

**Region 4
Asbestos/Vermiculite Investigation:**

**Asbestos Results from Vermiculite Processing Facilities in South Carolina
(June 2001)**



October 17, 2001

Science and Ecosystem Support Division
Environmental Investigations Branch
980 College Station Road, Athens, Georgia 30605



INTRODUCTION

On June 6, 2001 staff from the USEPA Region 4, Science and Ecosystem Support Division (SESD), Enforcement and Investigations Branch (EIB) collected vermiculite ore samples from processing facilities and mines in the Enoree and Woodruff, South Carolina areas. The facilities are primarily vermiculite expansion plants or mines. The focus of the sampling was to determine if current handling and processing activities have resulted in asbestos contamination that would be a threat to on-site or off-site human receptors. The results of these sampling investigations are included in this report.

BACKGROUND

The concern over asbestos contamination arose from the discovery of high concentrations of asbestos in the vermiculite deposits in Libby, Montana. The W.R. Grace Company closed the Libby Mine in 1990, but investigators wanted to determine if vermiculite ore from Libby had been shipped to other processing plants around the country. In May 2000 an evaluation of 22 past and present vermiculite operations in Region 4 was initiated by the Emergency Response and Removal Branch (ERRB) in Atlanta, GA. Site surveys were conducted by a Superfund Technical Assessment and Response Team (START) contractor to determine if sampling was necessary. Of the 22 facilities evaluated it was determined that only 8 would require sampling. This sampling occurred between October 2000 and March 2001. In May 2001, three more facilities were added to the sampling list. These were Carolina Vermiculite, Palmetto Vermiculite and WR Grace in South Carolina.

STUDY OBJECTIVES

The objective was to collect bulk material samples from each facility and analyze them for releasable asbestos using both Polarized Light Microscopy (PLM) and Transmission Electron Microscopy (TEM). The result would be used to determine if the material was "asbestos containing" according to the Toxic Substances Control Act (TSCA) definition of greater than 1% asbestos by weight (U S Code: Title 15, Section 2624).

STUDY AREA

The following facilities in South Carolina were sampled:

Carolina Vermiculite	P O Box 98	Woodruff, SC
Palmetto Vermiculite	P O Box 178	Woodruff, SC
WR Grace	26383 Hwy 221	Enoree, SC

STUDY METHODS

Surface soil samples were collected, when possible, close to where the exfoliation process was

conducted and in the area where the raw ore was stored. Additionally, a sample of the raw ore was collected when available. If the plant had more than one source of vermiculite, a sample was collected from each source. Approximately 1 kg of sample was collected for analysis. All samples were collected in accordance with the US EPA Region 4, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May, 1996. Samples were analyzed in accordance with the **US EPA Superfund Method for the Determination of Releasable Asbestos in Soils and Bulk Materials, Interim Version (Revised MDL)**. Laboratory data sheets are Attachment 1.

STUDY RESULTS

Carolina Vermiculite, Woodruff, SC 06/06/01
Project #01-0811

Sample ID	Sample Description	Results
CV-001-VO	Ore from Hanna Mine	None Detected
CV-002-VO	Blend pile	None Detected
CV-003-VO	"Slime" from ditch to settling pond	None Detected
CV-004-VO	Ore concentrate	None Detected
CV-005-VO	Ore from Fanny Young Mine	None Detected

Palmetto Vermiculite, Woodruff, SC 06/06/01
Project #01-0812

Sample ID	Sample Description	Results
PV-123-VO	Composite of African ore grades A2, A3, A4	None Detected
PV-004-VO	Virginia ore	None Detected
PV-005-VO	Carolina ore	None Detected
PV-006-VO	Waste rock	None Detected
PV-007-VO	Finished product	None Detected

WR Grace, Enoree, SC 06/06/01
Project #01-0809

Sample ID	Sample Description	Results
WR-001-VO	Davis Mine ore	<1% Tremolite /Actinolite
WR-002-VO	Ball Mine ore	<1% Tremolite
WR-003-VO	Rim Pile at plant	None Detected
WR-004-VO	#3 ore concentrate	None Detected
WR-005-VO	#4 expanded vermiculite	<1% Tremolite
WR-006-VO	Stoner rock from #4 vermiculite	None Detected
WR-007-VO	Tailings pond	<1% Tremolite /Actinolite

The above results were submitted by EMSL Laboratory, Westmont, NJ and reviewed by Integrated Laboratory Systems, Athens, GA. No data qualifiers were applied to the results.

CONCLUSIONS

From the laboratory results, 13 of the 17 samples submitted for asbestos analysis were “None Detected” and the remaining 4 samples were “<1% Tremolite” or “<1% Tremolite/Actinolite”. Therefore, according to the current TSCA definition of >1% being an asbestos containing material, no further action is needed.

LITERATURE CITED

US EPA Region 4 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual. May 1996.

US EPA Superfund Method for the Determination of Releasable Asbestos in Soils and Bulk Materials, Interim Version, Revised MDL.

Toxic Substances Control Act, US Code: Title 15, Section 2642.

ATTACHMENT 1

ANALYTICAL DATA SHEETS

**Submitted by
EMSL Laboratory
Westmont, NJ
and reviewed by
Integrated Laboratory Systems,
Athens, GA**

August 8, 2001

Jim Gray
US EPA
College Station Rd
Athens, GA 30613-7799

RE: EMSL Order ID# 040109201

Dear Jim:

Attached please find the results of your soil samples from the above referenced order number. These samples were analyzed for asbestos content via PLM NIOSH 9002 (Issue 2) and for asbestos structure quantification via the Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (EPA-540-R97-028 EPA Superfund). This letter is meant to document all the structure quantities identified by the Elutriator method including those not counted/reported based on the method's requirements. A summary of the results are given in the table below, explanatory notes follow. All results are from the reading of 10 grid openings for each analyzed sample.

<u>Customer Sample ID/ EMSL Sample ID</u>	<u>Total Asbestos Structures₂</u>	<u>Reported Asbestos Structures₃</u>		<u>Excluded Asbestos Structures₆</u>	<u>Mineral Fibers of Concern₇</u>
		<u>Protocol₄</u>	<u>Long₅</u>		
PV-004-VO/040109201-0001	NOT REPORTED ₁	N/A	N/A	N/A	N/A
PV-005-VO/040109201-0002	NOT REPORTED ₁	N/A	N/A	N/A	N/A
PV-006-VO/040109201-0003	0	0	0	0	3
PV-007-VO/040109201-0004	NOT REPORTED ₁	N/A	N/A	N/A	N/A
PV-123-VO/040109201-0005	0	0	0	0	1
CV-001-VO/040109201-0006	0	0	0	0	3
CV-002-VO/040109201-0007	0	0	0	0	0
CV-003-VO/040109201-0008	0	0	0	0	0
CV-004-VO/040109201-0009	0	0	0	0	0
CV-005-VO/040109201-0010	0	0	0	0	5
CV-003-VO (QC) / 040109201-0013	0	0	0	0	5

Notes:

1. These samples of soil/vermiculite did not generate any measurable (by weight) respirable dust for analysis when placed in the elutriator and such the subsequent analysis could not be performed. It is believed that these samples may have been subjected to a preparatory or processing procedure incorporating sieving. This may have resulted in size discrimination in these samples, leaving no particles <10 μ .
2. Total asbestos structures represents all asbestos structures (fibers, bundles, cluster, and matrix) found during analysis. This includes six asbestos types-Chrysotile and Amphibole Asbestos (Amosite, Actinolite, Tremolite, Crocidolite, and Anthophyllite).

Notes(Continued)

3. Reported asbestos structures represent all asbestos structures that meet the reporting requirements based on size as stated in the EPA Superfund Method. These structures must be $\leq 0.5\mu$ in diameter and $\geq 5\mu$ in length.
4. Protocol asbestos structures represent all asbestos structures that meet the requirements of Notes 1 and 2 and are $5-10\mu$ in length.
5. Long asbestos structures represent all asbestos structures that meet the requirements of Notes 1 and 2 and are $>10\mu$ in length.
6. Excluded asbestos structures represent all asbestos structures that meet the requirements of Note 1 but do not meet the size requirements of Notes 2-4.
7. Mineral Fibers of Concern represent a newer class of amphibole categories that has been identified by the USEPA Region 8 in conjunction with the Libby, MT project. These include richterite and winchite. The "Libby Amphiboles" are not currently classified as asbestos but those performing the risk assessment and exposure modeling from the sample results may take this mineral fiber data into consideration.

If you need any calculations based on the Libby Amphiboles identified in these samples, please let me know and I can create additional reports showing this data. If you have any questions or need further information please do not hesitate to contact me at 800-220-3675X 1209.

Sincerely,



Stephen Siegel, CIH
Asbestos Lab Manager

EPA US EPA SEDD Athens GA

Generic Chain of Custody

Copy

Reference Case:
Client No: **R**

Region: 4	Date Shipped: 6/14/2001	Chain of Custody Record	
Project Code: 01-0812	Carrier Name: FedEx	Refiniquished By: <i>[Signature]</i>	Sampler Signature: <i>[Signature]</i>
Account Code: 50102D04ZZQB00	Airbill:	(Date / Time) 6/14/01 13:00	Received By (Date / Time)
CERCLIS ID:	Shipped to: EMSL Analytical Inc	1	
Spill ID:	107 Haddon Ave	2	
Site Name/State: Palmetto Vermiculite/SC	Westmont NJ 08108	3	
Project Leader: Kevin Simmons	(856) 858-4800	4	
Action:			
Sampling Co: US EPA SEDD			

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE	STATION LOCATION	SAMPLE COLLECT DATE/TIME	SAMPLE No.	QC Type
PV-004-VO	Other/ Art Masters	L/G	ASBESTOS (45)	4A-103074 (Not preserved) (1)	PV-004-VO	S: 6/6/2001 13:32		-
PV-005-VO	Other/ Art Masters	L/G	ASBESTOS (45)	4A-103075 (Not preserved) (1)	PV-005-VO	S: 6/6/2001 13:34		-
PV-006-VO	Other/ Art Masters	L/G	ASBESTOS (45)	4A-103076 (Not preserved) (1)	PV-006-VO	S: 6/6/2001 13:35		-
PV-007-VO	Other/ Art Masters	L/G	ASBESTOS (45)	4A-103077 (Not preserved) (1)	PV-007-VO	S: 6/6/2001 13:45		-
PV-123-VO	Other/ Art Masters	L/C	ASBESTOS (45)	4A-103071 (Not preserved) (1)	PV-123-VO	S: 6/6/2001 13:30		-

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysts Key: ASBESTOS = Asbestos	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____

TR Number: 4-473322073-061401-0001

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
Send Copy to: Contract Laboratory Analytical Services Support, 2000 Edmund Halley Dr., Reston, VA. 20191-3436 Phone 703/264-8348 Fax 703/264-9222

REGION COPY

EPA US EPA SEDD Athens GA

Generic Chain of Custody

Copy

Reference Case:
Client No: **R**

Region: 4		Date Shipped: 6/14/2001		Chain of Custody Record	
Project Code: 01-0811		Carrier Name: FedEx		Relinquished By (Date / Time)	
Account Code: 50102D04ZZQB00		Airbill:		Received By (Date / Time)	
CERCLIS ID:		Shipped to: EMSL Analytical Inc 107 Haddon Ave Westmont NJ 08108 (856) 858-4800		Sampler Signature: <i>[Signature]</i>	
Spill ID:					
Site Name/State: Carolina Vermiculite/SC					
Project Leader: Kevin Simmons					
Action:					
Sampling Co: US EPA SEDD					

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE	STATION LOCATION	SAMPLE COLLECT DATE/TIME	SAMPLE No.	QC Type
CV-001-VO	Other/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103065 (Not preserved) (1)	CV-001-VO	S: 6/6/2001 10:52		
CV-002-VO	Other/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103066 (Not preserved) (1)	CV-002-VO	S: 6/6/2001 11:00		
CV-003-SS	Surface Soil/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103067 (Not preserved) (1)	CV-003-SS	S: 6/6/2001 11:15		
CV-004-VO	Other/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103068 (Not preserved) (1)	CV-004-VO	S: 6/6/2001 11:40		
CV-005-VO	Other/ Kevin Simmons	L/C	ASBESTOS (45)	4A-103069 (Not preserved) (1)	CV-005-VO	S: 6/6/2001 12:10		

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key: ASBESTOS = Asbestos	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____

TR Number: 4-473322073-061401-0002

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Contract Laboratory Analytical Services Support, 2000 Edmund Halley Dr., Reston, VA. 20191-3436 Phone 703/264-9222 Fax 703/264-9222

REGION COPY

EMSL Analytical, Inc.

107 Haddon Ave., Westmont, NJ 08108

Phone: (856) 858-4800 Fax: (856) 858-4980 Email: eslegal@EMSL.com

EMSL

Attn: Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: (706) 355-8744

Phone: 706-355-8613

Project:

Customer ID: USEP50

Customer PO:

Received: 06/15/01 11:38 AM

EMSL Order: 040109201

EMSL Project ID:

Analysis Date: 7/26/2001


Polarized Light Microscopy (PLM) Performed by NIOSH Method 9002, Issue 2

Sample	Location	Appearance	Treatment	% Fibrous	Non-Asbestos		Asbestos
					% Non-Fibrous	% Type	% Type
CV-004-VO (DUPLICATE) 040109201-0011		Brown Non-Fibrous Heterogeneous	Teased		100% Non-fibrous (other)		None Detected
LAB BLANK NIST FIBERGLASS (NBS 1866) 040109201-0012		Pink Fibrous Homogeneous	Teased	100% Glass			None Detected

Analyst(s)

Linda Price (1)

Scott Combs (11)


Stephen Siegel, CIH
or other approved signatory

Disclaimers: PLM has been known to miss asbestos in a small percentage of samples which contain asbestos. Thus negative PLM results cannot be guaranteed. EMSL suggests that samples reported as <1% or none detected be tested with either SEM or TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL. The above test must not be used by the client to claim product endorsement by NVLAP nor any agency of the United States Government. Laboratory is not responsible for the accuracy of results when requested to physically separate and analyze layered samples.

PLM-1

EMSL Analytical, Inc.

107 Haddon Ave., Westmont, NJ 08108

Phone: (856) 858-4800 Fax: (856) 858-4960 Email: sale@EMSL.com**EMSL**

Attn: Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: (706) 355-8744

Phone: 706-355-8613

Project:

Customer ID: USEP60

Customer PO:

Received: 06/15/01 11:38 AM

EMSL Order: 040109201

EMSL Project ID:

Analysis Date: 7/26/2001

Polarized Light Microscopy (PLM) Performed by NIOSH Method 9002, Issue 2

Sample	Location	Appearance	Treatment	Non-Asbestos		Asbestos
				% Fibrous	% Non-Fibrous	% Type
PV-004-VO 040109201-0001		Brown/Gray/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
PV-005-VO 040109201-0002		Gray/Brown/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
PV-006-VO 040109201-0003		Various Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
PV-007-VO 040109201-0004		Tan/Gold/Gray Non-Fibrous Heterogeneous	Teased		100% Non-fibrous (other)	None Detected
PV-123-VO 040109201-0005		Gray/Gold/Tan Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
CV-001-VO 040109201-0006		Gray/Brown/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
CV-002-VO 040109201-0007		Tan/Gold/Gray Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
CV-003-VO 040109201-0008		Tan/Gray/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose <1% Fibrous (other)	100% Non-fibrous (other)	None Detected
CV-004-VO 040109201-0009		Gray/Brown/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose <1% Fibrous (other)	100% Non-fibrous (other)	None Detected
CV-005-VO 040109201-0010		Gray/Rust/Gold Non-Fibrous Heterogeneous	Teased Crushed	<1% Cellulose <1% Fibrous (other)	100% Non-fibrous (other)	None Detected

Analyst(s)

Linda Price (1)
Scott Combs (11)

Stephen Siegel, CIH
or other approved signatory

Disclaimer: PLM has been known to miss asbestos in a small percentage of samples which contain asbestos. Thus negative PLM results cannot be guaranteed. EMSL suggests that samples reported as <1% or none detected be tested with either SEM or TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL. The above test must not be used by the client to claim product endorsement by NVLAP nor any agency of the United States Government. Laboratory is not responsible for the accuracy of results when requested to physically separate and analyze layered samples.

PLM-1

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Report Date 7/25/2001
Project Name Region 4 Vermiculite
Methods Draft Modified Elutriator Method for the Determination
of Asbestos In Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started 6/25/2001
Date Completed 7/24/2001
Analyst AS

Lab Sample# 040109201-0005
Field Subsample# PV-123-VO
Field Preparation Technique N/A
Sample Drying Yes
Sample Splitting N/A
Other N/A

Tem Analysis

Effective Area of Analytical Filter (sq mm) 385 (ME)
Magnification 19,000 X
Grid Opening Area (sq mm) 0.0061
Number of Grid Openings Scanned 10
Asbestos Structure Size and Type Categories of Interest Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category 5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g) 60.51
Air Flow Rate Through ME opening of Dust Generator (ml/min) 1430
Air Flow Rate Through IST opening of Dust Generator (ml/min) 72
Estimated Total Air Flow Rate Through Elutriator (ml/min) 1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator

Mass of Respirable Dust on Filter(g) 0.000154

Asbestos Analysis Results

	Total	Number or Protocol Structures Long(>10um)
No. of Chrysotile Asbestos Structures	0	0
No. of Amphibole Asbestos Structures	0	0
Amphibole Mineral Type(s)		

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	Concentrations	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< 4.098E+07	< 8.033E+07
Long Chrysotile Protocol Structures	< 4.098E+07	< 8.033E+07
Total Amphibole Protocol Structures	< 4.098E+07	< 8.033E+07
Long Amphibole Protocol Structures	< 4.098E+07	< 8.033E+07
Long Asbestos Protocol Structures	< 4.098E+07	< 8.033E+07
Total Asbestos Protocol Structures	< 4.098E+07	< 8.033E+07
Estimated Analytical Sensitivity: (s/gPM10)	4.098E+07	8.033E+07

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
Contacts: Stephen Slegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Report Date 7/25/2001
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Methods Draft Modified Elutriator Method for the Determination
of Asbestos in Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started
Date Completed
Analyst

6/25/2001
7/24/2001
AS

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

040109201-0001
PV-004-VO
N/A
Yes
N/A
N/A

Tem Analysis

Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

385 (ME)
19,000 X
0.0061
0
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category

5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

62.6
1430
72
1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator

Mass of Respirable Dust on Filter(g)

0

Asbestos Analysis Results

No.of Chrysotile Asbestos Structures
No.of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

Total Number or Protocol Structures
Long(>10um)

0 0
0 0

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	Concentrations	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< #DIV/0!	< #DIV/0!
Long Chrysotile Protocol Structures	< #DIV/0!	< #DIV/0!
Total Amphibole Protocol Structures	< #DIV/0!	< #DIV/0!
Long Amphibole Protocol Structures	< #DIV/0!	< #DIV/0!
Long Asbestos Protocol Structures	< #DIV/0!	< #DIV/0!
Total Asbestos Protocol Structures	< #DIV/0!	< #DIV/0!
Estimated Analytical Sensitivity: (s/gPM10)	#DIV/0!	#DIV/0!

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Report Date 7/25/2001
Project Name Region 4 Vermiculite
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of Asbestos in Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started
Date Completed
Analyst

6/25/2001
7/24/2001
AS

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

040109201-0002
PV-005-VO
N/A
Yes
N/A
N/A

Tem Analysis

Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

385 (ME)
19,000 X
0.0061
0
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category

5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

58.91
1430
72
1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator

Mass of Respirable Dust on Filter(g)

0

	Number or Protocol Structures	
	<u>Total</u>	<u>Long(>10um)</u>
Asbestos Analysis Results		
No. of Chrysotile Asbestos Structures	0	0
No. of Amphibole Asbestos Structures	0	0
Amphibole Mineral Type(s)		

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	Concentrations	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< #DIV/0!	< #DIV/0!
Long Chrysotile Protocol Structures	< #DIV/0!	< #DIV/0!
Total Amphibole Protocol Structures	< #DIV/0!	< #DIV/0!
Long Amphibole Protocol Structures	< #DIV/0!	< #DIV/0!
Long Asbestos Protocol Structures	< #DIV/0!	< #DIV/0!
Total Asbestos Protocol Structures	< #DIV/0!	< #DIV/0!
Estimated Analytical Sensitivity: (s/gPM10)	#DIV/0!	#DIV/0!

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Report Date 7/25/2001
Project Name Region 4 Vermiculite
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(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started
Date Completed
Analyst

6/25/2001
7/24/2001
AS

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

040109201-0003
PV-006-VO
N/A
Yes
N/A
N/A

Tem Analysis

Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

385 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category

5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

62.25
1430
72
1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator

Mass of Respirable Dust on Filter(g)

0.000163

Asbestos Analysis Results	Number or Protocol Structures	
	Total	Long(>10um)
No.of Chrysotile Asbestos Structures	0	0
No.of Amphibole Asbestos Structures	0	0
Amphibole Mineral Type(s)		

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	Concentrations	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< 3.872E+07	< 7.589E+07
Long Chrysotile Protocol Structures	< 3.872E+07	< 7.589E+07
Total Amphibole Protocol Structures	< 3.872E+07	< 7.589E+07
Long Amphibole Protocol Structures	< 3.872E+07	< 7.589E+07
Long Asbestos Protocol Structures	< 3.872E+07	< 7.589E+07
Total Asbestos Protocol Structures	< 3.872E+07	< 7.589E+07
Estimated Analytical Sensitivity: (s/gPM10)	3.872E+07	7.589E+07

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Report Date 7/25/2001
Project Name Region 4 Vermiculite
Methods Draft Modified Elutriator Method for the Determination
of Asbestos in Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started
Date Completed
Analyst

6/25/2001
7/24/2001
AS

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

040109201-0004
PV-007-VO
N/A
Yes
N/A
N/A

Tem Analysis

Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

385 (ME)
19,000 X
0.0061
0
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category

5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

6.32
1430
72
1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

0

	<u>Total</u>	<u>Number or Protocol Structures</u> <u>Long(>10um)</u>
Asbestos Analysis Results		
No. of Chrysotile Asbestos Structures	0	0
No. of Amphibole Asbestos Structures	0	0
Amphibole Mineral Type(s)		

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	<u>Concentrations</u>	
	<u>Mean</u>	<u>95% UCL</u>
Total Chrysotile Protocol Structures	< #DIV/0!	< #DIV/0!
Long Chrysotile Protocol Structures	< #DIV/0!	< #DIV/0!
Total Amphibole Protocol Structures	< #DIV/0!	< #DIV/0!
Long Amphibole Protocol Structures	< #DIV/0!	< #DIV/0!
Long Asbestos Protocol Structures	< #DIV/0!	< #DIV/0!
Total Asbestos Protocol Structures	< #DIV/0!	< #DIV/0!
Estimated Analytical Sensitivity: (s/gPM10)	#DIV/0!	#DIV/0!

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Report Date 7/25/2001
Project Name Region 4 Vermiculite
Methods Draft Modified Elutriator Method for the Determination
of Asbestos In Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started
Date Completed
Analyst

6/25/2001
7/24/2001
AS

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

040109201-0006
CV-001-VO
N/A
Yes
N/A
N/A

Tem Analysis

Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

385 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category

5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

61.13
1430
72
1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator

Mass of Respirable Dust on Filter(g)

0.000165

	<u>Total</u>	Number or Protocol Structures <u>Long(>10um)</u>
Asbestos Analysis Results		
No.of Chrysotile Asbestos Structures	0	0
No.of Amphibole Asbestos Structures	0	0
Amphibole Mineral Type(s)		

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	<u>Concentrations</u>	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< 3.825E+07	< 7.497E+07
Long Chrysotile Protocol Structures	< 3.825E+07	< 7.497E+07
Total Amphibole Protocol Structures	< 3.825E+07	< 7.497E+07
Long Amphibole Protocol Structures	< 3.825E+07	< 7.497E+07
Long Asbestos Protocol Structures	< 3.825E+07	< 7.497E+07
Total Asbestos Protocol Structures	< 3.825E+07	< 7.497E+07
Estimated Analytical Sensitivity: (s/gPM10)	3.825E+07	7.497E+07

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Westmont, NJ 08108
Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Report Date 7/25/2001
Project Name Region 4 Vermiculite
Methods Draft Modified Elutriator Method for the Determination
of Asbestos in Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started 6/25/2001
Date Completed 7/24/2001
Analyst AS

Lab Sample# 040109201-0007
Field Subsample# CV-002-VO
Field Preparation Technique N/A
Sample Drying Yes
Sample Splitting N/A
Other N/A

Term Analysis

Effective Area of Analytical Filter (sq mm) 385 (ME)
Magnification 19,000 X
Grid Opening Area (sq mm) 0.0061
Number of Grid Openings Scanned 10
Asbestos Structure Size and Type Categories of Interest Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category 5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g) 61.45
Air Flow Rate Through ME opening of Dust Generator (ml/min) 1430
Air Flow Rate Through IST opening of Dust Generator (ml/min) 72
Estimated Total Air Flow Rate Through Elutriator (ml/min) 1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator

Mass of Respirable Dust on Filter(g) 0.000016

	<u>Total</u>	Number or Protocol Structures <u>Long(>10um)</u>
Asbestos Analysis Results		
No. of Chrysotile Asbestos Structures	0	0
No. of Amphibole Asbestos Structures	0	0
Amphibole Mineral Type(s)		

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	<u>Concentrations</u>	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< 3.945E+08	< 7.732E+08
Long Chrysotile Protocol Structures	< 3.945E+08	< 7.732E+08
Total Amphibole Protocol Structures	< 3.945E+08	< 7.732E+08
Long Amphibole Protocol Structures	< 3.945E+08	< 7.732E+08
Long Asbestos Protocol Structures	< 3.945E+08	< 7.732E+08
Total Asbestos Protocol Structures	< 3.945E+08	< 7.732E+08
Estimated Analytical Sensitivity: (s/gPM10)	3.945E+08	7.732E+08

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Westmont, NJ 08108
Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Report Date 7/25/2001
Project Name Region 4 Vermiculite
Methods Draft Modified Elutriator Method for the Determination
of Asbestos in Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started
Date Completed
Analyst

6/23/2001
7/24/2001
AS

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

040109201-0008
CV-003-VO
N/A
Yes
N/A
N/A

Tem Analysis

Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

385 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category

5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

61.02
1430
72
1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

0.000031

Asbestos Analysis Results

No.of Chrysotile Asbestos Structures
No.of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

Total

0
0

Number or Protocol Structures Long(>10um)

0
0

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	Concentrations	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< 2.036E+08	< 3.990E+08
Long Chrysotile Protocol Structures	< 2.036E+08	< 3.990E+08
Total Amphibole Protocol Structures	< 2.036E+08	< 3.990E+08
Long Amphibole Protocol Structures	< 2.036E+08	< 3.990E+08
Long Asbestos Protocol Structures	< 2.036E+08	< 3.990E+08
Total Asbestos Protocol Structures	< 2.036E+08	< 3.990E+08
Estimated Analytical Sensitivity: (s/gPM10)	2.036E+08	3.990E+08

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Report Date 7/25/2001
Project Name Region 4 Vermiculite
Methods Draft Modified Elutriator Method for the Determination
of Asbestos in Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started 6/25/2001
Date Completed 7/24/2001
Analyst AS

Lab Sample# 040109201-0009
Field Subsample# CV-004-VO
Field Preparation Technique N/A
Sample Drying Yes
Sample Splitting N/A
Other N/A

Tem Analysis
Effective Area of Analytical Filter (sq mm) 385 (ME)
Magnification 19,000 X
Grid Opening Area (sq mm) 0.0061
Number of Grid Openings Scanned 10
Asbestos Structure Size and Type Categories of Interest Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category 5u Length
<0.5u Diameter

Dust Generator
Mass of Sample Tumbled(g) 60.71
Air Flow Rate Through ME opening of Dust Generator (ml/min) 1430
Air Flow Rate Through IST opening of Dust Generator (ml/min) 72
Estimated Total Air Flow Rate Through Elutriator (ml/min) 1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g) 0.000079

	<u>Total</u>	<u>Number of Protocol Structures</u> <u>Long(>10um)</u>
Asbestos Analysis Results		
No. of Chrysotile Asbestos Structures	0	0
No. of Amphibole Asbestos Structures	0	0
Amphibole Mineral Type(s)		

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	<u>Concentrations</u>	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< 7.989E+07	< 1.566E+08
Long Chrysotile Protocol Structures	< 7.989E+07	< 1.566E+08
Total Amphibole Protocol Structures	< 7.989E+07	< 1.566E+08
Long Amphibole Protocol Structures	< 7.989E+07	< 1.566E+08
Long Asbestos Protocol Structures	< 7.989E+07	< 1.566E+08
Total Asbestos Protocol Structures	< 7.989E+07	< 1.566E+08
Estimated Analytical Sensitivity: (s/gPM10)	7.989E+07	1.566E+08

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
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Report Date 7/25/2001
Project Name Region 4 Vermiculite
Methods Draft Modified Elutriator Method for the Determination
of Asbestos in Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started
Date Completed
Analyst

6/25/2001
7/24/2001
AS

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

040109201-0010
CV-005-VO
N/A
Yes
N/A
N/A

Tem Analysis

Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

385 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category

5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

60.64
1430
72
1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator

Mass of Respirable Dust on Filter(g)

0.000138

Asbestos Analysis Results

No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

Total

0
0

Number or Protocol Structures

Long(>10um)

0
0

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	Concentrations	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< 4.574E+07	< 8.964E+07
Long Chrysotile Protocol Structures	< 4.574E+07	< 8.964E+07
Total Amphibole Protocol Structures	< 4.574E+07	< 8.964E+07
Long Amphibole Protocol Structures	< 4.574E+07	< 8.964E+07
Long Asbestos Protocol Structures	< 4.574E+07	< 8.964E+07
Total Asbestos Protocol Structures	< 4.574E+07	< 8.964E+07
Estimated Analytical Sensitivity: (s/gPM10)	4.574E+07	8.964E+07

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Report Date 7/27/2001
Project Name Region 4 Vermiculite
Methods Draft Modified Elutriator Method for the Determination
of Asbestos in Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)
EMSL Order ID 040109201

Date Started
Date Completed
Analyst

6/25/2001
7/25/2001
ES

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

040109201-0013
CV-003-VO (QC)
N/A
Yes
N/A
N/A

Tem Analysis

Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

385 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Minimum Acceptable Structure Identification Category

5u Length
<0.5u Diameter

Dust Generator

Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

61.02
1430
72
1502

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator

Mass of Respirable Dust on Filter(g)

0.000031

Asbestos Analysis Results

No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

Total

0
0

Number or Protocol Structures

Long(>10um)

0
0

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

	Concentrations	
	Mean	95% UCL
Total Chrysotile Protocol Structures	< 2.036E+08	< 3.990E+08
Long Chrysotile Protocol Structures	< 2.036E+08	< 3.990E+08
Total Amphibole Protocol Structures	< 2.036E+08	< 3.990E+08
Long Amphibole Protocol Structures	< 2.036E+08	< 3.990E+08
Long Asbestos Protocol Structures	< 2.036E+08	< 3.990E+08
Total Asbestos Protocol Structures	< 2.036E+08	< 3.990E+08
Estimated Analytical Sensitivity: (s/gPM10)	2.036E+08	3.990E+08



US EPA SEDD Athens GA
Generic Chain of Custody

Date Shipped:
Carrier Name: FedEx
Airbill:
Shipped to:

Chain of Custody Record

Relinquished By	(Date / Time)	Sampler Signature: <i>WR Simon</i>	Received By	(Date / Time)
1 <i>WR Simon</i>	8/6/01 12:00		<i>A Kemp</i>	
2				
3				
4				

Reference Case
Client No:
SDG No:

For Lab Use Only

Lab Contract No:
Unit Price:
Transfer To:
Lab Contract No:
Unit Price:

FOR LAB USE ONLY
SAMPLE No. Sample Condition On Receipt

SAMPLE COLLECT
DATE/TIME

STATION
LOCATION

TAG No./
PRESERVATIVE

ANALYSIS/
TURNAROUND

MATRIX/
SAMPLER

SAMPLE No.

WR-001-VO	Other/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103078 (Not preserved) (1)	WR-001-VO	S: 6/6/01	15:10
WR-002-VO	Other/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103079 (Not preserved) (1)	WR-002-VO	S: 6/6/01	15:40
WR-003-VO	Other/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103080 (Not preserved) (1)	WR-003-VO	S: 6/6/01	16:10
WR-004-VO	Other/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103081 (Not preserved) (1)	WR-004-VO	S: 6/6/01	16:25
WR-005-VO	Other/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103082 (Not preserved) (1)	WR-005-VO	S: 6/6/01	16:35
WR-006-VO	Other/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103083 (Not preserved) (1)	WR-006-VO	S: 6/6/01	16:40
WR-007-SS	Surface Soil/ Kevin Simmons	L/G	ASBESTOS (45)	4A-103084 (Not preserved) (1)	WR-007-SS	S: 6/6/01	16:55

RECEIVED
EMSL
WESTMONT, NJ
01 AUG -7 AM 11:51

COPY

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Cooler Temperature Upon Receipt:	Chain of Custody Seal Number:
Analysis Key: ASBESTOS = Asbestos	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Custody Seal Intact? <input type="checkbox"/>	Shipment Iced? <input type="checkbox"/>

TR Number: 4-473322073-061901-0001

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
Send Copy to: Contract Laboratory Analytical Services Support, 2000 Edmund Halley Dr., Reston, VA. 20191-3436 Phone 703/264-9348 Fax 703/264-9222

LABORATORY COPY

EMSL Analytical, Inc.

107 Haddon Ave., Westmont, NJ 08108

Phone: (856) 858-4800 Fax: (856) 858-4960 Email: ssiegel@EMSL.com**EMSL**

Attn: Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: (706) 355-8744

Phone: 706-355-8613

Project:

Customer ID: USEP50
Customer PO:
Received: 06/15/01 11:38 AM

EMSL Order: 040109201

EMSL Project ID:

Analysis Date: 7/26/2001

Polarized Light Microscopy (PLM) Performed by NIOSH Method 9002, Issue 2

Sample	Location	Appearance	Treatment	Non-Asbestos		Asbestos
				% Fibrous	% Non-Fibrous	% Type
PV-004-VO 040109201-0001		Brown/Gray/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
PV-005-VO 040109201-0002		Gray/Brown/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
PV-006-VO 040109201-0003		Various Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
PV-007-VO 040109201-0004		Tan/Gold/Gray Non-Fibrous Heterogeneous	Teased		100% Non-fibrous (other)	None Detected
PV-123-VO 040109201-0005		Gray/Gold/Tan Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
CV-001-VO 040109201-0006		Gray/Brown/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
CV-002-VO 040109201-0007		Tan/Gold/Gray Non-Fibrous Heterogeneous	Teased	<1% Cellulose	100% Non-fibrous (other)	None Detected
CV-003-VO 040109201-0008		Tan/Gray/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose <1% Fibrous (other)	100% Non-fibrous (other)	None Detected
CV-004-VO 040109201-0009		Gray/Brown/Gold Non-Fibrous Heterogeneous	Teased	<1% Cellulose <1% Fibrous (other)	100% Non-fibrous (other)	None Detected
CV-005-VO 040109201-0010		Gray/Rust/Gold Non-Fibrous Heterogeneous	Teased Crushed	<1% Cellulose <1% Fibrous (other)	100% Non-fibrous (other)	None Detected

Analyst(s)

Linda Price (1)

Scott Combs (11)


Stephen Siegel, CIH
or other approved signatory

Disclaimers: PLM has been known to miss asbestos in a small percentage of samples which contain asbestos. Thus negative PLM results cannot be guaranteed. EMSL suggests that samples reported as <1% or none detected be tested with either SEM or TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL. The above test must not be used by the client to claim product endorsement by NVLAP nor any agency of the United States Government. Laboratory is not responsible for the accuracy of results when requested to physically separate and analyze layered samples.

PLM-1

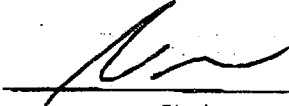
EMSL Analytical, Inc.

107 Haddon Ave., Westmont, NJ 08108

Phone: (856) 858-4800 Fax: (856) 858-4960 Email: eslagel@EMSL.com**EMSL**Attn: Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd.
Athens, GA 30613-7799Customer ID: USEP50
Customer PO:
Received: 06/15/01 11:38 AMFax: (706) 355-8744 Phone: 706-355-8613
Project:EMSL Order: 040109201
EMSL Project ID:
Analysis Date: 7/26/2001**Polarized Light Microscopy (PLM) Performed by NIOSH Method 9002, Issue 2**

Sample	Location	Appearance	Treatment	% Fibrous	Non-Asbestos	Asbestos
					% Non-Fibrous	% Type
CV-004-VO (DUPLICATE) 040109201-0011		Brown Non-Fibrous Heterogeneous	Teased		100% Non-fibrous (other)	None Detected
LAB BLANK NIST FIBERGLASS (NBS 1866) 040109201-0012		Pink Fibrous Homogeneous	Teased	100% Glass		None Detected

Analyst(s)

Linda Price (1)
Scott Combs (11)
Stephen Siegel, CIH
or other approved signatory

Disclaimers: PLM has been known to miss asbestos in a small percentage of samples which contain asbestos. Thus negative PLM results cannot be guaranteed. EMSL suggests that samples reported as <1% or none detected be tested with either SEM or TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL. The above test must not be used by the client to claim product endorsement by NVLAP nor any agency of the United States Government. Laboratory is not responsible for the accuracy of results when requested to physically separate and analyze layered samples.

PLM-1



September 28, 2001

Jim Gray
US EPA
College Station Rd
Athens, GA 30613-7799

RE: EMSL Order ID# 040112849

Dear Jim:

Attached please find the results of your soil samples from the above referenced order number. These samples were analyzed for asbestos content via PLM NIOSH 9002 (Issue 2) and for asbestos structure quantification via the Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (EPA-540-R97-028 EPA Superfund). This letter is meant to document all the structure quantities identified by the Elutriator method including those not counted/reported based on the method's requirements. A summary of the results are given in the table below, explanatory notes follow.

<u>Customer Sample ID/ EMSL Sample ID</u>	<u>Total Asbestos Structures₁</u>	<u>Reported Asbestos Structures₂</u>		<u>Excluded Asbestos Structures₅</u>	<u>Non- Regulated Amphiboles₆</u>
		<u>Protocol₃</u>	<u>Long₄</u>		
WR-001-VO/040112849-0001	0	0	0	0	12
WR-002-VO/040112849-0002	0	0	0	0	21
WR-003-VO/040112849-0003	0	0	0	0	21
WR-004-VO/040112849-0004	0	0	0	0	2
WR-005-VO/040112849-0005	0	0	0	0	5
WR-006-VO/040112849-0006	0	0	0	0	10
WR-007-SS/040112849-0007	0	0	0	0	6
WR-007-SSQC	0	0	0	0	10
BLANK	0	0	0	0	0

Notes:

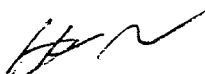
1. Total asbestos structures represents all asbestos structures (fibers, bulk, cluster, and matrix) found during analysis. This includes the six regulated asbestos types-Chrysotile and Amphibole Asbestos (Amosite, Actinolite, Tremolite, Crocidolite, and Anthophyllite).
2. Reported asbestos structures represent all asbestos structures that meet the reporting requirements based on size as stated in the EPA Superfund Method. These structures must be $\leq 0.5\mu$ in diameter and $\geq 5\mu$ in length.
3. Protocol asbestos structures represent all asbestos structures that meet the requirements of Notes 1 and 2 and are $5-10\mu$ in length.
4. Long asbestos structures represent all asbestos structures that meet the requirements of Notes 1 and 2 and are $>10\mu$ in length.

Notes (Continued)

5. Excluded asbestos structures represent all asbestos structures that meet the requirements of Note 1 but do not meet the size requirements of Notes 2-4.
6. Non-regulated Amphiboles represent a newer class of amphibole categories that have been identified by the USEPA Region 8 in conjunction with the Libby, MT project. These include richterite and winchite. These are also termed "Libby Amphiboles" and are not currently classified as regulated asbestos but those performing the risk assessment and exposure modeling from the sample results may take this mineral fiber data into consideration.

If you need any calculations based on the non-regulated amphiboles identified in these samples, please let me know and I can create additional reports showing this data. If you have any questions or need further information please do not hesitate to contact me at 800-220-3675X 1209.

Sincerely,



Stephen Siegel, CIH
Asbestos Lab Manager

COPY

EMSL Analytical, Inc.

107 Haddon Ave., Westmont, NJ 08108

Phone: (856) 858-4800 Fax: (856) 858-4960 Email: ssiegel@EMSL.com**EMSL**

Attn: Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: (706) 355-8744

Phone: 706-355-8613

Project: 4-473322073-0619101-0001

Customer ID: USEP50

Customer PO:

Received: 08/07/01 11:51 AM

EMSL Order: 040112849

EMSL Project ID:

Analysis Date: 6/20/2001


Polarized Light Microscopy (PLM) Performed by NIOSH Method 9002, Issue 2

Sample	Location	Appearance	Treatment	Non-Asbestos		Asbestos
				% Fibrous	% Non-Fibrous	% Type
WR-001-VO 040112849-0001		Brown Non-Fibrous Homogeneous	Teased		100% Non-fibrous (other)	<1% Tremolite/ Actinolite
WR-002-VO 040112849-0002		Brown Non-Fibrous Homogeneous	Teased		100% Non-fibrous (other)	<1% Tremolite
WR-003-VO 040112849-0003		Brown Non-Fibrous Homogeneous	Teased		100% Non-fibrous (other)	None Detected
WR-004-VO 040112849-0004		Brown Non-Fibrous Homogeneous	Teased		100% Non-fibrous (other)	None Detected
WR-005-VO 040112849-0005		Brown Non-Fibrous Homogeneous	Teased 1		100% Non-fibrous (other)	<1% Tremolite
WR-006-VO 040112849-0006		Brown Non-Fibrous Homogeneous	Teased		100% Non-fibrous (other)	None Detected
WR-007-SS 040112849-0007		Brown Non-Fibrous Homogeneous	Teased	1% Cellulose	99% Non-fibrous (other)	<1% Tremolite/ Actinolite

COPY

Analyst(s)

Linda Price (7)


Stephen Siegel, CIH
or other approved signatory

Disclaimers: PLM has been known to miss asbestos in a small percentage of samples which contain asbestos. Thus negative PLM results cannot be guaranteed. EMSL suggests that samples reported as <1% or none detected be tested with either SEM or TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL. The above test must not be used by the client to claim product endorsement by NVLAP nor any agency of the United States Government. Laboratory is not responsible for the accuracy of results when requested to physically separate and analyze layered samples.

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Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone: 856-358-4800 Fax: 856-858-4960

Date Started
Date Completed
Analyst

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

Test Analysis
Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

Minimum Acceptable Structure Identification Category

Dust Generator
Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

Filters from the Isokinetic Sampling Tube (IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

Asbestos Analysis Results
No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

ESTIMATED ASBESTOS CONCENTRATIONS (g/PM10)

Total Chrysotile Protocol Structures
Long Chrysotile Protocol Structures
Total Amphibole Protocol Structures
Long Amphibole Protocol Structures
Long Asbestos Protocol Structures
Total Asbestos Protocol Structures

Estimated Analytical Sensitivity: (g/PM10)

Report Date 9/28/2001
Project Name 4-473322073-0619101-0001
Methods Draft Modified Elutriator Method for the Determination
of Asbestos in Soils and Bulk Material Method
(dated May 23, 2000, Revision 1)

EMSL Order ID 040112849

9/10/2001
9/26/2001
AS

040112849-0001
WR-001-VO
N/A
Yes
N/A
N/A

385 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

5u Length
<0.5u Diameter

60.42
1430
72
1502

0.000175

	Total	Number of Protocol Structures	Long(>10um)
	0		0
	0		0

	Concentrations	
Mean	95% UCL	
< 3.607E+07	< 7.069E+07	
< 3.607E+07	< 7.069E+07	
< 3.607E+07	< 7.069E+07	
< 3.607E+07	< 7.069E+07	
< 3.607E+07	< 7.069E+07	
< 3.607E+07	< 7.069E+07	
3.607E+07	7.069E+07	

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Date Started
Date Completed
Analyst

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

Tem Analysis
Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

Minimum Acceptable Structure Identification Category

Dust Generator
Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

Asbestos Analysis Results
No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

Total Chrysotile Protocol Structures
Long Chrysotile Protocol Structures
Total Amphibole Protocol Structures
Long Amphibole Protocol Structures
Long Asbestos Protocol Structures
Total Asbestos Protocol Structures

Estimated Analytical Sensitivity: (s/gPM10)

Report Date 9/28/2001
Project Name 4-473322073-0619101-0001
Methods Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (dated May 23, 2000, Revision 1)
EMSL Order ID 040112849

9/10/2001
9/26/2001
AS

040112849-0002
WR-002-VO
N/A
Yes
N/A
N/A

385 (ME)
18,000 X
0.0061
7
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

5u Length
<0.5u Diameter

60.3
1430
72
1502

0.00023

Total	Number of Protocol Structures	
		Long(>10um)
0		0
0		0

Concentrations		
Mean	95% UCL	
< 3.920E+07	< 7.684E+07	
< 3.920E+07	< 7.684E+07	
< 3.920E+07	< 7.684E+07	
< 3.920E+07	< 7.684E+07	
< 3.920E+07	< 7.684E+07	
< 3.920E+07	< 7.684E+07	
3.920E+07	7.684E+07	

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Date Started
Date Completed
Analyst

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

Tem Analysis
Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

Minimum Acceptable Structure Identification Category

Dust Generator
Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

Report Date 9/28/2001
Project Name 4-473322073-0619101-0001
Methods Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (dated May 23, 2000, Revision 1)

EMSL Order ID 040112849

9/10/2001
9/26/2001
AS
040112849-0003
WR-003-VO
N/A
Yes
N/A
N/A

385 (ME)
19,000 X
0.0061
4
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

5u Length
<0.5u Diameter

50.38
1430
72
1502

0.000271

Asbestos Analysis Results
No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

Total	Number of Protocol Structures Long(>10um)
0	0
0	0

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

Total Chrysotile Protocol Structures
Long Chrysotile Protocol Structures
Total Amphibole Protocol Structures
Long Amphibole Protocol Structures
Long Asbestos Protocol Structures
Total Asbestos Protocol Structures

Estimated Analytical Sensitivity: (s/gPM10)

Concentrations	
Mean	95% UCL
< 5.822E+07	< 1.141E+08
< 5.822E+07	< 1.141E+08
< 5.822E+07	< 1.141E+08
< 5.822E+07	< 1.141E+08
< 5.822E+07	< 1.141E+08
< 5.822E+07	< 1.141E+08
5.822E+07	1.141E+08

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Date Started
Date Completed
Analyst

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

Test Analysis
Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

Minimum Acceptable Structure Identification Category

Dust Generator
Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

Asbestos Analysis Results
No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

ESTIMATED ASBESTOS CONCENTRATIONS (a/gPM10)

Total Chrysotile Protocol Structures
Long Chrysotile Protocol Structures
Total Amphibole Protocol Structures
Long Amphibole Protocol Structures
Long Asbestos Protocol Structures
Total Asbestos Protocol Structures

Estimated Analytical Sensitivity: (a/gPM10)

Report Date 9/28/2001
Project Name 4-473322073-0819101-0001
Methods Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (dated May 23, 2000, Revision 1)
EMSL Order ID 040112849

9/10/2001
9/26/2001
AS

040112849-0004
WR-004-VO
N/A
Yes
N/A
N/A

385 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

5u Length
<0.5u Diameter

44.77
1430
72
1502

0.000183

Total	Number of Protocol Structures
	Long(>10um)

0	0
0	0

Concentrations	
Mean	95% UCL
< 3.449E+07	< 6.760E+07
< 3.449E+07	< 6.760E+07
< 3.449E+07	< 6.760E+07
< 3.449E+07	< 6.760E+07
< 3.449E+07	< 6.760E+07
< 3.449E+07	< 6.760E+07
< 3.449E+07	< 6.760E+07
3.449E+07	6.760E+07

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Date Started
Date Completed
Analyst

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

Tem Analysis

Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

Minimum Acceptable Structure Identification Category

Dust Generator

Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

Filters from the Isokinetic Sampling Tube (IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

Report Date 9/28/2001
Project Name 4-473322073-0819101-0001
Methods Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (dated May 23, 2000, Revision 1)
EMSL Order ID 040112849

9/10/2001
9/26/2001
AS

040112849-0005
WR-005-VO
N/A
Yes
N/A
N/A

365 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

5u Length
<0.5u Diameter

6.35
1430
72
1502

0.000024

Asbestos Analysis Results

No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

Total	Number of Protocol Structures Long(>10um)
-------	--

0	0
0	0

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

Total Chrysotile Protocol Structures
Long Chrysotile Protocol Structures
Total Amphibole Protocol Structures
Long Amphibole Protocol Structures
Long Asbestos Protocol Structures
Total Asbestos Protocol Structures

Estimated Analytical Sensitivity: (s/gPM10)

Concentrations	
Mean	95% UCL
< 2.630E+08	< 5.154E+08
< 2.630E+08	< 5.154E+08
< 2.630E+08	< 5.154E+08
< 2.630E+08	< 5.154E+08
< 2.630E+08	< 5.154E+08
< 2.630E+08	< 5.154E+08
2.630E+08	5.154E+08

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Date Started
Date Completed
Analyst

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

Test Analysis
Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

Minimum Acceptable Structure Identification Category

Dust Generator
Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (mL/min)
Air Flow Rate Through IST opening of Dust Generator (mL/min)
Estimated Total Air Flow Rate Through Elutriator (mL/min)

Filters from the Isokinetic Sampling Tube (IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

Asbestos Analysis Results
No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

Total Chrysotile Protocol Structures
Long Chrysotile Protocol Structures
Total Amphibole Protocol Structures
Long Amphibole Protocol Structures
Long Asbestos Protocol Structures
Total Asbestos Protocol Structures

Estimated Analytical Sensitivity: (s/gPM10)

Report Date 8/28/2001
Project Name 4-473322073-0818101-0001
Methods Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (dated May 23, 2000, Revision 1)

EMSL Order ID 040112849

9/10/2001
9/26/2001
AS

040112849-0006
WR-008-VO
N/A
Yes
N/A
N/A

385 (ME)
19,000 X
0.0081
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

5u Length
<0.5u Diameter

46.5
1430
72
1502

0.000215

Total	Number of Protocol Structures Long(>10um)
0	0
0	0

Mean	Concentrations 95% UCL
< 2.936E+07	< 5.754E+07
< 2.936E+07	< 5.754E+07
< 2.936E+07	< 5.754E+07
< 2.936E+07	< 5.754E+07
< 2.936E+07	< 5.754E+07
< 2.936E+07	< 5.754E+07
2.936E+07	5.754E+07

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Date Started
Date Completed
Analyst

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

Test Analysis
Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

Minimum Acceptable Structure Identification Category

Dust Generator
Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

Asbestos Analysis Results
No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

ESTIMATED ASBESTOS CONCENTRATIONS (a/gPM10)

Total Chrysotile Protocol Structures
Long Chrysotile Protocol Structures
Total Amphibole Protocol Structures
Long Amphibole Protocol Structures
Long Asbestos Protocol Structures
Total Asbestos Protocol Structures

Estimated Analytical Sensitivity: (a/gPM10)

Report Date 9/28/01
Project Name 4-473322073-0618101-0001
Methods Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (dated May 23, 2000, Revision 1)
EMSL Order ID 040112849

9/10/01
9/26/01
AS

040112849-0007
WR-007-SSQC
N/A
Yes
N/A
N/A

385 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

5u Length
<0.5u Diameter

58.45
1430
72
1502

0.00014

Total	Number of Protocol Structures
	Long(>10um)

0	0
0	0

Concentrations

Mean	95% UCL
< 4.508E+07	< 8.836E+07
< 4.508E+07	< 8.836E+07
< 4.508E+07	< 8.836E+07
< 4.508E+07	< 8.836E+07
< 4.508E+07	< 8.836E+07
< 4.508E+07	< 8.836E+07
4.508E+07	8.836E+07

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Westmont, NJ 08108
Contact: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone: 856-858-4800 Fax: 856-858-4960

Date Started
Date Completed
Analyst

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

Tem Analysis
Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

Minimum Acceptable Structure Identification Category

Dust Generator
Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

Asbestos Analysis Results
No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

ESTIMATED ASBESTOS CONCENTRATIONS (s/gPM10)

Total Chrysotile Protocol Structures
Long Chrysotile Protocol Structures
Total Amphibole Protocol Structures
Long Amphibole Protocol Structures
Long Asbestos Protocol Structures
Total Asbestos Protocol Structures

Estimated Analytical Sensitivity: (s/gPM10)

Report Date 9/28/01
Project Name 4-473322073-0819101-0001
Methods Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (dated May 23, 2000, Revision 1)

EMSL Order ID 040112849

9/10/01
9/26/01
AS

040112849-0007
WR-007-SS
N/A
Yes
N/A
N/A

385 (ME)
18,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

5u Length
<0.5u Diameter

58.45
1430
72
1502

0.000173

Number of Protocol Structures
Total Long(>10um)

0	0
0	0

Concentrations

Mean	95% UCL
< 3.648E+07	< 7.151E+07
< 3.648E+07	< 7.151E+07
< 3.648E+07	< 7.151E+07
< 3.648E+07	< 7.151E+07
< 3.648E+07	< 7.151E+07
< 3.648E+07	< 7.151E+07

3.648E+07	7.151E+07
-----------	-----------

EMSL Analytical Inc.
107 Haddon Avenue
Westmont, NJ 08108
Contacts: Stephen Siegel, CIH, Scott Slavin, Ph.D
Phone:856-858-4800 Fax:856-858-4960

Date Started
Date Completed
Analyst

Lab Sample#
Field Subsample#
Field Preparation Technique
Sample Drying
Sample Splitting
Other

Test Analysis
Effective Area of Analytical Filter (sq mm)
Magnification
Grid Opening Area (sq mm)
Number of Grid Openings Scanned
Asbestos Structure Size and Type Categories of Interest

Minimum Acceptable Structure Identification Category

Dust Generator
Mass of Sample Tumbled(g)
Air Flow Rate Through ME opening of Dust Generator (ml/min)
Air Flow Rate Through IST opening of Dust Generator (ml/min)
Estimated Total Air Flow Rate Through Elutriator (ml/min)

Filters from the Isokinetic Sampling Tube(IST) opening of the Elutriator
Mass of Respirable Dust on Filter(g)

Asbestos Analysis Results
No. of Chrysotile Asbestos Structures
No. of Amphibole Asbestos Structures
Amphibole Mineral Type(s)

Report Date 8/28/2001
Project Name 4-473322073-0818101-0001
Methods Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material Method (dated May 23, 2000, Revision 1)

EMSL Order ID 040112849

9/10/2001
9/26/2001
AS

LAB BLANK
N/A
N/A
Yes
N/A
N/A

385 (ME)
19,000 X
0.0061
10
Protocol Fiber
>5-10u Length
<0.5u Diameter
Amphiboles/Chrysotile

Long Fiber
>10u Length
<0.5u Diameter
Amphiboles/Chrysotile

5u Length
<0.5u Diameter

1430
72
1502

Number of Protocol Structures
Long(>10um)

Total

0
0

0
0

USEPA REGION 8 LIBBY SITE INVESTIGATION
TEM Asbestos Structure Count

Page 1 of 1

QC Blank

Laboratory name:	EMSL Westmont, NJ
Instrument	JEOL 100 CX II (2)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm ²)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm ²)	0.85
Secondary Filter Area (mm ²)	

EPA Sample Number:	QC Blank
Sample Type (A=Air, D=Dust, O=Other):	
Air volume (L) or dust area (cm ²)	
Date received by lab	
Lab Job Number:	090112849
Lab Sample Number:	
Number of grids prepared	4
Prepared by	BC
Preparation date	

Analyzed by	AMS
Analysis date	9-27-2001
Method (D=Direct, I=Indirect)	D
Counting rules (I=ISO10312, A=ASHERA, O=Other)	I
Grid storage location	2001-0

Secondary Prep	
Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

Row M

Row M

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/Comments	1 = yes, blank = no		
			Primary	Total	Length	Width		LA	OA	C	NA		Sketch	Photo	EDS
1	G-8	ND													
	E-4														
	L-5														
	M-11														
	F-12														
2	K-7														
	H-8														
	E-12														
	C-9														
	D-4														

COPY

COPY

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NA = Non-asbestos

Attn: Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: 7063558744

Phone: 706-355-8613

USEPA REGION 8
SITE INVESTIGATION
TEM Asbestos Structure Count

ELUTRIATOR

Laboratory name:	EMSL, Westmont, NJ
Instrument	JEOL 100 CX II (Z)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm2)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm2)	385
Secondary Filter Area (mm2)	

EPA Sample Number:	WR-001-V0
Sample Type (A=Air, D=Dust, O=Other):	D
Air volume (L) or dust area (cm2)	
Date received by lab	5-7-2001
Lab Job Number:	040112849
Lab Sample Number:	0001
Number of grids prepared	4
Prepared by	DS
Preparation date	9-10-2001

Analyzed by	AMS
Analysis date	9-18-2001
Method (D=Direct, I=Indirect)	
Counting rules (I=ISO10312, A=ATHERA, O=Other)	I
Grid storage location	2001 - C

Secondary Prep	
Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				1 = yes, blank = no			
			Primary	Total	Length	Width		LA	OA	C	NA	Sketch/Comments	Sketch	Photo	EDS
1	G-8	MD11 MF			7.5	0.4		LA							1
	J-4	ND													
	L-8	MD11 MF			8	1.5		LA							1
	F	F			3.2	0.25		LA							1
		MD11 MF			8	1.2		LA							1
		MD11 MF			8.0	0.5		LA							1
	M-13	MD11 MF			7.5	5		LA							1
		F			5.0	0.6		LA							1
		MD11 MF			5.0	1.1		LA							1
		MD11 MF			3.0	5									1
	I-13	ND			28.5	0.5		LA							1
2	H-6														

1000

LA = Libby-type amphibole
OA = Other (non-Libby type) amphibole
C = Chrysotile

Row J

Row J

LAB NAME

EPA SAMPLE NO:

LAB JOB NUMBER

LAB SAMPLE NO:

SAMPLE TYPE

GRID STORAGE LOC.

EMSL Westmont. NJ

WR-001-V0

75 Rhin

040112849

2001-C

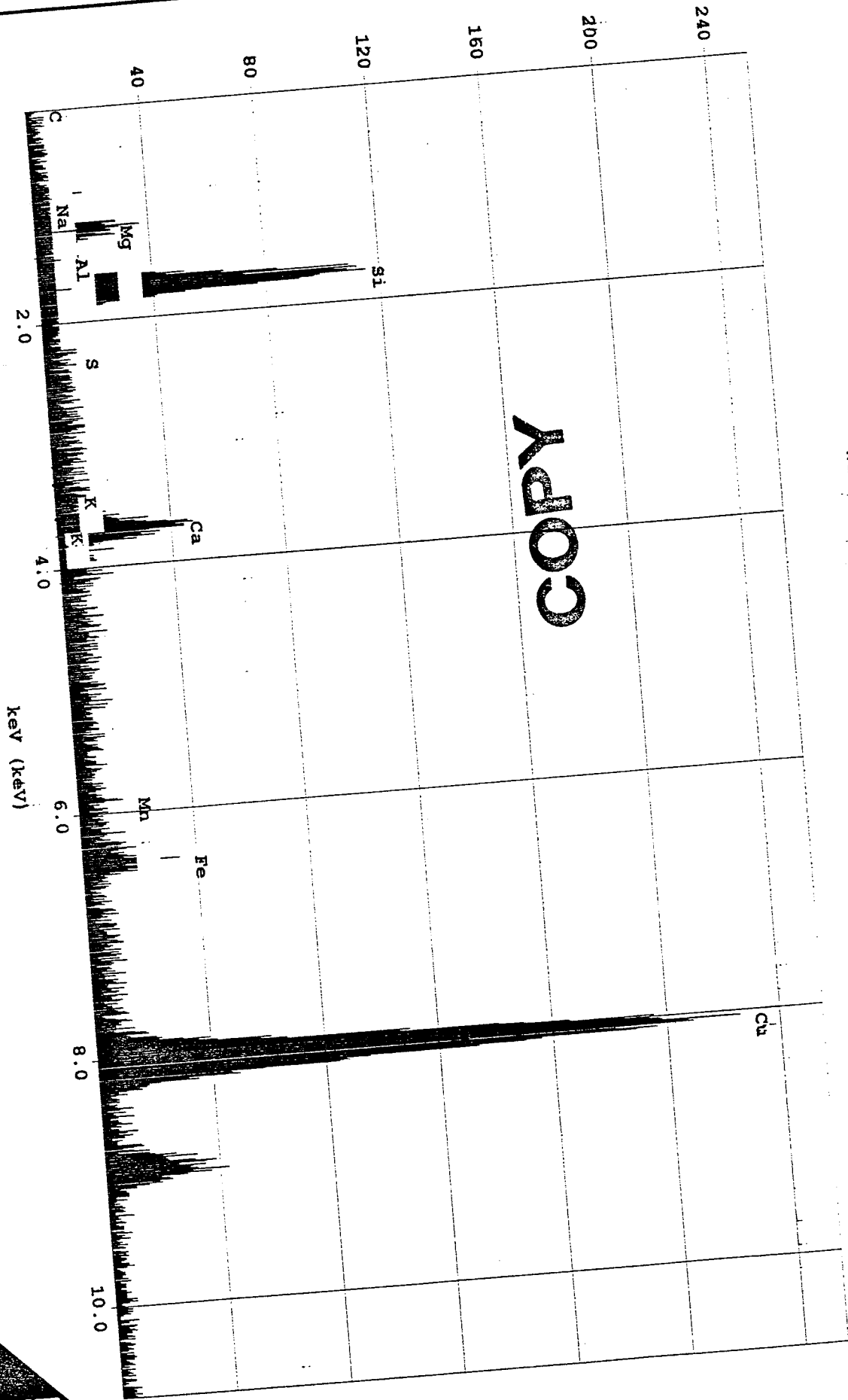
Row

4

Row 1

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class				Sketch/Comments	1 = yes, blank = no		
			Primary	Total	Length	Width		LA	OA	C	NA		Sketch	Photo	EDS
2	D-10	M _{PID} / MF			11.5 3.2	6 0.7		LA					/		
		F			2.8	0.9		LD							1
	E-6	M _{PID} / MF			10 6	2.5 0.9		LA							1
	G-5	M _{DLL} / MF			5.4 5.1	1.2 0.9		LA							1
	L-7	M _{DIO} / MF			10 2.2	8 0.8		LA							1

EMSL Analytical, Westmont, NJ
QDM_112849_WF-001-YO : Libby Amphibole
Wednesday, September 12, 2001

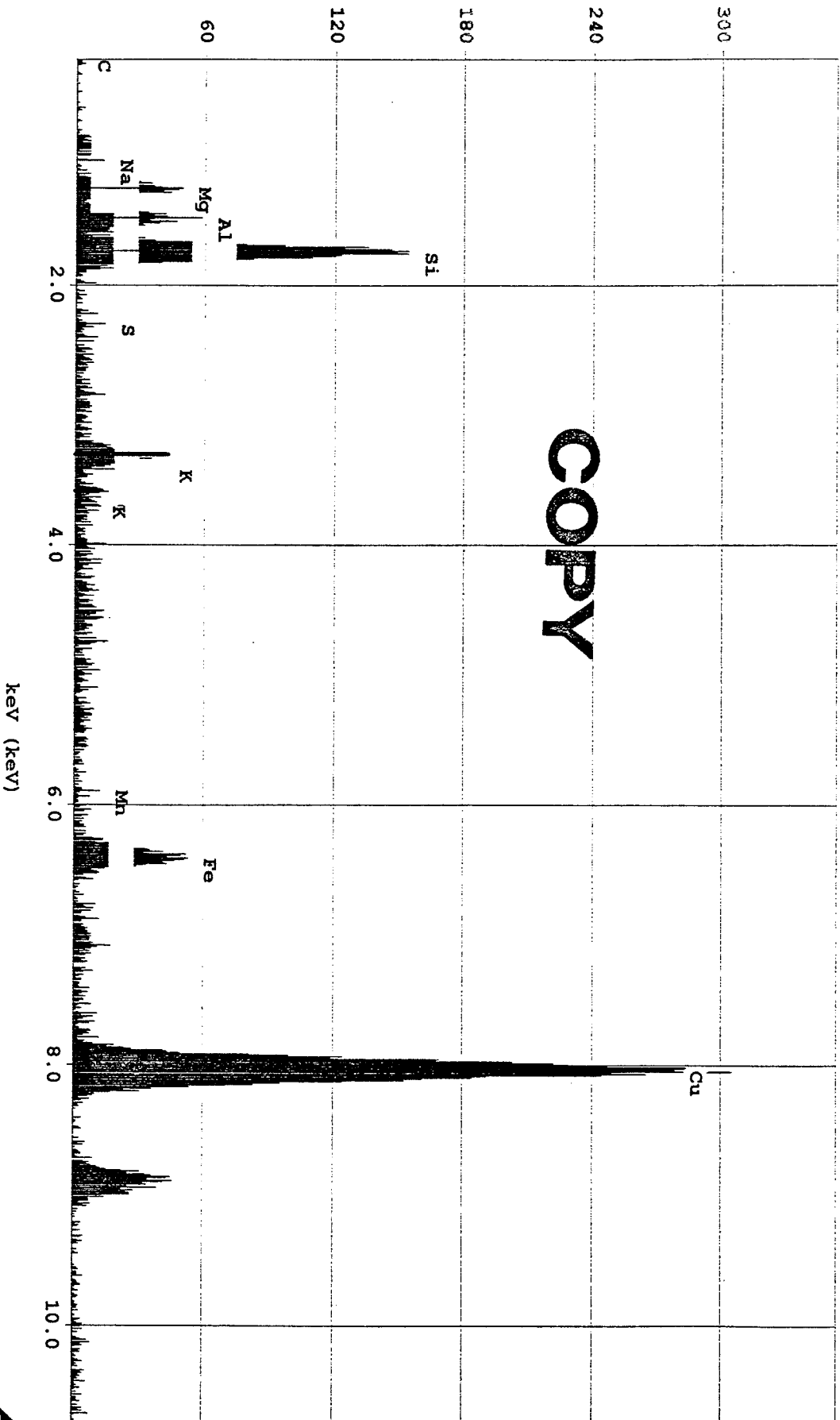




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EMSL Analytical, Westmont, NJ
CDM_112849_WR-001-VO : Libby Amphibole
Wednesday, September 12, 2001

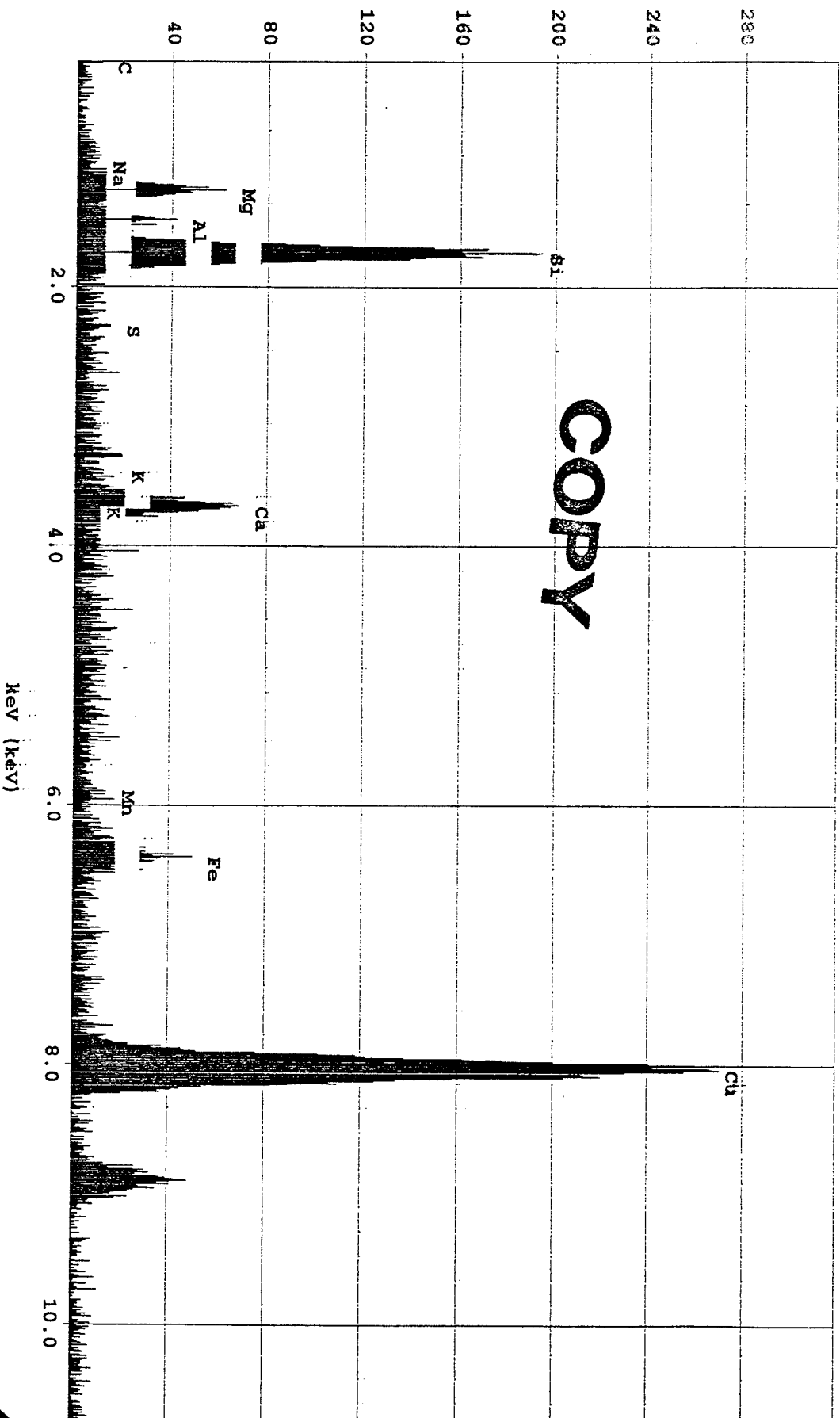
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ID(1):

EMSL Analytical, Westmont, NJ
CDM_112849_WR-001-VO : Libby Amphibole
Wednesday, September 12, 2001

COPY

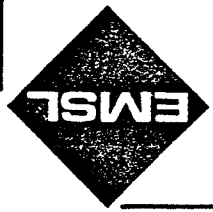
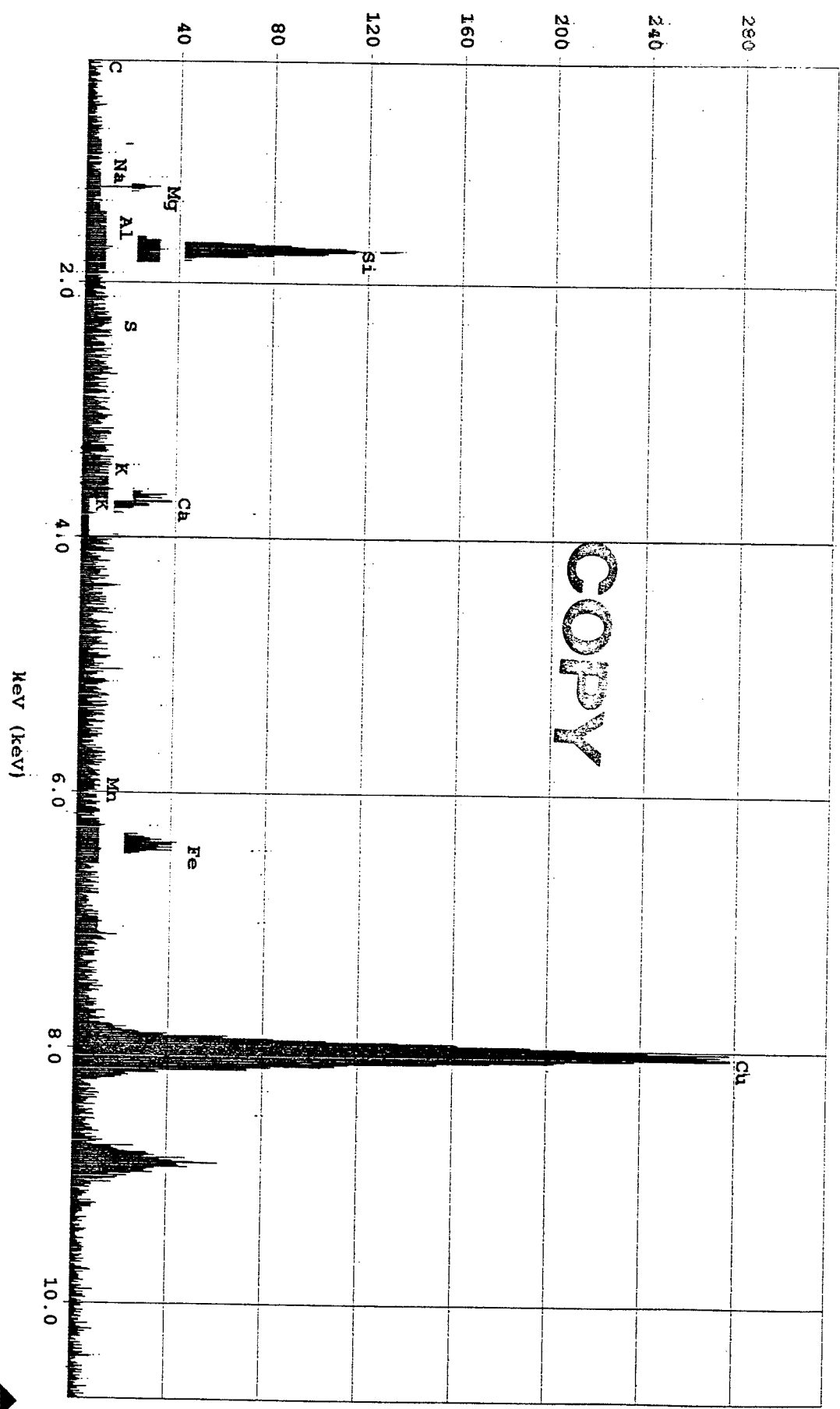


EMSL



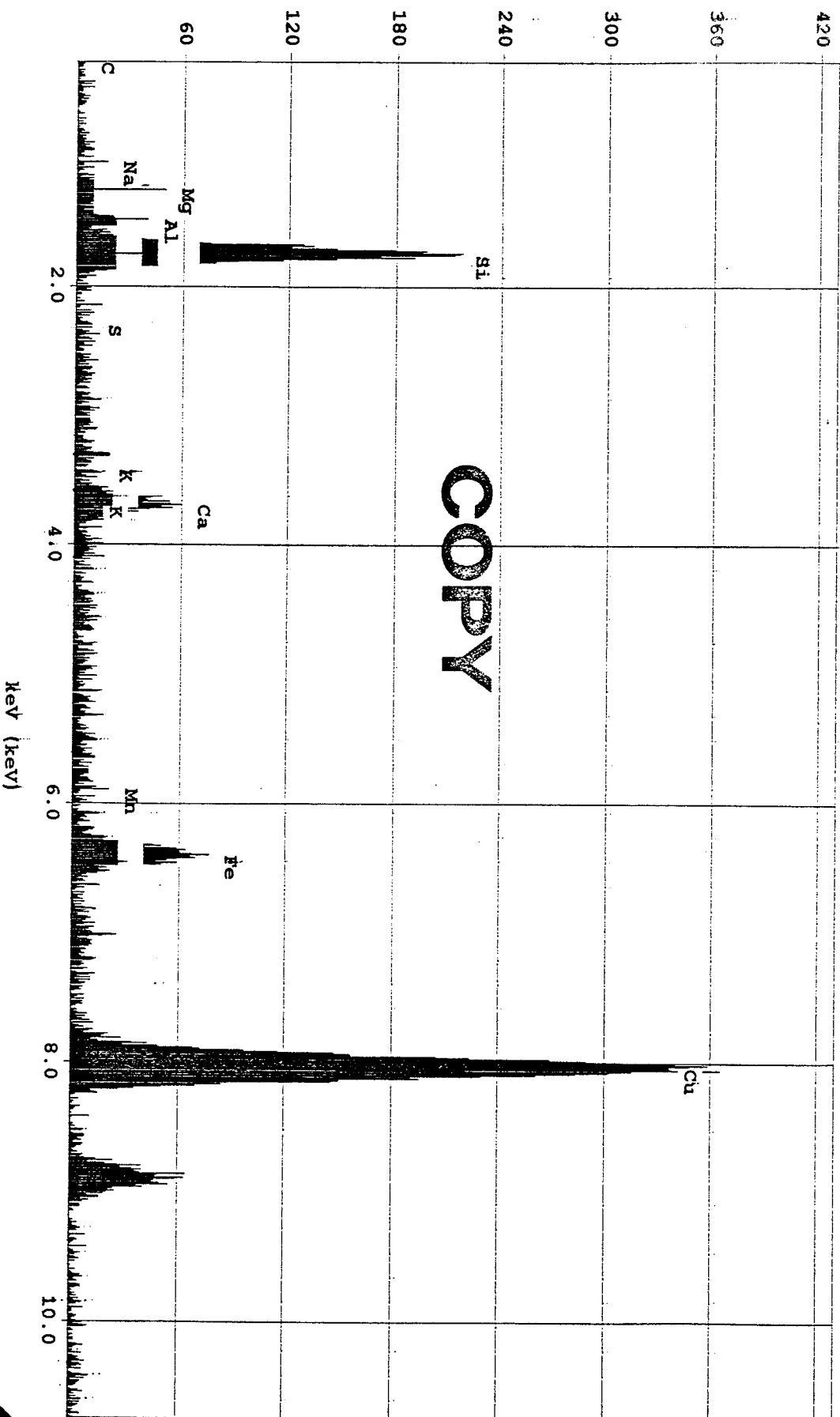
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EMSL Analytical, Westmont, NJ
CDM 112849, WR-001-VO : Libby Amphibole
Wednesday, September 12, 2001



ID(1):

EMSL Analytical, Westmont, NJ
CDM 412849, MR-001-VO : Libby Amphibole
Wednesday, September 12, 2001

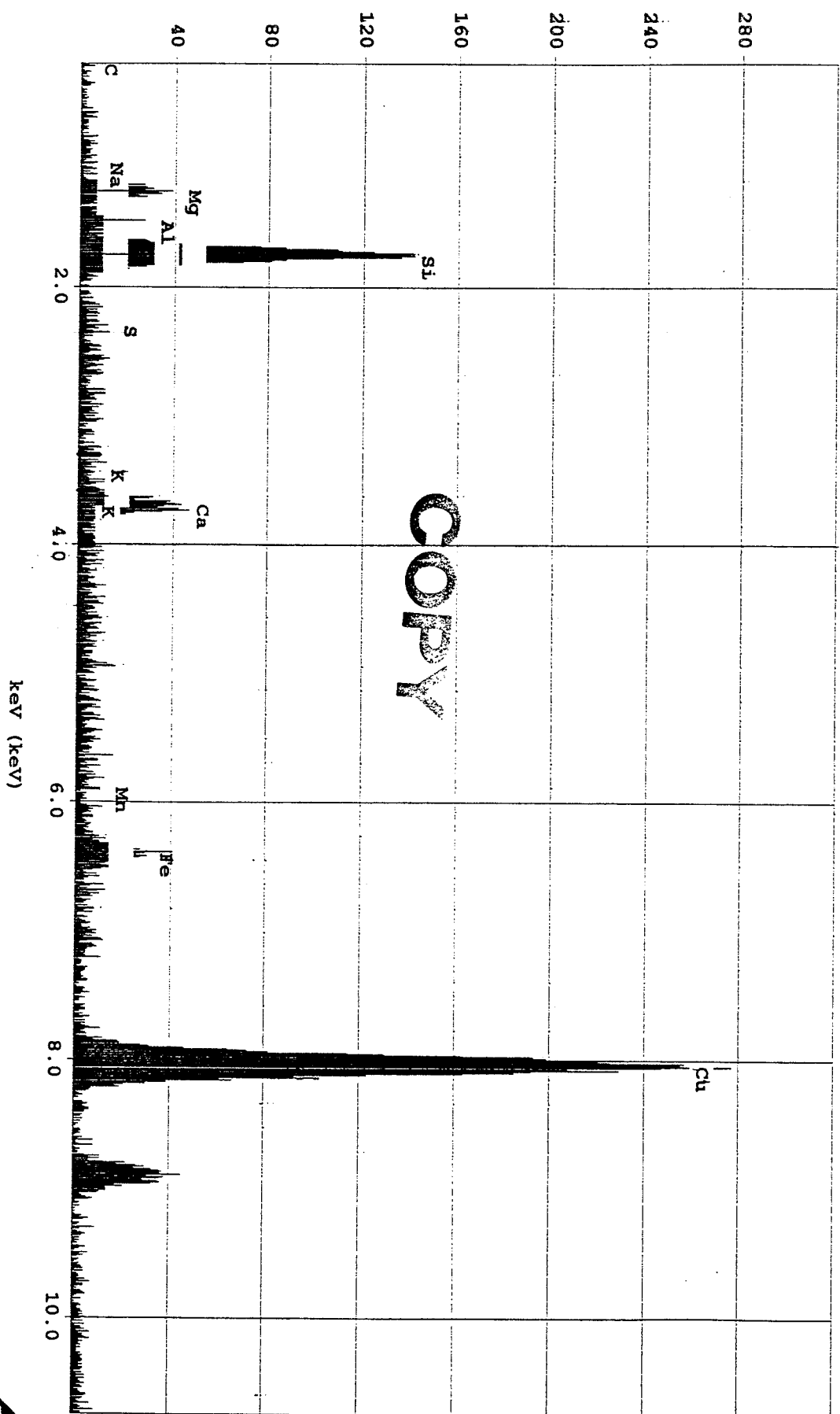


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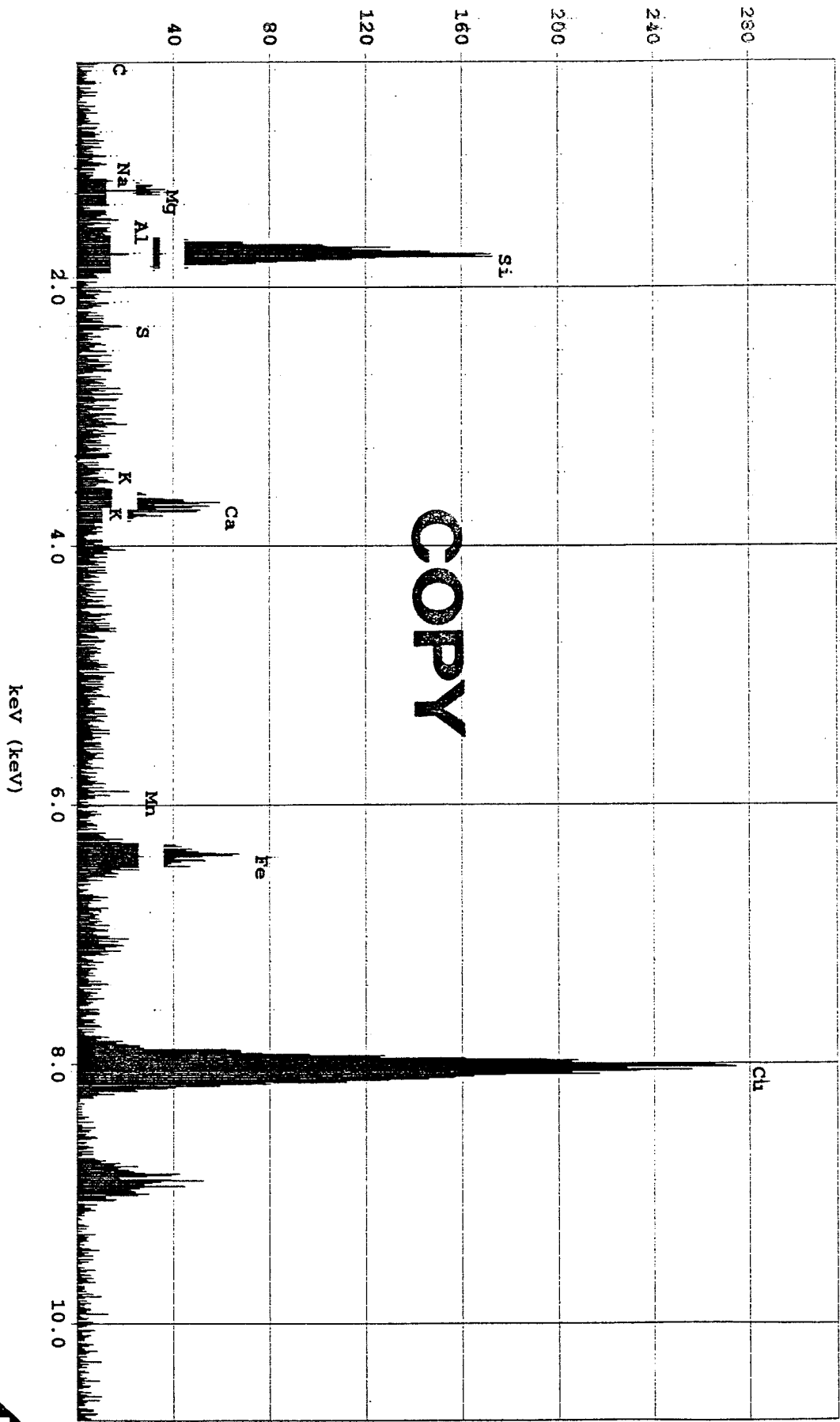
EMSL Analytical, Westmont, NJ
CDM_112849_1WR-001-VO : Libby Amphibole
Wednesday, September 12, 2001





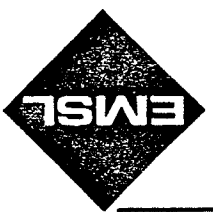
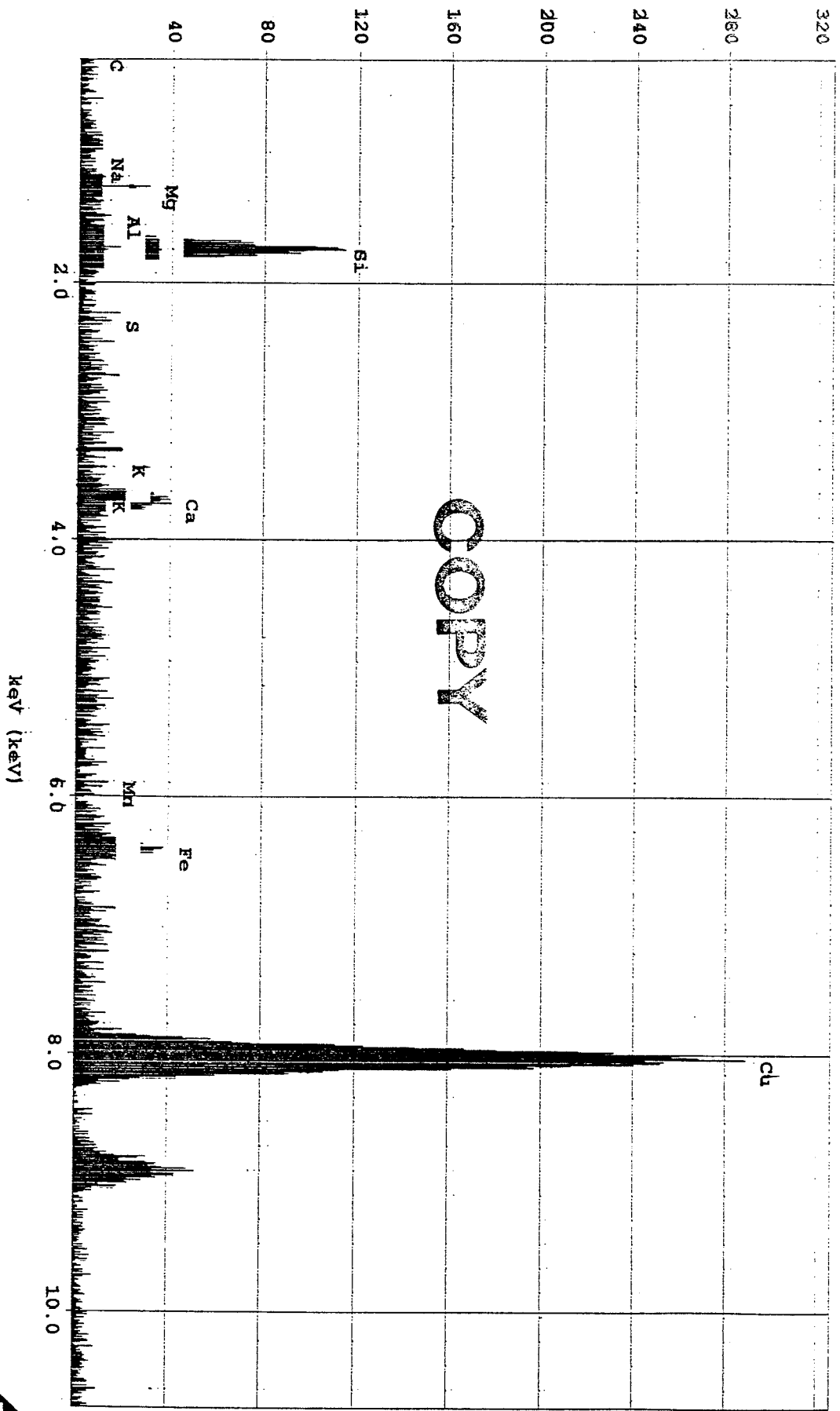
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EMSL Analytical, Westmont, NJ
CDM_112849_WR-001-VO : Libby Amphibole
Wednesday, September 12, 2001





EMSL Analytical, Westmont, NJ
CDM 112849 WR-001-VO : Libby Amphibole
Wednesday, September 12, 2001



Attn: Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: 7063553744

Phone: 706-355-8613

USEPA REGION 8 SITE INVESTIGATION
YEM Asbestos Structure Count

ELUTRIATOR

Laboratory name:	EMSL, Westmont, NJ
Instrument	JEOL 100 CX II (2)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm2)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm2)	385
Secondary Filter Area (mm2)	

EPA Sample Number:	WR-002-V0
Sample Type (A=Air, D=Dust, O=Other):	D
Air volume (L) or dust area (cm2)	
Date received by lab	8-7-2001
Lab Job Number:	040112849
Lab Sample Number:	0002
Number of grids prepared	4
Prepared by	DS
Preparation date	9-10-2001

Analyzed by	AMS
Analysis date	9-13-2001
Method (D=Direct, I=Indirect)	D
Counting rules (I=ISO10312, A=AHERA, O=Other)	I
Grid storage location	2001-C

Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/Comments	1 = yes, blank = no		
			Primary	Total	Length	Width		LA	OA	C	NA		Sketch	Photo	EDS
1	F-8	F			6.0	0.2		LA							1
		MD10 MF			10	8									1
		MD11 MF			4.8	1.0		LA							1
	I-4				6.0	1.2		LA							1
		MD11 MF			15	5.5									1
		MD11 MF			14	2.2									1
					10	7		LA			NA	Al, Si, Fe			1
					5.8	0.12		LA							1
		F			2.3	0.2		LA							1
	L-5	F			4.7	0.5		LA							1
		F			6.6	0.5		LA							1
					20	3.5									1
		MD10 MF			170	2					NA	Al, Si, Fe			1
		MD10 MF			7	5		LA							1
					3.2	0.9									1

COPY

LA = Libby-type amphibole
OA = Other (non-Libby type) amphibole
C = Chrysotile

Row K

Row K

USEPA REGION 8 LIBBY SITE INVESTIGATION
TEM Asbestos Structure Count

E. Livingston

LAB NAME

LAB SAMPLE NO:

EMSL Westmont NJ
0002

EPA SAMPLE NO:

SAMPLE TYPE

WR-002-V0
D

10 min

LAB JOB NUMBER

GRID STORAGE LOC.

040112849
2001-02

Row K

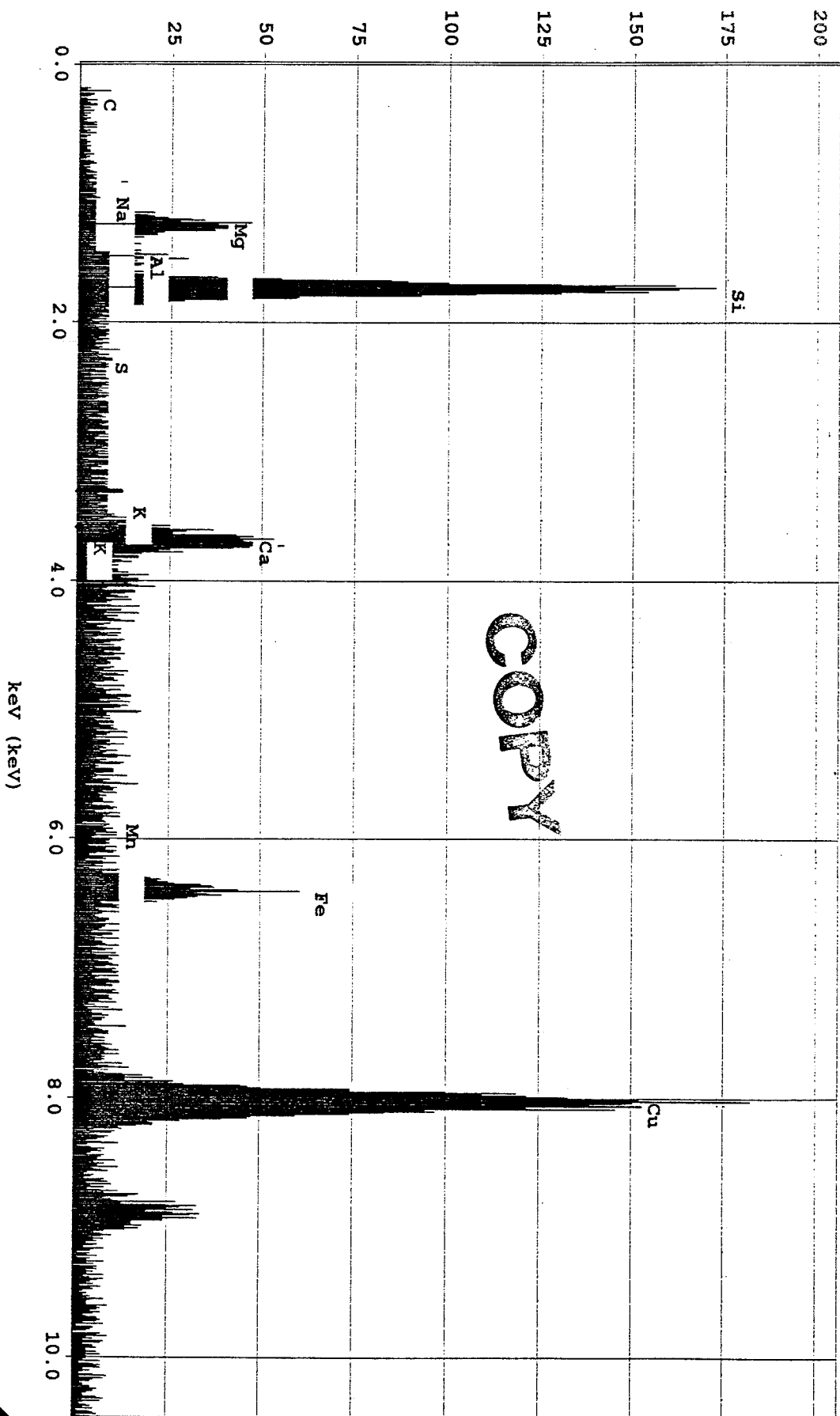
Row K

Grid	Grid Operating	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class				Sketch/Comments	1 = yes, blank = no		
			Primary	Total	Length	Width		LA	OA	C	NA		Sketch	Photo	EDS
1	D-4	F			7.5	1.5		LA							1
		MD11 MF			9	2.2									1
		MD11 MF			8.5	2.0		LA							1
		MD11 MF			20	10.0		LA							1
		MD11 MF			13.0	1.0		LA							1
		MD11 MF			11	1.1									1
		MD11 MF			11	0.4		LA							1
		MD11 MF			19	8									1
		MD11 MF			7.3	0.6									1
		MD11 MF			13	0.5		LA							1
		MD11 MF			7.4	0.5		LA							1
		MD10 MF			12	10		LA							1
		MD10 MF			3.5	0.7		LA							1
		MD10 MF			10.5	9		LA							1
		MD10 MF			5	0.3		LA							1
		MD11 MF			7	0.75		LA							1
		MD11 MF			12	2		LA							1
		MD11 MF			8	2		LA							1
		MD11 MF			7	0.7		LA							1
		MD11 MF			4.2	0.7		LA							1
		MD11 MF			7	4		LA							1
		MD11 MF			5	0.3		LA							1
		MD11 MF			7.5	1.1		LA							1
		MD11 MF			5	0.4		LA							1
		MD11 MF			4	0.2		LA							1

COPY



EMSL Analytical, Westmont, NJ
EPA_112849_WF-002-VO : Libby Amphibole
Thursday, September 18, 2001

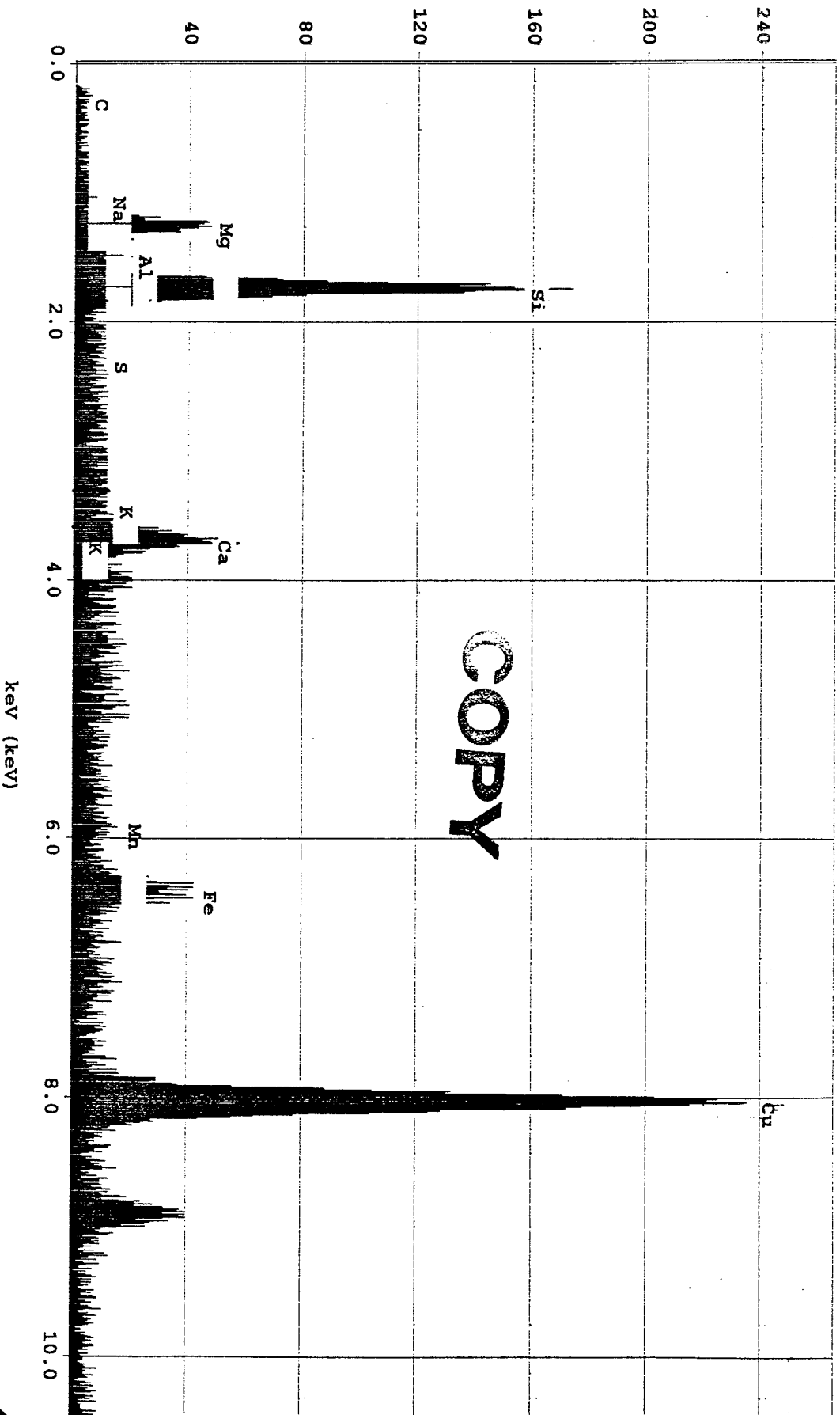


EMSL



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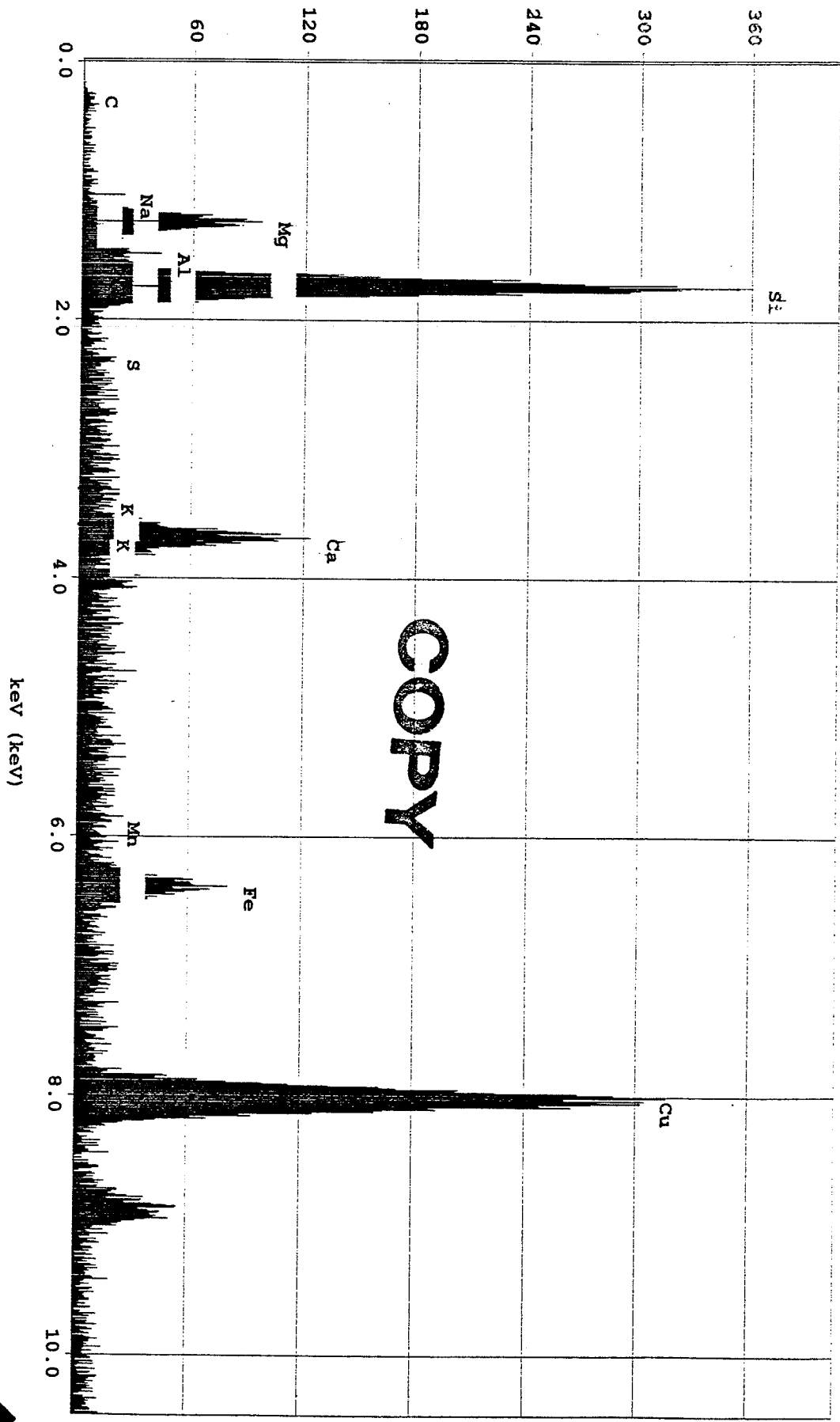
EMSL Analytical, Westmont, NJ
EPA_112849_WR-002-VO : Libby Amphibole
Thursday, September 18, 2001



EMSL



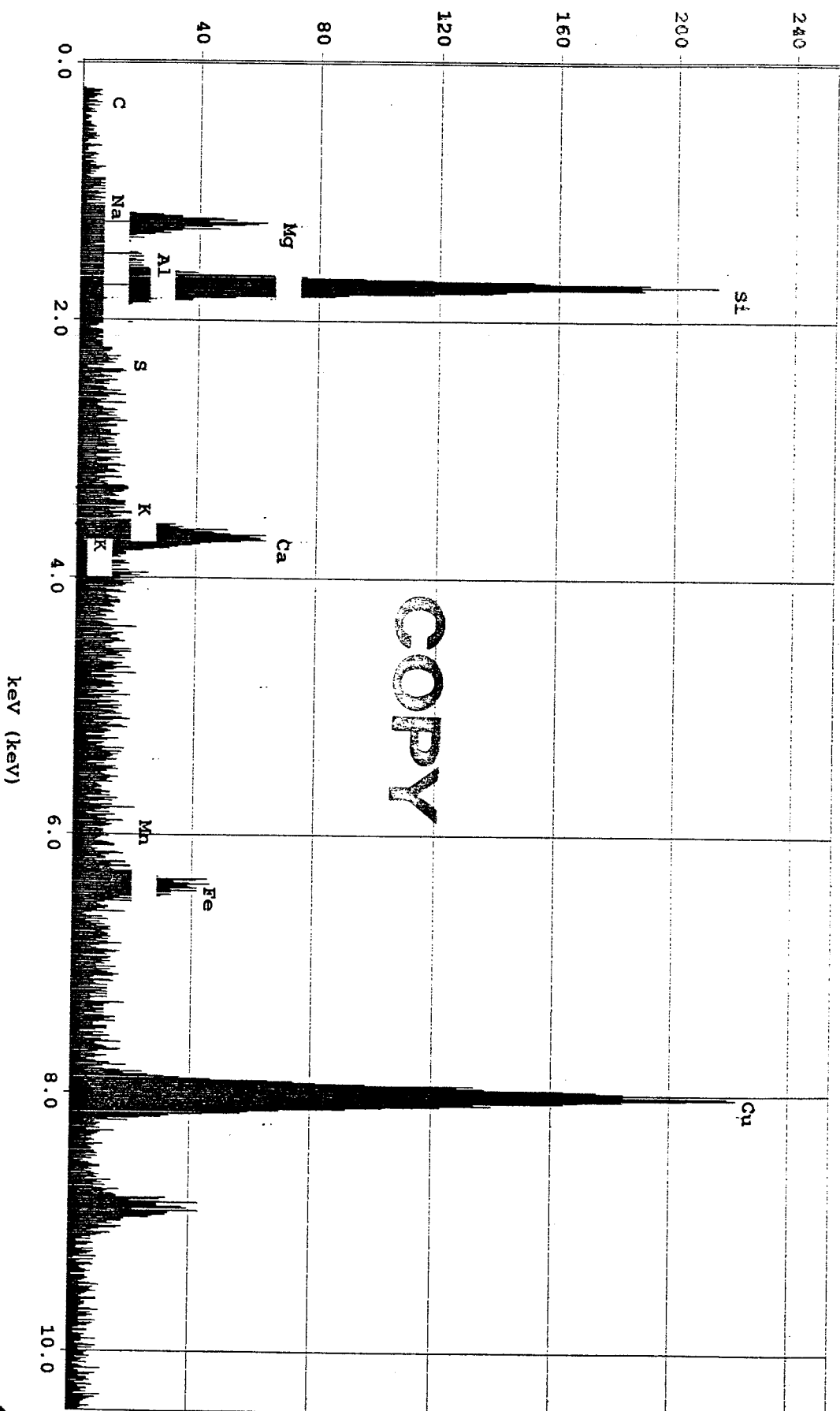
EMSL Analytical, Westmont, NJ
EPA_112849_WF-002-YO : Libby Amphibole
Thursday, September 13, 2001





ID(1):

EMSL Analytical, Westmont, NJ
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Thursday, September 18, 2001

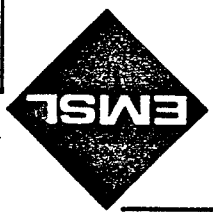
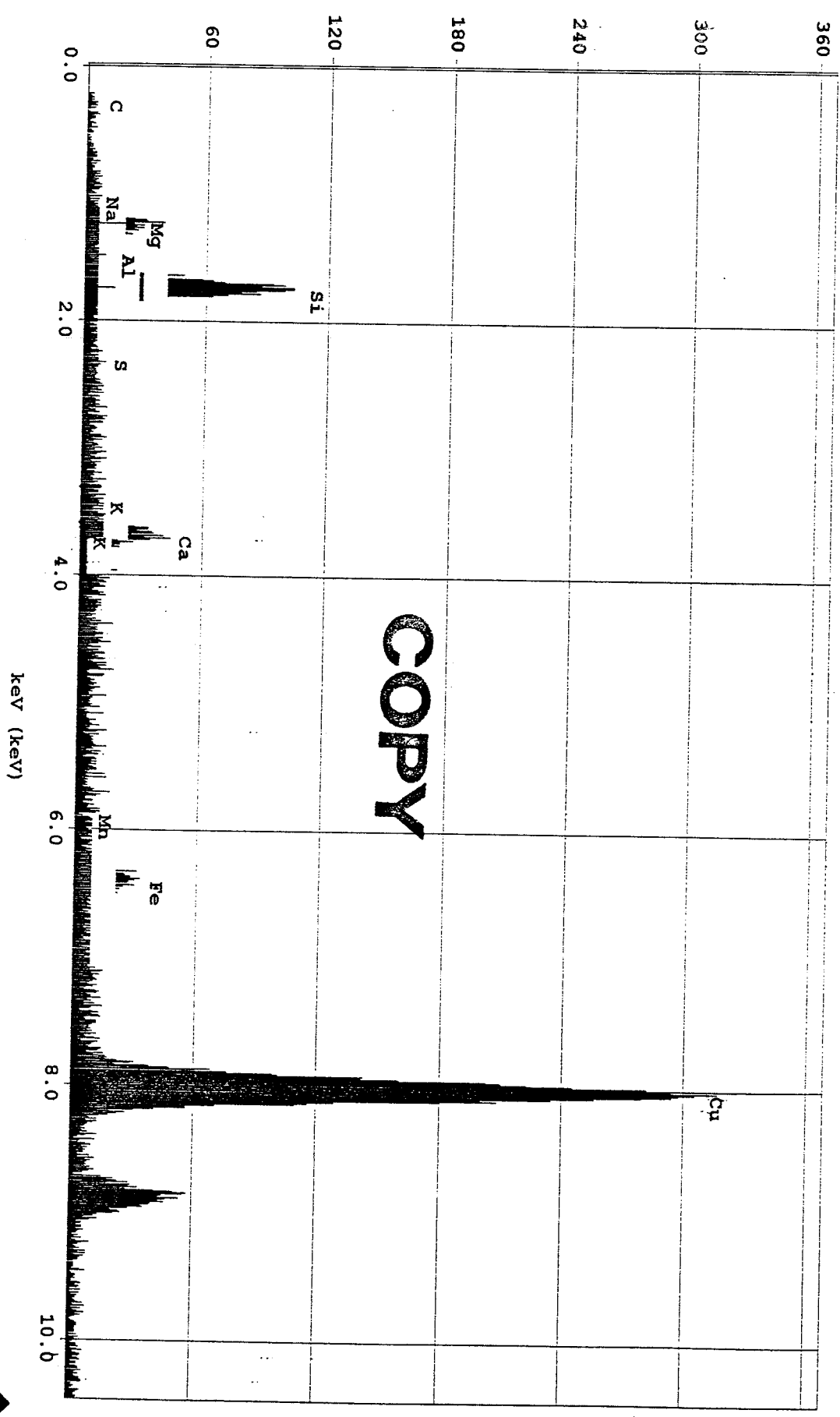


EMSL



IC(L):

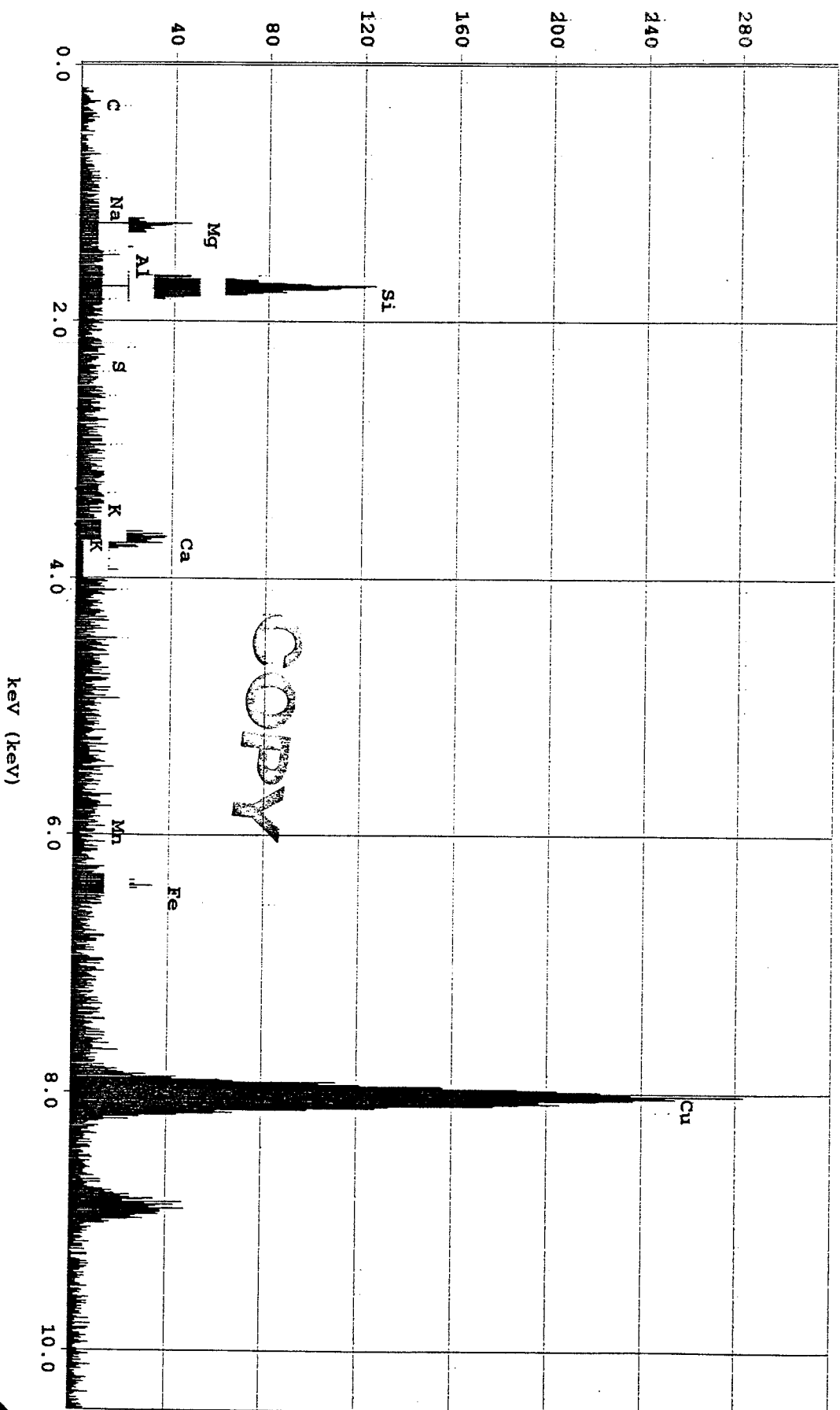
EMSL Analytical, Westmont, NJ
MPA_112849_WR-002-VO : Libby Amphibole
Thursday, September 18, 2001





ID(1):

EMSL Analytical, Westmont, NJ
EPA 112849-WR-002-YO : Libby Amphibole
Thursday, September 13, 2001



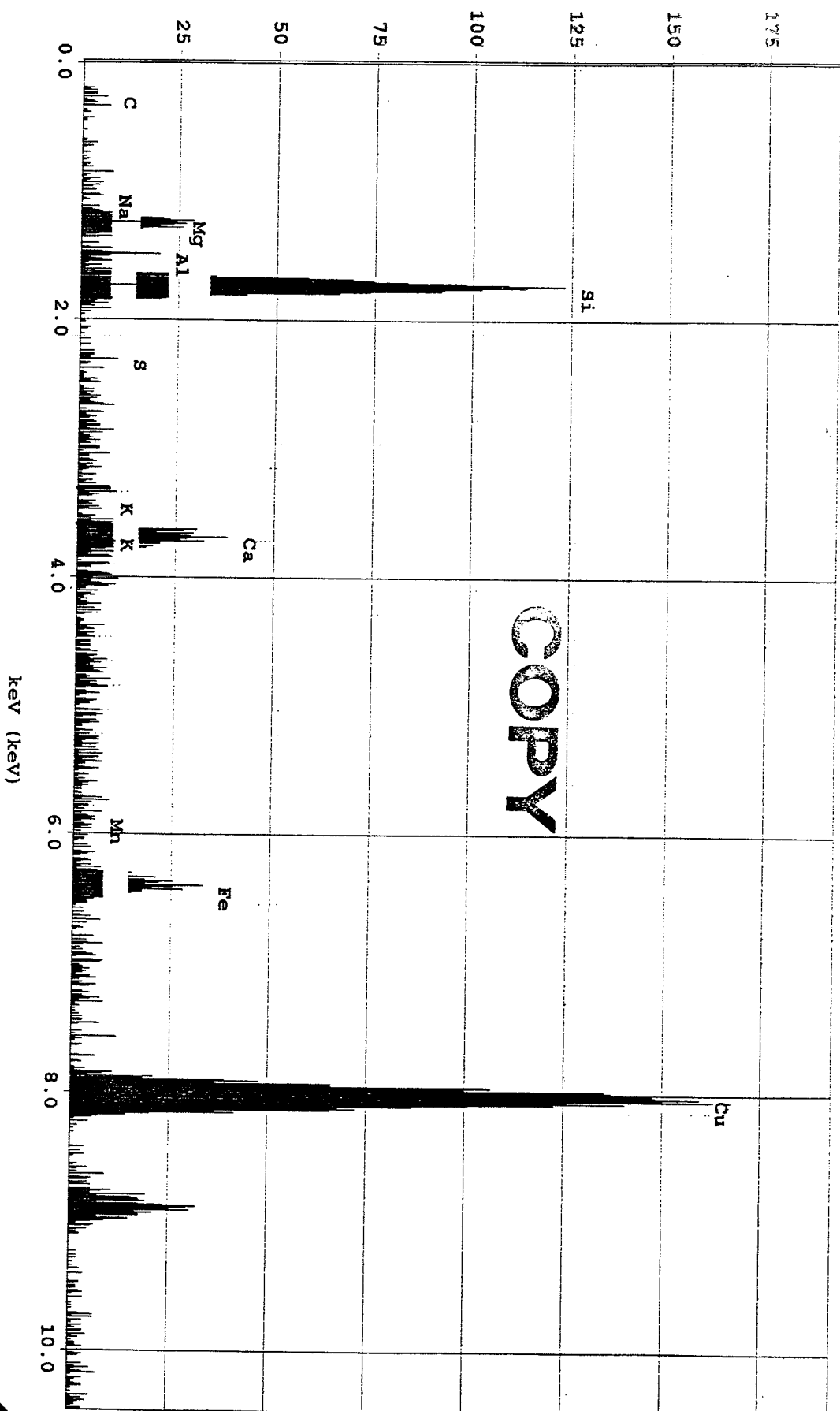
COPY





RE(I):

EMSL Analytical, Westmont, NJ
RPA_112849_MR-002-YO : Libby Amphipole
Thursday, September 18, 2001



EMSL

Attn: Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: 7063558744 Phone: 706-355-8613

USEPA REGION 8 SITE INVESTIGATION
TEM Asbestos Structure Count

ELUTRIATOR

Laboratory name:	EMSL, Westmont, NJ
Instrument	JEOL 100 CX II (2)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm2)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm2)	385
Secondary Filter Area (mm2)	

EPA Sample Number:	WR-003-V0
Sample Type (A=Air, D=Dust, O=Other):	D
Air volume (L) or dust area (cm2)	
Date received by lab	8-7-2001
Lab Job Number:	04012849
Lab Sample Number:	0003
Number of grids prepared	4
Prepared by	DS
Preparation date	8-10-2001

Analyzed by	SAH
Analysis date	9-12-2001
Method (D=Direct, I=Indirect)	D
Counting rules (I=ISO10312, A=ASHERA, O=Other)	I
Grid storage location	2001 - C

Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

Secondary Prep

Row H

Row H

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/Comments	1 = yes, blank = no		
			Primary	Total	Length	Width		LA	OA	C	NA		Sketch	Photo	EDS
I	I-6	F			2.5	0.25		LA							1
					8.5	0.35					NA	Si only			1
		MD10 MF			3	0.8									1
		MD10 MF			3	0.3		LA							1
		MD10 MF			8	6		LA							1
		MD21 MF			4.9	0.6		LA							1
		MD21 MF			8.5	8		LA							1
		MD21 MF			6.8	0.4		LA							1
		MF			3.5	0.15		LA							1
		F			3.5	0.4		LA							1
		MD11 MF			12	8		LA							1
		F			5.2	0.6		LA							1
		F			7.5	0.8		LA							1
		F			1.1	0.12		LA							1

COPY

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

USEPA REGION 8 SITE INVESTIGATION
TEM Asbestos Structure Count

ELUTRIATOR

LAB NAME: EMSL Westmont, NJ
LAB SAMPLE NO: 0008

EPA SAMPLE NO: WR-003-V0
SAMPLE TYPE: D

LAB JOB NUMBER: 040112849
GRID STORAGE LOC: 2001-C

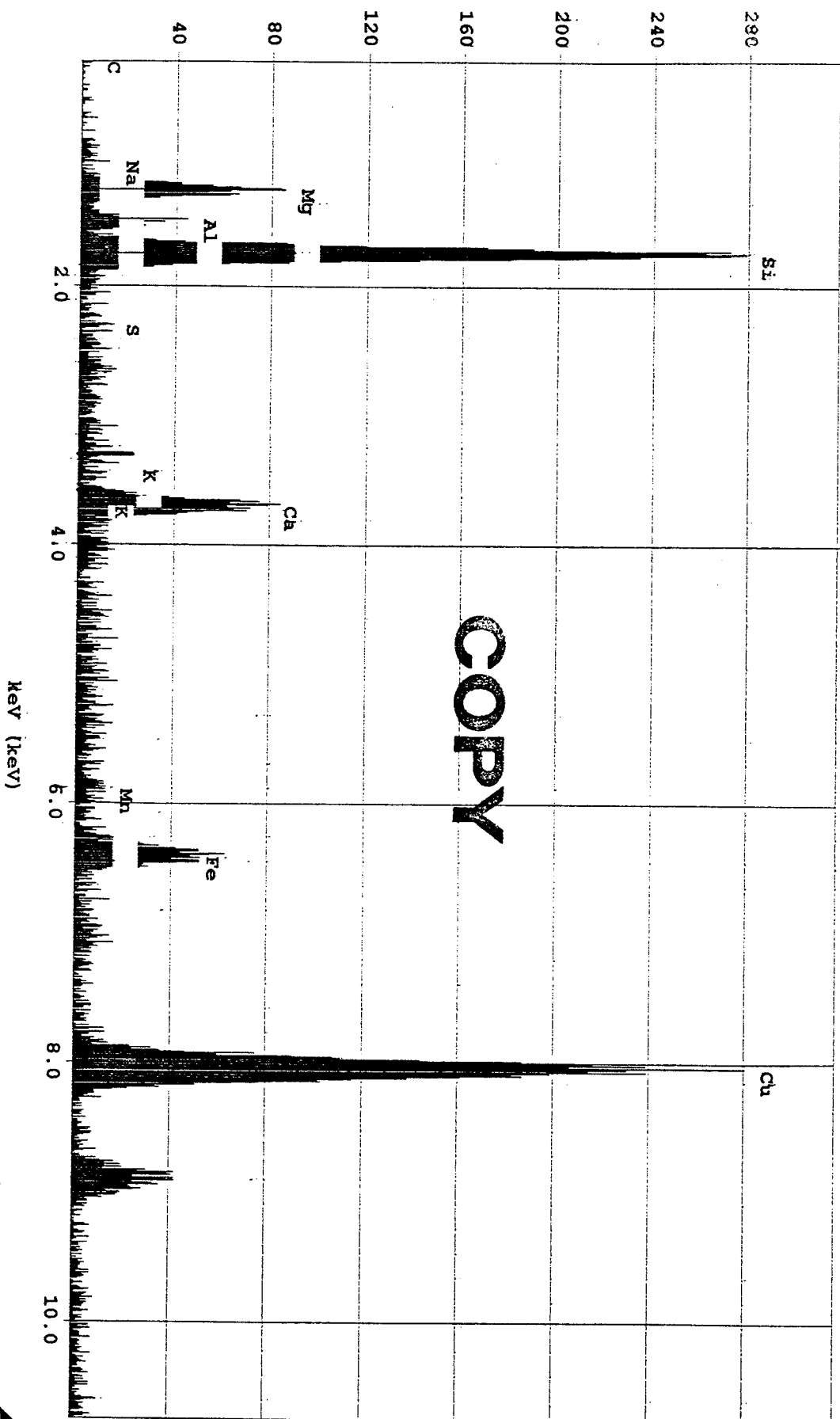
Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class				Sketch/Comments	1 = yes, blank = no		
			Primary	Total	Length	Width		LA	OA	C	NA		Sketch	Photo	EDS
1	F-8	MD21 MF			18	8		LH							1
		MF			4	0.5		LH							1
		MD20			12	10									
		MF			3	0.15		LA							1
		MF			2.5	0.5		LH							1
		MD22			20	10		LA							1
		MF			10	0.6		LA							1
		MF			13.2	1.0		LA							1
		F			16	1.0		LH							1
2	G-7	MD11 MF			20	10		LH							1
		MD10			7.5	1.0		LA							1
		MF			4.6	3		LA							1
		MD10			4	0.5		LA							1
		MF			20	10									
		MD11 MF			4	0.7		LA							1
		MD11 MF			9	0.1		LA							1
		MD11 MF			20	4.5									
		MD11 MF			19	2		LA							1

Row H



ID(1):

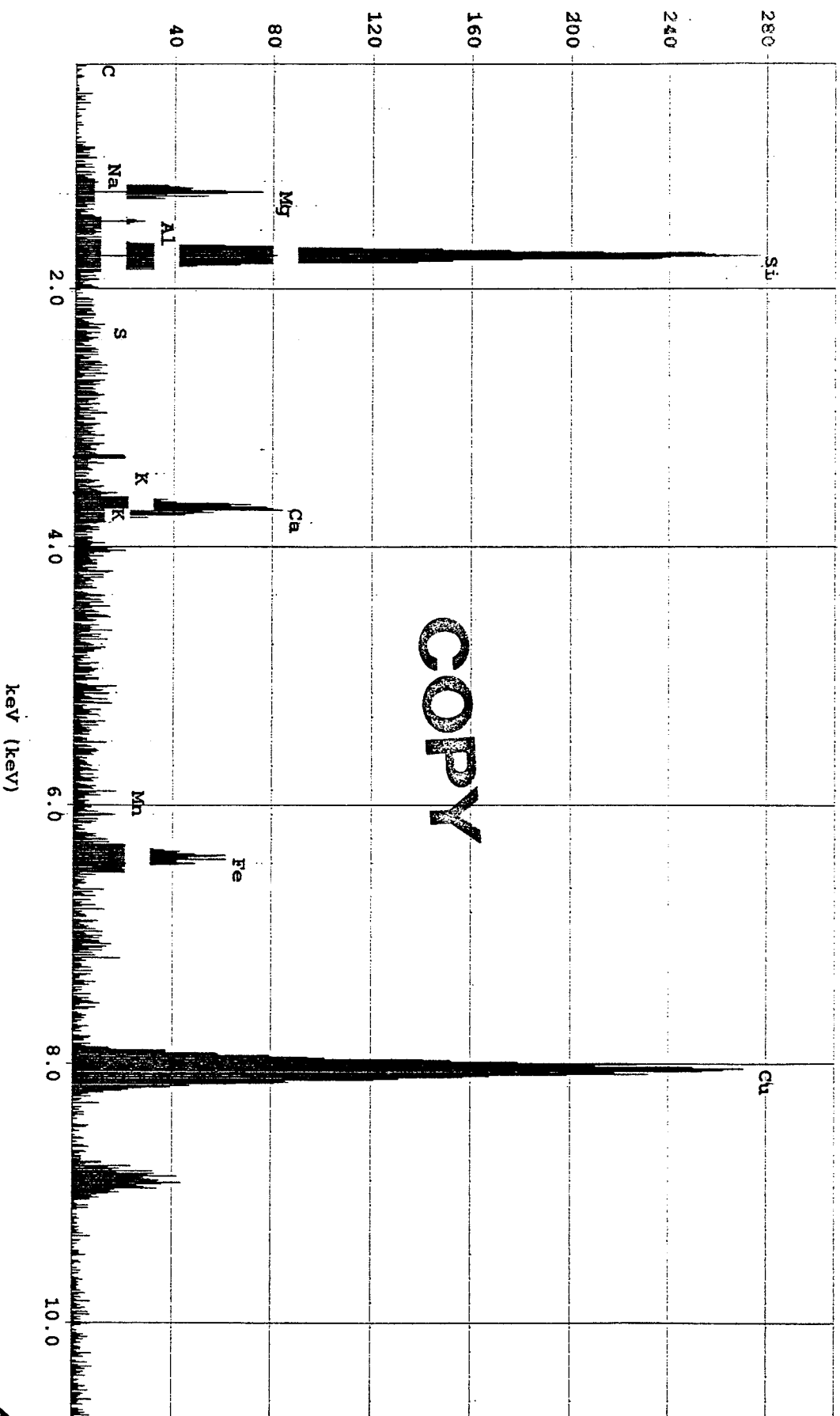
EMSL Analytical, Westmont, NJ
CDM_112849_WR-003-VO : Libby Amphibole
Wednesday, September 12, 2001





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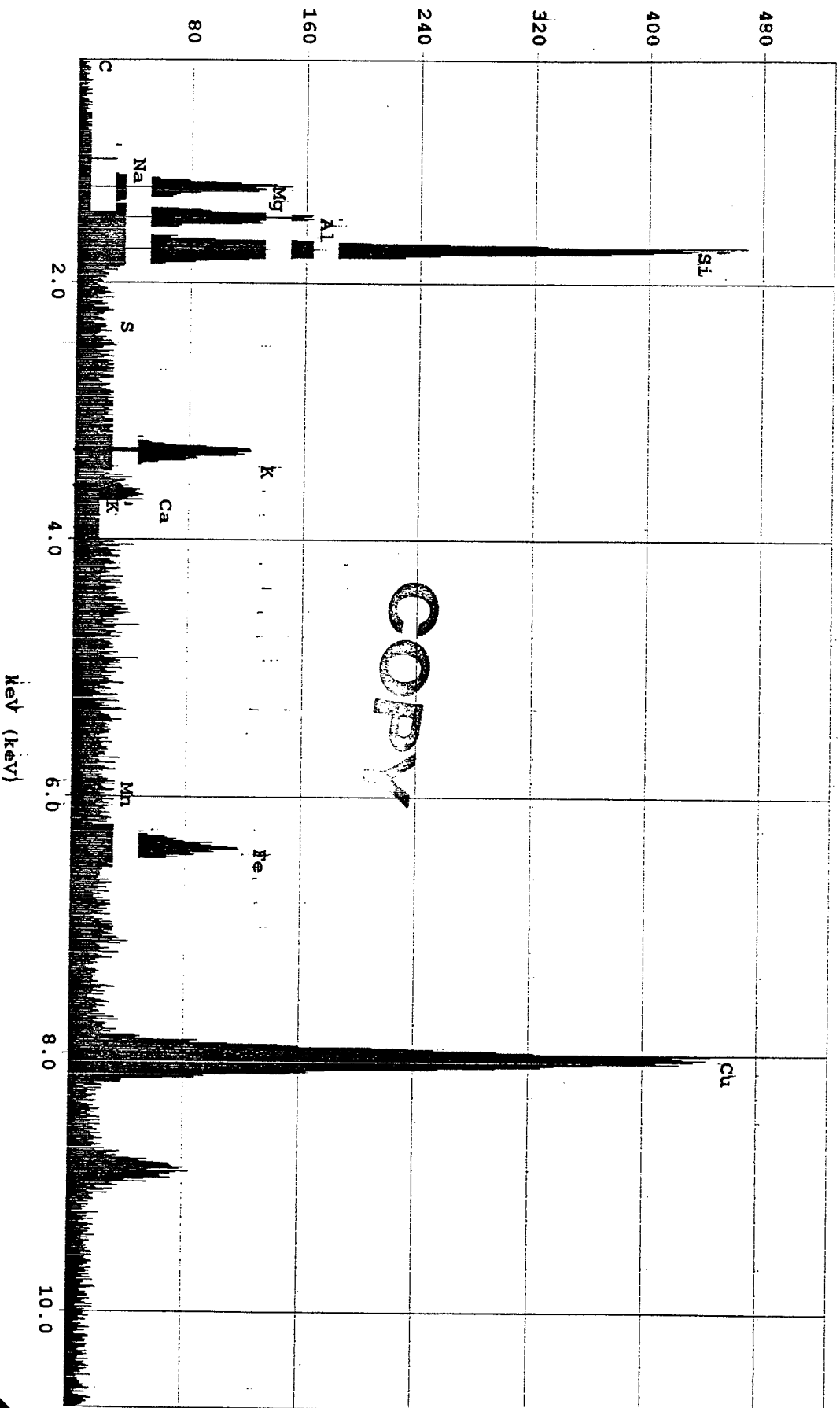
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CDM_112849_WR-003-VO : Libby Amphibole
Wednesday, September 12, 2001



EMSL

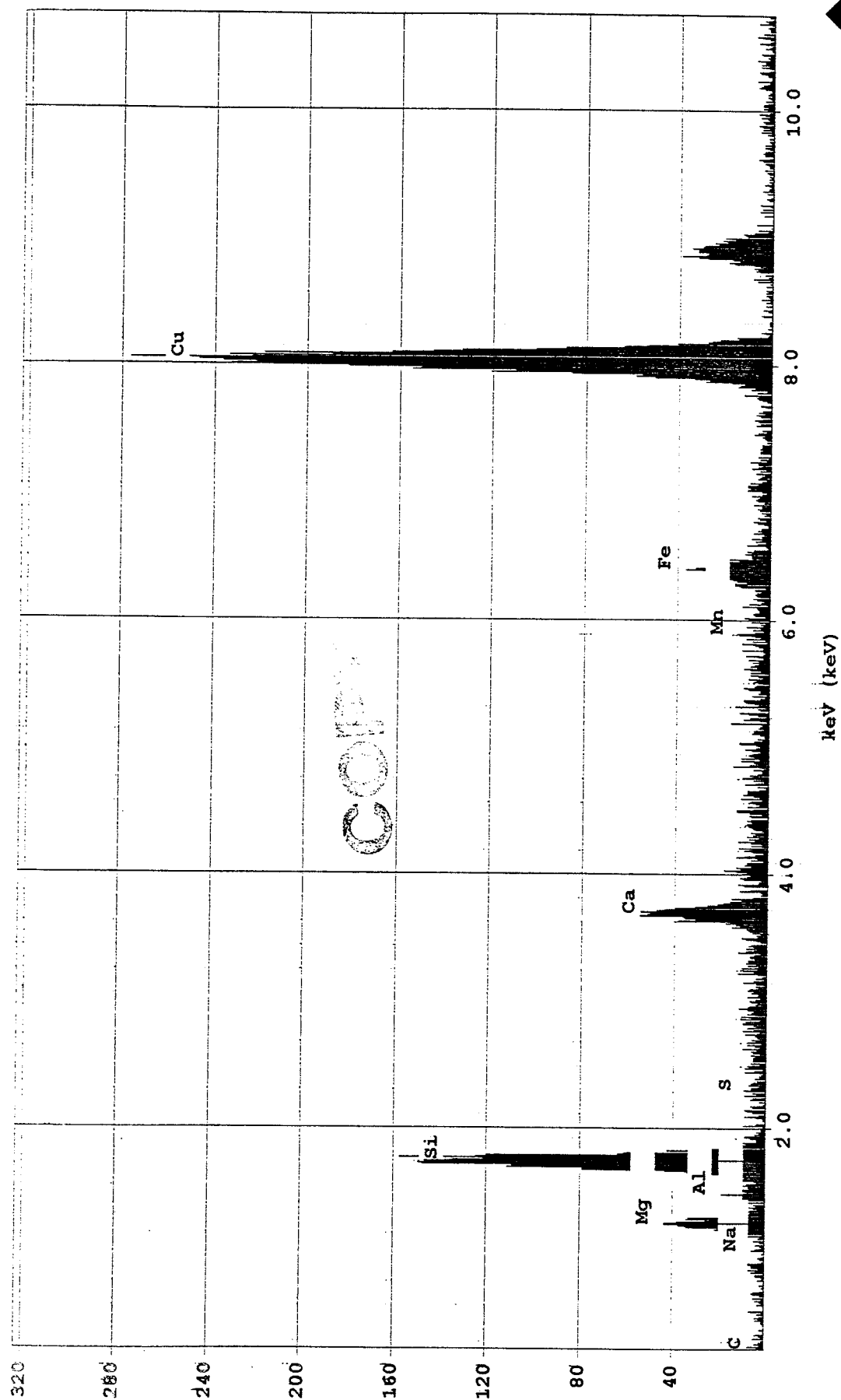
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EMSL Analytical, Westmont, NJ
CDM_112849_WR-003-VO : Libby Amphibole
Wednesday, September 12, 2001



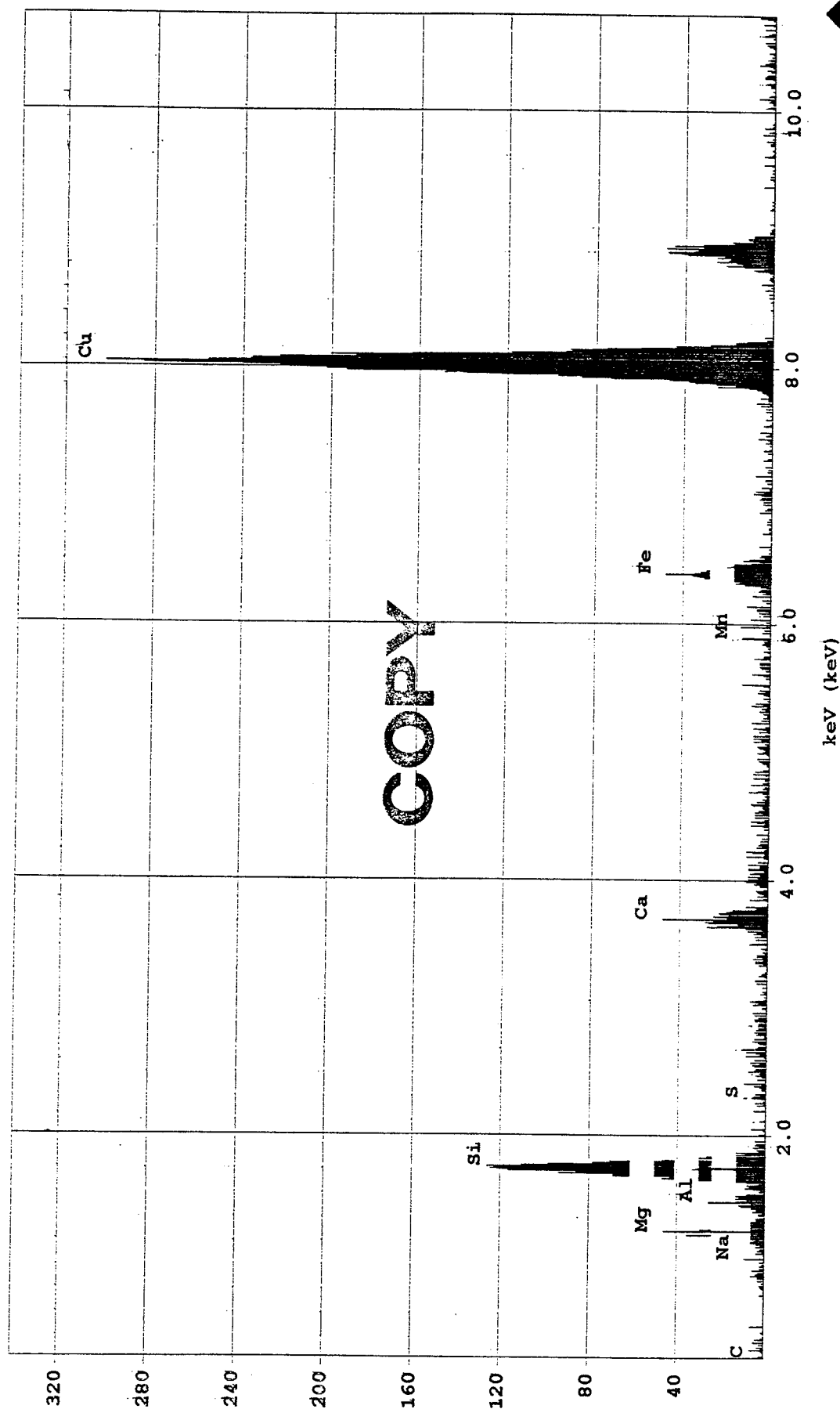
EMSL

EMSL Analytical, Westmont, NJ
 QDM 112849 WR-003-VO : Libby Amphibole
 Wednesday, September 12, 2001

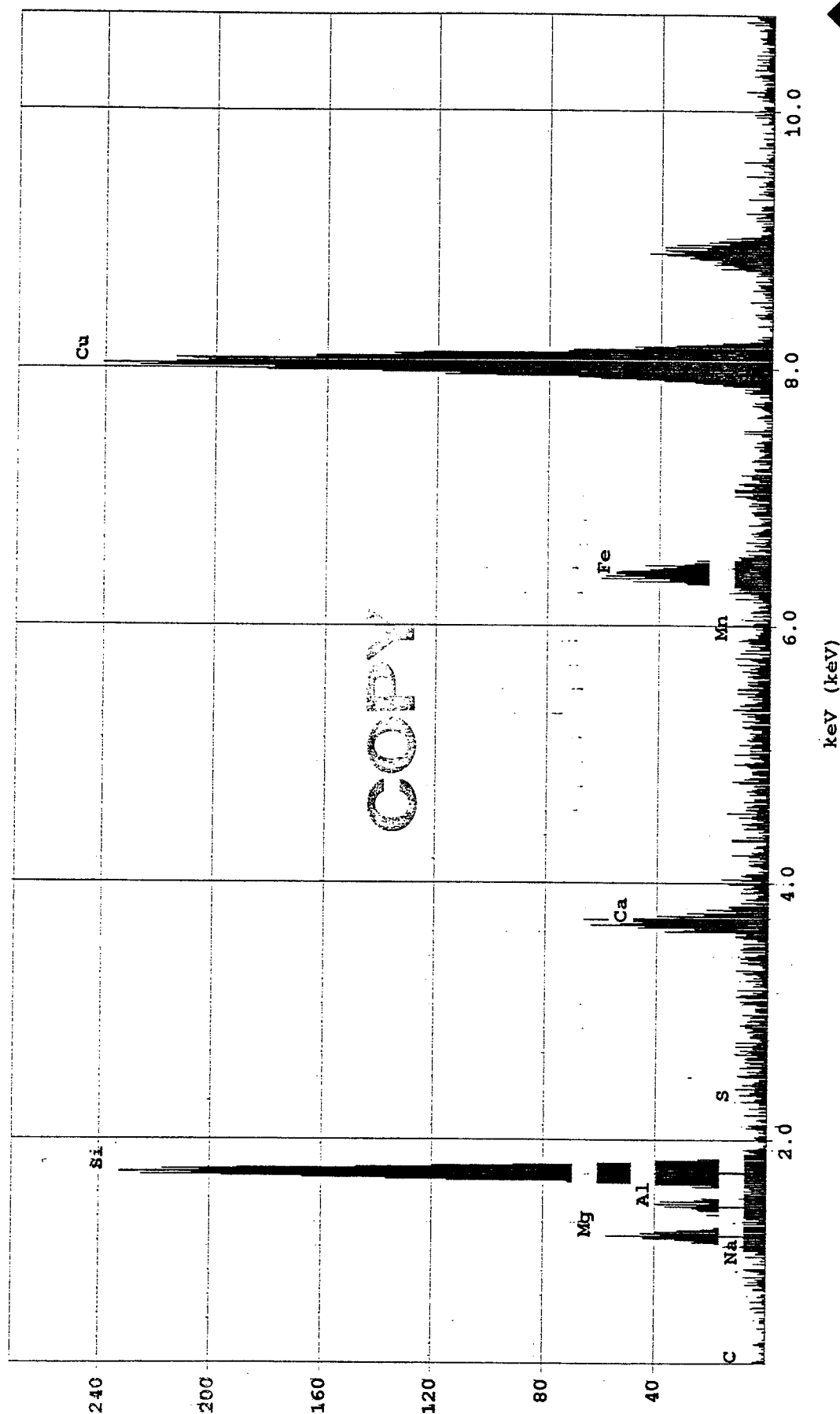


EMSL Analytical, Westmont, NJ
CDM_112849_WR-003-VO : Libby Amphibole
Wednesday, September 12, 2001

EMSL

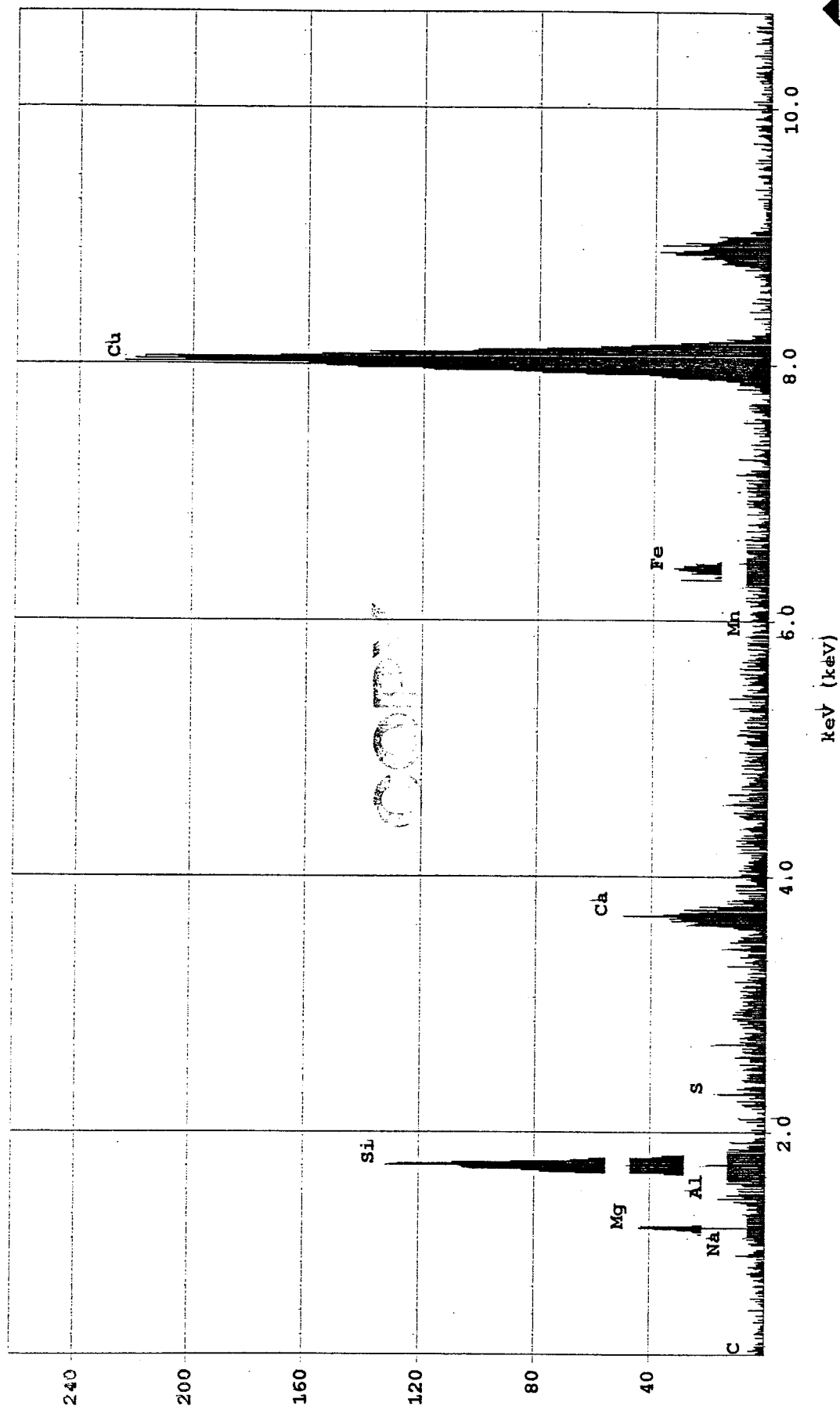


EMSL Analytical, Westmont, NJ
 CDM 112849 WR-003-VO : Libby Amphibole
 Wednesday, September 12, 2001

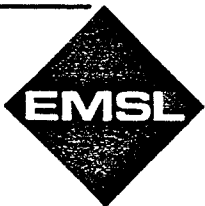




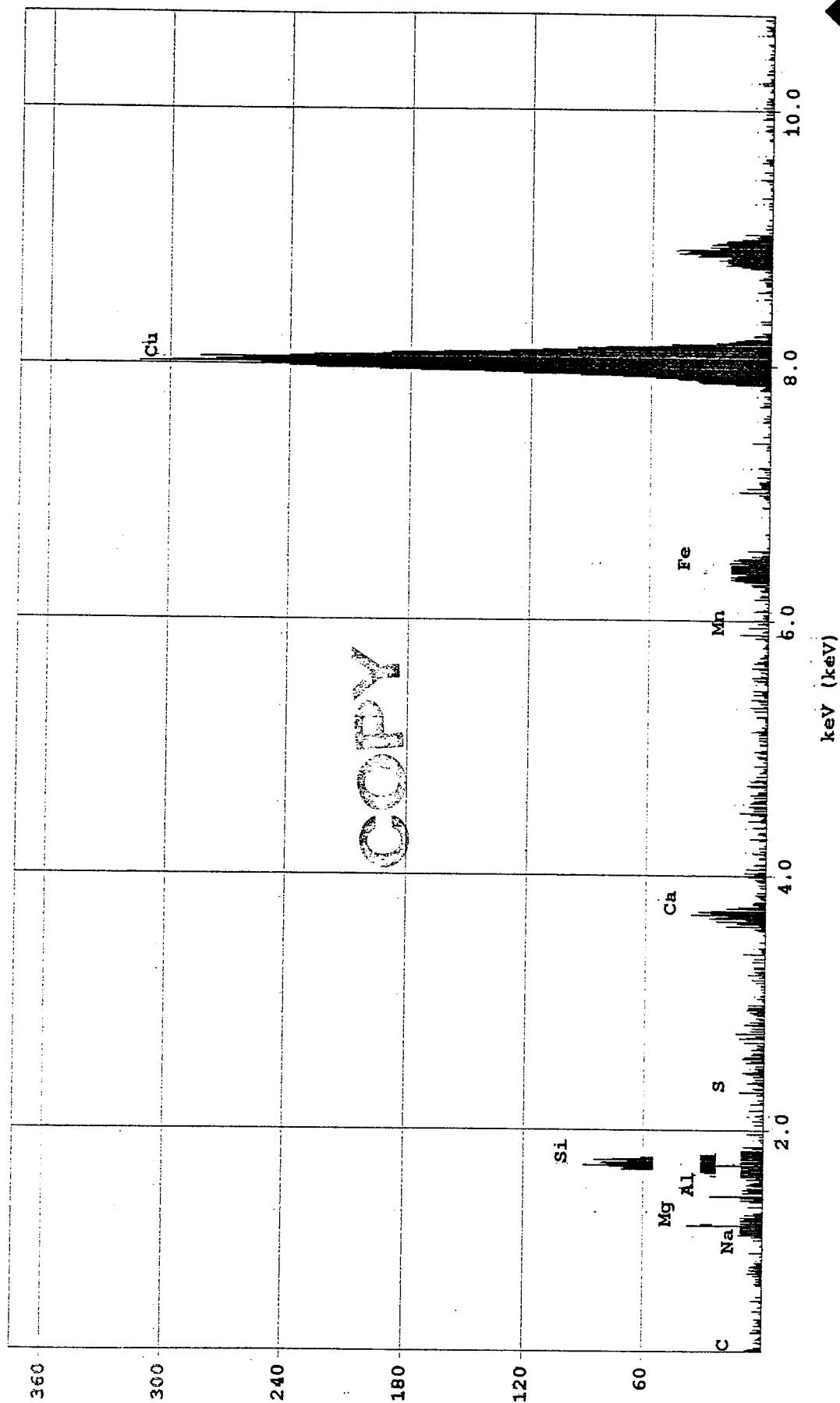
EMSL Analytical, Westmont, NJ
CDM_112849_WR-003-VO : Libby Amphibole
Wednesday, September 12, 2001



EDS(1):

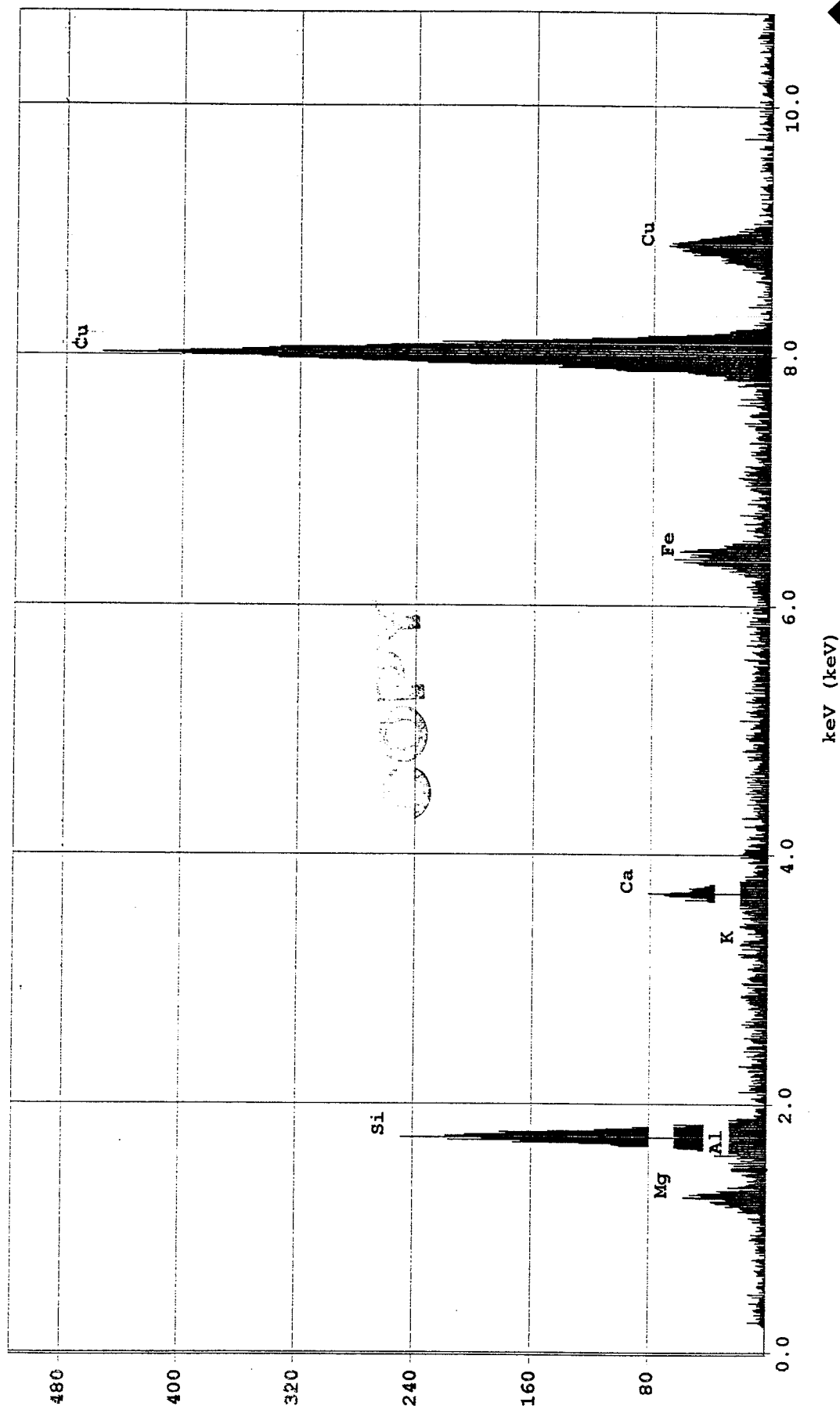


EMSL Analytical, Westmont, NJ
CDM_112849_WR-003-VO : Libby Amphibole
Wednesday, September 12, 2001

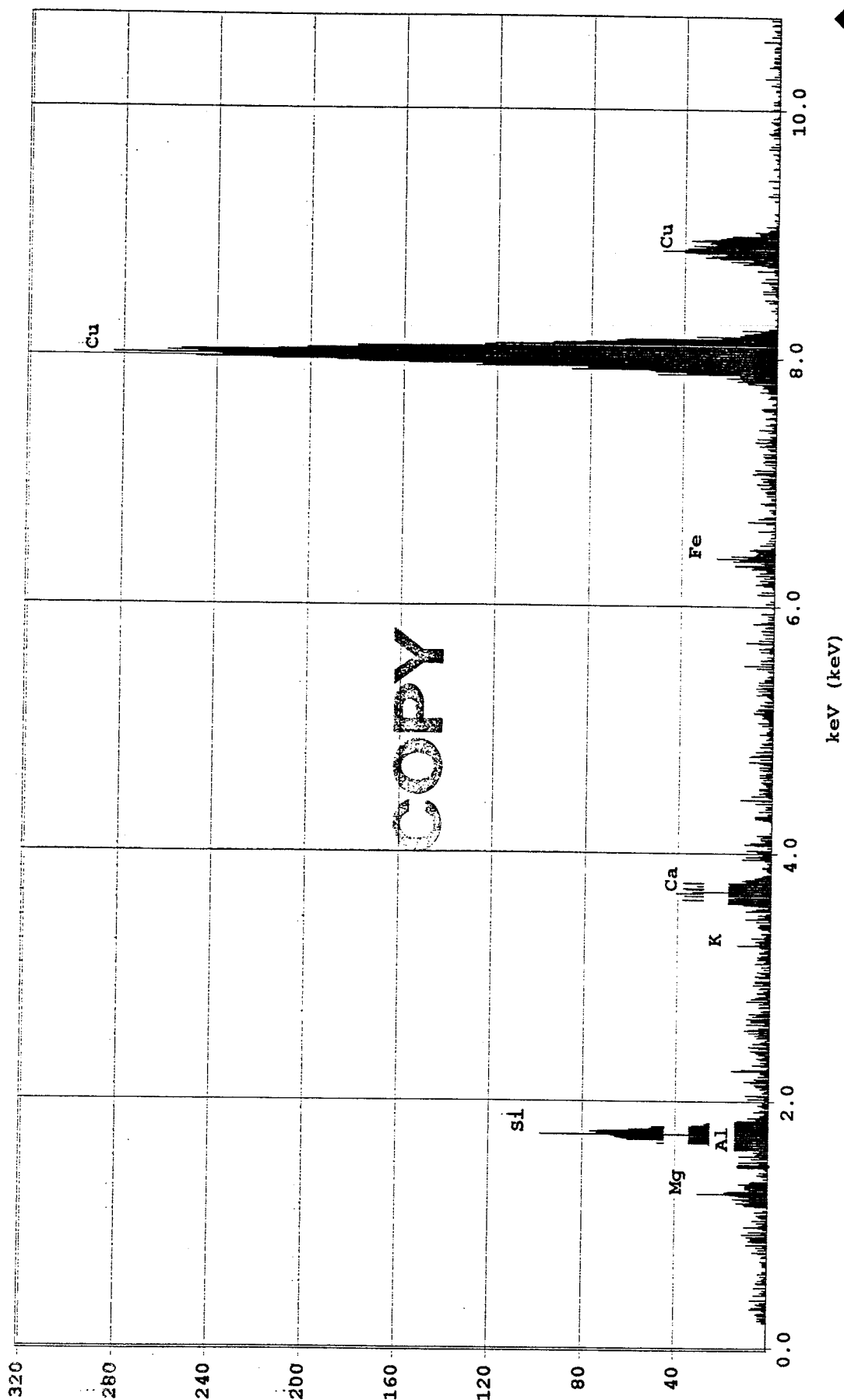


ID(1):

EMSL Analytical, Westmont, NJ
 EPA_112849_WR-004-VO: Libby Amphibole
 Tuesday, September 18, 2001



EMSL Analytical, Westmont, NJ
EPA_112849_WR-004-V0: Libby Amphibole
Tuesday, September 18, 2001



EMSL

Attn:

Jim Gray
U.S. EPA

Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: 7063558744

Phone: 706-355-8613

USEPA REGION 8

TEM Asbestos Structure Count

ELUTRIATOR

ॐ नमो भगवते

Laboratory name:	EMSL, Westmont, NJ
Instrument	JEOL 100 CX II (2)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm ²)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm ²)	
Secondary Filter Area (mm ²)	

EPA Sample Number:	WR-005-V0
Sample Type (A=Air, D=Dust, O=Other):	D
Air volume (L) or dust area (cm ²)	
Date received by lab	8-7-2001
Lab Job Number:	040112849
Lab Sample Number:	000
Number of grids prepared	4
Prepared by	DS
Preparation date	9-10-2001

Analyzed by	
Analysis date	
Method (D=Direct, I=Indirect) Counting rules (I=ISO10312, A=AHERA, O=Other)	I
Grid storage location	2001 - C

Secondary Prep

Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

[illegible]

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysolite

11/20/2020

Row Q

Attn:

Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: 7063558744

Phone: 706-355-8613

ELUTRIATOR

USEPA REGION 8 SITE INVESTIGATION
TEM Asbestos Structure Count

Page 1 of 2

Laboratory name:	EMSL, Westmont, NJ
Instrument	JEOL 100 CX II (2)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm ²)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm ²)	385
Secondary Filter Area (mm ²)	

EPA Sample Number:	WR-005-VO
Sample Type (A=Air, D=Dust, O=Other):	D
Air volume (L) or dust area (cm ²)	
Date received by lab	8-7-2001
Lab Job Number:	040112849
Lab Sample Number:	0005
Number of grids prepared	4
Prepared by	DS
Preparation date	9-10-2001

Analyzed by	AMS
Analysis date	9-18-2001
Method (D=Direct, I=Indirect)	
Counting rules (I=ISO10312, A=ASHERA, O=Other)	I
Grid storage location	2001 - C

Secondary Prep

Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

Section Date										Volume filtered for secondary prep (mL)									
Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				Sketch/Comments	1 = yes, blank = no						
			Primary	Total	Length	Width		LA	OA	C	NA		Sketch	Photo	EDS				
1	G-6	F			4.0	0.3		LA											
	I-8	FI			7.5	1.0					NA	Al, Si, Fe				/			
		F			7.0	0.6		LA								/			
	C-8	F			2	0.5		LA								/			
	F-12	F			4.25	0.4		LA								/			
		F			3.6	0.8		LA								/			
					7.0	0.5					NA	Mg, Al, Si, Ca, Fe				/			
					8.0	1.0					NA	Mg, Al, Si, Ca, Fe				/			
2	K-12	ND																	
	L-14	ND																	

LA = Libby-type amphibole

Row 1

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

0005	ERISL, Westmont, NJ
------	---------------------

WR-005-V0

10 min.

LAB JOB NUMBER

GRID STORAGE LOC.

040112849

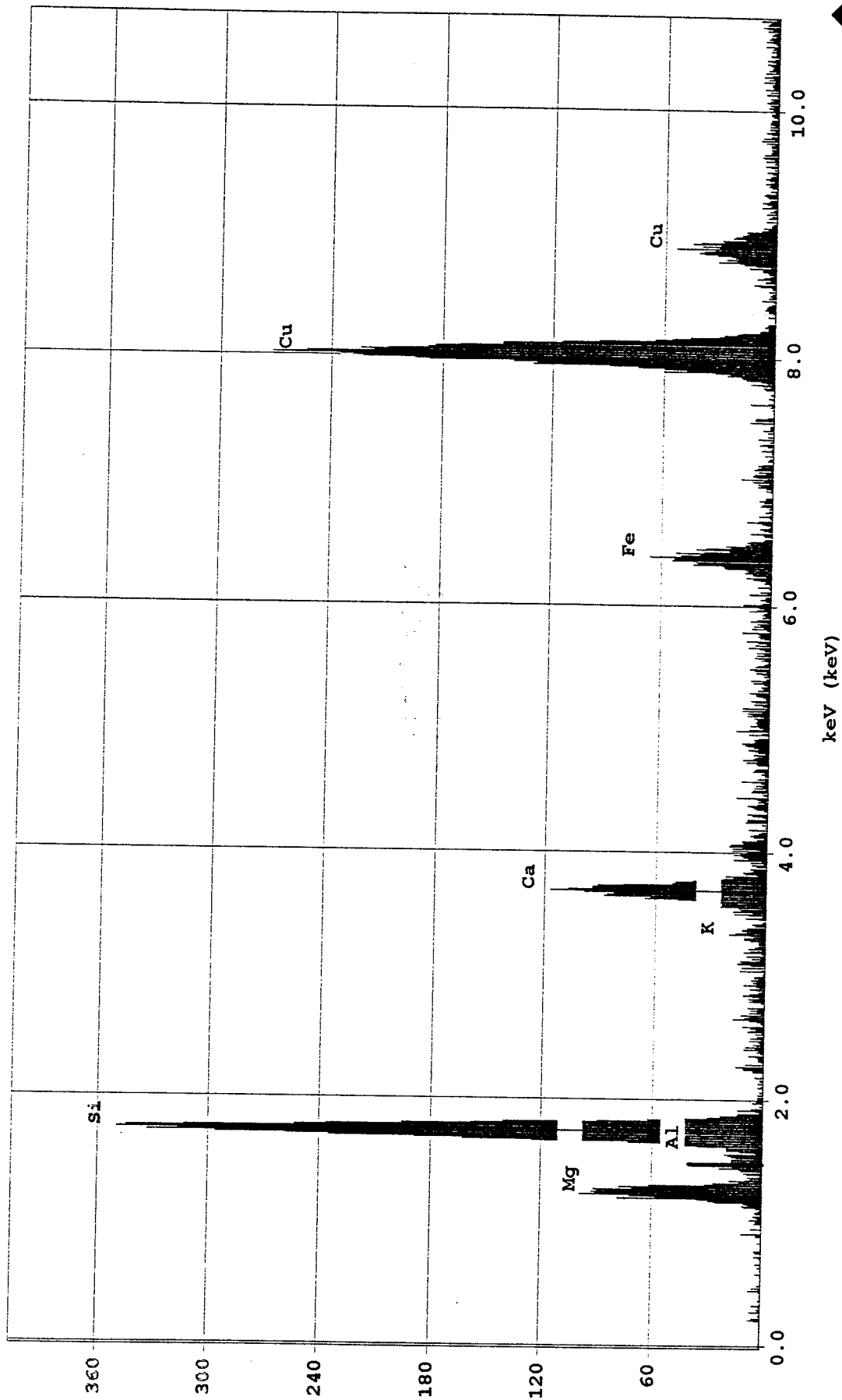
2001-02

20

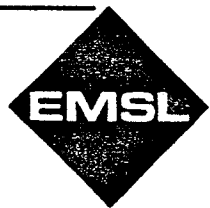
Row 9

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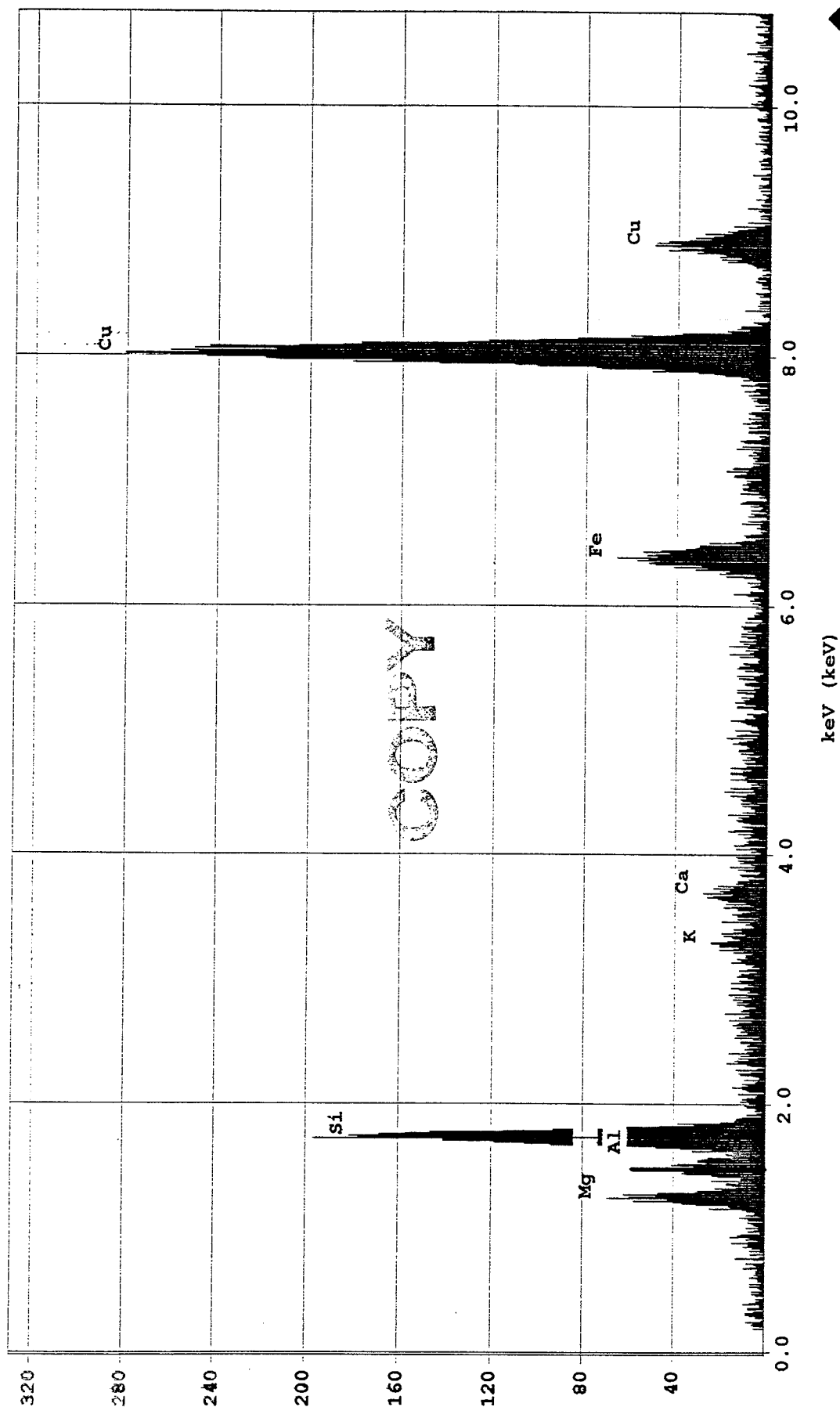
EMSL Analytical, Westmont, NJ
EPA_112849_WR-005-VO: Libby Amphibole
Tuesday, September 18, 2001



EMSL

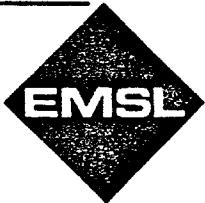


EMSL Analytical, Westmont, NJ
EPA_112849_WR-005-VQ: Libby Amphibole
Tuesday, September 18, 2001

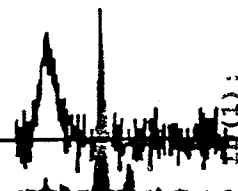
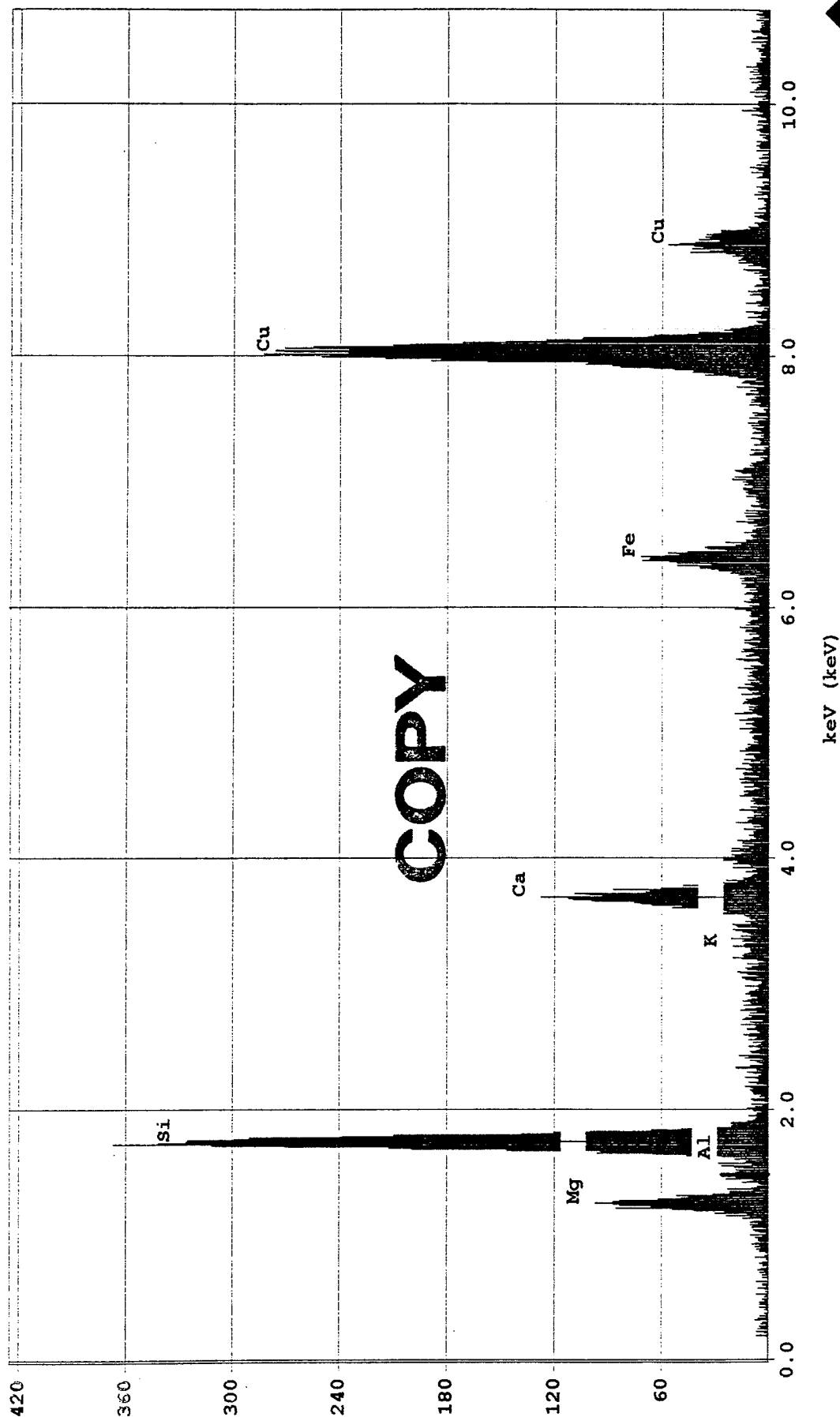


COPY

IP(1):



EMSL Analytical, Westmont, NJ
EPA_112849_WR-005-VO: Libby Amphibole
Tuesday, September 18, 2001



Attn: Jim Gray
U.S. EPA

Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: 7063558744 Phone: 706-355-8613

USEPA REGION 8 SITE INVESTIGATION
TEM Asbestos Structure Count

ELUTRIATOR

Page 1 of 2

Laboratory name:	EMSL, Westmont, NJ
Instrument	JEOL 100 CX II (2)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm ²)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm ²)	
Secondary Filter Area (mm ²)	

EPA Sample Number:	WR-006-V0
Sample Type (A=Air, D=Dust, O=Other):	D
Air volume (L) or dust area (cm ²)	
Date received by lab	8-7-2001
Lab Job Number:	040112849
Lab Sample Number:	0006
Number of grids prepared	4
Prepared by	DS
Preparation date	9-10-2001

Analyzed by	AKD
Analysis date	9-18-2001
Method (D=Direct, I=Indirect)	
Counting rules (I=ISO10312, A=ASHERA, O=Other)	I
Grid storage location	2001 - C

Secondary Prep

Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

Volume filtered for secondary prep (mL)																	
Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				1 = yes, blank = no					
			Primary	Total	Length	Width		LA	OA	C	NA	Sketch/Comments	Sketch	Photo	EDS		
1	D-8				11	2.5											
		F			5.5	0.5											
		MD10 MF			11	8											
					4.0	0.3											
	G-9	MD11 MF			14	0.5											
					7.0	0.6											
		F			2.5	0.3											
	J-7				6.0	0.5											
		F			5.5	0.3											
					7.0	0.35											
	M-6	MD11 MF			18	7											
					12.0	0.4											
	K-13	ND															

LA = Libby-type amphibole

Row R

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

LAB SAMPLE NO:

EPA SAMPLE NO:	SAMPLE TYPE
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
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88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

WR-006-VO	D
-----------	---

60 min.

LAB JOB NUMBER

GRID STORAGE LOC.

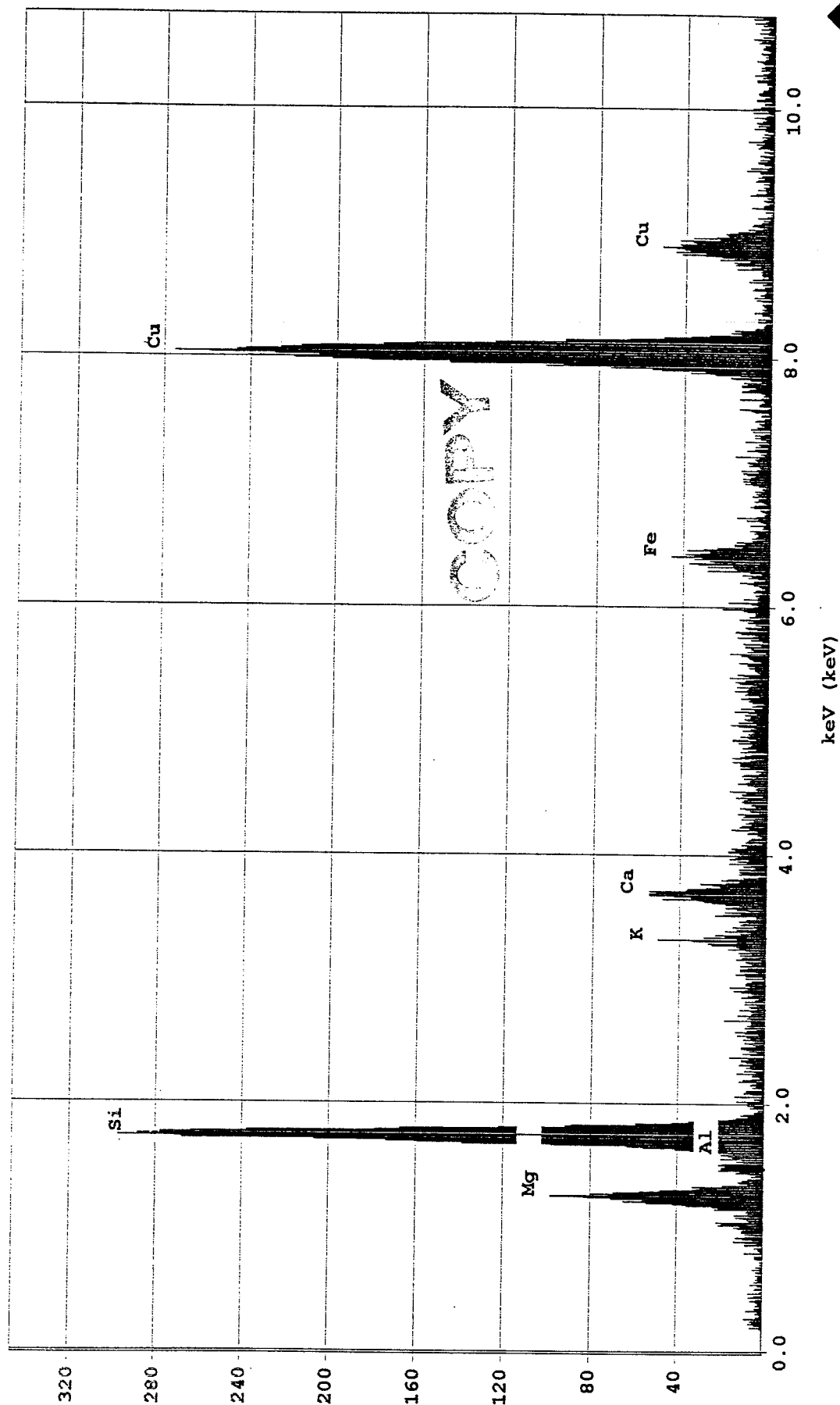
04012849
2001 C

Row R

Roz R

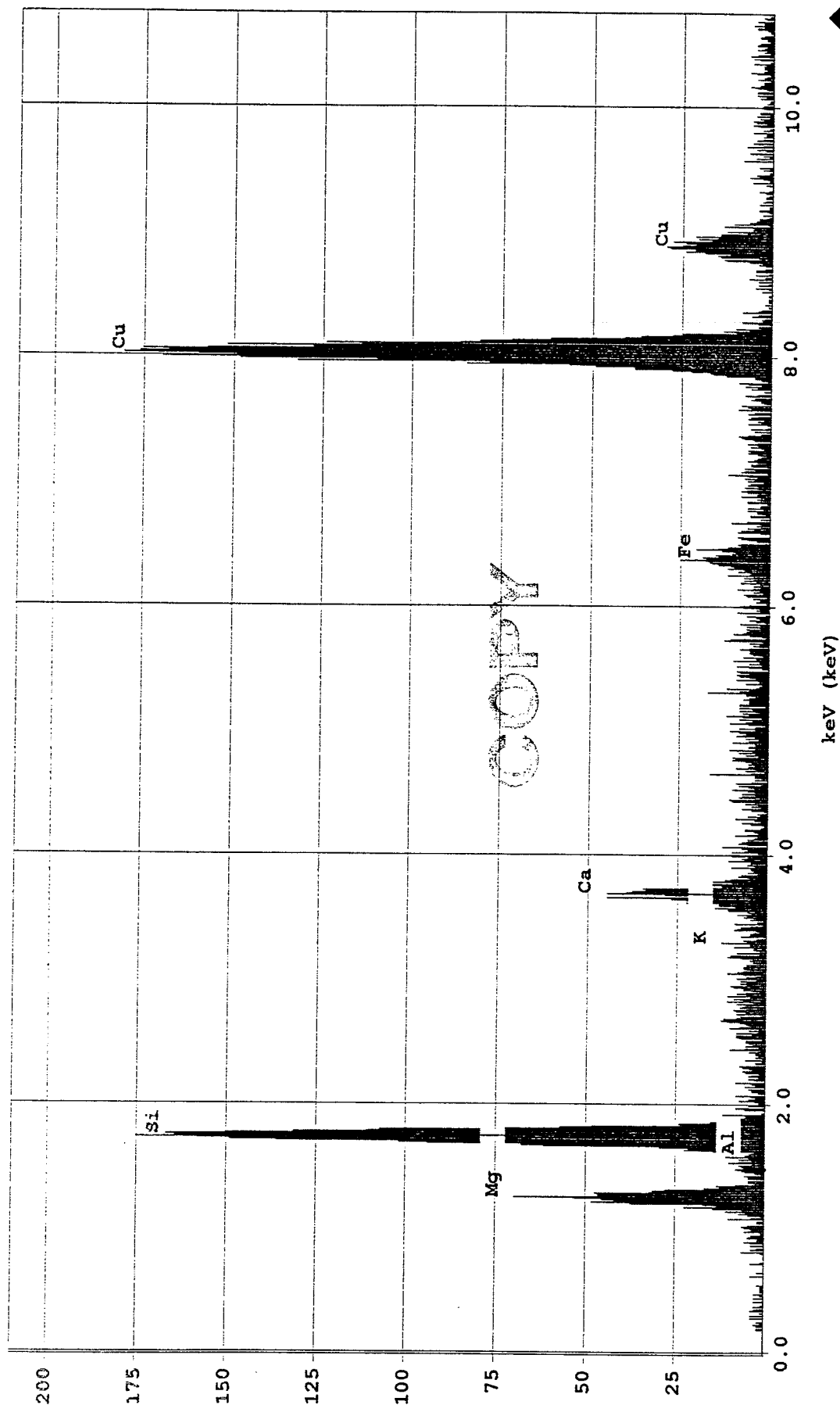
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EMSL Analytical, Westmont, NJ
EPA_112849_WR-006-VO: Libby Amphibole
Tuesday, September 18, 2001



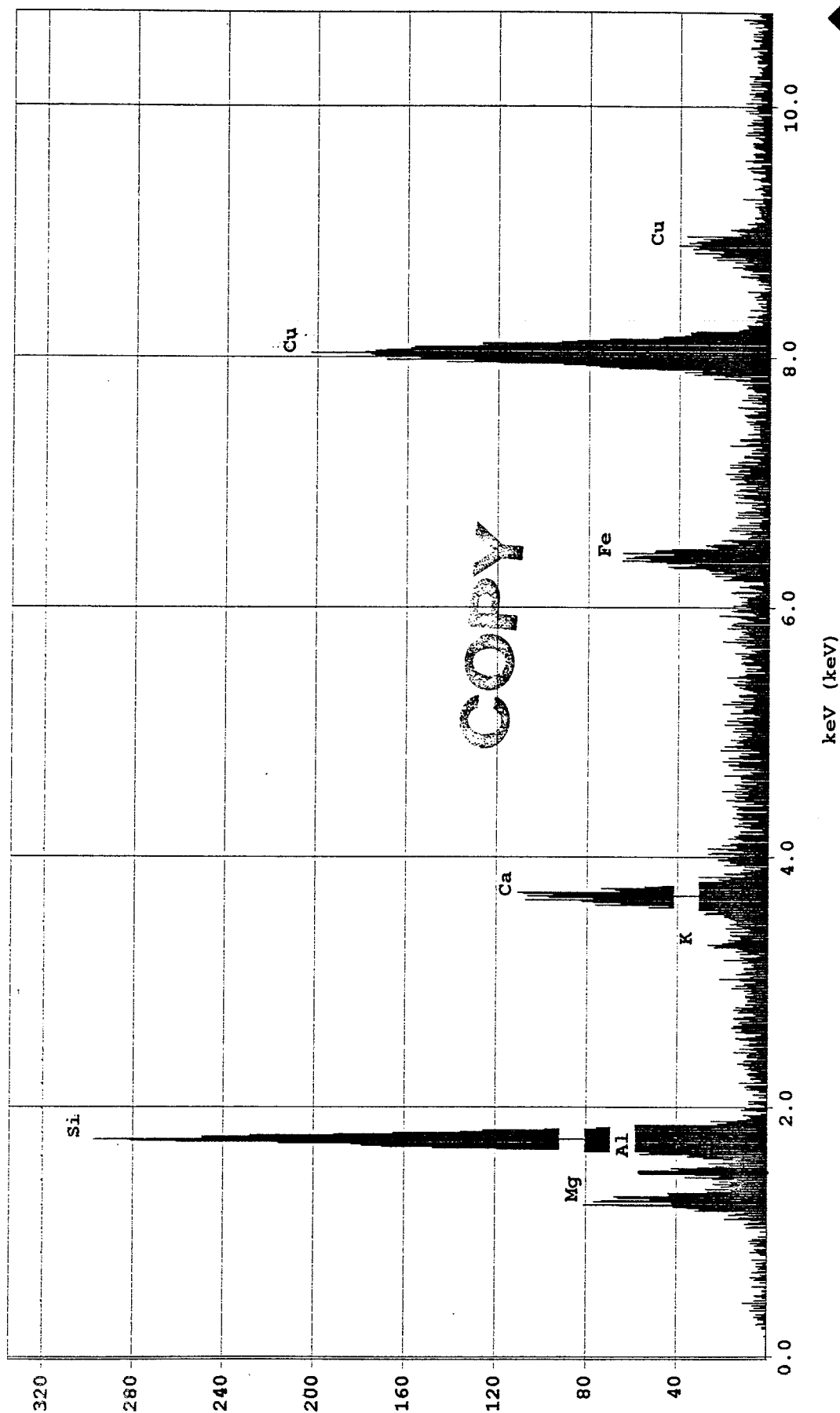
EMSL Analytical, Westmont, NJ
EPA 112849 WR-006-VO: Libby Amphibole
Tuesday, September 18, 2001

EMSL



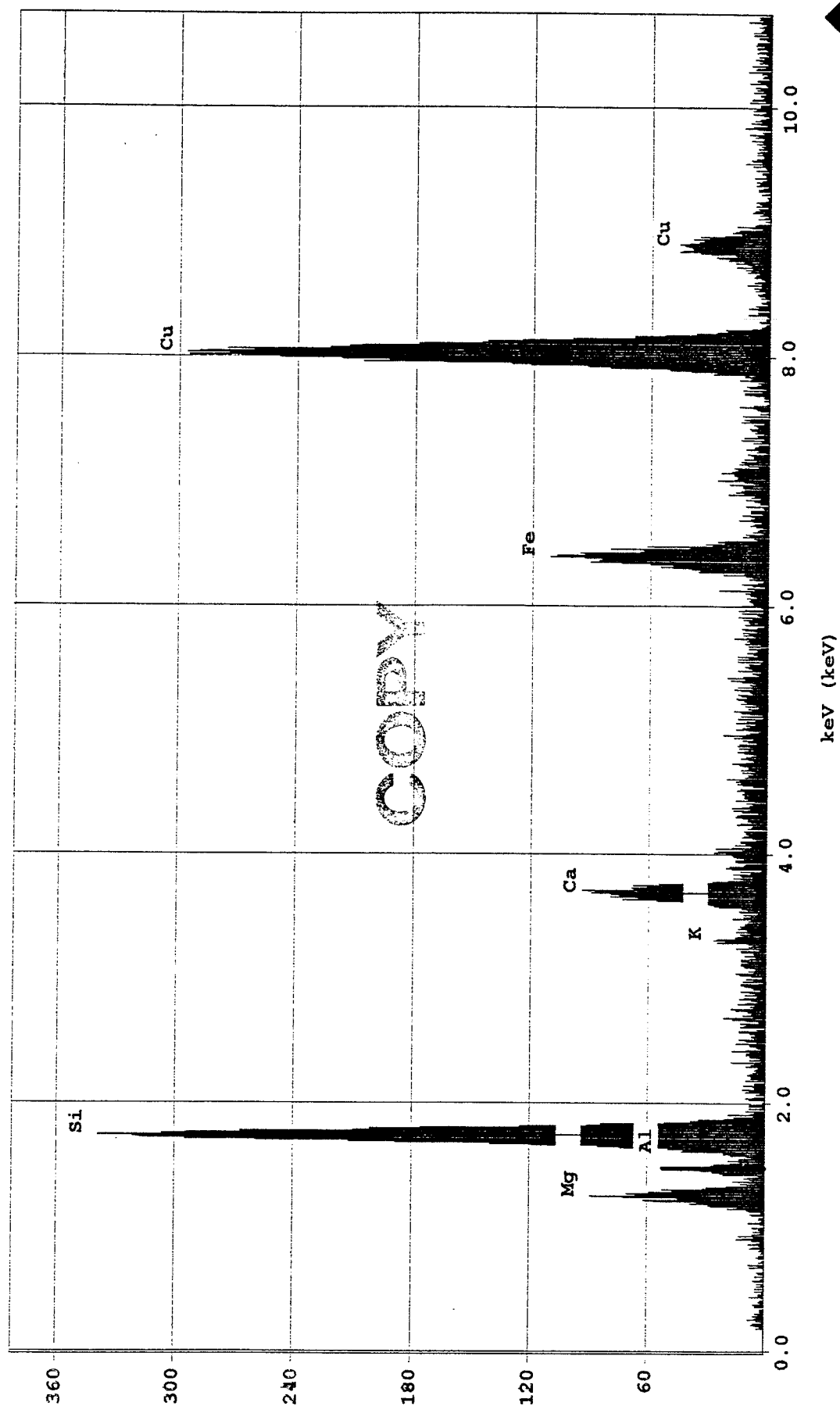
EMSL Analytical, Westmont, NJ
EPA_112849_WR-006-VO: Libby Amphibole
Tuesday, September 18, 2001

EMSL

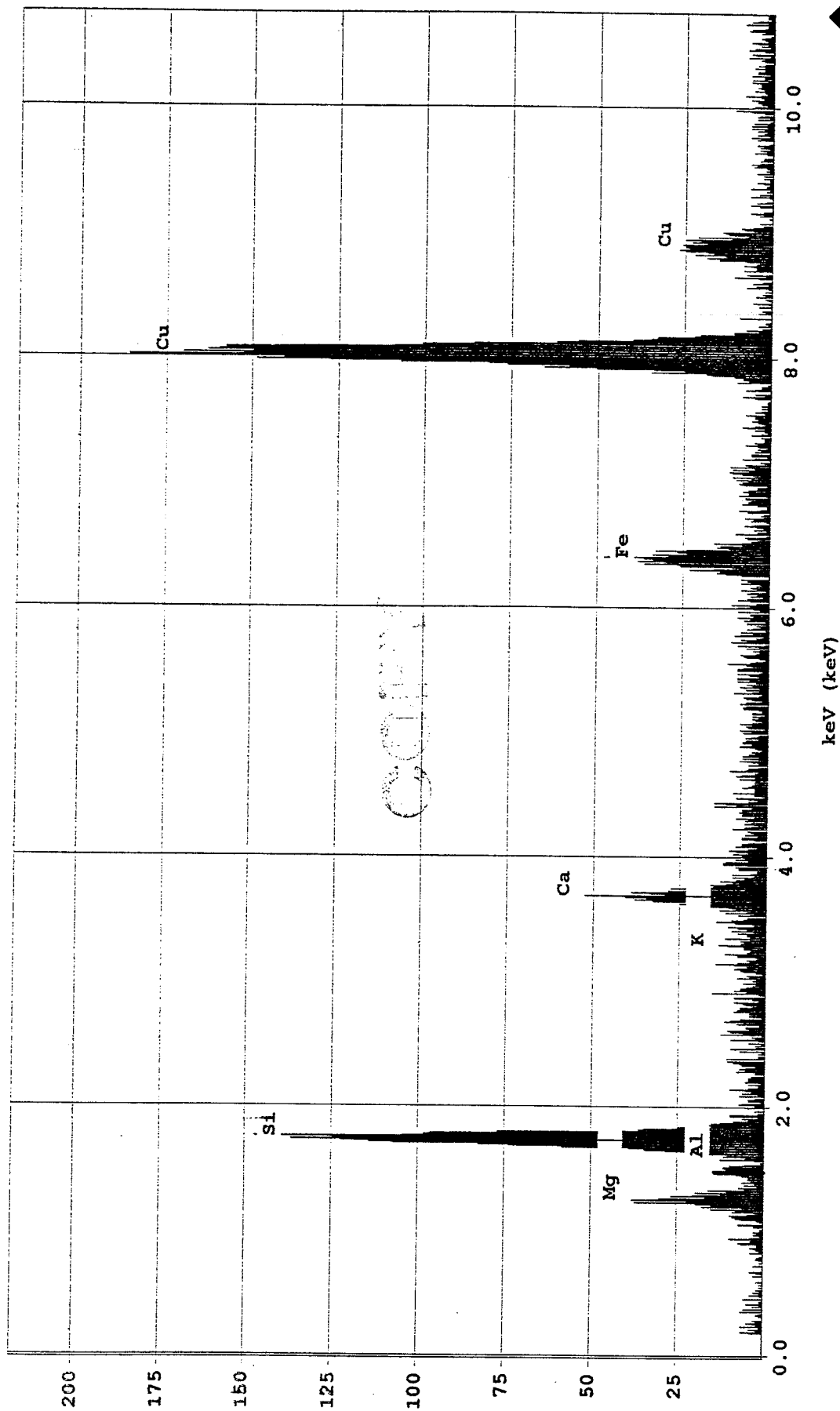


EMSL Analytical, Westmont, NJ
EPA_112849_WR-006-VO: Libby Amphibole
Tuesday, September 18, 2001

EMSL



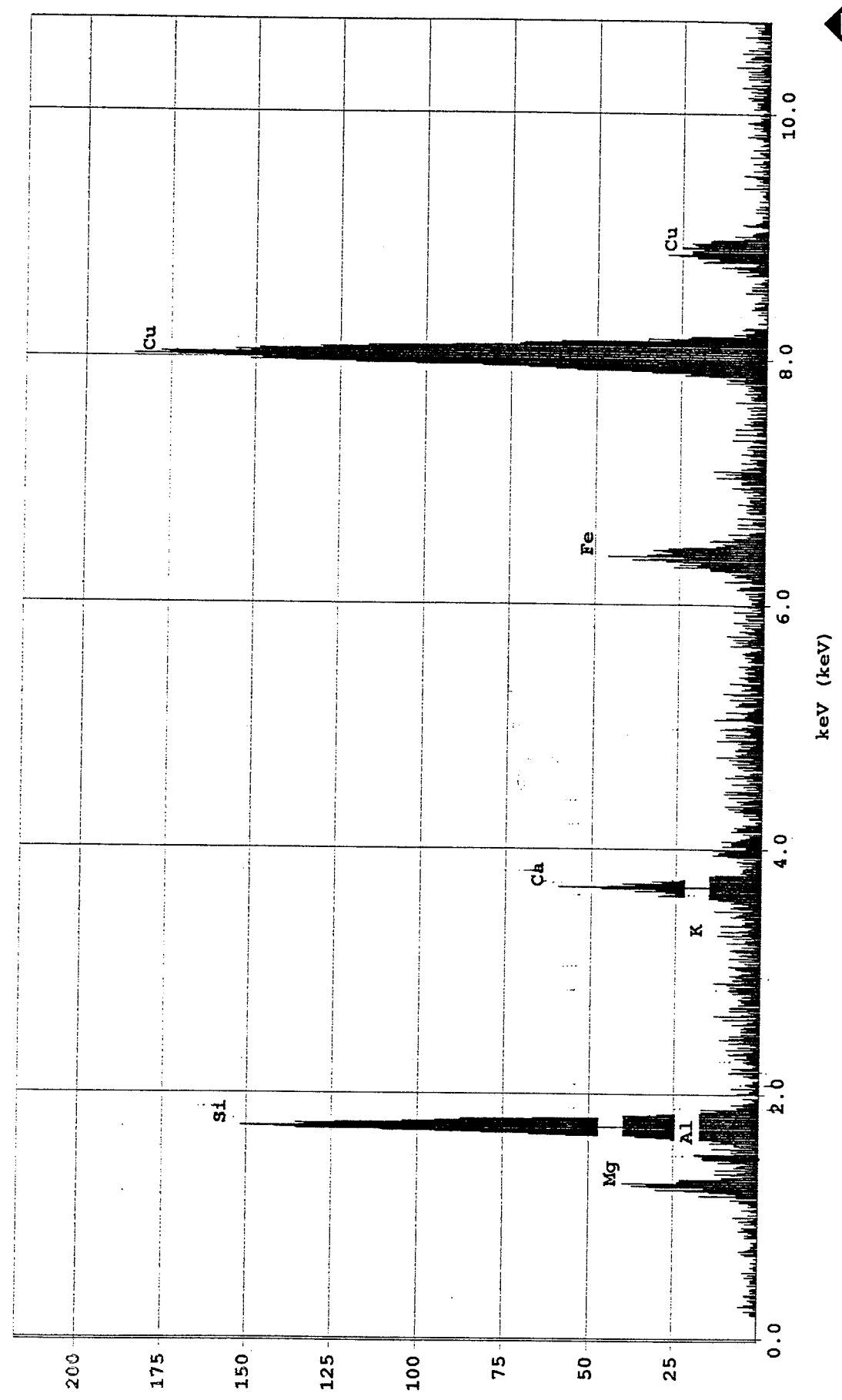
EMSL Analytical, Westmont, NJ
EPA_112849_WR-006-VQ: Libby Amphibole
Tuesday, September 18, 2001



EMSL

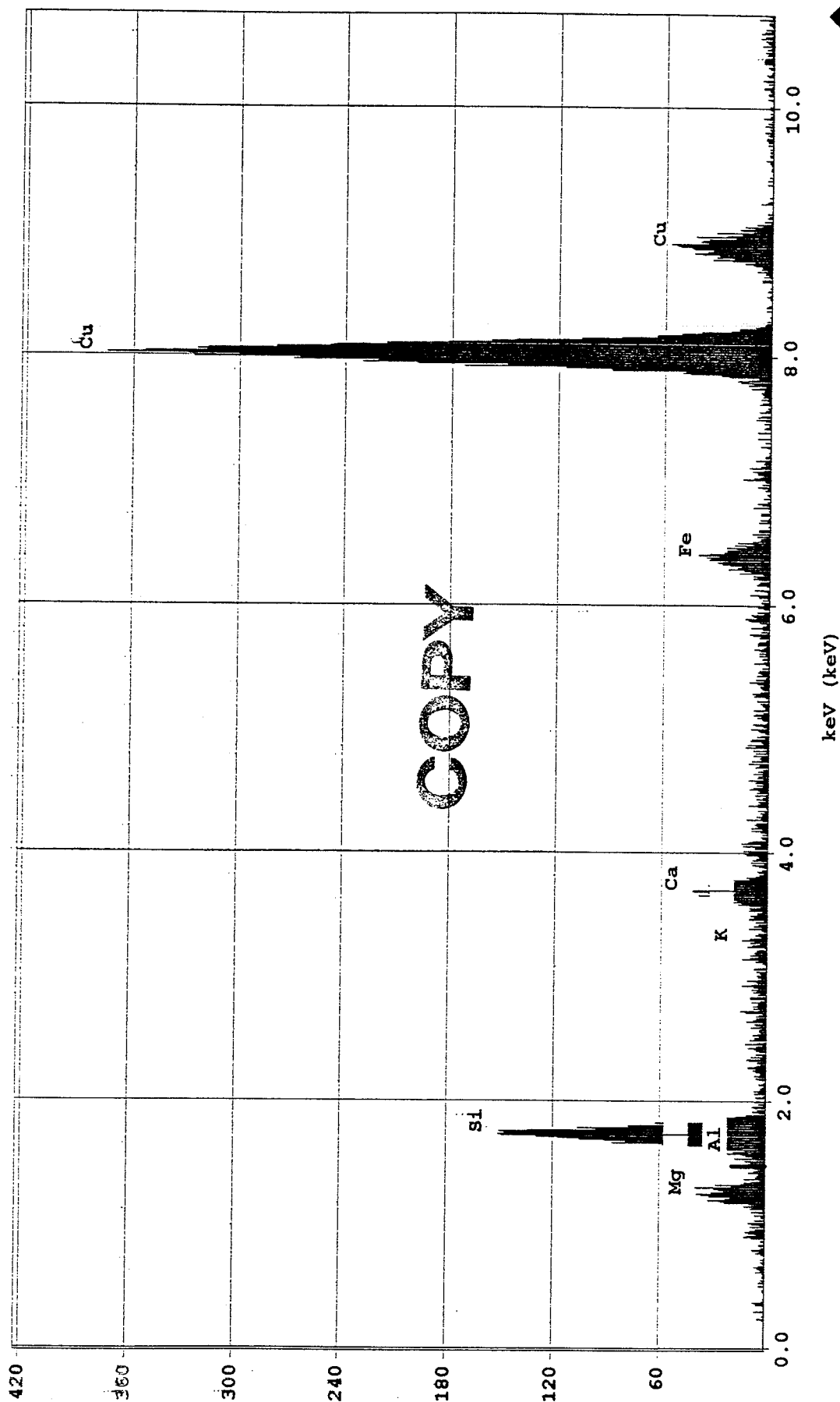


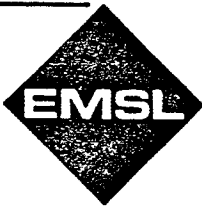
EMSL Analytical, Westmont, NJ
EPA 112849 WR-006-VO: Libby Amphibole
Tuesday, September 18, 2001



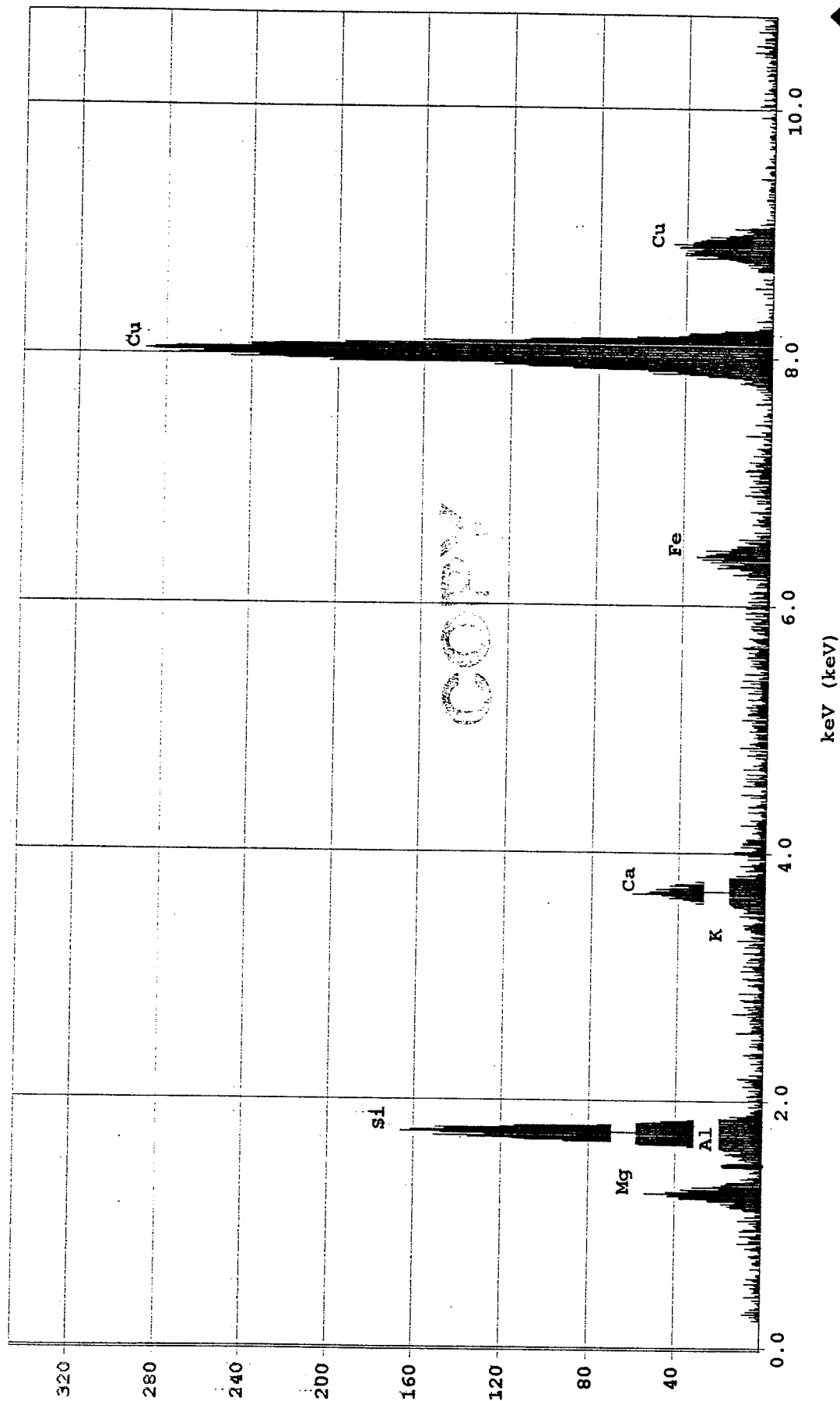
EMSL Analytical, Westmont, NJ
EPA_112849_MR-096-V0: Libby Amphibole
Tuesday, September 18, 2001

EMSL



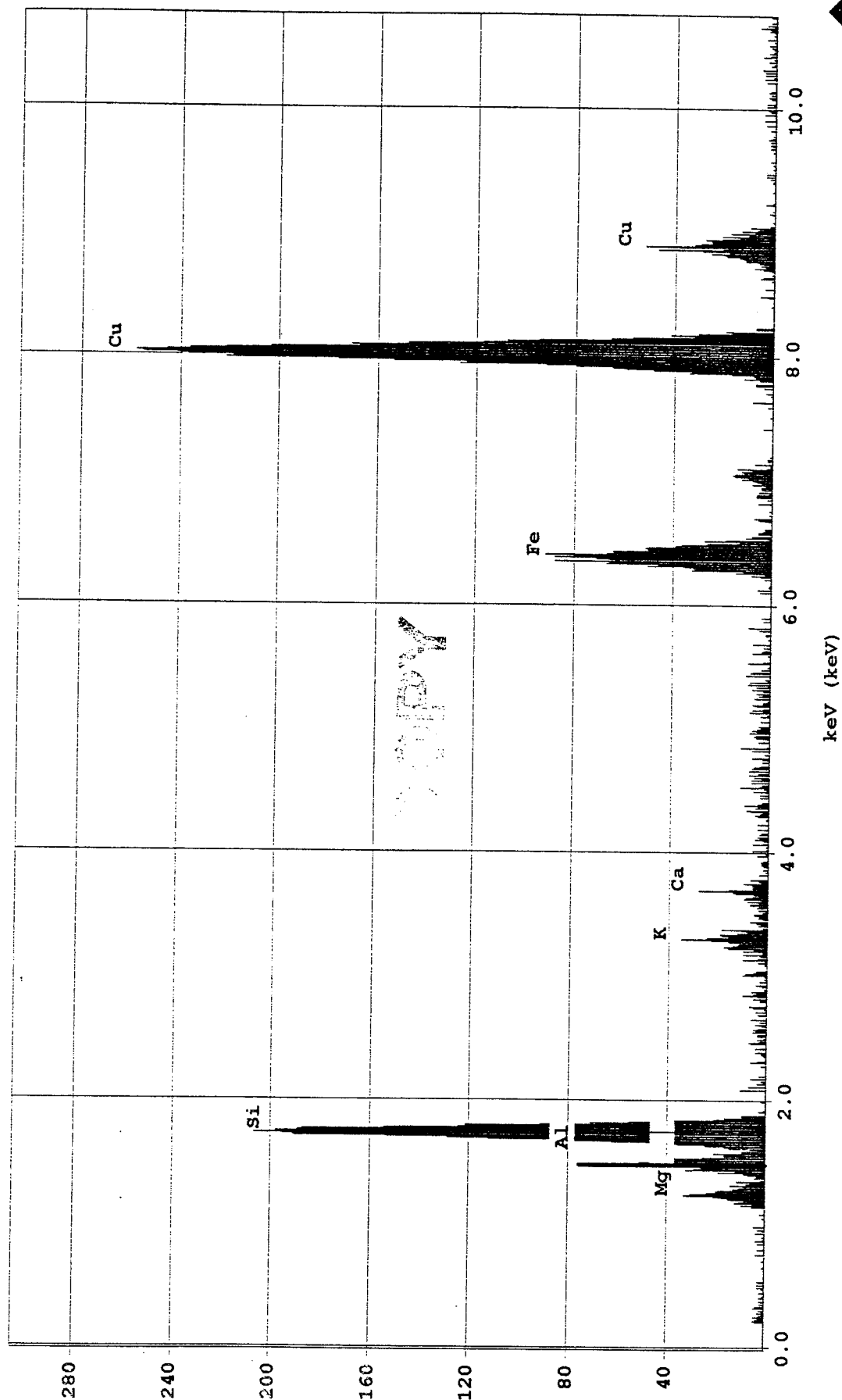


EMSL Analytical, Westmont, NJ
EPA_112849_WR-005-VO: Libby Amphibole
Tuesday, September 18, 2001





EMSL Analytical, Westmont, NJ
EPA_112849_WR-005-VO: Libby Amphibole
Tuesday, September 18, 2001



NA = Non-asbestos

ELUTRIATOR

USEPA REGION 8 LIBBY SITE INVESTIGATION TEM Asbestos Structure Count

Page 1 of 1

Laboratory name:	EMSL, Westmont, NJ
Instrument	JEOL 100 CX II (2)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm ²)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm ²)	385
Secondary Filter Area (mm ²)	

EPA Sample Number:	WR-007-SS
Sample Type (A=Air, D=Dust, O=Other):	D
Air volume (L) or dust area (cm ²)	
Date received by lab	
Lab Job Number:	640112849
Lab Sample Number:	0007
Number of grids prepared	4
Prepared by	BF
Preparation date	9-24-2001

Analyzed by	ANS
Analysis date	9-25-2001
Method (D=Direct, I=Indirect)	D
Counting rules (I=ISO10312, A=ASHERA, O=Other)	I
Grid storage location	2001-C

Secondary Prep

Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

Grid	Grid Opening	Structure Type	No. of Structures		Identification	Mineral Class (see below)				1 = yes, blank = no		
			Primary	Total		LA	OA	C	NA	Sketch	Photo	EDS
1	H-7	MD11 MF			Length: 16 Width: 13	LA						1
	E-8	MD11 MF			Length: 17 Width: 11	LA						1
	I-11	MD10 MF			Length: 3.3 Width: 0.7	LA						1
	L-10	MD10 MF			Length: 3.3 Width: 0.7	LA						1
	K-5	MD11 MF			Length: 2.5 Width: 1	LA						1
2	I-10	ND			Length: 2.5 Width: 0.6	LA						1
	F-8	MD11 MF			Length: 2.0 Width: 1.3	LA						1
	J-6	ND			Length: 1.6 Width: 0.9	LA						1
	G-6				Length: 6 Width: 0.9				NA	Si, Ca, Ti, Fe		1
	D-11				Length: 12 Width: 5.5	LA						1

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

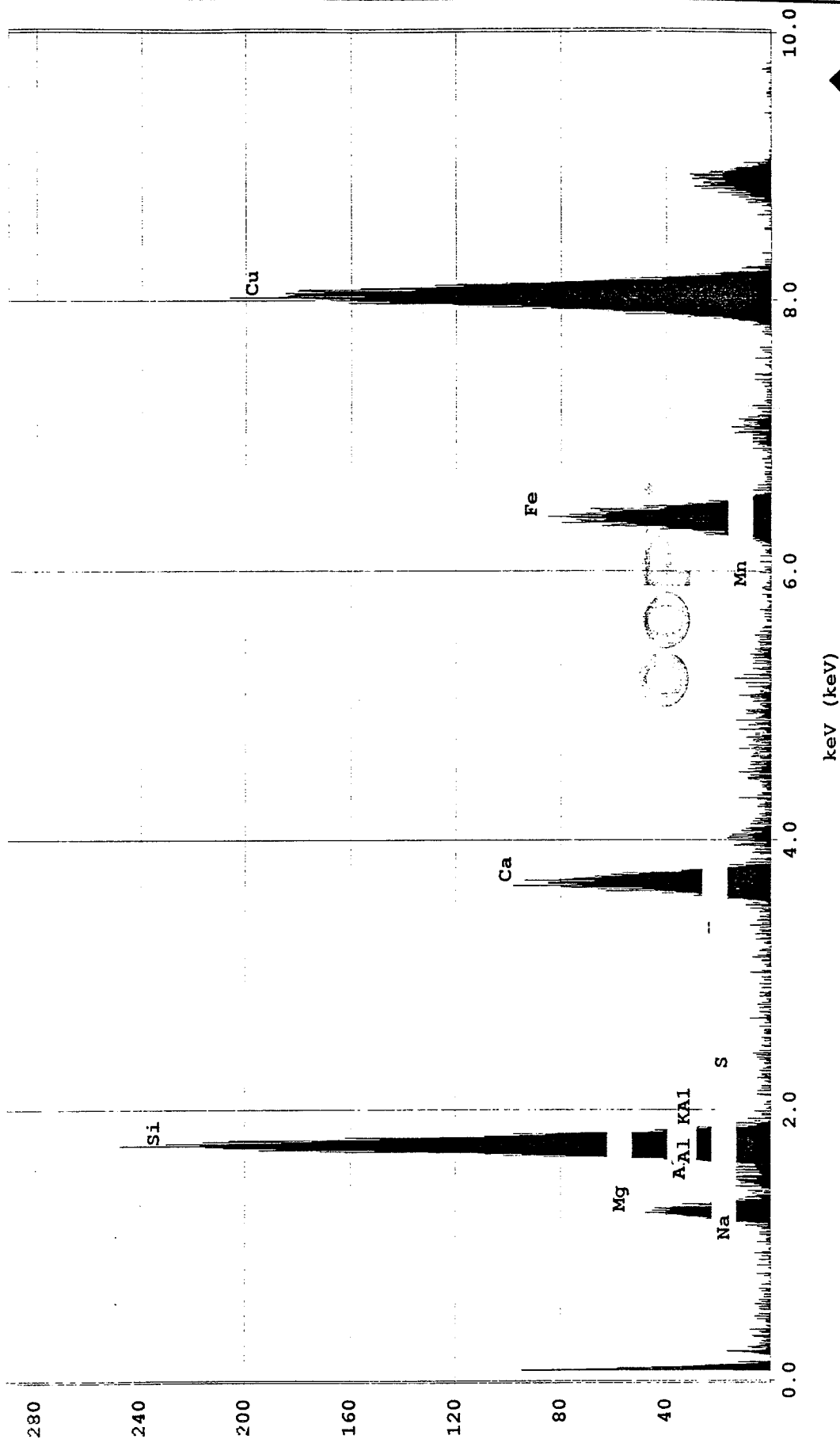
C = Chrysotile

NA = Non-asbestos

Row T

EMSL Analytical, Westmont, NJ
EPA Elutriator_112849 Sample WR-007-SS: Libby Amphibole
Tuesday, September 25, 2001

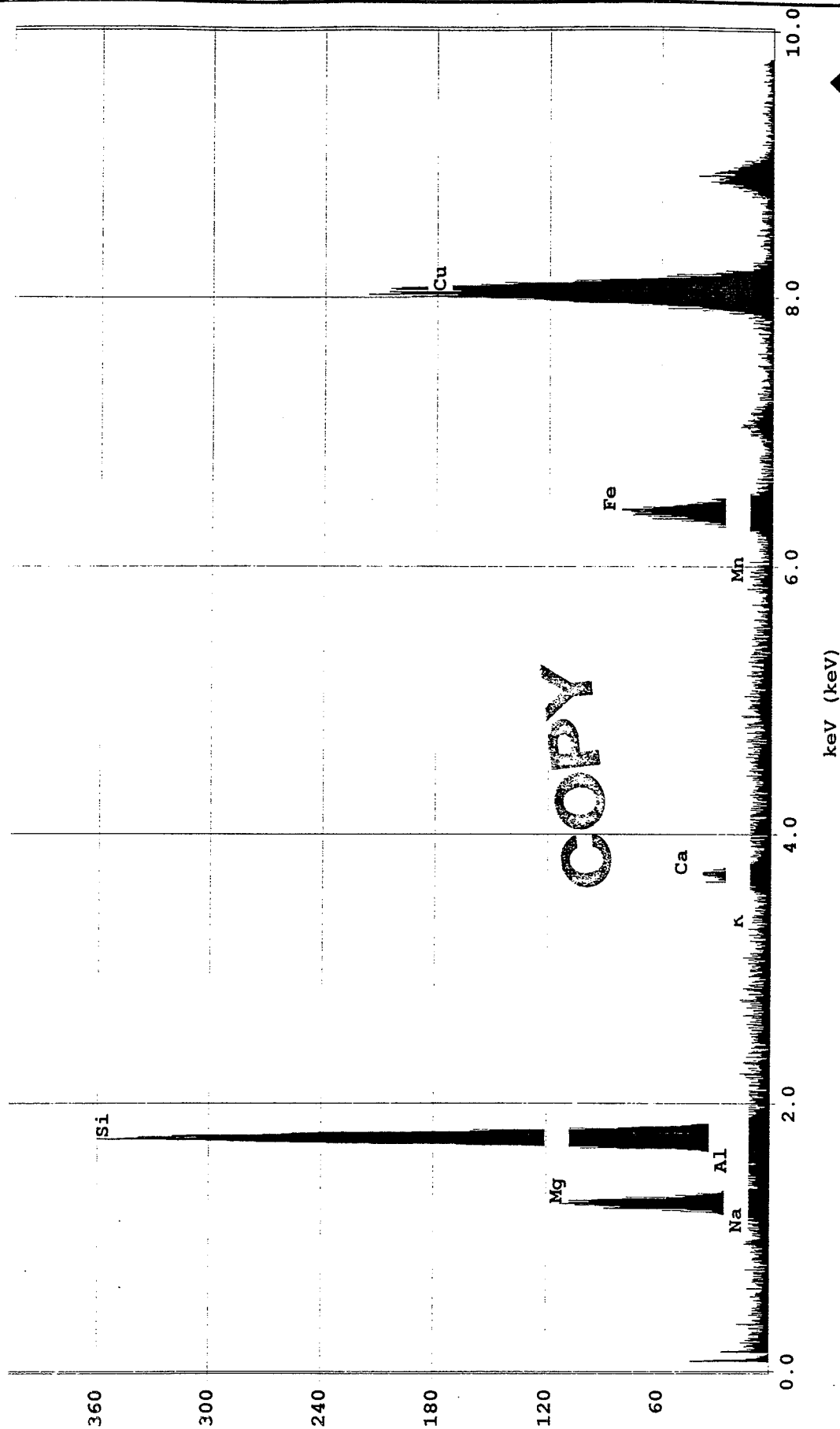
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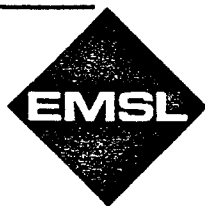
EMSL

EMSL Analytical, Westmont, NJ
EPA Elutriator_112849 Sample WR-007-SS: Libby Amphibole
Tuesday, September 25, 2001

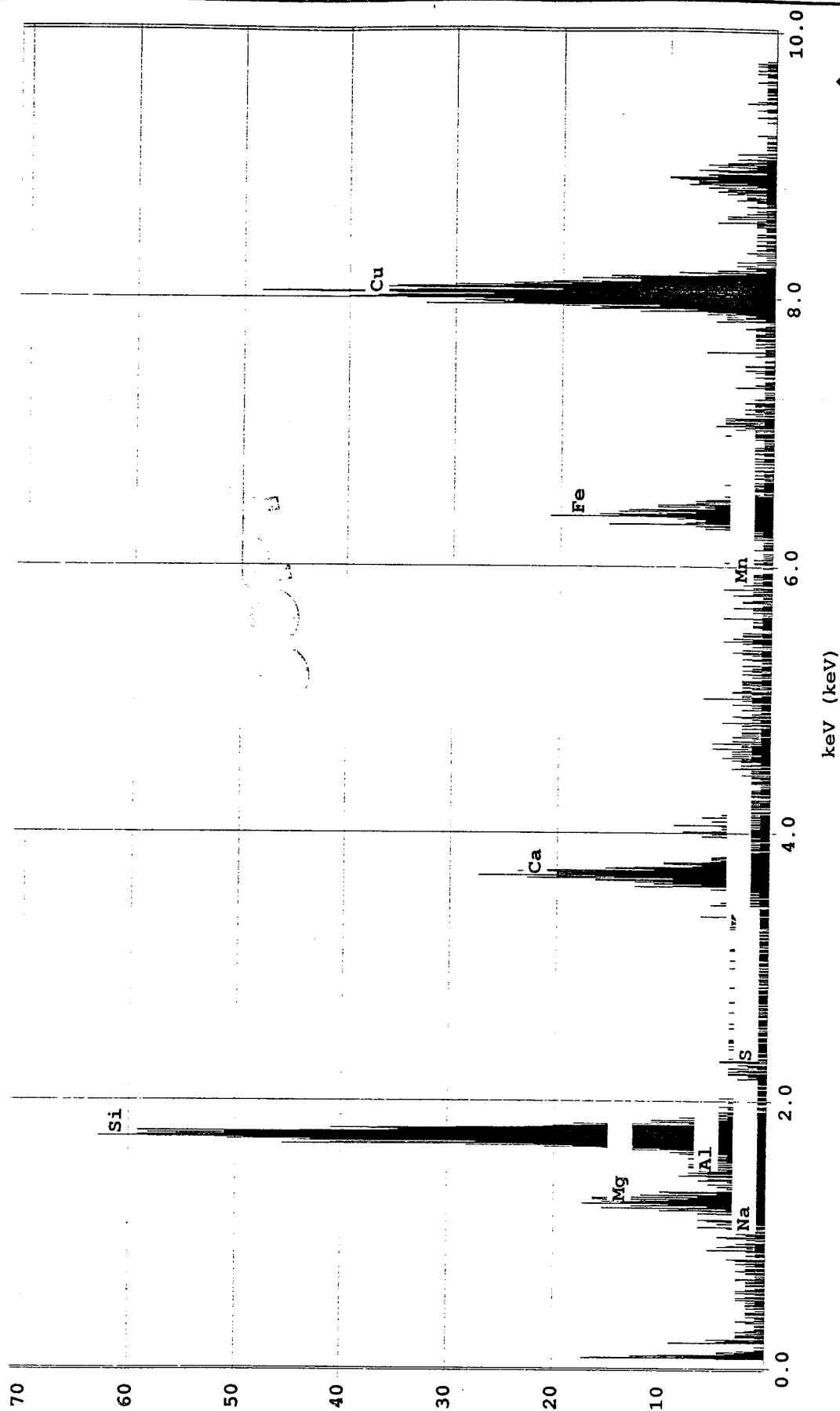
ID(1):



EMSL



EMSL Analytical, Westmont, NJ
EPA Elutriator_112849 Sample WR-007-SS: Libby Amphibole
Tuesday, September 25, 2001



ID (1):

ELUTRIATOR

USEPA REGION 8 LIBBY SITE INVESTIGATION TEM Asbestos Structure Count

Page 1 of 2

Laboratory name:	EMSL, Westmont, NJ
Instrument	JEOL 100 CX II (2)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm2)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm2)	385
Secondary Filter Area (mm2)	

EPA Sample Number:	WR-007-SS
Sample Type (A=Air, D=Dust, O=Other):	A
Air volume (L) or dust area (cm2)	D
Date received by lab	
Lab Job Number:	040112849
Lab Sample Number:	000
Number of grids prepared	4
Prepared by	DF
Preparation date	9-24-2001

Analyzed by	W
Analysis date	9-26-2001
Method (D=Direct, I=Indirect)	D
Counting rules (I=ISO10312, A=AHRA, O=Other)	I
Grid storage location	2001-C

Row U

Secondary Prep	
Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				1 = yes, blank = no		
			Primary	Total	Length	Width		LA	OA	C	NA	Sketch	Photo	EDS
1	H-7	MD11 MF			11	3		LA						1
		F			8	1.4		LA						1
	I-5	MD11 MF			10	2.9		LA						1
	L-7	F			8	0.7		LA						1
	D-10	MD11 MF			11	5		LA						1
	N-9	ND			6	0.9		LA						1
2	G-3	F			3.5	0.15		LA						1
	C-6	ND												

Row U

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole

C = Chrysotile

NA = Non-asbestos

COPY

ENISL, Westmont, NJ

LAB NAME

LAB SAMPLE NO:

EPA SAMPLE NO:

SAMPLE TYPE

WR-007-SS

△

LAB JOB NUMBER

GRID STORAGE LOC.

040112849

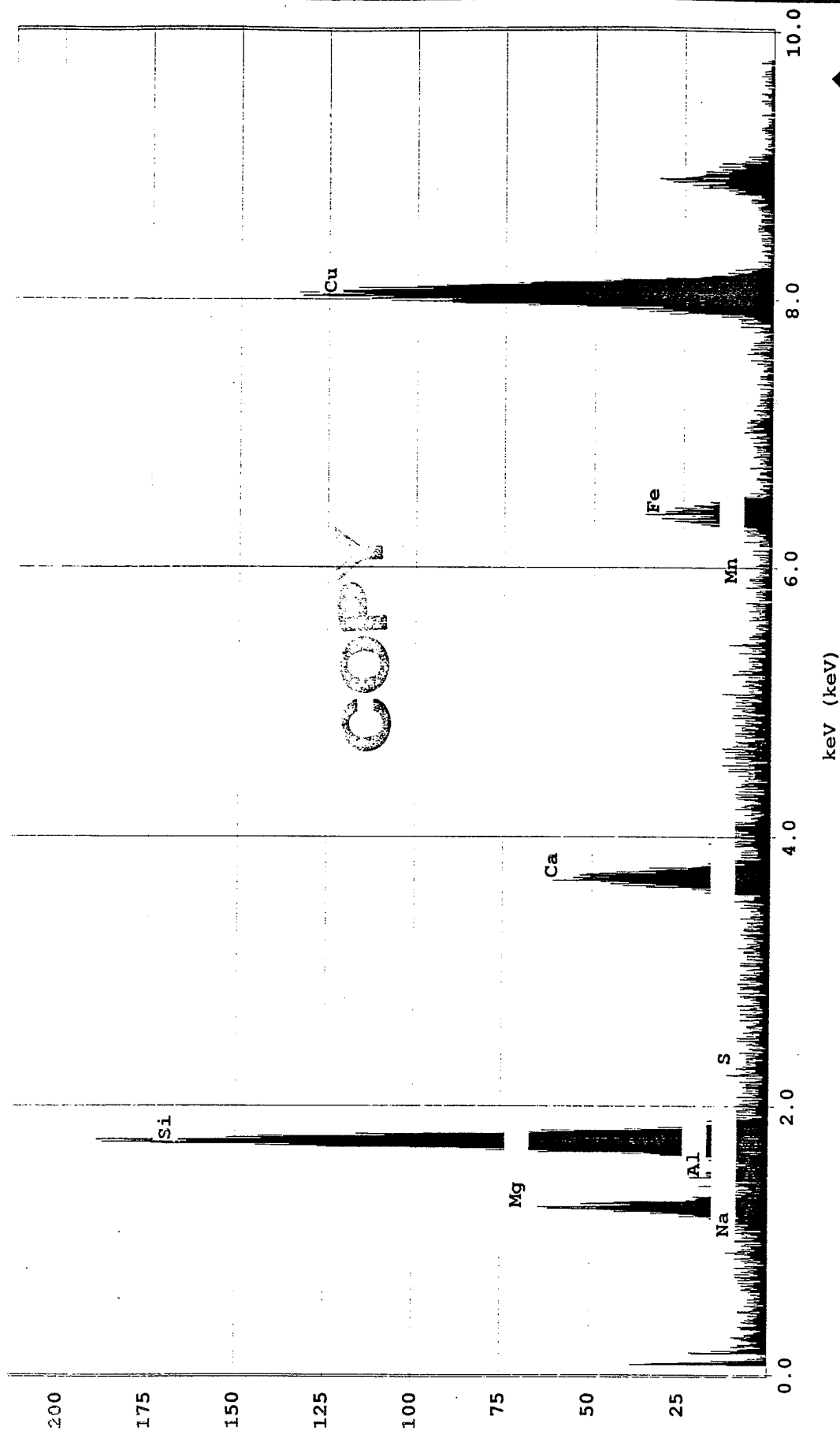
2001-2

Row u [illegible]

Row 11

EMSL Analytical, Westmont, NJ
EPA Elutriator_112849 Sample WR-007-SS: Libby Amphibole
Tuesday, September 25, 2001

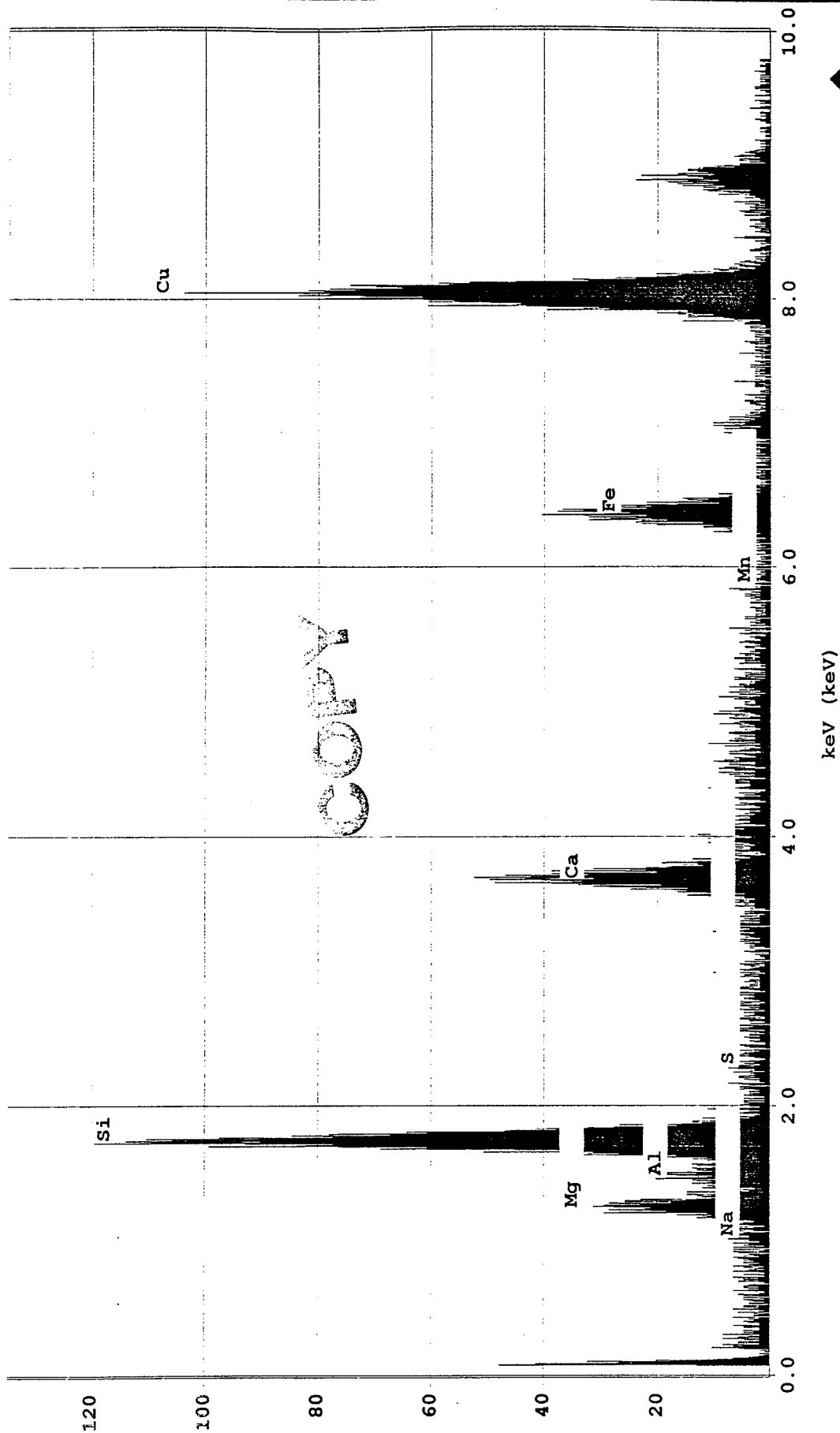
XD (1) :



EMSL

EMSL Analytical, Westmont, NJ
EPA Elutriator_112849 Sample WR-007-SS: Libby Amphibole
Tuesday, September 25, 2001

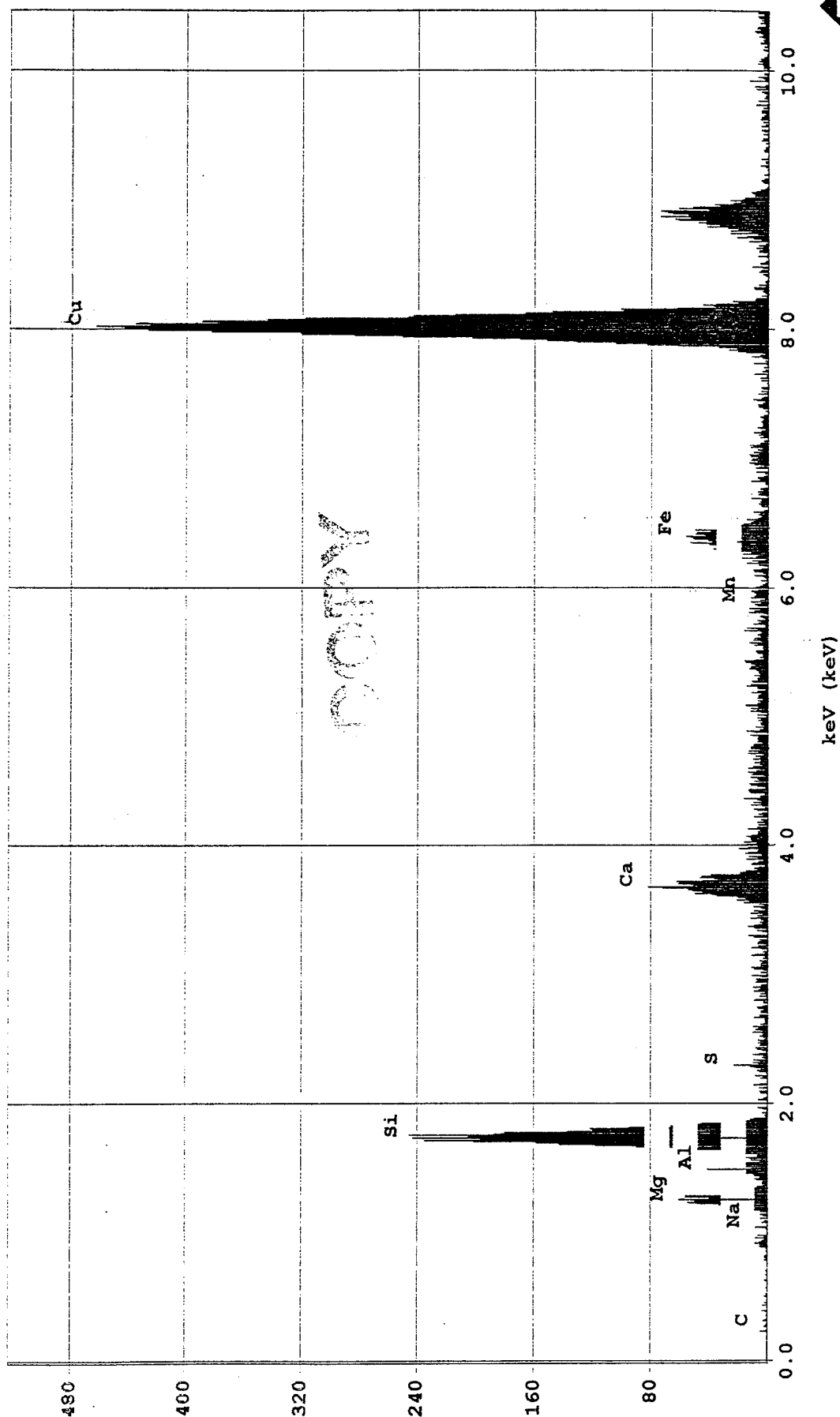
ID (1):



EMSL

EMSL Analytical, Westmont, NJ
EPA 112849 Elutriator Sample WR-007-SS: Libby Amphibole
Wednesday, September 26, 2001

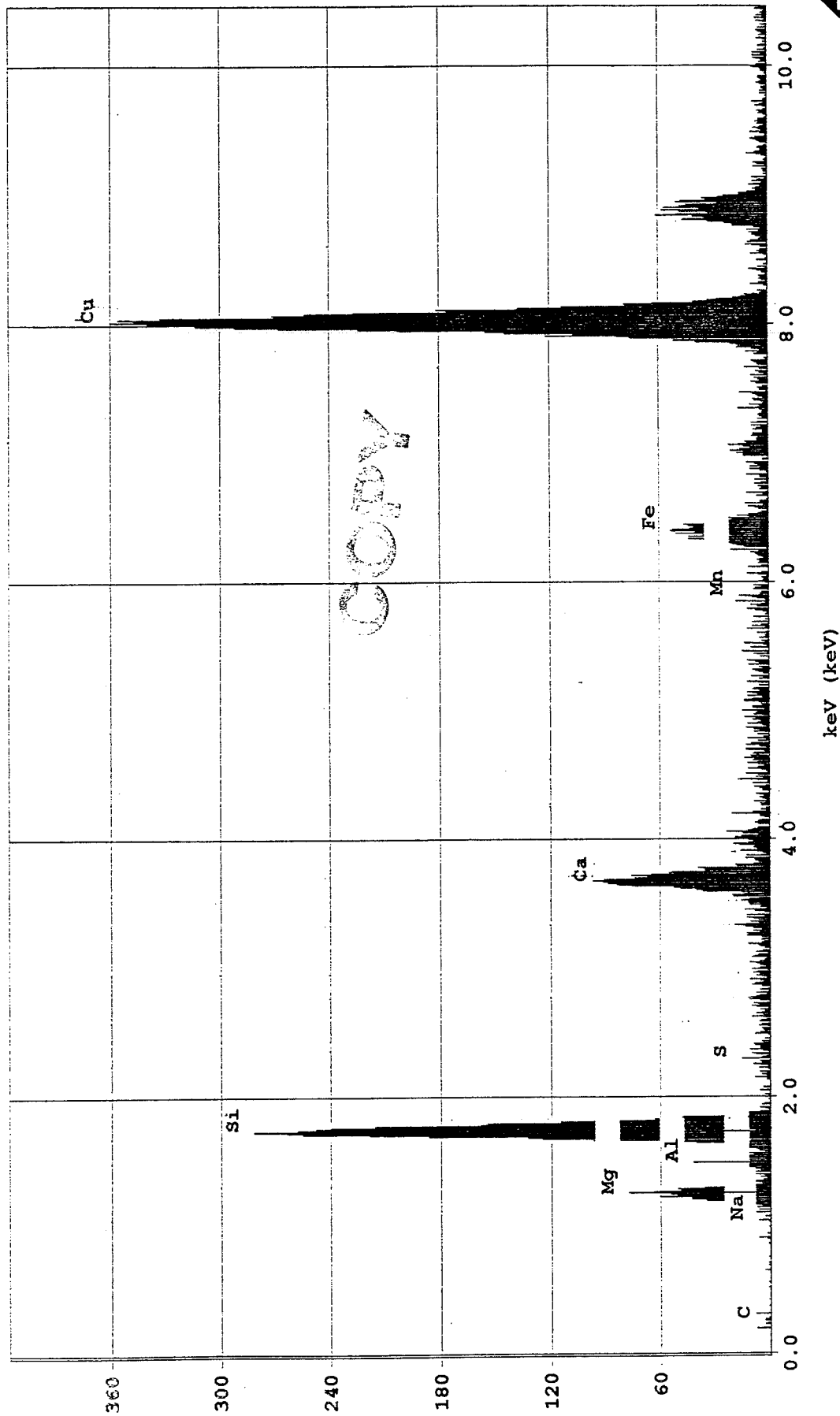
EMSL



ID(1):

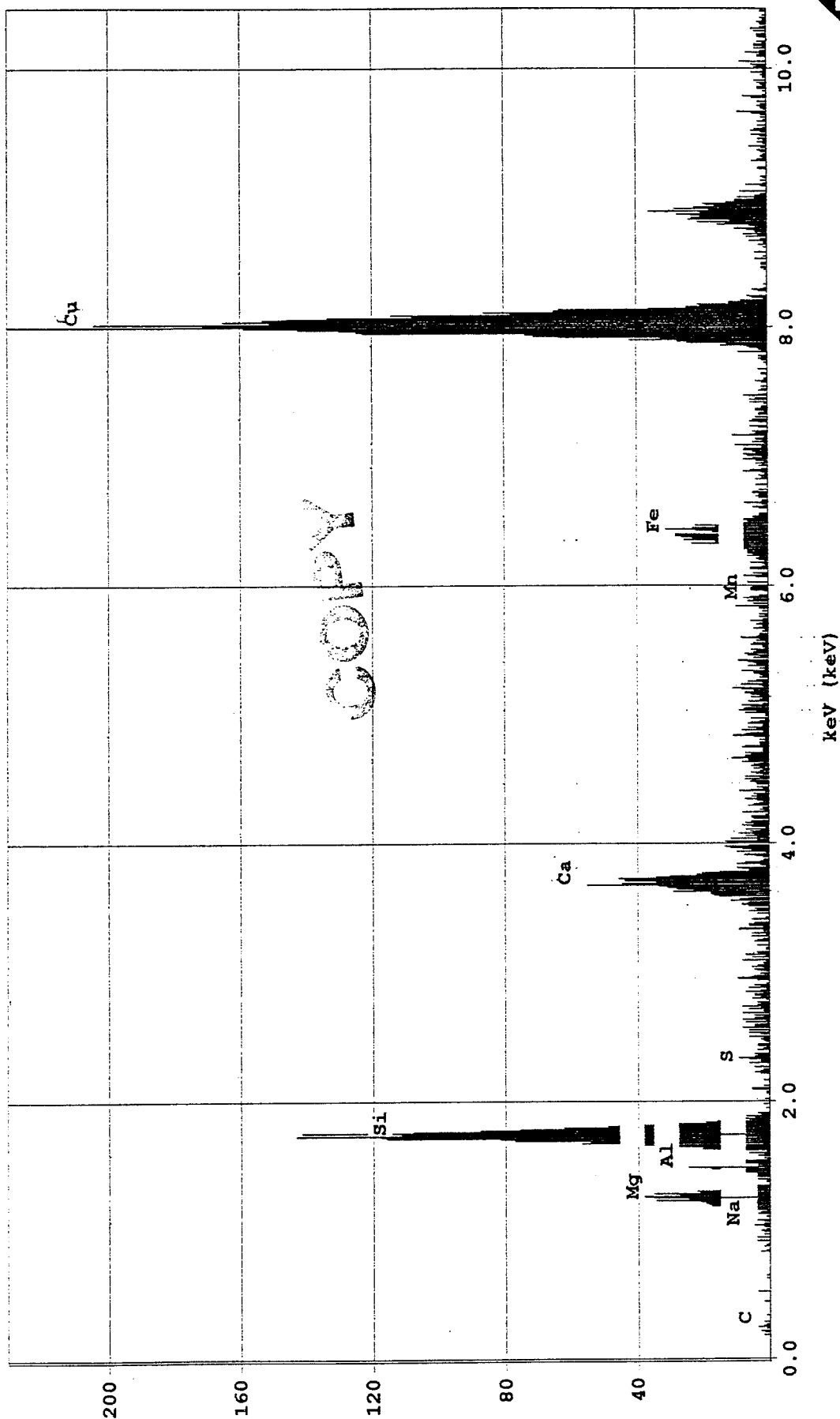
EMSL Analytical, Westmont, NJ
EPA 112849 Elutriator Sample WR-007-SS: Libby Amphibole
Wednesday, September 26, 2001

EMSL

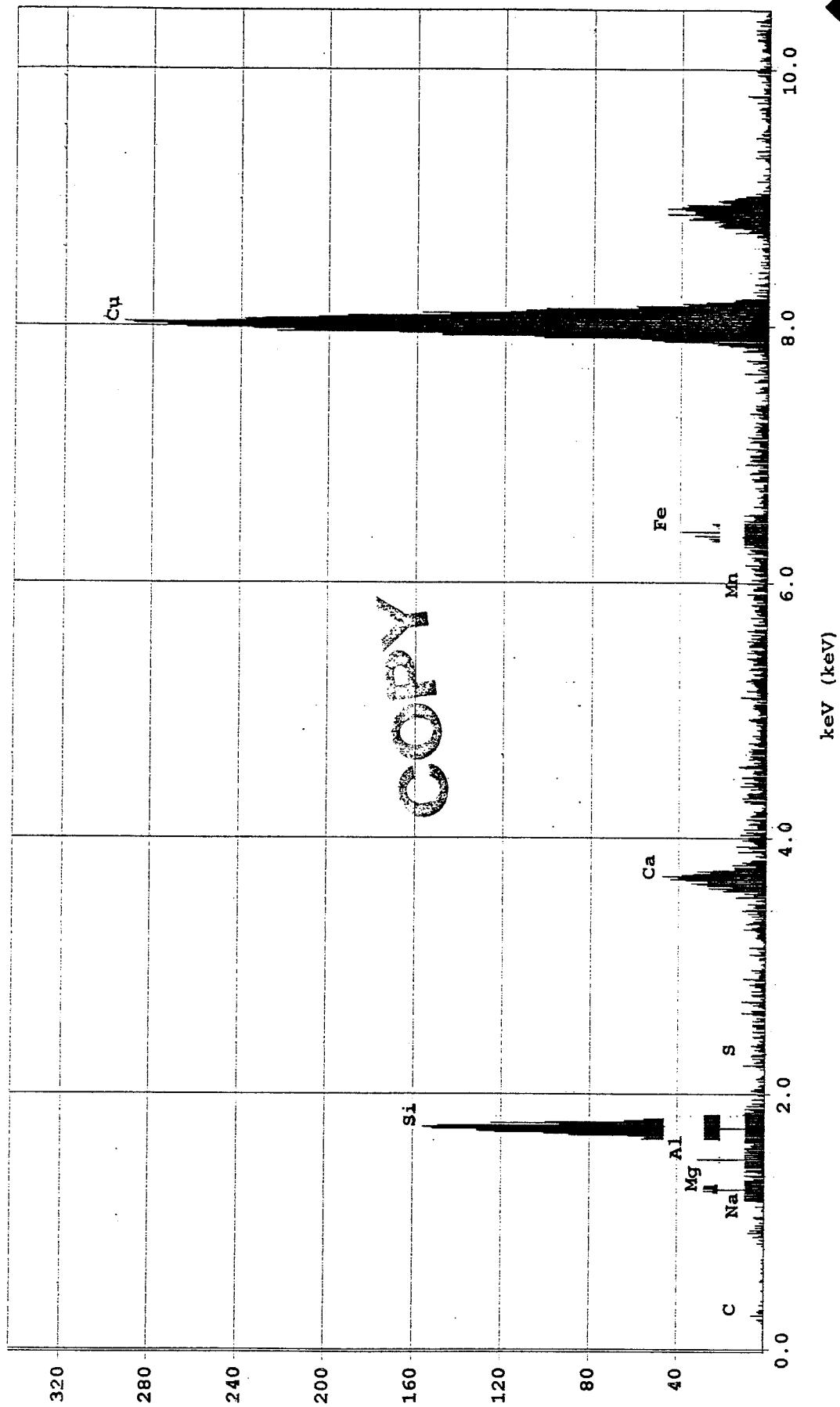


EMSL Analytical, Westmont, NJ
EPA 112849 Elutriator Sample WR-007-SS: Libby Amphibole
Wednesday, September 26, 2001

EMSL



EMSL Analytical, Westmont, NJ
EPA_112849 Elutriator Sample WR-007-SS: Libby Amphibole
Wednesday, September 26, 2001



EMSL

Attn:

Jim Gray
U.S. EPA
Environmental Services Division
College Station Rd
Athens, GA 30613-7799

Fax: 706-3558744

Phone: 706-355-8613

USEPA REGION 8 SITE INVESTIGATION
TEM Asbestos Structure Count

ELUTRIATOR

Page 1 of 1

Laboratory name:	EMSL, Westmont, NJ
Instrument	JEOL 100 CX II (2)
Voltage	100 KV
Magnification	19000 X
Grid opening area (mm ²)	0.0061
Scale: 1L =	1
Scale: 1D =	1
Primary filter area (mm ²)	385
Secondary Filter Area (mm ²)	

EPA Sample Number:	WR-004-V0
Sample Type (A=Air, D=Dust, O=Other):	D
Air volume (L) or dust area (cm ²)	
Date received by lab	8-7-2001
Lab Job Number:	040112849
Lab Sample Number:	0004-
Number of grids prepared	4
Prepared by	DS
Preparation date	9-10-2001

Analyzed by	24VS
Analysis date	09-18-2001
Method (D=Direct, I=Indirect)	
Counting rules (I=ISO10312, A=ASHERA, O=Other)	I
Grid storage location	2001 - C

Secondary Prep

Fraction of primary filter used:	
Total resuspension volume (mL)	
Volume filtered for secondary prep (mL)	

Volume filtered for secondary prep (mL)														
Grid	Grid Opening	Structure Type	No. of Structures		Dimensions		Identification	Mineral Class (see below)				1 = yes, blank = no		
			Primary	Total	Length	Width		LA	OA	C	NA	Sketch	Photo	EDS
1	H-6	ND												
	K-8													
	I-11													
	L-12													
	D-5													
2	G-11	↓												
	C-12	F	1	1	4.5	0.5								
	A-3	ND								LA				1
	I-1	F	2	2	9.0	0.55								
	K-7	ND								LA				1

LA = Libby-type amphibole
OA = Other / see Libby

Row 0

LA = Libby-type amphibole

OA = Other (non-Libby type) amphibole