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Radio Dust Blowout Study

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ZENITH RADIO DUST BLOWOUT STUDY

Work Practice Study

September 2003

Materials Analytical Services, Inc.

REVISION #0

Zenith Radio Dust Blowout Study

Work Practice Study

William E. Longo, Ph.D, Richard L. Hatfield, Michael D. Mount, CIH

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 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.^{1,2,3,4,5,6} 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 at each corner of the worktable approximately five feet from the floor and two to three feet from the work activity. For background and area samples, the high volume pumps were calibrated to a flow rate of approximately 10.0 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.

⁶ MDHS 82, The dust lamp, Health & Safety Executive, March 1997.

The investigator performing the work activity was fitted with two personal air samplers attached to his left and right shoulder areas. The samples were positioned to measure the breathing zone concentration of the asbestos dust during the study. The personal air samples were collected with battery operated Gillian pumps calibrated to a flow rate of approximately 2.5 liters per minute for the air cassettes. 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.

The individual working inside the ECL wore a Tyvek suit under cotton work clothes and were protected with a supplied air respirator. 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 personal air sampling and work time was 10 minutes in length. After completion of the cleaning activities and air sampling, a fabric sample from the work clothing of the investigator was collected in the ECL.

A small sample of the asbestos cloth material under the electronics chassis was removed and analyzed by PLM to determine the asbestos type and content.

ANALYTICAL METHODS

The 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 in fabrics.

WORK PRACTICE

MAS received a Zenith Universal Radio from the Law Offices of Clapper and Patti on July 25, 2003. The dimensions of the radio were approximately 37.5cm long, 17cm wide, and 24cm in height. Photographs were taken of the radio and are shown in Section 7 of this report. MAS was asked to determine if Mr. Raymond Walthers would have had an exposure to asbestos fibers when he worked with these types of radios.

MAS was provided with the following information concerning Mr. Walthers work history.

- 1) Plaintiffs' Deposition Volume 1 - 6/10/03
- 2) Plaintiffs' Deposition Volume 2 - 6/11/03
- 3) Defendant's Deposition Volume 1 - 6/11/03
- 4) Defendant's Deposition Volume 2 - 6/12/03

In addition to the above information, on August 26, 2003, Mr. Walthers was contacted by telephone by MAS personnel to review the work practices he used while repairing these types of radios while employed at Rod's Radio Repair and Howard's Radio Repair.

According to Mr. Walther's deposition and telephone conversation, Mr. Walthers stated that during the time at the radio repair shops, he would use compressed air to blowout the electronics section of the AC and AC/DC radio receivers. Mr. Walthers stated that he would do this approximately three different times depending on the amount of work that had to be done to a particular radio unit. The compressed air would be first used when the unit was opened to remove any dust that had accumulated inside the radio. If the electronic chassis had to be removed, Mr. Walthers stated he would use the compressed air again to clean off the chassis itself and the asbestos cloth strip area and a third time after the chassis had been put back in place. Mr. Walthers stated that he would spend about 5-10 seconds each time he used the compressed air on the radios. Mr. Walthers estimated that the pressure of the compressed air was approximately 90 psi.

To replicate Mr. Walthers activity, the Zenith radio was placed in the ECL and the back opened up by the investigator. Compressed air was used to blow out the dust for approximately 10-15 seconds. The chassis was then removed and the compressed air used again to blow off from both the chassis and the inside of the radio. This activity also lasted approximately 10-15 seconds. The chassis was replaced and briefly cleaned with the compressed air for about 10 seconds. The pressure of the compressed air was set at 90 psi. A dust sample was taken from the bottom section of the radio before the work study was started to determine the level of asbestos contamination if any.

RESULTS

The PLM analysis of the asbestos insulating strip showed that the material contained 60 percent chrysotile asbestos. The dust sample demonstrated that the inside of the Zenith radio was found to contain 12.9 billion asbestos fibers per square foot. During the compressed air study, the individual doing the blow out operation was exposed to levels of airborne asbestos fibers of between 2.6 to 3.4 fibers/cc as measured by PCM. The workers clothing was found to contain 26.0 million asbestos structures per square foot.

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 14 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

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

Rate of Error Calculation

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

	<u>Zenith Radio Blowout</u>	<u>Average f/cc</u>
1)	Area Samples	1.3
2)	Personnel Samples	3.0

The coefficient of variation determined at this laboratory for this range of PCM fiber counts are 0.16 for the area and personal samples. Therefore, the personal air samples' upper and lower limits are 2.52 f/cc and 3.48 f/cc, for the area samples, the upper and lower limits are 1.09 and 1.51 f/cc on average.

CONCLUSION

MAS conducted a work study to determine the release and potential exposure to airborne asbestos fibers during the compressed air blowout of dust from the inside of a Zenith Radio. This study showed that when a worker used compressed air to cleanout the dust from one of these types of radios, he would receive a significant exposure to respirable asbestos fibers in his breathing zone.

Also, the clothing worn by the worker in this study was found to be contaminated with chrysotile asbestos. This contamination is yet another potential source of exposure through re-entrainment of the asbestos dust from such activities as the brushing of the clothing or laundry activities.

Zenith Radio Dust Blowout Study

Work Practice Study

August 27, 2003

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 (Aramco, 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. Two video cameras (Sony Handcam, Model TRV99) will be used in this study.

II. BACKGROUND AIR SAMPLES

- A. The Zenith radio will be taken into the ECL and placed on the worktable one hour before the background samples.
- 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 2 – 3 feet from the work activity.

III. WORK PRACTICE STUDY

- A. The investigator will wear a supplied air respirator.
- B. The investigator will wear two personal air pumps and air cassettes, each located in his breathing zone, during the cleaning activity.
- C. The work practice will be performed under Tyndall lighting. The entire procedure will be video taped with two separate cameras.
- D. During filming, the Tyndall lighting will be turned off and overhead lights turned on at least once during the simulation.
- E. Area air samples will be taken during the study in each quadrant of the chamber at a flow rate of approximately 10.0 liters per minute.
- F. Compressed air at a pressure of 90 PSI will be used in this study.
- G. The work practice will consist of opening the back of the Zenith radio and blowing out the dust with the compressed air for approximately 10-15 seconds. The chassis removed and both areas cleaned for approximately 10-15 seconds. The chassis replaced and cleaned with compressed air for another 10 seconds.
- H. The investigators will wear two personal air samples during the work practice. The Gilian pumps will be calibrated to 2.5 liters per minutes for the air cassettes.
- I. The personal and area air cassettes will be collected during the study.
- J. The total time of the study will be ten minutes.

IV. Laboratory Analysis

- A. All air samples will by 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. Dust samples will be analyzed by the ASTM D5755-2 method.

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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 the ECL 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.
- B) Analyze air samples by the TEM indirect washout method.
- C) Analyze the cloth/fabric samples by the recommended EPA method.
- D) Analyze dust samples by the ASTM D-5755-2 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.

Zenith Radio Dust Blowout Study

Asbestos Air & 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>
A-0-A (NE)	IWA Background	<0.001	<0.05	N/A
A-0-B (SE)	IWA Background	<0.001	<0.05	N/A
A-0-C (SW)	IWA Background	<0.002	<0.05	N/A
A-0-D (NW)	IWA Background	<0.002	<0.05	N/A

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	1.20	0.80	0.80
A-1-B	IWA Area	1.42	29.71	2.41
A-1-C	IWA Area	1.21	1.70	N/A
A-1-D	IWA Area	1.23	0.83	N/A

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>
P-1-A	Personnel	2.6	16.6	N/A
P-1-B	Personnel	3.4	16.1	3.2

DUST ANALYSIS

		<u>Structures/ ft²</u>	<u>Structures/cm²</u>
F-O	Blank	N/A	N/A
F-B-1RH	Fabric	26.0 million	28.0 thousand

FIELD BLANKS

		<u>PCM Fibers/mm²</u>	<u>TEM Structures/mm²</u>
FB-1	IWA	<7	0.00
FB-2	IWA	<7	0.00

MATERIALS ANALYTICAL SERVICES, INC.
PLM ANALYSIS

Proj#-Spl#: M31735-001 Analyst W B Egeland Date: 7/28/03
 ClientName: Clapper & Patti ClientSpl: 1
 Location: _____
 Type_Mat: Zenith radio
 Gross Light tan. Compressed fibrous. 36 cm long, 8 cm wide and 1 mm thick.
 Visual: _____

OPTICAL DATA FOR ASBESTOS IDENTIFICATION

Morphology	<u>Wavy</u>		
Pleochroism	<u>None</u>		
Refract Index	<u>1.555/1.548</u>		
Sign	<u>+</u>		
Extinction	<u>Parallel</u>		
Birefringence	<u>Low</u>		
Melt	<u>No</u>		
Fiber Name	<u>Chrysotile</u>		

ASBESTOS MINERALS

EST. VOL. %

Chrysotile.....
 Amosite.....
 Crocidolite.....
 Tremolite/Actinolite.....
 Anthophyllite.....

60

OTHER FIBROUS COMPONENTS

Cellulose -ribbony

5

NON FIBROUS COMPONENTS

Binder

35

Effervescence: _____

Binder Description: Fine-grained aggregate

Comments: No starch observed

CLAPPER & PATTI
ATTORNEYS AT LAW
A PROFESSIONAL CORPORATION
2330 MARINSHIP WAY, SUITE 140
SAUSALITO, CALIFORNIA 94965

Jack K. Clapper
Steven J. Patti
John P. Mason
Michael J. Mandelbrot
Barry K. Matson
Of Counsel
Deborah F. Schweizer

TELEPHONE: (415) 332-4262
(800) 440-4262
FACSIMILE: (415) 331-5387
E-MAIL: jkc@clapperlaw.com

July 24, 2003

Via Overnight Mail

William Longo, Ph.D.
Materials Analytical Services, Inc.
3945 Lakefield Court
Suwanee, GA 30024

Re: *Raymon Walthers and Verta Walthers v. Admiral Corporation, et al.*
San Francisco County Superior Court, Case No. 418823

Dear Dr. Longo,

Enclosed please find materials pertaining to Mr. Walthers' case. I have also enclosed a Chain of Custody for your signature. Please sign and return the Chain of Custody to our office.

Mr. Walthers' case is set for trial commencing September 8, 2003.

Thank you for your assistance with this case.

Very truly yours,



Kari Walters

Enclosures

MATERIALS ANALYTICAL SERVICES, INC.
CHAIN-OF-CUSTODY

CLIENT: Clapper & Patti

MAS JOB: M31735

CONTACT: Jack Clapper

DATE RECEIVED: 7/25/03

PHONE: (415) 332-4262

SUBMITTED BY:

CLIENT JOB NAME: Asbestos Analyses

TRANSPORT:

CLIENT JOB#:

RECEIVED BY: dmazzaferro

CLIENT DOC(S): Letter of transmittal

CONDITION: good

FAX NUMBER: (415) 331-5387

MAS #	CLIENT ID	VOLUME	TYPE MATERIAL
-------	-----------	--------	---------------

001	1		Zenith radio
-----	---	--	--------------

LOCATION			
----------	--	--	--

002	2		insulation wire
-----	---	--	-----------------

LOCATION			
----------	--	--	--

MAS #	CLIENT ID
-------	-----------

VOLUME	TYPE MATERIAL
--------	---------------

INITIAL FILE REVIEW: _____ DATE: _____

SAMPLE PREP BY: _____ DATE: _____

SAMPLE ANALYSIS BY: _____ DATE: _____

COMMENT: paperwork given directly to Marie

Materials Analytical Services, Inc.

3945 Lakefield Court

Suwanee, Georgia 30024

(770) 866-3200

MATERIALS ANALYTICAL SERVICES PROJECT LOG

Client Code: MASCORP

MAS ID: M31968
Client Name: Materials Analytical Services, Inc.
Project Name: Chamber - Radio Cleaning
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 8/27/03

TRANSPORT INFORMATION:

Submitted By:	<u>Mike Mount</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

M31968

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
000	lab blank 8/29/03	0			
001	A-O-A	1801			
002	A-O-B	1828			
003	A-O-C	1707			
004	A-O-D	1774			
005	A-O-E	1828			
006	P-1-A	24.7			
007	P-1-B	25.5			

SIGNATURES

RECEIVED BY:

dmazzaferro

REVIEWED BY:

dmazzaferro

PREPARED BY:

dmazzaferro

ANALYZED BY:

dmazzaferro

REPORTED BY:

DEPOSED BY:

M31968

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
008	A-1-A	102			
009	A-1-B	102			
010	A-1-C	96			
011	A-1-D	99			
012	A-1-E	606			
013	FB-1	0			
014	FB-2	0			
000	lab blank 8/29/03	0			
001	A-O-A	1801			
002	A-O-B	1828			
003	A-O-C	1707			
004	A-O-D	1774			
005	A-O-E	1828			
006	P-1-A	24.7			
007	P-1-B	25.5			
008	A-1-A	102			
009	A-1-B	102			
010	A-1-C	96			
011	A-1-D	99			
012	A-1-E	606			
013	FB-1	0			
014	FB-2	0			

SIGNATURES

RECEIVED BY: _____

REVIEWED BY: _____

PREPARED BY: _____

ANALYZED BY: _____

REPORTED BY: _____

DEPOSED BY: _____

INDUSTRIAL HYGIENE AIR SAMPLING CHAIN OF CUSTODY



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

Co. Name

Address

PH

FAX

MAS, INC.

Project Number

Project Name

Work Area Description

Project Representative

Sampling Date

Radiation Cleaning
Chamber
M. Mount

8/27/03

Sheet 1 of 2

2003 Date	Sample No.	Sample Location	Pump Sample Media	Analysis Desired	Start Time	Stop Time	Total Time (Minutes)	Average Flow Rate (LPM)	Air Volume (Liters)
8/27	A-0-A	IC, NE before		PCM + TEM	06:58	09:59	181	9.95	1801
	A-0-B	SE						10.1	1828
	A-0-C	SW						9.43	1707
	A-0-D	NW						7.80	1774
	A-0-E	OC at decon			06:58	09:59		10.1	1828
	P-1-A	Per, Right, during 11071			15:23	15:43	10	2.47	24.7
	P-1-B	Per, Left, 11073			15:33	15:43	10	2.55	25.5
	A-1-A	IC, NE					10	10.2	102
	A-1-B	SE					10	10.2	102
	A-1-C	SW					10	9.6	96
	A-1-D	NW					10	9.9	99
	A-1-E	OC			15:30	14:30	60	10.1	606
	F-0	Before repair			NA	NA			
	F-1	after repair			NA	NA			

89612W

69512W

IC - In Containment
OC - Outside Containment
First Transfer By Michael D. Mount 8/27
Second Transfer By
Third Transfer By

CHAIN OF CUSTODY

Initial Shipment Date:

Mode of Transfer

Log-In Date

Received By

8/27/03

[Signature]

INDUSTRIAL HYGIENE AIR SAMPLING CHAIN OF CUSTODY



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

Co. Name

Address

PH:

FAX:

MAS, Inc

Project Number

Project Name

Work Area Description

Project Representative

Sampling Date

Radio Cleaning

Chamber

M. M

8/27/02

Sheet 2 of 2

8751424

Date	Sample No.	Sample Location	Sample Media	Analysis Desired	Start Time	Stop Time	Total Time (Minutes)	Average Flow Rate (LPM)	Air Volume (Liters)
	FB-1	Field Blank		PCM/TEM	—	—	—	—	0
	FB-2	Field Blank		↓ ↓	—	—	—	—	0

First Transfer By: Michael D. Mout 8/27
Second Transfer By:
Third Transfer By:

CHAIN OF CUSTODY

Initial Shipment Date:

Mode of Transfer

Log-In Date

Received By

8/27/02

[Signature]

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MATERIALS ANALYTICAL SERVICES, INC.

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: M31968 - Radio Cleaning
MAS Project Number: M31968
Date: September 3, 2003
Analytical Protocol: NIOSH 7400, Issue 2, August 15, 1994

Client Sample Number	MAS Sample Number	Volume (liters)	Fibers/ Fields Counted	Fiber Density (#/mm ²)	Measured Conc. (#/cc)
A-0-A	M31968-001	1801	4.5/100	ND	0.001
A-0-B	M31968-002	1828	3/100	ND	0.001
A-0-C	M31968-003	707	1.5/100	ND	0.002
A-0-D	M31968-004	1774	3.5/100	ND	0.002
A-0-E	M31968-005	1828	2.5/100	ND	0.001
P-1-A	M31968-006	25	100/78	166.5	2.564
P-1-B	M31968-007	26	103/59	226.7	3.157
A-1-A	M31968-008	102	100.5/41	318.3	1.202

Table continued on next page

ATLANTA

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MATERIALS ANALYTICAL SERVICES, INC.

Materials Analytical Services, Inc.
M31968 / Radio Cleaning
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-B	M31968-009	102	101.5/35	376.6	1.422
A-1-C	M31968-010	96	102.5/44	302.5	1.213
A-1-D	M31968-011	99	100.41	316.8	1.232
A-1-E	M31968-012	606	85/100	11.0	0.007
FB-1	M31968-013	0	0/100	ND	--
FB-2	M31968-014	0	0/100	ND	--
LOO					

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i

Sample # M3/968-003

Analysis Date.

10

00

Sample D

A - C - C

Pump Flow Rate, Liters/minute (FR)

Sample Time, minutes (T)

Sample Volume, Liters (V)

1767

Total Fibers Counted, Sample (FCS):

 $\frac{1}{2}$

Total Fields Counted. Sample 1 FLS;

100

Total Fibers Counted, Blank (FCB)

C

Total Fields Counted: Blank FLS)

100

Area of Filter mm^2 (AF)

385

Graticule Field Area, mm² (GFA)

0 2577

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

$$E = ((FCS, FLS), (FCE, FLE)), GFA$$

$E =$ UC, < > fibers/mm²

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

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

C = 0.002 fibers/cubic centimeter

NIOSH 7400 Issue 2: Phase Contrast Microscopy

Sample # M31968-C04

Media Type 25 mm MCE Filter

Sample ID	A-C-D
Pump Flow Rate, Liters/minute (FR)	
Sample Time, minutes (T)	
Sample Volume, Liters (V)	1774
Total Fibers Counted, Sample (FCS)	3 1/2
Total Fields Counted, Sample (FLS)	100
Total Fibers Counted, Blank (FCB)	0
Total Fields Counted, Blank (FLB)	100
Area of Filter, mm ² (AF)	315
Graticule Field Area, mm ² (GFA)	0.0077

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

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

E = 47 fibers/mm²

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

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

C = 0.0026 fibers/cubic centimeter

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

Project Name: RADIO CLEANING

Sample # 1451968-006

Analysis Date 8/29/03

Media Type 25 mm MCE Filter

1	-	-	1	1
1	2	1	1	2
4	1	-	2	5
3	1 1/2	1 1/2	1	1
1	-	3	2 1/2	3
1	-	1/2	1	1/2
-	-	1	2 1/2	2 1/2
1 1/2	1	-	1	2 1/2
3	1	1	1/2	2
3	1/2	1	-	1 1/2
2 1/2	1	1	-	3
1	1/2	1	-	2 1/2
1	1	1/2	2	-
2	3 1/2	1	3 1/2	1/2
2	-	-	1 1/2	2 1/2
1 1/2	1/2	1 1/2	2 1/2	1 1/2
1	1 1/2	1	-	2
1/2	1 1/2	1 1/2	1 1/2	1
1	1	1 1/2	1	1
2	-	2	-	2 1/2

Sample ID	<u>P-1-A</u>
Pump Flow Rate, Liters/minute (FR)	
Sample Time, minutes (T)	
Sample Volume, Liters (V)	<u>25</u>
Total Fibers Counted, Sample (FCS)	<u>160</u>
Total Fields Counted, Sample (FLS)	<u>78</u>
Total Fibers Counted, Blank (FCB)	<u>0</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>0.0077</u>

Calculation of Fiber density (E) in Fibers/square millimeter
$E = (FCS/FLS) - (FCB/FLB) / GFA$
E = <u>166.5</u> fibers/mm ²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter
$C = \frac{(E) \cdot (AF)}{1000 \cdot V}$
C = <u>256</u> fibers/cubic centimeter

Notes _____

ANALYST: _____

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

Project Name RADIA CLEANING

Sample # M 31968-007

Analysis Date 8/29/03

Media Type 25 mm MCE Filter

1 1/2	1 1/2	1	2 1/2	1
1	1	-	2 1/2	3
-	1	-	4	3
-	3	-	2	5
4	1	3 1/2	2 1/2	3
2 1/2	1	-	1	1
1 1/2	1	1	2	4
1 1/2	-	1	2	3
2	1 1/2	1	3	2
1	-	1 1/2	4	-
1	1 1/2	4	1 1/2	2 1/2
1	1	1	4	5
1	4 1/2	1 1/2	4	4
4	2	3	-	2
1	4	3	3	5 1/2
6	2 1/2	2 1/2	2	3
2 1/2	2	-	-	3 1/2
3	3	2	1	2 1/2
3	1/2	4	1 1/2	4

Sample ID	<u>P-1-B</u>
Pump Flow Rate, Liters/minute (FR)	
Sample Time, minutes (T)	
Sample Volume, Liters (V)	<u>26</u>
Total Fibers Counted, Sample (FCS)	<u>163</u>
Total Fields Counted, Sample (FLS)	<u>59</u>
Total Fibers Counted, Blank (FCB)	<u>0</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>0.0677</u>
Calculation of Fiber density (E) in Fibers/square millimeter $E = ((FCS/FLS) - (FCB/FLB)) / GFA$ E = <u>226.7</u> fibers/mm²	
Calculation of Fiber Concentration (C) in Fibers/cubic centimeter $C = \frac{E * (AF)}{1000 * V}$ C = <u>357</u> fibers/cubic centimeter	

Notes _____

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

Project Name: RADIC CLEANING

Sample # 1731968-C1C

Analysis Date: 8/29/03

Media Type 25 mm MCE Filter

2	3	5	3	3 1/2
3 1/2	3	1	4	5
—	2	6	1 1/2	3 1/2
1	2	2	1/2	2
4 1/2	2	2	3 1/2	3 1/2
2	2 1/2	2	—	2 1/2
3	1 1/2	1/2	1	4 1/2
1	1	1	2	3 1/2
5	3	2 1/2	4	—

Notes _____

Sample ID	<u>A-1-C</u>
Pump Flow Rate, Liters/minute (FR)	
Sample Time, minutes (T)	
Sample Volume, Liters (V)	<u>96</u>
Total Fibers Counted, Sample (FCS)	<u>112 1/2</u>
Total Fields Counted, Sample (FLS)	<u>44</u>
Total Fibers Counted, Blank (FCB)	<u>C</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>0.6677</u>
Calculation of Fiber density (E) in Fibers/square millimeter $E = ((FCS/FLS) - (FCB/FLB)) / GFA$ E = <u>202.5</u> fibers/mm ²	
Calculation of Fiber Concentration (C) in Fibers/cubic centimeter $C = \frac{(E) \cdot (AF)}{1000 \cdot V}$ C = <u>15.3</u> fibers/cubic centimeter	

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

Project Name: RAVIO CLEANING

Sample # M31968-C11

Analysis Date: 8/29/03

Media Type: 25 mm MCE Filter

2	1	1	2	2
3 1/2	3	1/2	1	2 1/2
5 1/2	2 1/2	8	2 1/2	1
3	3	1	3	3
1	2	—	2 1/2	2 1/2
3	4 1/2	2 1/2	2	1
1 1/2	7	2	3 1/2	1
—	4 1/2	—	1	4
2	1 1/2	—	4 1/2	4
2	4	3	3 1/2	4

Sample ID	<u>A-1-D</u>
Pump Flow Rate, liters/minute (FR)	
Sample Time, minutes (T)	
Sample Volume, Liters (V)	<u>99</u>
Total Fibers Counted, Sample (FCS)	<u>160</u>
Total Fields Counted, Sample (FLS)	<u>41</u>
Total Fibers Counted, Blank (FCB)	<u>0</u>
Total Fields Counted, Blank (FLB)	<u>100</u>
Area of Filter, mm ² (AF)	<u>185</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 =	<u>316.8</u> fibers/mm ²

Calculation of Fiber Concentration (C) in Fibers/cubic centimeter	
$C = \frac{(E) \cdot (AF)}{1000 \cdot V}$	
C =	<u>1.232</u> fibers/cubic centimeter

es _____

1

Sample # M 31968-C12

Analysis Date 8/29/03

Sites

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

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

E = 11.0 fibers/mm²

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

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

C = 0.007 fibers/cubic centimeter

μ_{CE}

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

Project Name AA10 CLEANING

Sample # V131968-013

Analysis Date 8/21/03

Media Type 25 mm MCE Filter

10	—	—	—	—	—
20	—	—	—	—	—
30	—	—	—	—	—
40	—	—	—	—	—
50	—	—	—	—	—
60	—	—	—	—	—
70	—	—	—	—	—
80	—	—	—	—	—
90	—	—	—	—	—
100	—	—	—	—	—

Sample ID	<u>FB-1</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>0.0075</u>

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

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

E = 0 < 7 fibers/mm²

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

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

C = 0.17 fibers/cubic centimeter

Notes _____

W. R. Smith
W. R. Smith

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

Project Name: RAPIO CLEANING

Sample # M31968-014

Analysis Date: 8/29/03

Media Type: 25 mm MCE Filter

10	
20	
30	
40	
50	
60	
70	
80	
90	
100	

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>585</u>
Graticule Field Area, mm ² (GFA)	<u>0.077</u>
Calculation of Fiber density (E) in Fibers/square millimeter $E = (FCS/FLS) - (FCB/FLB) / GFA$ E = <u>ND, <</u> fibers/mm²	
Calculation of Fiber Concentration (C) in Fibers/cubic centimeter $C = \frac{E * (AF)}{1000 * V}$ C = <u>0/A</u> fibers/cubic centimeter	

MAS Indirect TEM ANALYSIS M31968-000

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: lab blank 8/29/03

Sample Area/ Volume: 0 Liters

Date Analyzed: 9/3/2003

Filter Type: MCE 47mm

Analyst: Jayme Callan

Pore size: 0.45

Scope Number: 4

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Indirect Air

Indicated Mag: 25 KX

Dust

Screen Mag: 20 KX

YES 1 %

Grid box Number: 6639

Str < 5um: 0

Number of grids: 2

#1: 101

#3: 102

Str ≥ 5um: 0

Number of openings: 10

#2: 103

#4: 106

Total str: 0

Str / cc > 5: #Error /cc

Average Grid Size: 0.010608

Total Area Analyzed: 0.106

Filter used

Dilution

Dilution Factor

Detect_cc: #Div/0!

1/ 1

0

#Div/0!

Total cc: #Error

Str#	SquareID	Type	Structure	Length	Width	Morph.	SAED	EDS
	A5-C8		NSD					0
	C10		NSD					0
	E9		NSD					0
	F10		NSD					0
	H10		NSD					0
	B5-D8		NSD					0
	B10		NSD					0
	E2		NSD					0
	C1		NSD					0
	11		NSD					0

M31968-000 Sample Comments

MAS Indirect TEM ANALYSIS M31968-001

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-O-A	
Sample Area/ Volume:	1801 Liters	Date Analyzed:	9/3/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
	Indirect Air	Indicated Mag:	25 KX
	Dust	Screen Mag:	20 KX
	YES 1 %	Grid box Number:	6639

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

Number of grids:: 2 #1: 101 #3: 102
 Number of openings:: 10 #2: 103 #4: 106

Average Grid Size: 0.010608
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	0.04526
1/ 2	30	6.666667	Total cc:	0.00000

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	A10-19		NSD					0
	G10		NSD					0
	F7		NSD					0
	E10		NSD					0
	G8		NSD					0
	A9-D10		NSD					0
	E7		NSD					0
	G8		NSD					0
	H4		NSD					0
	J5		NSD					0

M31968 001 Sample Comments

MAS Indirect TEM ANALYSIS M31968-002

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-O-B	
Sample Area/ Volume:	1828 Liters	Date Analyzed:	9/3/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
	Indirect Air	Indicated Mag:	25 KX
	Dust	Screen Mag:	20 KX
	YES 1 %	Grid box Number:	6639

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

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 106

Average Grid Size: 0.010608
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	0.04459
1/ 2	30	6.666667	Total cc:	0.00000

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	D7-D1		NSD					0
	F2		NSD					0
	G4		NSD					0
	C5		NSD					0
	E9		NSD					0
	E7-F3		NSD					0
	G6		NSD					0
	I6		NSD					0
	J8		NSD					0
	H10		NSD					0

M31968 002 Sample Comments:

MAS Indirect TEM ANALYSIS M31968-003

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-O-C	
Sample Area/ Volume:	1707 Liters	Date Analyzed:	9/3/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
	Indirect Air	Indicated Mag:	25 KX
	Dust	Screen Mag:	20 KX
	YES 1 %	Grid box Number:	6639

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

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 105

Average Grid Size: 0.010557
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	0.04798
1/ 2	30	6.666667	Total cc:	0.00000

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	E6-J8		NSD					0
	I6		NSD					0
	F3		NSD					0
	E10		NSD					0
	C7		NSD					0
	D6-H6		NSD					0
	F7		NSD					0
	B6		NSD					0
	C4		NSD					0
	D2		NSD					0

M31968-003 Sample Comments:

MAS Indirect TEM ANALYSIS M31968-004

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-O-D	
Sample Area/ Volume:	1774 Liters	Date Analyzed:	9/3/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
	Indirect Air	Indicated Mag:	25 KX
	Dust	Screen Mag:	20 KX
	YES 1 %	Grid box Number:	8639

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

Number of grids:: 2 #1: 101 #3: 102
 Number of openings:: 10 #2: 103 #4: 105

Average Grid Size: 0.010557
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	0.04617
1/ 2	30	6.666667	Total cc:	0.00000

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	B7-E3		NSD					0
	D1		NSD					0
	C3		NSD					0
	B5		NSD					0
	A1		NSD					0
	B6-G7		NSD					0
	H8		NSD					0
	H10		NSD					0
	E9		NSD					0
	C8		NSD					0

M31968 004 Sample Comments:

MAS Indirect TEM ANALYSIS M31968-006

CLIENT NAME: Materials Analytical Services, Inc.			CLIENT SAMPLE ID: P-1-A	
Sample Area/ Volume:	24.7	Liters	Date Analyzed:	9/3/03
Filter Type:	MCE	47mm	Analyst:	Jayne Callan
Pore size:	0.45		Scope Number:	4
Effective Filter Area:	1297		Accelerating Voltage:	100 KV
	Indirect Air		Indicated Mag:	25 KX
	Dust		Screen Mag:	20 KX
	YES	1 %	Grid box Number:	6639

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

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 105

Average Grid Size: 0.010557
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect cc:	3.31613
1/ 2	30	6.666667	Total cc:	16.58066

Str#:	SquareID:	Type:	Structure:	Length	Width	Morph:	SAED:	EDS:
1	D5-H3	C	F	2.80	0.05	X	X	-1
2		C	F	1.00	0.05	X	X	0
3	G1	C	B	1.20	0.20	X	X	0
	E2		NSD					0
	C3		NSD					0
	A1		NSD					0
	D4-D8		NSD					0
4	C6	C	F	2.10	0.05	X	X	0
	D4		NSD					0
	A1		NSD					0
5	B4	C	C-F	0.50	0.10	X	X	0

M31968 006 Sample Comments:

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MAS Indirect TEM ANALYSIS M31968-007

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: P-1-B

Sample Area/ Volume: 25.5 Liters

Date Analyzed: 9/3/2003

Filter Type: MCE 47mm

Analyst: Jayme Callan

Pore size: 0.45

Scope Number: 4

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Indirect Air

Indicated Mag: 25 KX

Dust

Screen Mag: 20 KX

YES 1 %

Grid box Number: 6639

Str < 5um: 4

Number of grids: 2 #1: 101 #3: 102

Str ≥ 5um: 1

Number of openings: 10 #2: 103 #4: 105

Total str: 5

Str / cc > 5: 3.2121 /cc

Average Grid Size: 0.010557

Total Area Analyzed: 0.106

Filter used

Dilution

Dilution Factor

Detect_cc: 3.21210

1/2

30

6.666667

Total cc: 16.06048

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	B2-B5		NSD					0
	D4		NSD					0
1	B2	C	C-B	1.80	0.20	X	X	-1
2		C	F	1.00	0.05	X	X	0
	D1		NSD					0
3	J4	C	F	1.60	0.05	X	X	0
4	B1-F10	C	B	1.90	0.20	X	X	0
5	E8	C	F	0.80	0.05	X	X	0
	G7		NSD					0
	H4		NSD					0
	J2		NSD					0

M31968 007 Sample Comments:

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MAS Indirect TEM ANALYSIS M31968-008

CLIENT NAME: Materials Analytical Services, Inc.		CLIENT SAMPLE ID: A-1-A	
Sample Area/ Volume:	102 Liters	Date Analyzed:	9/3/2003
Filter Type:	MCE 47mm	Analyst:	Jayne Callan
Pore size:	0.45	Scope Number:	4
Effective Filter Area:	1297	Accelerating Voltage:	100 KV
	Indirect Air	Indicated Mag:	25 KX
	Dust	Screen Mag:	20 KX
	YES 1 %	Grid box Number:	6639

Str < 5um: 0
 Str ≥ 5um: 1
 Total str: 1
 Str / cc > 5: 0.8030 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 105

Average Grid Size: 0.010557
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	0.80302
1/ 2	30	6.666667	Total cc:	0.80302

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	C2-D5		NSD					0
	E7		NSD					0
	G6		NSD					0
	I6		NSD					0
1	H3	C	B	18.00	0.35	X	X	-1
	C1-D5		NSD					0
	G7		NSD					0
	J7		NSD					0
	F9		NSD					0
	D9		NSD					0

M31968 008 Sample Comments:

MAS Indirect TEM ANALYSIS M31968-009

CLIENT NAME: Materials Analytical Services, Inc.			CLIENT SAMPLE ID: A-1-B	
Sample Area/ Volume:	102	Liters	Date Analyzed:	9/3/2003
Filter Type:	MCE	47mm	Analyst:	Jayme Callan
Pore size:	0.45		Scope Number:	4
Effective Filter Area:	1297		Accelerating Voltage:	100 KV
	Indirect Air		Indicated Mag:	25 KX
	Dust		Screen Mag:	20 KX
	YES	1 %	Grid box Number:	6639

Str < 5um: 34
 Str ≥ 5um: 3
 Total str: 37
 Str / cc > 5: 2.4091 /cc

Number of grids: 2 #1: 101 #3: 102
 Number of openings: 10 #2: 103 #4: 105

Average Grid Size: 0.010557
 Total Area Analyzed: 0.106

Filter used	Dilution	Dilution Factor	Detect_cc:	0.80302
1/2	30	6.666667	Total cc:	29.71189

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	D1-J2		NSD					0
	J4		NSD					0
1	H3	C	F	0.60	0.05	X	X	-1
2		C	F	0.80	0.05	X	X	0
3		C	F	1.60	0.05	X	X	0
4		C	F	1.00	0.05	X	X	0
5		C	F	1.60	0.05	X	X	0
6		C	F	1.00	0.05	X	X	0
7		C	F	1.50	0.05	X	X	0
8		C	F	1.90	0.05	X	X	0
9		C	F	1.70	0.05	X	X	0
10		C	F	1.80	0.05	X	X	0
11		C	F	1.70	0.05	X	X	-1
12		C	F	0.80	0.10	X	X	0
13		C	F	1.60	0.05	X	X	0
14		C	F	1.90	0.05	X	X	0
15		C	C-F	2.20	0.05	X	X	0
16		C	B	1.00	0.10	X	X	0
17		C	F	3.50	0.05	X	X	0
18		C	F	7.00	0.05	X	X	0
19		C	F	1.90	0.05	X	X	0
20		C	F	0.80	0.05	X	X	0
21		C	F	1.80	0.05	X	X	1
22		C	F	1.80	0.05	X	X	0
23		C	F	1.40	0.05	X	X	0
24		C	C-F	1.90	0.05	X	X	0
25		C	F	1.50	0.05	X	X	0
26		C	F	1.60	0.05	X	X	0

MAS Indirect TEM ANALYSIS M31968-009

CLIENT NAME: Materials Analytical Services, Inc.					CLIENT SAMPLE ID:		A-1-B	
27	C	F	1.90	0.05	X	X	0	
28	C	F	4.20	0.03	X	X	0	
29	C	C-B	1.90	0.08	X	X	0	
30	C	B	9.50	0.20	X	X	0	
31	C	C-F	5.60	0.10	X	X	-1	
32	C	F	1.60	0.05	X	X	0	
	E2	NSD					0	
33	D1	C	F	1.90	0.05	X	X	0
34	D2-C7	C	F	1.00	0.05	X	X	0
35	C	F	0.60	0.05	X	X	0	
	A8	NSD					0	
36	B10	C	F	2.10	0.05	X	X	0
37	C	B	2.00	0.20	X	X	0	
	E10	NSD					0	
	G8	NSD					0	

M31968 009 Sample Comments:

Dec 03 - Ser-07

[illegible]

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μ

[illegible]

MATERIALS EVALUATION SERVICES
DIRECTOR: D. COOPER, M.D.

Wed 03-SEP-03
09:00 AM
JC

MATERIALS EVALUATION SERVICES											
DIRECTOR: D. COOPER, M.D.											

34 - 35 - 36

2

MAS Indirect TEM ANALYSIS M31968-010

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-C

Sample Area/ Volume: 96 Liters

Date Analyzed: 9/3/2003

Filter Type: MCE 47mm

Analyst: Jayme Callan

Pore size: 0.45

Scope Number: 4

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Indirect Air

Indicated Mag: 25 KX

Dust

Screen Mag: 20 KX

YES 1 %

Grid box Number: 6639

Str < 5um::

2

Number of grids:: 2

#1: 101

#3: 102

Str ≥ 5um::

0

Number of openings: 10

#2: 103

#4: 106

Total str::

2

Str / cc > 5:

0.0000

/cc

Average Grid Size: 0.010608

Total Area Analyzed: 0.106

Filter used

Dilution

Dilution Factor

Detect_cc: 0.84911

1 / 2

30

6.666667

Total cc: 1.69822

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	E2-G5		NSD					0
	H1		NSD					0
1	C4	C	F	1.60	0.05	X	X	-1
	C1		NSD					0
	B9		NSD					0
2	E1-D6	C	F	1.80	0.05	X	X	0
	G5		NSD					0
	I6		NSD					0
	H1		NSD					0
	J2		NSD					0

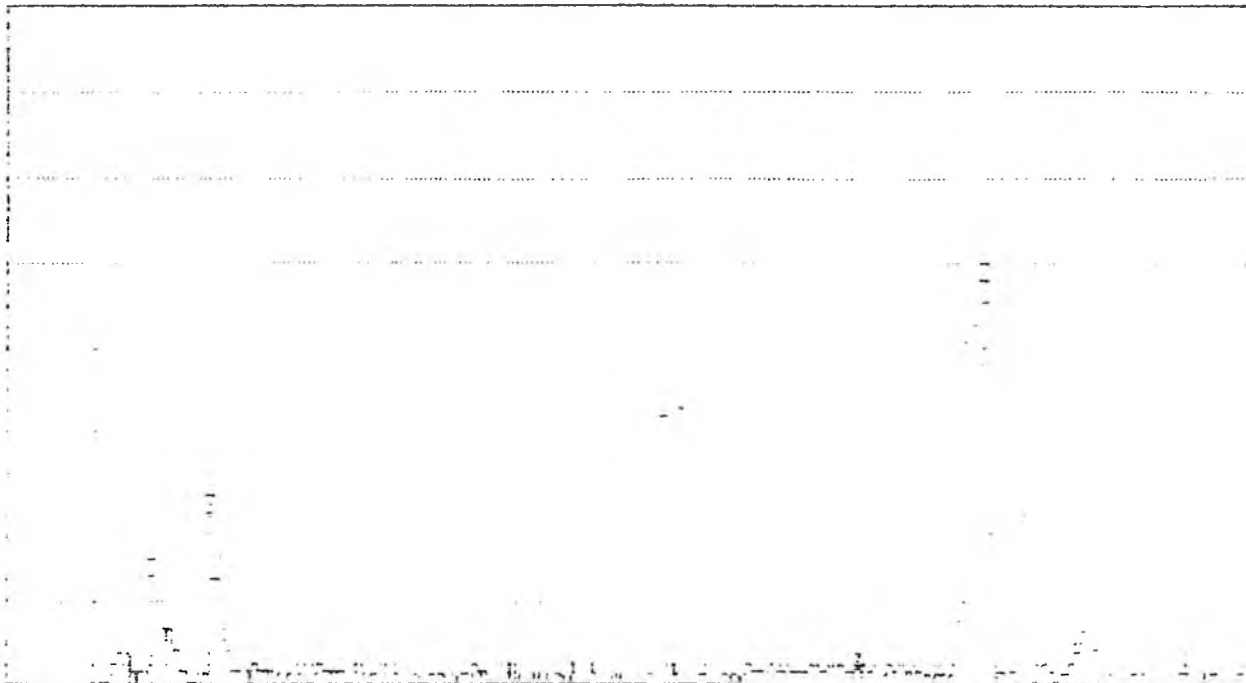
M31968 010 Sample Comments:

REF ID: A66047

Wed 03-Sep-63

SECRET

7c



0000

7E-26

7E-26

0000

11561-010 1-1-60-115

MAS Indirect TEM ANALYSIS M31968-011

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-D

Sample Area/ Volume: 99 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Indirect Air

Dust

YES 1 %

Date Analyzed: 9/3/2003

Analyst: Jayme Callan

Scope Number: 4

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid box Number: 6639

Str < 5um: 1
Str ≥ 5um: 0
Total str: 1
Str / cc > 5: 0.0000 /cc

Number of grids: 2 #1: 101 #3: 102
Number of openings: 10 #2: 103 #4: 105

Average Grid Size: 0.010557
Total Area Analyzed: 0.106

Filter used Dilution Dilution Factor
1/ 2 30 6.666667

Detect_cc: 0.82736

Total cc: 0.82736

Str#	SquareID	Type	Structure:	Length	Width	Morph	SAED	EDS
	A4-11		NSD					0
	J4		NSD					0
1	G5	C	C-F	2.20	0.10	X	X	-1
	E7		NSD					0
	I9		NSD					0
	B4-G9		NSD					0
	I10		NSD					0
	F8		NSD					0
	E10		NSD					0
	B9		NSD					0

M31968 011 Sample Comments:

Wed 03 - Sep - 03

This image shows a blank, aged, cream-colored page, likely an endpaper or flyleaf of a book. The paper has a slightly textured appearance with some faint smudges and discoloration, particularly towards the bottom edge. The left edge of the page shows the binding, with visible stitching or staples. There is no text or other markings on the page.[illegible]

MAS Indirect TEM ANALYSIS M31968-012

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: A-1-E

Sample Area/ Volume: 606 Liters

Date Analyzed: 9/3/2003

Filter Type: MCE 47mm

Analyst: Jayme Callan

Pore size: 0.45

Scope Number: 4

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Indirect Air

Indicated Mag: 25 KX

Dust

Screen Mag: 20 KX

YES 1 %

Grid box Number: 6639

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

Number of grids: 2 #1: 101 #3: 102
Number of openings: 10 #2: 103 #4: 106

Average Grid Size: 0.010608
Total Area Analyzed: 0.106

Filter used Dilution Dilution Factor
1/2 30 6.666667

Detect_cc: 0.13451

Total cc: 0.00000

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	B10-J8		NSD					0
	G8		NSD					0
	D7		NSD					0
	E3		NSD					0
	H3		NSD					0
	B9-F1		NSD					0
	D3		NSD					0
	C5		NSD					0
	E7		NSD					0
	F9		NSD					0

M31968-012 Sample Comments:

MAS Indirect TEM ANALYSIS M31968-013

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: FB-1

Sample Area/ Volume: 0 Liters

Date Analyzed: 9/3/2003

Filter Type: MCE 47mm

Analyst: Jayme Callan

Pore size: 0.45

Scope Number: 4

Effective Filter Area: 1297

Accelerating Voltage: 100 KV

Indirect Air

Indicated Mag: 25 KX

Dust

Screen Mag: 20 KX

YES 1 %

Grid box Number: 6639

Str < 5um: 0

Number of grids: 2

#1: 101

#3: 102

Str ≥ 5um: 0

Number of openings: 10

#2: 103

#4: 106

Total str: 0

Str / cc > 5: #Error /cc

Average Grid Size: 0.010608

Total Area Analyzed: 0.106

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-D4		NSD					0
	C6		NSD					0
	B9		NSD					0
	G8		NSD					0
	H10		NSD					0
	D10-J3		NSD					0
	F4		NSD					0
	E7		NSD					0
	B8		NSD					0
	E10		NSD					0

M31968 013 Sample Comments:

MAS Indirect TEM ANALYSIS M31968-014

CLIENT NAME: Materials Analytical Services, Inc.

CLIENT SAMPLE ID: FB-2

Sample Area/ Volume: 0 Liters

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Indirect Air

Dust

YES 1 %

Date Analyzed: 9/3/2003

Analyst: Jayme Callan

Scope Number: 4

Accelerating Voltage: 100

KV

Indicated Mag: 25

KX

Screen Mag: 20

KX

Grid box Number: 6639

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

Number of grids: 2 #1: 101 #3: 102
Number of openings: 10 #2: 103 #4: 106

Average Grid Size: 0.010608
Total Area Analyzed: 0.106

Filter used Dilution Dilution Factor
1/ 2 30 6.666667

Detect_cc: #Div/0!

Total cc: #Error

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS
	E9-D5		NSD					0
	C4		NSD					0
	A4		NSD					0
	A1		NSD					0
	F1		NSD					0
	E10-J4		NSD					0
	G3		NSD					0
	J7		NSD					0
	J9		NSD					0
	F6		NSD					0

M31968 014 Sample Comments:

MATERIALS ANALYTICAL SERVICES PROJECT LOG

Client Code: MASCORP

MAS ID: M31969
Client Name: Materials Analytical Services, Inc.
Project Name: Chamber - Radio Cleaning
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 8/27/03

TRANSPORT INFORMATION:

Submitted By:	Mike Mount	Documents:	COC
Delivery By:	Hand Delivery		
Received By:	dmazzaferro	Comments for COC:	
Condition:	good		

CONTACT INFORMATION:

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

Page 1 of 1

M31969

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
000	lab blank	0			
001	F-0	25			
002	F-1	15			

SIGNATURES

RECEIVED BY: dmazzaferro

REVIEWED BY: dmazzaferro

PREPARED BY: dmazzaferro

ANALYZED BY: _____

REPORTED BY: _____

DEPOSED BY: _____

INDUSTRIAL HYGIENE AIR SAMPLING CHAIN OF CUSTODY



Co. Name

Address

PH

FAX

MAS, INC

Project Number

Project Name

Work Area Description

Project Representative

Sampling Date

Radiation Cleaning

Chamber

M. Mount

8/27/03

3945 Lakeland Court

Suwanee, GA 30024

PH (770) 866-3200

FAX (770) 866-3259

Sheet 1 of 2

2003 Date	Sample No.	Sample Location	Pump Sample Media	Analysis Desired	Start Time	Stop Time	Total Time (Minutes)	Average Flow Rate (LPM)	Air Volume (Liters)
8/27	A-0-A	IC, NE before		PCM + TEM	06:58	09:59	181	7.95	1801
	A-0-B	SE						10.1	1828
	A-0-C	SW						9.43	1707
	A-0-D	NW						7.50	1774
	A-0-E	OC at decou			06:58	09:59		10.1	1828
	P-1-A	Per, Right, during 11071			15:33	15:43	10	2.47	24.7
	P-1-B	Per, Left, 11073			15:33	15:43	10	2.55	25.5
	A-1-A	IC, NE					10	10.2	102
	A-1-B	SE					10	10.2	102
	A-1-C	SW					10	9.6	96
	A-1-D	NW					10	9.4	99
	A-1-E	OC			15:30	14:30	60	10.1	606
	F-0	Before repair			NA	NA			
	F-1	after repair			NA	NA			

IC - In Containment

OC - Outside Containment

First Transfer By Michael D. Mount 8/27

Second Transfer By

Third Transfer By

CHAIN OF CUSTODY

Initial Shipment Date:

Mode of Transfer

Log-In Date

Received By

8/27/03

Michael D. Mount

SEM DUST ANALYSIS

M31969

001

Materials Analytical Services, Inc.

Chamber - Radio Cleaning

Client Sample ID: F-0

Sample Area/ Volume: 25 cm²

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Fabnc

Analysis type: Dust

Grid Acceptance YES 5 %

Date Analyzed: 9/3/2003

Analyst: Ding Qian

Scope Number: 2

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6621

Str < 5um:	0	Number of grids:	2	#1:	102	#3:	103	Average Grid Size:	0.010353
Str ≥ 5um:	0	Number of openings:	10	#2:	101	#4:	101	Total Area Analyzed:	0.104
Total Str:	0								
Volume Filtered	100 ml	Str / sq ft	0.000E+00	Str / cm ²	0.000E+00				
Dilution Factor	2.5	Str / sq ft ≥ 5	0.000E+00	Str / cm ² ≥ 5	0.000E+00				

Str#	SquareID	Type	Structure	Length	Width	Morph.	SAED	EDS	Photo	Sketch
	E1-A3		NSD							
	C4		NSD							
	D5		NSD							
	F5		NSD							
	H3		NSD							
	E2-C2		NSD							
	B3		NSD							
	C4		NSD							
	B5		NSD							
	C6		NSD							

M31969 001 Sample Comments:

FEM DUST ANALYSIS

M31969

002

Materials Analytical Services, Inc.

Chamber - Radio Cleaning

Client Sample ID:

F-1

Sample Area/ Volume: 15 cm²

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Fabric

Analysis type: Dust

Grid Acceptance YES 3 %

Date Analyzed: 9/3/2003

Analyst: Ding Qian

Scope Number: 2

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6621

Str < 5um:	2	Number of grids:	2	#1: 102	#3: 103	Average Grid Size:	0.010301
Str ≥ 5um:	2	Number of openings:	10	#2: 101	#4: 100	Total Area Analyzed:	0.103
Total Str:	4						

Volume Filtered	30 ml	Str / sq ft	2.599E+07	Str / cm ²	2.798E+04
Dilution Factor	8.333333	Str / sq ft ≥ 5	1.300E+07	Str / cm ² ≥ 5	1.399E+04

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS	Photo	Sketch
	C1-A2		NSD							
	B3		NSD							
1	C4	C	B	4.20	0.02	X	X			
	D5	C	F	2.00	0.01	X	X			
3	E8	C	F	6.80	0.01	X	X			
	C2-D4		NSD							
	G9		NSD							
4	J5	C	F	5.20	0.01	X	X			
	G3		NSD							
	D7		NSD							

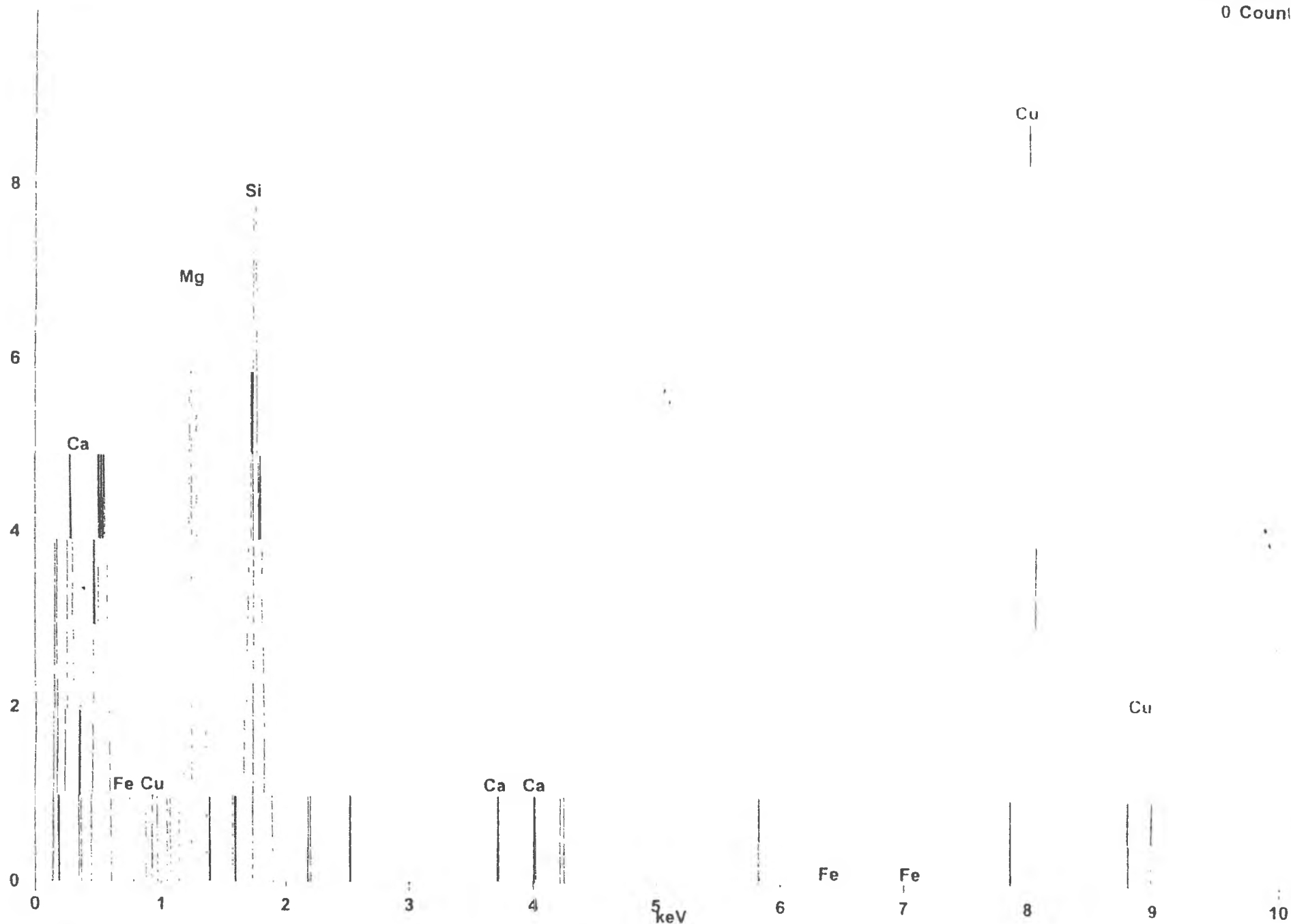
M31969 002 Sample Comments:

Reject: Install Calibration

Full scale counts: 10

M31969-002, Chrysotile EDS

Cursor: 10.228 keV
0 Count



TEM SAMPLE DATA

M31969

Page 1 of 1

Prep SOP#: MT-017
Prep Status: Complete
Sample Type: Fabric
Analysis type: Dust

prep_date: 8/29/03 Prep Tech: dmazzaferro

Archival Information

Slides: 180 Filters: Bottles: 949 Gld_box: 6621

Archive Comments:

Disposal Comments:

Request Dates:

Sample Number	Sample ID	Area	Filter Portion	Total Susp	#1	#2	#3	#4	#5	Filter Type
000	lab blank	0	cm2 1/1	200	100					MT 1 47mm
					Dilution Factors	2				1297
001	F-0	25	cm2 1/1	250	100					MT 1 47mm
					Dilution Factors	2.5				1297
002	F-1	15	cm2 1/1	250	10	30				MT 1 47mm
					Dilution Factors	25	8.333			1297

MATERIALS ANALYTICAL SERVICES

PROJECT LOG

Client Code: 1250

MAS ID: M31892
Client Name: Clapper & Patti
Project Name: Dust Inside Zenith Radio
Logged By: dmazzaferro

Client Job No: _____
Client PO: _____
Date In: 8/18/03

TRANSPORT INFORMATION:

Submitted By:	Bill Longo	Documents:	COC
Delivery By:	Hand Delivery		
Received By:	dmazzaferro	Comments for COC:	
Condition:	good		

CONTACT INFORMATION:

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

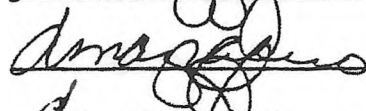
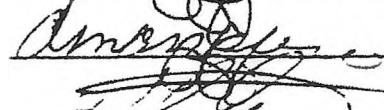
Page 1 of 1

M31892

SAMPLE INFORMATION:

#	Client ID	Volume	#	Client ID	Volume
001	81603-1	36			
002	81603-2	0			

SIGNATURES

RECEIVED BY: 
REVIEWED BY: 
PREPARED BY: 
ANALYZED BY: 
REPORTED BY: _____
DEPOSED BY: _____

TEM SAMPLE DATA

M31892

Page 1 of 1

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

prep_date: 8/19/03 Prep Tech: dmazzaferro

Slides: 193 Filters: 63 Bottles: 951 Gld_box: 6607

Archive Comments:

Disposal Comments:

Prep Dates

Sample Number	Sample ID	Area	Filter Portion	Total Susp	#1	#2	Filtered Volumes in ml			Filter Type
000	lab blank 8/19/03	0	cm2 1/1	100	30					MCE 47mm
					Dilution Factors	3.333				1297
001	81603-1	36	cm2 1/1	100	10	30	0.01	0.05	0.1	MCE 47mm
					Dilution Factors	10	3.333	10000	20000	10000
002	81603-2	0	cm2 1/1	100	30					MCE 47mm
					Dilution Factors	3.333				1297



MAS

3945 Lake field Court
Suwanee, GA 30024
770-866-3200 Phone
770-866-3259 Fax

[illegible]

TEM DUST ANALYSIS

M31892

000

Clapper & Patti
Dust Inside Zenith Radio

Client Sample ID: lab blank 8/19/03

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 0 %

Date Analyzed: 8/21/2003
Analyst: William Stark
Scope Number: 1
Accelerating Voltage: 100 KV
Indicated Mag: 25 KX
Screen Mag: 20 KX
Grid_box: 6607

Str < 5um:	0	Number of grids:	2	#1:	102	#3:	105	Average Grid Size:	0.010661
Str ≥ 5um:	0	Number of openings:	10	#2:	103	#4:	103	Total Area Analyzed:	0.107
Total Str:	0								
Volume Filtered	30 ml	Str / sq ft	0.000E+00	Str / cm2	0.000E+00				
Dilution Factor	3.333333	Str / sq ft ≥ 5	0.000E+00	Str / cm2 ≥ 5	0.000E+00				

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS	Photo	Sketch
	B9-H3		NSD							
	I5		NSD							
	G8		NSD							
	E7		NSD							
	D5		NSD							
	B10-I3		NSD							
	H5		NSD							
	F7		NSD							
	C6		NSD							
	D2		NSD							

M31892 000 Sample Comments:

FEM DUST ANALYSIS

M31892

001

Clapper & Patti

Dust Inside Zenith Radio

Client Sample ID:

81603-1

Sample Area/ Volume: 36 cm2

Filter Type: MCE 47mm

Pore size: 0.45

Effective Filter Area: 1297

Sample type: Dust

Analysis type: Dust

Grid Acceptance YES 0 %

Date Analyzed: 8/22/2003

Analyst: William Stark

Scope Number: 1

Accelerating Voltage: 100 KV

Indicated Mag: 25 KX

Screen Mag: 20 KX

Grid_box: 6607

Str < 5um: 27

Number of grids: 2

#1: 103

#3: 105

Average Grid Size: 0.010608

Str > 5um: 14

Number of openings: 10

#2: 102

#4: 102

Total Area Analyzed: 0.106

Total Str: 41

Str / sq ft 1.294E+10

Str / cm2 1.392E+07

Volume Filtered 0.1 ml

Str / sq ft >=5 4.417E+09

Str / cm2 >=5 4.755E+06

Dilution Factor 1000

Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS	Photo	Sketch
1	E10-F5	C	C-F	10.00	0.10	X	X	✓	---	---
2	G9	C	F	7.00	0.02	X	X	---	---	---
3		C	C-B	1.50	0.20	X	X	---	---	---
		C	C-B	4.50	0.20	X	X	---	---	---
5		C	F	2.40	0.02	X	X	---	---	---
6		C	F	2.80	0.04	X	X	---	---	---
7		C	B	2.20	0.20	X	X	---	---	---
8		C	F	2.00	0.02	X	X	---	---	---
9	D10	C	B	2.20	0.15	X	X	---	---	---
10		C	F	1.00	0.02	X	X	---	---	---
11		C	F	1.20	0.04	X	X	✓	---	---
12	A6	C	F	4.20	0.08	X	X	---	---	---
13		C	B	1.20	0.10	X	X	---	---	---
14		C	F	3.60	0.04	X	X	---	---	---
15	B4	C	B	2.00	0.15	X	X	---	---	---
16		C	F	2.00	0.02	X	X	---	---	---
17		C	F	18.00	0.05	X	X	---	---	---
18		C	F	2.00	0.02	X	X	---	---	---
19		C	F	10.00	0.02	X	X	---	---	---
20		C	B	7.00	0.10	X	X	---	---	---
21		C	C-F	12.00	0.04	X	X	✓	---	---
2	D10-H1	C	B	10.00	0.10	X	X	---	---	---
		C	F	5.20	0.02	X	X	---	---	---

24		C	B	7.00	0.10	X	X	--	--	--
	D5	C	F	2.20	0.02	X	X	--	--	--
26		C	F	1.00	0.02	X	X	--	--	--
27	C8	C	F	5.80	0.02	X	X	--	--	--
28		C	B	4.80	0.15	X	X	--	--	--
29		C	M-F	0.90	0.02	X	X	--	--	--
30		C	F	3.20	0.02	X	X	--	--	--
31		C	F	15.00	0.02	X	X	✓	--	--
32		C	C-F	8.00	0.02	X	X	--	--	--
33	I3	C	B	11.50	0.10	X	X	--	--	--
34		C	C-B	2.80	0.20	X	X	--	--	--
35		C	F	2.60	0.02	X	X	--	--	--
36		C	M-F	3.00	0.02	X	X	--	--	--
37		C	F	1.20	0.02	X	X	--	--	--
38	A4	C	F	6.00	0.02	X	X	--	--	--
39		C	C-F	4.20	0.02	X	X	--	--	--
40		C	M-B	3.40	0.20	X	X	--	--	--
41		C	F	4.80	0.02	X	X	✓	--	--

892 001 Sample Comments:

SEM DUST ANALYSIS

M31892

002

Clapper & Patti
Dust Inside Zenith Radio

Client Sample ID: 81603-2

Sample Area/ Volume:	0 cm2	Date Analyzed:	8/21/2003
Filter Type:	MCE 47mm	Analyst:	William Stark
Pore size:	0.45	Scope Number:	1
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 0 %	Grid_box:	6607

Str < Sum:	0	Number of grids:	2	#1:	103	#3:	105	Average Grid Size:	0.010715
Str ≥ Sum:	0	Number of openings:	10	#2:	100	#4:	106	Total Area Analyzed:	0.107
Total Str:	0								
Volume Filtered	30 ml	Str / sqr ft	0.000E+00	Str / cm2	0.000E+00				
Dilution Factor	3.333333	Str / sqr ft >=5	0.000E+00	Str / cm2 >=5	0.000E+00				

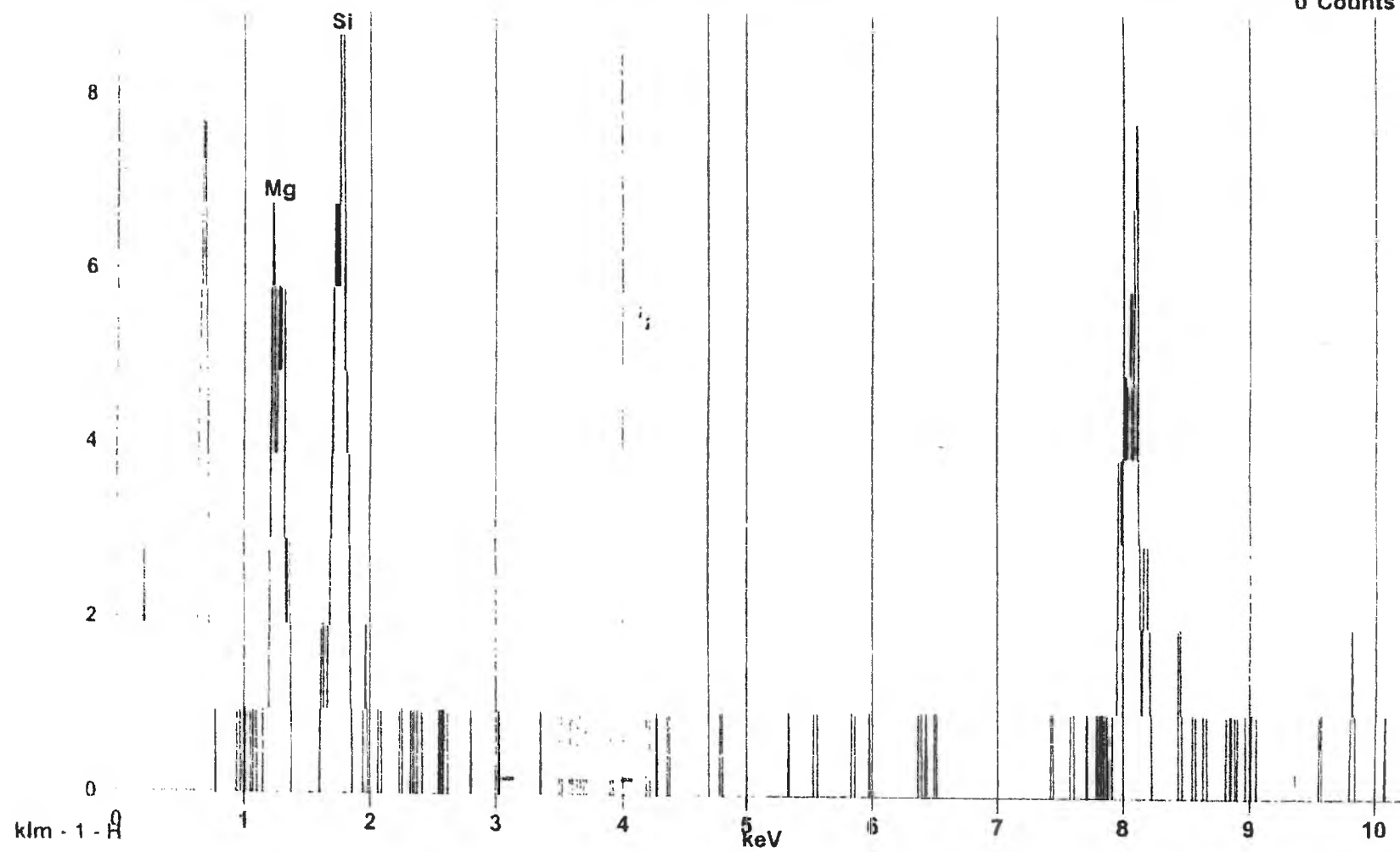
Str#	SquareID	Type	Structure	Length	Width	Morph	SAED	EDS	Photo	Sketch
	E5-D2		NSD							
	F1		NSD							
	H3		NSD							
	C6		NSD							
	A9		NSD							
	E6-H9		NSD							
	E10		NSD							
	B7		NSD							
	A3		NSD							
	F3		NSD							

M31892 002 Sample Comments:

Full scale counts: 9

M31892-001: Chrysotile EDS

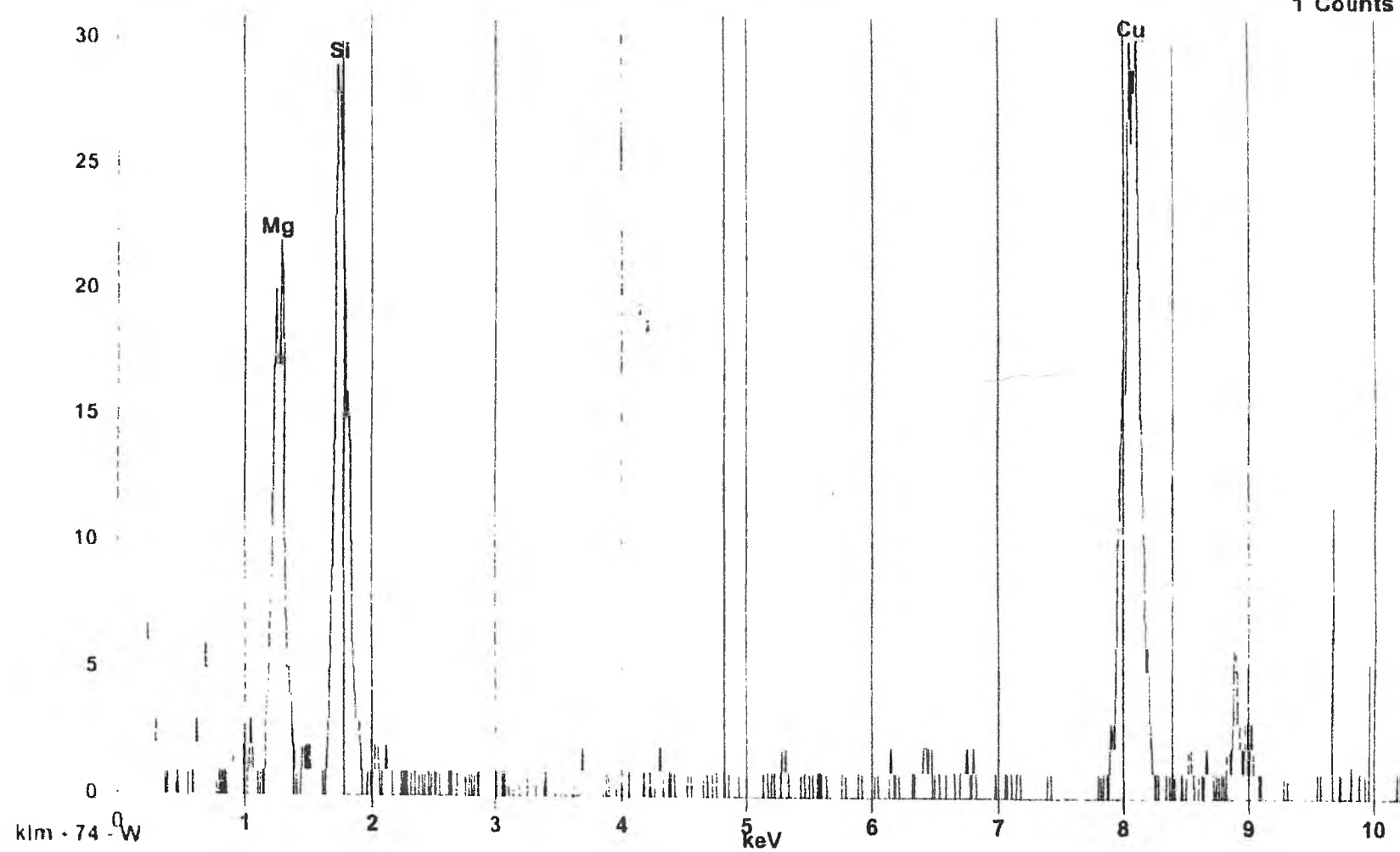
Cursor: 4.697 keV
0 Counts



Full scale counts: 30

M31892-001: Chrysotile EDS

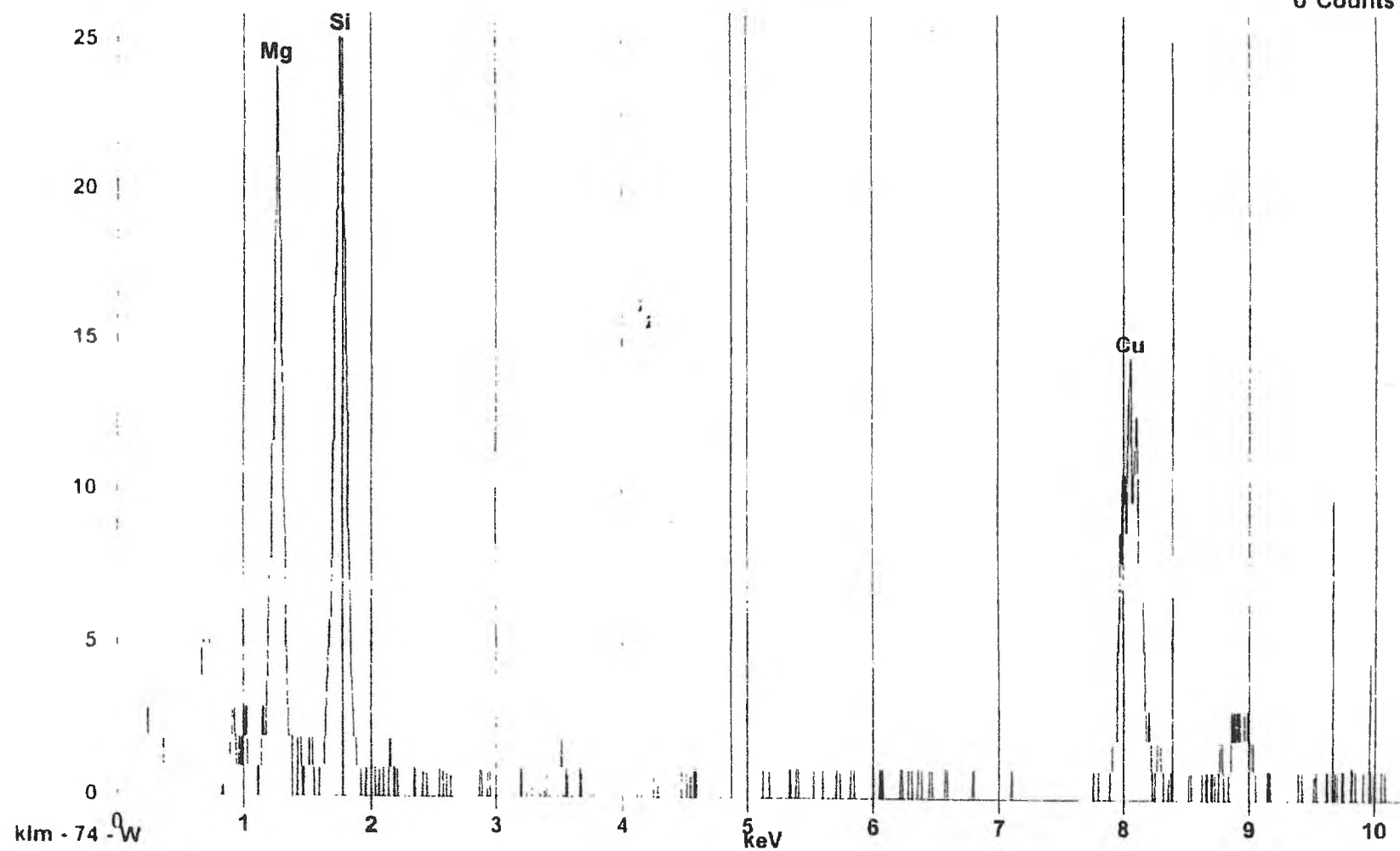
Cursor: 4.823 keV
1 Counts



Full scale counts: 26

M31892-001: Chrysotile EDS

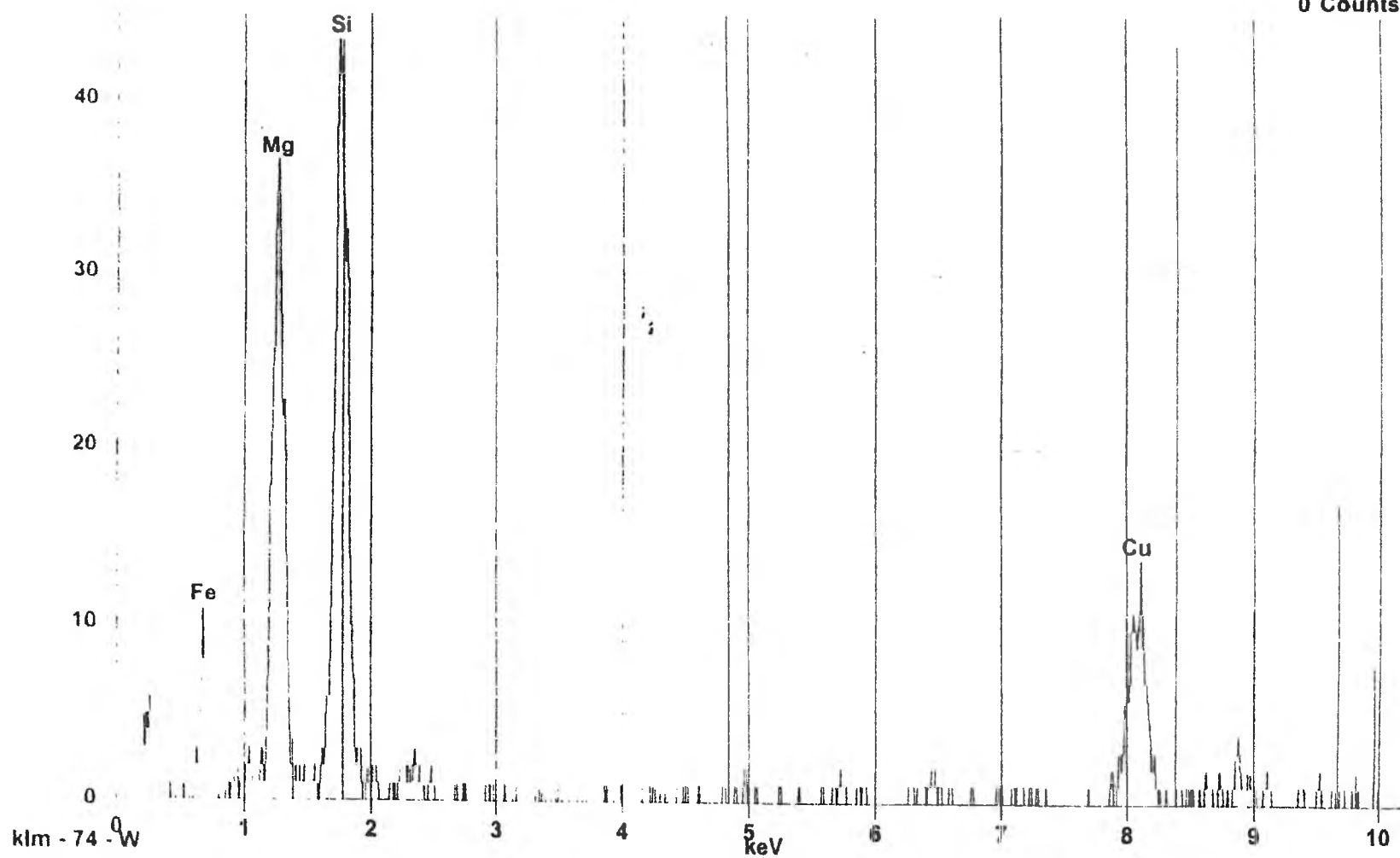
Cursor: 4.874 keV
0 Counts



Full scale counts: 44

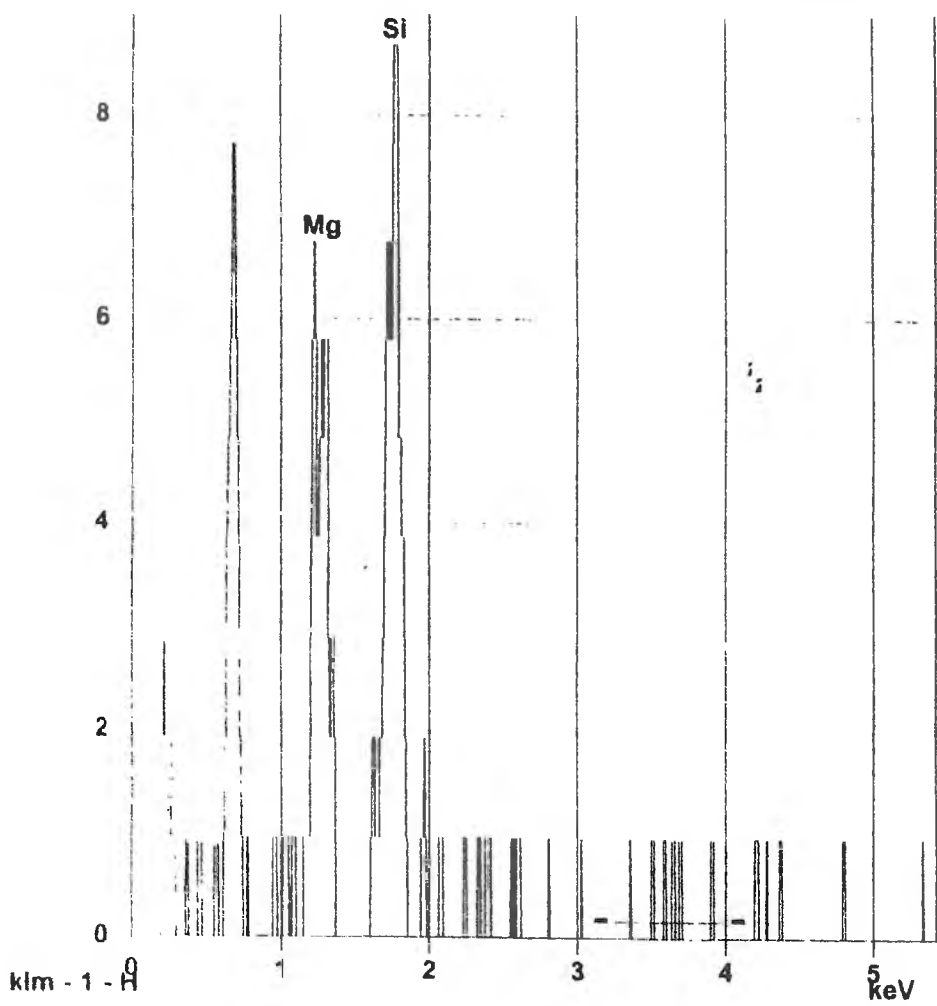
M31892-001: Chrysotile EDS

Cursor: 4.836 keV
0 Counts



Full scale counts: 9

Base(5)



Cursor: 5.429 keV
0 Counts

