NA 702-01 R00

CR 1999-1300

CONDITION REPORT

NO. 1999 - 1300

Page 1 of 17

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)	SIGNATURE	ORGANIZATION	PHONE NO.	MAIL STOP
Robert C. Hovland		SYSC	8406	1056

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)	SIGNATURE	ORGANIZATION	PHONE NO.	MAIL STOP	DATE
Robert C. Hovland	for D.C. Gerson	SYSC	8406	1056	7/30/99

REPORTABILITY
☐ 1 HR ☐ 4 HR ☐ 24 HR ☒ N/A

OPERABLE
☒ YES ☐ NO ☐ NON TECH SPEC.

ACTIONS TAKEN / COMMENTS:

See actions taken above.

☐ Continued

SIGNATURE	DATE	TIME
	7/30/99	1608

CATEGORY	OWNER	DUE DATE	CAUSE DETERMINATION
Important	SYSC	9/27/99	Apparent Cause

☐ SRB ☐ ERB ☐ EXPERIENCE REVIEW ☒ CATPR ☐ EXTENT OF CONDITION ☐ POTENTIAL MRFF ☐ OTHER REVIEWS

NA702_01.DOT 12/98

Initiator
C. Nowicki

A-1

CR1999-1300

NA 702-02 R00

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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 FLUNDY TO REVIEW OUR ACTIONS FOR COMPREHENSIVE AND MAKE RECOMMENDATIONS. 9/24/99

☐ Continued

10 CFR PART 21? ☐ YES ☒ NO	SYSTEM CAPABLE OF PERFORMING SPECIFIED FUNCTION? ☒ YES ☐ NO ☐ N/A	
PREPARER (Print) Robert C. Hovland	SIGNATURE	DATE 9/23/99
SUPERVISOR APPROVAL (Print) DAVID C. GOSER Supervisor-Electrical/Controls Systems	SIGNATURE	DATE 9/24/99
MANAGER APPROVAL (Print) Dave Eshelman ☐ N/A	SIGNATURE	DATE 9/27/99
SRB APPROVAL (Print) ☒ N/A	SIGNATURE	DATE
ERB APPROVAL (Print) ☒ N/A	SIGNATURE	DATE

NA702_02.DOT 12/98

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

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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.

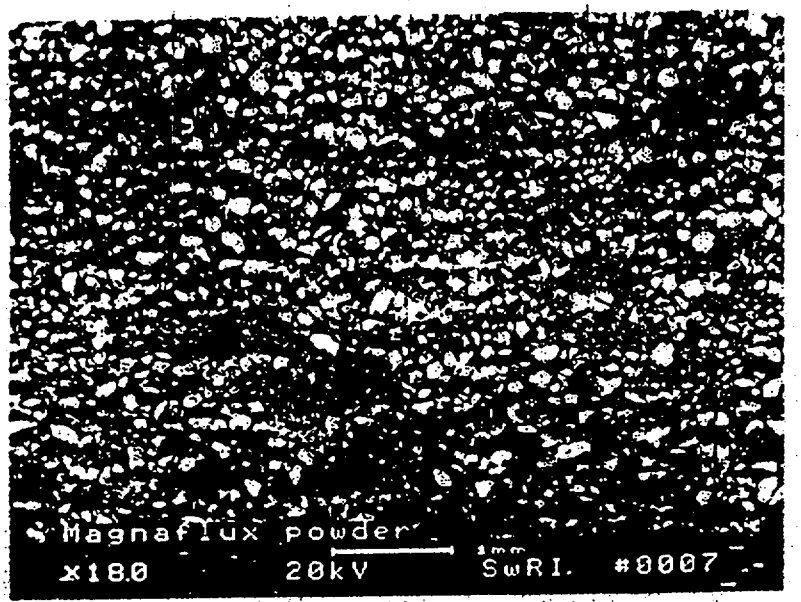
EDS spectra were also obtained from an overall area, Figure 9, and on an isolated particle Figure 10, on filter 7/16/99 White Bird. It is evident from these spectra that the deposits on the filter were also predominately iron oxide.

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 that 50μm in size and exhibited a very powdery appearance.

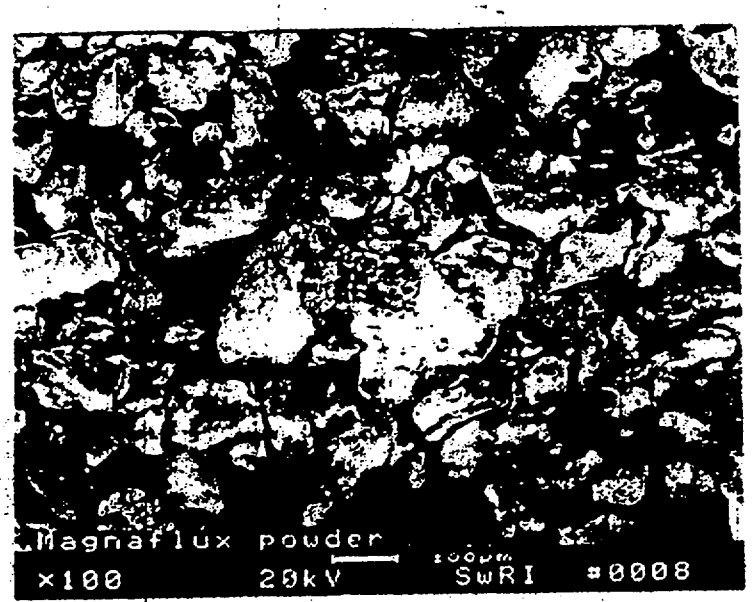
4.0 CONCLUSIONS

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 1¾ 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.**

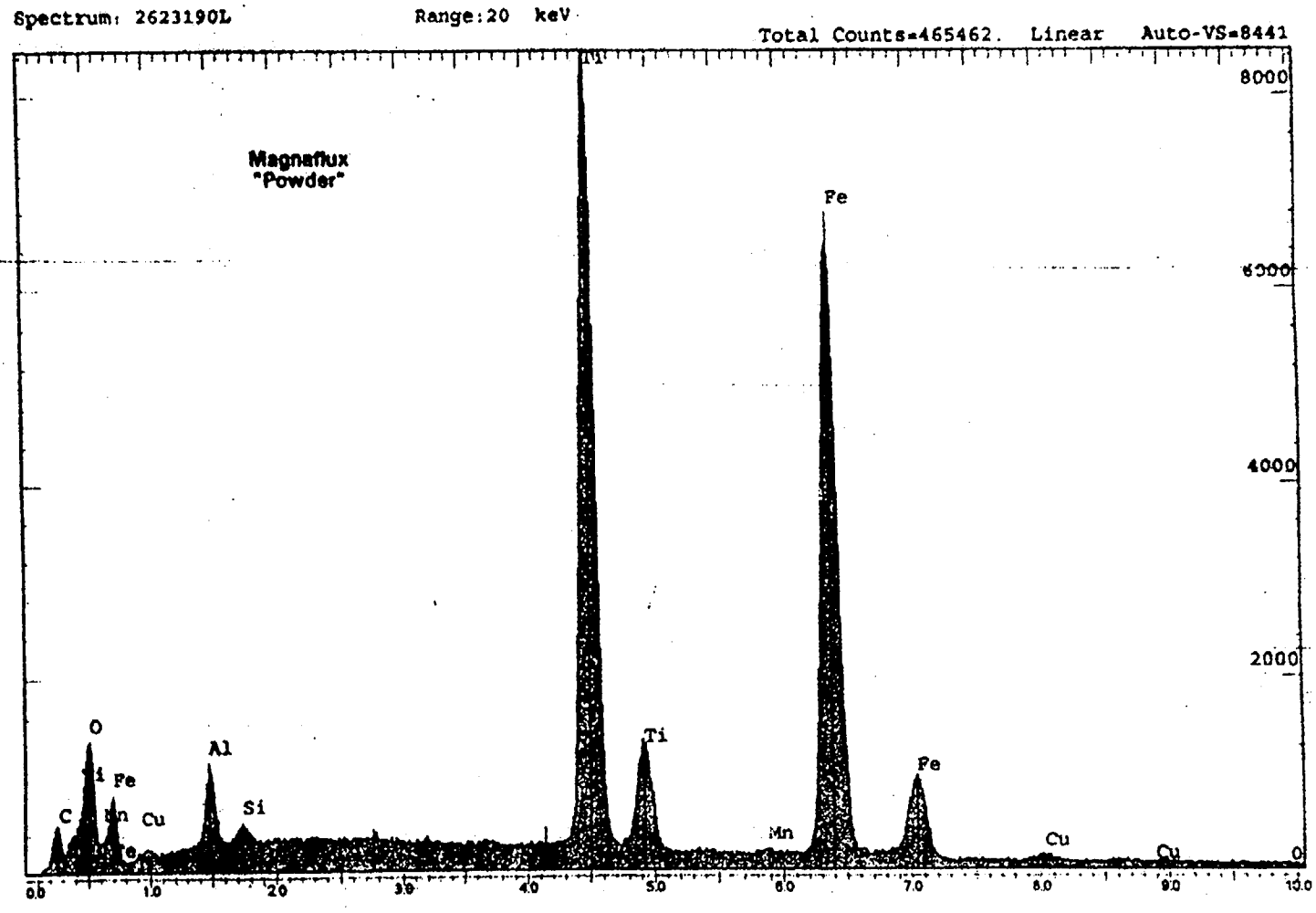


Figure 2. **EDS spectrum obtained from the Magnaflux powder.**

5

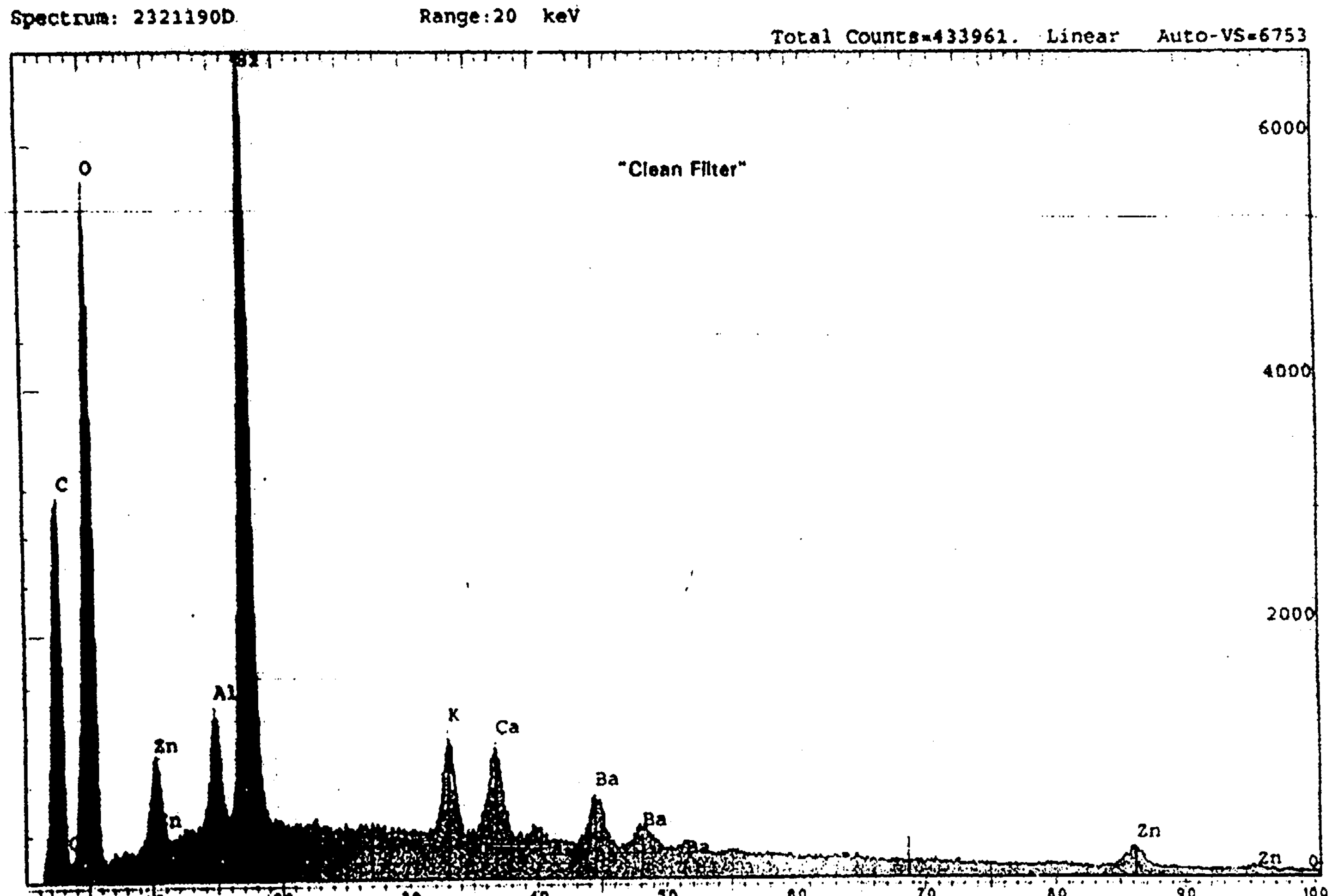


Figure 3. EDS spectrum obtained from a deposit free section of filter 4597BA 7/9/99@1400.

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[4281]

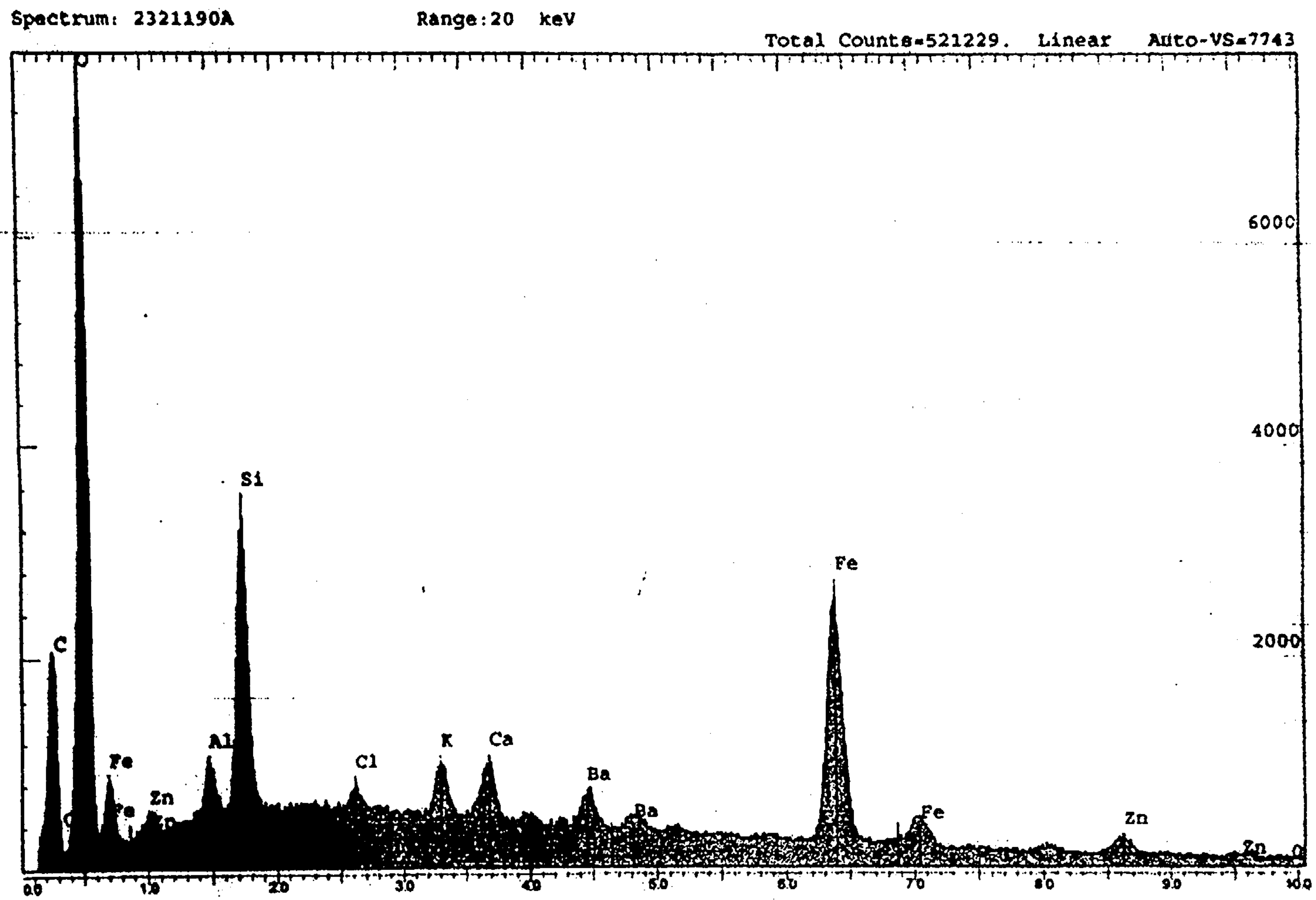


Figure 4. **EDS spectrum from an overall area of deposits on filter 4597BA 7/3/99@1400.**

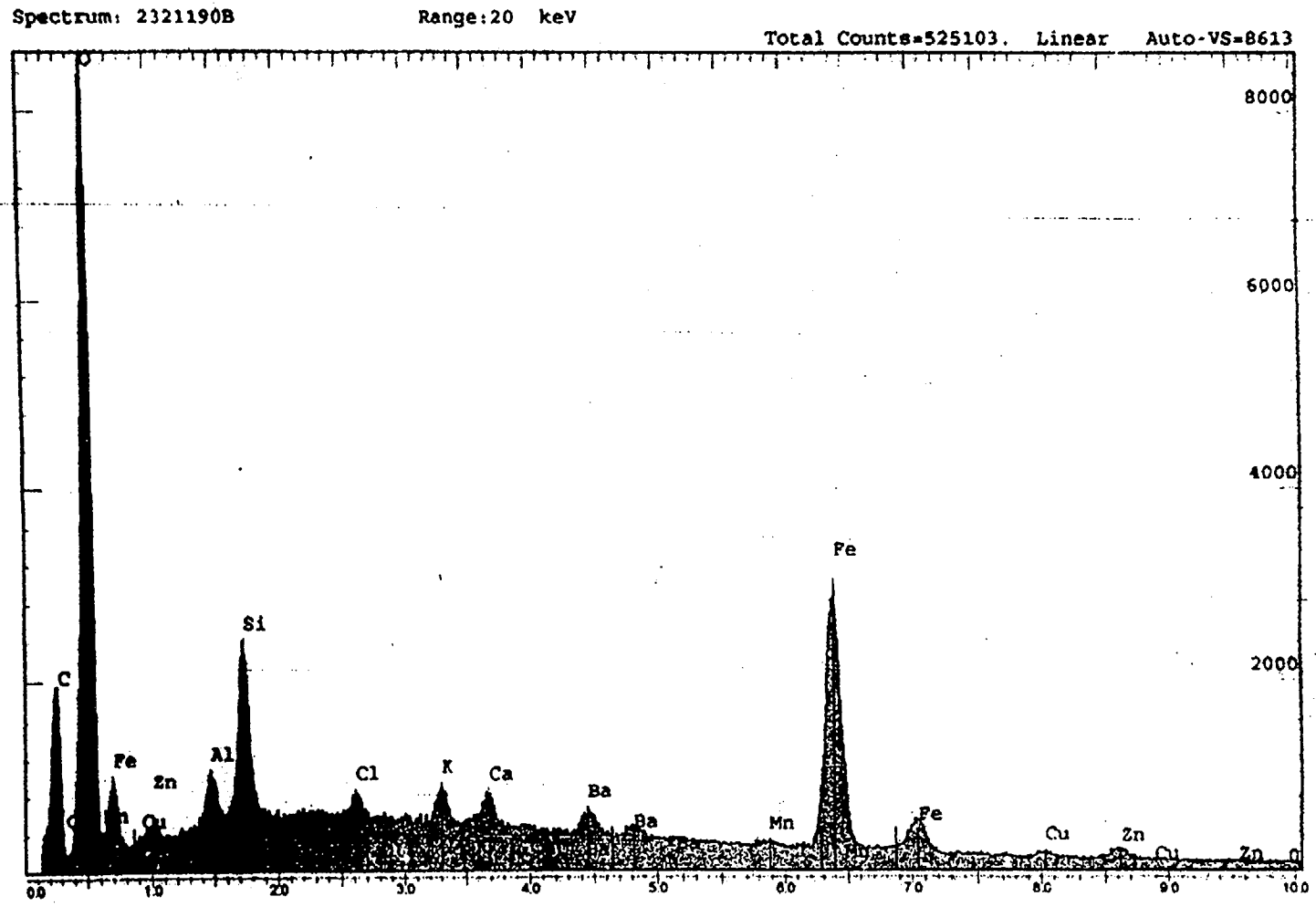


Figure 5. EDS spectrum from a second overall area of deposits on filter 4597BA 7/3/99@1400.

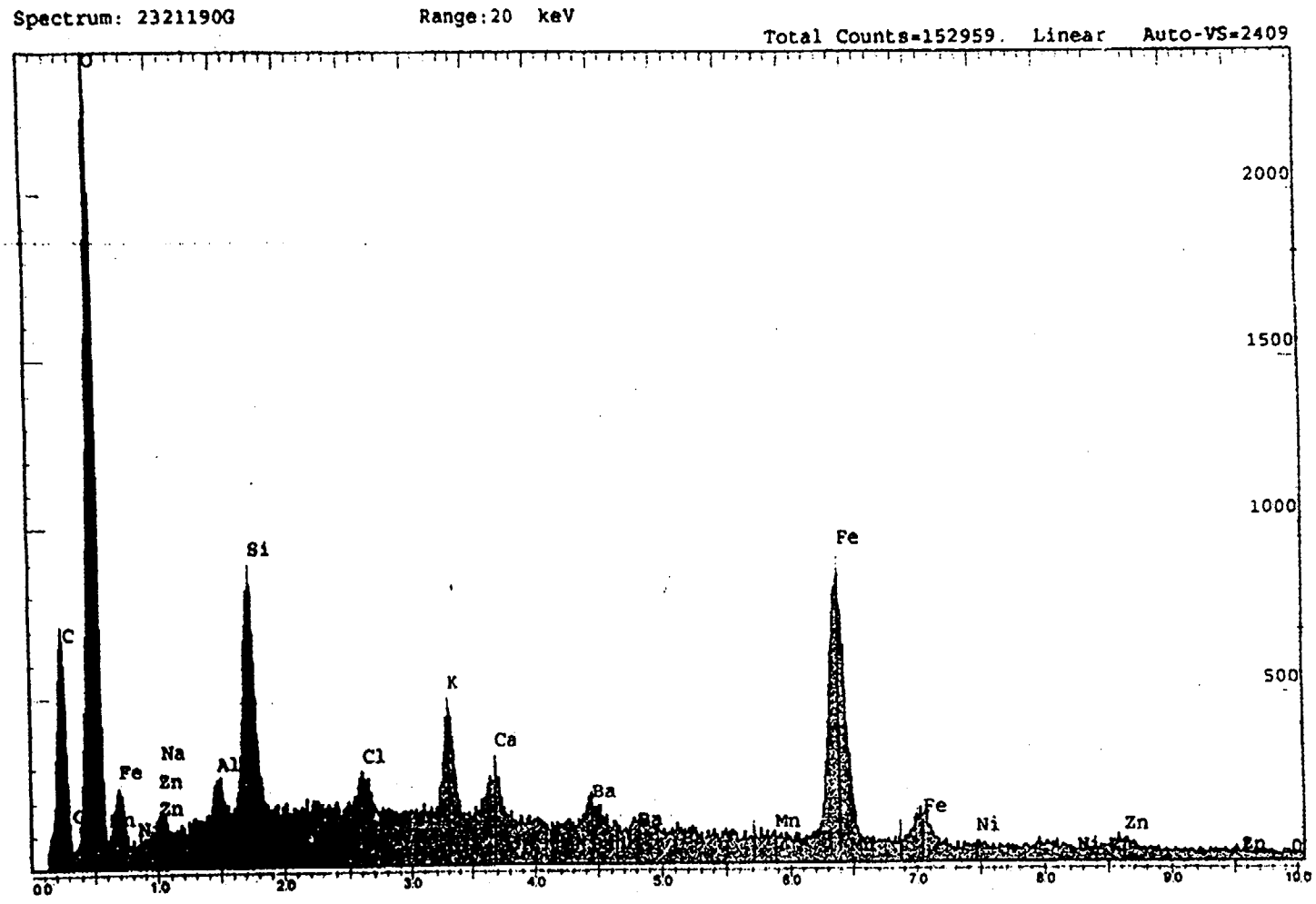


Figure 6. **EDS spectrum from an overall area of deposits on filter 4597BA 7/9/99@2016.**

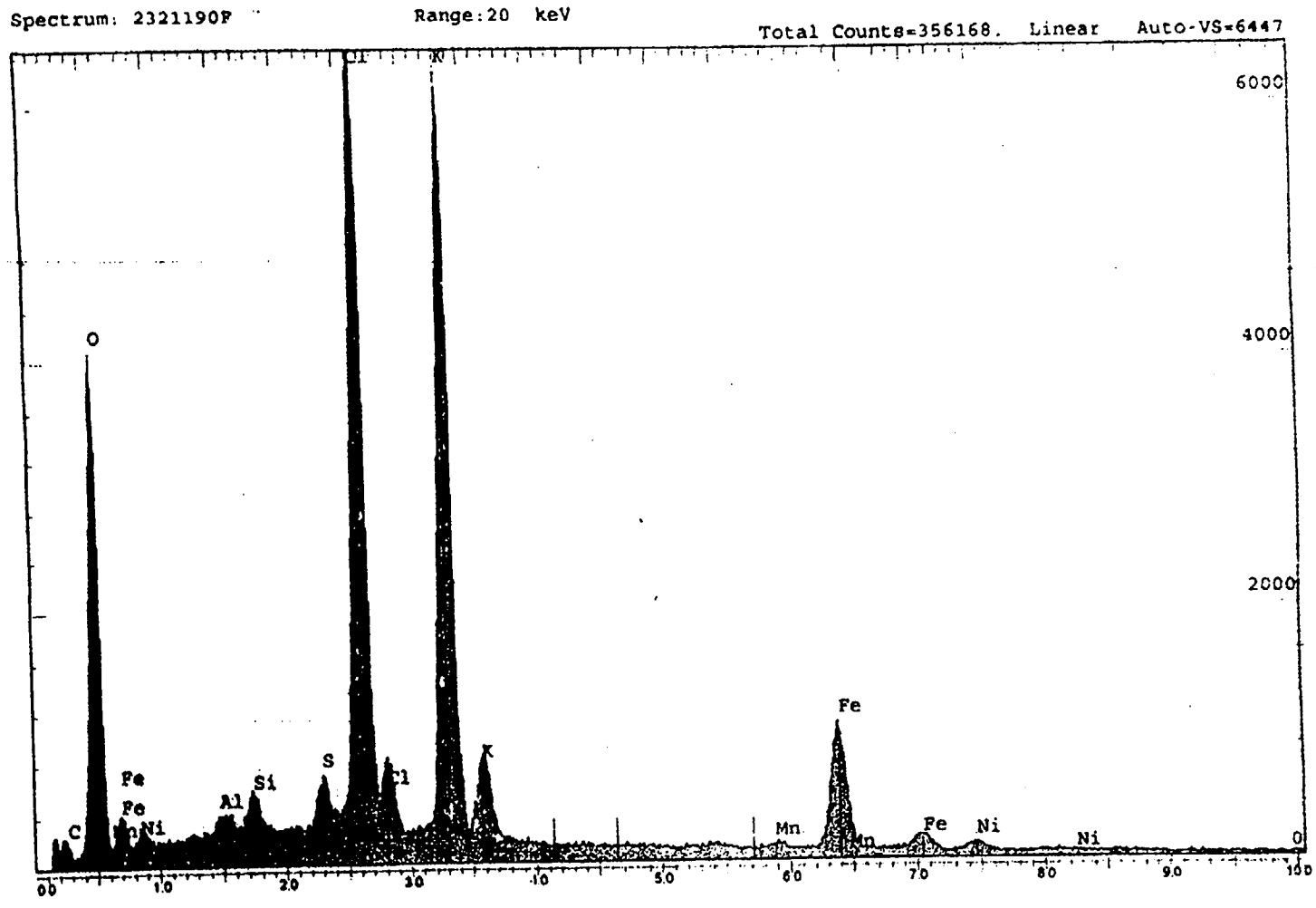


Figure 7. **EDS spectrum from a single dark particle on filter 4597BA 7/9/99@2016.**

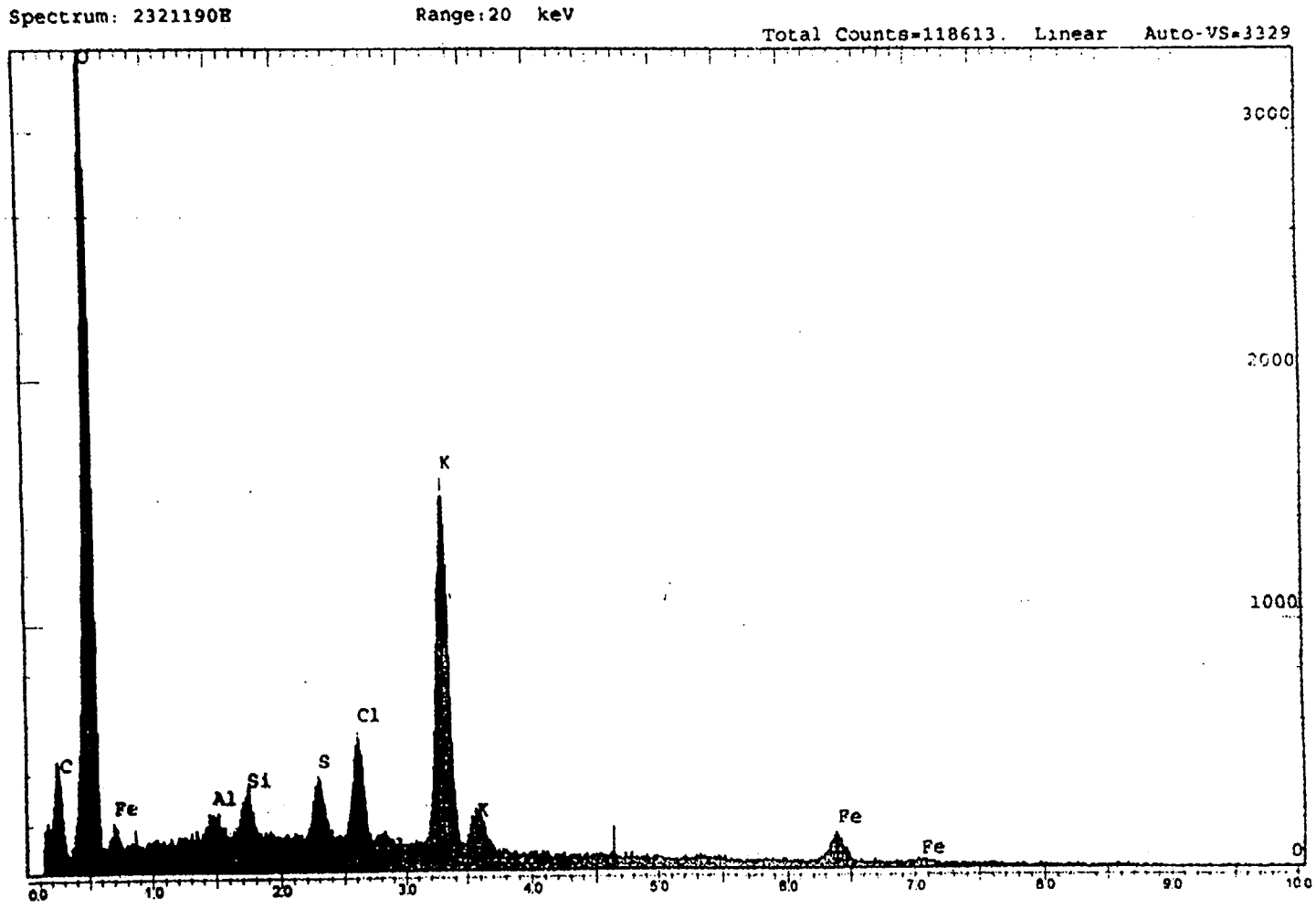


Figure 8. **EDS spectrum from a second dark particle on filter 4597BA 7/9/99@2016.**

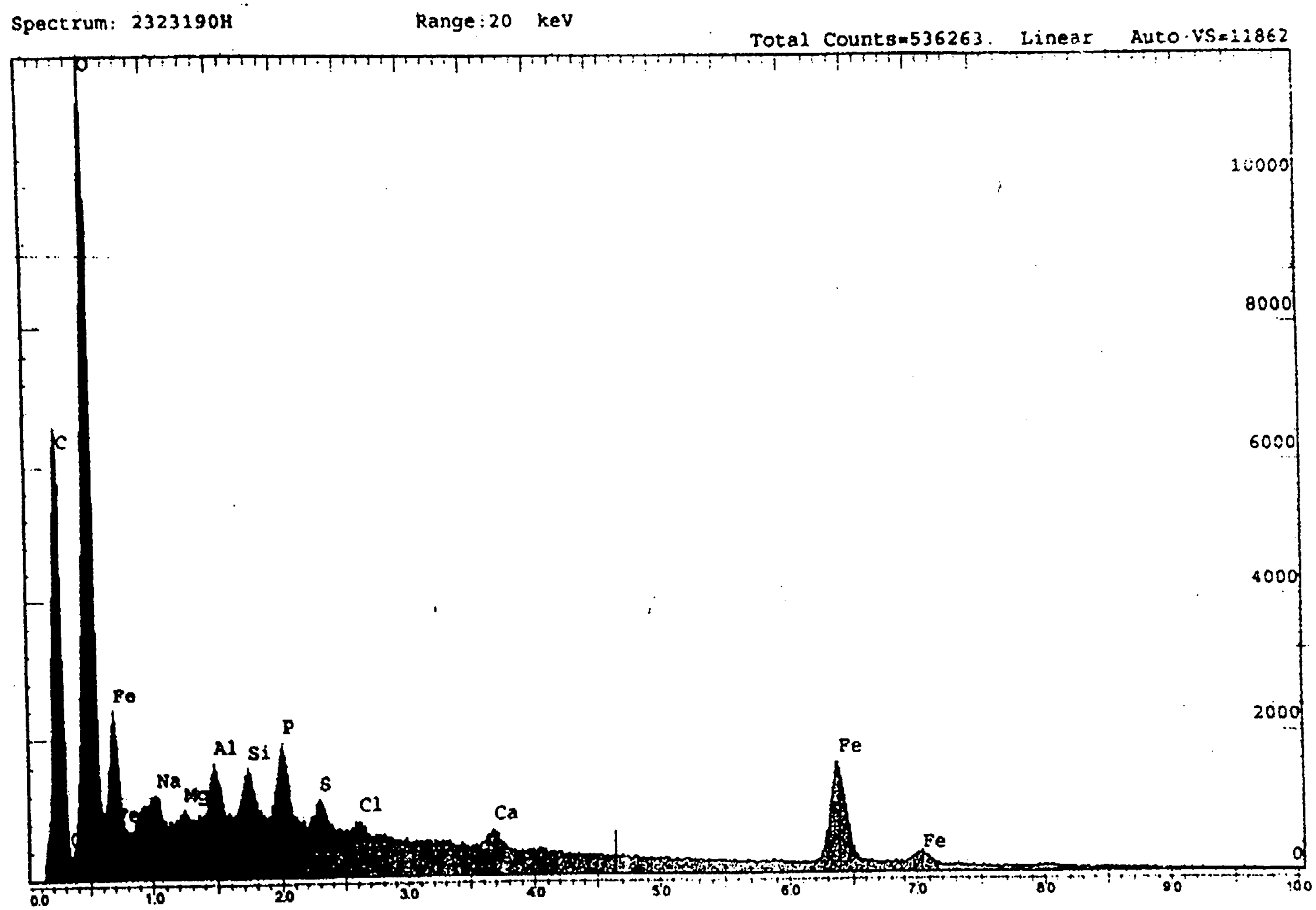


Figure 9. EDS spectrum from an overall area of deposits on filter 7/16/99 White Bird.

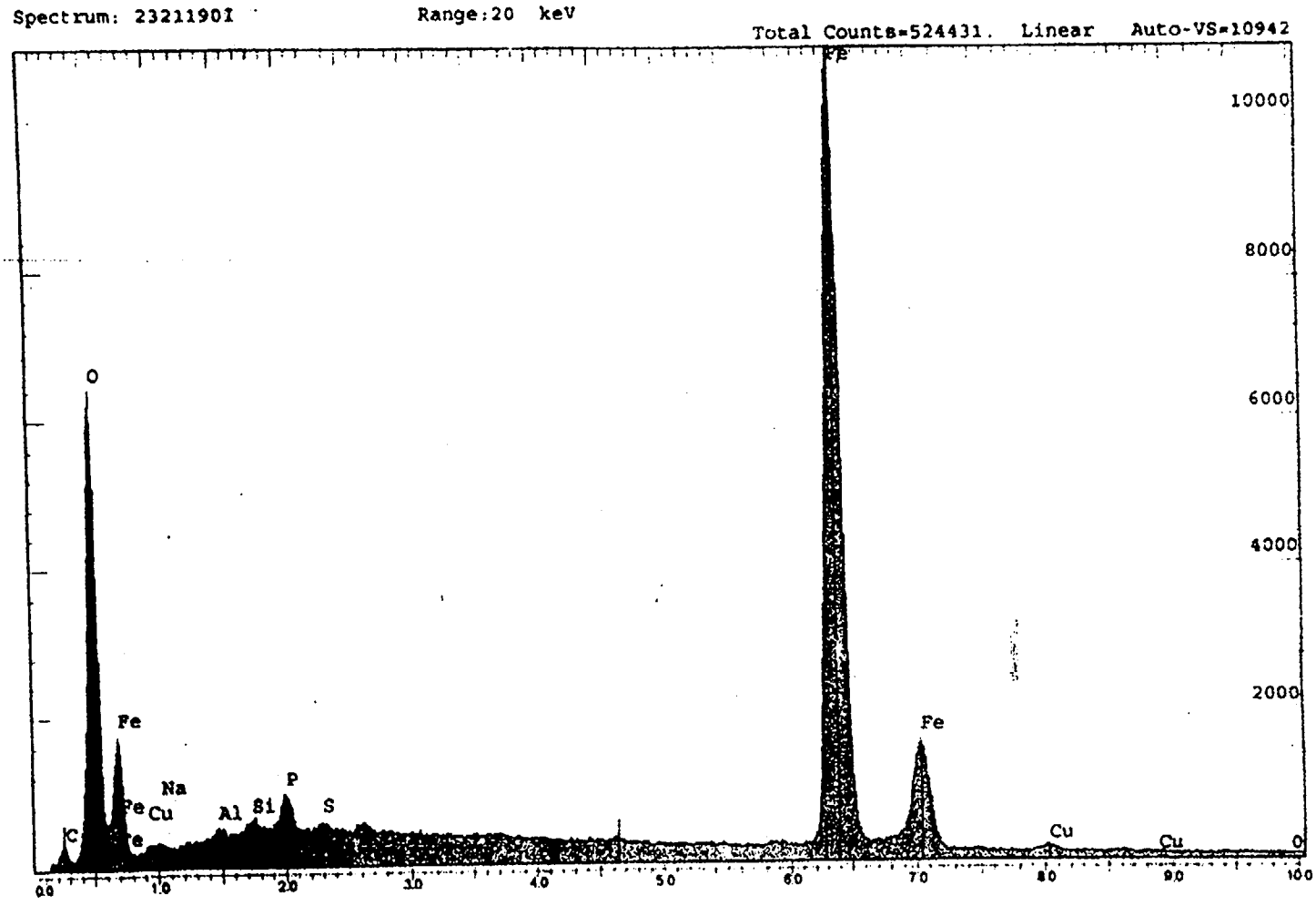
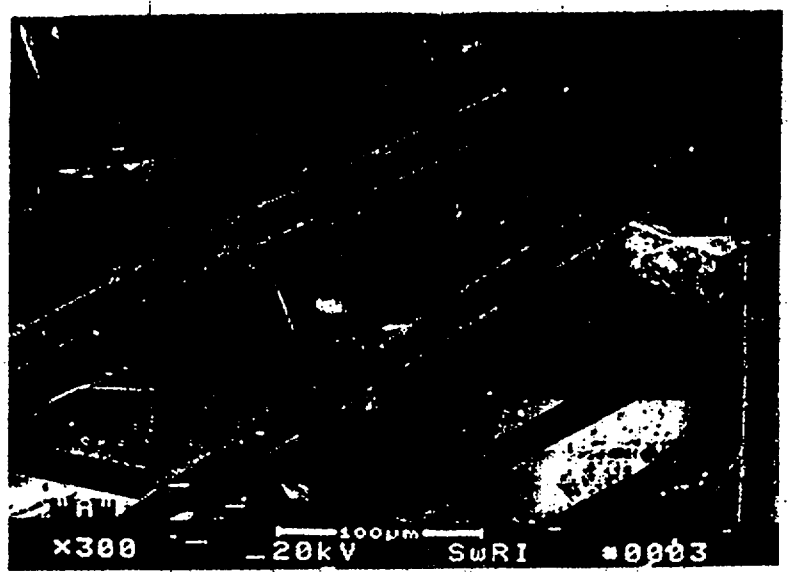
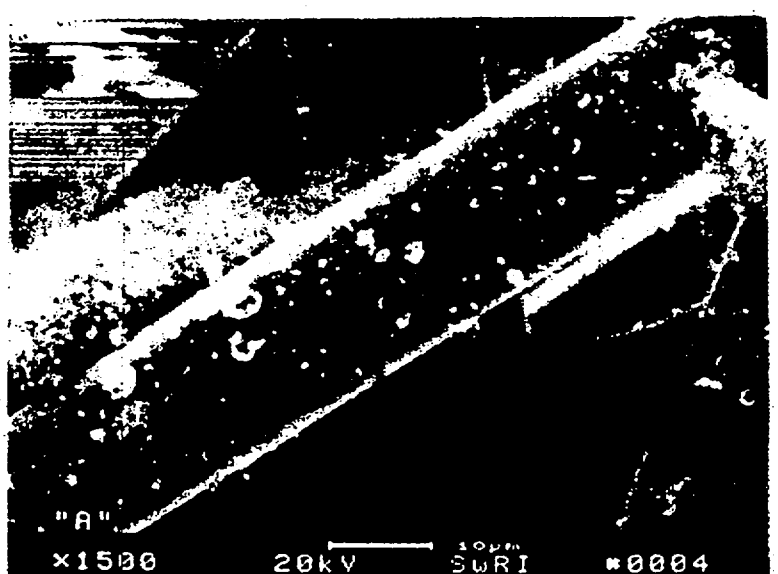


Figure 10, EDS spectrum from a single particle on filter 7/16/99 White Bird.



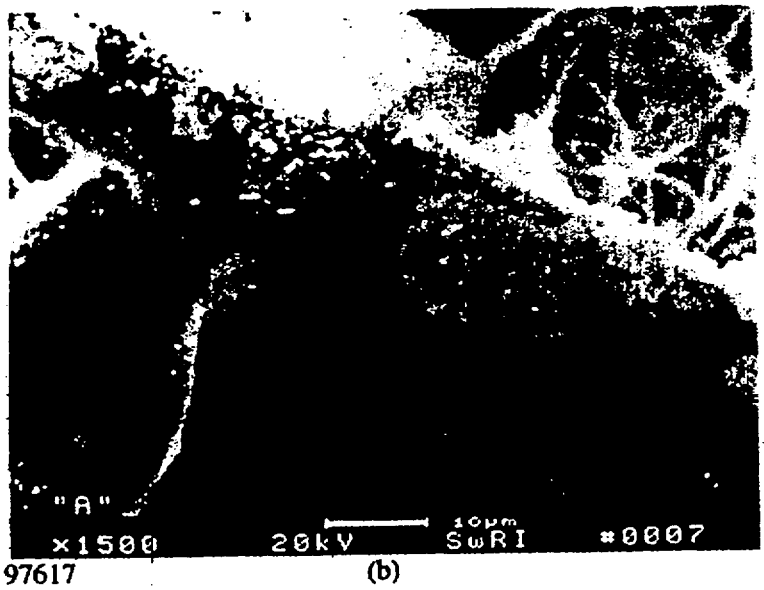
97614 (a)



97615 (b)

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

END OF RECORD