CD-EDC
 Amphibole AD x ADP x

ASPECT RATIO
 3:1 5:1
 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 (mm²)
 MCE 385
 PC 34
 MCN 107
 Other _____

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

GO Area (mm²) 0.94
 No. of GO. to Analyze 200

PREP

DIRECT PREP
INDIRECT PREP

Volume _____ liters
 Working Volume _____ ml
 Weight _____ grams
 Ashd Area _____ %

Prepared By JTP
 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: 2100 X
 Camera Constant: 210
 Accelerating Voltage: 100KV
 Beam Current: 10 µA
 K-Factor: 1.4

Analyst 1266 Date 8/26/10

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification										EDS Analysis					Comments					
			Width	Length	NA	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADK	AQ	ADQ	AZQ	AZZ		Na	Mg	Si	Ca	Fe
<u>C26</u>		<u>N29</u>																							
<u>E23</u>																									
<u>E26</u>																									
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TEM ASBESTOS ANALYSIS

Client Sand blank EMS Lab No. 2 of 2
 Sample No. 8/25/10 Page 2 of 2

RECEIVING

ANALYSIS

Grid Address: A120X
 Screen Magnification: 25x
 Camera Constant: 10
 Accelerating Voltage: 100KV
 Beam Current: 1.4 μ A
 K-Factor: 1.4
 Analyst: Pedle Date: 8/28

MICROSCOPE

- H600A - Serial No. 542-36-01
- H600B - Serial No. 542-05-06
- H600C - Serial No. 542-24-03
- ENERGY DISPERSIVE X-RAY SYSTEM
- Keve - Model No. 3200-0106-0365
- Keve - Model No. 3600-0206-0146 Quantum System

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	ADX	AQ	ADQ	AZQ	AZZ		Na	Mg	Si	Ca	Fe
E3-4		N7																							
U3-1																									
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TEM ASBESTOS ANALYSIS

Client Sand blank EMS Lab No. 2 of
 Sample No. 8/25/10 Page 2 of

RECEIVING

ANALYSIS

Grid Address: B1C1X
 Screen Magnification: 28.2
 Camera Constant: 70
 Accelerating Voltage: 100KV
 Beam Current: 70 μ A
 K-Factor: 1.4
 Analyst: Perk

- MICROSCOPE
- H600A - Serial No. 542-36-01
 - H600B - Serial No. 542-05-06
 - H600C - Serial No. 542-24-03
- ENERGY DISPERSIVE X-RAY SYSTEM
- Keve - Model No. 3208-0106-0365
 - Keve - Model No. 3600-0206-0146
Quantum System

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification										EDS Analysis					Comments						
			Width	Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ		Na	Mg	Si	Ca	Fe	
H43		N29																								
H46																										
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TEM ASBESTOS ANALYSIS

Client Sand blank EMS Lab No. _____
 Sample No. 8/2610 Page 3 of _____

RECEIVING

ANALYSIS

MICROSCOPE
 H600A - Serial No. 542-36-01
 H600B - Serial No. 542-05-06
 H600C - Serial No. 542-24-03
 ENERGY DISPERSIVE X-RAY SYSTEM
 KeveX - Model No. 3200-0106-0365
 KeveX - Model No. 3600-0206-0146
 Quantum System
 Grid Address: B
 Screen Magnification: 9100 X
 Camera Constant: 253
 Accelerating Voltage: 100KV
 Beam Current: 10 μ A
 K-Factor: 1.4
 Analyst: Park Date: 8/26/10

TEM - 1B (1-08)

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification										EDS Analysis					Comments					
			Width	Length	NAM	TM	CM	CD	CO	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ		Na	Mg	Si	Ca	Fe
<u>C50</u>		<u>W39</u>																							
<u>E53</u>																									
<u>E56</u>																									
<u>153</u>																									
<u>158</u>																									
<u>W33</u>																									
<u>W36</u>																									
<u>153</u>																									
<u>B61</u>																									
<u>B64</u>																									
<u>E64</u>																									
<u>E64</u>																									
<u>E64</u>																									
<u>W61</u>																									

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. 2 of 2
 Sample No. 8/25/10 Page 2 of 2

RECEIVING

ANALYSIS

Grid Address: C
 Screen Magnification: 9.1kx
 Camera Constant: 28.2
 Accelerating Voltage: 100KV
 Beam Current: 10 μ A
 K-Factor: 1.44
 Analyst: Loelle Date: 8/25/10

- 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)		Fiber Classification										EDS Analysis					Comments					
			Width	Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ		Na	Mg	Si	Ca	Fe
EL4		N/D																							
GL4-1																									
HL4																									
HL7																									
HTU																									
KS-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 ASBESTOS ANALYSIS

Client Sand Blnk EMS Lab No. 2 of 2
 Sample No. 8-25-10 Page 2 of 2

RECEIVING

ANALYSIS

Grid Address: D
 Screen Magnification: 9700 X
 Camera Constant: 252
 Accelerating Voltage: 100KV
 Beam Current: 10 μ A
 K-Factor: 14
 Analyst: Padre 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
 Keval - Model No. 3200-0106-0365
 Keval - Model No. 3600-0206-0146
 Quantum System

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	ADX	AQ	ADQ	AZQ	AZZ		Na	Mg	Si	Ca	Fe
E40		N29																							
L44																									
H41																									
H40																									
G51																									
G50																									
B51																									
B50																									
G51																									
G50																									
H51																									
H50																									

OBSERVATIONS:

- Clean
 Debris: Very Light Light Moderate Heavy Very Heavy
 Gypsum: Very Light Light Moderate Heavy Very Heavy
 Condition of the Grid: Good Scrapy Undissolved Filler Folded

Spot Size Measurements

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

Conditions of Measurements

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

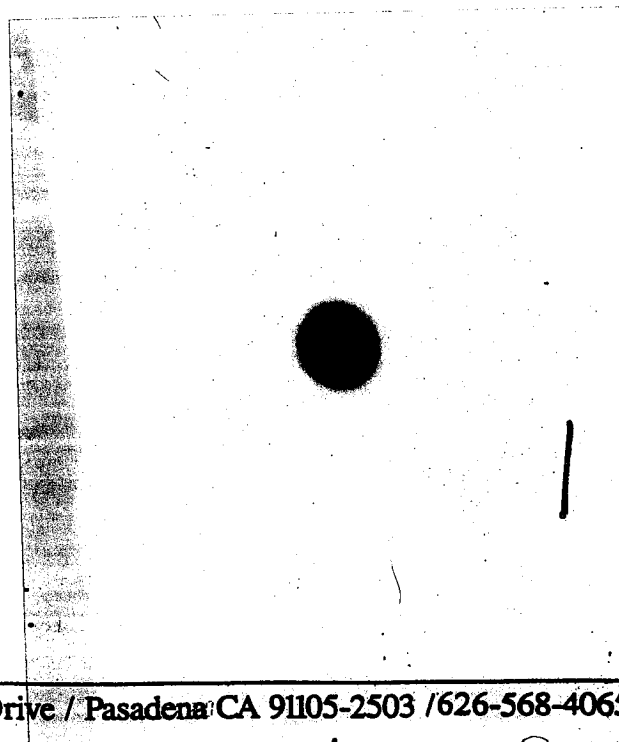
Measurements from a photo 8.5

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

Spot Size Calculation

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

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



TEM CAMERA CONSTANT DETERMINATION

TEM H600B

Measured and Calculated by LS 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

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

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

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

$$\text{CC (4*)} = (45.9 \text{ mm}) \times 1/2 \times 1.230 = 28.33$$

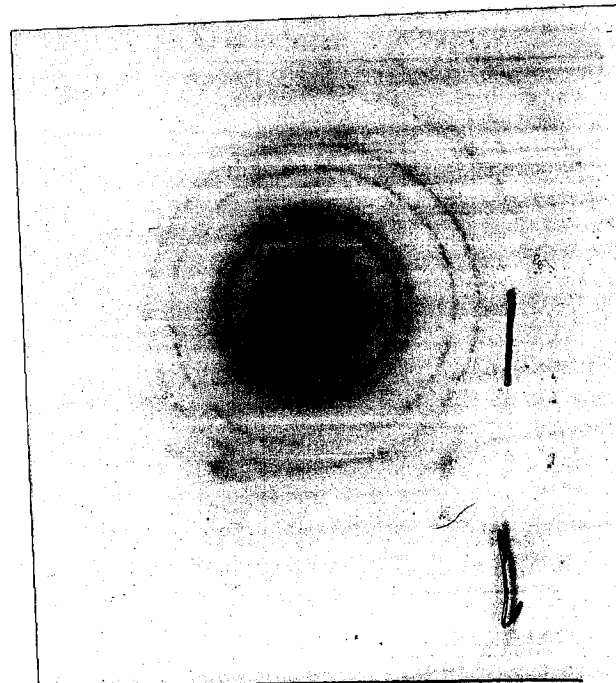
$$\text{Average Camera Constant} = \sqrt{28.3}$$

* 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 3mch
 AFTER SERVICE CALIBRATION _____

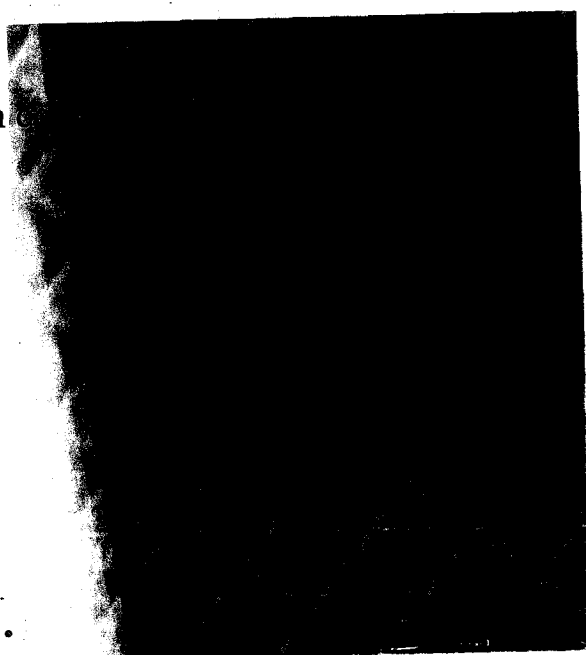
A-600/B-600/C-600

BY: R

Measurement	Number of Spacing Flourescent Screen Magnification	Distance (mm)	Number of Spacing Film Magnification
1	25,000x 53/6 - 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 - 19,180	51/12 - 9,180	
5	53.5/6 - 19,260	51/12 - 9,180	
6		51/12 - 9,180	
7	ave 19,100		
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



SCOPE B

$$K = \frac{[Cn/C(Si)]}{[In/I(Si)]}$$

C(Si)= 18.74

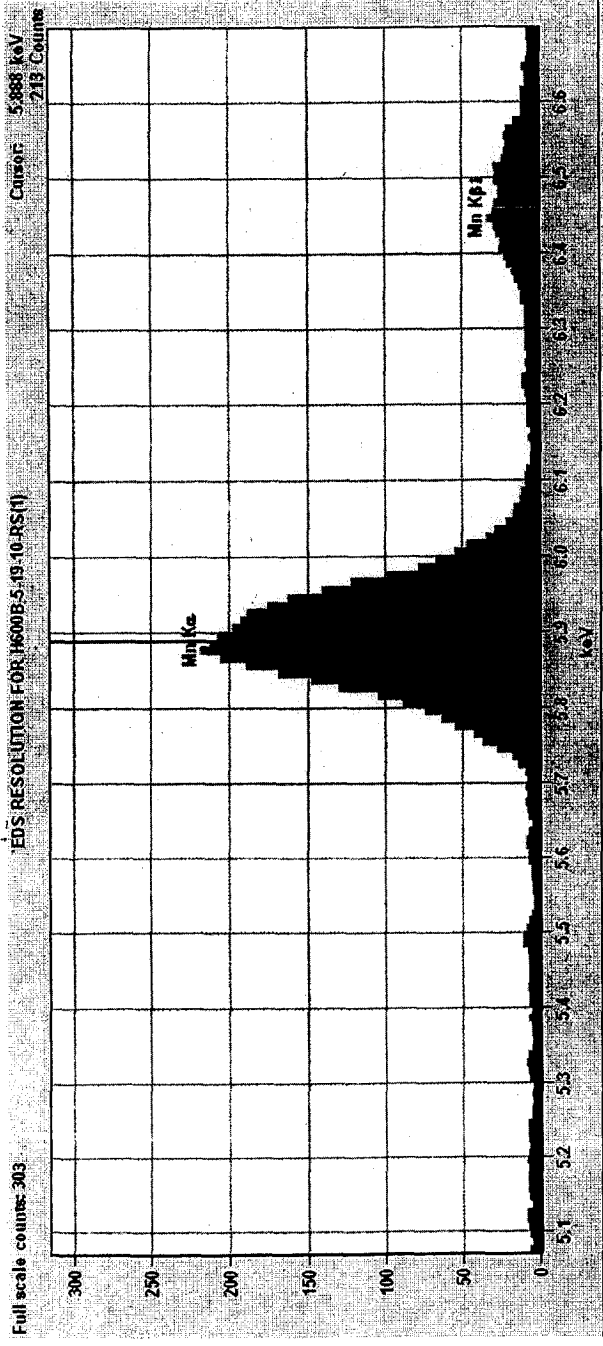
n	Cn	RUN 1		RUN 2		RUN 3		RUN 4		RUN 5		RUN 6	
		I(Si)=	In	I(Si)=	In	I(Si)=	In	I(Si)=	In	I(Si)=	In	I(Si)=	In
Na	1.81	1694	1.3034	1095	1.0674	986	1.5627	1133	1.4112	1004	1.5587	395	1.8251
Mg	7.57	6992	1.3207	3738	1.3077	4447	1.4491	4902	1.3641	4714	1.3885	1983	1.5205
Al	6.54	7768	1.027	4152	1.0171	5455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



Auto Manual FWHM F055 Bench Test

Element	Line	Line	FWHM (eV)	Avg. FWHM
Mn	K	1	148.79	148.79
Mn	K	2	152.00	151.89
Mn	K	3	155.83	153.21
Mn	K	4	149.17	152.20
Mn	K	5	155.40	152.84

Peak #	Min. Count	Max. Count	FWHM (eV)	Avg. FWHM
1	5.895	3991	148.79	148.79
2	5.895	3930	152.00	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

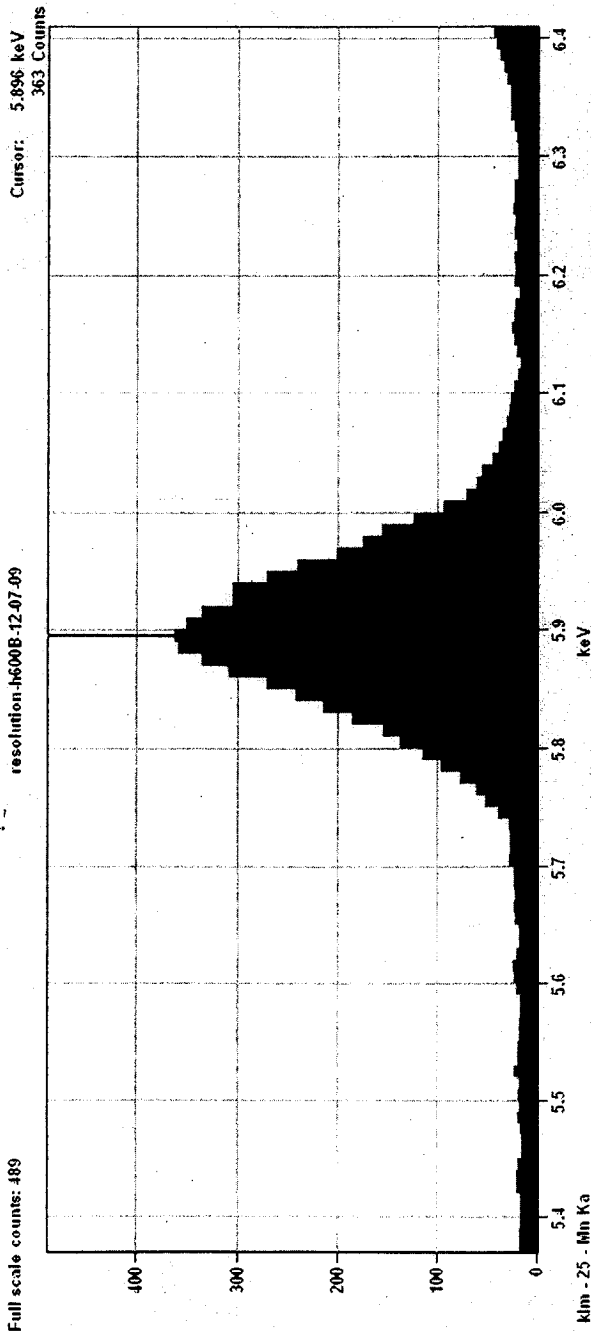
Stat	Value
Avg	5.893
Sigma	0.002
RMS	3.54
Min. Count	0.0%
Max. Count	10.0%
FWHM	2.3%

Additional Measurements: Measure FWHM and FWHM

Acquisition Criteria: Measure FWHM and FWHM

Level: 45, Peak Count: 5, No. Trials: 5

Time Constant: 60 (Slow)



Auto | Manual | FWHM | Fe55 Bench Test |

Elements

Atomic Symbol	Min	Line	K
Atomic Symbol		Line	K
<input type="checkbox"/> Ratio Peaks			

Additional Measurements

Measure Zero Peak Measure FWHM and FWTM

Acquisition Criteria

LiveTime (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	136.95
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	
Stdev:	0.001	2014	10.52	
RMS:	0.0%	42.2%	7.5%	