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CURTIS,N.W. Pennsylvania Power & Light Co.
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see RFIs

SUBJECT: Forwards qualification repts for MSIV actuators & MSIV leakage control heater sys.

DISTRIBUTION CODE: A048S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 11+282
TITLE: Equipment Qualification (OR & PRE-OL)

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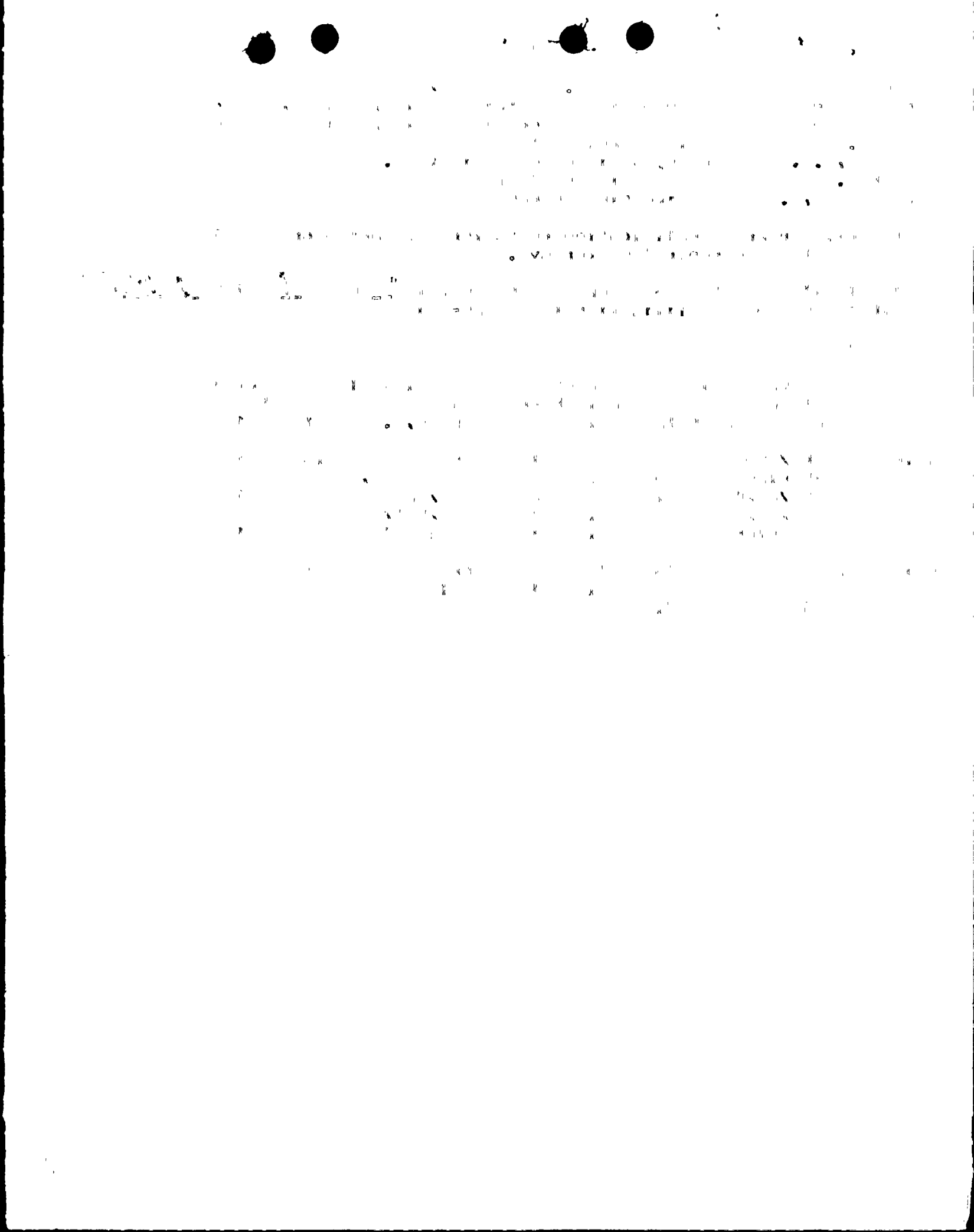

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Norman W. Curtis
Vice President-Engineering & Construction-Nuclear
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JUL 28 1982

Mr. A. Schwencer, Chief
Licensing Branch No. 2
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
SEISMIC QUALIFICATION OF MSIV ACTUATOR AND
LEAKAGE CONTROL HEATER SYSTEM
ER 100450 FILE 841-2 Docket Nos. 50-387
PLA-1220 50-388

Dear Mr. Schwencer:

Enclosed are four-page SQRT Forms and qualification reports for the Main Steam Isolation Valve Actuators (HV-1F022 A through D, HV-1F028A through D) and the Main Steam Isolation Valve - Leakage Control System Heater (1E-203 A through D).

This letter and the enclosed material are provided to satisfy the requirements of Section 3.10.2.1 (3) and (4) of Supplement No. 3 to NUREG 0776 and completes our response to these requirements.

Very truly yours,

R J Curtis

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

A048

Enclosure

cc: R. Perch - NRC w/o
A. Lee - NRC w/a

Qualification Summary of Equipment

I. Plant Name: Susquehanna — Type:

1. Utility: Penn. Power & Light — PWR

2. NSSS: GE 3. A/E: Rechtel — BWR/4-Mark II Containment

II. Component Name Main Steam Isolation Valve & Actuator

1. Scope: [X] NSSS [ ] BOP

2. Model Number: 21283-H Quantity: 8

3. Vendor: Atwood & Morrill Company

4. If the component is a cabinet or panel, name and model No. of the devices included: Not Applicable

5. Physical Description a. Appearance Air-operated Y-pattern globe valve

b. Dimensions 45" wide, 63' long, 114" high

c. Weight 12,300 lb. dry, 13,400 lb wet; Note 1

6. Location: Building: Drywell and steam tunnel

Elevation: 745'

7. Field Mounting Conditions [X] Bolt (No. 20, Size 2")
[ ] Weld (Length)
[X] Butt-welded to 26" main steam piping at the valve inlet and discharge

8. a. System in which located: Main Steam

b. Functional Description: Isolate main steam lines and provide signal on stem position

c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown

[X] Both [ ] Neither

9. Pertinent Reference Design Specifications: GE specification 21A9257, Rev.3

Note 1: Weight of the actuator assembly alone is 2,780 lb.

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III. Is Equipment Available for Inspection in the Plant: [X] Yes [ ] No

IV. Equipment Qualification Method:

[ ] Test [ ] Analysis [X] Combination of Test and Analysis

VPF 3180-12-3 (Note 2)

Qualification Report*: ATR For Susquehanna 1 & 2, 26" MSIV Valve Actuator Dynamic Qualification Test

(No., Title and Date) ATR-DDO-8204

Company that Prepared Report: GE

Company that Reviewed Report: GE

V. Vibration Input:

1. Loads considered: a. [ ] Seismic only

b. [ ] Hydrodynamic only

c. [X] Combination of (a) and (b)

2. Method of Combining RRS: [ ] Absolute Sum [X] SRSS [ ] (other, specify)

3. Required Response Spectra (attach the graphs): Yes

4. Damping Corresponding to RRS: OBE 4% SSE 4%

5. Required Acceleration in Each Direction: [ ] ZPA [X] Other RRS (attached) (specify)

OBE	S/S =	N/A	F/B =	N/A	V =	N/A
SSE	S/S =	N/A	F/B =	N/A	V =	N/A

6. Were fatigue effects or other vibration loads considered?

[X] Yes [ ] No

If yes, describe loads considered and how they were treated in overall qualification program: Thermal fatigue effect was evaluated per the applicable ASME Boiler & Pressure Vessel Code and documented in the Design Report (VPF 3180-12-3)

*NOTE: If more than one report complete items IV thru VII for each report.

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Note 2: This is the valve design report. It is referenced here only for the thermal fatigue analysis.

VI. If Qualification by Test, then Complete*: Actuator only.

1. [ ] Single Frequency [ ] Multi-Frequency: [ ] random [ ] sine beat [X] Independent
2. [ ] Single Axis [ ] Multi-Axis
3. No. of Qualification Tests: OBE 10 SSE 2 Other _____ (specify)
4. Frequency Range: 1-100 Hz
5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical):
   S/S = Open & closed 10.2 Hz F/B = Open - 11.4 Hz Closed-11.7 Hz V = Open - 90 Hz Closed - 10 Hz
6. Method of Determining Natural Frequencies
   [X] Lab Test [ ] In-Situ Test [ ] Analysis
7. TRS enveloping RRS using Multi-Frequency Test [X] Yes (Attach TRS & RRS graphs) [ ] No
8. Input g-level Test: OBE S/S = N/A F/B = N/A V = N/A
   SSE S/S = N/A F/B = N/A V = N/A
9. Laboratory Mounting:
   1. [X] Bolt (No. 20, Size 2") [ ] Weld (Length _____) [ ] _____
10. Functional operability verified: [X] Yes [ ] No [ ] Not Applicable
11. Test Results including modifications made: Demonstrated that the valve actuator assembly performed all tested functions throughout the test sequence.
12. Other test performed (such as aging or fragility test, including results):
    NONE

*Note: If qualification by a combination of test and analysis also complete Item VII.

VII. If Qualification by Analysis, then complete:

1. Method of Analysis:

[ ] Static Analysis [ ] Equivalent Static Analysis

[X] Dynamic Analysis: [ ] Time-History [ ] Response Spectrum

2. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical):

S/S = _____ F/B = _____ V = _____

3. Model Type: [X] 3D [ ] 2D [ ] 1D

[X] Finite Element [X] Beam [ ] Closed Form Solution

4. [X] Computer Codes: PISYS [illegible]

Frequency Range and No. of modes considered: Seismic: 1-33 Hz
Hydrodynamic: 1-60 Hz

[ ] Hand Calculations

5. Method of Combining Dynamic Responses: [ ] Absolute Sum [X] SRSS
[ ] Other: _____ (specify)

6. Damping: OBE .5% N/A SSE 1% Seismic 2% Hydrodynamic Basis for the damping used: 385HZ777

7. Support Considerations in the model: Rigid supports, snubbers, hangers, struts and weld ends

8. Critical Structural Elements:

A.

Identification	Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable
Inboard MSIV Outlet at Line A	Main Steam A line	SSE & Hydro.	SSE	8226	17,700 psi

B.

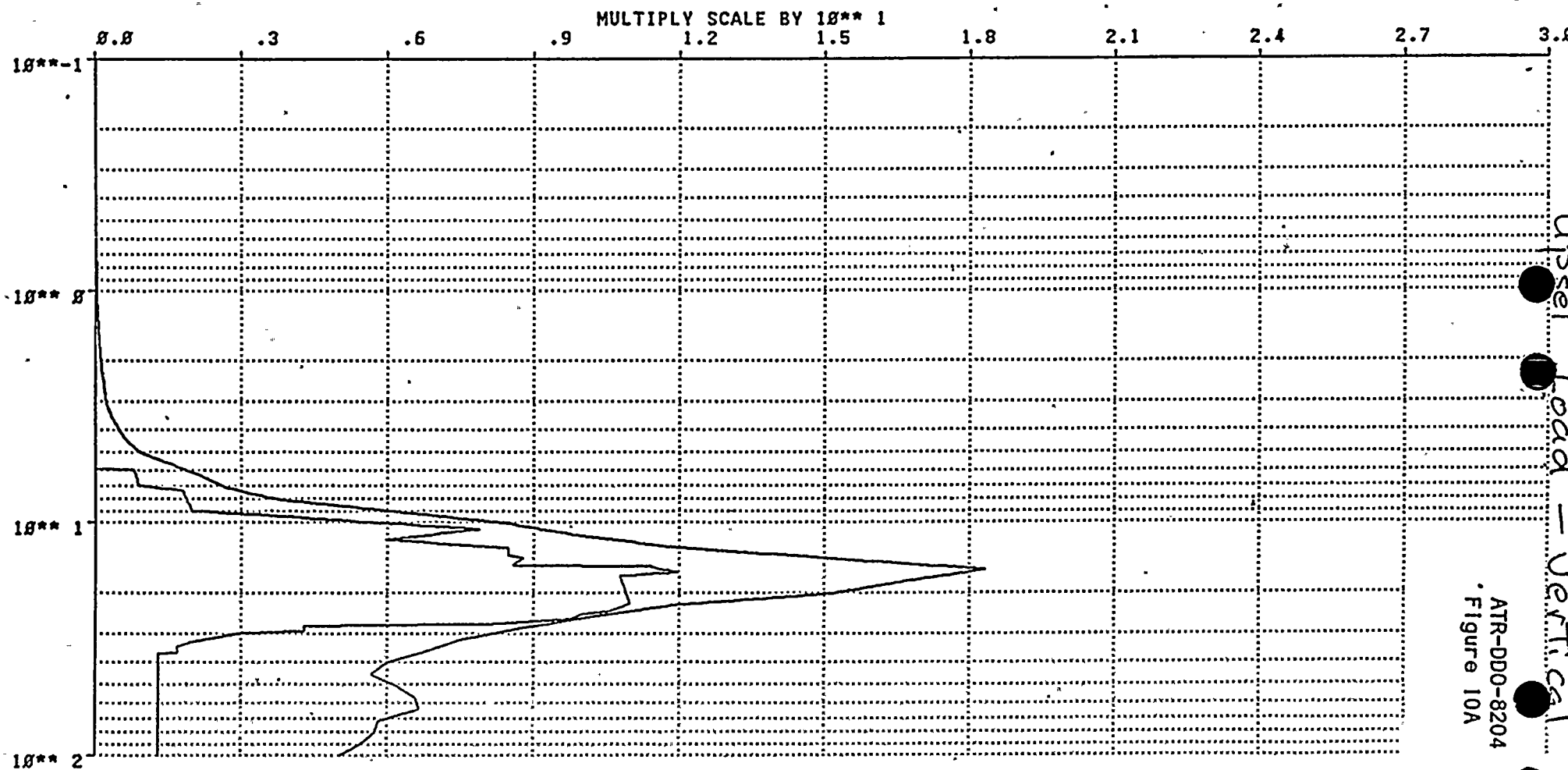
Max. Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability
See Test		

RUN 25 TPP524.Ø926 OBE 9ØX XA-YC DATE 6/15/82 16:1Ø: Ø CHANNEL 4 TAB VT1

DECIMATION RATIO 2 7412 POINTS ANALYZED. DELTA T .ØØ4 1/6 OCTAVE 1ØØ.ØØ HZ LP FILTER 6 POLES

4.ØØ % DAMPING START TIME Ø.ØØØ SEC END TIME 29.648 SEC Ø RECORDS SKIPPED 218 RECORDS ANALYZED

1ØØ.Ø % AND Ø.Ø % RRS PLOTTED



SEMI-CLOSED METHOD APPROXIMATION : 7-22-8Ø REVISION

Upset load – vertical

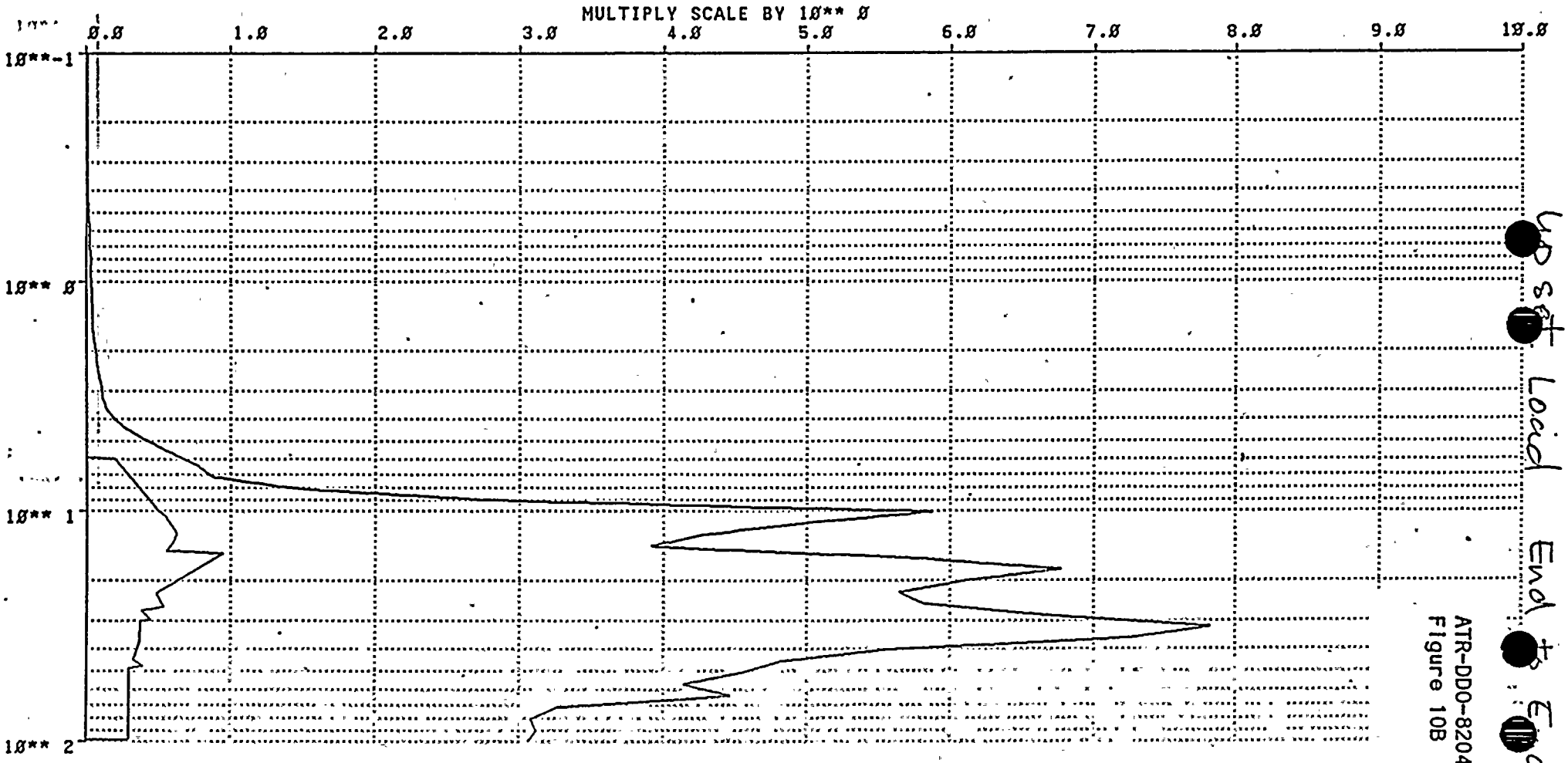
ATR-DDO-8204
Figure 10A

RUN 125 TPP524.0926 OBE 90% XA-YC DATE 6/15/82 16:10: 0 CHANNEL 3 TAB HZ1

DECIMATION RATIO 2 7412 POINTS ANALYZED DELTA T .004 1/ 6 OCTAVE 100.00 HZ LP FILTER 6 POLES

4.00 % DAMPING START TIME 0.000 SEC END TIME 29.648 SEC 0 RECORDS SKIPPED 218 RECORDS ANALYZED

100.0 % AND 0.0 % RRS PLOTTED



SEMI-CLOSED METHOD APPROXIMATION : 7-22-80 REVISION

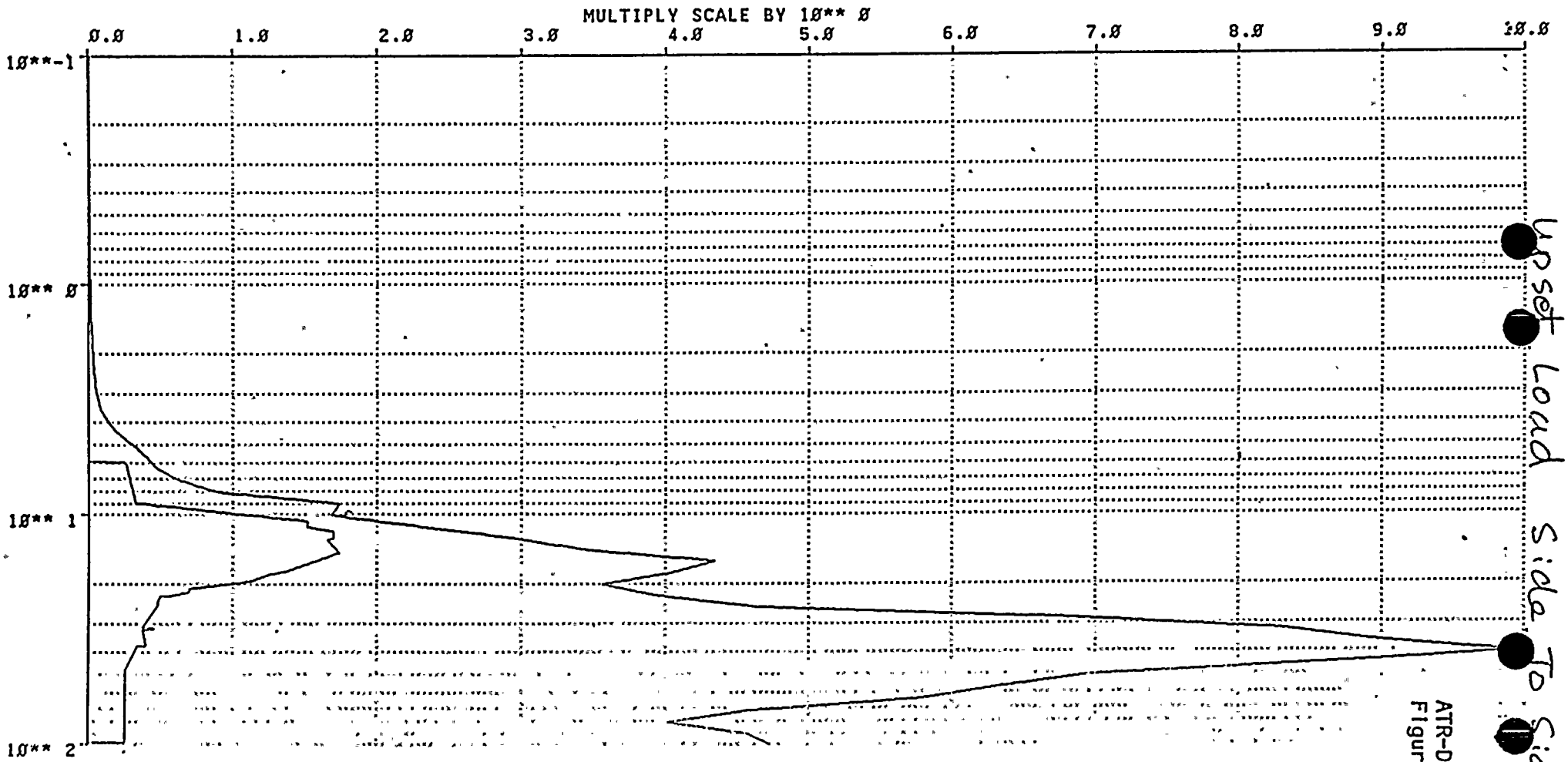
ATR-DDO-8204
Figure 10B

RUN 45 TPP524.0926 MSIV OBEZ 95% ZB-YC DATE 6/19/82 12:50: 0 CHANNEL 3 TAB HZ1

DECIMATION RATIO 2 7344 POINTS ANALYZED DELTA T .004 1/ 6 OCTAVE 100.00 HZ LP FILTER 6 POLES

4.00 % DAMPING START TIME 0.000 SEC END TIME 29.376 SEC 0 RECORDS SKIPPED 216 RECORDS ANALYZED

100.0 % AND 0.0 % RRS PLOTTED



SEMI-CLOSED METHOD APPROXIMATION : 7-22-69 REVISION

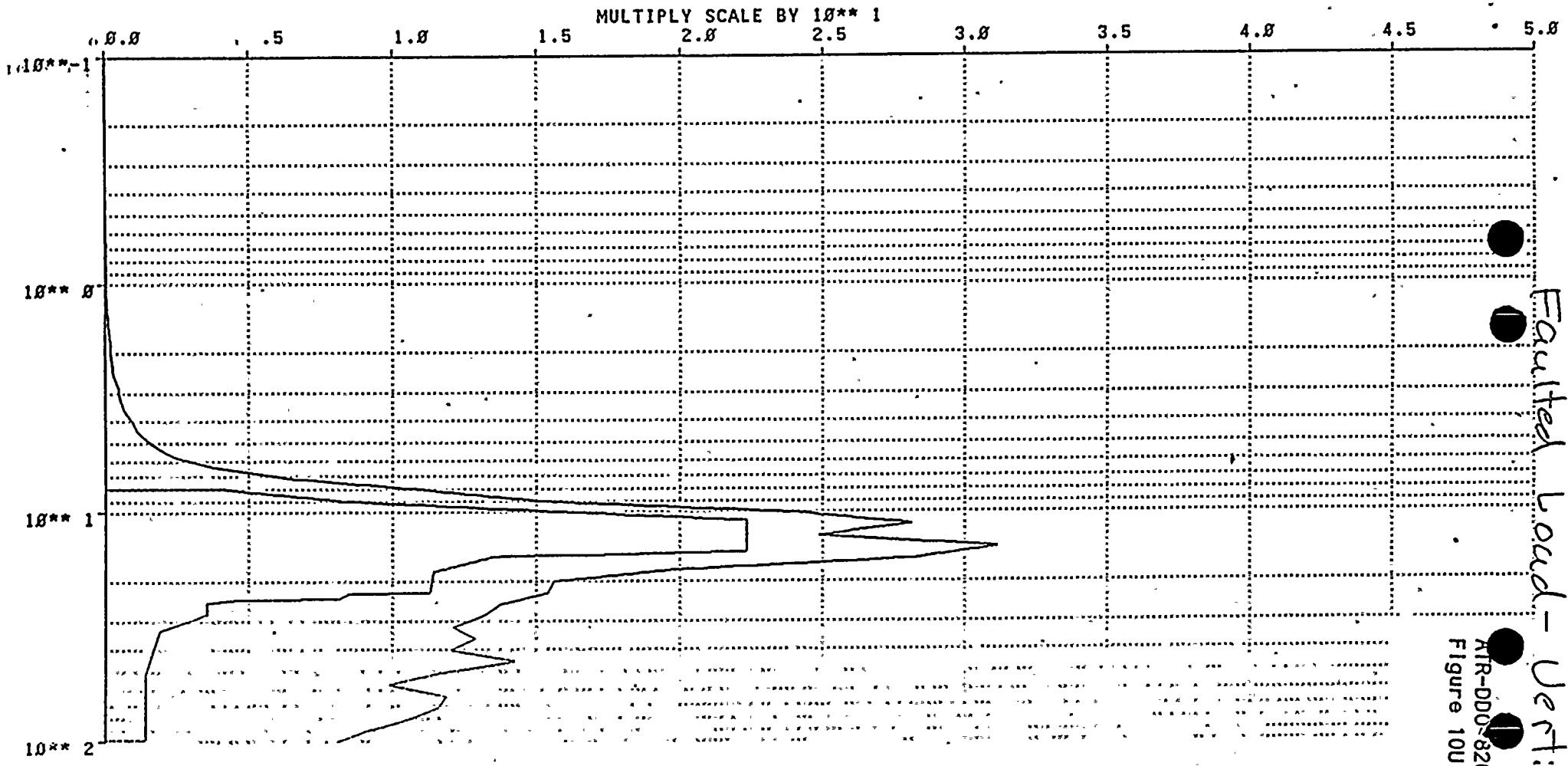
ATR-DDO-8204
Figure 10L

RUN 53 TPP524.0926 MSIV SSEZ 100% ZC-YD DATE 6/21/82 15:30: 0 CHANNEL 4 TAB VT1

DECIMATION RATIO 2 7514 POINTS ANALYZED DELTA T .004 1/ 6 OCTAVE 100.00 HZ LP FILTER 6 POLES

4.00 % DAMPING START TIME 0.000 SEC END TIME 30.056 SEC 0 RECORDS SKIPPED 221 RECORDS ANALYZED

100.0 % AND 0.0 % RRS PLOTTED



Faulted Load - Vertical

ATR-DDC-8204
Figure 10U

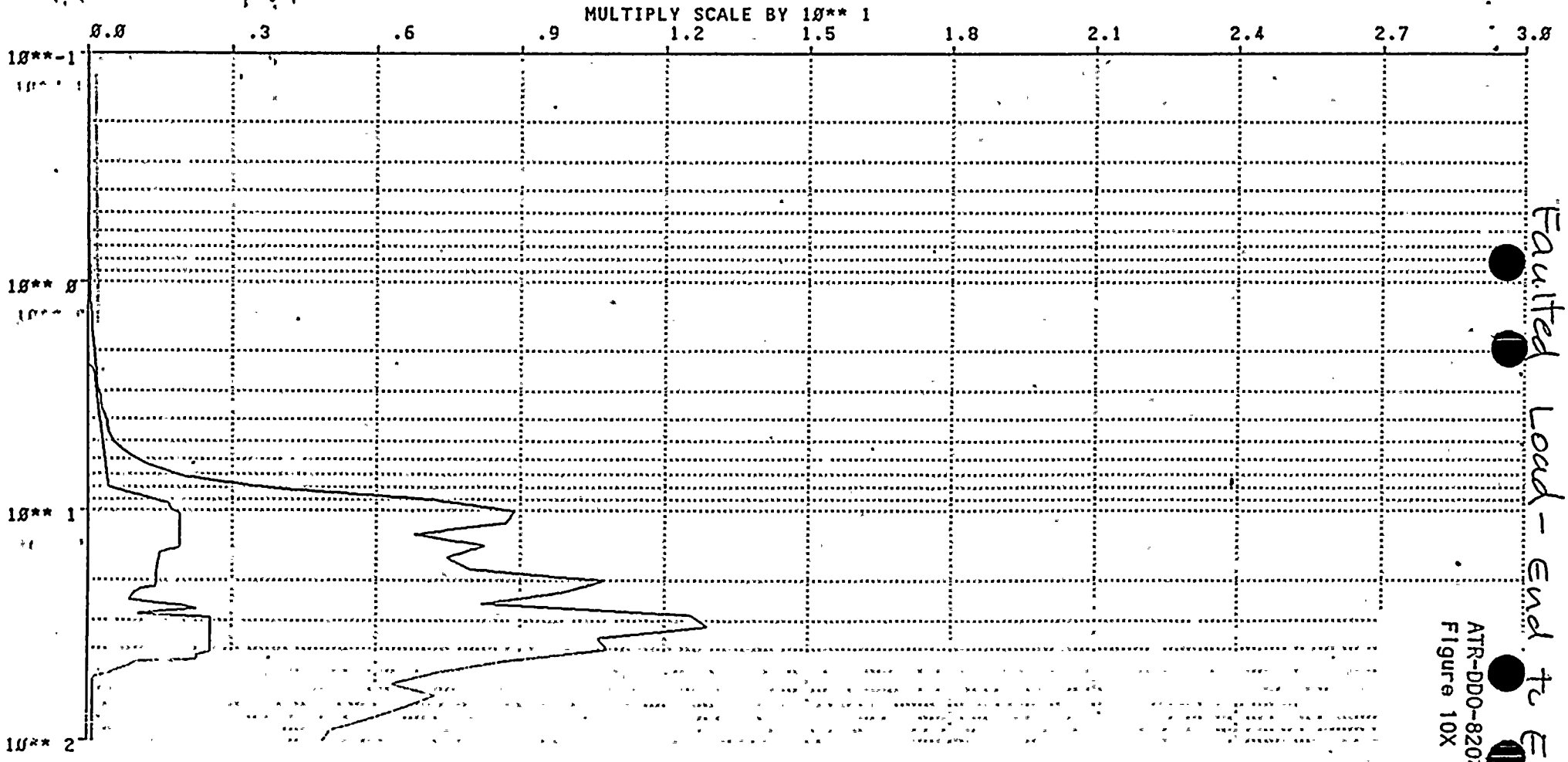
Sh 104
of 108

RUN 54 TPP524.Ø926 MSIV SSEX ØXXA-1ØØXY DATE 6/22/82 9:5Ø: Ø CHANNEL 3 TAB HZ1

DECIMATION RATIO 2 7514 POINTS ANALYZED DELTA T .ØØ4 1/6 OCTAVE 1ØØ.ØØ HZ LP FILTER 6 POLES

4.ØØ % DAMPING START TIME Ø.ØØØ SEC END TIME 3Ø.Ø56 SEC Ø RECORDS SKIPPED 221 RECORDS ANALYZED

1ØØ.Ø % AND Ø.Ø % RRS PLOTTED



Faulted Load - End to End

ATR-DDO-8204
Figure 10X

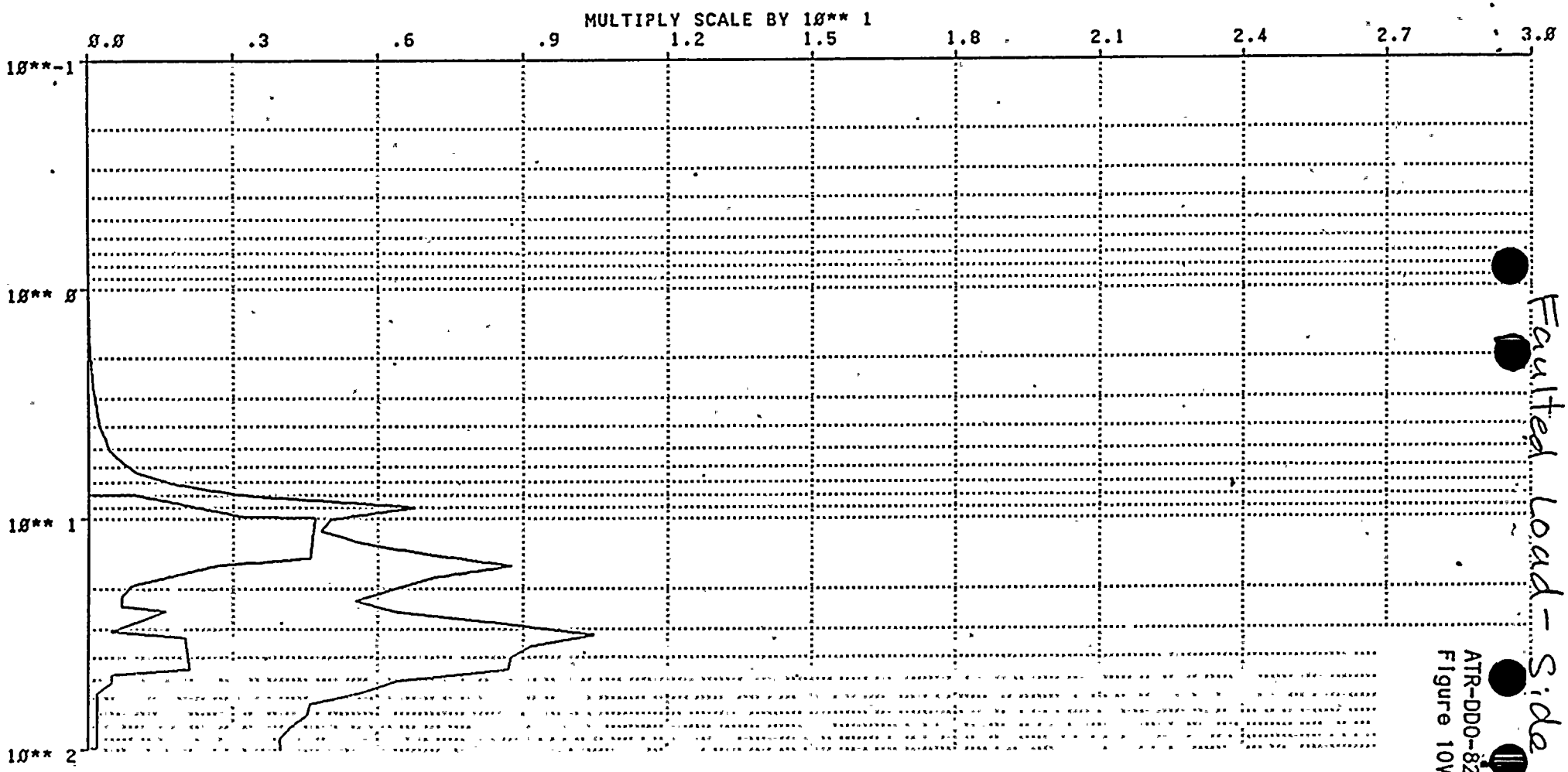
SEMI-CLOSED METHOD APPROXIMATION : 7-22-80 REVISION

RUN 53 TPP524.0926 MSIV SSEZ 100% ZC-YD DATE 6/21/82 15:30: 0 CHANNEL 3 TAB HZ1

DECIMATION RATIO 2 7514 POINTS ANALYZED DELTA T .004 1/ 6 OCTAVE 100.00 HZ LP FILTER 6 POLES

4.00 % DAMPING START TIME 0.000 SEC END TIME 30.056 SEC 0 RECORDS SKIPPED 221 RECORDS ANALYZED

100.0 % AND 0.0 % RRS PLOTTED



SEMI-CLOSED METHOD APPROXIMATION : 7-22-80 REVISION

Faulted Load - Side to Side

ATR-DDO-8204
Figure 10V

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of 108