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CUTTING OF CERTAIN-TEED ASBESTOS CONTAINING PIPE

Work Practice Study

October, 2002

Materials Analytical Services, Inc.

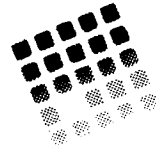
REVISION #1

Table of Contents

Cutting of Certain-Teed Asbestos Containing Cement Pipe

Work Practice Study

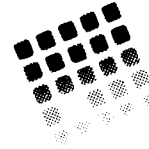
1	Protocol for Work Practice Study
2	Asbestos Air & Fabric Results 1. M29410
3	Bulk Analysis Data 1. M29327
4	Air Analysis Data 1. M29410
5	Fabric Analysis Data 1. M29411
6	Surface Dust Analysis Data 1. M29398 2. M29413
7	Passive Dust Analysis Data 1. M29412
8	Photographs & Tools



INDEX OF REVISIONS

Revision #		Date Completed	Remarks
1)	Revision #0	October 21, 2002	N/A
2)	Revision #1	July 17, 2003	Correct Typographical Error

SECTION 1



Cutting of Certain-Teed Asbestos Containing Cement Pipe

Work Practice Study

STUDY DESIGN AND METHODOLOGY

The study was performed in the exposure characterization lab (ECL). The size of the ECL is approximately 20' x 15' x 8' and the walls and ceiling are constructed of a painted plastic laminate. The ECL was constructed with two viewing windows for video taping purposes and has an air exchange rate of approximately 200 cubic feet per minute with two primary inlet sources and a negative air machine that produces a constant airflow during the study. Before the study, the ECL was decontaminated by standard asbestos abatement methods including HEPA vacuuming of all dust and debris and wet wiping of all surfaces in the ECL.

During video taping of the workplace study, high intensity lighting (three Altman 360Q 750 watt lights) were utilized inside the ECL to enhance the possible observations of any respirable size dust particles released during the work activity. Previous studies and protocols have shown that the use of the "Tyndall light phenomena" is an effective method of displaying airborne dust generated from workplace activities.^{1,2,3,4,5} To minimize reflection, the walls inside the ECL were painted black.

During the study, air samples were collected using 25mm air cassettes containing 0.8 micron pore size mixed cellulose ester (MCE) filters and a 5.0 micron backing pad. The air sampling pumps were calibrated utilizing a DryCal[®] primary standard before and after the sample collection. High volume pumps (Dawson 110V) were used for area or bystander air samples during the study. The pumps were located outside the ECL and connected to the air sample cassettes by Tygon[®] tubing through the walls of the ECL. The four area air samples were located on the quadrant ends of the ECL. The air sampling cassettes were located approximately five feet from the floor and six to eight feet from the work activity. For background samples, the high volume pumps were calibrated to a flow rate of 10.0 liters per minute. During the actual work practice, the high volume pumps were calibrated to a flow rate of between 1.5 and 2.0 liters per minute.

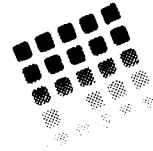
¹ Surgen Commander P.G. Harris, "The Effects and Control of Disease Associated with Exposure in Devonport Dockyard", Doctoral Dissertation.

² C. Dernchl & K.S. Lane, "Asbestos Toxicology Report", Union Carbide Corporation.

³ D.T. ECLs, "Dust Control Development" (S. Chissick and R. Derricott), in Asbestos Volume 2 Properties, Applications and Hazards, 6 193, 1983.

⁴ I.J. Selikoff, "Insulation Hygiene Progress Report", Volume 3 No.4, Winter, 1971.

⁵ Environmental Protection Agency SOP EPA-Libby-02, March 2001.



The investigators performing the work activity were each fitted with several personnel air samplers attached to their left and right shoulder areas. The samples were positioned to measure the breathing zone concentration of the asbestos dust during the studies. The personnel air samples were collected with battery operated Gillian pumps calibrated to a flow rate of 0.5 liters per minute for the air cassettes and 2.75 liters per minute for the midget impingers. Before the study, background samples were run both inside and outside the ECL. The PCM and TEM air samples were collected in general accordance with methods outlined in the NIOSH 7400 method. During the study, two air cassettes were opened in the ECL for approximately 30 seconds, and then closed. These samples were analyzed as field blanks.

Three passive dust samplers were placed on the floor inside the ECL. The collection containers were placed at the 9, 12, and 3 o'clock position in reference to the worker at the worktable at a distance of approximately three feet from the table. These samples were collected at the end of the study and one passive dust field blank was opened in the ECL for 30 seconds.

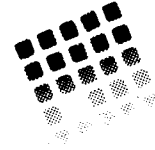
The individuals working inside the ECL wore a Tyvek suit under 100% cotton work clothes and were protected with a supplied air respirators. The ECL design included decontamination areas for clothing removal and for a shower to remove any residual asbestos contamination before the worker left the ECL area.

The air sampling and work time for the cutting of Certain-Teed cement pipe was 5 minutes in length. After completion of the cutting activities and air sampling, fabric samples from the work clothes of the investigator who cut the pipe were collected in the ECL.

A sample of the Certain-Teed cement pipe was analyzed by PLM to determine the asbestos type and content. Before the study was started, two microvac dust samples were collected from the cement pipe surface. One from the finished (as manufactured) and one from the rough (turned end) surface of the pipe. After the study, one dust sample was collected again from the finish surface.

ANALYTICAL METHODS

The air filters were analyzed in general accordance with the NIOSH 7400 method for PCM using A counting rules. For TEM analysis, a modified Yamate EPA level II indirect air sample analysis was performed. The samples for TEM analysis were first prepared using a washout redeposit method. The fabric samples were prepared by the recommended EPA method to determine the level of asbestos contamination of the clothing worn by the investigators. The midget impinger samples were analyzed by the ACGIH method. A solution of 50% water and alcohol was used in the impinger and the results were expressed as million particles per cubic feet (MPPCF). For the dust analysis, the ASTM D5755-95 method was used and for the passive samplers, a modified D5755-95 method was followed.



WORK PRACTICE

MAS received a section of Certain-Teed asbestos containing cement pipe from Charles Ay on September 17, 2002. The dimension of the cement pipe was approximately 20 inches long with a 6-inch diameter. Photographs were taken of this pipe section and are shown in Section 8 of this report. A common work practice used for this type of cement pipe was to cut the material with an electric handsaw containing a masonry blade. Therefore, to simulate this work procedure, our study consisted of making one cut across the end of the Certain-Teed pipe section that we received. A new 7¼" Skil saw with a new DeWalt® abrasive saw blade was used for the study. The saw was rated at 2.3 HP and 13 amps. Additional information about this tool is shown in Section 8 of this report.

During the pipe cutting study, air samples will be collected according to the following schedule:

I. Personnel (IWA)

- 1) 0 – 5 minutes P-1-A, P-1-B, P-1-C and P-1-D

II. Area (IWA)

- 1) 0 – 5 minutes 1st Area Sample Set
- 2) 100 – 115 minutes 2nd Area Sample Set

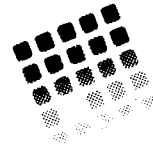
II. Midget Impingers

- 1) 0 – 5 minutes P-1-MIWL & P-1-MIRH

RESULTS

During the work practice, the individual performing the cutting operation was exposed to levels of airborne asbestos fibers of between 171.3 to 244.8 fibers/cc as measured by PCM. The helper/assistant's exposure level ranged from 247.8 to 192.3 fibers/cc when also measured by PCM. The midget impinger levels had a range of 60.2 MPPCF to 129.6 MPPCF. The results for the surface and passive dust samples can be found in the summary page.

The PLM analysis showed that the Certain-Teed cement pipe contained 20% chrysotile and 1% crocidolite asbestos as determined by the recommended Environmental Protection Agency protocol for this analysis.



asbestos dust from the clothing when such activities as the brushing of the clothing or laundry activities are done.

QUALITY CONTROL

Phase Contrast Microscopy

MAS is accredited by AIHA for phase contrast microscopy of fiber analysis and has been a participant in AIHA's asbestos Proficiency Analytical Testing (PAT) program for asbestos fiber analysis for the last 13 years. During that time, MAS has passed each and every PAT round for the fiber analysis samples. Additionally, MAS exchanges air samples with outside laboratories and has developed intra and inter-counter precision for the laboratory.

For the PCM air samples analyzed in this study, 10% blind recounts were performed and those results were within the confidence limits as specified by NIOSH.

Transmission Electron Microscopy & Bulk Analysis

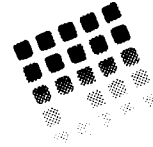
MAS is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) to analyze asbestos air samples by transmission electron microscopy and bulk samples by optical microscopy.

Rate of Error Calculation

The rate of error for this study is based on the PCM analysis and is determined as follows:

<u>Cement Pipe Cutting</u>	<u>Average f/cc</u>
1) Personnel Samples	214.1

The coefficient of variation determined at this laboratory for this range of PCM fiber counts are 0.1676 for personnel samples. Therefore, the personnel air samples' upper and lower limits are 248.6 f/cc and 179.8 f/cc.



CONCLUSION

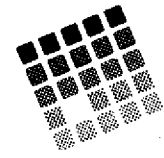
MAS conducted a study to determine the release and potential exposure to airborne asbestos fibers during the cutting of Certain-Teed asbestos containing cement pipe. This study shows that when one cut is made with an electric saw containing a masonry blade across the 6" diameter cement pipe; significant amounts of asbestos fibers were released into the breathing zone of the individual and the bystander/assistant who were performing this work activity.

The average asbestos exposure for the investigators performing the cutting in this study was approximately 214.1 fibers/cc as measured by PCM. The personnel samples were collected over a 5-minute period. Assuming that in an 8-hour work day that was the only exposure this individual would have had was for the 5 minutes, then his 30 minute excursion limit would have been 35.7 f/cc (3.6 times over OSHA's 1972 limit) and 2.2 fibers/cc on a 8-hour time weighted average. The 2.2 fibers/cc would be in violation of OSHA's 1976 PEL limit.

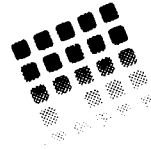
A dust sample taken on the pipe surface before the work practice study, showed an average surface contamination level of 5.44 billion asbestos structures per square foot of pipe from both the finished and rough surface. This concentration of asbestos contaminated dust can be classified as severe and this dust can easily be transferred to any individual who would handle this type of pipe during their work activities. Another interesting point is the results of the dust sample that was collected from the finished area of the pipe after the work practice was completed. This sample was collected in the same general area as the "before" dust sample on the finished surface. When analyzed, this sample showed a result of 69.2 billion asbestos structures per square foot. A 10 fold increase when compared to the "before" dust sample taken on the pipe. The passive dust collection samples showed an average asbestos concentration of 9.5 billion structures per square foot. Again, this amount of fallout asbestos dust can be rated as severe and demonstrates how an individual work area can also become contaminated when cement pipes of this nature are cut with an electric saw with abrasive saw blades.

The surface and passive dust data here clearly shows that when an individual has to cut the Certain-Teed pipe with an electric saw, not only will he breathe a significant level of airborne asbestos fibers, but the severe residual asbestos contamination on the surface of the pipe and in his work area after the cut provides another potential source for exposure to that individual.

When, the clothing worn by the person cutting the pipe in this study was analyzed, it was found to be highly contaminated with asbestos. This asbestos contamination on his clothing is yet another potential source of exposure through re-entrainment of the



asbestos from the work clothes.



Cutting of Certain-Teed Asbestos Containing Cement Pipe

Work Practice Study

September 27, 2002

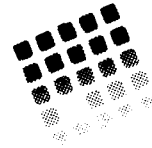
Protocol

I. ECL SET-UP

- A. Study is to be performed in the exposure characterization lab (ECL) constructed using negative airflow asbestos abatement technology. The size of the ECL is approximately 15' x 20' x 8'.
- B. Air exchange inside the ECL will be approximately 200 cubic feet per minute as measured (Extech Model 451126) at the air exhaust of the HEPA filter negative air machine (AramSCO, Comanche Model #55011).
- C. Tyndall lighting setup in accordance with the methods described in D.T. Chambers, "Asbestos", John Wiley & Sons, 6, 193, 1983 and the Environmental Protection Agency SOP, EPA-Libby-02, Revision #1, March 2001 (Tyndall lighting section only). The lighting source will be three high intensity lights (750 watts, ellipsoid pyrex glass lens, 219K candle power, 8 degree beam divergence) located on each side of the work activity.
- D. Three video cameras (Sony Handcam, Model TRV99) will be used in this study.

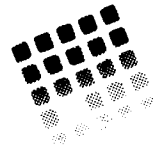
II. BACKGROUND AIR SAMPLES

- A. Twenty-four hours before the background air samples are taken, the Certain-Teed cement pipe will be placed on the worktable in the ECL. The ventilation rate of the negative machine will be set to a flow rate of 2000 cubic feet per minute. The flow rate will then be adjusted to 200 cubic feet per minute during background sampling.
- B. Adjust and calibrate high volume area pumps to 10 liters per minute.
- C. Setup four area air samples inside the ECL. Use 25 mm air cassettes containing 0.8 micron pore size mixed cellulose ester (MCE) filters with a 5.0 micron backing pad.
- D. Locate the area air samples in each quadrant of the ECL at a height of 55" from the floor and a distance of approximately 6 feet from the work activity.



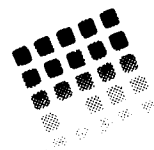
III. WORK PRACTICE STUDY

- A. Before the study, two dust samples will be collected from the finished (as manufactured) and the rough (turned end) surface of the pipe.
- B. Three passive dust samples will be placed at the 9, 12, and 3 o'clock position in relation to the worktable and located at a distance of approximately three feet.
- C. The investigators will wear a supplied air respirator.
- D. The investigators will wear two personnel air pumps and air cassettes and one midjet impinger each located in their breathing zone.
- E. The work practice will be performed under Tyndall lighting. The entire procedure will be video taped with two separate cameras.
- F. During filming, the Tyndall lighting will be turned off and overhead lights turned on at least once during the simulation.
- G. Area air samples will be taken during the study in each quadrant of the chamber at a flow rate of between 1.5 and 2.0 liters per minute. Two sets of area samples will be collected. The high volume pumps will be calibrated both before and after the air samples are collected.
- H. A 7¼" 13 amp Skil® saw (2.3 HP) Model #5600-01 with a 7" abrasive saw (DeWalt) will be used in this study.
- I. The work practice will consist of cutting one cross section from the end of the cement pipe.
- J. The investigators will wear personnel air samples during the work practice. The Gilian pumps will be calibrated to 0.5 liters per minutes for the air cassettes and 2.75 liters per minute for the midjet impinger. Each investigator will wear two air cassettes and one midjet impinger sample. After the study, the air pumps will be recalibrated.
- K. The personnel air cassettes will be collected for five minutes.
- L. The first set of area samples will be collected for five minutes, the second set will be run for 15 minutes and started between 60 and 120 minutes after the first area samples have been collected.



IV. Laboratory Analysis

- A. All air samples will be analyzed in general accordance with the NIOSH 7400 PCM method using A counting rules. After a portion of the filter has been removed for the PCM analysis, the filter then will be analyzed by TEM.
- B. For the TEM analysis, all air samples will be prepared by the indirect washout method. Samples will be analyzed using the EPA Level II Modified Counting Rules.
- C. Fabric samples will be analyzed by the EPA recommended method.
- D. Midget impinger samples will be analyzed by the recommended ACGIH method.
- E. Dust samples will be analyzed in general accordance with the ASTM D5755-95 method. The passive dust samples will be analyzed by the modified ASTM method.



Work Practice Simulation Protocol

I) Chamber Setup

- A) The walls, ceiling, and floor are painted black to diminish light reflection.
- B) Arranged lighting for Tyndall effect in general accordance with the method described in by D.T. Chambers, "Asbestos", John Wiley & Sons, 6, 193, 1983.

II) Background Air Samples

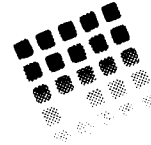
- A) Adjust and calibrate high volume area pump to appropriate flow rate.
- B) Set up two or more air samples inside the chamber and one outside air sample in general accordance with the procedure outlined in the NIOSH 7400 method.¹

III) Work Practice Study²

- A) Review the appropriate information on work practices simulation.
- B) Acquire all necessary tools and materials required for work practice simulation.
- C) Calibrate personnel and high volume sampling pumps appropriate to flow rates.
- D) Set ventilation to 200 cubic feet per minute as measured with the Extech Flow Anemometer.
- E) Set up two or more inside air samples and one outside air sample in general accordance with the procedure outlined in the NIOSH 7400 Method.¹
- F) Participants in the study are to wear protective clothing, work apparel, and respiratory protection equipment.
- G) Set up the personnel air samples in general accordance with the procedure outlined in the NIOSH 7400 method.¹
- H) Determine the appropriate time for the length of study.
- I) Work practice study performed as determined in Section III, A&B.

¹ If midjet impinger air sampling is to be done, set up the samples in general accordance with the ACGIH method.

² Parts of the procedure may be done in advance of chamber set up.



- J) If appropriate, film the work practice study from start to finish in two directions. During filming, turn off Tyndall lighting and turn the overhead lights on at least on one occasion.

IV. ANALYSIS

- A) Analyze air samples by NIOSH 7400 PCM methods with A counting rules.³ (See Note)
- B) Analyze air samples by the TEM indirect method.
- C) Analyze the cloth/fabric samples by the recommended EPA method.
- D) Analyze dust samples by the ASTM D-5755-95 method.

V. RESULTS

- A) Air: Report PCM results as fibers/cc, report TEM results all sizes (structures/cc) and greater than or equal to 5 microns in fibers/cc.
- B) Fabric: Report TEM results as number of asbestos structures per cm² and per square foot of cloth sample.
- C) Dust: Report TEM results as number of asbestos structures per cm² and per square foot of surface area sampled.

VI. OPTIONAL ANALYSIS

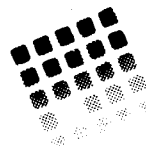
- A) Midget impinger samples analyzed by the ACGIH method.
- B) Dust samples analyzed by the ASTM D-5755-95.

Note: According to the NIOSH 7400 method, fiber counts outside 100-1300 fibers/mm² range have greater than optimal variability and are probably biased.

³ If the air samples are too overloaded for PCM analysis, use the indirect washout method.

SECTION 2

Cutting of Certain-Teed Asbestos Containing Cement Pipe



Asbestos Air, Dust & Fabric Analysis Results

<u>Sample No.</u>	<u>Sample Description</u>	<u>PCM Fibers/cc</u>	<u>TEM Str/cc (All)</u>	<u>TEM Fibers ≥ 5 µm/cc</u>	<u>Midget Impinger MPPCF</u>
A-0-A (NE)	IWA Background	<0.01	<0.04	N/A	
A-0-B (SE)	IWA Background	<0.01	<0.04	N/A	
A-0-C (SW)	IWA Background	<0.01	<0.04	N/A	
A-0-D (NW)	IWA Background	<0.01	<0.04	N/A	
A-MP-1	IWA Background	-----	-----	-----	0.09

PERSONNEL SAMPLES

<u>Sample No.</u>	<u>Sample Description</u>	<u>PCM Fibers/cc</u>	<u>TEM Str/cc (All)</u>	<u>TEM Fibers ≥ 5 µm/cc</u>	<u>Midget Impinger MPPCF</u>
P-1-A WLR	Personnel	247.8	8,126.3	1,218.9	
P-1-B RHR	Personnel	244.8	5,902.9	1,967.6	
P-1-C WLL	Personnel	192.3	2,566.1	721.7	
P-1-D RHL	Personnel	171.3	11,276.5	2,013.7	
P-1-MIWL	Personnel	-----	-----	-----	60.2
P-1-MIRH	Personnel	-----	-----	-----	129.6

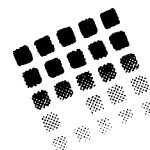
AREA SAMPLES

<u>Sample No.</u>	<u>Sample Description</u>	<u>PCM Fibers/cc</u>	<u>TEM Str/cc (All)</u>	<u>TEM Fibers ≥ 5 µm/cc</u>
A-1-A	IWA Area	66.3	986.7	302.1
A-1-B	IWA Area	37.0	8,383.2	3,193.6
A-1-C	IWA Area	34.7	4,711.3	1,603.8
A-1-D	IWA Area	86.0	1,269.8	355.5
Collected 95 Minutes After Area 1 Samples				
A-2-A	IWA Area	8.6	33.3	6.7
A-2-B	IWA Area	7.8	22.8	2.3
A-2-C	IWA Area	9.2	22.6	2.3
A-2-D	IWA Area	9.9	16.9	8.5

AIR FIELD BLANKS

		<u>PCM Fibers/mm²</u>	<u>TEM Structures/mm²</u>
FB-1	IWA	<7	< 13
FB-2	IWA	<7	< 13

**Cutting of Certain-Teed
Asbestos Containing Cement Pipe**



Asbestos Air & Fabric Analysis Results

Continued

FABRIC ANALYSIS

		<u>Structures/ ft²</u>	<u>Structures/cm²</u>
Fabric Blank	Blank	N/D	N/D
Fabric RLH	Fabric	6.21 billion	6.68 million

SURFACE DUST ANALYSIS

		<u>Structures/ ft²</u>	<u>Structures/cm²</u>
#1	Rough Surface (Turned) Before Study	5.9 billion	6.3 million
#2	Finished Surface Before Study	5.0 billion	5.4 million
#3	Finished Surface After Study	69.2 billion	74.5 million
#4	Field Blank	N/D	N/D

PASSIVE DUST ANALYSIS

		<u>Structures/ ft²</u>	<u>Structures/cm²</u>
#1	3 O'clock Position	2.5 billion	2.7 million
#2	12 O'clock Position	9.2 billion	9.9 million
#3	9 O'clock Position	16.7 billion	18.0 million
#4	Field Blank	N/D	N/D

ND = Non-detected

SECTION 3

MATERIALS ANALYTICAL SERVICES, INC.
CHAIN-OF-CUSTODY

CLIENT: Materials Analytical Services, Inc.

MAS JOB: M29327

CONTACT: Bill Longo

DATE RECEIVED: 9/17/02

PHONE: (770) 866-3200

SUBMITTED BY: Charles Ay, AsbestosDetec

CLIENT JOB NAME: Certainteed Asbestos Cement Pipe

TRANSPORT: FedEx

CLIENT JOB#:

RECEIVED BY: Bill Longo

CLIENT DOC(S):

CONDITION: good

FAX NUMBER: (770) 866-3259

MAS #	CLIENT ID	VOLUME	TYPE	MATERIAL	MAS #	CLIENT ID	VOLUME	TYPE	MATERIAL
001	1			certainteed asbestos cement pipe					

LOCATION

INITIAL FILE REVIEW: _____ DATE: _____

SAMPLE PREP BY: _____ DATE: _____

SAMPLE ANALYSIS BY: _____ DATE: _____

COMMENT: _____

Materials Analytical Services, Inc.
3945 Lakefield Court
Suwanee, Georgia 30024
(770) 866-3200

**MATERIALS ANALYTICAL SERVICES, INC.
PLM ANALYSIS**

Proj#-Spl#: M29327 - 001 **Analyst** W.B. Egeland **Date:** 10/22/02
ClientName: Materials Analytical Services, Inc. **ClientSpl:** 1
Location: _____
Type_Mat: certainiteed asbestos cement pipe
Gross – Gray. Cementitious matrix with abundant white and blue fiber bundles throughout. No paint
Visual: observed.

OPTICAL DATA FOR ASBESTOS IDENTIFICATION

Morphology	<u>Wavy</u>	<u>Straight</u>	
Pleochroism	<u>None</u>	<u>Lt. Blue/Blue</u>	
Refract Index	<u>1.555/1.548</u>	<u>1.705/1.6905</u>	
Sign	<u>+</u>	<u>-</u>	
Extinction	<u>Parallel</u>	<u>Parallel</u>	
Birefringence	<u>Low</u>	<u>Mod</u>	
Melt	<u>No</u>	<u>No</u>	
Fiber Name	<u>Chrysotile</u>	<u>Crocidolite</u>	

ASBESTOS MINERALS

EST. VOL. %

Chrysotile.....	<u>20</u>
Amosite.....	
Crocidolite.....	<u>1</u>
Tremolite/Actinolite.....	
Anthophyllite.....	

OTHER FIBROUS COMPONENTS

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

NON FIBROUS COMPONENTS

_____	_____
_____	_____
_____	_____
_____	_____
Binder	<u>79</u>

Effervescence: Moderate.

Binder Description: Cementitious

Comments: No starch observed

FedEx USA Airbill

8204 6146 8975

1 From This portion can be removed for Recipient's records.
Date 9-16-06 FedEx Tracking Number 820461468975
Sender's Name Charles A Y Phone 714 530-1922
Company ASBESTOS DETECTION
Address 12862 GARDEN GROVE BLVD # 220
City GARDEN GROVE State CA ZIP 92843

2 Your Internal Billing Reference

3 To
Recipient's Name DR William Longo Phone 770 866 3208
Company MAS
Address 3945 LAKE FIELD COURT
To "HOLD" at FedEx location, print FedEx address. We cannot deliver to P.O. boxes or P.O. ZIP codes.
City SWANEE State GA ZIP 30024



4a Express Package Service **Packages up to 150 lbs.**
Delivery commitment may be later in some areas.
☐ FedEx Priority Overnight Next business morning
☒ FedEx Standard Overnight Next business afternoon
☐ FedEx First Overnight Earliest next business morning delivery to select locations
☐ FedEx 2Day* Second business day
☐ FedEx Express Saver* Third business day
* FedEx Envelope/Letter Rate not available Minimum charge: One-pound rate

4b Express Freight Service **Packages over 150 lbs.**
Delivery commitment may be later in some areas.
☐ FedEx 1Day Freight* Next business day
☐ FedEx 2Day Freight Second business day
☐ FedEx 3Day Freight Third business day
* Call for Confirmation

5 Packaging Declared value limit \$500
☐ FedEx Envelope/Letter*
☐ FedEx Pak*
☒ Other Pkg. Includes FedEx Box, FedEx Tube, and customer pkg.

6 Special Handling Include FedEx address in Section 3.
☐ SATURDAY Delivery Available for FedEx Priority Overnight and FedEx 2Day to select ZIP codes
☐ SUNDAY Delivery Available for FedEx Priority Overnight to select ZIP codes
☐ HOLD Weekday at FedEx Location Not available with FedEx First Overnight
☐ HOLD Saturday at FedEx Location Available for FedEx Priority Overnight and FedEx 2Day to select locations
Does this shipment contain dangerous goods?
One box must be checked.
☒ No ☐ Yes As per attached Shipper's Declaration
☐ Yes Shipper's Declaration not required
☐ Dry Ice Dry Ice, 9, UN 1845 x kg
☐ Cargo Aircraft Only

7 Payment Bill to: 10758458-1
Enter FedEx Acct. No. or Credit Card No. below.
☐ Sender Acct. No. in Section 1 will be billed.
☐ Recipient
☒ Third Party
☐ Credit Card
☐ Cash/Check
Total Packages 1 Total Weight 60
Total Charges
Credit Card Auth.

8 Release Signature Sign to authorize delivery without obtaining signature.

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.
Questions? Call 1-800-Go-FedEx (800-463-3339)
Visit our Web site at www.fedex.com
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359

SECTION 4

MATERIALS ANALYTICAL SERVICES

PROJECT LOG

Client Code: MASCORP

MAS ID: M29410
Client Name: Materials Analytical Services, Inc.
Project Name: CertainTeed Asbestos Cement Pipe Cuttin
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 9/27/02

TRANSPORT INFORMATION:

Submitted By:	<u>Richard Hatfield</u>	Documents:	<u>COC</u>
Delivery By:	<u>Hand Delivery</u>		
Received By:	<u>dmazzaferro</u>	Comments for COC:	
Condition:	<u>good</u>		

CONTACT INFORMATION:

Contact:	<u>Bill Longo</u>	Work Phone:	<u>(770) 866-3200</u>	Ext:	
Title:	First Name: Last Name: Suffix	Other Phone:		Ext:	
Mr.	<u>William Longo</u>	Fax:	<u>(770) 866-3259</u>		

Page 1 of 2

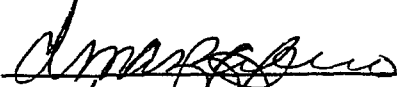
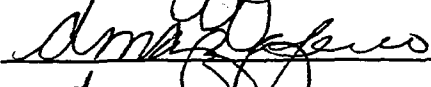
M29410

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
001	A-O-A	2100	020	A-2-A	30
002	A-O-B	2100	021	A-2-B	30
003	A-O-C	2100	022	A-2-C	30
004	A-O-D	2100	023	A-2-D	24
005	A-O-E	2100			
006	A-O-MI	52			
007	A-1-A	10			
008	A-1-B	10			
009	A-1-C	10			
010	A-1-D	8			
011	A-1-E	50			
012	P-1-A	2.5			
013	P-1-B	2.5			
014	P-1-C	2.5			
015	P-1-D	2.5			
016	P-1-MIWL2	13.75			
017	P-1-MIRHD2	13.75			
018	FB-1	0			
019	FB-2	0			

M29410

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
SIGNATURES					
RECEIVED BY:					
REVIEWED BY:					
PREPARED BY:					
ANALYZED BY:					
REPORTED BY:					
DEPOSED BY:					

MAS

Co. Name _____
Address _____

PH: _____
FAX: _____

Sampling Date:

Cutting Constraints

Sheet 2 of 3

Date	Sample No.	Sample Location	Sample Type	Sample Times (Minutes)			Flow Rate (Liters per Minute)		
				Start	Stop	Duration	Before	After	Average
9/27/02	P-1-A	WLR FWA	Personal	2:22	2:27		0.5	0.5	
	13 P-1-B	RHR					0.5	0.5	
	14 P-1-C	WLR					0.5	0.5	
	15 P-1-D	RHR					0.5	0.5	
	16 P-1-ME	WLB ₂					2.75	2.75	
	17 P-1-ME	RH D ₂					2.75	2.75	
	18 FB-1		Field Blank						
	19 FB-2		Field Blank						
	Fabric-Blank		Fabric						
	Fabric-RHR		Fabric						

Received By

First Transfer By:
Second Transfer By:
Third Transfer By:

Initial Shipment Date: 9/27

Hand

9/27/02

Amos

TEM CLEARANCE AIR SAMPLING DATA SHEET



Co. Name _____

Address _____

Project Number: _____

Project Name: _____

Work Area Description: _____

Project Representative: _____

Sampling Date: _____

Cutting Cerraintal AC pipe

3945 Lakefield Court

Suwanee, GA 30024

PH: (770) 866-3200

FAX: (770) 866-3259

PH: _____

FAX: _____

Sheet 1 of 3

Date	Sample No.	Sample Location	Sample Type	Sample Times (Minutes)			Flow Rate (Liters per Minute)		
				Start	Stop	Duration	Before	After	Average
9/27/02	A-0-A	IWA	Background	7:00AM	10:30AM		10.0	10.0	
	2 A-0-B	IWA	↓	↓	↓		10.0	10.0	
	3 A-0-C	IWA	↓	↓	↓		10.0	10.0	
	4 A-0-D	IWA	↓	↓	↓		10.0	10.0	
	5 A-0-E	OWA	↓	↓	↓		10.0	10.0	
	6 A-0-MF	IWA	Background	10:34	10:53		2.75	2.75	
	7 A-1-A	IWA	A-1-A	2:22	2:27		2.00	2.00	
	8 A-1-B	IWA	↓	↓	↓		2.0	2.00	
	9 A-1-C	IWA	↓	↓	↓		2.0	2.00	
	10 A-1-D	IWA	↓	↓	↓		1.6	1.6	
	11 A-1-E	OWA	↓	↓	↓		10.0	10.0	

129410

First Transfer By:
Second Transfer By:
Third Transfer By:

CHAIN OF CUSTODY

Initial Shipment Date:

K. Haffner 9/27

Mode of Transfer

Hand

Log-In Date

9/27/02

Received By

Donna

TEM CLEARANCE AIR SAMPLING DATA SHEET



Co. Name _____
 Address _____

 PH: _____
 FAX: _____

3945 Lakefield Court
 Suwanee, GA 30024
 PH: (770) 866-3200
 FAX: (770) 866-3259

Project Number: _____
 Project Name: _____
 Work Area Description: _____
 Project Representative: _____
 Sampling Date: _____

*Cutting Curtain track
 AC Pipe*

Sheet 3 of 3

Date	Sample No.	Sample Location	Sample Type	Sample Times (Minutes)			Flow Rate (Liters per Minute)		
				Start	Stop	Duration	Before	After	Average
	Fabric		Fabric						
20	A-2-A	IWA	AREA	4:02	4:17		2.0	2.0	
21	A-2-B	IWA	AREA	↓	↓		2.0	2.0	
22	A-2-C	IWA	AREA	↓	↓		2.0	2.0	
23	A-2-D	IWA	AREA	↓	↓		1.6	1.6	
	PS-1								
	PS-2								
	PS-3								
	PS-Blank								
	Butt		Butt						
	Dust #1	off pipe	DUST	10X10 cm					

29410

29412

29413

CHAIN OF CUSTODY

Initial Shipment Date:

9/27

Mode of Transfer

Hand

Log-In Date

9/27/02

Received By

Greg Jew

First Transfer By:
 Second Transfer By:
 Third Transfer By:



Dust Counting Method

Cell Field Count

1	1	0	1	1
---	---	---	---	---

Average Field Count 0.80 = AFC

Average Blank Field Count = ABFC

Average Net Field Count = ANFC

Field Area (sq. mm) 0.25 = FA

Volume of Sample (ml) 100.00 = SV

Additional Dilution Factor 1 = DF

Cell Depth (mm) 1 = CD

Cell Factor 4000 = CF
1000/(field area) x (cell depth)

Air Volume = AV
Sampled (cu.ft.)

Dust Concentration #VALUE! particles per cubic foot

Dust Concentration = ANFC x CF x SV x DF / AV

Project Name

Certain-Teed

Project Number

Sample Number

Sample Location

Blank



Dust Counting Method

Cell Field Count

1	1	2	1	1
---	---	---	---	---

Average Field Count 1.20 = AFC

Average Blank Field Count = ABFC

Average Net Field Count = ANFC

Field Area (sq. mm) = FA

Volume of Sample (ml) = SV

Additional Dilution Factor = DF

Cell Depth (mm) = CD

Cell Factor = CF
 $1000 / (\text{field area}) \times (\text{cell depth})$

Air Volume = AV
Sampled (cu.ft.)

Dust Concentration particles per cubic foot

Dust Concentration = ANFC x CF x SV x DF / AV

Project Name

Certain-Teed

Project Number

Sample Number

Background

Sample Location

IWA - Area Background



Dust Counting Method

Cell Field Count

72	83	88	69	89
----	----	----	----	----

Average Field Count 80.20 = AFC

Average Blank Field Count 0.80 = ABFC

Average Net Field Count 79.40 = ANFC

Field Area (sq. mm) 0.25 = FA

Volume of Sample (ml) 100.00 = SV

Additional Dilution Factor 2 = DF

Cell Depth (mm) 1 = CD

Cell Factor 4000 = CF
 $1000 / (\text{field area}) \times (\text{cell depth})$

Air Volume 0.49 = AV
Sampled (cu.ft.)

Dust Concentration 129,632,653 particles per cubic foot

Dust Concentration = $\text{ANFC} \times \text{CF} \times \text{SV} \times \text{DF} / \text{AV}$

Project Name

Certain-Teed

Project Number

Sample Number

P-1-MIRH

Sample Location

IWA-Personnel



Dust Counting Method

Cell Field Count

79	84	76	54	80
----	----	----	----	----

Average Field Count 74.60 = AFC

Average Blank Field Count = ABFC

Average Net Field Count = ANFC

Field Area (sq. mm) = FA

Volume of Sample (ml) = SV

Additional Dilution Factor = DF

Cell Depth (mm) = CD

Cell Factor = CF
1000/(field area) x (cell depth)

Air Volume = AV
Sampled (cu.ft.)

Dust Concentration particles per cubic foot

Dust Concentration = ANFC x CF x SV x DF / AV

Project Name

Certain-Teed

Project Number

Sample Number

P-1-MIWL

Sample Location

IWA - Personnel



MATERIALS ANALYTICAL SERVICES, INC.
3945 LAKEFIELD COURT
SUWANEE, GEORGIA 30024
(770) 866-3200

Summary of Results of Analyses by
Phase Contrast Microscopy (PCM)

Client Name: Materials Analytical Services, Inc.
Client Job Number/Name: M29410 / CertainTeed Asbestos Cement Pipe
Cutting
MAS Project Number: M29410
Date: October 23, 2002
Analytical Protocol: NIOSH 7400, Issue 2, August 15, 1994

Client Sample Number	MAS Sample Number	Volume (liters)	Fibers/ Fields Counted	Fiber Density (f/mm ²)	Measured Conc. (f/cc)
A-0-A	M29410-001	2100	3/100	ND, <7	<0.001
A-0-B	M29410-002	2100	3/100	ND, <7	<0.001
A-0-C	M29410-003	2100	2.5/100	ND, <7	<0.001
A-0-D	M29410-004	2100	6/100	ND, <7	<0.001
A-0-E	M29410-005	2100	2/100	ND, <7	<0.001
A-1-A	M29410-007	10	265.5/20	1722.7	66.325
A-1-B	M29410-008	10	148/20	959.7	36.950
A-1-C	M29410-009	10	139/20	901.3	34.700

Table continued on next page

f/mm² = fibers/square millimeter

f/cc = fibers/cubic centimeter

ND = None Detected

LOQ = Limit of Quantitation



Materials Analytical Services, Inc.
M29410 / CertainTeed Asbestos Cement Pipe Cutting
Table for PCM Analysis
Page 2

Table continued from previous page

Client Sample Number	MAS Sample Number	Volume (liters)	Fibers/ Fields Counted	Fiber Density (f/mm ²)	Measured Conc. (f/cc)
A-1-D	M29410-010	10	275.5/20	1787.7	86.031
A-1-E	M29410-011	50	0.5/100	ND, <7	<0.054
P-1-A	M29410-012	2.5	288/20	1868.8	287.800
P-1-B	M29410-013	2.5	245/20	1589.6	244.800
P-1-C	M29410-014	2.5	192.5/20	1248.7	192.300
P-1-D	M29410-015	2.5	171.5/20	1112.3	171.300
FB-1	M29410-018	0	2/100	ND, <7	--
FB-2	M29410-019	0	0/100	ND, <7	--
A-2-A	M29410-020	30	103/20	667.5	8.567
A-2-B	M29410-021	30	103/22	606.7	7.786
A-2-C	M29410-022	30	110.5/20	716.2	9.192
A-2-D	M29410-023	24	100/21	617.1	9.900
LOQ				7	

f/mm² = fibers/square millimeter
f/cc = fibers/cubic centimeter
ND = None Detected
LOQ = Limit of Quantitation

Materials Analytical Services Airborne Fiber Analysis

NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-001

Analysis Date: 10/22/02 Media Type: 25 mm MCE Filter

[illegible]

Notes: _____

Sample ID:	<u>A-0-A</u>
Pump Flow Rate, Liters/minute (FR)	_____
Sample Time, minutes (T)	_____
Sample Volume, Liters (V)	<u>2100</u>
Total Fibers Counted, Sample (FCS)	<u>3</u>
Total Fields Counted, Sample (FLS)	<u>100</u>
Total Fibers Counted, Blank (FCB)	<u>1</u>
Total Fields Counted, Blank (FLB)	<u>100</u>
Area of Filter, mm ² (AF)	<u>385</u>
Graticule Field Area, mm ² (GFA)	<u>0.0027</u>

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = ND, < 7 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = < 0.001 fibers/cubic centimeter

Unit of Quantitation (LCC) = "fibers/mm"

For counts outside the 100–500 fibers mm^{-2} range have greater than optimal variability and are probably biased.

W. B. Hall

neg Sv 

Date 10/23/02

Date: 10/23/02

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-002
Analysis Date: 10/22/02 Media Type: 25 mm MCE Filter

[illegible]

Notes:

Sample ID:	<u>A-0-B</u>
Pump Flow Rate, Liters/minute (FR)	<u> </u>
Sample Time, minutes (T)	<u> </u>
Sample Volume, Liters (V)	<u>2/00</u>
Total Fibers Counted, Sample (FCS)	<u>3</u>
Total Fields Counted, Sample (FLS)	<u>100</u>
Total Fibers Counted, Blank (FCB)	<u>1</u>
Total Fields Counted, Blank (FLB)	<u>100</u>
Area of Filter, mm ² (AF)	<u>380</u>
Graticule Field Area, mm ² (GFA)	<u>0.0077</u>

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 40, < 7 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = < 0.001 fibers/cubic centimeter

per counts outside the 100-300 fibers/mm² range have greater than optimal variability and are probably biased.

W. J. Hill

...wea Sv

Date 10/27/02

Date: 10/23/07

NIOSH 7400 Issue 2: Phase Contrast Microscopy

Project Name: CERTAINTEED ADGESICS CEMENT PIPE CUTTING Sample # 1729410-003

Analysis Date: 10/22/02 Media Type: **25 mm MCE Filter**

10	— — — — —	Sample ID: <u>A-0-C</u>
20	— — — — —	Pump Flow Rate, Liters/minute (FR) _____
30	— — — — —	Sample Time, minutes (T) _____
40	— — — — —	Sample Volume, Liters (V) <u>2100</u>
50	— — — — —	Total Fibers Counted, Sample (FCS) <u>2 1/2</u>
60	— — — — —	Total Fields Counted, Sample (FLS) <u>100</u>
70	— — — — —	Total Fibers Counted, Blank (FCB) <u>1</u>
80	— — — — —	Total Fields Counted, Blank (FLB) <u>100</u>
90	— — — — —	Area of Filter, mm ² (AF) <u>385</u>
100	— — — — —	Graticule Field Area, mm ² (GFA) <u>0.0077</u>

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 100, < 7 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = < 0.001 fibers/cubic centimeter

$$\text{LCC} = \frac{\text{Fibers}}{\text{mm}^2}$$

* per counts outside the 100-1000 cps/mm range have greater than optimal variability and are probably biased

Analyst: L. J. Hall

Approved By:

Date 6/6/23/02

Date 10/23/02

NIOSH 7400 Issue 2: Phase Contrast Microscopy

Project Name: CERTAINTED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-007

Analysis Date: 10/22/02 Media Type: **25 mm MCE Filter**

8	18	13	11	9	124
$13\frac{1}{2}$	$17\frac{1}{2}$	$14\frac{1}{2}$	9	$11\frac{1}{2}$	10
$12\frac{1}{2}$	$12\frac{1}{2}$	$18\frac{1}{2}$	$8\frac{1}{2}$	16	192
$20\frac{1}{2}$	14	10	$12\frac{1}{2}$	$15\frac{1}{2}$	20
					30
					40
					50
					60
					70
					80
					90
					100

Notes: > 50% OF FILTER COVERED
WITH PARTICULATE, PROBABLY BIASED.

Limit of Quantitation (LOQ) = 1 fibers/mm²

² fiber counts outside the "100-1000 fibers/mm" range have greater than optimal variability and are probably biased.

naivst

Witnessed By: 

Sample ID: A-1-A

124
10

192

20

30

40

50

60

70

80

90

100

Pump Flow Rate, Liters/minute (FR)

Sample Time, minutes (T)

Sample Volume, Liters (V)

Total Fibers Counted, Sample (FCS)

Total Fields Counted, Sample (FLS)

Total Fibers Counted, Blank (FCB)

Total Fields Counted, Blank (FLB)

Area of Filter, mm^2 (AF)

Graticule Field Area, mm^2 (GFA)

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS)-(FCB/FLB))/GFA$$

E = 1722.7 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$G = \frac{(E) \cdot (AF)}{1000 \cdot V}$$

C = 66.325 fibers/cubic centimeter

Date 10/23/92

Date: 10/23/02

Materials Analytical Services Airborne Fiber Analysis

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-008

Analysis Date: 10/22/02 Media Type: 25 mm MCE Filter

[illegible]

Notes: 750% of FILTER COVERED
WITH PARTICULATE, PROBABLY SLATED.

10	Sample ID:	<u>A-1-B</u>
20	Pump Flow Rate, Liters/minute (FR)	
30	Sample Time, minutes (T)	
40	Sample Volume, Liters (V)	<u>10</u>
50	Total Fibers Counted, Sample (FCS)	<u>148</u>
60	Total Fields Counted, Sample (FLS)	<u>20</u>
70	Total Fibers Counted, Blank (FCB)	<u>1</u>
80	Total Fields Counted, Blank (FLB)	<u>100</u>
90	Area of Filter, mm ² (AF)	<u>325</u>
100	Graticule Field Area, mm ² (GFA)	<u>0.0077</u>
Calculation of Fiber density (E) in Fibers/square millimeter $E = ((FCS/FLS) - (FCB/FLB)) / GFA$ E = <u>959.7</u> fibers/mm²		
Calculation of Fiber Concentration (C) in Fibers/cubic centimeter $C = \frac{(E) * (AF)}{1000 * V}$ C = <u>36.950</u> fibers/cubic centimeter		

Limit of Quantitation (LOQ) = 7 fibers/mm²

* fiber counts outside the '00-'100 fibers/mm* range have greater than normal variability and are probably biased

innuendo

(15)

By and

Date _____

NIOSH 7400 Issue 2: Phase Contrast Microscopy

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-009

Analysis Date: 10/22/02 Media Type: 25 mm MCE Filter

[illegible]

Notes: PARTICULATE HEAVY
BUT LESS THAN 50%.

10	Sample ID:	<u>A-1-C</u>
	Pump Flow Rate, Liters/minute (FR)	<u> </u>
20	Sample Time, minutes (T)	<u> </u>
	Sample Volume, Liters (V)	<u>10</u>
30	Total Fibers Counted, Sample (FCS)	<u>139</u>
40	Total Fields Counted, Sample (FLS)	<u>20</u>
	Total Fibers Counted, Blank (FCB)	<u>1</u>
50	Total Fields Counted, Blank (FLB)	<u>100</u>
	Area of Filter, mm ² (AF)	<u>385</u>
60	Graticule Field Area, mm ² (GFA)	<u>0.0077</u>
70	Calculation of Fiber density (E) in Fibers/square millimeter	
80	$E = ((FCS/FLS) - (FCB/FLB)) / GFA$	
90	E =	<u>906.30</u> fibers/mm ²
100	Calculation of Fiber Concentration (C) in Fibers/cubic centimeter	
	$C = \frac{(E) * (AF)}{1000 * V}$	
	C =	<u>34.700</u> fibers/cubic centimeter

Limit of Quantitation (LOQ) = "fibers/mm"

fiber counts outside the "00-1000 fibers/mm" range have greater than optimal variability and are probably biased

-naivsi *h. p. ...*

neg Bv

Date 10/23/02

Date. 10/23/02

Materials Analytical Services Airborne Fiber Analysis
NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-011

Analysis Date: _____ Media Type: **25 mm MCE Filter**

-	-	-	-	-	
1/2	-	-	-	-	10
-	-	-	-	-	
-	-	-	-	-	20
-	-	-	-	-	
-	-	-	-	-	30
-	-	-	-	-	
-	-	-	-	-	40
-	-	-	-	-	
-	-	-	-	-	50
-	-	-	-	-	
-	-	-	-	-	60
-	-	-	-	-	
-	-	-	-	-	70
-	-	-	-	-	
-	-	-	-	-	80
-	-	-	-	-	
-	-	-	-	-	90
-	-	-	-	-	
-	-	-	-	-	100

Notes: _____

Limit of Quantitation (LOQ) = 7 fibers/mm²

Fiber counts outside the 100-1000 fibers/mm² range have greater than optimal variability and are probably biased

Analyst: W. S. Gull

Reviewed By: Donald G. Gull

Date: 10/23/02

Date: 10/23/02

Materials Analytical Services
 3945 Lakeridge Court
 Suwanee, GA 30024
 Phone (770) 866-3200

Page _____ of _____

Sample ID: <u>A-1-E</u>	
Pump Flow Rate, Liters/minute (FR)	_____
Sample Time, minutes (T)	_____
Sample Volume, Liters (V)	<u>50</u>
Total Fibers Counted, Sample (FCS)	<u>1/2</u>
Total Fields Counted, Sample (FLS)	<u>100</u>
Total Fibers Counted, Blank (FCB)	<u>1</u>
Total Fields Counted, Blank (FLB)	<u>100</u>
Area of Filter, mm ² (AF)	<u>385</u>
Graticule Field Area, mm ² (GFA)	<u>0.0477</u>
Calculation of Fiber density (E) in Fibers/square millimeter $E = ((FCS/FLS) - (FCB/FLB)) / GFA$ E = <u>ND, < 7</u> fibers/mm²	
Calculation of Fiber Concentration (C) in Fibers/cubic centimeter $C = \frac{(E) * (AF)}{1000 * V}$ C = <u>< 0.054</u> fibers/cubic centimeter	

Materials Analytical Services Airborne Fiber Analysis NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-012

Analysis Date: 10/22/02 Media Type: 25 mm MCE Filter

[illegible]

Notes: _____

Sample ID: P-1-A

Pump Flow Rate, Liters/minute (FR)

Sample Time, minutes (T)

Sample Volume, Liters (V)

Total Fibers Counted, Sample (FCS)

40 Total Fields Counted, Sample (FLS)

Total Fibers Counted, Blank (FCB)

50 Total Fields Counted, Blank (FLB)

Area of Filter, mm^2 (AF)

60 Graticule Field Area, mm² (GFA)

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS)-(FCB/FLB))/GFA$$

E = 1868.8 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$G = \frac{(E)^*(AF)}{1000 * V}$$

$$C = \frac{287.800}{\text{fibers/cubic centimeter}}$$

Limit of Quantitation (LOQ) = 7 fibers/mm²

• per counts outside the 100-500 fibers/mm range have greater than optimal variability and are probably biased

-n21vsi

By _____

Case

Date _____

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-015
Analysis Date: 10/22/02 Media Type: 25 mm MCE Filter

[illegible]

Notes: _____

10	Sample ID: <u>P-1-D</u>	
	Pump Flow Rate, Liters/minute (FR)	
20	Sample Time, minutes (T)	
	Sample Volume, Liters (V)	<u>2.5</u>
30	Total Fibers Counted, Sample (FCS)	<u>171.2</u>
40	Total Fields Counted, Sample (FLS)	<u>20</u>
	Total Fibers Counted, Blank (FCB)	<u>1</u>
50	Total Fields Counted, Blank (FLB)	<u>100</u>
	Area of Filter, mm ² (AF)	<u>385</u>
60	Graticule Field Area, mm ² (GFA)	<u>0.0077</u>
70	Calculation of Fiber density (E) in Fibers/square millimeter	
80	$E = ((FCS/FLS) - (FCB/FLB)) / GFA$	
90	E = <u>1112.3</u>	fibers/mm ²
100	Calculation of Fiber Concentration (C) in Fibers/cubic centimeter	
	$C = \frac{(E) * (AF)}{1000 * V}$	
	C = <u>171.300</u>	fibers/cubic centimeter

Analyst: W. B. Egan
Reviewed By: David J. Jones

Date: 10/23/02

Date: 10/23/02

Materials Analytical Services Airborne Fiber Analysis
NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CONTAMINATED ASBESTOS CEMENT PIPE CUTTING

Sample # 729410-018

Analysis Date: 10/22/02

Media Type: 25 mm MCE Filter

1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	-	-	-	-
10	-	-	-	-
11	-	-	-	-
12	-	-	-	-
13	-	-	-	-
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	-	-	-	-
18	-	-	-	-
19	-	-	-	-
20	-	-	-	-
21	-	-	-	-
22	-	-	-	-
23	-	-	-	-
24	-	-	-	-
25	-	-	-	-
26	-	-	-	-
27	-	-	-	-
28	-	-	-	-
29	-	-	-	-
30	-	-	-	-
31	-	-	-	-
32	-	-	-	-
33	-	-	-	-
34	-	-	-	-
35	-	-	-	-
36	-	-	-	-
37	-	-	-	-
38	-	-	-	-
39	-	-	-	-
40	-	-	-	-
41	-	-	-	-
42	-	-	-	-
43	-	-	-	-
44	-	-	-	-
45	-	-	-	-
46	-	-	-	-
47	-	-	-	-
48	-	-	-	-
49	-	-	-	-
50	-	-	-	-
51	-	-	-	-
52	-	-	-	-
53	-	-	-	-
54	-	-	-	-
55	-	-	-	-
56	-	-	-	-
57	-	-	-	-
58	-	-	-	-
59	-	-	-	-
60	-	-	-	-
61	-	-	-	-
62	-	-	-	-
63	-	-	-	-
64	-	-	-	-
65	-	-	-	-
66	-	-	-	-
67	-	-	-	-
68	-	-	-	-
69	-	-	-	-
70	-	-	-	-
71	-	-	-	-
72	-	-	-	-
73	-	-	-	-
74	-	-	-	-
75	-	-	-	-
76	-	-	-	-
77	-	-	-	-
78	-	-	-	-
79	-	-	-	-
80	-	-	-	-
81	-	-	-	-
82	-	-	-	-
83	-	-	-	-
84	-	-	-	-
85	-	-	-	-
86	-	-	-	-
87	-	-	-	-
88	-	-	-	-
89	-	-	-	-
90	-	-	-	-
91	-	-	-	-
92	-	-	-	-
93	-	-	-	-
94	-	-	-	-
95	-	-	-	-
96	-	-	-	-
97	-	-	-	-
98	-	-	-	-
99	-	-	-	-
100	-	-	-	-

Notes: _____

Sample ID: FB-1

Pump Flow Rate, Liters/minute (FR) _____

Sample Time, minutes (T) _____

Sample Volume, Liters (V) 0

Total Fibers Counted, Sample (FCS) 2

Total Fields Counted, Sample (FLS) 100

Total Fibers Counted, Blank (FCB) _____

Total Fields Counted, Blank (FLB) _____

Area of Filter, mm² (AF) 385

Graticule Field Area, mm² (GFA) 0.0077

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = NO, < 7 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = NA fibers/cubic centimeter

Limit of Quantitation (LOQ) = 7 fibers/mm²

Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst: William B. Hill

Date: 10/23/02

Reviewed By: David Green

Date: 10/23/02

Materials Analytical Services Airborne Fiber Analysis
NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-019

Analysis Date: 10/22/02 Media Type: **25 mm MCE Filter**

[illegible]

Notes:

Sample ID:	<u>FB-2</u>
Pump Flow Rate, Liters/minute (FR)	_____
Sample Time, minutes (T)	_____
Sample Volume, Liters (V)	<u>0</u>
Total Fibers Counted, Sample (FCS)	<u>0</u>
Total Fields Counted, Sample (FLS)	<u>100</u>
Total Fibers Counted, Blank (FCB)	_____
Total Fields Counted, Blank (FLB)	_____
Area of Filter, mm ² (AF)	<u>385</u>
Graticule Field Area, mm ² (GFA)	<u>0.7077</u>

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = ND, < fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = NA fibers/cubic centimeter

Limit of Quantitation (LOQ) = 7 fibers/mm²

Fiber counts outside the 100-1300 fibers/mm² range have greater than optimal variability and are probably biased.

Analisi: Will B. Hill

Date 10/23/02

Reviewed By 

Date: 10/23/02

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-020
Analysis Date: 10/22/02 Media Type: 25 mm MCE Filter

[illegible]

Notes: _____

10	Sample ID: <u>A-2-A</u>	
	Pump Flow Rate, Liters/minute (FR)	
20	Sample Time, minutes (T)	
	Sample Volume, Liters (V)	<u>30</u>
30	Total Fibers Counted, Sample (FCS)	<u>103</u>
40	Total Fields Counted, Sample (FLS)	<u>20</u>
	Total Fibers Counted, Blank (FCB)	<u>1</u>
50	Total Fields Counted, Blank (FLB)	<u>100</u>
	Area of Filter, mm ² (AF)	<u>385</u>
60	Graticule Field Area, mm ² (GFA)	<u>0.0077</u>
70	Calculation of Fiber density (E) in Fibers/square millimeter	
80	$E = ((FCS/FLS) - (FCB/FLB)) / GFA$	
90	E = <u>667.5</u>	fibers/mm ²
100	Calculation of Fiber Concentration (C) in Fibers/cubic centimeter	
	$C = \frac{(E) * (AF)}{1000 * V}$	
	C = <u>8.570</u>	fibers/cubic centimeter

Fiber counts outside the 100-1000 fibers/mm² range have greater than optimal variability and are probably biased.

Analyst: W. B. Egan
Reviewed By: David G. Duncan

Date 10/22/02
Date 10/23/02

NIOSH 7400 Issue 2: Phase Contrast Microscopy

Project Name: CERTAINTEED ADJUSTABLE CEMENT PIPE CUTTING Sample # 1729410-021

Analysis Date: 10/22/02 Media Type: 25 mm MCE Filter

3	1	-	2	4	
3½	5	6	5	1	10
5½	7	3	5	5½	
10	6	7	7	3	20
6½	7	2½	3	8½	
					30
					40
					50
					60
					70
					80
					90
					100

Notes:

Sample ID:	<u>A-2-B</u>
Pump Flow Rate, Liters/minute (FR)	_____
Sample Time, minutes (T)	_____
Sample Volume, Liters (V)	<u>30</u>
Total Fibers Counted, Sample (FCS)	<u>103</u>
Total Fields Counted, Sample (FLS)	<u>22</u>
Total Fibers Counted, Blank (FCB)	<u>1</u>
Total Fields Counted, Blank (FLB)	<u>100</u>
Area of Filter, mm ² (AF)	<u>345</u>
Graticule Field Area, mm ² (GFA)	<u>0.0077</u>

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 606.7 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = 7.786 fibers/cubic centimeter

Limit of Quantitation (LOQ) = 7 fibers/mm²

Fiber counts outside the 100-1000 fibers/mm² range have greater than optimal variability and are probably biased

-naivst

Reviewed By: Daniel [Signature]

Date 10/23/02

Date. 10/23/02

NIOSH 7400 Issue 2; Phase Contrast Microscopy

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-022

Analysis Date: 16/22/02 Media Type: 25 mm MCE Filter

[illegible]

Notes:

Sample ID:	A-2-C
Pump Flow Rate, Liters/minute (FR)	
Sample Time, minutes (T)	
Sample Volume, Liters (V)	30
Total Fibers Counted, Sample (FCS)	1105
Total Fields Counted, Sample (FLS)	20
Total Fibers Counted, Blank (FCB)	1
Total Fields Counted, Blank (FLB)	100
Area of Filter, mm ² (AF)	385
Graticule Field Area, mm ² (GFA)	0.0077

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 716.2 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = 9.192 fibers/cubic centimeter

Limit of Quantitation (LOQ) = 7 fibers/mm

• Fiber counts outside the 100-1000 fibers/mm² range have greater than optimal variability and are probably biased

naive:

Prepared By James H. Hume

Date 10/23/02

Date: 10/23/02

NIOSH 7400 Issue 2: Phase Contrast Microscopy

Project Name: CERTAINTEED ASBESTOS CEMENT PIPE CUTTING Sample # 1729410-023

Analysis Date: 10/22/02 Media Type: 25 mm MCE Filter

[illegible]

Notes: _____

Sample ID:	A-2-D
Pump Flow Rate, Liters/minute (FR)	
Sample Time, minutes (T)	
Sample Volume, Liters (V)	24
Total Fibers Counted, Sample (FCS)	100
Total Fields Counted, Sample (FLS)	21
Total Fibers Counted, Blank (FCB)	1
Total Fields Counted, Blank (FLB)	101
Area of Filter, mm ² (AF)	385
Graticule Field Area, mm ² (GFA)	0.0022

Calculation of Fiber density (E) in Fibers/square millimeter

$$E = ((FCS/FLS) - (FCB/FLB)) / GFA$$

E = 617.1 fibers/mm²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter

$$C = \frac{(E) * (AF)}{1000 * V}$$

C = 9.900 fibers/cubic centimeter

$$\text{Limit of Quantitation (LOQ)} = 7 \text{ fibers/mm}^2$$

Fiber counts outside the 100-300 fibers/mm² range have greater than optimal variability and are probably biased

Analyst: 

Reviewed By: 

Date 10/23/02

Date: 10/23/02

MAS Indirect TEM ANALYSIS M29410-001

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-O-A

Sample Area/ Volume: 2100 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 3 %

Date Analyzed: 10/17/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100

Indicated Mag: 25

Screen Mag: 20

Grid box Number: 6319

KV

KX

KX

Str < 5um: 0
Str ≥ 5um: 0
Total str: 0
Str / cc > 5: 0.0000 /cc

Number of grids: 2 #1: 113 #3: 112
Number of openings: 10 #2: 114 #4: 114

Average Grid Size: 0.012825
Total Area Analyzed: 0.128

Filter used

Dilution

Dilution Factor

Detect_cc: 0.03210

1/ 2

30

6.666667

Total cc: 0.00000

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	A10-H7		NSD					
	G5		NSD					
	I3		NSD					
	E2		NSD					
	D6		NSD					
	A9-E1		NSD					
	B5		NSD					
	F3		NSD					
	G6		NSD					
	H7		NSD					

M29410 001 Sample Comments:

MAS Indirect TEM ANALYSIS M29410-002

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-O-B

Sample Area/ Volume: 2100 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 2 %

Date Analyzed: 10/17/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100

Indicated Mag: 25

Screen Mag: 20

Grid box Number: 6319

KV

KX

KX

Str < 5um: 0

Str ≥ 5um: 0

Total str: 0

Str / cc > 5: 0.0000 /cc

Number of grids: 2

#1: 114

#3: 114

Number of openings: 10

#2: 114

#4: 114

Average Grid Size: 0.012996

Total Area Analyzed: 0.130

Filter used

Dilution

Dilution Factor

1/ 2

30

6.666667

Detect_cc: 0.03168

Total cc: 0.00000

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	E7-E9		NSD					
	G8		NSD					
	H6		NSD					
	F4		NSD					
	C5		NSD					
	D7-E5		NSD					
	B5		NSD					
	D3		NSD					
	F5		NSD					
	G7		NSD					

M29410 002 Sample Comments:

MAS Indirect TEM ANALYSIS M29410-003

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-O-C

Sample Area/ Volume: 2100 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 2 %

Date Analyzed: 10/17/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100

Indicated Mag: 25

Screen Mag: 20

Grid box Number: 6319

KV

KX

KX

Str < 5um: 0

Str ≥ 5um: 0

Total str: 0

Str / cc > 5: 0.0000 /cc

Number of grids: 2

#1: 113

#3: 113

Number of openings: 10

#2: 114

#4: 114

Average Grid Size: 0.012882

Total Area Analyzed: 0.129

Filter used

Dilution

Dilution Factor

1/ 2

30

6.666667

Detect_cc: 0.03196

Total cc: 0.00000

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	E6-B4		NSD					
	C6		NSD					
	E7		NSD					
	G5		NSD					
	H7		NSD					
	D6-B5		NSD					
	D2		NSD					
	F4		NSD					
	G6		NSD					
	D9		NSD					

M29410 003 Sample Comments:

MAS Indirect TEM ANALYSIS M29410-004

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-O-D	
Sample Area/ Volume:	2100 Liters	Date Analyzed:	10/17/02
Filter Type:	MCE 47mm	Analyst:	Mehrdad Motamedi
Pore size:	0.45	Scope Number:	3
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	Dust	Screen Mag:	20 KX
Grid Acceptance	YES 2 %	Grid box Number:	6319

Str < 5um:	0
Str ≥ 5um:	0
Total str:	0
Str / cc > 5:	0.0000 /cc

Number of grids:	2	#1:	114	#3:	113
Number of openings:	10	#2:	113	#4:	112

Average Grid Size:	0.012769
Total Area Analyzed:	0.128

Filter used	Dilution	Dilution Factor	Detect_cc:	0.03225
1/ 2	30	6.666667	Total cc:	0.00000

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	B6-H9		NSD					
	G7		NSD					
	G4		NSD					
	D5		NSD					
	C4		NSD					
	B7-G10		NSD					
	H7		NSD					
	E9		NSD					
	E3		NSD					
	A7		NSD					

M29410 004 Sample Comments:

MAS Indirect TEM ANALYSIS M29410-007

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-A

Sample Area/ Volume: 10 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 5 %

Date Analyzed: 10/21/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid box Number: 6319

Str < 5um: 34

Str ≥ 5um: 15

Total str: 49

Str / cc > 5: 302.0494 /cc

Number of grids: 2

#1: 113

#3: 113

Number of openings: 10

#2: 114

#4: 114

Average Grid Size: 0.012882

Total Area Analyzed: 0.129

Filter used

Dilution

Dilution Factor

1 / 2

10

20

Detect_cc: 20.13662

Total cc: 986.69461

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	A1-I8	C	B	8.00	1.70	X	X	Print Out
2	I8	C	F	1.80	0.10	X	X	
3	I8	C	M-F	2.00	0.10	X	X	
4	I8	C	B	2.50	0.50	X	X	
5	I8	C	F	5.20	0.10	X	X	
6	I8	C	M-B	2.00	0.20	X	X	
7	I8	C	B	6.00	0.20	X	X	
8	I8	C	B	2.50	0.20	X	X	
9	G6	C	B	10.00	0.20	X	X	
10	G6	C	M-F	1.00	0.10	X	X	Print Out
11	F4	C	M-B	1.40	0.20	X	X	
12	F4	C	F	3.70	0.10	X	X	
13	F4	C	F	2.00	0.20	X	X	
14	F4	C	B	6.00	0.40	X	X	
15	F4	C	F	1.30	0.02	X	X	
16	F4	C	B	9.00	0.50	X	M34342	
17	F4	C	M-B	3.00	0.20	X	X	
18	J4	C	B	9.00	0.20	X	X	
19	J4	C	B	3.00	0.30	X	X	
20	J4	C	F	2.40	0.02	X	X	Print Out
21	J4	C	M-B	2.00	0.20	X	X	
22	J4	C	B	12.00	0.20	X	X	
23	J4	C	F	2.40	0.10	X	X	
24	H1	C	B	17.00	0.50	X	X	
25	H1	C	F	5.30	0.20	X	X	
26	H1	C	B	3.80	0.30	X	X	
27	H1	C	B	10.00	0.20	X	X	
28	H1	C	B	4.00	0.20	X	X	

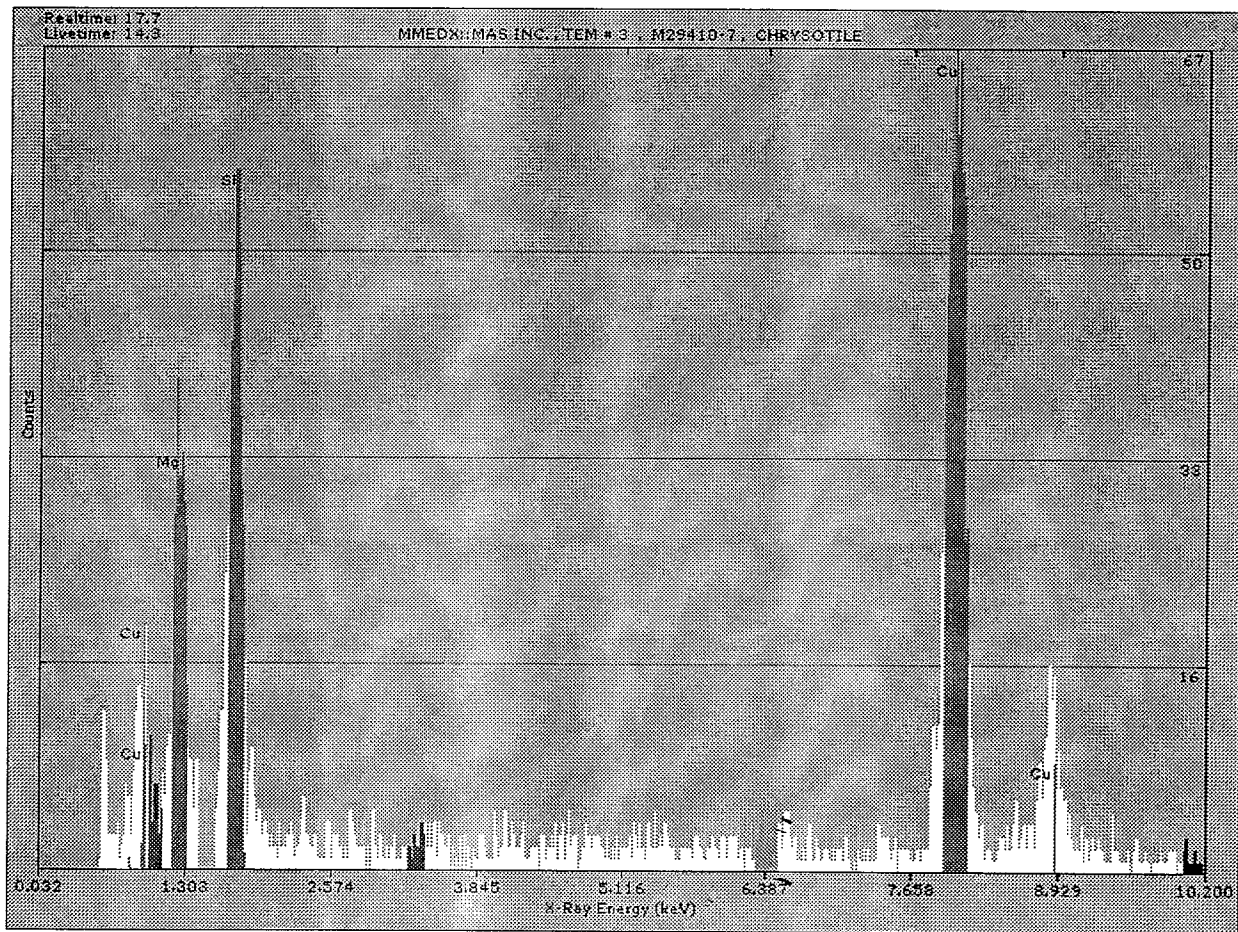
MAS Indirect TEM ANALYSIS M29410-007

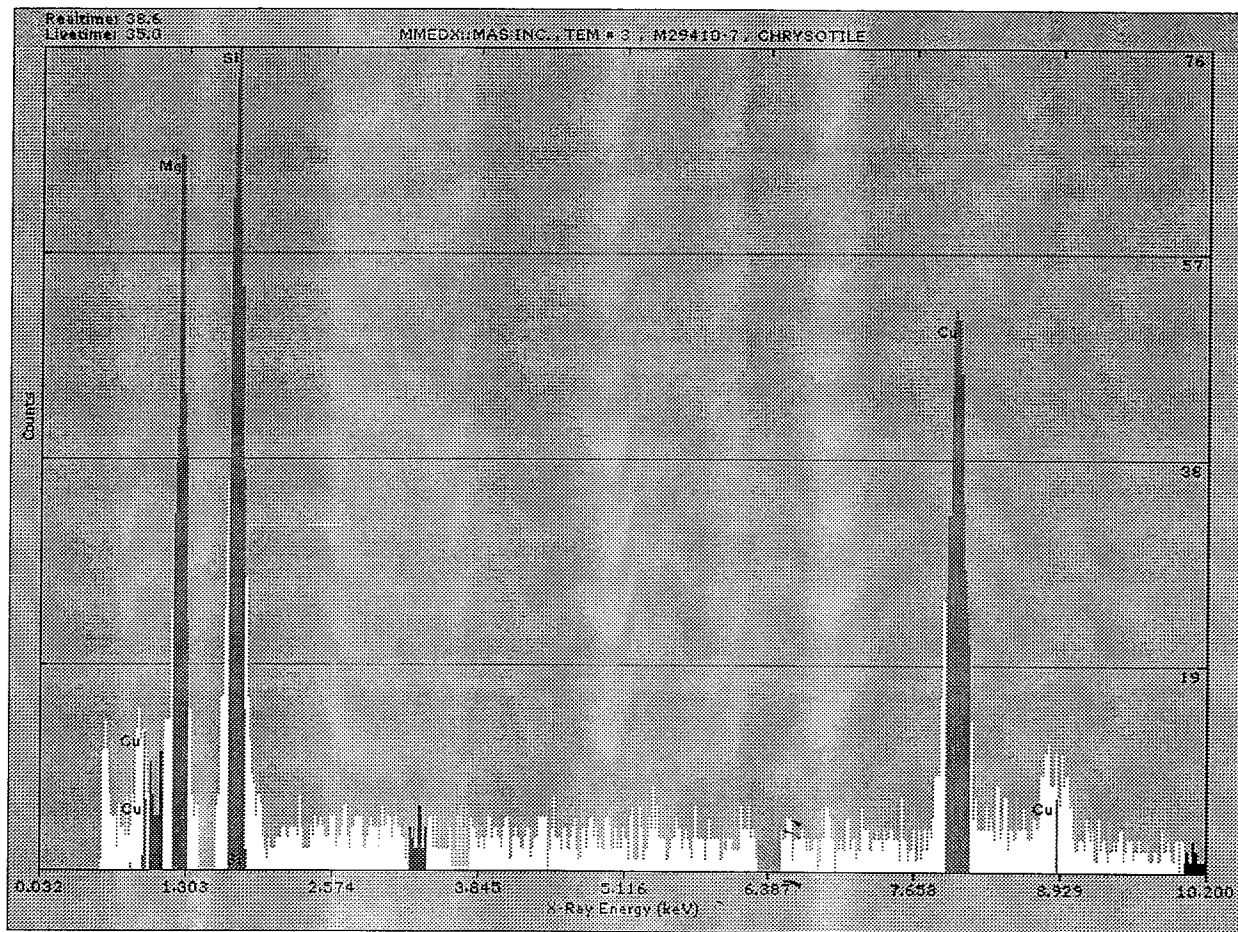
CLIENT NAME: Materials Analytical Services, Inc.

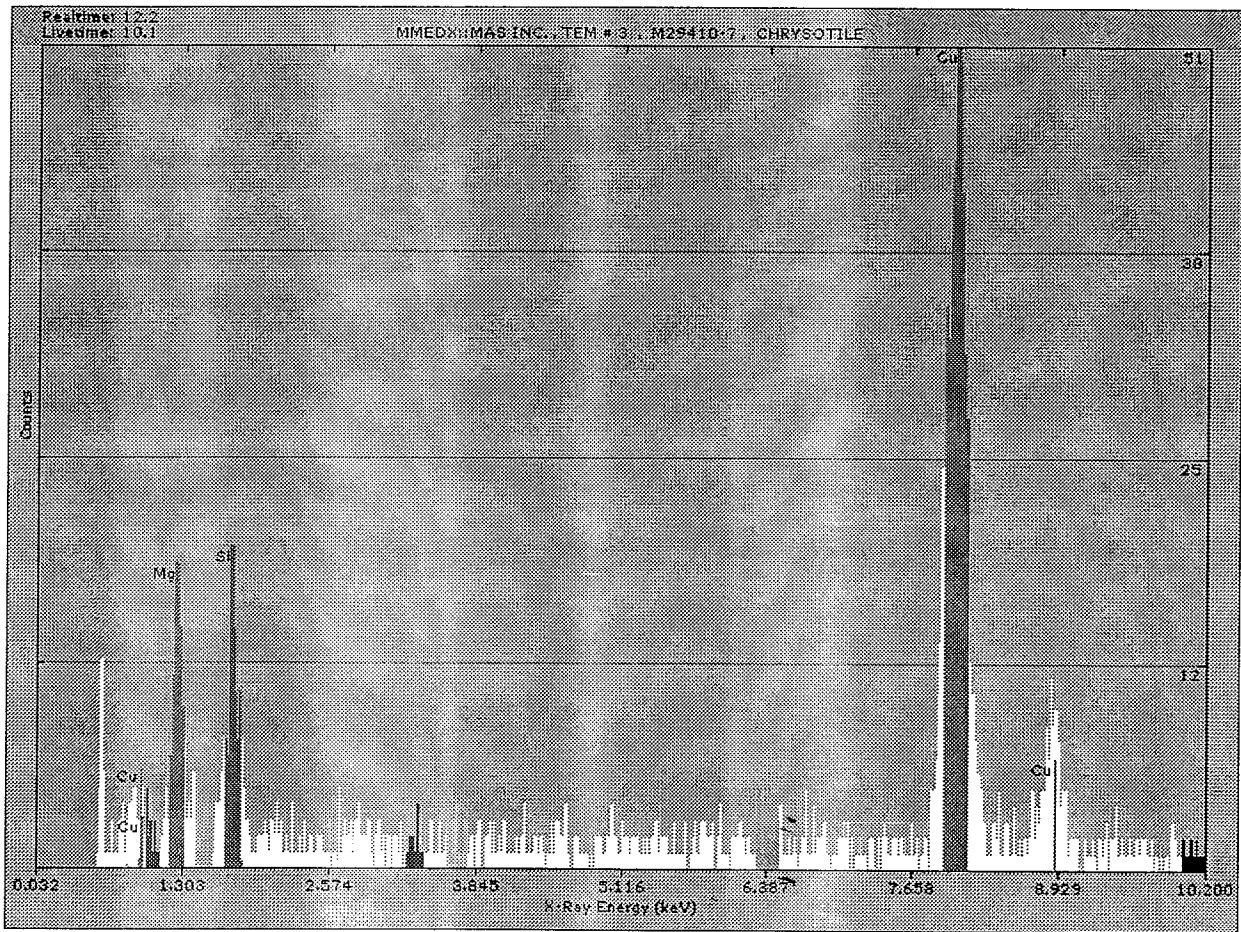
CLIENT SAMPLE ID: A-1-A

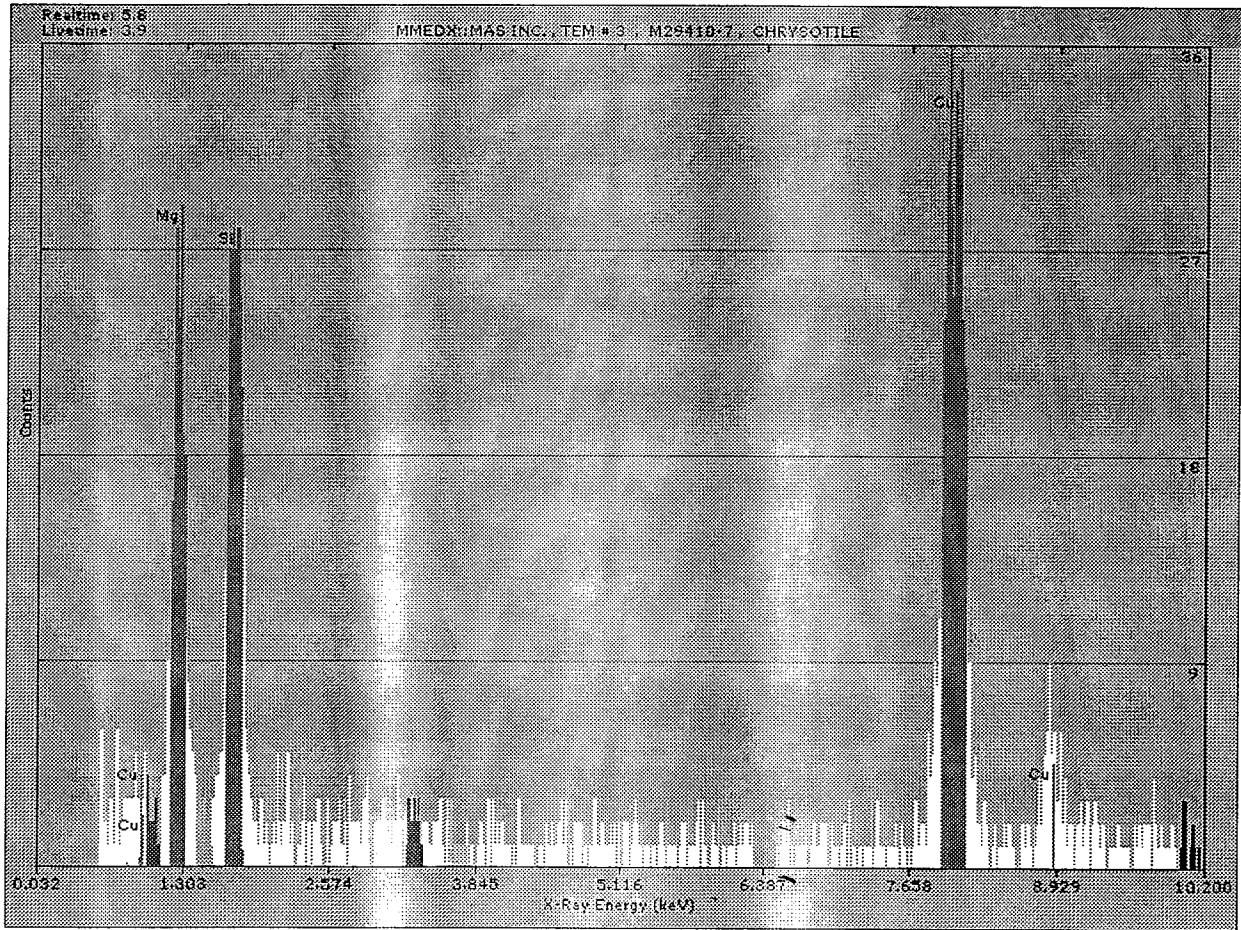
29	H1	C	B	2.00	0.30	X	X	
30	A2-J2	C	M-B	0.80	0.20	X	X	Print Out
31	J2	C	M-B	4.00	0.50	X	X	
32	J2	C	B	17.00	0.50	X	X	
33	J2	C	F	2.40	0.10	X	X	
34	J2	C	B	4.40	0.40	X	X	
35	J2	C	B	16.00	0.30	X	X	
36	I6	C	B	2.50	0.20	X	X	
37	I6	C	M-B	3.70	0.40	X	X	
38	I6	C	M-B	4.00	0.60	X	X	
39	I6	C	F	2.00	0.10	X	X	
40	I6	C	F	2.00	0.10	X	X	Print Out
41	I6	C	F	3.80	0.10	X	X	
42	G7	C	C-F	3.40	0.10	X	X	
43	G7	C	B	2.50	0.40	X	X	
44	G7	C	B	14.00	0.20	X	X	
45	G7	C	M-F	0.80	0.02	X	X	
46	G7	C	B	13.00	0.70	X	X	
47	E8	C	M-B	1.70	0.60	X	X	
48	E8	C	M-F	2.30	0.10	X	X	
49	C6	C	F	2.40	0.10	X	X	

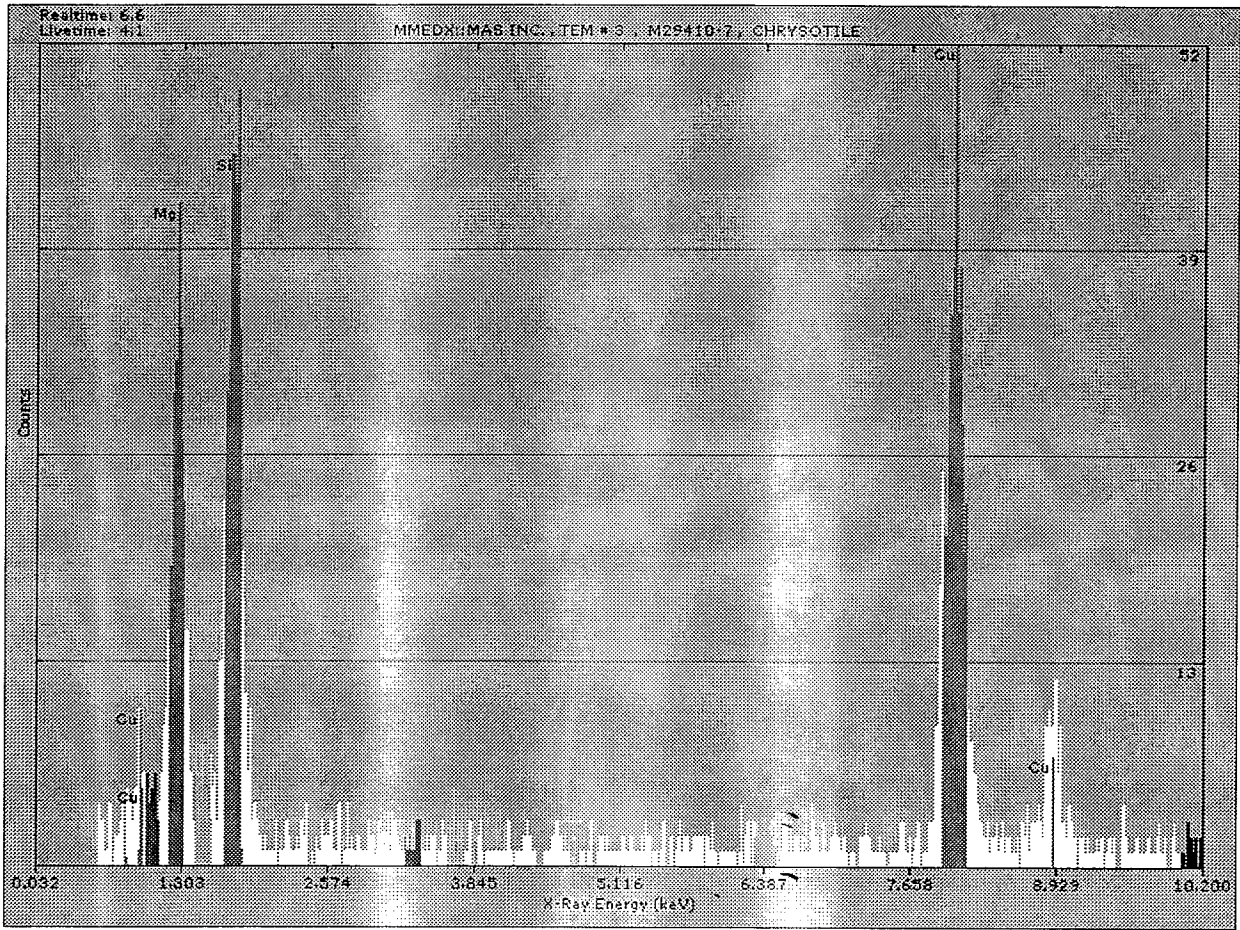
M29410 007 Sample Comments:











MAS Indirect TEM ANALYSIS M29410-008

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-B

Sample Area/ Volume: 10 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 3 %

Date Analyzed: 10/21/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid box Number: 6319

Str < 5um: 13

Str ≥ 5um: 8

Total str: 21

Str / cc > 5: 3193.5980 /cc

Number of grids: 2

#1: 114

#3: 114

Number of openings: 10

#2: 114

#4: 114

Average Grid Size: 0.012996

Total Area Analyzed: 0.130

Filter used

Dilution

Dilution Factor

1 / 2

0.5

400

Detect_cc: 399.19975

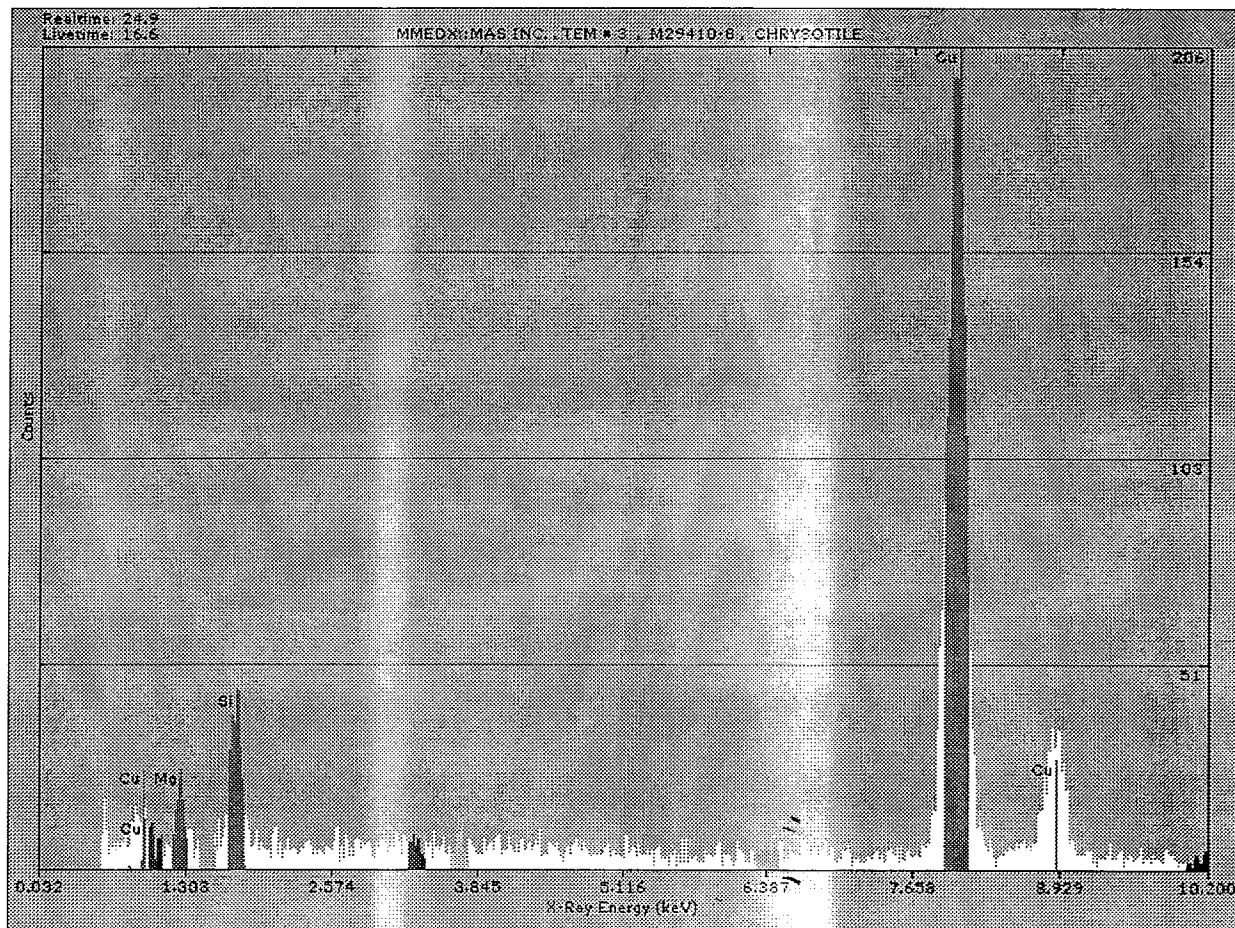
Total cc: 8383.19483

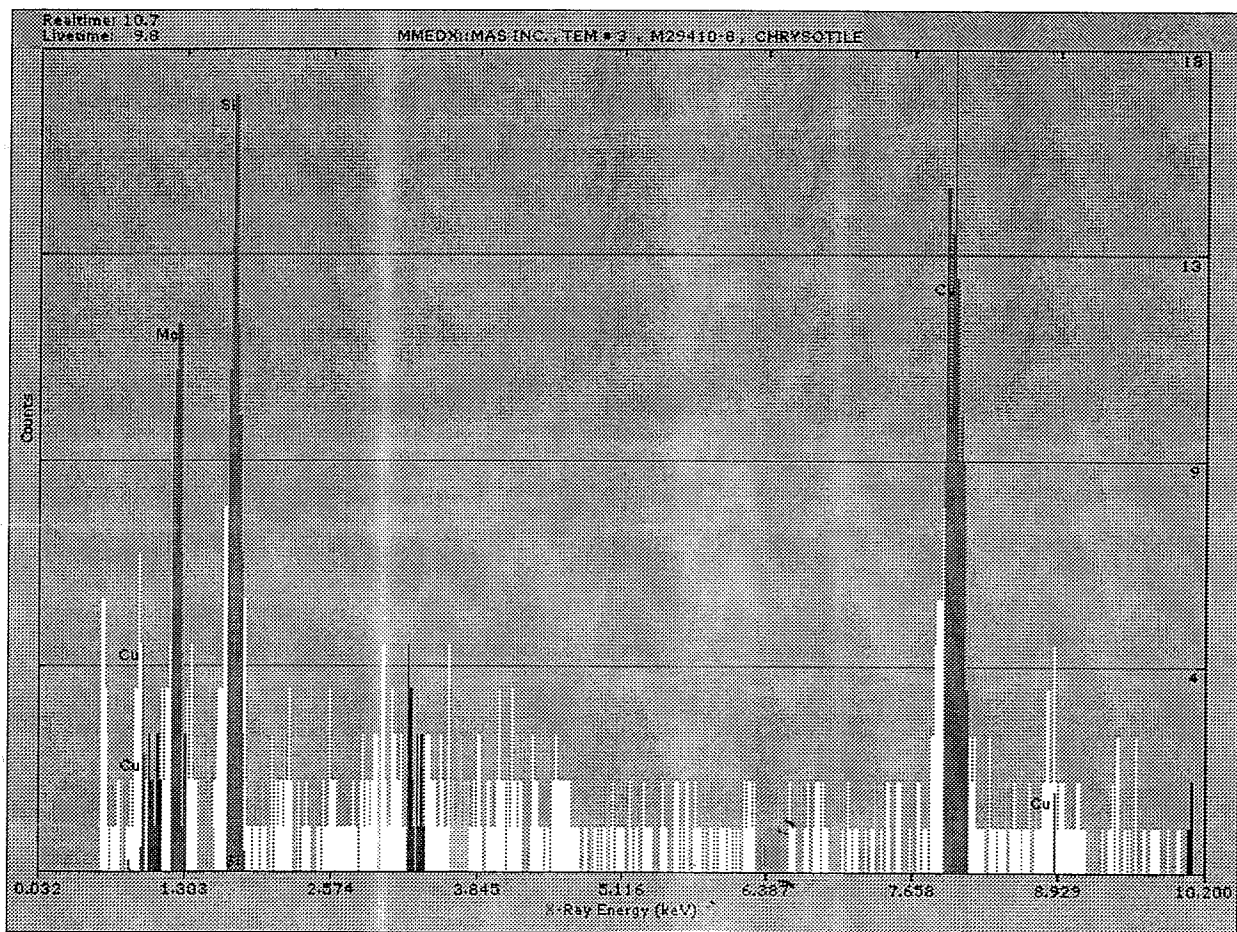
Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	C1-E7	C	M-F	2.00	0.10	X	X	Print Out
2	E7	C	B	8.00	0.60	X	X	
3	E7	C	C-B	7.00	0.20	X	X	
	I8		NSD					
4	H6	C	M-F	0.90	0.10	X	X	
5	G3	C	F	1.80	0.10	X	X	
6	G3	C	F	1.60	0.05	X	X	
7	G3	C	F	24.00	0.10	X	X	
8	I5	C	B	10.00	0.20	X	X	
9	B1-H4	C	B	21.00	0.60	X	X	
10	H4	C	M-F	9.00	0.10	X	X	Print Out
11	H4	C	F	3.00	0.10	X	X	
12	H4	C	F	1.30	0.06	X	X	
13	H4	C	B	4.00	0.40	X	X	
14	G7	C	F	2.60	0.10	X	X	
15	G7	C	F	2.00	0.10	X	X	
16	G7	C	F	3.60	0.10	X	X	
17	F5	C	B	2.30	0.30	X	X	
18	F5	C	C-B	23.00	0.30	X	X	
19	C8	C	B	5.30	0.60	X	X	
20	E9	C	F	1.60	0.10	X	X	Print Out
21	E9	C	M-F	4.00	0.20	X	X	

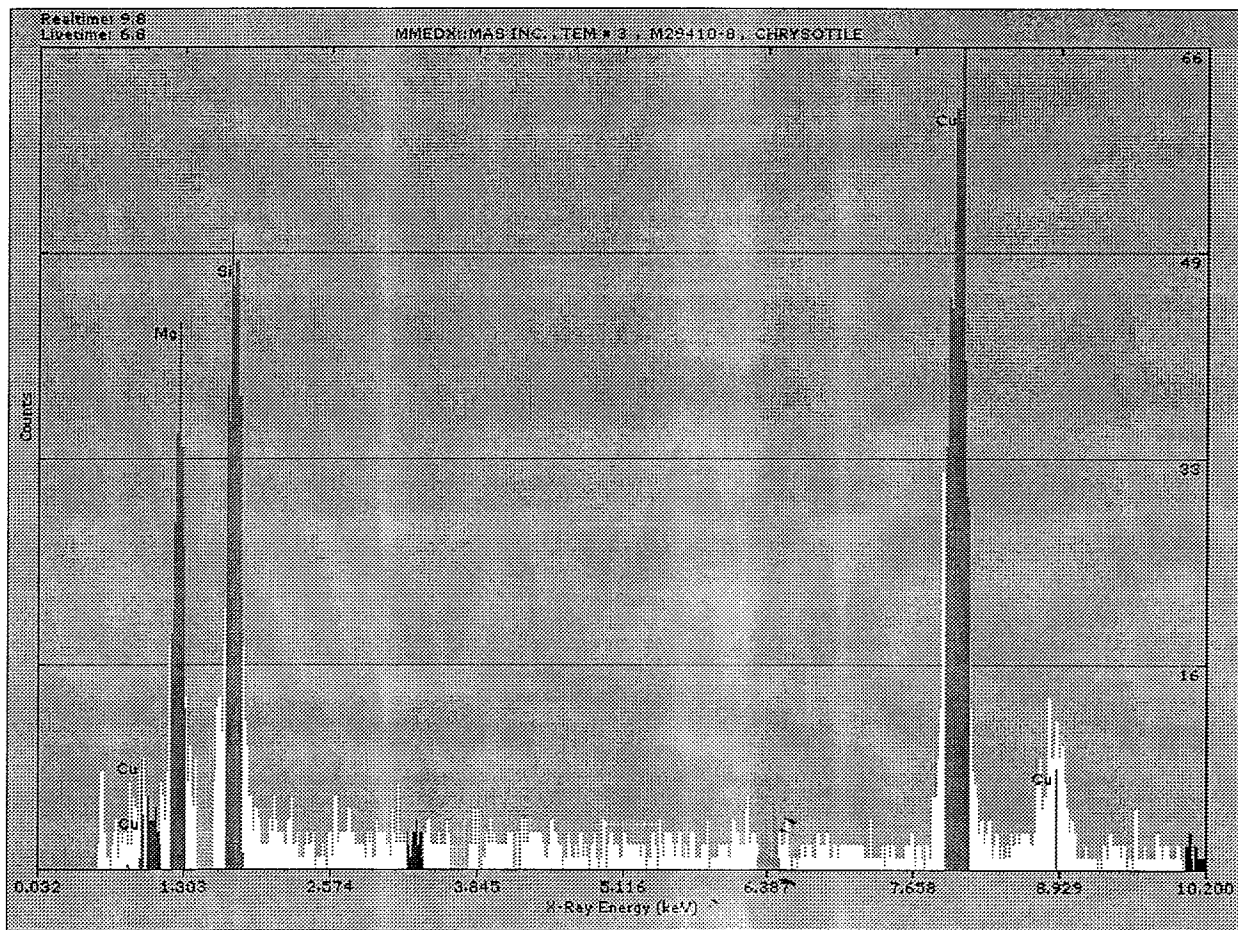
M29410 008 Sample Comments:

Residue: 24.9
LiveTime: 16.6

MMEDX/MAS INC., TEM # 3, M29410-6, CHRY20TILE







MAS Indirect TEM ANALYSIS M29410-009

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-C

Sample Area/ Volume: 10 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 5 %

Date Analyzed: 10/21/02

Analyst: Al Harmon

Scope Number: 2

Accelerating Voltage: 100

Indicated Mag: 25

Screen Mag: 20

Grid box Number: 6319

KV

KX

KX

Str < 5um: 31

Str ≥ 5um: 16

Total str: 47

Str / cc > 5: 1603.8334 /cc

Number of grids: 2

#1: 114

#3: 114

Number of openings: 10

#2: 113

#4: 114

Average Grid Size: 0.012939

Total Area Analyzed: 0.129

Filter used

Dilution

Dilution Factor

1/ 2

2

100

Detect_cc: 100.23959

Total cc: 4711.26053

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	C6-B6	C	M-F	2.00	0.04	X	X	Print Out
2	B6	C	M-F	7.00	0.04	X	X	
3	D4	C	B	4.00	0.20	X	X	
4	D4	C	C-F	3.00	0.04	X	X	
5	D4	C	M-F	2.00	0.10	X	X	
6	D4	C	M-F	3.00	0.05	X	X	
7	D4	C	C-B	5.00	0.20	X	X	
8	D4	C	M-F	3.00	0.10	X	X	
9	D4	C	B	14.00	0.50	X	X	
10	D4	C	M-B	8.00	0.30	X	X	Print Out
11	D4	C	B	10.00	0.60	X	X	
12	G5	C	B	6.00	0.40	X	X	
13	G5	C	B	7.00	0.60	X	X	
14	G5	C	F	3.00	0.04	X	X	
15	H7	C	C-F	2.00	0.04	X	X	
16	H7	C	F	3.00	0.04	X	X	
17	H7	C	F	1.00	0.03	X	X	
18	F6	C	F	1.00	0.03	X	X	
19	F6	C	M-F	2.00	0.04	X	X	
20	D6-F4	CR	M-F	3.00	0.20	M24936	M24935	Print Out
21	F4	C	B	4.00	0.20	X	X	Print Out
22	F4	C	M-B	15.00	0.40	X	X	
23	F4	C	C-B	3.00	0.20	X	X	
24	D2	C	M-F	1.00	0.04	X	X	
25	D2	C	B	3.00	0.40	X	X	
26	D2	C	M-F	4.00	0.04	X	X	
27	B4	C	M-F	0.60	0.03	X	X	
28	B4	C	B	8.00	0.30	X	X	

MAS Indirect TEM ANALYSIS M29410-009

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID:

A-1-C

29	B4	C	F	6.00	0.04	X	X	
30	B4	C	M-B	3.00	0.20	X	X	Print Out
31	B4	C	M-B	8.00	0.40	X	X	
32	B4	C	F	4.00	0.04	X	X	
33	B4	C	M-B	6.00	0.20	X	X	
34	B4	C	B	2.00	0.20	X	X	
35	C6	C	M-F	4.00	0.04	X	X	
36	C6	C	F	2.00	0.04	X	X	
37	C6	C	M-F	7.00	0.05	X	X	
38	C6	C	F	3.00	0.04	X	X	
39	C6	C	C-B	6.00	0.30	X	X	
40	F9	C	F	4.00	0.05	X	X	Print Out
41	F9	C	F	5.00	0.04	X	X	
42	F9	C	F	3.00	0.04	X	X	
43	F9	C	C-F	2.00	0.04	X	X	
44	F9	C	F	2.00	0.04	X	X	
45	F9	C	B	5.00	0.20	X	X	
46	F9	C	F	3.00	0.04	X	X	
47	F9	C	F	2.00	0.04	X	X	

M29410 009 Sample Comments:

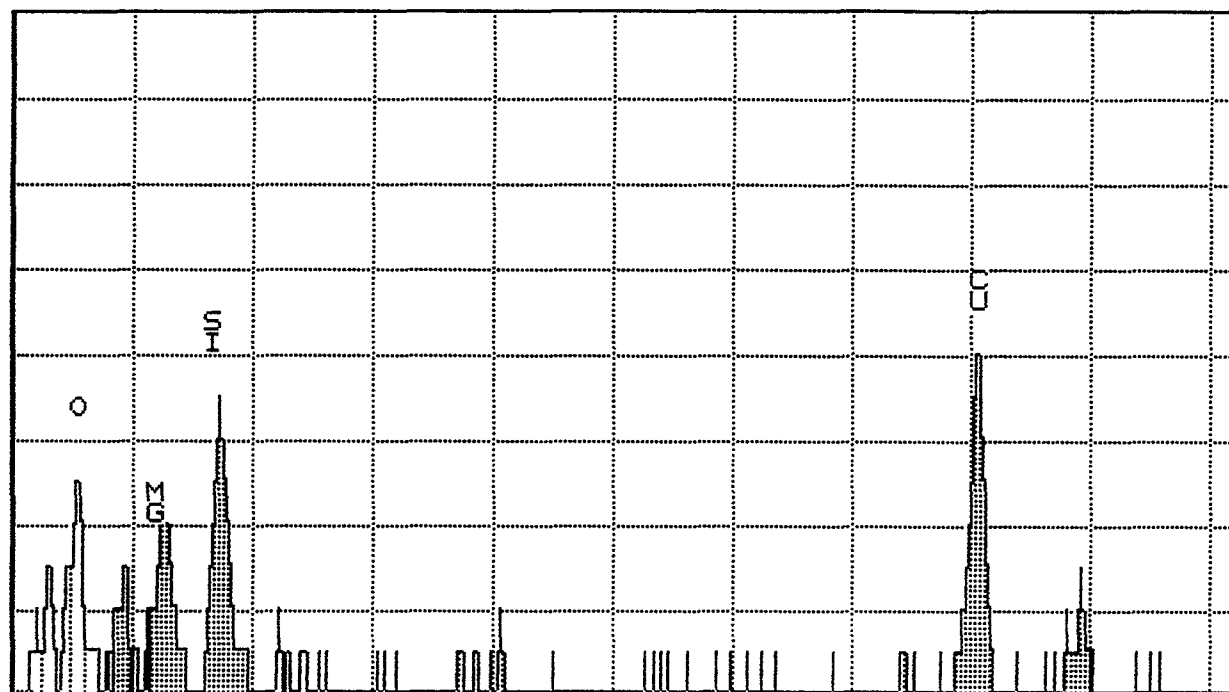
MATERIALS ANALYTICAL SERVICES

MON 21-OCT-02 16:15

Cursor: 0.000keV = 0

ROI

(0) 0.000: 0.000



0.000

VFS = 16

10.240

19

M29410-009; CHRYSOTILE

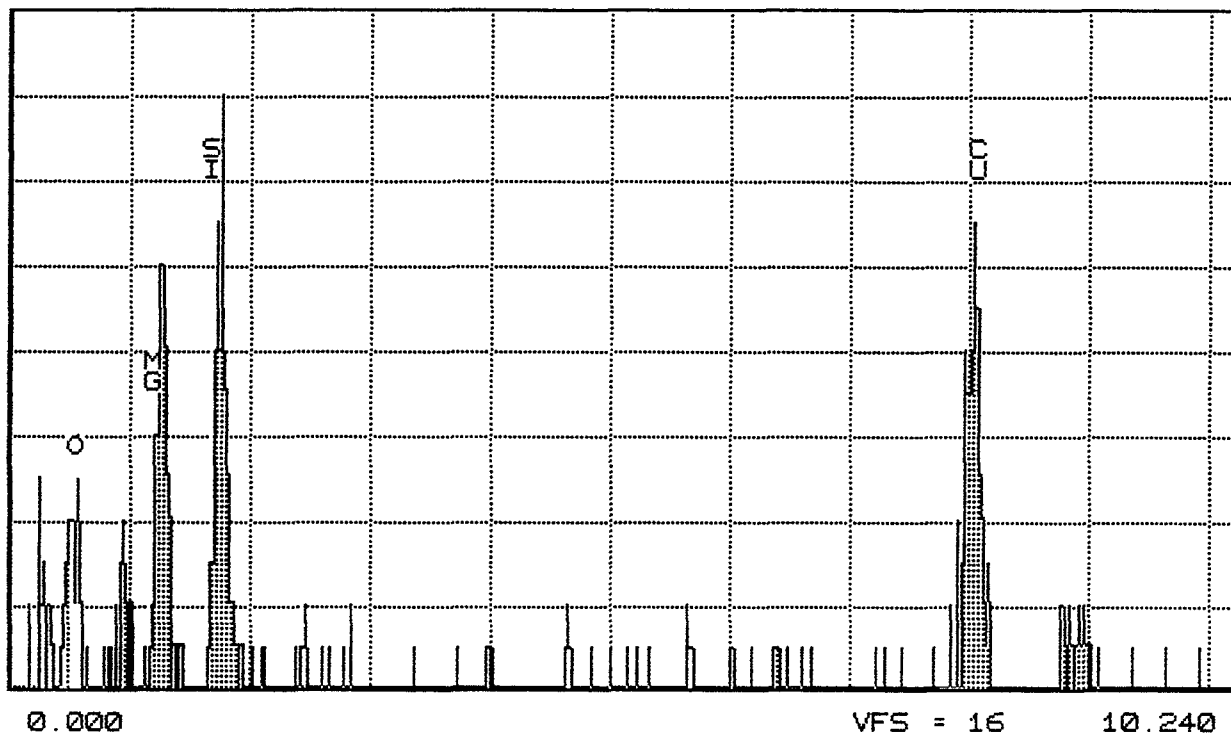
MATERIALS ANALYTICAL SERVICES

MON 21-OCT-02 16:05

Cursor: 0.000keV = 0

ROI

(0) 0.000: 0.000



0.000

VFS = 16

10.240

595

M29410-009; CHRYSOTILE

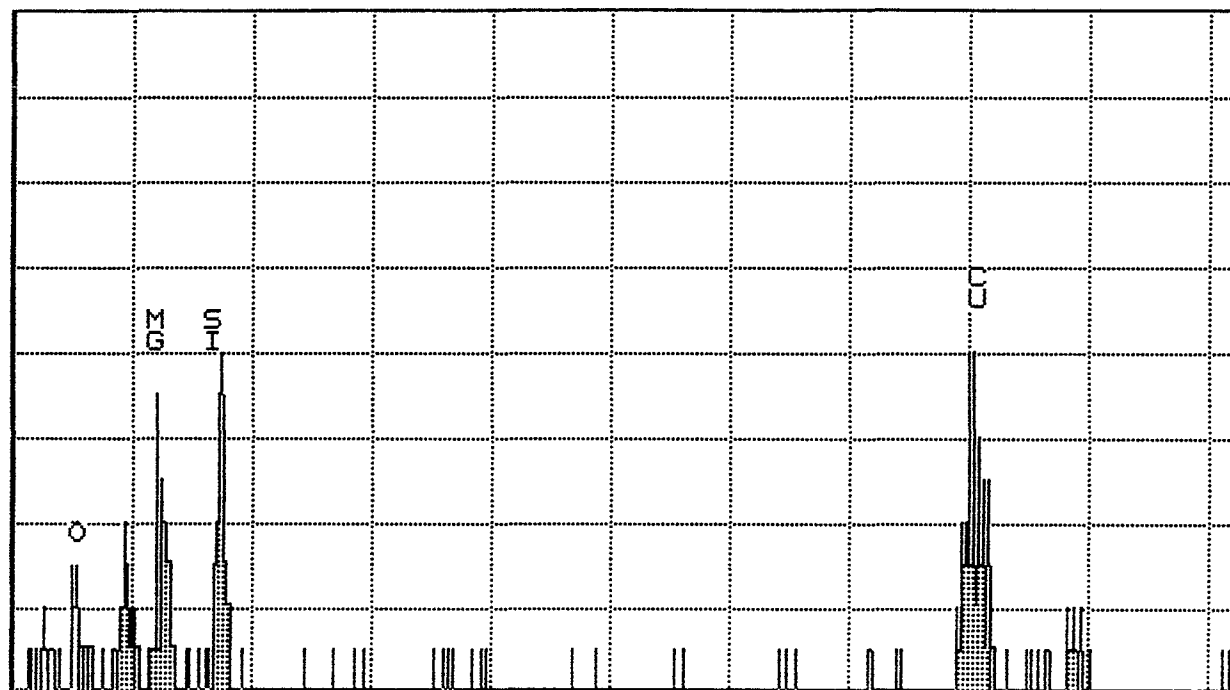
MATERIALS ANALYTICAL SERVICES

MON 21-OCT-02 15:49

Cursor: 0.000keV = 0

ROI

(0) 0.000: 0.000



0.000

VFS = 16

10.240

13

M29410-009; CHRYSOTILE

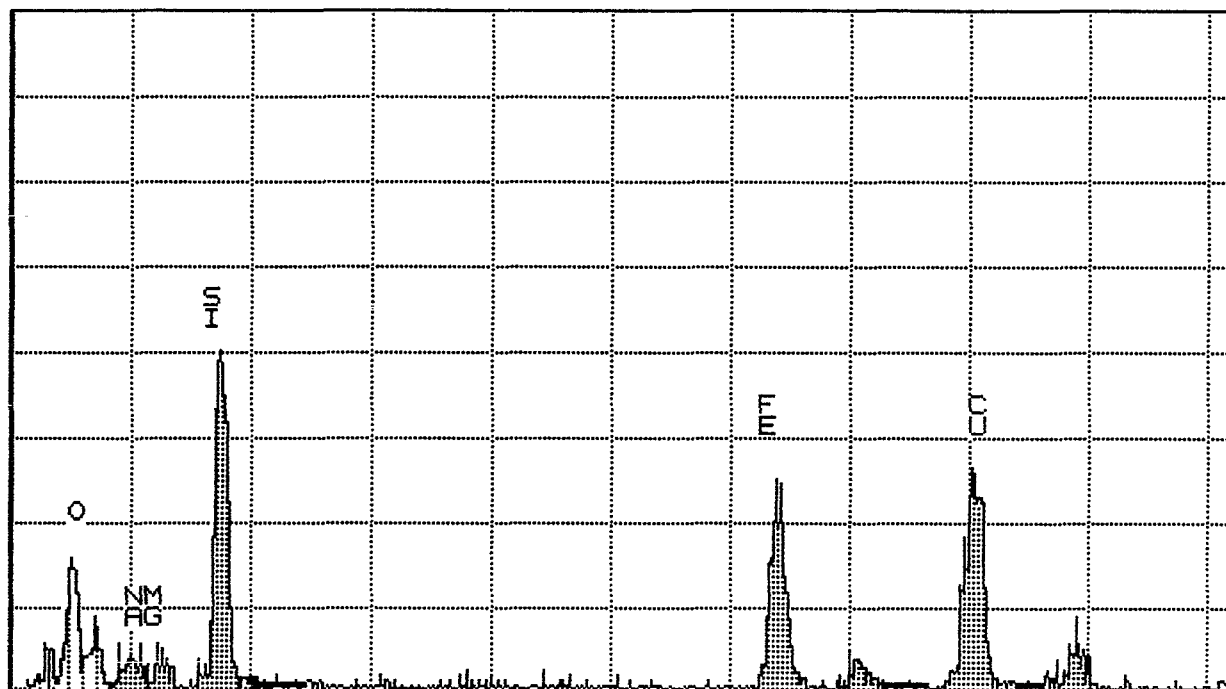
MATERIALS ANALYTICAL SERVICES

MON 21-OCT-02 15:42

Cursor: 0.000keV = 0

ROI

(0) 0.000: 0.000



0.000

VFS = 128

10.240

22

M29410-009; CROCIDOLITE

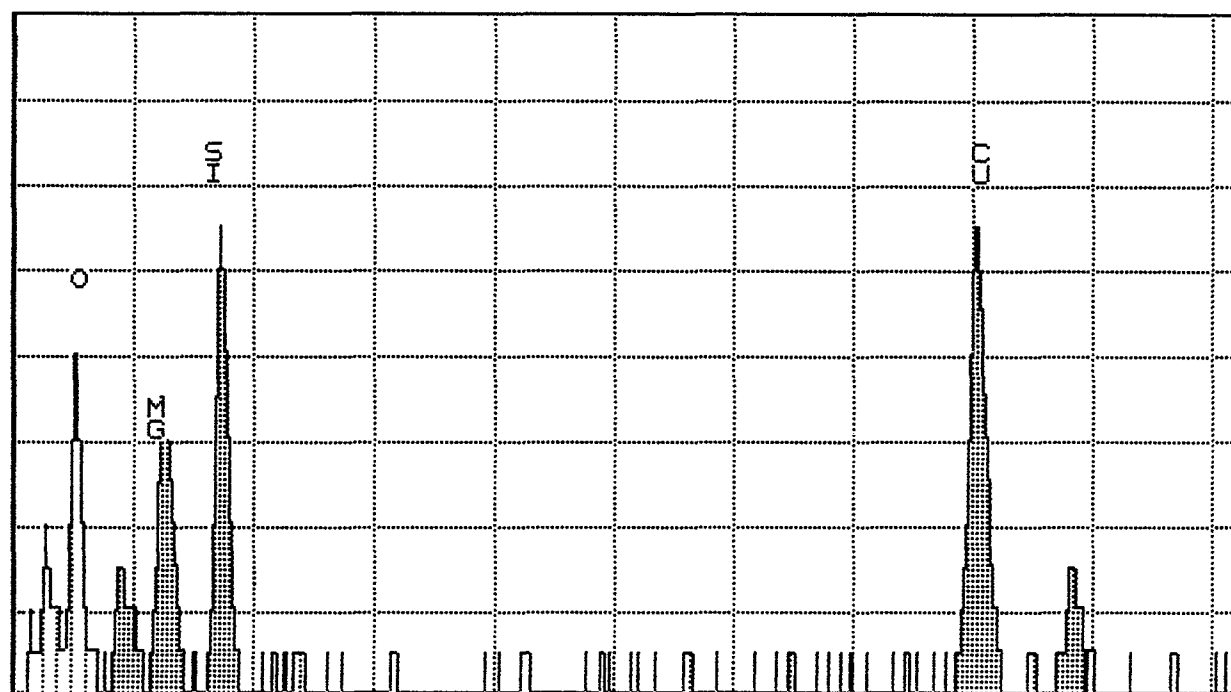
MATERIALS ANALYTICAL SERVICES

MON 21-OCT-02 14:56

Cursor: 0.000keV = 0

ROI

(0) 0.000: 0.000



0.000

VFS = 16

10.240

31

M29410-009; CHRYSOTILE

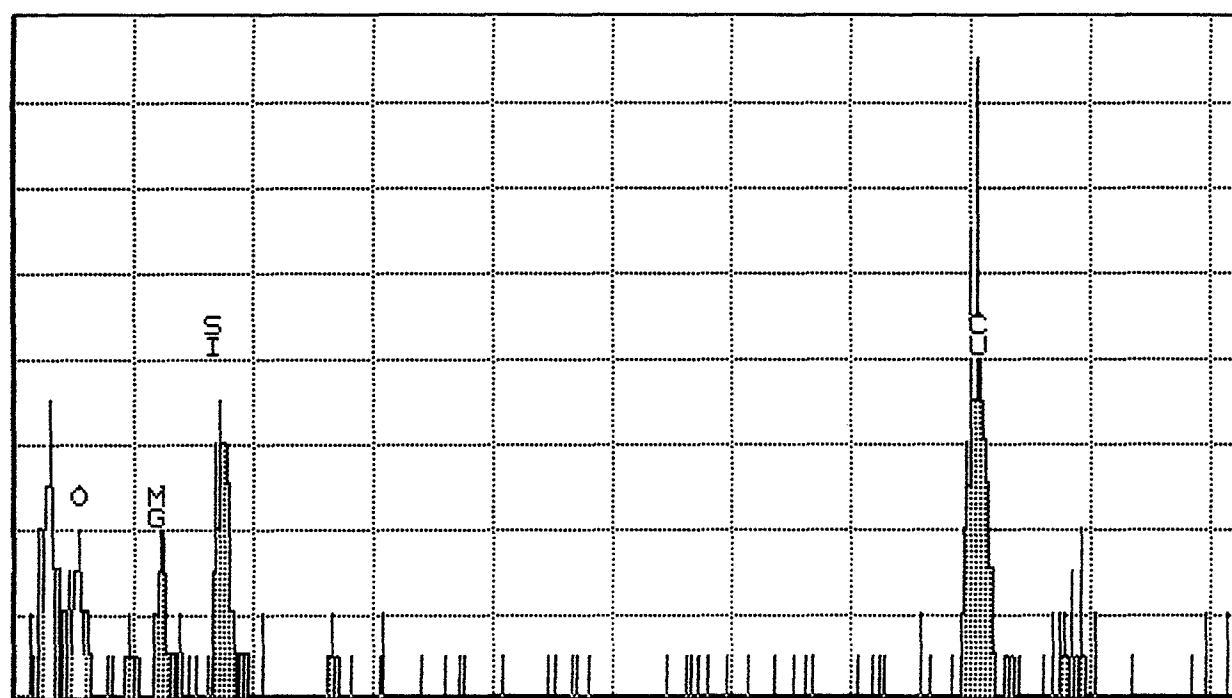
MATERIALS ANALYTICAL SERVICES

MON 21-OCT-02 14:45

Cursor: 0.000KeV = 0

ROI

(0) 0.000: 0.000



0.000

VFS = 16

10.240

32

M29410-009; CHRYSOTILE

MAS Indirect TEM ANALYSIS M29410-010

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-1-D	
Sample Area/ Volume:	8 Liters	Date Analyzed:	10/21/02
Filter Type:	MCE 47mm	Analyst:	Mehrdad Motamedi
Pore size:	0.45	Scope Number:	3
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	Dust	Screen Mag:	20 KX
Grid Acceptance	YES 5 %	Grid box Number:	6319

Str < 5um: 36
 Str ≥ 5um: 14
 Total str: 50
 Str / cc > 5: 355.5373 /cc

Number of grids: 2 #1: 111 #3: 114
 Number of openings: 10 #2: 114 #4: 113

Average Grid Size: 0.012768
 Total Area Analyzed: 0.128

Filter used	Dilution	Dilution Factor	Detect_cc:	25.39552
1 / 2	10	20	Total cc:	1269.77600

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	A4-B8	C	M-F	3.00	0.20	X	X	Print Out
2	B8	C	F	4.00	0.10	X	X	
3	B8	C	B	2.00	0.20	X	X	
4	B8	C	B	11.00	2.00	X	X	
5	B8	C	F	8.00	1.00	X	X	
6	B8	C	M-F	1.50	0.10	X	X	
7	B8	C	F	7.00	0.10	X	X	
8	B8	C	F	3.20	0.03	X	X	
9	B8	C	F	2.00	0.10	X	X	
10	C6	C	F	2.00	0.10	X	X	Print Out
11	C6	C	M-B	1.70	0.20	X	X	
12	C6	C	M-F	2.60	0.10	X	X	
13	C6	C	M-F	4.00	0.10	X	X	
14	D2	C	M-F	2.40	0.06	X	X	
15	D2	C	M-F	1.80	0.10	X	X	
16	D2	C	F	5.50	0.10	X	X	
17	D2	C	F	0.70	0.02	X	X	
18	D2	C	M-B	5.00	0.40	X	X	
19	D2	CR	F	3.60	0.20	M34344	M34343	Print Out
20	H4	C	C-B	5.50	0.20	X	X	Print Out
21	H4	C	M-B	5.00	0.30	X	X	
22	H4	C	B	5.00	0.40	X	X	
23	H4	C	C-B	4.00	0.40	X	X	
24	H4	C	M-F	1.80	0.20	X	X	
25	H4	C	F	1.50	0.10	X	X	
26	H4	C	M-B	1.30	0.20	X	X	
27	I8	C	F	5.00	0.10	X	X	
28	I8	C	F	3.70	0.10	X	X	

MAS Indirect TEM ANALYSIS M29410-010

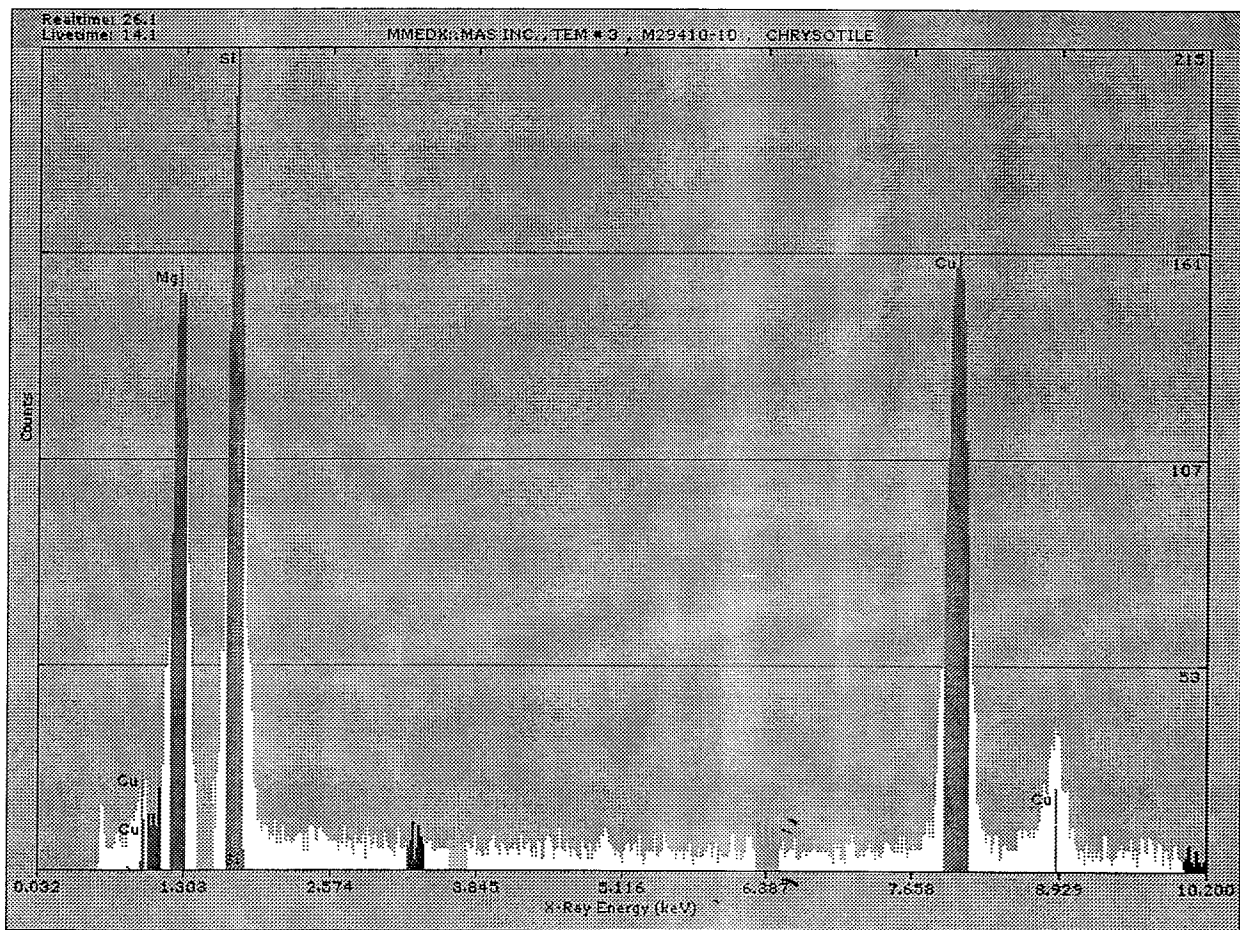
CLIENT NAME: Materials Analytical Services, Inc.

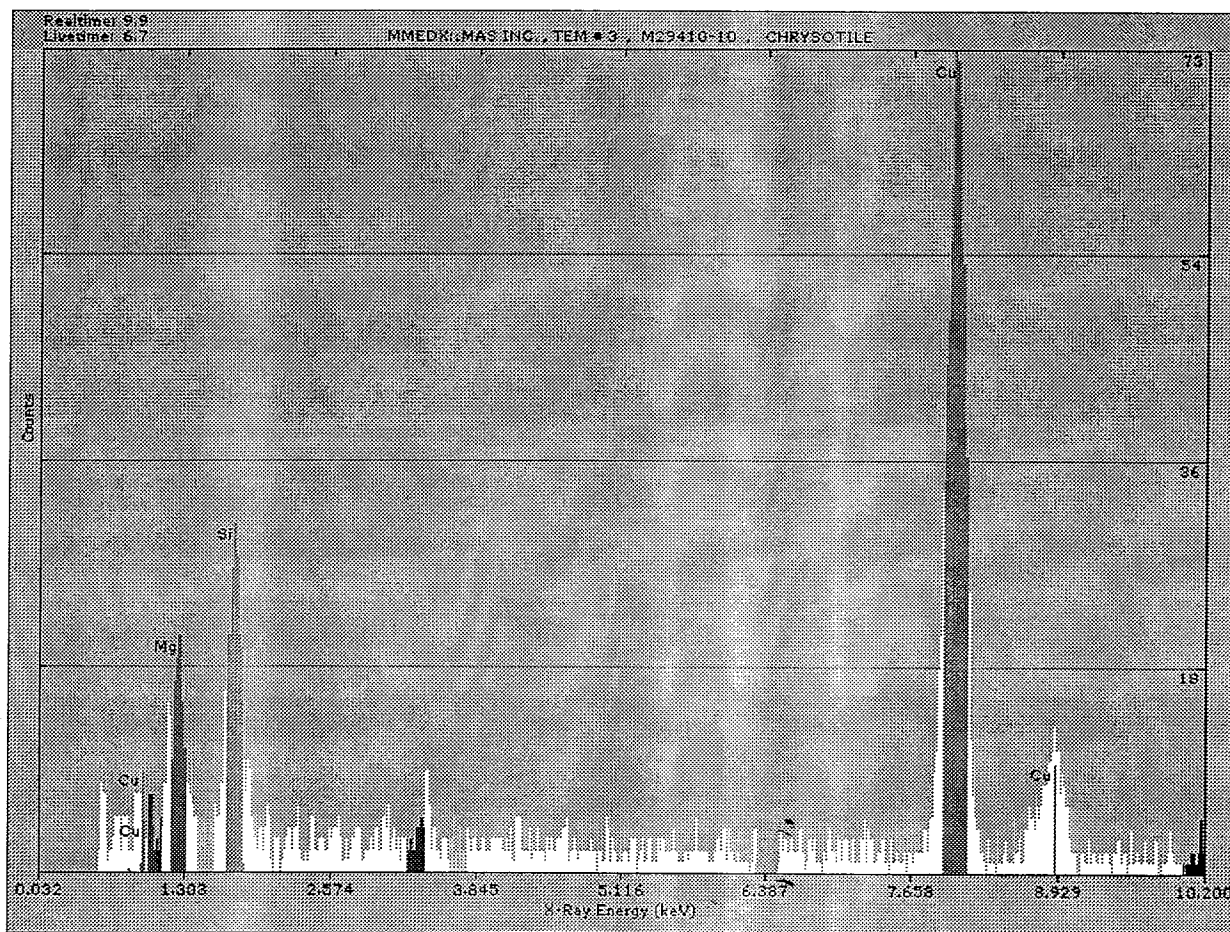
CLIENT SAMPLE ID:

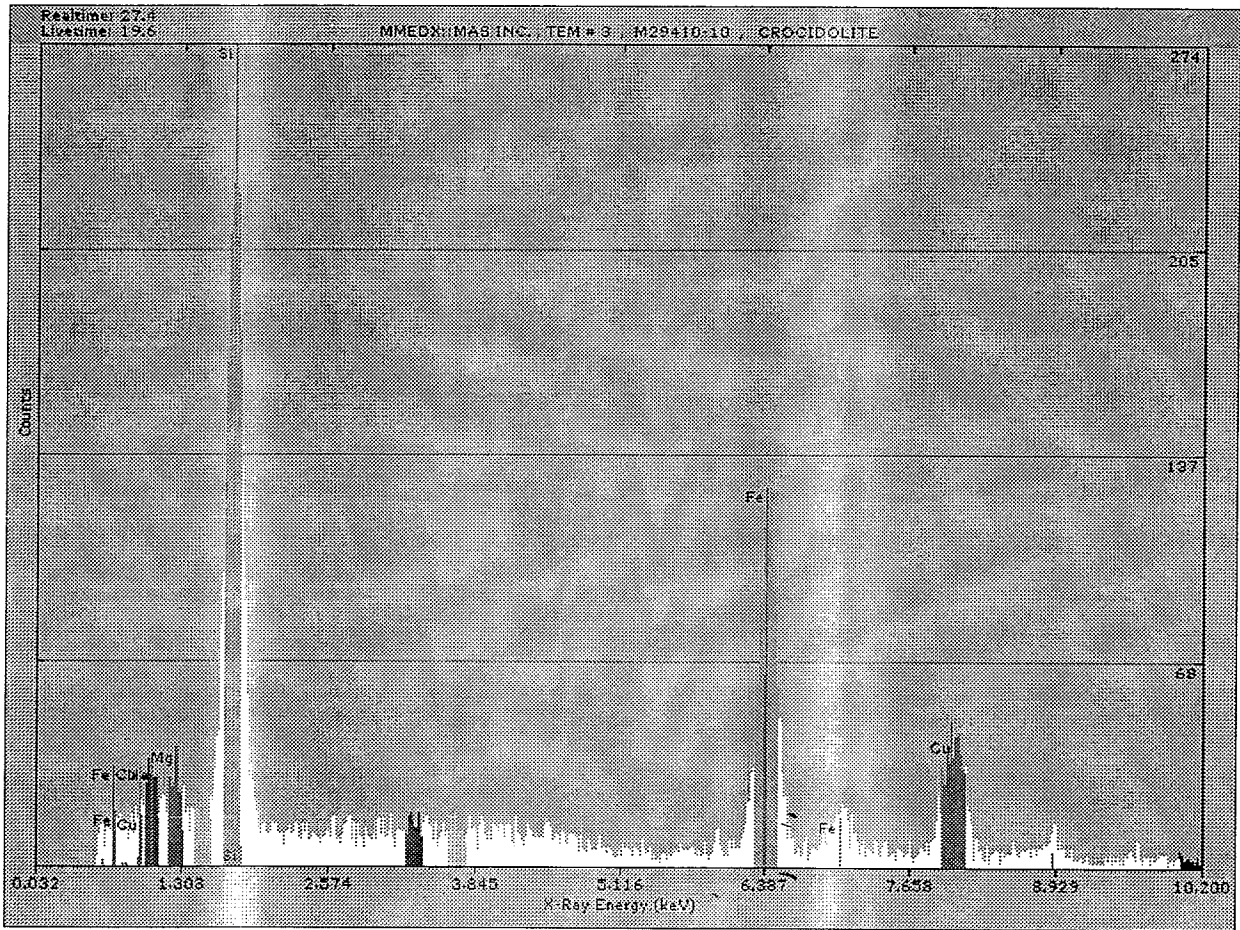
A-1-D

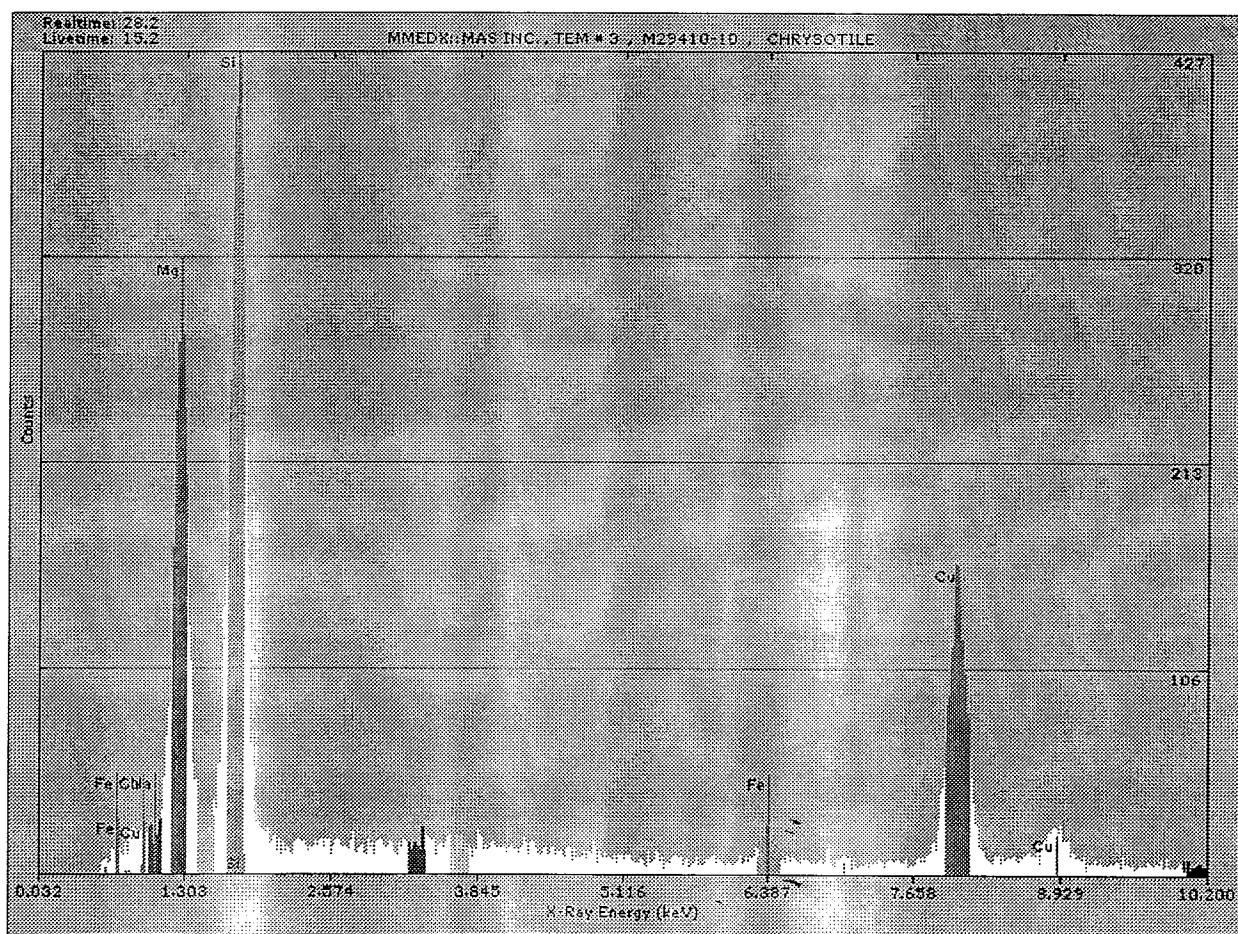
29	I8	C	M-F	3.00	0.10	X	X	
30	I8	C	F	1.00	0.10	X	X	Print Out
31	B4-C9	C	F	1.70	0.10	X	X	
32	C9	C	F	2.00	0.10	X	X	
33	C9	C	C-B	2.00	0.30	X	X	
34	C9	C	F	1.60	0.10	X	X	
35	C9	C	M-F	1.00	0.10	X	X	
36	B7	C	B	4.00	0.30	X	X	
37	B7	C	B	6.00	2.00	X	X	
38	C4	C	B	5.70	0.40	X	X	
39	C4	C	B	25.00	4.00	X	X	
40	C4	C	F	2.00	0.10	X	X	Print Out
41	C4	C	B	5.50	0.20	X	X	
42	C4	C	F	8.00	0.10	X	X	
43	C4	C	M-F	3.80	0.10	X	X	
44	F2	C	B	4.00	0.30	X	X	
45	F2	C	F	1.00	0.10	X	X	
46	F6	C	M-B	2.50	0.50	X	X	
47	F6	C	B	4.40	0.20	X	X	
48	F6	C	M-F	2.00	0.10	X	X	
49	F6	C	C-B	4.00	0.30	X	X	
50	F6	C	B	4.30	0.20	X	X	Print Out

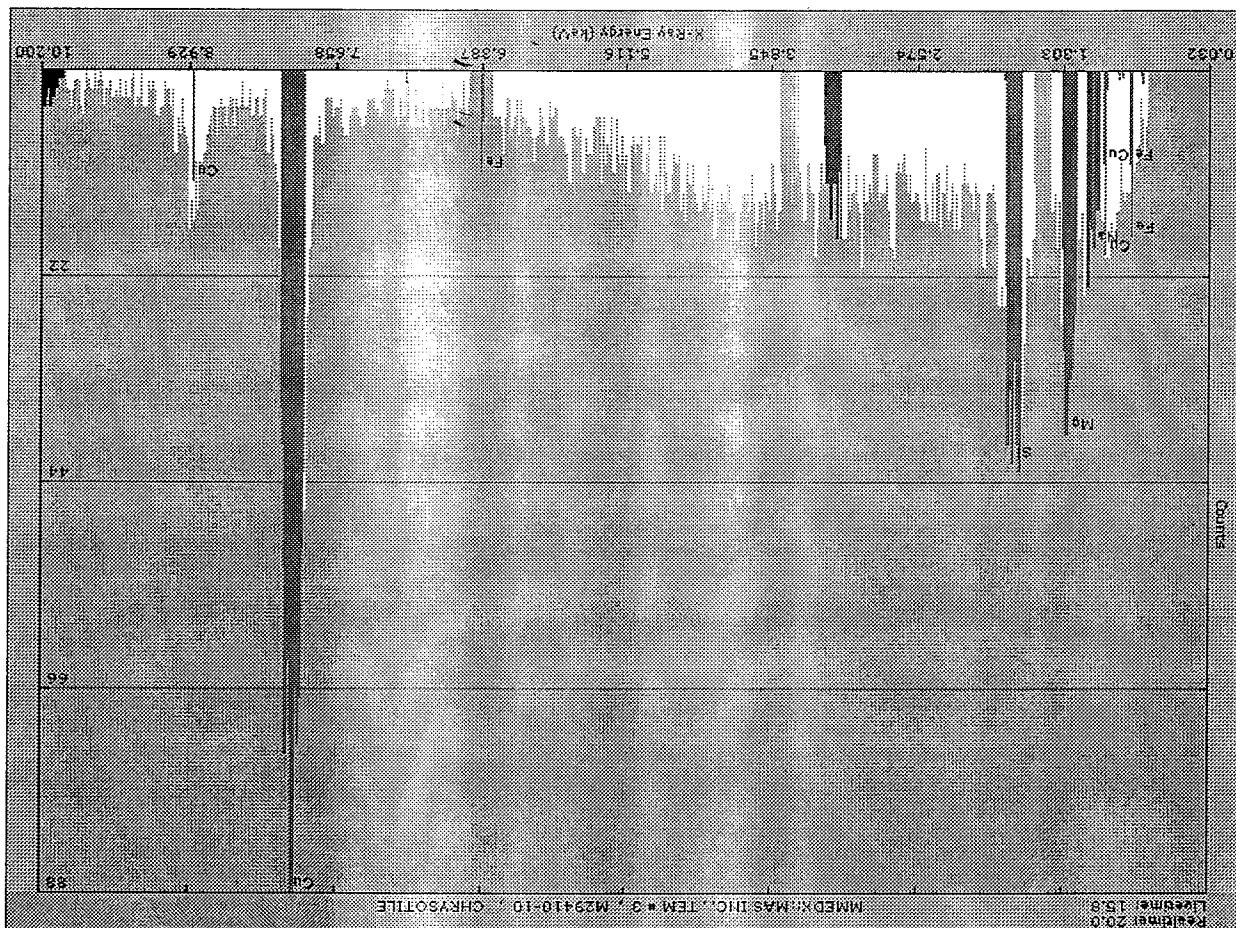
M29410 010 Sample Comments:

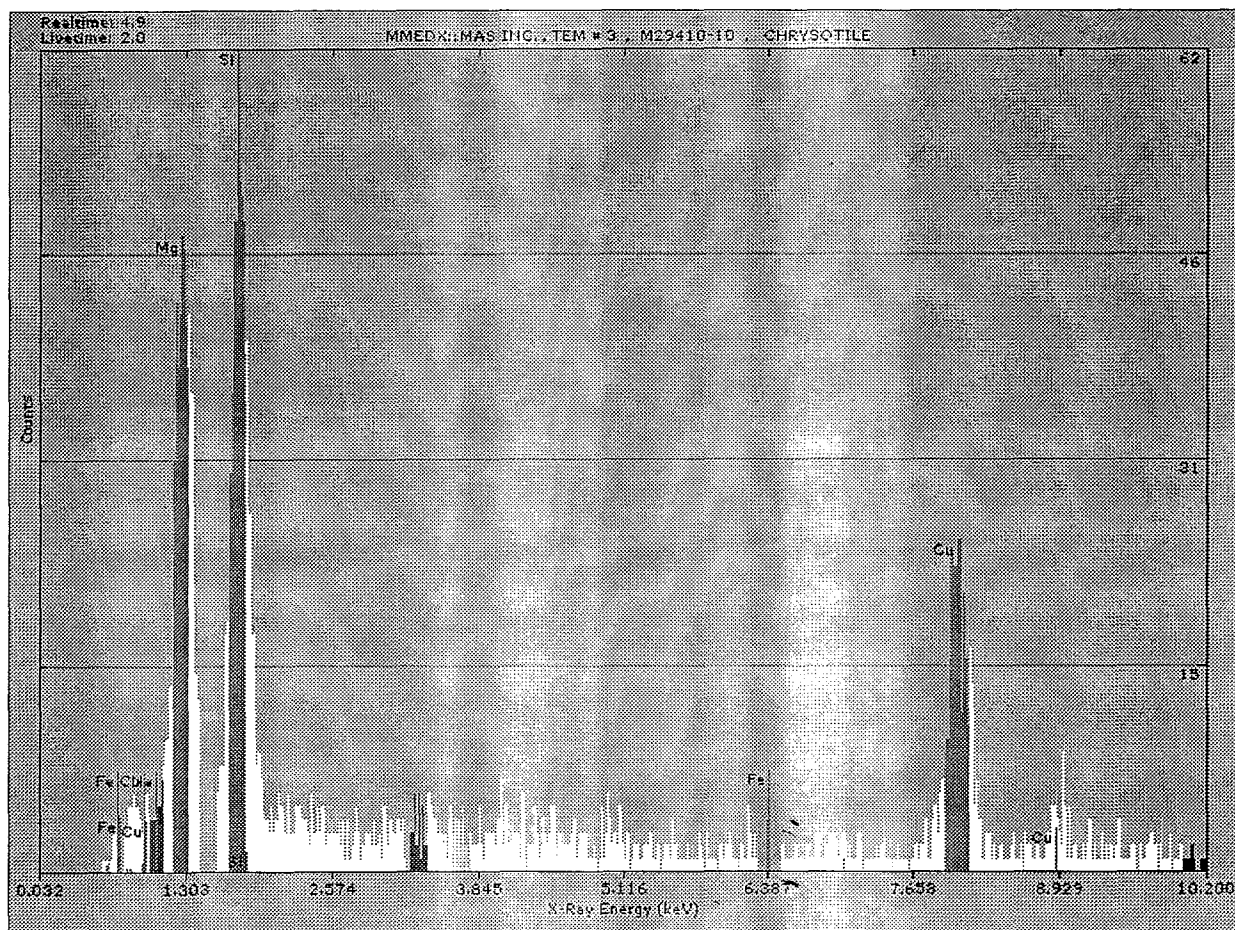


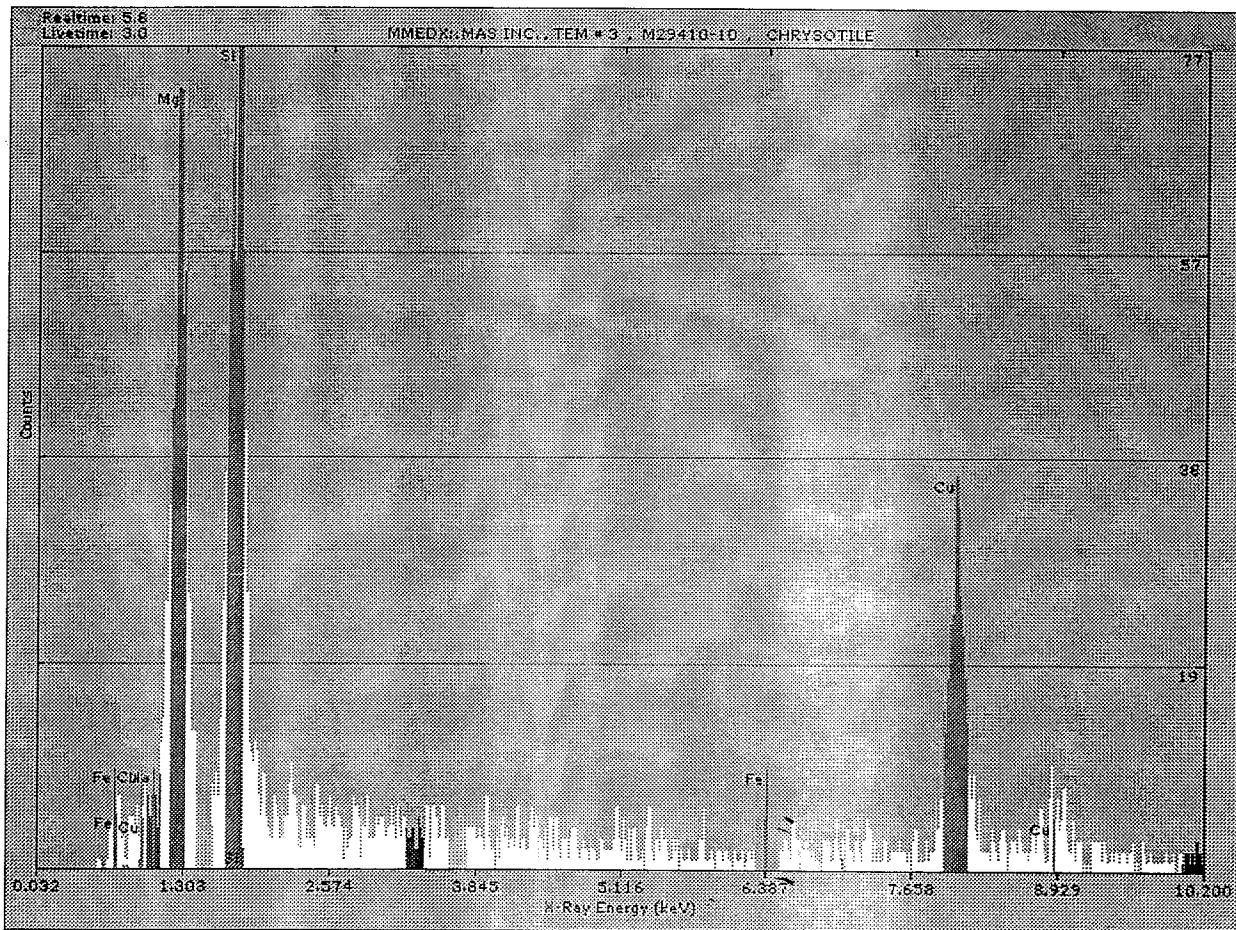












MAS Indirect TEM ANALYSIS M29410-012

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-A

Sample Area/ Volume: 2.5 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 6 %

Date Analyzed: 10/22/02

Analyst: Al Harmon

Scope Number: 4

Accelerating Voltage: 100

Indicated Mag: 25

Screen Mag: 20

Grid box Number: 6319

KV

KX

KX

Str < 5um: 17

Str ≥ 5um: 3

Total str: 20

Str / cc > 5: 1218.9372 /cc

Number of grids: 2

#1: 113

#3: 112

Number of openings: 10

#2: 113

#4: 114

Average Grid Size: 0.012769

Total Area Analyzed: 0.128

Filter used

Dilution

Dilution Factor

1 / 2

2

100

Detect_cc: 406.31241

Total cc: 8126.24819

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	C7-B2	C	B	4.00	0.60	X	X	Print Out
2	A4	C	F	1.00	0.03	X	X	
3	A4	C	F	3.00	0.04	X	X	
4	A4	C	B	8.00	0.30	X	X	
5	A4	C	B	3.00	0.60	X	X	
6	C6	C	M-F	1.00	0.04	X	X	
7	C6	C	B	3.00	0.50	X	X	
8	F5	C	F	4.00	0.10	X	X	
9	F5	C	F	2.00	0.04	X	X	
10	F5	C	B	12.00	0.20	X	X	Print Out
11	D2	C	F	2.00	0.04	X	X	
12	D7-B7	C	B	5.00	0.20	X	X	
13	B7	C	B	2.00	0.40	X	X	
14	A6	C	F	4.00	0.04	X	X	
15	C3	C	C-F	2.00	0.04	X	X	
16	C3	C	B	3.00	0.40	X	X	
17	E2	C	M-F	2.00	0.04	X	X	
18	E2	C	F	3.00	0.04	X	X	
19	G1	C	F	4.00	0.05	X	X	
20	G1	C	F	1.00	0.04	X	X	Print Out

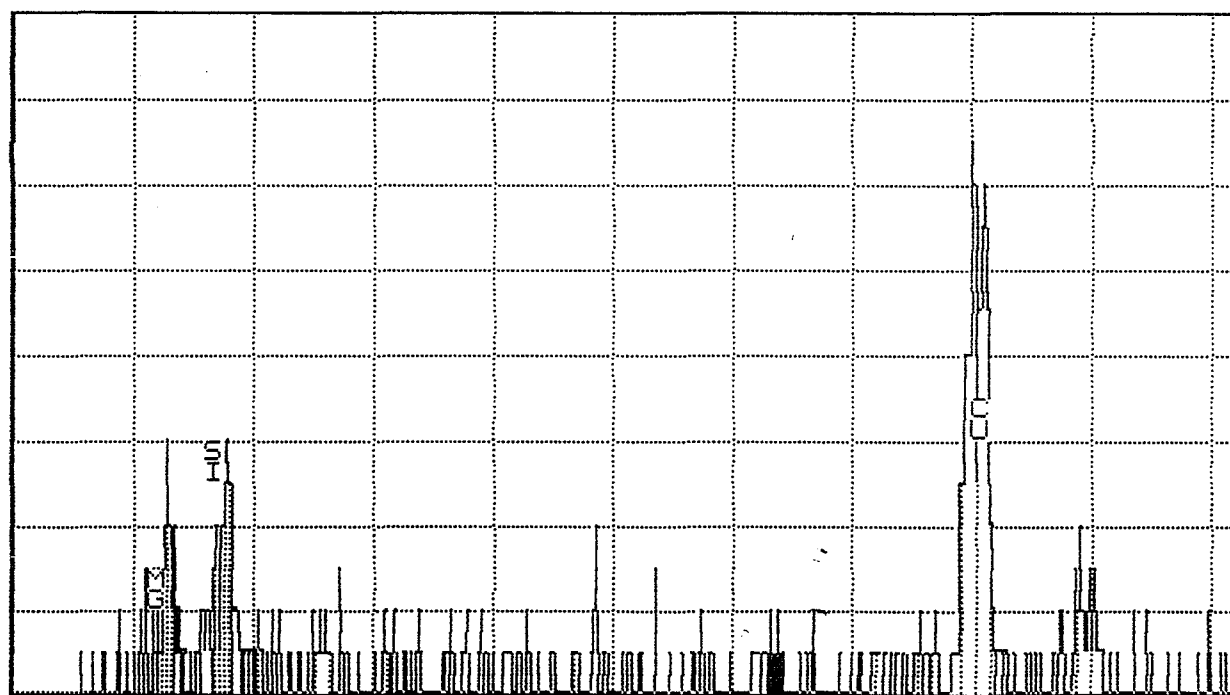
M29410 012 Sample Comments:

MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 10:39

Cursor: 0.000keV = 0

ROI (SIK α) 1.660: 1.820=32



0.000

VFS = 16

10.240

0

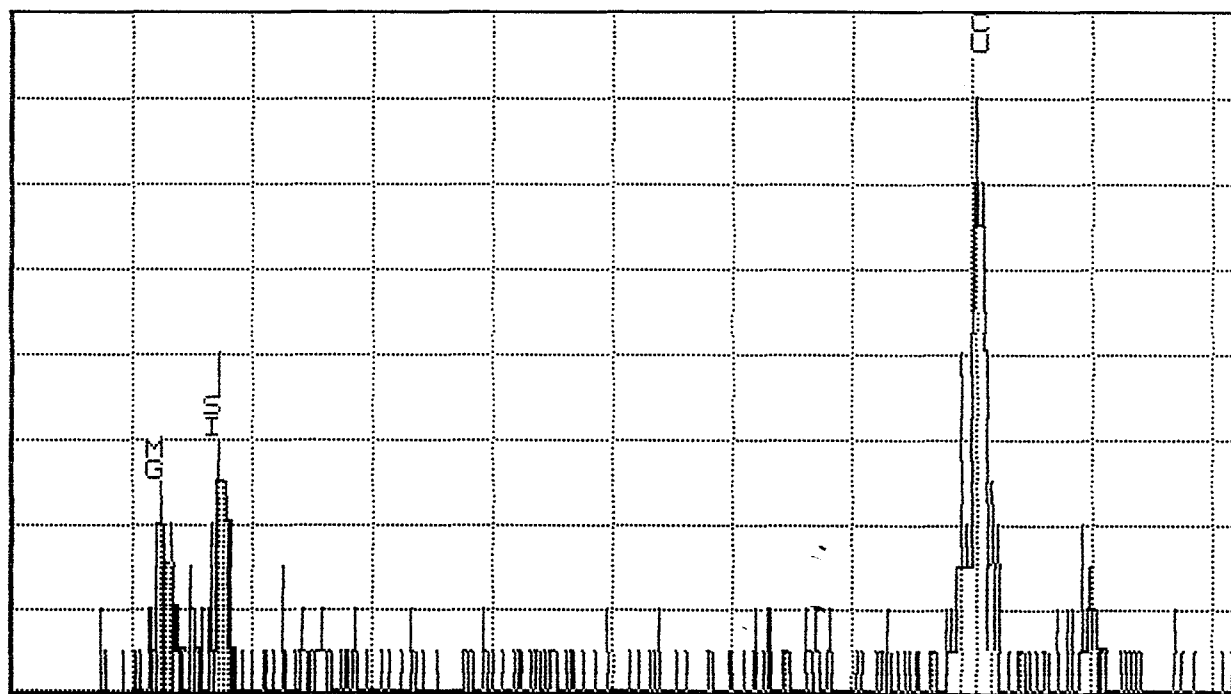
M29410-012; CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 10:14

Cursor: 0.000keV = 0

ROI (SIK α) 1.660: 1.820=33



0.000

VFS = 16

10.240

0

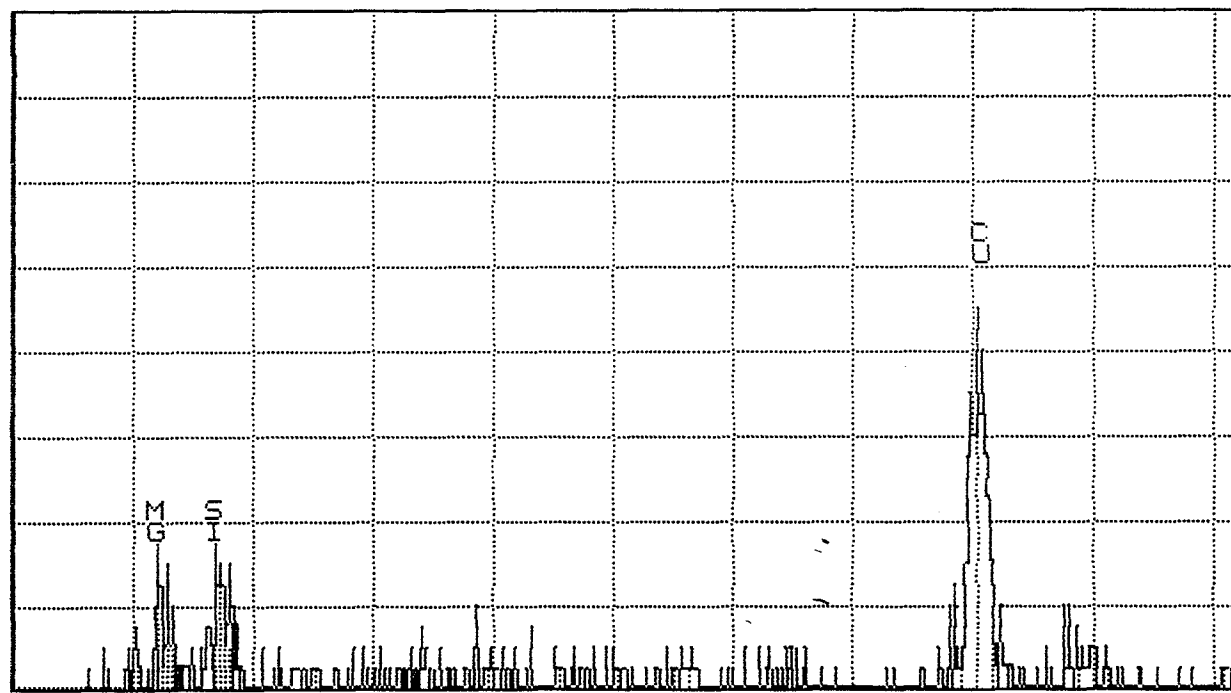
M29410-012; CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 09:41

Cursor: 0.000keV = 0

ROI (SIKd) 1.660: 1.820=37



0.000

VFS = 32

10.240

0

M29410-012; CHRYSOTILE

MAS Indirect TEM ANALYSIS M29410-013

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-B

Sample Area/ Volume: 2.5 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 4 %

Date Analyzed: 10/22/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100

Indicated Mag: 25

Screen Mag: 20

Grid box Number: 6319

KV

KX

KX

Str < 5um: 48

Str ≥ 5um: 24

Total str: 72

Str / cc > 5: 1967.6359 /cc

Number of grids: 2

#1: 113

#3: 113

Number of openings: 10

#2: 113

#4: 111

Average Grid Size: 0.012656

Total Area Analyzed: 0.127

Filter used

Dilution

Dilution Factor

1/ 2

10

20

Detect_cc: 81.98483

Total cc: 5902.90771

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	C10-H9	C	F	1.80	0.20	X	X	Print Out
2	H9	C	F	1.60	0.03	X	X	
3	H9	C	B	0.80	0.10	X	X	
4	H9	C	F	4.00	0.10	X	X	
5	H9	C	F	2.30	0.10	X	X	
6	H9	C	B	6.00	0.20	X	X	
7	H9	C	F	3.00	0.10	X	X	
8	H9	C	B	7.00	0.40	X	X	
9	H9	C	B	8.40	3.00	X	X	
10	F7	C	B	12.00	0.50	X	X	Print Out
11	F7	C	B	1.80	0.20	X	X	
12	F7	C	B	4.00	0.20	X	X	
13	F7	C	F	2.00	0.10	X	X	
14	F7	C	C-B	4.40	0.30	X	X	
15	D8	C	F	2.50	0.10	X	X	
16	D8	C	B	15.00	0.50	X	X	
17	D8	C	F	3.40	0.10	X	X	
18	D8	C	B	4.00	0.20	X	X	
19	D8	C	B	9.00	0.90	X	X	
20	D8	C	C-B	8.00	0.30	X	X	Print Out
21	D8	C	M-F	1.20	0.10	X	X	
22	D8	C	B	3.00	0.20	X	X	
23	D8	C	C-B	4.50	0.40	X	X	
24	D8	C	C-F	4.00	0.10	X	X	
25	D8	C	B	2.00	0.20	X	X	
26	D8	C	B	7.00	0.80	X	X	
27	B5	C	F	4.50	0.20	X	X	
28	B5	C	C-B	5.80	0.20	X	X	

MAS Indirect TEM ANALYSIS M29410-013

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-B

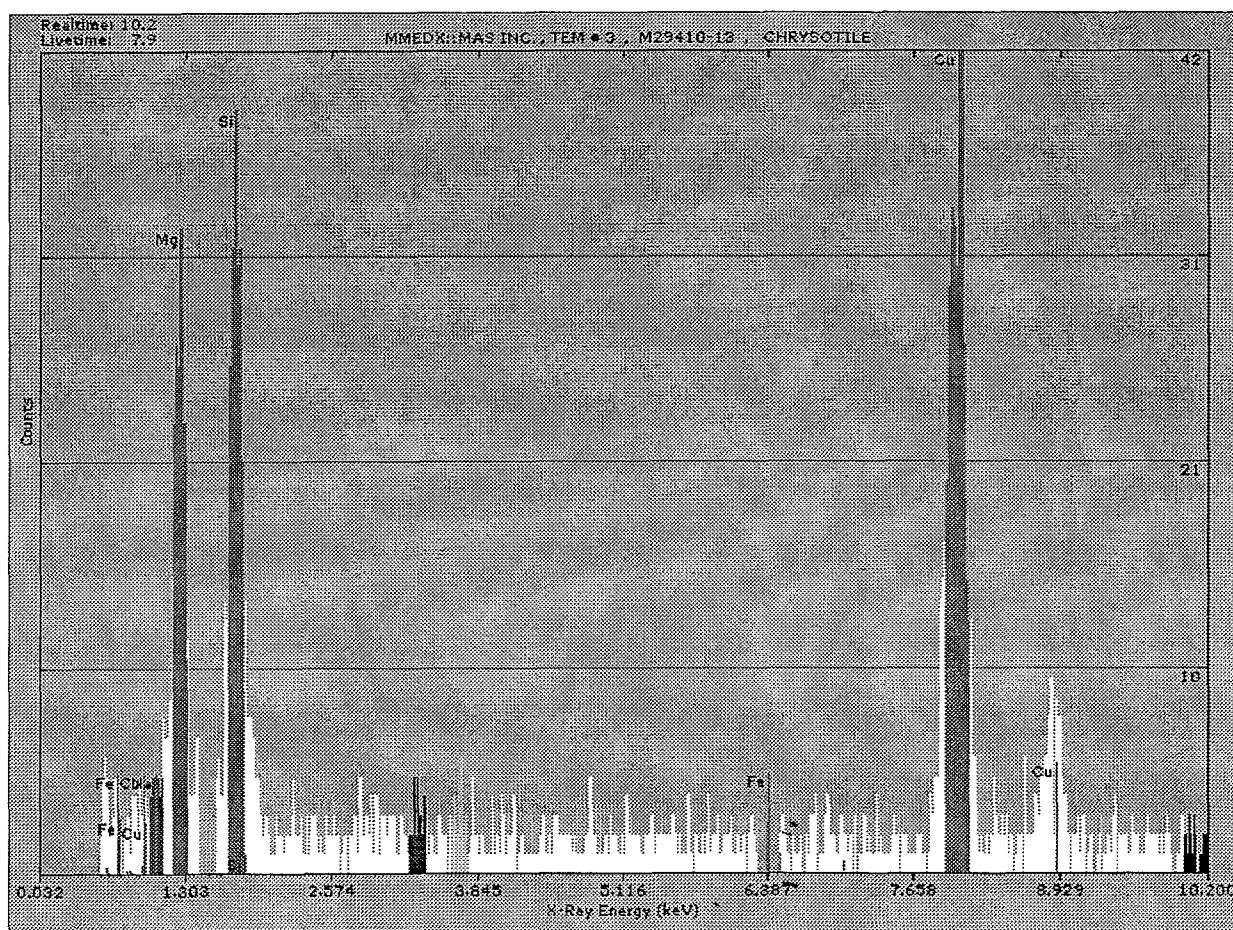
29	B5	C	B	1.30	0.10	X	X	
30	B5	C	B	8.00	0.20	X	X	Print Out
31	B5	C	B	5.80	0.40	X	X	
32	B5	C	B	4.50	0.90	X	X	
33	B5	C	B	8.40	0.30	X	X	
34	H3	C	B	10.00	0.20	X	X	
35	H3	C	M-F	2.30	0.10	X	X	
36	C9-I7	C	F	3.00	0.03	X	X	
37	I7	C	F	17.00	0.20	X	X	
38	I7	C	B	3.00	0.20	X	X	
39	G5	C	B	5.00	0.80	X	X	
40	G5	C	B	2.00	0.70	X	X	Print Out
41	G5	C	F	1.00	0.10	X	X	
42	G5	C	F	0.90	0.05	X	X	
43	G5	C	F	1.00	0.20	X	X	
44	G5	C	F	1.80	0.10	X	X	
45	G5	C	F	2.20	0.20	X	X	
46	G5	C	B	6.00	0.40	X	X	
47	G5	C	F	2.30	0.10	X	X	
48	G5	C	F	3.60	0.10	X	X	
49	G5	C	F	1.30	0.05	X	X	
50	G5	C	B	18.00	0.20	X	X	Print Out
51	G5	C	F	1.20	0.10	X	X	
52	G5	C	F	8.00	0.20	X	X	
53	G5	C	F	1.00	0.10	X	X	
54	G5	C	F	2.00	0.10	X	X	
55	G5	C	M-F	2.00	0.10	X	X	
56	E2	C	F	3.00	0.10	X	X	
57	E2	C	M-F	6.00	0.20	X	X	
58	E2	C	F	4.00	0.10	X	X	
59	E2	C	M-F	1.20	0.10	X	X	
60	E2	CR	F	0.70	0.10	X	X	Print Out
61	C5	C	B	13.00	2.00	X	X	
62	C5	C	F	3.00	0.10	X	X	
63	C5	C	B	2.00	0.20	X	X	
64	C5	C	F	4.40	0.10	X	X	
65	C5	C	F	3.00	0.20	X	X	
66	C5	C	F	1.60	0.05	X	X	
67	C5	C	B	3.00	0.40	X	X	
68	C5	C	F	2.00	0.10	X	X	
69	C5	C	B	6.00	0.40	X	X	
70	C5	C	B	8.80	0.40	X	X	Print Out
71	D7	C	B	9.00	0.20	X	X	
72	D7	C	B	19.00	0.20	X	X	

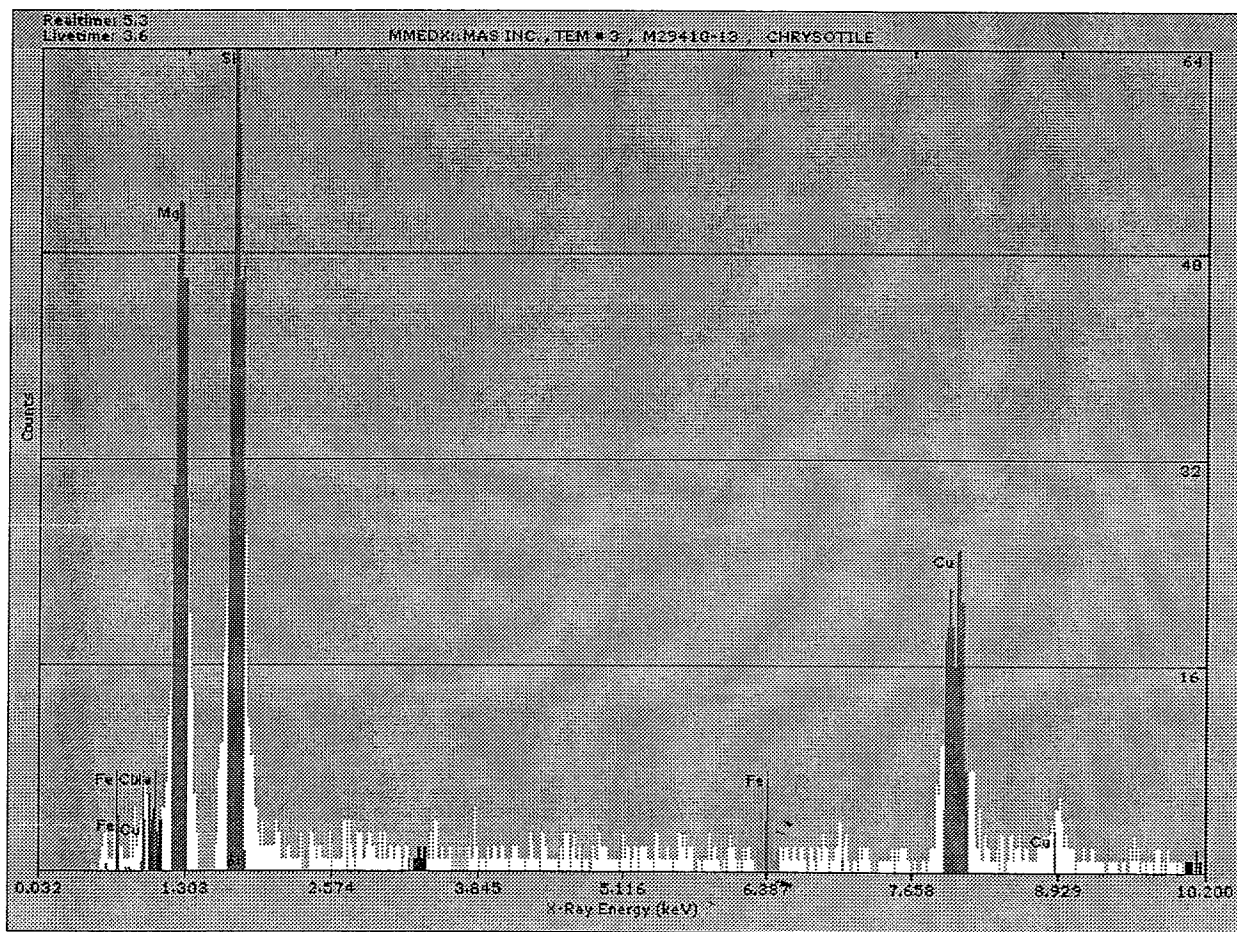
M29410 013 Sample Comments:

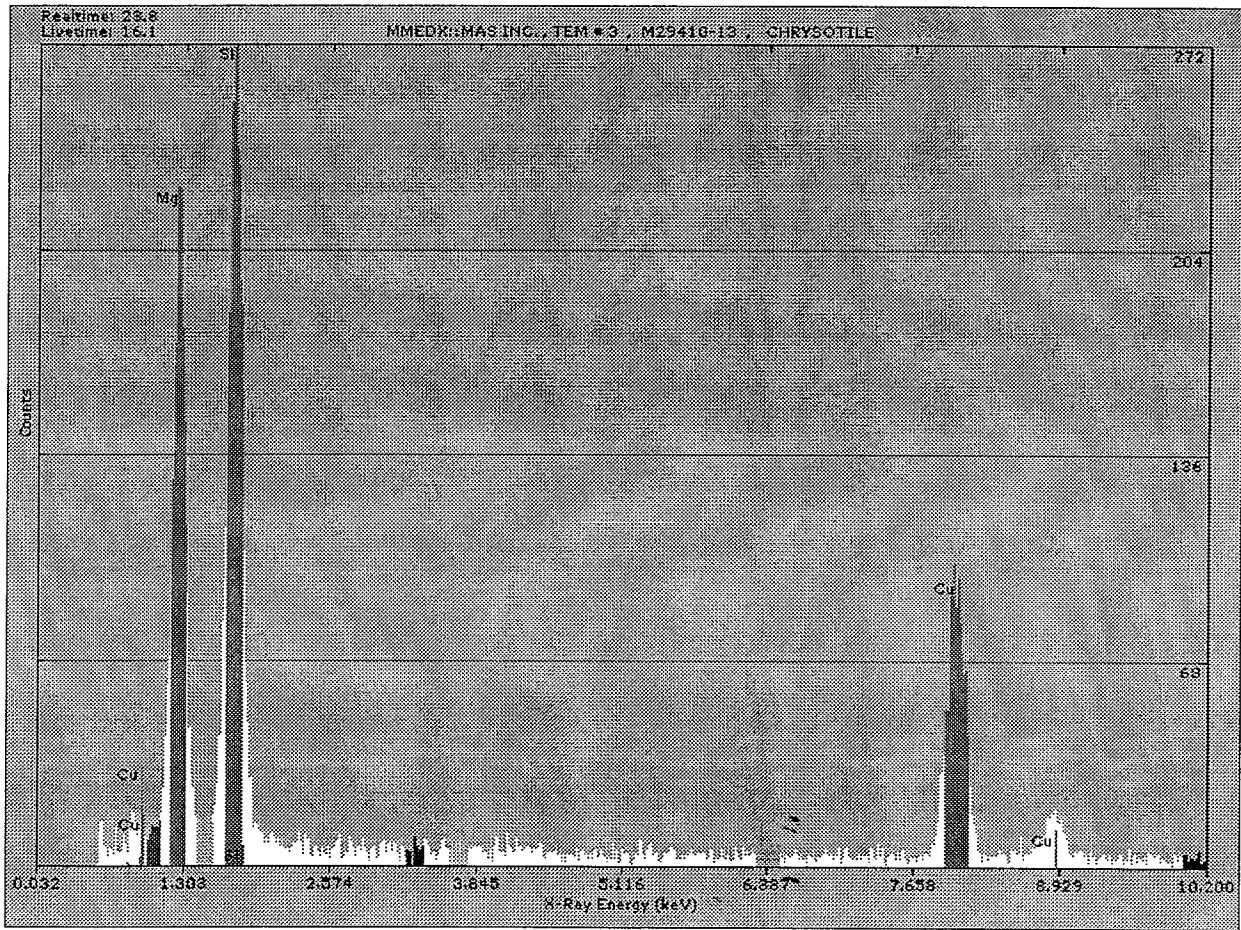
MAS Indirect TEM ANALYSIS M29410-013

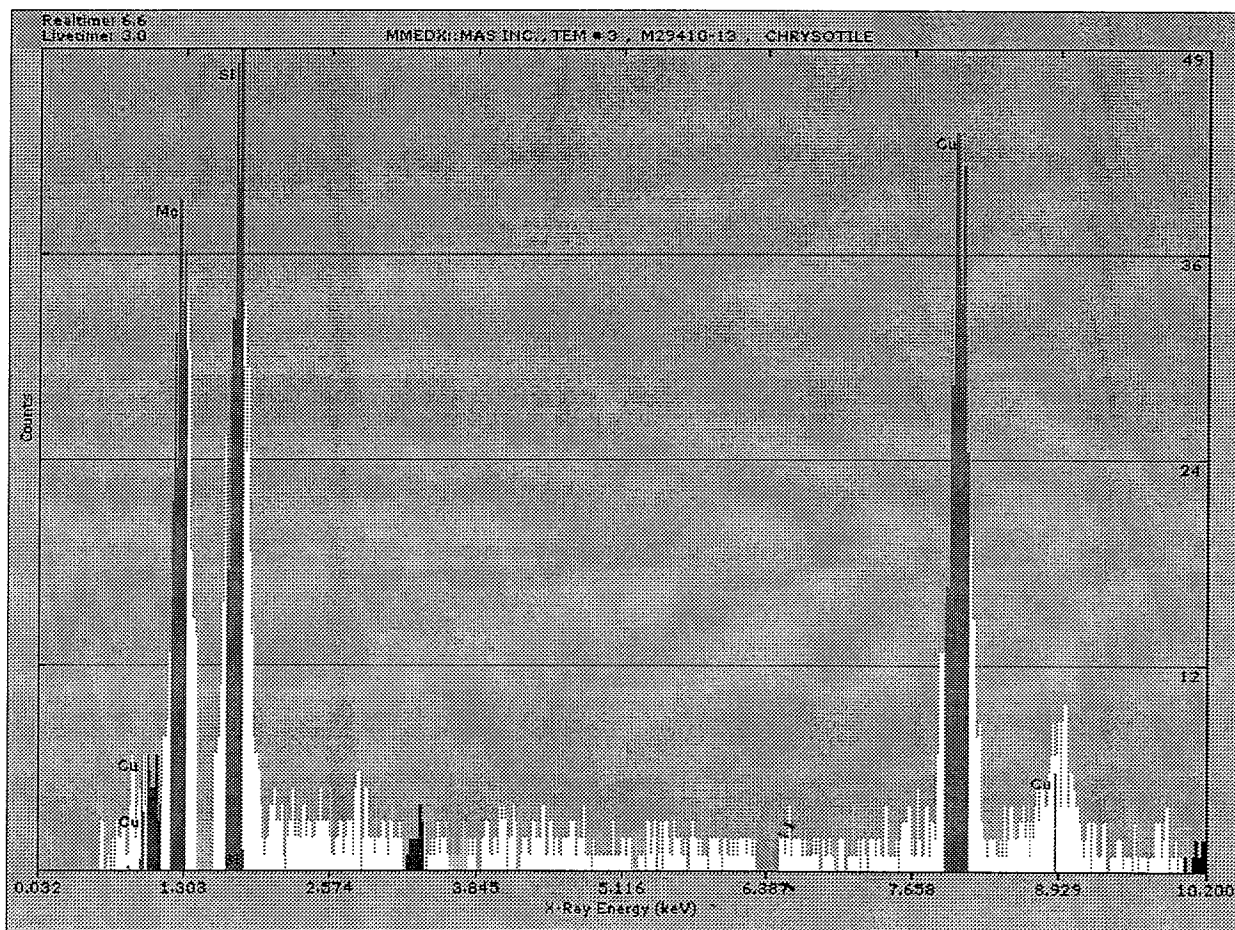
CLIENT NAME: Materials Analytical Services, Inc.

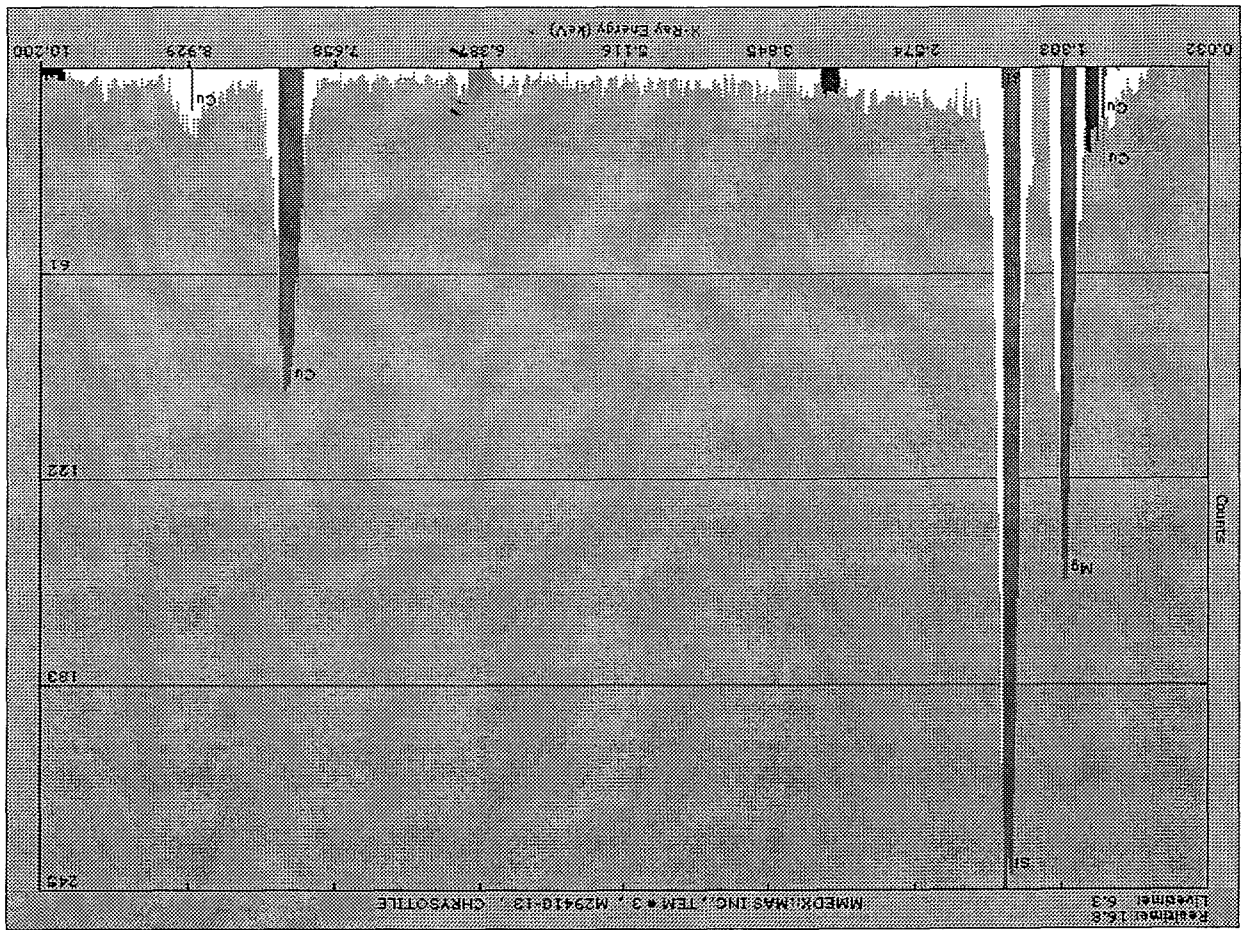
CLIENT SAMPLE ID: P-1-B

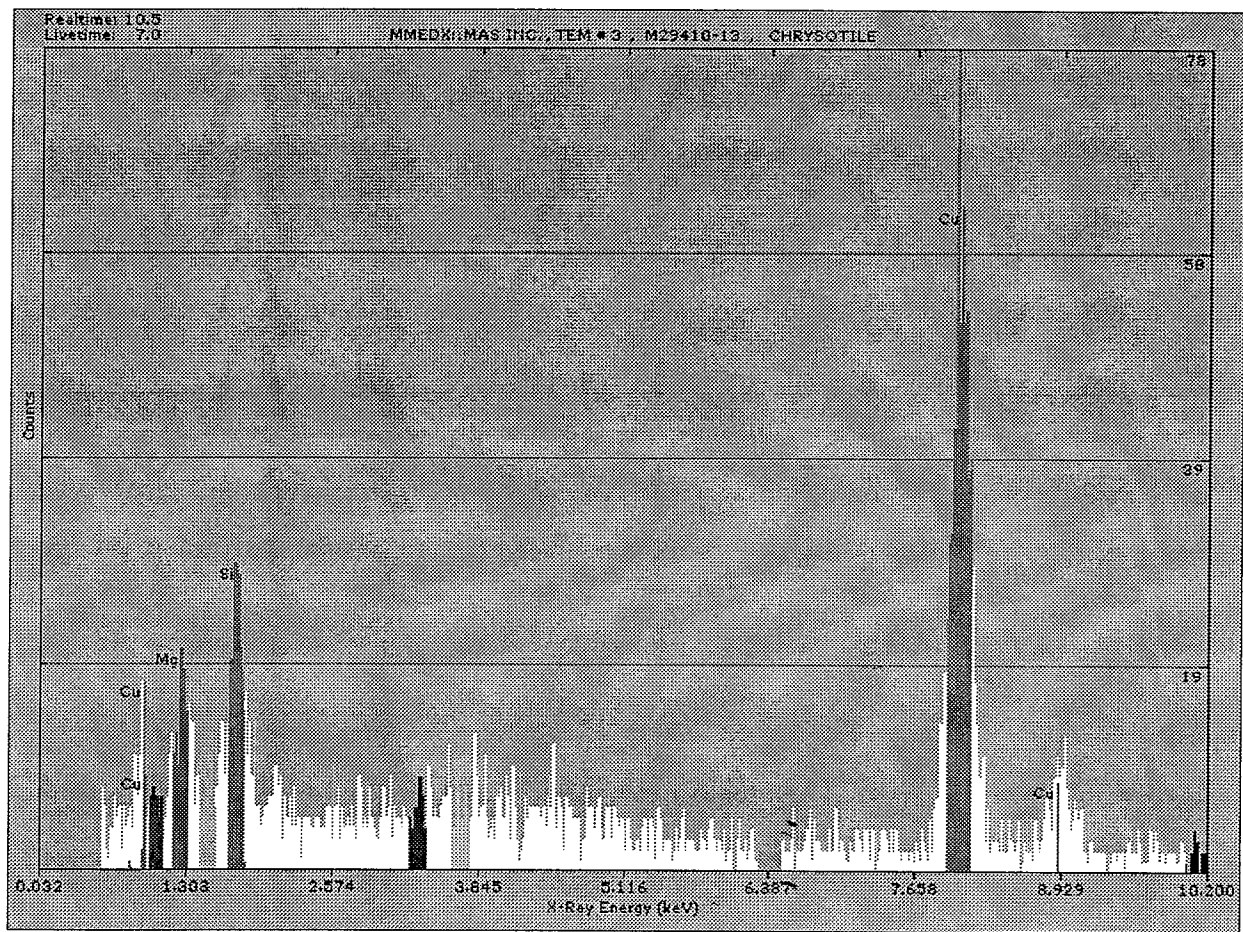


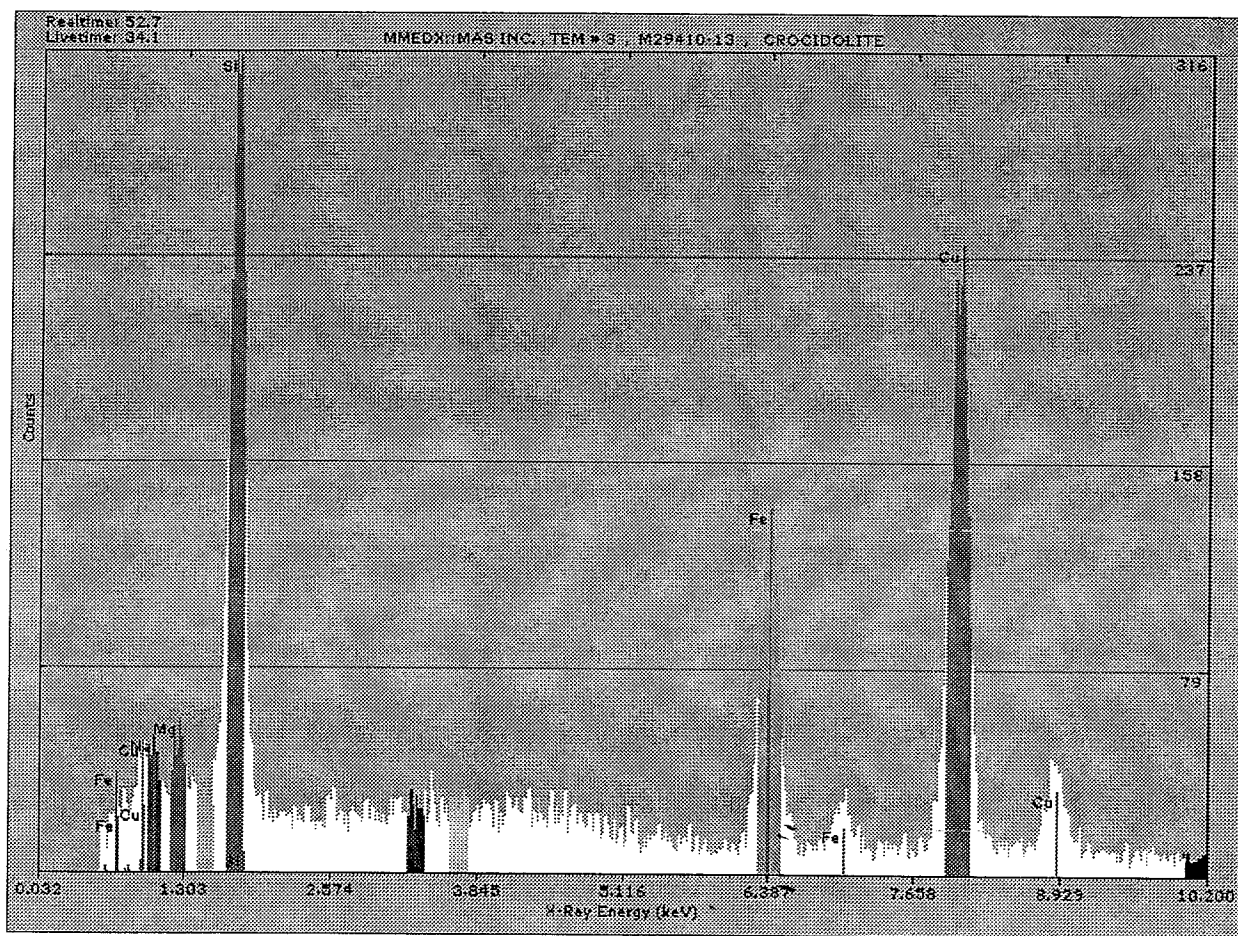


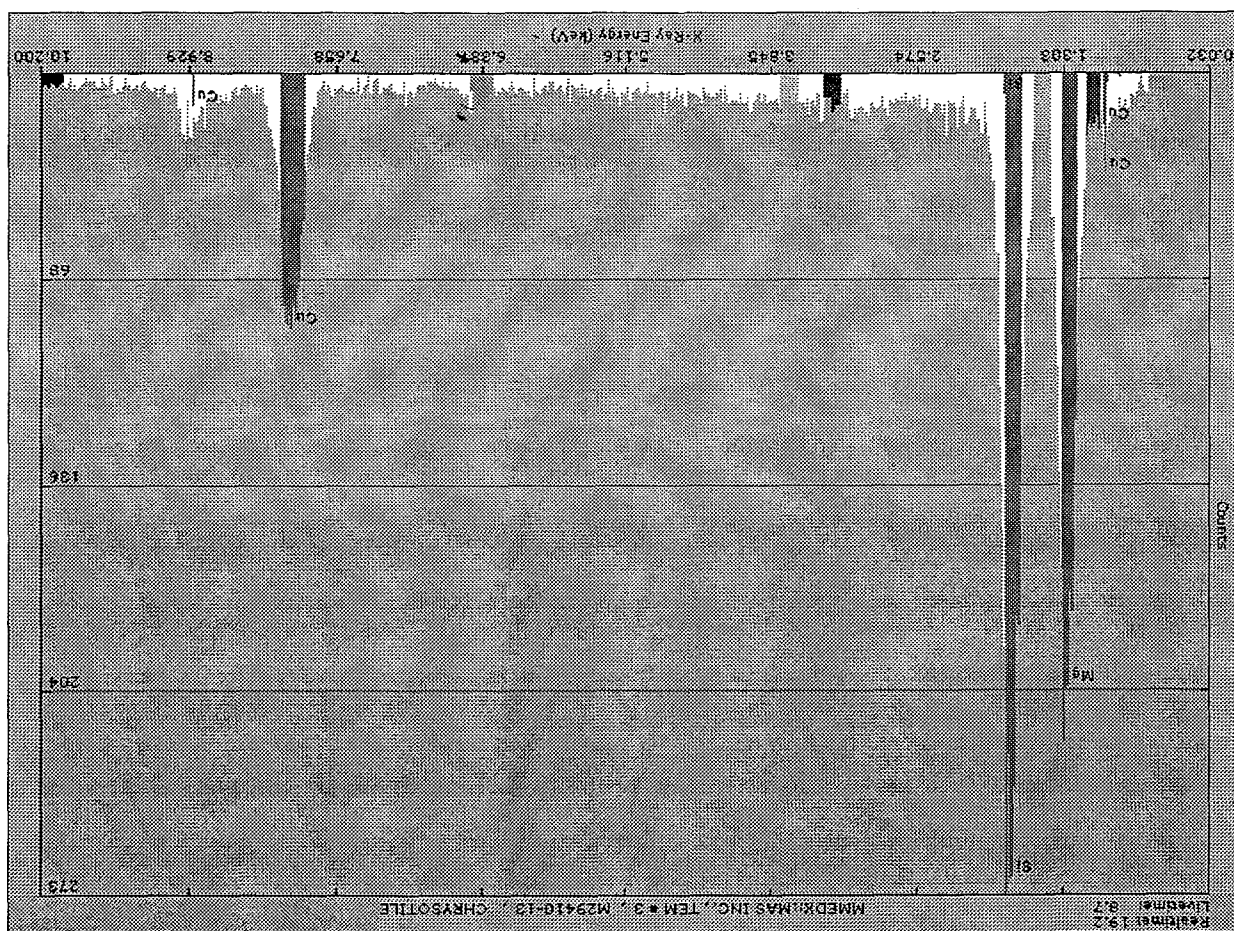












MAS Indirect TEM ANALYSIS M29410-014

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-C

Sample Area/ Volume: 2.5 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 5 %

Date Analyzed: 10/22/02

Analyst: Al Harmon

Scope Number: 4

Accelerating Voltage: 100

Indicated Mag: 25

Screen Mag: 20

Grid box Number: 6319

KV

KX

KX

Str < 5um: 23

Str ≥ 5um: 9

Total str: 32

Str / cc > 5: 721.7250 /cc

Number of grids: 2

#1: 114

#3: 113

Number of openings: 10

#2: 114

#4: 114

Average Grid Size: 0.012939

Total Area Analyzed: 0.129

Filter used

Dilution

Dilution Factor

1 / 2

10

20

Detect_cc: 80.19167

Total cc: 2566.13340

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	A9-I6	C	F	2.00	0.04	X	X	Print Out
2	G9	C	M-B	10.00	0.30	X	X	
3	G9	C	M-B	12.00	0.40	X	X	
4	G9	C	F	2.00	0.04	X	X	
5	G9	C	M-F	3.00	0.04	X	X	
6	G9	C	M-F	3.00	0.04	X	X	
7	G9	C	F	4.00	0.04	X	X	
8	D8	C	F	3.00	0.05	X	X	
9	D8	C	C-F	1.00	0.04	X	X	
10	D8	C	M-F	2.00	0.04	X	X	Print Out
11	D8	C	B	10.00	0.30	X	X	
12	B6	C	B	15.00	0.80	X	X	
13	B6	C	B	3.00	0.20	X	X	
14	B6	C	F	3.00	0.05	X	X	
15	B6	C	C-B	8.00	0.30	X	X	
16	F3	C	F	3.00	0.10	X	X	
17	F3	C	F	2.00	0.04	X	X	
18	F3	C	M-F	3.00	0.04	X	X	
19	A10-H6	C	B	3.00	0.20	X	X	
20	H6	C	F	3.00	0.04	X	X	Print Out
21	I8	C	B	3.00	0.20	X	X	
22	I8	C	B	10.00	0.30	X	X	
23	I8	C	M-F	2.00	0.04	X	X	
24	I8	C	M-F	2.00	0.04	X	X	
25	E7	C	B	3.00	0.40	X	X	
26	B4	C	B	7.00	0.30	X	X	
27	B4	C	C-F	2.00	0.04	X	X	
28	B4	C	M-F	1.00	0.04	X	X	

MAS Indirect TEM ANALYSIS M29410-014

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID:

P-1-C

29	B4	C	F	2.00	0.04	X	X
30	D3	C	B	7.00	0.30	X	X
31	D3	C	F	5.00	0.04	X	X
32	D3	C	M-B	4.00	0.30	X	X

Print Out

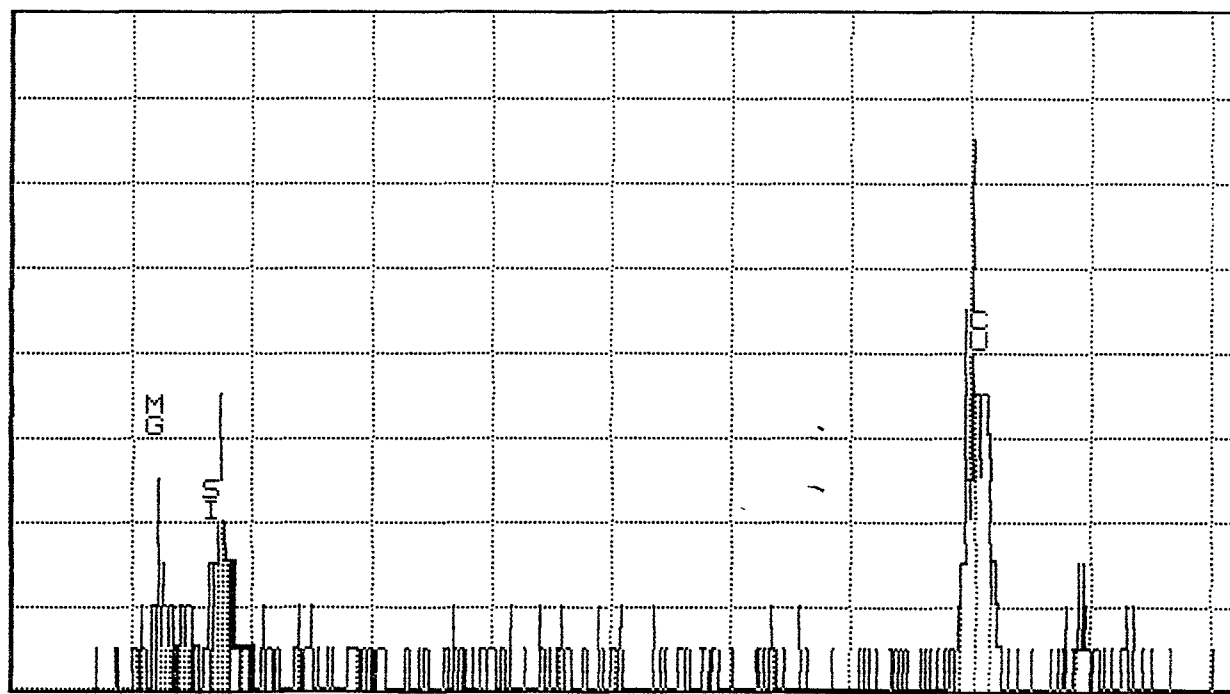
M29410 014 Sample Comments:

MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 12:33

Cursor: 0.000keV = 0

ROI (SIK α) 1.660: 1.820=30



0.000

VFS = 16

10.240

0

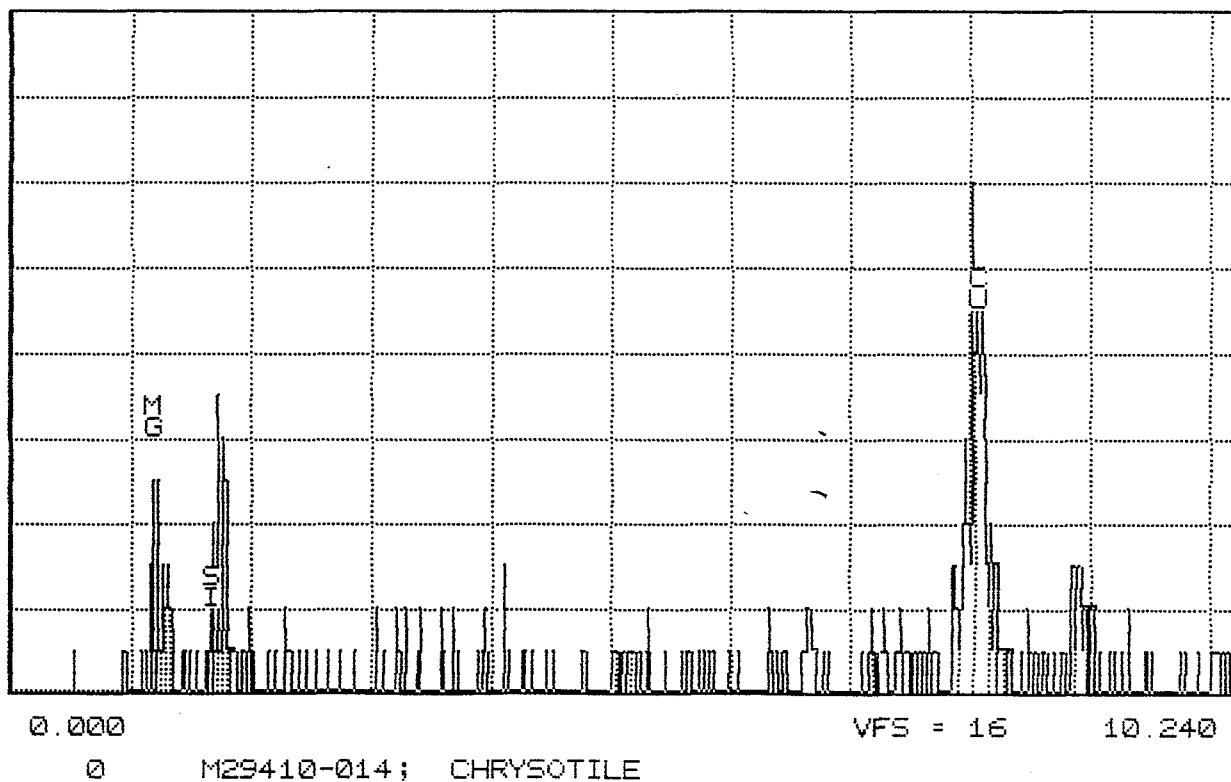
M29410-014; CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 12:52

Cursor: 0.000keV = 0

ROI (SIK α) 1.660: 1.820=27

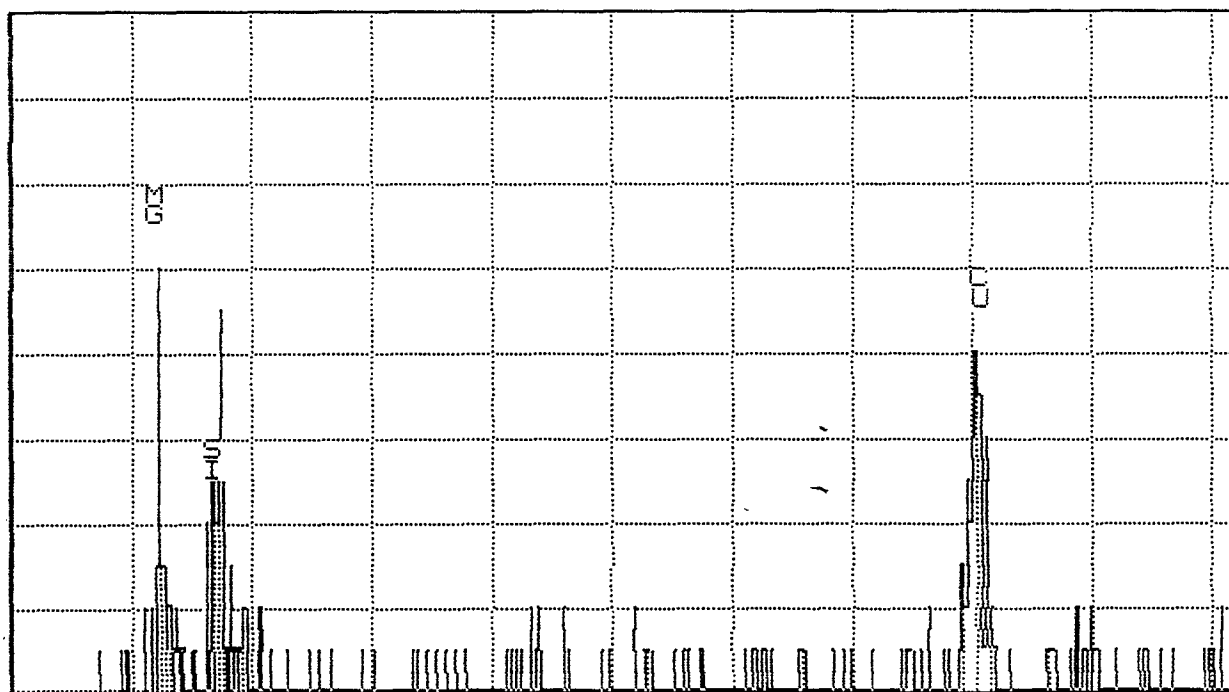


MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 13:06

Cursor: 0.000keV = 0

ROI (SIK α) 1.660: 1.820=29



0.000

VF5 = 16

10.240

0

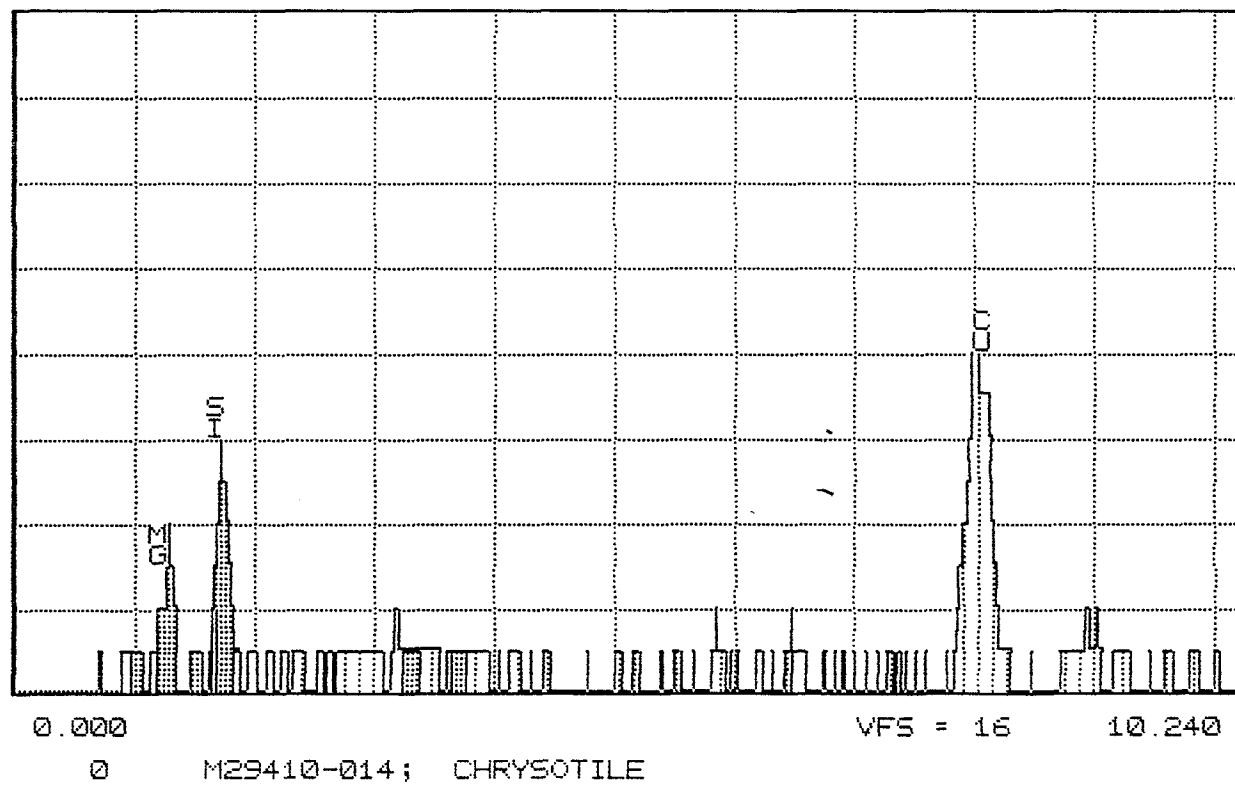
M29410-014; CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 13:32

Cursor: 0.000keV = 0

ROI (SIK α) 1.660: 1.820=32



MAS Indirect TEM ANALYSIS M29410-015

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-D

Sample Area/ Volume: 2.5 Liters

Date Analyzed: 10/22/02

Filter Type: MCE 47mm

Analyst: Mehrdad Motamedi

Pore size: 0.45

Scope Number: 3

Effective Filter Area: 1297

Accelerating Voltage: 100

KV

Sample type: Indirect Air

Indicated Mag: 25

KX

Analysis type: Dust

Screen Mag: 20

KX

Grid Acceptance YES 3 %

Grid box Number: 6319

Str < 5um: 23
Str ≥ 5um: 5
Total str: 28
Str / cc > 5: 2013.6625 /cc

Number of grids: 2 #1: 114 #3: 114
Number of openings: 10 #2: 113 #4: 113

Average Grid Size: 0.012882
Total Area Analyzed: 0.129

Filter used Dilution Dilution Factor
1/ 2 2 100

Detect_cc: 402.73249
Total cc: 11276.50986

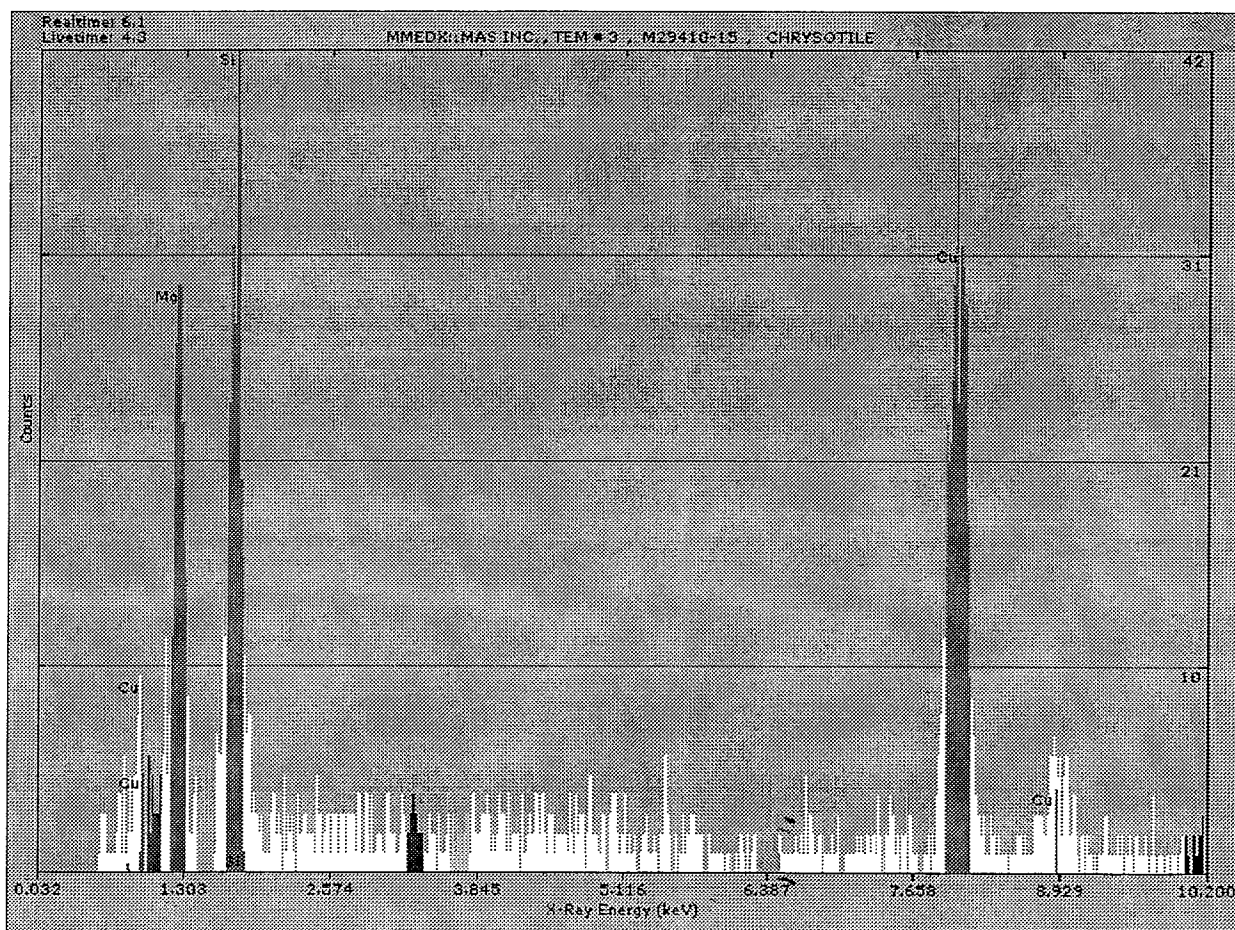
Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	D1-F9	C	B	3.70	0.20	X	X	Print Out
2	F9	C	M-F	1.50	0.10	X	X	
3	F9	C	B	32.00	0.80	X	X	
4	D6	C	M-F	0.90	0.10	X	X	
5	G7	C	B	1.30	0.20	X	X	
6	G7	C	F	1.70	0.10	X	X	
7	G7	C	B	2.00	0.10	X	X	
8	I5	C	M-B	1.30	0.20	X	X	
9	I5	C	F	2.30	0.10	X	X	
10	H1	CR	F	3.00	0.20	X	X	Print Out
11	H1	C	F	2.00	0.10	X	X	
12	H1	C	F	1.30	0.10	X	X	
13	D2-A1	C	F	1.40	0.10	X	X	
14	A1	C	B	5.50	0.30	X	X	
15	A1	C	B	12.00	1.70	X	X	
16	A1	C	F	1.70	0.10	X	X	
17	A1	C	F	2.00	0.20	X	X	
18	A1	C	M-F	3.60	0.20	X	X	
19	B3	C	F	3.00	0.10	X	X	
20	E1	C	B	4.20	0.20	X	X	Print Out
21	E1	C	F	1.30	0.10	X	X	
22	H3	C	B	2.50	0.40	X	X	
23	H3	C	B	1.00	0.20	X	X	
24	H3	C	B	10.00	0.50	X	X	
25	H3	C	M-B	2.00	0.20	X	X	
26	F4	C	M-B	9.00	0.30	X	X	
27	F4	C	B	1.60	0.20	X	X	
28	F4	C	M-F	1.20	0.10	X	X	

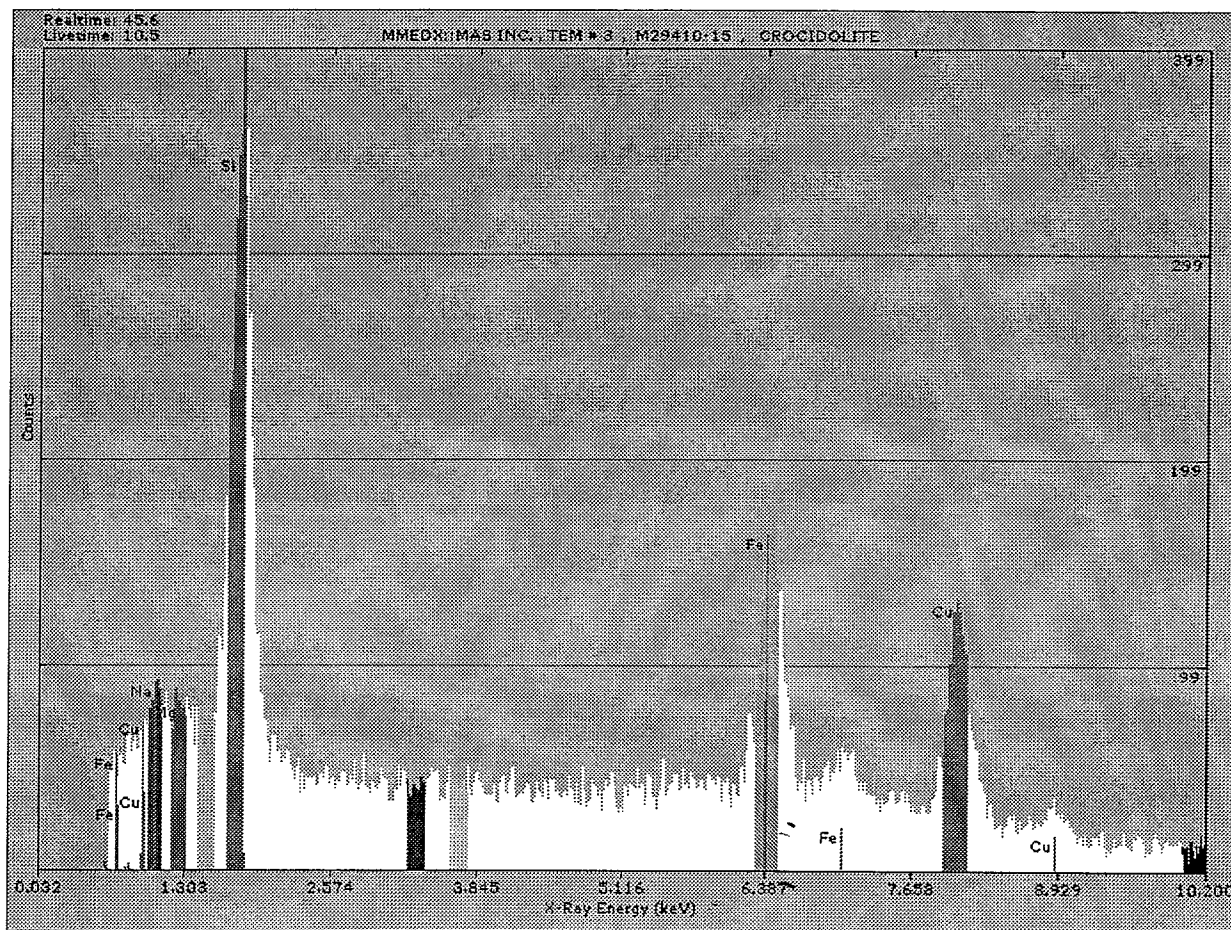
MAS Indirect TEM ANALYSIS M29410-015

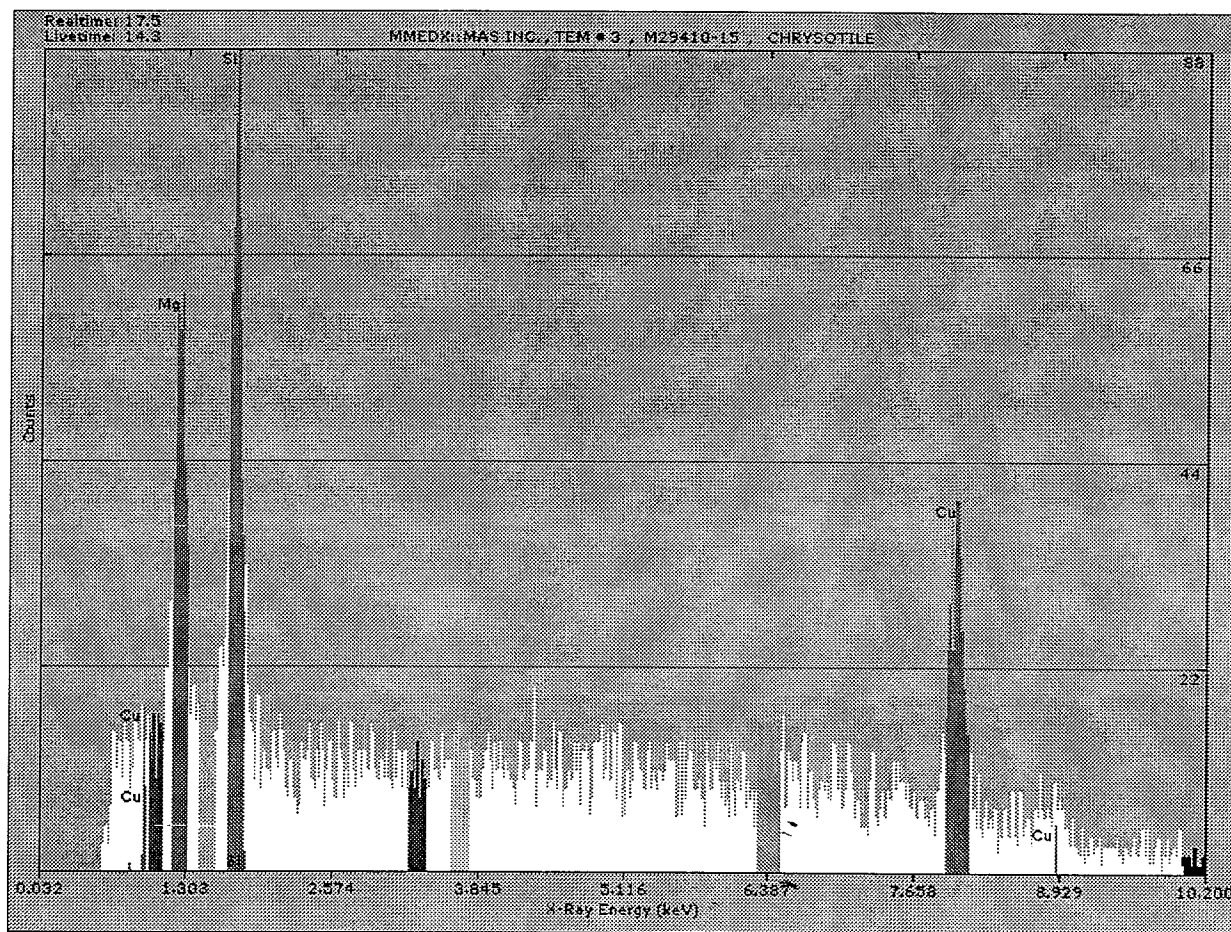
CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-D

M29410 015 Sample Comments:







MAS Indirect TEM ANALYSIS M29410-018

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: FB-1

Sample Area/ Volume: 0 Liters

Date Analyzed: 10/23/02

Filter Type: MCE 47mm

Analyst: Al Harmon

Pore size: 0.45

Scope Number: 2

Effective Filter Area: 1297

Accelerating Voltage: 100

KV

Sample type: Indirect Air

Indicated Mag: 25

KX

Analysis type: Dust

Screen Mag: 20

KX

Grid Acceptance YES 2 %

Grid box Number: 6319

Str < 5um: 0

Number of grids: 2

#1: 114

#3: 113

Str ≥ 5um: 0

Number of openings: 10

#2: 113

#4: 113

Total str: 0

Str / cc > 5: #Error /cc

Average Grid Size: 0.012826

Total Area Analyzed: 0.128

Filter used

Dilution

Dilution Factor

Detect_cc: #Div/0!

1/ 2

30

6.666667

Total cc: #Error

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	E9-B8		NSD					
	D7		NSD					
	H6		NSD					
	I3		NSD					
	G1		NSD					
	E10-F4		NSD					
	C6		NSD					
	E7		NSD					
	H8		NSD					
	B3		NSD					

M29410 018 Sample Comments:

MAS Indirect TEM ANALYSIS M29410-019

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: FB-2	
Sample Area/ Volume:	0 Liters	Date Analyzed:	10/23/02
Filter Type:	MCE 47mm	Analyst:	Al Harmon
Pore size:	0.45	Scope Number:	2
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	Dust	Screen Mag:	20 KX
Grid Acceptance	YES 2 %	Grid box Number:	6319

Str < 5um: 0
 Str ≥ 5um: 0
 Total str: 0
 Str / cc > 5: #Error /cc

Number of grids: 2 #1: 114 #3: 113
 Number of openings: 10 #2: 112 #4: 113

Average Grid Size: 0.012769
 Total Area Analyzed: 0.128

Filter used	Dilution	Dilution Factor	Detect_cc:	#Div/0!
1/ 2	30	6.666667	Total cc:	#Error

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	D9-I5		NSD					
	G3		NSD					
	C5		NSD					
	E8		NSD					
	G9		NSD					
	D10-H7		NSD					
	J6		NSD					
	G4		NSD					
	F1		NSD					
	E6		NSD					

M29410 019 Sample Comments:

MAS Indirect TEM ANALYSIS M29410-020

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-2-A	
Sample Area/ Volume:	30 Liters	Date Analyzed:	10/22/02
Filter Type:	MCE 47mm	Analyst:	Al Harmon
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	Dust	Screen Mag:	20 KX
Grid Acceptance	YES 5 %	Grid box Number:	6319

Str < 5um: 12
 Str ≥ 5um: 3
 Total str: 15
 Str / cc > 5: 6.6533 /cc

Number of grids: 2 #1: 114 #3: 114
 Number of openings: 10 #2: 114 #4: 114

Average Grid Size: 0.012996
 Total Area Analyzed: 0.130

Filter used	Dilution	Dilution Factor	Detect_cc:	2.21778
1/ 2	30	6.666667	Total cc:	33.26665

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
B1-B7								
1	C5	C	F	3.00	0.04	X	X	Print Out
2	C5	C	F	4.00	0.04	X	X	
3	C5	C	F	2.00	0.04	X	X	
4	C5	C	F	3.00	0.04	X	X	
	A3		NSD					
5	E4	C	M-F	1.00	0.04	X	X	
6	E4	C	B	8.00	0.40	X	X	
7	E4	C	F	1.00	0.04	X	X	
8	G4	C	C-B	6.00	0.30	X	X	
9	B2-D5	C	F	2.00	0.04	X	X	
10	D5	C	F	2.00	0.04	X	X	Print Out
11	D5	C	F	3.00	0.04	X	X	
12	D5	C	M-B	8.00	0.50	X	X	
13	E1	C	M-B	4.00	0.20	X	X	
14	E1	C	M-F	2.00	0.05	X	X	
	H2		NSD					
	I5		NSD					
15	G7	C	F	2.00	0.04	X	X	

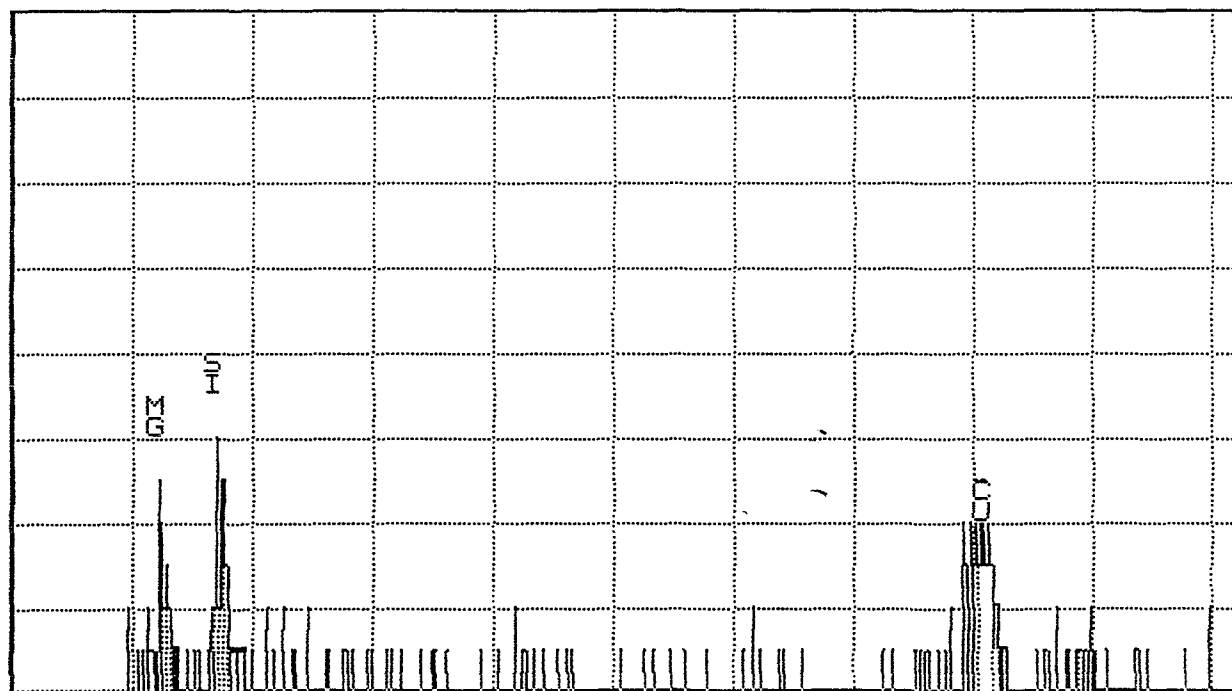
M29410 020 Sample Comments:

MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 14:05

Cursor: 0.000keV = 0

ROI (SIK α) 1.660: 1.820=26



0.000

VFS = 16

10.240

0

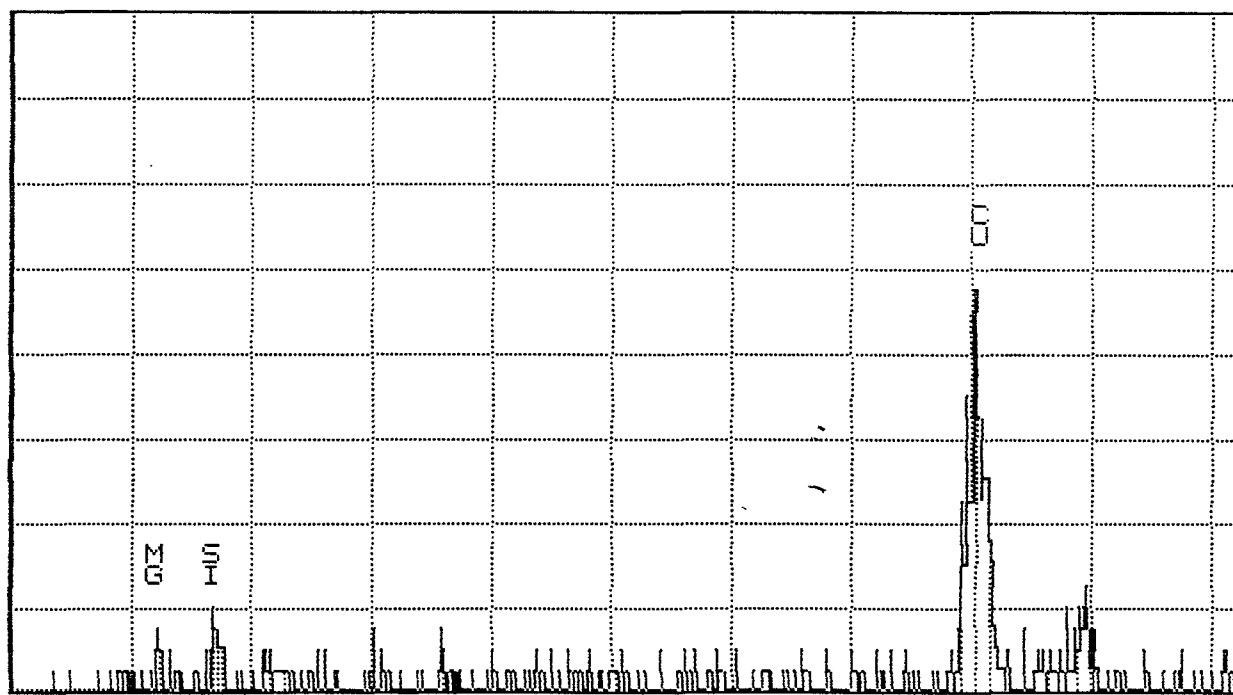
M29410-020; CHRYSOTILE

MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 13:48

Cursor: 0.000keV = 0

ROI (SIK α) 1.660: 1.820=15



0.000

VFS = 32

10.240

0

M29410-020; CHRYSOTILE

MAS Indirect TEM ANALYSIS M29410-021

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-2-B

Sample Area/ Volume: 30 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 3 %

Date Analyzed: 10/22/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100

Indicated Mag: 25

Screen Mag: 20

Grid box Number: 6319

KV

KX

KX

Str < 5um: 9

Str ≥ 5um: 1

Total str: 10

Str / cc > 5: 2.2775 /cc

Number of grids: 2

#1: 113

#3: 111

Number of openings: 10

#2: 112

#4: 114

Average Grid Size: 0.012655

Total Area Analyzed: 0.127

Filter used

Dilution

Dilution Factor

Detect_cc: 2.27754

1/ 2

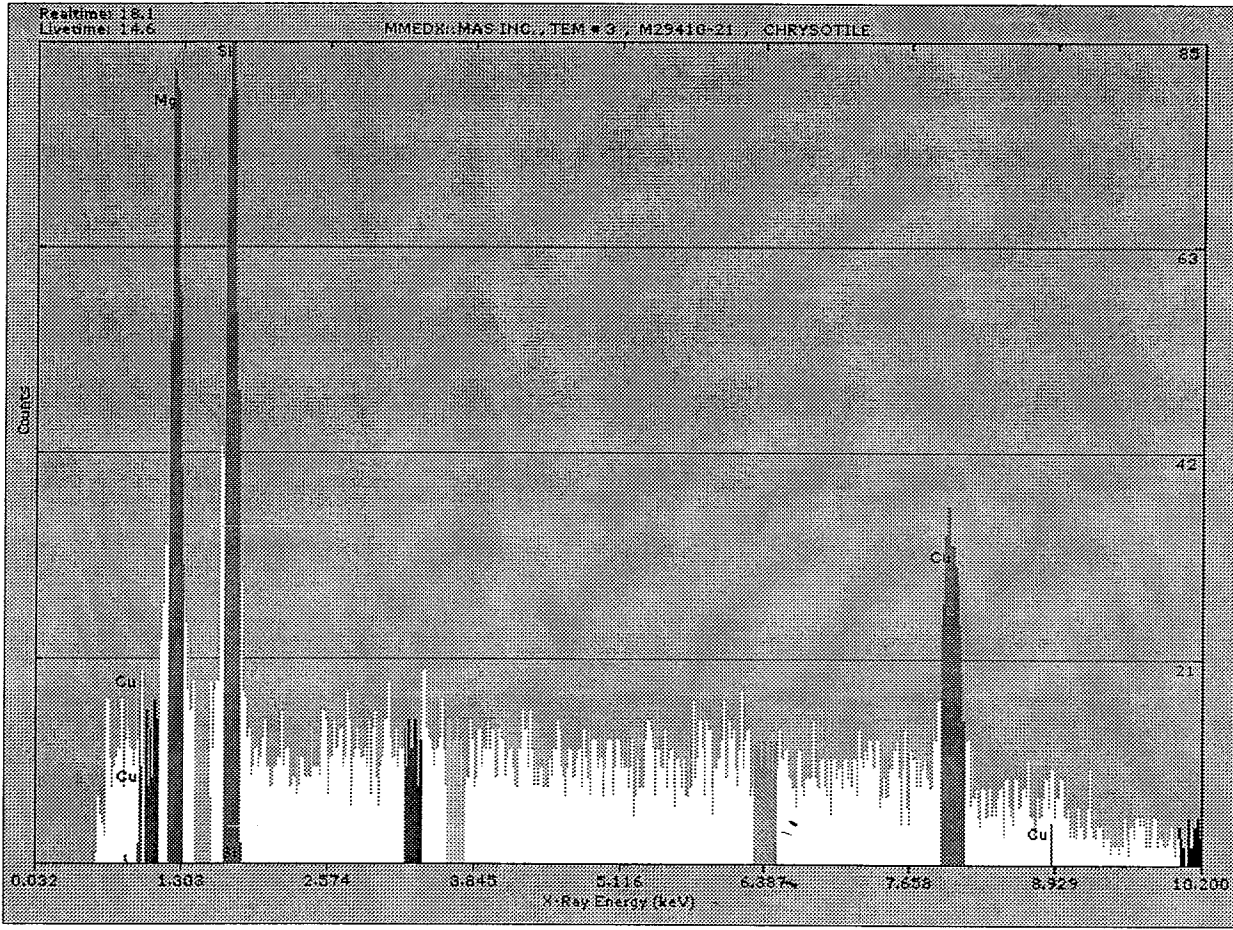
30

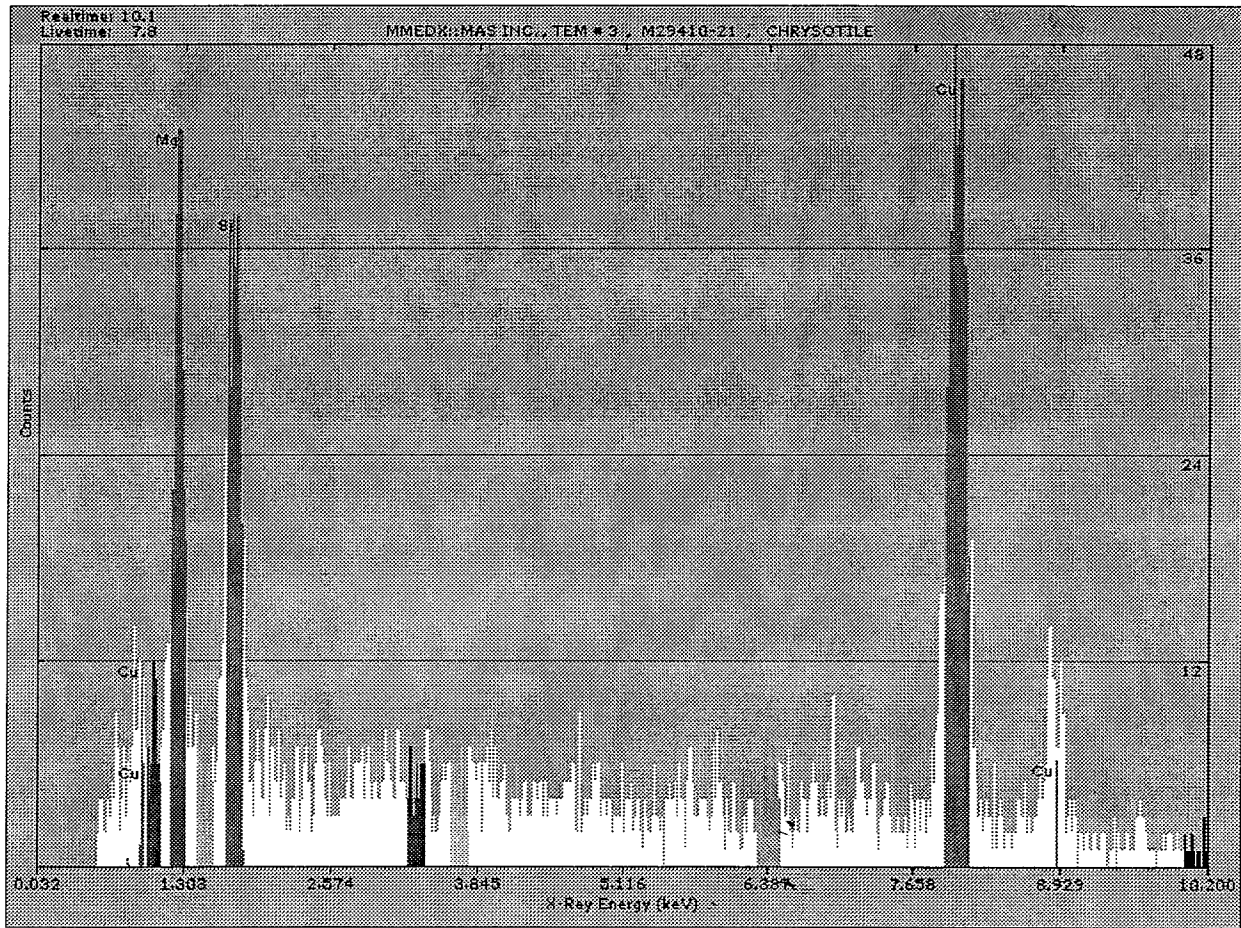
6.666667

Total cc: 22.77536

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	D1-G9	C	F	2.00	0.20	X	X	Print Out
2	G9	C	M-F	2.00	0.20	X	X	
3	F7	C	B	6.00	0.20	X	X	
4	F7	C	F	3.40	0.10	X	X	
	C7		NSD					
5	B5	C	B	3.00	0.40	X	X	
	E3		NSD					
	D2-A4		NSD					
	B6		NSD					
	D7		NSD					
6	F5	C	M-B	3.00	0.30	X	X	
7	F5	C	F	1.70	0.10	X	X	
8	F5	C	F	1.80	0.10	X	X	
9	H4	C	F	3.00	0.05	X	X	
10	H4	C	B	2.00	0.20	X	X	Print Out

M29410 021 Sample Comments:





MAS Indirect TEM ANALYSIS M29410-022

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-2-C

Sample Area/ Volume: 30 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Indirect Air

Analysis type: Dust

Grid Acceptance YES 4 %

Date Analyzed: 10/22/02

Analyst: Al Harmon

Scope Number: 2

Accelerating Voltage: 100

Indicated Mag: 25

Screen Mag: 20

Grid box Number: 6319

KV

KX

KX

Str < 5um: 9

Str ≥ 5um: 1

Total str: 10

Str / cc > 5: 2.2573 /cc

Number of grids: 2

#1: 114

#3: 113

Number of openings: 10

#2: 112

#4: 113

Average Grid Size: 0.012769

Total Area Analyzed: 0.128

Filter used

Dilution

Dilution Factor

Detect_cc: 2.25729

1 / 2

30

6.666667

Total cc: 22.57291

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	D4-H2	C	F	1.00	0.04	X	X	Print Out
2	H2	C	M-F	1.00	0.04	X	X	
	J4		NSD					
	H9		NSD					
3	E9	C	B	5.00	0.30	X	X	
4	E9	C	B	3.00	0.20	X	X	
5	B6	C	M-F	1.00	0.04	X	X	
6	B6	C	M-F	1.00	0.03	X	X	
	D5-D3		NSD					
7	B4	C	M-B	2.00	0.20	X	X	
8	B4	C	F	1.00	0.04	X	X	
	C6		NSD					
9	E9	C	C-F	2.00	0.04	X	X	
10	G1	C	M-B	4.00	0.30	X	X	Print Out

M29410 022 Sample Comments:

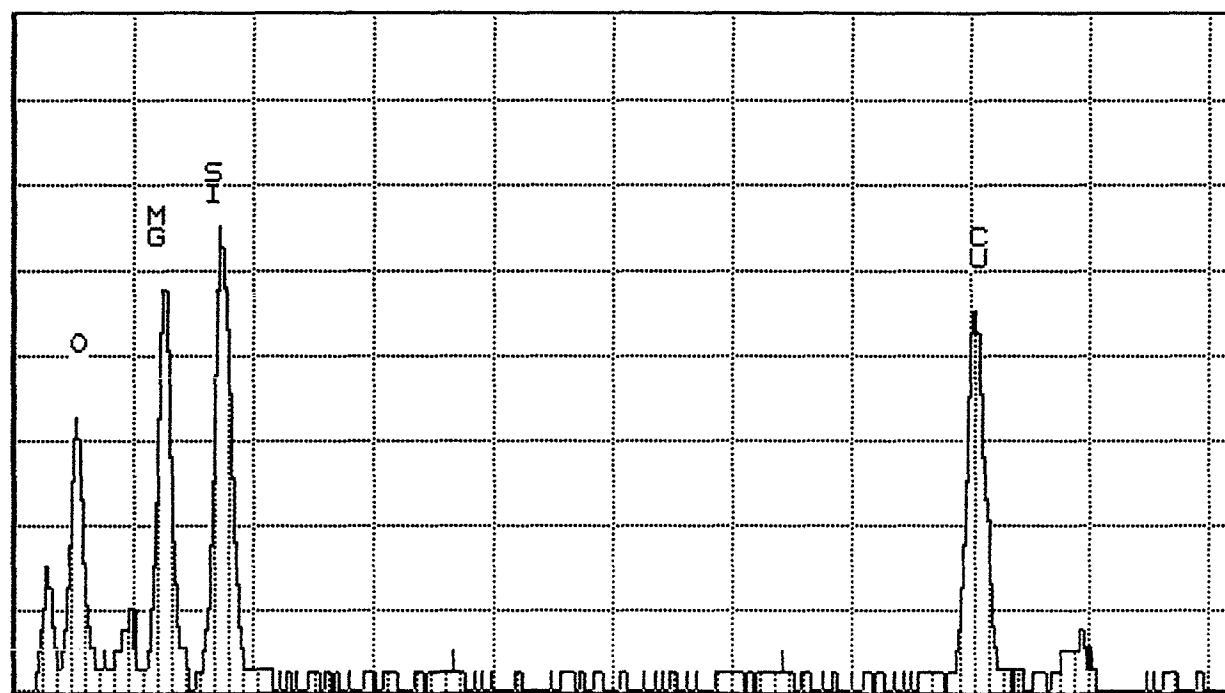
MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 15:13

Cursor: 0.000keV = 0

ROI

(0) 0.000: 0.000



0.000

VFS = 32

10.240

12

M29410-022; CHRYSOTILE

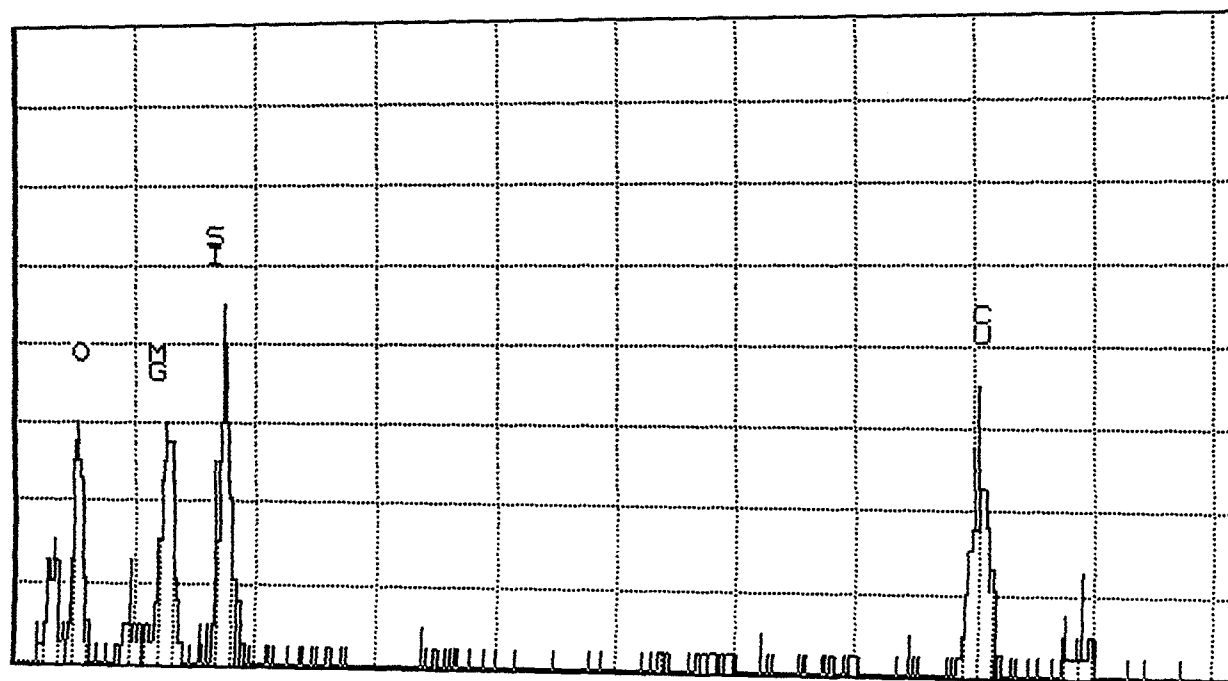
MATERIALS ANALYTICAL SERVICES

TUE 22-OCT-02 14:42

Cursor: 0.000keV = 0

ROI

(0) 0.000: 0.000



0.000

VFS = 32

10.240

9

M29410-022; CHRYSOTILE

MAS Indirect TEM ANALYSIS M29410-023

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-2-D	
Sample Area/ Volume:	24 Liters	Date Analyzed:	10/22/02
Filter Type:	MCE 47mm	Analyst:	Mehrdad Motamedi
Pore size:	0.45	Scope Number:	3
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
Sample type:	Indirect Air	Indicated Mag:	25 KX
Analysis type:	Dust	Screen Mag:	20 KX
Grid Acceptance	YES 3 %	Grid box Number:	6319

Str < 5um: 3
 Str ≥ 5um: 3
 Total str: 6
 Str / cc > 5: 8.4645 /cc

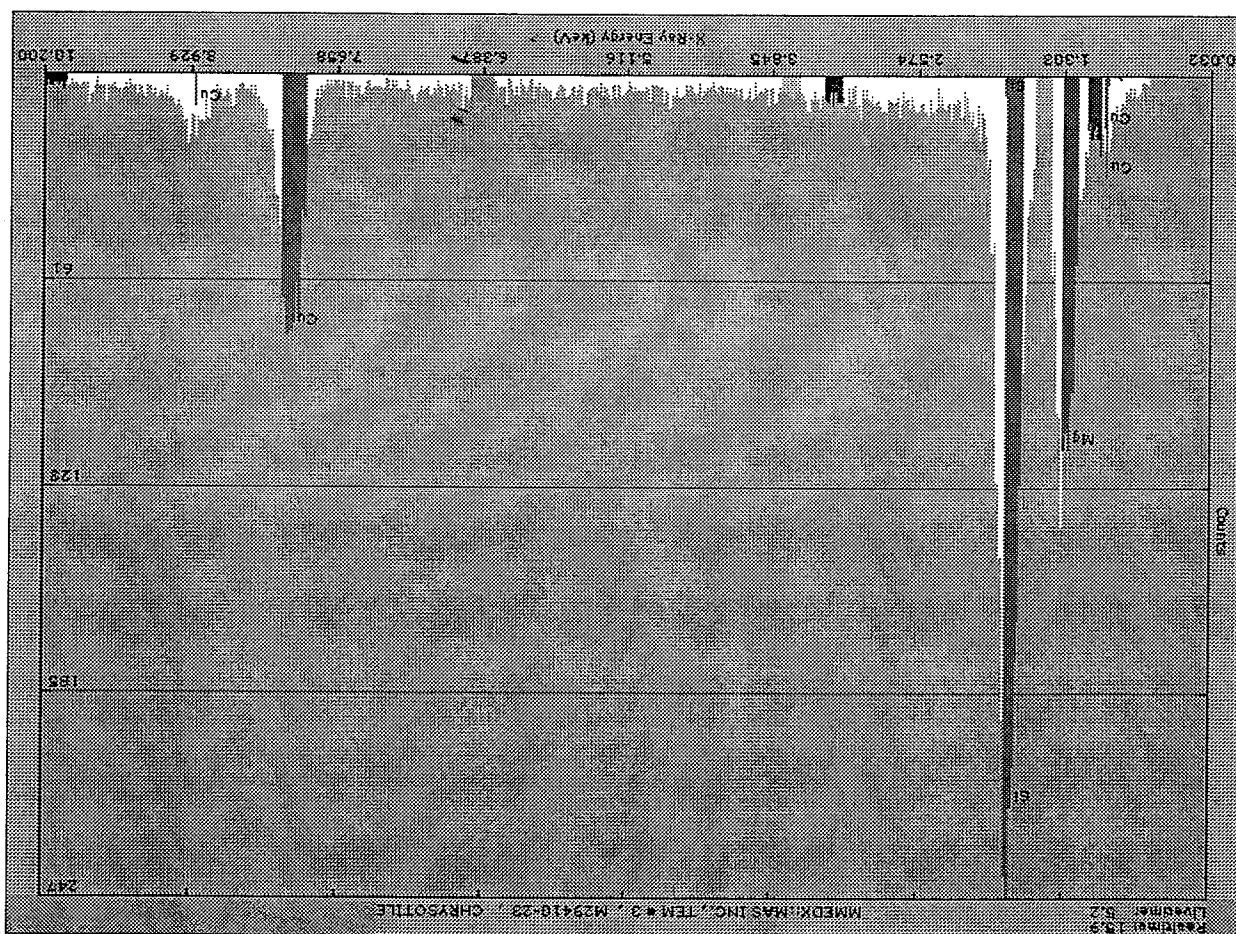
Number of grids: 2 #1: 113 #3: 113
 Number of openings: 10 #2: 113 #4: 113

Average Grid Size: 0.012769
 Total Area Analyzed: 0.128

Filter used	Dilution	Dilution Factor	Detect_cc:	2.82150
1 / 2	30	6.666667	Total cc:	16.92902

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
	A5-H2		NSD					
1	E3	C	B	5.30	0.40	X	X	Print Out
2	E3	C	F	0.60	0.10	X	X	
3	E3	C	B	0.90	0.20	X	X	
	B5		NSD					
	E7		NSD					
4	G8	C	B	5.30	0.20	X	X	
	B5-H9		NSD					
	F8		NSD					
5	C7	C	C-F	4.00	0.20	X	X	
6	C4	C	B	5.30	0.40	X	X	
	F3		NSD					

M29410 023 Sample Comments:



SECTION 5

MATERIALS ANALYTICAL SERVICES

PROJECT LOG

Client Code: MASCORP

MAS ID: M29411
Client Name: Materials Analytical Services, Inc.
Project Name: CertainTeed Asbestos Cement Pipe Cuttin
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 9/27/02

TRANSPORT INFORMATION:

Submitted By:	<u>Richard Hatfield</u>	Documents:	<u>COC</u>
Delivery By:	<u>Hand Delivery</u>		
Received By:	<u>dmazzaferro</u>	Comments for COC:	
Condition:	<u>goo</u>		

CONTACT INFORMATION:

Contact:	<u>Bill Longo</u>	Work Phone:	<u>(770) 866-3200</u>	Ext:	
Title:	First Name: <u>William</u>	Last Name: <u>Longo</u>	Suffix:	Other Phone:	Ext:
				Fax:	<u>(770) 866-3259</u>

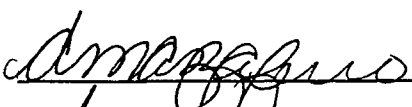
Page 1 of

M29411

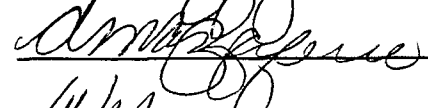
SAMPLE INFORMATION:

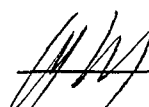
#	Client ID	Volume	#	Client ID	Volume
000	field blank 9/28/02	0			
001	Fabric-Blank	25			
002	Fabric-RLH	31.5			

SIGNATURES

RECEIVED BY: 

REVIEWED BY: 

PREPARED BY: 

ANALYZED BY: 

REPORTED BY: _____

DEPOSED BY: _____

TEM SAMPLE DATA

M29411

Page 1 of 1

Prep SOP#: Mt-021
Prep Status: Complete
Sample Type: Fabric
Analysis type: Dust

prep_date: 9/28/02 Prep Tech: dmazzaferro

Archival Information			
Slides:	180	Filters:	
Bottles:	847	Gid_box:	6316
Archive Comments:			
Disposal Comments:			

Reprep Dates

Sample Number	Sample ID	Area	Filter Portion	Total Susp	#1	#2	#3	#4	#5	Filter Type:
000	field blank 9/28/02	0	cm2 1/1	200	30	0	0	0	0	MCE 47mm
					Dilution Factors	6.667	0	0	0	1297
001	Fabric-Blank	25	cm2 1/1	250	30	0	0	0	0	MCE 47mm
					Dilution Factors	8.333	0	0	0	1297
002	Fabric-RLH	31.5	cm2 1/1	250	10	30	0.1	0.5	0	MCE 47mm
					Dilution Factors	25	8.333	2500	500	1297

MAS

Co. Name _____
 Address _____

 PH: _____
 FAX: _____

Sampling Date:

Cutting Constraints

Sheet 2 of 3

Date	Sample No.	Sample Location	Sample Type	Sample Times (Minutes)			Flow Rate (Liters per Minute)		
				Start	Stop	Duration	Before	After	Average
9/27/02	P-1-A	WLR FWA	Personnel	2:22	2:27		0.5	0.5	
13	P-1-B	RHR					0.5	0.5	
14	P-1-C	WLR					0.5	0.5	
15	P-1-D	RHR					0.5	0.5	
16	P-1-ME	WLR B ₂					2.75	2.75	
17	P-1-ME	RHR D ₂					2.75	2.75	
18	FB-1		Field Blank						
19	FB-2		Field Blank						
	Fabric-Blank		Fabric						
	Fabric-RHR		Fabric						

First Transfer By:
Second Transfer By:
Third Transfer By:

Initial Shipment Date: 9/27

Hand

9/27/02

Amesbury

TEM DUST ANALYSIS

M29411

001

Materials Analytical Services, Inc.

CertainTeed Asbestos Cement Pipe Cutting

Client Sample ID:

Fabric-Blank

Sample Area/ Volume: 25 cm2

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Fabric

Analysis type: Dust

Grid Acceptance YES 5 %

Date Analyzed: 10/4/02

Analyst: Mehrdad Motamedi

Scope Number: 2

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6316

Str < 5um: 0
Str ≥ 5um: 0
Total Str: 0

Number of grids: 2

#1: 113

#3: 113

Average Grid Size: 0.012882

Number of openings: 10

#2: 114

#4: 114

Total Area Analyzed: 0.129

Volume Filtered 30 ml

Dilution Factor 8.333333

Str / sqr ft 0.000E+00

Str / cm2 0.000E+00

Str / sqr ft ≥ 5 0.000E+00

Str / cm2 ≥ 5 0.000E+00

TEM DATA

Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
	A4-B1		NSD					
	C4		NSD					
	E3		NSD					
	H1		NSD					
	I4		NSD					
	A5-I8		NSD					
	G6		NSD					
	D9		NSD					
	B7		NSD					
	A8		NSD					

M29411 001

Sample_comments

TEM DUST ANALYSIS

M29411

002

Materials Analytical Services, Inc.

Client Sample ID: Fabric-RLH

CertainTeed Asbestos Cement Pipe Cutting

Sample Area/ Volume: 31.5 cm²

Date Analyzed: 10/4/02

Filter Type: MCE 47mm

Analyst: Mehrdad Motamedi

Pore size: 0.45

Scope Number: 3

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Sample type: Fabric

Indicated Mag: 25 KX

Analysis type: Dust

Screen Mag: 20 KX

Grid Acceptance YES 4 %

Grid_box: 6316

Str < 5um: 38
Str ≥ 5um: 4
Total Str: 42

Number of grids: 2 #1: 114 #3: 113

Average Grid Size: 0.012939

Number of openings: 10 #2: 114 #4: 114

Total Area Analyzed: 0.129

Volume Filtered -0.5 ml

Str / sq ft 6.208E+09

Str / cm² 6.683E+06

Dilution Factor 500

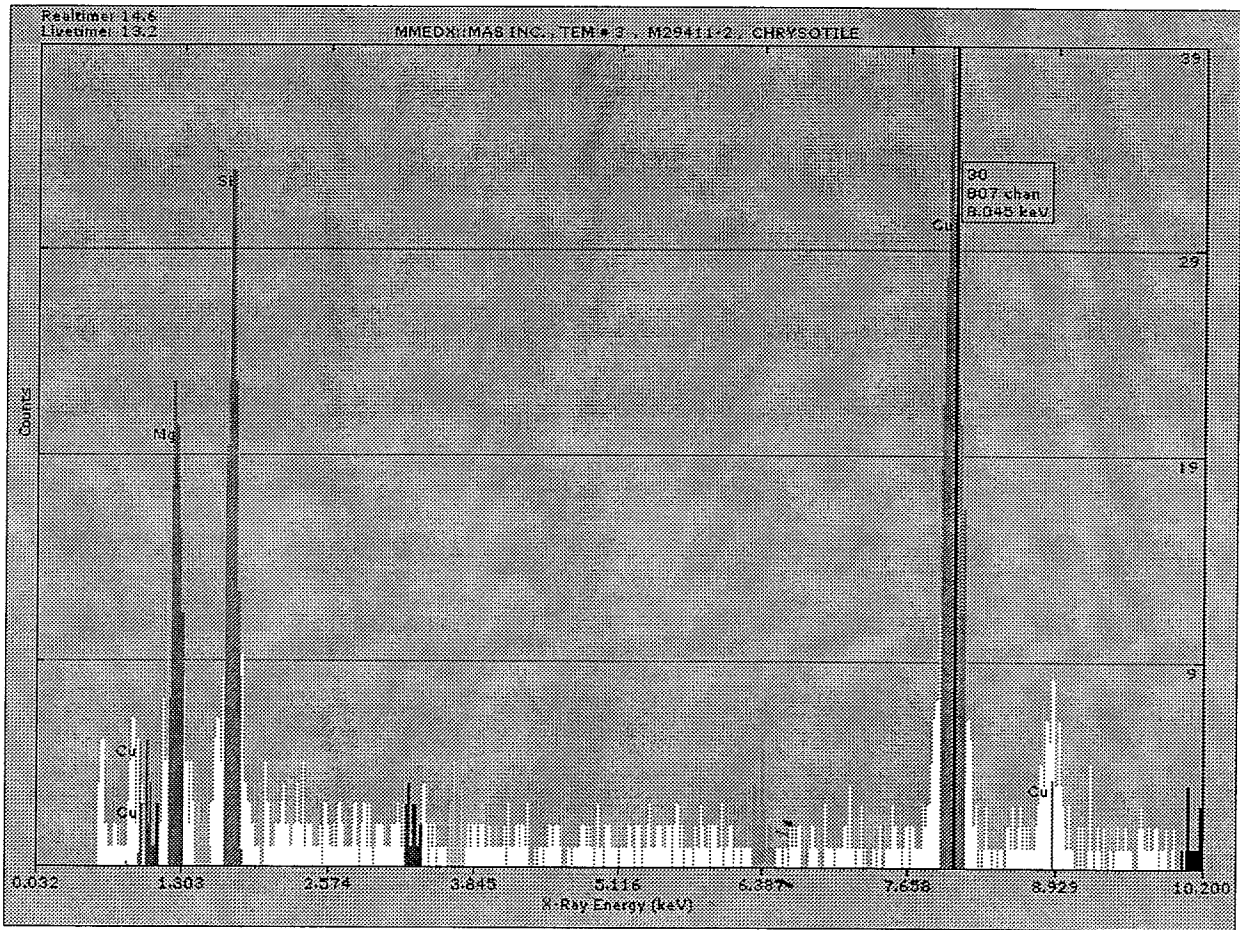
Str / sq ft ≥ 5 5.913E+08

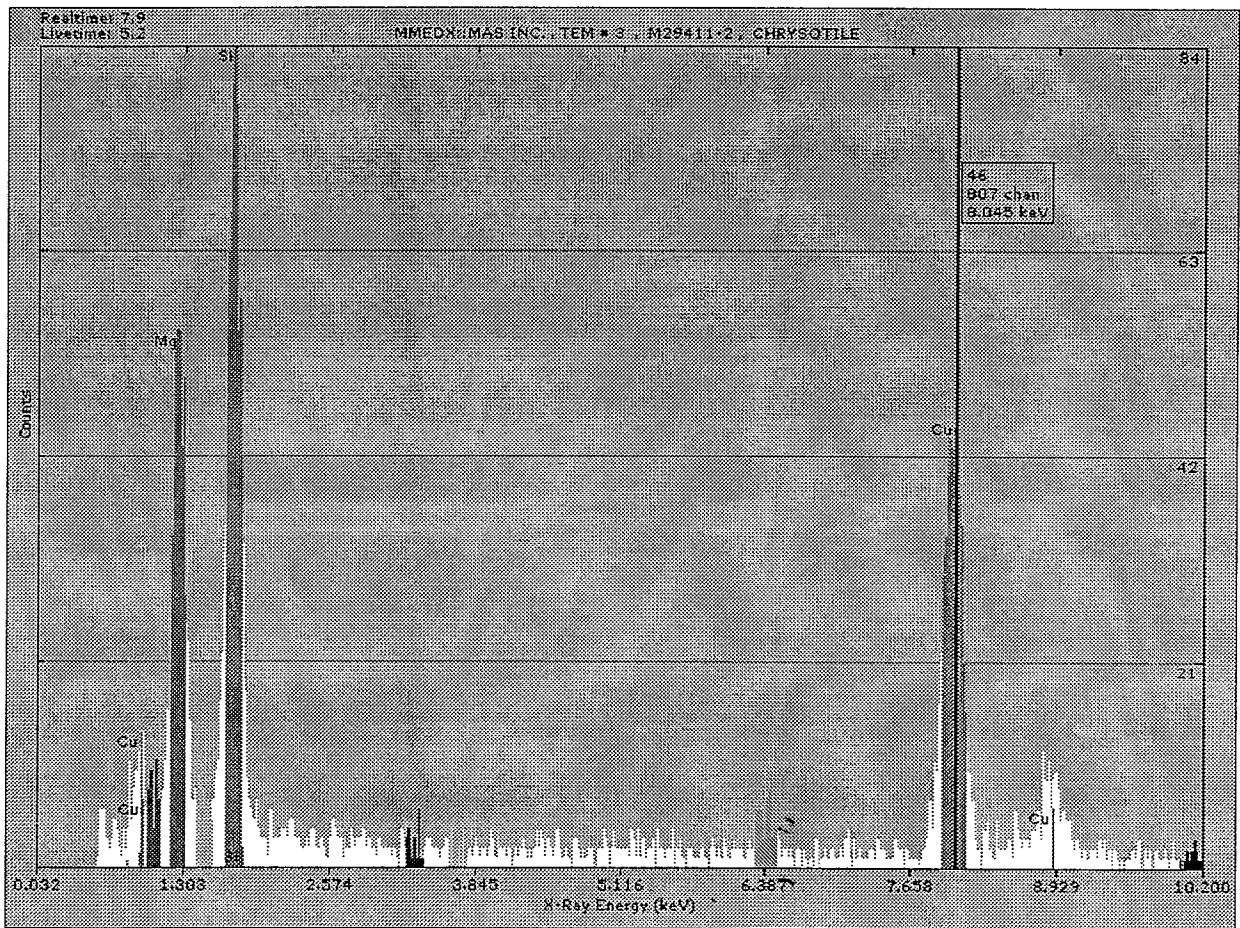
Str / cm² ≥ 5 6.364E+05

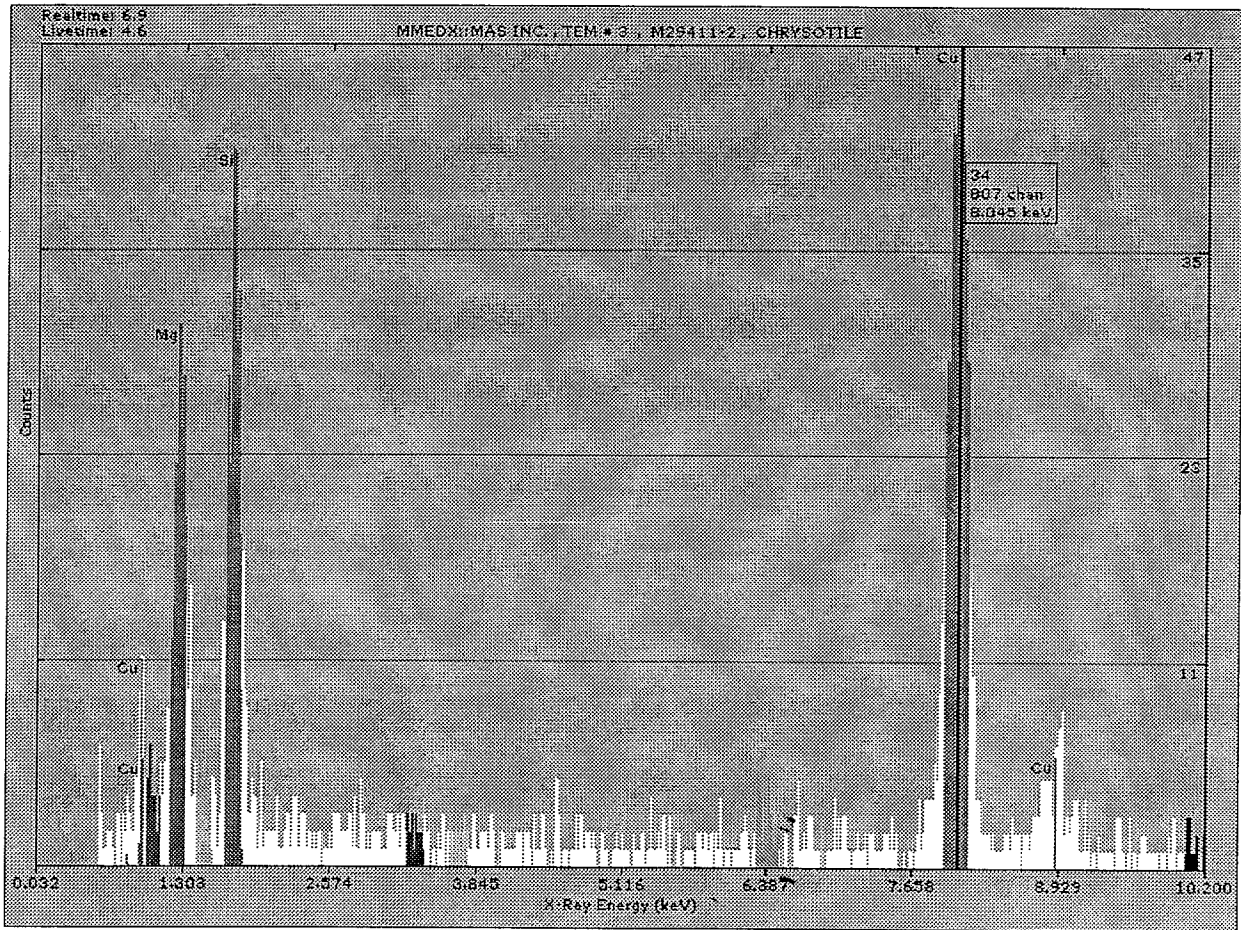
TEM DATA

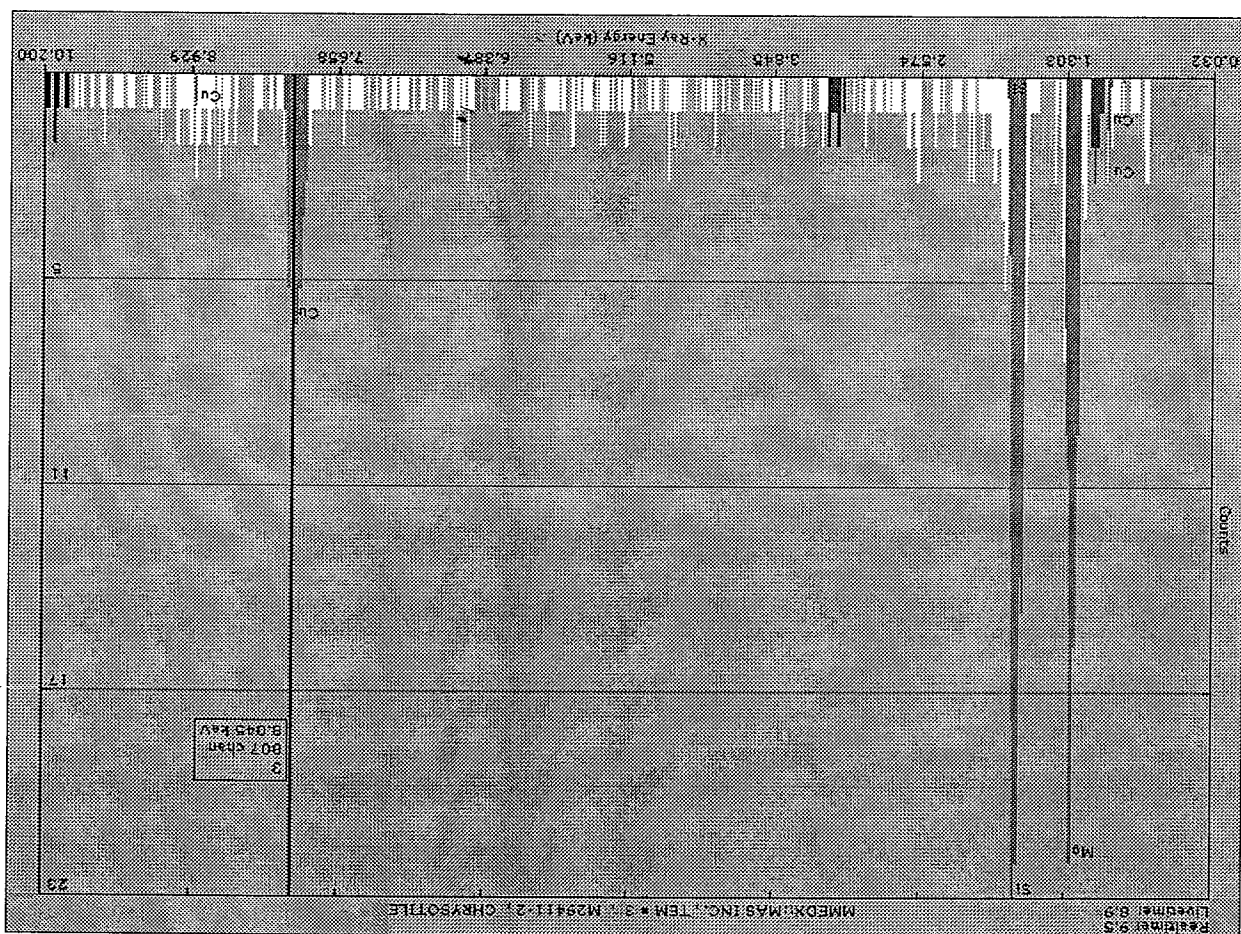
Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
1	C2-J3	C	F	5.20	0.10	X	X	Print Out
2	J3	C	B	3.00	0.20	X	X	
3	J3	C	M-F	3.70	0.10	X	X	
4	J6	C	F	2.00	0.10	X	X	
5	J6	C	F	1.40	0.05	X	X	
	J6	C	F	3.50	0.10	X	X	
7	J6	C	F	2.60	0.10	X	X	
8	F9	C	F	3.80	0.10	X	X	
9	F9	C	F	2.00	0.10	X	X	
10	F9	C	B	2.40	0.30	X	X	Print Out
11	D8	C	F	7.00	0.20	X	X	
12	D8	C	F	4.40	0.10	X	X	
13	D8	C	F	4.00	0.10	X	X	
14	D8	C	F	1.70	0.04	X	X	
15	D8	C	F	3.00	0.10	X	X	
16	D8	C	F	2.40	0.05	X	X	
17	D8	C	F	1.00	0.10	X	X	
18	D8	C	F	1.60	0.05	X	X	
19	D8	C	F	1.30	0.10	X	X	
20	F6	C	F	2.30	0.20	X	X	Print Out
21	D2-B2	C	B	2.00	0.80	X	X	
22	B2	C	F	1.80	0.10	X	X	
23	B2	C	F	3.00	0.10	X	X	
24	D5	C	F	7.00	0.10	X	X	
25	D5	C	M-F	1.20	0.10	X	X	
	D5	C	F	3.00	0.10	X	X	
27	D5	C	F	1.00	0.10	X	X	
28	D5	C	F	2.40	0.05	X	X	
29	D5	C	F	2.00	0.10	X	X	

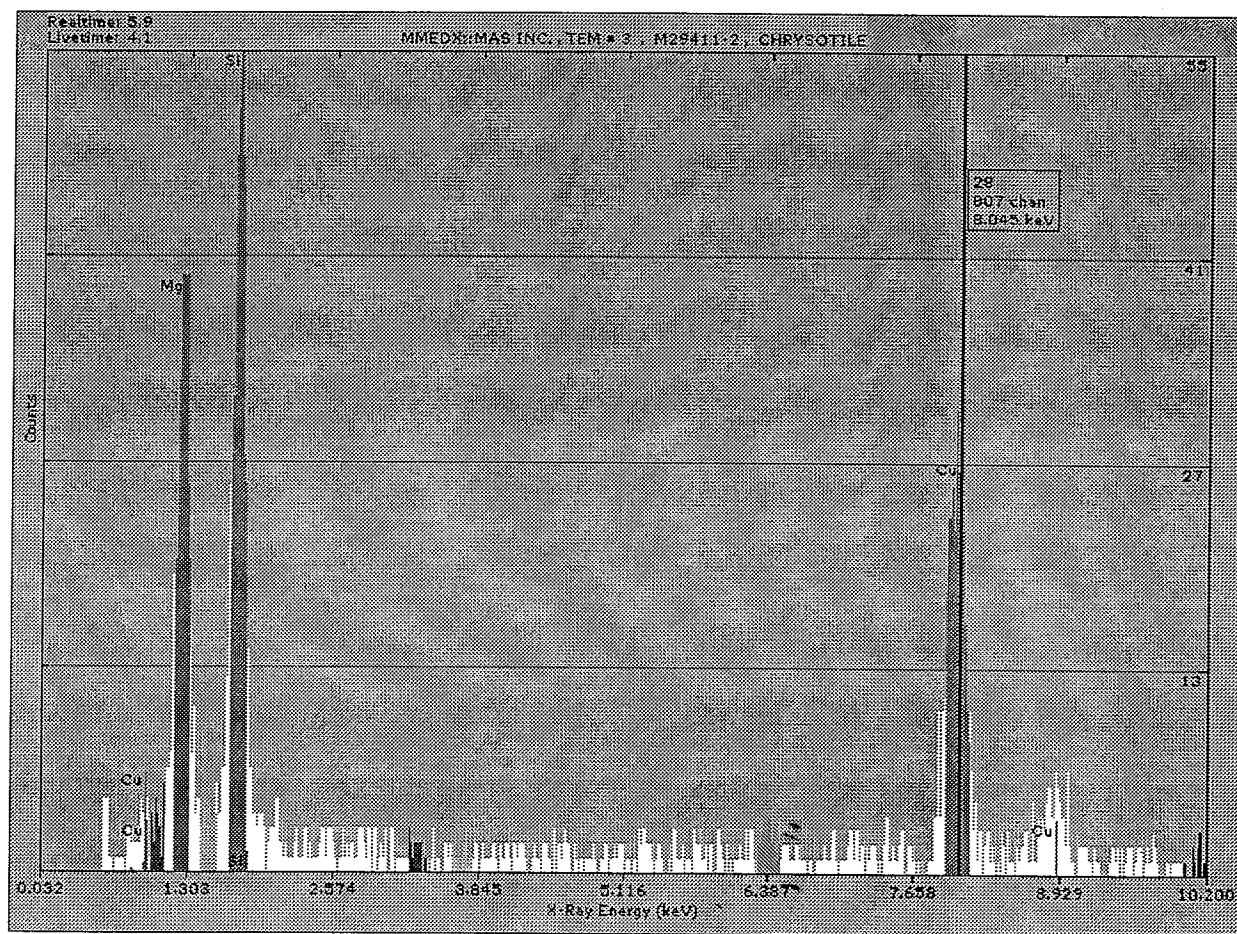
30	D5	C	F	1.00	0.10	X	X	Print Out
31	D5	C	F	0.90	0.10	X	X	
32	D5	C	F	2.00	0.05	X	X	
33	E8	C	F	3.00	0.02	X	X	Print Out
34	E8	C	F	1.30	0.05	X	X	
35	E8	C	F	2.00	0.10	X	X	
36	E8	C	B	3.00	0.40	X	X	
37	G9	C	F	1.00	0.10	X	X	
38	G9	C	F	1.60	0.10	X	X	
39	G9	C	B	2.20	0.10	X	X	
40	G9	C	F	3.60	0.20	X	X	Print Out
41	I8	C	F	5.70	0.10			
42	I8	C	F	1.00	0.10			











SECTION 6

MATERIALS ANALYTICAL SERVICES PROJECT LOG

Client Code: **MASCORP**

MAS ID: M29398
Client Name: Materials Analytical Services, Inc.
Project Name: Certainfeed
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 9/26/02

TRANSPORT INFORMATION:

Submitted By:	<u>Richard Hatfield</u>	Documents:	_____
Delivery By:	<u>Hand Delivery</u>		_____
Received By:	<u>dmazzaferro</u>	Comments for COC:	_____
Condition:	<u>good</u>		_____

CONTACT INFORMATION:

Contact:	<u>Richard Hatfield</u>	Work Phone:	<u>(770) 866-3204</u>	Ext:	_____
Title:	First Name: _____	Last Name: _____	Suffix: _____	Other Phone:	_____
Mr.	<u>Richard</u>	<u>Hatfield</u>		Fax:	<u>(770) 866-3259</u>

Page 1 of 2

M29398

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
001	1	100			
002	2	100			
003	3	0			

SIGNATURES

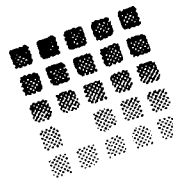
RECEIVED BY: *dmazzaferro*

REVIEWED BY: *dmazzaferro*

PREPARED BY: *dmazzaferro*

ANALYZED BY: *MM*

REPORTED BY: _____



MATERIALS
ANALYTICAL
SERVICES

SAMPLE CASSETTE LABEL DATA

MAS PROJECT NUMBER:

M29398

PREPARED BY:

[Signature]

MAS SAMPLE NO.

DATA

M29398-001

#1

Certainteed

Form turned Surface

5x20cm

M29398-002

#2

Certainteed

Finished Surface

10x10cm

M29398-003

#3

Certainteed

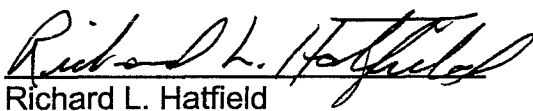
Field blank



CertainTeed Asbestos Cement Pipe Surface Dust Samples Before Study

- #1 Dust from turned surface - 5 x 20 cm
- #2 Dust from finished (unturned) surface - 10 x 10 cm
- #3 Field Blank

Collected on September 26, 2002

By: 
Richard L. Hatfield

Received 9-26-02 Imberger m29398

TEM DUST ANALYSIS

M29398

001

Materials Analytical Services, Inc.

Client Sample ID: 1

CertainTeed Asbestos Cement Pipe Surface Dust Befor

Sample Area/ Volume: 100 cm2

Date Analyzed: 10/4/02

Filter Type: MCE 47mm

Analyst: Mehrdad Motamedi

Pore size: 0.45

Scope Number: 3

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Sample type: Dust

Indicated Mag: 25 KX

Analysis type: Dust

Screen Mag: 20 KX

Grid Acceptance YES 3 %

Grid_box: 6318

Str < 5um: 8

Number of grids: 2

#1: 114

#3: 114

Average Grid Size: 0.012996

Str ≥ 5um: 11

Number of openings: 10

#2: 114

#4: 114

Total Area Analyzed: 0.130

Total Str: 19

Str / sq ft 5.872E+09

Str / cm2 6.321E+06

Volume Filtered 0.03 ml

Dilution Factor 3333.333

Str / sq ft ≥ 5 3.400E+09

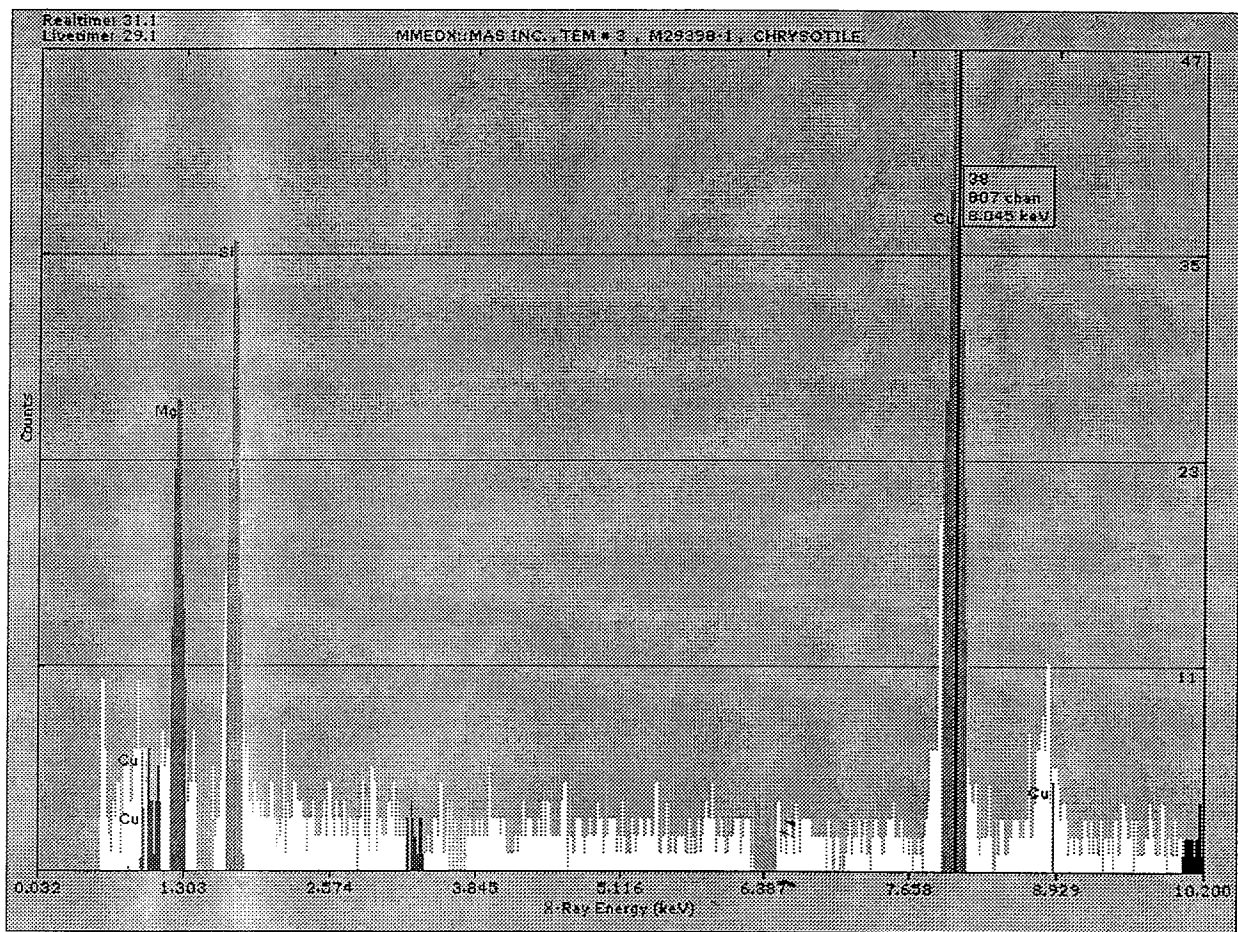
Str / cm2 ≥ 5 3.659E+06

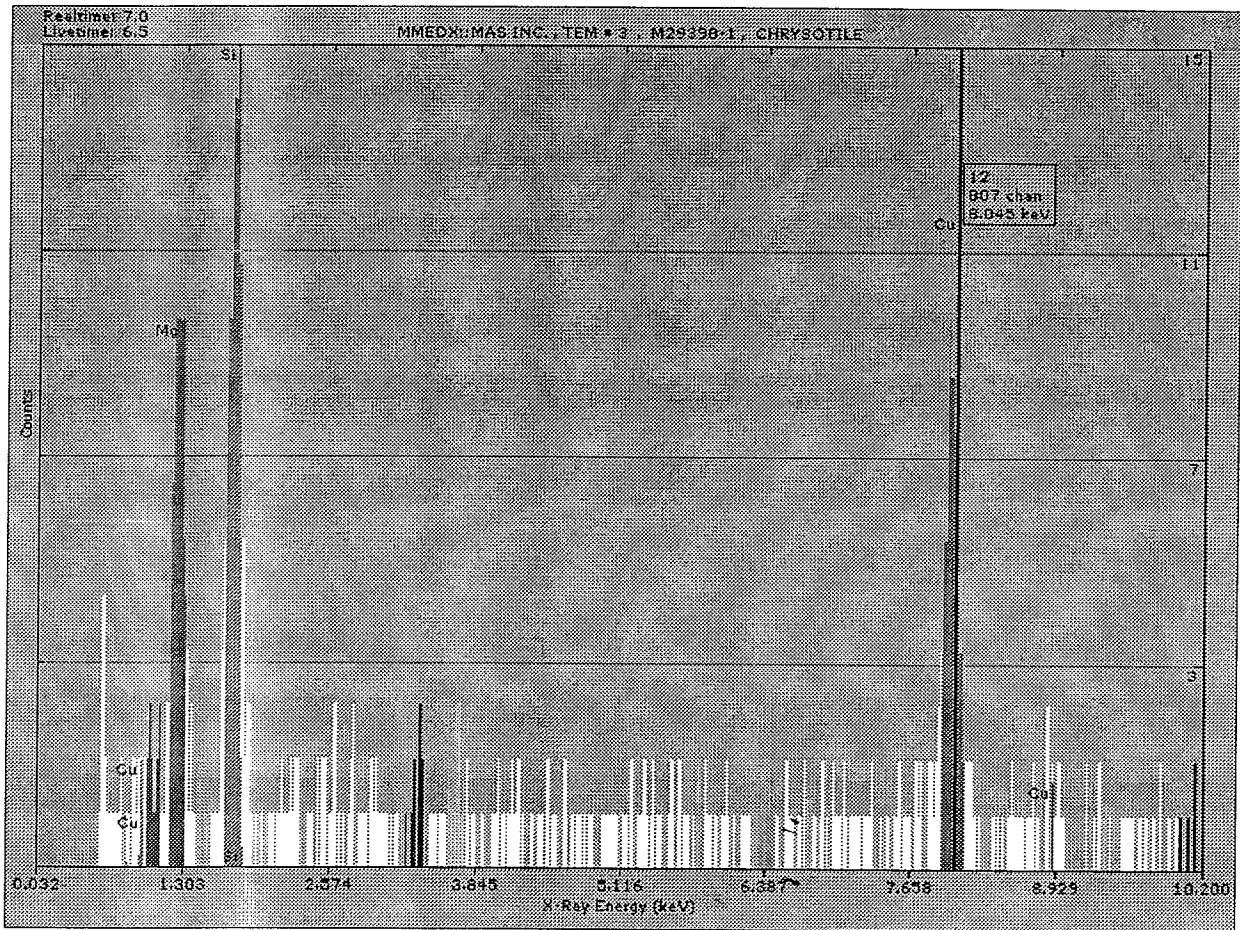
TEM DATA

Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
1	E10-G3	C	B	23.00	0.10	X	M34331	Print Out
2	G3	C	F	0.90	0.01	X	X	
3	G3	C	F	16.00	0.05	X	X	
4	F8	C	F	10.50	0.10	X	X	
5	D8	C	F	4.40	0.10	X	X	
	D8	C	F	1.70	0.10	X	X	
7	D8	C	M-F	2.60	0.01	X	X	
	A5		NSD					
8	E5	C	F	9.30	0.10	X	X	
9	E5	C	F	3.40	0.10	X	X	
10	E9-H4	C	F	0.70	0.02	X	X	Print Out
11	H4	C	F	1.30	0.05	X	X	
12	H4	C	F	11.00	0.10	X	X	
13	H4	C	F	19.40	0.10	X	X	
14	H4	C	F	6.00	0.10	X	X	
15	H4	C	F	13.00	0.10	X	X	
16	H4	C	F	2.30	0.20	X	X	
	F2		NSD					
17	A1	C	B	5.50	0.20	X	X	
18	B3	C	F	7.00	0.10	X	X	
19	D8	C	B	32.00	1.00	X	X	

M29398 001

Sample_comments





TEM DUST ANALYSIS

M29398

002

Materials Analytical Services, Inc.

CertainTeed Asbestos Cement Pipe Surface Dust Befor

Client Sample ID:

2

Sample Area/ Volume: 100 cm2

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Dust

Analysis type: Dust

Grid Acceptance YES 3 %

Date Analyzed: 10/4/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6318

Str < 5um: 8
Str ≥ 5um: 8
Total Str: 16

Number of grids: 2

#1: 112 #3: 114

Average Grid Size: 0.012825

Number of openings: 10

#2: 114 #4: 113

Total Area Analyzed: 0.128

Volume Filtered 0.03 ml

Str / sqr ft 5.011E+09

Str / cm2 5.394E+06

Dilution Factor 3333.333

Str / sqr ft ≥ 5 2.505E+09

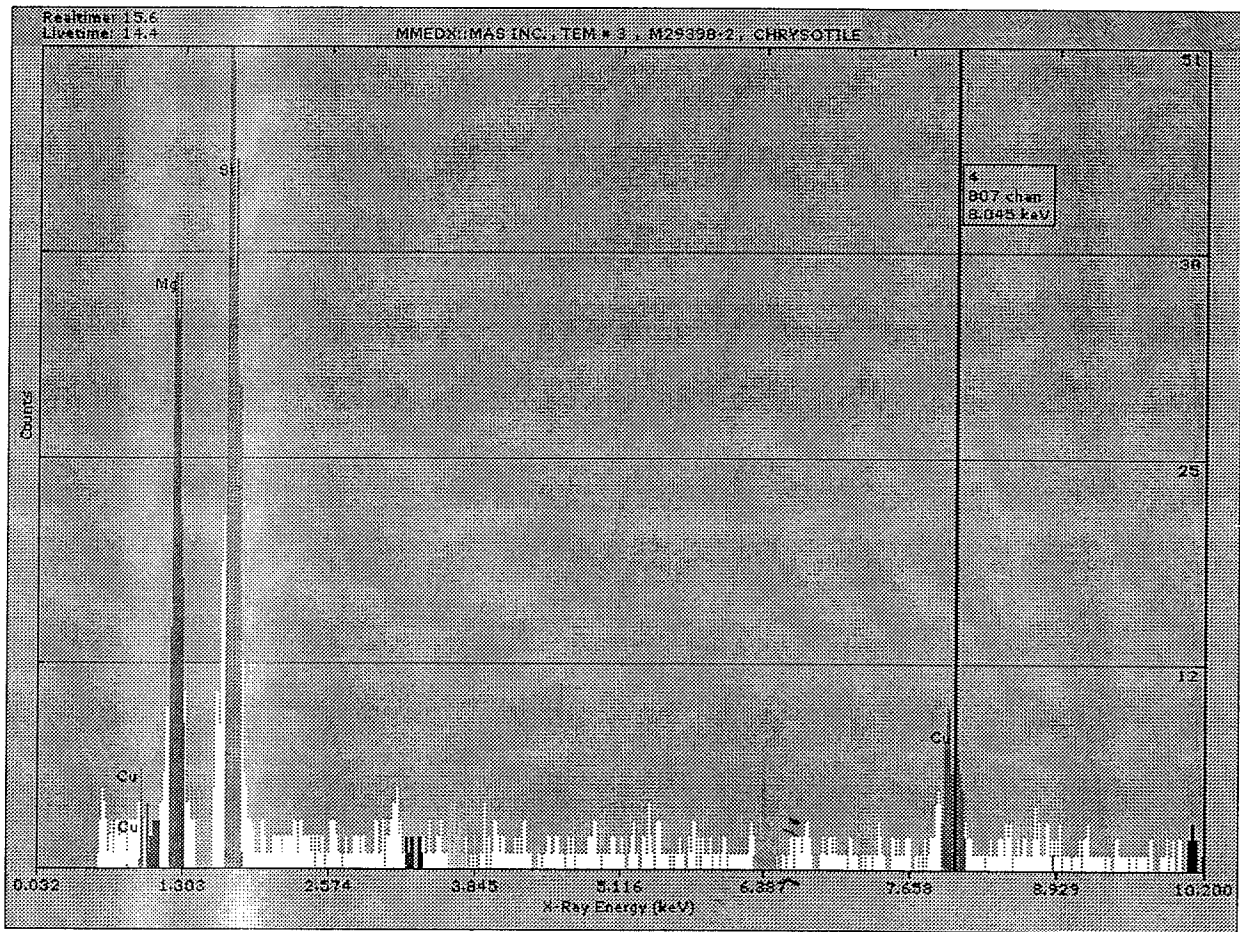
Str / cm2 ≥ 5 2.697E+06

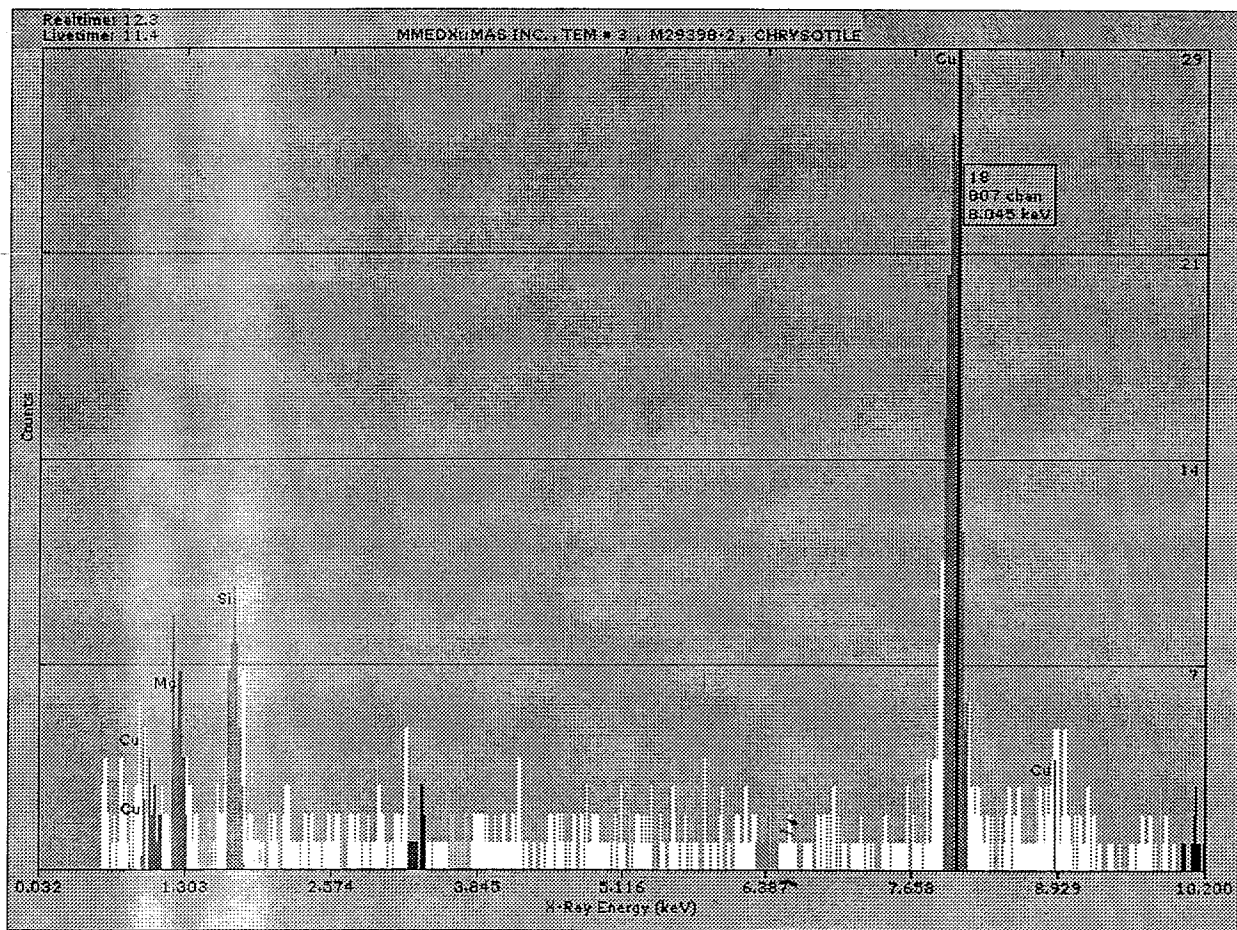
TEM DATA

Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
1	C10-D10	C	M-F	11.00	0.10	X	X	Print Out
2	D3	C	M-F	1.30	0.10	X	X	
3	E1	C	M-F	10.00	0.10	X	X	
4	E1	C	F	0.70	0.10	X	X	
	G3	C	B	28.00	2.00	X	X	
6	C2	C	F	2.50	0.04	X	X	
7	C2	C	F	1.00	0.03	X	X	
8	C2	C	F	2.60	0.05	X	X	
9	C9-G5	C	F	3.00	0.20	X	X	
10	E2	C	F	3.70	0.10	X	X	Print Out
11	E2	C	F	16.50	0.10	X	X	
12	I2	C	F	23.00	0.10	X	X	
13	I2	C	F	9.00	0.05	X	X	
14	I2	C	B	7.00	0.10	X	X	
15	I2	C	F	2.40	0.02	X	X	
	H4		NSD					
16	J1	C	B	30.00	0.20	X	X	

M29398 002

Sample_comments





TEM DUST ANALYSIS

M29398

003

Materials Analytical Services, Inc.

CertainTeed Asbestos Cement Pipe Surface Dust Befor

Client Sample ID:

3

Sample Area/ Volume: 0 cm2

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Dust

Analysis type: Dust

Grid Acceptance YES 2%

Date Analyzed: 10/4/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6318

Str < 5um: 0
Str ≥ 5um: 0
Total Str: 0

Number of grids: 2 #1: 113 #3: 113

Number of openings: 10 #2: 113 #4: 113

Average Grid Size: 0.012769

Total Area Analyzed: 0.128

Volume Filtered 30 ml

Dilution Factor 3.333333

Str / sqr ft 0.000E+00

Str / cm2 0.000E+00

Str / sqr ft ≥ 5 0.000E+00

Str / cm2 ≥ 5 0.000E+00

TEM DATA

Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
	A10-B9		NSD					
	C7		NSD					
	D5		NSD					
	G3		NSD					
	J1		NSD					
	A9-E9		NSD					
	C7		NSD					
	E5		NSD					
	D3		NSD					
	H3		NSD					

M29398 003

Sample_comments

MATERIALS ANALYTICAL SERVICES

PROJECT LOG

Client Code: MASCORP

MAS ID: M29413
Client Name: Materials Analytical Services, Inc.
Project Name: CertainTeed Asbestos Cement Pipe Cuttin
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 9/27/02

TRANSPORT INFORMATION:

Submitted By: _____	Documents: <u>COC</u>
Delivery By: <u>Hand Delivery</u>	_____
Received By: <u>dmazzaferro</u>	Comments for COC: _____
Condition: <u>good</u>	_____

CONTACT INFORMATION:

Contact: <u>Bill Longo</u>	Work Phone: <u>(770) 866-3200</u>	Ext: _____
Title: First Name: _____ Last Name: _____ Suffix _____	Other Phone: _____	Ext: _____
Mr. <u>William</u> <u>Longo</u>	Fax: <u>(770) 866-3259</u>	_____

Page 1 of 2

M29413

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
001	DUST #1	100			

SIGNATURES

RECEIVED BY: *dmazzaferro*

REVIEWED BY: *dmazzaferro*

PREPARED BY: *dmazzaferro*

ANALYZED BY: *RV*

REPORTED BY: _____

TEM SAMPLE DATA

M29413

Page 1 of 1

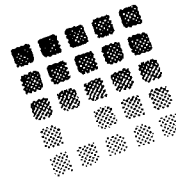
Prep SOP#: MT-003
 Prep Status: Complete
 Sample Type: Dust
 Analysis type: Dust

prep_date: 9/28/02 Prep Tech: dmazzaferro

Archival Information			
Slides:	180	Filters:	
Bottles:	848	Gld_box:	6316
Archive Comments:			
Disposal Comments:			

Reprep Dates

Sample Number	Sample ID	Area	Filter Portion	Total Susp		#1	#2	Filtered Volumes in m					Filter Type:
								#3	#4	#5			
000	lab blank 9/28/02	0	cm2	1/1	100								
						Dilution Factors	30	0	0	0	0	MCE 47mm	
							3.333	0	0	0	0	1297	
001	DUST #1	100	cm2	1/1	100								
						Dilution Factors	0.1	0.6	0.001	0.003	0.01	MCE 47mm	
							1000	166.7	1E+05	33330	10000	1297	



MATERIALS
ANALYTICAL
SERVICES

SAMPLE CASSETTE LABEL DATA

MAS PROJECT NUMBER: M29413
PREPARED BY: [Signature]
MAS SAMPLE NO. DATA

M29413-001 1# dust after cutting
from finished surface
10 x 10 cm

TEM CLEARANCE AIR SAMPLING DATA SHEET



Co. Name

Address

3945 Lakefield Court

Suwanee, GA 30024

PH: (770) 866-3200

FAX: (770) 866-3259

PH:

FAX:

Project Number:

Project Name:

Work Area Description:

Project Representative:

Sampling Date:

Cutting Cr. train track
AC Pipe

Sheet 3 of 3

Date	Sample No.	Sample Location	Sample Type	Sample Times (Minutes)			Flow Rate (Liters per Minute)		
				Start	Stop	Duration	Before	After	Average
		Fabric	Fabric						
20	A-2-A	IWA	AREA	4:02	4:17		2.0	2.0	
21	A-2-B	IWA	AREA	↓	↓		2.0	2.0	
22	A-2-C	IWA	AREA	↓	↓		2.0	2.0	
23	A-2-D	IWA	AREA	↓	↓		1.6	1.6	
	PS-1								
	PS-2								
	PS-3								
	PS-Blank								
	Bulk		Bulk						
	Dust #1	off pipe	DUST	10x10cm					

CHAIN OF CUSTODY

Initial Shipment Date:

Mode of Transfer

Log-In Date

Received By

First Transfer By:

Second Transfer By:

Third Transfer By:

9/27

Hand

9/27/02

Amey Jew

TEM DUST ANALYSIS

M29413

001

Materials Analytical Services, Inc.

Client Sample ID:

DUST #1

CertainTeed Asbestos Cement Pipe Cutting

Sample Area/ Volume: 100 cm²

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Dust

Analysis type: Dust

Grid Acceptance YES 3 %

Date Analyzed: 10/4/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6316

Str < 5um: 18
Str ≥ 5um: 4
Total Str: 22

Number of grids: 2

#1: 112

#3: 114

Average Grid Size: 0.012769

Number of openings: 10

#2: 113

#4: 113

Total Area Analyzed: 0.128

Volume Filtered 0.003 ml

Dilution Factor 33333.33

Str / sqr ft 6.920E+10

Str / cm² 7.449E+07

Str / sqr ft ≥ 5 1.258E+10

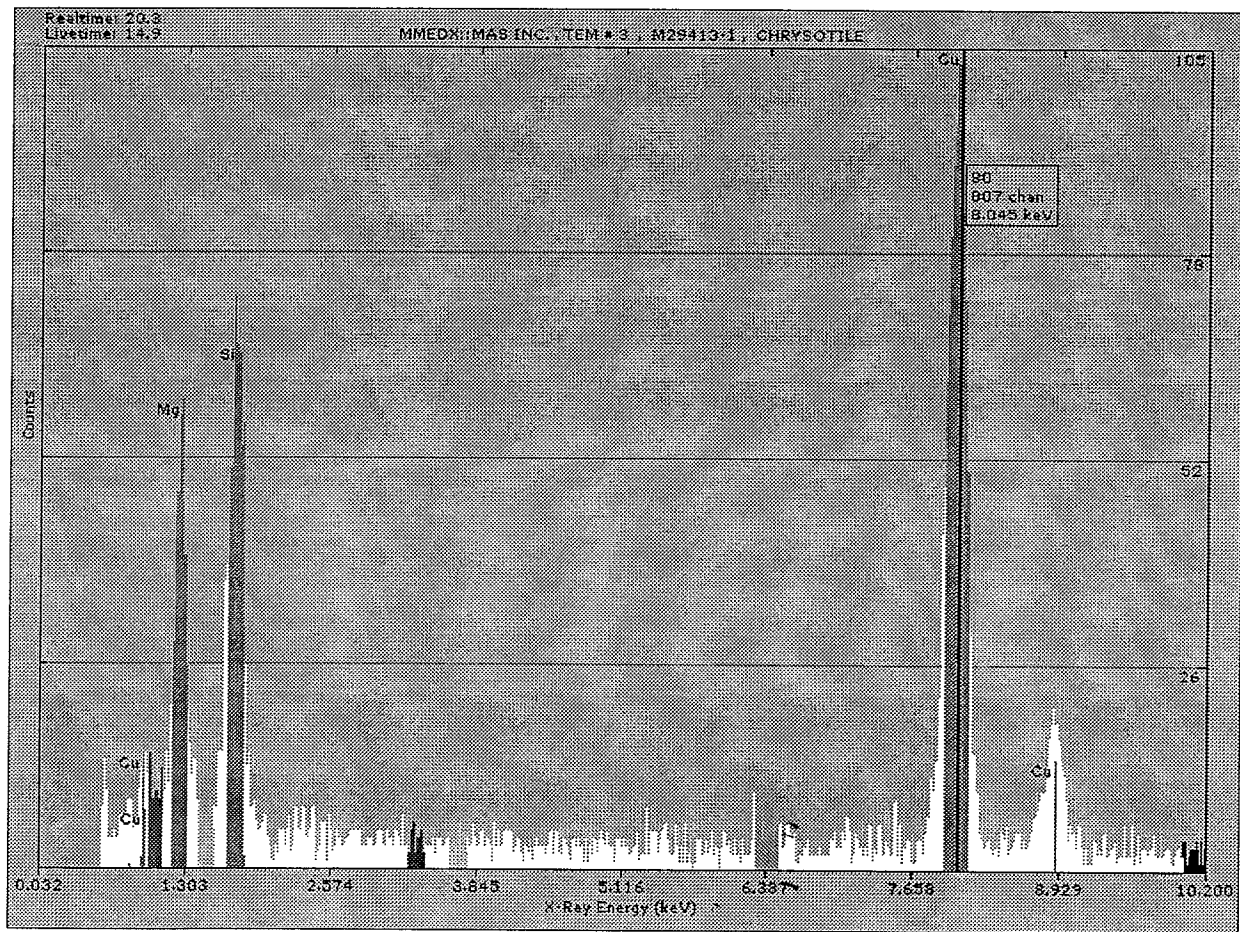
Str / cm² ≥ 5 1.354E+07

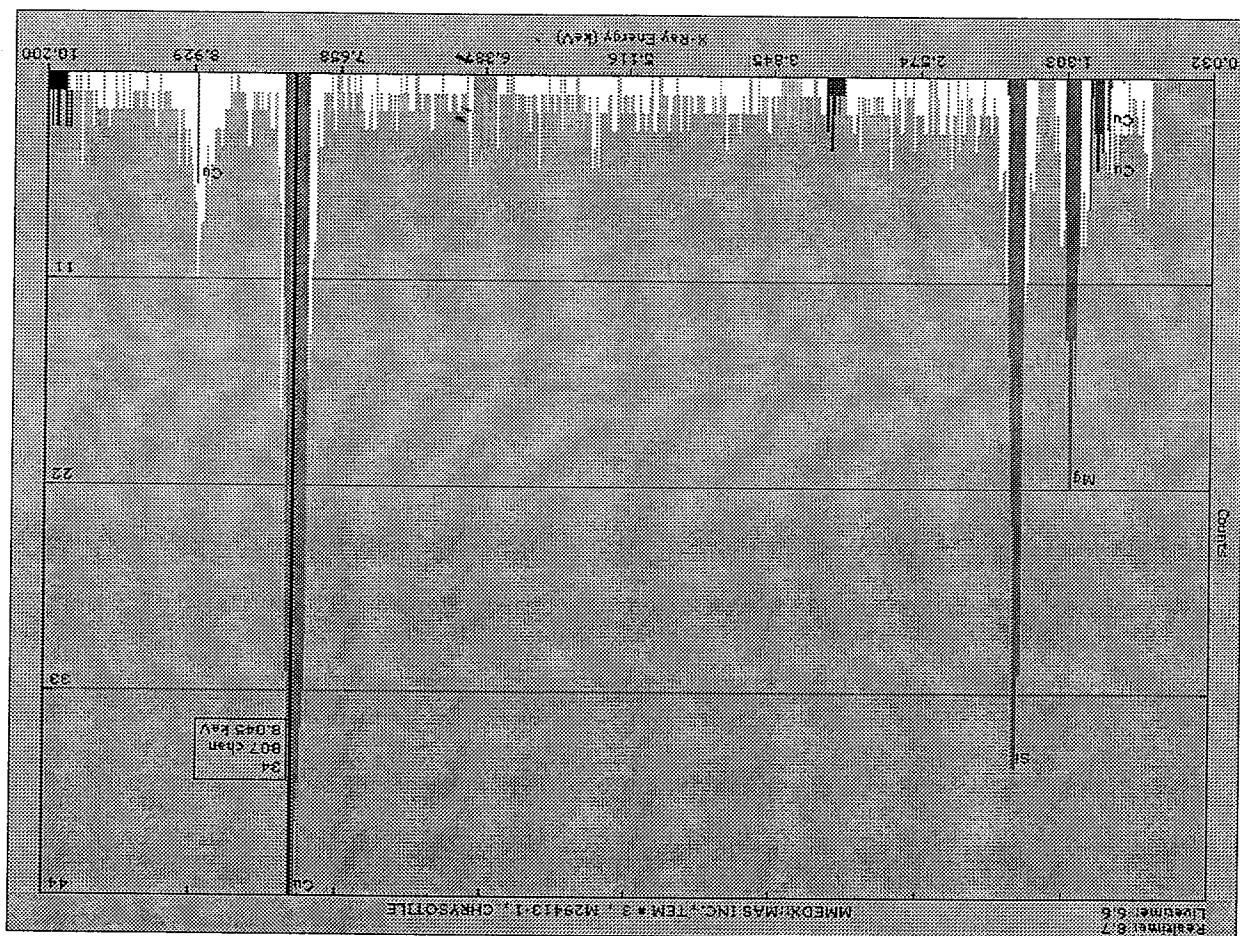
TEM DATA

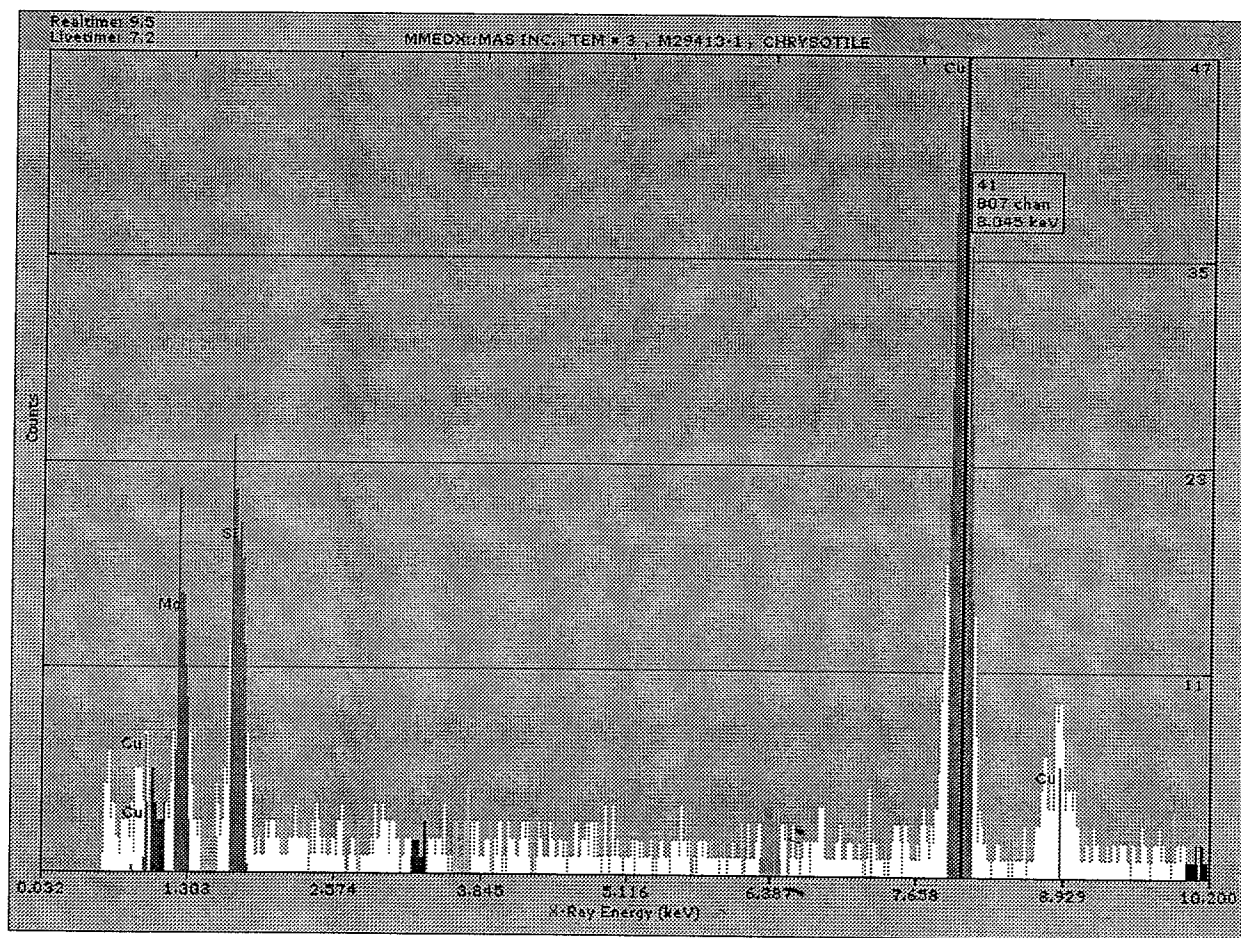
Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
1	A2-F1	C	C-F	2.30	0.10	X	X	Print Out
2	F1	C	M-F	2.00	0.10	X	X	
3	H2	C	M-F	2.00	0.10	X	X	
4	H2	C	C-F	2.00	0.10	X	X	
5	H2	C	M-F	1.90	0.10	X	X	
	J5	C	F	3.00	0.10	X	X	
7	H7	C	F	1.70	0.10	X	X	
8	G5	C	B	31.00	0.20	X	X	
9	G5	C	F	1.30	0.20	X	X	
10	G5	C	F	13.00	0.04	X	X	Print Out
11	B2-I9	C	F	2.00	0.10	X	X	
12	G8	C	M-F	0.90	0.10	X	X	
13	D6	C	F	1.30	0.10	X	X	
14	D6	C	F	2.00	0.05	X	X	
15	D6	C	F	0.50	0.02	X	X	
16	D6	C	B	4.00	0.20	X	X	
17	D2	C	C-F	2.00	0.20	X	X	
18	D2	C	F	1.30	0.03	X	X	
19	D2	C	F	1.80	0.10	X	X	
20	D2	C	F	6.80	0.10	X	X	Print Out
21	G4	C	F	2.00	0.10	X	X	
22	G4	C	B	13.00	0.50	X	X	

M29413 001

Sample_comments







SECTION 7

MATERIALS ANALYTICAL SERVICES PROJECT LOG

Client Code: MASCORP

MAS ID: M29412
Client Name: Materials Analytical Services, Inc.
Project Name: CertainTeed Asbestos Cement Pipe Cuttin
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 9/27/02

TRANSPORT INFORMATION:

Submitted By:	<u>Richard Hatfield</u>	Documents:	<u>COC</u>
Delivery By:	<u>Hand Delivery</u>		
Received By:	<u>dmazzaferro</u>	Comments for COC:	
Condition:	<u>good</u>		

CONTACT INFORMATION:

Contact:	<u>Bill Longo</u>	Work Phone:	<u>(770) 866-3200</u>	Ext:	
Title:	First Name: _____ Last Name: _____ Suffix _____	Other Phone:		Ext:	
Mr.	<u>William Longo</u>	Fax:	<u>(770) 866-3259</u>		

Page 1 of 2

M29412

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
001	PS-1	49.2			
002	PS-2	49.2			
003	PS-3	49.2			
004	PS-Blank	49.2			

SIGNATURES

RECEIVED BY: *dmazzaferro*

REVIEWED BY: *dmazzaferro*

PREPARED BY: *dmazzaferro*

ANALYZED BY: *MM*

REPORTED BY: _____

TEM CLEARANCE AIR SAMPLING DATA SHEET



Co. Name _____

Address _____

3945 Lakefield Court

Suwanee, GA 30024

PH: (770) 866-3200

FAX: (770) 866-3259

PH: _____

FAX: _____

Project Number: _____

Project Name: _____

Work Area Description: _____

Project Representative: _____

Sampling Date: _____

Cutting Car Train Trail
AC Pipe

Sheet 3 of 3

Date	Sample No.	Sample Location	Sample Type	Sample Times (Minutes)			Flow Rate (Liters per Minute)		
				Start	Stop	Duration	Before	After	Average
	Fabric		Fabric						
	A-2-A	IWA	AREA	4:02			2.0	2.0	
	A-2-B	IWA	AREA	↓			2.0	2.0	
	A-2-C	IWA	AREA	↓			2.0	2.0	
	A-2-D	IWA	AREA	↓			1.6	1.6	
	PS-1	3'0'clock							
	PS-2	12'0'clock							
	PS-3	9'0'clock							
	PS-Blank								
	Bulk #1		Bulk						
	Dust #1	off pipe	Dust	10x10cm					

CHAIN OF CUSTODY

Initial Shipment Date: _____

Mode of Transfer _____

Log-In Date _____

Received By _____

First Transfer By: _____
Second Transfer By: _____
Third Transfer By: _____

9/27

Hand

9/27/02

James Lee

TEM SAMPLE DATA

M29412

Page 1 of 1

Prep SOP#:	MT-020
Prep Status:	
Sample Type:	dust tins
Analysis type:	Dust

```
prep_date: 9/28/02 Prep Tech: dmazzaferro
```

Archival Information

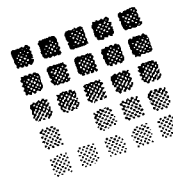
Slides: 180 Filters: Bottles: 848 Gld_box: 6318

Archive Comments:

Disposal Comments:

Reprep Dates

Sample Number	Sample ID	Area		Filter Portion	Total Susp	Filtered Volumes in ml					Filter Type:		
						#1	#2	#3	#4	#5			
000	lab blank 9/28/02	0	cm2	1/	1	100		50	0	0	0	0	MCE 47mm
							Dilution Factors	2	0	0	0	0	1297
001	PS-1	49.2	cm2	1/	1	100		1	10	0.04	0.12	0	MCE 47mm
							Dilution Factors	100	10	2500	833.3	0	1297
002	PS-2	49.2	cm2	1/	1	100		1	6	0.04	0.12	0	MCE 47mm
							Dilution Factors	100	16.67	2500	833.3	0	1297
003	PS-3	49.2	cm2	1/	1	100		1	6	0.1	0.3	0	MCE 47mm
							Dilution Factors	100	16.67	1000	333.3	0	1297
004	PS-Blank	49.2	cm2	1/	1	100		50	0	0	0	0	MCE 47mm
							Dilution Factors	2	0	0	0	0	1297



MATERIALS
ANALYTICAL
SERVICES

SAMPLE CASSETTE LABEL DATA

MAS PROJECT NUMBER: M29412
PREPARED BY: Amazzagotto

MAS SAMPLE NO. DATA

M29412-001 PS-1 Table

M29412-002 PS-2 Floor
Right Side South

M29412-003 PS-3 Floor
Left Side North

M29412-004 PS-Field block

TEM DUST ANALYSIS

M29412

001

Materials Analytical Services, Inc.

Client Sample ID:

PS-1

CertainTeed Asbestos Cement Pipe Cutting

Sample Area/ Volume: 49.2 cm2

Date Analyzed: 10/23/02

Filter Type: MCE 47mm

Analyst: Mehrdad Motamedi

Pore size: 0

Scope Number: 3

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Sample type: dust tins

Indicated Mag: 25 KX

Analysis type: Dust

Screen Mag: 20 KX

Grid Acceptance YES 3 %

Grid_box: 6318

Str < 5um:	32
Str ≥ 5um:	12
Total Str:	44

Number of grids: 2

#1: 113

#3: 114

Average Grid Size: 0.012883

Number of openings: 10

#2: 113

#4: 114

Total Area Analyzed: 0.129

Volume Filtered 0.05 ml

Str / sqr ft 1.673E+10

Str / cm2 1.801E+07

Dilution Factor 2000

Str / sqr ft ≥ 5 4.563E+09

Str / cm2 ≥ 5 4.911E+06

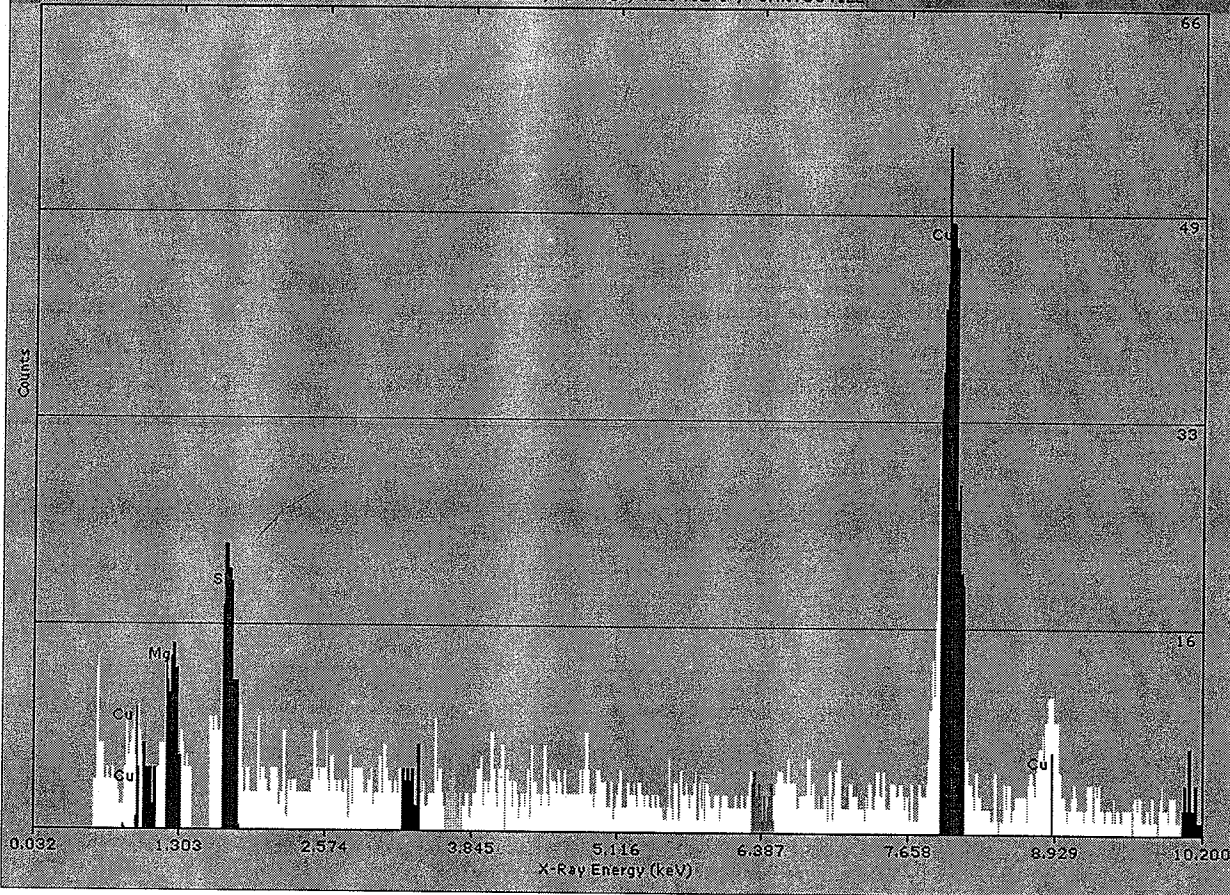
TEM DATA

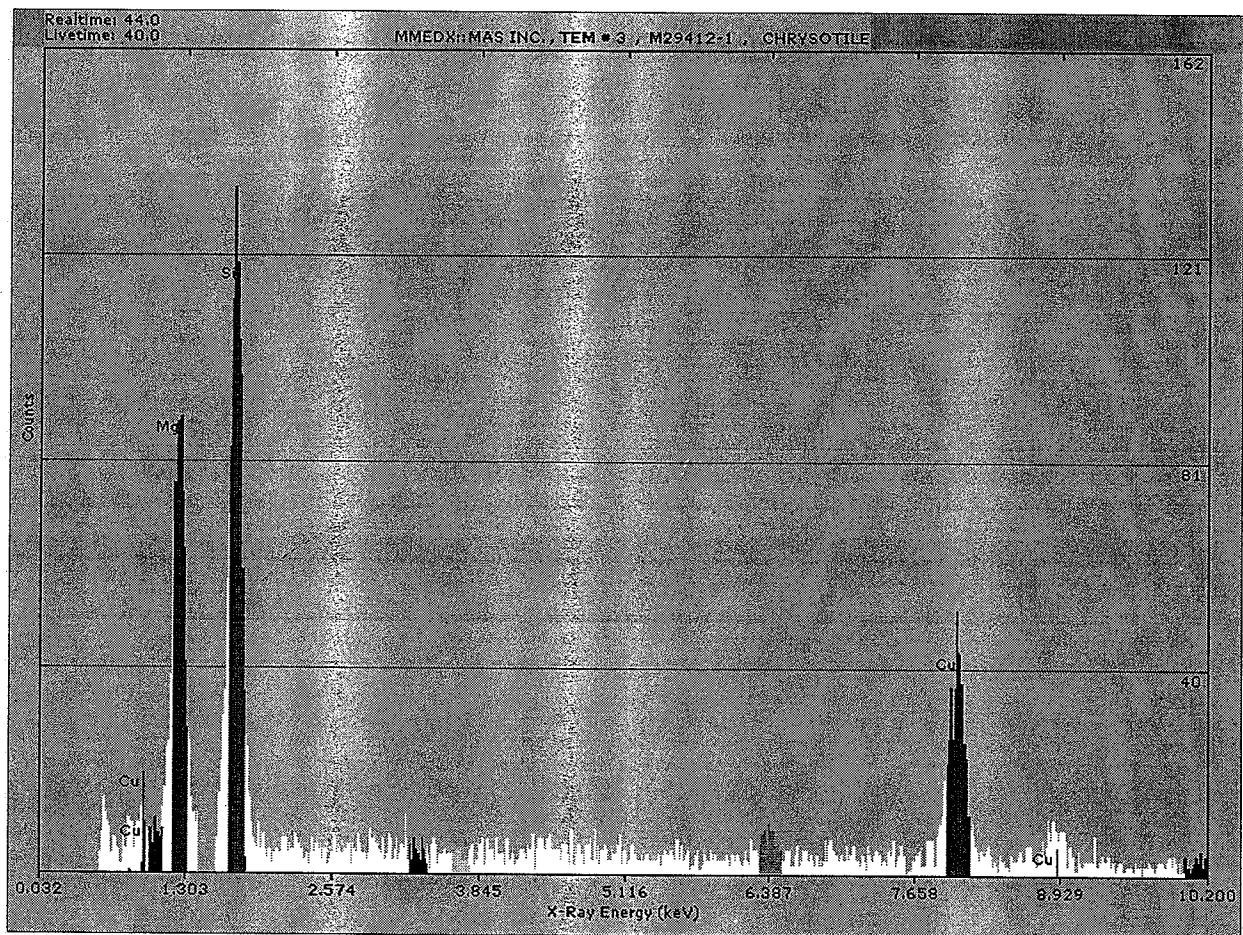
Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
1	A10-G3	C	F	16.00	0.10	X	M34346	Print Out
2	G3	C	F	2.40	0.05	X	X	
3	G3	C	M-F	2.00	0.05	X	X	
4	F1	C	B	3.40	0.20	X	X	
5	F1	C	F	7.30	0.20	X	X	
6	F1	C	F	2.80	0.05	X	X	
7	F1	C	F	2.00	0.10	X	X	
8	J5	C	B	0.80	0.20	X	X	
9	J5	C	F	3.60	0.10	X	X	
10	J5	C	F	7.00	0.10	X	X	Print Out
11	J5	C	M-F	3.80	0.20	X	X	
12	H6	C	B	8.00	0.60	X	X	
13	H6	C	F	1.00	0.05	X	X	
14	H6	C	F	5.40	0.10	X	X	
15	I8	C	F	1.30	0.03	X	X	
16	I8	C	F	7.00	0.10	X	X	
17	I8	C	B	4.60	0.20	X	X	
18	I8	C	M-F	4.00	0.10	X	X	
19	I8	C	F	6.00	0.10	X	X	
20	I8	C	F	2.00	0.10	X	X	Print Out
21	A9-F2	C	M-F	1.30	0.10	X	X	
22	F2	C	F	4.30	0.10	X	X	
23	F2	C	F	2.00	0.10	X	X	
24	F2	C	B	3.00	0.70	X	X	
25	F2	C	F	14.00	0.20	X	X	
26	F2	C	B	4.00	1.00	X	X	
27	F2	C	F	1.80	0.10	X	X	
28	F2	C	F	15.00	0.10	X	X	
29	C3	C	F	1.70	0.04	X	X	

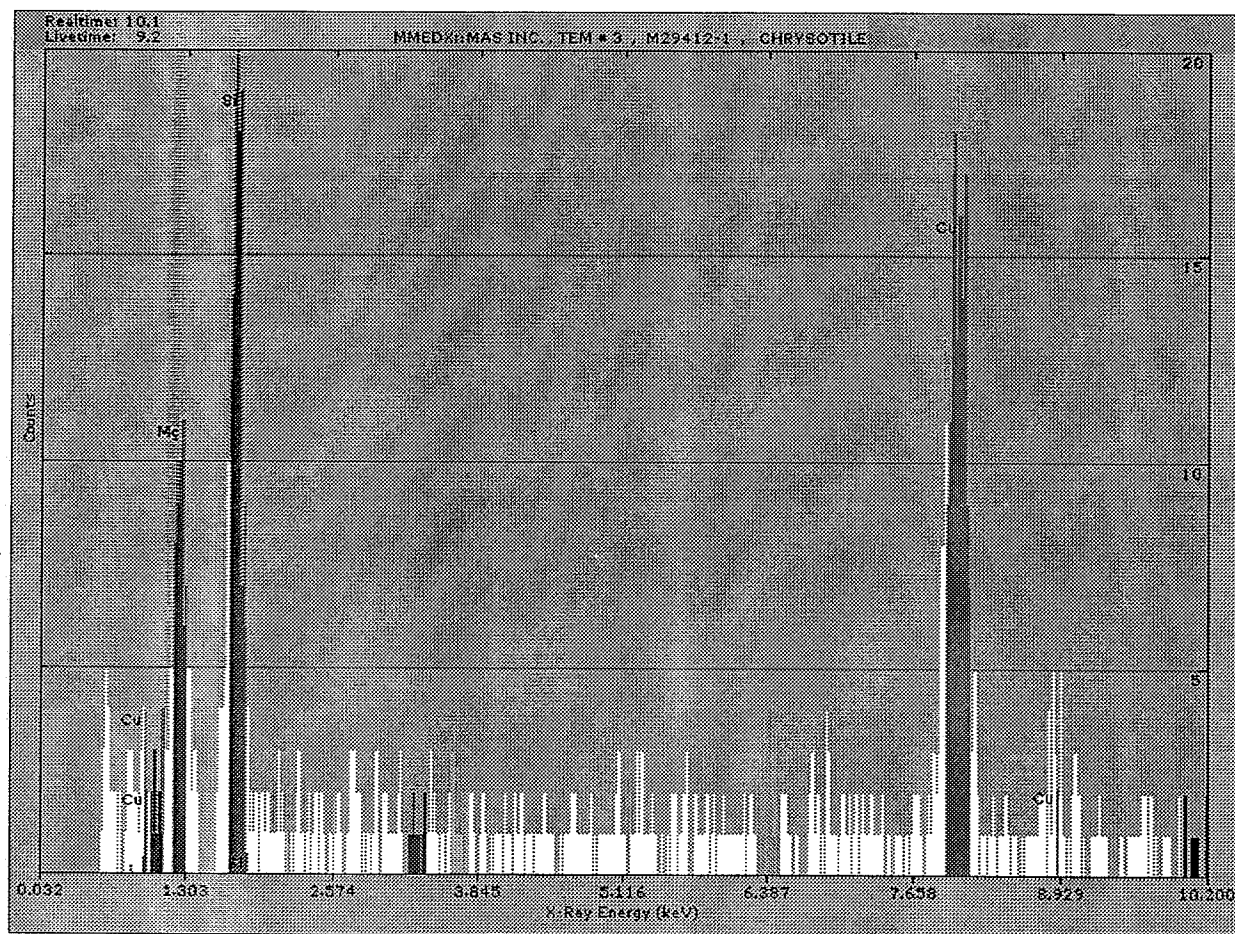
30	C3	C	F	6.50	0.10	X	X	Print Out
31	A4	C	B	2.80	0.20	X	X	
32	A4	C	B	2.00	0.20	X	X	
33	A4	C	F	1.70	0.10	X	X	
34	A4	C	M-F	0.90	0.05	X	X	
35	D7	C	F	0.90	0.10	X	X	Print Out
36	D7	C	M-B	2.50	0.20	X	X	
37	D7	C	F	4.00	0.10	X	X	
38	F8	C	F	4.00	0.05	X	X	
39	F8	C	C-F	5.00	0.10	X	X	
40	F8	C	F	4.40	0.10	X	X	
41	F8	C	F	4.00	0.10	X	X	
42	F8	C	B	5.40	0.50	X	X	
43	F8	C	F	4.00	0.10	X	X	
44	F8	C	F	4.50	0.10	X	X	
M29412 001								
Sample_comments								

Realtme: 42.8
Livetime: 40.0

MMEDX: MAS INC., TEM # 3, M29412-1, CHRYSOTILE

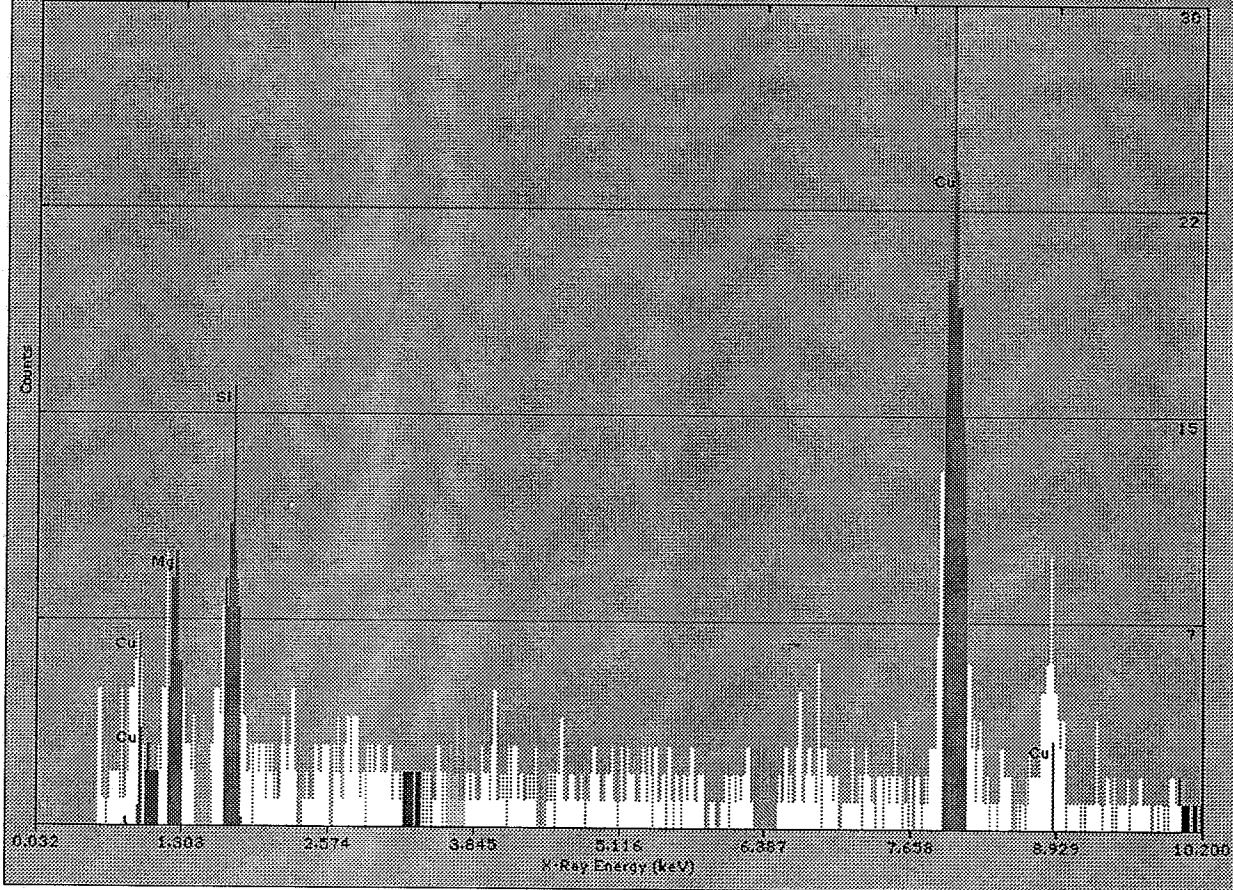


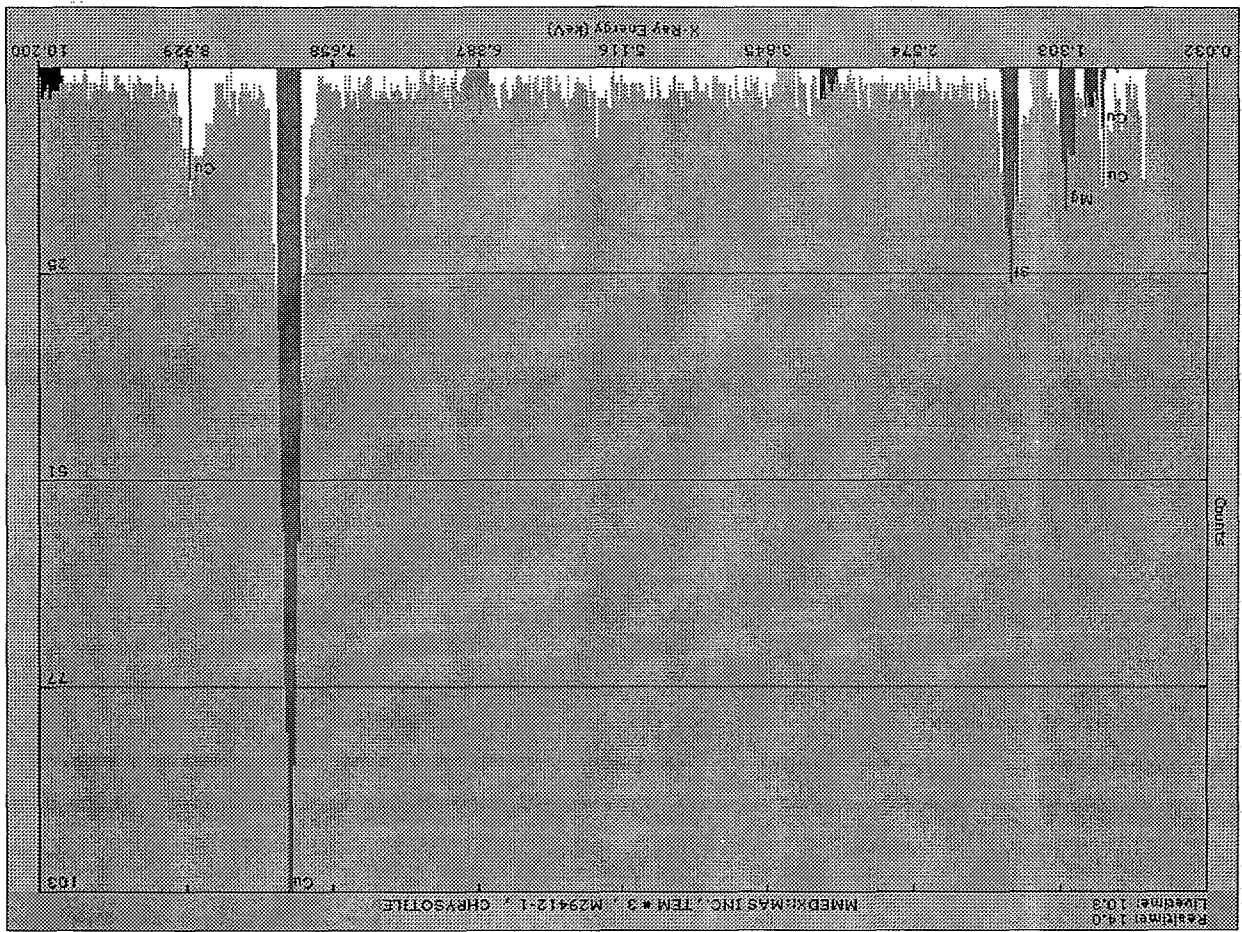




Realtime: 15.4
Livetime: 14.2

MMEDX: MAS INC., TEM #3, M29412-1, CHRYSOTILE





TEM DUST ANALYSIS

M29412

002

Materials Analytical Services, Inc.

CertainTeed Asbestos Cement Pipe Cutting

Client Sample ID:

PS-2

Sample Area/ Volume: 49.2 cm2

Filter Type: MCE 47mm

Pore size: 0

Effective Filter Area: 1297

Sample type: dust tins

Analysis type: Dust

Grid Acceptance YES 3 %

Date Analyzed: 10/23/02

Analyst: Al Harmon

Scope Number: 2

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6318

Str < 5um: 10
Str ≥ 5um: 9
Total Str: 19

Number of grids: 2

#1: 112

#3: 113

Average Grid Size: 0.012713

Number of openings: 10

#2: 112

#4: 114

Total Area Analyzed: 0.127

Volume Filtered 0.04 ml

Dilution Factor 2500

Str / sqr ft 9.151E+09

Str / cm2 9.850E+06

Str / sqr ft ≥ 5 4.335E+09

Str / cm2 ≥ 5 4.666E+06

TEM DATA

Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
1	C8-I6	C	F	3.00	0.04	X	X	Print Out
2	G8	C	F	5.00	0.04	X	X	
3	G8	C	M-B	32.00	0.40	X	X	
4	D7	C	F	1.00	0.04	X	X	
5	D7	C	F	10.00	0.05	X	X	
6	D7	C	B	5.00	0.20	X	X	
7	E4	C	B	4.00	0.30	X	X	
8	E4	C	B	5.00	0.20	X	X	
9	G2	C	F	15.00	0.05	X	X	
10	G2	C	B	6.00	0.80	X	X	Print Out
11	G2	C	F	2.00	0.04	X	X	
12	C9-D2	C	F	2.00	0.04	X	X	
13	D2	C	B	7.00	0.20	X	X	
	G4		NSD					
14	I5	C	F	1.00	0.03	X	X	
15	I5	C	F	3.00	0.04	X	X	
16	J10	C	F	2.00	0.04	X	X	
17	J10	C	B	2.00	0.20	X	X	
18	J10	C	M-F	6.00	0.05	X	X	
19	I1	C	F	3.00	0.04	X	X	

M29412 002

Sample_comments

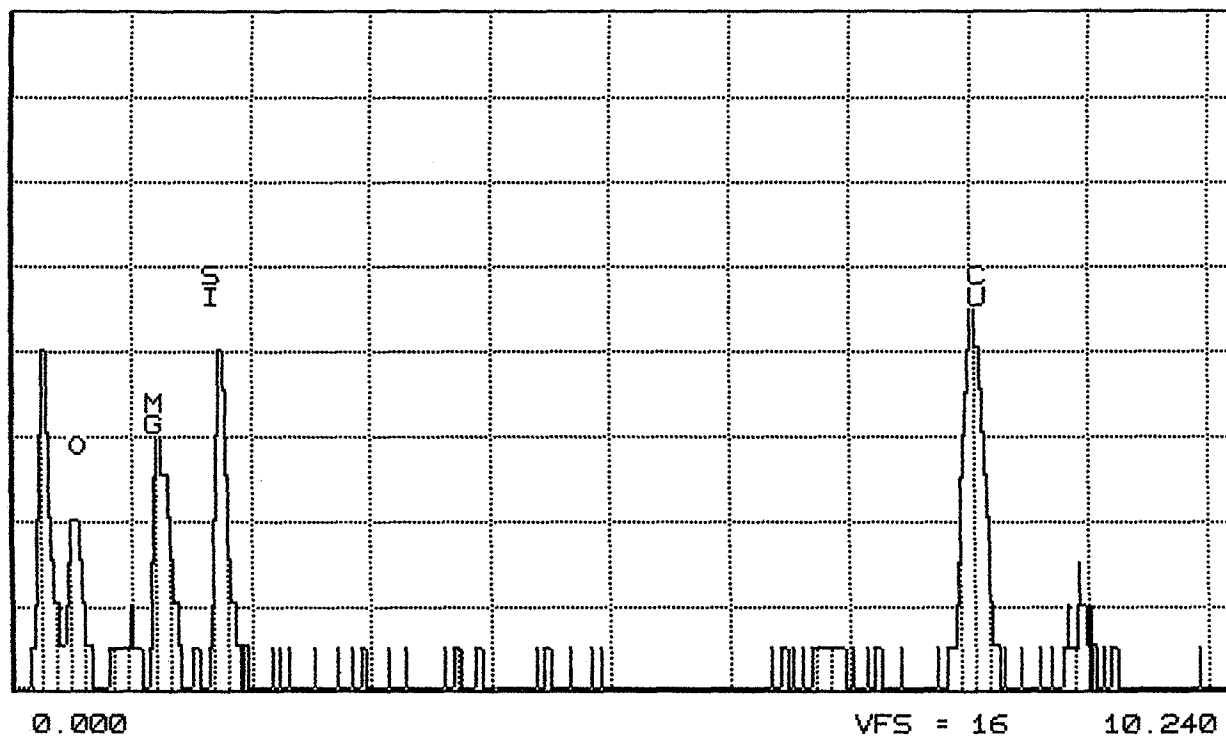
MATERIALS ANALYTICAL SERVICES

WED 23-OCT-02 13:23

Cursor: 0.000keV = 0

ROI

(0) 0.000: 0.000



16 M29412-002; CHRYSOTILE

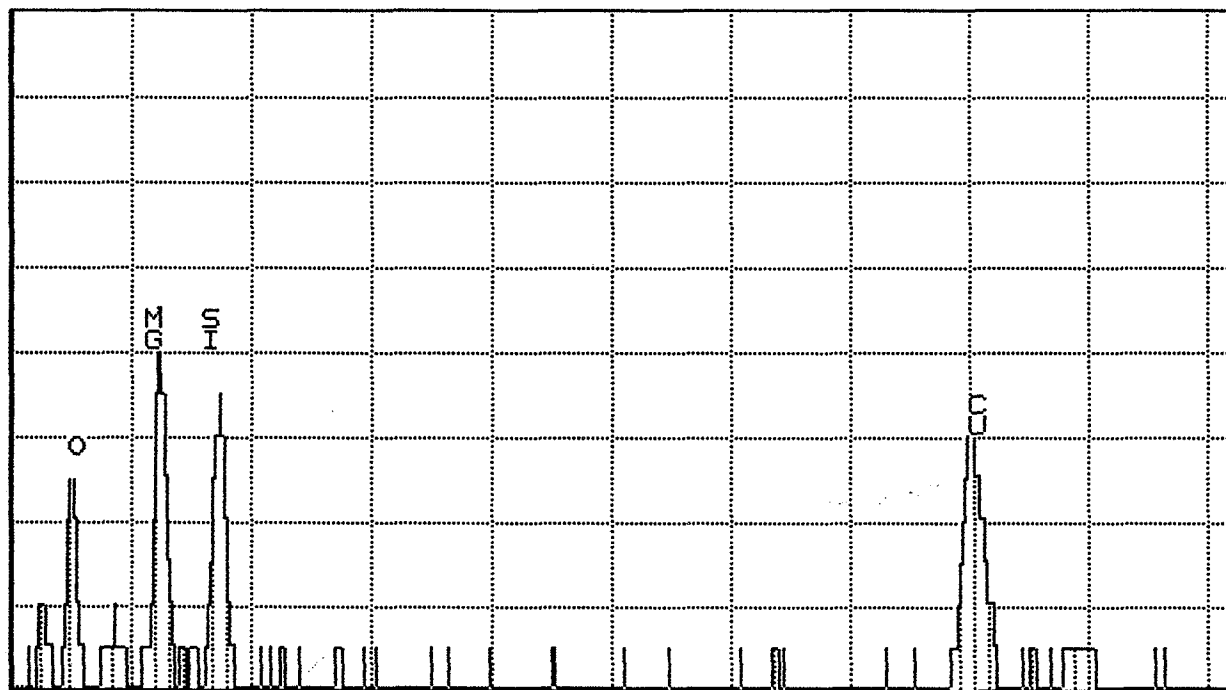
MATERIALS ANALYTICAL SERVICES

WED 23-OCT-02 13:33

Cursor: 0.000keV = 0

ROI

(0) 0.000: 0.000



0.000

VFS = 16

10.240

317

M29412-002; CHRYSOTILE

TEM DUST ANALYSIS

M29412

003

Materials Analytical Services, Inc.

CertainTeed Asbestos Cement Pipe Cutting

Client Sample ID:

PS-3

Sample Area/ Volume: 49.2 cm2

Filter Type: MCE 47mm

Pore size: 0

Effective Filter Area: 1297

Sample type: dust tins

Analysis type: Dust

Grid Acceptance YES 2 %

Date Analyzed: 10/23/02

Analyst: Mehrdad Motamedi

Scope Number: 3

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6318

Str < 5um:

11

Number of grids:

2

#1: 112

#3: 113

Average Grid Size: 0.012825

Str ≥ 5um:

2

Number of openings:

10

#2: 114

#4: 114

Total Area Analyzed: 0.128

Total Str:

13

Volume Filtered 0.1 ml

Str / sq ft 2.483E+09

Str / cm2 2.672E+06

Dilution Factor 1000

Str / sq ft ≥ 5 3.819E+08

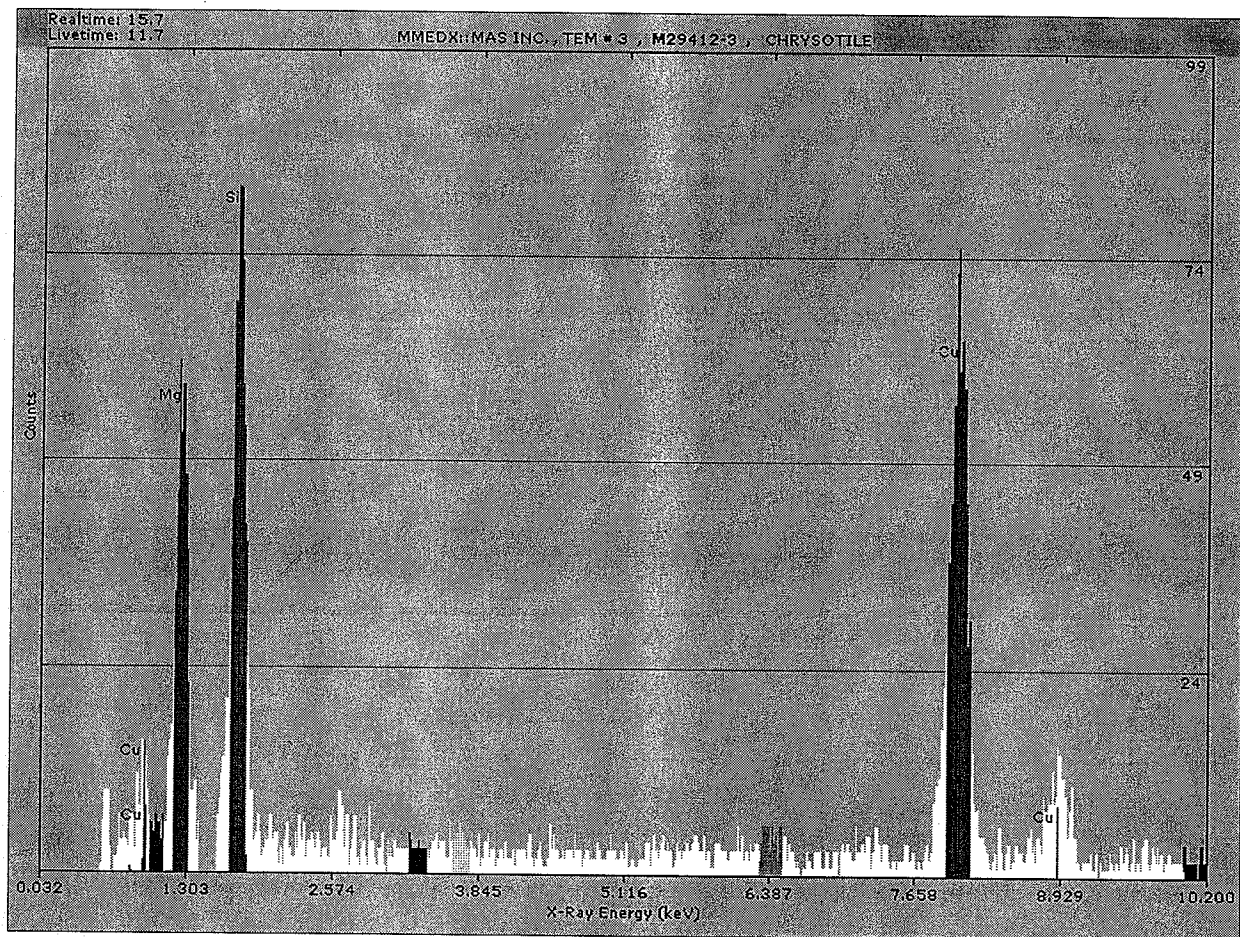
Str / cm2 ≥ 5 4.111E+05

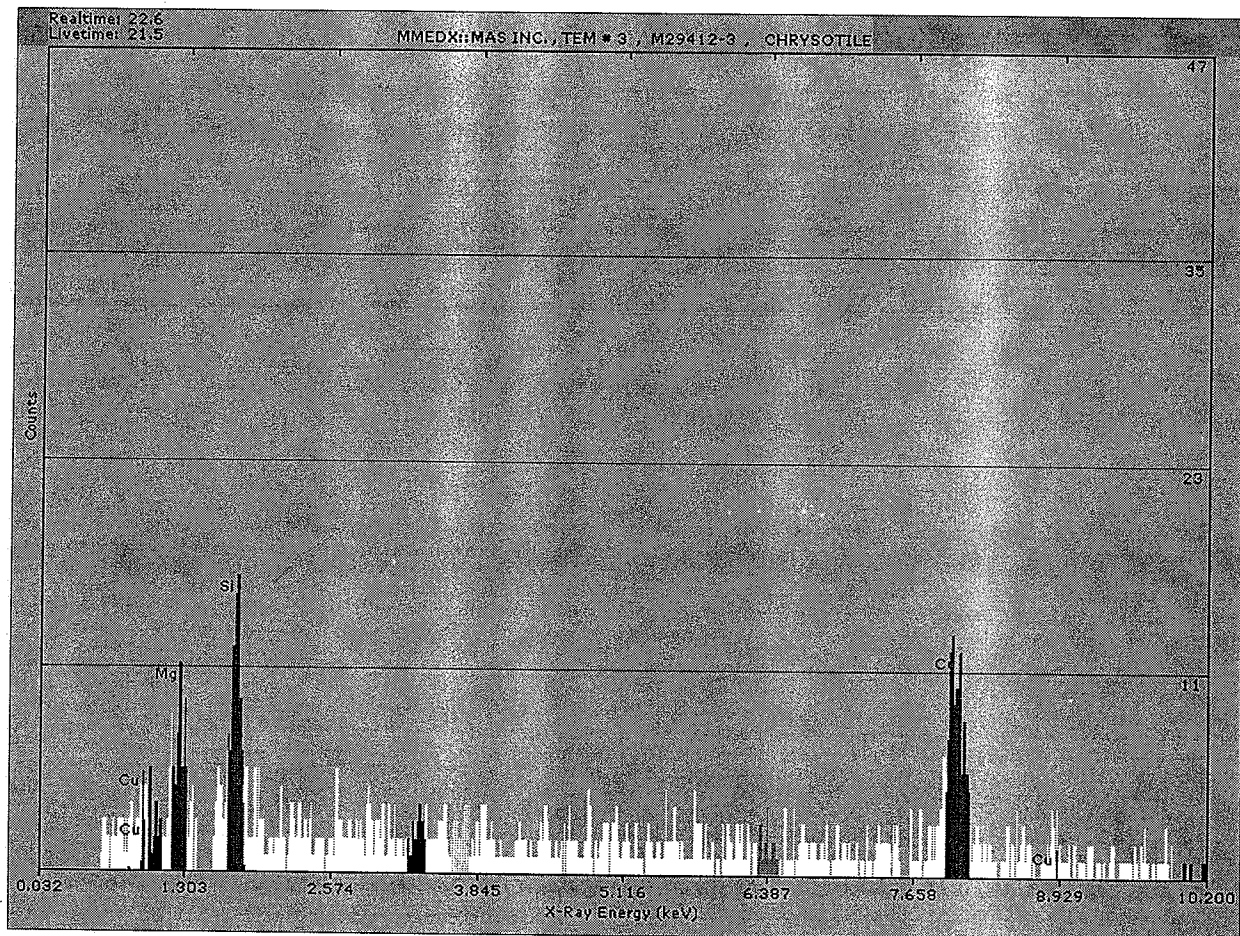
TEM DATA

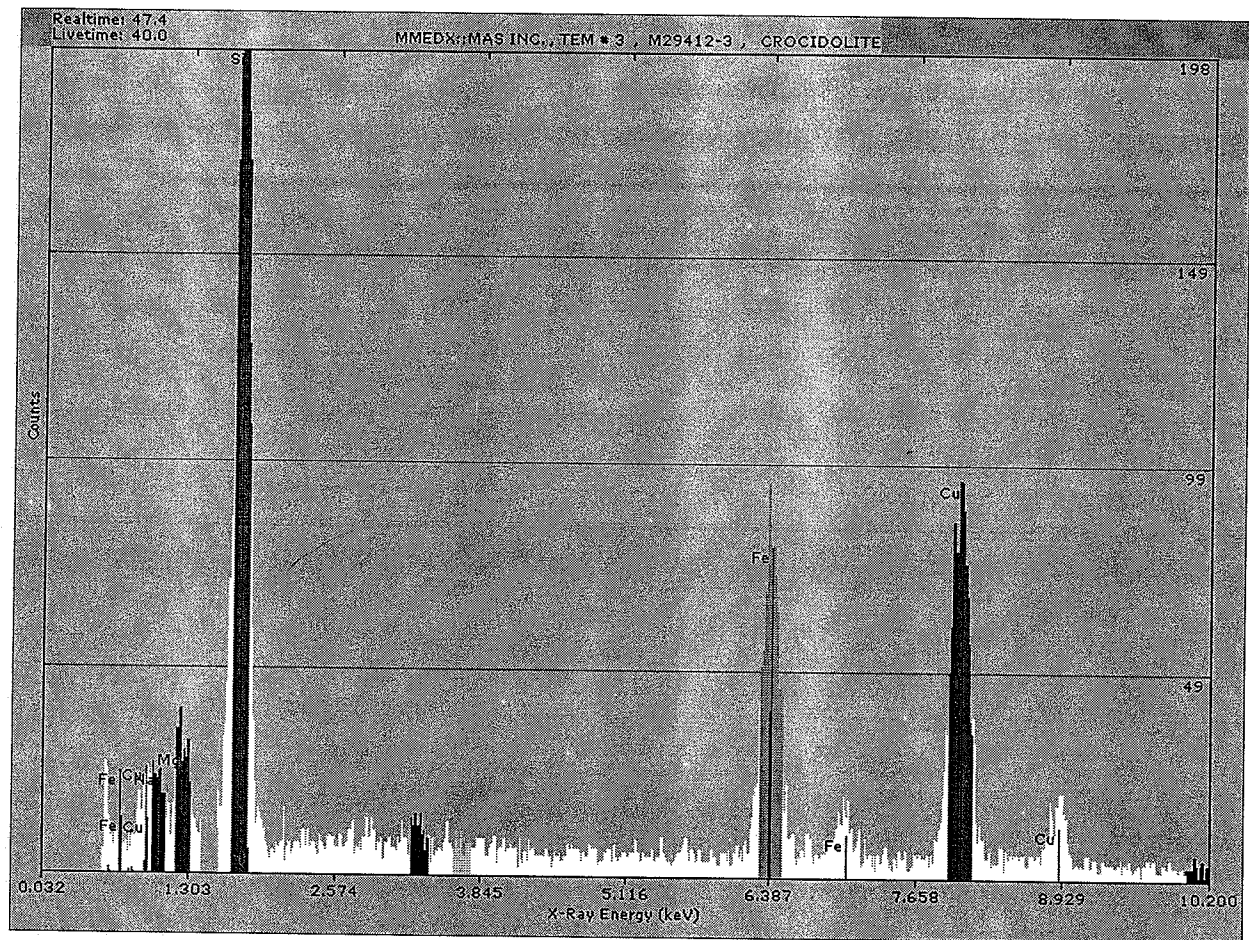
Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
1	E10-H2	C	F	5.70	0.10	X	X	Print Out
2	H2	C	F	4.00	0.10	X	X	
3	H2	C	F	1.70	0.10	X	X	
4	F1	C	F	1.20	0.10	X	X	
5	F1	C	F	2.00	0.20	X	X	
	G4		NSD					
6	B1	C	M-F	1.00	0.10	X	X	
	F5		NSD					
7	E9-I9	C	M-B	0.80	0.20	X	X	
8	I9	C	F	2.00	0.10	X	X	
9	J6	C	B	8.00	0.40	X	X	
10	J6	C	F	1.70	0.02	X	X	Print Out
11	J6	C	F	1.20	0.01	X	X	
12	H3	CR	M-F	4.00	0.20	M34348	M34347	Print Out
	F1		NSD					
13	C2	C	M-F	1.00	0.10	X	X	

M29412 003

Sample_comments







TEM DUST ANALYSIS

M29412

004

Materials Analytical Services, Inc.

CertainTeed Asbestos Cement Pipe Cutting

Client Sample ID:

PS-Blank

Sample Area/ Volume: 49.2 cm2

Filter Type: MCE 47mm

Pore size: 0

Effective Filter Area: 1297

Sample type: dust tins

Analysis type: Dust

Grid Acceptance YES 2 %

Date Analyzed: 10/23/02

Analyst: Al Harmon

Scope Number: 2

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6318

Str < 5um: 0
Str ≥ 5um: 0
Total Str: 0

Number of grids: 2

#1: 113

#3: 114

Average Grid Size: 0.012939

Number of openings: 10

#2: 114

#4: 114

Total Area Analyzed: 0.129

Volume Filtered 50 ml

Dilution Factor 2

Str / sq ft 0.000E+00

Str / cm2 0.000E+00

Str / sq ft ≥ 5 0.000E+00

Str / cm2 ≥ 5 0.000E+00

TEM DATA

Str#:	SquareID:	Type:	Structure	Length	Width	Morph:	SAED:	EDS:
	E9-C6		NSD					
	D8		NSD					
	B9		NSD					
	A3		NSD					
	G8		NSD					
	E10-D2		NSD					
	E6		NSD					
	H8		NSD					
	J4		NSD					
	B4		NSD					

M29412 004

Sample_comments

SECTION 8

TESTED AT 700 PSI

Certainteed

6" CLASS 200 TYPE II

FLUID-TITE CO



TESTED AT 700 PSI

Certainteed

6" CLASS 200 TYPE II

FLUID-TITE CO



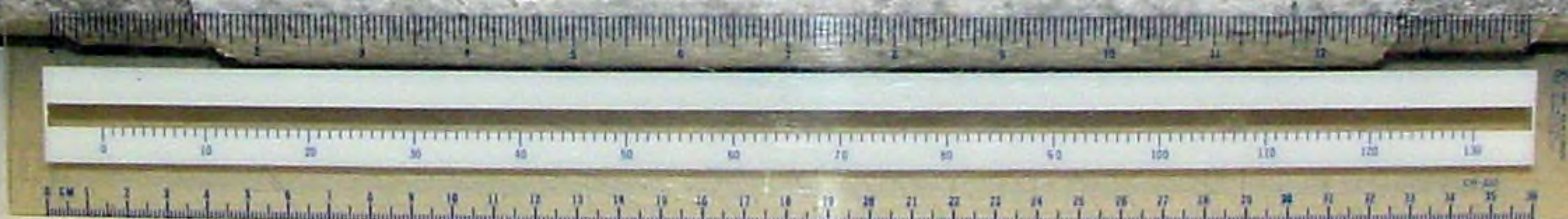


TESTED AT 700 PSI

CertainTeed

6" CLASS 200 TYPE II

FLUID-TITE CO







TESTED AT 700 PSI

Certainteed

6" CLASS 200 TYPE II

FLUID-TITE CO



DEWALT.



HOLLOW GROUND FOR:
PLYWOOD
PLASTIC
LAMINATES

7 $\frac{1}{4}$ " (184mm)

5/8" (16mm) arbor/ojo/ahore
with 

Base cônica para:
Madera contrachapada
Plástico
Laminados

Lame évidée pour
Contreplaqué
Plastique
Laminés

DW3326
DW3526 (bulk)

⚠ WARNING:
WEAR EYE PROTECTION

Not for use in masonry,
concrete, or metal.
Max RPM 7000



DW3521

DeWALT

Abrasive Saw Blade

Lame pour scie abrasive / Hoja abrasiva de sierra

Type 1/Tipo 1

MAX RPM: 8,700 / MIN.

7" x 1/8" x 5/8" -
(180mm x 2mm x 16mm)



CONCRETE/ MASONRY Cutting

Pour couper dans le BÉTON ET
LA MAÇONNERIE / Para cortar
MAMPOSTERÍA Y CONCRETO

Manufactured by / Exported by: DeWalt
Industrial Tool Co. 701 East Joppa Road
Baltimore, MD 21286

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Brockville Ontario
K6V 5W6

Made in the U.S.A.
Fabriquée aux États-Unis
Hecho en EE.UU.



606624-01

⚠ WARNING:

To Prevent Serious Injury: Wear eye, face & body protection / Do not drop / Mount & use wheel properly per ANSI B7.1 OSHA / Use guards

⚠ AVERTISSEMENT :

Pour éviter des blessures graves, porter un équipement de protection pour les yeux, visage et corps / Ne pas laisser tomber / Monter et utiliser la meule correctement selon ANSI B7.1 OSHA / Utiliser un écran de protection

⚠ ADVERTENCIA:

Para prevenir lesión seria: Use protección para los ojos, cara y cuerpo / No deje caer / Monte y use la rueda correctamente según ANSI B7.1 OSHA / Use protector de la hoja

SKIL®

SPECIFICATIONS

VOLTS	120V AC, 50-60 Hz
AMPS	13
RPM	4600/MIN.

CARACTÉRISTIQUES DU MODÈLE 5600

TENSION 120 V, 50-60 Hz

INTENSITÉ 13 A

VITESSE 4600 TR/MIN

ESPECIFICACIONES DEL MODELO 5600

V 120 V CA, 50-60 Hz

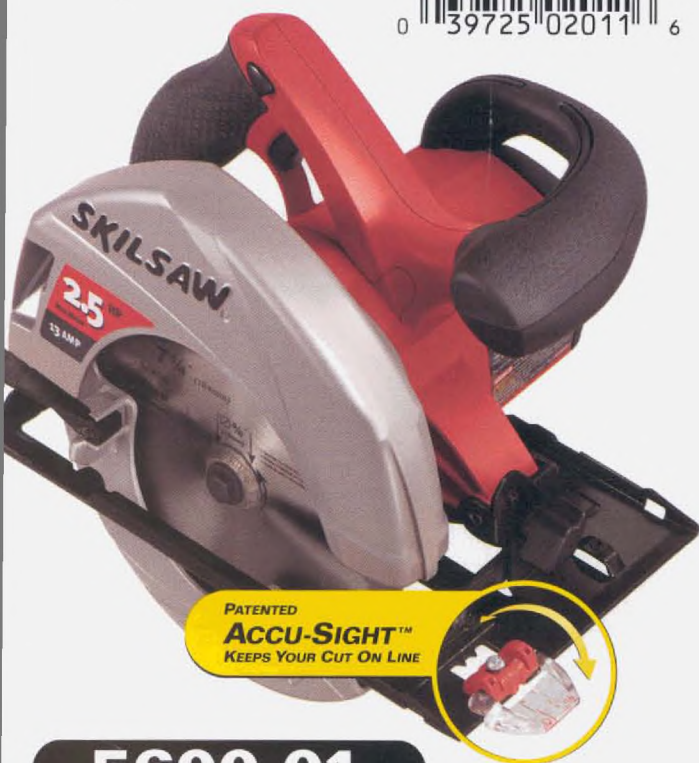
A 13 A

RPM 4 600

H288093



0 39725 02011 6



PATENTED
ACCU-SIGHT™
KEEPS YOUR CUT ON LINE

5600-01

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2.5HP MAX. MOTOR **13 AMP MOTOR**

7 1/4" SKILSAW®

- ✓ **PATENTED ACCU-SIGHT™**
KEEPS YOUR CUT ON LINE
- ✓ **PATENTED SOFT GRIP-RIGHT™ HANDLE**
OFFERS OPTIMAL COMFORT AND CONTROL
- ✓ **PATENTED ANTI-SNAG LOWER GUARD DESIGN**
REDUCES SNAGS WHEN MAKING NARROW CUT-OFFS
- ✓ **REAR VIEW DEPTH ADJUSTMENT**
QUICKLY ASSURES DESIRED CUT DEPTH
- ✓ **SAFETY LOCK/GUARDED TRIGGER**
MINIMIZES ACCIDENTAL STARTS

CLICK IT

DIAL IT

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**MADE IN THE
USA**

KIL®



2.5HP MAX. MOTOR **13 AMP MOTOR**

7 1/4" **SKILSAW**®

LEGENDARY PERFORMANCE. CUTTING EDGE TECHNOLOGY.

PATENTED
Accu-SIGHT™

KEEPS YOUR CUT ON LINE



PATENTED
SOFT GRIP-RIGHT™ HANDLE

OFFERS OPTIMAL COMFORT AND CONTROL



✓ **PATENTED ANTI-SNAG LOWER GUARD DESIGN**
REDUCES SNAGS WHEN MAKING NARROW CUT-OFFS

✓ **REAR VIEW DEPTH ADJUSTMENT**
QUICKLY ASSURES DESIRED CUT DEPTH

✓ **SAFETY LOCK/GUARDED TRIGGER**
MINIMIZES ACCIDENTAL STARTS

PATENTED
Accu-SIGHT™
KEEPS YOUR CUT ON LINE



2
YEAR

HOME USE WARRANTY
1 YEAR IN MEXICO

GARANTIE DE 2 ANS EN USAGE
DOMESTIQUE 1 AN EN MEXICO
GARANTIA DE USO DOMESTICO
DE 2 AÑOS 1 AÑO EN MEXICO

**MADE IN THE
USA**