

TEXAS INSTRUMENTS, INC.'S

09/10/03

REQUEST 6

BOX 7

PART A-P

PART B

34 Forest St
MS 1D-16
Attleboro, MA 02703

facsimile transmittal

To: Rock Carter (Ford) Fax: 313-621-0646
From: Al Hopkins (Texas Instruments) Date: 04/13/99
Re: SEM-EDS Data Collected at TI Pages: This Cover Sheet & 41 Pages of Data
SAC-41
CC: [Click here and type name]

Urgent For Review Please Comment Please Reply Please Recycle

Rock, this data was accumulated while Ford Engineering was present. They took copies of this data and all the actual parts of the sample. They had, however, left the small amounts of debris for our Chem Lab to perform FT/IR analysis to check if there was brake fluid present. In fact, the FT/IR analysis showed that this was the case.

As you know, we subsequently were requested to send this small amount of debris (wrapped in aluminum foil) back to Ford. I would think that it would be much more useful to examine the actual switch itself.

In any case, this is the key to the data. I am going to try to E-mail you the photos electronically tomorrow. If you have any questions, feel free to call me at 606-236-3040.

<u>Sample</u>	<u>Pages</u>	<u>Photos</u>	<u>Spectra</u>
Top Surf of Cap after Degreasing	1-14	01-08	001-009
Terminal Cavity after Disassembly	15-28	06-15	010-013
"A" -Black Flake from Trough	29-31	20	024-021
"B" - Material Scrapped from Cap Assembly	32-37	21	022-026
"C" - Green Material on Cap	38-41	22	027-029

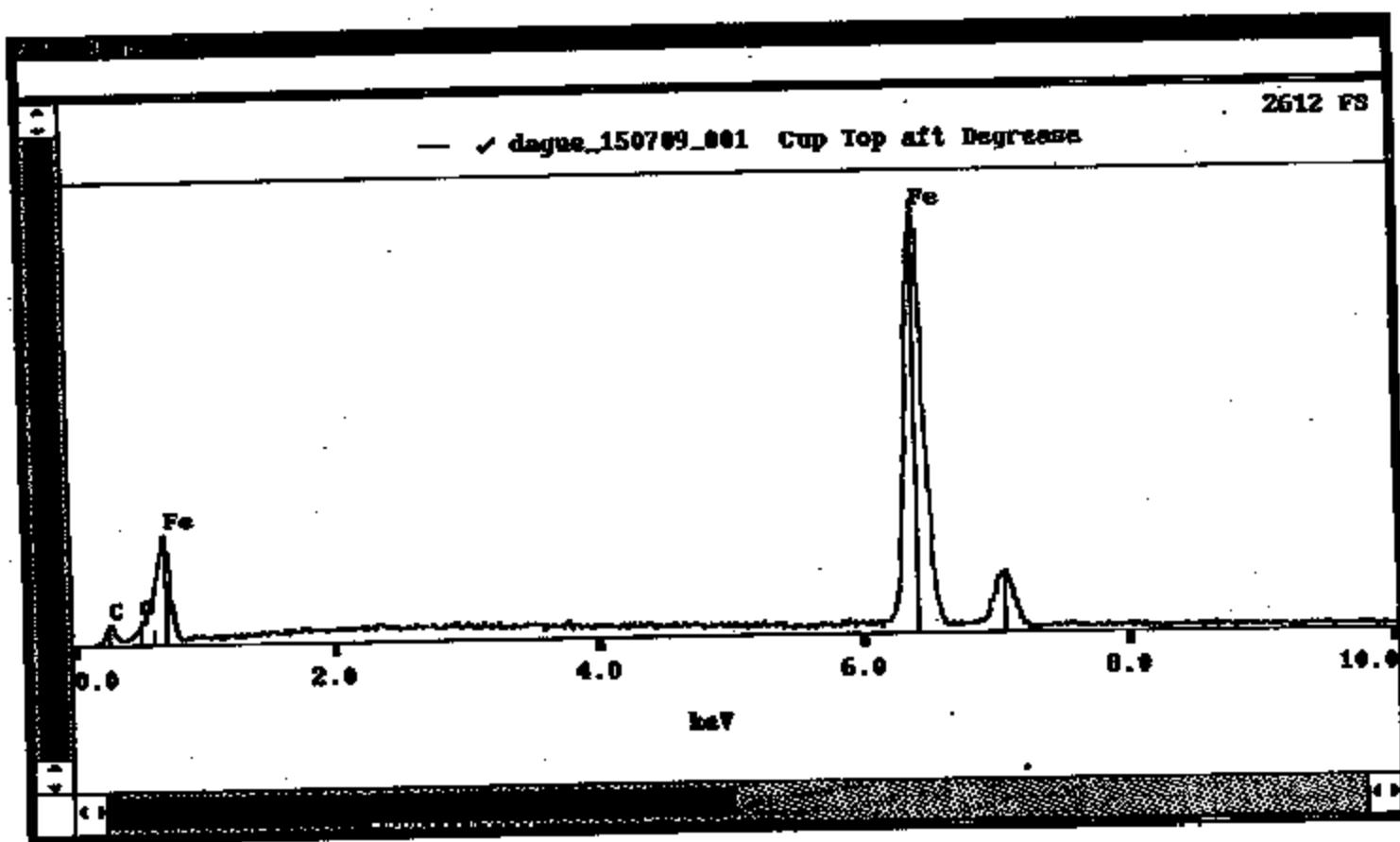
Regards,

Al

TI-NHTSA 9049

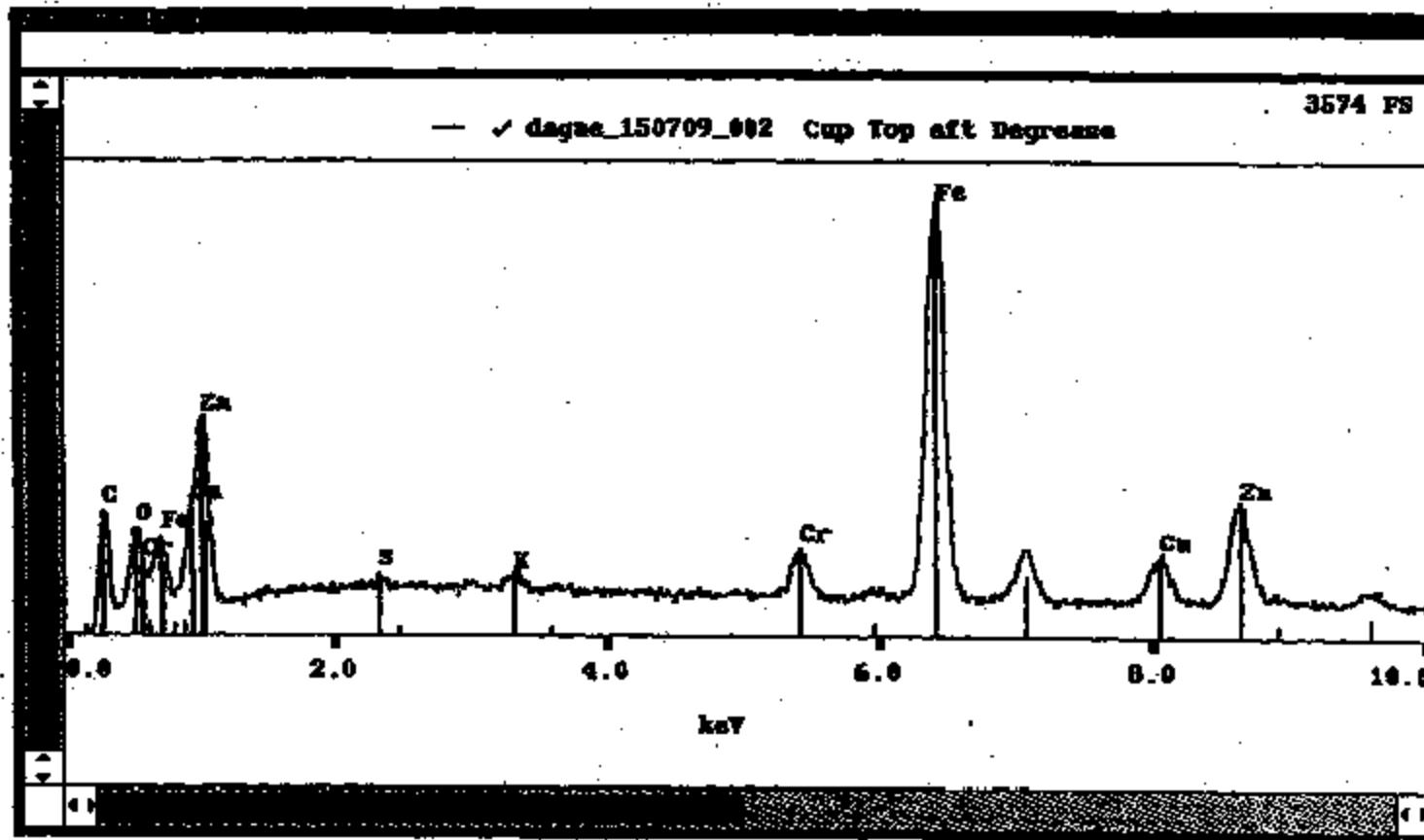
150709AHHNL

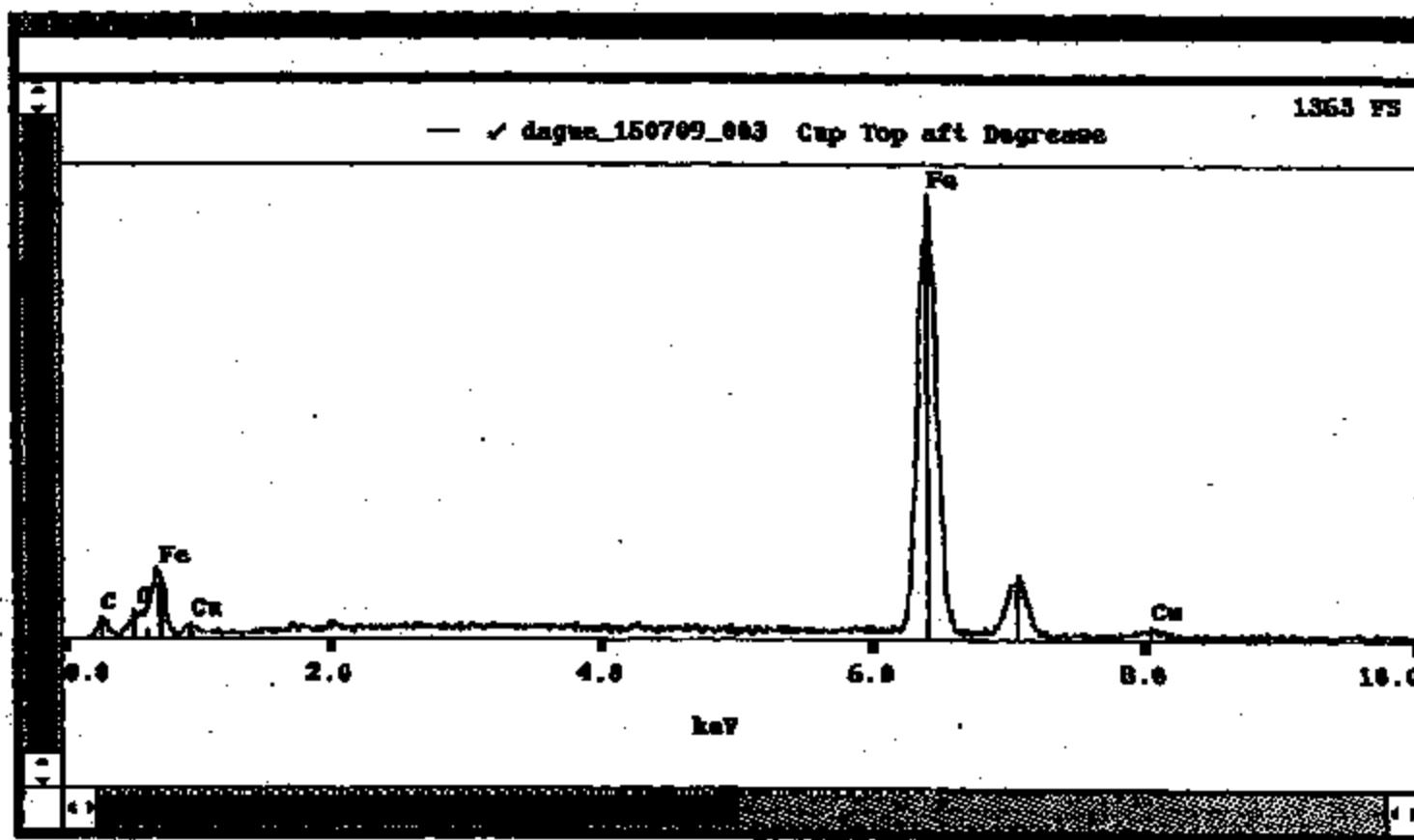
150709 Top Surf of Cup after degreasing no 01



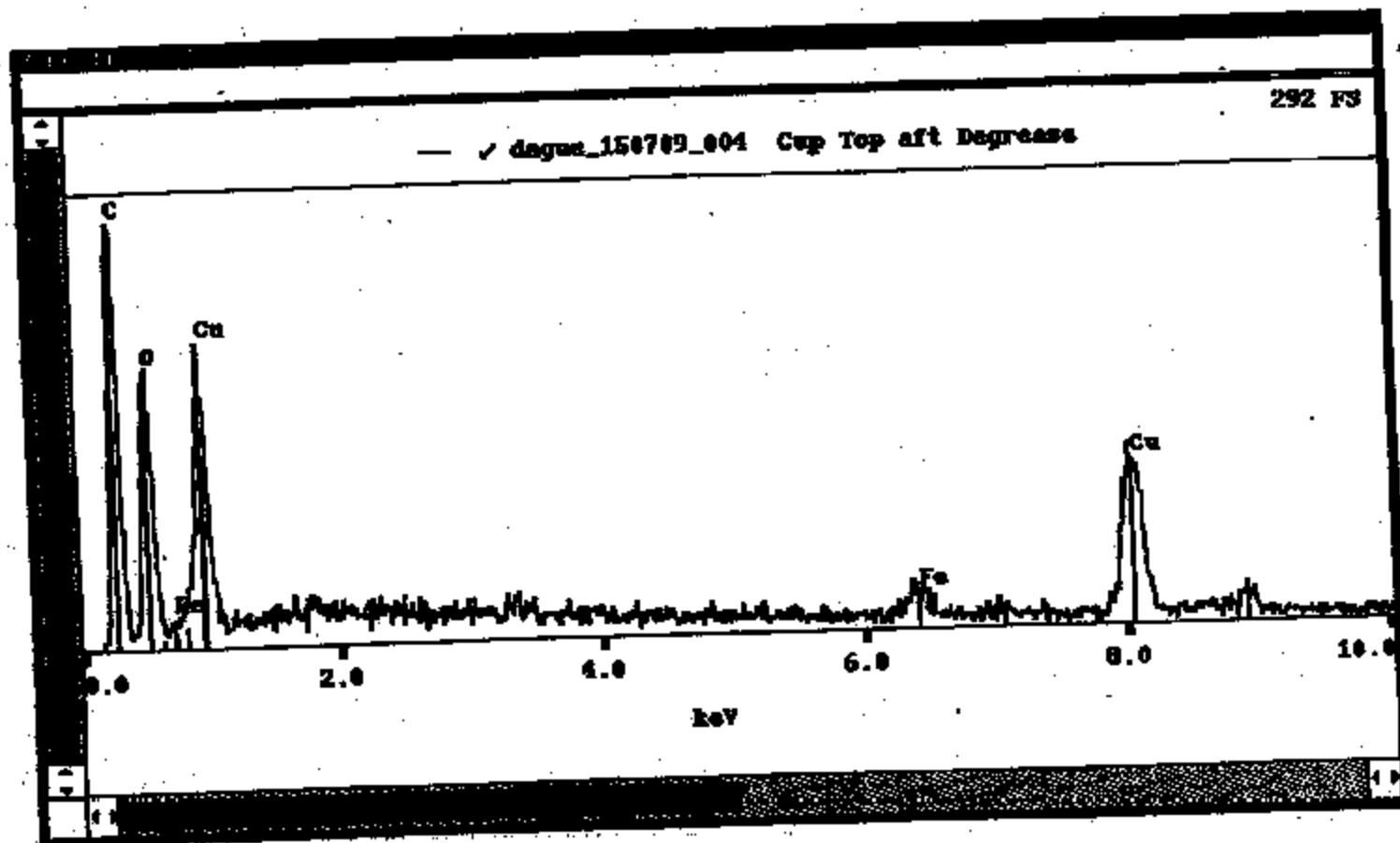
TINHTSA 9851

3

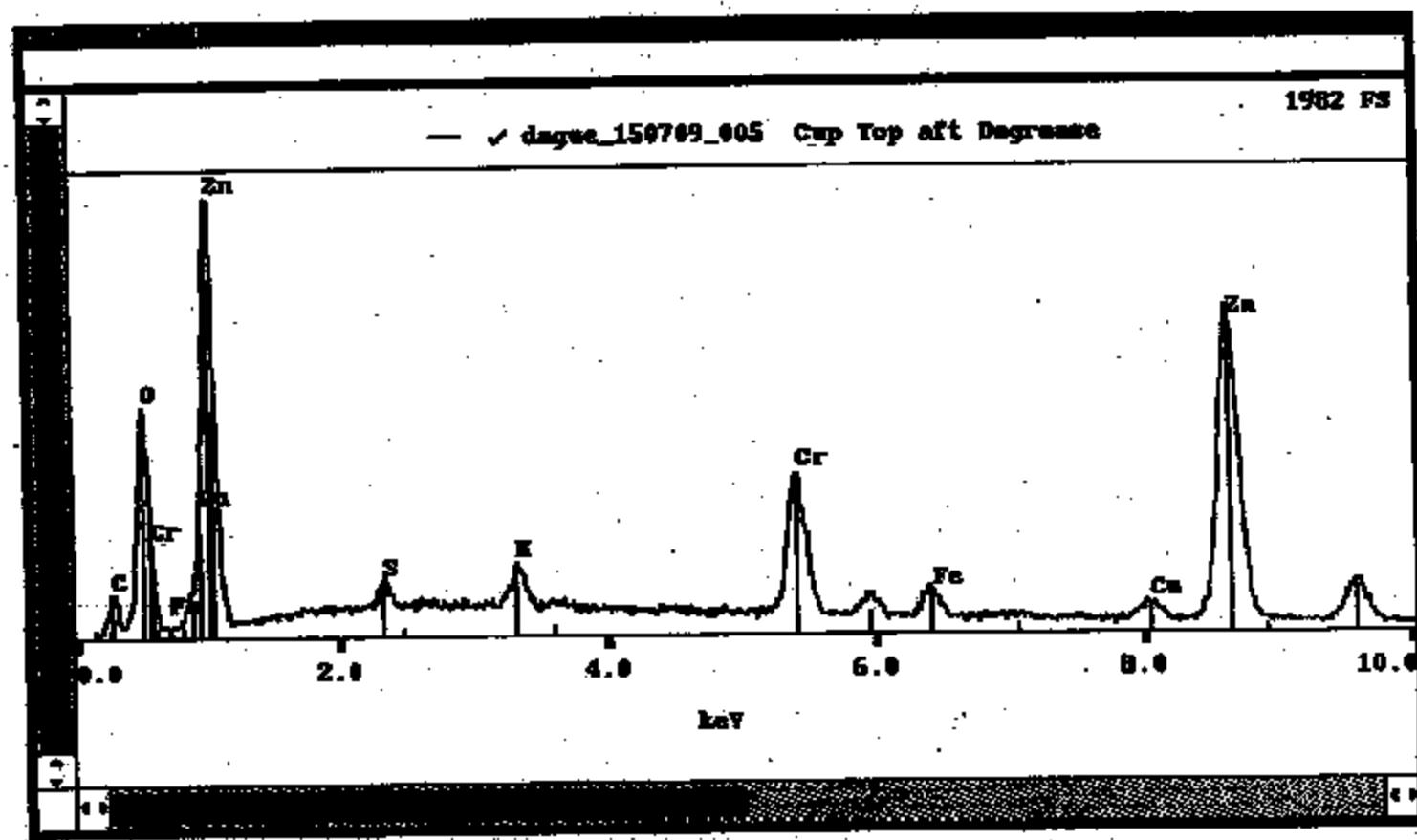




5



6

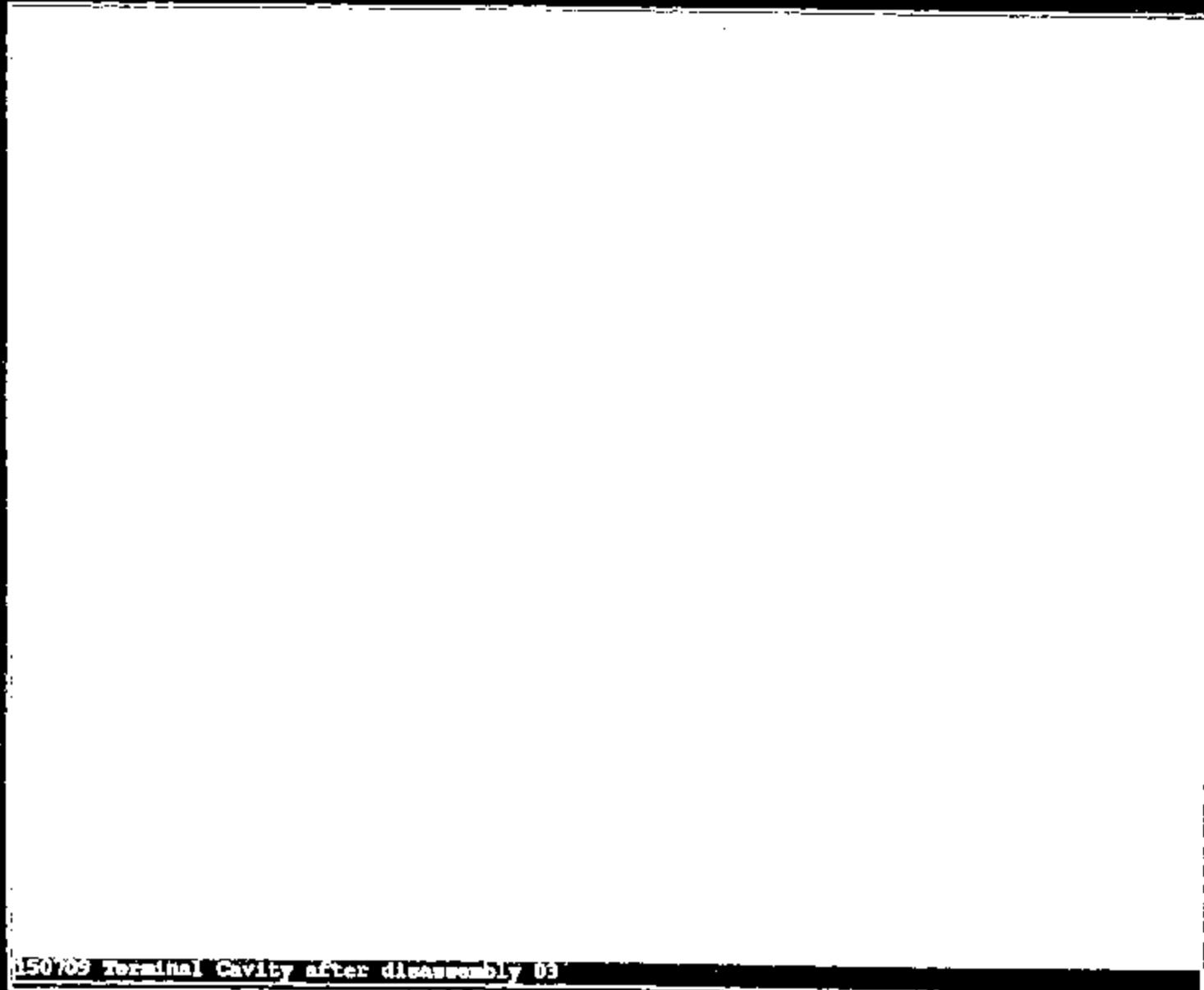


T-ANHTSA 6856

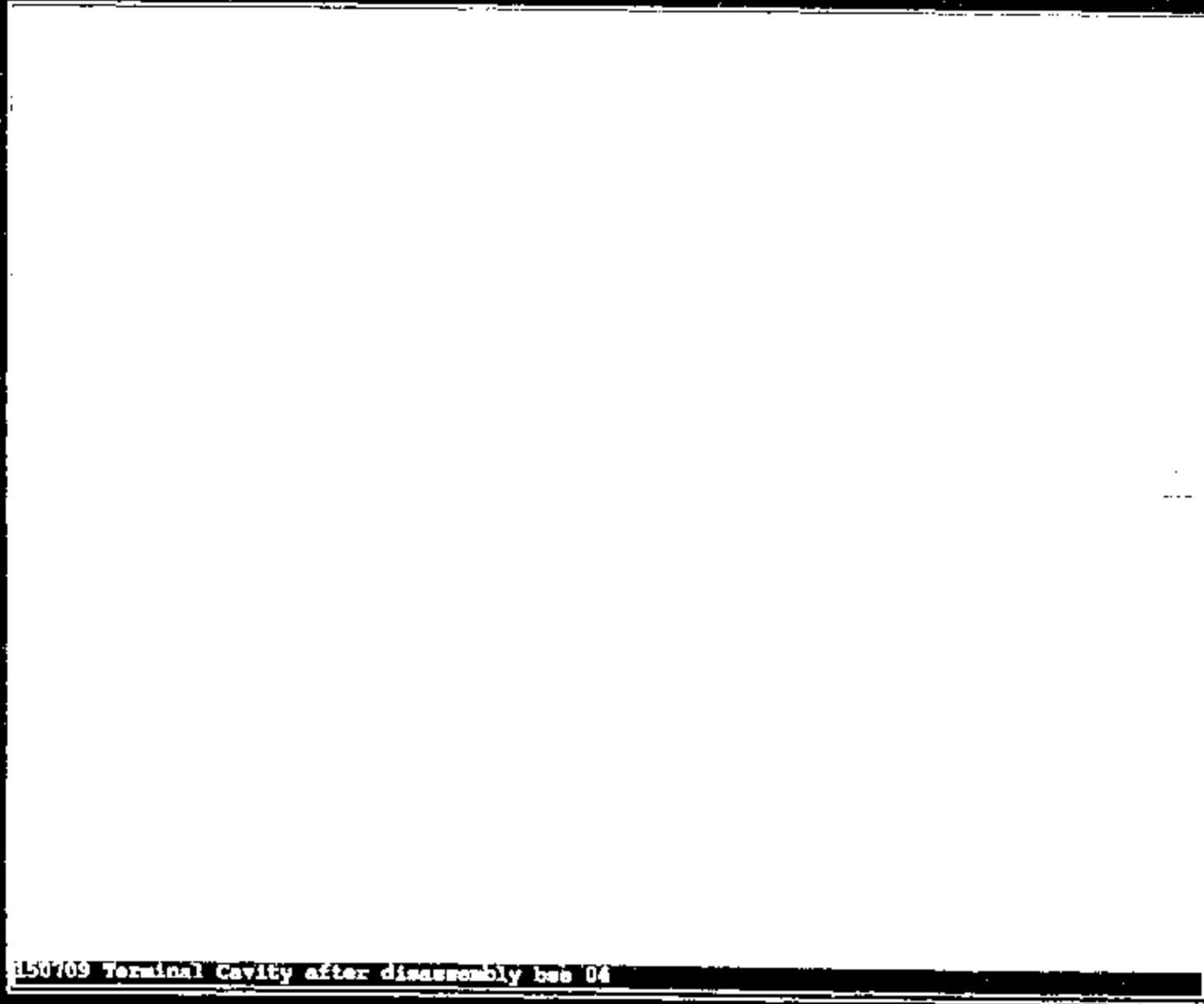
TANHTSA 855

150709 Top Surf of Cup after degreasing baa 02

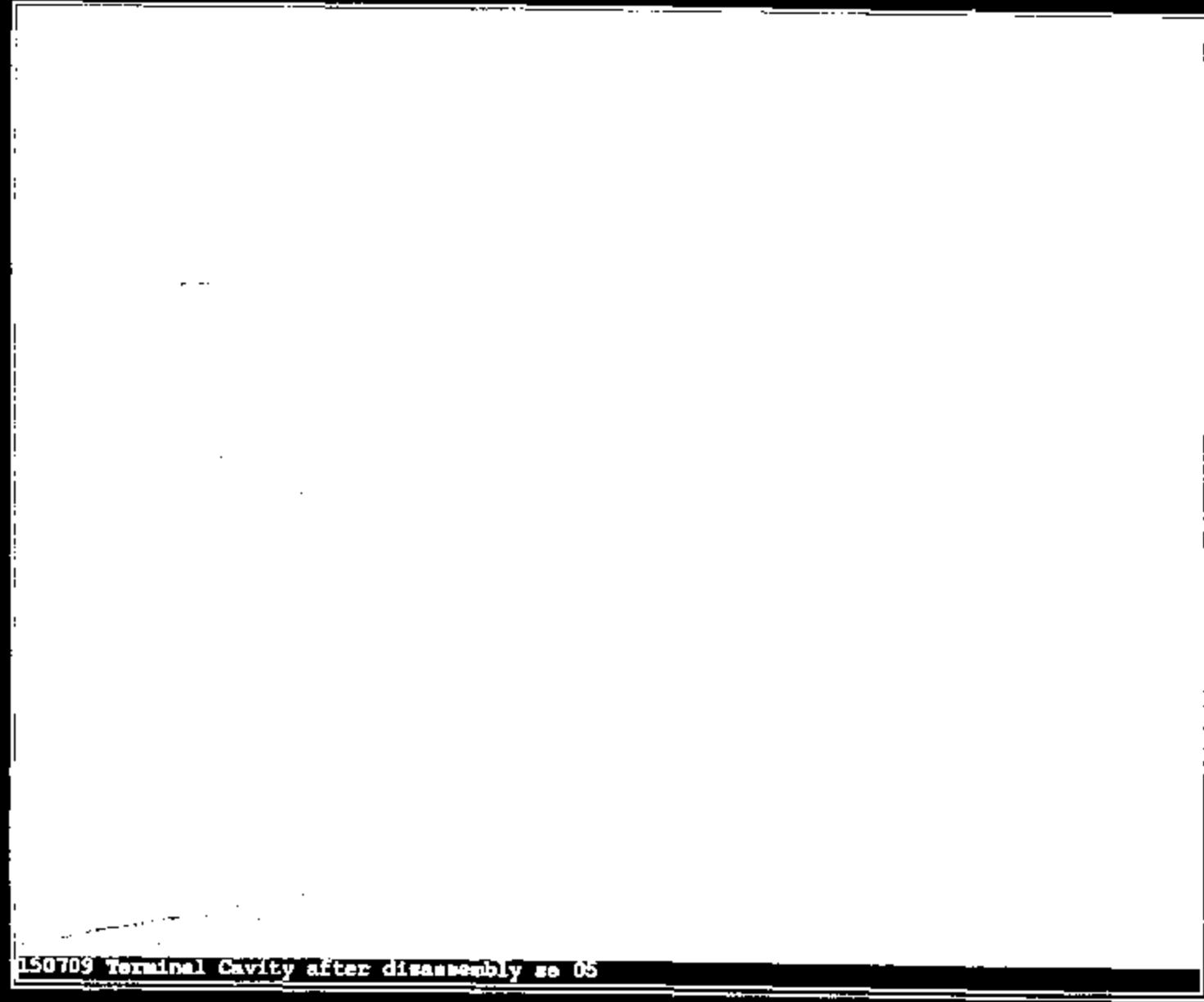
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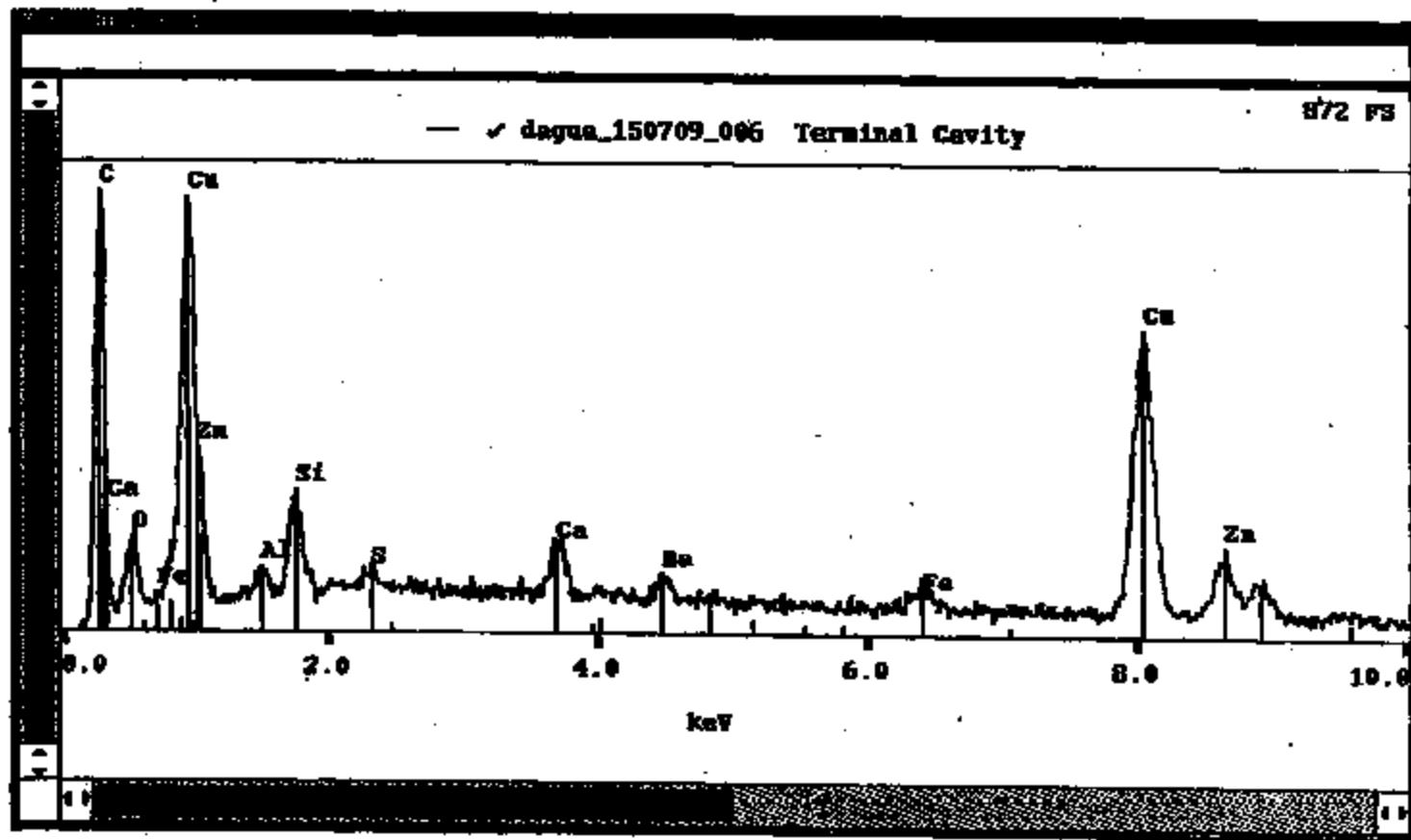


150709 Terminal Cavity after disassembly 03

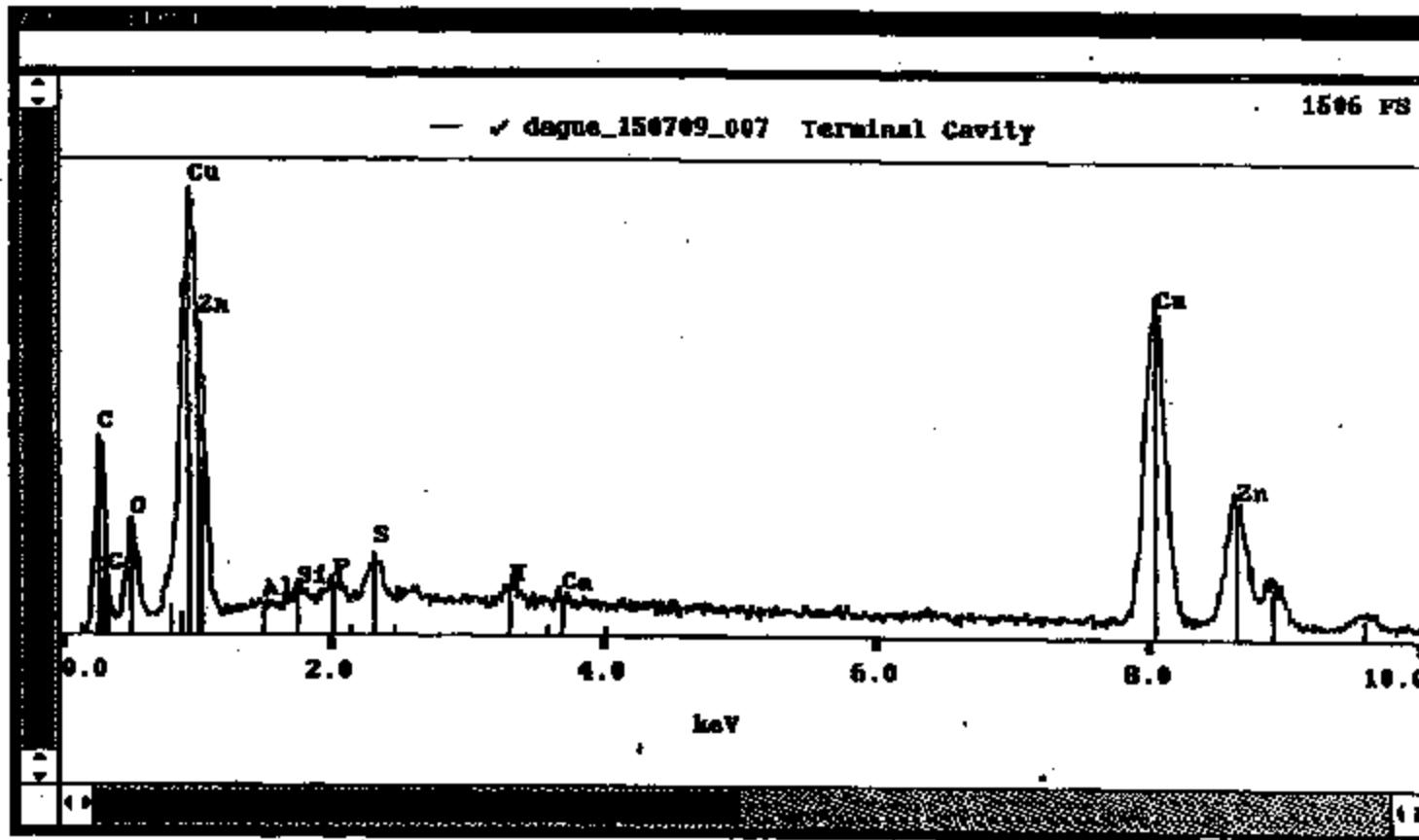


150709 Terminal Cavity after disassembly bce 04

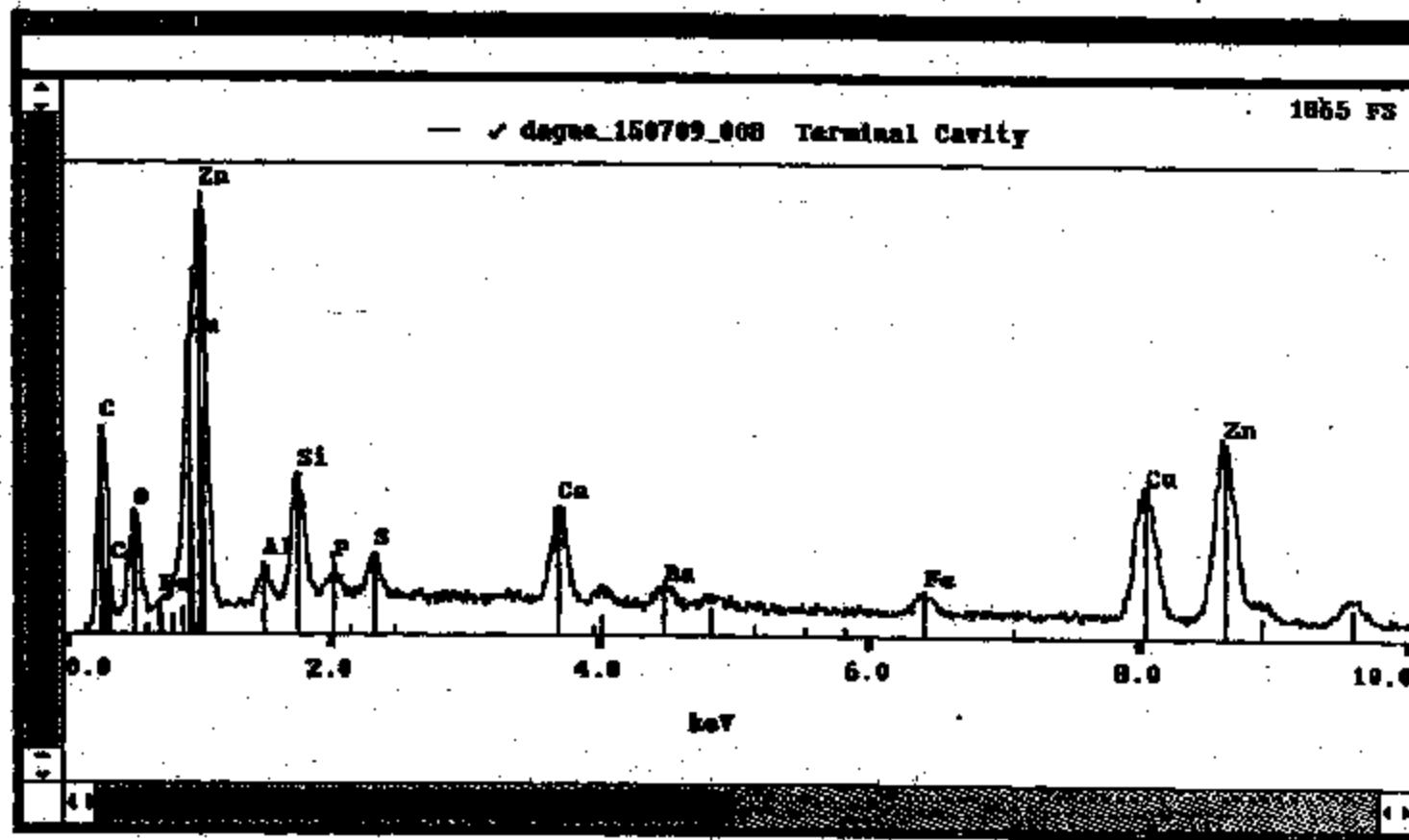




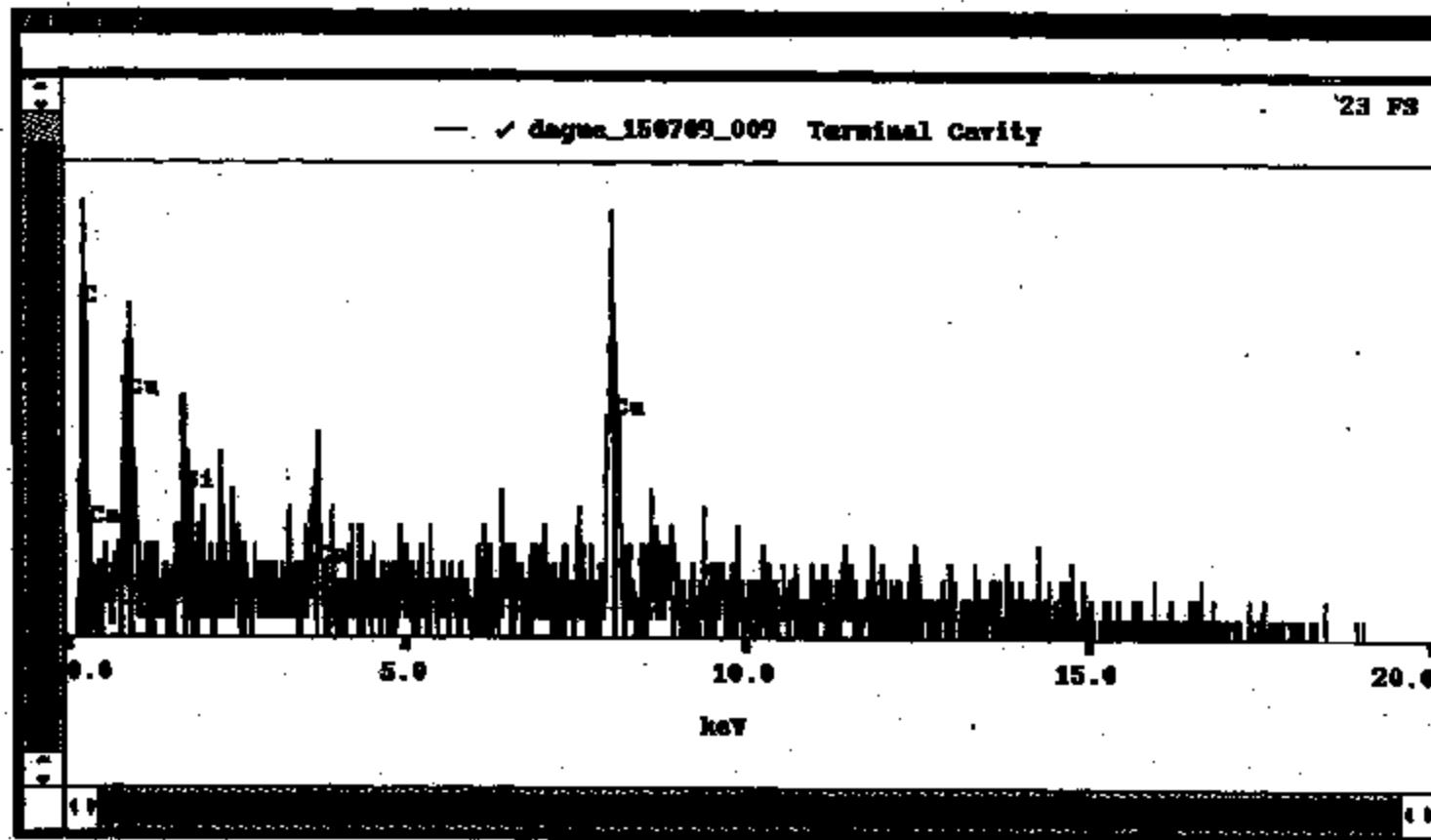
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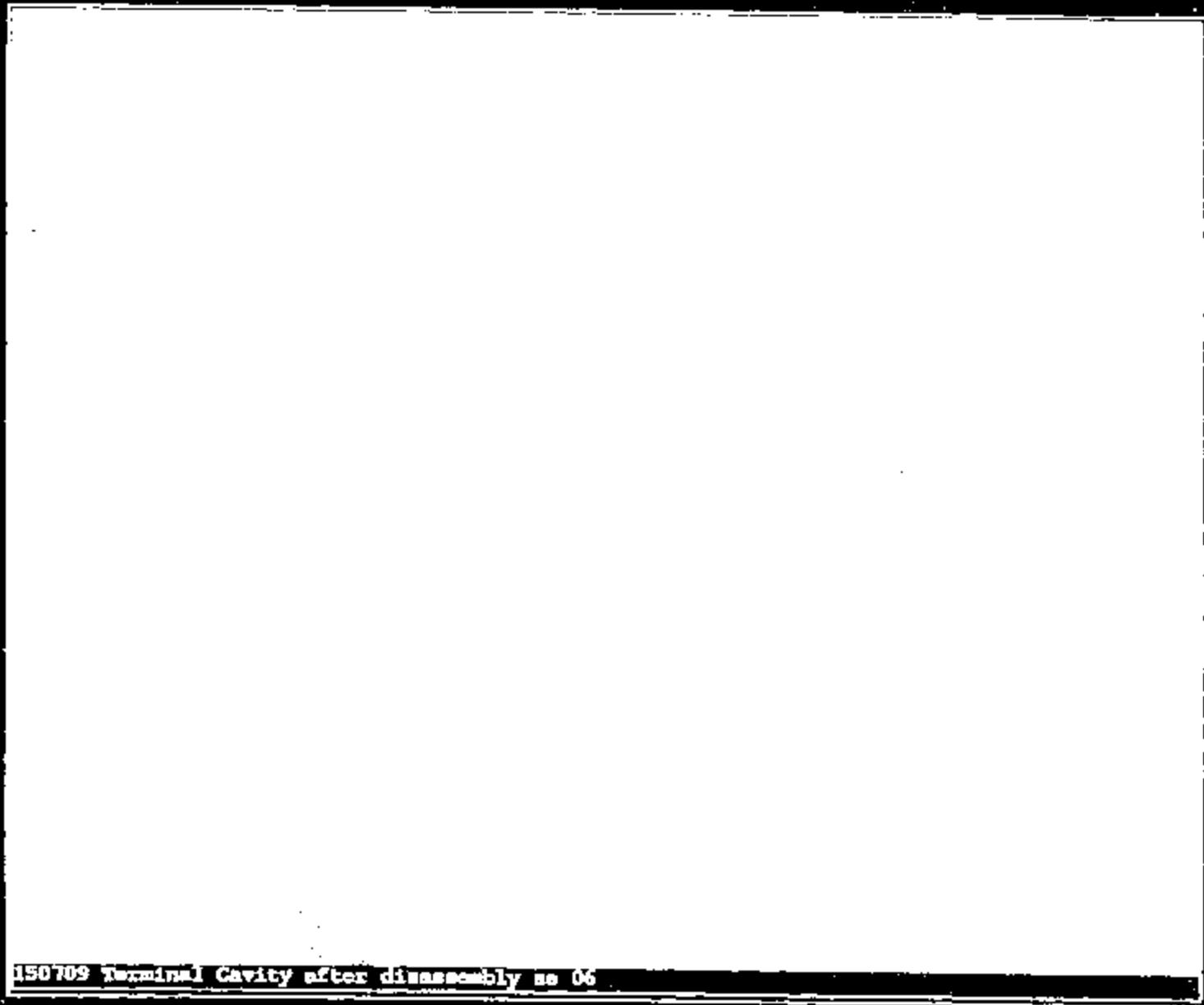


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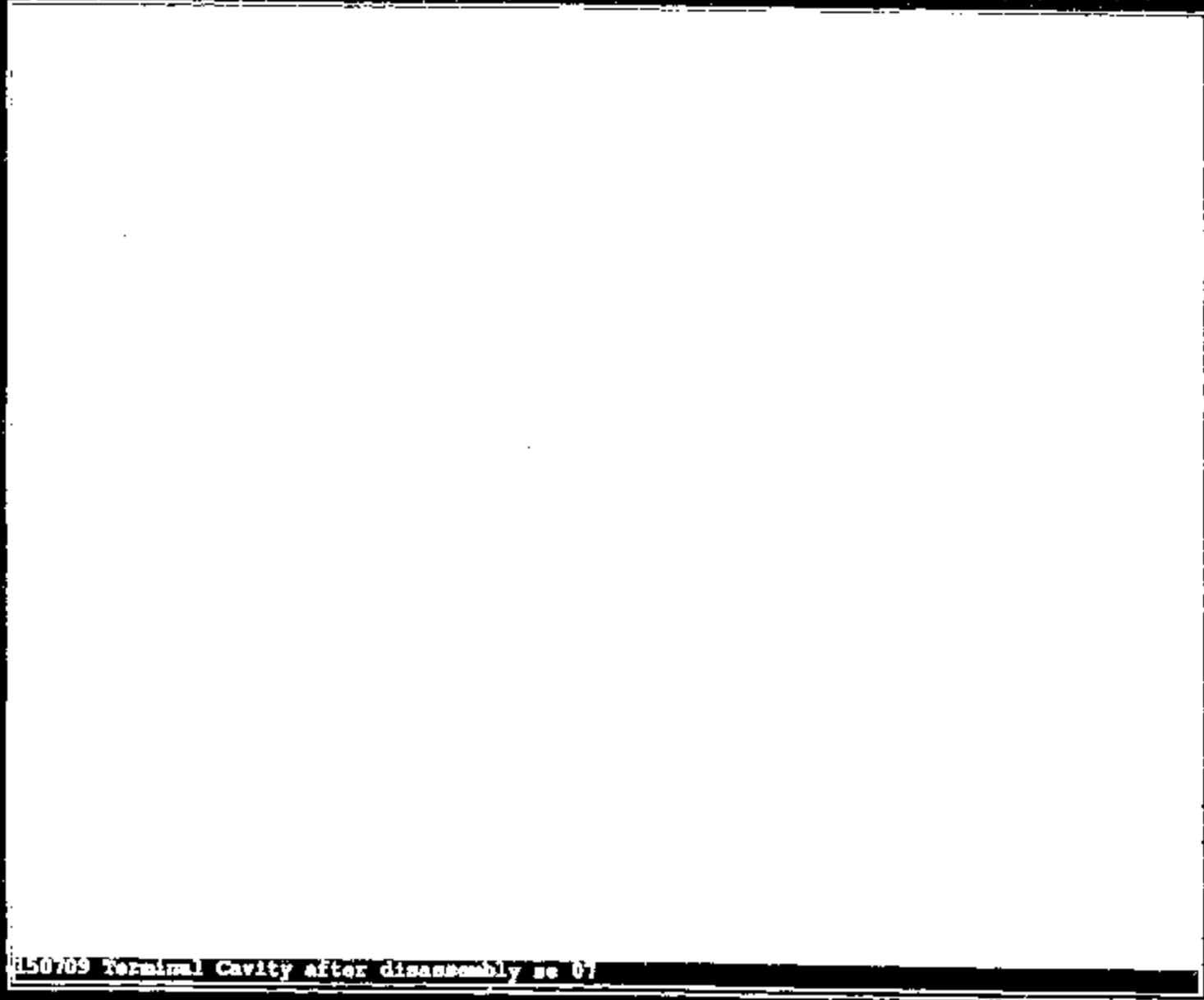
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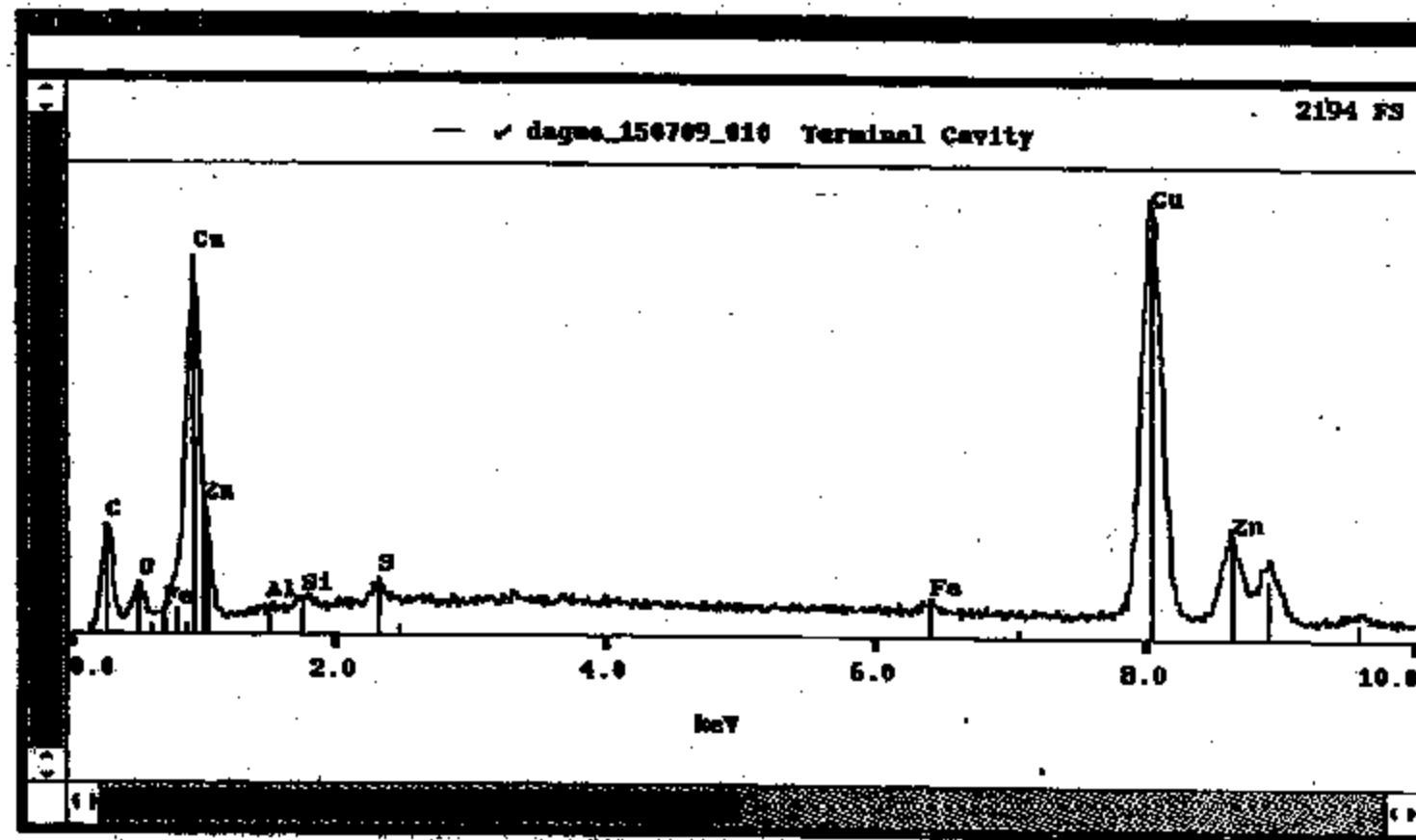
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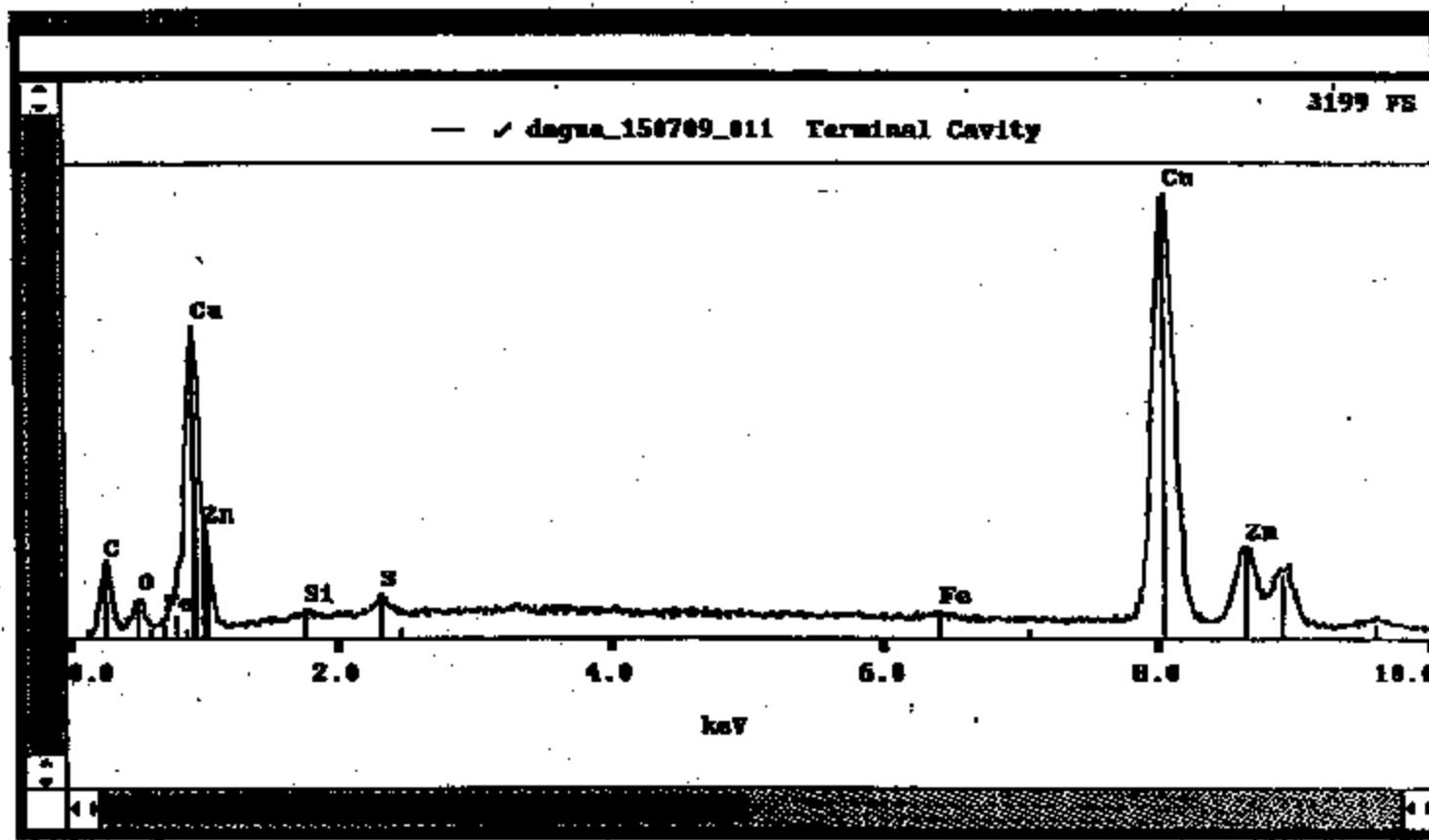
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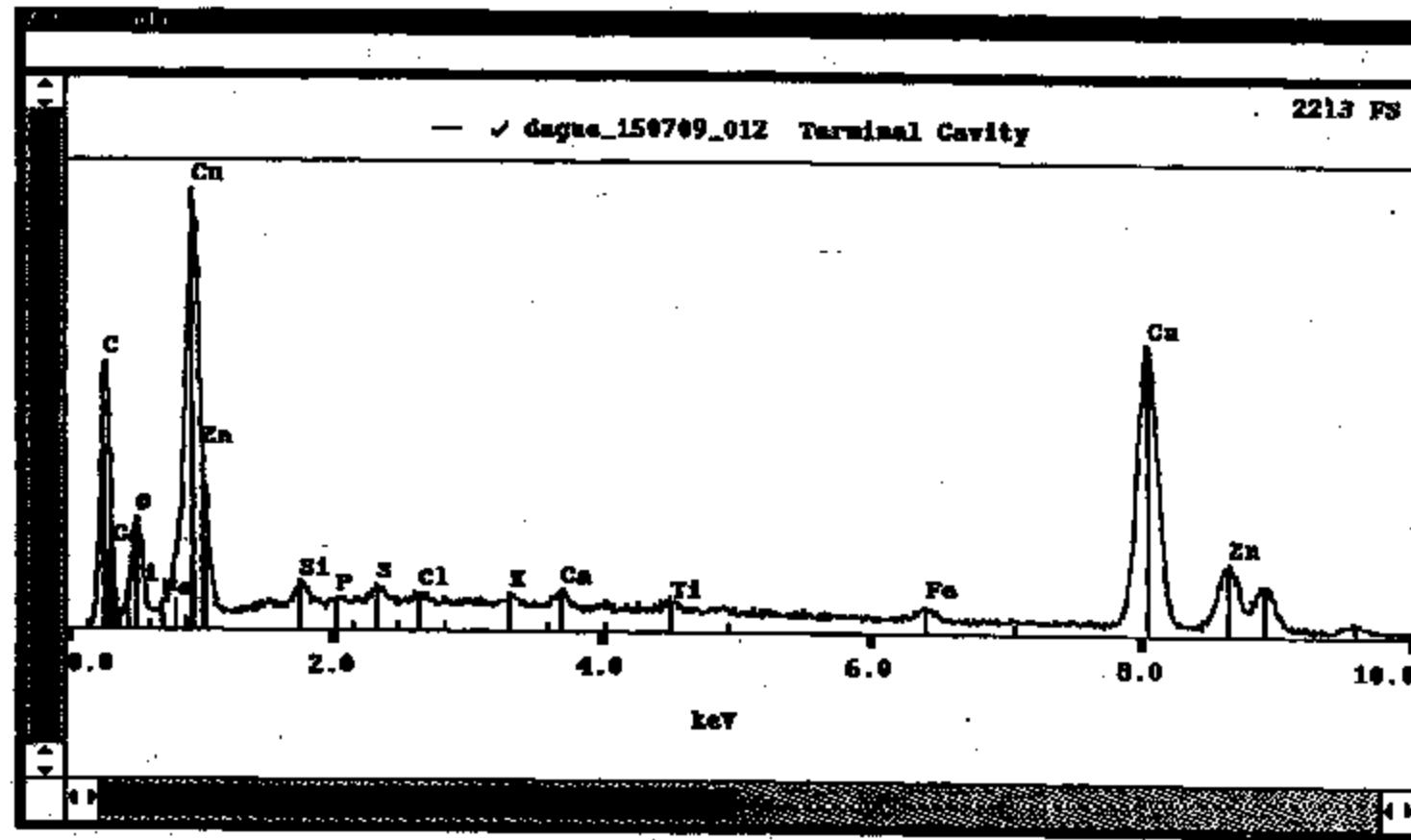
150709 Terminal Cavity after disassembly se 01

17

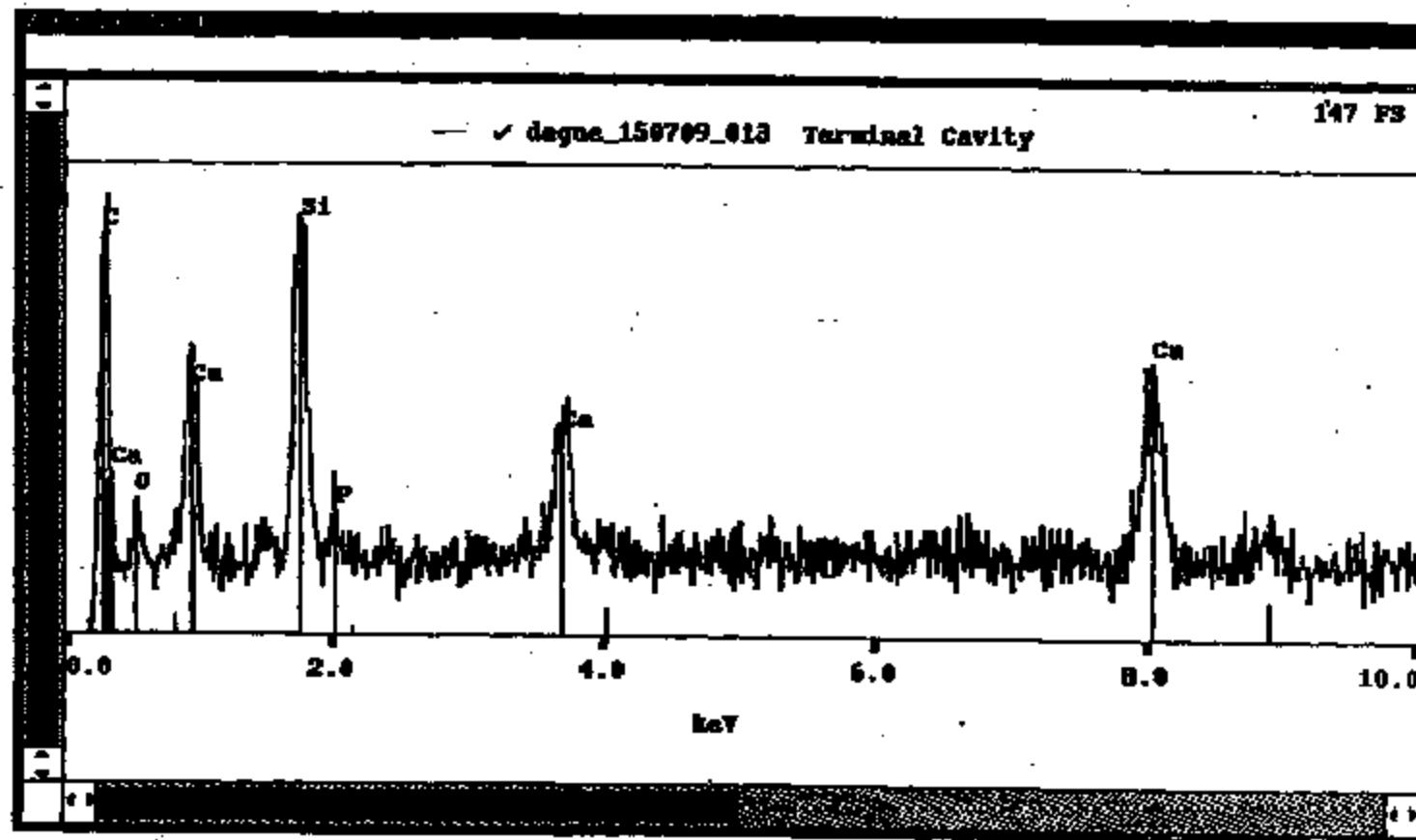




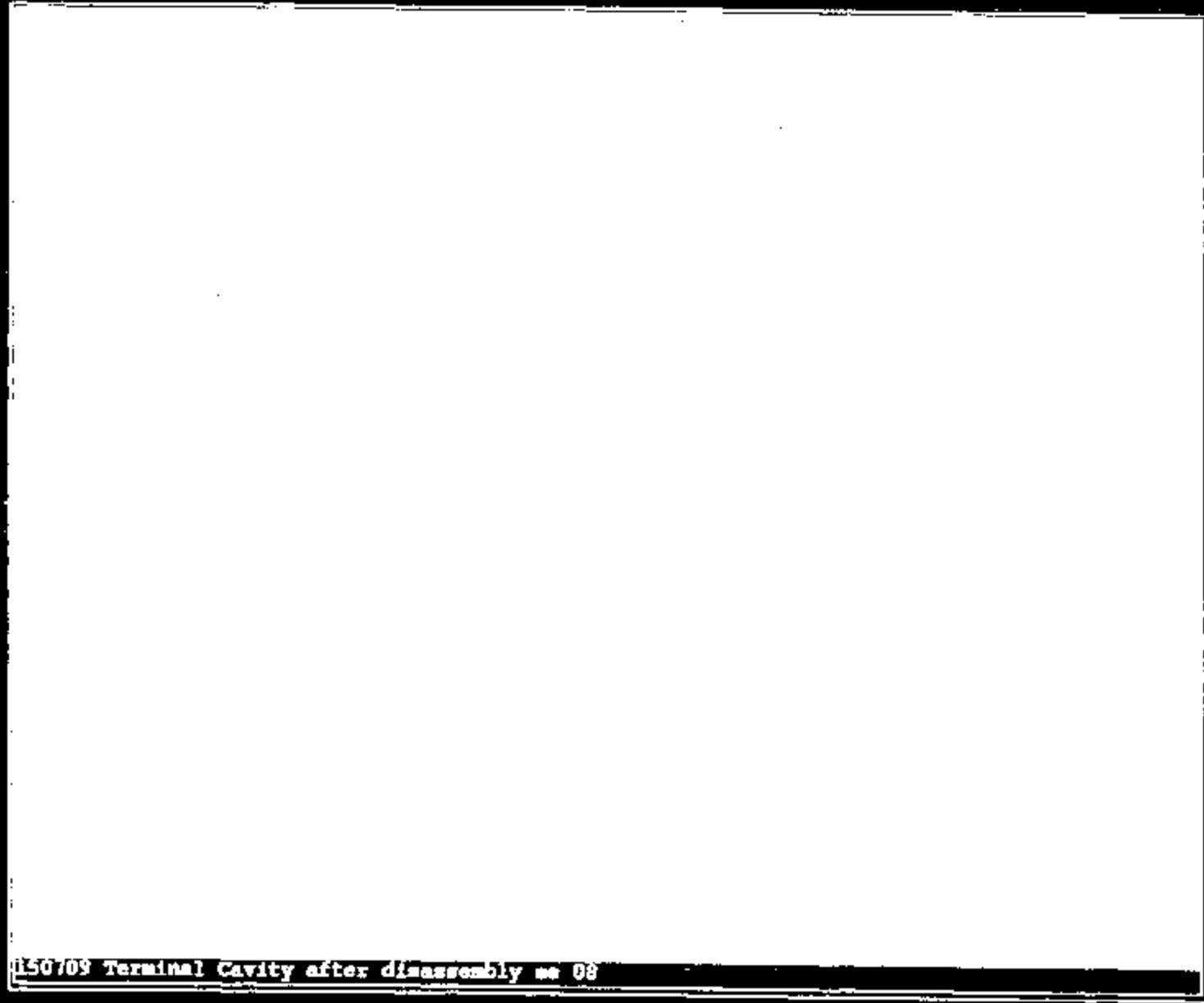
14



30



21

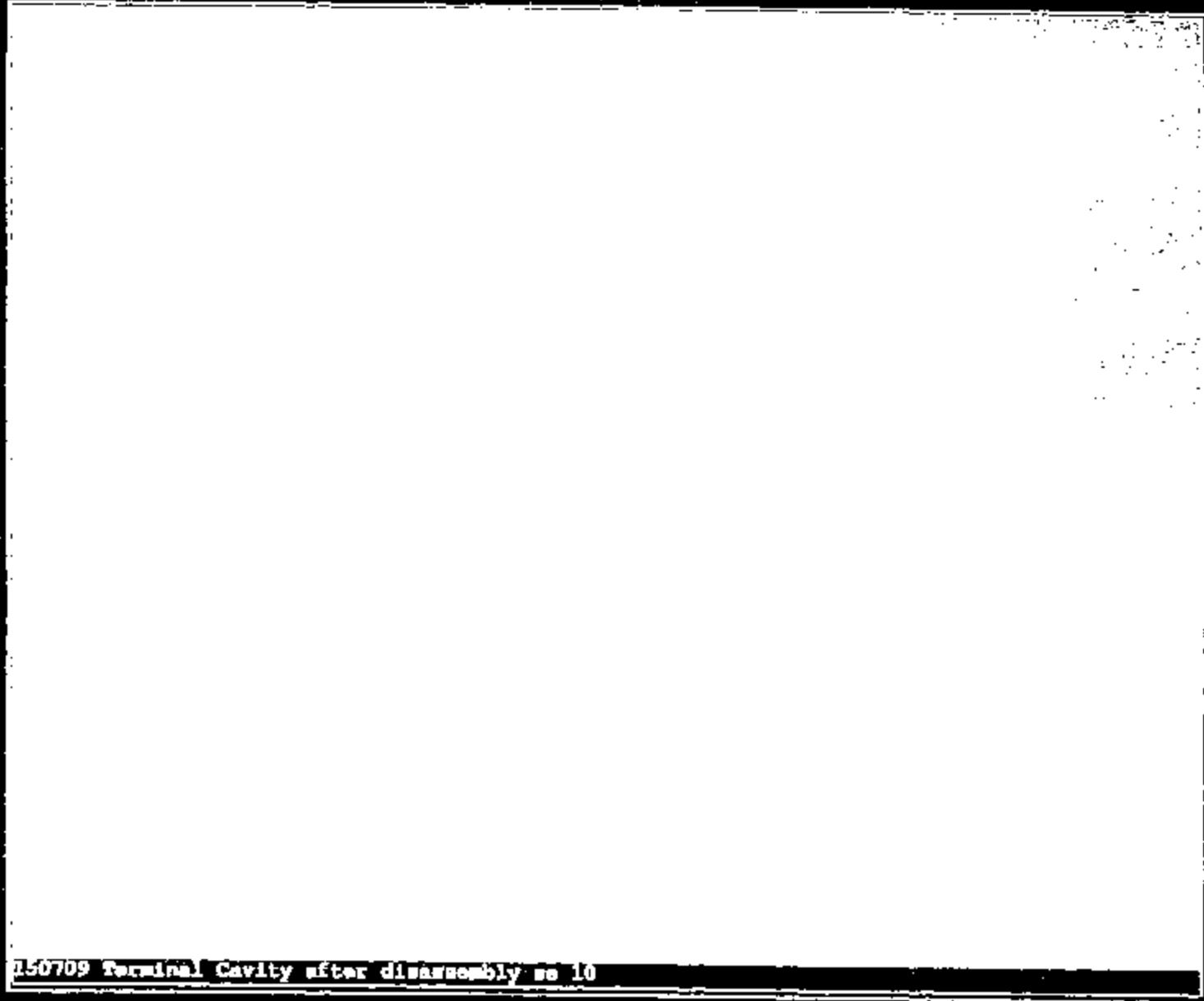


1150709 Terminal Cavity after disassembly no 08

29

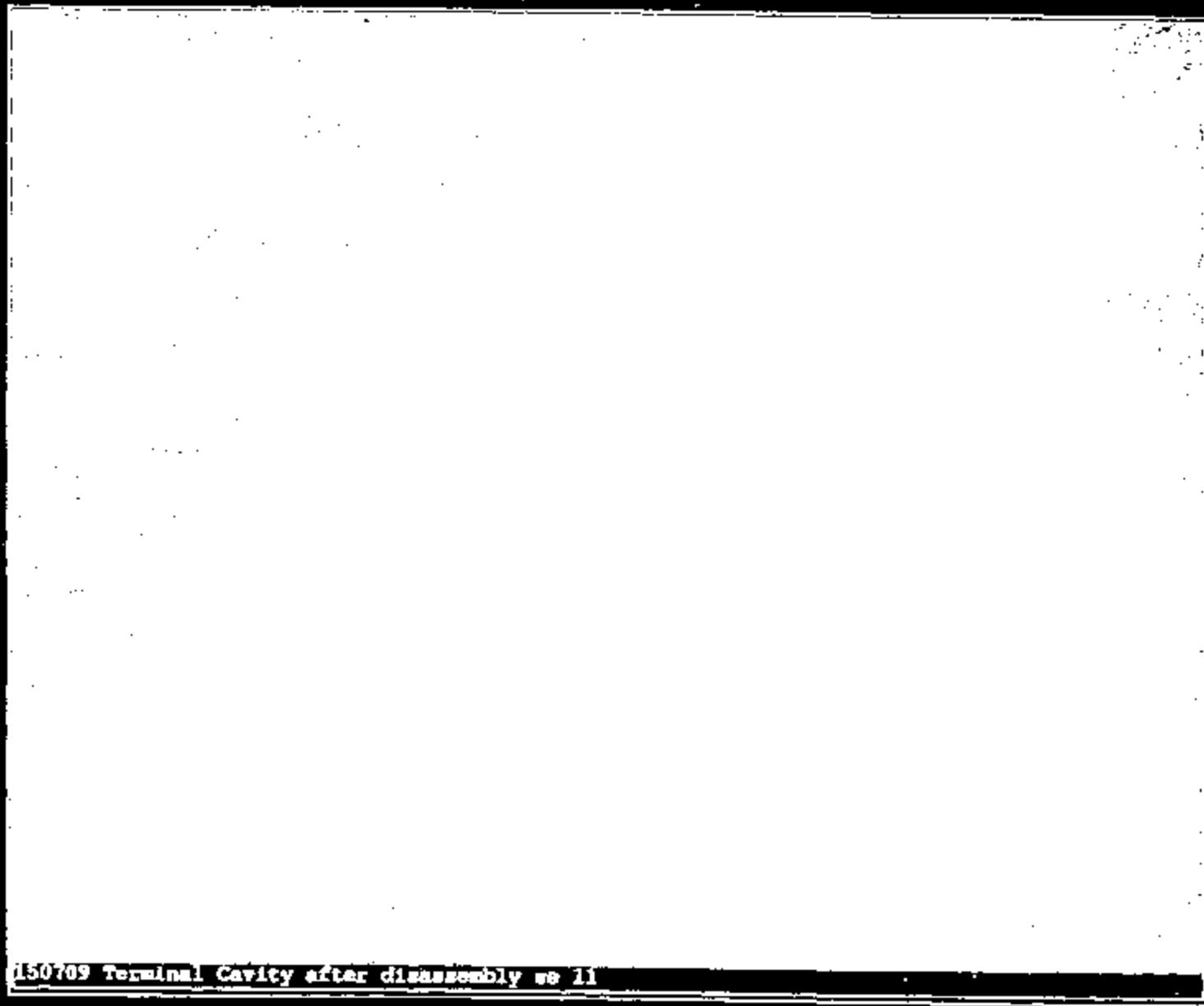
150709 Terminal Cavity after disassembly no 09

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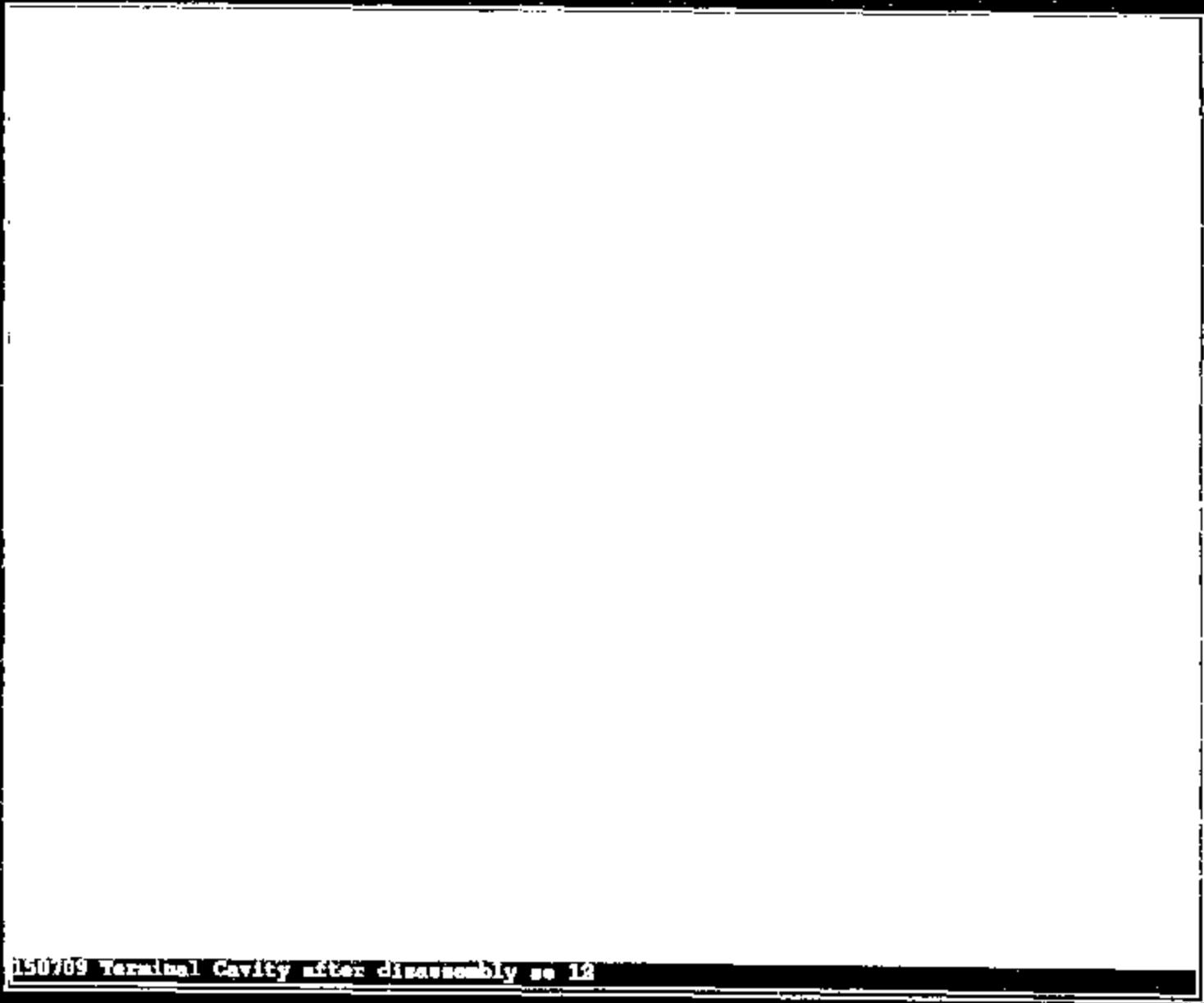
150709 Terminal Cavity after disassembly no 10

34

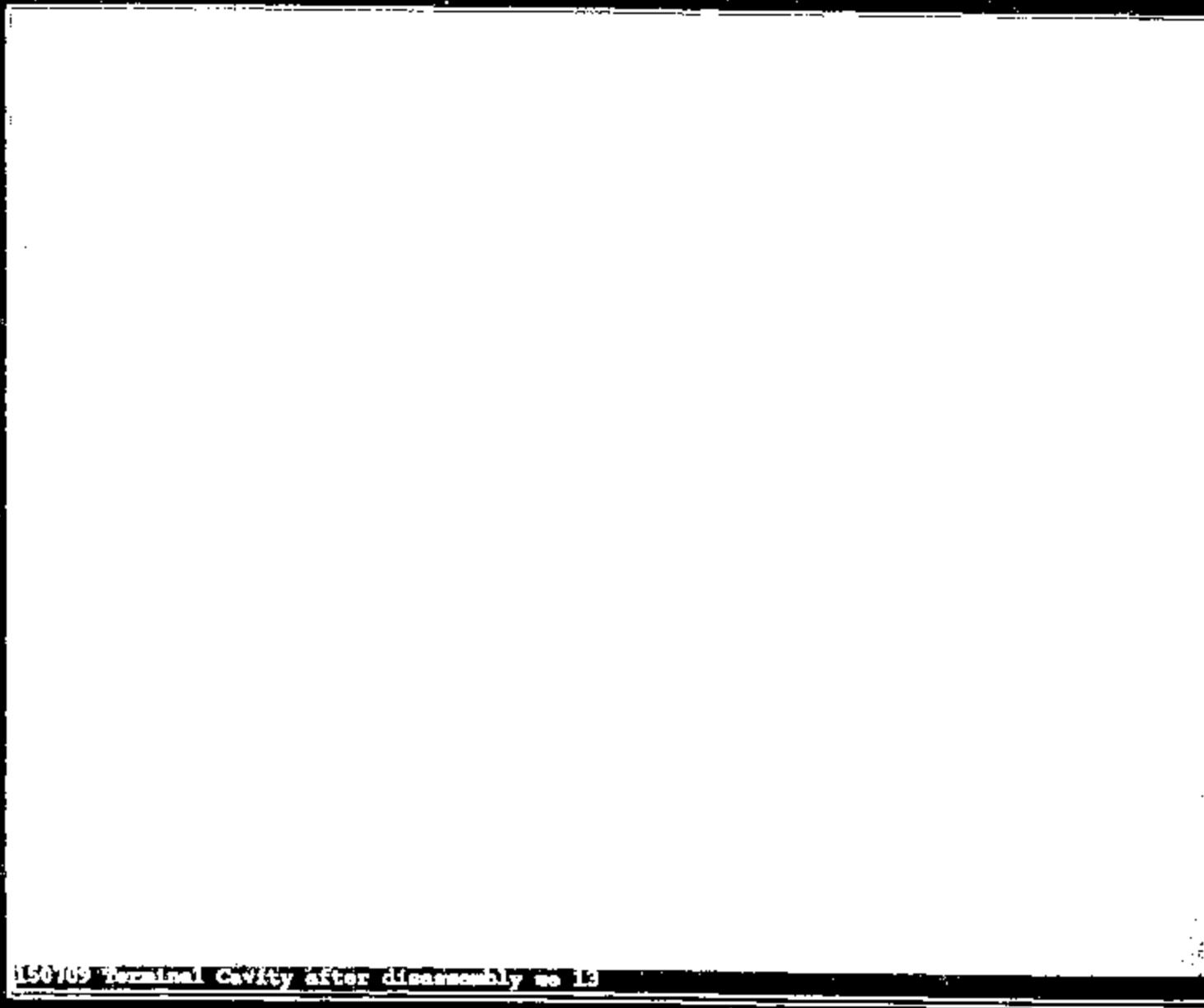


150709 Terminal Cavity after disassembly w/ 11

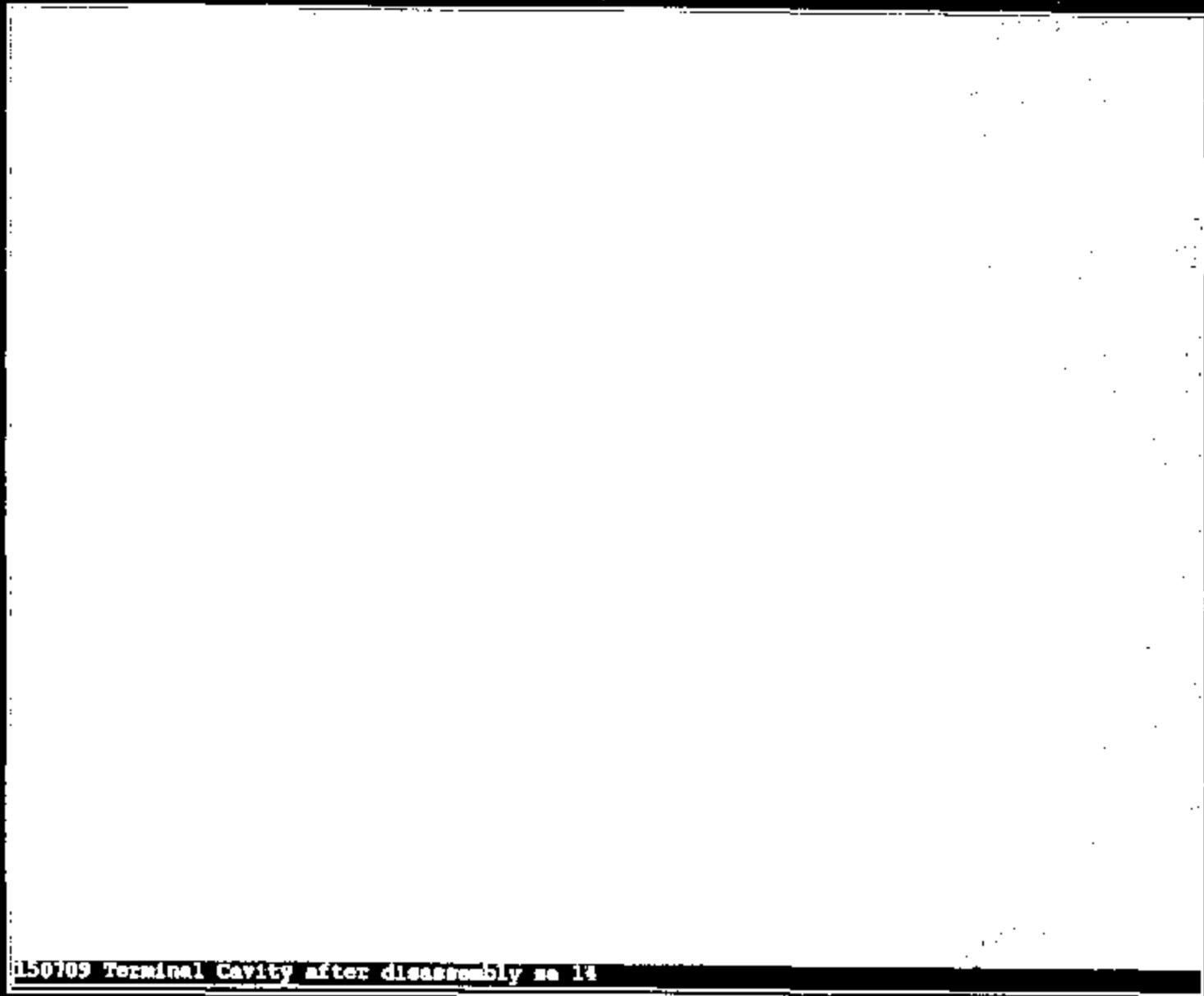
25



150789 Terminal Cavity after disassembly se 12



150709 Terminal Cavity after disassembly no 13



150709 Terminal Cavity after disassembly sa 14

28

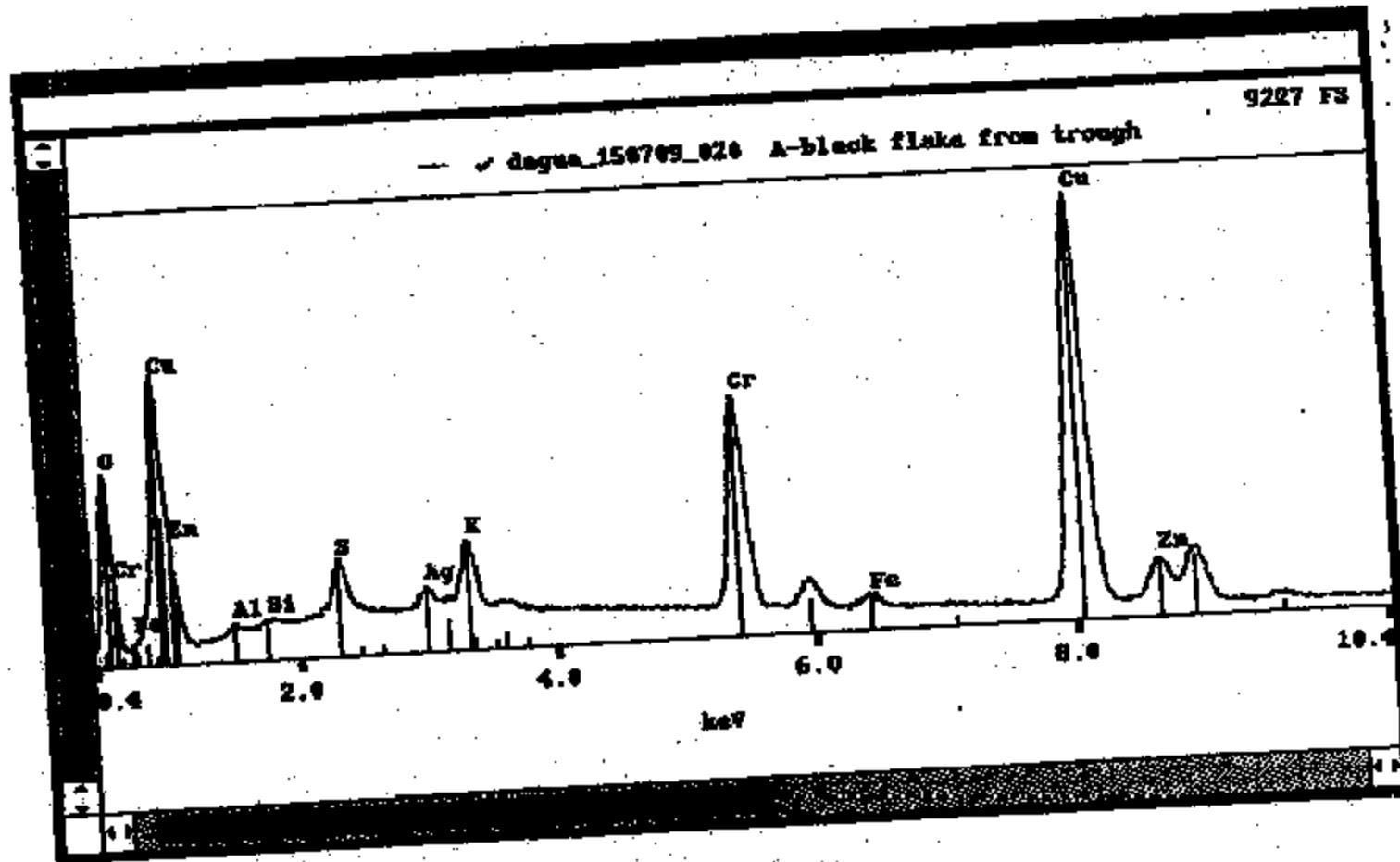
150709 Terminal Cavity after disassembly se 15

TL-NHTR-A 9577

TI-NHTSA 9678

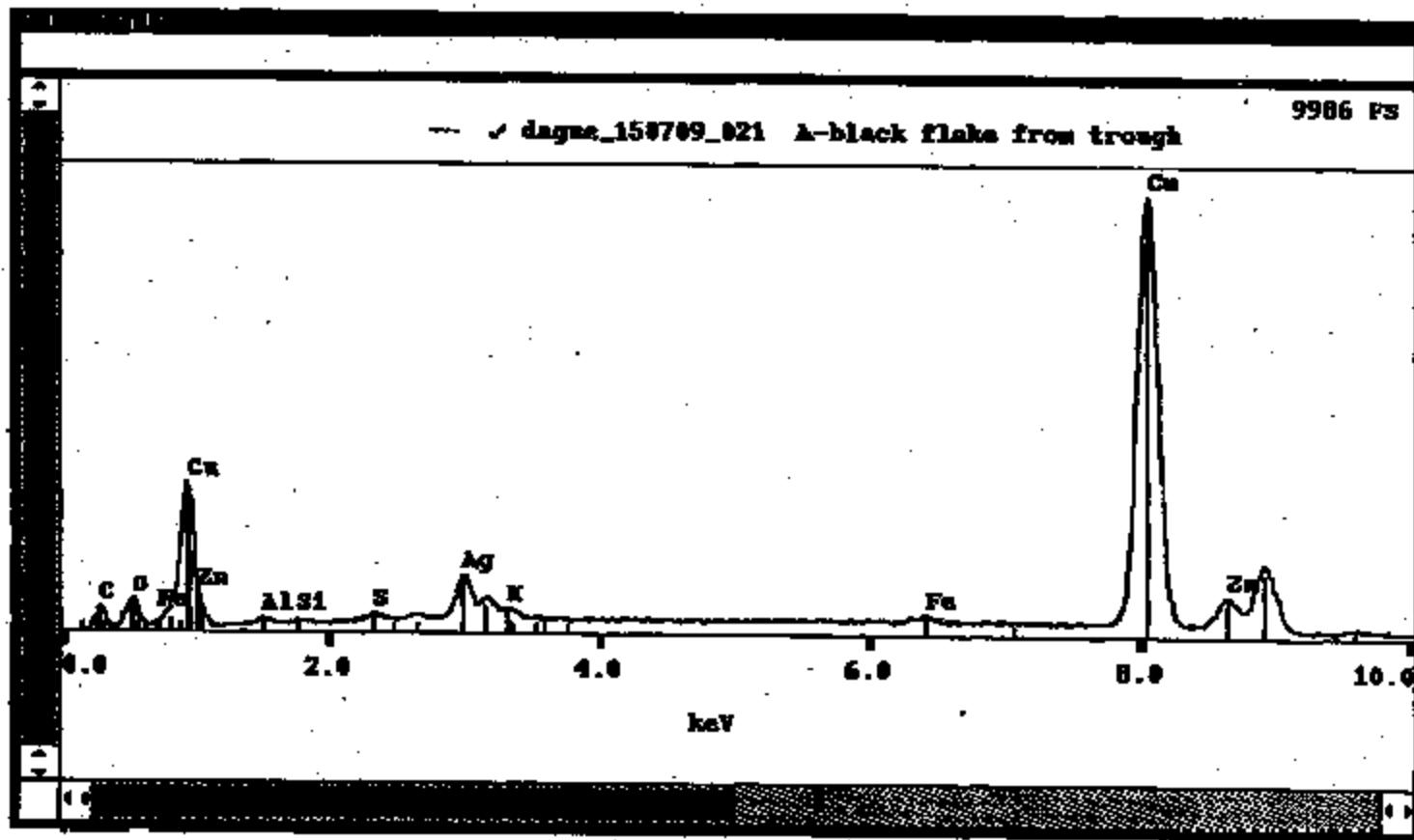
150709 A-black flake from trough, 50x bee 20

70



TINHTSA 9679

31

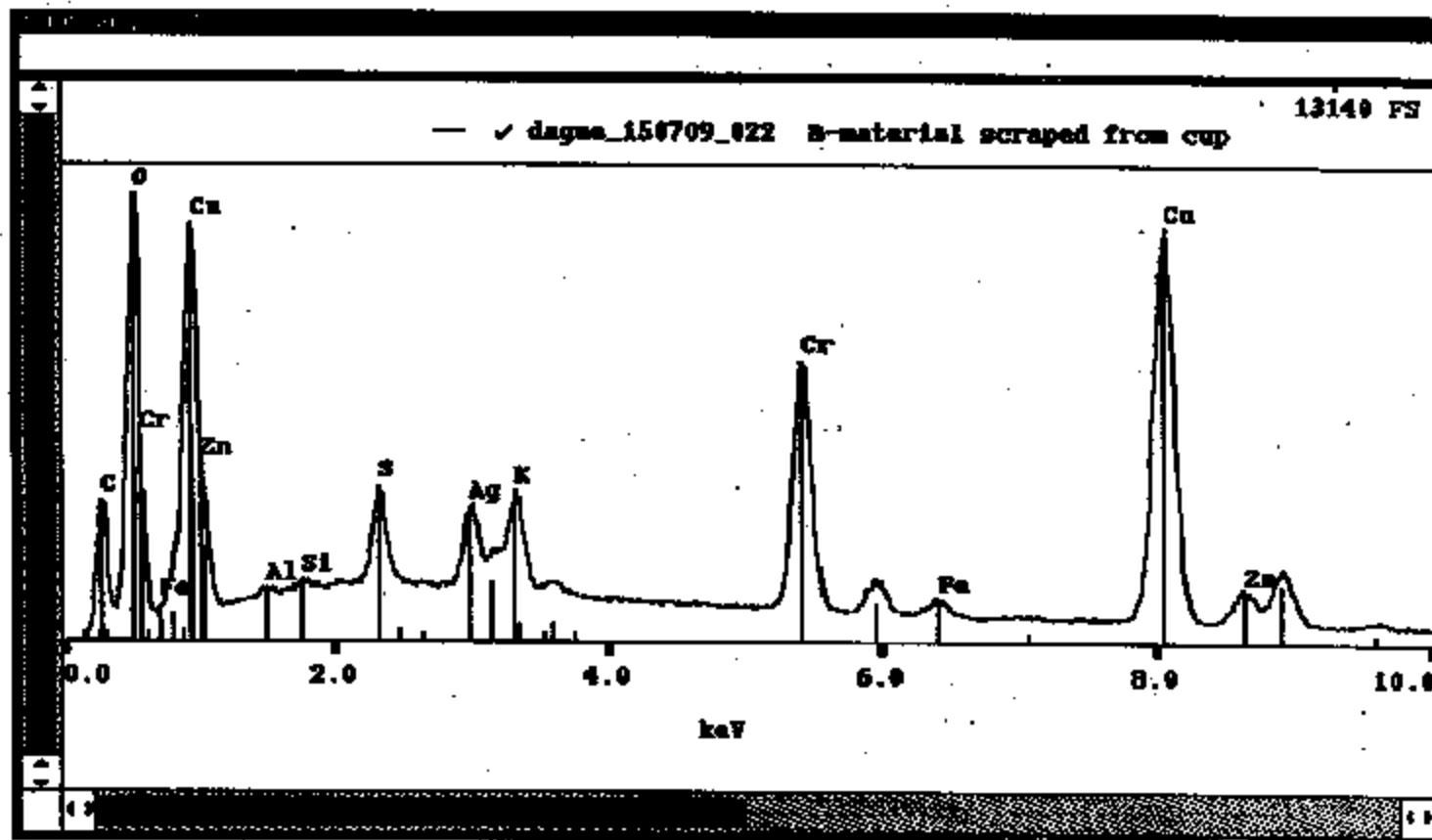


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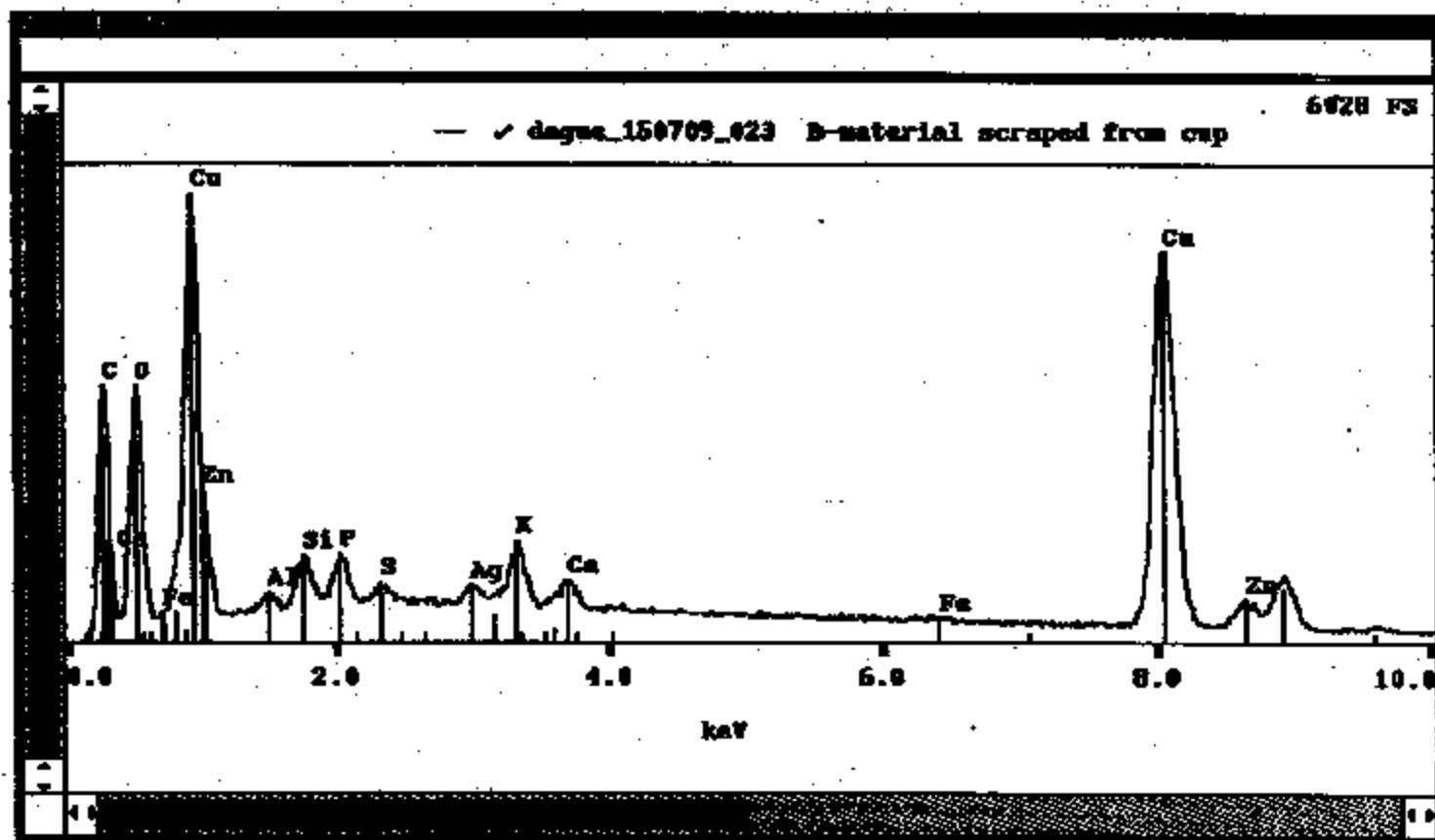


150709 B, material scraped from cup assembly, 50x bse 21

33

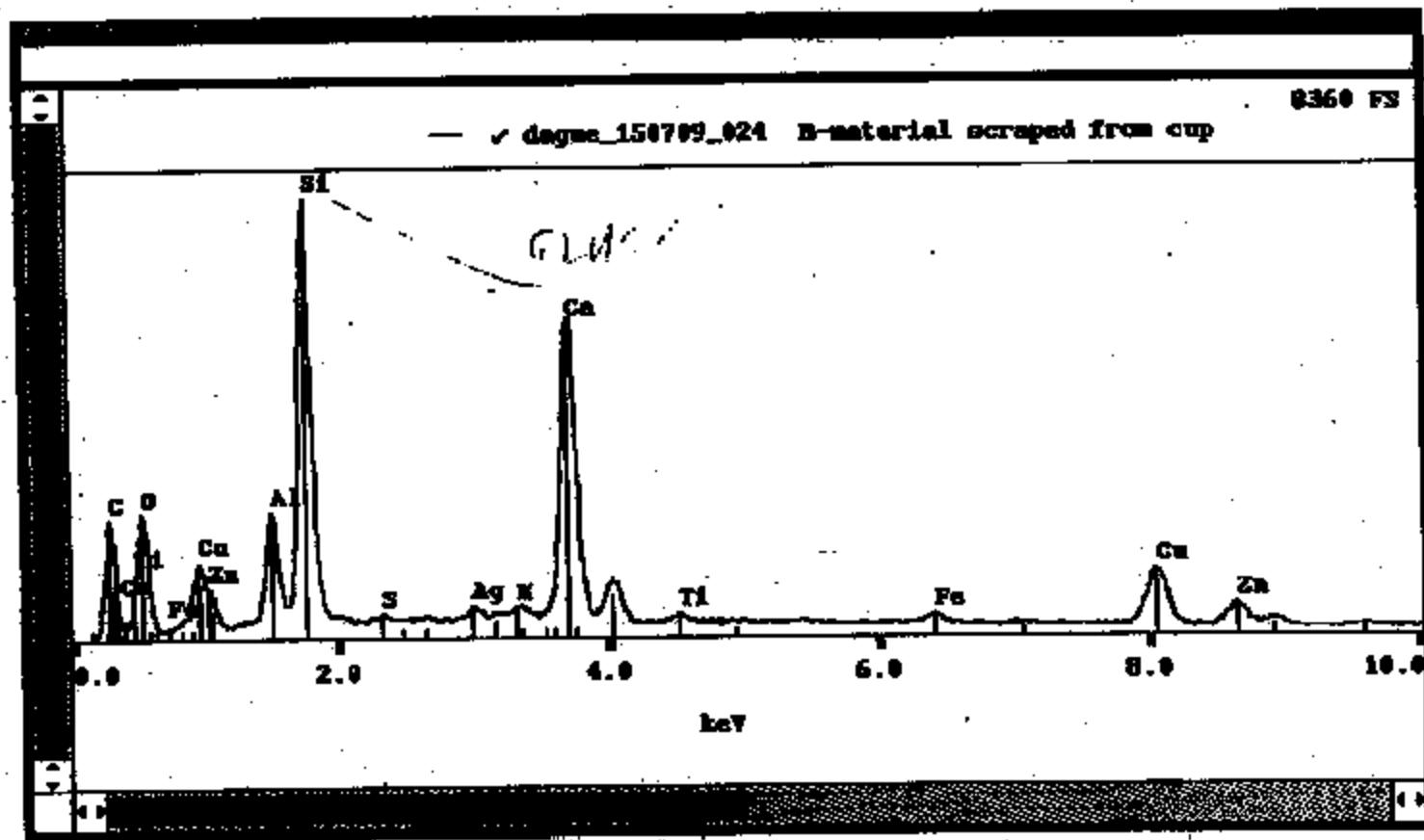


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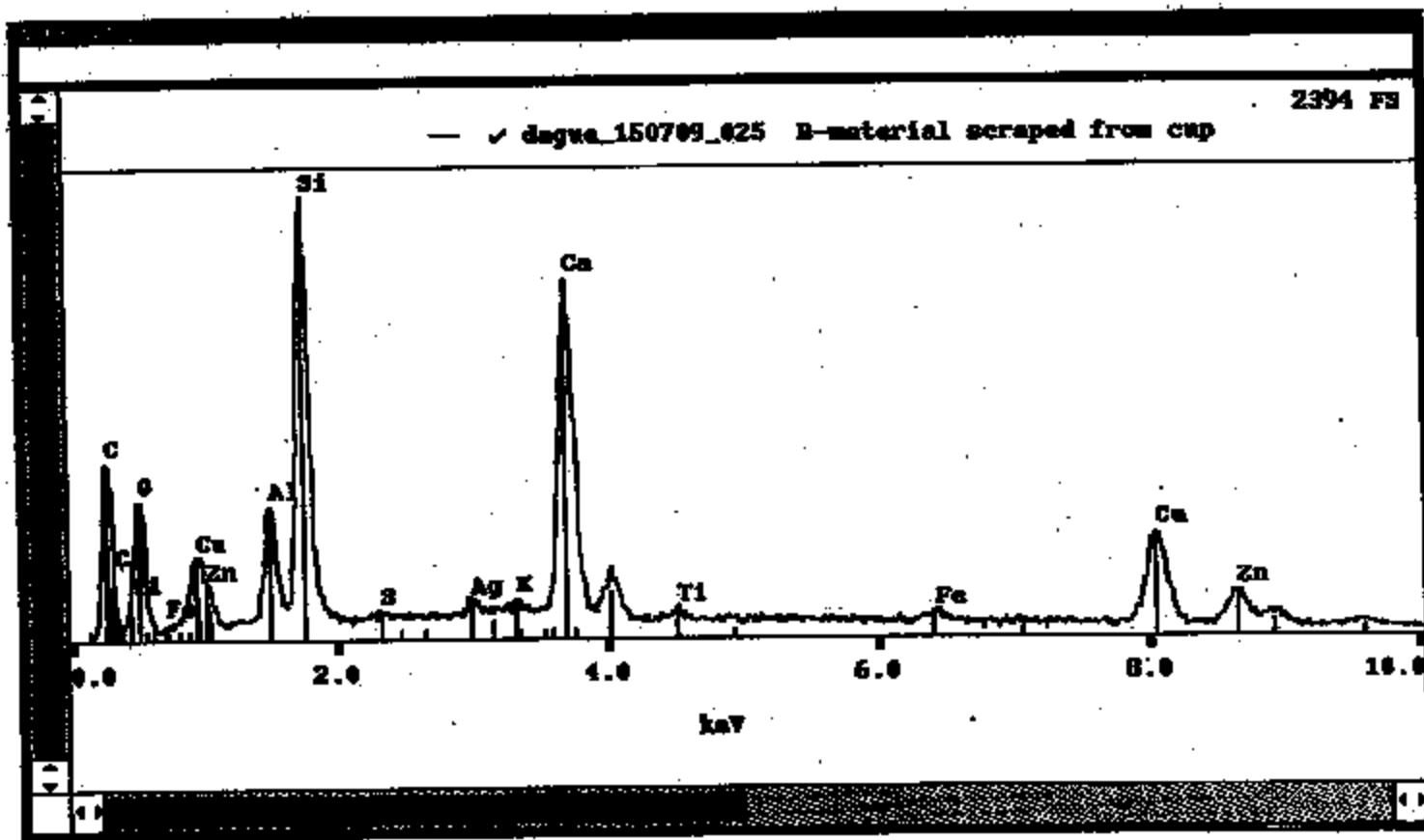


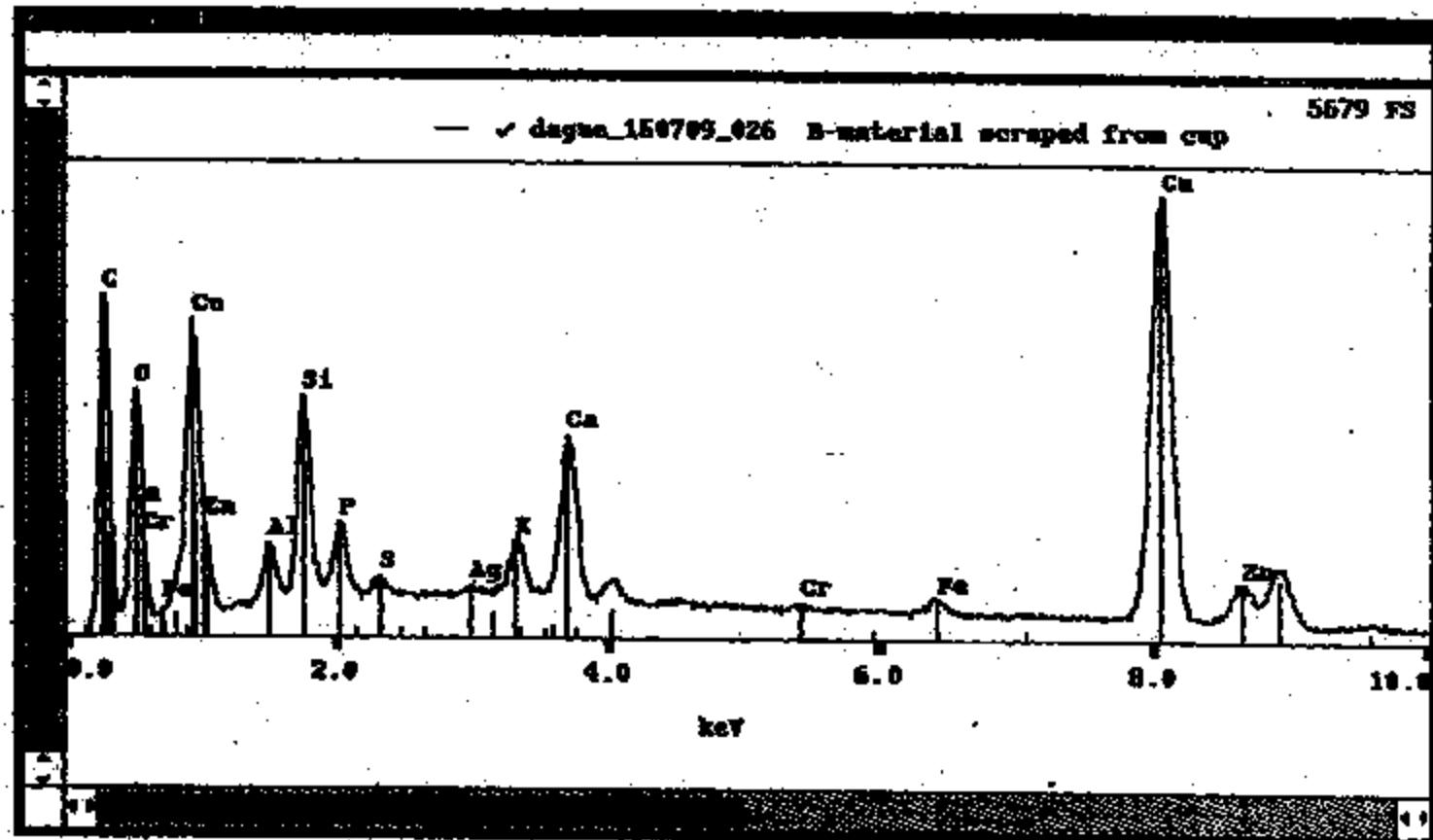
C

CS

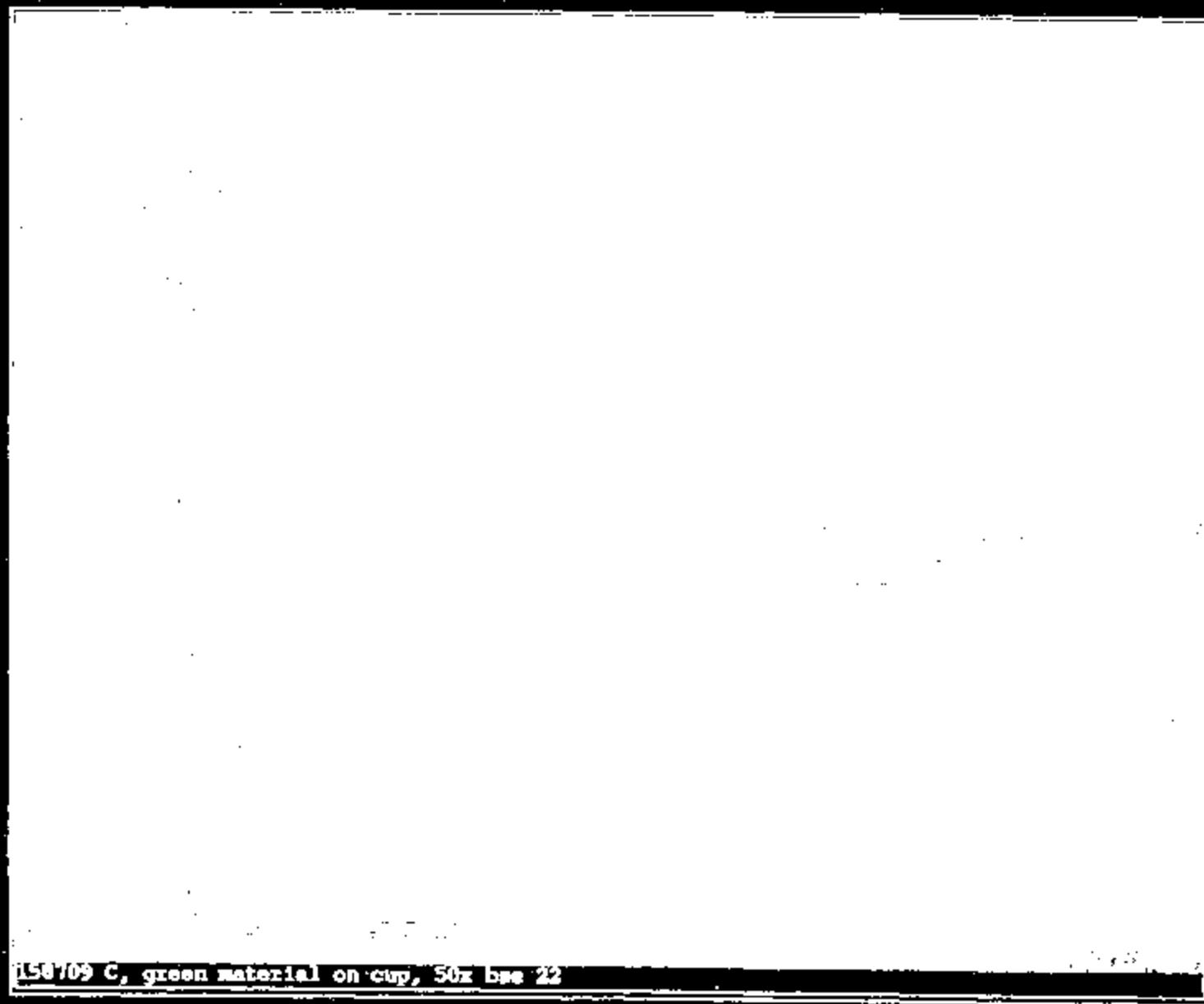


TH-NHTSA 6684



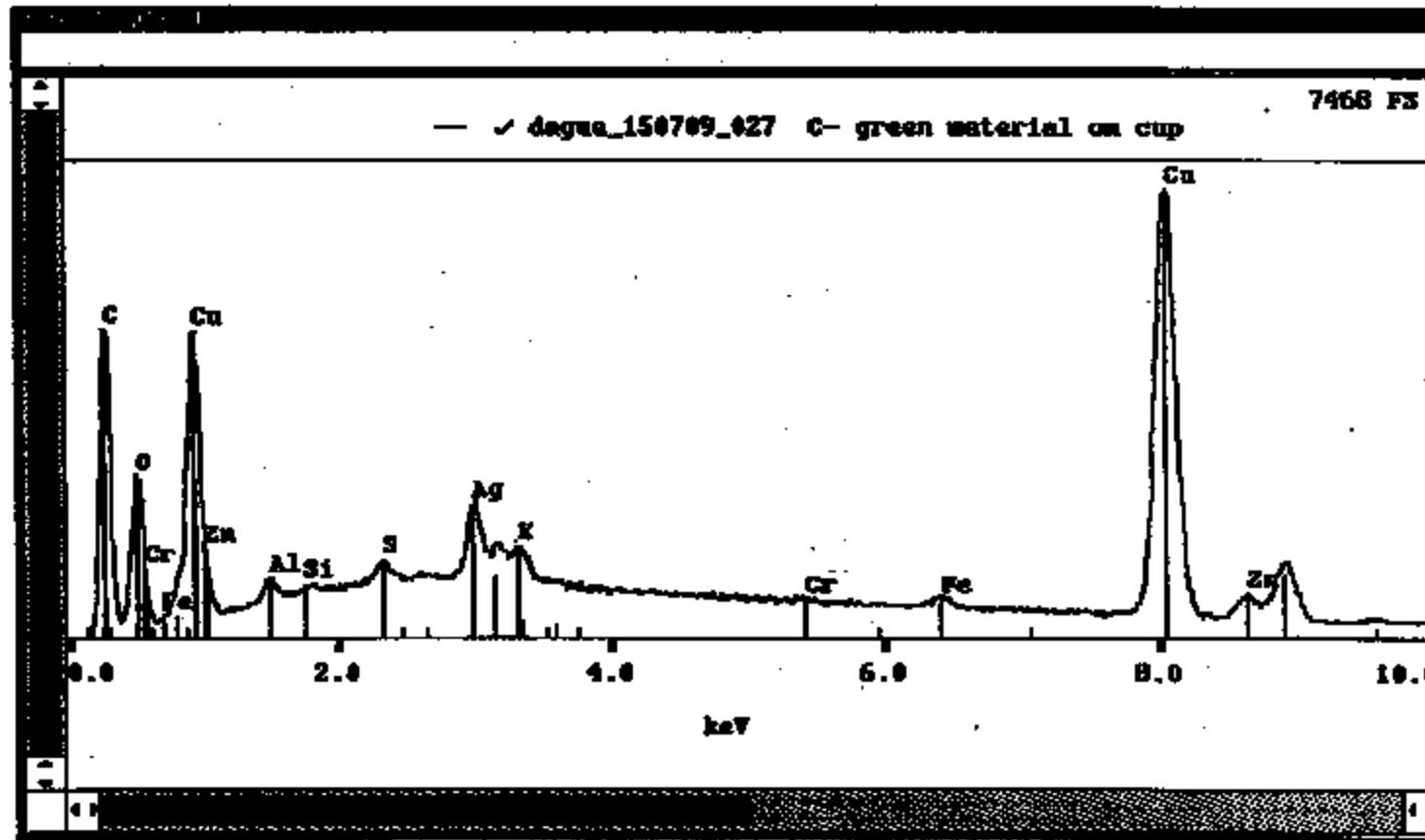


38



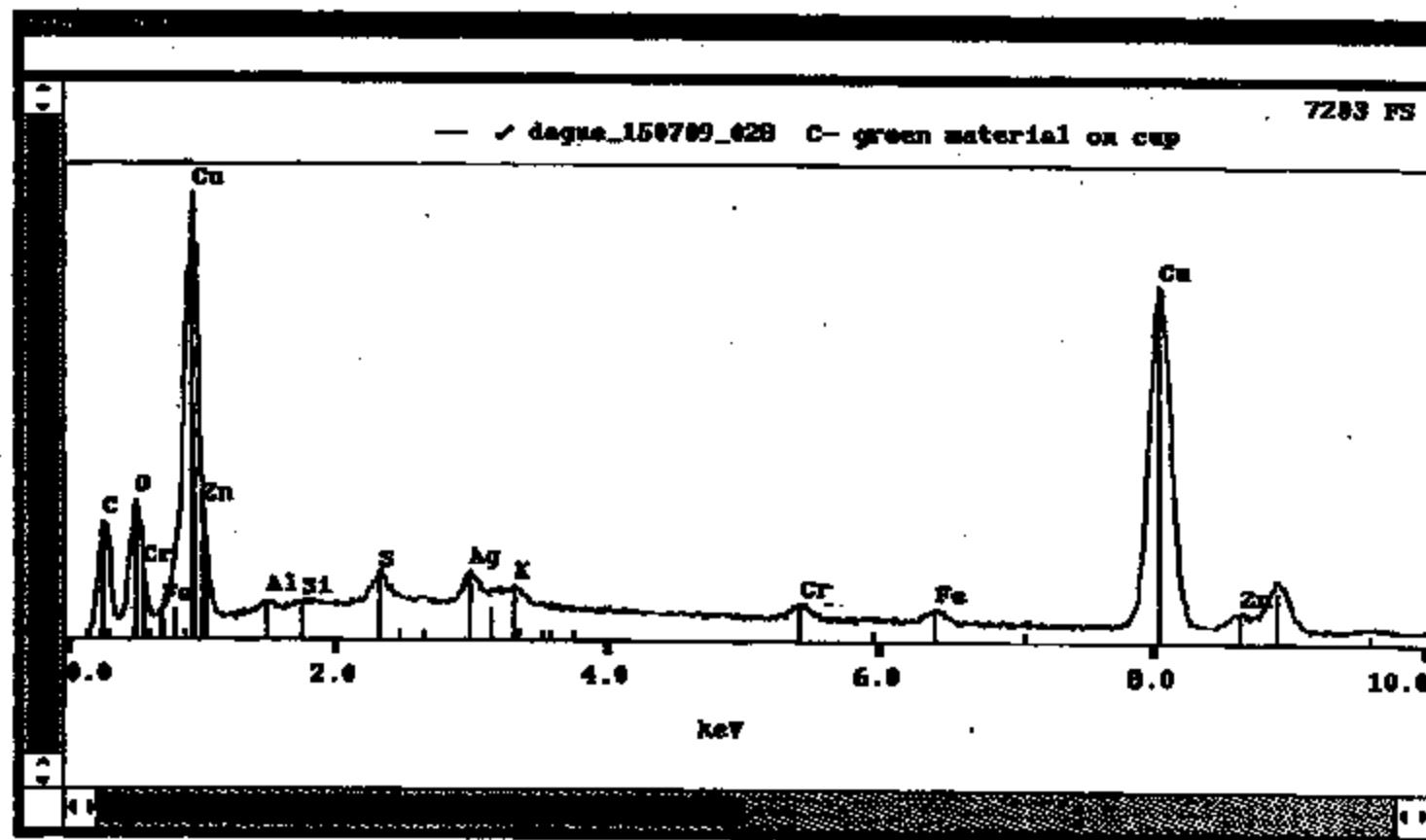
150709 C, green material on cup, 50x bse 22

39

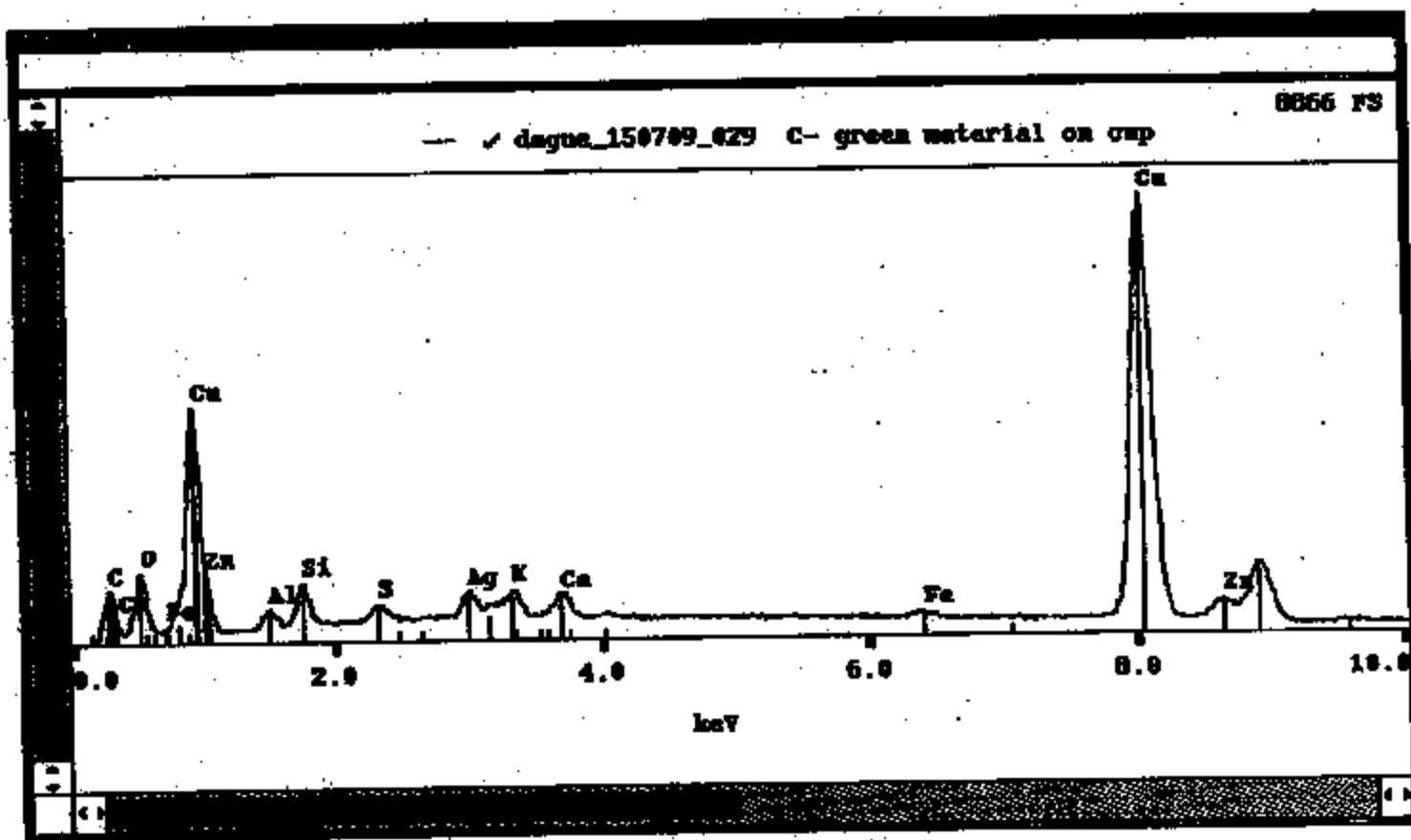


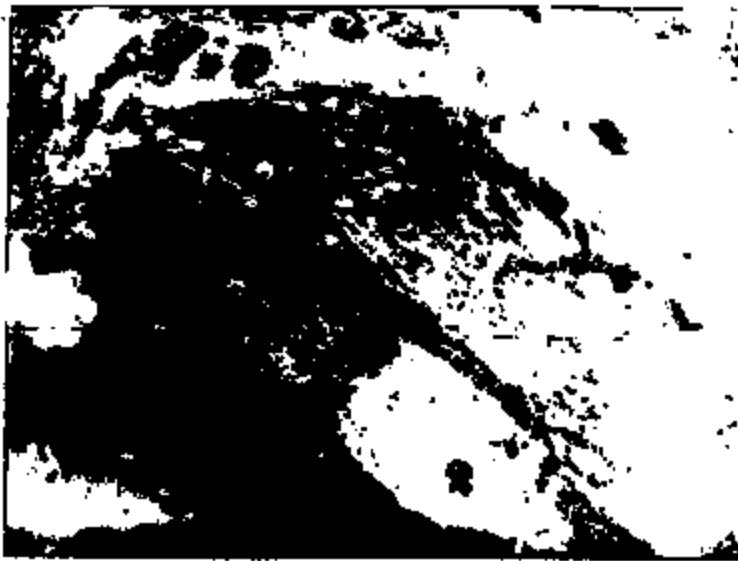
TINHTSA 6638

70

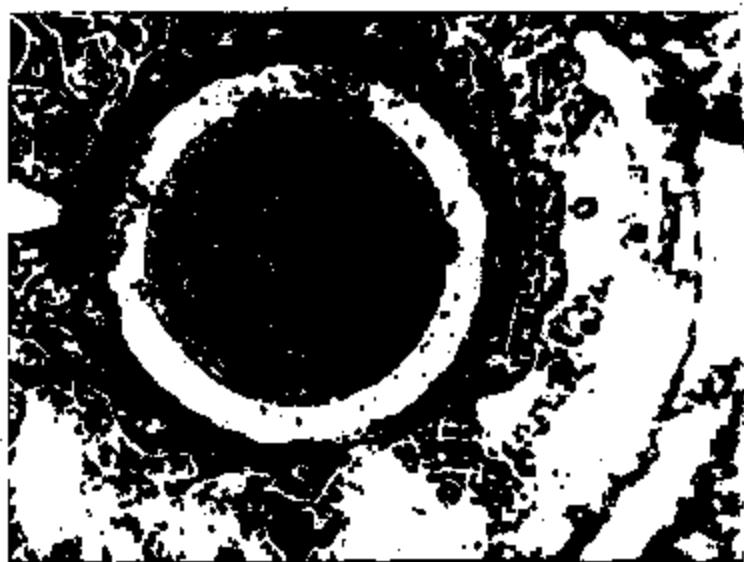


41





TI-NHTSA 9891



TI-NHTSA 9892



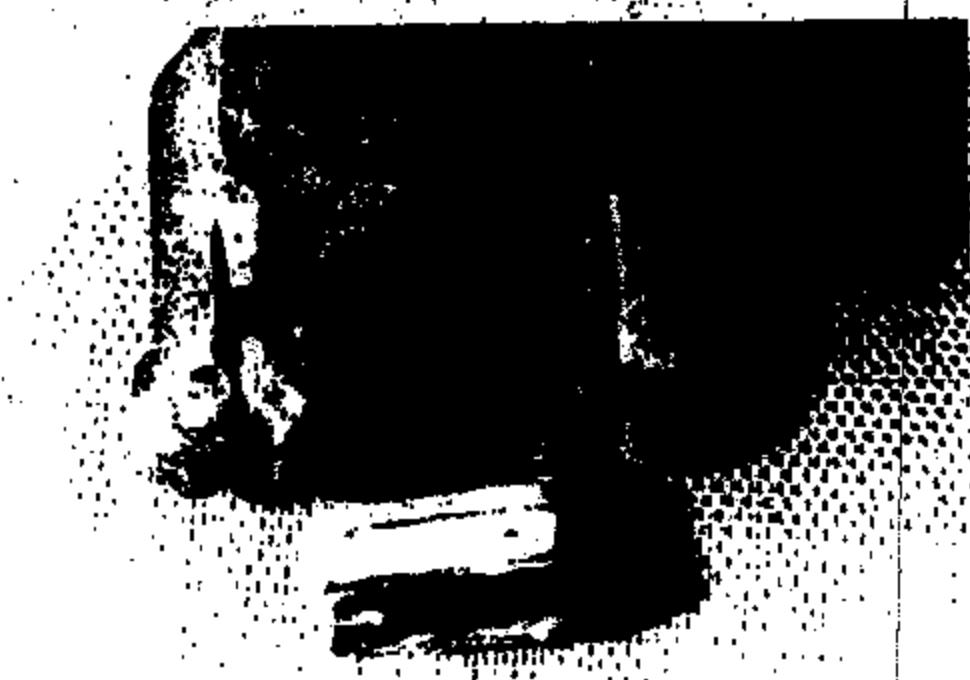
TI-NHTSA 9093



TI-NHTSA 0004

TI-NHTSA 9695

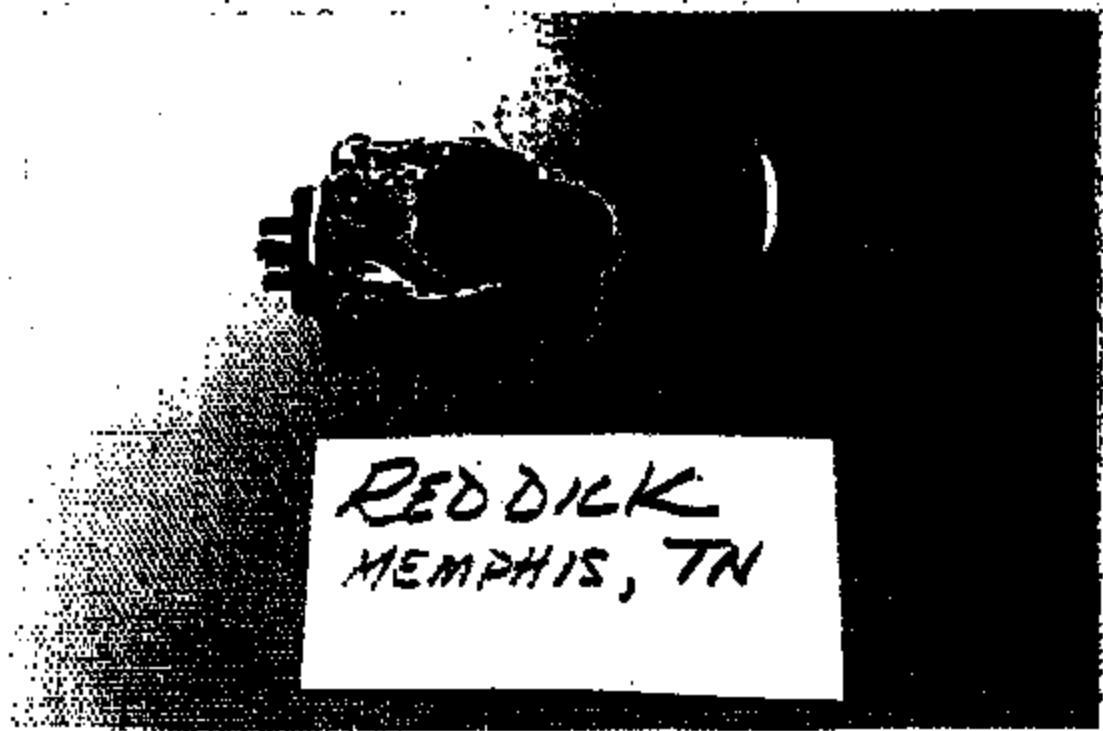
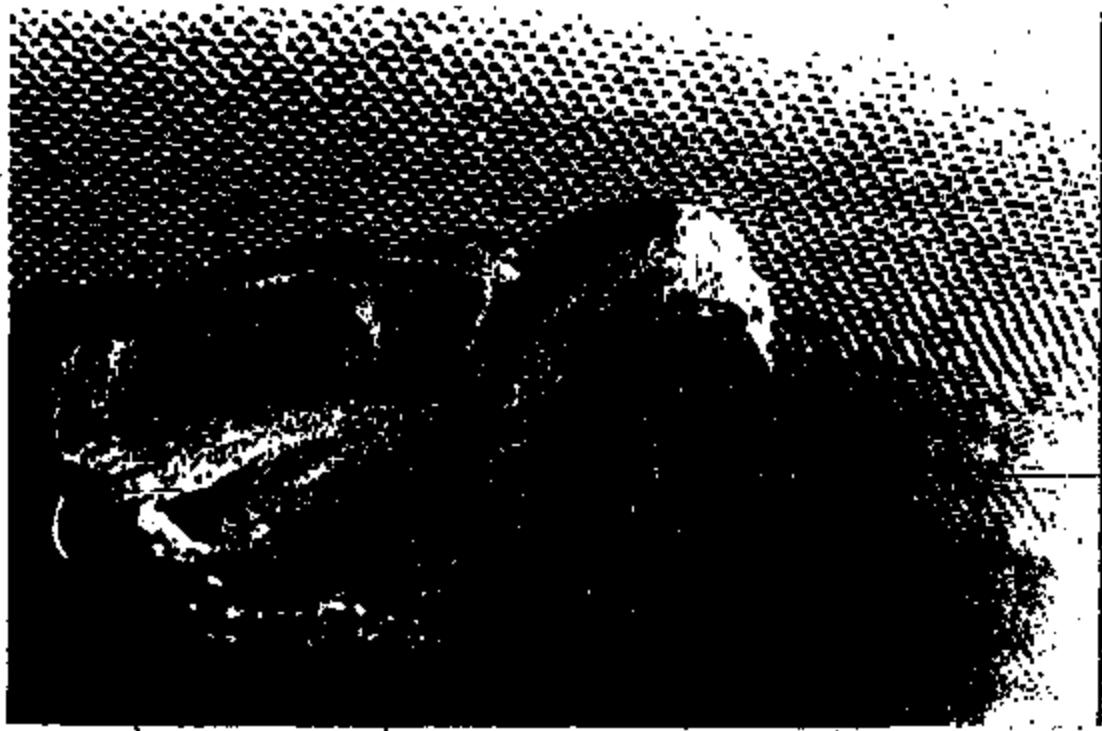
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T1-NHTGA 9696



TI-NHTSA 9897



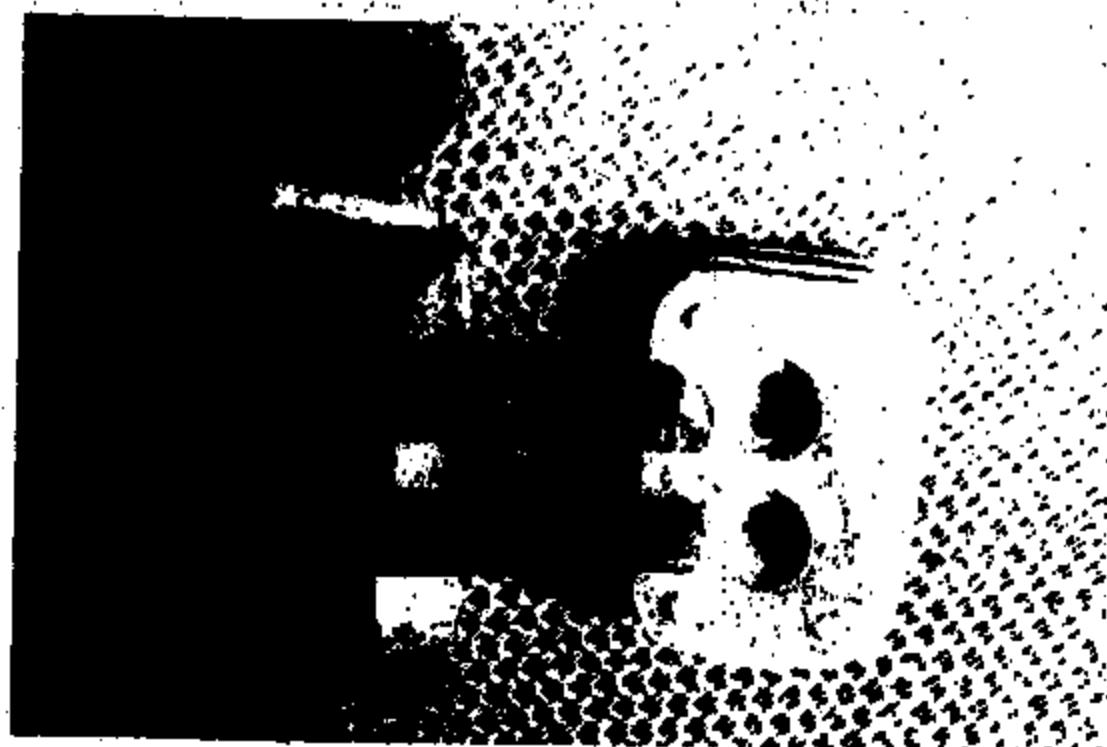
TI-NHTSA 9698



TI-NHTSA 9698



TI-NHTSA 9700



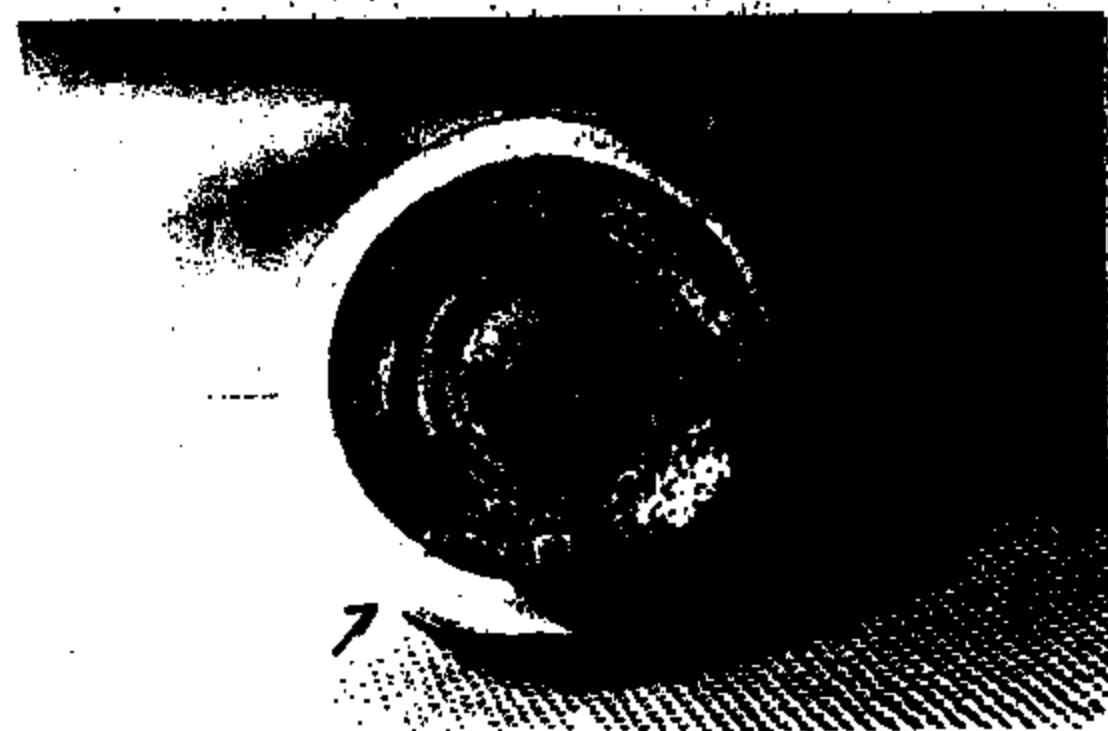
TI-NHTSA 9701



TL-NHTSA 9702



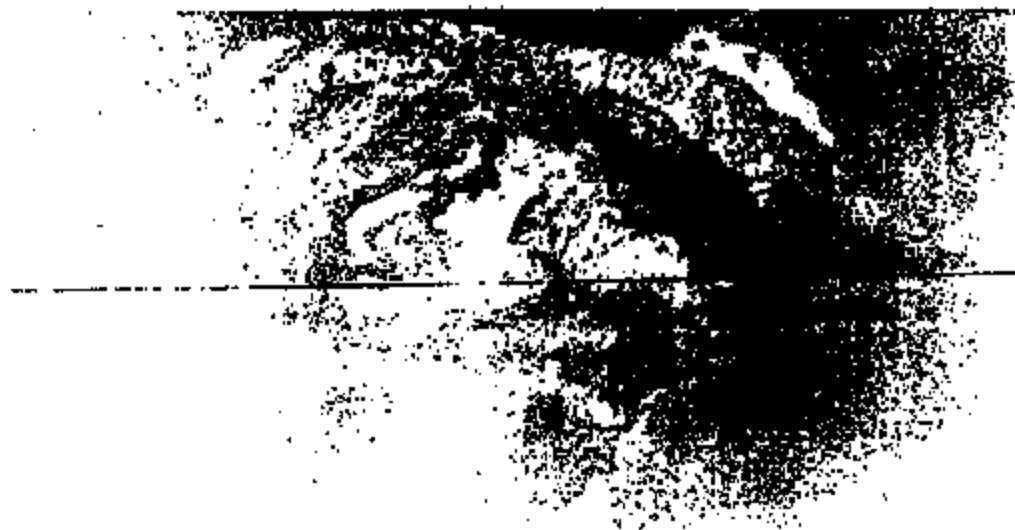
TI-NHTSA 9703



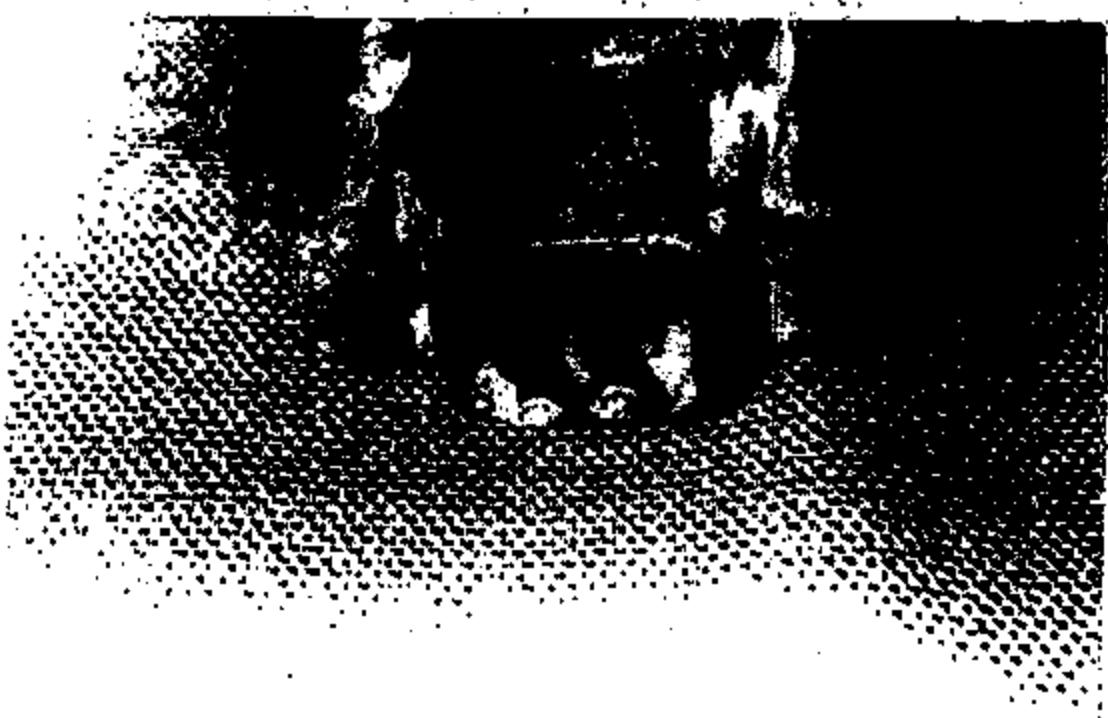
TI-NHTSA 9704



TI-NHTSA 9706



TI-NHTSA 9706



TI-NHTSA 9707



TI-NHTSA 8708



TI-NHTSA 9709

LOG NO. 12762TEST NO. 151700

TECHNICAL SERVICE LABS

TEST NO. 151700

*POC ID.	<u>122</u>
REQUESTOR CUST CENTER	<u>357</u>
PRODUCT CODE	
REQUESTOR	<u>SEAN MCGEE</u>
MAIL STATION	<u>12-39</u>
EXTENSION	<u>2535</u>
MBO ID	<u>SFAM</u>
DATE SUBMITTED	<u>3/17/99</u>
DATE RECEIVED	
NO. OF SAMPLES	<u>1</u>
COMPOSITION	

STATE YOUR PROBLEM
SAMPLE DESCRIPTION
77 PSL2-1
5% Salt water Burn
Identification of
corrosion matl.

INFORMATION DESIRED:

REPORT OF RESULTS:

Acetone Soaked, QTip + wood stick Rubbed,
Acetone Flushed, Air Dried

DATE RECEIVED _____

DATE OUT _____

TECHNIQUE			
HOURS WORKED			
PROCEDURE USED			

*PCC I.D.

MC-325
PC-127
VERS-168
AFCC-483
IMD-430

TM-431
WIRE-432
EPD-621
PEP-622
CSD-635

CLKE-122
CAN-854
AD DEV-266
EMCD-677

FACIL-514
FAÇIL-621
FACIL-531
STAFF-855

TI-NHTSA 9710

TO: SEAN MULLIGAN
RUSS BAUMAN

ATTORNEY-CLIENT PRIVILEGED COMMUNICATION

SUBJECT: 99-181: TSL # 131700: PRELIMINARY FINDINGS ON LINCOLN SIMULATION SAMPLES

OBJECTIVE:

Determine if there are similarities between the original sample that Ford had hand-carried in (TSL # 130709) and the simulation samples.

DISCUSSION:

Be advised that these are very, very preliminary findings. We have had a host of equipment problems for the last two weeks and I haven't had the opportunity to do a thorough job.

There are a number of findings that point to a similarity in the failure mode between the hand-carried sample (Memphis) and the simulation sample that had been dosed with sodium-chloride solution through the connector. In particular, both the simulation and the Memphis sample show the following characteristics:

- Corrosion of the brass contact/terminal assemblies
- Arcing at the broken ends of those assemblies.
- Presence of large amounts of decomposed plastic base material.

There are, however, other findings that indicate that this certainly isn't a precise simulation; especially in regards to the nature of the fluid which caused the corrosion as is shown below:

- The Simulation sample shows a vast amount of sodium and chlorine in the corrosion deposit; the Memphis sample didn't show a significant amount.
- The Memphis sample showed a substantial amount of potassium and sulfur with lesser and variable amounts of phosphorous; the Simulation sample didn't. As I had remarked at the time, potassium is an element that is often associated with detergents used to clean autos. Although this certainly isn't conclusive, it is suggestive.
- The Simulation sample showed very substantial corrosive attack on the top surface of the cup while the Memphis sample showed a much smaller amount.

We have not seen significant similarities between the Memphis sample and the "24 Hour-Used Brake Fluid with 5% Water" sample in regards to the terminal/contact assemblies.

The data was collected under the guidelines of TSL-S-71, Rev A which can be accessed at <http://www-mcd.mc.ti.com/tal/>. SEM-EDAX (Scanning Electron Microscope with Energy Dispersive Analysis of X-rays) analysis was used in the above described analysis. The data will be sent through the internal mail.

AL HOPKINS

MSG ID: AHOP

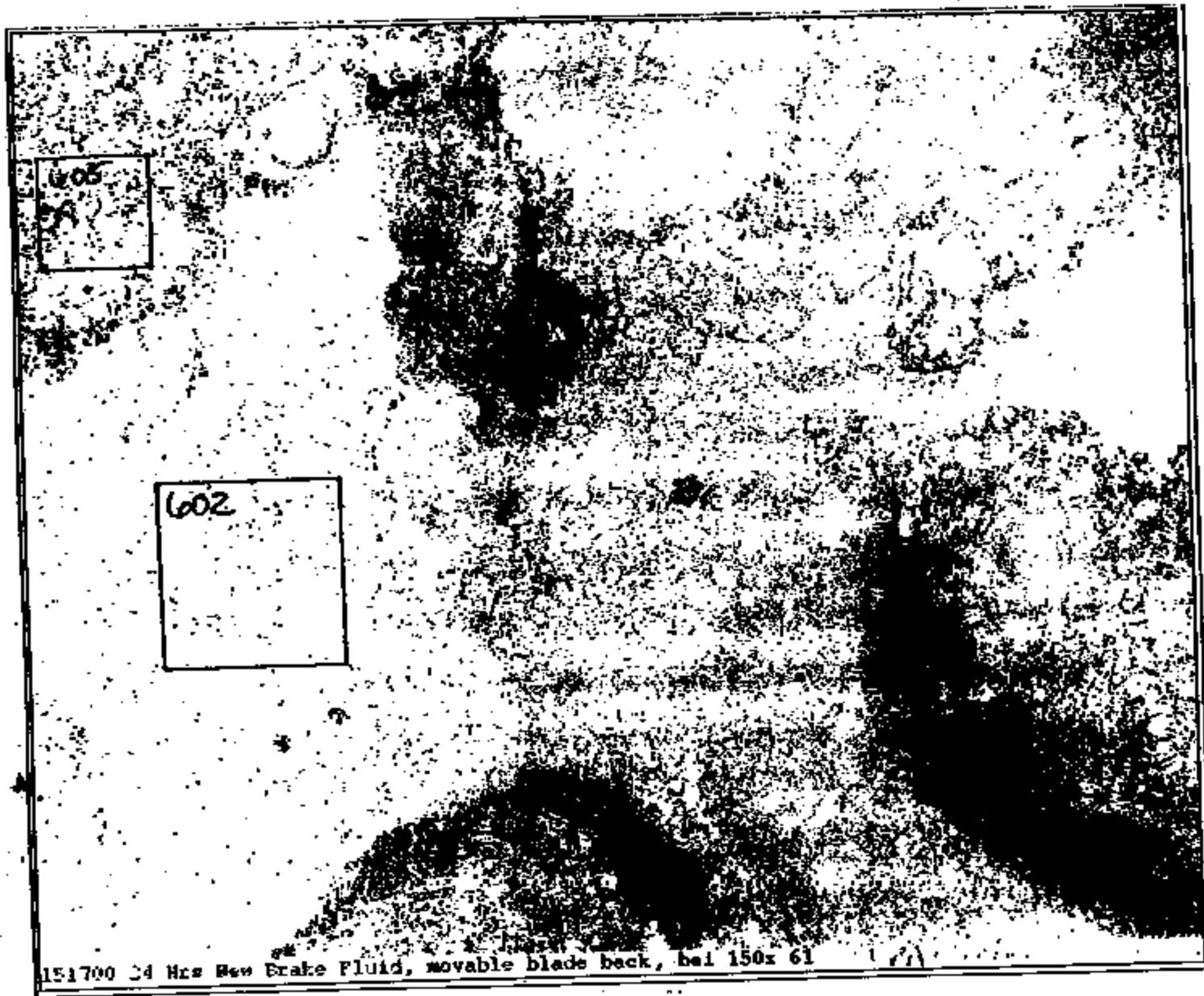
PHONE: 508/236-3040

TI-NHTSA 9711

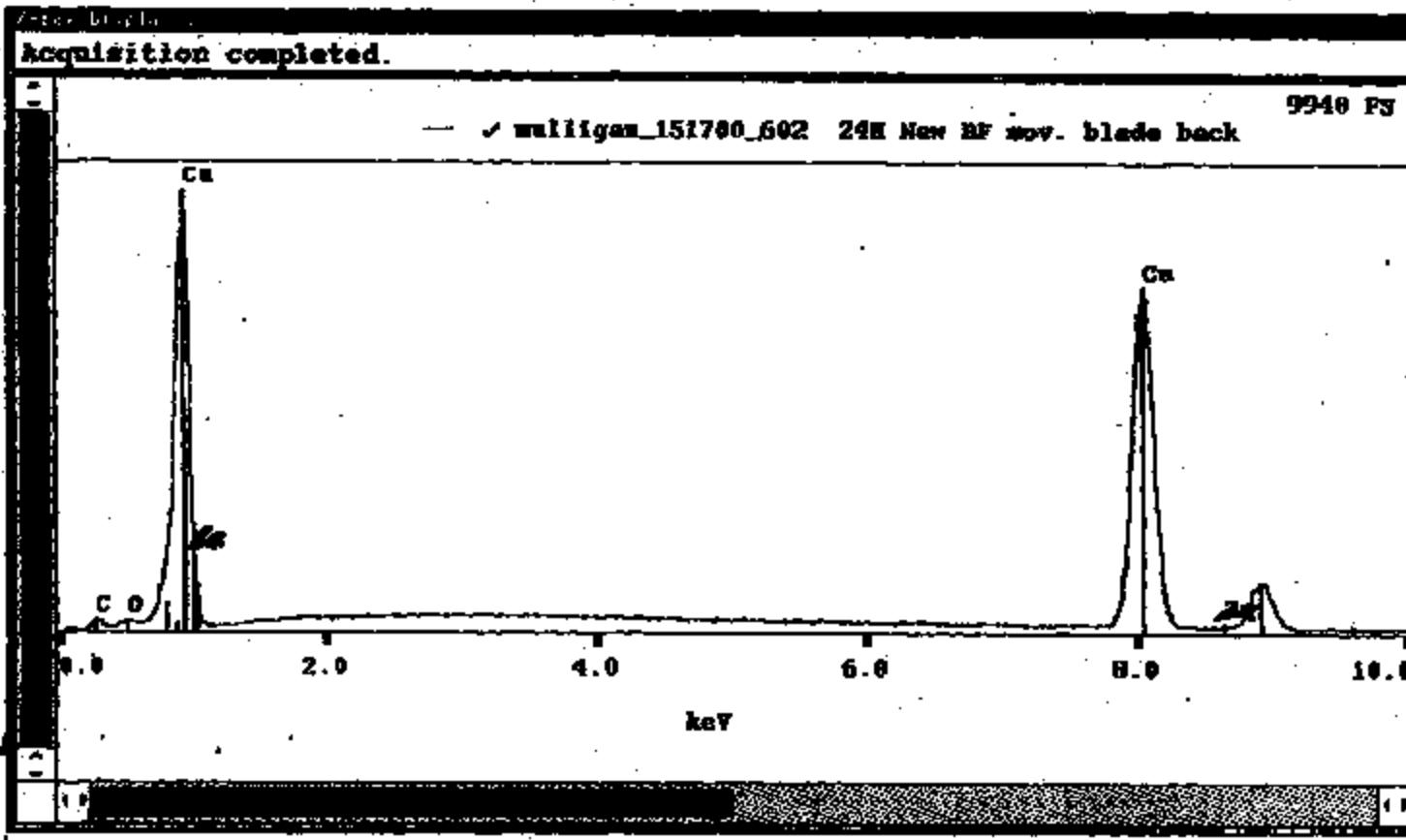
<u>Line</u>	<u>Sample</u>	<u>Support, Washer, Converter & Spacer</u>	<u>Cup, exc Fe, Cr, Sn or glass</u>	<u>Terminals, exc Cu, Sn, Zn</u>
	5% NaCl in H ₂ O	Red & white corrosion products	Na, Cl, Cu, C, O	
	Table Salt: Noryl Base	Red & white corrosion products	Na, Cl, Cu, C, O	Na, Cl, C, O
18	18 Hr Impend Burn	Red & white corrosion products	Na, Cl, Cu, C, O	Na, Cl, C, O
48	200 mAmp Current	Red & white corrosion products	Na, Cl, Cu, C, O	Na, Cl, C, O
24	New BF	Blackish Deposits (BF?)	Cu, C, O	
24	New BF: 5% H ₂ O	Blackish Deposits (BF?)	Cu, C, O	
24	Used BF:	Blackish Deposits Brake Fluid	Cu, C, O	
24	Used BF: 5% H ₂ O	Blackish Deposits (BF?)	Cu, C, O	
3	Rain Water	Red & white corrosion products	Cu, C, O	
24	Tap Water	Red & white corrosion products		

Notes:

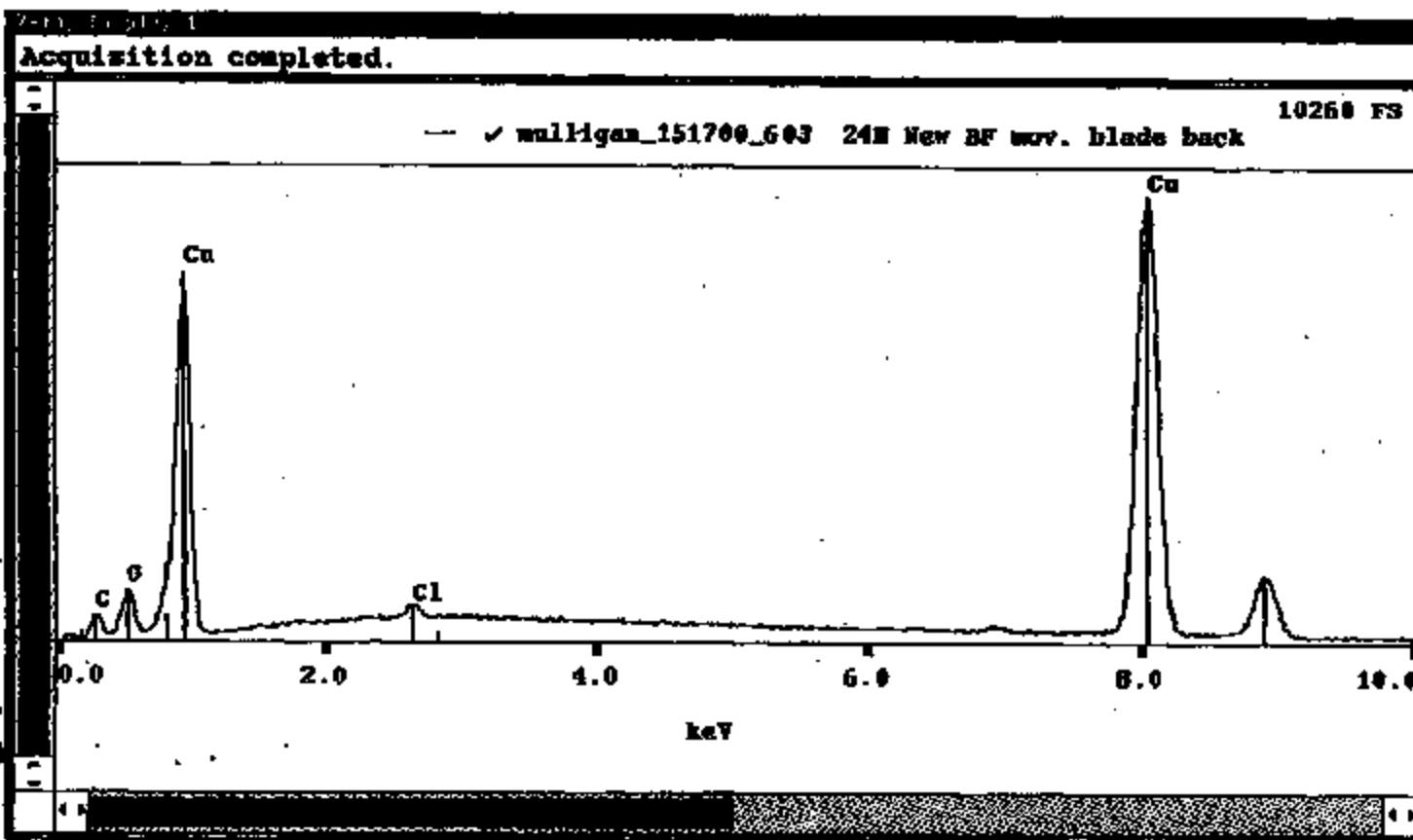
K, Cl and R were detected once on the cup of the 5% NaCl sample.
 J, and Sn were detected once on the cup of the Used BF w 5% H₂O sample.



TI-NHTSA 8713



TJNHTBA 6714



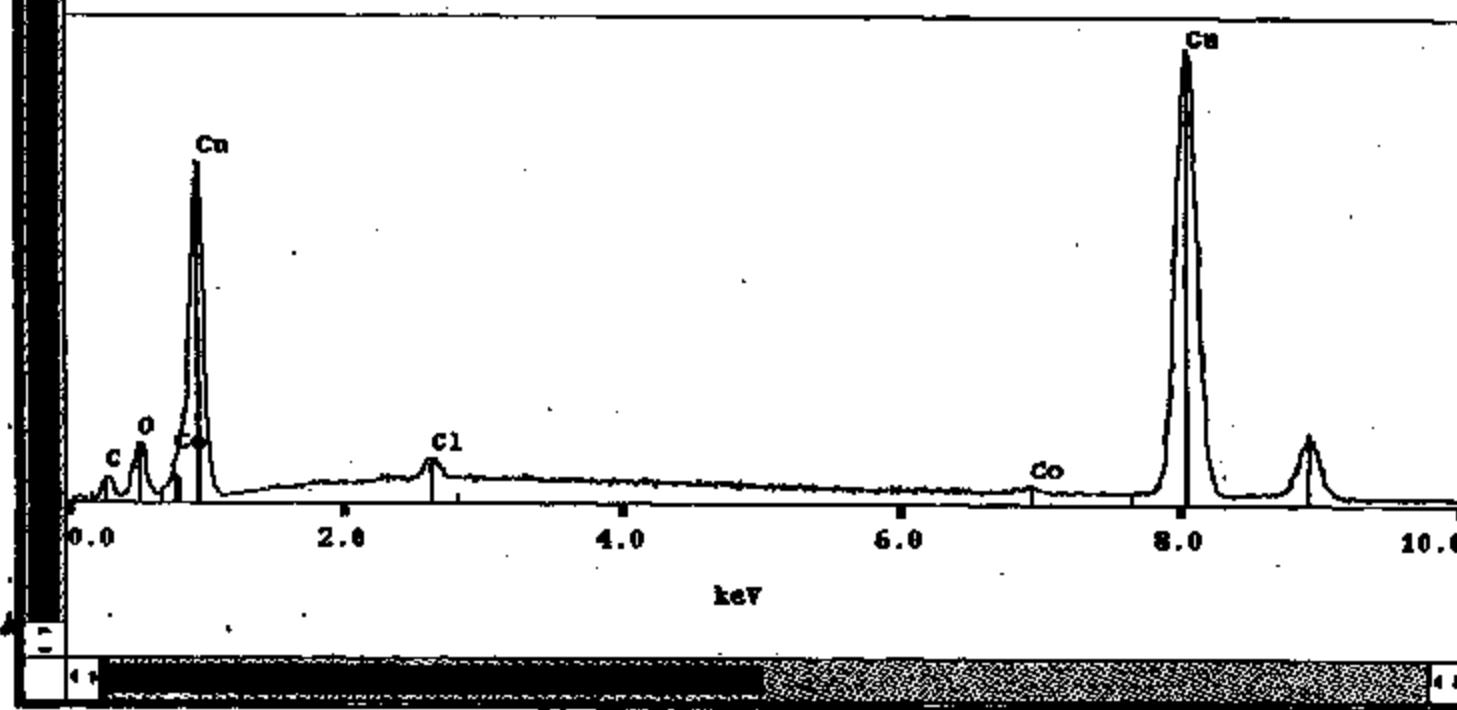
THNHTSA 874

EDX Display

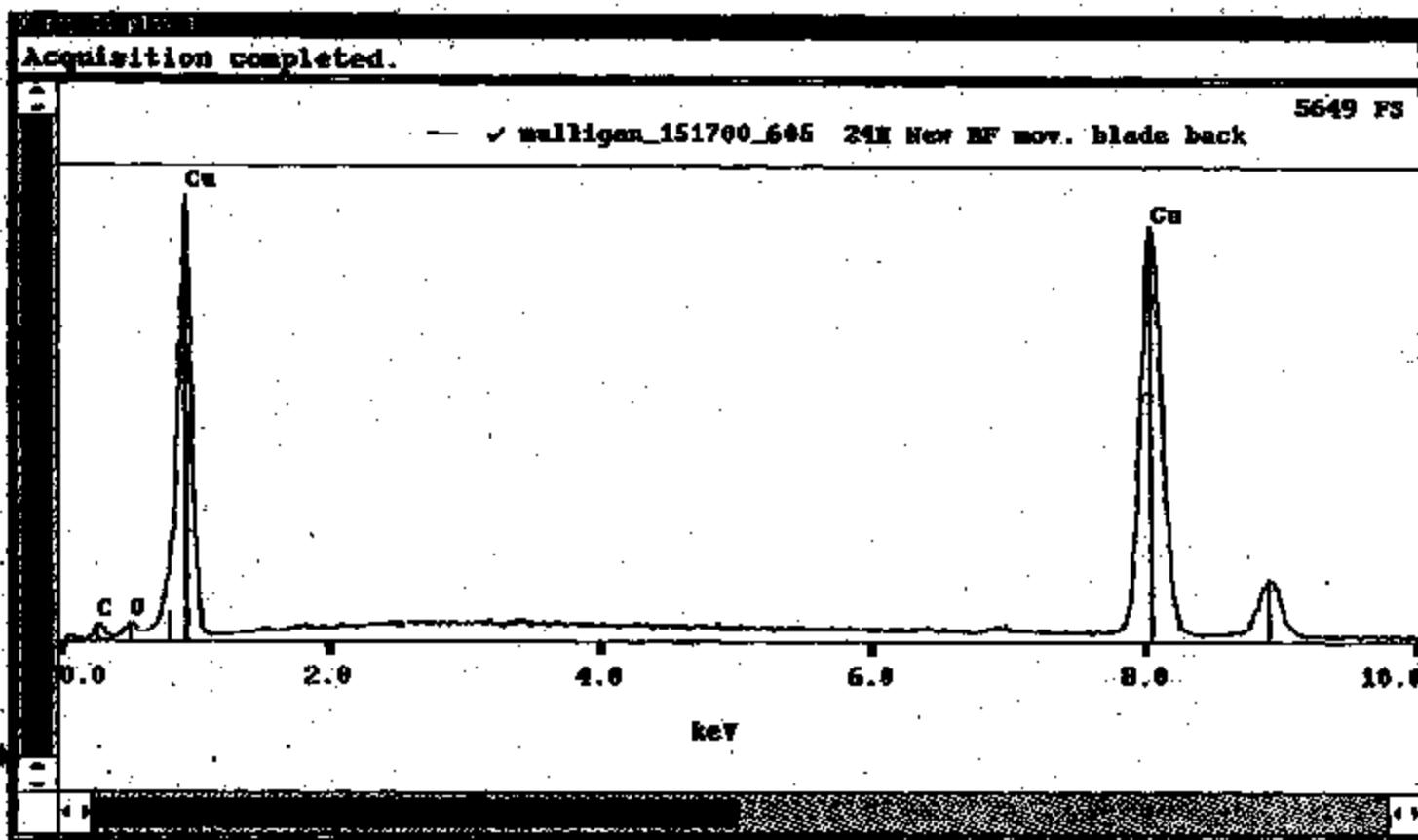
Acquisition completed.

5894 FS

walligan_151700_604 24K New RF nov. blade back



U-MHTSA 8716



151700 24 Mr New Brake Fluid, movable blade back, sei 1000x 66

TRNTSA 9718

151700 24 Mr New Brake Fluid, movable blade back, sel 150x 67

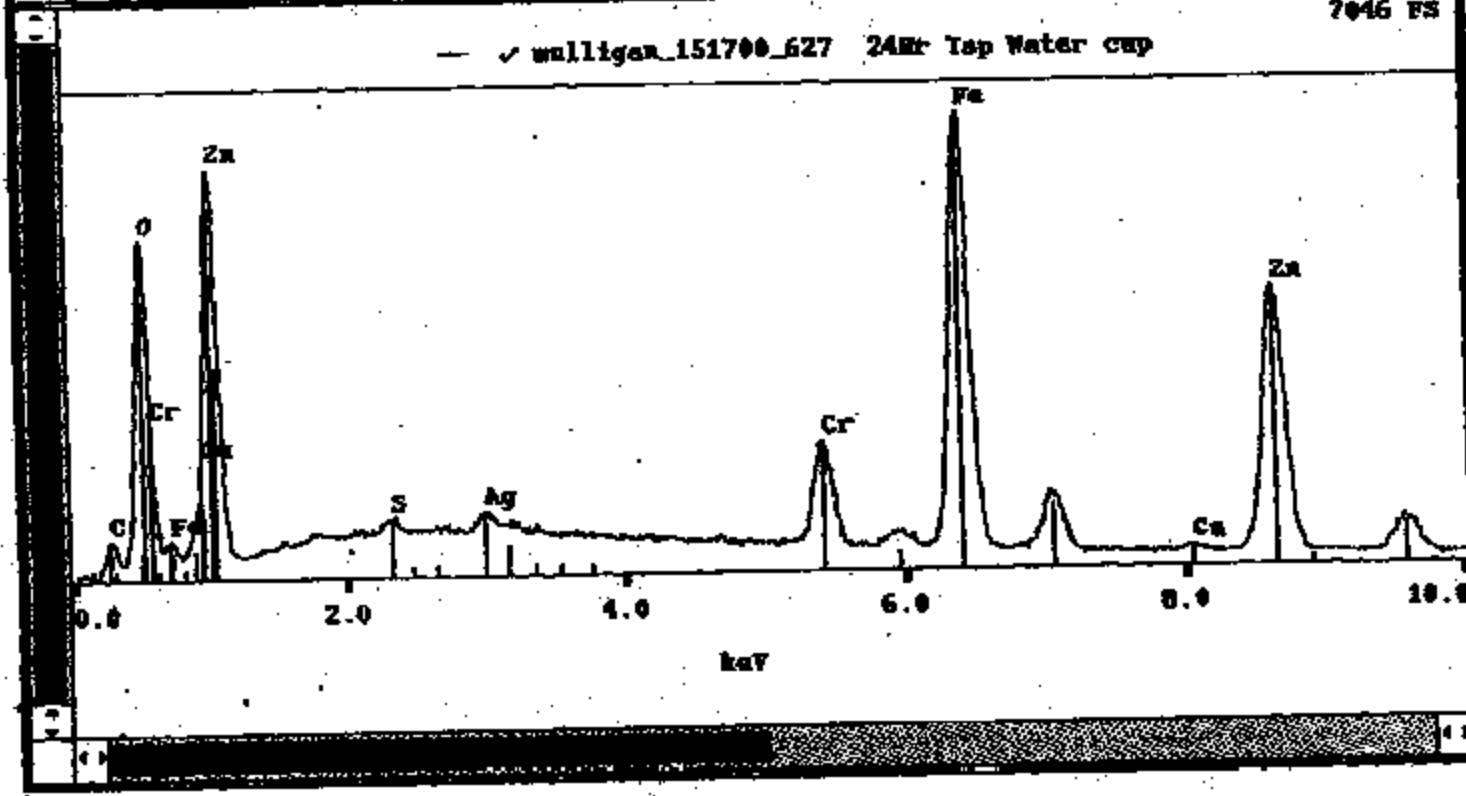
TNHTSA 9710



151700 24Hr Tap Water, cup 30x bei 74

Acquisition completed.

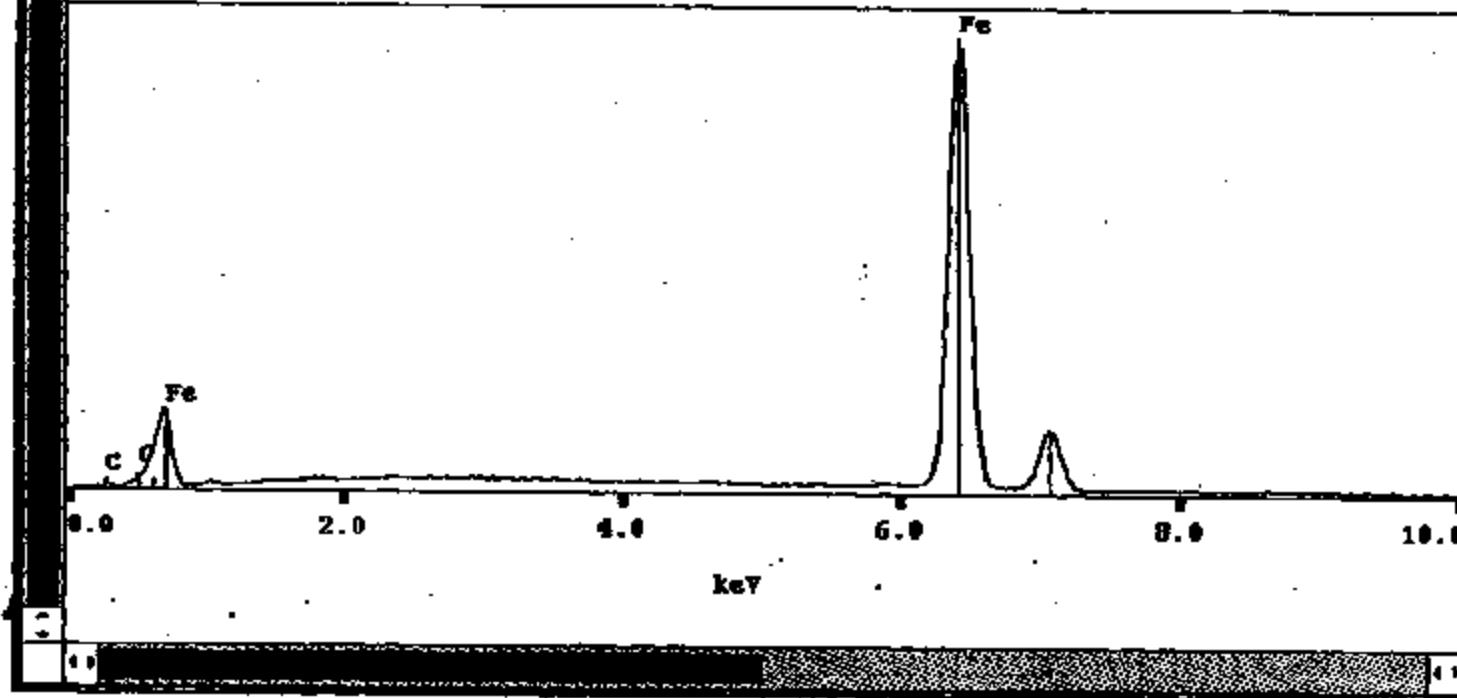
2046 FS



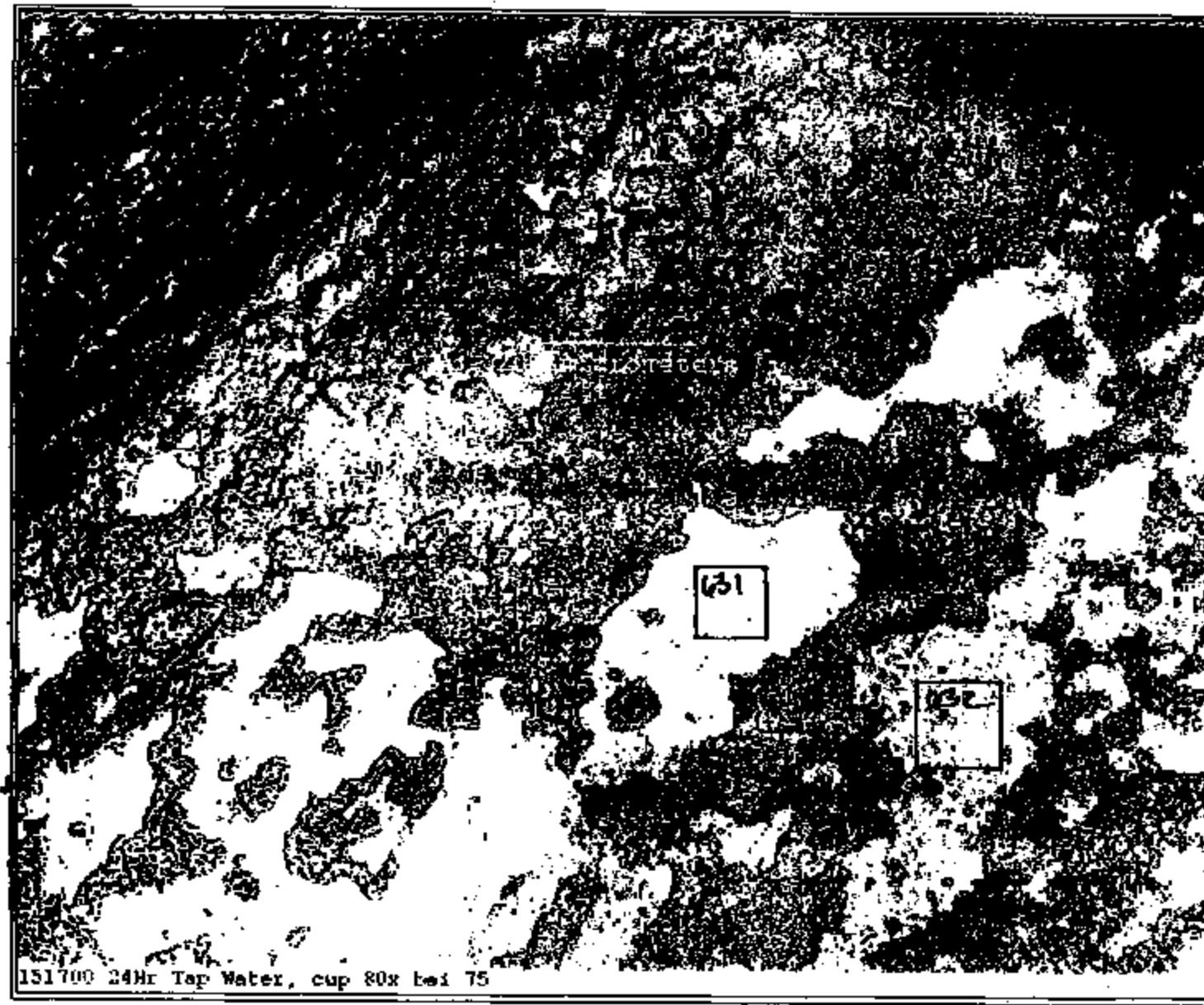
Acquisition completed.

— ✓ mulligan_151700_628 24hr Tap Water cup

10000 FS



TINHTSA 9722



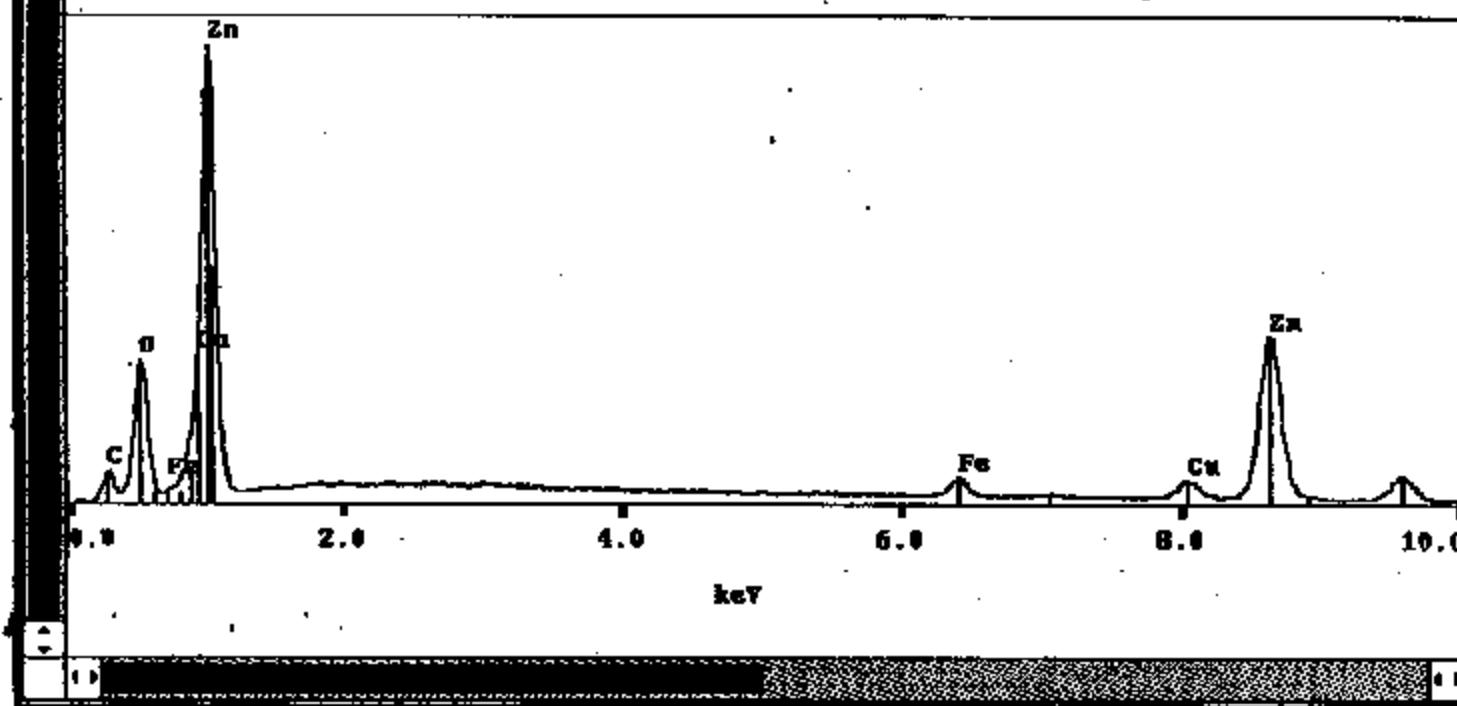
131700 24Hr Tap Water, cup 80x bei 75

TINHTSA 8723

Acquisition completed.

10463 F9

✓ nulligen_151700_629 24hr Tap Water cup



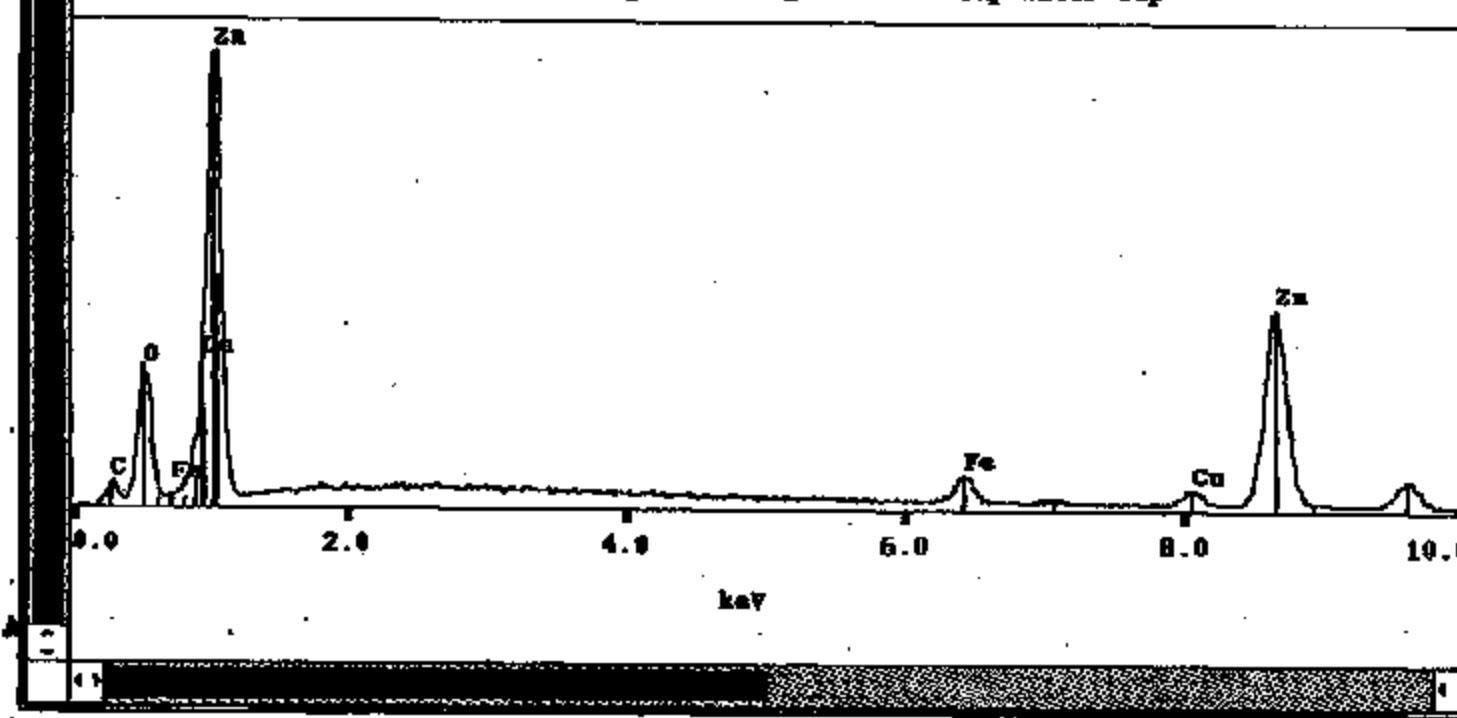
TMHTSA 672

Mass Spec - pL/g L

Acquisition completed.

— ✓ mulligan_151700_630 24Hr Tap Water cup

5633 FS

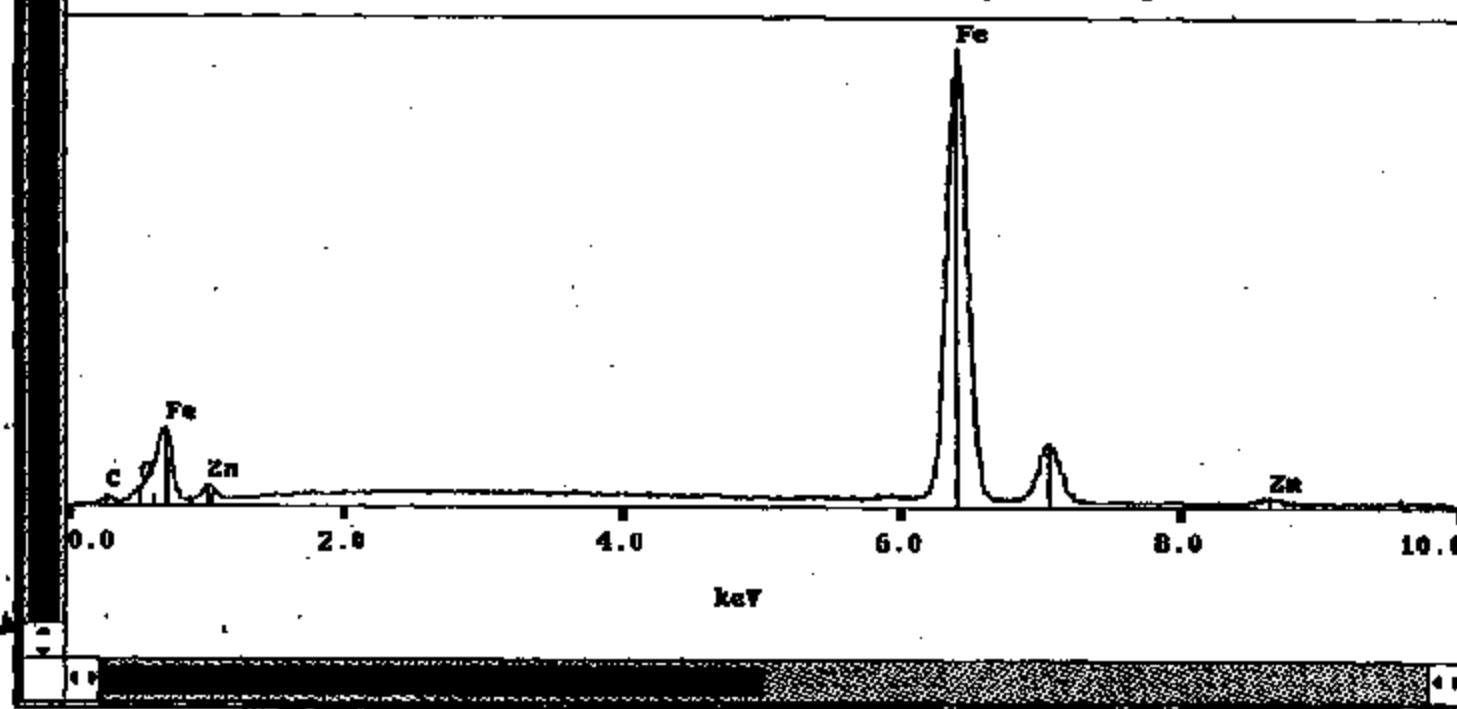


X-ray Spectrum

Acquisition completed.

8034 PS

walligak_151700_631 24Mr Tap Water cap

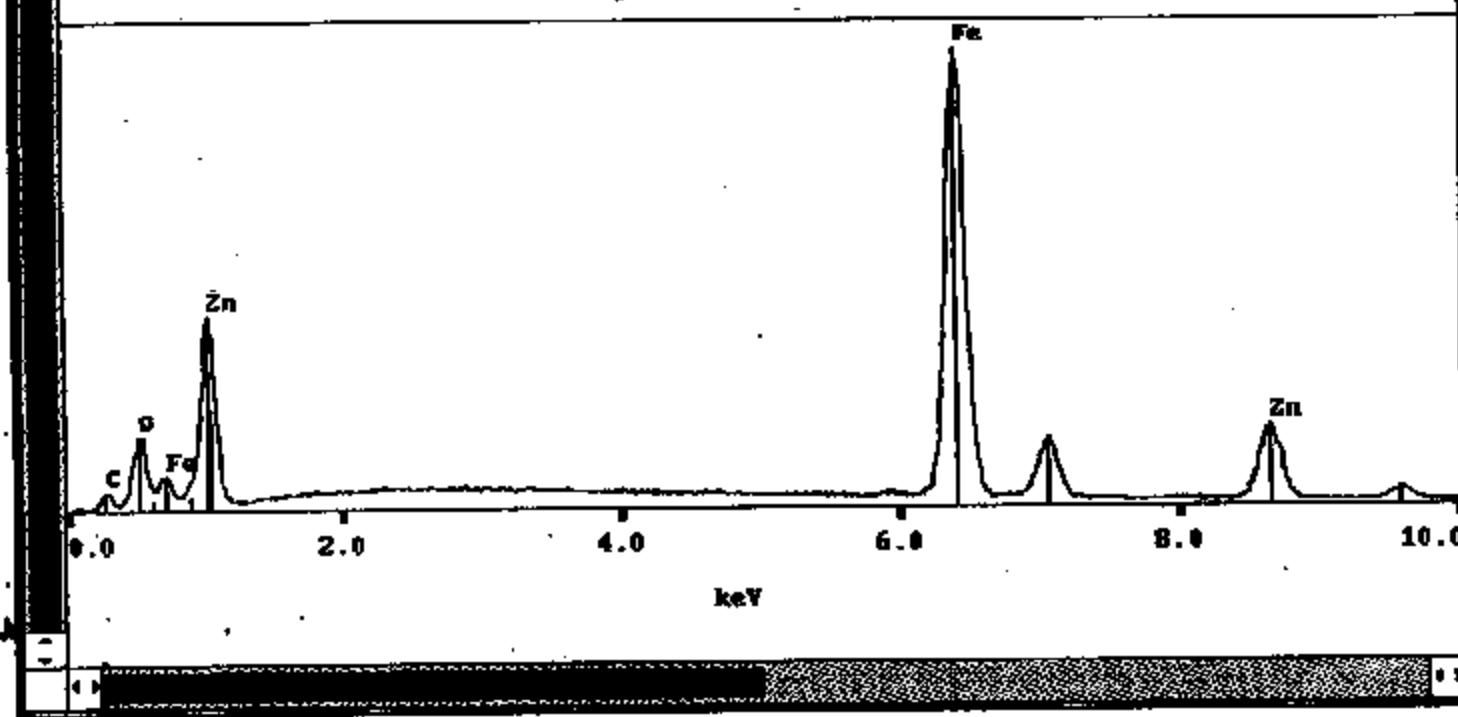


Z:\Data\play 1

Acquisition completed.

9927 FS

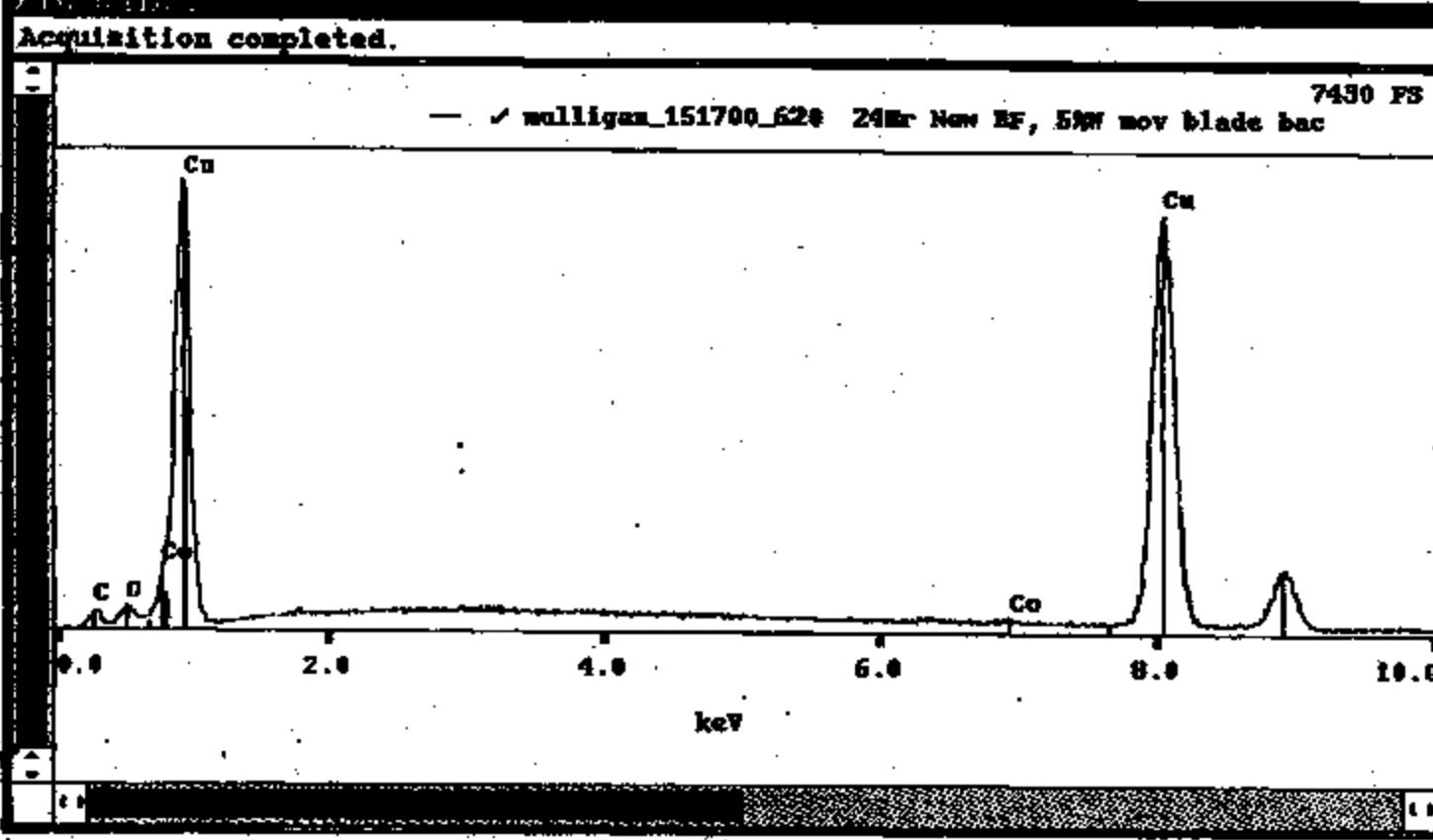
— > mulligan_151700_632 24hr Tap Water cup



TINHTSA 9727



151700 24Hr Soe Brake Fluid-5% H₂O, 100x bei 70

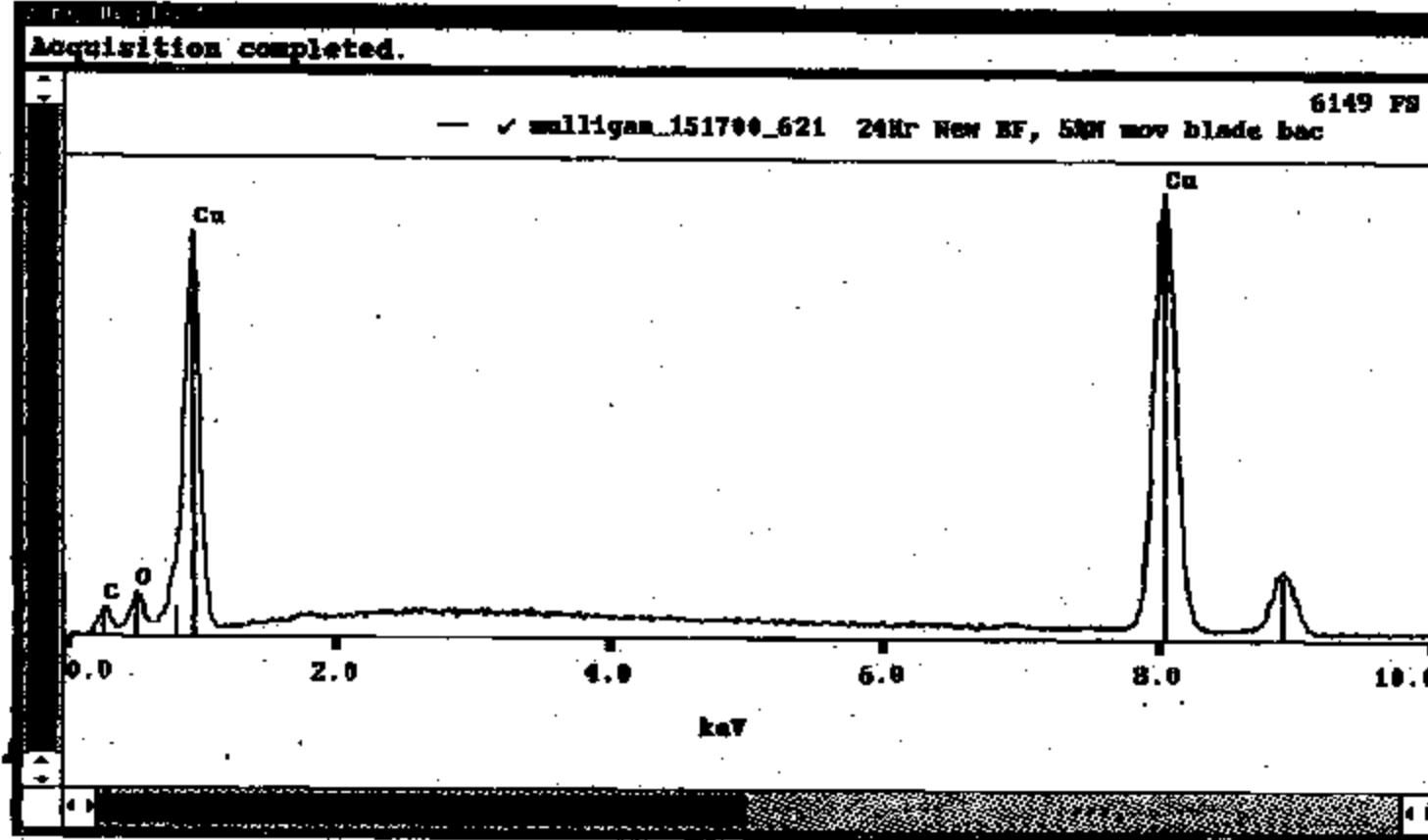


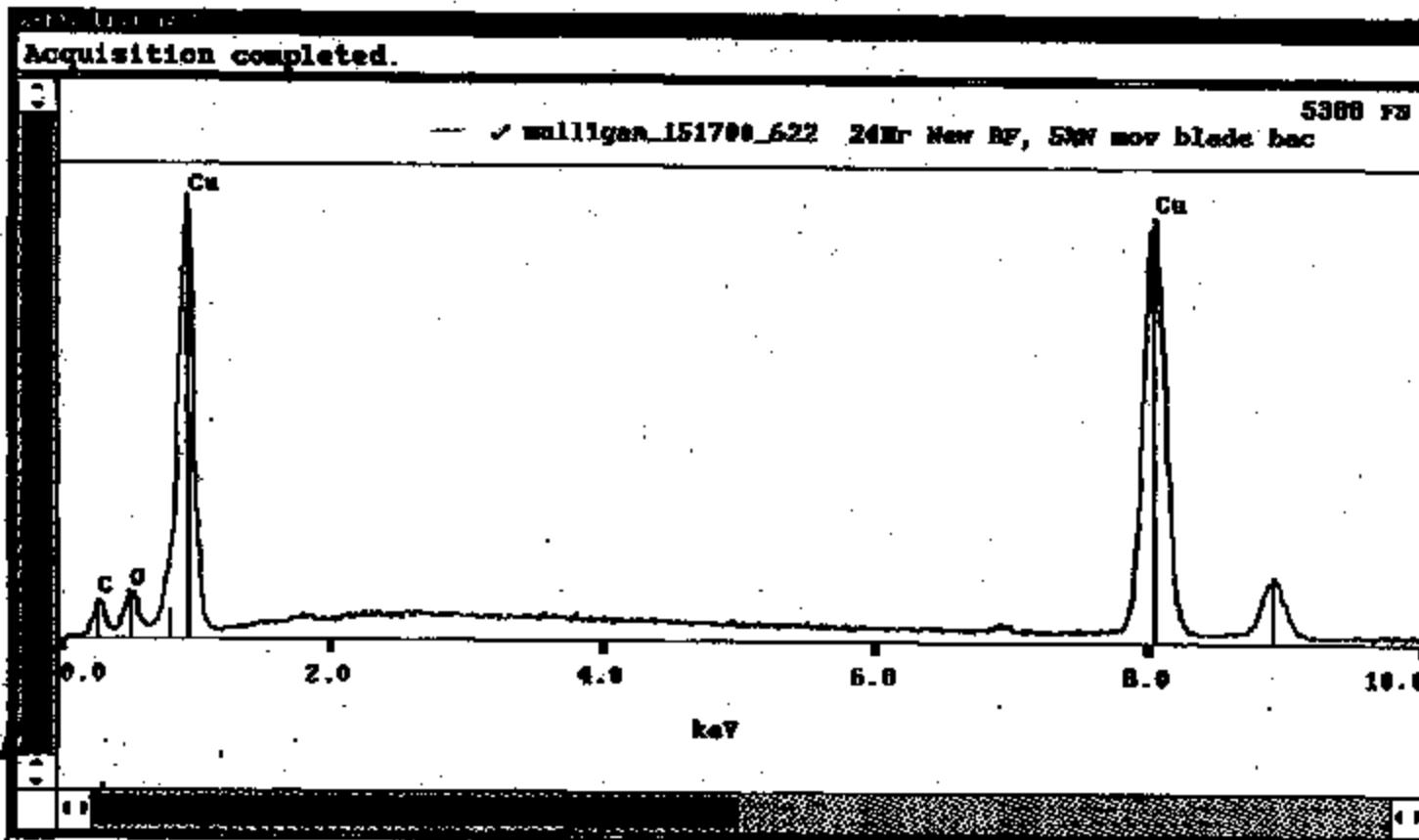
TR-NHHTBA 9729

Acquisition completed.

6149 PS

— \ mulligan_151700_621 24Mr New EF, 50W nov blade bac



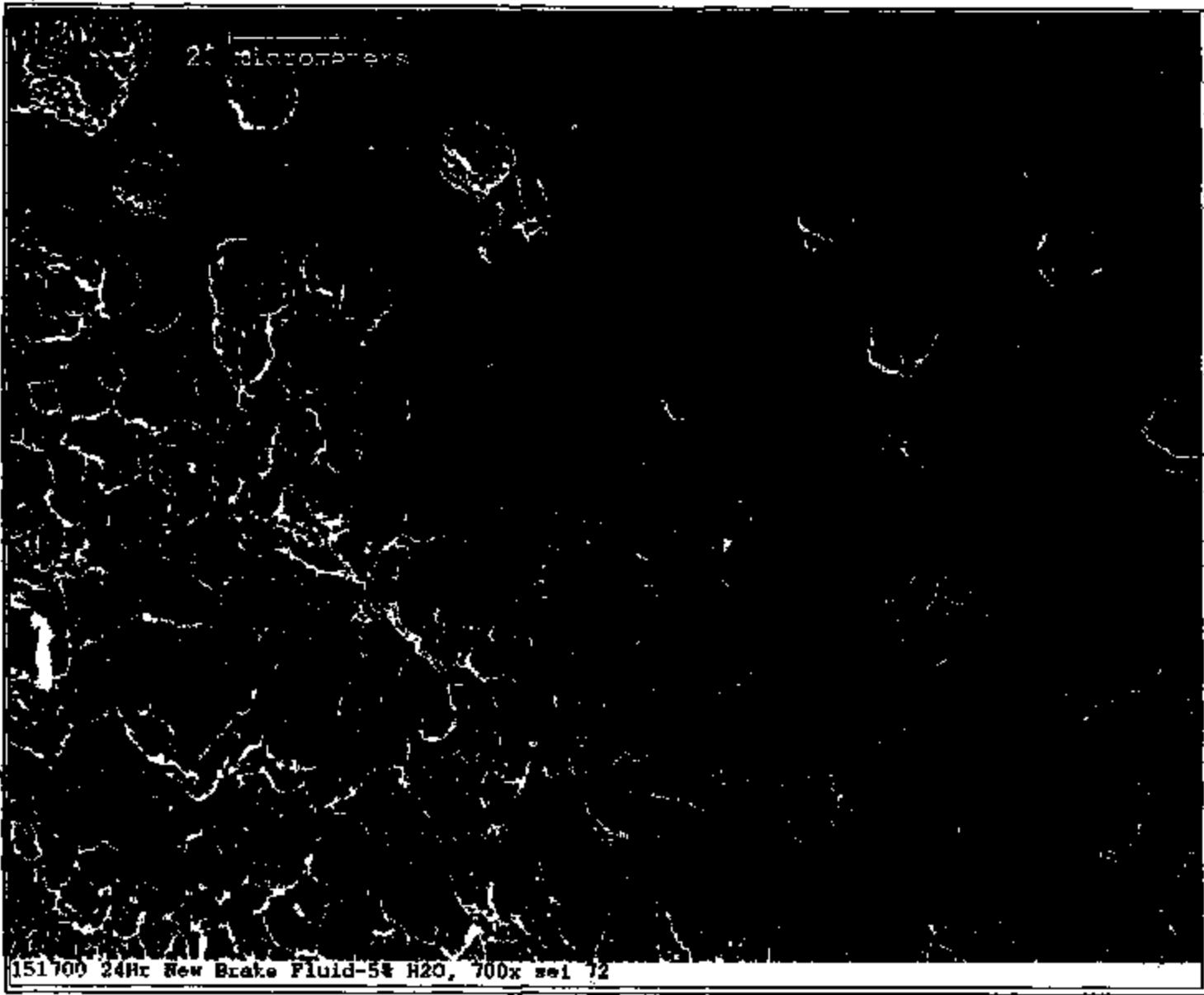


TI-NHT3A 8731

LS1700 24Hr New Brake Fluid-5% H₂O, 170x sei 71

LS1700 24Hr New Brake Fluid-5% H₂O, 170x sei 71

T-NHTSA 9732



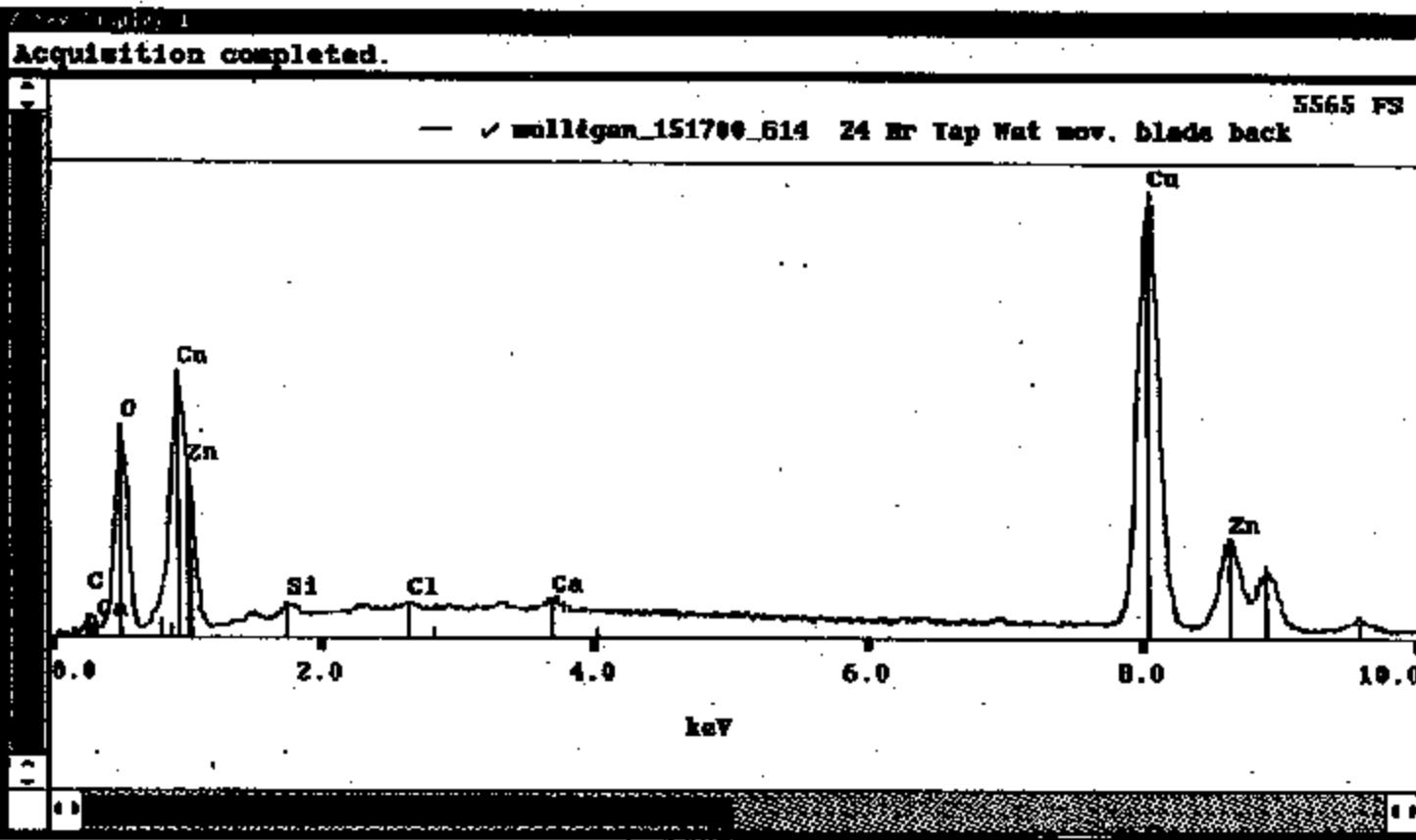
TL-NH78A 0733

017

1517

151700 24 Hr Tap Water, movable blade back, bei 100x 68

TI-NHTSA 0734

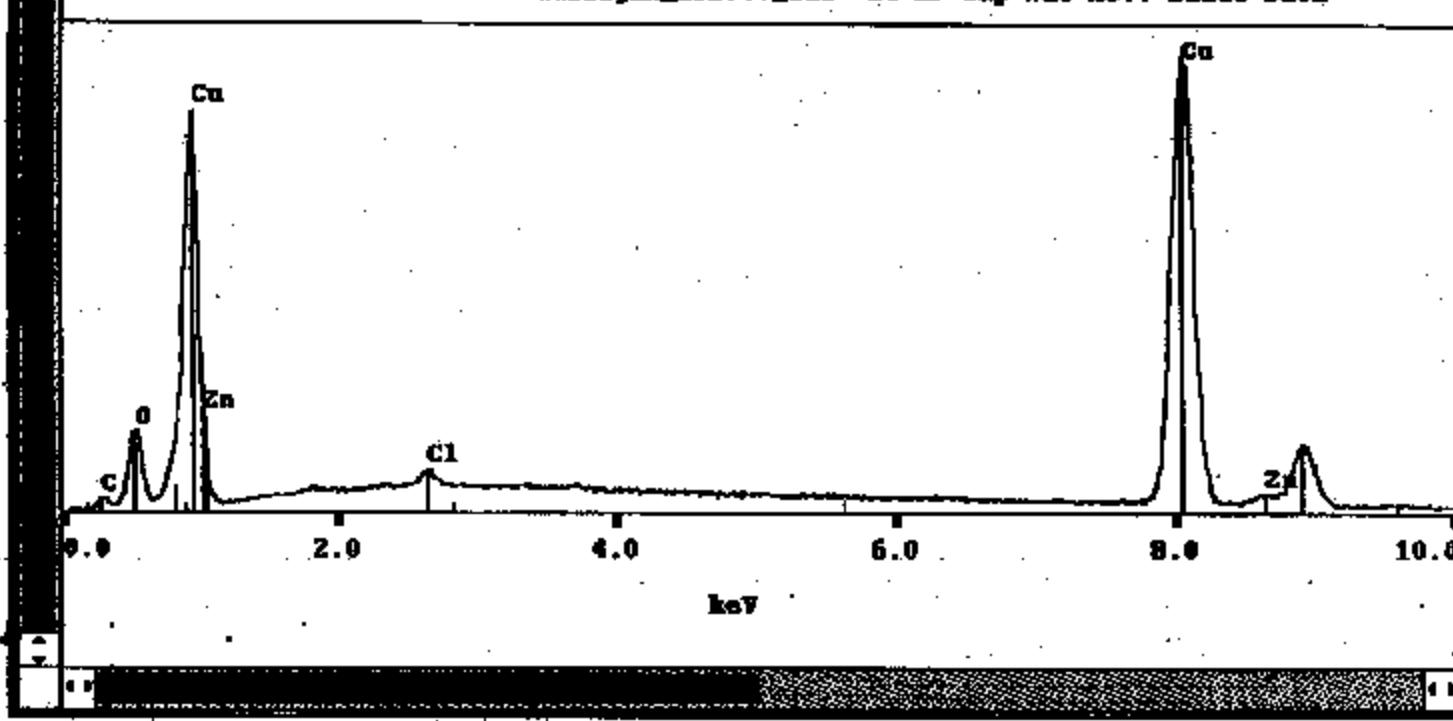


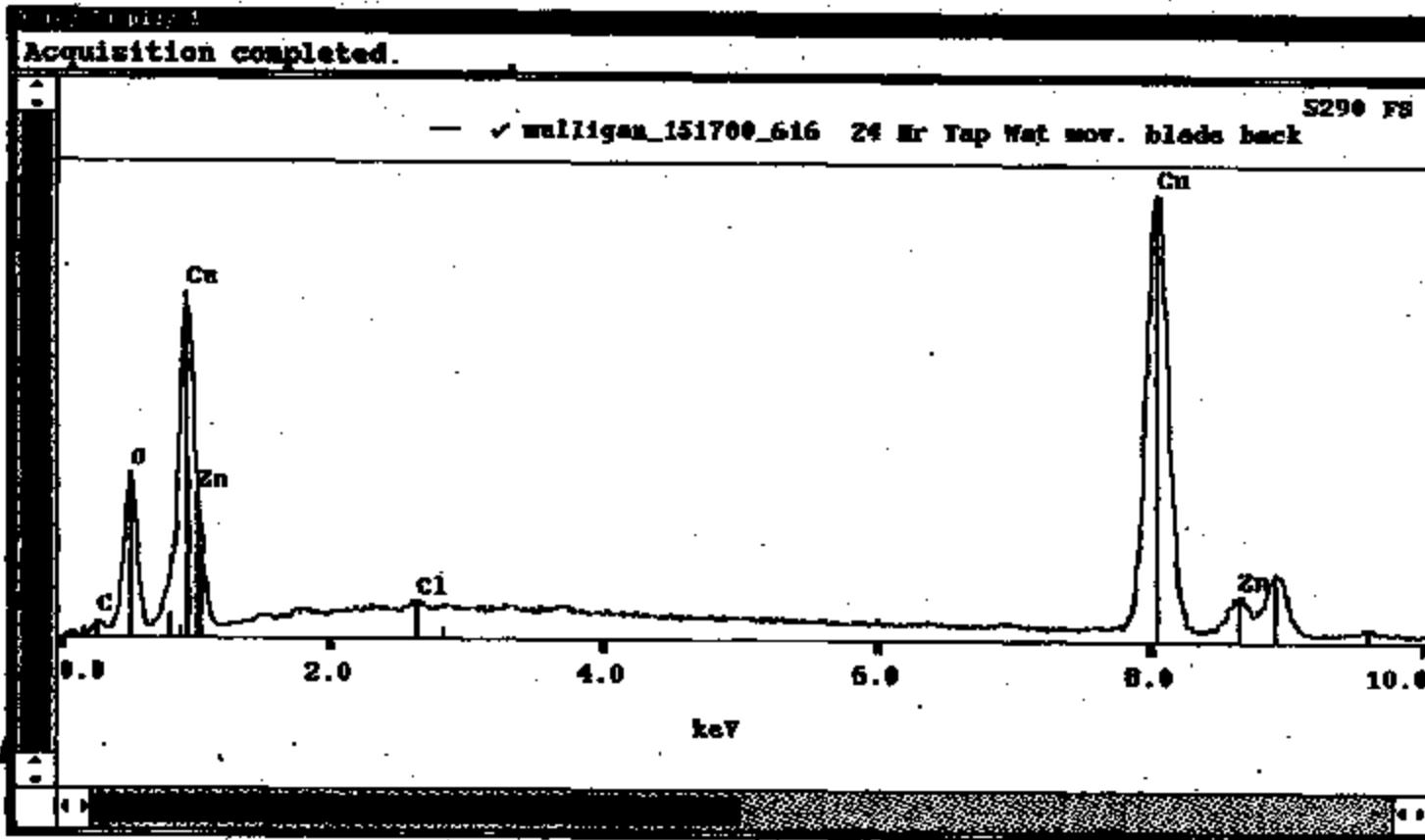
1-NHTSA 8736

Acquisition completed.

7984 FS

walligan_151700_615 24 hr Tap Wet nov. blade back





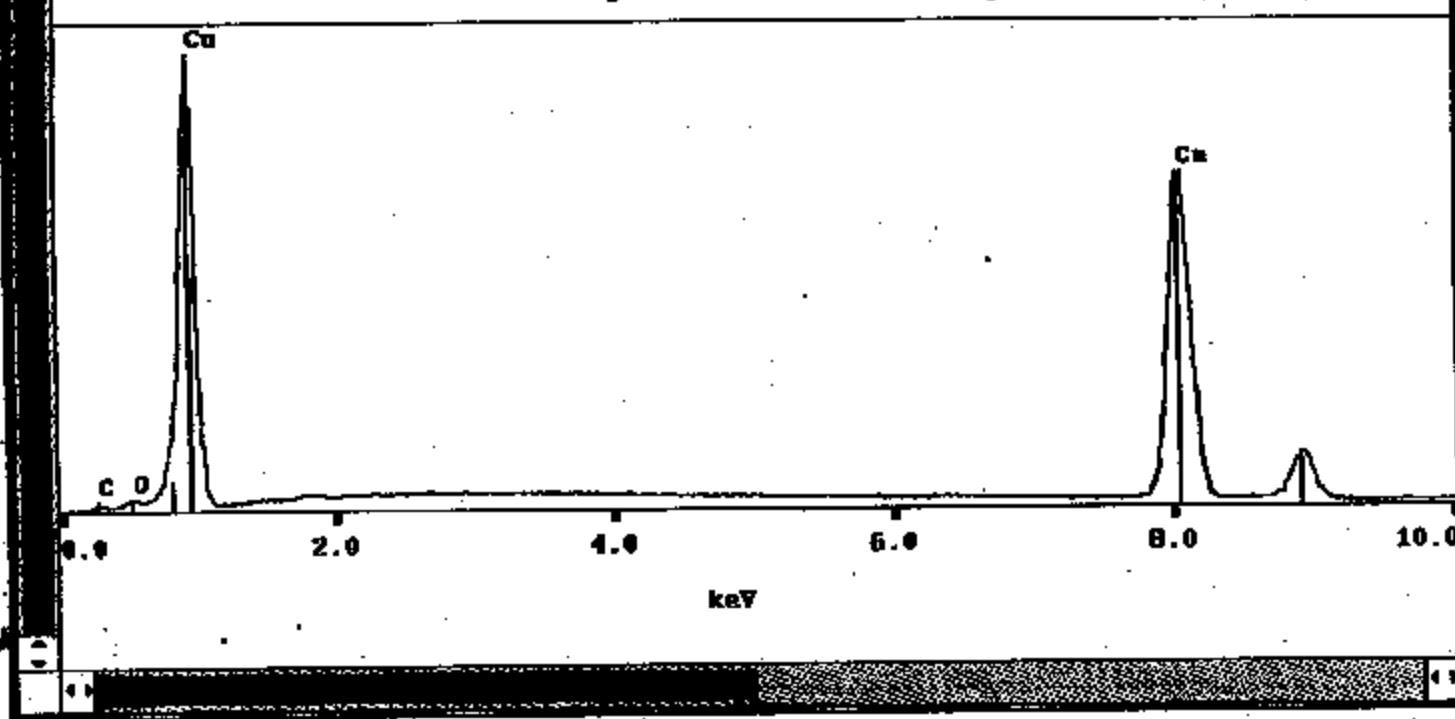
TI-NHTSA 9737

Acq. Step: 1

Acquisition completed.

14621 PS

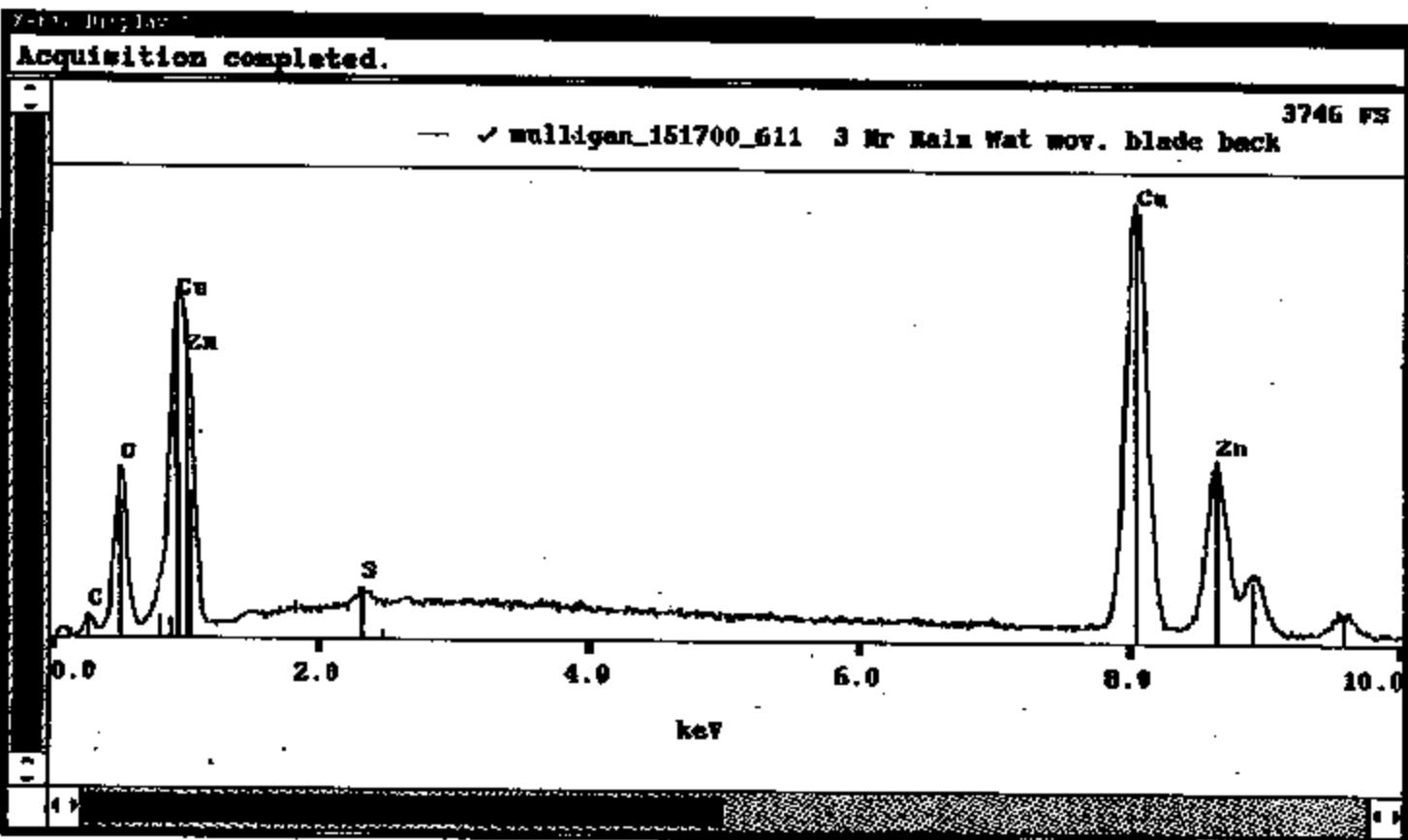
✓ walligan_151700_617 24 hr Tap Wet mov. blade back



T-NHTBA 9738



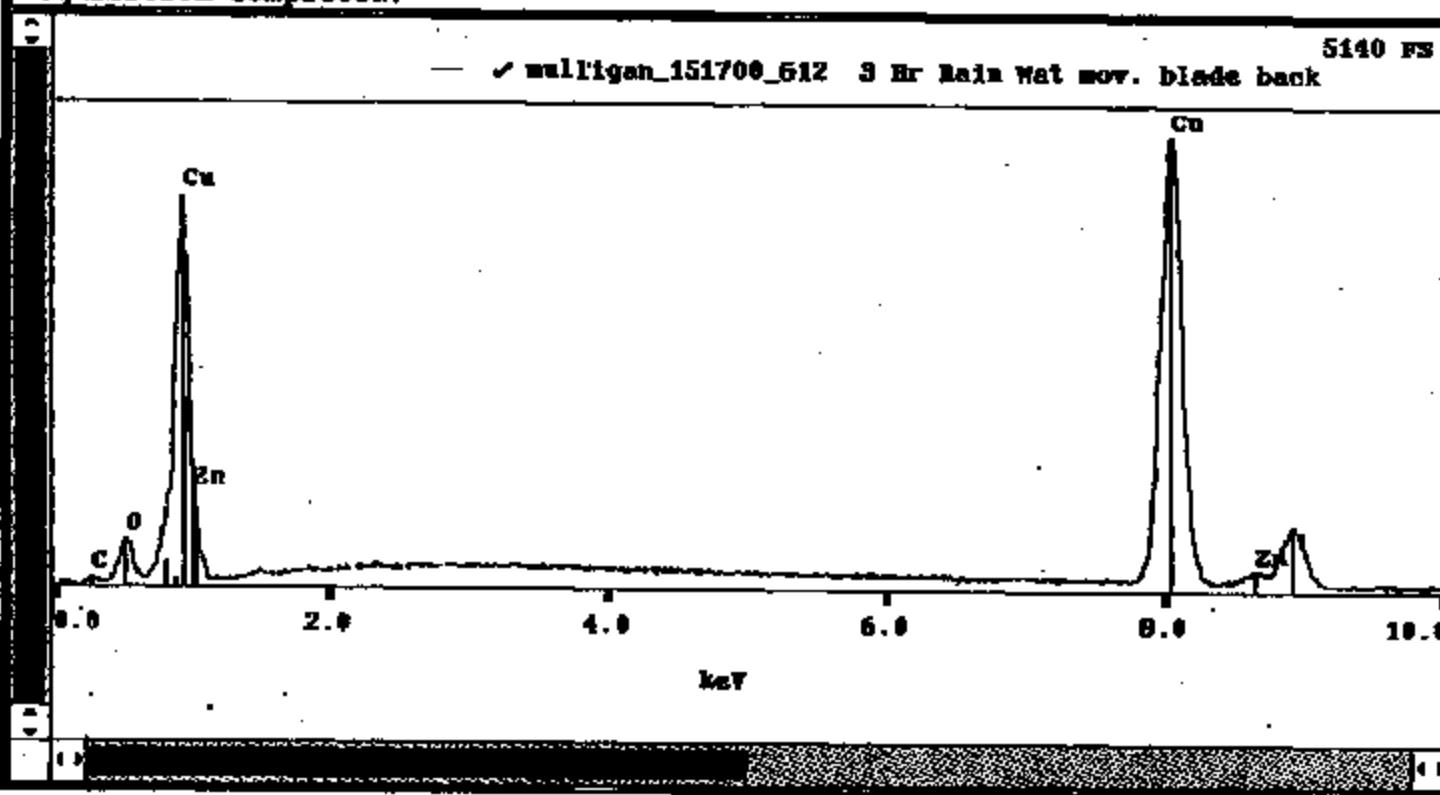
151700 3 Hrs Rain Water, movable blade back, bei 90x 65



TI-NHTSA 9740

File: 511701

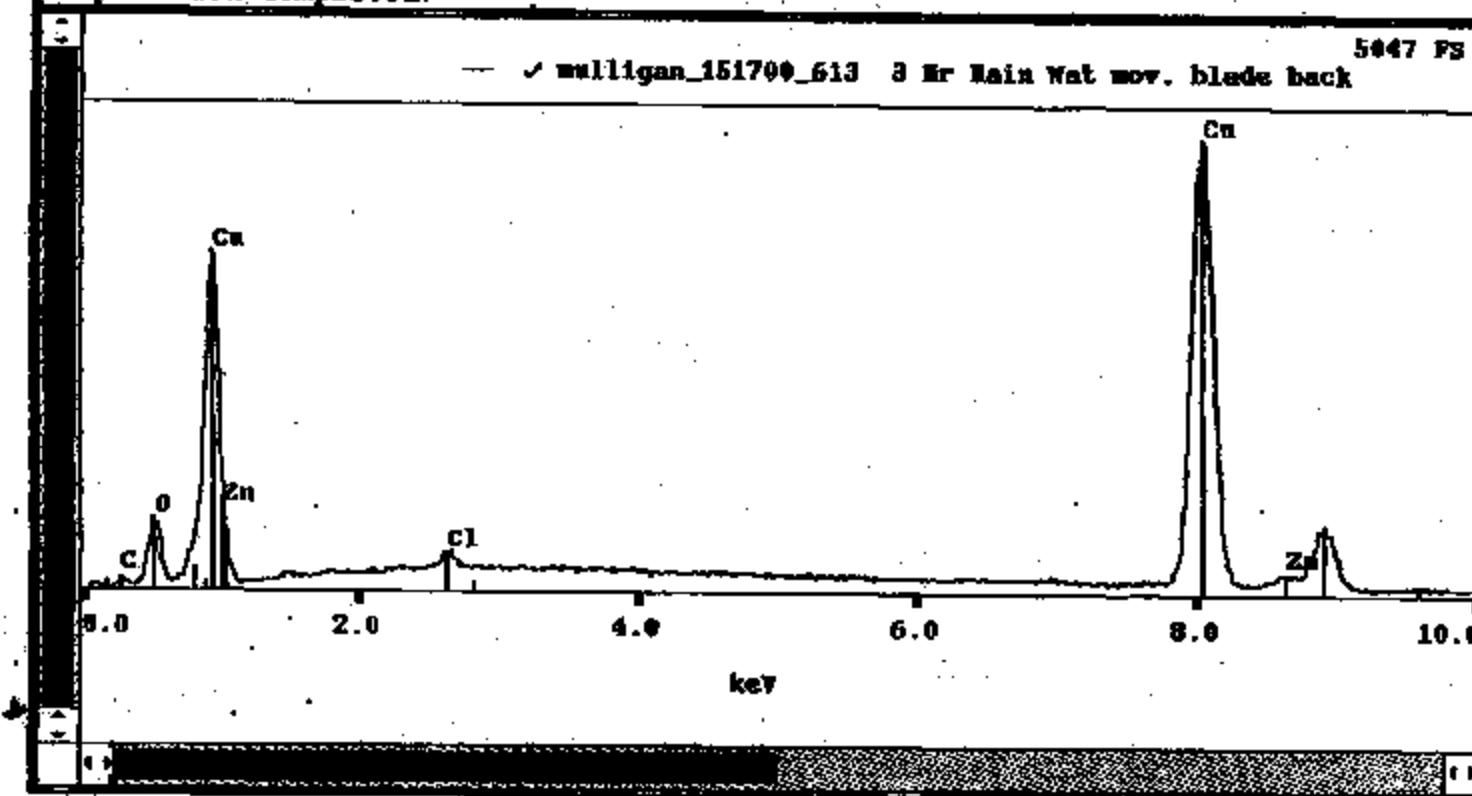
Acquisition completed.



T-NHTSA 9741

C:\TAN\100\102

Acquisition completed.

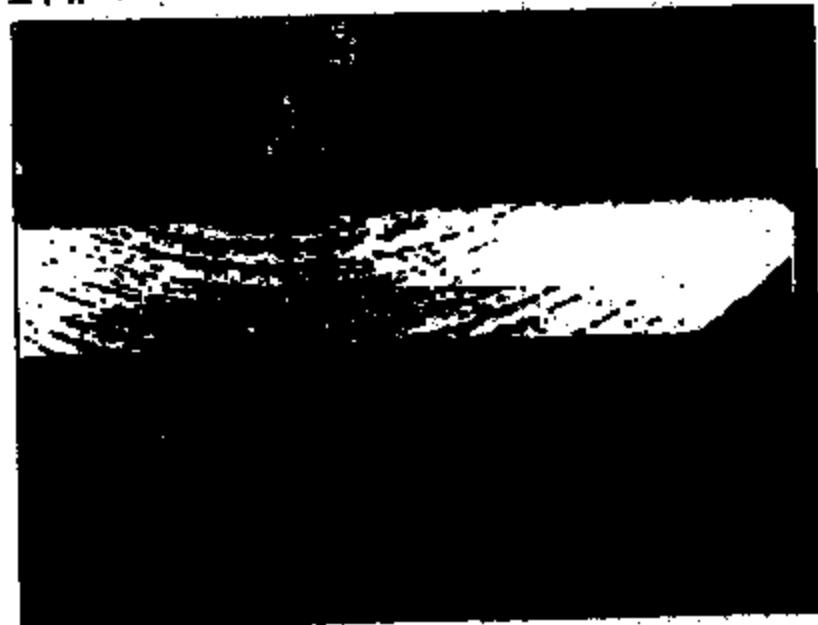


TIA-NHTSA 8742

~~24 H TAP WATER - STAT - Cleaned in IPA~~



~~24 H TAP WATER - STAT - Cleaned in IPA~~



T1-NHTSA 9743

-44 TAPWATER STAT cleared in 300

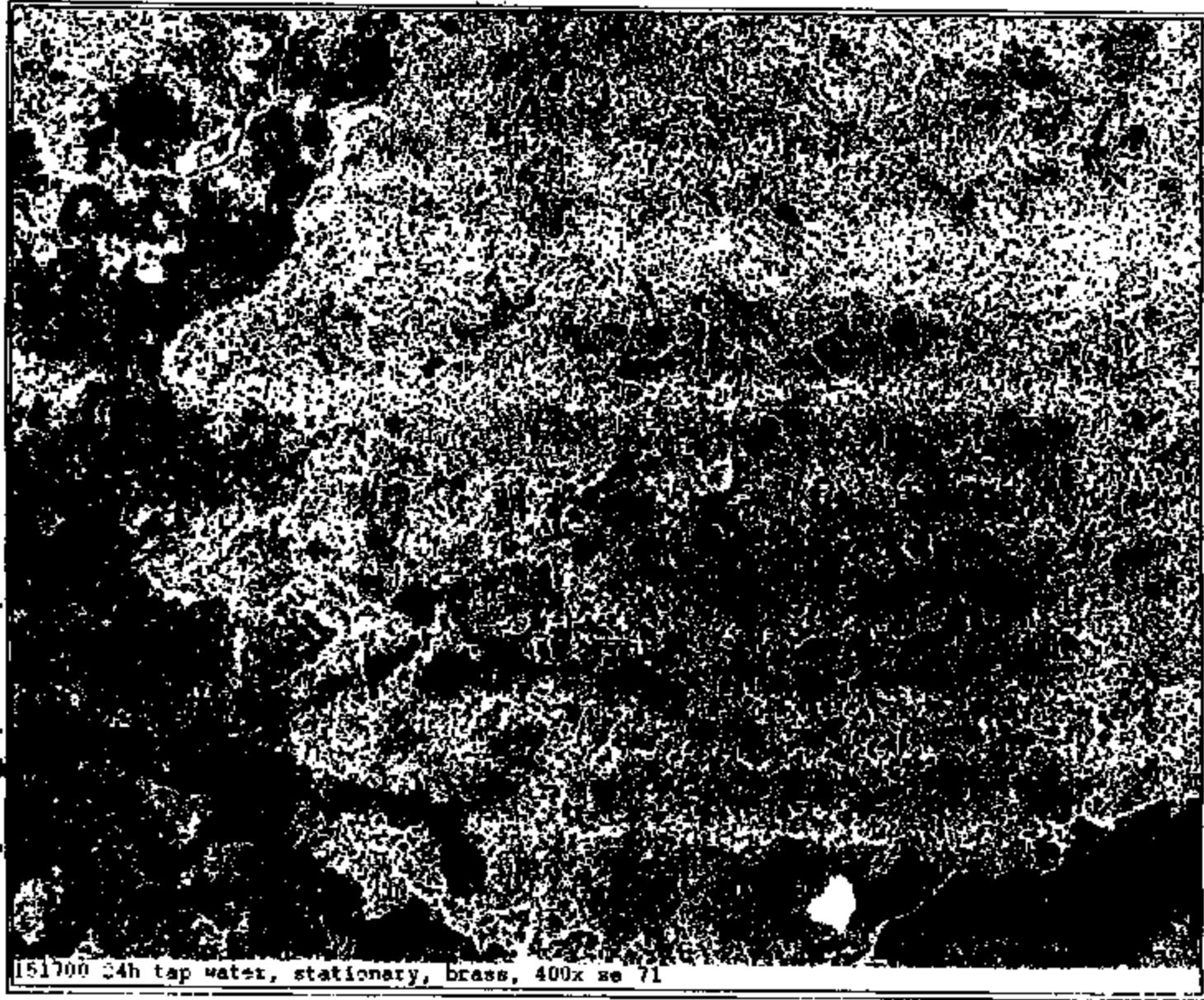


TIA-NHTSA 9744



151700 24h tap water, stationary, brass, 75x ee 70

TH-NHTSA 9745



151700 34h tap water, stationary, brass, 400x se 71

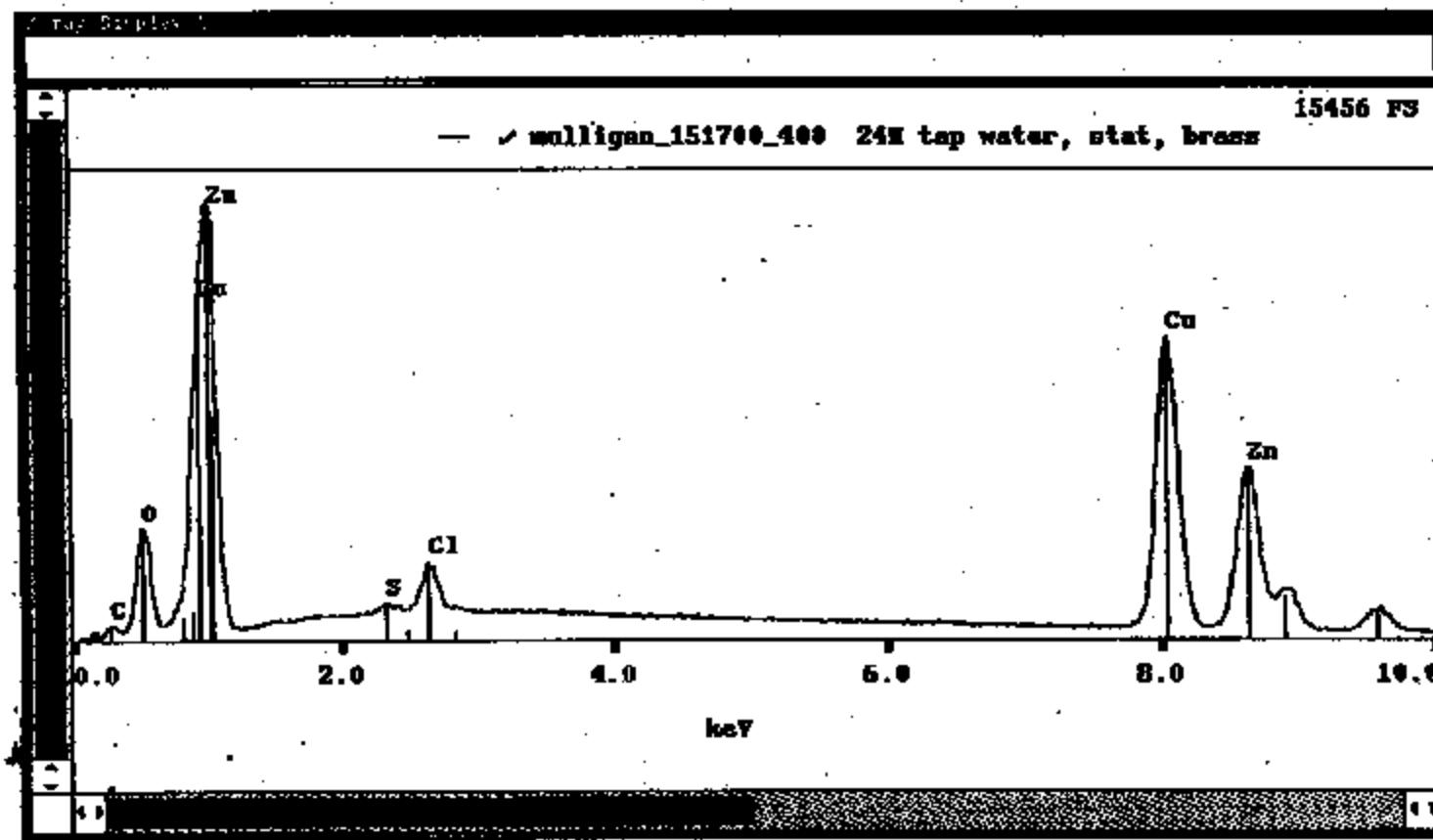


151700 24h tap water, stationary, brass, 75x bei 72

PI-NHTSA 8748

151700 24h tap water, stationary, brass, 600x bei 73

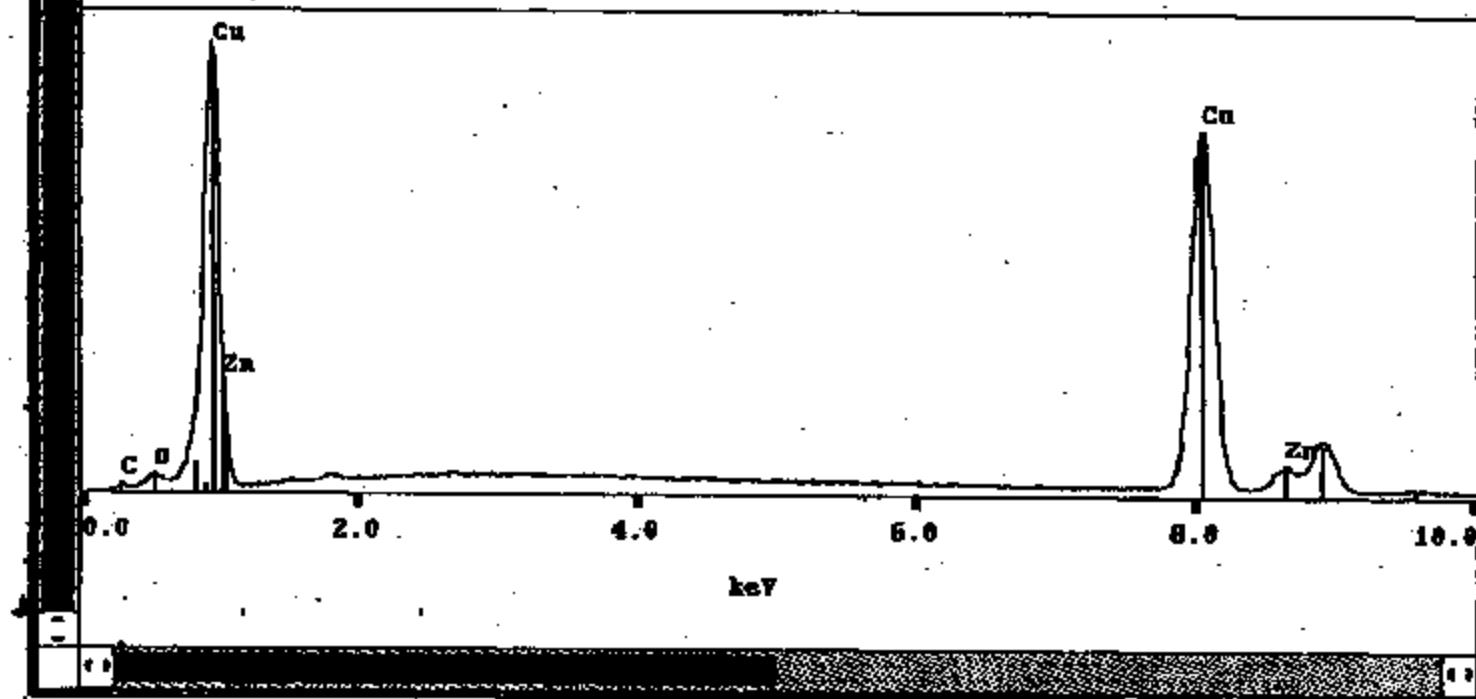




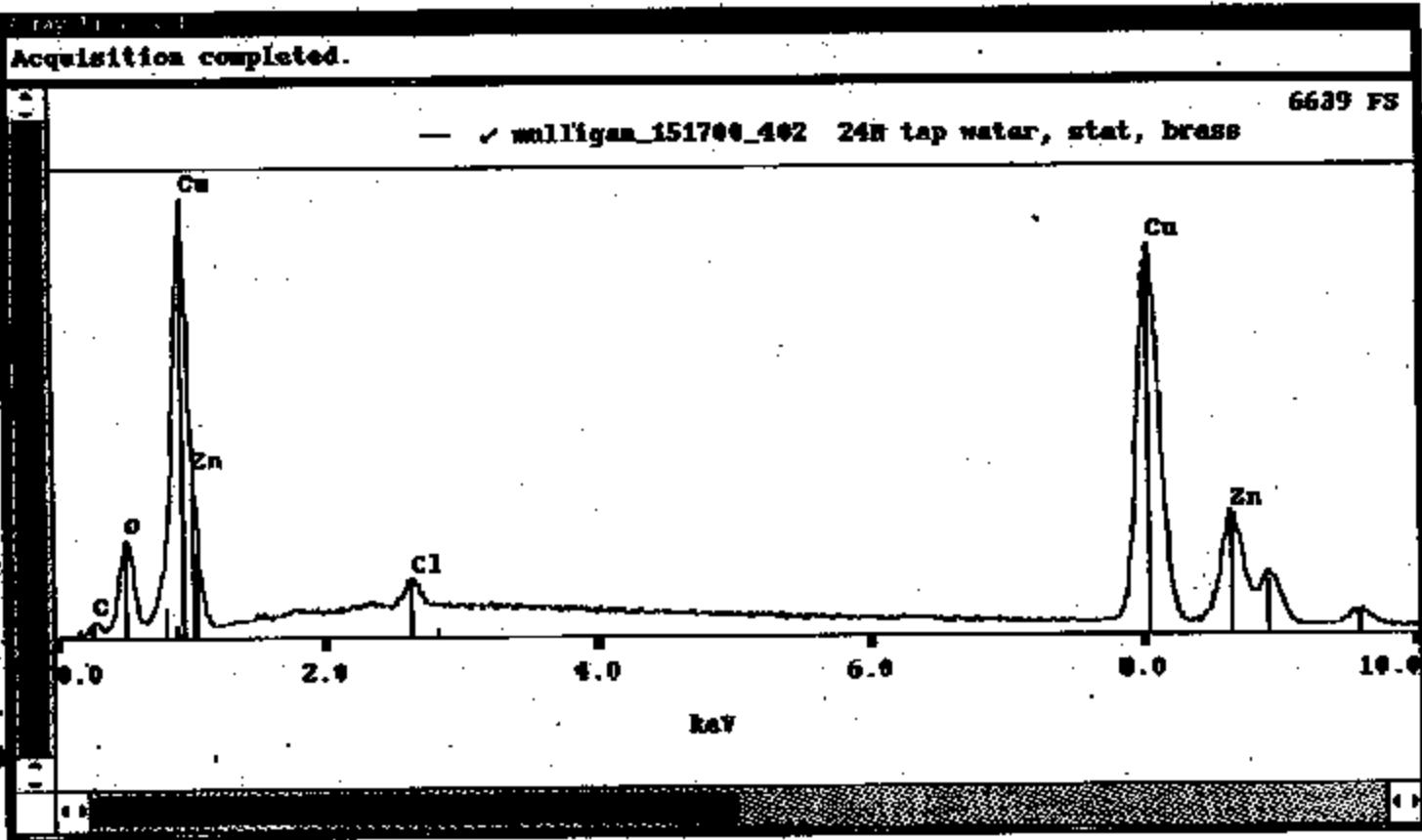
TI-NHTSA 8749

Acquisition completed.

✓ mulligan_151708_401 24H tap water, stat, brass 10414 FS



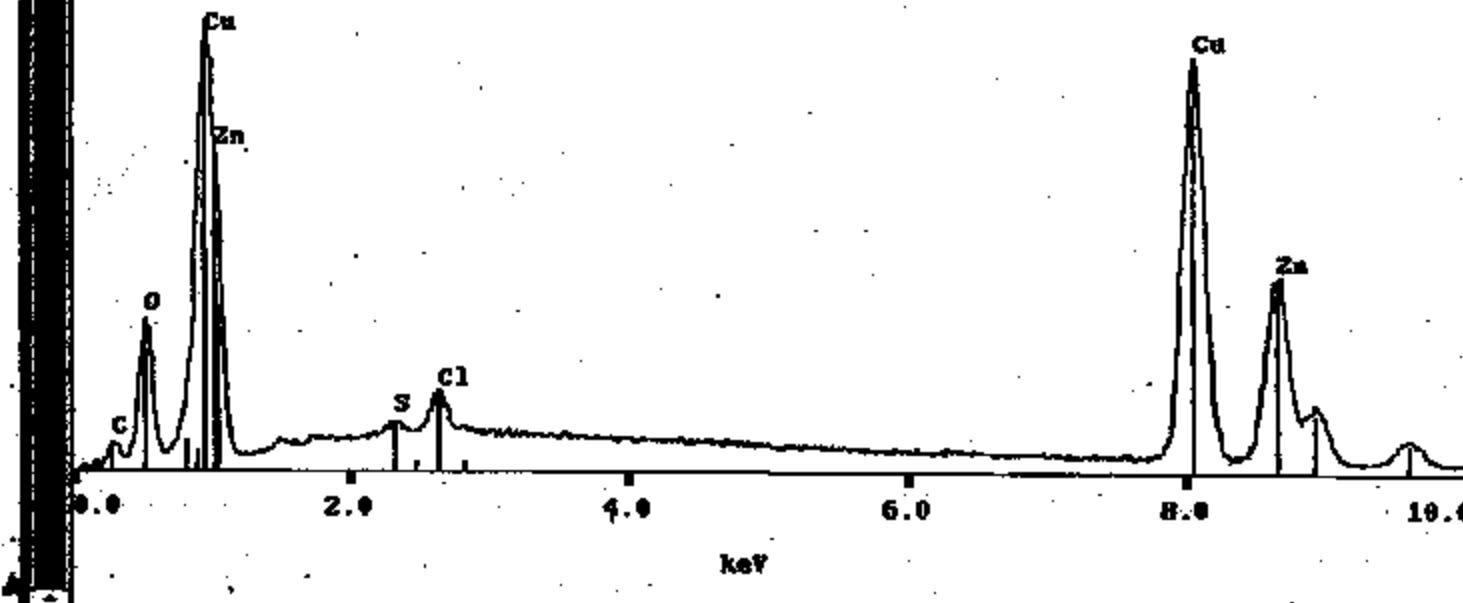
TL-KHNTSA 8750



TH-NHT3A 9781

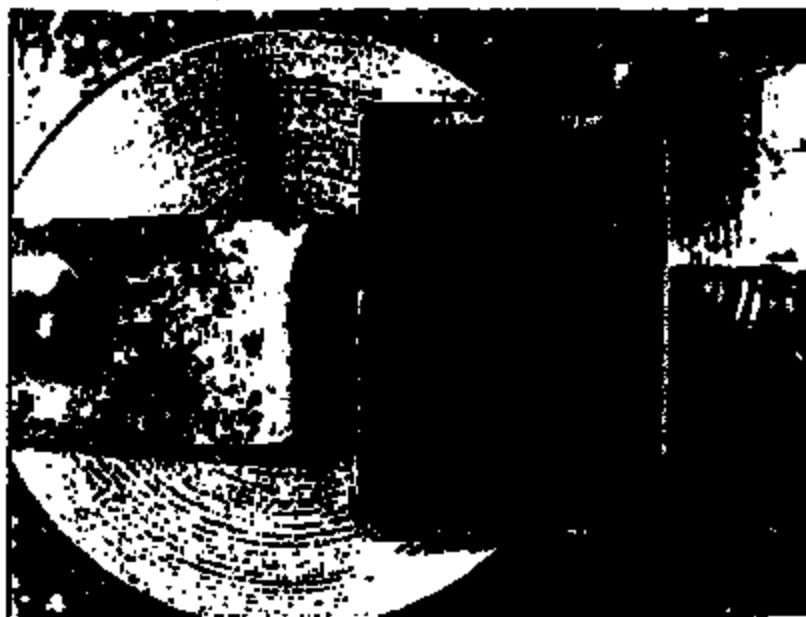
Acquisition completed.

5898 F3
mulligan_151700_463 24H tap water, stat, brass

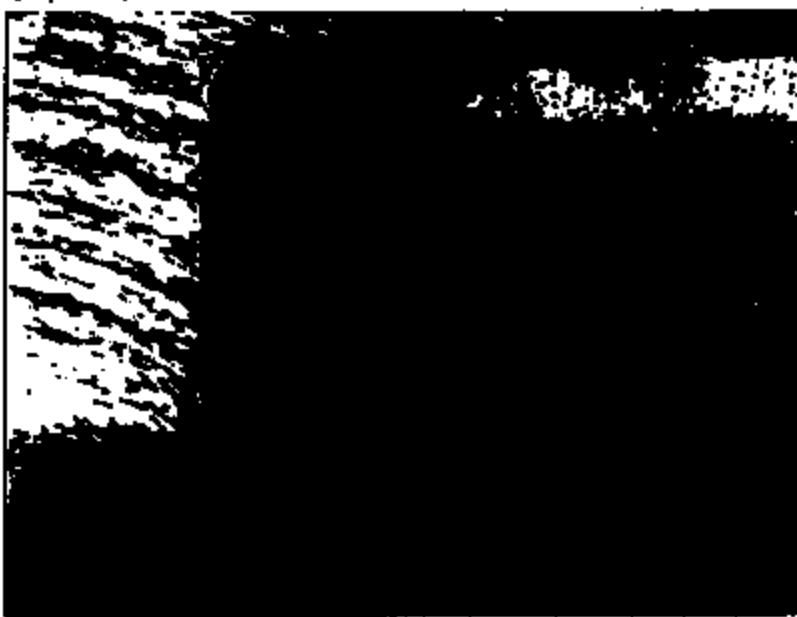


T-NHSA 8752

24 H TAPWATER, THORACIC-CHANCED IN IPA



24 H TAPWATER-Mov SPC Cleared



TI-NHTSA 9753

24 H TAPWATER MOISTURE - Cleaned in IPA



T1-NHTSA 9754



151700 24h tap water, movable, brass, 300x bei 77

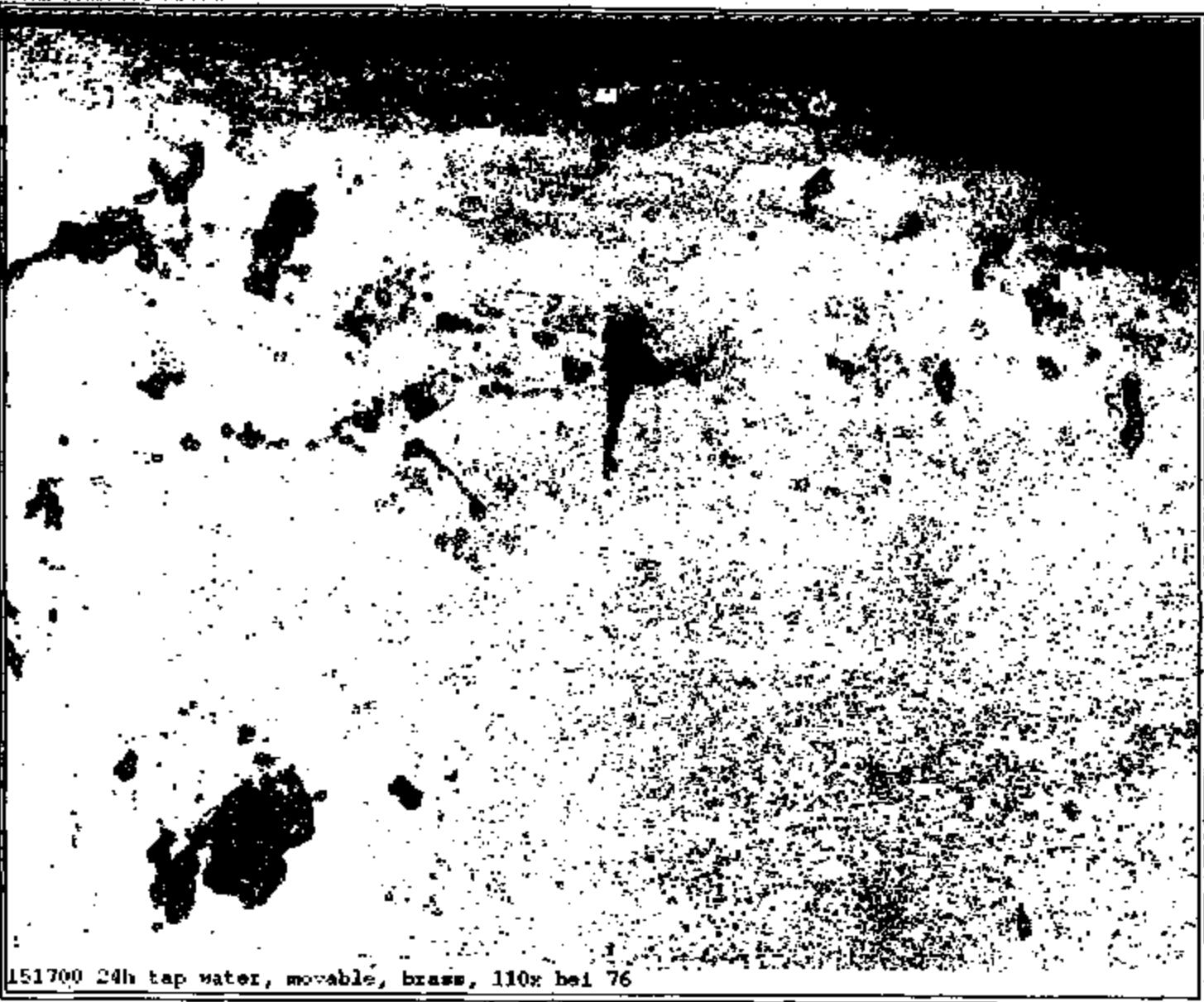


151700 24h tap water, movable, brass, 27x sei 74

TH-NHTSA 9788

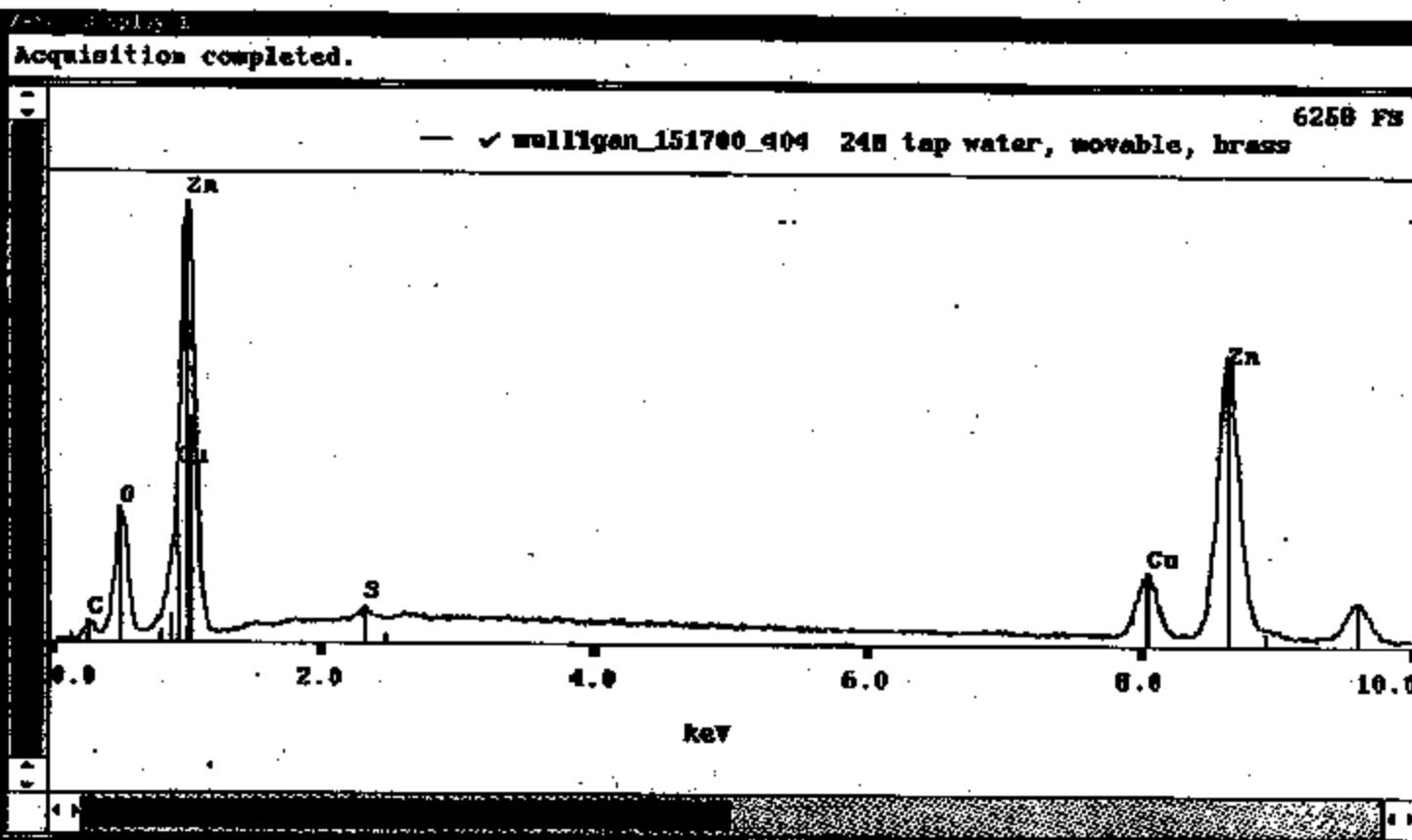


151700 24h tap water, movable, brass, 110x sei 75



151700 24h tap water, movable, brass, 110x bei 76

TH-NHTSA 6738



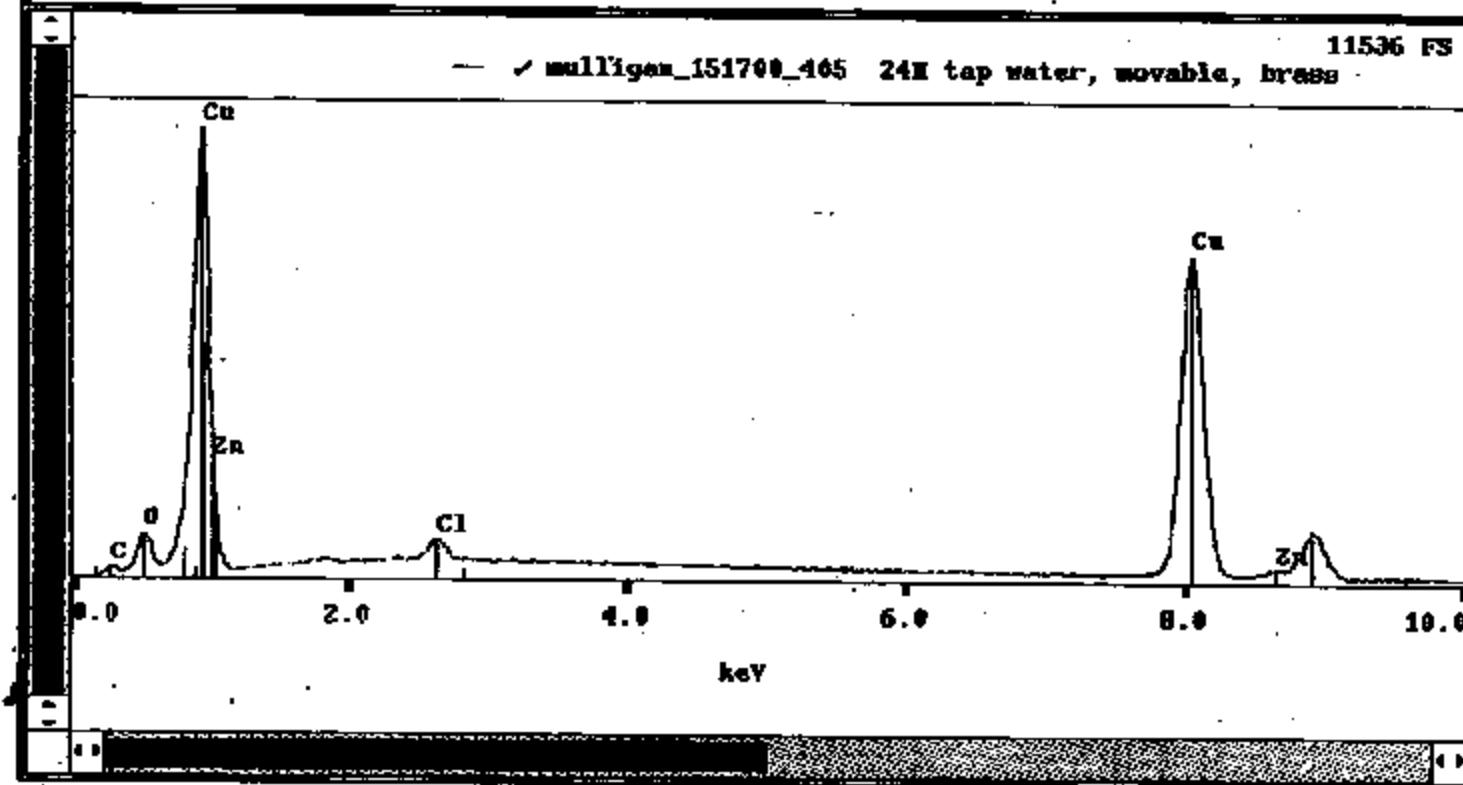
Ti-NHTSA 9750

Z=0.4, 01100.lov

Acquisition completed.

11536 FS

✓ mulligan_151700_465 24K tap water, movable, brass



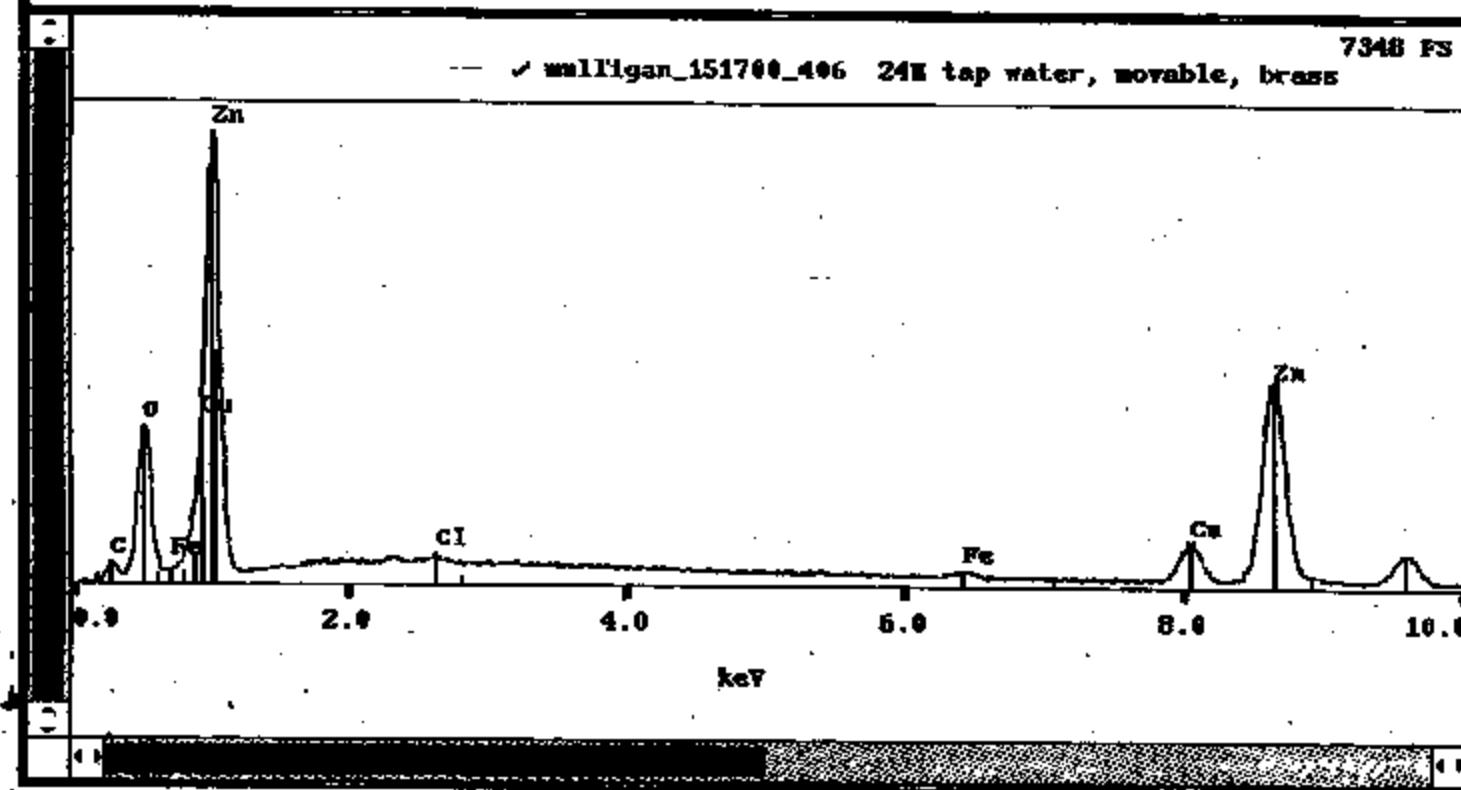
TINHTSA 9780

2.1.5.0.1.0.1

Acquisition completed.

7348 FS

walligan_151700_496 24E tap water, movable, brass



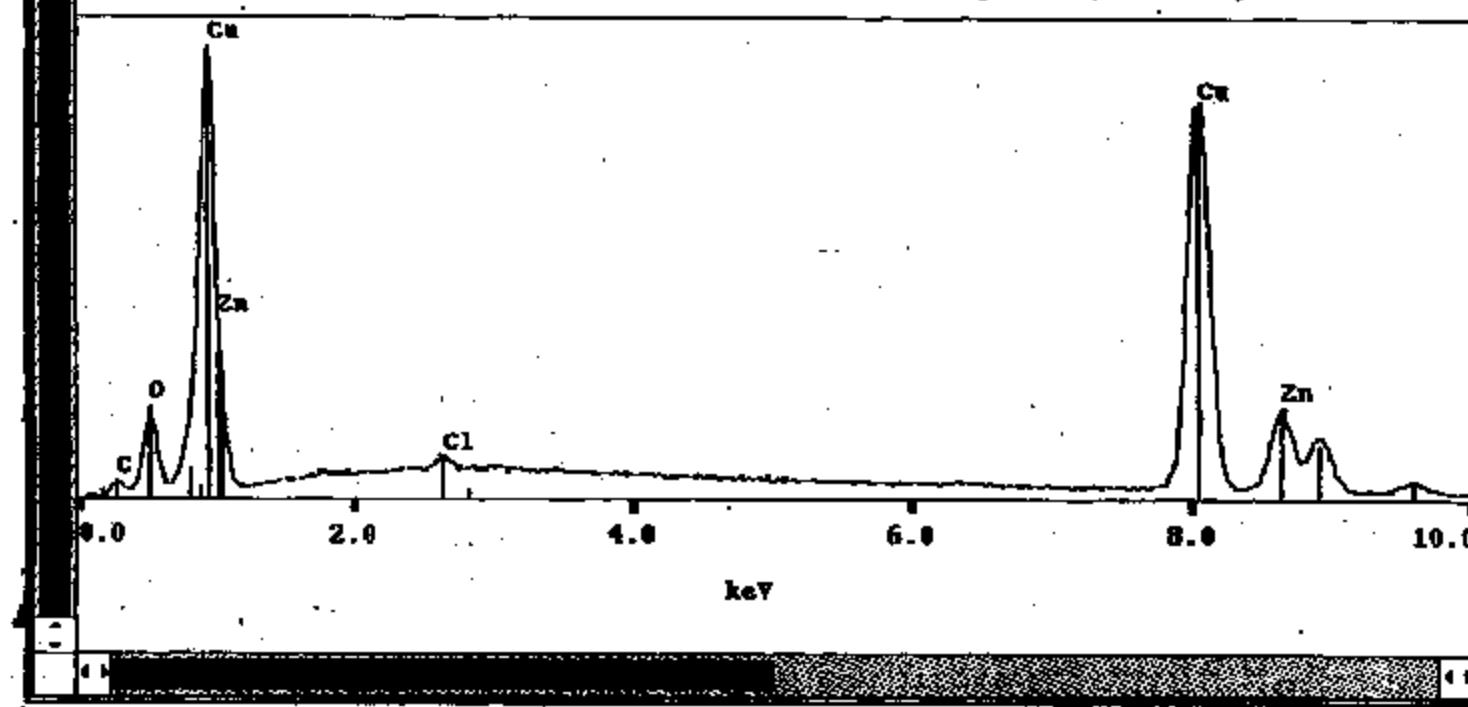
THINTEA 9781

000000000000

Acquisition completed.

0079 F9

✓ nulligan_151700_407 24H tap water, movable, brass

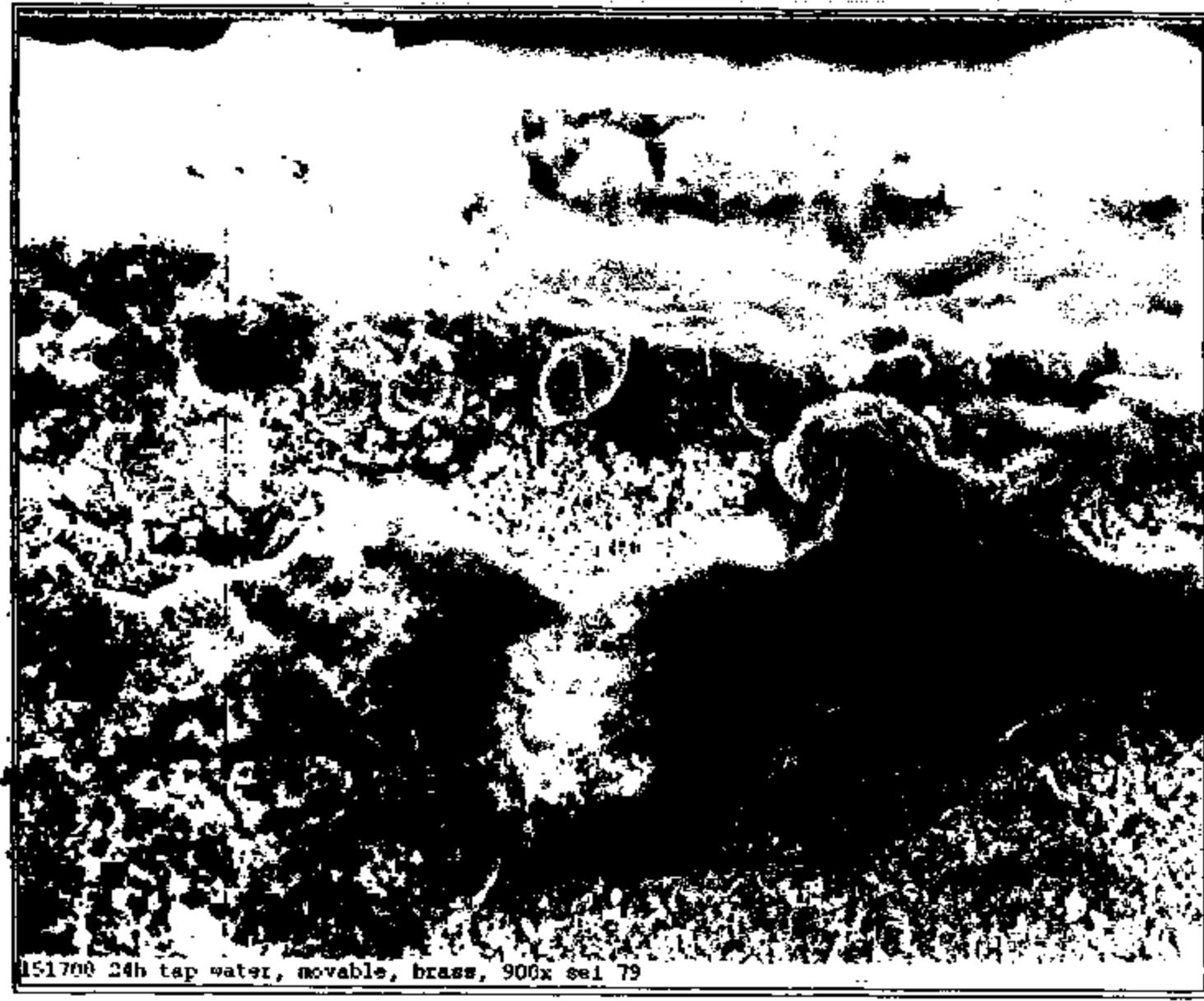


TIAHTSA 0762

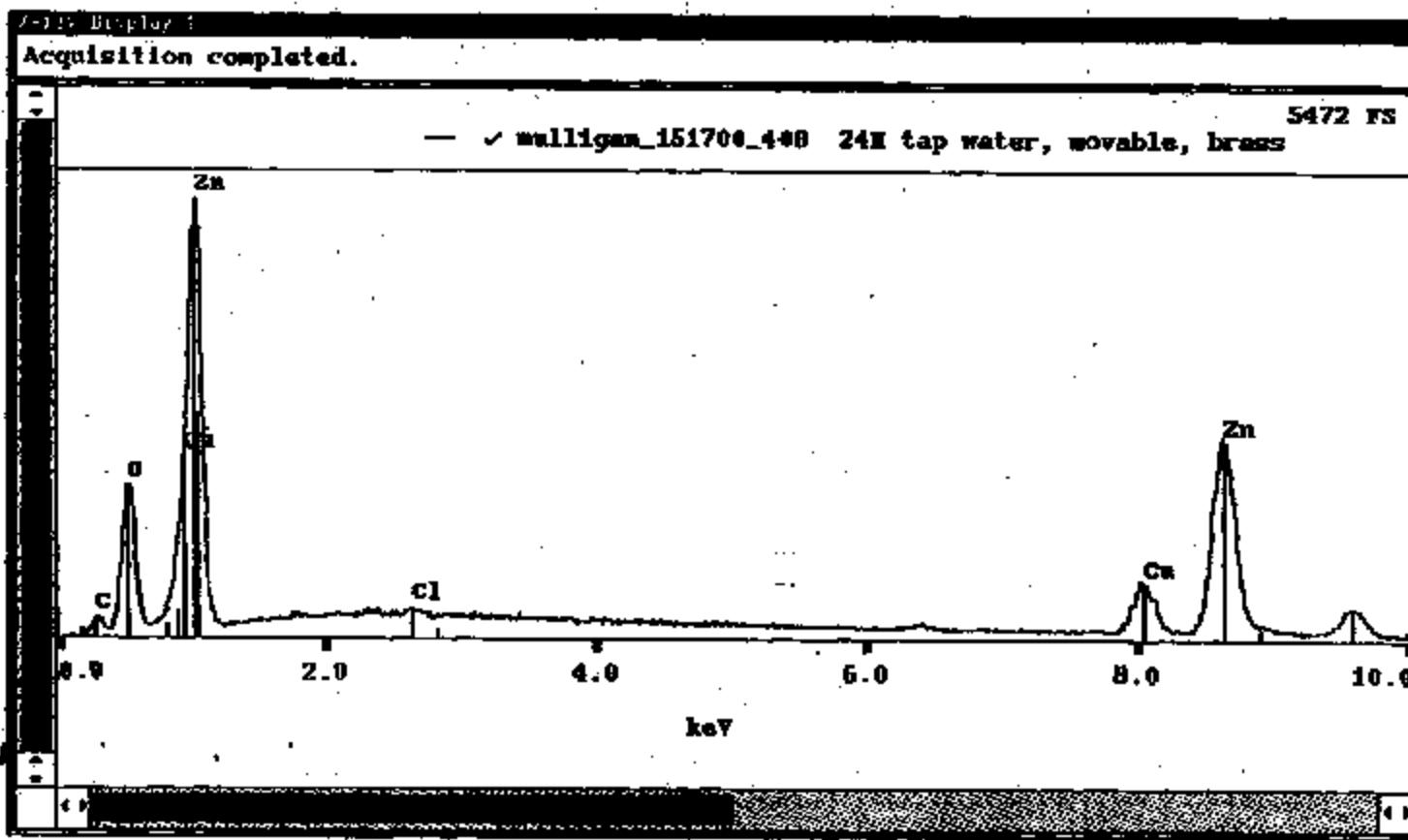


151700 24h tap water, moveable, brass, 900x Mei 78

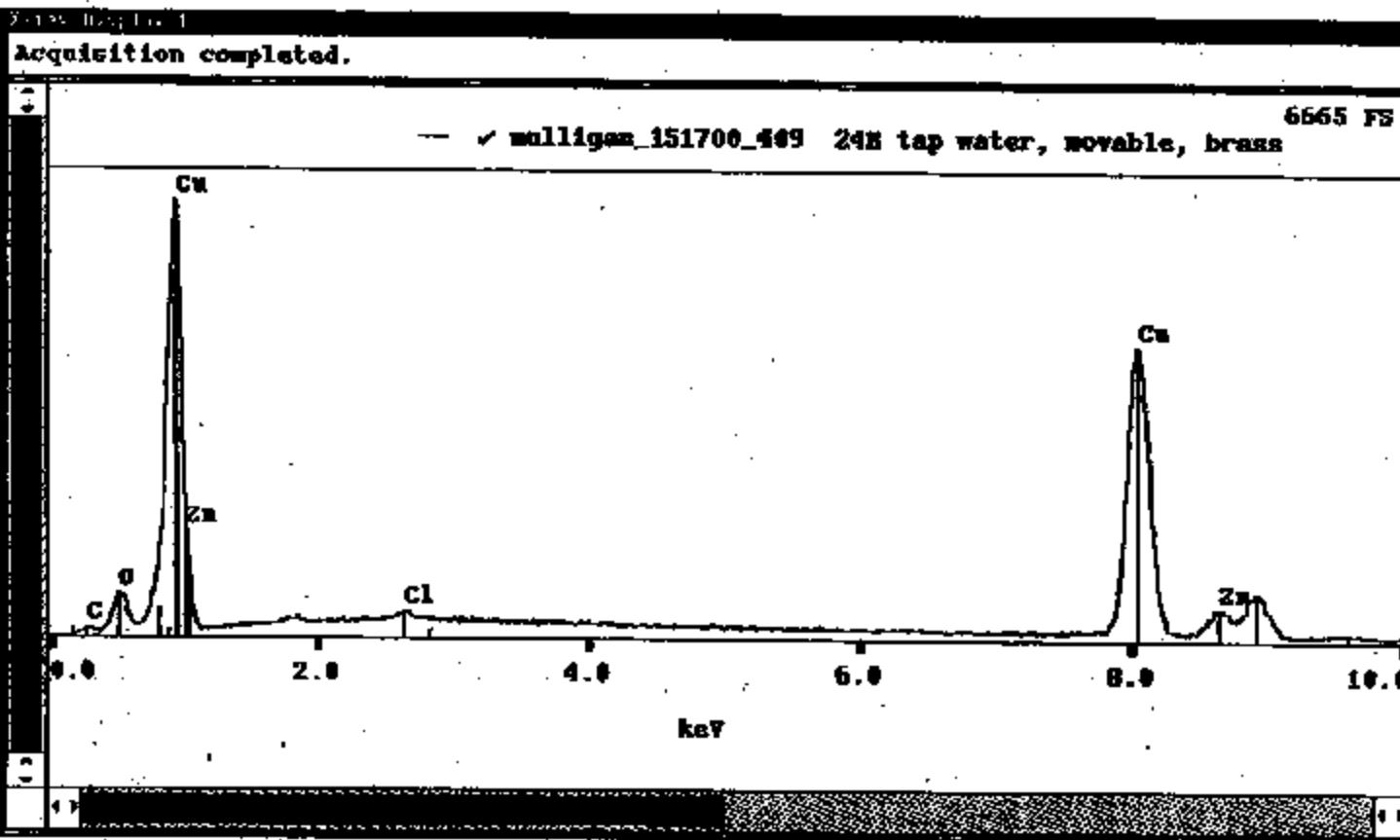
BET



151700 24h tap water, movable, brass, 900x sei 79



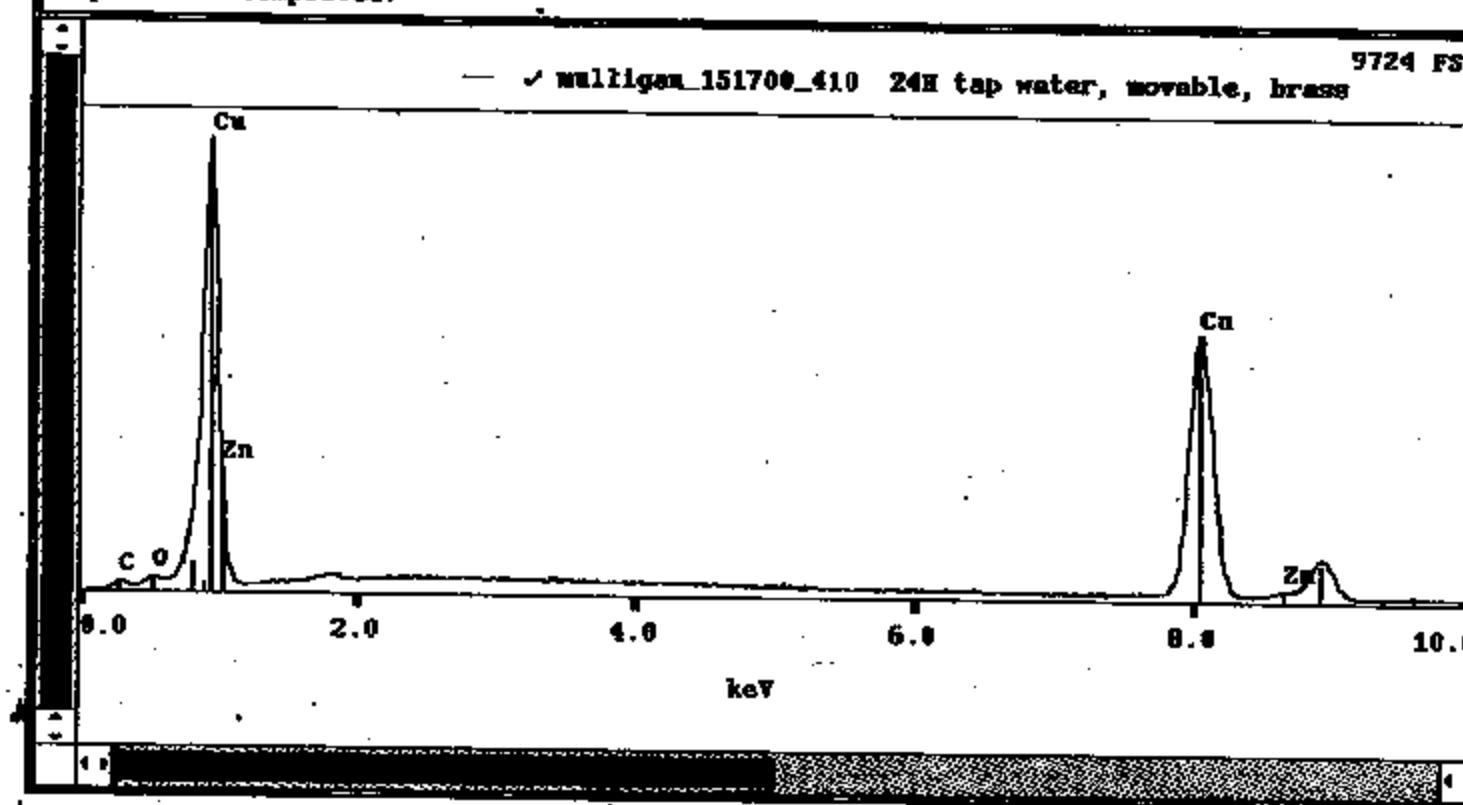
TI-NITRA 9765



П-Н-Г-З-А 0768

X-ray display 1

Acquisition completed.

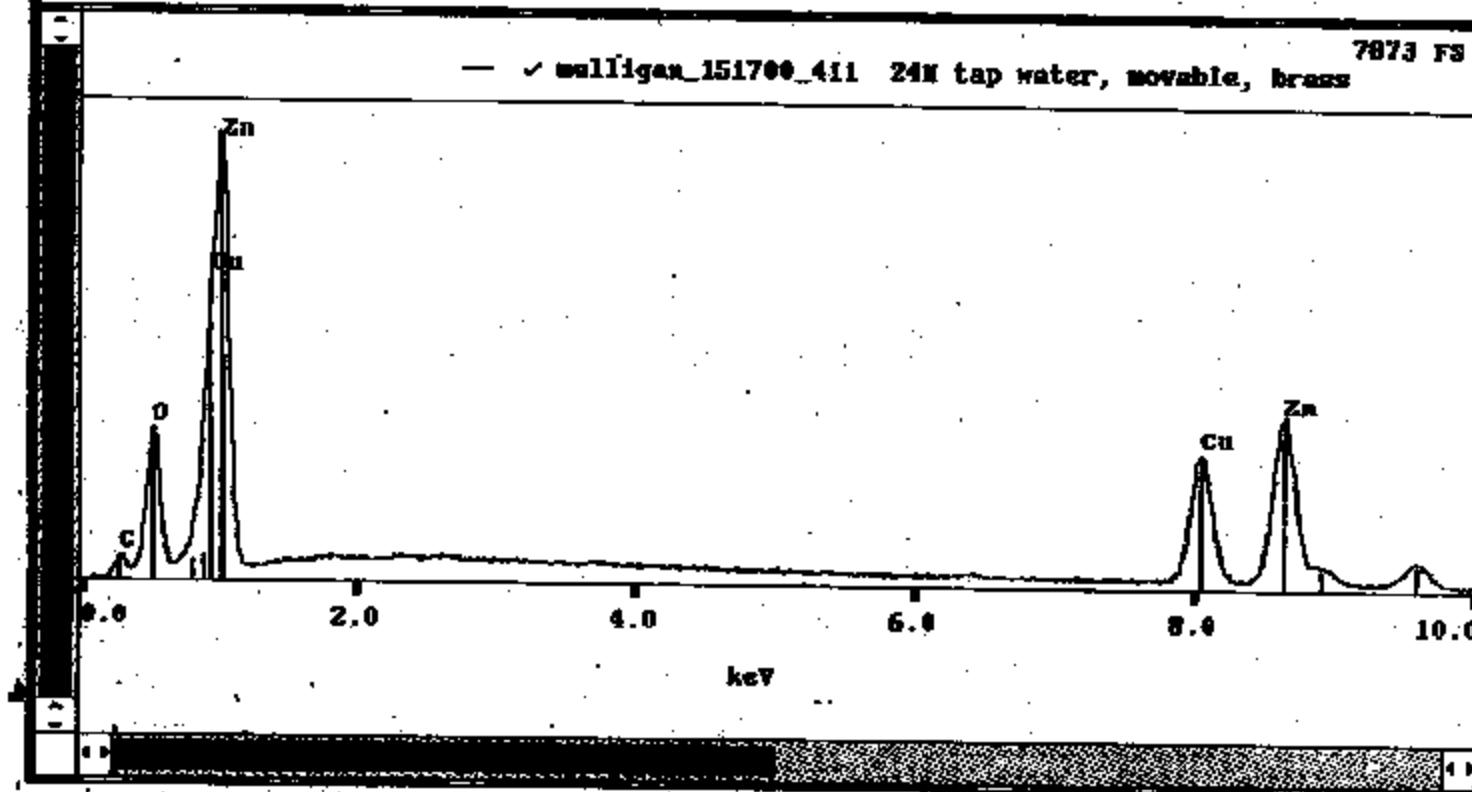


THNHTBA 9767

Acquisition completed.

7873 FS

— ✓ walligan_151700_411 24k tap water, movable, brass



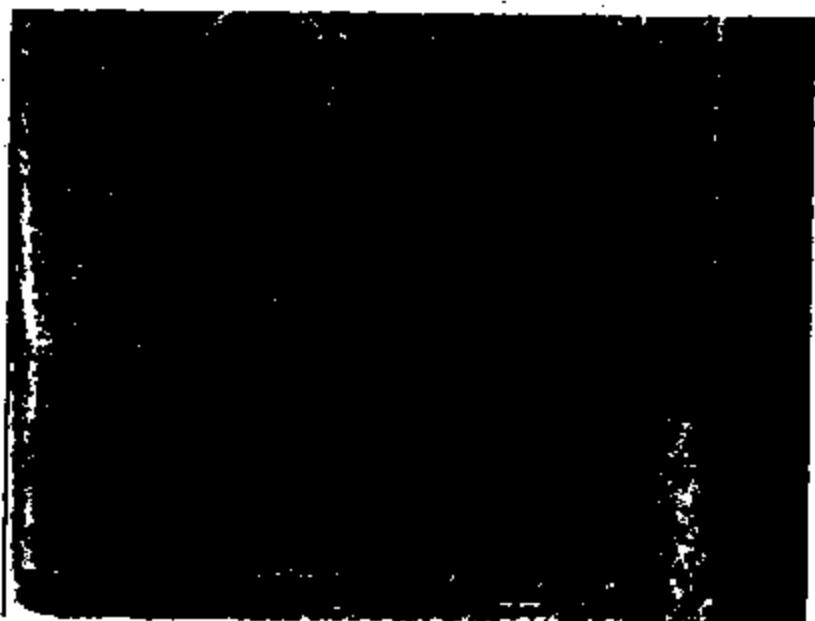
244 NEW B.Fuid 5% water - cleaned in IPA

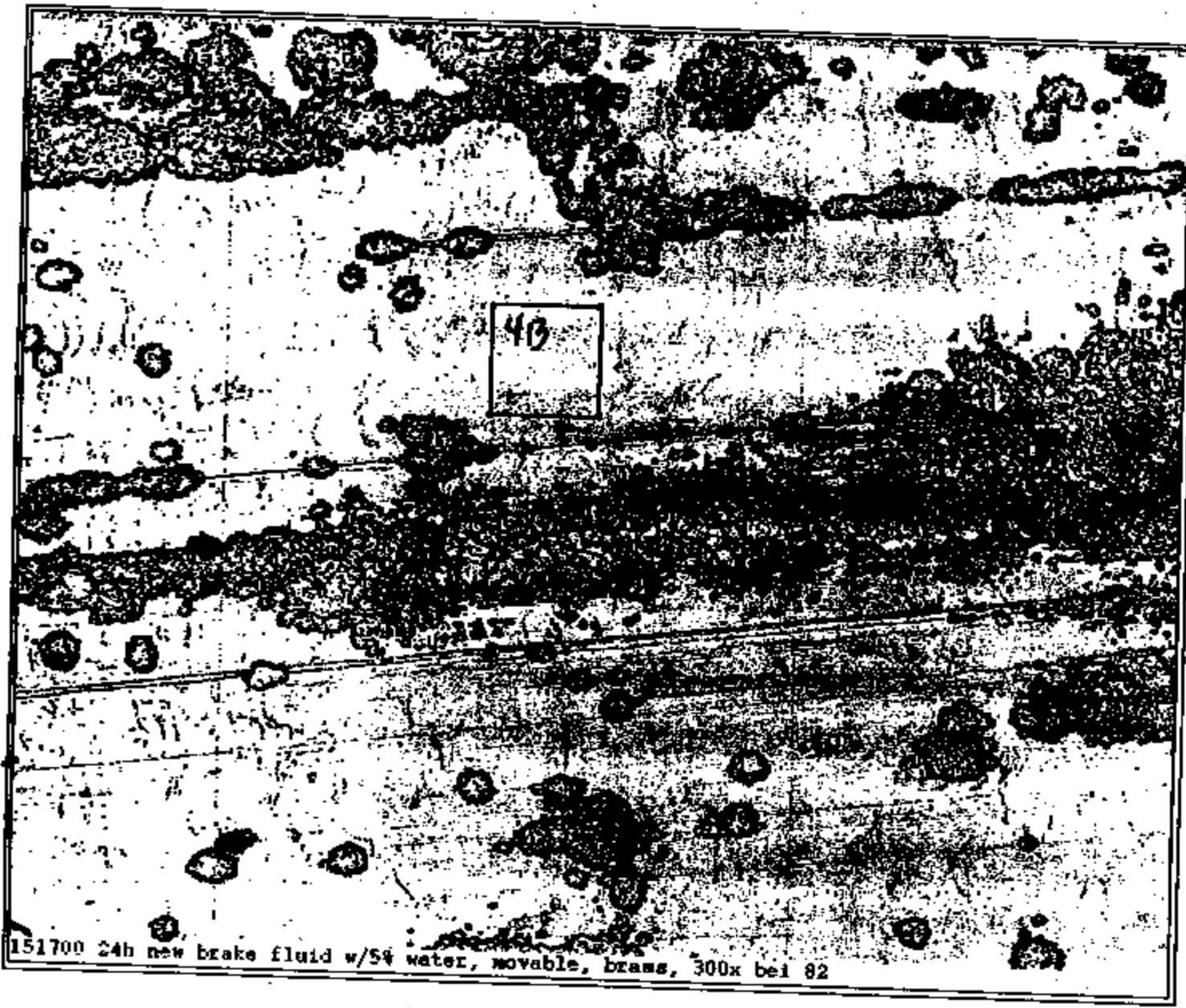
Nov.



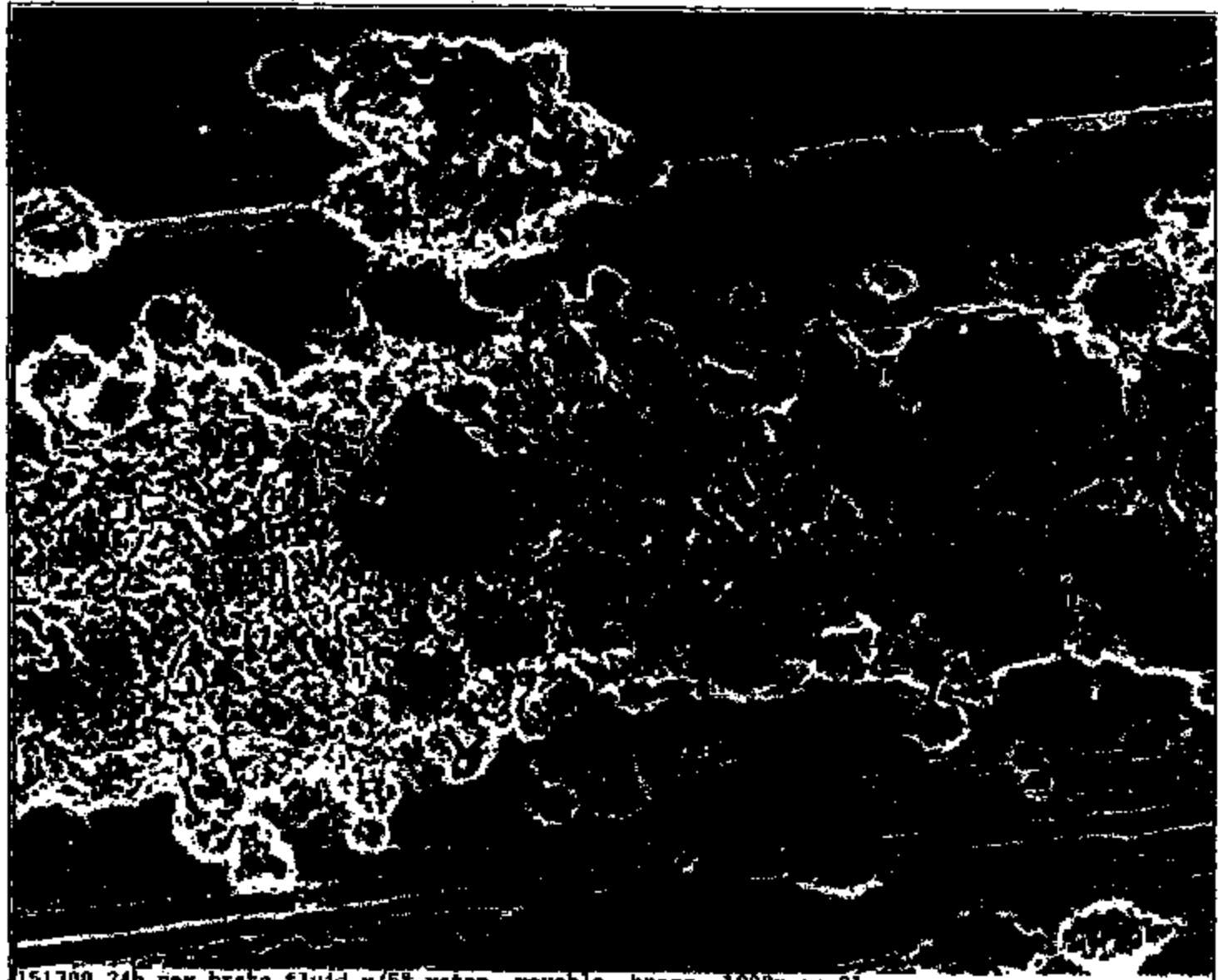
244 NEW BF 5% H2O - Cleaned in IPA

Nov.

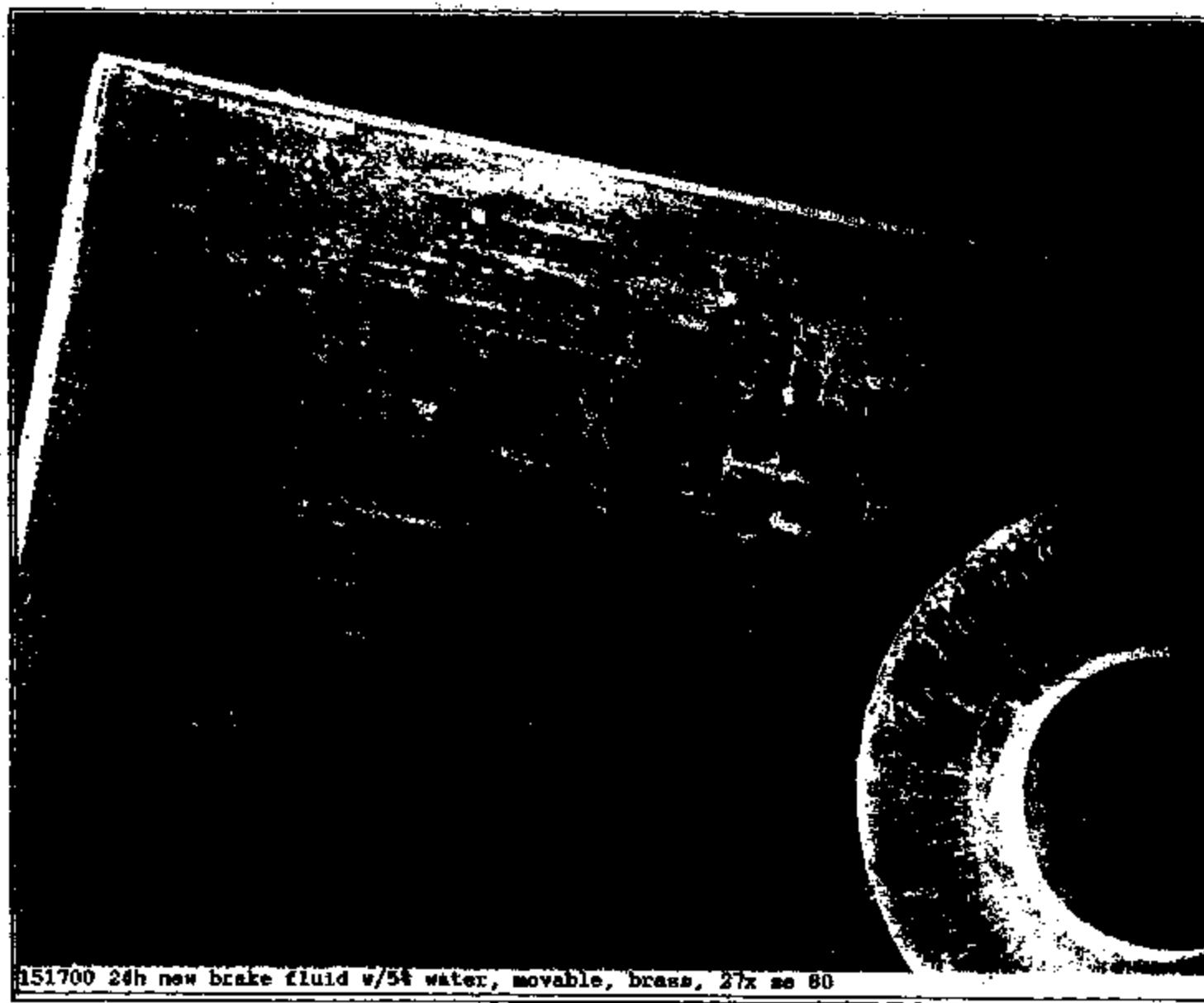




151700 24h new brake fluid w/5% water, movable, brams, 300x bei 82



151700 24h new brake fluid w/5% water, movable, brass, 1000x se 61



151700 24h new brake fluid w/5% water, movable, brass, 27x no 80

TM-NHTSA 8772