

NA 702-01 R00

CR 1999-1300

CONDITION REPORT

NO. 1999-1300

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DESCRIPTION OF CONDITION:

Several filters from the CTMT radiation monitors and a sample from the White Bird used for CTMT pressure releases were sent to Southwest Research Institute (SRI) for analysis as part of the RE4597AA/BA action plan. Per telecon with Dr. Richard Page of SRI, the analysis was completed on 7/29 with the following results:

The RE 4597BA filter from 7/3/99 contained primarily Iron Oxide (10-100 microns with some smaller particles down to 1 micron). There was also some measurable Chlorine. The Iron Oxide particles had a granular appearance indicating the source is from corrosion.

The RE 4597BA filter from 7/9/99 also had three darker spots on it which were analyzed to contain potassium and chlorine. A sample from the white bird filter also contained iron oxide. No Boron was detected, however, Dr. Page indicated there would have to be a large quantity of Boron on the filter to detect it. SRI will send a written report by next Friday.

Continued

INITIATOR (print) Robert C. Hovland	SIGNATURE <i>[Signature]</i>	ORGANIZATION SYSC	PHONE NO. 8406	MAIL STOP 1058
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REVIEW, INCLUDING ACTIONS TAKEN / RECOMMENDATIONS:

TM 99-0022 has been initiated to reduce the iron oxide in the CTMT atmosphere per the RE4597AA/BA action plan. Followup activities are recommended to determine the source of the iron oxide.

NCAQ - RECOMMENDED       N/A PLANT OPERATIONS       Continued

SUPERVISOR (print) Robert C. Hovland	SIGNATURE <i>[Signature]</i> for P.C. Gerion	ORGANIZATION SYSC	PHONE NO. 8406	MAIL STOP 1058	DATE 7/30/99
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REPORTABILITY      OPERABLE  
 1 HR    4 HR    24 HR    N/A     
 YES       NO       NON TECH SPEC.

ACTIONS TAKEN / COMMENTS:

See actions taken above.

Continued

SIGNATURE <i>[Signature]</i> mm	DATE 7/30/99	TIME 1608
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CATEGORY Important	OWNER SYSC	DUE DATE 9/27/99	CAUSE DETERMINATION Apparent Cause
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SRB     EXPERIENCE REVIEW     EXTENT OF CONDITION     OTHER REVIEWS  
 ERB     CATPR     POTENTIAL MRFF

Initiator  
D. Nowicki

NA702\_01.DOT 12/98

A-1

CONDITION REPORT

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Problem Statement:

The performance of the Containment Radiation Monitors, RE4597AA and RE4597BA has degraded due to repetitive low sample flow conditions. The cause of the low sample flow is due to a buildup of material on the particulate filters. The particulate matter is primarily an iron oxide powder but the source is unknown.

Apparent Cause:

A radiation monitor action plan was completed to check the RE4597AA/BA skid performance, inspect sample lines, check filter material, and analyze the particulate matter on the filters. The results indicate the low flow conditions are due to the particulate matter that is building up on the filters. The material was sent to Southwest Research Institute for analysis and was determined to be primarily an iron oxide (See attached report SwRI Project No. 18-2321-190). Some possible sources of the iron oxide include:

1. Containment Air Cooler activities during the mid-cycle outage including the CAC No. 1 motor replacement and decon activities.
2. CR 1999-0275 identified condensation on Service Water piping dripping onto and rusting the conduit below ( 585' above CACs)

While the exact source of the rust is not known, the high particulate problem developed about the same time as the Plant Startup (5/10/99) after the mid-cycle outage. The CAC motors were started on 5/4/99 and the Plant entered Mode 4 on 5/7/99 which required the alignment of CTMT Purge to the Mechanical Penetration Rooms. RE 4597AA had a low flow alarm on 5/10/99 and RE4597BA had a low flow alarm on 5/13/99. Subsequent filter changes were required every 24-48 hours.

Remedial Actions:

Temporary Modification 99-0022 installed four portable HEPA filtration units in containment on 8/10/99 per WO 99-005029-000 to reduce the particulate concentration.

The MRC assigned CATS Item #1 to SYSC to determine if an OE should be issued. SYSC will use the Nuclear Network to ask the industry if they have experienced a similar type of particulate problem. CATS Item #3

CATPR:

1. Plant Engineering will issue an Action Plan for 12RFO which will include CTMT walkdowns to identify possible sources and activities for rust removal CATS Item #2. *PLANT ENGINEERING IS UTILIZING EXPERTS FROM SARGENT & Lundy TO REVIEW OUR ACTIONS FOR COMPLETENESS AND MAKE RECOMMENDATIONS.*

Continued

10 CFR PART 217	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	SYSTEM CAPABLE OF PERFORMING SPECIFIED FUNCTION?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
PREPARER (Print) Robert C. Hovland		SIGNATURE <i>Robert C. Hovland</i>	DATE 9/23/99
SUPERVISOR APPROVAL (Print) DAVID C. GARDNER Supervisor-Electrical/Controls Systems		SIGNATURE <i>David C. Gardner</i>	DATE 9/24/99
MANAGER APPROVAL (Print) <input type="checkbox"/> N/A <i>Don Estelma</i>	<input type="checkbox"/> N/A	SIGNATURE <i>Don Estelma</i>	DATE 9/27/99
SRB APPROVAL (Print) <input checked="" type="checkbox"/> N/A	<input checked="" type="checkbox"/> N/A	SIGNATURE	DATE
ERB APPROVAL (Print) <input checked="" type="checkbox"/> N/A	<input checked="" type="checkbox"/> N/A	SIGNATURE	DATE

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# ANALYSIS OF FILTER DEPOSITS

Final Report  
SwRI Project No. 18-2321-190

Prepared for  
The Toledo Edison Company  
Davis-Besse Plant  
5501 North State Route 2  
Oak Harbor, OH 43449

Prepared by  
Richard A. Page

August 1999



**SOUTHWEST RESEARCH INSTITUTE**

CP 1999-1300  
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# ANALYSIS OF FILTER DEPOSITS

Final Report  
SwRI Project No. 18-2321-190

Prepared for

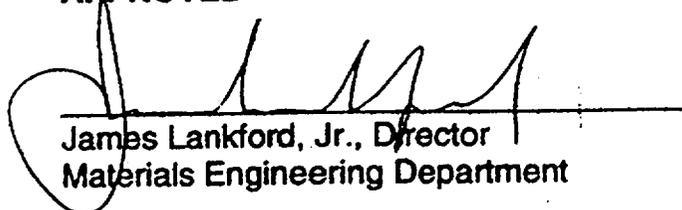
The Toledo Edison Company  
Davis-Besse Plant  
5501 North State Route 2  
Oak Harbor, OH 43449

Prepared by

Richard A. Page

August 1999

**APPROVED**



James Lankford, Jr., Director  
Materials Engineering Department

An EDS spectrum from an overall area of deposit on filter 4597BA 7/9/99@2016, Figure 6, was essentially identical to those obtained from filter 4597BA 7/3/99@1400. Spectra were also obtained from two of the dark particles on the filter, Figures 7 and 8. These particles were different from the overall deposit in that the iron peaks were reduced and high potassium and chlorine peaks were present.

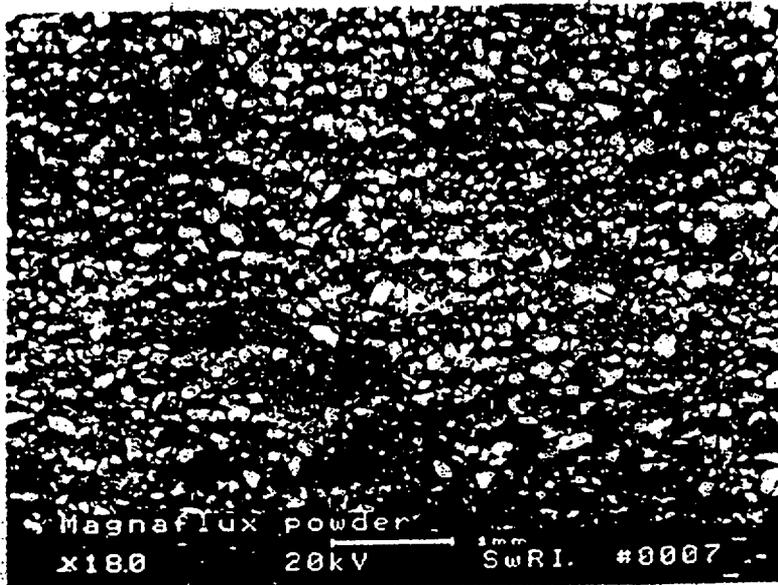
EDS spectra were also obtained from an overall area, Figure 9, and on an isolated particle Figure 10, on filter 7/16/99 White Bird. It is evident from these spectra that the deposits on the filter were also predominately iron oxide.

Imaging of the as-received filters in the SEM was limited by the low conductivity of the filter medium. To overcome this impediment, a gold palladium coating was applied to one of the filter samples, 4597BA 7/3/99@1400, following the EDS measurements. Electron micrographs obtained from the coated filter sample are shown in Figures 11 and 12. The deposits were generally less than 50µm in size and exhibited a very powdery appearance.

#### 4.0 CONCLUSIONS

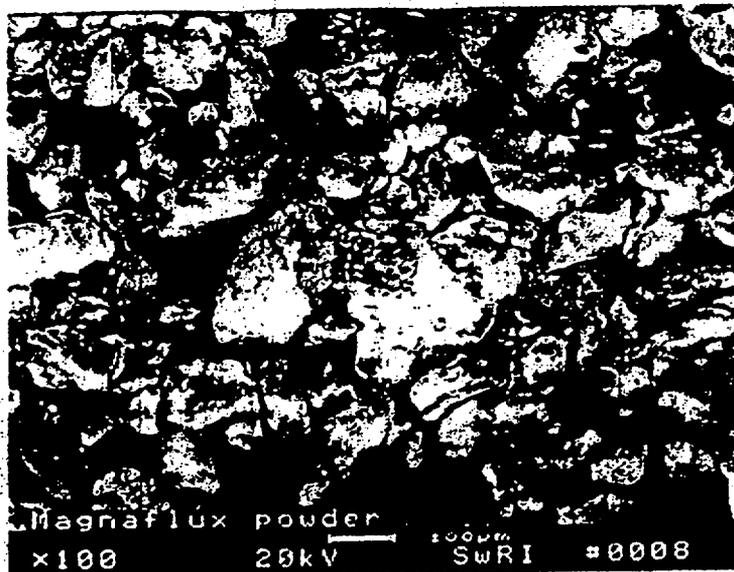
The following conclusions have been drawn from the results obtained in this investigation.

1. The uniform beige deposit that was present on the six 2¼ inch diameter filter samples was a powdery iron oxide. Small amounts of chlorine and copper were present in the deposit. ←
2. Large potassium chloride containing particles were present on one of the filters.
3. The deposits present on the 1¼ inch diameter filter were also primarily iron oxide.
4. Neither the shape nor the chemistry of the deposits is consistent with a Magnaflux powder origin. Titanium, a major constituent of the Magnaflux powder, was not detected on any of the filters examined, and the powdery morphology of the deposits was not at all similar to the larger angular Magnaflux powder.
5. The iron oxide deposits are likely corrosion products from an iron base component within the system. ←



97624

(a)



97625

(b)

Figure 1. Scanning electron micrographs of the Magnaflux powder.

Spectrum: 2623190L

Range: 20 keV

Total Counts=465462. Linear Auto-VS=8441

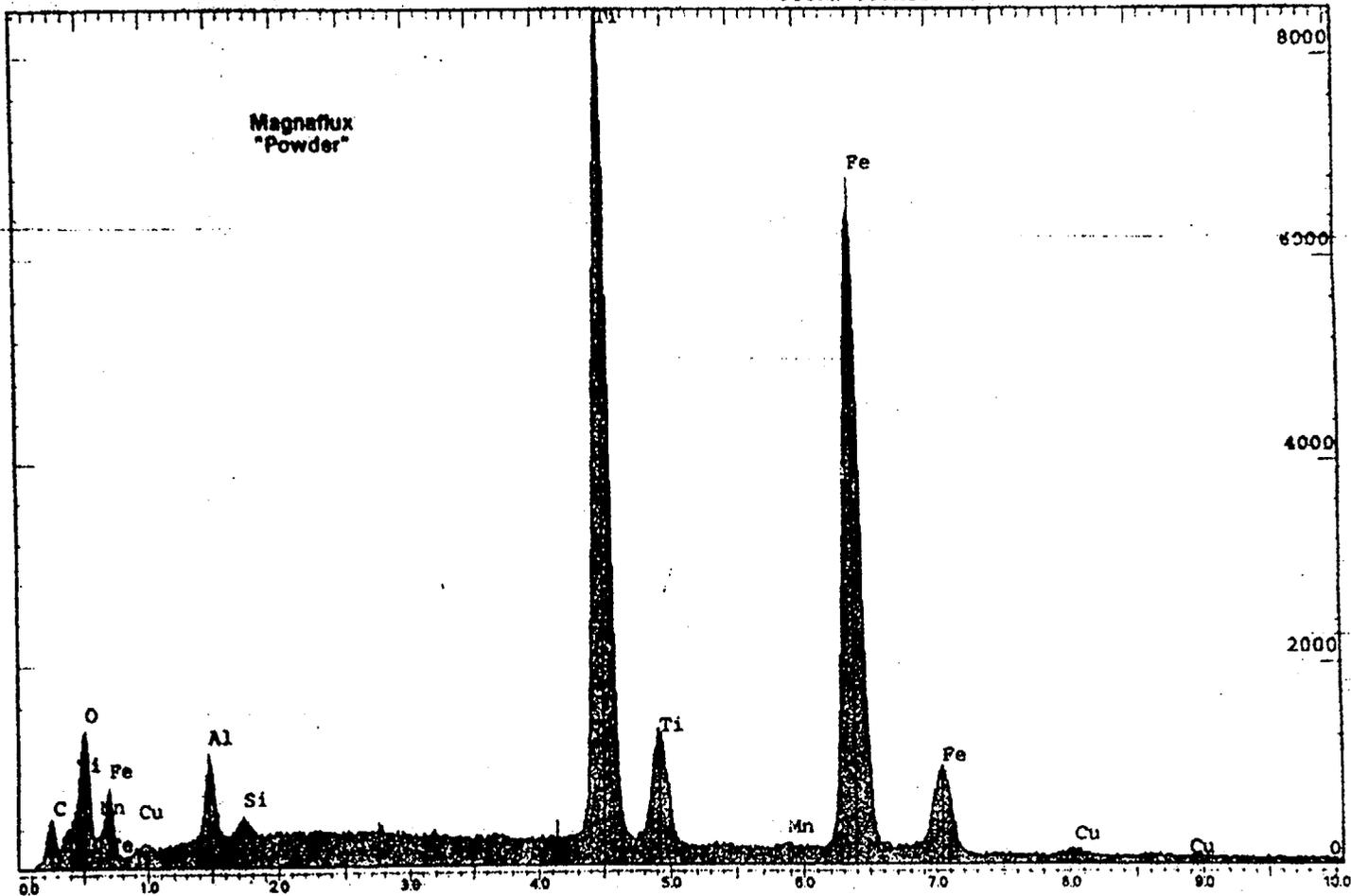


Figure 2. EDS spectrum obtained from the Magnaflux powder.

CR1000-1000000  
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Spectrum: 2321190D

Range: 20 keV

Total Counts=433961. Linear Auto-VS=6753

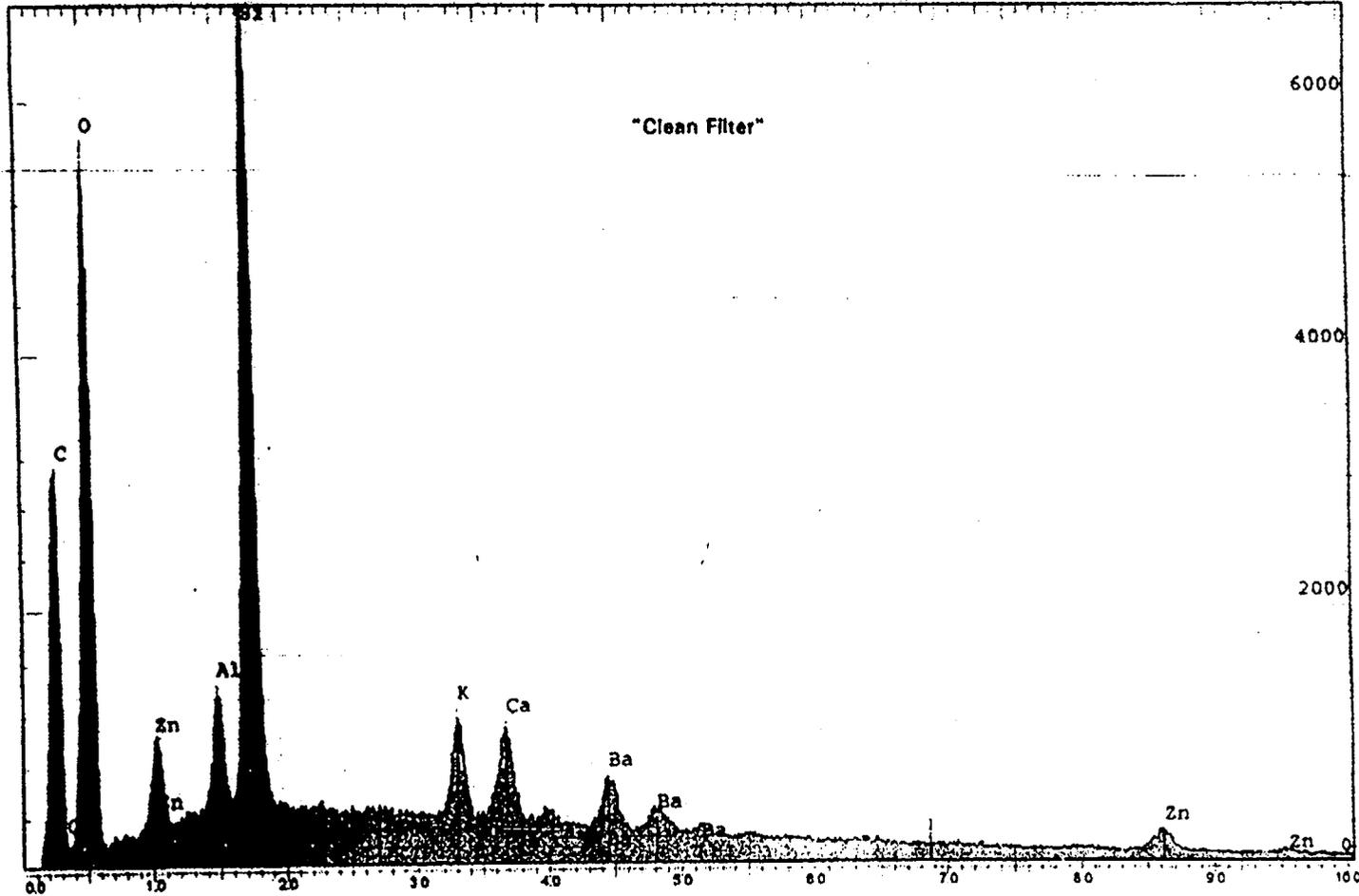


Figure 3. EDS spectrum obtained from a deposit free section of filter 4597BA 7/9/99@1400.

CP 1000 13000  
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Spectrum: 2321190A

Range: 20 keV

Total Counts=521229. Linear Auto-VS=7743

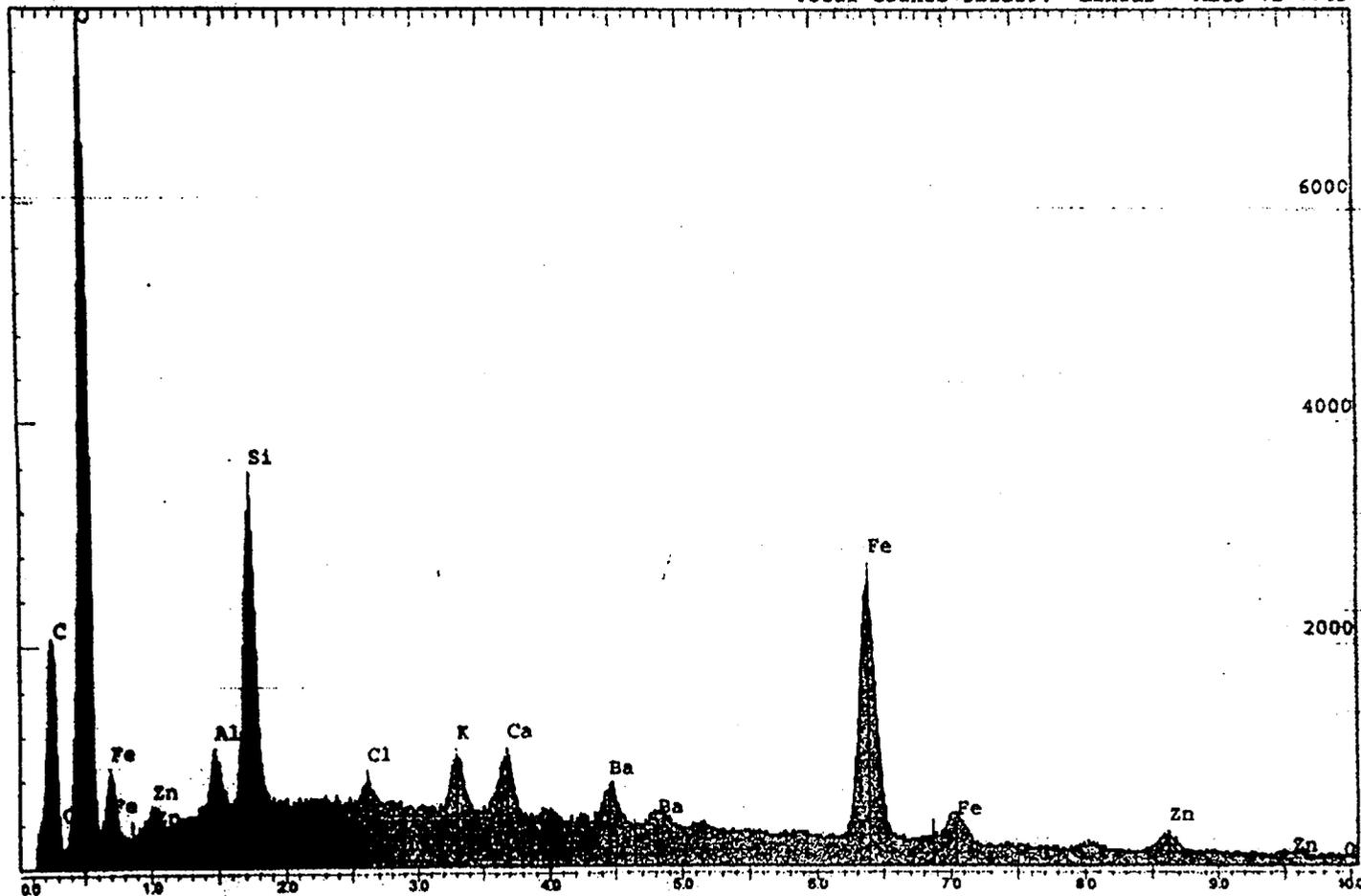


Figure 4. EDS spectrum from an overall area of deposits on filter 4597BA 7/3/99@1400.

[4282]

CE 1000-1800  
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Spectrum: 2321190B

Range: 20 keV

Total Counts=525103. Linear Auto-VS=8613

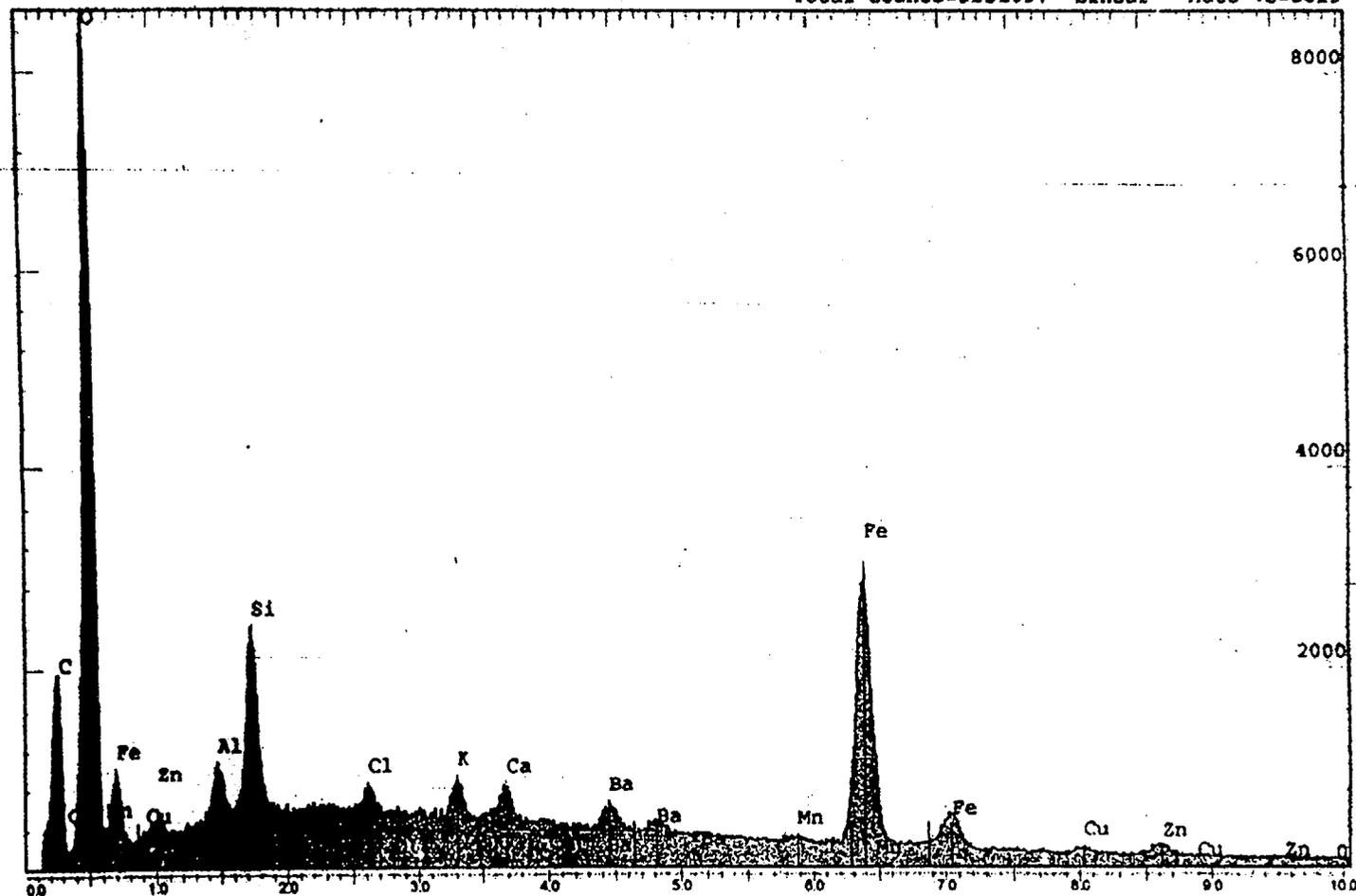


Figure 5. EDS spectrum from a second overall area of deposits on filter 4597BA 7/3/99@1400.

[4283]

CF 1000-4200  
Page 10/6/97

Spectrum: 23211903

Range: 20 keV

Total Counts=152959. Linear Auto-VS=2409

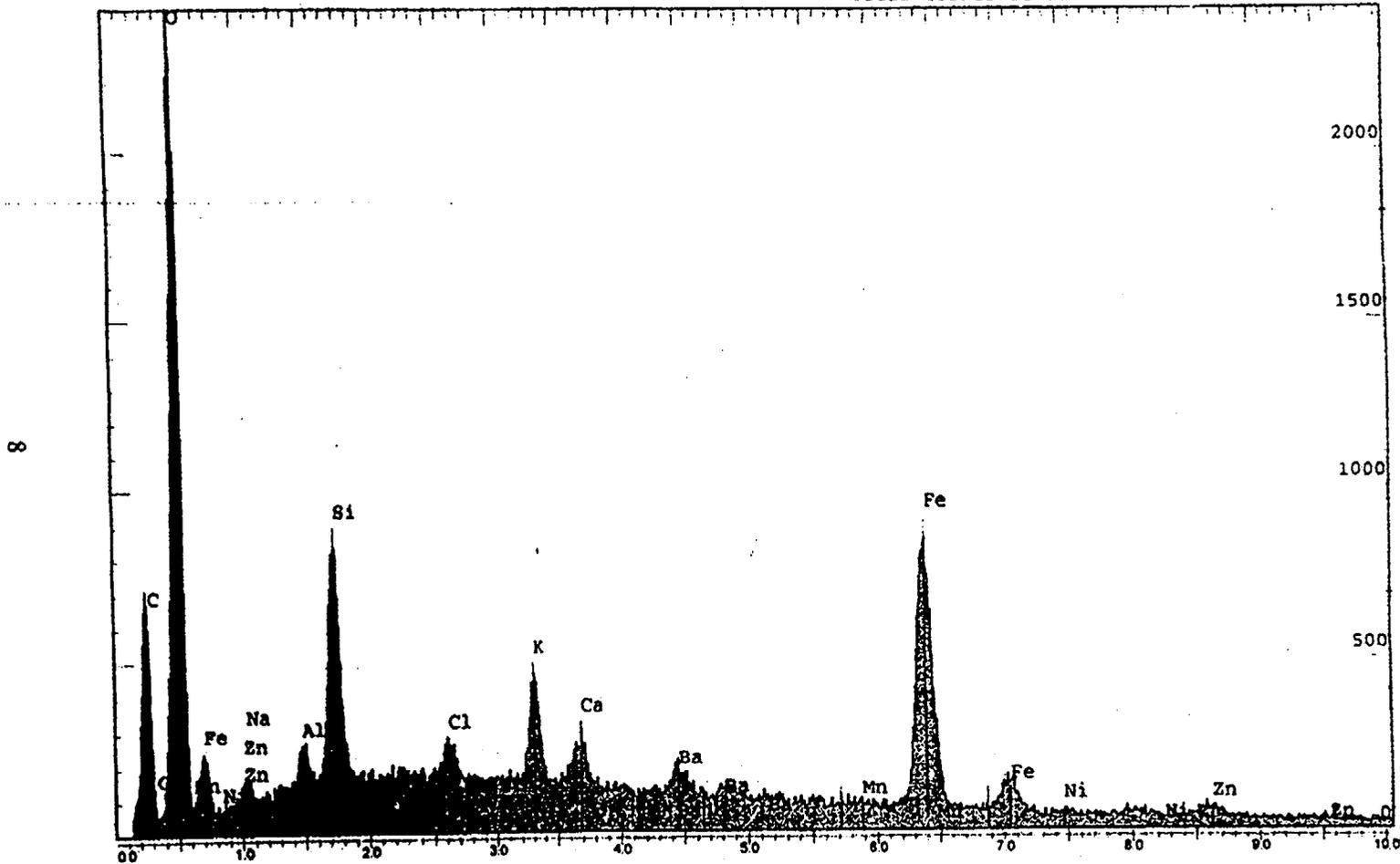


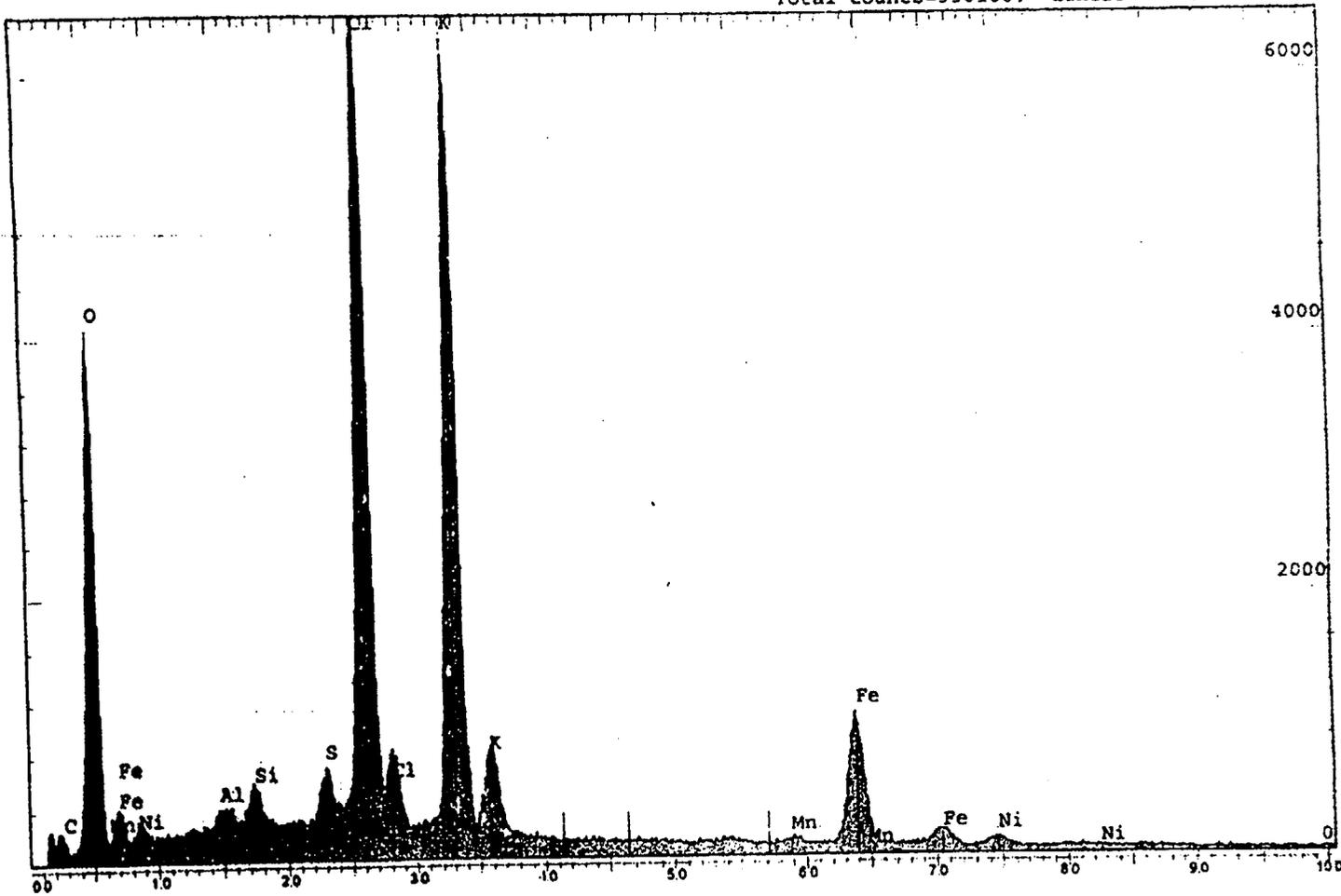
Figure 6. EDS spectrum from an overall area of deposits on filter 4597BA 7/9/99@2016.

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Spectrum: 2321190F

Range: 20 keV

Total Counts=356168. Linear Auto-VS-6447



9

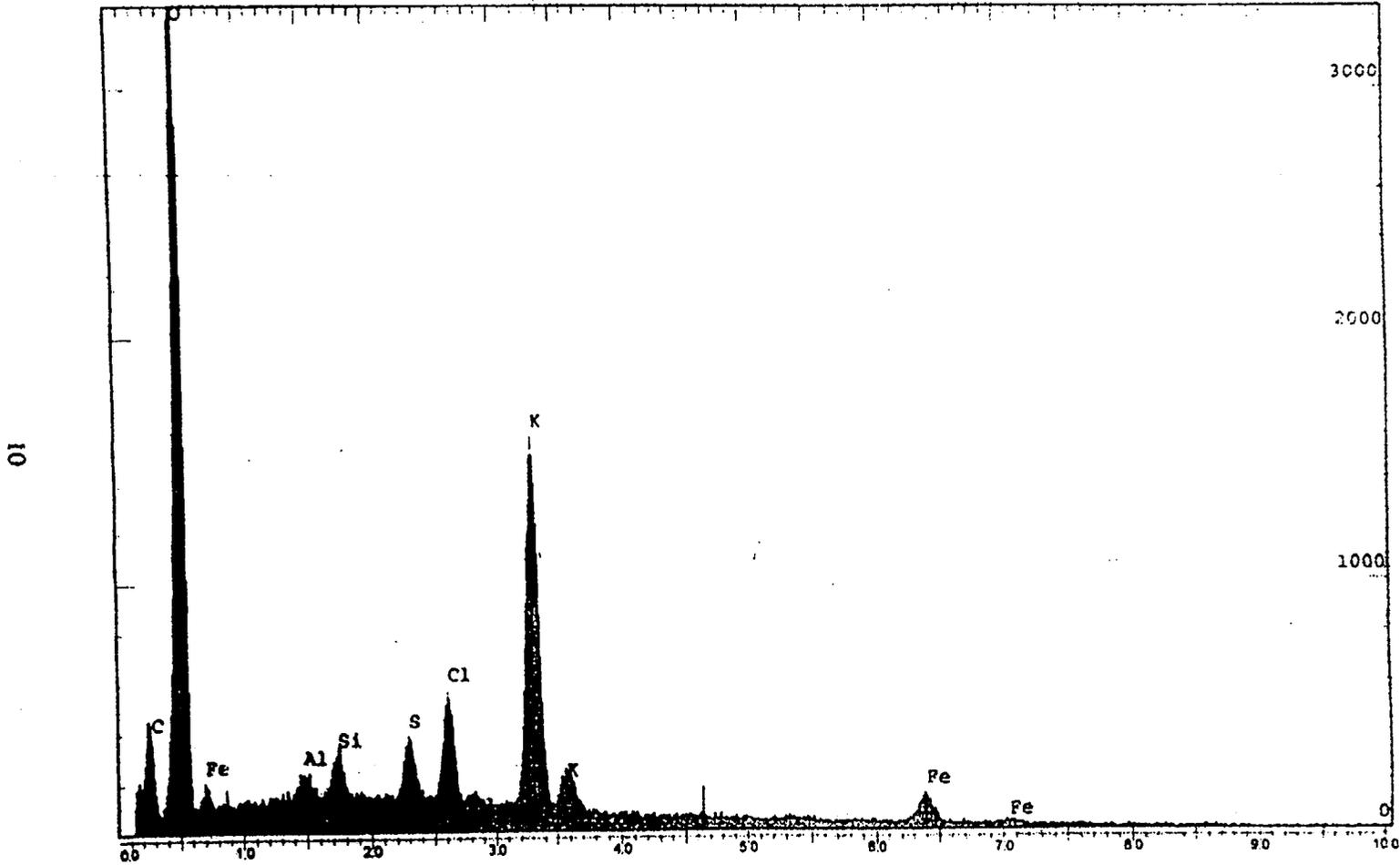
02/19/99-1200  
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Figure 7. EDS spectrum from a single dark particle on filter 4597BA 7/9/99@2016.

Spectrum: 2321190B

Range: 20 keV

Total Counts=118613. Linear Auto-VS=3329



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Figure 8. EDS spectrum from a second dark particle on filter 4597BA 7/9/99@2016.

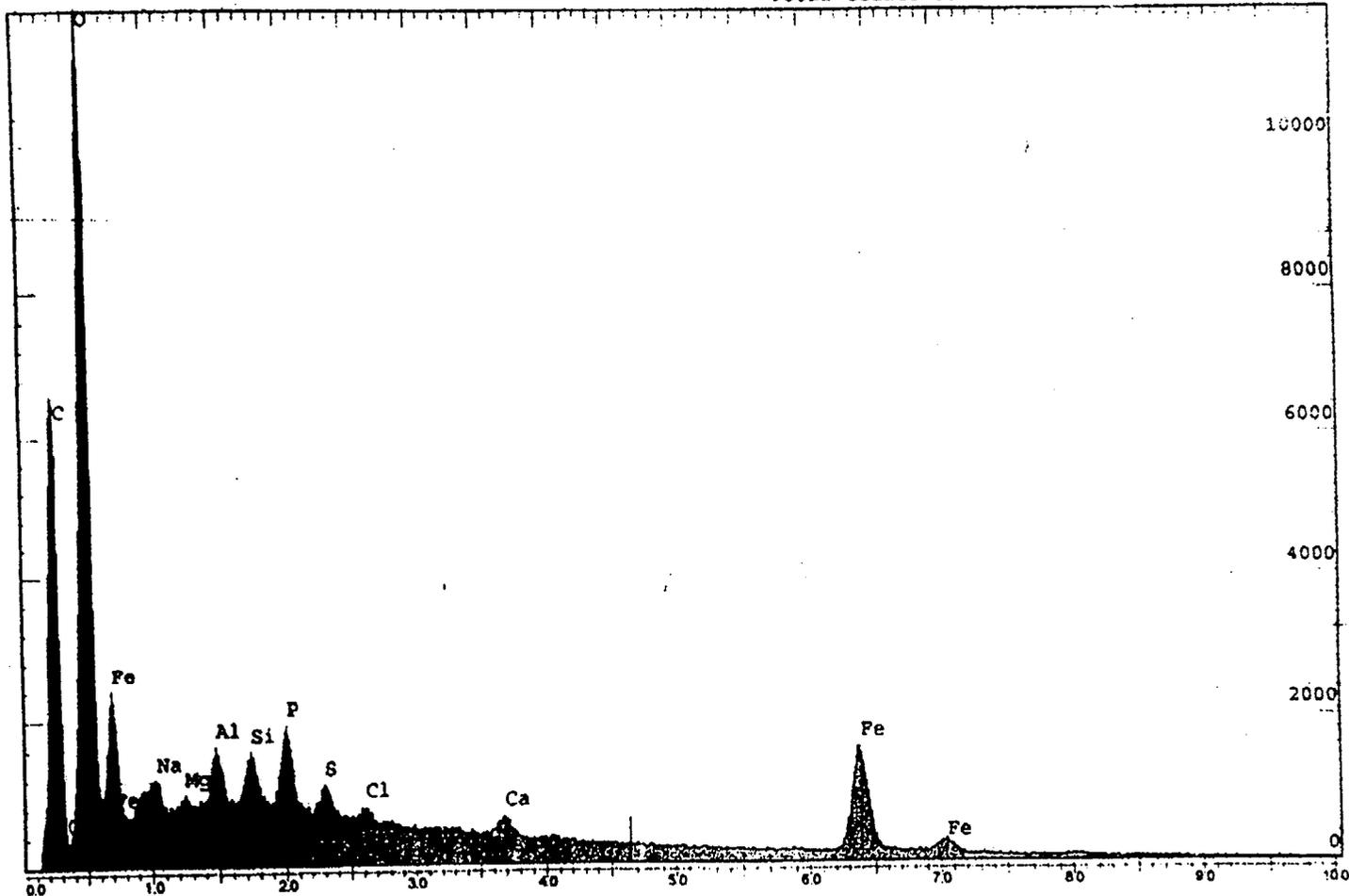
[4286]

Spectrum: 2323190H

Range: 20 keV

Total Counts=536263. Linear Auto-VS=11862

11



CE 1999-1200  
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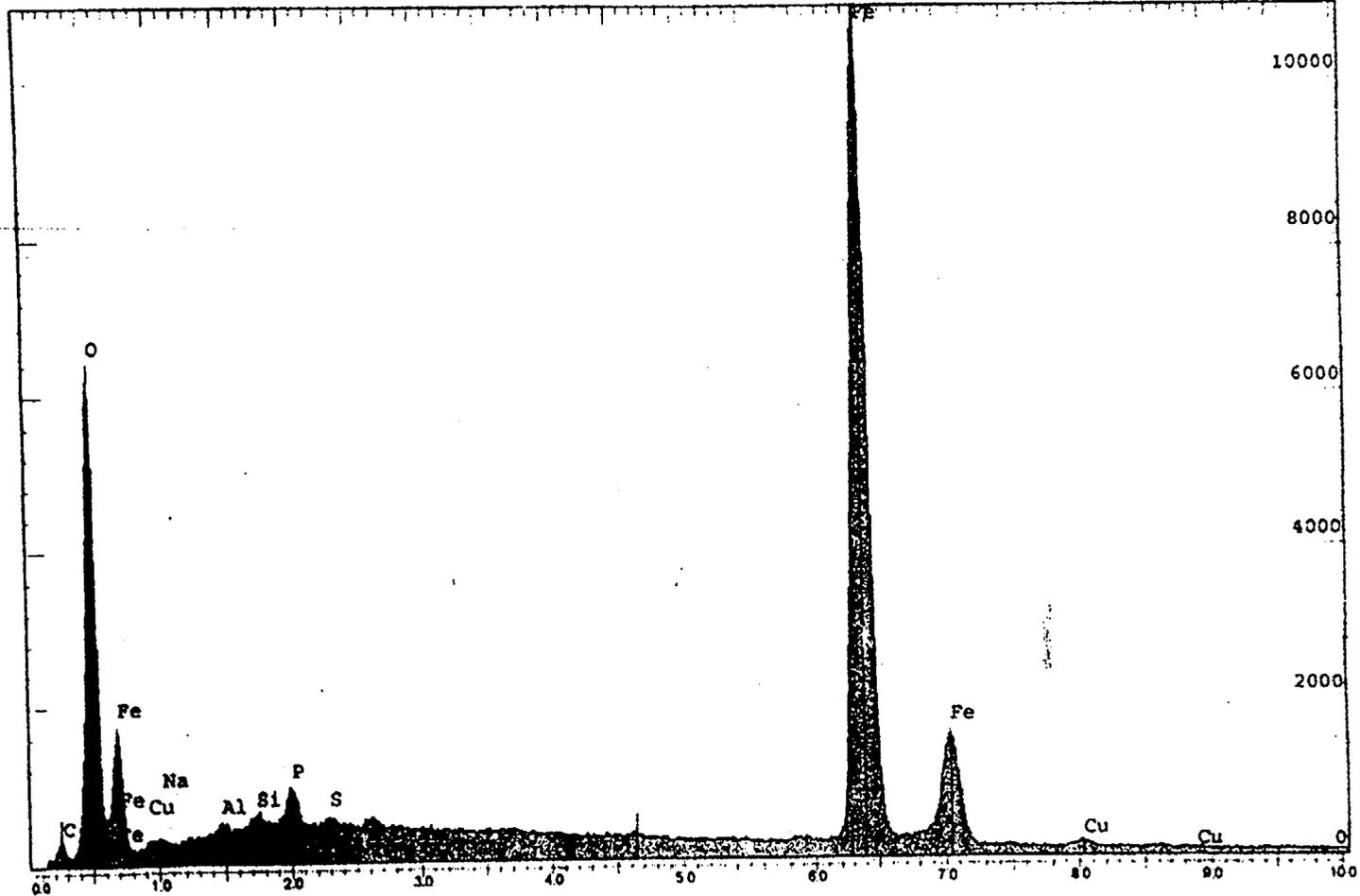
Figure 9. EDS spectrum from an overall area of deposits on filter 7/16/99 White Bird.

Spectrum: 23211901

Range: 20 keV

Total Counts=524431. Linear Auto-VS=10942

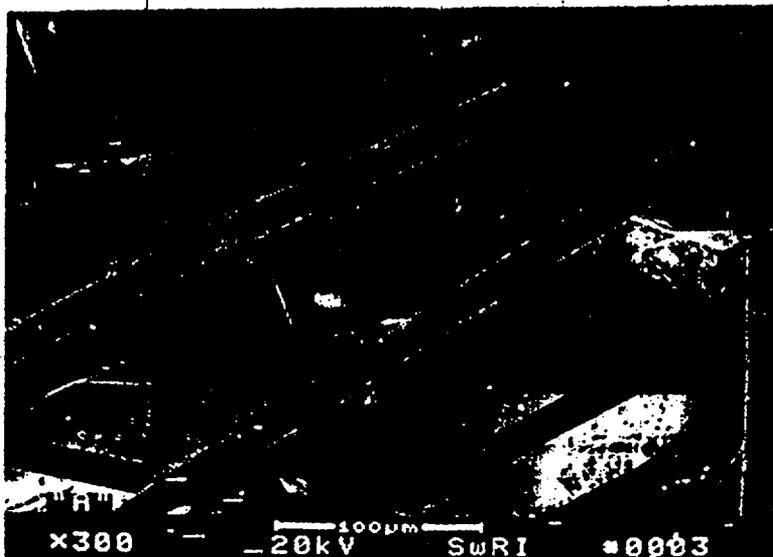
12



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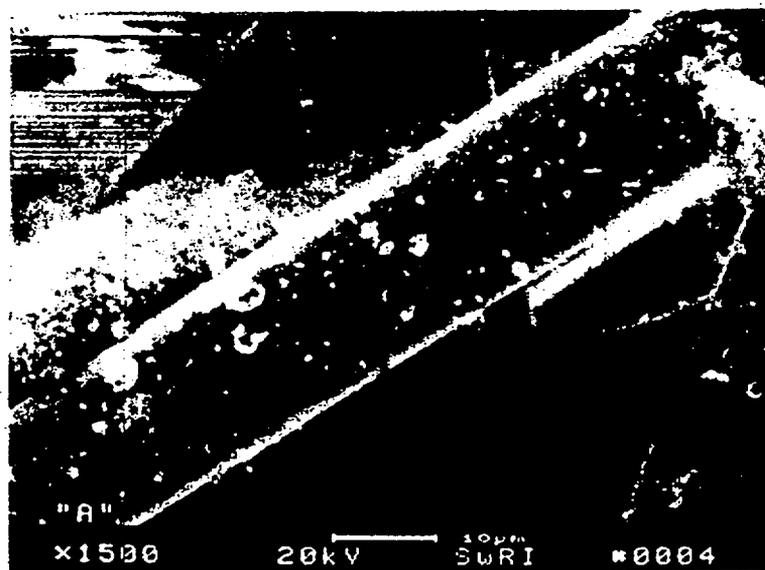
Figure 10. EDS spectrum from a single particle on filter 7/16/99 White Bird.

[4288]



97614

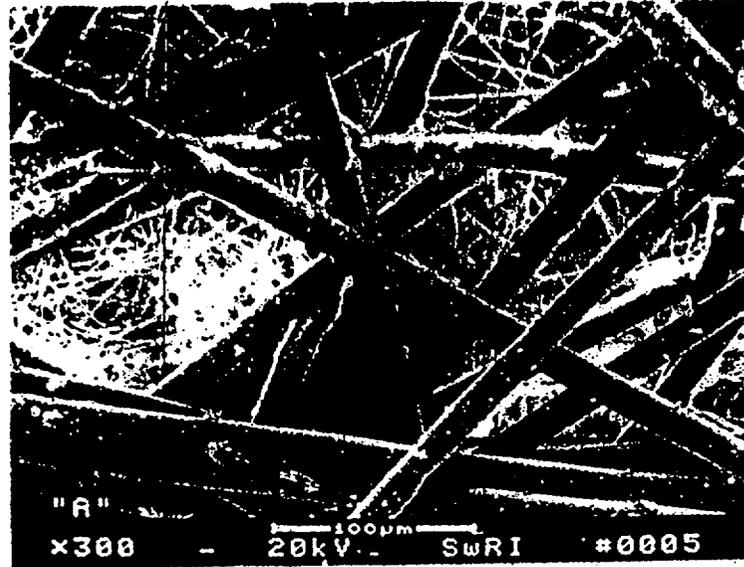
(a)



97615

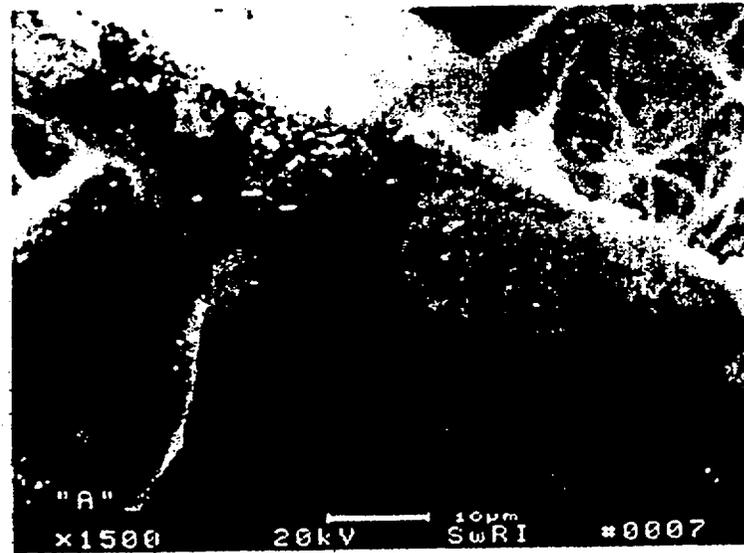
(b)

Figure 11. Scanning electron micrographs of an area of deposits on filter 4597BA 7/3/99@1400 following application of a gold/palladium coating.



97616

(a)



97617

(b)

Figure 12. Scanning electron micrographs of a second area of deposits on filter 4597BA 7/3/99@1400 following application of a gold/palladium coating.

RECORD END SHEET  
No. 5406

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OF  
RECORD**