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FACIL:50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
AUTH.NAME AUTHOR AFFILIATION
MANGAN,C.V. Niagara Mohawk Power Corp.
RECIP.NAME RECIPIENT AFFILIATION
BUTLER,W. Licensing Branch 2

SUBJECT: Forwards SQRT & Pump & Valve Operability Review Team forms re RAS & Equipment Qualifications ~~Qualification~~ & sys piping & instrument drawings for plant, per 850523 request for addl info. Related Westinghouse & S&W specs encl.

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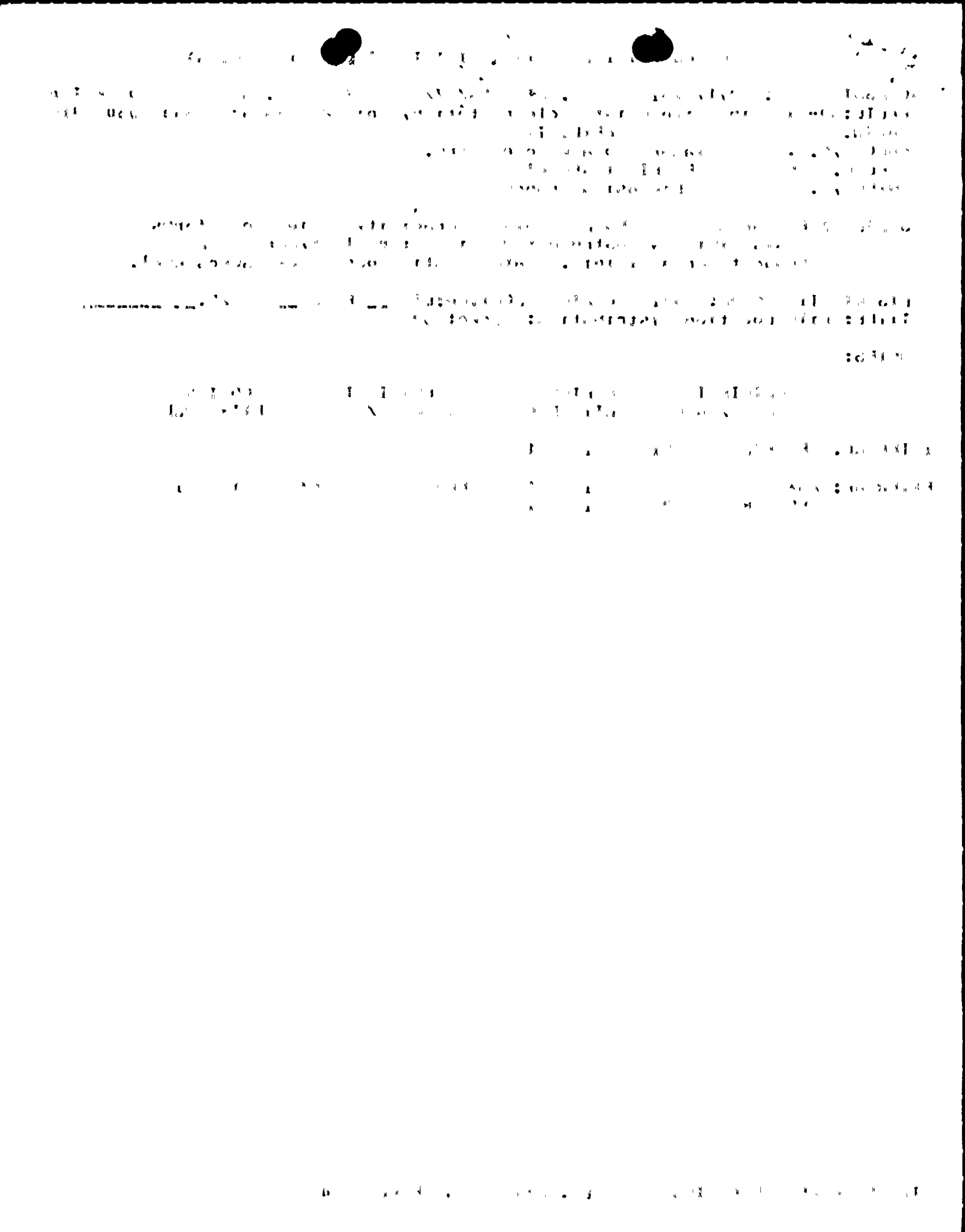


NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

July 5, 1985
(NMP2L 0440)

Mr. Walter Butler, Chief
Licensing Branch No. 2
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Butler:

Re: Nine Mile Point Unit 2
Docket No. 50-410

Enclosed please find completed Seismic Qualification Review Team forms and Pump and Valve Operability Review Team forms and system piping and instrument drawings for Nine Mile Point Unit 2. These forms fulfill an oral request of the NRC staff of May 23, 1985. This information is provided for your review for the upcoming audit currently scheduled for the week of July 8, 1985. If you have any questions, please identify those to Mr. Rademacher of my staff.

Sincerely,

C. V. Mangan
Vice President
Nuclear Engineering & Licensing

CVM/mg

Enclosure

R. Gramm, Resident Inspector
Project File

Add: NSIC Ltr, Encl
M. Haughy 1 0

Hool 1/5 Sets

Per M. Haughy

PPD NO. 184C5988
MPL: C12-N601 A-D

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point Unit 2 Type:
1. Utility: Niagra Mohawk Power Corp. PWR ____
2. NSSS: General Electric BWR 5 MK II
3. A/E: Stone & Webster Engineering Corp. Other ____

II. Component Name Trip Unit

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: 184C5988 G100 Quantity: 4
3. Size or Range: ____
4. Vendor: GE
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: See attachment 1
   b. Dimensions: See attachment 1
   c. Weight: ____
7. Location: Building: Control Room
   Elevation: 306'-0"
8. Field Mounting Conditions [ ] Bolt (No. ___, Size ___)
   [ ] Weld (Length ___)
   [X] Installed in card file with 10-32 screws
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   Mounted in control room panels H13-P609 amd H13-P611
10. a. System in which located: CRD Hydraulic Control
    b. Functional Description: active class 1E
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [X] Both [ ] Neither [ ] Other ____

PPD NO. 184C5988
MPL: C12-N601 A-D

II. Pertinent Reference Design Specification for Qualification Requirements: _____

a. [X] Seismic Input
b. [ ] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

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

Qualification Report*: NEDC 30560

(No., Title and Date): Trip unit qualification report dated 3-30-84

Company that Prepared Report: General Electric

Company that Reviewed Report: General Electric

Where Report is filed or available: GE Valley Forge PA

Applicable Codes and/or Standards: IEEE Std. 344-1975

V. Vibration Input:

1. Loads considered:
   a. [X] Seismic only
   b. [ ] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)

2. Method of Combining RRS:

   [ ] Absolute Sum [ ] SRSS [X] N/A (other, specify)

3. Required Response Spectra** (attach the graphs): See attachment 2

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

PPD NO. 184C5988
MPL: C12-N601 A-D

4. Damping Corresponding to RRS: OBE 2% SSE 3%
5. Required Acceleration in Each Direction:
   [X] ZPA [ ] Other _____ (specify)
   OBE S/S = 0.25 g F/B = 0.25 g V = 0.14 g
   SSE S/S = 0.40 g F/B = 0.40 g V = 0.25 g

6. Were fatigue effects considered:
   [X] Yes [ ] No
   If yes, describe how they were treated in overall qualification program: SRV aging performed

VI. If Qualification by Test, then Complete:

1. [ ] Single Frequency [X] Multi-Frequency [X]random
   [ ] sine beat
   [ ] _____
2. [ ] Single Axis [X] Multi-Axis
   [ ] Independent Axis [X] In-phase motions
3. Number of Qualifications Tests:
   OBE 5 SSE 1 Other _____ (specify)
4. Frequency Range: 1-100 HZ
5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical):
   S/S = * F/B = * V = *
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) See attachment 4
   [ ] No

* Not recorded

MPL: C12-N601 A-D

PPD NO. 184C5988

8. Maximum Input g Level Test:

OBE S/S = 1.5 g F/B = 1.5 g V = 2.7 g

SSE S/S = 3.0 g F/B = 4.6 g V = 4.6 g

9. Laboratory Mounting:

A. [ ] Bolt (No. ___, Size ___)

[ ] Weld (Length ___) [x] Installed in card file with 10-32 screws

B. Orientation and Fixturing: Units were tested as part of the trip unit cabinet qualification program.

10. Functional operability verified:

[X] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:

Trip units performed satisfactory during OBE and SSE tests. Some anomalies occured as outlined in reference 1 appendix C, and section A7-9.

12. Other tests performed (such as aging or fragility test, including results):

SRV aging

13. Failure Modes (If appropriate) _____

14. Margins Available: [X] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, then complete: N/A

1. Method of Analysis:

[ ] Static Analysis [ ] Equivalent Static Analysis

[ ] 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: [ ] 3D [ ] 2D [ ] 1D

[ ] Finite Element [ ] Beam

[ ] Closed Form Solution [ ] Other _____

MPL: C12-N601A-D
PPD NO. 184C5988

4. [ ] Computer Codes: _____
   Frequency Range and No. of modes _____
   [ ] Hand Calculations
5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [ ] SRSS [ ] Other: _____ (specify)
6. Damping:
   OBE _____ SSE _____ Basis for damping used: _____
7. Support Considerations in the model: _____
8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

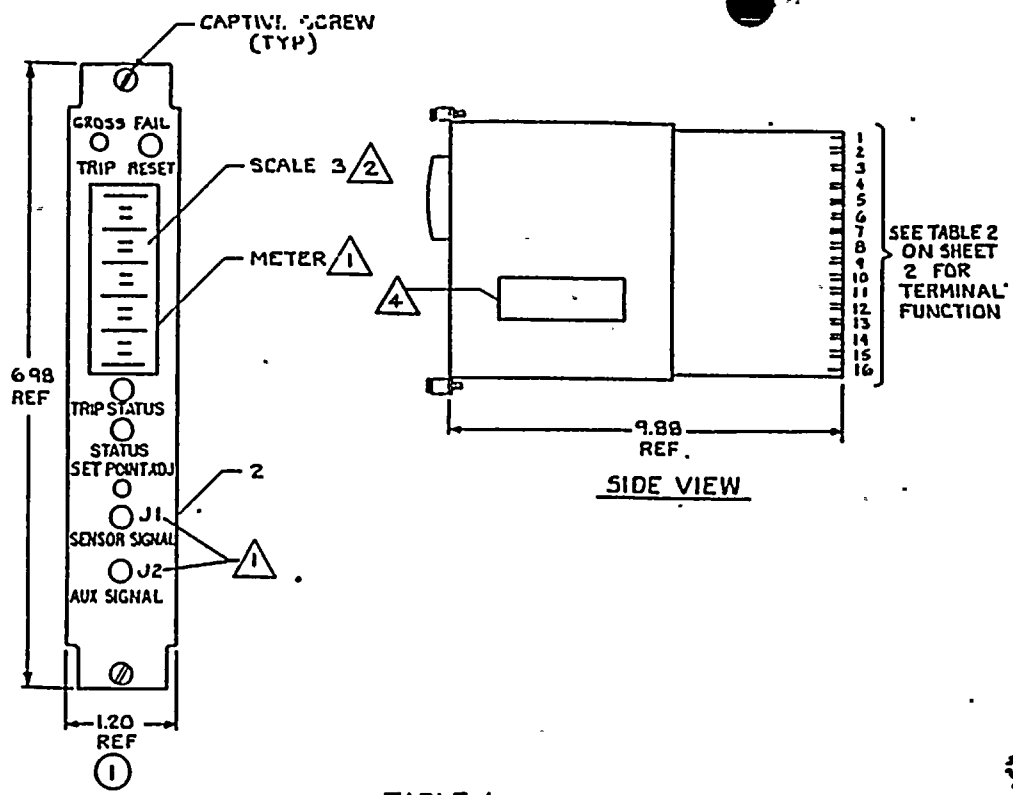
B.

Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____
10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

ATTACHMENT 1

GE DRAWING



NOTES:

1. METER AND TEST JACKS J1 & J2 NOT PROVIDED ON SLAVE TRIP UNITS.
2. DISCARD EXISTING SCALE EXCEPT FOR GROUPS 100, 200, 300, 400, 500.
3. FOR GROUP VARIATION REFER TO SCALE PURCHASE PART DRAWING, ITEM 3.
4. OBLITERATE THE ORIGINAL PART NO. MODEL NO. AND SERIAL NO. WITHOUT DAMAGING THE FUNCTION OF THE PART. MARK 184C5988G_ NUMBER, SERIAL NO. AND NUCLEAR SAFETY RELATED PER SPECIFICATION Y1010A1 METHODS 2 OR 3.
5. GROUPS 100 THROUGH 599 TRIP RESET DIFFERENTIAL RANGE = 0.5 TO 20%. GROUPS 600 THROUGH 799 TRIP RESET DIFFERENTIAL RANGE = 0.5 TO 50%.

{(NOTES CONTINUED BELOW)}

SPECIFICATIONS:

1.0 PERFORMANCE SPECIFICATIONS - 22A7716.
2.0 PRODUCT PERFORMANCE QUALIFICATION SPECIFICATION - 22A7793.
3.0 QUALIFICATION REPORT - 24A1206AB
4.0 DEMONSTRATION OF COMPLIANCE, ANALOG TRIP SYSTEM TRIP UNIT-DC 24A1206AB
5.0 ENVIRONMENTAL QUALIFICATION REPORT SUPPLEMENT, TRIP UNIT -24A1206AE.

6. TRANSIENT SUPPRESSION DIODE PART NUMBER 287A6496P005, OR EQUIVALENT, TO BE CONNECTED IN PARALLEL WITH THE RELAY COIL DRIVEN BY PIN 11, TRIP OUTPUT.

TABLE 1

GROUP 3	TRIP UNIT TYPE	INPUT TYPE	ANALOG INPUT LOW PASS FILTER CUTOFF FREQUENCY	MAKE FROM 188C7359	FOR TYPICAL APPLICATION SEE SHEET 2
100 THRU 199	MASTER	4-20 MA	250HZ	G001	FIGURE 1
200 THRU 299	MASTER	RTD 3 WIRE PLATINUM $\alpha = 0.00385\ \Omega/\Omega/°C$	250HZ	G002	FIGURE 2
300 THRU 399	SLAVE	1-5VDC	250HZ	G003	FIGURE 3
400 THRU 499	MASTER	1-5VDC DIFFERENTIAL	250HZ	G004	FIGURE 4
500 THRU 599	MASTER	4-20 MA	1HZ	G005	FIGURE 1
600 THRU 699	MASTER	4-20MA	250HZ	G006	FIGURE 1
700 THRU 799	SLAVE	1-5VDC	250HZ	G007	FIGURE 3

REV. STATUS	
1	6
2	0

REVISIONS

2	R. WALLBERG 11-6-81 — NJ39742 — CHK BY: R. WALLBERG
2	1-25-83 — I.OC-L — NJ39749 — CHK BY: M BURT
3	D. DONOFRIO 11/4/83 — NJ43046 — CHK. BY: N. SEID
4	A. GARCIA 1/11/83 — NJ49329 — CHK BY: C. CELIS
5	MLCDWG 3-21-84 — NJ5271I — CHK'D BY: E. CASEY
6	R. A. WILSON — NJ55445 — CHK. BY: C. FORSTON

EQUIPMENT CLASS. CODE A. PL ISSUED

	IMPORTANT TO SAFETY: THIS ITEM IS OR CONTAINS A SAFETY RELATED ITEM ☒ YES ☐ NO	IEEE CLASS 1E NUCLEAR SAFETY RELATED ☒ YES ☐ NO

SIGNATURES	DAY	MO	YR
ORIGINATOR T. LILLEY	29	4	82
CHECKED R. TAILLET	27	5	82
APPD E. SALOPEK	27	5	82
ENGR E. SCHMIDT	27	5	82

APPLIED PRACTICES ALL SURF ✓
UNLESS OTHERWISE SPECIFIED
TOLERANCES ON:
2 PLACE DECIMALS ± FRACTIONS ±
3 PLACE DECIMALS ± ANGLES ±

GENERAL ELECTRIC
NC & I DEPT LOC SAN JOSE
DOC TYPE — ASSEMBLY
MODIFICATION TRIP UNIT —
FMF - GENL USE
ISSUE DATE June 2982 — DWG NO. 184C5988 — 6
AML-3114 — CONT SYM C — SH 1 — CONT SH 2

184C5988 1 1

C-942-MM 1 EIS

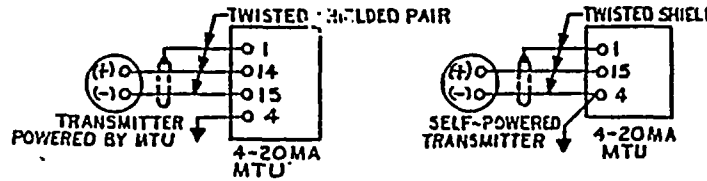


FIGURE 1 4-20 MA INPUT MTU APPLICATION

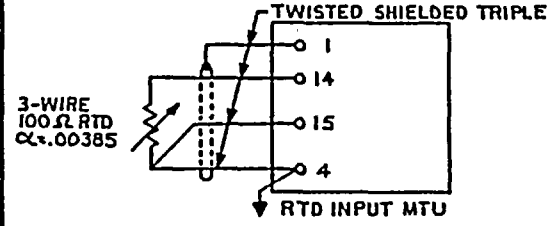


FIGURE 2 RTD INPUT MTU APPLICATION

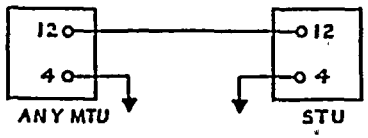


FIGURE 3 STU APPLICATION

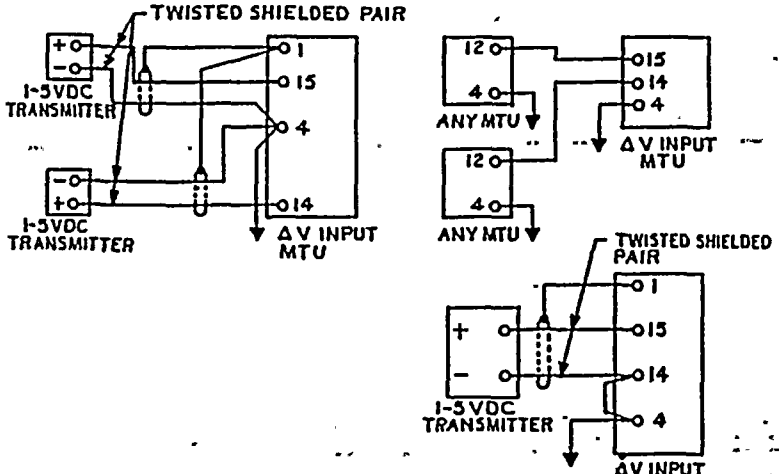


FIGURE 4 1-5VDC DIFFERENTIAL MTU APPLICATION

NOTE: SIGNAL COMMON BUS

TABLE 2

TERMINAL NUMBER	FUNCTION 4-20MA MTU FIGURE 1	FUNCTION RTD MTU FIGURE 2	FUNCTION SLAVE TU FIGURE 3	FUNCTION ΔV MTU FIGURE 4
TERMINAL FUNCTIONS (SEE SIDEVIEW SHEET 1)				
1	CHASSIS GND SHIELD	CHASSIS GND SHIELD	CHASSIS GND SHIELD	CHASSIS GND SHIELD
2	+25VDC POWER INPUT	+25VDC POWER INPUT	+25VDC POWER INPUT	+25VDC POWER INPUT
3	+25VDC POWER RETURN	+25VDC POWER RETURN	+25VDC POWER RETURN	+25VDC POWER RETURN
4	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
5	TRIP STATUS OUTPUT (TO CAL UNIT)	TRIP STATUS OUTPUT (TO CAL UNIT)	TRIP STATUS OUTPUT (TO CAL UNIT)	TRIP STATUS OUTPUT (TO CAL UNIT)
6	CAL COMMAND INPUT (FROM CAL UNIT)	CAL COMMAND INPUT (FROM CAL UNIT)	NOT USED	CAL COMMAND INPUT (FROM CAL UNIT)
7	CAL CURRENT INPUT (FROM CAL UNIT)	CAL CURRENT INPUT (FROM CAL UNIT)	NOT USED	CAL CURRENT INPUT (FROM CAL UNIT)
8,9	CARD OUT OF FILE	CARD OUT OF FILE	CARD OUT OF FILE	CARD OUT OF FILE
10	GROSS FAIL OUTPUT	GROSS FAIL OUTPUT	GROSS FAIL OUTPUT	GROSS FAIL OUTPUT
11	TRIP OUTPUT	TRIP OUTPUT	TRIP OUTPUT	TRIP OUTPUT
12	ANALOG OUTPUT (TO MTU/STU AS REQUIRED)	ANALOG OUTPUT (TO MTU/STU AS REQUIRED)	ANALOG INPUT (FROM MTU PIN 12)	ANALOG OUTPUT (TO MTU/STU AS REQUIRED)
13	NOT USED	NOT USED	NOT USED	NOT USED
14	TRANSMITTER EXCITATION (AS REQUIRED SEE FIG. 1)	RTD EXCITATION	NOT USED	ANALOG INPUT (NEGATIVE)
15	ANALOG INPUT (TRANSMITTER RETURN)	RTD RETURN	NOT USED	ANALOG INPUT (POSITIVE)
16	ANALOG OUTPUT (TO AUXILIARY DEVICE)	ANALOG OUTPUT (TO AUXILIARY DEVICE)	NOT USED	ANALOG OUTPUT (TO AUXILIARY DEVICE)

SIGNATURES	DAY	MO	YR
ORIGN N. LOCKWOOD	10	5	82
CHECKD R. TAILLET	27	5	82
APPD F. SALOPEK	27	5	82
ENGRG E. SCHMIOT	27	5	82

GENERAL ELECTRIC
NC&I DEPT LOC SAN JOSE

MODIFICATION TRIP UNIT

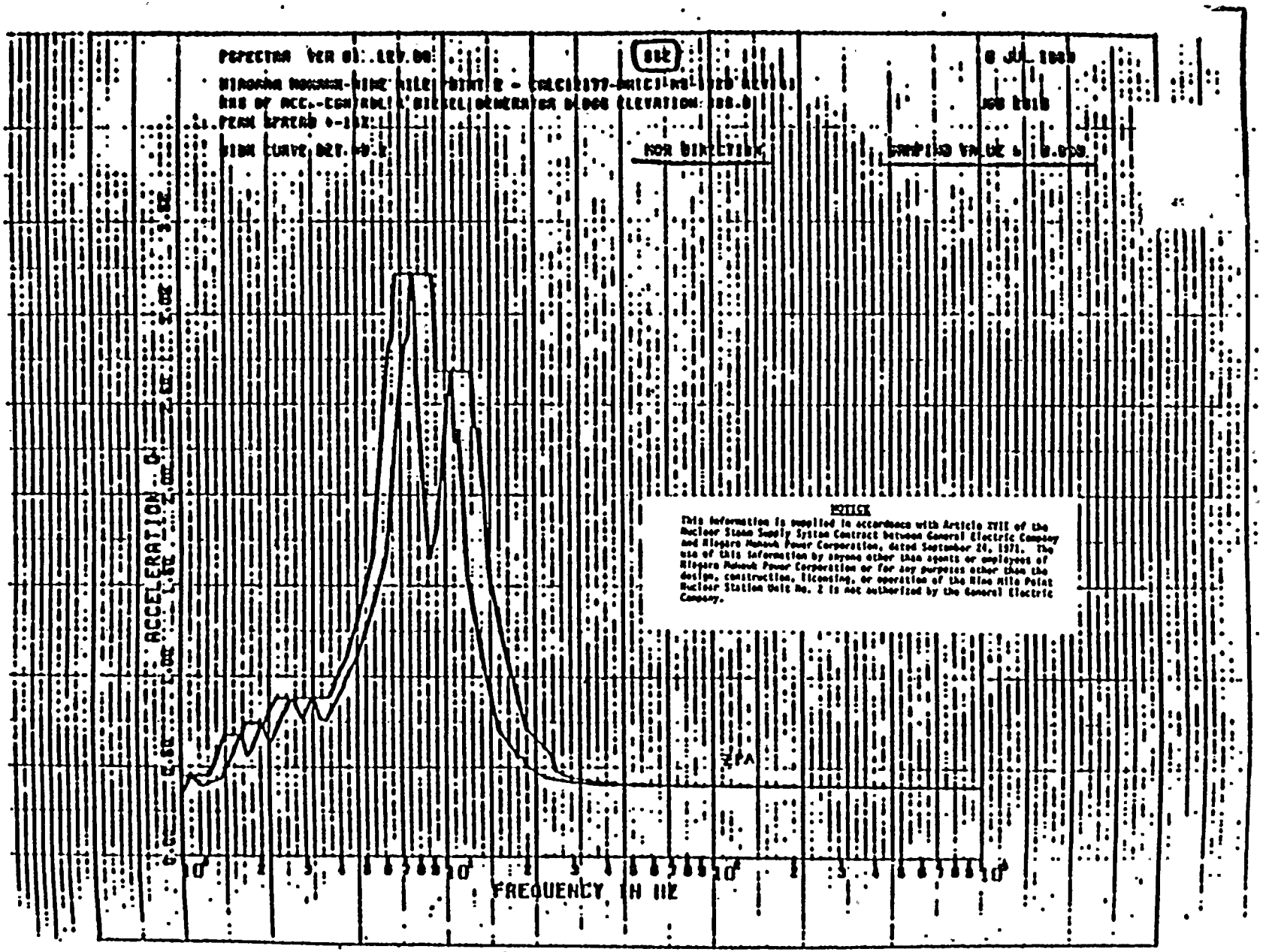
FME: GENL USE

ISSUE DATE June 282 | DWG NO. 184C5988 | O

SH 2 CONT ON F

ATTACHMENT 2

REQUIRED RESPONSE SPECTRA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FREQUENCY IN HZ
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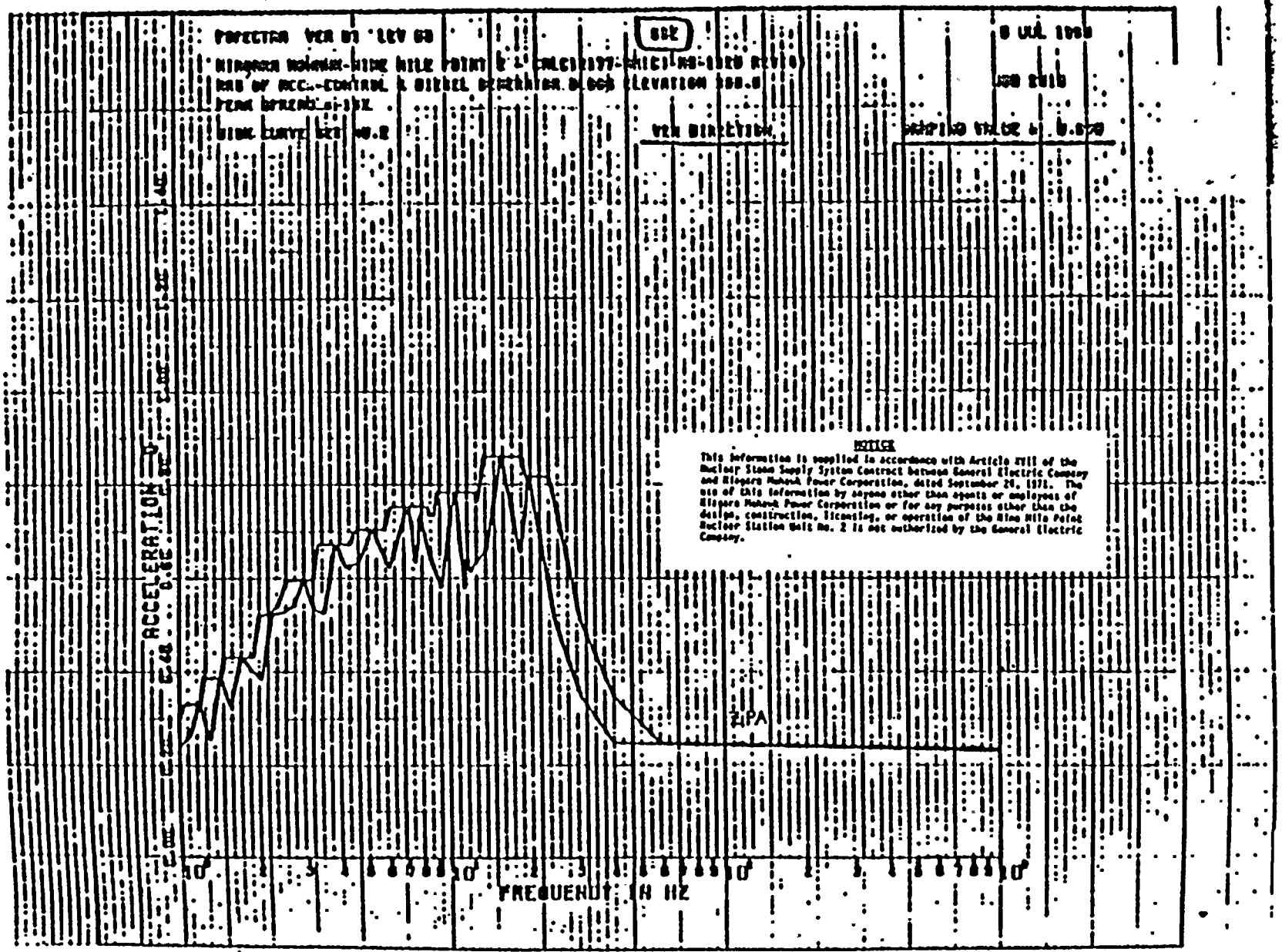
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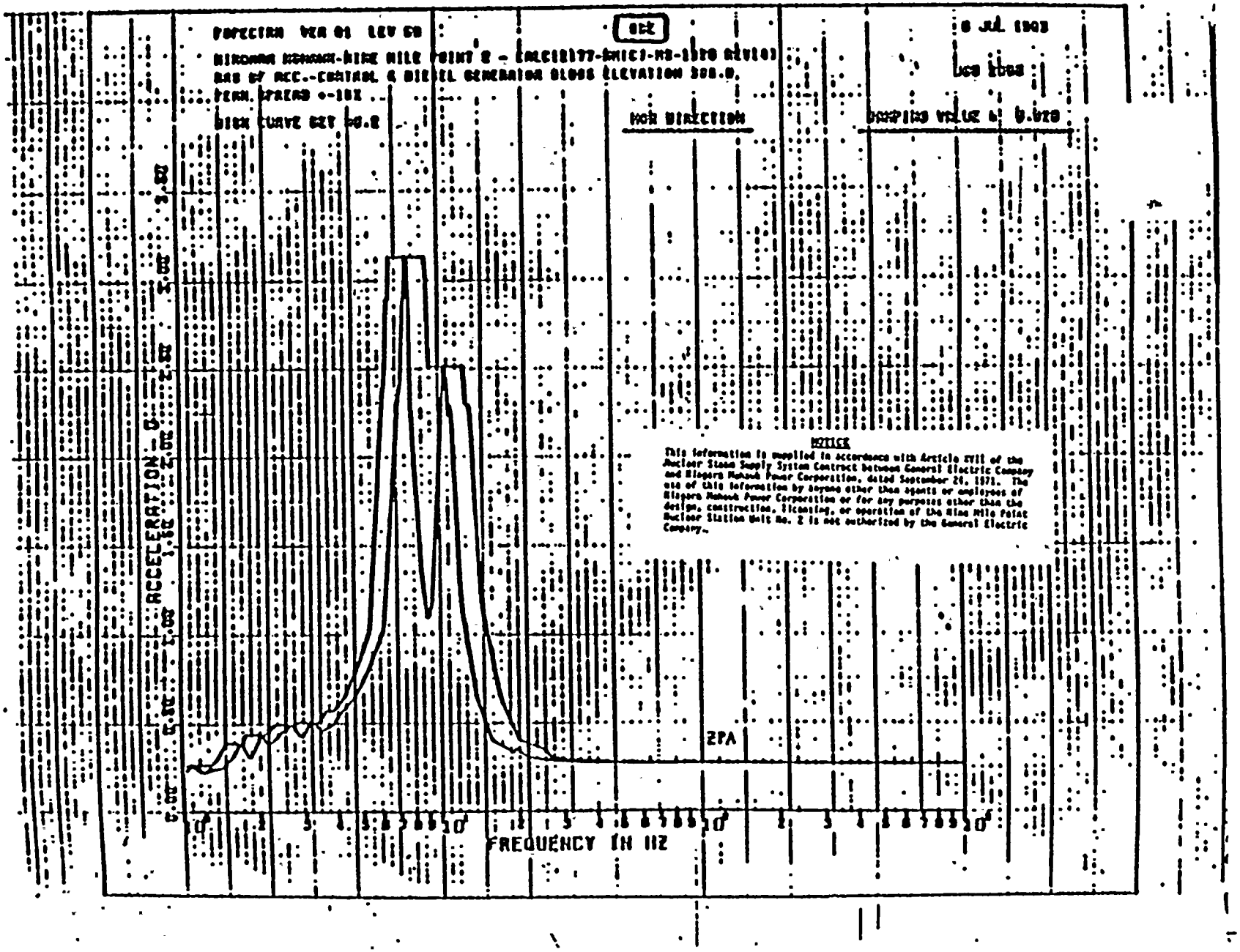
SPECTRUM VER 01 LEV 00
8 JUL 1983
NOR DIRECTION
ACCELERATION - g
2.0E
1.5E
1.0E
0.5E
3.0E
2PA
FREQUENCY IN HZ
NOTICE
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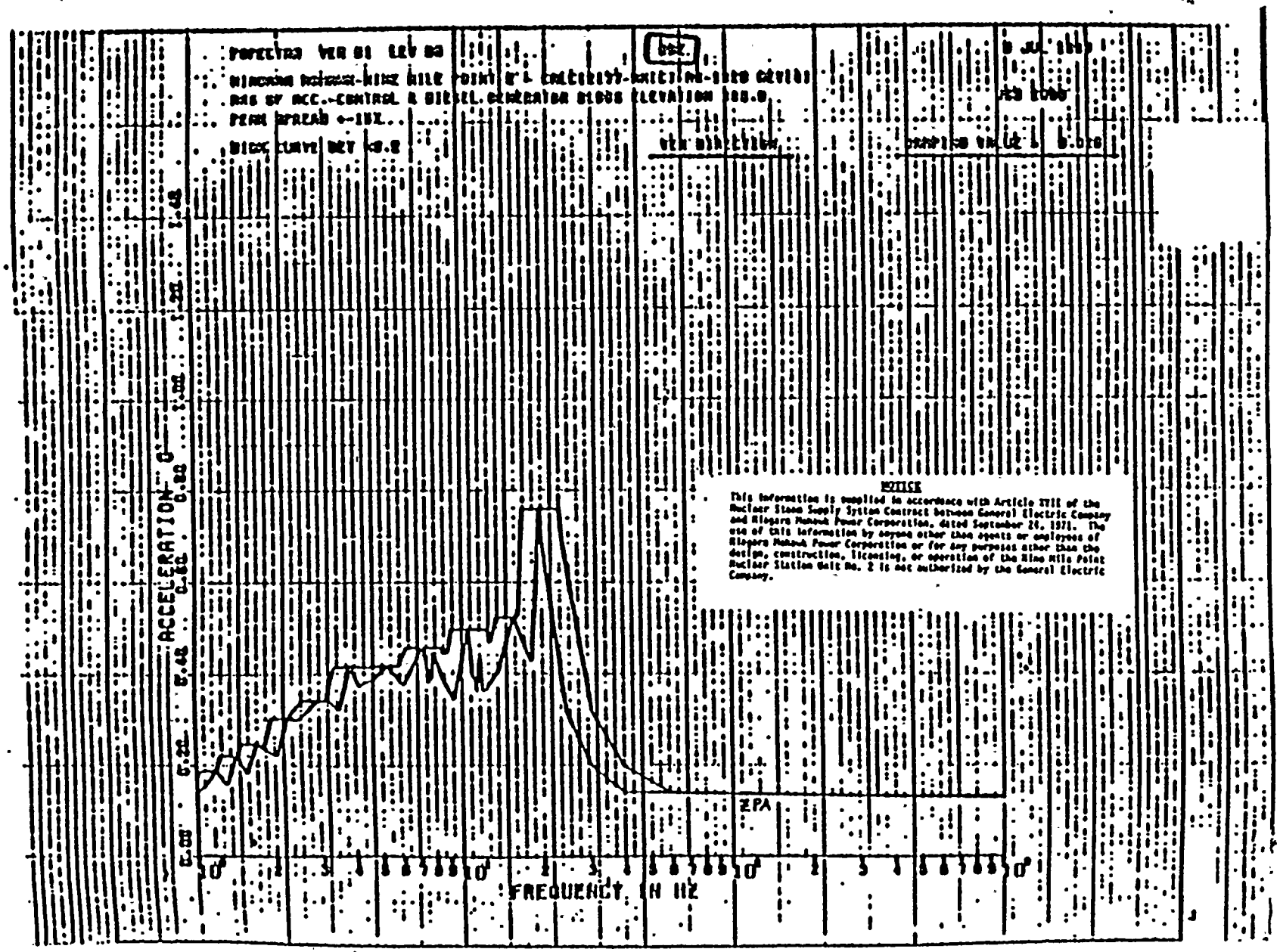
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ATTACHMENT 3

TEST RESPONSE SPECTRA

184C5988
GE TRIP UNIT

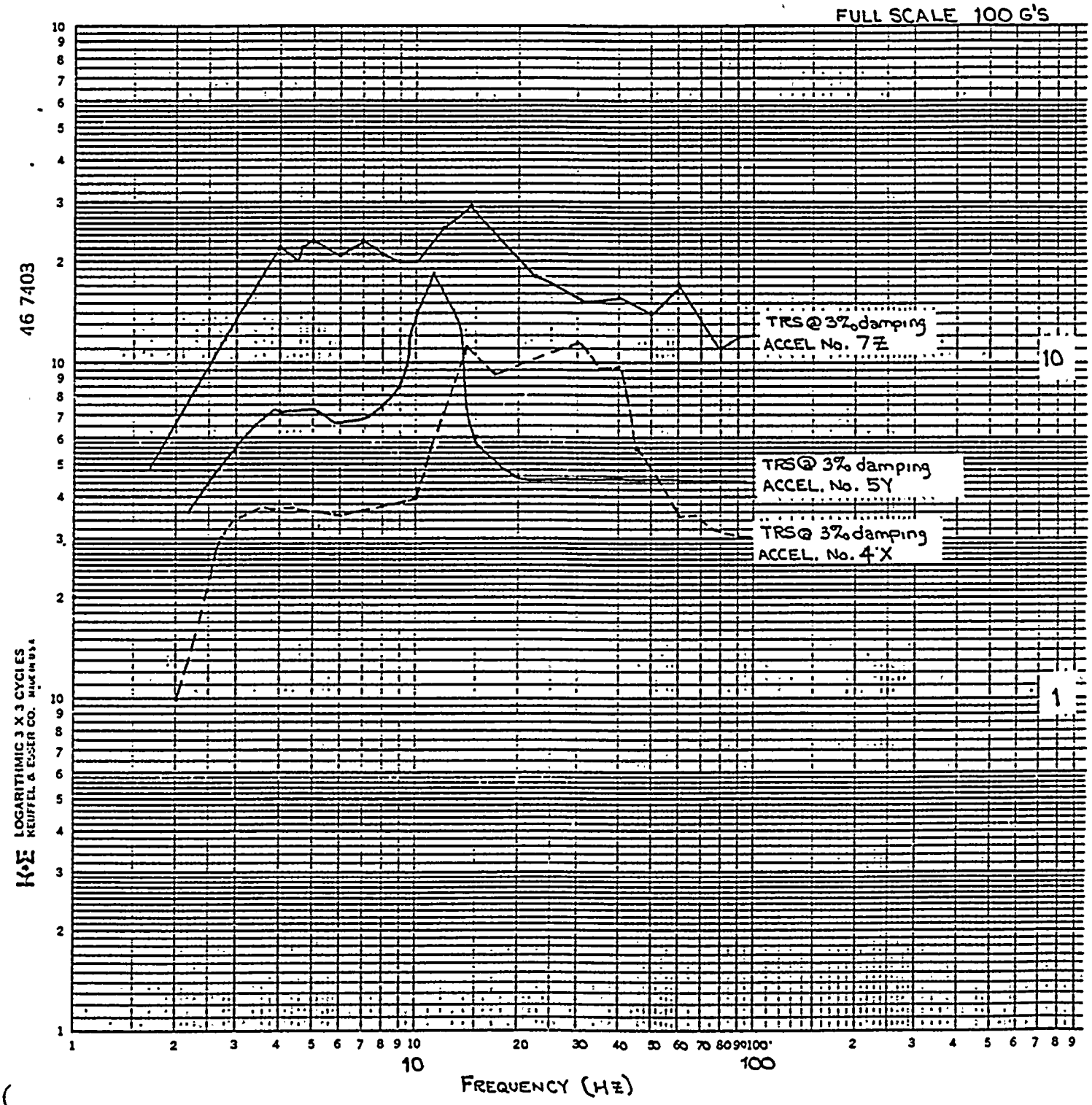


FIGURE 2-4

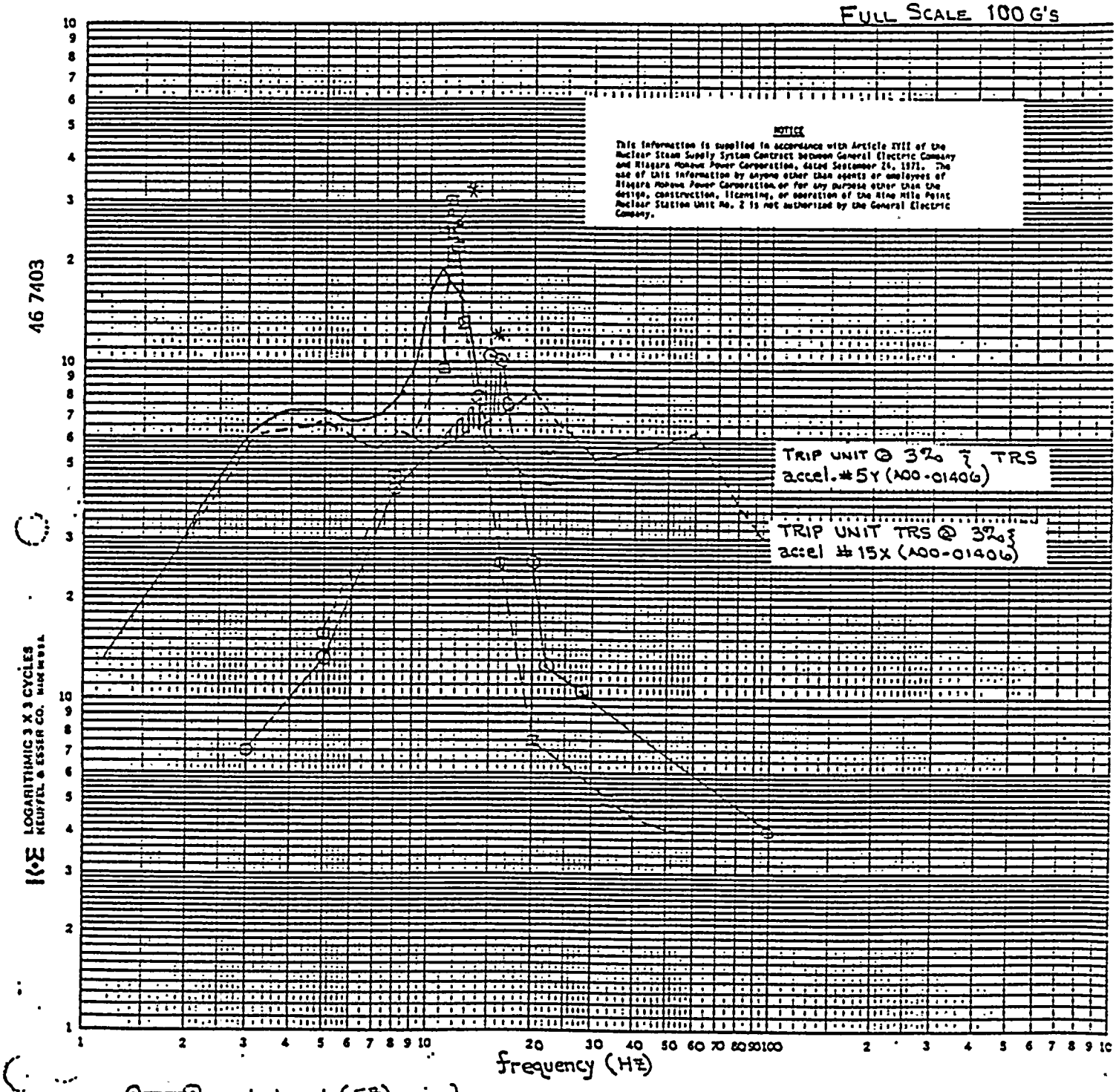
ATTACHMENT 4

TRS/RRS COMPARISON

NINE MILE POINT - 2 NEDC-30560

H13-P609/P611

GE TRIP UNIT; MPL NOS. C12-N601 A-D



⊙——⊙ Lateral (FB)

⊡----⊡ Longitudinal (SS)

} WORST CASE THEORETICAL RRS

A5-18

* Other SSE data contained in DRF # A00-01406 Vol. 5 ; 25g @ 11 Hz accel. # 7Y and .12g @ 15Hz accel. # 3X. (Pgs. E-18, E-39 of NEDM 30257)

Device MPL: C12-N601A,B,C,D

Panel MPL: H13-P609/P611

Similar Panel: See Below

Estimation of NMP-2 H13-P609/P611 panel transmissibilities in FB and SS directions: H13-P609/P611 is a 4 bay 150" wide panel for which no data are available. By using data from results of tests performed on Limerick H12-P601 (6 bay 158") and Limerick H12-P661 (4 bay 96") panel, the transmissibility data are tabulated for each of these panels. The highest transmissiblities are used to calculated the theroretical RRS for the H13-P609/611.

Limerick panel transmissibility H12-P661

(from DRF-A00-1138 TAB H)

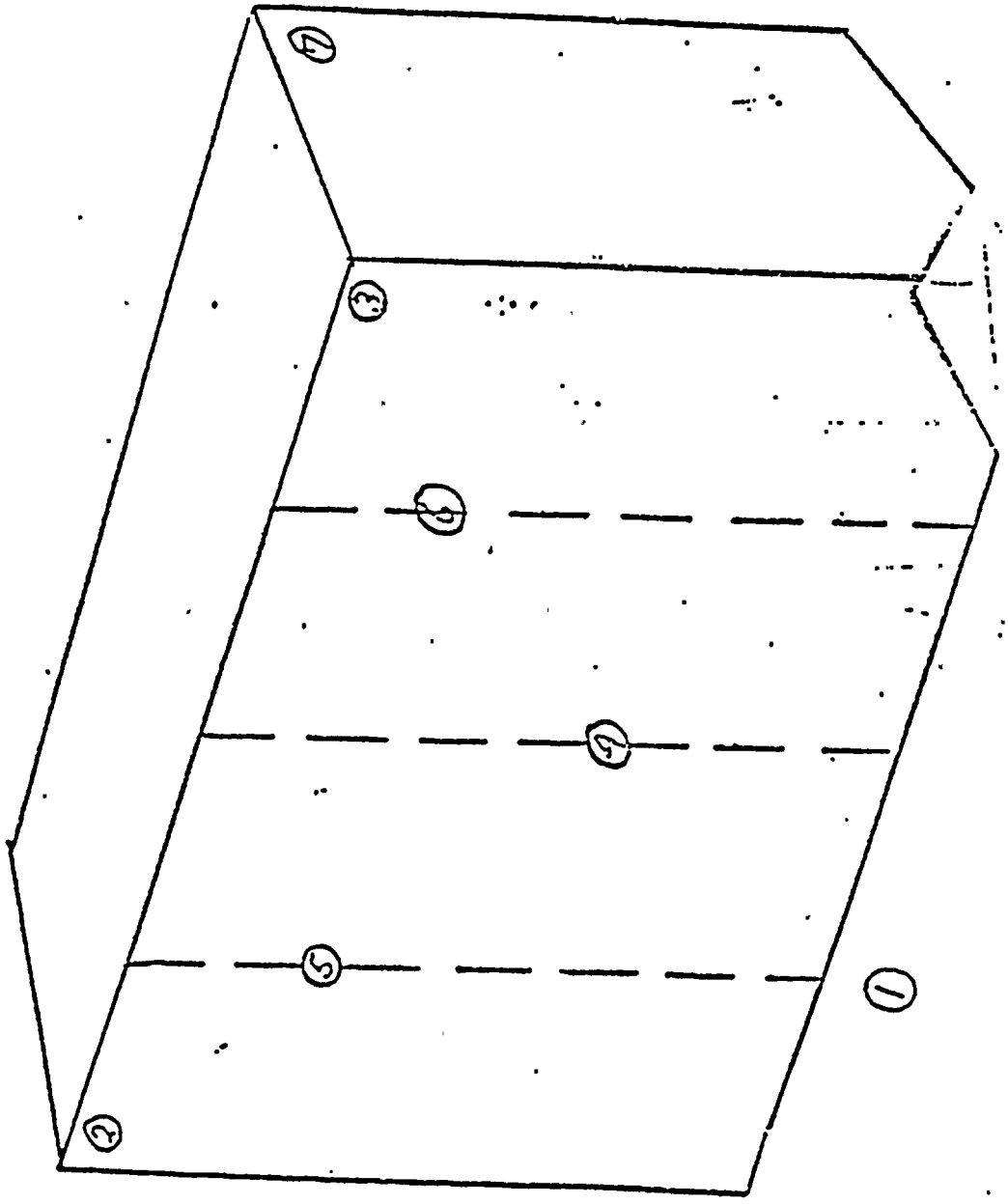
PANEL H12-P661

FREQ (Hz)	F-B (LATERAL)	FREQ	SS (LONG.)
3	1.0	5	1.2
5	1.0	8	1.3
8	1.2	11	3.65
14	3.7	11.5	11.25
15	7.5	12	8.33
16	8.6	12.5	4.8
17	7.5	16	2.13
20	4.0	20	1.25
22	2.5	24	1.25
29	1.1	28	2.5
33	1.0	32	1.22
28	3.7		
30	2.0		

GENERAL ELECTRIC

NUCLEAR ENERGY DIVISION

TEST REPORT
LIMERICK H12-P561
DOCUMENT NO. REV. NO.
SHEET NO. 3



- ACCELEROMETER LOCATIONS

DRF-A00-1338 TAB F

WORSE CASE PANEL

Panel Transmissibility

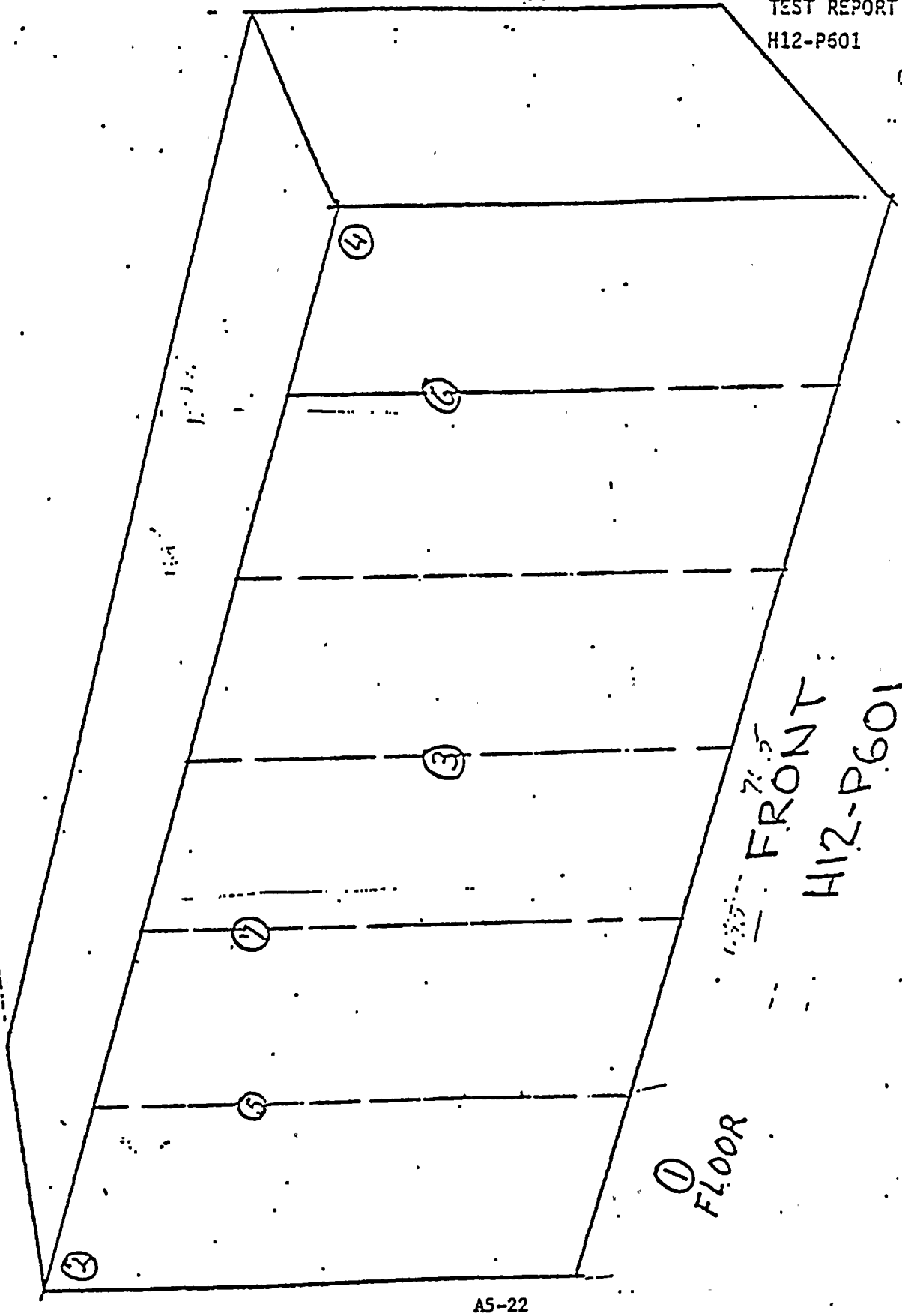
Limerick H12-P601

(6 bay 158")

FREQ (Hz)	F-B (LATERAL)
3	1.9
4	2.2
10	3.33
11.5	5.67
12	6.0
13	5.6
15	3.3
18	2.3
22	1.5
27	1.5
32	1.4

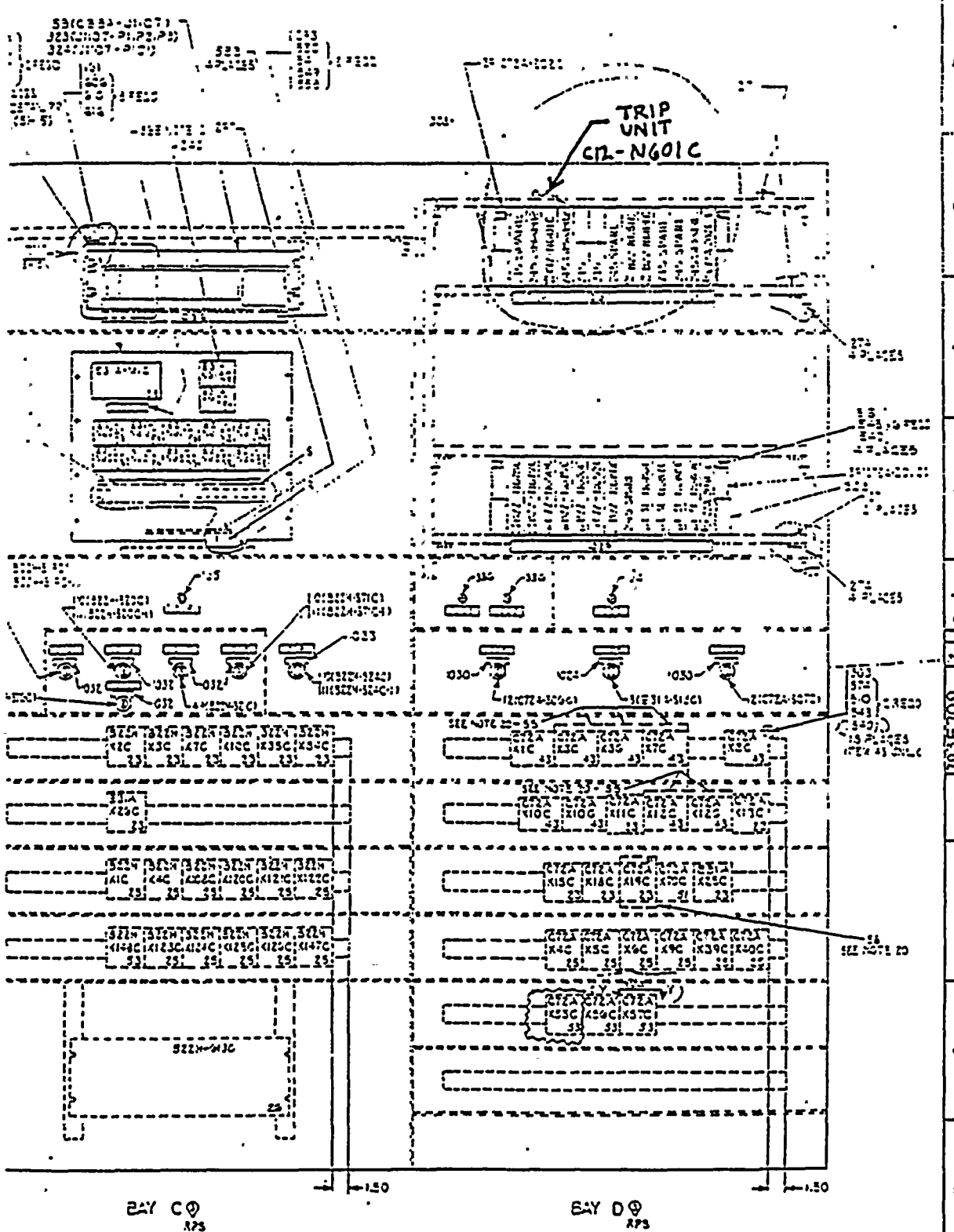
FREQ	SS (LONG.)
3	1.0
5	1.0
10	1.3
16	1.76
18	1.7
20	1.4
22	1.0
27	1.0
30	1.0
34	1.0

DRF H12-9
TEST REPORT: LIMERI
H12-P601
0 Sheet -

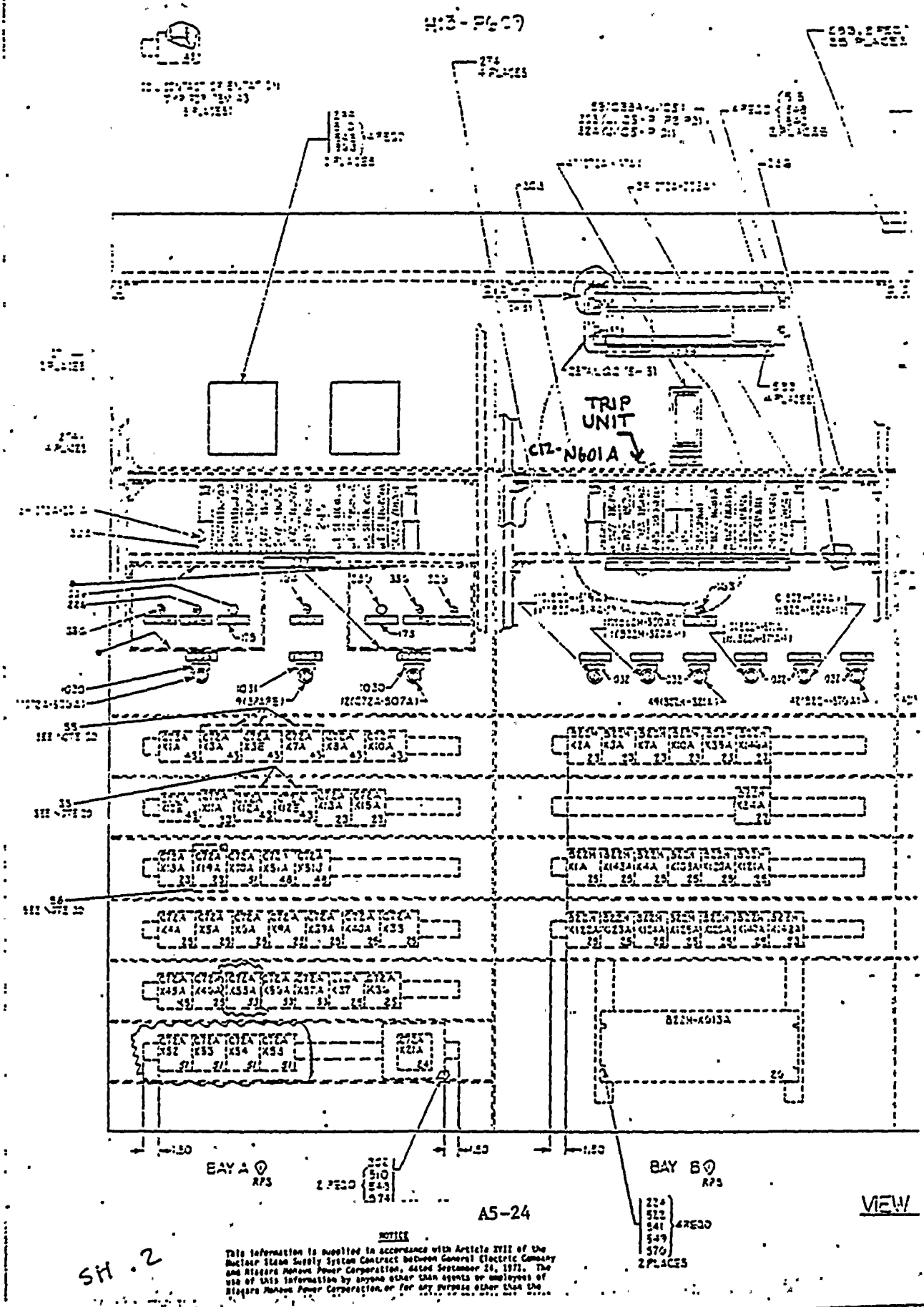


- ACCELEROMETER LOCATIONS

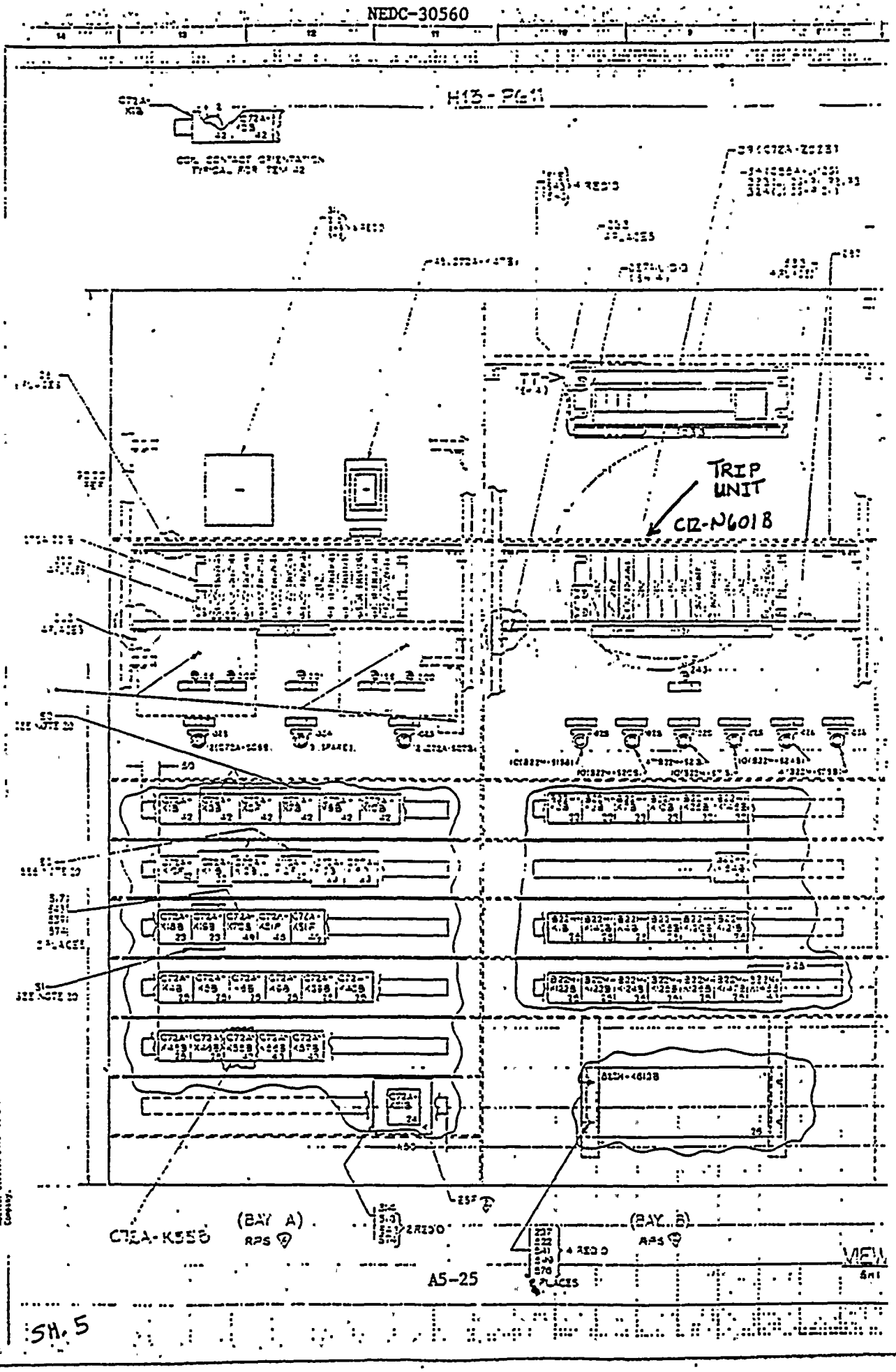
H13-P609

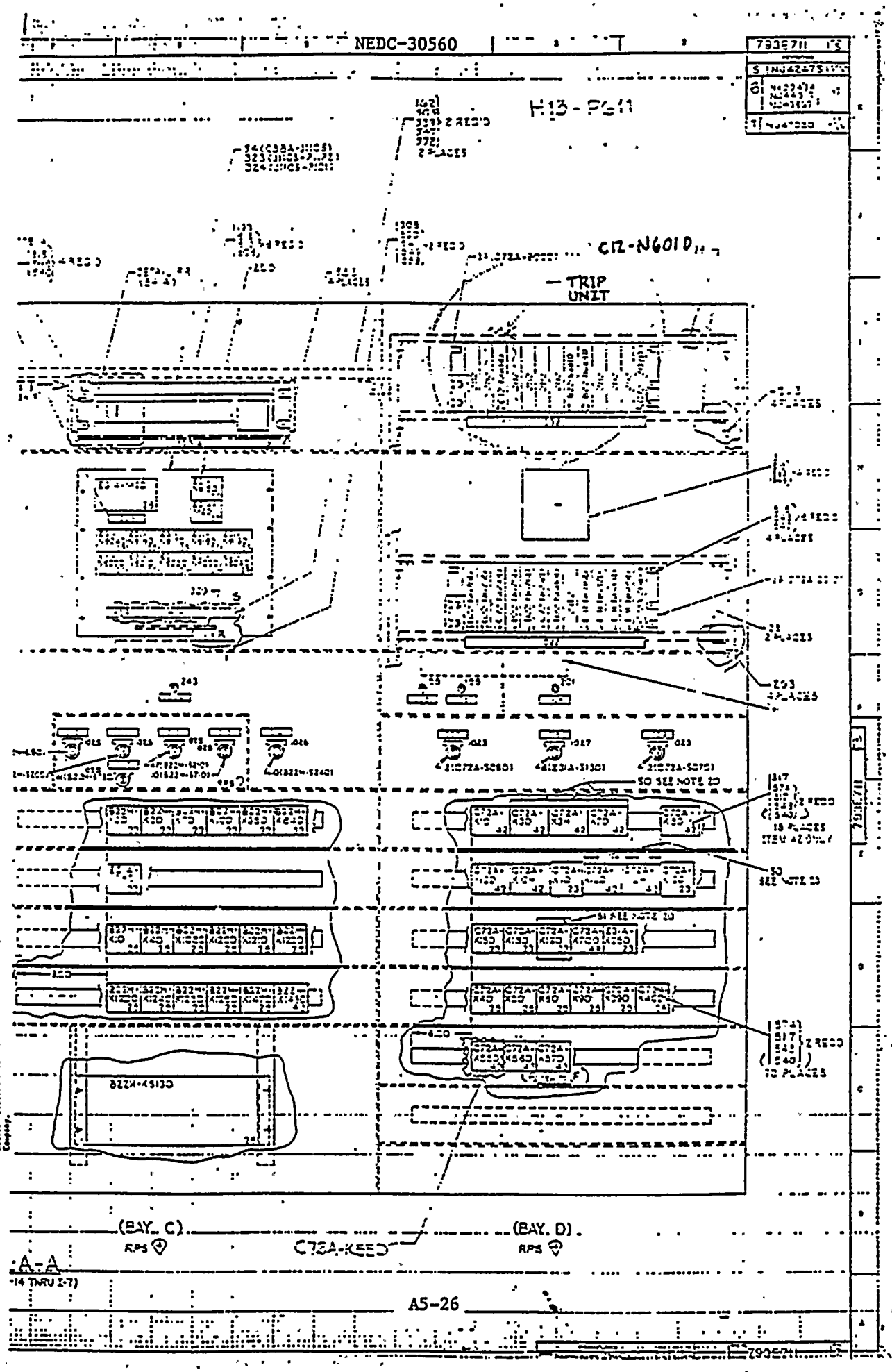


A-A



SH. 2


H13-P611
TRIP UNIT
CB-N6018
C72A-K55B
(BAY A)
RPS
(BAY B)
RPS
A5-25
SH. 5


H13-P611
C72-N601D
TRIP UNIT
SEE NOTE 23
(BAY C)
RPS
C72A-K603
(BAY D)
RPS
A-A
(4 THRU 2-7)

PPD NO. 147D7166

MPL: C41A-SRU2

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point Unit 2 Type:

1. Utility: Niagra Mohawk Power Corp. PWR ____
2. NSSS: General Electric Co. BWR 5 MK II
3. A/E: Stone & Webster Engineering Corp. Other ____

II. Component Name Signal Resistor Unit

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: 766100BAAN2 Quantity: 1
3. Size or Range: 1-5 VDC
4. Vendor: Bailey Controls Company
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: See attachment 1
   b. Dimensions: See attachment 1
   c. Weight: 2.1 lbs.
7. Location: Building: Control Room
   Elevation: 306'-0"
8. Field Mounting Conditions [X] Bolt (No. 2, Size#8-32)
   [ ] Weld (Length ____)
   [ ] ____
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   Mounted in control room panel H13-P601
10. a. System in which located: Standby Liquid Control
    b. Functional Description: ____
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [X] Both [ ] Neither [ ] Other ____

PPD NO. 147D7166
MPL C41A-SRU2

11. Pertinent Reference Design Specification for Qualification Requirements: _____

a. [X] Seismic Input
b. [ ] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

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

Qualification Report*: NEDC-30563

(No., Title and Date): Bailey SRU Qualification Report dated 3/28/84

Company that Prepared Report: General Electric Co.

Company that Reviewed Report: General Electric Co.

Where Report is filed or available: GE Valley Forge, PA.

Applicable Codes and/or Standards: IEEE Std. 344-1975

V. Vibration Input:

1. Loads considered:
   a. [X] Seismic only
   b. [ ] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)
2. Method of Combining RRS:
   [ ] Absolute Sum [ ] SRSS [X] N/A (other, specify)
3. Required Response Spectra** (attach the graphs): See attachment 2

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

PPD NO. 147D7166
MPL: C41A-SRU2

4. Damping Corresponding to RRS: OBE 2% SSE 3%
5. Required Acceleration in Each Direction:
   [X] ZPA [ ] Other _____ (specify)
   OBE S/S = 0.25 F/B = 0.25 V = 0.14
   SSE S/S = 0.40 F/B = 0.40 V = 0.25

6. Were fatigue effects considered:
   [X] Yes [ ] No
   If yes, describe how they were treated in overall qualification program: SRV aging performed

VI. If Qualification by Test, then Complete:

1. [ ] Single Frequency [X] Multi-Frequency [X]random
   [ ] sine beat
   [ ] _____
2. [ ] Single Axis [X] Multi-Axis
   [ ] Independent Axis [ ] In-phase motions
3. Number of Qualifications Tests:
   OBE 5 SSE 1 Other _____ (specify)
4. Frequency Range: 1-100 Hz
5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical):
   S/S = Note 1 F/B = Note 1 V = Note 1
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

Note 1 : 0.2 g resonance search test was performed on a similar unit, however results of this test were not provided.

8. Maximum Input g Level Test: (ZPA)

OBE S/S = 10.0 g F/B = 10.0 g V = 10.0 g

SSE S/S = 14.0 g F/B = 14.0 g V = 14.0 g

9. Laboratory Mounting:

A. [X] Bolt (No. 2, Size 8-32)

[ ] Weld (Length ____) [ ] _____

B. Orientation and Fixturing: _____

10. Functional operability verified:

[X] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:

SRU's passed the acceptance criteria of accuracy (pre and post seismic)

_____

12. Other tests performed (such as aging or fragility test, including results):

One of the test units underwent 10.0 g ZPA fragility testing.

_____

13. Failure Modes (If appropriate) _____

14. Margins Available: [X] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, then complete: N/A

1. Method of Analysis:

[ ] Static Analysis [ ] Equivalent Static Analysis

[ ] 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: [ ] 3D [ ] 2D [ ] 1D

[ ] Finite Element [ ] Beam

[ ] Closed Form Solution [ ] Other _____

MPL: C41A-SRU2

4. [ ] Computer Codes: _____
   Frequency Range and No. of modes _____
   [ ] Hand Calculations
5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [ ] SRSS [ ] Other: _____ (specify)
6. Damping:
   OBE _____ SSE _____ Basis for damping used: _____
7. Support Considerations in the model: _____
8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B.

Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____
10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

ATTACHMENT 1

GE DRAWING

NUCLEAR SAFETY RELATED

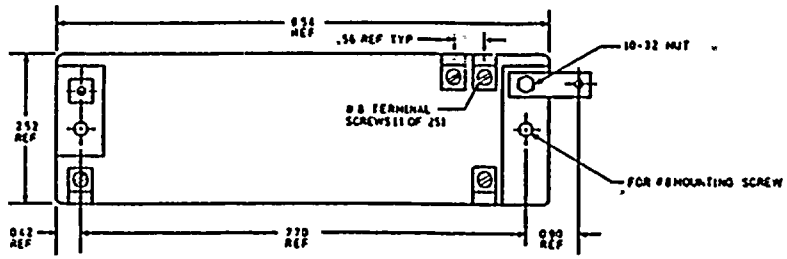
GENERAL ELECTRIC 14707166

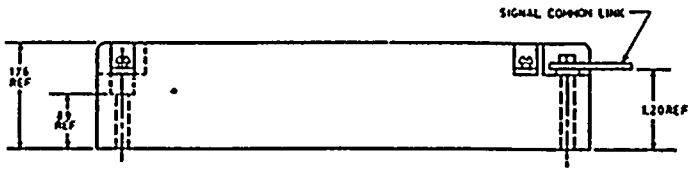
14707166

SIGNAL RESISTOR UNIT

CLASS 1

FSC: 6350-00HN





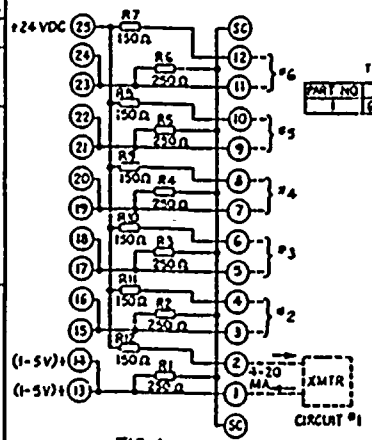


FIG. 1 [1]

TABLE 1

PART NO	TYPE	FIG NO	CATALOG NUMBER
1	6 TRANSMITTERS	1	7661000AAN2

[1]

TABLE 2

[1]	FIG NO	CIRCUIT RESISTANCE	ACCEPTANCE TOLERANCE AT 23° ± 5°C
	1	249Ω 1%Ω	0.25 %
		47Ω 1%Ω	5.0 %

SPECIFICATIONS.

1.0 EQUIPMENT IDENTIFICATION. BAILEY CONTROLS COMPANY TYPE 766 SIGNAL RESISTOR UNIT.
1.1 PART IDENTIFICATION. REFER TO TABLE 1.
2.0 THE EQUIPMENT IS TO BE DESIGNED, ASSEMBLED AND TESTED IN ACCORDANCE WITH THE FOLLOWING DOCUMENTS AND SPECIFICATIONS.
3.0 QUALIFICATION REQUIREMENTS.
3.1 IEEE STANDARD 323-1974, IEEE STANDARD FOR QUALIFYING CLASS 1E EQUIPMENT FOR NUCLEAR POWER GENERATING STATIONS. (SEE DOCUMENT 3.3 FOR IMPLEMENTATION).
3.2 IEEE STANDARD 344-1975, IEEE RECOMMENDED PRACTICE FOR SEISMIC QUALIFICATION OF CLASS 1E EQUIPMENT FOR NUCLEAR POWER GENERATING STATIONS. (SEE DOCUMENT 3.4 FOR IMPLEMENTATION)
3.3 2234650 - QUALIFICATION AND PROCUREMENT SPECIFICATION FOR CSS CLASS 1E EQUIPMENT (1978/79 REQUIREMENTS).*
3.4 2234320 - SEISMIC QUALIFICATION PROCEDURE FOR CLASS 1E ELECTRICAL EQUIPMENT.*
3.5 2494223 - SUSCEPTIBILITY TEST OR APPROVED EQUAL.
4.0 MARGIN REQUIREMENTS. EXCEPT WHERE OTHERWISE SPECIFIED, THE ENVIRONMENTAL AND FUNCTIONAL PARAMETERS ARE TO HAVE ADDED TO THEM THE FOLLOWING MARGINS, IN ACCORDANCE WITH DOCUMENT 3.0, PARAGRAPH 6.3.1.3.
4.1 TEMPERATURE ±15°F (8°C).
4.2 PRESSURE N/A
4.3 RADIATION N/A
4.4 VOLTAGE N/A
4.5 FREQUENCY N/A
4.6 TIME ±10%
4.7 ENVIRONMENTAL TRANSIENTS N/A
4.8 VIBRATION ±1"%OF ACCELERATION
5.0 ENVIRONMENTAL CONDITIONS - REMOTE CONTROL ROOM
5.1 AMBIENT - CONTROL ROOM AND CONTROL EQUIPMENT ROOM.
5.1.1 TEMPERATURE. NORMAL 90°F ± 10°F FOR CABINET HEAT
EXTREME (MAXIMUM) 104° FOR 8 HOURS PER YEAR, -10°F (MINIMUM) 50°F
TRANSPORTATION AND STORAGE -70° TO 180°F.
5.1.2 RELATIVE HUMIDITY.
MAXIMUM CONTINUOUS 60%
MINIMUM CONTINUOUS 10%
5.1.3 ATMOSPHERIC PRESSURE.
MAXIMUM +1 INCH H_2O GAUGE
MINIMUM -0.8 INCH H_2O GAUGE
5.2 ELECTRICAL ENVIRONMENT N/A
5.3 VIBRATION
5.3.1 FREQUENCY. NORMAL (NON-SEISMIC) 10-40 HZ
TRANSPORTATION AND STORAGE 10-60 HZ.
SEISMIC 1-33 HZ
5.3.2 ACCELERATION- NORMAL (NON-SEISMIC) 0.01G
TRANSPORTATION AND STORAGE 0.5G
SEISMIC 1.0G HORIZONTAL, 0.67G VERTICAL (EPA-1.0G)
(SEE DOCUMENT 3.4 FOR RESPONSE SPECTRUM REQUIREMENTS)
5.4 RADIATION N/A
5.5 CHEMICAL ENCLOSURE-WATER SPRAYS N/A
5.6 SIMULTANEOUS ACCIDENT STRESS CONDITIONS N/A
6.0 FUNCTIONAL INPUT N/A
6.1 ELECTRICAL INPUT
6.1.1 VOLTAGE 24 VDC (FUSED)
6.1.2 CURRENT 0.174 (MAXIMUM FOR 6 TRANSMITTERS)
6.1.3 CIRCUIT LOAD 250 Ohm OUTPUT SIGNAL SOURCE
6.1.4 SUSCEPTIBILITY N/A
7.0 RANGE
7.1 INPUT RANGE 4-20 mADC
7.2 OUTPUT RANGE 1-5 VDC
8.0 PERFORMANCE
8.1 NORMAL OPERATION.
THE UNIT SHALL PERFORM ITS FUNCTION (INPUT TO OUTPUT) WITH AN ACCURACY OF ±0.125% [1]
THE EQUIPMENT IS ENERGIZED CONTINUOUSLY DURING PLANT OPERATION AND IS OPERATIONALLY TESTED EVERY 30 DAYS.
8.2 OBE(SCA BASIS EVENT OPERATION (CLASS 1E OPERATION).
A. DURING THE UNIT SHALL PERFORM ITS FUNCTION (INPUT TO OUTPUT) WITH AN ACCURACY OF ±0.5% DURING AND AFTER A DESIGN BASIS EVENT (SEISMIC).
B. POST-DBE OPERATING TIME.
9.0 INSTALLATION, CONNECTIONS, INTERFACES
9.1 N/A
9.2 MOUNTING.
THE UNIT IS SECURELY FASTENED TO A VERTICAL SURFACE WITH TWO #8 MOUNTING SCREWS.
9.3 ELECTRICAL CONNECTIONS.
SIGNAL AND POWER CONNECTIONS ARE MADE TO #8 TERMINAL SCREWS. THE SIGNAL COMMON CONNECTION IS MADE TO THE SC LINK.
9.4 INTERFACES AND AUXILIARY DEVICES N/A

10.3 DESIGN LIFE.
THE EQUIPMENT IS INSTALLED IN A PLANT WITH A 40-YEAR LIFE. THE PARTS WITH A LIFE LESS THAN 40 YEARS WILL BE REPLACED AS RECOMMENDED BY THE SUPPLIER TO MAINTAIN THE CLASS 1E FUNCTION.
12.0 QUALIFIED LIFE.
THE EQUIPMENT SHALL HAVE A QUALIFIED LIFE ESTABLISHED AS A RESULT OF TYPE TESTING. (SEE REFERENCES 3.1 & 3.3)
14.0 SUPPLIER SUBMITTAL REQUIREMENTS.*
14.1 SEE SUPPLIER DOCUMENT LIST REFERENCED ON THIS DRAWING FOR ONE TIME SUBMITTALS.
14.2 SEE 2624590, SECTION 5 AND TABLE 4 FOR PRODUCT QUALITY ASSURANCE SUBMITTAL REQUIREMENTS.
EACH SHIPMENT SHALL INCLUDE:
A. RECORDED CHARACTERISTICS OF CALIBRATION
B. CERTIFICATE OF COMPLIANCE

* IMPLEMENTED BY VENDOR STANDARD QA PROGRAM ASSURING COMPLIANCE WITH INTENT OF SPECIFICATION.

[1] QUALIFICATION TEST PROCEDURE QTP-0873 & TEST DATA QB 3202-698-766 ARE FILED AS 44EA554G001

AS MANUFACTURED BY: BAILEY OR ENGINEERING APPROVED EQUIVALENT

REV	DESCRIPTION	BY	DATE
A	PRELIMINARY ISSUE		

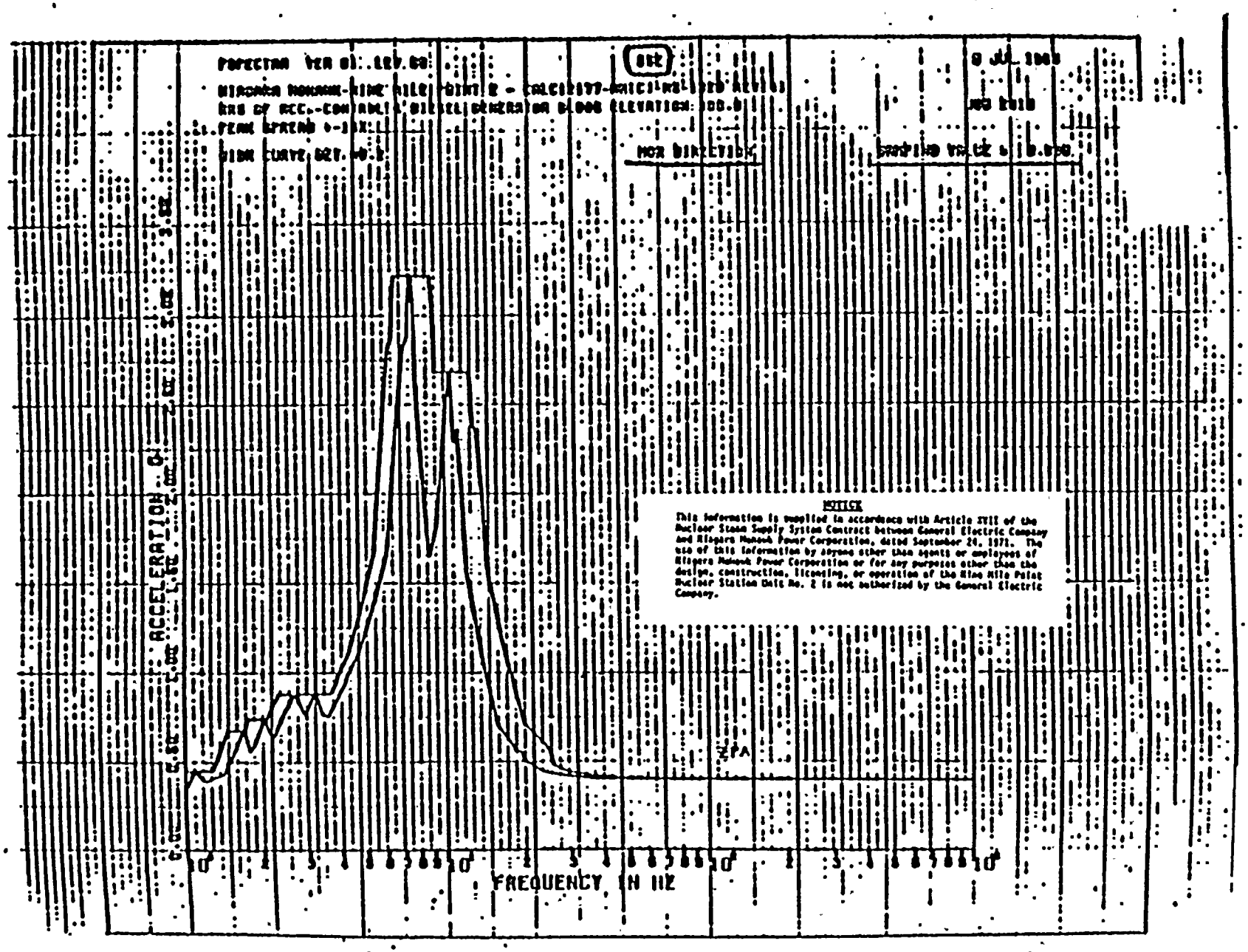
PT NO	VENDOR INDEX FILE (GE USE ONLY)
1	44EA554G001

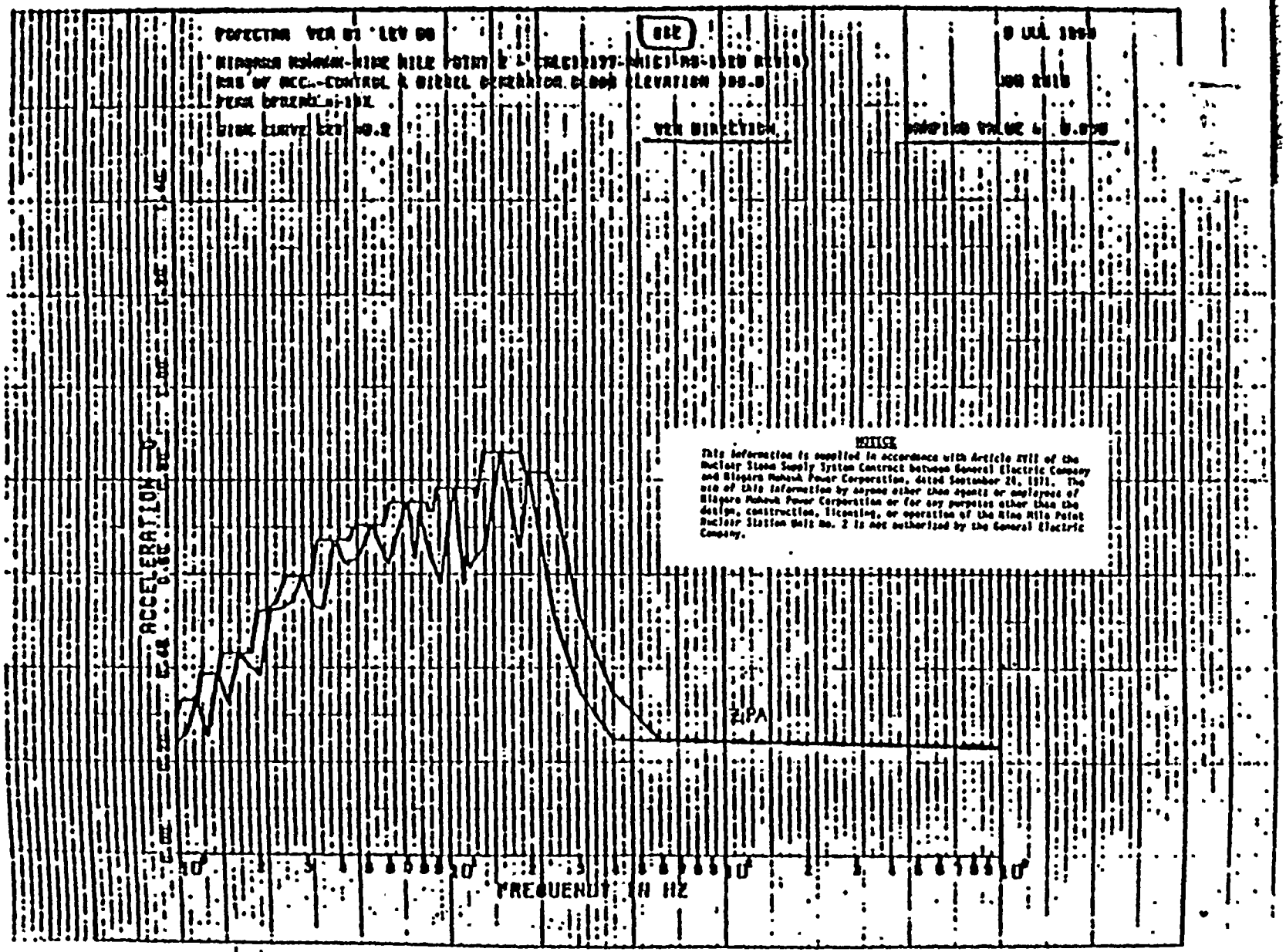
CHKD BY: [illegible] 10 APR 8-80

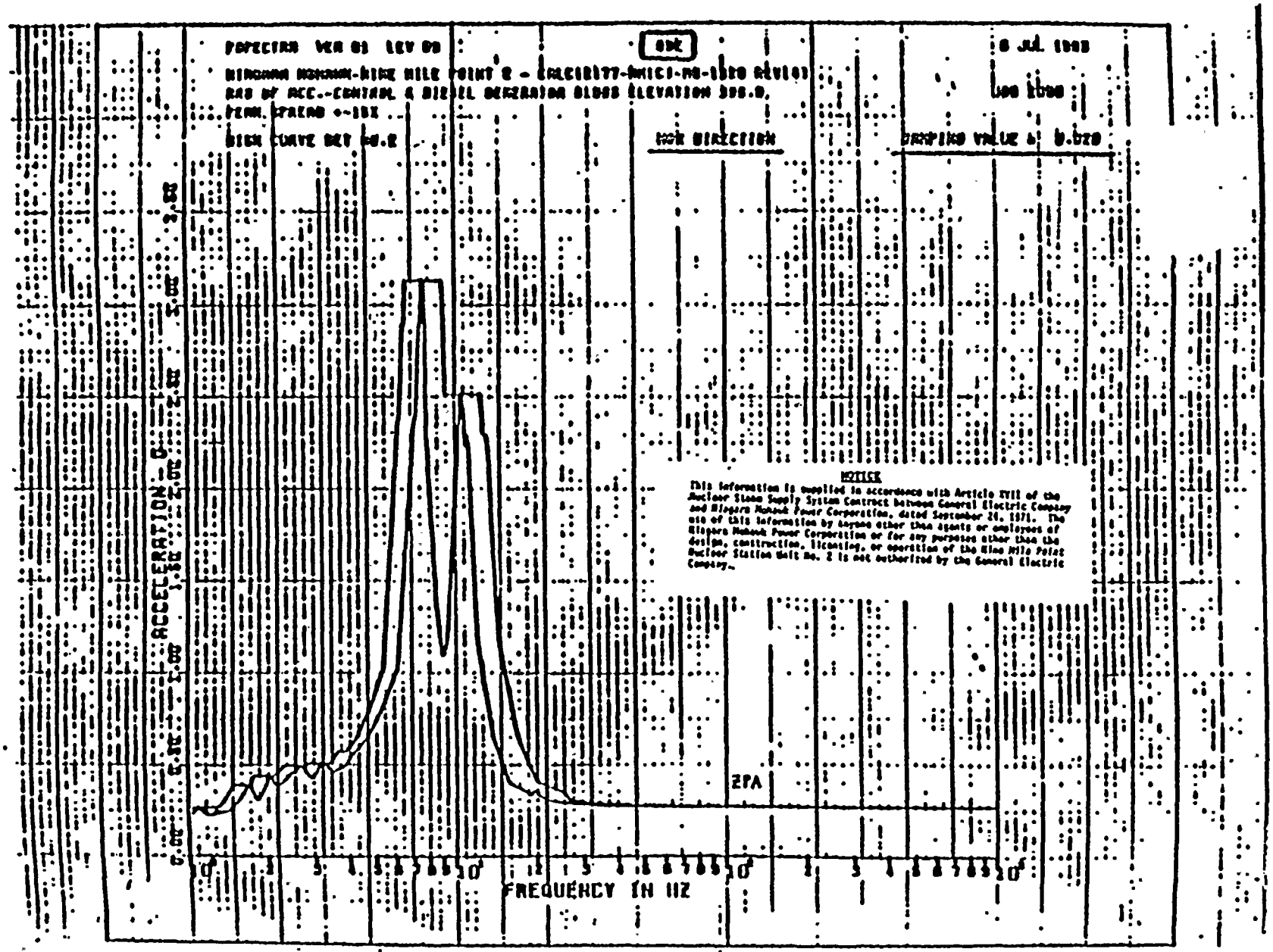
14707166

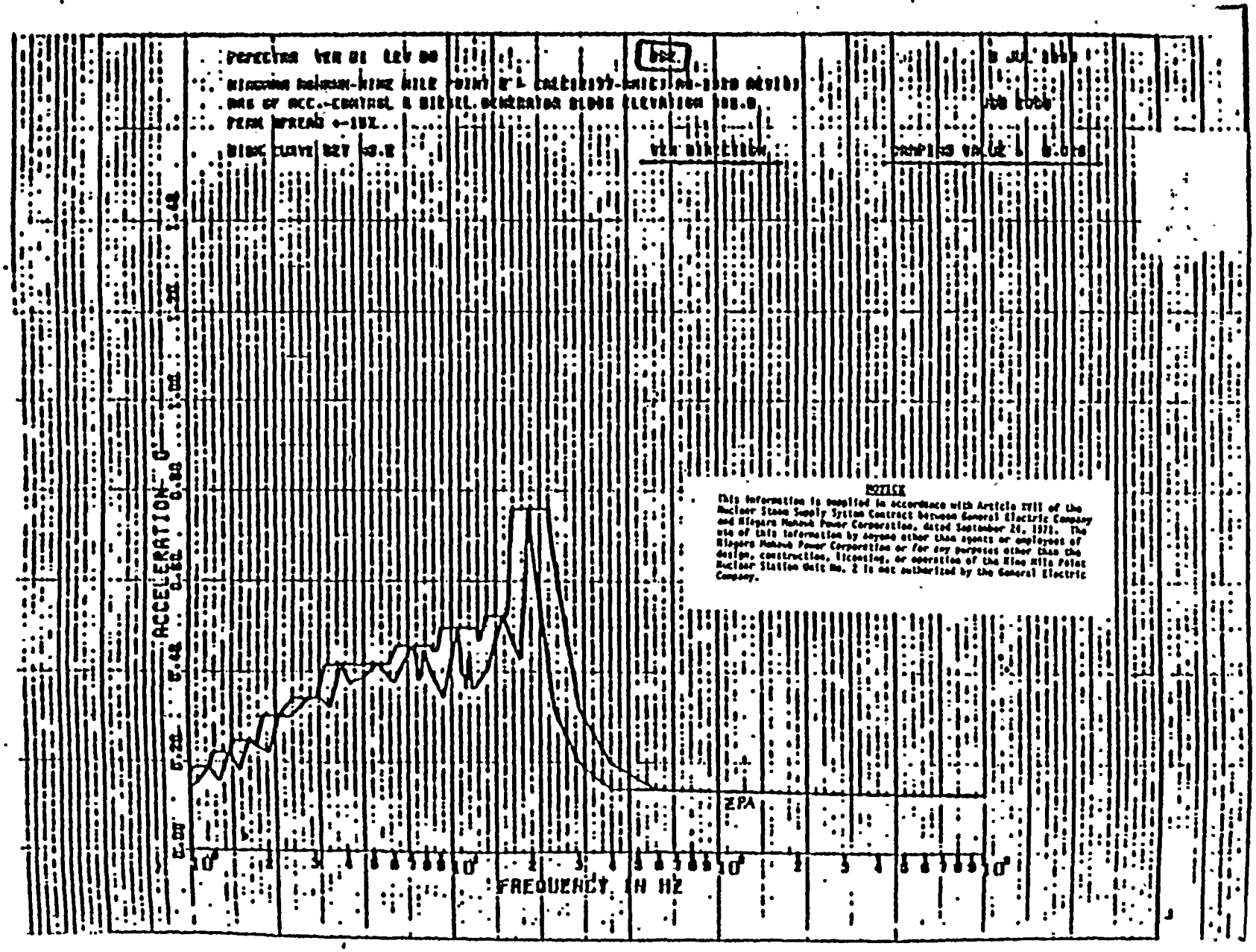
ATTACHMENT 2

REQUIRED RESPONSE SPECTRA


ACCELERATION, G
FREQUENCY, IN HZ
NOTICE
This information is supplied in accordance with Article XIII of the Nuclear Steam Supply System Contract between General Electric Company and Niagara Mohawk Power Corporation, dated September 24, 1971. The use of this information by anyone other than agents or employees of Niagara Mohawk Power Corporation or for any purpose other than the design, construction, licensing, or operation of the Nine Mile Point Nuclear Station Unit No. 2 is not authorized by the General Electric Company.


ACCELERATION
FREQUENCY IN HZ
ZPA
NOTICE
This information is supplied in accordance with Article XIII of the Nuclear Steam Supply System Contract between General Electric Company and Niagara Mohawk Power Corporation, dated September 24, 1971. The use of this information by anyone other than agents or employees of Niagara Mohawk Power Corporation or for any purpose other than the design, construction, licensing, or operation of the Nine Mile Point Nuclear Station Unit No. 2 is not authorized by the General Electric Company.


SPECTRA VER 01 LEV 00
8 JUL 1983
ROCK DIRECTION
DAMPING VALUE = 0.020
NOTICE
This information is supplied in accordance with Article XVII of the Nuclear Steam Supply System Contract between General Electric Company and Niagara Mohawk Power Corporation, dated September 24, 1971. The use of this information by anyone other than agents or employees of Niagara Mohawk Power Corporation or for any purpose other than the design, construction, licensing, or operation of the Nine Mile Point Nuclear Station Unit No. 2 is not authorized by the General Electric Company.
ZPA
ACCELERATION-G
FREQUENCY IN HZ



NOTICE

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ATTACHMENT 3

TEST RESPONSE SPECTRA

BAILEY SRU TRS (147D7166)

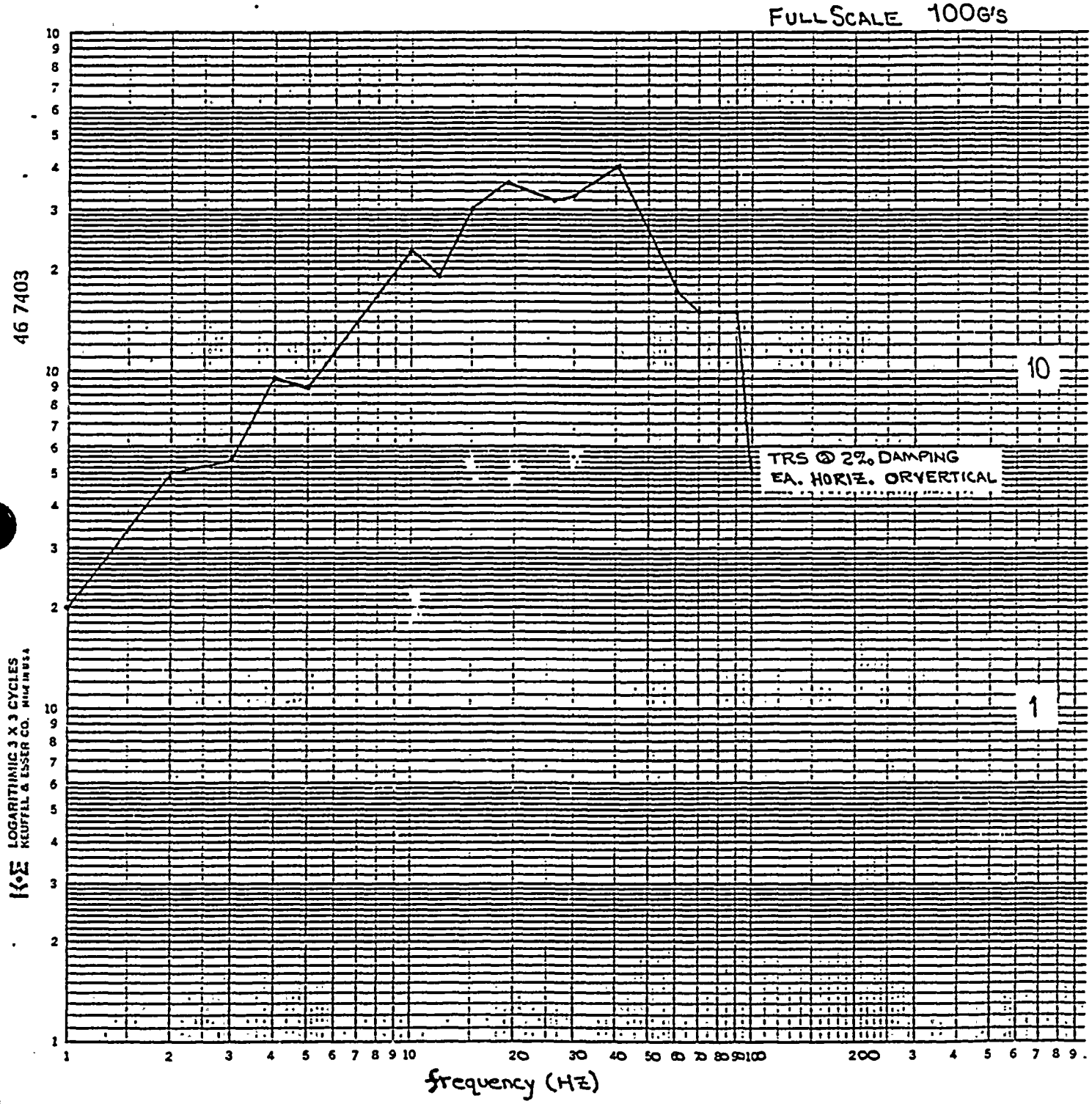


FIGURE 2-8

ATTACHMENT 4

TRS/RRS COMPARISON

NINE MILE POINT 2

Device MPL: C41A-SRU2
Panel MPL: H13-P601
Similar Panel: Cofrentes H13-P601
Reference DRF A00-1138 Tab K

The signal resistor unit listed is qualified based on the TRS/theortical comparison (figure 1 and 2). The theoretical RRS is based on transmissibility data obtained from seismic testing (sine sweep and or dwell data, table 1) of a panel similar to the NMP-2 H13-P601.

The attached panel drawing (figure 3) shows the location of C41A-SRU2 on the panel and the tested panel diagram (figure 4) shows the location of accelerometers 5 and 6 from which test data were aquired.

The theoretical RRS plotted on figures 1 and 2 was calculated as the product of panel transmissiblity and floor response acceleration level at conincident frequencies, and constitutes the worst case RRS at the device mounted location for the front to back, side to side, and vertical directions.

Freq (Hz)	Lateral	Vert.	Long.
35	1.5	1.1	1.1
34	1.4		
32	1.8		
29	1.6		
25	1.2		
23	1.2	1.2	3.4
22	1.2		
21	1.2		
19	1.2		3.1
15	1.2	1.0	4.9
12	1.2		
9	1.1		
5	0.9	1.1	1.1
3	1.0		

Table 1
Cofrentes H13-P601
ACC # 5.6 Transmissibility Data

Plotted by: M. Shelf
Checked by: R. Clintgen
Date: 9-15-82 Time:

Babcock & Wilcox
Bailey Controls Company
QUALIFICATION TEST LAB.

Test Item: 766 SIGNAL RESISTOR UNIT
Item P/N: 766100BAAN2
Item S/N: Q371-1,3
Ref. Spec: QTP-N137
Unit: Operational ☑ Non-operational ☐
Temp. & Humidity: 72°F; 55% RH
Test Type: SSE
Duration: 30 sec
Sweep Speed: - oct/minute
Damping: 2%
Pickup Sensing Axis: Z
Pickup Sensitivity: 101 mv/g
Vibration Axis: +XZ
☑ Line ☐ Tape
Graph Number: 25
Tolerance: +6 dB −0 dB

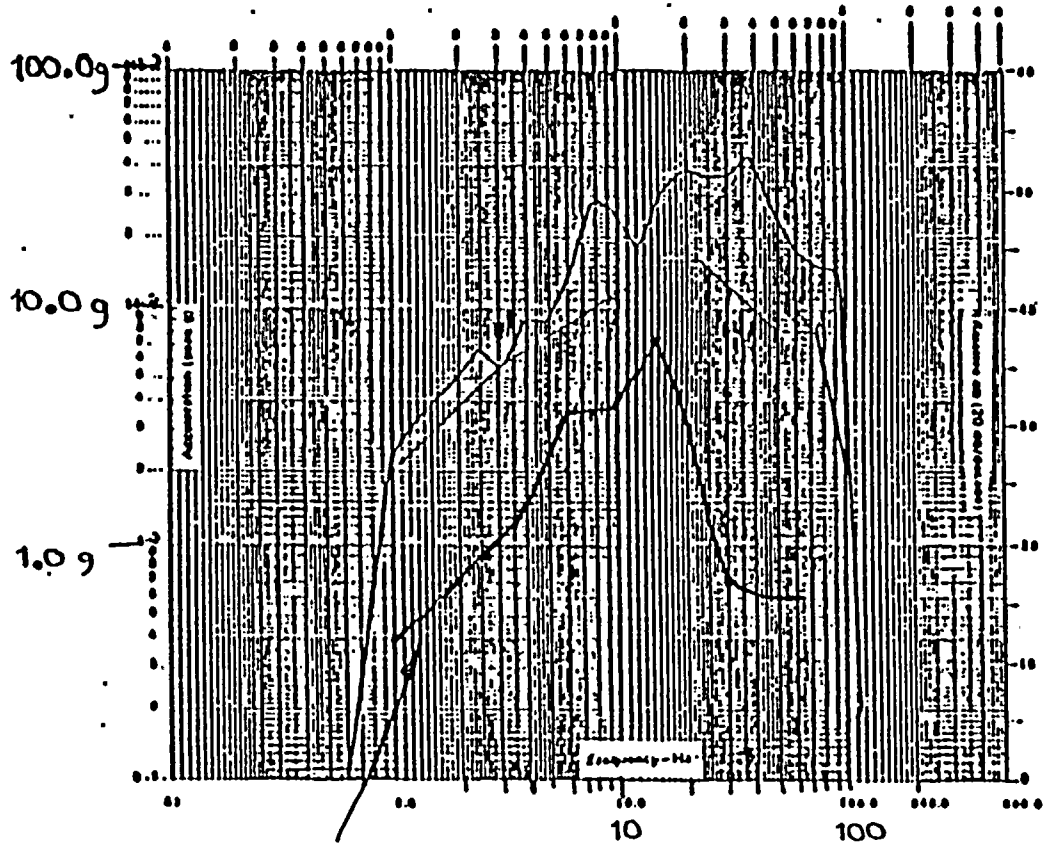


FIGURE 1 – H13-P601 theoretical RRS (envelope of FB, SS, Y) at C41-SRU2 LOCATION

GENERAL ELECTRIC CO.
FILE NO. 422X556-002
REV. 0
APPROVED

Plotted by: [illegible] Babcock & Wilcox
Checked by: [illegible] Babcock & Wilcox Company
Date: 4-15-92 Time: _____ QUALIFICATION TEST LAB.

Test Item: 766 SIGNAL RESISTOR UNIT
Item P/N: 766100 BAAN2
Item S/N: 0371-1, 3
Ref. Spec.: QTP N137
Unit: Operational ☒ Non operational ☐
Temp. & Humidity: 72°F · 55% RH
Test Type: SSE
Duration: 30 sec
Sweep Speed: — octaves/min
Damping: 2%
Pickup Sensing Axis: Z
Pickup Sensitivity: 100 mV/g
Vibration Axis: HOR
☒ Line ☐ Tape
Graph Number: 26
Tolerance: +6dB −0dB

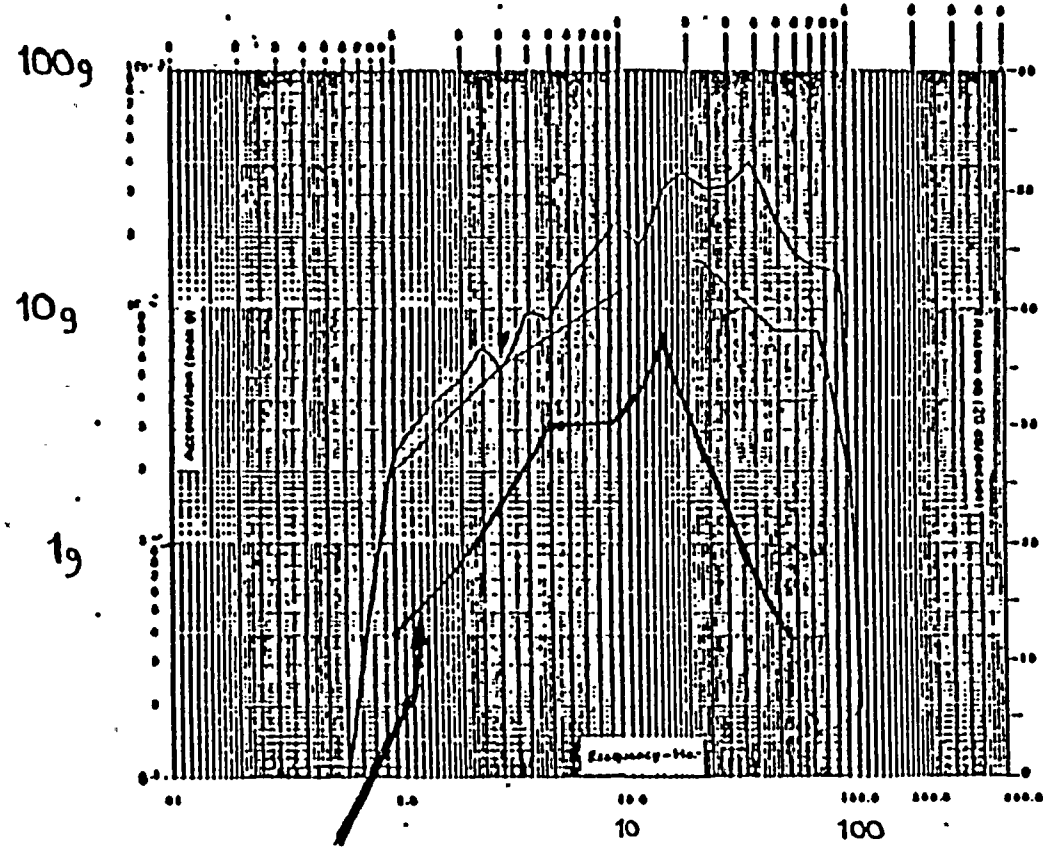


FIGURE 2 H13-P601 theoretical RRS (envelope of FB, SS, V) at C41-SR12 LOCATION

GENERAL ELECTRIC CO.
FILE NO. 442X556-002
REV. 0
APPROVED _____
EU-75 AC 05

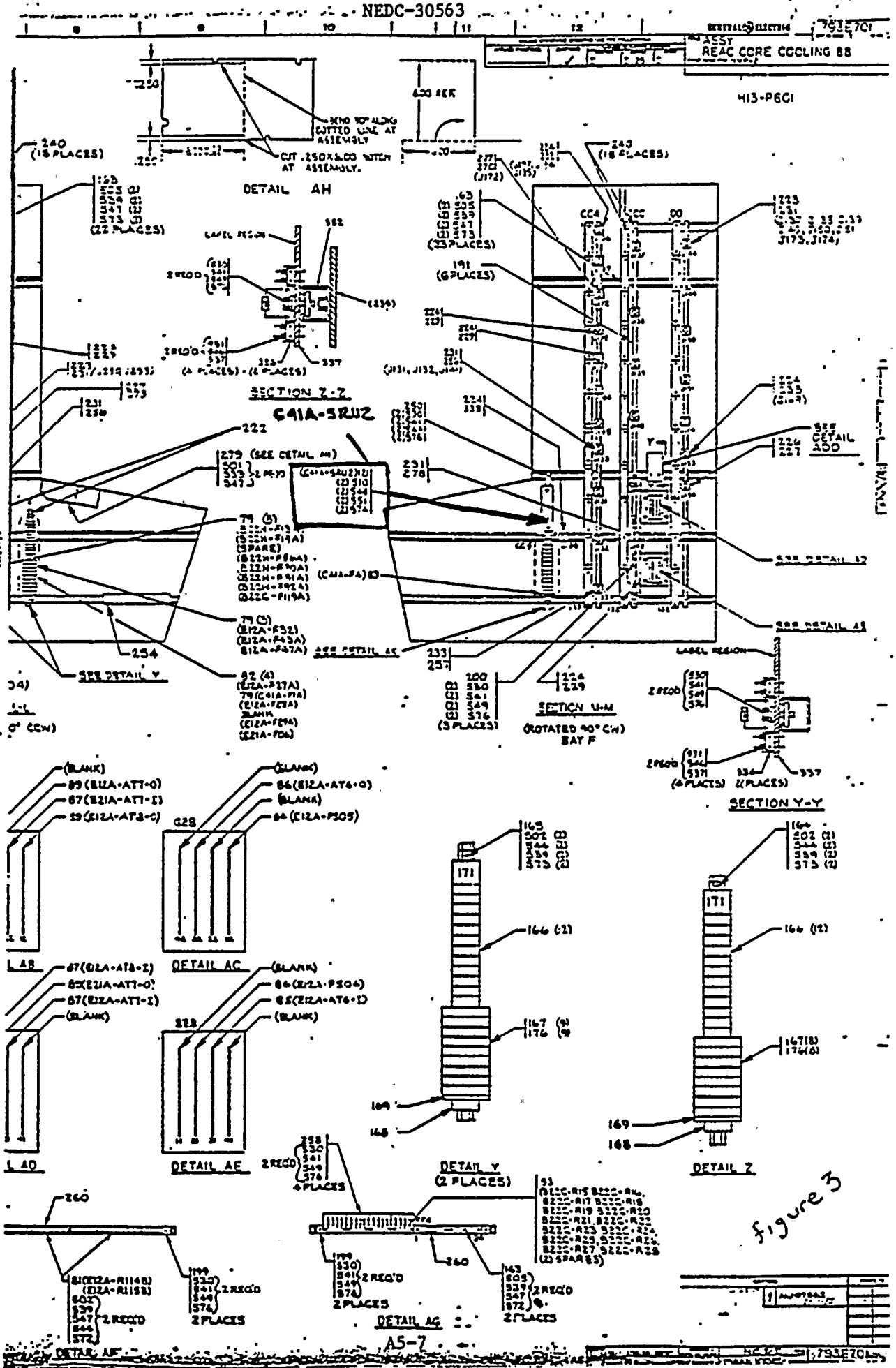
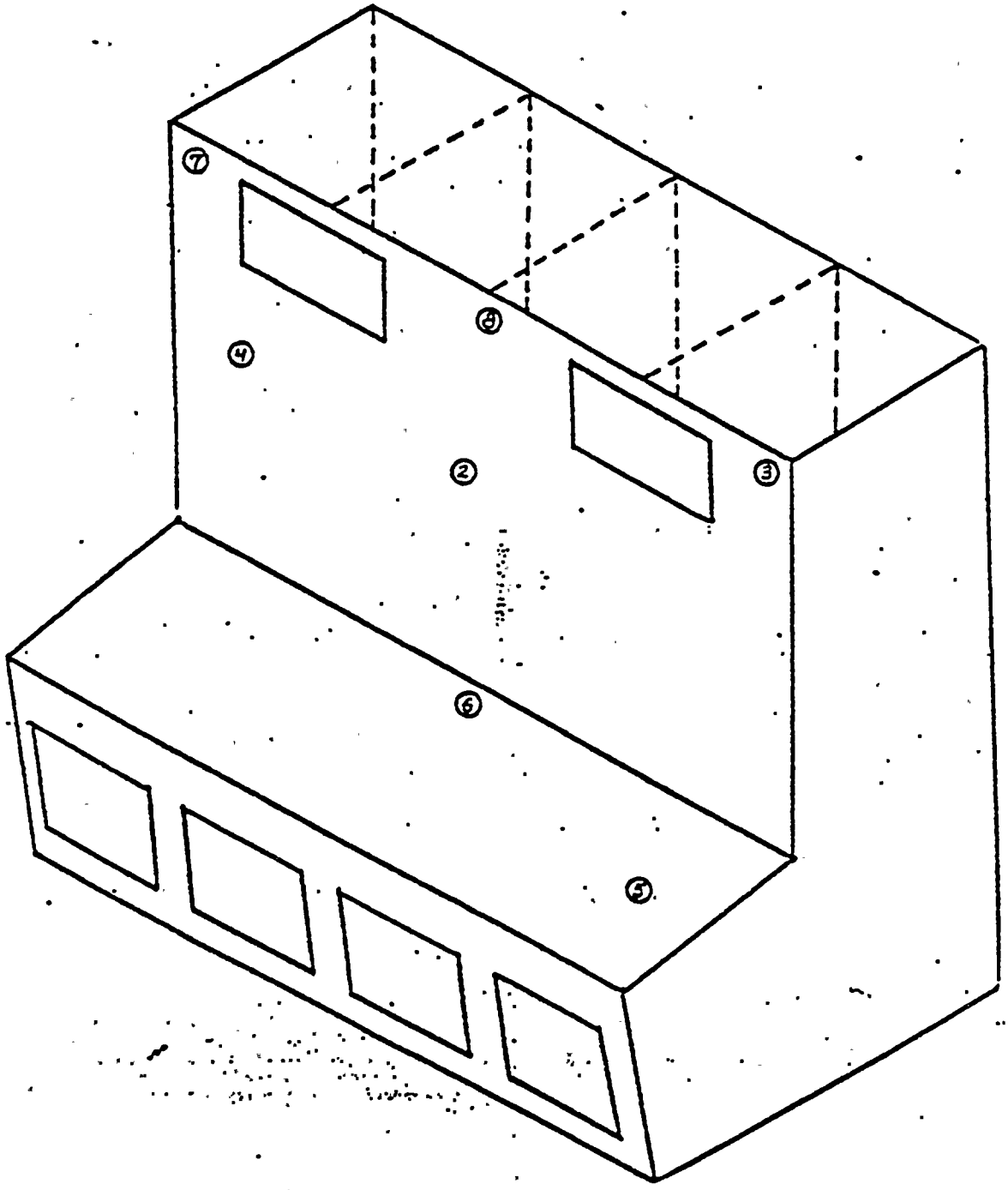

ASSY
REAC CORE COOLING 88
H13-P6CI
DETAIL AH
SECTION Z-Z
C41A-SRU2
SECTION U-M
(ROTATED 90° CW)
BAY F
SECTION Y-Y
DETAIL AC
DETAIL AE
DETAIL Y
(2 PLACES)
DETAIL Z
DETAIL AG
DETAIL AF
SEE DETAIL Y
SEE DETAIL AA
SEE DETAIL AB
SEE DETAIL AD
(BLANK)
(SPARE)
2 REQ'D
4 PLACES
2 PLACES
(2 PLACES)
(16 PLACES)
(22 PLACES)
(6 PLACES)
(4 PLACES)
(2 PLACES)

figure 3

FIGURE 4

ACCELEROMETER LOCATIONS



H13-P601

FIGURE 4

MPL: C41-C001

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point 2

1. Utility: Niagara Mohawk Pwr.Corp.
2. NSSS: General Electric Co.
3. A/E: Stone & Webster

Type:
PWR ____
BWR 5 Mark II
Other ____

II. Component Name: Standby Liquid Control (SLC) Pump & Motor Assembly

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: 2X3TD-60 w/Gear Pac & Motor Quantity: 2
3. Size or Range: 2X3
4. Vendor: Union Pump Co. Battle Creek, Michigan
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: Horizontal, Reciprocating Action Pump with Base Plate
   b. Dimensions: Height 21-7/8", length O.A. 59", width O.A.43"
   c. Weight: Approx. 2350 lbs.
7. Location: Building: Containment
   Elevation: 289 ft.
8. Field Mounting Conditions [X] Bolt (No. 7, Size 3/4")
   [ ] Weld (Length ____)
   [ ] ____
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.] - On floor
10. a. System in which located: Standby Liquid Control System
    b. Functional Description: To inject a neutron absorber into the reactor ~~vessel incase of control rod failure.~~
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [ ] Both [X] Neither [ ] Other ____

MPL C41-C001

11. Pertinent Reference Design Specification for Qualification Requirements: Seismic Qualification Procedure No. 5430-6958 (VPF No. 5517-1-2)

a. [X] Seismic Input
b. [ ] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

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

Qualification Report*: 5430-6958 (VPF 5517-2-2)

(No., Title and Date): Seismic Qualification Test Report, 1/28/77

Company that Prepared Report: Approved Engineering Test Laboratories

Company that Reviewed Report: General Electric

Where Report is filed or available: NEBO, San Jose, CA

Applicable Codes and/or Standards: NEMA

V. Vibration Input:

1. Loads considered:
   a. [ ] Seismic only
   b. [ ] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [X] Combination of (a), and (b)

2. Method of Combining RRS:

   [ ] Absolute Sum [X] SRSS [ ] _____ (other, specify)

3. Required Response Spectra** (attach the graphs): N/A

* Analysis for pump and motor assembly qualification reports are contained in VPF-3679-10-3, Pump Seismic Calculations, VPF 3676-71-1, pump natural frequency and VPF 3676-191-4 motor seismic and natural frequency calculations, by Union Pump Co., Battlecreek, Michigan.

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

RH:rm/A09104*-2

MPL: C41-C001

4. Damping Corresponding to RRS: OBE N/A SSE N/A

5. Required Acceleration in Each Direction:

[X] ZPA [ ] Other _____ (specify)

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

SSE S/S = 1.04g F/B = 1.04g V = 0.87g

6. Were fatigue effects considered:

[ ] Yes [X] No

If yes, describe how they were treated in overall qualification program: _____

_____

_____

VI. If Qualification by Test, then Complete: (Motor only)

1. [X] Single Frequency [ ] Multi-Frequency [ ]random
[ ] sine beat
[ ] _____

2. [ ] Single Axis [X] Multi-Axis
[ ] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:

OBE 4 SSE 8 Other _____ (specify)

4. Frequency Range: 10-80-10 Hz

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

S/S =None detected F/B = None detected V = None detected

6. Method of Determining Natural Frequencies:

[X] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS enveloping RRS using Multi-Frequency Test:

[ ] Yes (Attach TRS & RRS graphs)

[X] No

MPL: C41-C001

8. Maximum Input g Level Test:

OBE S/S = 1.4g F/B = 1.4g V = 1.4g

SSE S/S = 2.0g F/B = 2.0g V = 2.0g

9. Laboratory Mounting:

A. [X] Bolt (No. 4, Size 1/2")

[ ] Weld (Length ____) [ ] _____

B. Orientation and Fixturing: _____

10. Functional operability verified:

[X] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made: No motor failure during seismic testing. Upon completion of test motor was coupled to a dynamometer set for 40 HP and ran continuously for 125 minutes, spec. maximum run time.

12. Other tests performed (such as aging or fragility test, including results):
Accelerated thermal aging performed to simulate end of life condition of the motor insulation system. Nonmetallic parts irradiated to 4.6×10^6 rads. No degradation of materials visible. Aging and radiation performed prior to seismic type test.

13. Failure Modes (If appropriate) N/A

14. Margins Available: [N/A] Input Spectrum [N/A] Fragility

VII. If Qualification by Analysis, then complete:

1. Method of Analysis: (Pump and motor assembly)

[X] Static Analysis [ ] Equivalent Static Analysis

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

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

S/S = >100 HZ F/B = >100 HZ V = >100 HZ

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

[ ] Finite Element [ ] Beam

[ ] Closed Form Solution [ ] Other _____

MPL: C41-C001

4. [ ] Computer Codes: N/A

Frequency Range and No. of modes 100 HZ

[X] Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

[ ] Absolute Sum [X] SRSS [ ] Other: _____ (specify)

6. Damping:

OBE _____ SSE 2% Basis for damping used: 385HA603* (Ref. 10, Sht. 10)

7.. Support Considerations in the model: N/A

8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable
Motor hold down bolts	(Tension) Faulted		5,600	15,000
	(Shear) "		3,470	12,000
Pump hold down bolts	(Tension) Faulted		17,680	37,500
	(Shear) "		11,350	30,000

B.

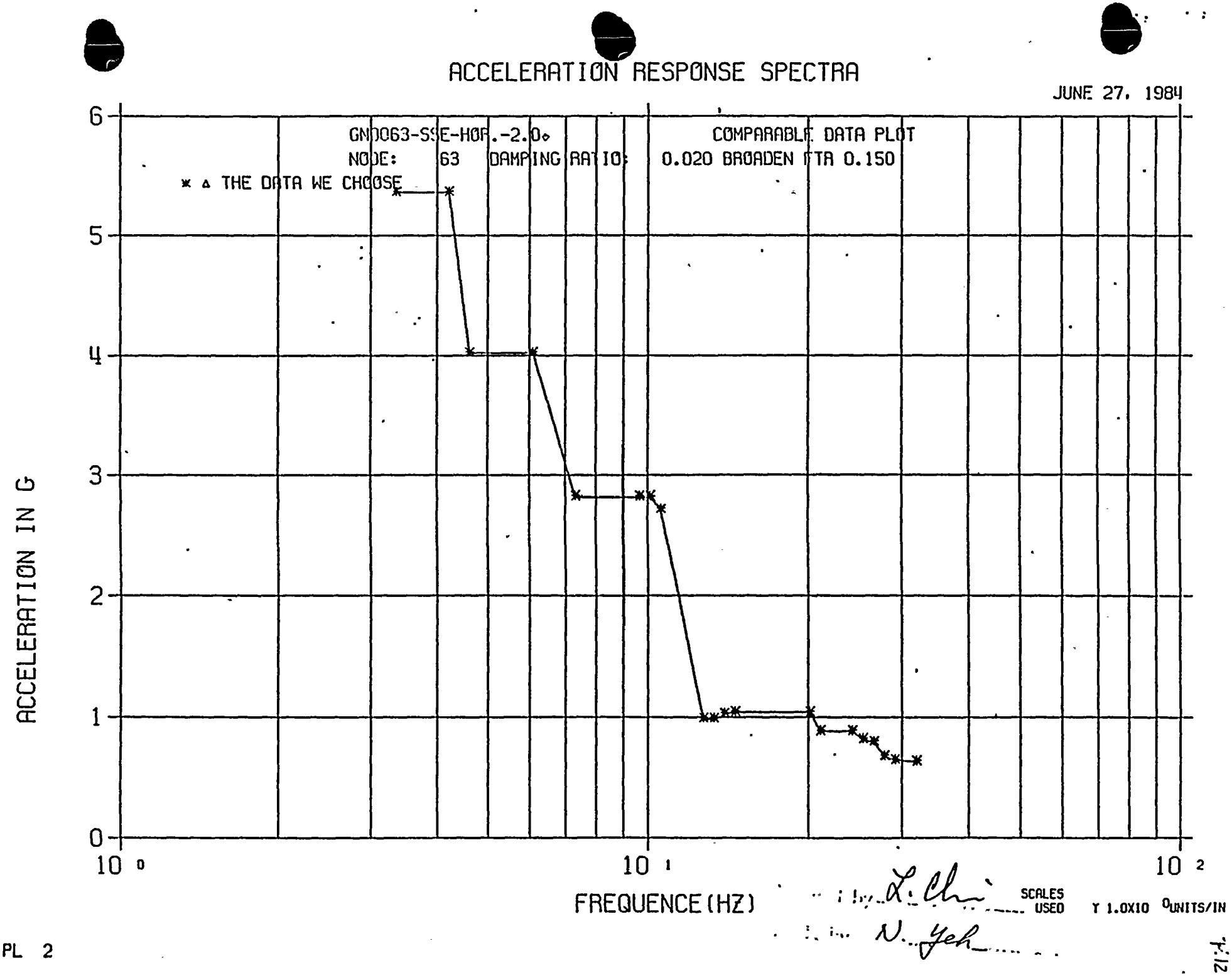
Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability
N/A		

*This is a conservative evaluation since BWR-6 documentation defines an allowable damping value of 3 percent for SSE seismic spectra and for emergency and faulted load combinations.

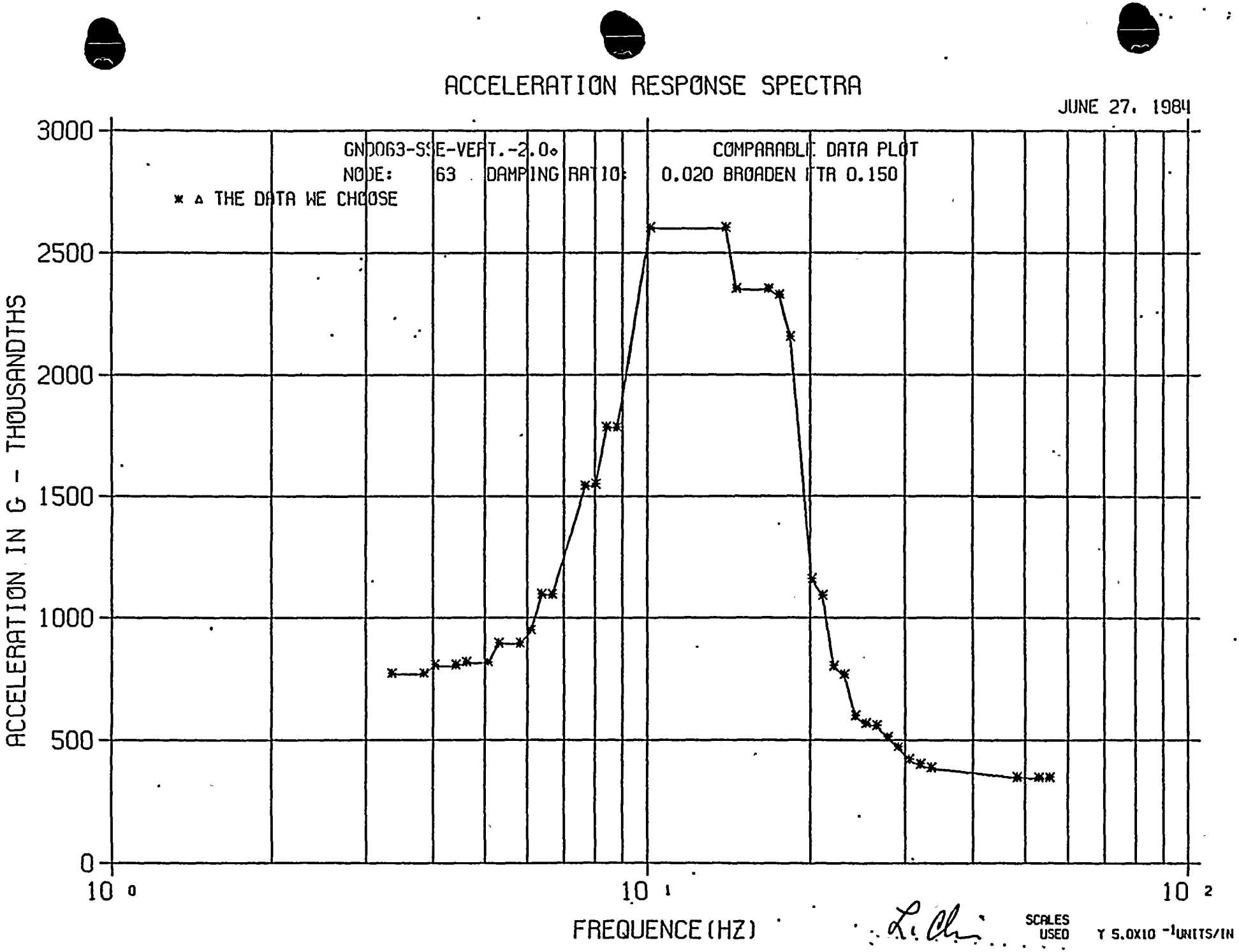
9. Failure Modes: _____

10. Margins Available: [ ] Input Spectrum

[X] Stress or Deflection


ACCELERATION RESPONSE SPECTRA
JUNE 27, 1984
GN0063-SSE-HOR.-2.0%
NODE: 63 DAMPING RATIO: 0.020 BROADEN FTR 0.150
COMPARABLE DATA PLOT
* Δ THE DATA WE CHOOSE
ACCELERATION IN G
FREQUENCE (HZ)
0
1
2
3
4
5
6
10 0
10 1
10 2
SCALES USED
Y 1.0X10 0 UNITS/IN

PL 2



PL 2

L. Chu

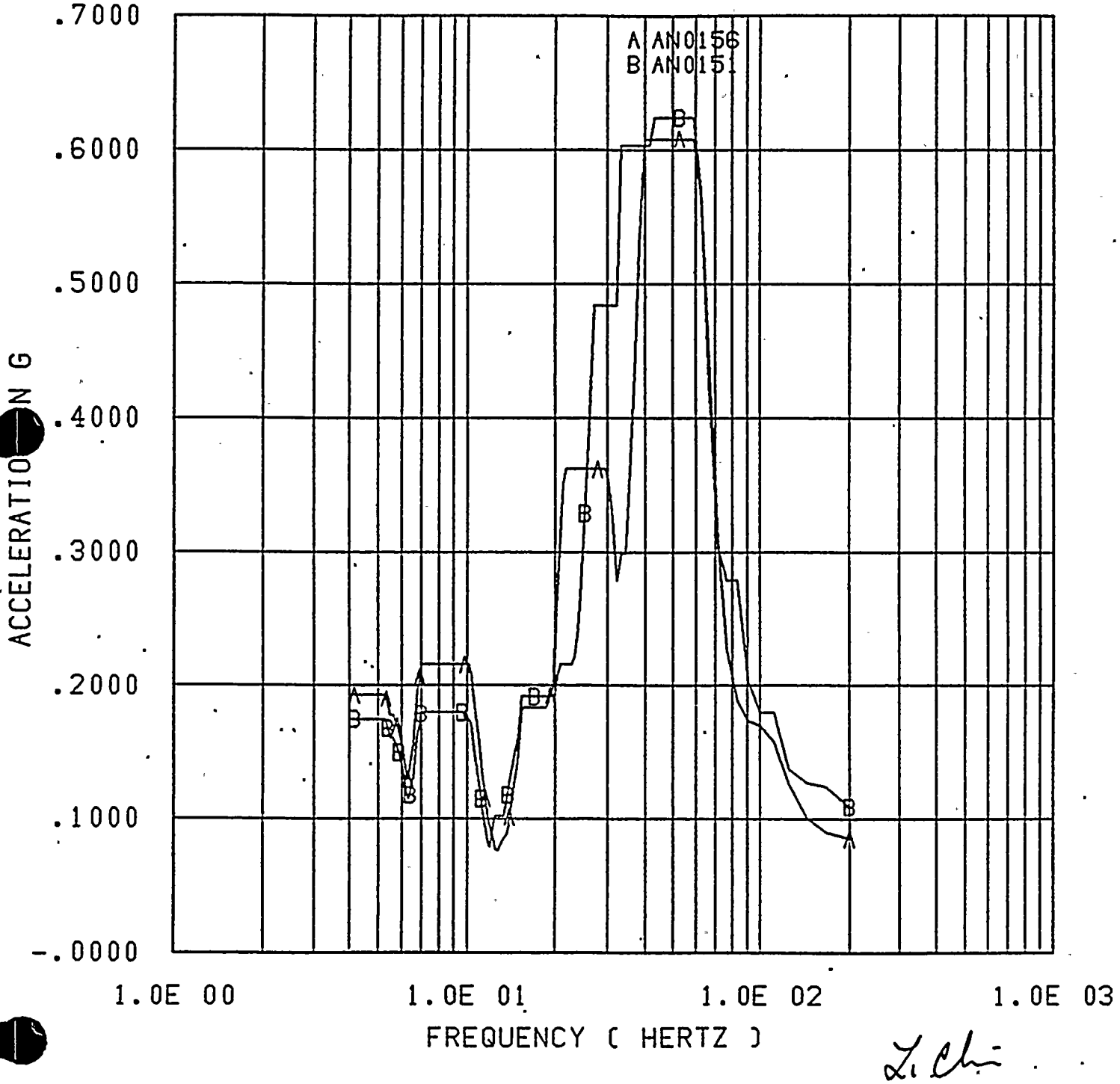
N. Yeh

4.15

ARSYS RESPONSE SPECTRA PLOT 1
DATE 06/25/84

p.18

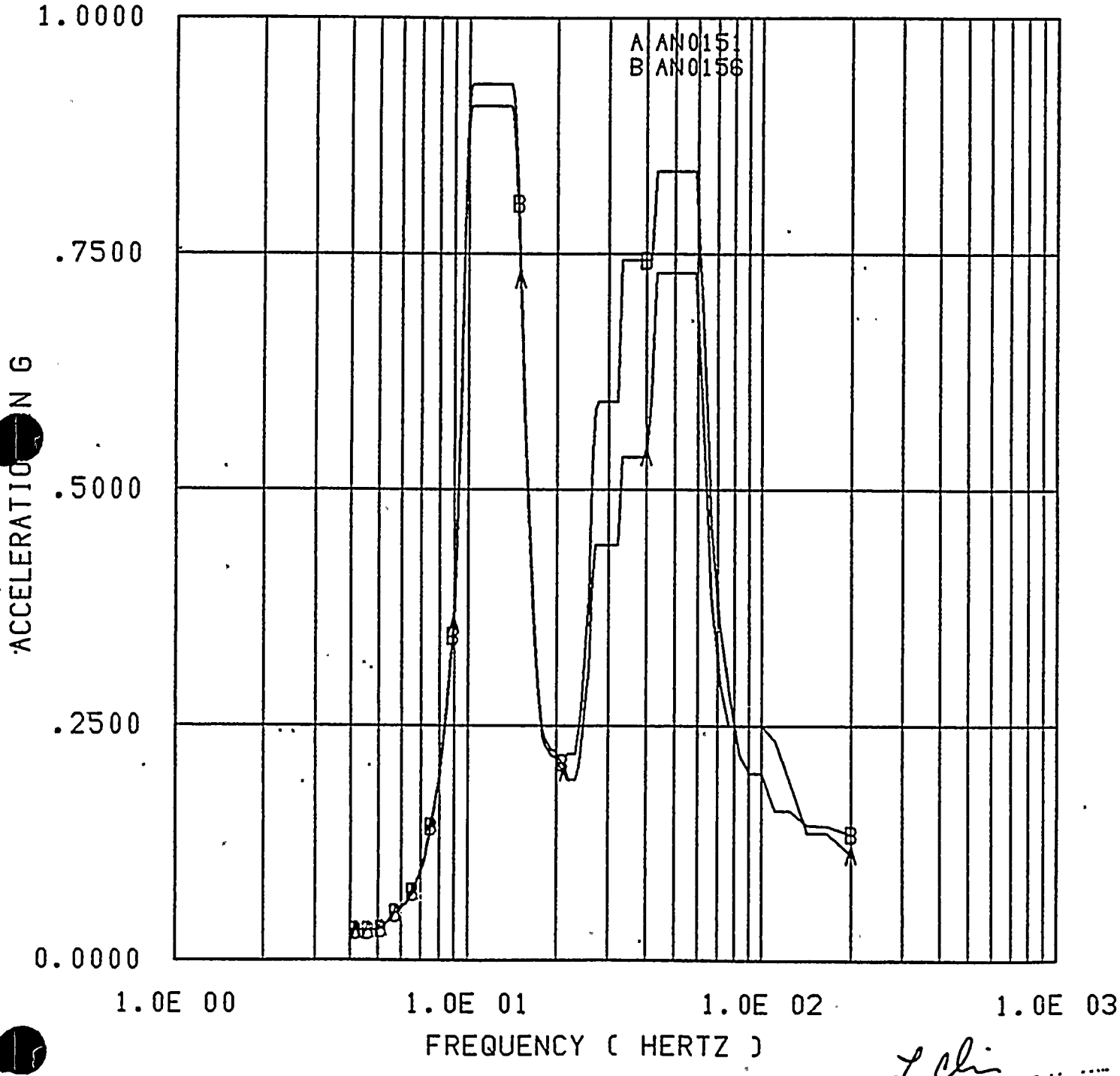
NINE MILE POINT 2
SRV HORIZONTAL 2%
SLC PUMP, TANK



Li Chi
N. Yh

ARSYS RESPONSE SPECTRA PLOT 2
DATE 06/25/84

NINE MILE POINT 2
SRV VERTICAL 2%
SLC PUMP, TANK

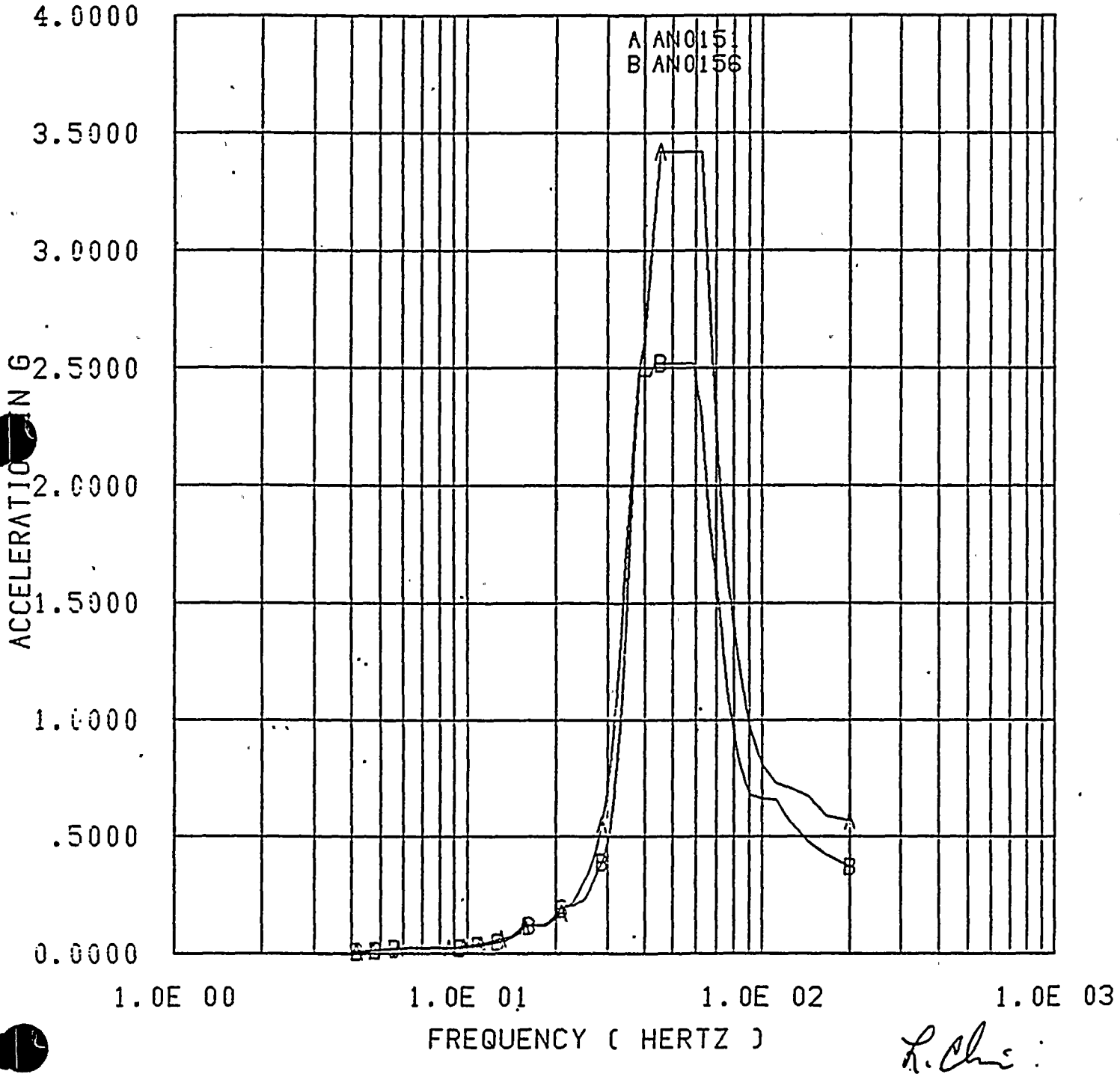


L. Chin
N. Yeh

ARSYS RESPONSE SPECTRA PLOT 3
DATE 06/28/84

p.2

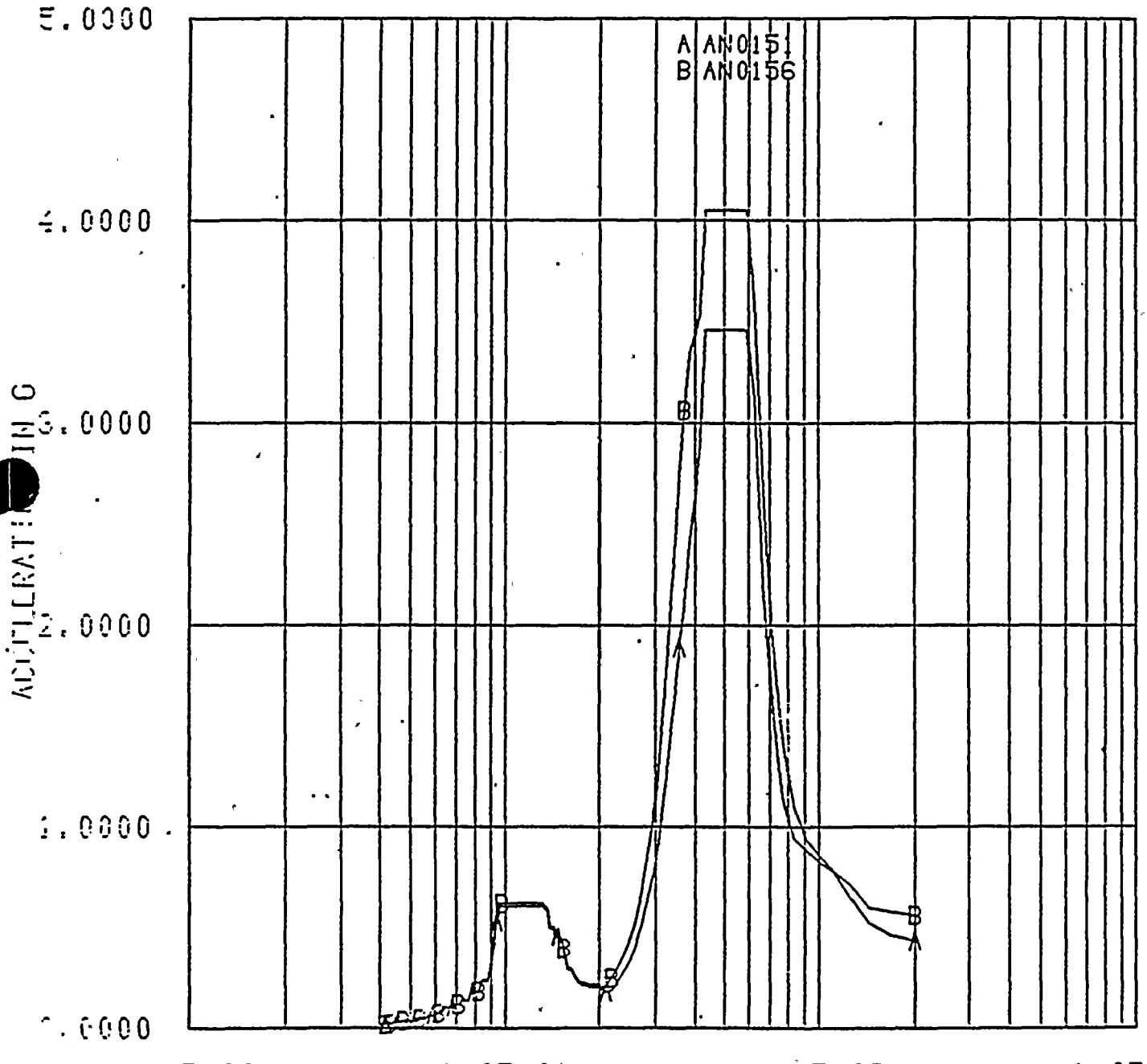
NINE MILE POINT 2
LOCA HORIZONTAL 2%
SLC PUMP, TANK



L. Chu
N. Yeh

ANSYS RESPONSE SPECTRA PLOT 4
DATE 06/28/84

NINE MILE POINT 2
LOCA VERTICAL 2%
SLC PUMP, TANK



L. Chi
N. Yeh

MPL: C41-R003

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point 2 Type:

1. Utility: Niagara Mohawk Power Corp. PWR ____
2. NSSS: General Electric Co. BWR- 5, MK II
3. A/E: SWEC Other ____

II. Component Name Pressure Indicator

1. Scope: [x] NSSS [ ] BOP [ ] Other
2. Model Number: 613B Quantity: 1
3. Size or Range: 0-2000 psi
4. Vendor: Robertshaw
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: See Attachment 1
   b. Dimensions: See Attachment 1
   c. Weight: 2.5 lb
7. Location: Building: Later
   Elevation: Later
8. Field Mounting Conditions [ ] Bolt (No. ___, Size ___)
   [ ] Weld (Length ____)
   [X] Later
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   Later
10. a. System in which located: Standby Liquid Control
    b. Functional Description: Passive, Class 1E
    c. Is the equipment required for [ ] Hot Standby [X] Cold Shutdown [ ] Both [ ] Neither [ ] Other ____

MPL: C41-R003

11. Pertinent Reference Design Specification for Qualification Requirements: As specified on GE drawing

a. [X] Seismic Input
b. [X] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualfied Life

III. Is Equipment Available for Inspection in the Plant:

[x] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

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

Qualification Report*: GE DRF No. A00-794-10

(No., Title and Date): A00-794-10 "H22 Local Panels" 18 Mar 1980

Company that Prepared Report: General Electric Co.

Company that Reviewed Report: General Electric Co.

Where Report is filed or available: GE

Applicable Codes and/or Standards: As specified on GE drawing

V. Vibration Input:

1. Loads considered:
   a. [x] Seismic only
   b. [x] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)

2. Method of Combining RRS:

[ ] Absolute Sum [X] SRSS [ ] _____ (other, specify)

3. Required Response Spectra** (attach the graphs): See Attachment 2

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

4. Damping Corresponding to RRS: OBE 1,2,4% SSE 2,3,4%

5. Required Acceleration in Each Direction:
[x] ZPA [ ] Other _____ (specify)
OBE S/S = 0.25g F/B = 0.25g V = 0.20g
SSE S/S = 0.40g F/B = 0.40g V = 0.32g

6. Were fatigue effects considered:
[ ] Yes [X] No
If yes, describe how they were treated in overall qualification program: _____

VI. If Qualification by Test, then Complete:

1. [ ] Single Frequency [x] Multi-Frequency [ ]random
[ ] sine beat
[ ] _____

2. [ ] Single Axis [x] Multi-Axis
[x] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:
OBE 5 SSE 1 Other _____ (specify)

4. Frequency Range: 1-250 Hz

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical)Device was tested as part of a panel; therefore, the natural frequency of the device was not determined.
S/S = N/A F/B = N/A V = N/A

6. Method of Determining Natural Frequencies:
[x] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS envelping RRS using Multi-Frequency Test:
[x] Yes (Attach TRS & RRS graphs)
[ ] No

MPL: C41-R003

8. Maximum Input g Level Test:

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

   SSE S/S = 6.241 g F/B = 6.241 g V = 5.73 g

9. Laboratory Mounting:

   A. [ ] Bolt (No. ____, Size ____)

   [ ] Weld (Length ____) [ ] _____

   B. Orientation and Fixturing: Mounted on local rack per drawing

10. Functional Operability Verified:

    [X] Yes [ ] No [ ] Not Applicable

11. Test Results Including Modifications Made:

    Device performance met the specifications.

12. Other Tests Performed (Such as Aging or Fragility Test, Including Results):

    None

13. Failure Modes (if appropriate): None

14. Margins Available: [X] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

   [ ] Static Analysis [ ] Equivalent Static Analysis

   [ ] 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:

   [ ] 3D [ ] 2D [ ] 1D

   [ ] Finite Element [ ] Beam

   [ ] Closed Form Solution [ ] Other _____

4. [ ] Computer Codes: _____

   Frequency Range and Number of Modes: 1-100 Hz

   [ ] Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   [ ] Absolute Sum [ ] SRSS [ ] Other _____ (Specify)

6. Damping:

   OBE _____ SSE _____ Basis for Damping Used _____

7. Support Considerations in the Model: _____

8. Critical Structural Elements:

A.	Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B.	Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____

10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

11. Pertinent Reference Design Specification for Qualification Requirements:

As specified on GE drawing

a. [X] Seismic Input
b. [X] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or Limited Availability

IV. Equipment Qualification Method:

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

Qualification Report:* Letter to N. G. Luria from D. K. Henrie

(No., Title and Date): "Perry Rerun-SQRT Instructure TRS for 72" Local Rack" 19 Aug 83

Company that Prepared Report: GE

Company that Reviewed Report: GE

Where Report is Filed or Available: GE

Applicable Codes and/or Standards: As specified on GE drawing

V. Vibration Input

1. Loads Considered: (Note: a and b combined)

a. [X] Seismic only
b. [X] Hydrodynamic only
c. [ ] Vibration from normal operation
d. [ ] Combination of a, b, and c

2. Method of Combining RRS:

[ ] Absolute Sum [X] SRSS [ ] _____ (Other, Specify)

3. Required Response Spectra** (attach the graphs): See attachment 2

Note:
*If more than one report, complete Items IV thru VII for each report.
**If other than RRS is used, describe methods.

4. Damping Corresponding to RRS: OBE 1.2,4% SSE 2,3,4%

5. Required Acceleration in Each Direction:

[X] ZPA [ ] Other _____ (Specify)

OBE S/S = 0.25g F/B = 0.25g V = 0.20g
SSE S/S = 0.4g F/B = 0.4g V = 0.32g

6. Were fatigue effects considered:

[ ] Yes [X] No

If yes, describe how they were treated in overall qualification program:

_____

_____

_____

VI. If Qualification by Test, Then Complete: N/A

1. [ ] Single Frequency [ ] Multi-Frequency [ ] Random
[ ] Sine Beat
[ ] _____

2. [ ] Single Axis [ ] Multi-Axis
[ ] Independent Axis [ ] In-Phase Motions

3. Number of Qualification Tests:

OBE _____ SSE _____ Other _____ (Specify)

4. Frequency Range: _____

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

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

6. Method of Determining Natural Frequencies:

[ ] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test:

[ ] Yes (Attach TRS and RRS Graphs)
[ ] No

8. Maximum Input g Level Test:

OBE S/S = _____ F/B = _____ V = _____
SSE S/S = _____ F/B = _____ V = _____

9. Laboratory Mounting:

A. [ ] Bolt (No. ____, Size ____)
[ ] Weld (Length ____) [ ] _____

B. Orientation and Fixturing: _____

10. Functional Operability Verified:

[ ] Yes [ ] No [ ] Not Applicable

11. Test Results Including Modifications Made:

_____

_____

12. Other Tests Performed (Such as Aging or Fragility Test, Including Results):

_____

_____

13. Failure Modes (if appropriate): _____

14. Margins Available: [ ] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, Then Complete:

1. Method of Analysis:

[ ] Static Analysis [ ] Equivalent Static Analysis
[ ] Dynamic Analysis [ ] Time-History
[X] Response Spectrum

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

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

3. Model Type:

[X] 3D [ ] 2D [ ] 1D
[ ] Finite Element [ ] Beam
[ ] Closed Form Solution [ ] Other _____

5A MPL: C41-R003

4. [ ] Computer Codes: ERSIN03

Frequency Range and Number of Modes: 1-100 Hz All Modes

[ ] Hand Calculations: N/A

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

[ ] Absolute Sum [ ] SRSS [ ] Other N/A (Specify)

6. Damping:

OBE N/A SSE 3% Basis for Damping Used _____

7. Support Considerations in the Model: Mounting Conditions

8. Critical Structural Elements: N/A

A.	Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable
	N/A				

B.	Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability
	N/A		

9. Failure Modes: N/A

10. Margins Available: N/A [ ] Input Spectrum [ ] Stress or Deflection

NOTE: Analysis was performed to determine the device location acceleration levels when subjected to the levels of the reference 2(A00-794-10) test.

11. Pertinent Reference Design Specification for Qualification Requirements:

As specified on GE drawing

a. [X] Seismic Input
b. [X] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or Limited Availability

IV. Equipment Qualification Method:

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

Qualification Report:* GE DRF No. A00-1084-160

(No., Title and Date): 710-215 "Report of Seismic Test on Twenty-Six (26) Pressure Gauges for Robertshaw Controls Co." 7 Feb 73

Company that Prepared Report: TII Testing Labs, Inc.

Company that Reviewed Report: GE

Where Report is Filed or Available: GE

Applicable Codes and/or Standards: As specified on GE drawing

V. Vibration Input

1. Loads Considered: (Note: a and b combined)

a. [X] Seismic only
b. [X] Hydrodynamic only
c. [ ] Vibration from normal operation
d. [ ] Combination of a, b, and c

2. Method of Combining RRS:

[ ] Absolute Sum [X] SRSS [ ] _____ (Other, Specify)

3. Required Response Spectra** (attach the graphs): See attachment 2

Note:
*If more than one report, complete Items IV thru VII for each report.
**If other than RRS is used, descrive methods.

4. Damping Corresponding to RRS: OBE 1,2,4% SSE 2,3,4%

5. Required Acceleration in Each Direction:

[X] ZPA [ ] Other _____ (Specify)

OBE S/S = 0.25g F/B = 02.5g V = 0.2g
SSE S/S = 0.4g F/B = 0.4g V = 0.32g

6. Were fatigue effects considered:

[ ] Yes [X] No

If yes, describe how they were treated in overall qualification program:

_____

_____

_____

VI. If Qualification by Test, Then Complete:

1. [ ] Single Frequency [X] Multi-Frequency [ ] Random
[ ] Sine Beat
[X] Sinusoidal

2. [ ] Single Axis [X] Multi-Axis
[X] Independent Axis [ ] In-Phase Motions

3. Number of Qualification Tests:

OBE _____ SSE _____ Other Not Specified (Specify)

4. Frequency Range: 2-200 Hz

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

S/S = 176 Hz & 198 Hz F/B = 176 Hz & 198 Hz V = 176 Hz & 198 Hz

6. Method of Determining Natural Frequencies:

[X] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test: N/A

[ ] Yes (Attach TRS and RRS Graphs)
[ ] No

C41-R003
GE Dwg No. 163C1184

8. Maximum Input g Level Test:

OBE S/S = N/A F/B = N/A V = N/A
SSE S/S = 2.0 g F/B = 2.0 g V = 1.34 g

9. Laboratory Mounting: The gauges were screwed to a steel manifold by their normal socket mounting threads. The manifold was bolted with two 3/4 in. bolts to a one inch aluminum plate and the plate was secured with nine 3/8 in. bolts to the table of the vibration machine.

A. [ ] Bolt (No. ____, Size ____)
[ ] Weld (Length ____) [ ] _____

B. Orientation and Fixturing: _____

10. Functional Operability Verified:

[X] Yes [ ] No [ ] Not Applicable

11. Test Results Including Modifications Made:

An exploratory vibration test was performed from 2-200-2 Hz to identify resonant frequencies. The gauges were then subjected to a continuous sine vibration test for at least 5 minutes at each of the resonant frequencies determined. Results of these tests indicate that 3 of the 26 gauges leaked due to tubing cracks. All other tested gauges successfully passed the specified seismic vibration tests and were linear and accurate within 0.5% F.S. . The applied sine dwell acceleration levels were 4.0g (peak) in each horizontal direction and 2.7g (peak) vertical

13. Failure Modes (if appropriate): see explanation of failure modes below*

14. Margins Available: [X] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

[ ] Static Analysis [ ] Equivalent Static Analysis
[ ] Dynamic Analysis [ ] Time-History
[ ] Response Spectrum

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

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

* Test results indicate that all of the failures resulting in leakage were a result of dynamic amplification due to tubing natural frequencies of greater than 90 Hz. This is far enough above the high frequency cutoff of approx. 30 Hz that failures of this type are not expected based on a comparison of the tested and required ZPA levels contained herein.

4. [ ] Computer Codes: _____

   Frequency Range and Number of Modes: _____

   [ ] Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   [ ] Absolute Sum [ ] SRSS [ ] Other _____ (Specify)

6. Damping:

   OBE _____ SSE _____ Basis for Damping Used _____

7. Support Considerations in the Model: _____

8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____

10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

ATTACHMENT 1

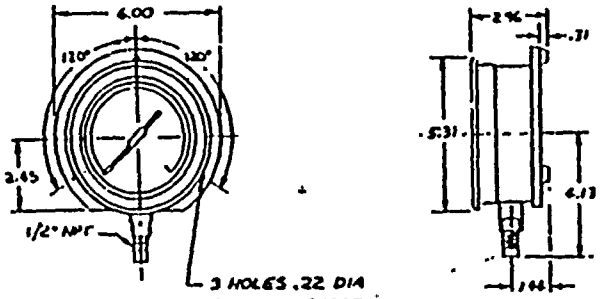
Drawing 163C1184

GENERAL ELECTRIC 163C1

PURCHASED PART
INDICATOR, PRESSURE

NUCLEAR SAFETY RELATED

FSC 6685-41/N CLASS II



MODEL 7330 (SEE TABLE 1)

SPECIFICATIONS:

1.0 EACH MODEL SHALL BE DESIGNED, ASSEMBLED AND TESTED IN ACCORDANCE WITH REFERENCE DOCUMENTS DESCRIBED IN TABLE

2.0 ENVIRONMENTAL CONDITIONS:

	MINIMUM	NORMAL	MAXIMUM
TEMPERATURE (°F)	45	150	212
PRESSURE		ATMOSPHERIC	
HUMIDITY (RH)	20	40	100

3.0 DESIGN SPECIFICATIONS:

1) ELEMENT: BOURDON TUBE - 316 STAINLESS STEEL
2) SOCKET: 316 STAINLESS STEEL
3) RANGE: SEE TABLE 1.
4) ACCURACY: ± 1/2% FS
5) PROCESS FLUID: DEMINERALIZED WATER (200°F MAX)

4.0 VENDOR SUBMITTAL REQUIREMENTS: SEE TABLE 2

5.0 ESSENTIAL REQUIREMENTS FOR QUALIFICATION TEST:
MUST PASS A HYDROSTATIC TEST AT 212°F FOR A MIN. OF 10 MINUTES AT 4.25 X DESIGN PRESS. RATING.

6.0 ESSENTIAL REQUIREMENTS FOR PRODUCTION TEST:
MUST PASS MANUFACTURER'S STANDARD HYDROSTATIC TEST

NOTES:
1.0 FURNISH WITH MAXIMUM READING POINTER ASSEMBLY (ACCURACY WITH MAX. POINTER ENGAGED IS WITHIN ± 1% FS).

TABLE 1

PART NO.	PRESSURE RANGE SCALE		PART NO.	PRESSURE RANGE SCALE
1	30"HG VAC-15 PSI		52	760 mm HG-2 Kg/cm^2
2	30"HG VAC-30 PSI		53	760 mm HG-4 Kg/cm^2
3	30"HG VAC-60 PSI		54	760 mm HG-7 Kg/cm^2
4	30"HG VAC-100 PSI		55	760 mm HG-10 Kg/cm^2
5	30"HG VAC-150 PSI		56	0-1 Kg/cm^2
6	0-15 PSI		57	0-2 Kg/cm^2
7	0-30 PSI		58	0-4 Kg/cm^2
8	0-60 PSI		59	0-7 Kg/cm^2
9	0-100 PSI		60	0-10 Kg/cm^2
10	0-150 PSI		61	0-11 Kg/cm^2
11	0-160 PSI		62	0-14 Kg/cm^2
12	0-200 PSI		63	0-42 Kg/cm^2
13	0-600 PSI		64	0-70 Kg/cm^2
14	0-1000 PSI		65	0-84 Kg/cm^2
15	0-1200 PSI		66	0-105 Kg/cm^2
16	0-1500 PSI		67	0-140 Kg/cm^2
17	0-2000 PSI		68	0-150 Kg/cm^2
18	0-2100 PSI		69	760 mm HG-20 Kg/cm^2
19	30"HG VAC-300 PSI		70	0-21 Kg/cm^2
20	0-300 PSI		71	760 mm HG-14 Kg/cm^2
21	30"HG VAC-200 PSI		72	0-760 mm HG VAC
22	0-30 IN HG VAC		73	0-30 Kg/cm^2
23	30"HG VAC-250 PSI		74	0-5 Kg/cm^2
24	0-4000 PSI		75	0-100 Kg/cm^2
26	0-1500 PSI, NOTE 1		76	0-105 Kg/cm^2 NOTE 1
51	760 mm HG-1 Kg/cm^2		77	0-2500 PSI
			78	0-175 KG/cm^2

TABLE 2
VENDOR SUBMITTAL REQUIREMENTS

DESCRIPTION	QUALIFICATION SPECIFICATION 22544614		PURCHASE SPECIFICATION 22544615	
	REQ'D	PARA	REQ'D	PARA
VDR'S SPECIFICATION	YES	6.1.1	-	-
MANUFACTURING FLOW PLAN	YES	6.1.1	-	-
QUALITY ASSURANCE PROCED.	YES	6.1.2	-	-
TAG/IDENT. NUMBER	YES	6.1.5	YES	6.0
INSTRUCTION MANUAL	YES	6.2	-	-
CERTIF. OF COMPLIANCE	-	-	YES	5.3
QUALIF. TEST PROCEDURE**	YES	6.1.2	-	-
QUALIF. TEST REPORT**	YES	6.1.2	-	-
QUALITY ASSURANCE	YES	5.1.3	YES	5.1
CLEANING/PACKING	-	-	YES	70,80
SEISMIC VIBRATION DATA	YES	6.1.4	—	—

** HYDROSTATIC TEST ONLY

AS MANUFACTURED BY: ASHCROFT SHIM OR ENG. APPROV. EQUIV.

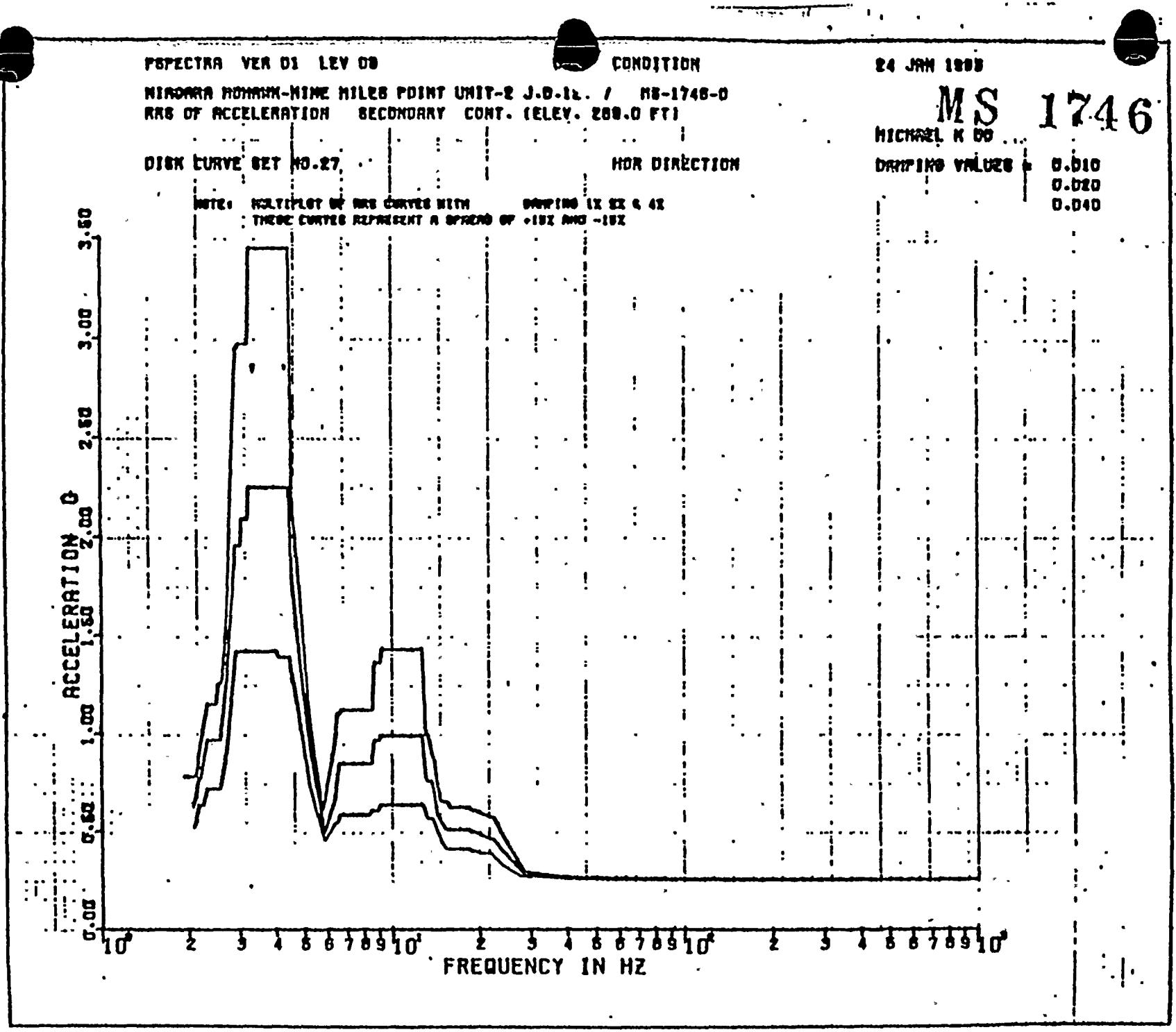
163C1184 EQ MARK

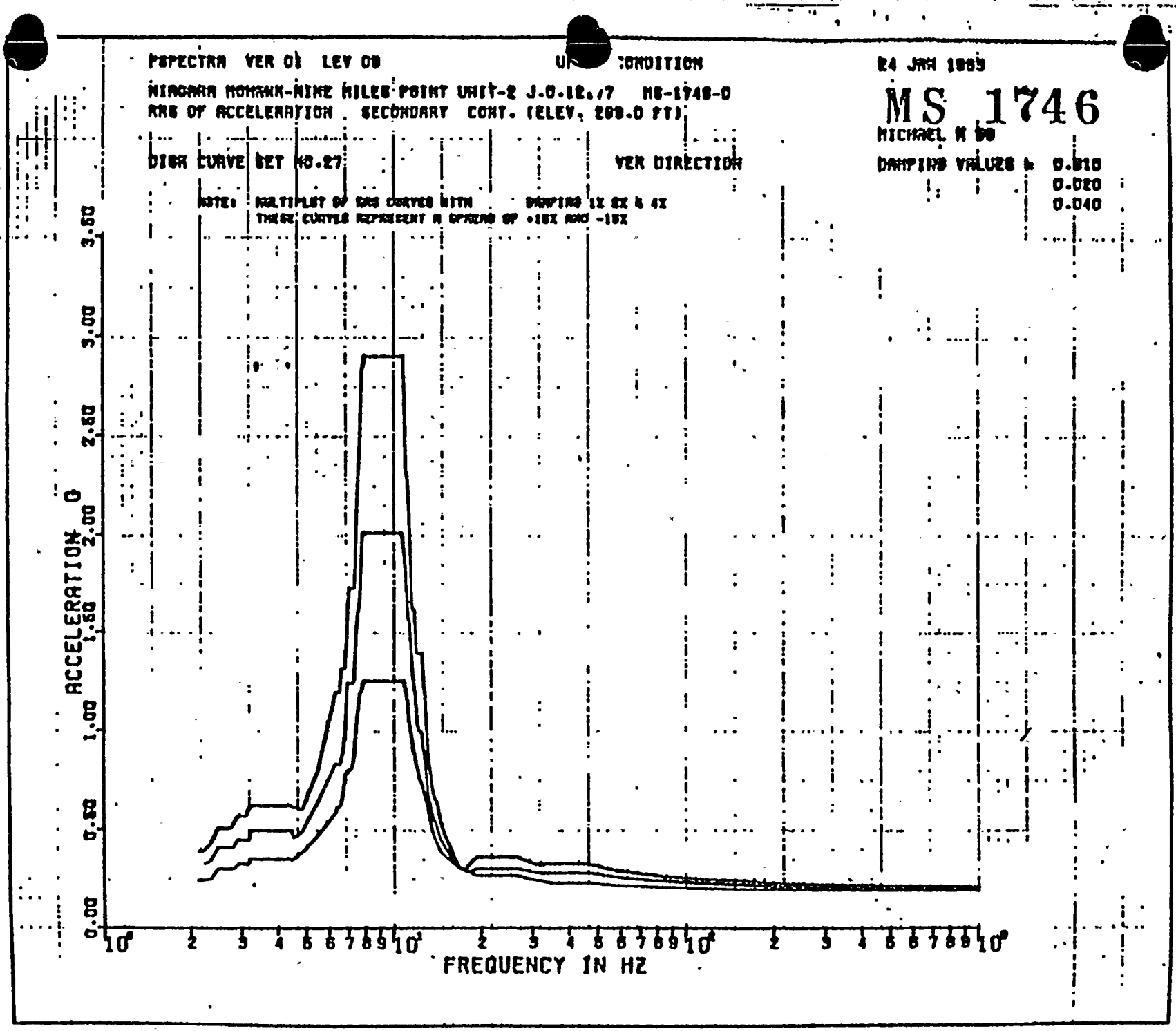
REVISIONS				ZONE	
3	NEG2272			2	2
4	NE67800			4&6	68
5	NE78129			61	69
				4	78
					93
					DR-6

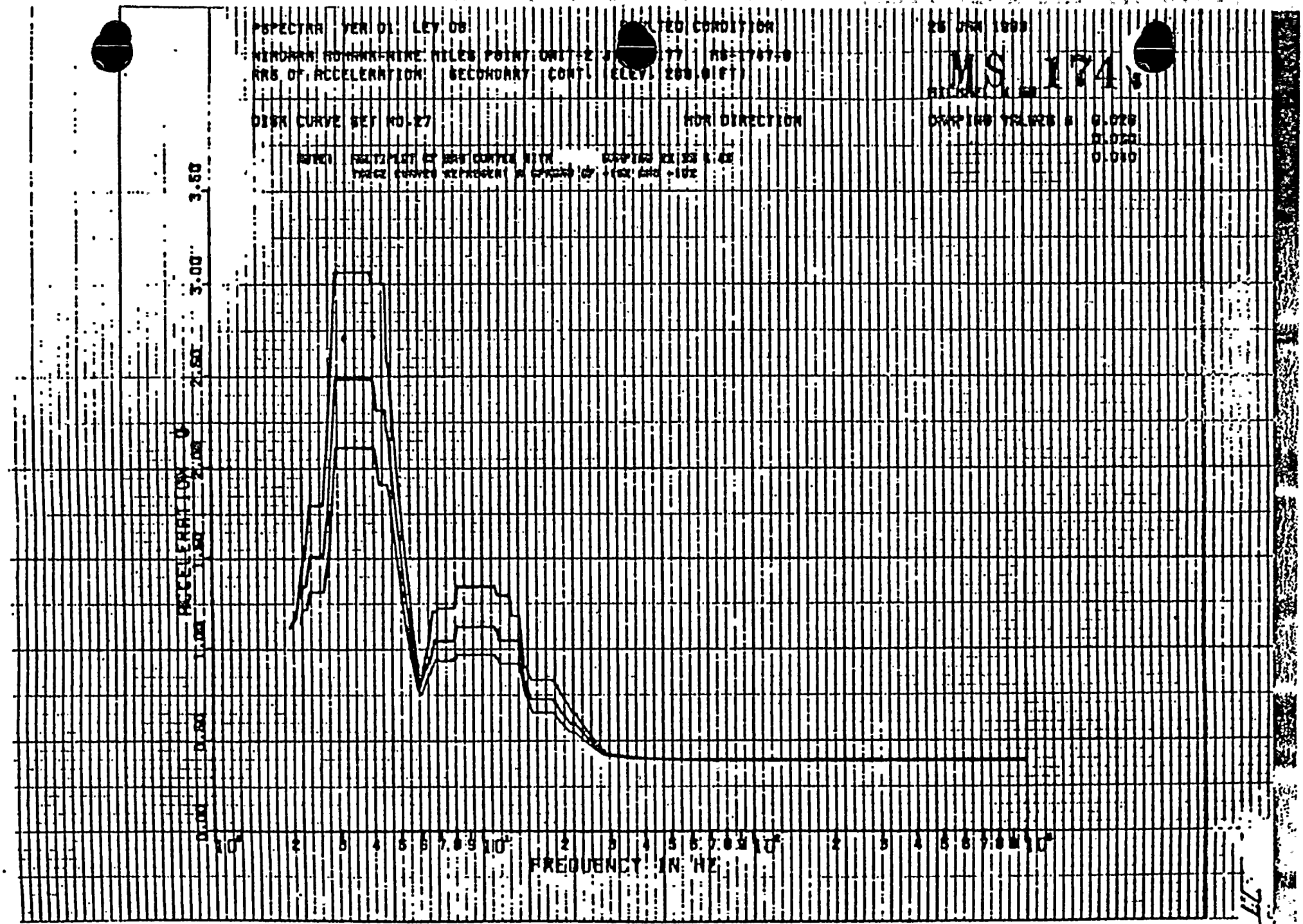
NED SAN JOSE 163C1184 J

ATTACHMENT 2

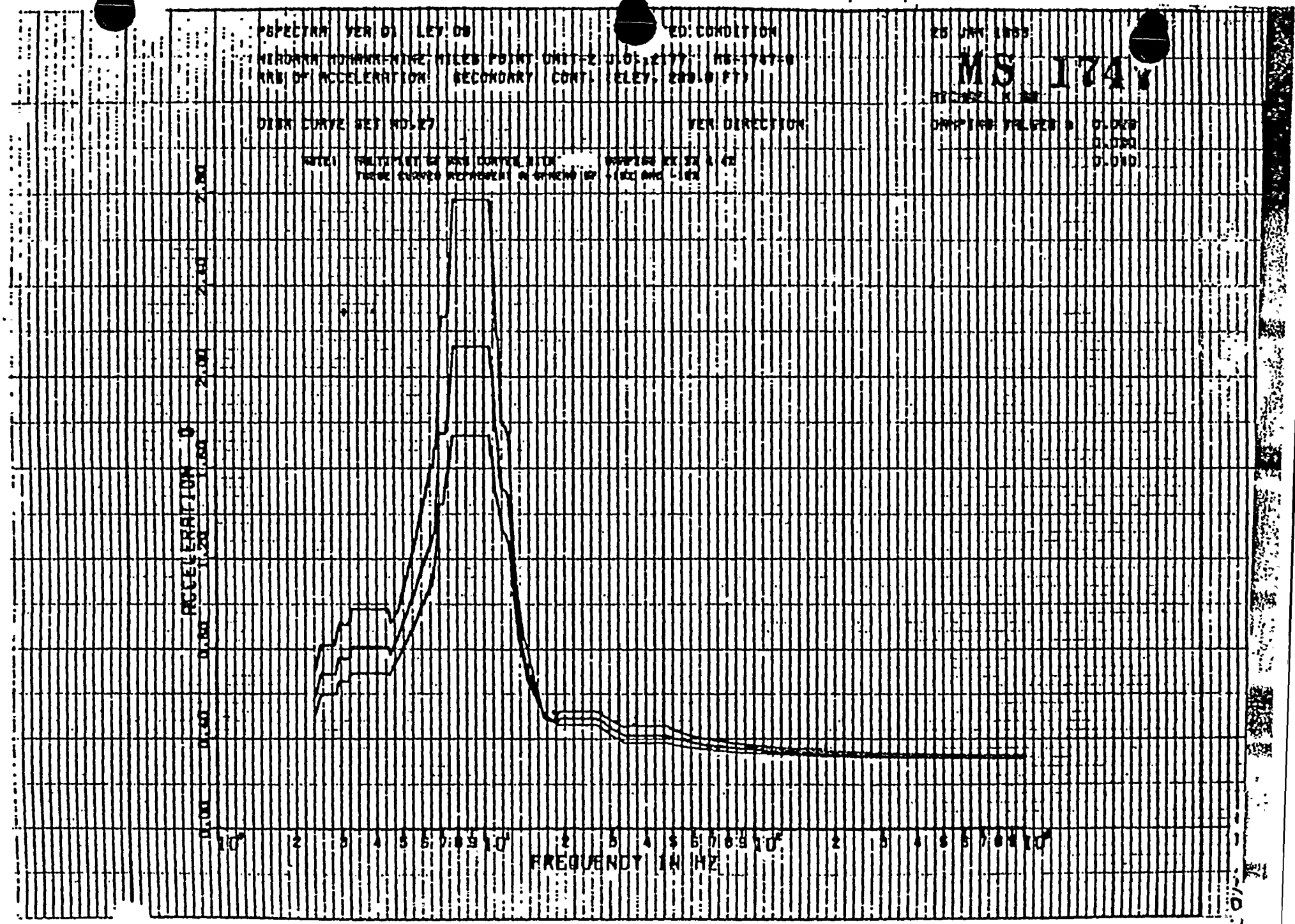
REQUIRED RESPONSE SPECTRA


PSPECTRA VER 01 LEV 08
CONDITION
24 JAN 1988
NIAGARA MOHAWK-NINE MILES POINT UNIT-2 J.O.1L. / MS-1746-0
RMS OF ACCELERATION SECONDARY CONT. (ELEV. 288.0 FT)
MS 1746
MICHAEL K DO
DISK CURVE SET NO.27
HOR DIRECTION
DAMPING VALUES = 0.010
0.020
0.040
NOTE: MULTIPLOT OF RMS CURVES WITH DAMPING 1% 2% & 4%
THESE CURVES REPRESENT A SPREAD OF +10% AND -10%
ACCELERATION G
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
10
2
3
4
5
6
7
8
9
10
2
3
4
5
6
7
8
9
10
2
3
4
5
6
7
8
9
10
FREQUENCY IN HZ


SPECTRA VER 01 LEV 08
24 JAN 1989
NIAGARA MOHAWK-NINE MILES POINT UNIT-2 J.O.12.77 MS-1746-0
RMS OF ACCELERATION . SECONDARY CONT. (ELEV. 289.0 FT)
MS 1746
MICHAEL K 08
DIGH CURVE SET 40.27
VER DIRECTION
DAMPING VALUES : 0.010
0.020
0.040
NOTE: MULTIPLOT OF RMS CURVES WITH DAMPING 1% 2% & 4%
THESE CURVES REPRESENT A SPREAD OF +10% AND -10%
ACCELERATION G
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
10
2
3
4
5
6
7
8
9
10
2
3
4
5
6
7
8
9
10
2
3
4
5
6
7
8
9
10
FREQUENCY IN HZ

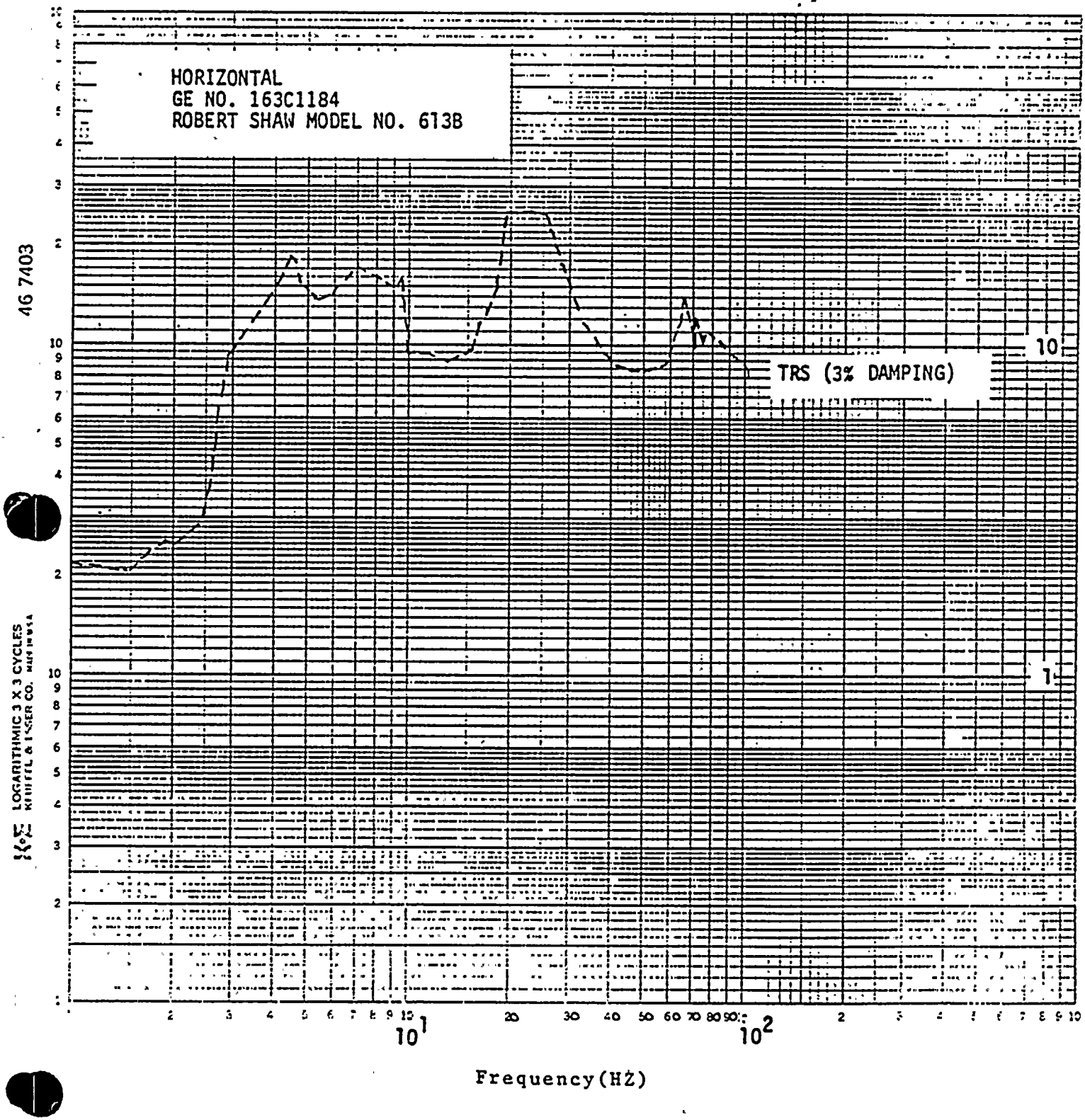

SPECTRAL VELOCITY
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
FREQUENCY IN HZ

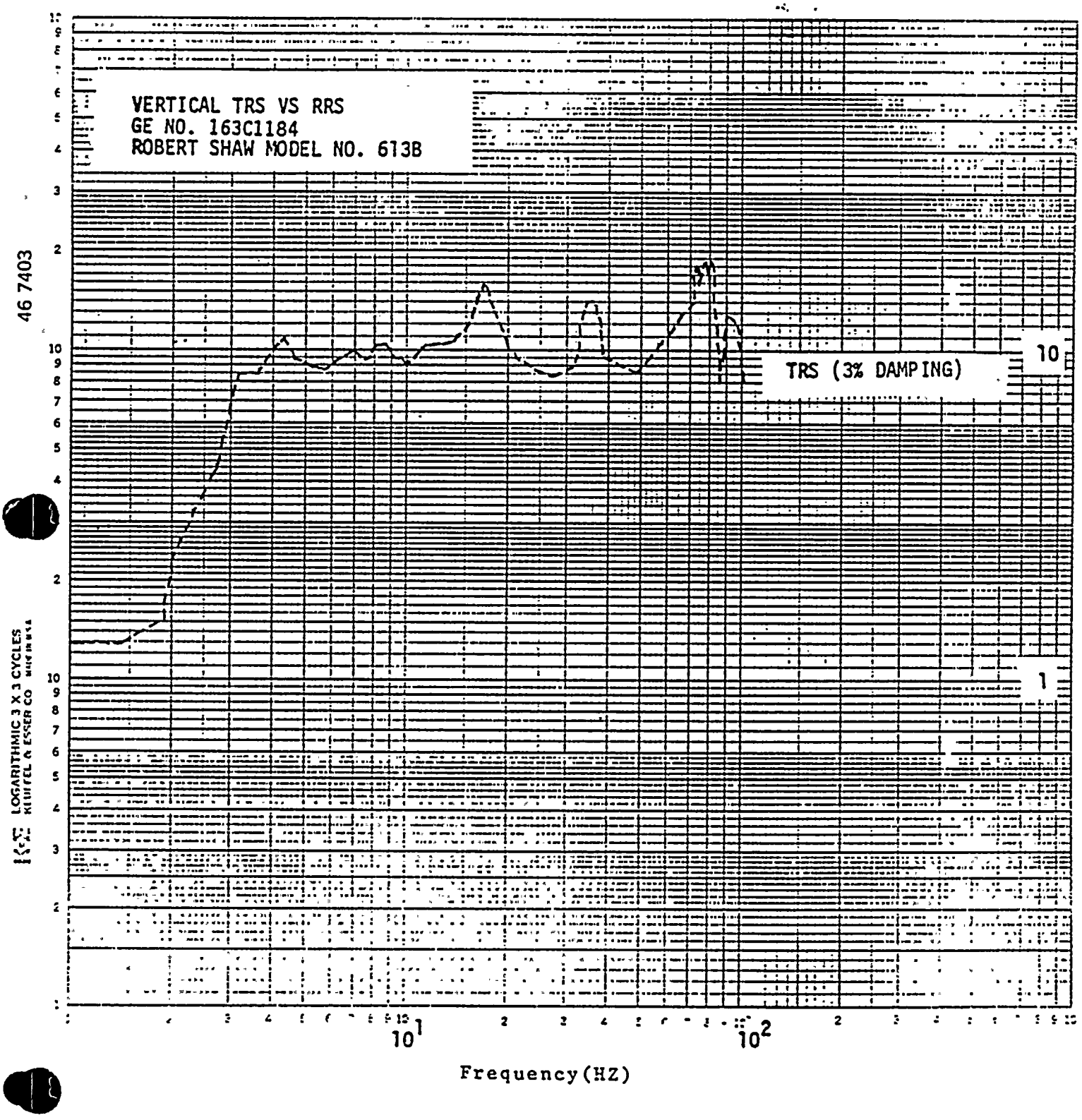
MS-174.3


MS 174
ACCELERATION G
2.50
2.00
1.50
1.00
0.50
0.00
FREQUENCY IN HZ

ATTACHMENT 3

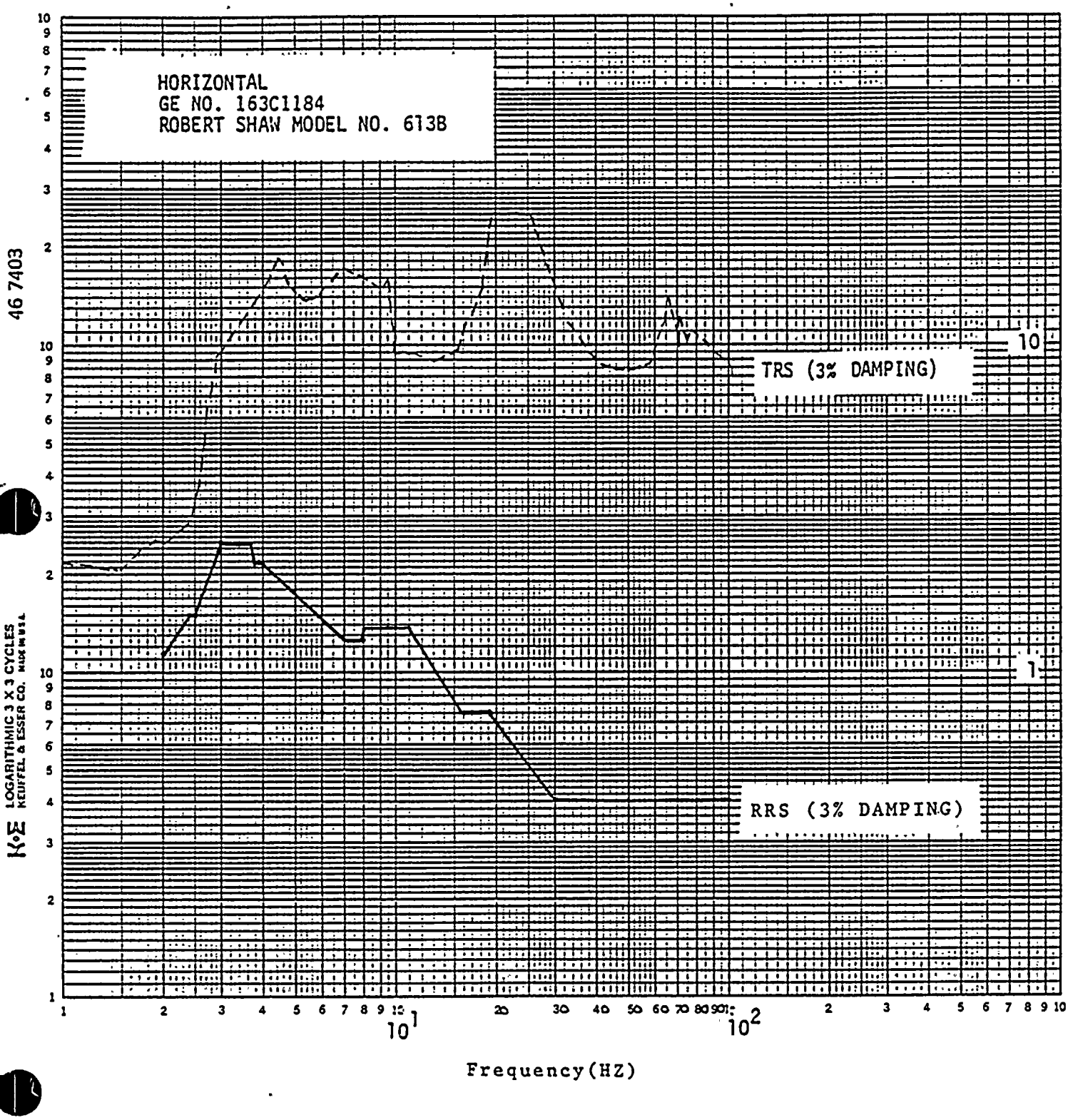
TEST RESPONSE SPECTRA

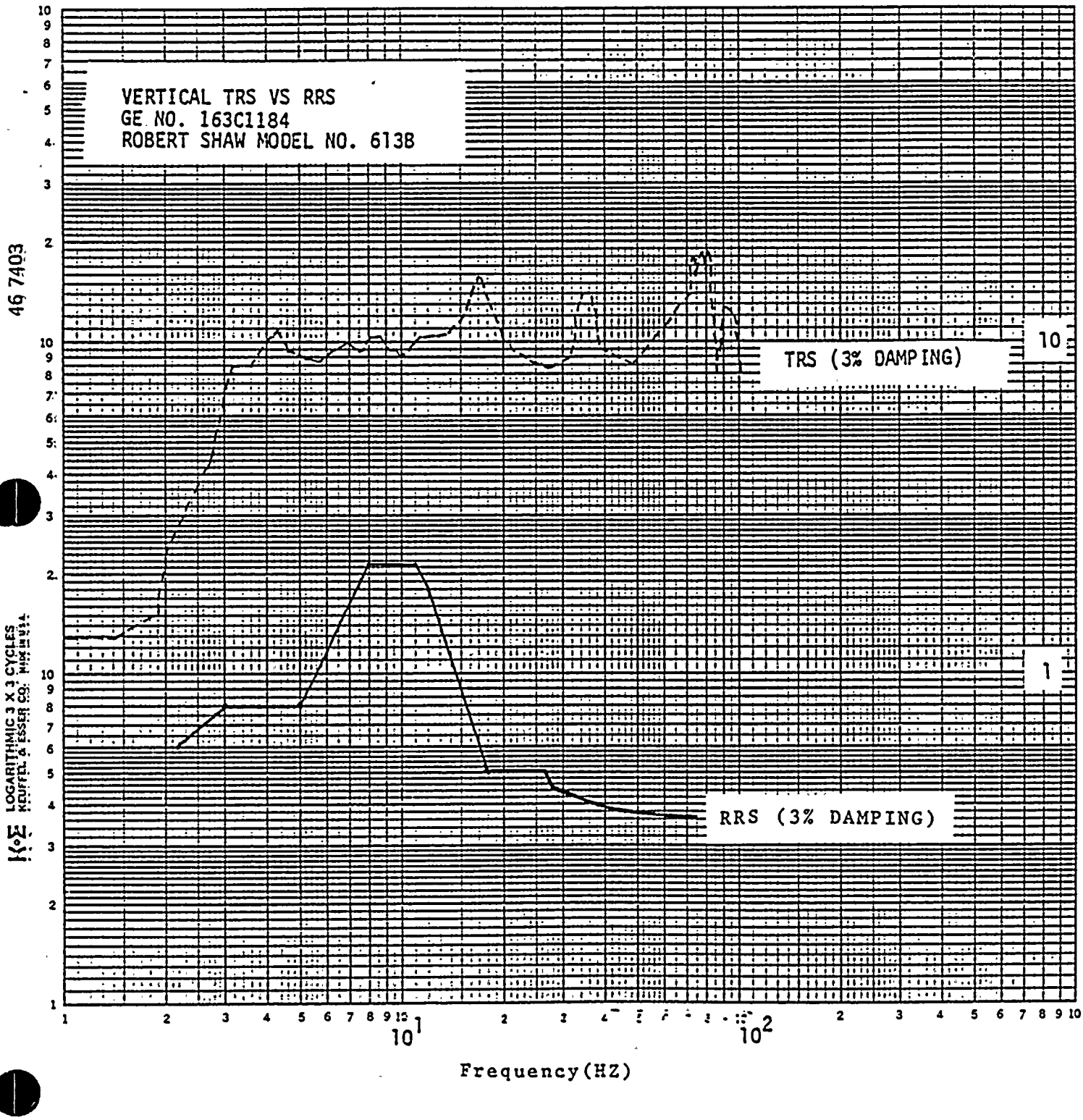

HORIZONTAL
GE NO. 163C1184
ROBERT SHAW MODEL NO. 613B
TRS (3% DAMPING)
10
1
46 7403
LOGARITHMIC 3 X 3 CYCLES
KEUFFEL & ESSER CO.
10^1
10^2
Frequency(HZ)


VERTICAL TRS VS RRS
GE NO. 163C1184
ROBERT SHAW MODEL NO. 613B
TRS (3% DAMPING)
10
1
46 7403
LOGARITHMIC 3 X 3 CYCLES
KEUFFEL & ESSER CO
10^1
10^2
Frequency(HZ)

ATTACHMENT 4

COMPARISON OF RRS TO TRS


HORIZONTAL
GE NO. 163C1184
ROBERT SHAW MODEL NO. 613B
TRS (3% DAMPING)
RRS (3% DAMPING)
10
1
46 7403
KE LOGARITHMIC 3 X 3 CYCLES
KEUFFEL & ESSER CO.
Frequency(HZ)


VERTICAL TRS VS RRS
GE NO. 163C1184
ROBERT SHAW MODEL NO. 613B
TRS (3% DAMPING)
RRS (3% DAMPING)
10
1
46 7403
KE LOGARITHMIC 3 X 3 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.
Frequency(HZ)

PPD NO. 184C5841
MPL: C41-K600 A,B

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point Unit 2 Type:

1. Utility: Niagra Mohawk Power Corp. PWR _____
2. NSSS: General Electric Co. BWR 5 MK II
3. A/E: Stone & Webster Engineering Corp. Other _____

II. Component Name Power Supply

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: 9T66Y988 Quantity: 2
3. Size or Range: 120 VAC/24 DC
4. Vendor: General Electric
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: See attachment 1
   b. Dimensions: See attachment 1
   c. Weight: 25-31
7. Location: Building: Control Room
   Elevation: 306'-0"
8. Field Mounting Conditions [X] Bolt (No. 4, Size 10-32)
   [ ] Weld (Length ____)
   [ ] _____
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.] Mounted in control room panels H13-P601 and H13-P629
10. a. System in which located: Standby Liquid Control
    b. Functional Description: _____
    c. Is the equipment required for [ ] Hot Standby [X] Cold Shutdown [ ] Both [ ] Neither [ ] Other _____

PPD NO. 184C5841
MPL C41-K600A,B

11. Pertinent Reference Design Specification for Qualification Requirements: _____

a. [X] Seismic Input
b. [ ] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

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

Qualification Report*: NEDC- 30564

(No., Title and Date): GE Power Supply Qualification Report, dated 3/29/84

Company that Prepared Report: General Electric

Company that Reviewed Report: General Electric

Where Report is filed or available: GE Valley Forge , PA

Applicable Codes and/or Standards: IEEE Std 344-1975

V. Vibration Input:

1. Loads considered:
   a. [X] Seismic only
   b. [ ] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)
2. Method of Combining RRS:
   [ ] Absolute Sum [ ] SRSS [X] N/A (other, specify)
3. Required Response Spectra** (attach the graphs): See Attachment 2

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

PPD NO. 184C5841
MPL: C41-K600A,B

4. Damping Corresponding to RRS: OBE 2% SSE 3%

5. Required Acceleration in Each Direction:
[X] ZPA [ ] Other _____ (specify)
OBE S/S = 0.25 F/B = 0.25 V = 0.14
SSE S/S = 0.40 F/B = 0.40 V = 0.25

6. Were fatigue effects considered:
[X] Yes [ ] No
If yes, describe how they were treated in overall qualification program: SRV aging performed

VI. If Qualification by Test, then Complete:

1. [ ] Single Frequency [X] Multi-Frequency, [X] random
[ ] sine beat
[ ] _____

2. [ ] Single Axis [X] Multi-Axis
[ ] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:
OBE 5 SSE 1 Other N/A (specify)

4. Frequency Range: 1-100 Hz

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical):
S/S = Note 1 F/B = Note 1 V = Note 1

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

Note 1 : Natural frequency detected was above 100 Hz

MPL: C41-K600A,B

8. Maximum Input g Level Test: (ZPA)

OBE S/S = 5.5 g F/B = 5.5 g V = 7.0 g

SSE S/S = 11.0 g F/B = 11.0 g V = 20.0 g

9. Laboratory Mounting:

A. [X] Bolt (No. 4, Size 10-32)

[ ] Weld (Length ____) [ ] _____

B. Orientation and Fixturing: mounted to rigid fixture which was bolted to test table using 5/8"-12 UNC bolts

10. Functional operability verified:

[X] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:

1 unit was tested to 360 % of basic OBE level with no out of tolerance shift bias or signal level change. No anomalies were noted during seismic test.

12. Other tests performed (such as aging or fragility test, including results):

SRV aging

13. Failure Modes (If appropriate) _____

14. Margins Available: [X] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, then complete: N/A

1. Method of Analysis:

[ ] Static Analysis [ ] Equivalent Static Analysis

[ ] 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: [ ] 3D [ ] 2D [ ] 1D

[ ] Finite Element [ ] Beam

[ ] Closed Form Solution [ ] Other _____

PPD NO. 184C5841
MPL: C41-K600A,B

4. [ ] Computer Codes: _____
   Frequency Range and No. of modes _____
   [ ] Hand Calculations
5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [ ] SRSS [ ] Other: _____ (specify)
6. Damping:
   OBE _____ SSE _____ Basis for damping used: _____
7. Support Considerations in the model: _____
8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____
10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

ATTACHMENT 1

GE DRAWING

GENERAL ELECTRIC 184C5841

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES | SURFACES ✓ | ± | ± | ±

TITLE SELECTED ITEM
POWER SUPPLY
FIRST MADE FOR GENL USE

NUCLEAR SAFETY RELATED

OVERALL REVISION	3

SUMMARY SHEET	REV
1	3
2	3
3	0
4	0

SPECIFICATIONS:

1.0 DESIGN SPECIFICATIONS:

1.1 INPUT VOLTAGE VARIATIONS: NORMAL 115 VAC
MAXIMUM 127 VAC
MINIMUM 102 VAC

1.2 INPUT FREQUENCY: ±5% SEE TABLE 1, SH 2

1.3 OUTPUT VOLTAGE REQUIREMENTS: SEE TABLE 1, SH 2.
NORMAL 24 VDC [3]
MAXIMUM 28 VDC AT NO LOAD
MINIMUM 23 VDC AT RATED LOAD (5) [3]

1.4 OUTPUT CURRENT REQUIREMENTS: SEE TABLE 1, SH 2.

1.5 OUTPUT VOLTAGE RIPPLE TO BE 1% OR LESS, RMS. — (9) [3]

1.6 POWER SUPPLY TO OPERATE CONTINUOUSLY WITH NO LOAD.

2.0 CLASS 1E TEST REQUIREMENTS:
THE FOLLOWING ARE THE MINIMUM REQUIREMENTS TO BE VERIFIED FOR CLASS 1E APPLICATIONS IN ACCORDANCE WITH THE CONDITIONS BELOW.

2.1 ENVIRONMENTAL CONDITIONS:

PARAMETER	MINIMUM	NORMAL	MAXIMUM
TEMPERATURE (F°)	40	70/104	115 — (6)
HUMIDITY (RH%)	20	40/90	100
RADIATION DOSE RATE (R/HR)	—	15×10^{-3}	6.5×10^{2}
EXPOSURE INTEGRATED (R)	—	5.3×10^{-3}	1.70×10^{5}
PRESSURE	—	—	8 IN. WC

2.2 THE GROSS SEISMIC LIMIT FOR ALL AXES 5.0 g's.

3.0 QUALIFICATION TESTING MUST BE DONE AT THE COMBINED WORST CASE CONDITION LISTED IN 4.1 & 4.2 BELOW:

3.1 OUTPUT CURRENT VOLTAGE, INPUT VOLTAGE, TEMPERATURE, HUMIDITY.

3.2 OUTPUT CURRENT, VOLTAGE, INPUT VOLTAGE, SEISMIC G-LEVEL.

4.0 IEEE STANDARDS:

4.1 IEEE 323-1974; IEEE STANDARD FOR QUALIFYING CLASS 1E EQUIPMENT FOR NUCLEAR POWER GENERATING STATIONS.

4.2 IEEE 344-1975; IEEE RECOMMENDED PRACTICES FOR SEISMIC QUALIFICATION OF CLASS 1E EQUIPMENT FOR NUCLEAR POWER GENERATING STATIONS.

5.0 INTERFACES:

5.1 SCHEMATICS SHOWN ARE FOR INTERFACE WIRING PURPOSES ONLY. (AT THE TB). SPECIFIC COMPONENTS AND INTERNAL WIRING ARE TYPICAL AND MAY DIFFER.

5.2 FIGURES SHOW OVERALL SIZE CHARACTERISTIC AND MOUNTING DIMENSIONS ONLY. INDIVIDUAL COMPONENTS SHOWN ON POWER SUPPLY MAY DIFFER AND ARE NOT TO SCALE.

NOTES:

[3] (1.) FOR NEW DESIGN SPARES AND RENEWAL PARTS USE P006, 8, 10 OR 12.

(2.) FOR NEW DESIGN SPECIFY P10 THIS DRAWING.

(3.) DELETED

[3] (4.) DELETED

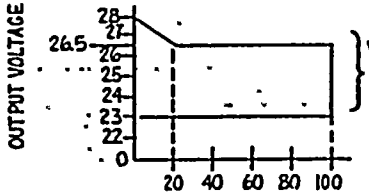
(5.) 1% INPUT FREQUENCY CHANGE RESULTS IN A 1.8% OR LESS CHANGE IN OUTPUT VOLTAGE. DECREASING FREQUENCY REDUCES OUTPUT VOLTAGE.

[3] (6.) DELETED.

(7.) DELETED

(8.) DO NOT USE, NO QUALIFICATION PLANNED

[3] (9.) EMI SUSCEPTIBILITY TEST SHALL BE PERFORMED PER 249A1238.



VOLTAGE REGULATION CURVE

REVISIONS				C	PRINTS TO
3	ENGR'D 3-3-81 SEKOU WILLIAMS RRS	2	ENGR'D 4-22-81 R SHASTALL RRS	0	AML-2178	4320G
				1	H.R. LOPEZ	VF1
						212B
						427A
						4320G

NJ41010 CHK BY: E. GREVELDING

NJ34019 CHKD BY: D. Woolley

NJ28059 CHK'D BY: R.A. HOLMES

RE-ENGR'D AUG-21-81 J.R. DAVALLE 9-1-81

APPROVED R.A. ZOCKER

NC&T SAN JOSE

184C5841 SHT 2 REV 3

B CHK BY: E. WEATHERFORD 8-31-81 C E. Weatherford 9-1-81 CI

>00370015

184C5841 SHT 2 REV 3

GENERAL ELECTRIC 184C5841

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

APPLIED PRACTICES	SURFACES			
	✓			

TITLE SELECTED ITEM
POWER SUPPLY
FIRST MADE FOR GENL USE

5

TABLE 1

	PART NO.	DC OUTPUT VOLTS	DC OUTPUT AMPS	AC INPUT 102-127V HERTZ	OUTLINE FIG	WIRING SCHEMATIC FIGURE	DIMENSIONS A	B	C	D	E	MAKE FROM PART NO.	
1	1	24	6.5	60	1	6	17.00	5.25	7.00	4.00	.63	184C4292G001	
1	2		10.0		1			7.00	7.00	4.00	1.50	184C4292G002	
1	3		15.0		1			7.00	7.00	4.00	1.50	184C4292G003	
1	4		25.0		2	6		7.00	8.50	4.00	1.50	184C4292G004	
6	5		2.5		3	8		3.50	6.12	3.00	.25	184C4548P001	
	6		6.0					5.25	9.75	2.25	1.50	184C4548P002	3
6	7		10.0					5.25	8.75	2.25	1.50	184C4548P003	3
	8		20.0	60				7.00	9.38	4.00	1.50	184C4548P004	
6	9		2.5	50				3.50	6.12	3.00	.25	184C4548P005	2
	10		6.0					5.25	9.62	2.25	1.50	184C4548P006	3
6	11		10.0					5.25	8.75	2.25	1.50	184C4548P007	
	12		20.0	50	3			7.00	8.50	4.00	1.50	184C4548P008	
6	13		500	60	4			10.50	11.38	—	—	184C4548P009	
6	14		25	50	3			8.75	9.75	4.00	2.37	184C5524G002	
6	15	24	25	60	3	8	17.00	8.75	9.62	4.00	2.37	184C5524G001	

184C5841

REVISIONS			PRINTS TO
1	NJ28059 12-16-81		
2	NJ34019 3-5-82		
3	NJ41010 3-5-82		

ENG RELEASE AUG-21-81 J.R.DAVALLE 9-1-81
9/1/81 R.A.Cowher R.A.ROCKER
NC&I SAN JOSE
184C5841
SIZE A3 SHEET 3 OF 3
B CHK BY: E.WEATHERFORD 8 E.Weatherford 9-1-81 CI

GENERAL ELECTRIC 184C5841

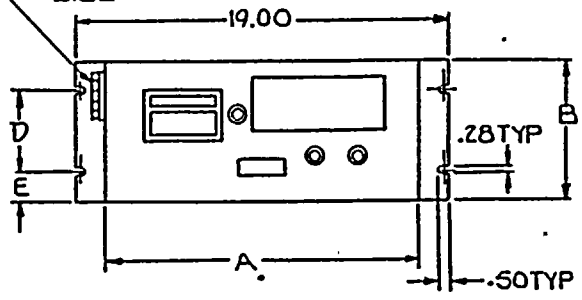
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

APPLIED FINISHES	SURFACES			
	✓	±	±	±

TITLE POWER SUPPLY

FIRST MADE FOR GENL USE

TB-1
6-32 TERMINAL SIZE



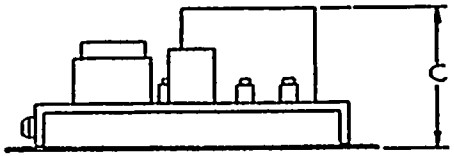
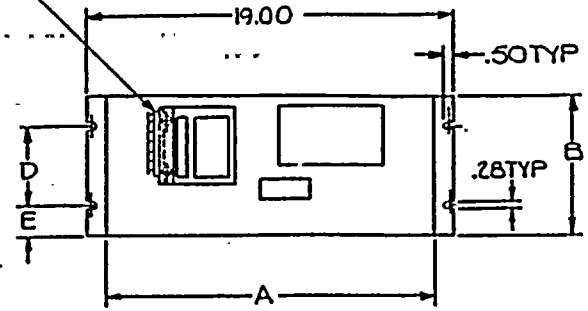


FIG 1

TB-1
8-32 TERMINAL SIZE



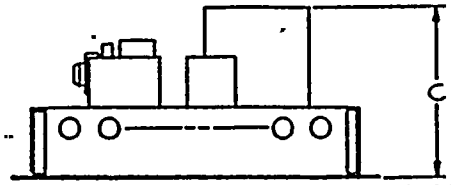


FIG 2

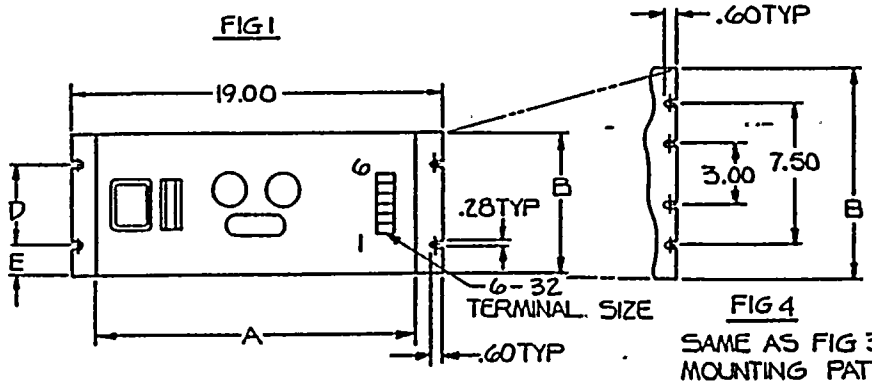


FIG 4

SAME AS FIG 3 EXCEPT MOUNTING PATTERN

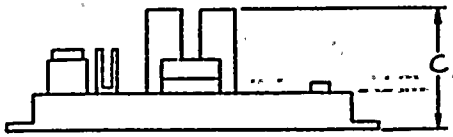


FIG 3

184C5841
REV NO
0

REVISIONS

PRINTS TO

DRAWN J DAVALE 7-1-81	M/C R. CROCKER	NPD SAN JOSE	184C5841 SHEET 4 OF 4
CHK BY: E. Woodward 6		CI	

GENERAL ELECTRIC

184C5841 F 4

TITLE POWER SUPPLY

FIRST MADE FOR GENI USE

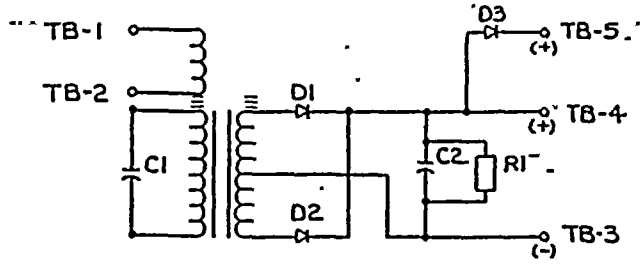


FIG 6
SCHEMATIC

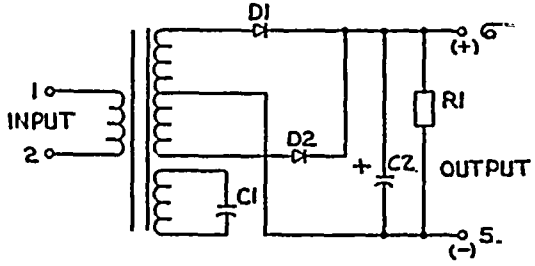


FIG 8
SCHEMATIC

184C5841 F 4

REV NO D

REVISIONS

PRINTS TO

D CRENSHAW AUG 11-81

J DANIELLE 9-1-81

R CROCKER

NPD SAN JOSE

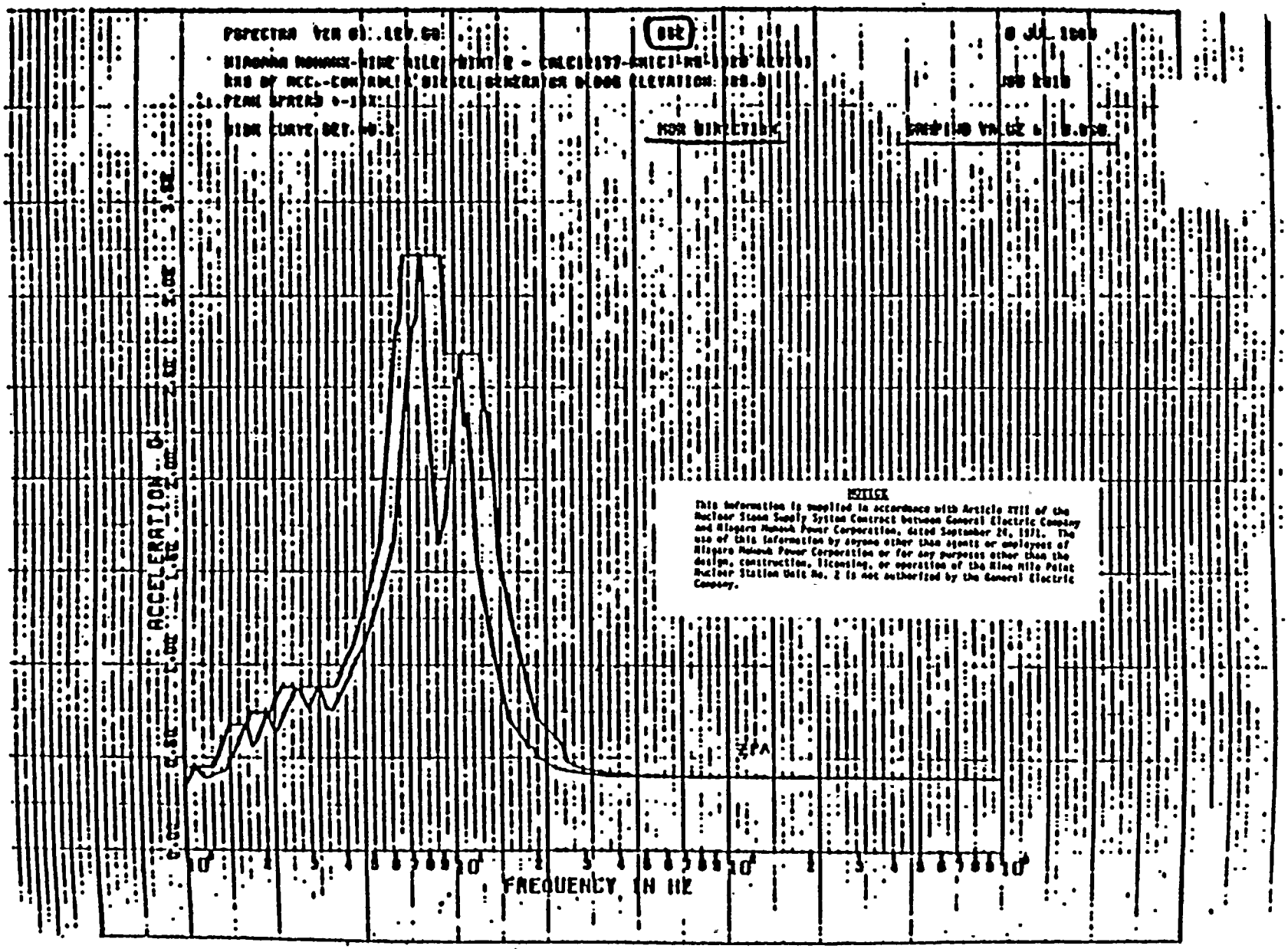
184C5841 F 4

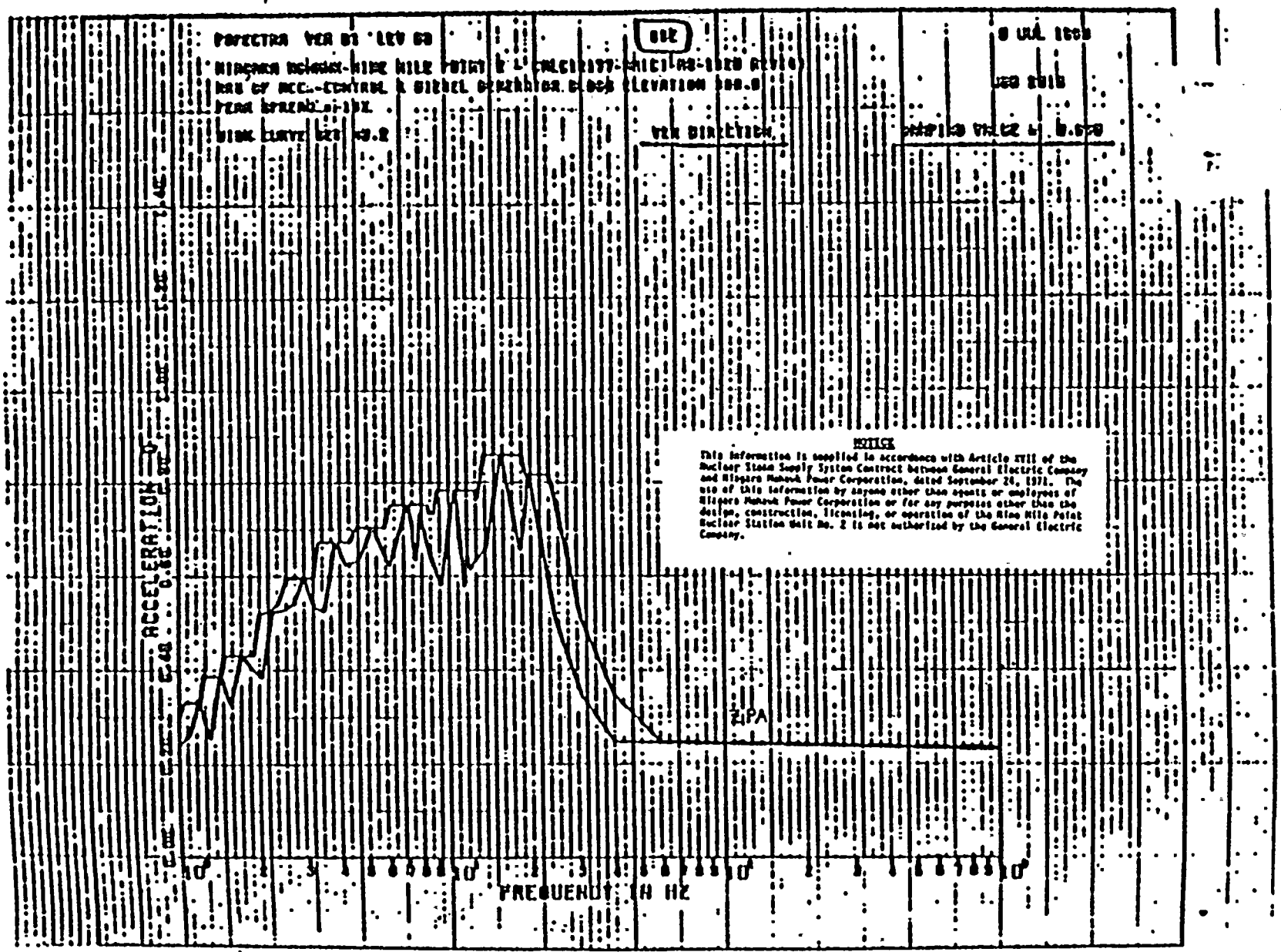
S CHK BY E WEATHERFORD 9-1-81

CI

ATTACHMENT 2

REQUIRED RESPONSE SPECTRA


ACCELERATION - G
FREQUENCY IN HZ
NOTICE
This information is supplied in accordance with Article VIII of the Nuclear Steam Supply System Contract between General Electric Company and Niagara Mohawk Power Corporation, dated September 24, 1971. The use of this information by anyone other than agents or employees of Niagara Mohawk Power Corporation or for any purposes other than the design, construction, licensing, or operation of the Nine Mile Point Nuclear Station Unit No. 2 is not authorized by the General Electric Company.


ACCELERATION
FREQUENCY IN HZ
ZPA
NOTICE
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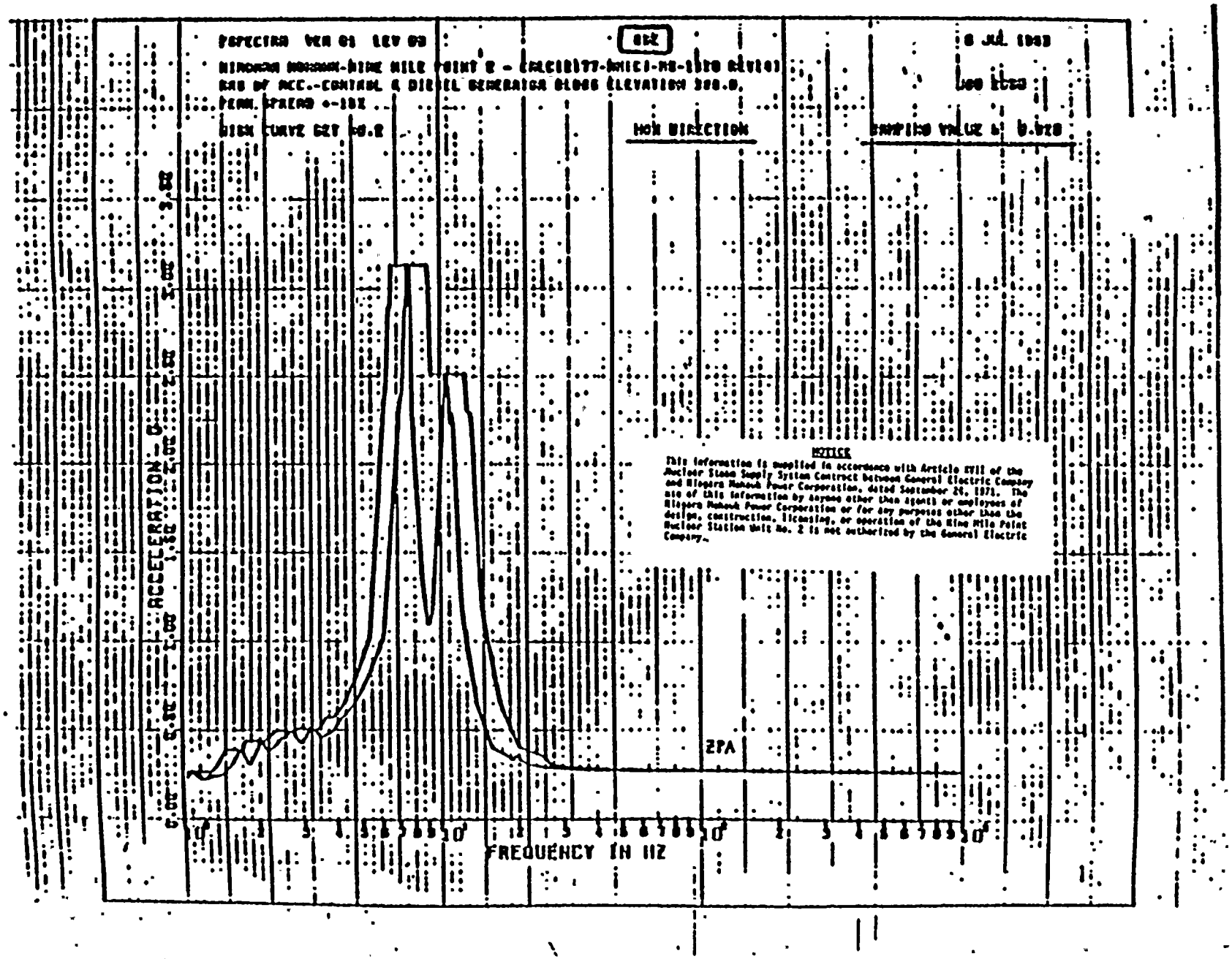
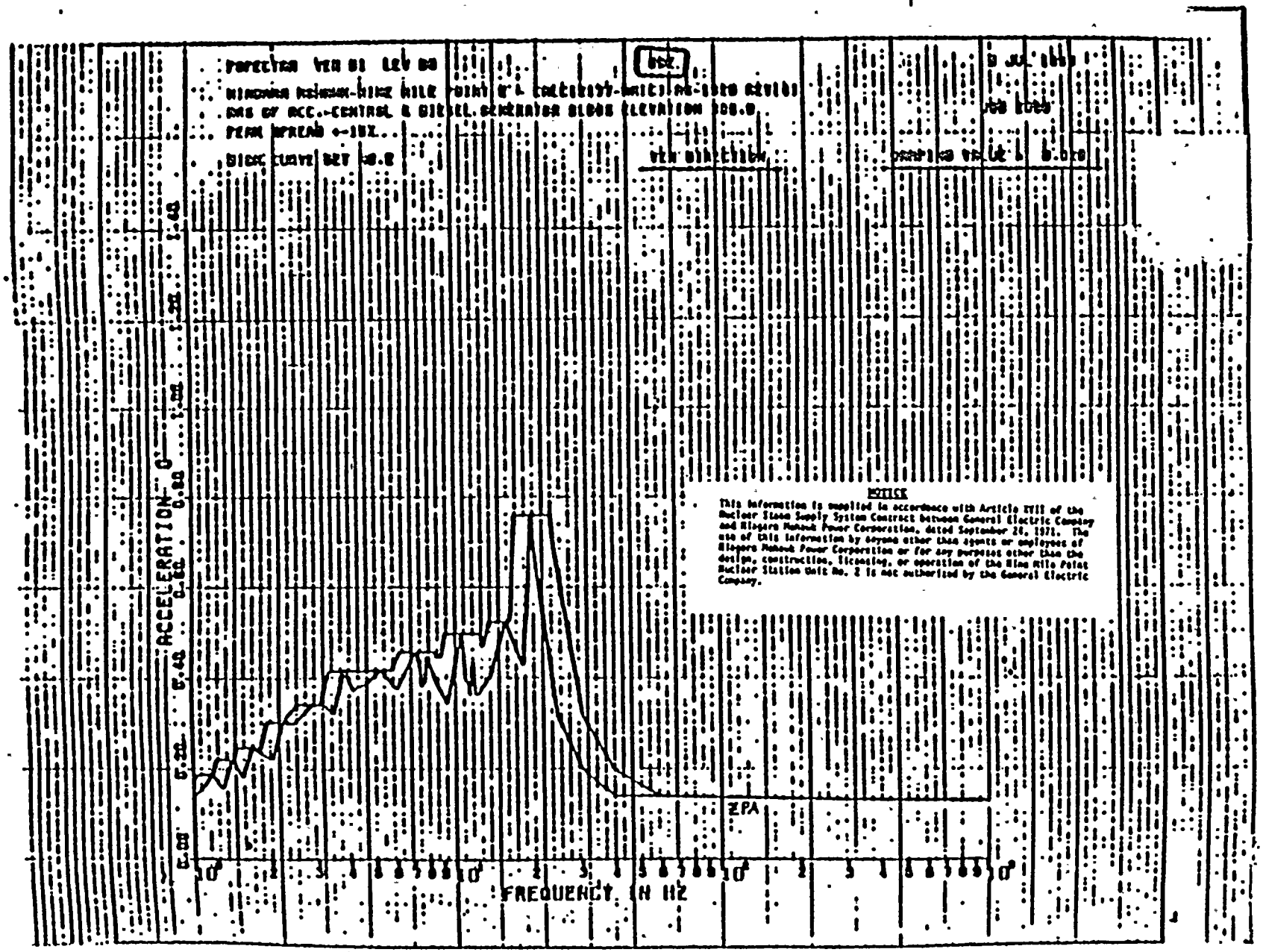

SPECTRA VER 01 LEV 03
8 JUL 1983
HORIZONTAL
HOR DIRECTION
ACCELERATION - G
ZPA
FREQUENCY IN HZ
NOTICE
This information is supplied in accordance with Article XVII of the Nuclear Steam Supply System Contract between General Electric Company and Niagara Mohawk Power Corporation, dated September 28, 1971. The use of this information by anyone other than agents or employees of Niagara Mohawk Power Corporation or for any purposes other than the design, construction, licensing, or operation of the Nine Mile Point Nuclear Station Unit No. 2 is not authorized by the General Electric Company.



ATTACHMENT 3

TEST RESPONSE SPECTRA

GE Power Supply (184C5841)

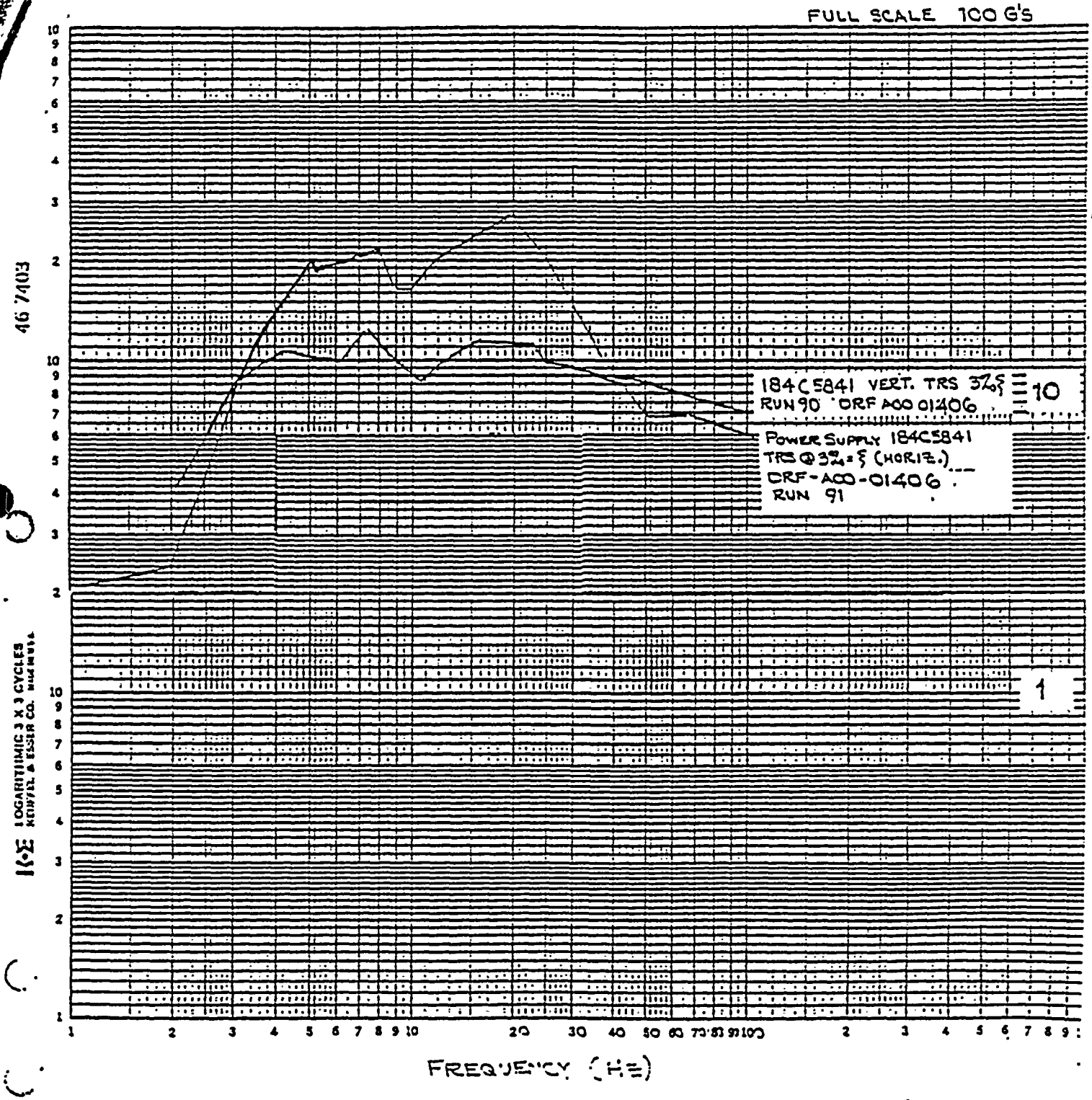


FIGURE 2-5

ATTACHMENT 4

TRS/RRS COMPARISON

NINE MILE POINT 2

POWER SUPPLY
SEISMIC QUALIFICATION

The attached sheets contain seismic qualification information on the followng devices. These devices are qualified for use at their mounting locations based on the attached information.

Device Name	Panel MPL	Device MPL
Power Supply	H13-P629	C41-K600A
Power Supply	H13-P601	C41-K600B

The attached plots are a comparison of the TRS to the theoretical RRS. Theoretical RRS are calculated by multiplying panel transmissibility at each frequency by floor response specta acceleration response at that frequency, This represents the device excepted acceleration levels.

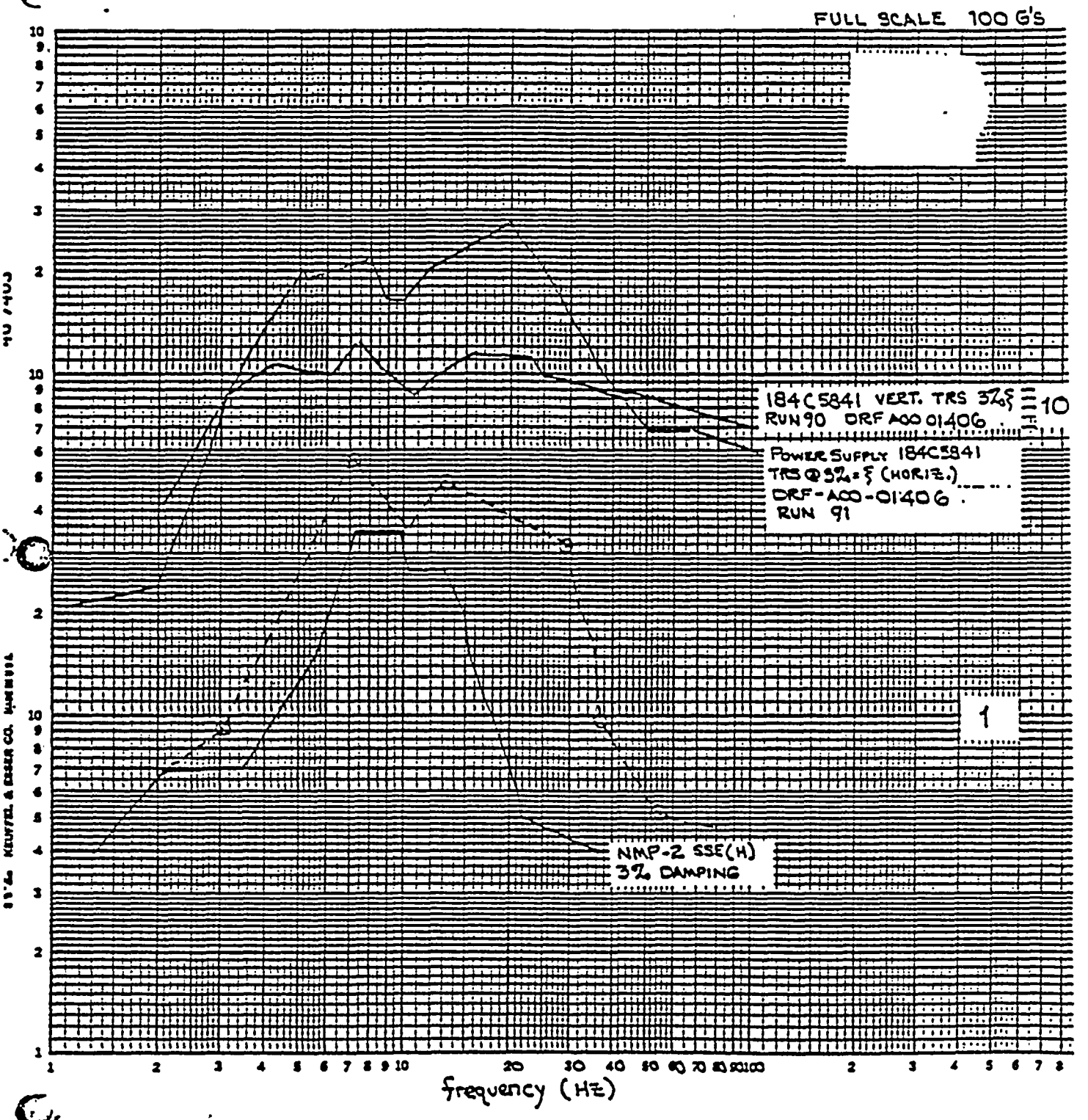
Panel transmissilibity data were obtained from DRF A00-1138 sine sweep and/or dwell resonant search data for panels similar to the NMP-2 panels on which equipment is mounted.

The tabulated transmissibility data, the similar tested panel drawing showing accelerometer mounting locations, and the NMP-2 panel drawings showing device locations accompany each TRS/theoretical RRS comparison.

Qualification for these devices is based on the envelopment of the theoretical RRS by the device test response spectrum.

NINE MILE POINT-2
H13-P629
POWER SUPPLY (184C5841)
C41-K600A

NEDC-30564



⊙----⊙ H13-P629 ENVELOPE OF FB/SS WORST CASE THEORETICAL RRS
tested panel Perry H13-P655 (DRF A00-1138 TAB R)

Device MPL: C41-K600A
Panel MPL:: H13-P629 :
Similar Panel: Perry H13-P655
DRF#: A00-1138 Tab R

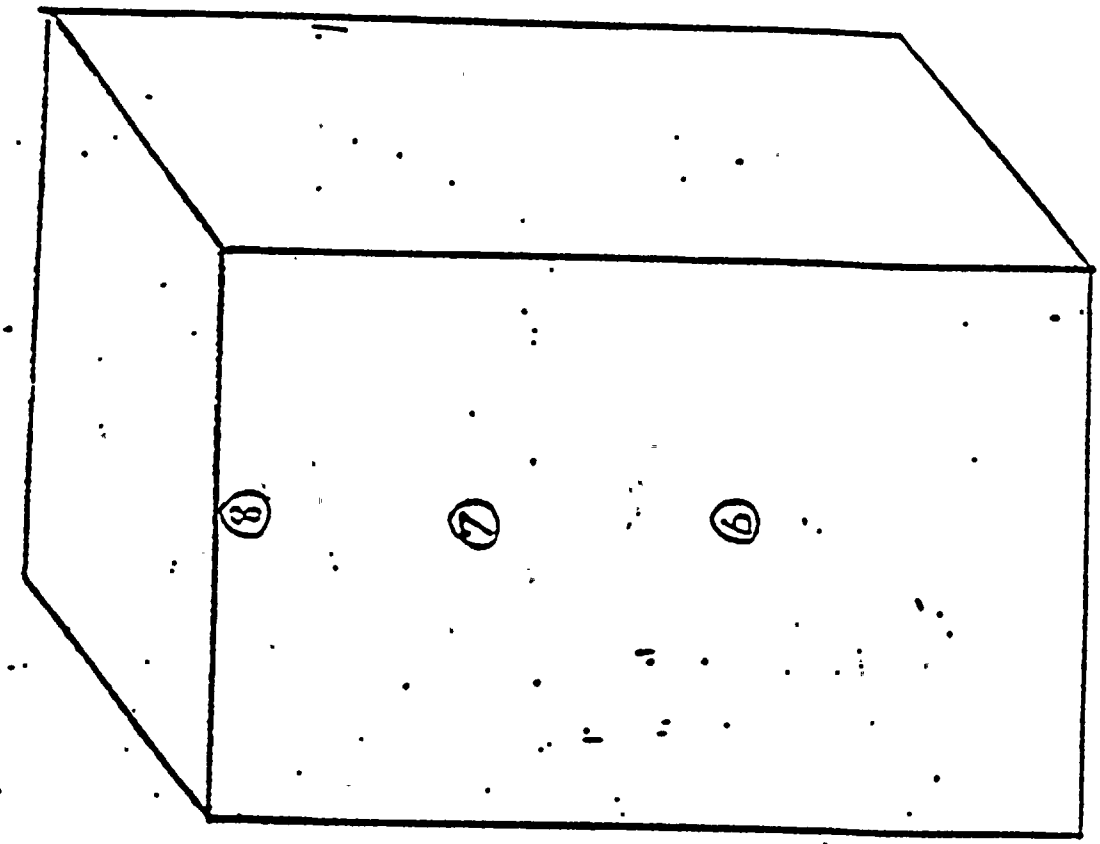
FREQ (Hz)	F-B (LATERAL)	FREQ	SS (LONG.)
3	1.2	3	1.3
7	1.6	5	1.4
10	1.3	8	1.2
14	1.5	11	1.4
19	2.11	14	1.8
23	2.9	17.8	1.8
25	4.0	21.7	6.0
29	7.3	27	1.0
32	4.7	31	1.0
34	4.1	34	2.4
36	2.3	37	2.4
38	2.2	40	1.0
41	1.6	43	1.0
43	1.3	47	1.0
45	1.1	51	1.0
48	1.1	56	1.0
50	1.0	60	1.0
53	1.3		
55	1.0		
57	1.0		
60	1.0		

- Value selected at freq. as envelope of FB and SS

NUCLEAR ENERGY BUSINESS GROUP

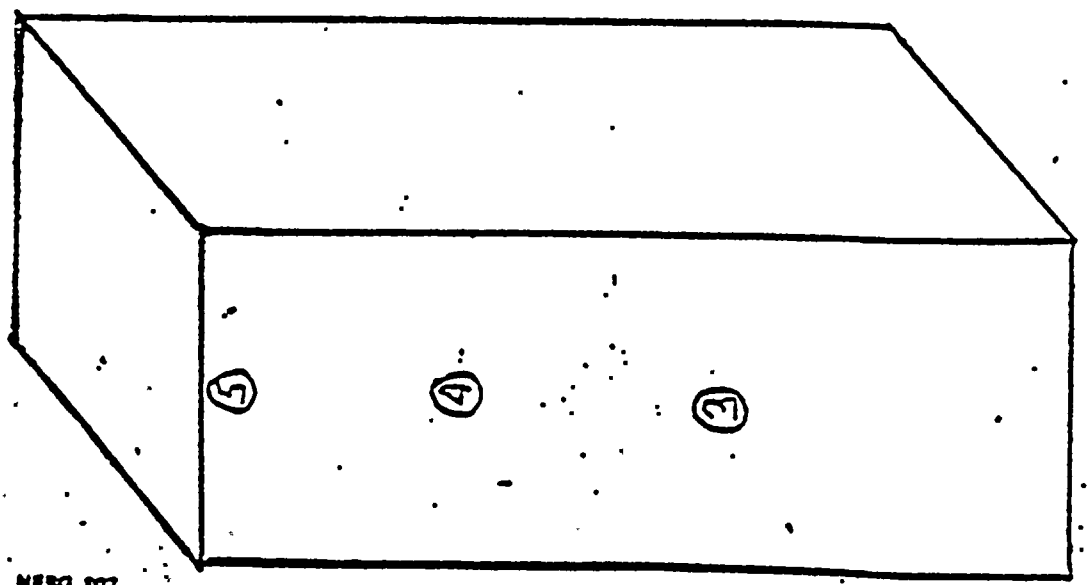
GENERAL ELECTRIC

H13-P654, P655 SH NO. 14
REV

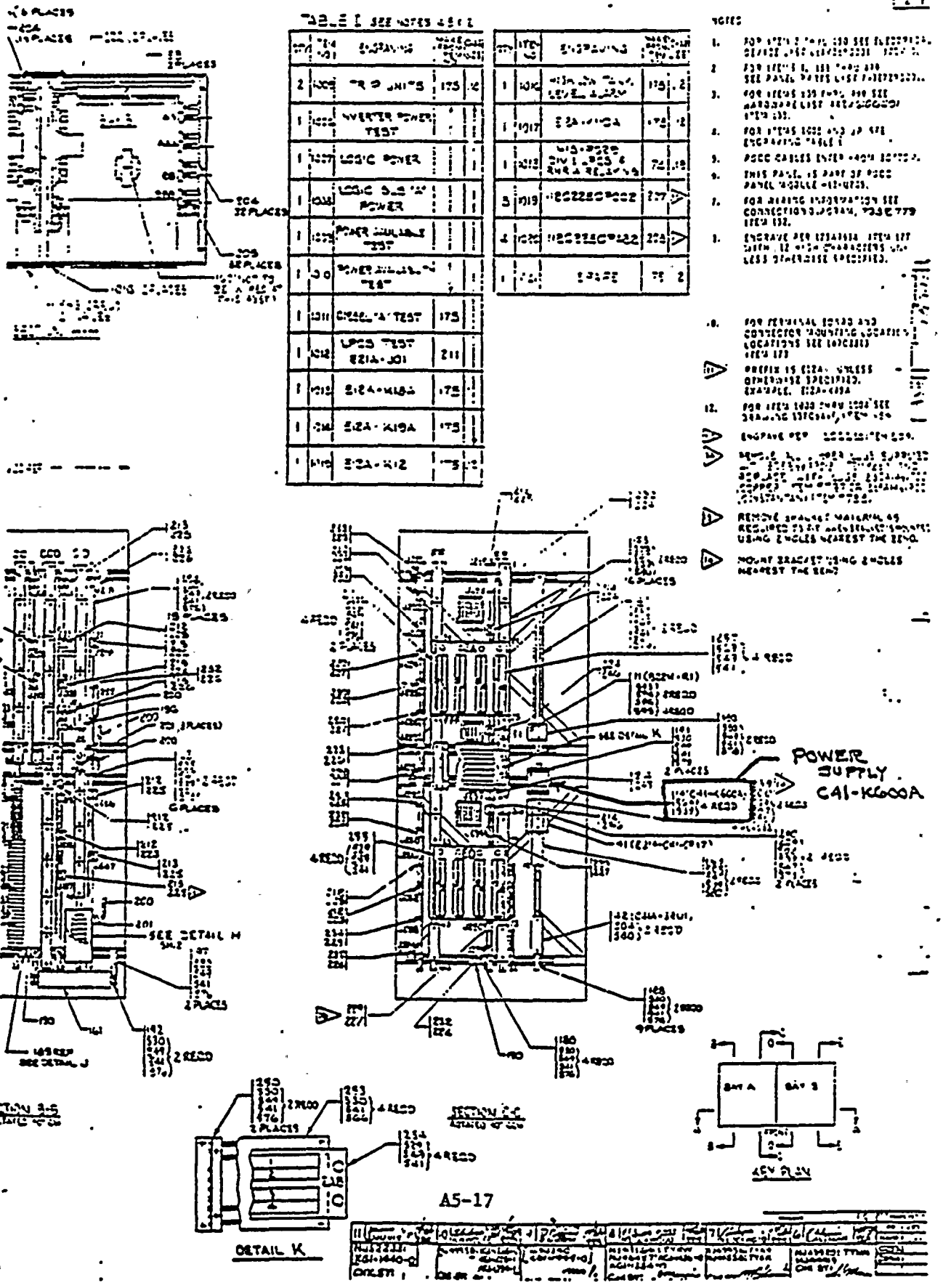


H13-P655

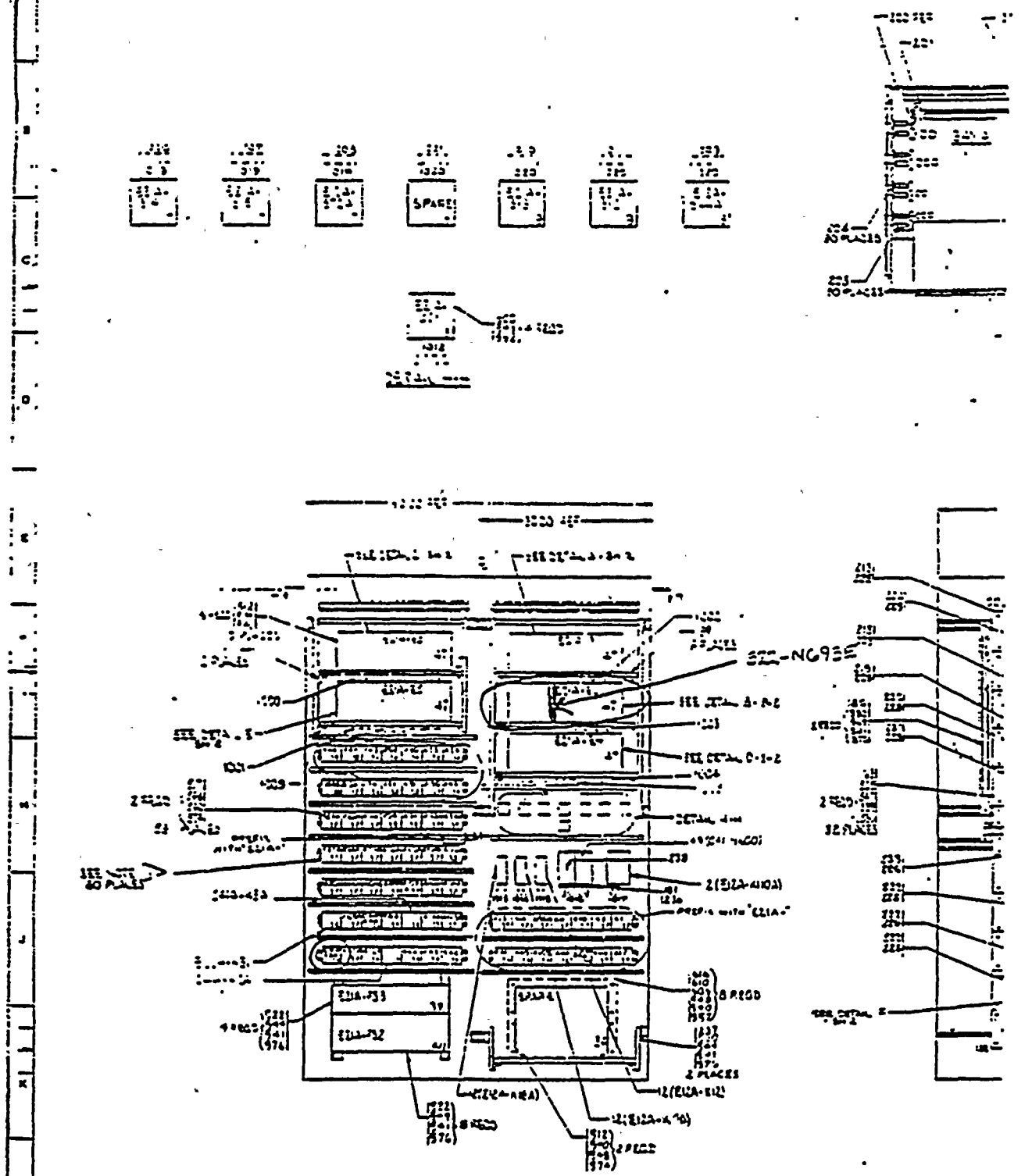
ACCELEROMETER LOCATIONS
HSIV PANELS



H13-P654


POWER SUPPLY C41-K6000A
DETAIL K

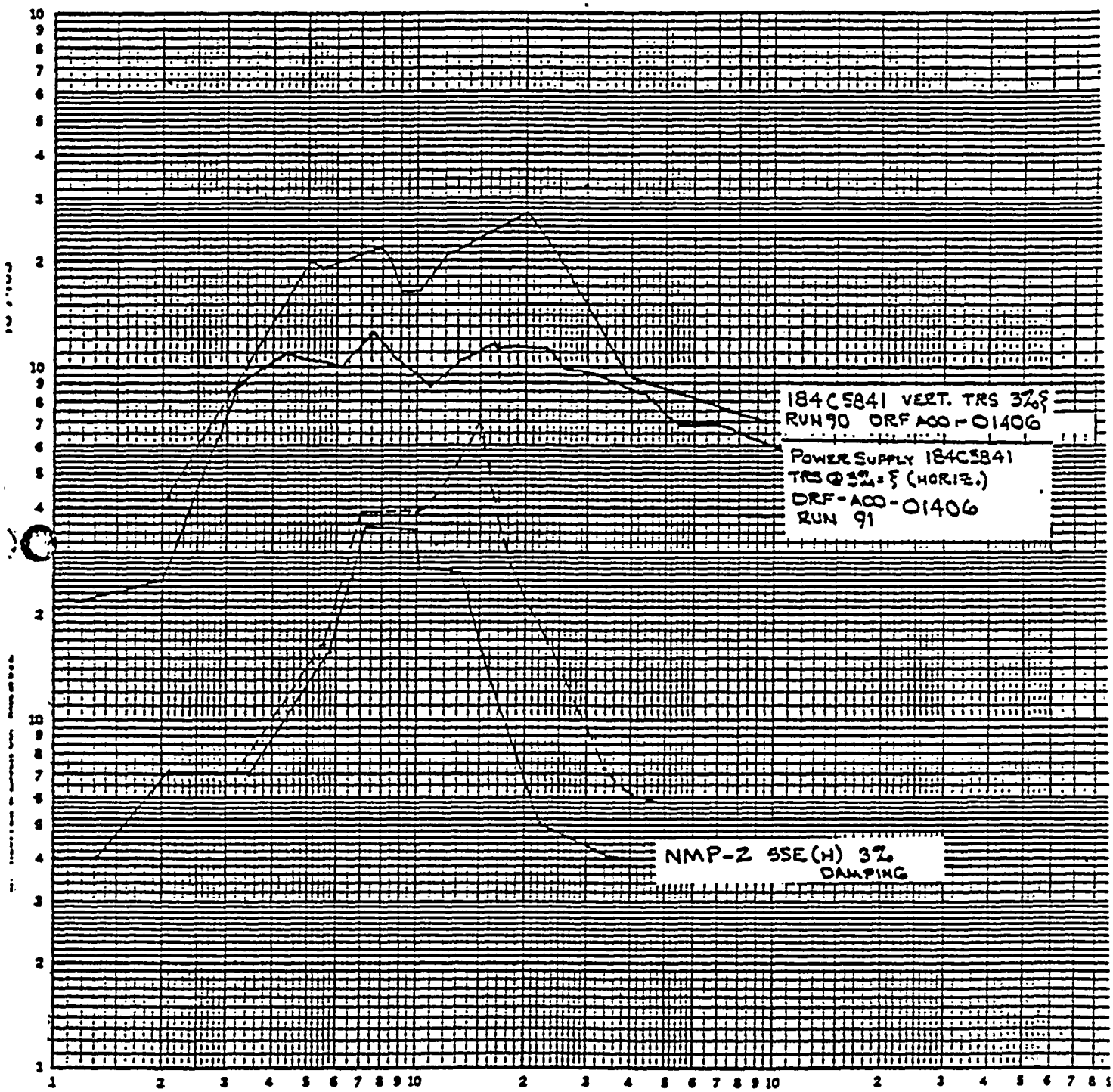
H13-P629



DETAIL J
BAY A - FROM REAR

NMP-2

H13-P601
POWER SUPPLY (184C5841)
MPL No. C41-K600B



——— H13-P601 theoretical RRS (envelope of FB, SS, V) at C41-K600B LOCATION

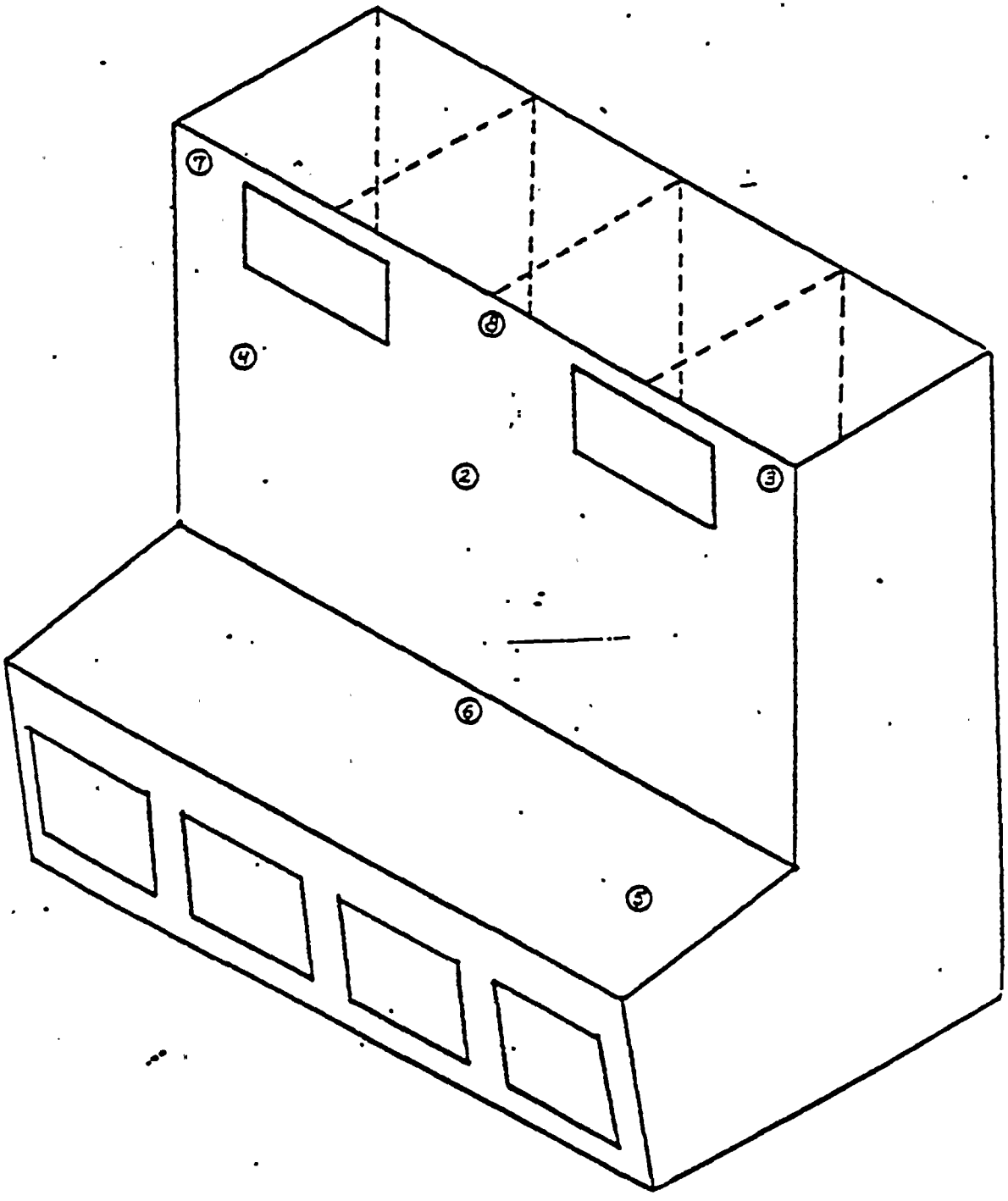
Device MPL: C41-K600B
Panel MPL: H13-P601
Similar Panel: Cofrentes H13-P601
DRF #: A00-1138 Tab K

Freq. (Hz)	Lateral	Vert.	Long.
35	1.5	1.1	1.1
34	1.4		
32	1.8		
29	1.6		
25	1.2		
23	1.2	1.2	3.4
22	1.2		
21	1.2		
19	1.2		3.1
15	1.2	1.0	4.9
12	1.2		
9	1.1		
5	0.9	1.1	1.1
3	1.0		

Cofrentes H13-P601
ACC # 5, 6 Transmissibility Data

FIGURE 1

ACCELEROMETER LOCATIONS



H13-P601

MEBG 807

MPL: C51-J003

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point-2 Type:

1. Utility: Niagara Mohawk Power Corp. PWR ____
2. NSSS: BWR-5 BWR 5, MK II
3. A/E: Stone & Webster Other ____

II. Component Name Flange, Drywell Penetration

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: N/A Quantity: 6
3. Size or Range: 5.00 Dia 150 lb Blind Flange
4. Vendor: GE C&I
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: Flange with tube on center axis
   b. Dimensions: 5" Dia Flange; 7, In x .375 in Dia Tube
   c. Weight: 10 lbs. approx.
7. Location: Building: Reactor
   Elevation: 252' 9.25"
8. Field Mounting Conditions [x] Bolt (No. 4, Size 0.5")
   [x] Weld (Length 6")
   [ ] ____
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]

   Welded to penetration pipe of containment & attached to guide tube unions.
10. a. System in which located: Neutron Monitoring System
    b. Functional Description: Containment Penetration
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [ ] Both [x] Neither [ ] Other ____

MPL C51-J003

11. Pertinent Reference Design Specification for Qualification Requirements: 157C4620, 23A1931, 23A1932, 23A1933, 23A1934

a. [x] Seismic Input
b. [x] Hydrodynamic Load Input
c. [x] Fatigue Considerations
d. [x] Service Conditions
e. [x] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[x] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

[x] Test [ ] Analysis [ ] Combination of Test and Analysis

Qualification Report*: VPF 112C2398

(No., Title and Date): 71185, Seismic Evaluation, 26 Jan. 1973

Company that Prepared Report: Viking Laboratories

Company that Reviewed Report: General Electric

Where Report is filed or available: DRF C51-20, GE San Jose

Applicable Codes and/or Standards: ASME Section III

V. Vibration Input:

1. Loads considered:
   a. [ ] Seismic only
   b. [ ] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [x] Combination of (a), (b), and (c)
2. Method of Combining RRS:
   [x] Absolute Sum [ ] SRSS [ ] _____ (other, specify)
3. Required Response Spectra** (attach the graphs): Not required because of rigid body characteristic.

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

RH: rm/A09104*-2

MPL: C51-J003

4. Damping Corresponding to RRS: N/A OBE _____ SSE _____

5. Required Acceleration in Each Direction:

[x] ZPA [ ] Other See Task II-Load Def.(specify)

OBE S/S = y=.196g F/B = x=.201g V = .160g

SSE S/S = y=.310g F/B = x=.339g V = .284g

6. Were fatigue effects considered:

[x] Yes [ ] No

If yes, describe how they were treated in overall qualification program: The sine sweep for resonance search and the fragility testing enveloped the potential fatigue conditions.

VI. If Qualification by Test, then Complete:

1. [ ] Single Frequency [x] Multi-Frequency [ ]random
[ ] sine beat
[x] Single axis sine

2. [x] Single Axis [ ] Multi-Axis
[ ] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:
OBE _____ SSE _____ Other Fragility Test on 3 Axes (specify)

4. Frequency Range: 5 to 1000 Hz

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical): None Identified
S/S = _____ F/B = _____ V = _____

6. Method of Determining Natural Frequencies:
[x] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS enveloping RRS using Multi-Frequency Test:
[ ] Yes (Attach TRS & RRS graphs)
[x] No

MPL: C51-J003

8. Maximum Input g Level Test:

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

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

10g Fragility Test Each Axis.

9. Laboratory Mounting:

A. [ ] Bolt (No. ___, Size ____)

[ ] Weld (Length ____) [ ] _____

B. Orientation and Fixturing: Rigidly mounted in a fixed attitude approximating service use.

10. Functional operability verified:

[x] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:

No physical damage or leaks were observed and no modifications were required.

12. Other tests performed (such as aging or fragility test, including results):

Test was a fragility test.

13. Failure Modes (If appropriate) None Identified

14. Margins Available: [ ] Input Spectrum [x] Fragility
Combined SSE seismic plus hydrodynamic loads is 1.50g. Fragility test was 10g.

VII. If Qualification by Analysis, then complete: N/A

1. Method of Analysis:

[ ] Static Analysis [ ] Equivalent Static Analysis

[ ] 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: [ ] 3D [ ] 2D [ ] 1D

[ ] Finite Element [ ] Beam

[ ] Closed Form Solution [ ] Other _____

MPL: _____

4. [ ] Computer Codes: _____
   Frequency Range and No. of modes _____
   [ ] Hand Calculations
5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [ ] SRSS [ ] Other: _____ (specify)
6. Damping:
   OBE _____ SSE _____ Basis for damping used: _____
7. Support Considerations in the model: _____
8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection _____ Location _____ Maximum Allowable Deflection to Assure Functional Operability _____

9. Failure Modes: _____
10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

QUALIFICATION SUMMARY

1. Component Name: Tip Guide Tube Valve Assembly

2. MPL or EDL Item No.: C51-J004 A-E (PPD # 136B1302)

3. Qualification Documentation

   A. Qualification Summary of Equipment (SQRT Form attached)

   B. Reference Documents

Reference Number	Document Identification	Date	Title
1	Ogden Technology Laboratories Inc. Test Procedure No. 70865	13 Jun 1972	"Qualification Test Procedure for G.E. Shear Valve"
2	GE DRF A00-1084-15	2/12/81	Seismic Qualification Summary - Ball and Shear Valve Assembly
3	SWEC J.O. No. 12177 Ltr. No. T-71-909	14 May 1984	"RRS, upset and faulted for NMP-2 EL. 261.0 ft." Cal. Nos. MS-1746, MS-1747

4. Requirements

   This device is classified as active and thus must be able to maintain its structural and functional integrity when subjected to the seismic and or hydrodynamic conditions as specified in reference 3.

5. Demonstrated Capability

   The capability of this device to perform before during and after a seismic event is demonstrated in reference 2.

6. Rationale for Qualification

   This device is considered qualified for use at Nine Mile point 2 based on the test levels (10g in each axis) exceeding the required response spectrum ZPA levels (0.25g FB and SS; 0.24 g V), and no resonances below 33 Hz.

MPL: C51-J004 A-E

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point 2 Type:

1. Utility: Niagara Mohawk Power Corp. PWR ____
2. NSSS: General Electric Co. BWR- 5, MK II
3. A/E: SWEC Other ____

II. Component Name TIP Guide Tube Valve Assembly

1. Scope: [x] NSSS [ ] BOP [ ] Other
2. Model Number: None Quantity: 5
3. Size or Range: N/A
4. Vendor: GE
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: See Attachment 1
   b. Dimensions: See Attachment 1
   c. Weight: 25.0 lbs.
7. Location: Building: Later
   Elevation: Later
8. Field Mounting Conditions [ ] Bolt (No. ___, Size ___)
   [ ] Weld (Length ____)
   [x] Later
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   Wall mounted
10. a. System in which located: traversing in-core probe system
    b. Functional Description: active Class 1E
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [ ] Both [ ] Neither [x] Other containment isolation

MPL: C51-J004 A-E

11. Pertinent Reference Design Specification for Qualification Requirements: As specified on GE drawing

a. [x] Seismic Input
b. [x] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualfied Life

III. Is Equipment Available for Inspection in the Plant:

[x] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

[x] Test [ ] Analysis [ ] Combination of Test and Analysis

Qualification Report*: GE DRF No. A00-1084-15

(No., Title and Date): "Seismic Qualification Summary - Ball and Shear Valve Assembly ", 2/12/81

Company that Prepared Report: GE

Company that Reviewed Report: GE

Where Report is filed or available: GE

Applicable Codes and/or Standards: As specified on attachment 1

V. Vibration Input:

1. Loads considered:
   a. [x] Seismic only
   b. [x] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)

2. Method of Combining RRS:

   [ ] Absolute Sum [x] SRSS [ ] _____ (other, specify)

3. Required Response Spectra** (attach the graphs): see attachment 2

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

MPL: C51-J004 A-E

4. Damping Corresponding to RRS: OBE 1,2,4% SSE 2,3,4%

5. Required Acceleration in Each Direction:
[x] ZPA [ ] Other _____ (specify)
OBE S/S = 0.14 F/B = 0.14 V = 0.20
SSE S/S = 0.25 F/B = 0.25 V = 0.24

6. Were fatigue effects considered:
[ ] Yes [x] No
If yes, describe how they were treated in overall qualification program: _____

VI. If Qualification by Test, then Complete:

1. [x] Single Frequency [ ] Multi-Frequency [ ]random
[x] sine beat
[x] resonant Search

2. [x] Single Axis [ ] Multi-Axis
[ ] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:
OBE _____ SSE _____ Other Malfunction Limit
(specify)

4. Frequency Range: 5-30 Hz @ 1.5g x and y; 0.5g Z
30-1000 Hz @ 0.5g ea. axis

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical)
S/S = None F/B = None V = None

6. Method of Determining Natural Frequencies:
[x] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS envelping RRS using Multi-Frequency Test:
[x] Yes
[ ] No

MPL: C51-J004 A-E

8. Maximum Input g Level Test:

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

SSE S/S = 10 g F/B = 10 g V = 10 g

9. Laboratory Mounting:

A. [x] Bolt (No. ___, Size ___)

[ ] Weld (Length ___) [ ] ___

B. Orientation and Fixturing: G.E. supplied test fixture

10. Functional operability verified:

[x] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:

Each unit functioned properly during and after testing

12. Other tests performed (such as aging or fragility test, including results):

None

13. Failure Modes (If appropriate) None

14. Margins Available: [ ] Input Spectrum [x] Fragility

VII. If Qualification by Analysis, then complete: N/A

1. Method of Analysis:

[ ] Static Analysis [ ] Equivalent Static Analysis

[ ] 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:

[ ] 3D [ ] 2D [ ] 1D

[ ] Finite Element [ ] Beam

[ ] Closed Form Solution [ ] Other

MPL: C51-J004 A-E

4. [ ] Computer Codes: _____
   Frequency Range and No. of modes _____
   [ ] Hand Calculations
5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [x] SRSS [ ] Other: Similar to tested device (specify)
6. Damping:
   OBE _____ SSE _____ Basis for damping used: _____
7. Support Considerations in the model: _____
8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: N/A
10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection
    [x] Other Similar to tested device

ATTACHMENT 1

GE DRAWING 136B1302

136B1302

GENERAL ELECTRIC

136B1302

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

APPLIED PRACTICES	SURFACES	FRACTIONS ±	DECIMALS ± .20	ANGLES ±
	✓			

136B1302

TITLE ASSY

VALVE, GUIDE TUBE

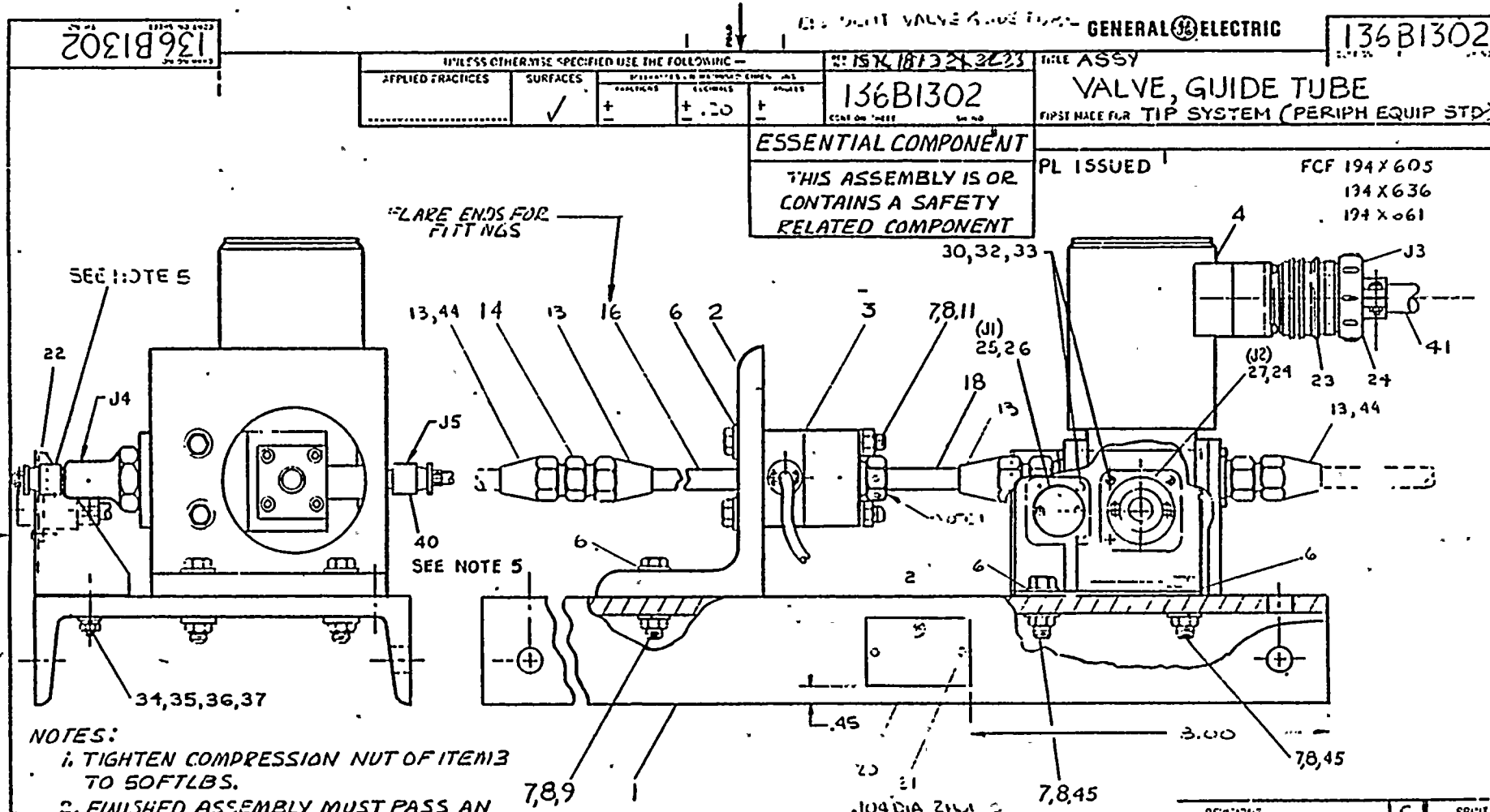
FIRST MADE FOR TIP SYSTEM (PERIPH EQUIP STD)

ESSENTIAL COMPONENT

THIS ASSEMBLY IS OR CONTAINS A SAFETY RELATED COMPONENT

PL ISSUED

FCF 194X605
194X636
194X661



NOTES:

1. TIGHTEN COMPRESSION NUT OF ITEM 3 TO 50 FT LBS.
2. FINISHED ASSEMBLY MUST PASS AN "A" DIA ROD WITH .DIA $^{+.005}_{-.000}$ CHAMFER ON LEADING EDGE.
3. MATING CONNECTORS ARE SUPPLIED WITH SHEAR VALVE, ITEM 3.
4. ITEMS 3 & 4 ARE ESSENTIAL.

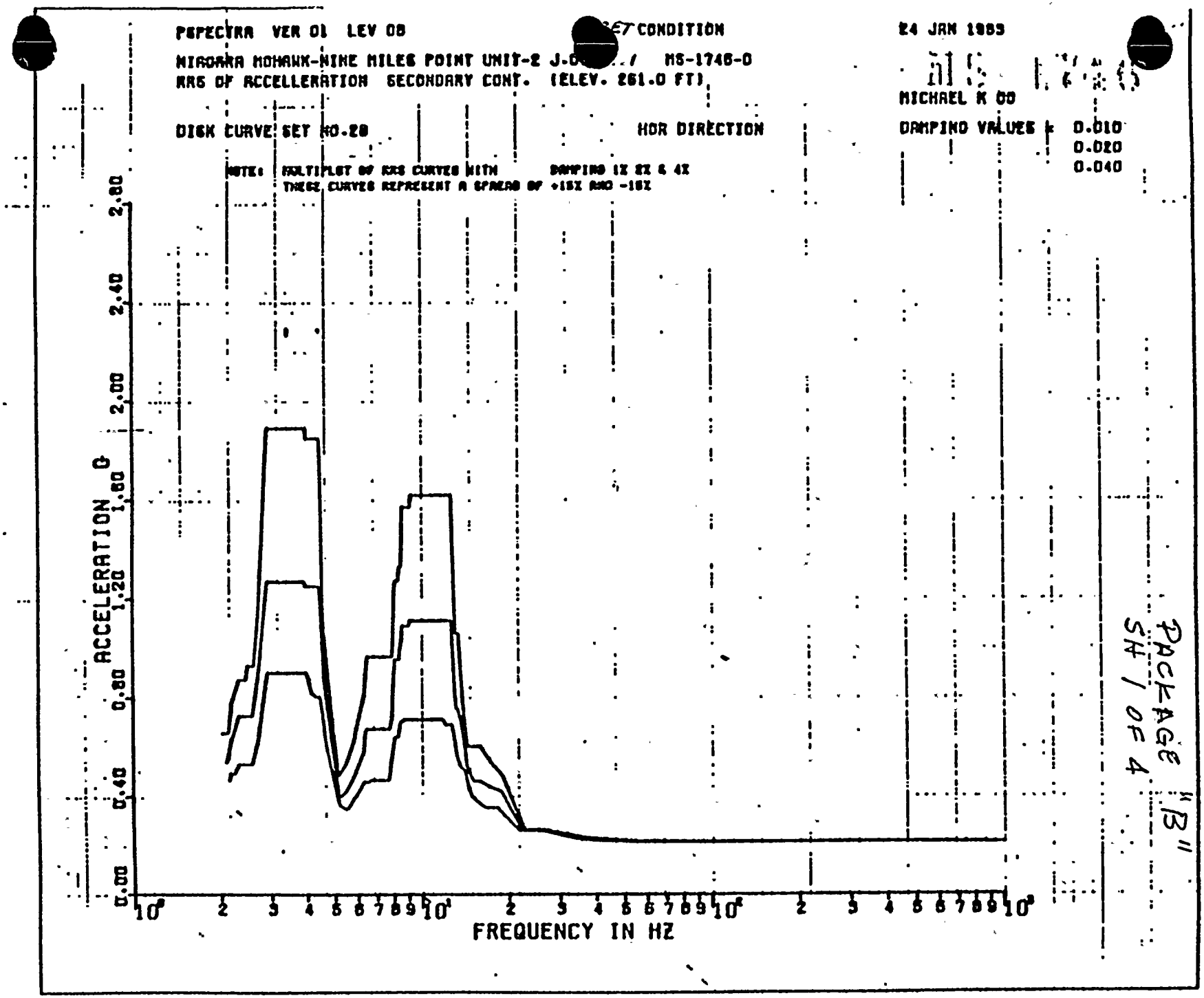
3	.208
2	.273
1	.273
GR NO	A $^{+.002}_{-.002}$ D...

REVISIONS	C	PRINTS TO
23 (ECN) 4-326	C1	28
NE 70267		
		136
		11
		SG

DRAWN L. [illegible] 15 MAY 67
CHECKED [illegible] JUN 16-67
APPROVED [illegible]
NED SAN JOSE
136B1302
C1

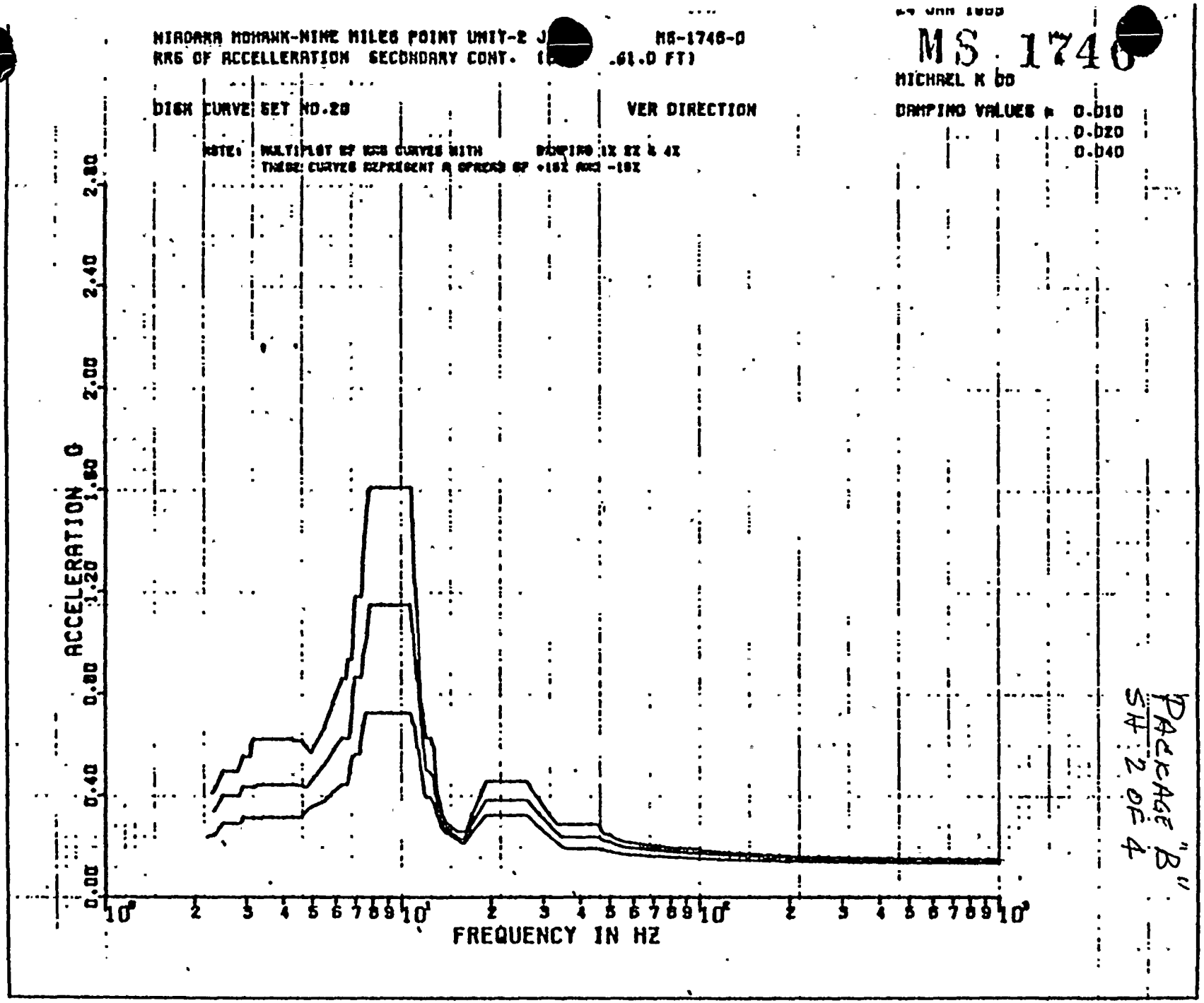
ATTACHMENT 2

REQUIRED RESPONSE SPECTRA



PACKAGE "B"
SH 1 OF 4

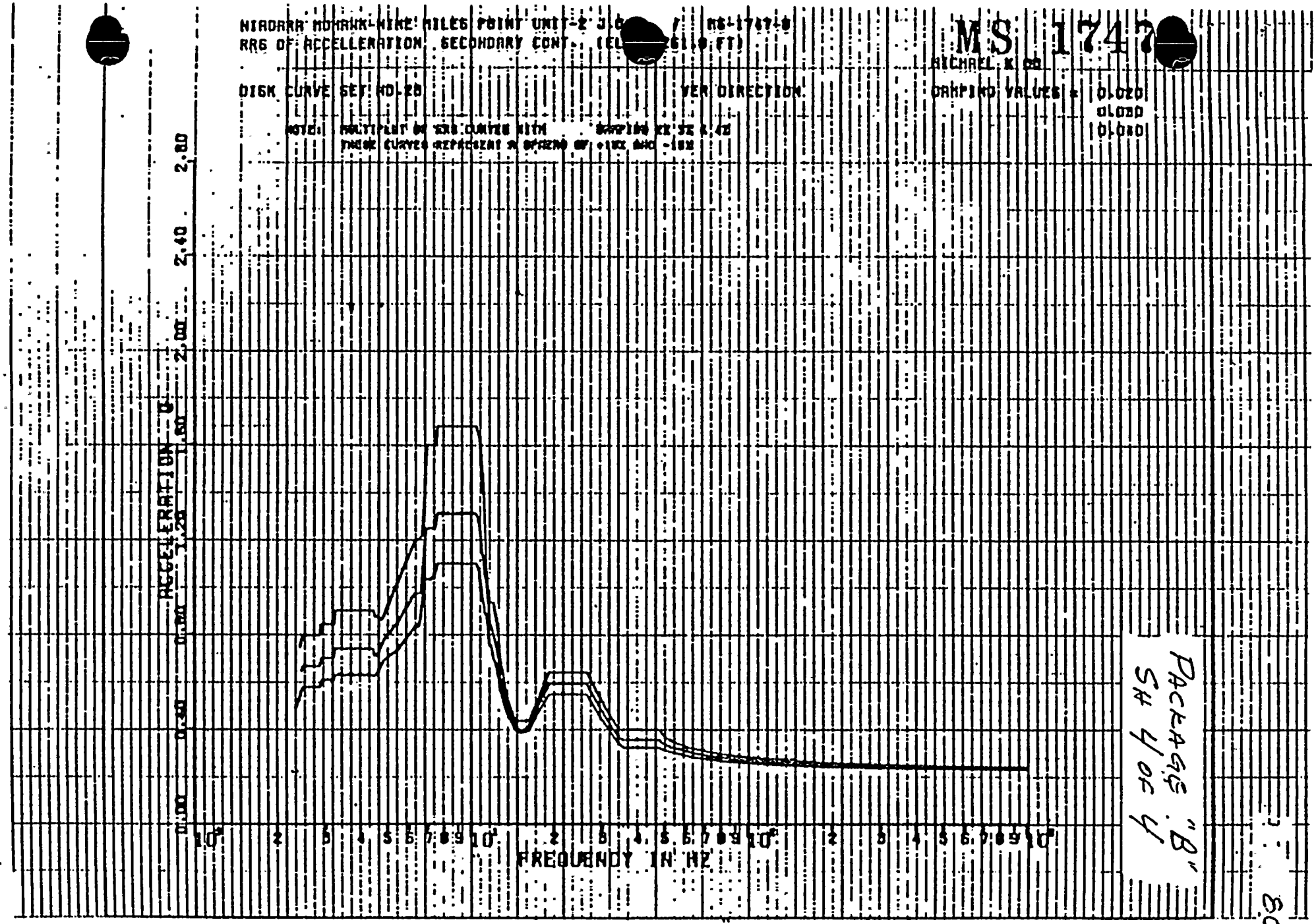
PAGE # 77



PACKAGE "B"
SH 2 OF 4

PAGE 70

MS 174
MICHAEL K CO
DISK CURVE SET NO:20
HOR DIRECTION
DAMPING VALUES = 0.020
0.040
0.080
ACCELERATION G
2.50
2.00
1.50
1.20
1.00
0.80
0.60
0.50
0.40
0.30
0.25
0.20
0.15
0.10
FREQUENCY IN HZ
PACKAGE "B"
SH. 3 OF 4


NIAGARA MOHAWK-NINE MILES POINT UNIT-2 J.O. / NS-1747-B
RRS OF ACCELERATION SECONDARY CONT. (EL 261.0 FT)
MS 1747
MICHAEL K CO
DISK CURVE SET NO.20
VER DIRECTION
DAMPING VALUES = 0.020
0.030
0.050
NOTE: MULTIPLY BY THE CURVES WITH DAMPING OF 2% BY 1.42
THESE CURVES REPRESENT A SPREAD OF +10% AND -10%
ACCELERATION G
2.80
2.40
2.00
1.60
1.20
0.80
0.40
0.00
10^1 2 3 4 5 6 7 8 9 10^0 2 3 4 5 6 7 8 9 10^-1 2 3 4 5 6 7 8 9 10^-2
FREQUENCY IN HZ
PACKAGE "B"
SH 4 OF 4
80

PPD NO. 169C9489
MPL: C72A- K55 A-D

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point Unit 2 Type:

1. Utility: Niagra Mohawk Power Corp. PWR ____
2. NSSS: General Electric Co. BWR 5 MK II
3. A/E: Stone & Webster Engineering Corp. Other ____

II. Component Name Relay

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: GP Series Quantity: 4
3. Size or Range: ____
4. Vendor: Agastat
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: See attachment 1
   b. Dimensions: See attachment 1
   c. Weight: 10.9 oz.
7. Location: Building: Control Room
   Elevation: 306'-0"
8. Field Mounting Conditions [ ] Bolt (No. ___, Size ___)
   [ ] Weld (Length ___)
   [ ] ____
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   Mounted in control room panels H13-P609 and H13-P611
10. a. System in which located: CRD Hydraulic Control *
    b. Functional Description: ____
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [X] Both [ ] Neither [ ] Other ____

* Supplies signal to Reactor Protection System

PPD NO. 169C9489
MPL C72A-K55 A-D

11. Pertinent Reference Design Specification for Qualification Requirements: _____

a. [X] Seismic Input
b. [ ] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

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

Qualification Report*: NEDC- 30559

(No., Title and Date): Agastat Relay Qualification Report dated 3-30-84

Company that Prepared Report: General Electric Co.

Company that Reviewed Report: General Electric Co.

Where Report is filed or available: GE Valley Forge , PA

Applicable Codes and/or Standards: IEEE Std. 344-1975

V. Vibration Input:

1. Loads considered:
   a. [X] Seismic only
   b. [ ] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)
2. Method of Combining RRS:
   [ ] Absolute Sum [ ] SRSS [X] N/A (other, specify)
3. Required Response Spectra** (attach the graphs): See attachment 2

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

PPD NO. 169C9489
MPL: C72A-K55 A-D

4. Damping Corresponding to RRS: OBE 2% SSE 3%
5. Required Acceleration in Each Direction:
   [X] ZPA [ ] Other _____ (specify)
   OBE S/S = 0.25 F/B = 0.25 V = 0.14
   SSE S/S = 0.40 F/B = 0.40 V = 0.25

6. Were fatigue effects considered:
   [X] Yes [ ] No
   If yes, describe how they were treated in overall qualification program: SRV aging performed

VI. If Qualification by Test, then Complete:

1. [ ] Single Frequency [X] Multi-Frequency [X]random
   [ ] sine beat
   [ ] _____
2. [ ] Single Axis [X] Multi-Axis
   [ ] Independent Axis [X] In-phase motions
3. Number of Qualifications Tests:
   OBE 5 SSE 1 Other _____ (specify)
4. Frequency Range: 1-40 Hz
5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical):
   S/S = Not Determined F/B = Not Determined V = Not Determined
6. Method of Determining Natural Frequencies: N/A
   [ ] Lab Test [ ] In-Situ Test [ ] Analysis
7. TRS enveloping RRS using Multi-Frequency Test:
   [X] Yes (Attach TRS & RRS graphs)
   [ ] No

PPD NO. 169C9489
MPL: C72A-K55 A-D

8. Maximum Input g Level Test: (ZPA)
   OBE S/S = _____ F/B = _____ V = _____
   SSE S/S = 13.0 g F/B = 13.0 g V = 13.0 g

9. Laboratory Mounting:
   A. [X] Bolt (No. ___, Size ____) SAE Grade 3 Cap Screws
   [ ] Weld (Length ____) [ ] _____
   B. Orientation and Fixturing: tested on 45 deg. incline test fixture

10. Functional operability verified:
    [X] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:
    Operation during seismic tests was satisfactory.

12. Other tests performed (such as aging or fragility test, including results):
    N/A

13. Failure Modes (If appropriate) _____

14. Margins Available: [X] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, then complete: N/A

1. Method of Analysis:
   [ ] Static Analysis [ ] Equivalent Static Analysis
   [ ] 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: [ ] 3D [ ] 2D [ ] 1D
   [ ] Finite Element [ ] Beam
   [ ] Closed Form Solution [ ] Other _____

PPD NO. 169C9489

MPL: C72A-K55 A-D

4. [ ] Computer Codes: _____
   Frequency Range and No. of modes _____
   [ ] Hand Calculations
5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [ ] SRSS [ ] Other: _____ (specify)
6. Damping:
   OBE _____ SSE _____ Basis for damping used: _____
7. Support Considerations in the model: _____
8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____
10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

ATTACHMENT 1

GE DRAWING

GENERAL ELECTRIC

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLIED PRACTICES | SURFACES ✓ | ± | ± | ±

TITLE PURCHASE PART
RELAY
FIRST MADE FOR GENL USE
FSC 5935-12/N

CLASS I

ESSENTIAL COMPONENT
THIS ITEM IS OR CONTAINS A SAFETY RELATED COMPONENT
ELECTRICAL | IE

NUCLEAR SAFETY RELATED

OVERALL REVISION 9

SUMMARY SHEET	QTY
1	9
2	8
3	9

DESIGN SPECIFICATIONS

1.0 EQUIPMENT IDENTIFICATION: RELAY

1.1 PART IDENTIFICATION: SEE TABLE 1.

2.0 THE EQUIPMENT IS TO BE DESIGNED, ASSEMBLED AND TESTED IN ACCORDANCE WITH THE DOCUMENTS AND SPECIFICATIONS IDENTIFIED IN THE FOLLOWING SECTIONS.

3.0 QUALIFICATION REQUIREMENTS

3.1 IEEE STD 323-1974 - IEEE STANDARD FOR QUALIFYING CLASS IE EQUIPMENT FOR NUCLEAR POWER GENERATING STATIONS.

3.2 IEEE STD 344-1975 - IEEE RECOMMENDED PRACTICES FOR SEISMIC QUALIFICATION OF CLASS IE EQUIPMENT FOR NUCLEAR POWER GENERATING STATIONS.

3.3 262A6590 - QUALIFICATION AND PROCUREMENT SPECIFICATION FOR C & I CLASS IE EQUIPMENT (1974/75 REQUIREMENTS).(FOR REFERENCE ONLY)

3.4 22A4320 - SEISMIC QUALIFICATION PROCEDURE FOR CLASS IE ELECTRICAL EQUIPMENT.(FOR REFERENCE ONLY)

3.5 249A1238 - SUSCEPTIBILITY TEST OR APPROVED EQUAL.

3.6 IEEE STD C37.98-1978 IEEE STANDARD SEISMIC TESTING OF RELAYS

4.0 MARGIN REQUIREMENTS

EXCEPT WHERE OTHERWISE SPECIFIED THE ENVIRONMENTAL AND FUNCTIONAL PARAMETERS ARE TO HAVE ADDED TO THEM THE FOLLOWING MARGINS IN ACCORDANCE WITH DOCUMENT 3.1 PARA 6.3.1.5.

4.1 TEMPERATURE +15°F (8°C)

4.2 PRESSURE +10% OF GAUGE

4.3 RADIATION + 10%,

4.4 VOLTAGE ±10% OF RATED VALUE

4.5 FREQUENCY ±5% OF RATED VALUE

4.6 TIME +10%

4.7 ENVIRONMENTAL TRANSIENTS: N A

4.8 VIBRATION +10% OF ACCELERATION

5.0 ENVIRONMENTAL CONDITIONS, CONTROL ROOM

5.1.1 TEMPERATURE:
NORMAL 60°-90°F (104°F INCLUDING CABINET HEAT)
MINIMUM 40°F
ABNORMAL 104°F (PLUS 10°F CABINET HEAT & 15° MARGIN)
DBE 120°F FOR 8 HRS (PLUS 10°F CABINET HEAT & 15° MARGIN.)

5.1.2 RELATIVE HUMIDITY:
NORMAL 20-50 % RH
ABNORMAL 90 % RH FOR 1 DAY PER YEAR
DBE 95% RH FOR 8 HRS

5.1.3 ATMOSPHERIC PRESSURE: ± 2 PSIG

5.2 ELECTRICAL ENVIRONMENT

5.2.1 EMI: 249A1238 - SUSCEPTIBILITY TEST OR APPROVED EQUAL

5.3 SEISMIC VIBRATION

5.3.1 SEISMIC QUALIFICATION IN ACCORDANCE WITH DOCUMENT 3.2 AND 3.6. THE RESPONSE SPECTRA G LEVELS ARE IN ACCORDANCE WITH DOCUMENT 3.6 OVER THE FREQUENCY RANGE OF 1-40 HZ WITH ZPA VALUES AS STATED FOR THE THREE RELAY OPERATIONAL MODES:
NON-OPERATE (DE-ENERGIZED) MODE - 1.3 G
OPERATE (ENERGIZED) MODE - 4.0 G
TRANSITIONAL MODE ——— 4.0 G

5.4 RADIATION, 1.8×10^5 RAD (TID)

5.5 CHEMICAL, INCLUDING WATER SPRAYS: N A

5.6 SIMULTANEOUS ACCIDENT STRESS CONDITIONS: N A

6.0 FUNCTIONAL INPUT

6.1 ELECTRICAL INPUT

[9] 6.1.1 VOLTAGE: 120 VAC, 12, 24, 48, 125, 250 VDC

6.1.1.1 POWER CONSUMPTION:
AT RATED VOLTAGE 15.6 VAMP FOR AC COILS & 6 WATTS FOR DC COILS. THERE IS NO SURGE CURRENT DURING OPERATION.

6.1.2 CURRENT: CONTACT RATINGS CONTINUOUS (RESISTIVE) 125 VDC 1.0 AMPS, 120 VAC 10.0 AMPS

6.1.3 FREQUENCY: 50-60 HZ

6.1.4 INSULATION: INSULATION RESISTANCE: MINIMUM 500 MEGOHMS @ 500 VDC BETWEEN ALL NON-CONNECTED TERMINALS AS WELL AS BETWEEN NON-CONNECTED TERMINALS & THE RELAY YOKE.
DIELECTRIC: 1500 VRMS 60 HZ BETWEEN POINTS SPECIFIED ABOVE.

6.2 PROCESS INPUT: N/A

7.0 RANGE: N/A

8.0 PERFORMANCE REQUIREMENTS:

8.1 NORMAL OPERATIONS

AS MANUFACTURED BY: CONTROL PRODUCTS DIVISION OF AMERACE CORP OR ENGINEERING APPROVED EQUIVALENT

REVISIONS	C	PRINTS TO
9 C D00 2-22-79 FMI		426F VF1
		426G 0218

NJ55462
CHK BY: B. WOOLEY

PART NO.	SUPPLIER DOCUMENT LIST
1	442X181
	GE USE ONLY

D SOKOLSKY 1/30/79 — 2-22-79 — NE80 SAN JOSE — 169C9489 REV 9 SHT 2 OF 3

CHK'D BY

F-942-MM6 >00363564 CI EIS

UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —
APPLIED PRACTICES | SURFACES ✓ | ± | ± | ±

TITLE PURCHASE PART RELAY
FIRST MADE FOR GENL USE

8.1.1 CONTACT RESISTANCE: LESS THAN150 MILLIOHMS

8.1.2 CONTACT TRANSFER TIME REQUIREMENTS:

	DE-ENERGIZED RELAY		ENERGIZED RELAY	
COIL VOLTAGE	CLOSURE TIME OF NORMALLY OPEN CONTACTS(M SEC)	RELEASE TIME OF NORMALLY CLOSED CONTACTS (MSEC)	CLOSURE TIME OF NORMALLY CLOSED CONTACTS (M SEC)	RELEASE TIME OF NORMALLY OPEN CONTACTS (MSEC)
AC	35	18	85	70
DC	30	15	25	8

8.1.3 MINIMUM COIL PICK-UP VOLTAGE: 80% MIN DC COILS; 85% MIN AC COILS

8.1.4 COIL DROP-OUT VOLTAGE SHALL BE BETWEEN 5% AND 45% OF THE NORMAL AC OR DC OPERATING VOLTAGE LISTED IN TABLE 1.

8.1.5 CLASS 1E SAFETY FUNCTION

8.1.5.1 THE RELAY CONTACTS MUST TRANSFER UPON APPLICATION OR REMOVAL OF COIL POWER IN ORDER TO FULFILL THE REQUIRED SAFETY FUNCTION

8.1.5.2 THE RELAY COIL SHALL MAINTAIN THE ENERGIZED STATE WITH ITS COIL POWER SUBJECTED TO THE NC CONTACT INTERRUPTION IN 8.1.6.1

8.1.6 CONTACT RELIABILITY

8.1.6.1 MAINTAIN STATE DURING SEISMIC : OPEN CONTACTS MUST NOT FALSELY TRANSFER AND CLOSED CONTACTS MUST NOT HAVE A CHATTER TIME GREATER THAN 1 MILLESECOND FOR THE SEISMIC ENVIRONMENT OF 5.3 FOR BOTH THE ENERGIZED AND DEENERGIZED STATE.

8.2 DBE OPERATIONS

8.2.1 DELETED

9.0 ACCESSORIES, AND INSTALLATION

9.1 MECHANICAL MOUNTING REQUIREMENTS, NORMAL MOUNTING HORIZONTAL

9.2 ACCESSORY, INTERFACE AND AUXILIARY DEVICE REQUIREMENTS.

9.3 ELECTRICAL CONNECTION REQUIREMENTS - SEE WIRING DIAG. SH.3

9.4 PROCESS CONNECTION REQUIREMENTS: N.A

9.5 INSTALLATION REQUIREMENTS

10.0 DESIGN LIFE: THE RELAY DESIGN LIFE SHALL BE 2.5×10^4 MECHANICAL OPERATIONS. WHICH IS SIGNIFICANTLY MORE THAN THE EXPECTED USAGE IN 10 YEARS OF OPERATION

10.1 OPERATIONAL USE: THE RELAY MAY OPERATE FOR EXTENDED TIME PERIODS (MONTHS) IN THE ENERGIZED OR DE-ENERGIZED STATE BEFORE SAFETY OPERATION IS REQUIRED.

11.0 RELIABILITY: FAILURE RATE LESS THAN 10^{-6} FAILURES/HOUR

12.0 QUALIFIED LIFE - THE EQUIPMENT SHALL HAVE A QUALIFIED LIFE OF TEN YEARS ESTABLISHED AS A RESULT OF TYPE TESTING.

13.0 OTHER DESIGN REQUIREMENTS

13.1 THE RELAY SOCKET MUST BE ABLE TO ACCOMMODATE A 0.3 INCH LONG TERMINAL SCREW FOR MULTIPLE LUG TERMINATING WITHOUT ALLOWING UNTERMINATED TERMINAL SCREW CONTACT WITH A FLAT SOCKET MOUNTING SURFACE.

14.0 SUPPLIER SUBMITTAL REQUIREMENTS

14.1 SEE SUPPLIER DOCUMENT LIST ON THIS DRAWING FOR ONE TIME SUBMITTALS

14.2 SEE REFERENCE 3.3, SECTION 5 AND TABLE 4 FOR PRODUCT QUALITY ASSURANCE SUBMITTAL REQUIREMENTS. EACH SHIPMENT SHALL INCLUDE:

A. TEST DATA REPORT

B. CERTIFICATE OF COMPLIANCE

NOTE:

1. THESE FIGURES AND DIMENSIONS ARE FOR REFERENCE ONLY; APPROVED VENDOR OUTLINE DRAWING SHALL GOVERN.

2 UNLESS OTHERWISE SPECIFIED. THE FOLLOWING ACCESSORIES SHALL BE INCLUDED: SOCKET AGASTAT PT. NO.ECR0002001 FIG.2 HEAVY DUTY LOCKING STRAP, AGASTAT PT. NO. ECR0133001 FIG3 ADAPTER PLATE. AGASTAT PT NO 34176-01 FIG 4

3. DELETED.

4. CATALOG NUMBER EGPIC2004002
   BASIC RELAY

8 5 THE ADAPTER PLATE IS FURNISHED BY THE VENDOR NON-NUCLEAR SAFETY RELATED.

169C9489 SH 3 REV 2

REVISIONS			PRINTS TO
8 NJ55914 5/1/84	2 NJ29559		
	3 NJ35679 5-13-85		
	4 NJ37882		

D SOKOLSKY 2-22-79 | NC&I SAN JOSE | 169C9489 SH 3 REV 2

5 CHKD BY 6 CI GIS

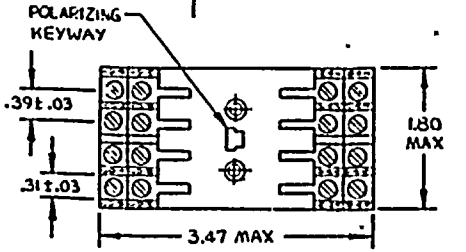
GENERAL ELECTRIC

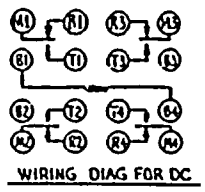
169C9489

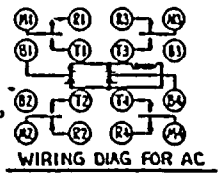
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING — APPLICABLE PRACTICES | SURFACES | ✓ | ± | ± | ±

TITLE PURCHASE PART RELAY

FIRST MADE FOR GENERAL







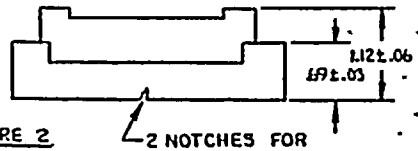


FIGURE 2

SOCKET ECR0002001

TABLE 1

PART NO.	NOMINAL COIL VOLTAGE	FREQ (HZ)	COIL IND LOAD (REF)	CATALOG NUMBER
1	120VAC	50/60	4.6	EGPEC2004002
2	125VDC	DC	7.0	EGPDC2004002
3	250VDC	DC	28.4	EGPFC2004002
4	24VDC	DC	0.28	EGPBC2004002
5	48VDC	DC	1.12	EGPCC2004002
6	—	—	—	SOCKET ECR0002001
7	—	—	—	STRAP ECR0133001
8	—	—	—	ADAPTER 34176-01
9	12VDC	DC	—	EGPAC2004002

△5 △9 △2

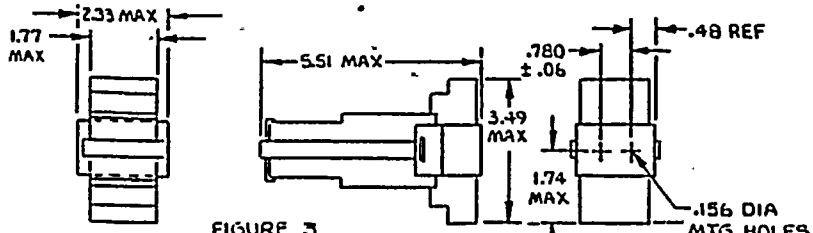


FIGURE 3

RELAY WITH ECR0002001 SOCKET (WITH SCREW TERMINALS) AND ECR0133001 LOCKING STRAP

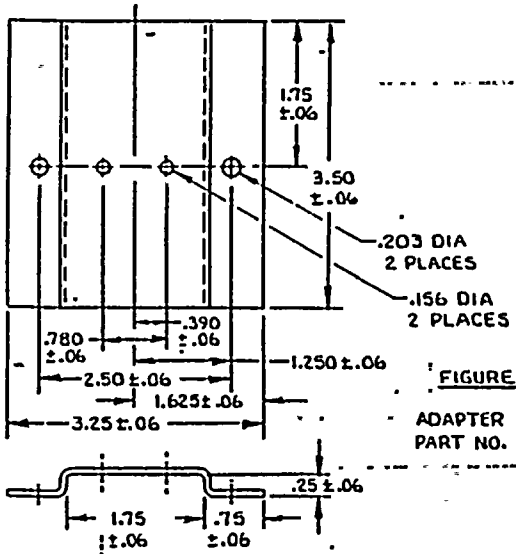
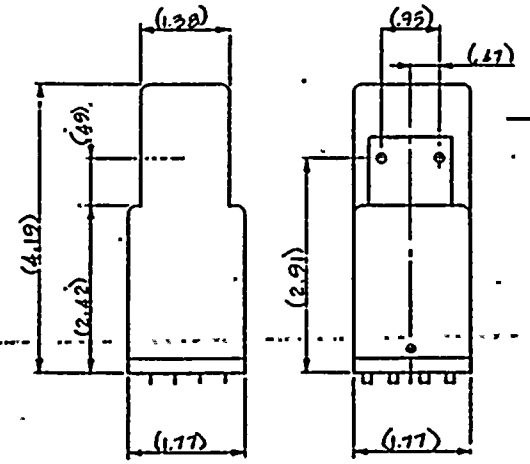


FIGURE 4

ADAPTER PLATE PART NO. 34176-01

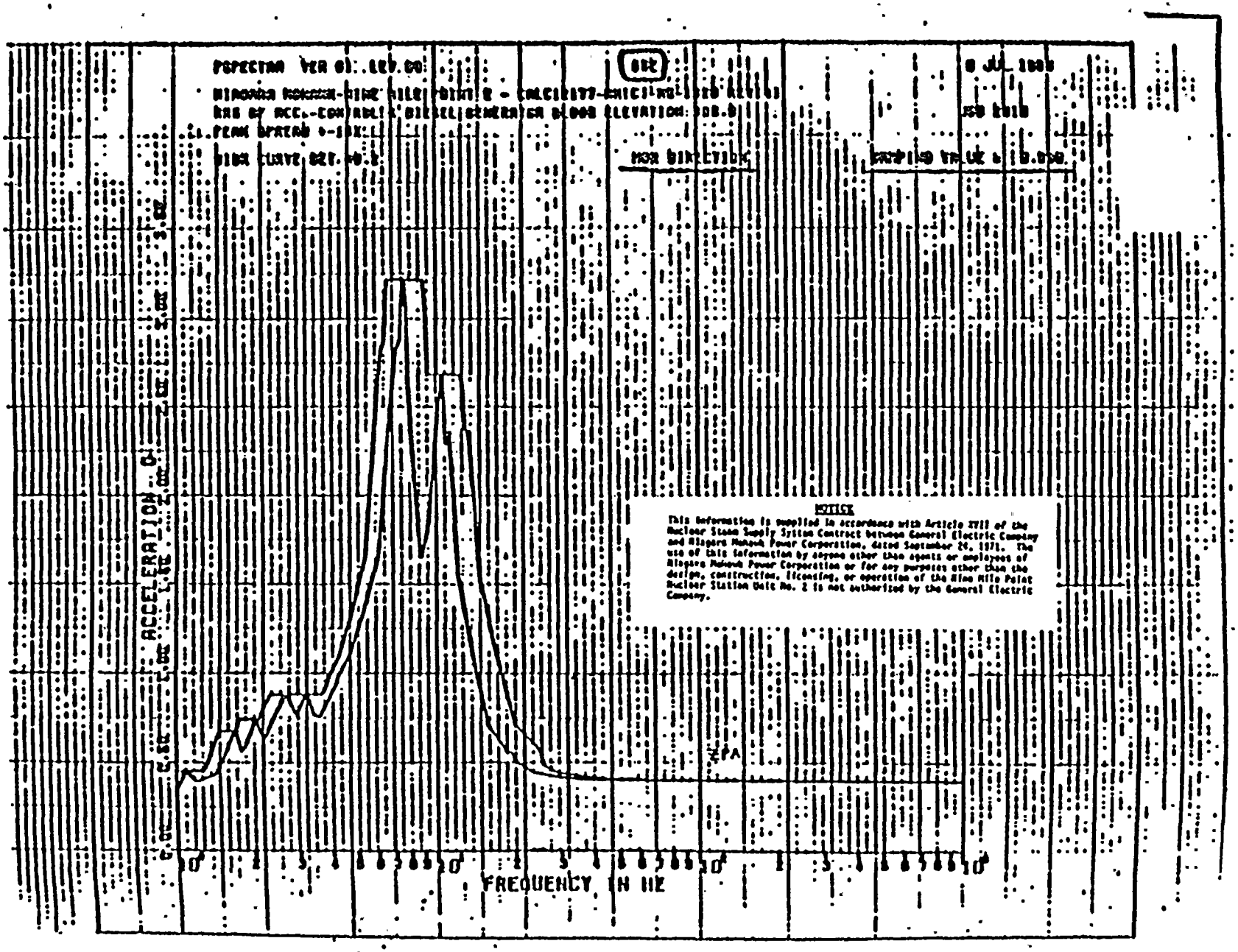


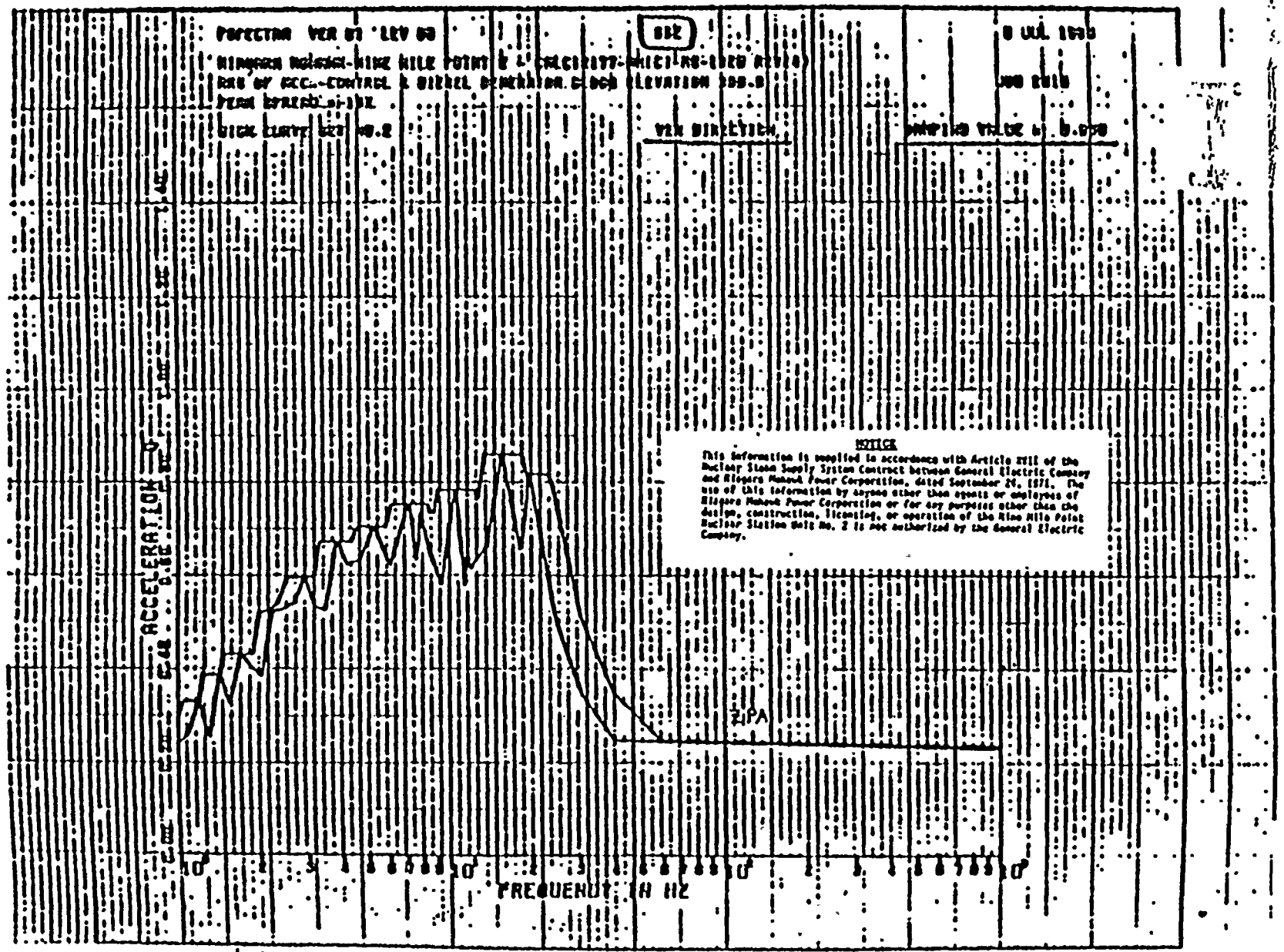
REVISIONS					PRINTS TO
9	NJ55462 10-23-91 H	6	NJ42481 3-23-93	2	NJ29559 5-13-92
		7	NJ52863	3	NJ35679
		8	NJ55914 5/18/94	4	NJ37882

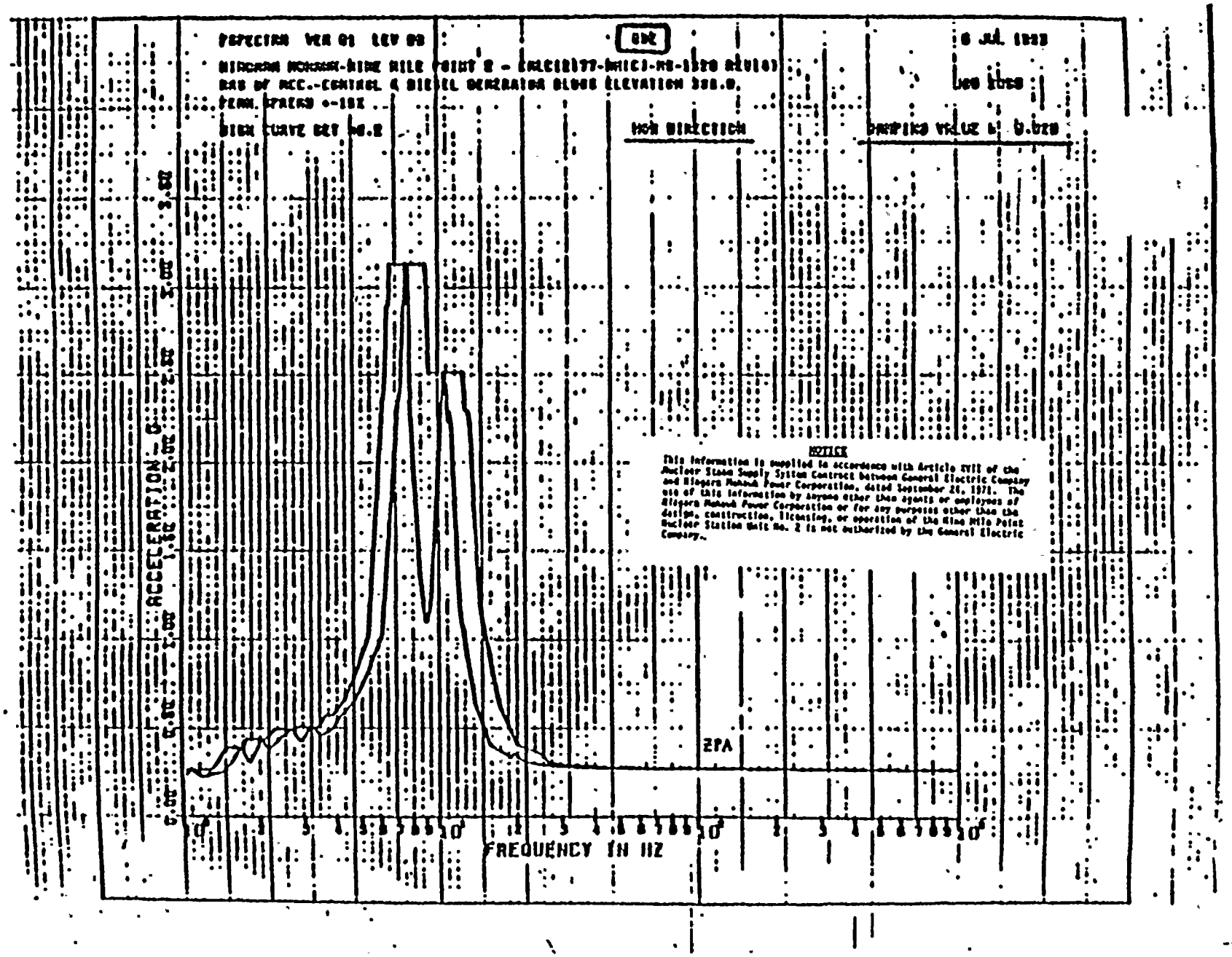
D HOKOLSKY 02.22.79 NEBO SAN JOSE 169C9489

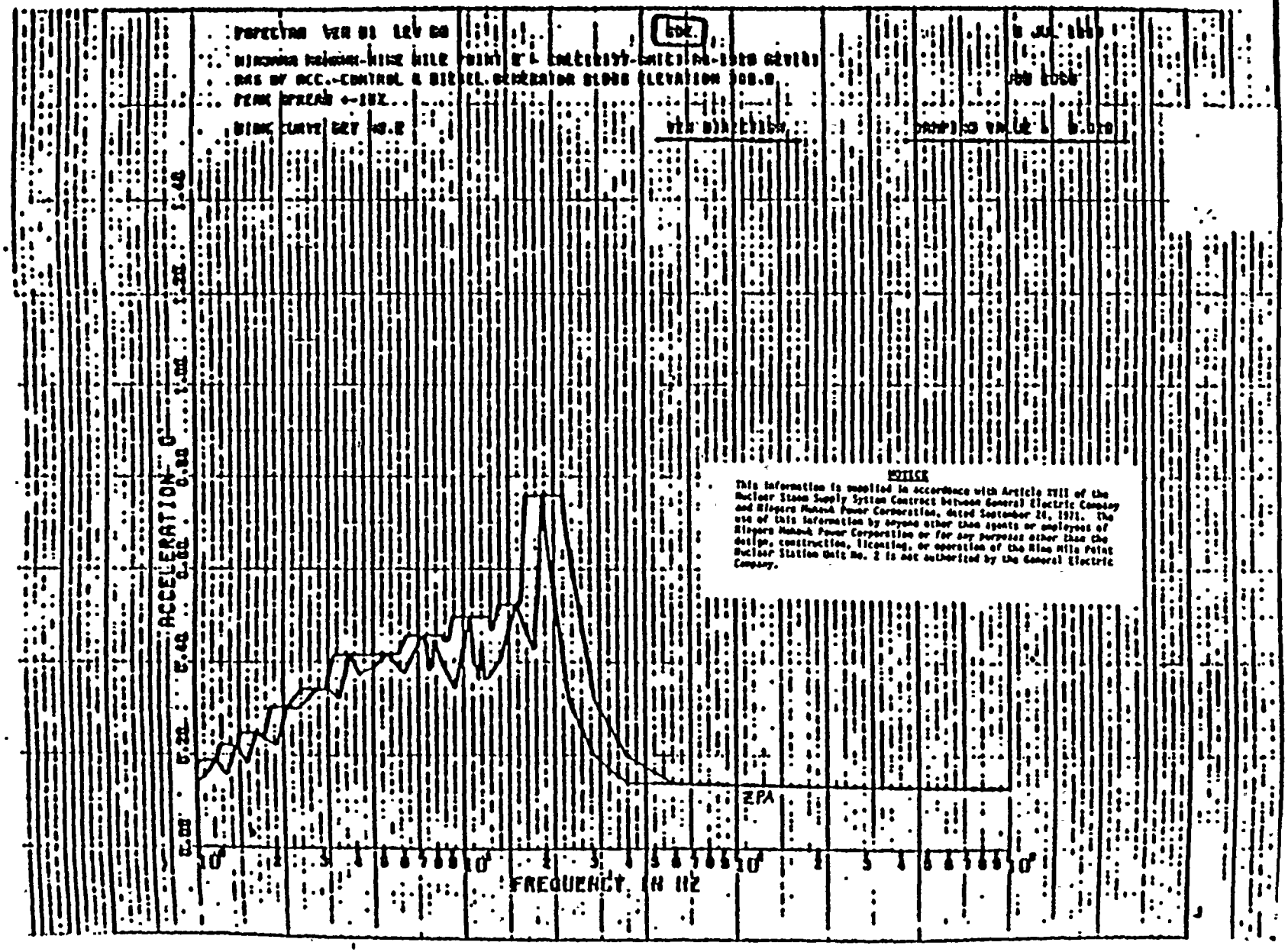
ATTACHMENT 2

REQUIRED RESPONSE SPECTRA


ACCELERATION - G
FREQUENCY IN HZ
NOTICE
This information is supplied in accordance with Article XVIII of the Nuclear Steam Supply System Contract between General Electric Company and Allegheny Ludlum Power Corporation, dated September 26, 1971. The use of this information by anyone other than agents or employees of Allegheny Ludlum Power Corporation or for any purposes other than the design, construction, licensing, or operation of the Nine Mile Point Nuclear Station Unit No. 2 is not authorized by the General Electric Company.


ACCELERATION
FREQUENCY IN HZ
NOTICE
This information is supplied in accordance with Article XIII of the Nuclear Steam Supply System Contract between General Electric Company and Niagara Mohawk Power Corporation, dated September 29, 1971. The use of this information by anyone other than agents or employees of Niagara Mohawk Power Corporation or for any purposes other than the design, construction, licensing, or operation of the Nine Mile Point Nuclear Station Unit No. 2 is not authorized by the General Electric Company.


ACCELERATION - G
FREQUENCY IN HZ
ZPA
NOTICE
This information is supplied in accordance with Article XVII of the Nuclear Steam Supply System Contract between General Electric Company and Niagara Mohawk Power Corporation, dated September 21, 1971. The use of this information by anyone other than agents or employees of Niagara Mohawk Power Corporation or for any purposes other than the design, construction, licensing, or operation of the Nine Mile Point Nuclear Station Unit No. 2 is not authorized by the General Electric Company.


ACCELERATION G
FREQUENCY, IN HZ
ZPA
NOTICE
This information is supplied in accordance with Article VIII of the Nuclear Steam Supply System Contract between General Electric Company and Rlegers Mohawk Power Corporation, dated September 24, 1971. The use of this information by anyone other than agents or employees of Rlegers Mohawk Power Corporation or for any purposes other than the design, construction, licensing, or operation of the Rlue Hills Point Nuclear Station Unit No. 2 is not authorized by the General Electric Company.

ATTACHMENT 3

TEST RESPONSE SPECTRA

AGASTAT RELAY (169C9488)
(169C9489)

A7
A8

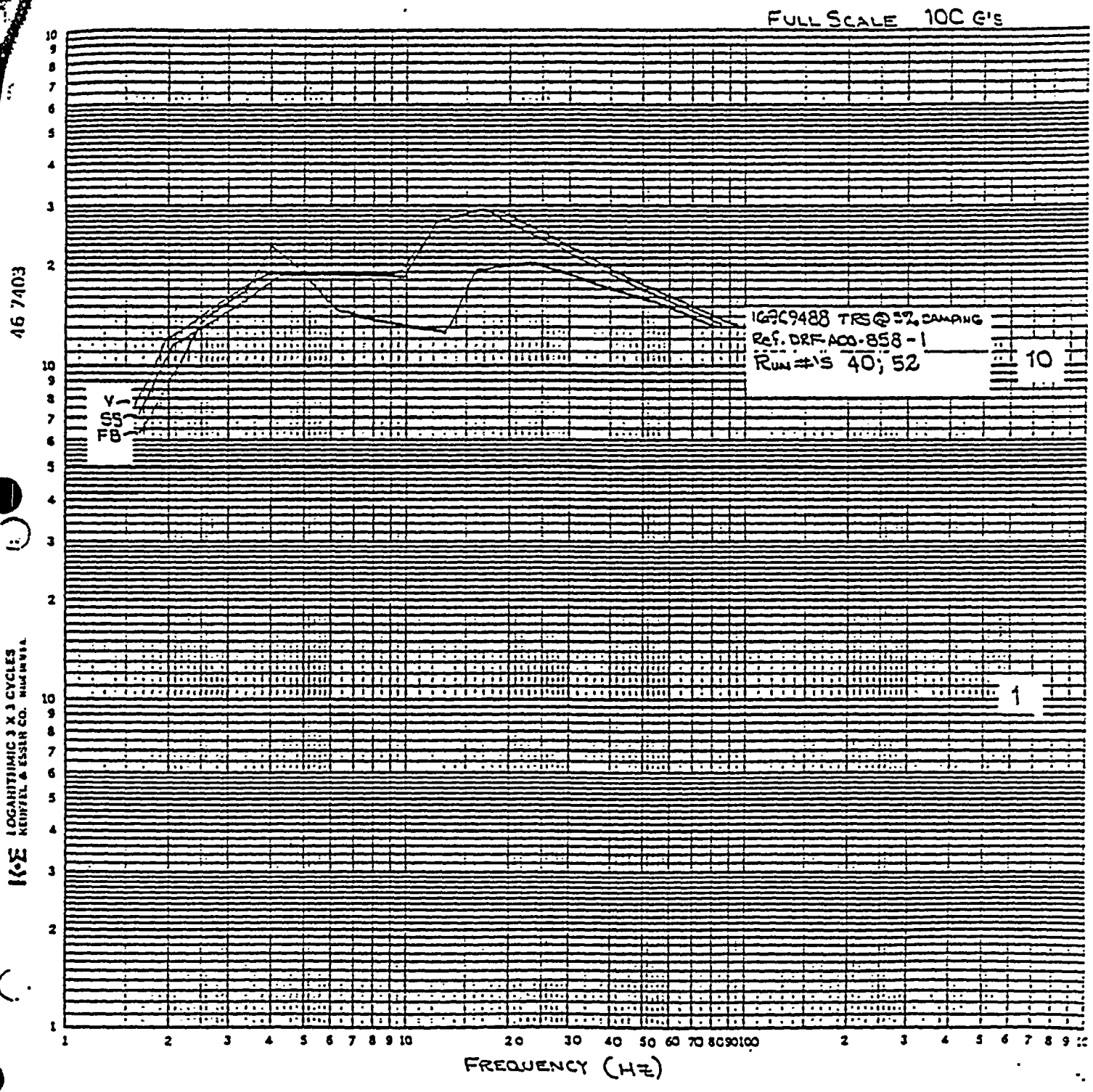


FIGURE 2-6

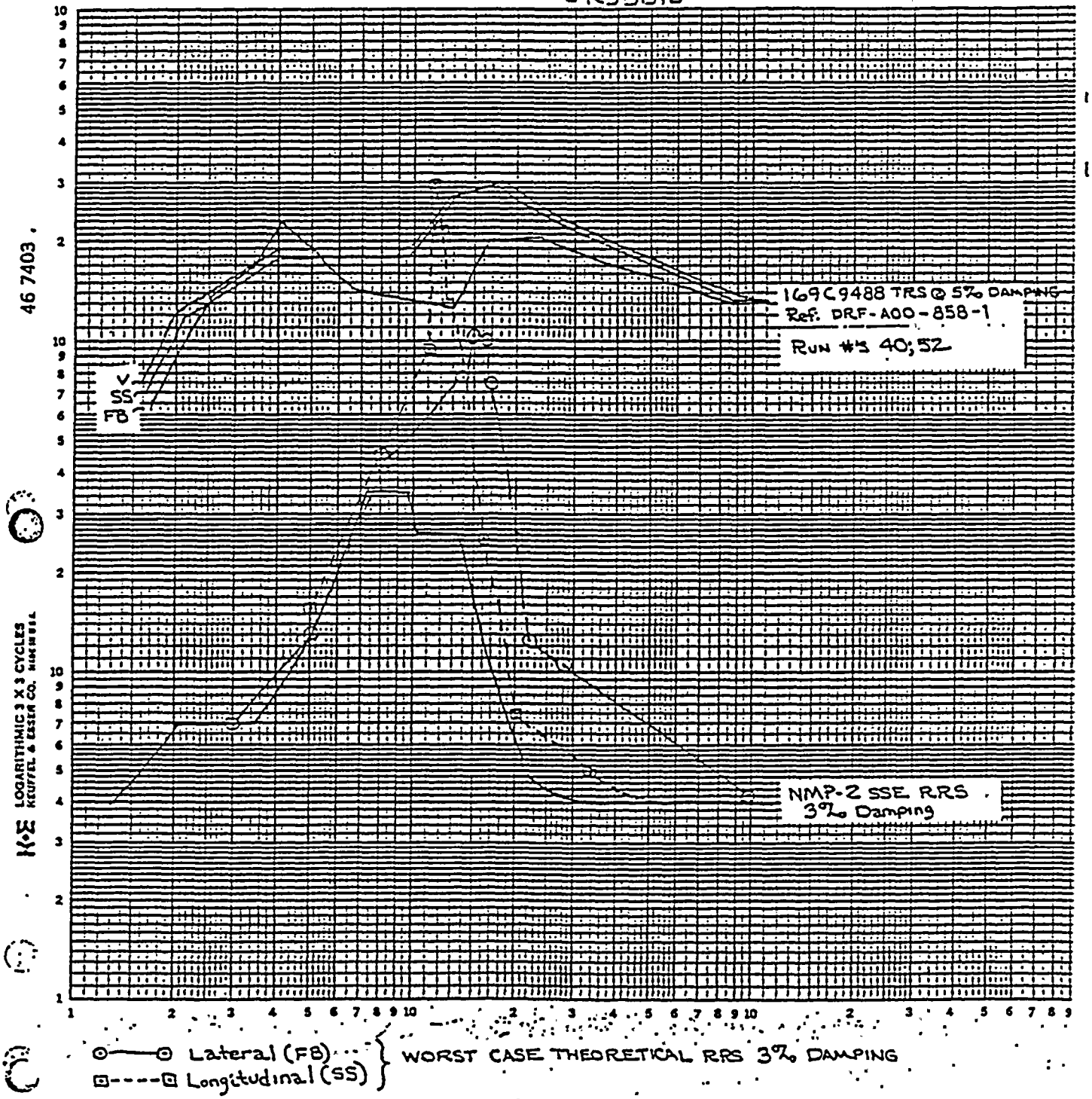
ATTACHMENT 4

TRS/RRS COMPARISON

NINE MILE POINT - 2

H13-P609/P611 NEDC-30559

AGASTAT RELAY MPL NOS. C72 - K53
- K52
- K54
- K58
- K55A,C
- K55B,D



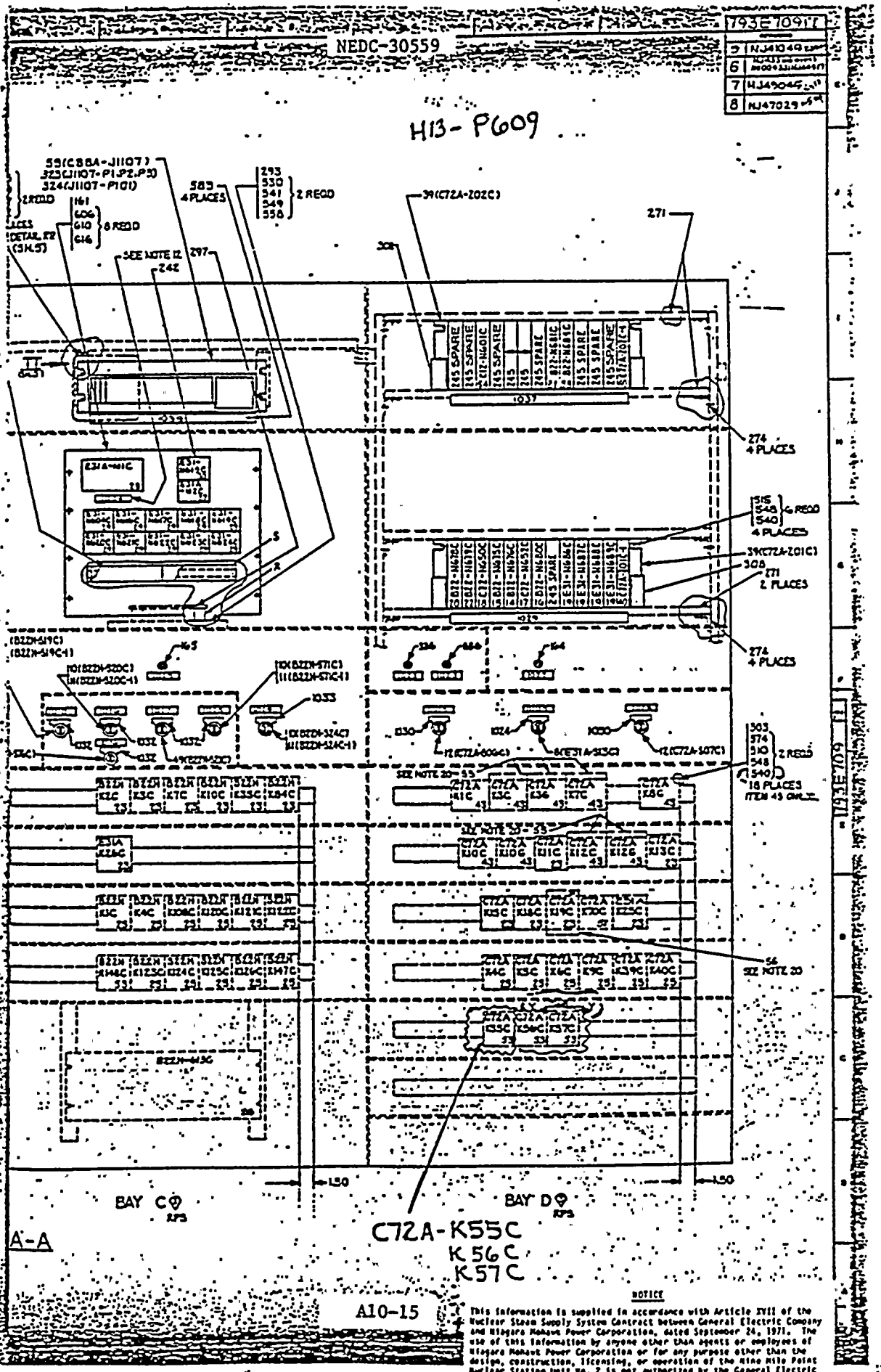
Device MPL No. C72-K53 C72-K56A-D
-K52 -K57A-D
-K54
-K58
-K55A,C
-K55B,D

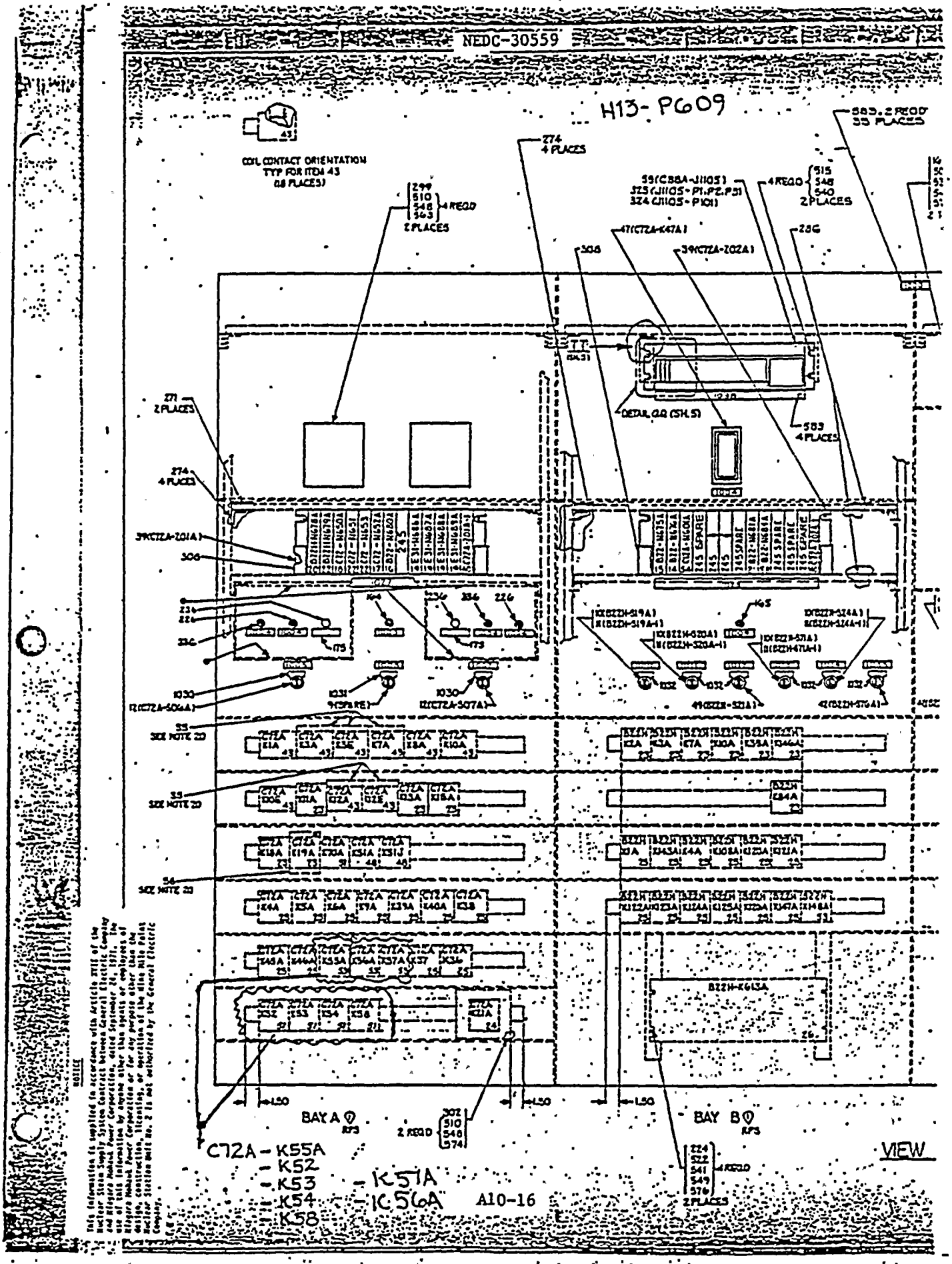
Panel MPL Nos. H13-P609/P611
Similar panel: Limerick H12-P661
DRF #: A00-1138 Tab H

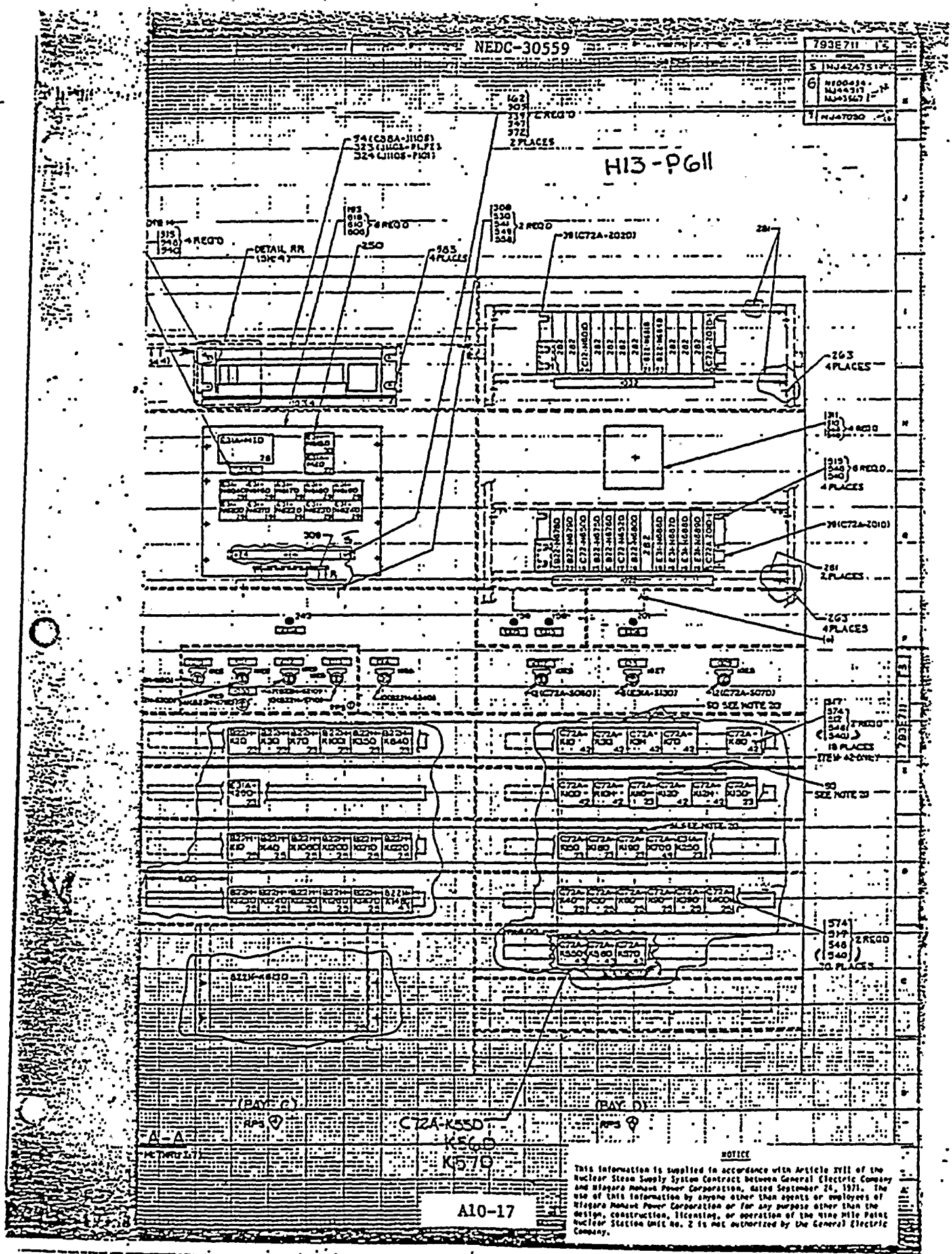
These devices are qualified based on their panel mounted locations (see attached figures). The attached plot contains theoretical RRS for the worst case mounting locations, the subject devices will not see nearly these levels based on their proximity to the floor.

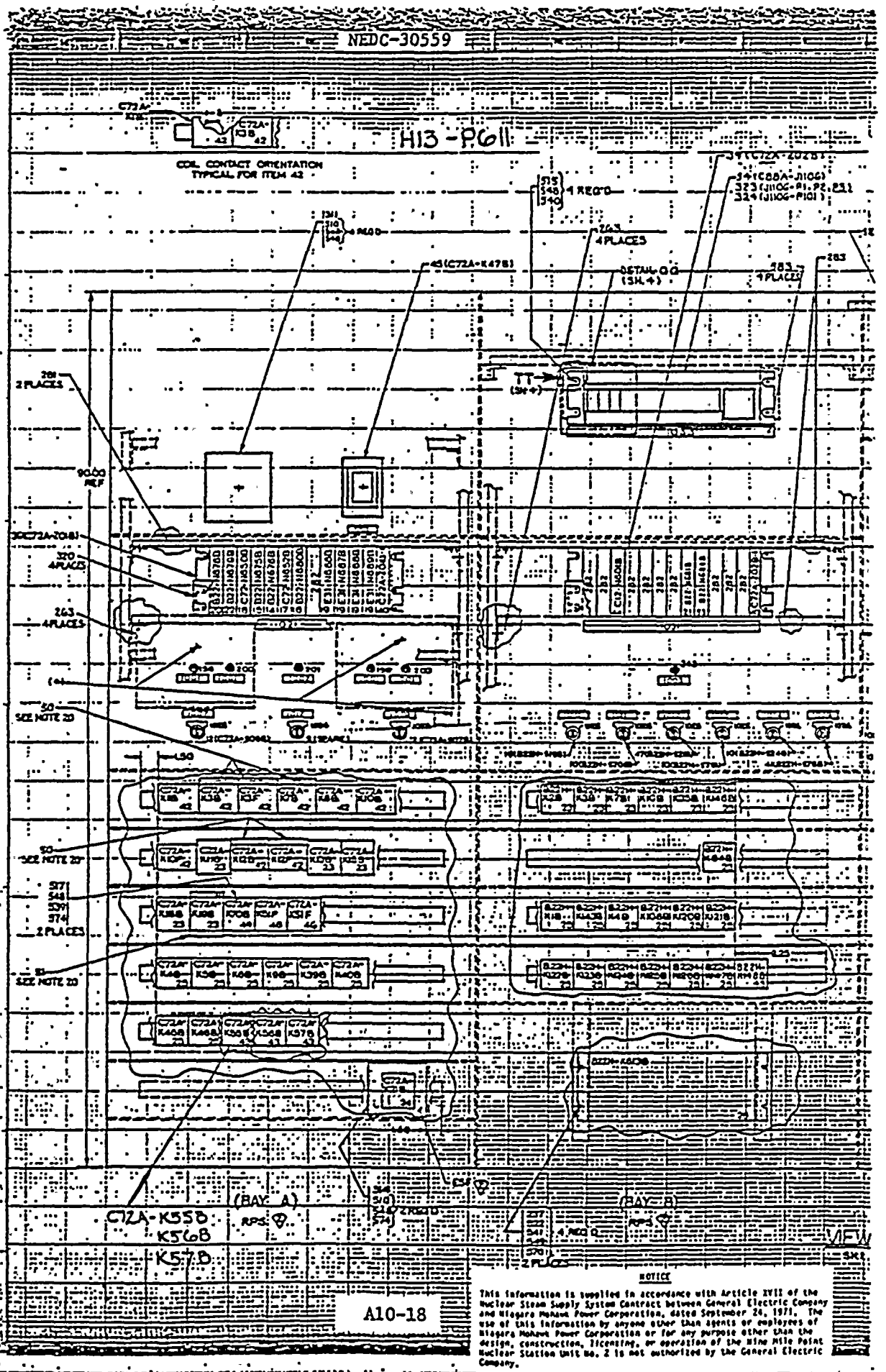
Limerick panel transmissibility H12-P661
(from DRF-A00-1138 Tab H) 4 bay 96"

FREQ (Hz)	F-B (LATERAL)	FREQ (HZ)	S-S (LONG.)
3	1.0	5	1.2
5	1.0	8	1.3
8	1.2	11	3.65
14	3.7	11.5	11.25
15	7.5	12	8.33
16	8.6	12.5	4.8
17	7.5	16	2.13
20	4.0	20	1.25
22	2.5	24	1.25
29	1.1	28	2.5
33	1.0	32	1.22




H13-P609
COIL CONTACT ORIENTATION
TYP FOR ITEM 43
(8 PLACES)
274
4 PLACES
583.2 REQD
35 PLACES
4 REQD
2 PLACES
271
2 PLACES
503
4 PLACES
DETAIL GB (SH. 5)
BAY A
BAY B
VIEW
C72A-K55A
-K52
-K53
-K54
-K58
-K51A
-K56A
A10-16





MPL: E12-B001

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point, Unit 2 Type:

1. Utility: Niagara Mohawk Power Corp. PWR ____
2. NSSS: General Electric Company BWR 5 Mark II
3. A/E: Stone & Webster Engineering Corp. Other N/A

II. Component Name RHR Heat Exchanger

1. Scope: [XX] NSSS [ ] BOP [ ] Other
2. Model Number: Type CEU Quantity: 2
3. Size or Range: 48-189
4. Vendor: Atlas Industrial Manufacturing Co., Clifton, NJ
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: Shell & Tube Vertical Heat Exchanger
   b. Dimensions: 290.70" OAL x 49.75" OD
   c. Weight: 58,000 lbs. (flooded)
7. Location: Building: Reactor Auxiliary Bay (North & South)
   Elevation: 175'-0" to 207'-9.5"
8. Field Mounting Conditions [X] Bolt (No. 8, Size 3.0")
   [ ] Weld (Length ____)
   [ ] ____
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   Suspended
10. a. System in which located: Residual Heat Removal System
    b. Functional Description: RHR heat exchanger is used for cooling the reactor during shutdown, for suppression pool cooling, and for condensin reactor steam on hot standb
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [X] Both [ ] Neither [ ] Other ____

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9/23/82

MPL E12-B001

11. Pertinent Reference Design Specification for Qualification Requirements: DRF E12-00022-2

a. [X] Seismic Input
b. [X] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

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

Qualification Report*: Nine Mile Point, Unit 2, RHR Heat Exchanger New Loads and Modified Support Structure Analysis Report

(No., Title and Date): DRF E12-00022-2

Company that Prepared Report: General Electric Company

Company that Reviewed Report: General Electric Company

Where Report is filed or available: General Electric Company

Applicable Codes and/or Standards: ASME Section III Class 2 & 3

V. Vibration Input:

1. Loads considered:
   a. [X] Seismic only } combined
   b. [X] Hydrodynamic only } combined
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)

2. Method of Combining RRS:

   [X] Absolute Sum [ ] SRSS [ ] _____ (other, specify)

3. Required Response Spectra** (attach the graphs): Graphs attached for SSE, SRV, and LOCA.

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

RH:rm/A09104*-2

MPL: E12-B001

4. Damping Corresponding to RRS: OBE 1% SSE 2%

5. Required Acceleration in Each Direction:

[ ] ZPA [X] Other * _____ (specify)

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

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

* Since response spectrum analysis was performed, no one particular acceleration value was used. Refer to attached curve values.

6. Were fatigue effects considered:

[ ] Yes [X] No

If yes, describe how they were treated in overall qualification program: _____

_____

_____

VI. If Qualification by Test, then Complete: N/A

1. [ ] Single Frequency [ ] Multi-Frequency [ ] random
[ ] sine beat
[ ] _____

2. [ ] Single Axis [ ] Multi-Axis
[ ] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:

OBE _____ SSE _____ Other _____ (specify)

4. Frequency Range: _____

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

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

6. Method of Determining Natural Frequencies:

[ ] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS enveloping RRS using Multi-Frequency Test:

[ ] Yes (Attach TRS & RRS graphs)

[ ] No

MPL: E12-B001

8. Maximum Input g Level Test:
   OBE S/S = _____ F/B = _____ V = _____
   SSE S/S = _____ F/B = _____ V = _____

9. Laboratory Mounting:
   A. [ ] Bolt (No. ___, Size ___)
   [ ] Weld (Length ___) [ ] _____
   B. Orientation and Fixturing: _____

10. Functional operability verified:
    [ ] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:

    _____

    _____

12. Other tests performed (such as aging or fragility test, including results):

    _____

    _____

13. Failure Modes (If appropriate) _____

14. Margins Available: [ ] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, then complete:

1. Method of Analysis:
   [X] Static Analysis [ ] Equivalent Static Analysis
   [X] Dynamic Analysis [ ] Time-History [X] Response Spectrum

2. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical):
   S/S = 1st Mode 17.0 Hz F/B = 2nd Mode 18.0 Hz V = 5th Mode 38.0 Hz

3. Model Type: [X] 3D [ ] 2D [ ] 1D
   [X] Finite Element [ ] Beam
   [ ] Closed Form Solution [ ] Other _____

MPL: E12-B001

4. [X] Computer Codes: SAP4G07, BILRD01, BSTIF01
   Frequency Range and No. of modes 17.0 Hz to 126.9 Hz, 25 modes
   [ ] Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [ ] SRSS [X] Other: See footnote.*
   (specify)

6. Damping:
   OBE _____ SSE 2% Basis for damping used: GE internal criteria document 385HA777 Rev.

7. Support Considerations in the model: Upper support lugs connected to and lower support lugs bolted to flexible support structure.

8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable
Shell	Static & Dynamic		17,838	19,250 psi
Anchor Bolts	Static & Dynamic		6,919 (tensile)	29,000 psi (tensile)

Additional stress values are provided on attached Table 2. Of the two RHR heat exchangers in the south (RHR*E1B) and north (RHR*E1A) auxiliary bay, it has been judged that the south auxiliary bay heat exchangers will be the governing case because of its overloaded shell inlet nozzle, N3. Results presented are those computed for (RHR*E1B). These values should bound those of (RHR*E1A).

B.

Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

Since the heat exchanger is a passive component, the magnitude of displacement has a negligible effect on functionality.

9. Failure Modes: Structural failure

10. Margins Available: [ ] Input Spectrum
    [X] Stress or Deflection

* Response to input from three orthogonal directions combined SRSS and responses due to individual closely spaced modes in accordance with Reg. Guide 1.92.

RH:rm/A09104*-5
9/23/82

RHR HEAT EXCHANGER

INVESTIGATED LOCATIONS

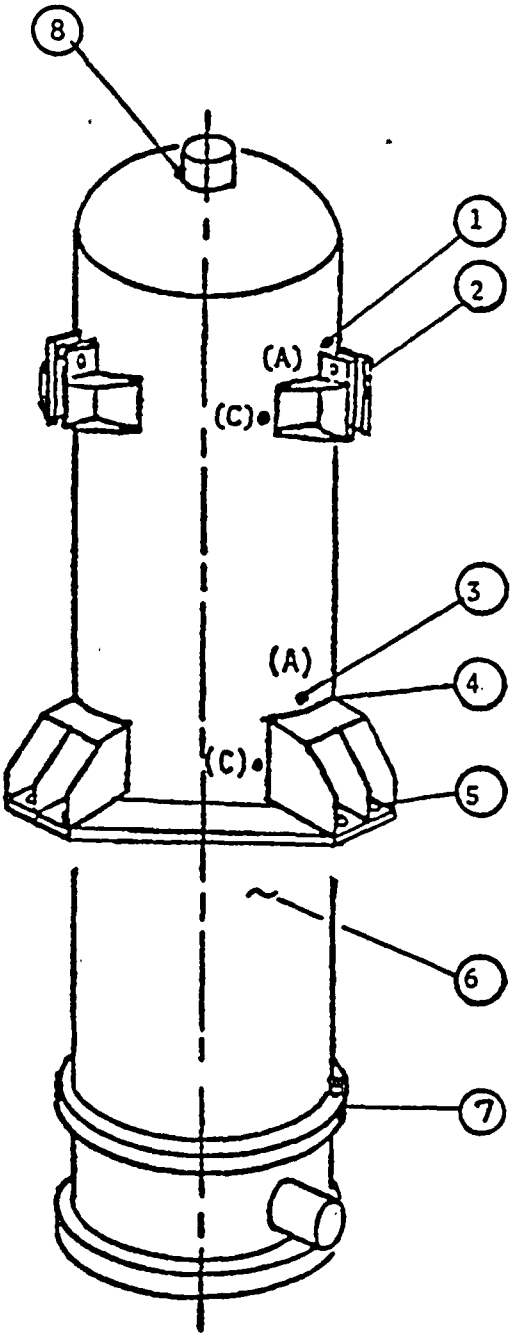


FIGURE 2

Investigated Locations

1. Upper support to shell (A) and (C)
   - Bijlaard stresses due to support load
   - Pressure and remote nozzle membrane stress
   - Dynamic membrane stress
2. Upper support
   - Bracket and attachment weld stress
3. Lower support to shell (A) and (C)
   - Bijlaard stresses due to support load
   - Pressure and remote nozzle membrane stress
   - Dynamic membrane stress
4. Lower support
   - Bracket and attachment weld
5. Lower support anchor bolts
   - Reaction load tension and shear stress
6. Shell
   - Pressure and remote nozzle membrane stress
   - Dynamic membrane stress
7. Tubesheet flange and bolts
   - Design pressure stress
   - Mechanical load equivalent pressure stress
8. Shell inlet nozzle N3 to elliptical head
   - Bijlaard stress due to AE supplied nozzle loads
   - Pressure membrane stress

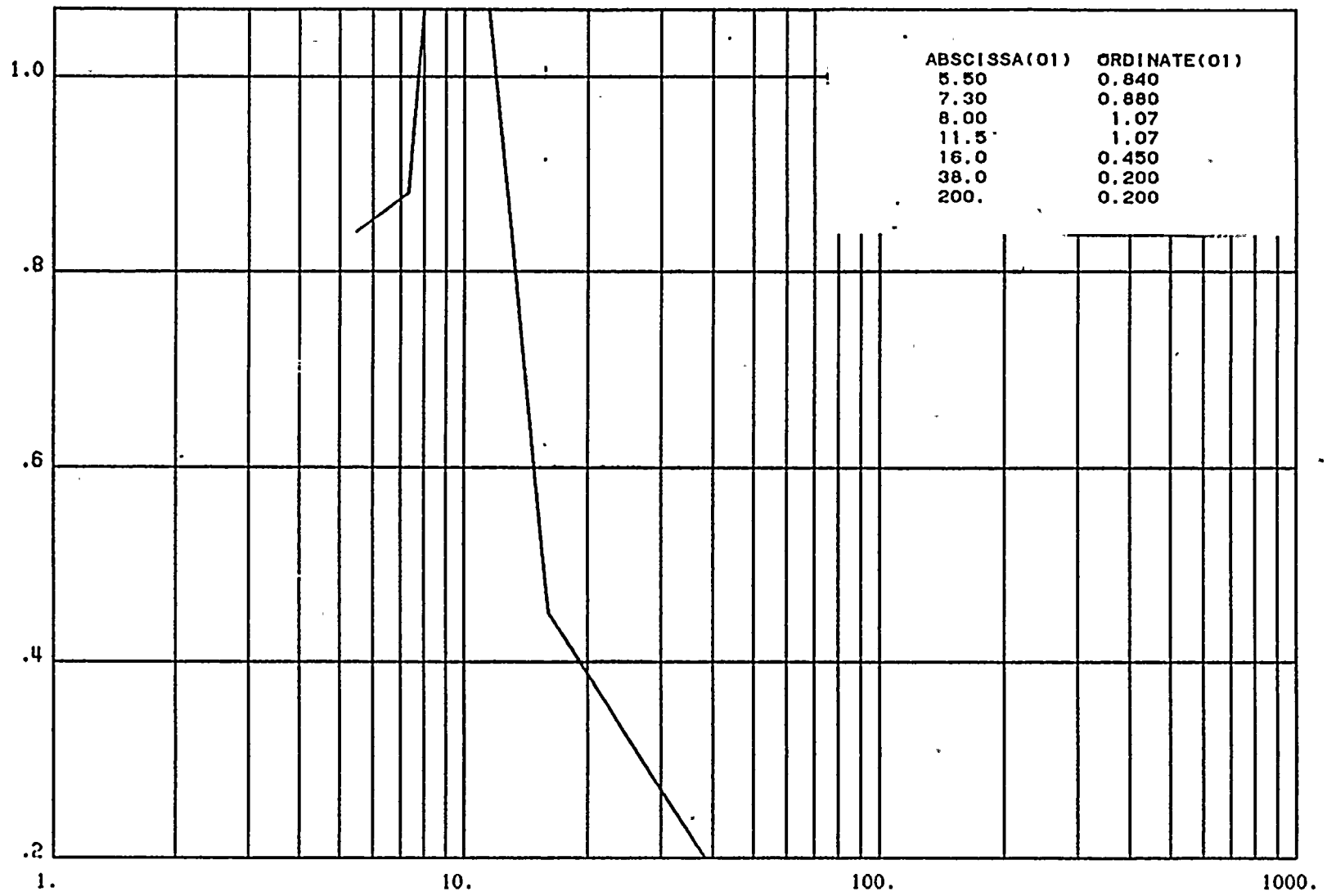
TABLE 2

STRESS ANALYSIS RESULTS
RHR HEAT EXCHANGER

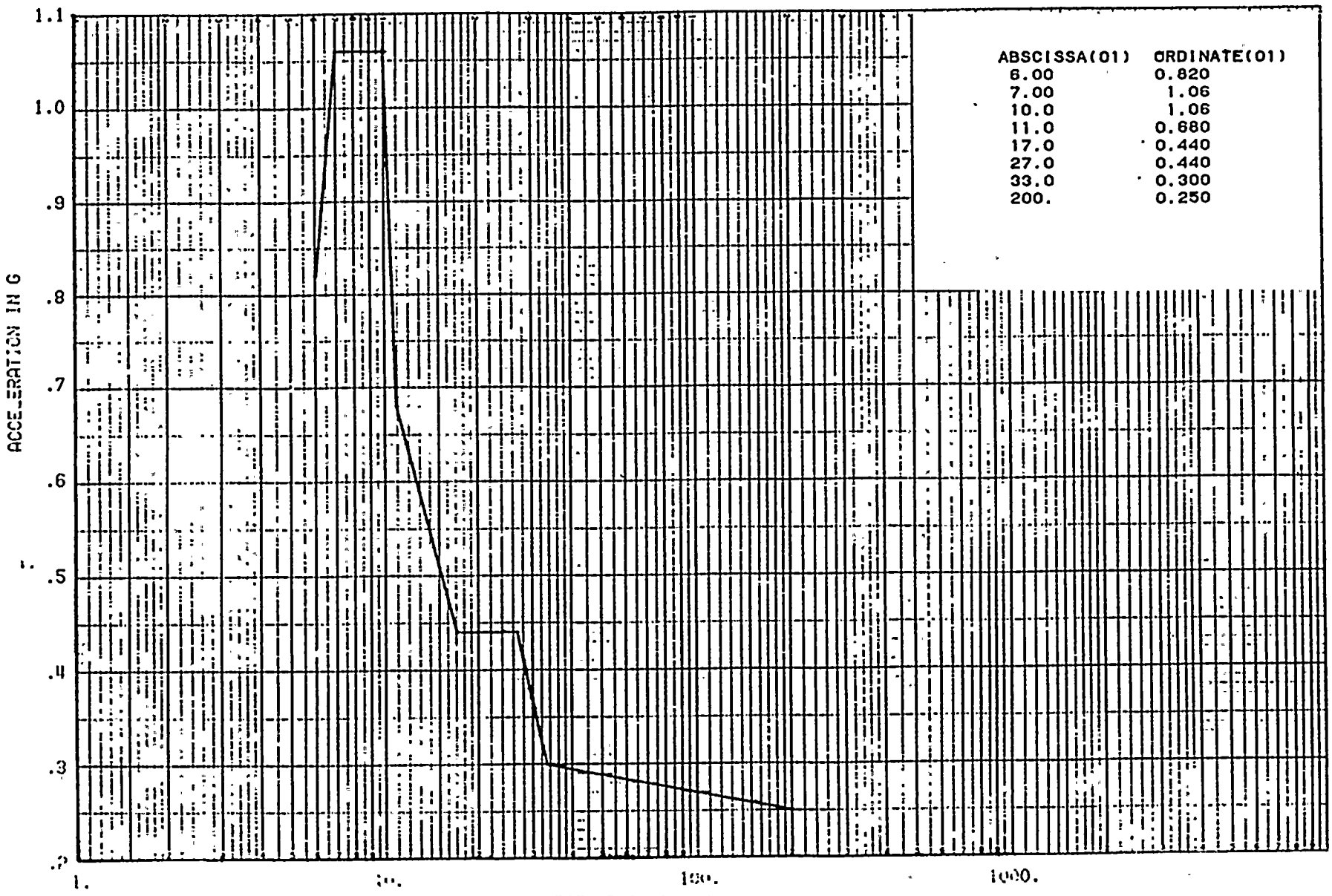
Load Combination: Faulted (See Note 3)
Acceptance Criteria: Upset Allowable Stress (See Note 3)
Refer to Figure 2 for designation of investigated locations.

	Total Static and Dynamic Calculated Stress	Upset Allowable Stress (PSI)
1. Upper support to shell:		(1.65)S
- Location "A" principal stress	18,864	28,875
- Location "C" principal stress	18,697	28,875
2. Upper support bracket and attachment weld		Tension=1/2(1.65)S
- Principal stress	2,299	14,438
3. Lower support to shell:		(1.65)S
- Location "A" principal stress	23,097	28,875
- Location "C" principal stress	20,874	28,875
4. Lower support bracket and attachment weld		(1.65)(.5)S
- Principal stress	4,888	14,438
5. Lower support anchor bolts		Tension=.5(Su) Shear=.62(Su)(.33)
- Tension stress	6,919	29,000
- Shear stress	3,771	11,990
6. Shell		(1.10)S
- Principal Stress	17,838	19,250
7. Tubesheet Flange and Bolts		1.5 (26,250)
- Flange hub stress	37,714	39,375
- Flange bolt stress	22,009	25,000
8. Inlet shell nozzle (N3) to elliptical head		(1.65)S
- Principal stress	17,490	28,875

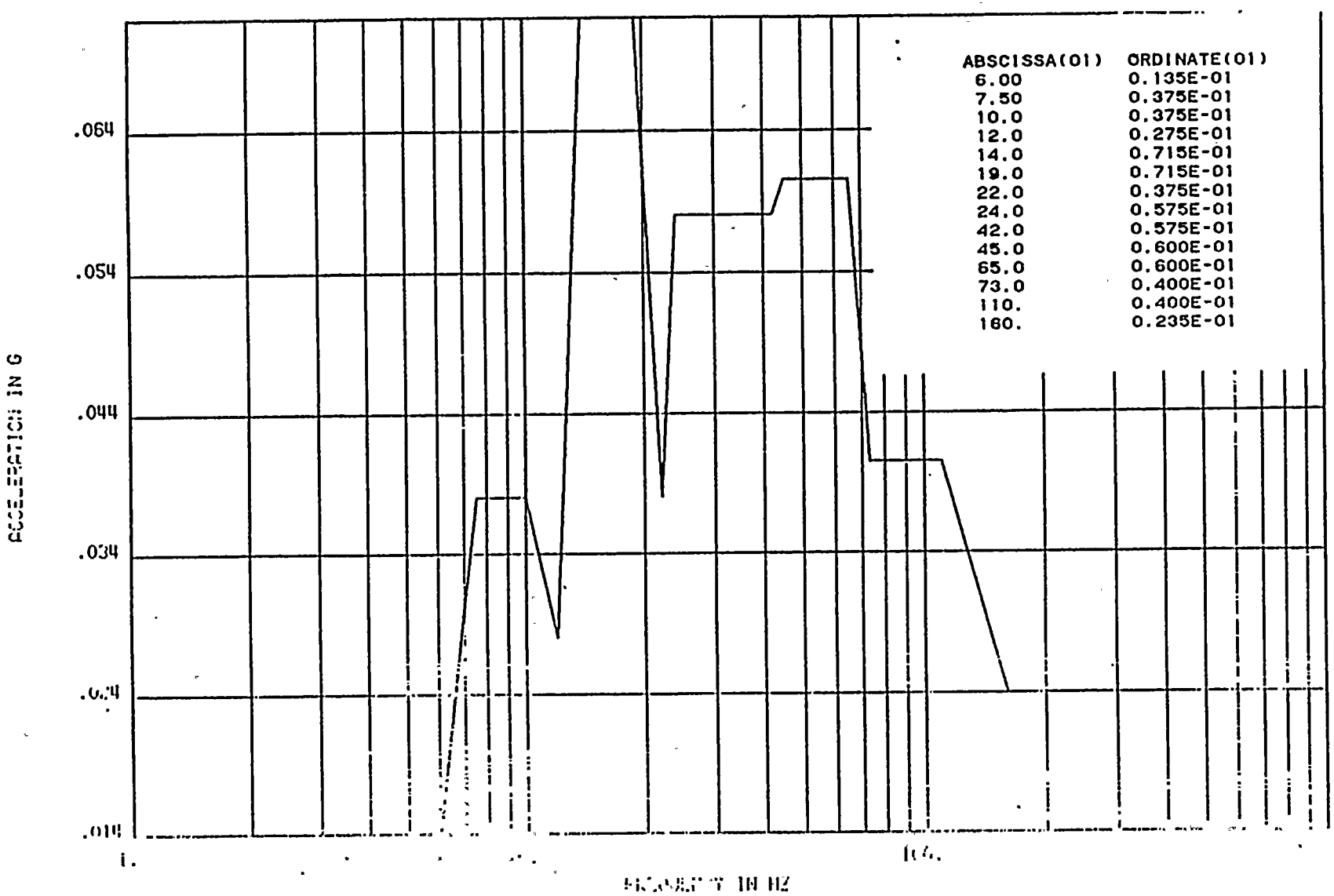
NOTES:
1. "Stress" in this table implies maximum primary membrane principal stress.
2. Lower support anchor bolt values are from "highest" stressed bolt.
3. Stresses resulting from faulted load case combination are compared with upset allowables eliminating need to investigate upset, emergency and faulted conditions separately. Nozzle loads on N3 used maximum of AE supplied loads (i.e., maximum combinations of normal, upset, emergency, and faulted load conditions).

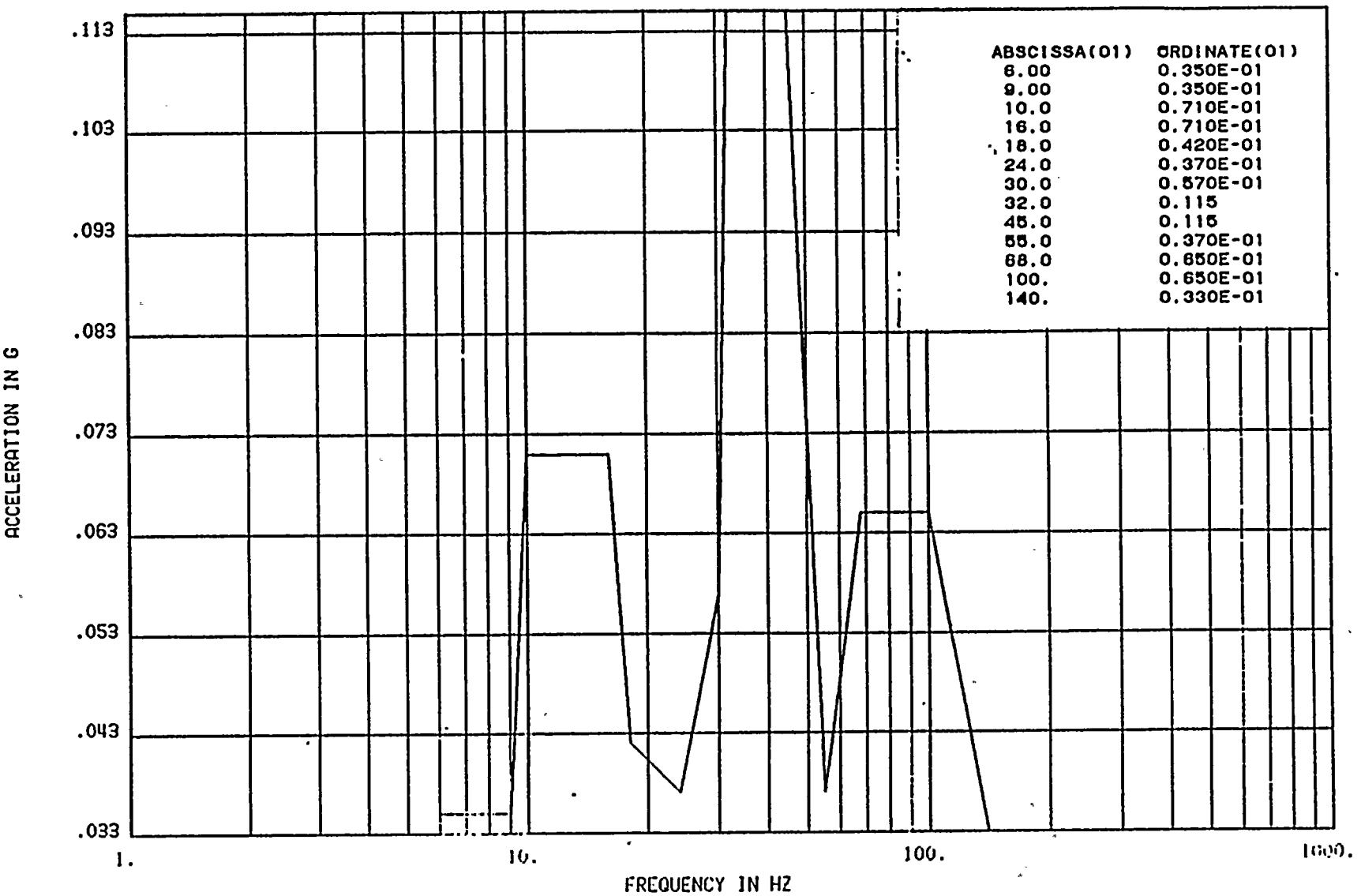


SSE HORIZONTAL RESPONSE SPECTRUM (2% DAMPING), NMP 2 RHR HEAT EXCHANGER

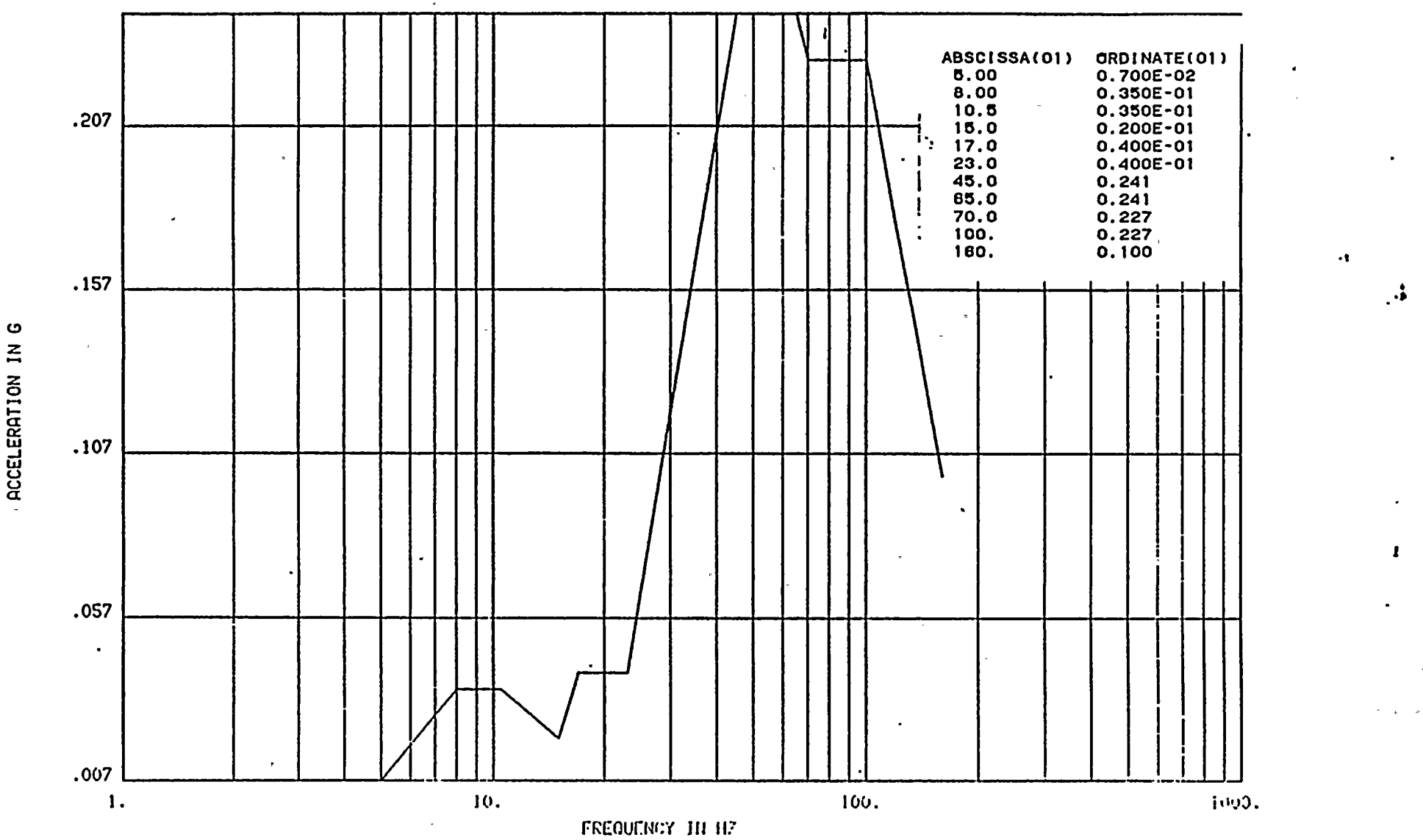


OBE VERTICAL RESPONSE SPECTRUM (2% DAMPING), REF 2 RHR HEAT EXCHANGER

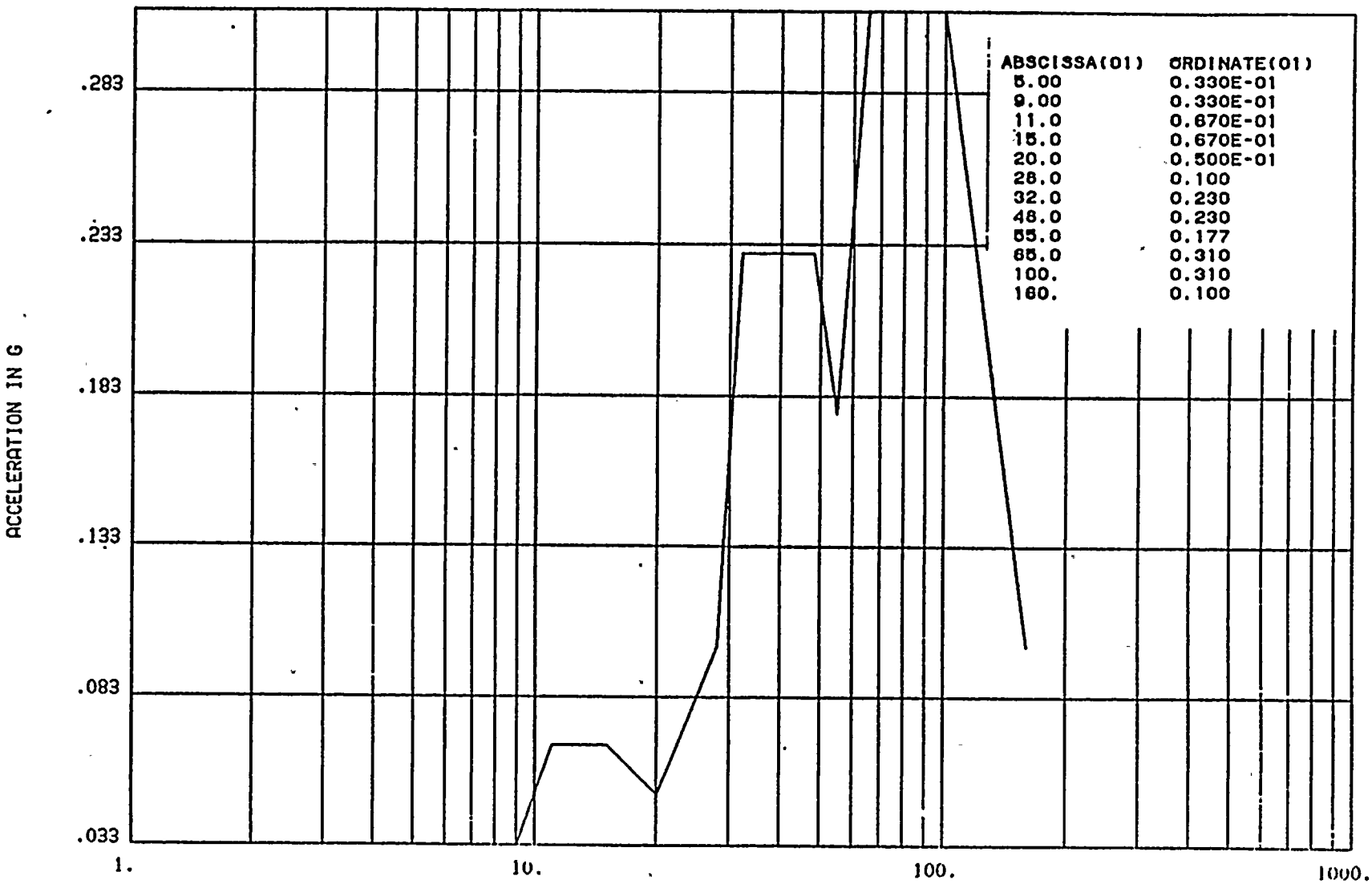

ABSCISSA(01) ORDINATE(01)
6.00 0.135E-01
7.50 0.375E-01
10.0 0.375E-01
12.0 0.275E-01
14.0 0.715E-01
19.0 0.715E-01
22.0 0.375E-01
24.0 0.575E-01
42.0 0.575E-01
45.0 0.600E-01
65.0 0.600E-01
73.0 0.400E-01
110. 0.400E-01
160. 0.235E-01
.064
.054
.044
.034
.024
.014
ACCELERATION IN G



SRV VERTICAL RESPONSE SPECTRUM (2% DAMPING), NMP 2 RHR HEAT EXCHANGER



LOCA HORIZONTAL RESPONSE SPECTRUM (2% DAMPING), NMP 2 RHR HEAT EXCHANGER



LOCA VERTICAL RESPONSE SPECTRUM (2% DAMPING), NMP 2 RHR HEAT EXCHANGER

MPL: E12-N006

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point, Unit 2 Type:

1. Utility: Niagara Mohawk Power Corp. PWR ____
2. NSSS: General Electric Company BWR 5 /Mark II
3. A/E: Stone and Webster Other ____

II. Component Name Flow Orifice Assembly

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: PNFOC-103-4 Quantity: 2
3. Size or Range: 18" RF-WN 300 # (Flanges)
4. Vendor: Peerless Nuclear Corp.
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: Flanged Orifice for an 18 inch, schedule Std pipe.
   b. Dimensions: Flanged OD = 28 inches. Flange thk. = Not Avail (~ 2 1/4")
   c. Weight: Not Avail. Length along pipe = 6 1/4 inches per flange.
7. Location: Building: Containment
   Elevation: 188' & 233'
8. Field Mounting Conditions [X] Bolt (No. 24 , Size: Bolt 1 1/4 inches, Hole 1 3/8 in.)
   [ ] Weld (Length ____)
   [ ] ____
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   The flanges are welded to the pipe, then bolted together with the orifice plate between them.
10. a. System in which located: Residual Heat Removal
    b. Functional Description: Fluid ΔP flow measuring device
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [ ] Both [X] Neither [ ] Other ____

MPL E12-N006

11. Pertinent Reference Design Specification for Qualification Requirements: 21A9505, Rev. 5, and 21A9505CZ, Rev. 0
731E966C, Rev 6

a. [ ] Seismic Input
b. [X] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [X] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or limited availability (by unbolting and then replacing gaskets upon reassembly).

IV. Equipment Qualification Method:

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

Qualification Report*: See attachment hereto.
(No., Title and Date): 9-Mi-2-E12-N006-1, 9/15/83
Company that Prepared Report: General Electric
Company that Reviewed Report: General Electric
Where Report is filed or available: General Electric
Applicable Codes and/or Standards: ANSI B16.5

V. Vibration Input:

1. Loads considered:
   a. [ ] Seismic only
   b. [X] Hydrodynamic only▲
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)

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

3. Required Response Spectra** (attach the graphs): N/A

▲ Due to the light weight of the orifice, inertial loads from seismic and other vibration forces acting on the orifice plate are insignificant when compared with the differential pressure at maximum steady state flow, which the orifice plate is designed to withstand.

* If more than one report complete Items IV thru VII for each report. (N/A).

** If other than RRS is used, describe methods. (see attached calculation).

RH:rm/A09104*-2

MPL: E12-N006

4. Damping Corresponding to RRS: OBE N/A SSE N/A

5. Required Acceleration in Each Direction:

[ ] ZPA [ ] Other N/A (specify)

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

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

6. Were fatigue effects considered:

[ ] Yes [X] No (not ASME Class I)

If yes, describe how they were treated in overall qualification program: _____

_____

_____

VI. If Qualification by Test, then Complete: (N/A)

1. [ ] Single Frequency [ ] Multi-Frequency [ ]random
[ ] sine beat
[ ] _____

2. [ ] Single Axis [ ] Multi-Axis
[ ] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:

OBE _____ SSE _____ Other _____ (specify)

4. Frequency Range: _____

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

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

6. Method of Determining Natural Frequencies:

[ ] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS enveloping RRS using Multi-Frequency Test:

[ ] Yes (Attach TRS & RRS graphs)

[ ] No

MPL: E12-N006

8. Maximum Input g Level Test:
   OBE S/S = _____ F/B = _____ V = _____
   SSE S/S = _____ F/B = _____ V = _____

9. Laboratory Mounting:
   A. [ ] Bolt (No. ___, Size ____)
      [ ] Weld (Length ____) [ ] _____
   B. Orientation and Fixturing: _____

10. Functional operability verified:
    [ ] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:
    _____
    _____

12. Other tests performed (such as aging or fragility test, including results):
    _____
    _____

13. Failure Modes (If appropriate) _____

14. Margins Available: [ ] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, then complete: (Section VII not applicable, see note at end of this section)

1. Method of Analysis:
   [ ] Static Analysis [ ] Equivalent Static Analysis
   [ ] 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: [ ] 3D [ ] 2D [ ] 1D
   [ ] Finite Element [ ] Beam
   [ ] Closed Form Solution [ ] Other _____

MPL: E12-N006

4. [ ] Computer Codes: _____
   Frequency Range and No. of modes _____
   [ ] Hand Calculations
5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [ ] SRSS [ ] Other: _____ (specify)
6. Damping:
   OBE _____ SSE _____ Basis for damping used: _____
7. Support Considerations in the model: _____
8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B.

Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____
10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

RH: rm/A09104*-5
9/23/82

NOTE, SECTION VII:

(1) Seismic analysis is not applicable for the orifice plate. Seismic forces are insignificant compared with forces due to differential pressure at maximum flow, which the orifice plate is designed to withstand. The "Orifice Plate Calculation", attached to this summary, assumes a gasket inside the diameter as based on typical manufacturers' standard sizing practices for spiral wound, asbestos filled gaskets. If the actual dimension (ID) of the (customer-supplied) gasket differs significantly from the assumed diameter, customer should recalculate using actual value.

(2) Associated piping is not G.E. responsibility. Customer must demonstrate that maximum expected (design) pressure plus equivalent pressure due to loads and moments (from piping system), when combined, do not exceed the maximum allowable pressure for the flanges and associated bolting.

GENERAL ELECTRIC CO.
Nuclear Energy Business Operations
ENGINEERING CALCULATION SHEET

NUMBER 9-Mi-2-E12-N006-1 DATE 9-15-83
SUBJECT ORIFICE PLATE CALCULATION BY S.Y. Koh SHEET 1 OF 5

I. ORIFICE IDENTIFICATION AND DATA SOURCES:

(A) Project: Nine Mile Pt. -2
(B) MPL No.: E12-N006
(C) System: RHR
(D) System Specification No.: 22A2817AB
(E) Vendor Drawing No.: 6059-27-5
(F) Vendor Calibration Curve: 6059-28-4
(G) Reference GE Purch. Spec. Data Sheet: 21A9505 CE

II. SYSTEM DATA:

(A) Maximum Flow Rate (per I(D) or I(G)): 8000 gpm

(B) Corresponding Differential Pressure (from I(F)):
410 in. H_2O (c/w Purch Spec (I(G)) max. of 410 "H_2O @ 68 °F.)
Δp (maximum) = 410 in. H_2O @ 68 °F. = 14.79 psig.

(C) Maximum Fluid Temperature (from I(D) or I(G)): 150 °F.*
(* This meter is on incoming line from RHR Service Water System; the value of 360°F given in I(D) does not apply.)

III. STAINLESS STEEL DATA:

(A) Poisson's Ratio: $\gamma = 0.31$ { Source: Juvinall, "Stress, Strain, and Strength", 1967 Edition, Appendix (Table) A.1

(B) Yield Strength Values, S_y, Minimums* (per ASME B&PV Code, Section III, Subsection NA, Table I-2.2):

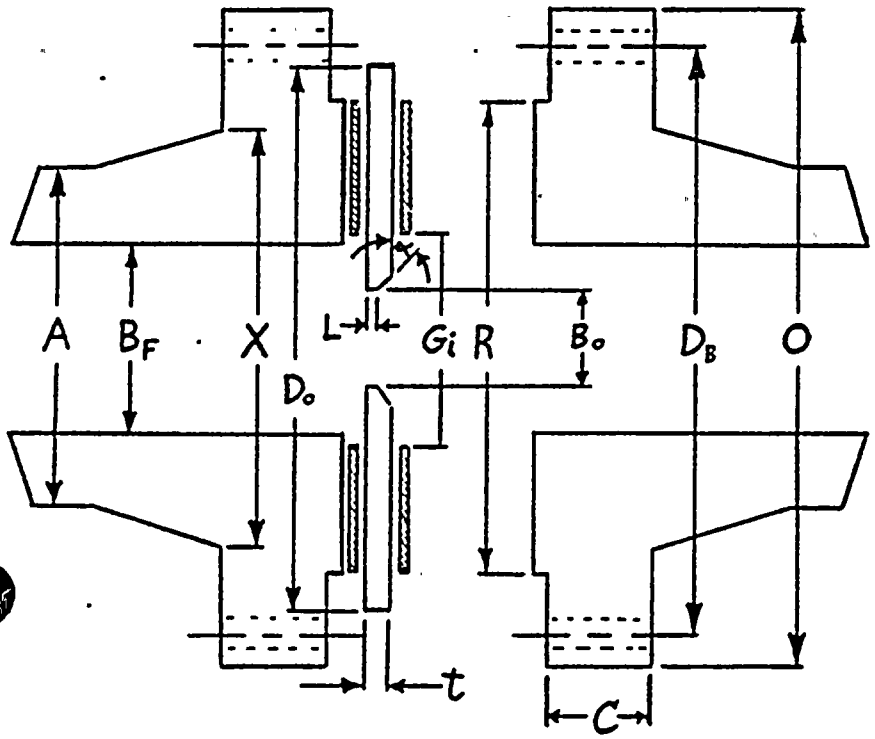
	TEMPERATURE, °F					
MATERIAL	100	200	300	400	500	600
304 ss	25.0	21.3	19.1	17.5	16.3	15.5
316 ss	25.0	21.1	18.9	17.2	15.9	15.0

(The above values are in ksi)
* Minimums, based on 304L and 316L, for conservatism.

(C) Actual Orifice Plate Material:
316 ss

S. Y. Koh

IV. FLANGE AND ORIFICE PLATE DATA (from I(E)):



A = not avail
X = not avail.
R = not avail.
D_B = not avail.
O = 28.0
C = not avail.

D_o = 23.5
L = 0.25
α = no bevel

} FLANGE and ORIFICE DATA (Provided for information; not used in pressure drop stress calculation.)

FLANGE AND ORIFICE DATA FOR CALCULATION OF STRESS DUE TO PRESSURE DROP:

t = [0.25 in.] (orifice plate thickness)

B_o = [10.412 in] (orifice hole diameter)

G_i = [17.553 in.] * (gasket inner diameter)

* Note concerning G_i --

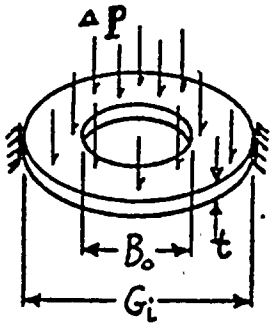
☐ Use actual data, if available.

☒ When actual data is not available, use standard sizing practice, where $G_i = B_F + 1/4$ inch (B_F = [17.303] (flange bore dia.)).

Source: Flexitallic and Lamons gasket design bulletins.

S.Y. Koh

V. CALCULATION METHOD; STRESS DUE TO BENDING:



- Edge of orifice plate fixed at (and beyond) the gasket inner diameter, G_i.
- Orifice plate free to bend at points inside the gasket inner diameter.
- Uniform load of ΔP on the area where it is free to bend.

The above conditions are satisfied by Case No. 17, Table X, of "Formulas for Stress and Strain", by Raymond J. Roark, fourth edition, ©1965; refer to P.221 of that text. The maximum stress is a radial stress which occurs at the outer edge of the plate (i.e., where it is fixed -- at the G_i diameter in this case. This stress is given by:

$$S_r = \frac{3w}{4t^2}\left[a^2 - 2b^2 + \frac{b^4(m-1) - 4b^4(m+1)\log\frac{a}{b} + a^2b^2(m+1)}{a^2(m-1) + b^2(m+1)}\right],$$

where: $a = \frac{G_i}{2} =$ 8.7765 (from IV)

$b = \frac{B_o}{2} =$ 5.2060 (from IV)

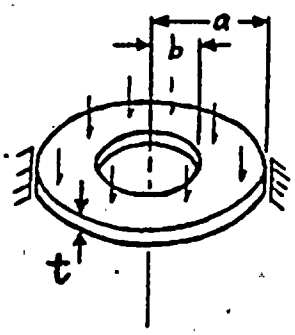
$m = \frac{1}{\nu} =$ 3.226 (from III(A))

$w = \Delta P =$ 14.79 psig (from II(B))

$t =$ 0.25 (from IV)

AND "log" is log to the base "e", per the examples in Chapter 10 of Roark (see reference identified above).

VI. CALCULATION METHOD; STRESS DUE TO SHEAR:



Load on orifice:

$P = (\Delta P)(\pi)(a^2 - b^2)$; this load, P, is an axial shear load which occurs at the edge of the plate and is uniformly distributed around the circumference.

Corresponding Shear Stress:

$$\tau_a = \frac{P}{2\pi a t} = \frac{(\Delta P)(\pi)(a^2-b^2)}{2\pi a t} = \boxed{\frac{(\Delta P)(a^2-b^2)}{2at}}$$, where

a and b are as given in Section V.

VII. PRINCIPLE STRESS:

General Expression:

$$\sigma_1 = \frac{\sigma_x + \sigma_y}{2} + \sqrt{\left(\frac{\sigma_x - \sigma_y}{2}\right)^2 + \tau_{xy}^2} = \underline{\text{maximum normal stress.}}$$

{Reference: Shigley, "Mechanical Engineering Design", 1963 Edition, Eq. 2.6 (for σ_1), P. 22}

In this case,

$S_{(max.\ princ.)} = \sigma_1$ $\qquad$ $\tau_a = \tau_{xy}$ (τ_a from Section VI)

S_r (from V) $= \sigma_x$ $\qquad$ $\sigma_y = 0$ (no circumferential stress)

$$\Longrightarrow \underline{\underline{S_{(max.\ princ.)} = \frac{S_r}{2} + \sqrt{\left(\frac{S_r}{2}\right)^2 + \tau_a^2}}}$$

NUMBER 9-Mi.-2-E12-N006-1 DATE 9-15-83

SUBJECT ORIFICE PLATE CALCULATION BY S.Y. Koh SHEET 5 OF 5

S.Y. Koh

VIII. RESULTS

```
RUN GLN@GG/GLN/PLATE
   ENTER GI,BO,T, INCHES WATER (60 F)
-17.555,10.412,0.25,410.
   ENTER TEMP, MAT. TYPE(304 OR 316)
=150.,316


     ORIFICE PLATE STRESS CALCULATION
     --------------------------------

        ORIFICE GEOMETRY:
                    A (IN.)    = 8.7765
                    B (IN.)    = 5.2060
                    T (IN.)    = 0.2500
        ORIFICE MATERIAL:
                       TYPE    = 316 SS
                   TEMP (F)    = 150.
                YIELD (PSI)    = 22771.3

        BENDING STRESS (PSI) =  6514.3
          SHEAR STRESS (PSI) =   168.2
        MAX PRINCIPAL STRESS =  6518.6

         FLOW PRESSURE (PSI) =  14.79

MAX CAPABILITY (DELTA P):
                       (PSI) =   51.65
                  (IN. H20) = 1432.24


***SINCE MAX PRINCIPAL ORIFICE STRESS IS LESS
   THAN YIELD STRESS, THE PLATE DESIGN IS ADEQUATE.
```

E22B-K35AC

MPL: H22-P028

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point Nuclear Station Unit 2 Type:

1. Utility: Niagara Mohawk Power Corp. PWR _____
2. NSSS: GE BWR- 5, MK II
3. A/E: Stone & Webster Other _____

II. Component Name Local Instrument Rack

1. Scope: [x] NSSS [ ] BOP [ ] Other
2. Model Number: H22-P028 Quantity: 1
3. Size or Range: N/A
4. Vendor: General Electric Co.
5. If the component is a cabinet or panel, name and model number of the devices included: See attached device list
6. Physical Description:
   a. Appearance: Vertical Board
   b. Dimensions: 36"W x 36"D x 84"H
   c. Weight: Not Available
7. Location: Building: Control Building
   Elevation: 261' Elev.
8. Field Mounting Conditions [x] Bolt (No. 12 , Size ½")
   [ ] Weld (Length ____)
   [ ] _____
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   Floor mounted
10. a. System in which located: High Pressure Core Spray Diesel Generator
    b. Functional Description: Instrument support
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [x] Both [ ] Neither [ ] Other _____

MPL H22-P028

11. Pertinent Reference Design Specification for Qualification Requirements: See purchase part drawings.

a. [x] Seismic Input
b. [ ] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[x] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

[ ] Test [ ] Analysis [x] Combination of Test and Analysis

Qualification Report*: Clinton Panel Seismic Test Report

(No., Title and Date): GE DRF A00-1138, Index X

Company that Prepared Report: General Electric Co.

Company that Reviewed Report: General Electric Co.

Where Report is filed or available: General Electric Co., Wayne PA

Applicable Codes and/or Standards: IEEE 344-1975

V. Vibration Input:

1. Loads considered:
   a. [x] Seismic only
   b. [ ] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)
2. Method of Combining RRS:
   [ ] Absolute Sum [ ] SRSS [X] N/A (other, specify)
3. Required Response Spectra** (attach the graphs): See Figures 2.4A, & 2.4B.

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

MPL: H22-P028

4. Damping Corresponding to RRS: OBE N/A SSE 4%

5. Required Acceleration in Each Direction:

[x] ZPA [ ] Other _____ (specify)

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

SSE S/S = 0.56g's F/B = 0.56g's V = 0.60g's

Combined (SRSS) horizontal

6. Were fatigue effects considered:

[ ] Yes [x] No

If yes, describe how they were treated in overall qualification program: N/A

VI. If Qualification by Test, then Complete:

1. [ ] Single Frequency [x] Multi-Frequency [x]random
[ ] sine beat
[ ] _____

2. [ ] Single Axis [x] Multi-Axis
[ ] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other N/A (specify)

4. Frequency Range: 1-45 Hz

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

S/S = 14 Hz F/B = 34 Hz V = 60 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

MPL: H22-P028

8. Maximum Input g Level Test:
   OBE S/S = N/A F/B = N/A V = N/A
   SSE S/S = 3.8g's F/B = 4.2g's V = 4.2g's

9. Laboratory Mounting:
   A. [x] Bolt (No. ___, Size ____) Note: Panels were mounted to
   [ ] Weld (Length ___) [ ] ___ simulate actual service. Clamps
   B. Orientation and Fixturing: _____ were used instead of bolts where necessary.

10. Functional operability verified:
    [ ] Yes [ ] No [x] Not Applicable

11. Test Results including modifications made:
    Test results were satisfactory

12. Other tests performed (such as aging or fragility test, including results):
    N/A

13. Failure Modes (If appropriate) N/A

14. Margins Available: [x] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, then complete: N/A

1. Method of Analysis:
   [ ] Static Analysis [ ] Equivalent Static Analysis
   [ ] 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: [ ] 3D [ ] 2D [ ] 1D
   [ ] Finite Element [ ] Beam
   [ ] Closed Form Solution [ ] Other _____

MPL: H22-P028

4. [ ] Computer Codes: _____
   Frequency Range and No. of modes
   [ ] Hand Calculations
5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [ ] SRSS [ ] Other: _____ (specify)
6. Damping:
   OBE _____ SSE _____ Basis for damping used: _____
7. Support Considerations in the model: _____
8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B.

Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____
10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

SEISMIC QUALIFICATION REEVALUATION OF NUCLEAR SAFETY RELATED EQUIPMENT

PANEL MPL REFERENCE: H22-P028 TITLE: HPCS DESL GEN PROT RLY VB PL 491X204G001
LOCATION: CONTROL BLDG., STANDBY HPCS,261' PANEL DIMENSIONS: 36"Wx36"Dx90"H REV 2

DESCRIPTION / EQUIPMENT NAME / MPL NUMBER	IDENTIFICATION ELEV.	EC	SEISMIC CAPABILITY/ MALFUNCTION LIMIT F-B	S-S	V	MAXIMUM EXPECTED ACCELERATION AT LOC. F-B	S-S	V	REMARKS
RELAY-LOCKOUT-TYPE HEA	163C1194P002	A	----	----	----	----	----	----	----
E22B-K36			3.0	5.8	2.5	TESTED ON CL.	H22-P028		CL H22-P028
E22B-K38			3.0	5.8	2.5	"	"	"	"
RELAY, PANEL AUXILIARY	159C4251P001	A							
E22B-K02			4.0	11.0	7.5	TESTED ON CL.	H22-P028		A00-1084-121
E22B-K03			4.0	11.0	7.5	"	"	"	"
E22B-K04			4.0	11.0	7.5	"	"	"	"
E22B-K05			4.0	11.0	7.5	"	"	"	"
E22B-K06			4.0	11.0	7.5	"	"	"	"
E22B-K12			4.0	11.0	7.5	"	"	"	"
RELAY,PANEL AUXILIARY	136B3137P001	A							
E22B-K09			4.9	11.0	7.5	TESTED ON CL.	H22-P028		A00-1084-24
E22B-K11			4.9	11.0	7.5	"	"	"	"
RELAY	147D7151P002	A							
E22B-K30AC			2.5	2.5	2.5	TESTED ON CL.	H22-P028		H22-14
RELAY	163C1187P001	A							
E22B-K31			3.0	5.8	2.5	TESTED ON CL.	H22-P028		CL H22-P028
RELAY	169C8933P002	A							
E22B-K32			QUALIFIED BY FMEA			2.5	4.8	1.1	E22-00030-2
RELAY	163C1178P002	A							
E22B-K33AB			1.9	3.0	2.3	TESTED ON CL.	H22-P028		CL H22-P028
RELAY	163C1175P005	A							
E22B-K35AC			3.0	5.1	2.4	TESTED ON CL.	H22-P028		CL H22-P028
RELAY	209A4312P003	A							
E22B-K01			6.0	6.0	6.0	3.2	5.7	1.2	A00-02094
RELAY	137C6405P001	A							
E22B-K39			3.0	3.0	3.0	2.8	5.4*	1.3	A00-02094
RELAY,PANEL AUXILIARY	228B1470P001								
E22B-K16			4.9	11.0	7.5	2.8	5.4	1.2	A00-1084-24

DATE

* Expected acceleration exceeds capability

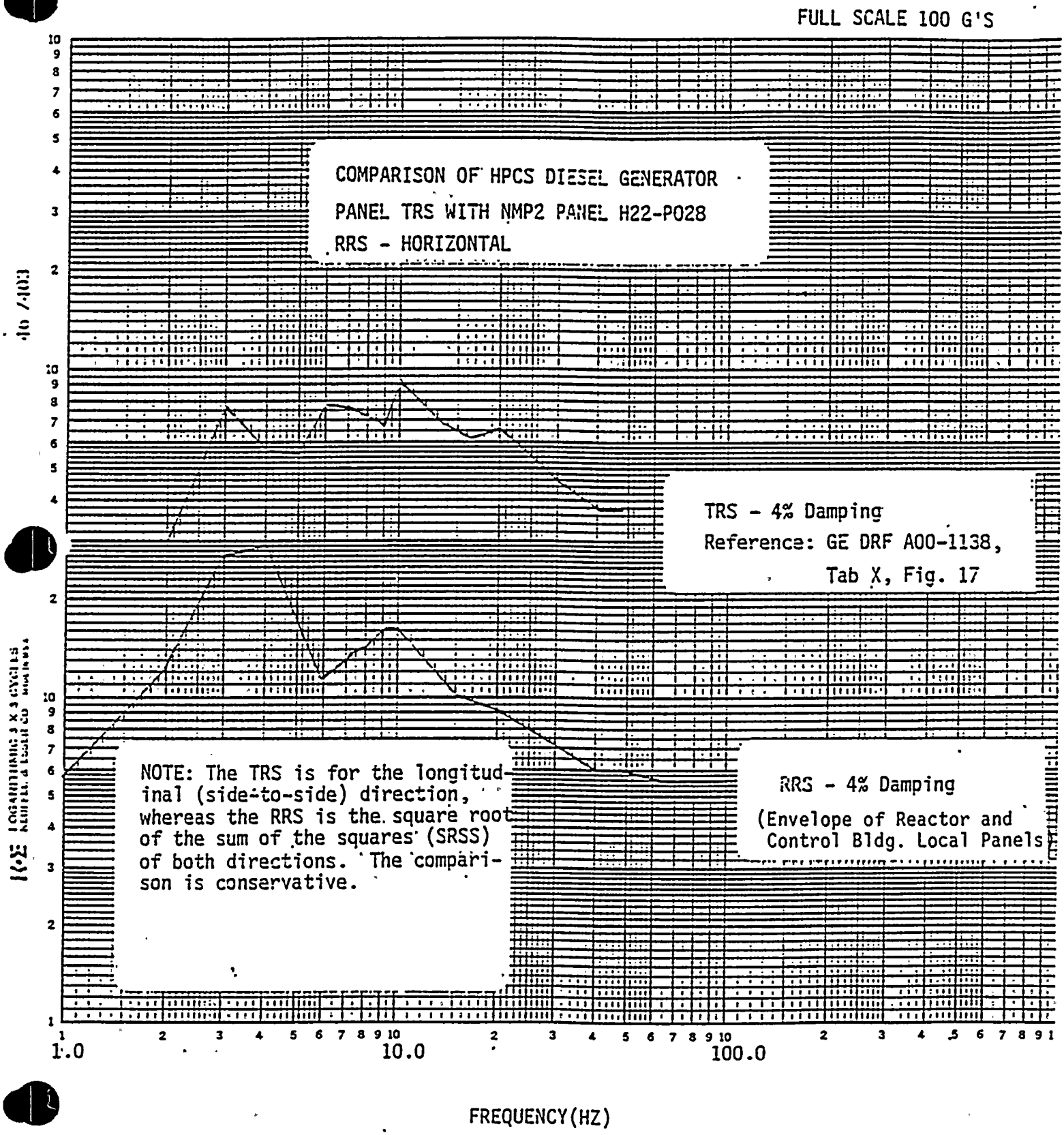

FULL SCALE 100 G'S
COMPARISON OF HPCS DIESEL GENERATOR PANEL TRS WITH NMP2 PANEL H22-P028 RRS - HORIZONTAL
TRS - 4% Damping
Reference: GE DRF A00-1138, Tab X, Fig. 17
NOTE: The TRS is for the longitudinal (side-to-side) direction, whereas the RRS is the square root of the sum of the squares (SRSS) of both directions. The comparison is conservative.
RRS - 4% Damping
(Envelope of Reactor and Control Bldg. Local Panels
1.0
10.0
100.0
FREQUENCY(HZ)

figure 2.4A

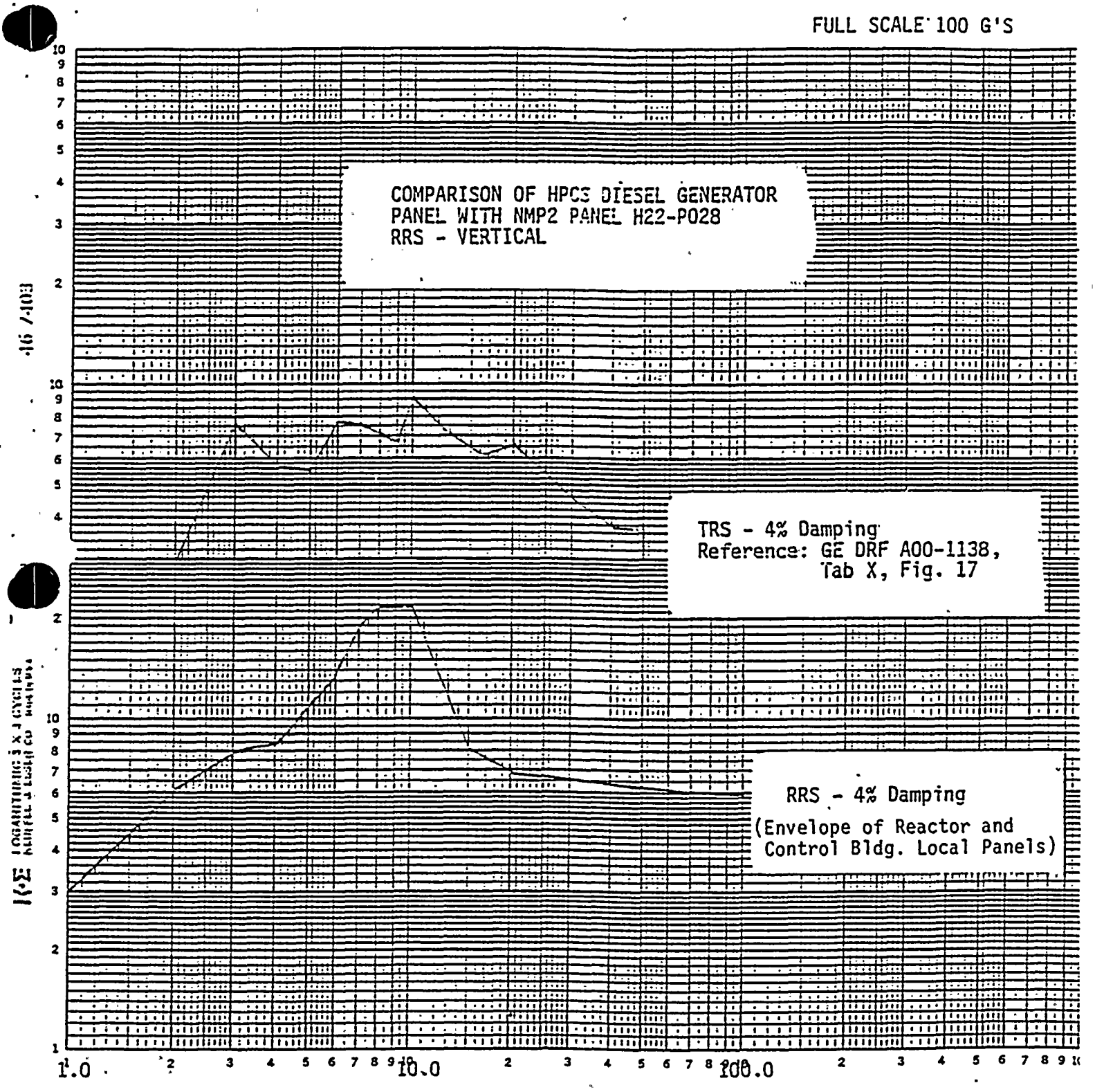

FULL SCALE 100 G'S
COMPARISON OF HPCS DIESEL GENERATOR PANEL WITH NMP2 PANEL H22-P028 RRS - VERTICAL
TRS - 4% Damping
Reference: GE DRF A00-1138, Tab X, Fig. 17
RRS - 4% Damping
(Envelope of Reactor and Control Bldg. Local Panels)
1.0
10.0
100.0
FREQUENCY(HZ)

FIGURE 2.4B

MPL: E22-C001

SEISMIC AND DYNAMIC QUALIFICATION SUMMARY OF EQUIPMENT

I. Plant Name: Nine Mile Pt. 2 Type:

1. Utility: Niagara Mohawk Power Corporation PWR N/A
2. NSSS: General Electric BWR 5 MARK II
3. A/E: Stone and Webster Other N/A

II. Component Name: High Pressure Core Spray Pump and Motor

1. Scope: [X]NSSS [ ] BOP [ ] Other
2. Model Number: 30DX19CKXLH(pump), 5K6357XC15A(motor) Quantity: one (1)
3. Size or Range: 13 Stage VMT (pump), 3050 HP (motor)
4. Vendors: Byron Jackson (pump) General Electric (motor)
5. If the component is a cabinet or panel, name and model number of the devices included: N/A
6. Physical Description:
   a. Appearance: Vertical pump and motor
   b. Dimensions: 473 inches pump and motor length
   c. Weight: 68,000 lb. pump and motor
7. Location: Building: Containment
   Elevation: 175 feet
8. Field Mounting Conditions: [X] Bolt (No. 24, Size 2½)
   [ ] Weld (Length)
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   Floor mounted.
10. a. System in which located: High pressure core spray
    b. Functional Description: Emergency core cooling.
    c. Is the equipment required for: [ ] Hot Standby [ ] Cold Shutdown [X] Both [ ] Neither [ ] Other

MPL E22-C001

11. Pertinent Reference Design Specification for Qualification Requirements:

21A1913, 21A1913AB Pump

21A1944, 21A1944AB Motor

a. [X] Seismic Input
b. [X] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. IS EQUIPMENT AVAILABLE FOR INSPECTION IN THE PLANT:

[X] Yes [ ] No [ ] Partial or limited availability

IV. EQUIPMENT QUALIFICATION METHOD:

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

Qualification Report*: NEDC-30469 & Nine Mile Pt.-2 HPCS Pump & Motor New Loads Analysis.
(No., Title and Date): Environmental Qualification, Dec. 1983, DRF E22-00019-1, HPCS Pump & Motor New Loads Analysis, Nov. 1984

Company that Prepared Report: General Electric

Company that Reviewed Report: General Electric

Where Report is filed or available: San Jose, California

Applicable Codes and/or Standards: ASME III, NEMA, IEEE

V. Vibration Input:

1. Loads considered:
   a. [ ] Seismic only
   b. [ ] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [X] Combination of (a), (b), and (c)

2. Method of Combining RRS:

   [X] Absolute Sum [ ] SRSS [ ] Other, specify

3. Required Response Spectra** (attach the graphs): Response spectra curves attached.

E:
* If more than one report complete items IV thru VII for each report.
** If other than RRS is used, describe methods.

MPL: E22-C001

4. Damping Corresponding to RRS: OBE 1% SSE 2%

5. Required Acceleration in Each Direction:

[ ] ZPA [X] Other (specify) Response Spectra, Dynamic Analysis

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 considered:

[X] Yes [ ] No

If yes, describe how they were treated in overall qualification program:
The cyclic loading nature of the upset case seismic loads was qualitatively considered. The number of stress cycles over the plant life results in ASME Code alternating stress allowable (SA) that is higher than stresses estimated at stress concentrations. Vibration displacements from pump operation are measured to be less than Hydraulic Institute Standards; therefore, high cycle vibration stresses are low and would not lead to pump failure.

VI. IF QUALIFICATION BY TEST, THEN COMPLETE: (Type test of motor to qualify insulation system and to benchmark analysis.)

1. [ ] Single Frequency [X] Multi-Frequency [ ] Random

[ ] sine beat [X] Resonant frequencies were determined in a sine sweep. The motor was then excited at the 18 & 44 hertz frequencies determined in the sine sweep.

2. [ ] Single Axis [X] Multi-Axis

[X] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:

OBE: 5 SSE: 3 Other (specify): N/A

4. Frequency Range: 0-80 Hz (Type Test)

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

(Dominant frequency -- motor only)

S/S = 44 Hertz F/B = 44 Hertz V = N/A

6. Method of Determining Natural Frequencies:

[X] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS enveloping RRS using Multi-Frequency Test:

[ ] Yes (Attach TRS & RRS graphs) [X] No. No TRS were developed. The acceleration of the motor structure during the test was compared to the design values of acceleration.

MPL: E22-C001

8. Maximum Input g Level Test:

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

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

9. Laboratory Mounting:

A. [X] Bolt (No. 8, Size 1-1/8) (Motor)

[ ] Weld (Length __) [ ] _____

B. Orientation and Fixturing: Vertical Flange Mounted

10. Functional operability verified:

[X] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:

Reference 8

12. Other tests performed (such as aging or fragility test, including results):

N/A

13. Failure Modes (If appropriate) N/A

14. Margins Available: [ ] Input Spectrum [ ] Fragility [X] N/A

VII. IF QUALIFICATION BY ANALYSIS, THEN COMPLETE:

1. Method of Analysis:

[X] Static Analysis [ ] Equivalent Static Analysis

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

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

S/S = 18 F/B = 18 V = 62

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

[X] Finite Element [X] Beam

[ ] Closed Form Solution [ ] Other _____

MPL: E22-C001

4. [ ] Computer Codes: SAP4G07

Frequency Range and No. of modes: 1 to 150HZ 22 Modes

[ ] Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

[ ] Absolute Sum [ ] SRSS [X] Other (specify): *

* Response to input 3 orthogonal directions combined SRSS and responses due to individual modes combined SRSS, with closely spaced modes combined according to Reg. Guide 1.92.

6. Damping:

OBE 1% SSE 2% Basis for damping used: Reference 7

7. Support Considerations in the model: _____

8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

See attached Table

B.

Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: Deflection or Limits or Structural Failure

10. Margins Available: [ ] Input Spectrum

[X] Stress or Deflection

NINE MILE POINT 2 HPCS PUMP & MOTOR

ECCS PUMP/MOTOR EVALUATION LOCATIONS

Critical Locations	Load Combinations		Calculated Stress	Allowable Stress	Stress Ratio
o Stress Evaluation					
1. Suction barrel shell	P_S+S+N+DYN		6,052	21,000	0.288
2. Discharge head shell adjacent to disc. and suct. nozzles	P_S+S+N+N_LDYN	Disch. Suct.	15,611 10,534	34,650	0.451 0.304
3. Discharge tee adjacent to disc. head cover, disc. support ribs or tee junction.	P_SD+S+N+DYN		11,311	16,800	0.673
4. Pump top case, series case, and first stage case at minimum section.	P_D+S+N+DYN	Top Series First	12,860 11,063 5,711	14,000	0.919
5. Suction barrel head/pin interface (RHR & LPCS only)	P_S+S+N+DYN		N/A	N/A	N/A
6. Discharge colun (RHR & LPCS only)	P_D+S+N+DYN		N/A	N/A	N/A
7. Discharge column flange and bolting (RHR & LPCS only)	P_D+S+N+DYN		N/A	N/A	N/A
8. Discharge head flange and bolting, thread engagement	P_S+S+N+DYN		324	645	0.502
9. Pump top case, series case, and first stage case flanges and bolting, thread engagement	P_D+S+N+DYN	Top Series First	40,679 41,532 31,880	45,000	0.923
10. Suction barrel mounting flange and bolting	P_S+S+N+DYN		195*	532	0.367
11. Motor bolting, thread engagement	S+DYN		5,878	25,000	0.235
12. Motor stand at cover plate and at windows	S+DYN	HS CP	1,739 1,788	17,500	0.102
13. Foundation bolting	S+N+DYN	Tension Shear	2,883 821	10,000	0.288
14. Discharge support rib	S+N+DYN		23,320	31,500	0.740
15. Seismic support ribs	S+N+DYN		7,773	17,500	0.444
16. Pump shaft bearings	S+N+DYN+T		63	75.7	0.832
17. Pump shaft at minimum section	S+N+DYN+T		9,572	36,000	0.266
18. ICD load at lower shell support	S+N+DYN		11,144	20,000	0.557
19. Motor thrust load	S+DYN	Up Down	12,372 22,082	14,500 23,146	0.853 0.954
o Operability					
20. Acceleration at motor CG	DYN	H V	0.995 0.294	2.0 0.83	0.498 0.354
21. Relative displacement between shaft and throttle bushing	S+N+DYN+T		0.0088	0.009	0.978
22. Relative displacement between shaft and mechanical seal	S+N+DYN		0.007	0.03	0.233
23. Cyclone separator seal piping	P+S+DYN		9,183	18,000	0.510
24. Heat exchanger bolts (RHR pump only)	S+DYN		N/A	N/A	N/A

TABLE 1

*ASME Equivalent Pressure

PSPECTRA VER 01 LEV 08 SEISMIC (OBE)

27 DEC 1982

NIAGARA MOHAWK-NINE MILES POINT UNIT-2 J.O.12177 MS-1765-0
RRS OF ACC. SECONDARY CONT. (ELEV. 176.0 FT)

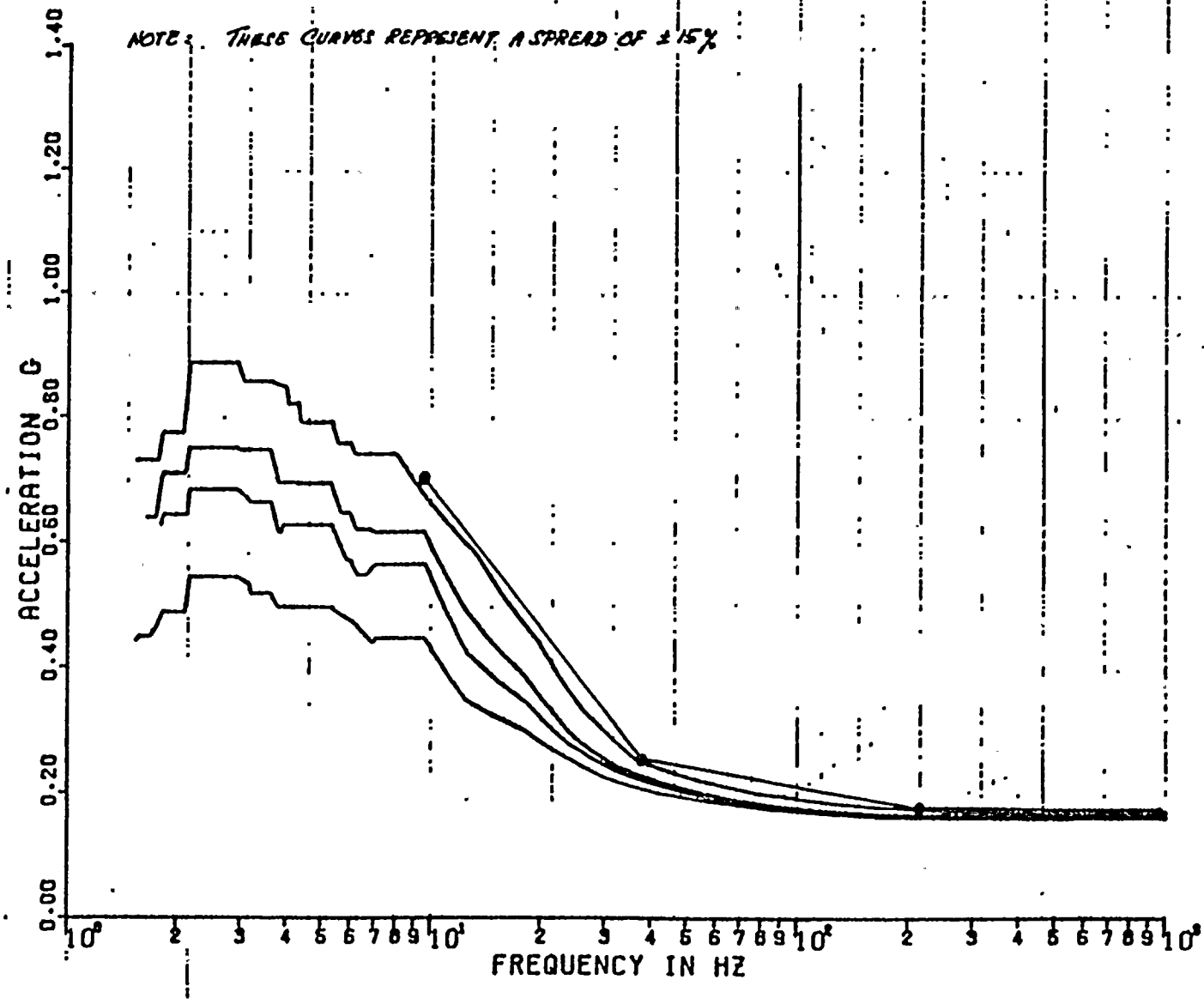
MS1765

DISK CURVE SET NO.10

HOR DIRECTION

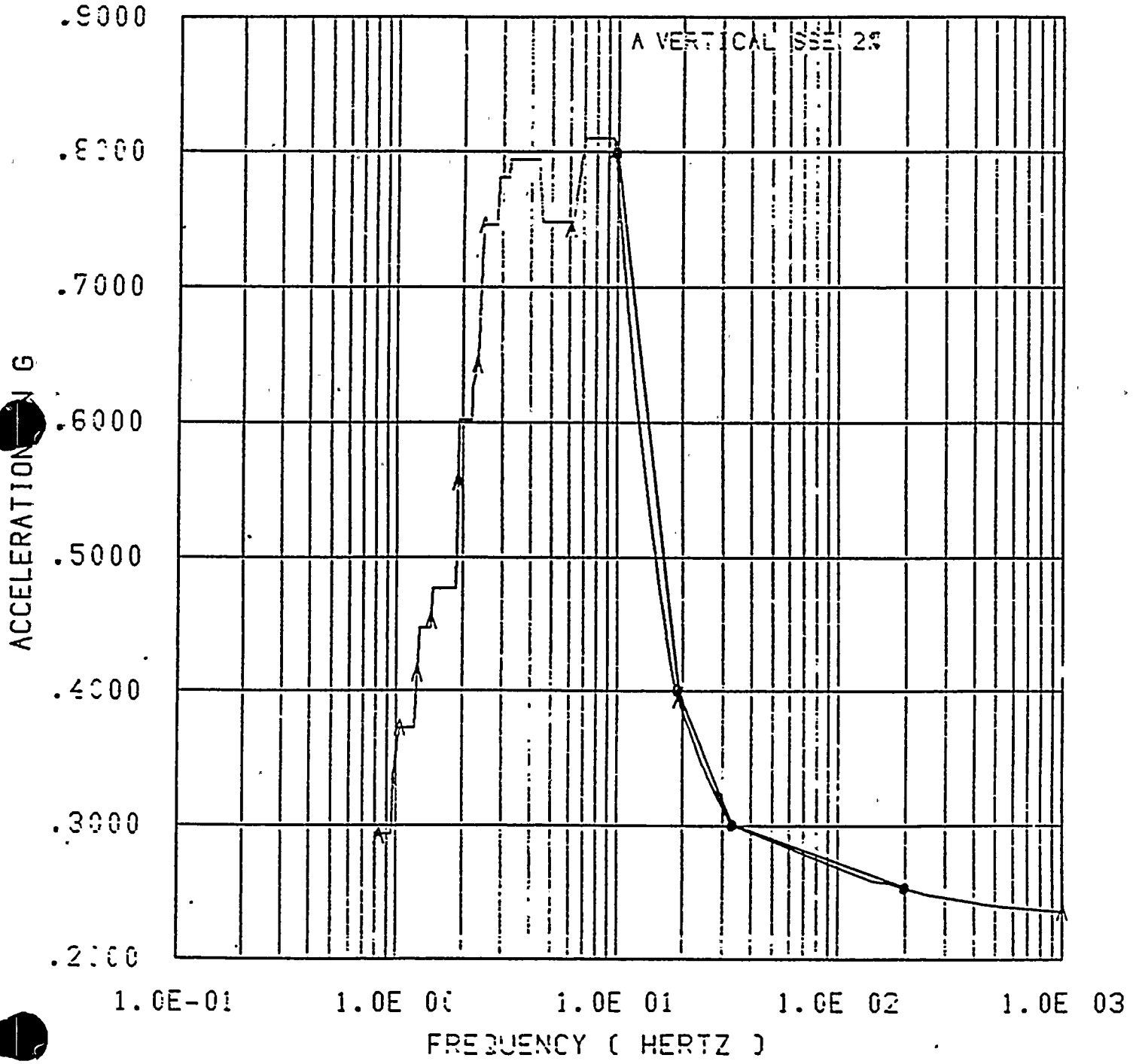
DAMPING VALUES = 0.020
0.030
0.040
0.070

NOTE: THESE CURVES REPRESENT A SPREAD OF ± 15%



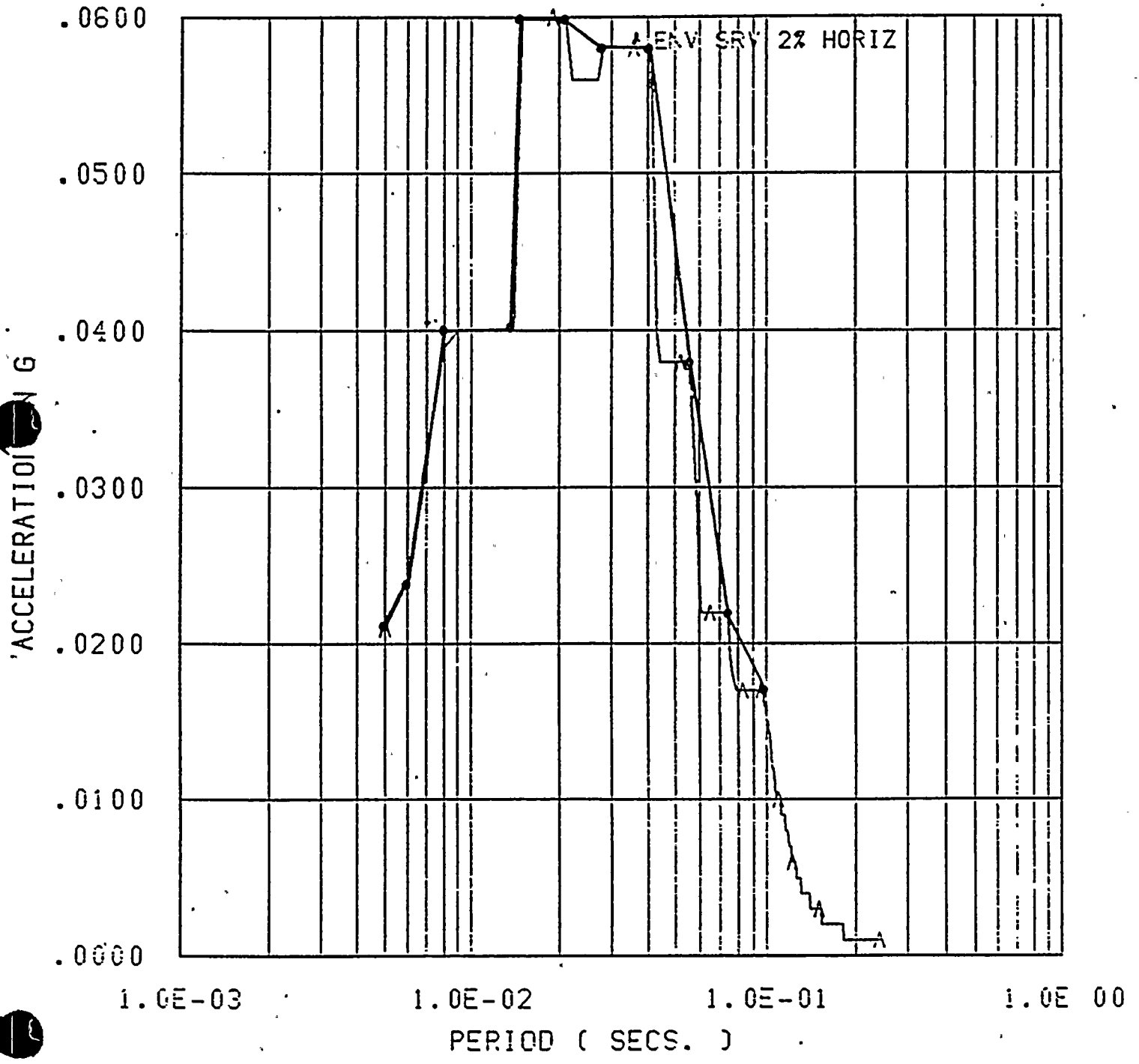
ARSYS RESPONSE SPECTRA PLOT 6
DATE 08/08/84

NINE MILE POINT 2
SSE .VERTICAL 2%
ELEVATION 175



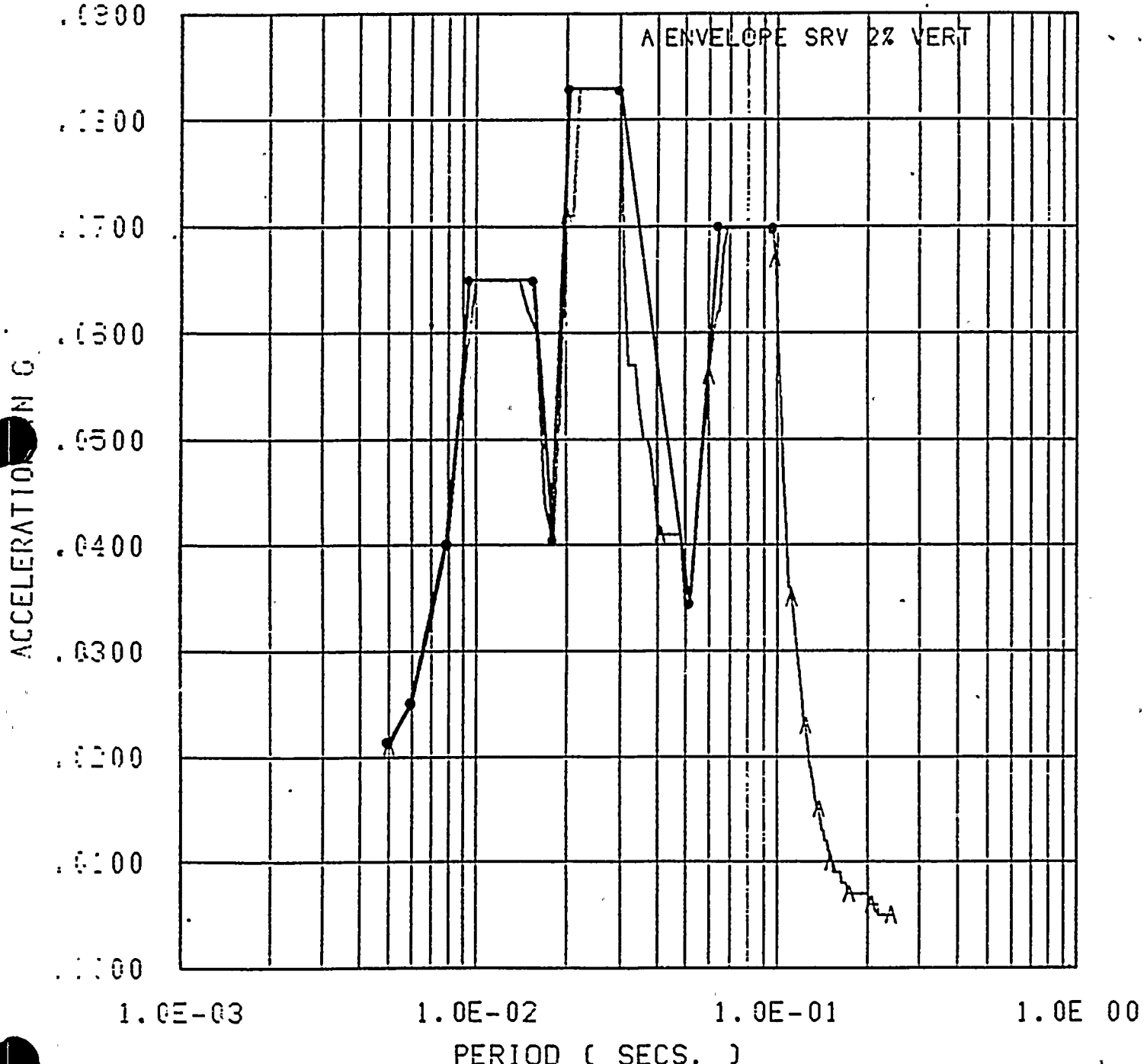
ARSYS RESPONSE SPECTRA PLOT 6
DATE 06/06/84

NINE MILE POINT 2
SRV HORIZONTAL 2%
ELEVATION 175 NODE 80



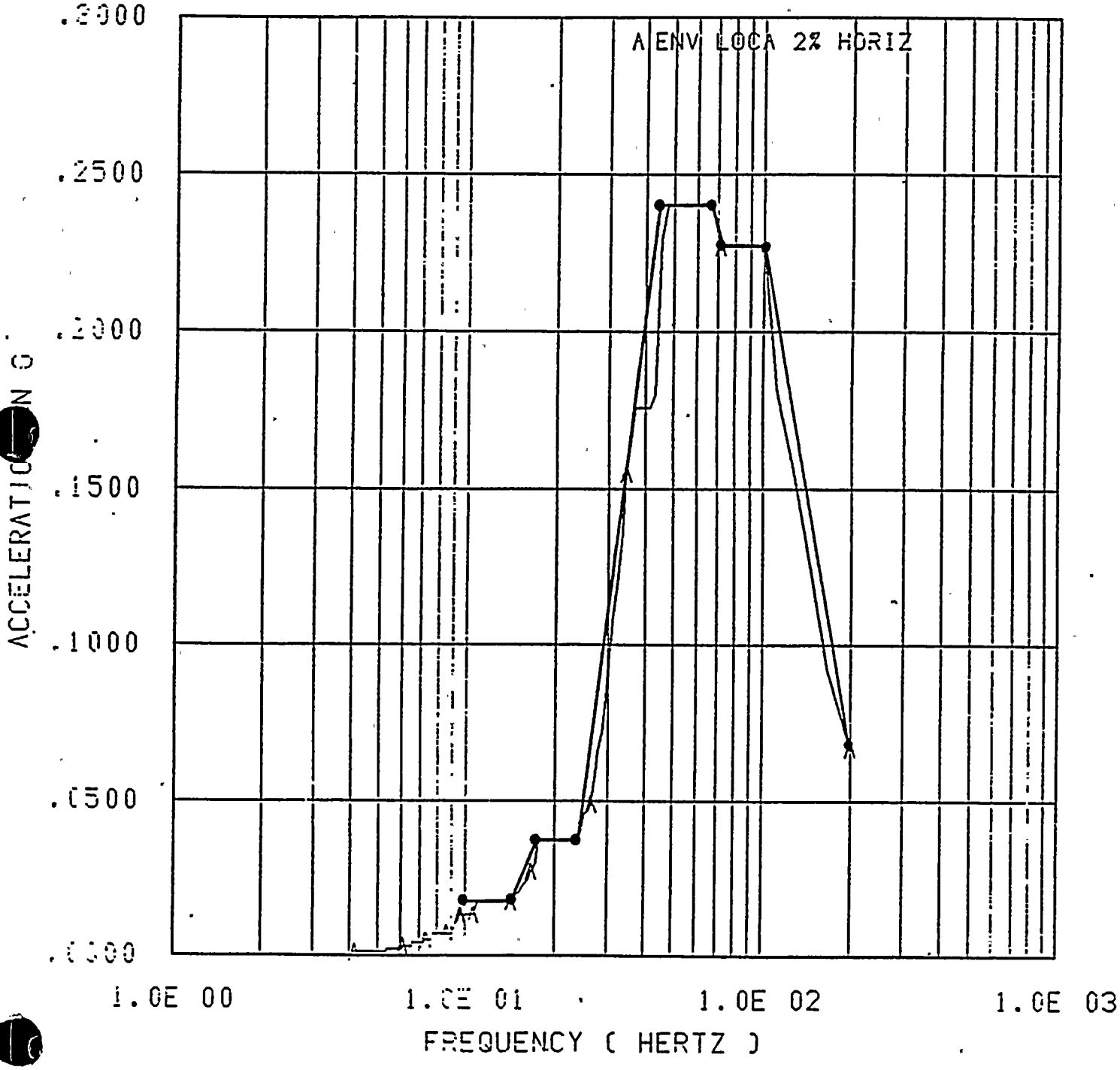
ARSYS RESPONSE SPECTRA PLOT 1
DATE 05/31/84

NINE MILE POINT 2
SRV VERTICAL 2%
ELEVATION 175 NODE 80



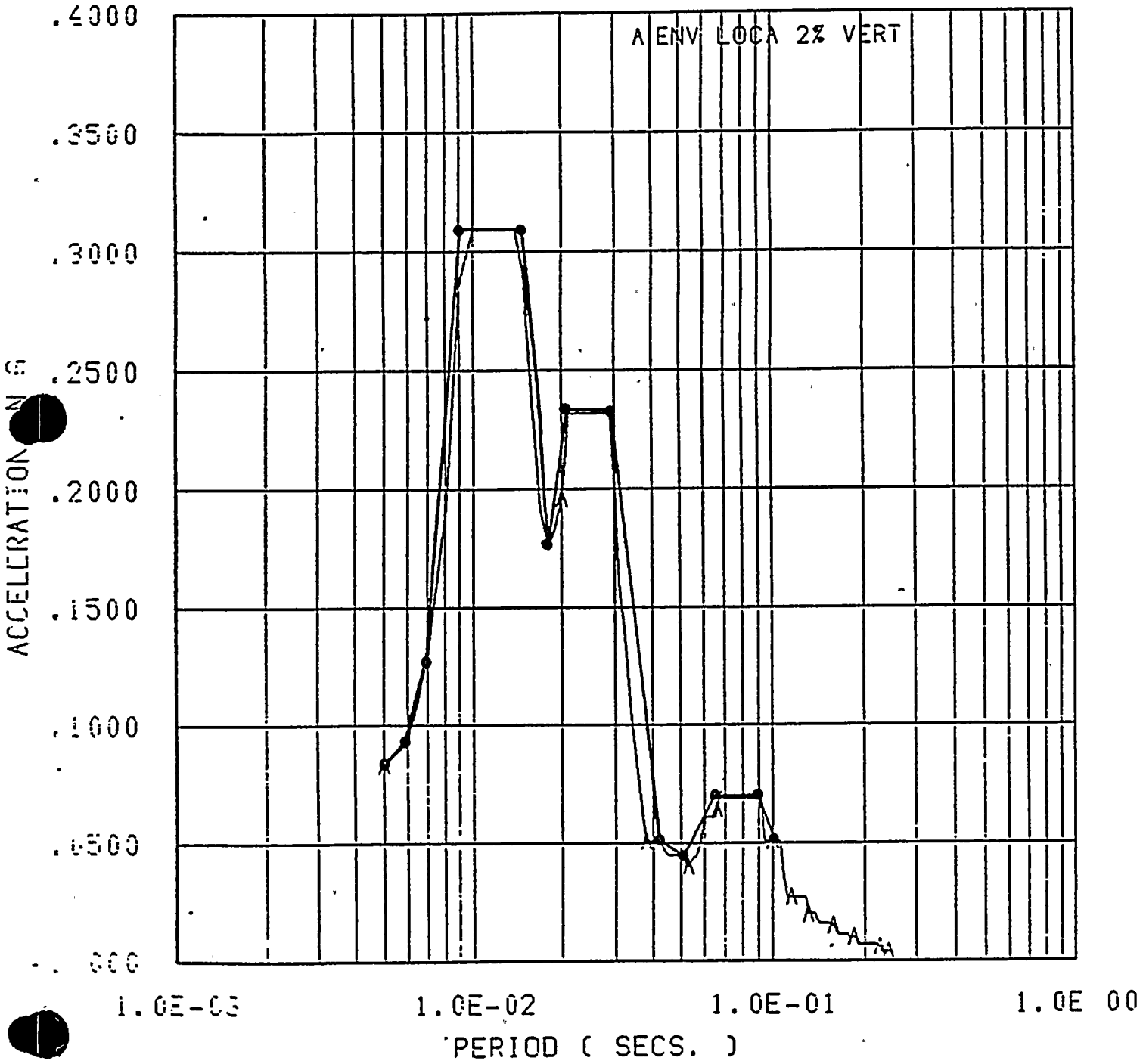
ARBITRARY RESPONSE SPECTRA PLOT /
DATE 06/08/84

NINE MILE POINT 2
LOCA HORIZONTAL 2%
ELEVATION 175 NODE 80



ARSYS RESPONSE SPECTRA PLOT 7
DATE 09/06/84

NINE MILE POINT 2
LOCA VERTICAL 2%
ELEVATION 175 NODE 80



Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point 2 Type: ____

1. Utility: Niagara Mohawk Power Corp PWR ____
2. NSSS: General Electric Company BWR 5, MK II
3. A/E: Stone and Webster Engineering Co. Other ____

II. Component Name: High Pressure Core Spray Motor Control Center

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: Series 8000 Quantity: 1
3. Size or Range: 5 vertical stack
4. Vendor: General Electric Company
5. If the component is a cabinet or panel, name and model number of the devices included: 5 vertical panels 20" x 20" x 90" ea. (11) size 1, (3) size 2 FVR's; (4) size 1, (2) size 3, (3) size 2 FVNR starter units; eight feeder units
6. Physical Description:
   a. Appearance: Cabinet
   b. Dimensions: 100" x 20" x 90"
   c. Weight: N/A
7. Location: Building: Diesel Generator and Control Building
   Elevation: 261 ft.
8. Field Mounting Conditions: [ ] Bolt (No. ____, Size ____)
   [X] Weld (¼" fillet, 7 inch long on 20 inch centers)
   [ ] ____
9. Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.):
   Welded to floor plates.
10. a. System in which located: HPCS
    b. Functional Description: Active, Class 1E
    c. Is the equipment required for
       [ ] Hot Standby [ ] Cold Shutdown [X] Both
       [ ] Neither [ ] Other

11. Pertinent Reference Design Specification for Qualification Requirements: _____

a. [X] Seismic Input
b. [ ] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or Limited Availability

IV. Equipment Qualification Method:

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

Qualification Report:* DRF A00-01933

(No., Title and Date): Motor Control Center Qualification Report, Nine Mile Point 2

Company that Prepared Report: General Electric Company

Company that Reviewed Report: General Electric Company

Where Report is Filed or Available: Valley Forge, Pennsylvania

Applicable Codes and/or Standards: IEEE 344-1975

V. Vibration Input

1. Loads Considered:

a. [ ] Seismic only
b. [ ] Hydrodynamic only
c. [ ] Vibration from normal operation
d. [ ] Combination of a, b, and c

2. Method of Combining RRS:

[ ] Absolute Sum [ ] SRSS [X] N.A. (other, specify)

3. Required Response Spectra** (attached the graphs): See Attachment 1

NOTE:

* If more than one report complete Items IV thru VII for each report.
** If other than RRS is used, describe methods.

4. Damping Corresponding to RRS: OBE 2% SSE 3%

5. Required Acceleration in Each Direction:

[X] ZPA [ ] Other _____ (Specify)

OBE S/S = 0.13 F/B = 0.13 V = 0.10
SSE S/S = 0.24 F/B = 0.24 V = 0.18

6. Were fatigue effects considered:

[ ] Yes [X] No

If yes, describe how they were treated in overall qualification program:

_____

_____

_____

VI. If Qualification by Test, Then Complete:

1. [ ] Single Frequency [X] Multi-Frequency
   [ ] Random
   [ ] Sine Beat
   [X] Sine Sweep for resonance search.

   (Resonance search testing)

2. [X] Single Axis [ ] Multi-Axis
   [ ] Independent Axis [ ] In-Phase Motions
   [X] Simultaneous horizontal and vertical phase incoherent.

3. Number of Qualification Tests:

   OBE 5 SSE 1 Other _____ (Specify)

4. Frequency Range: 1-40 Hz

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

   S/S = 4.5 Hz F/B = 6,14,22 Hz V = None below 33 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 and RRS graphs)
   [ ] No

8. Maximum Input g Level Test:

OBE S/S = N/A F/B = N/A V = N/A
SSE S/S = 3.2 g F/B = 3.2 g V = 1.9 g

9. Laboratory Mounting:

A. [X] Bolt (No. 12, Size 1/2")
[ ] Weld (Length ____) [X] _____

B. Orientation and Fixturing: Fixture welded to test table. MCC bolted to fixture.

10. Functional Operability Verified:

[X] Yes [ ] No [ ] Not Applicable

11. Test Results Including Modifications Made:

See qualification summary

12. Other Tests Performed (Such as Aging or Fragility Test, Including Results):

13. Failure Modes (if appropriate): _____

14. Margins Available: [X] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, Then Complete: (Not Applicable)

1. Method of Analysis:

[ ] Static Analysis
[ ] Dynamic Analysis
[ ] Equivalent Static Analysis
[ ] Time-History
[ ] Response Spectrum

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

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

3. Model Type:

[ ] 3D [ ] 2D [ ] 1D
[ ] Finite Element [ ] Beam
[ ] Closed Form Solution [ ] Other _____

4. [ ] Computer Codes: _____

   Frequency Range and Number of Modes: _____

   [ ] Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   [ ] Absolute Sum [ ] SRSS [ ] Other _____ (Specify)

6. Damping:

   OBE _____ SSE _____ Basis for Damping Used _____

7. Support Considerations in the Model: _____

8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B.

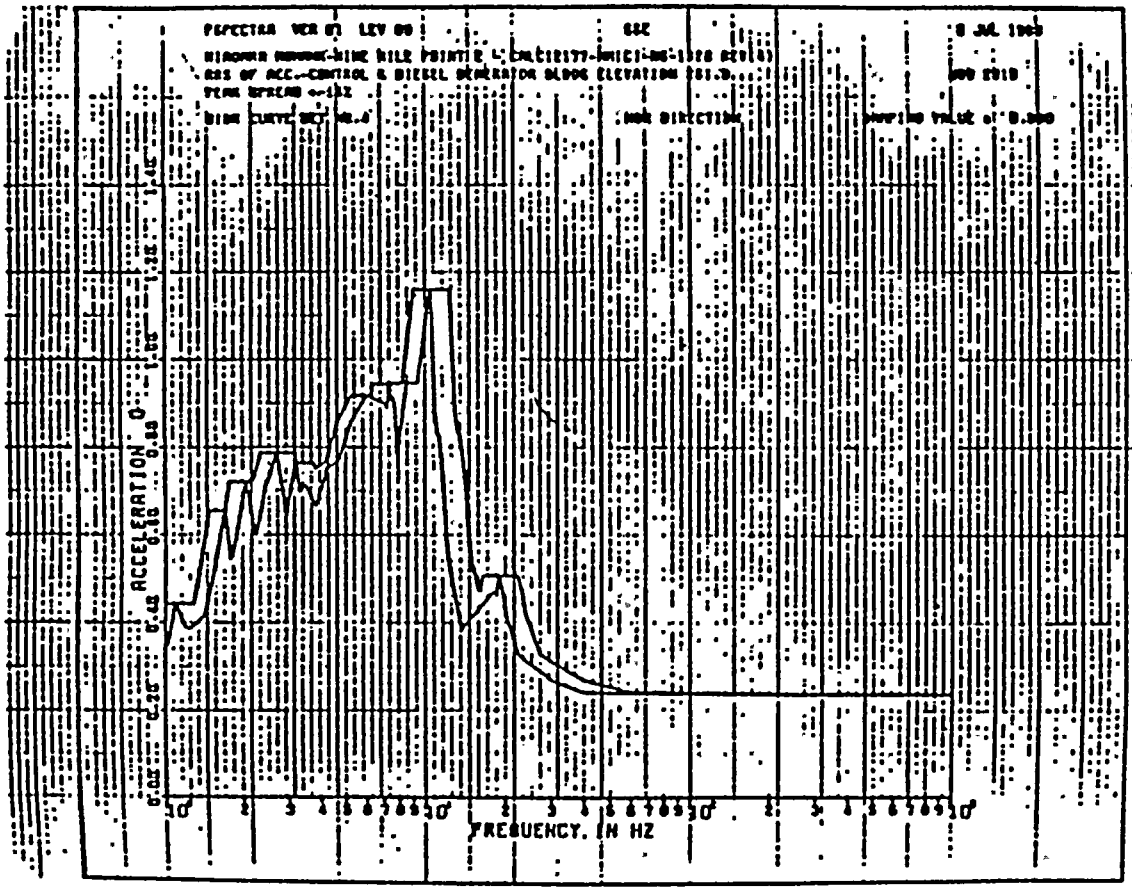
Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____

10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

ATTACHMENT 1

REQUIRED RESPONSE SPECTRA



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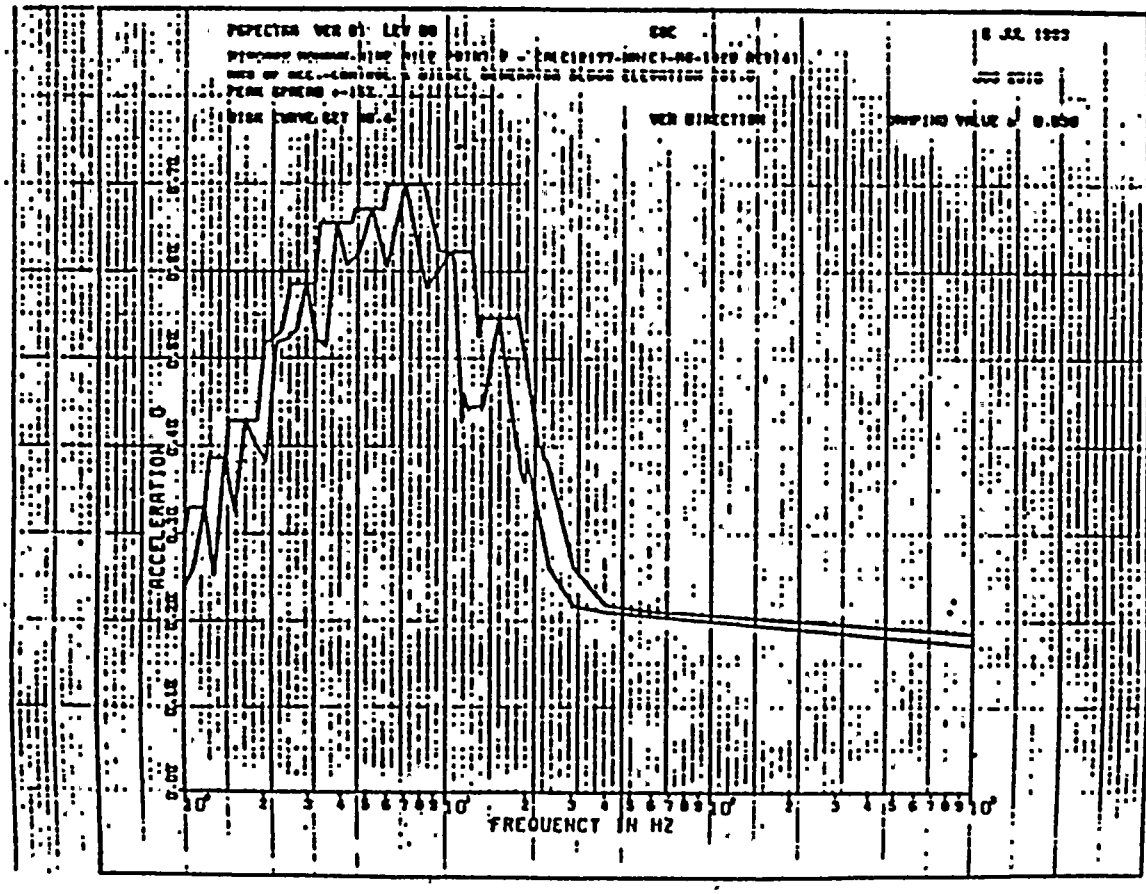

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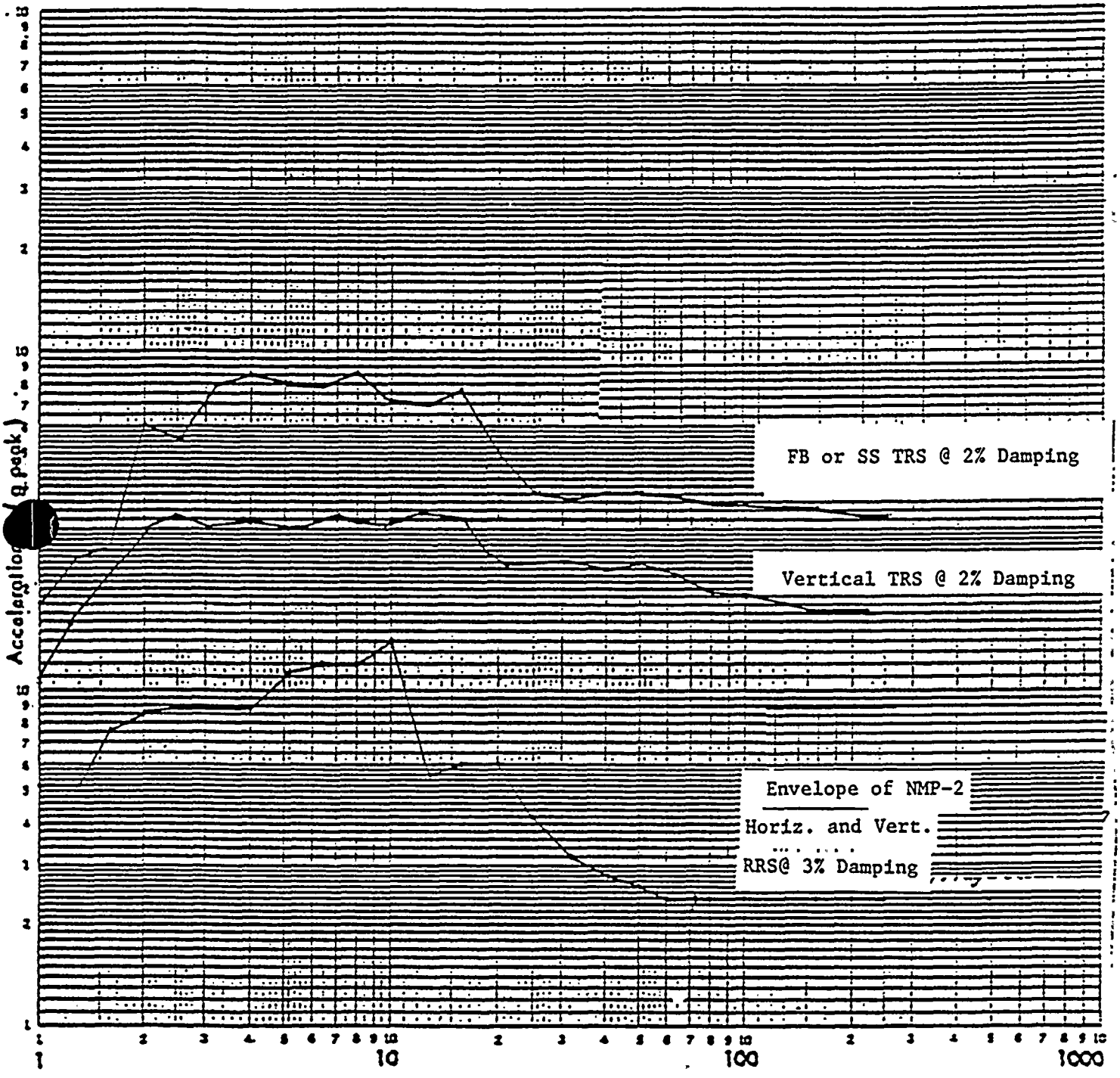
ATTACHMENT 2

COMPARISON OF TRS AND RRS

FULL SCALE SHOCK SPECTRUM (g Peak)

1.0 ☐ 10 ☐ 100 ☒ 1000 ☐



Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point 2 Type: _____

1. Utility: Niagara Mohawk Power Corp PWR _____
2. NSSS: General Electric Company BWR 5, Mk II
3. A/E: Stone and Webster Other _____

II. Component Name: Control Room Panel

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: H13-P608 Quantity: 1
3. Size or Range: N/A
4. Vendor: General Electric Company
5. If the component is a cabinet or panel, name and model number of the devices included: See attached device list
6. Physical Description:
   a. Appearance: Vertical board, 5 bay
   b. Dimensions: 150" W x 90" H x 36" DP
   c. Weight: ~2500 lbs
7. Location: Building: Control and Diesel Generator - Control Room
   Elevation: 306"
8. Field Mounting Conditions: [X] Bolt (No. 40 , Size 1/2")
   [ ] Weld (Length)
   [ ] _____
9. Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.):
   Floor
10. a. System in which located: Power Range Monitor
    b. Functional Description: Power Range Monitor
    c. Is the equipment required for
       [ ] Hot Standby [ ] Cold Shutdown [ ] Both
       [X] Neither [ ] Other

11. Pertinent Reference Design Specification for Qualification Requirements: As specified on GE drawing.

a. [X] Seismic Input
b. [ ] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or Limited Availability

IV. Equipment Qualification Method:

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

Qualification Report:* DRF #H11-00009

(No., Title and Date): "Seismic Testing of H11-P608 Panel" 20 May 83

Company that Prepared Report: General Electric

Company that Reviewed Report: General Electric

Where Report is Filed or Available: General Electric

Applicable Codes and/or Standards: As specified on GE drawing.

V. Vibration Input

1. Loads Considered:

a. [X] Seismic only
b. [ ] Hydrodynamic only
c. [ ] Vibration from normal operation
d. [ ] Combination of a, b, and c

2. Method of Combining RRS:

[ ] Absolute Sum [ ] SRSS [ ] N/A (other, specify)

3. Required Response Spectra** (attached the graphs): Attached.

NOTE:

* If more than one report complete Items IV thru VII for each report.
** If other than RRS is used, describe methods.

4. Damping Corresponding to RRS: OBE N/A SSE 4%

5. Required Acceleration in Each Direction:

[X] ZPA [ ] Other _____ (Specify)

OBE S/S =	N/A	F/B =	N/A	V =	N/A
SSE S/S =	0.4 g	F/B =	0.4 g	V =	0.25 g

6. Were fatigue effects considered:

[X] Yes [X] No

If yes, describe how they were treated in overall qualification program:

SRV blowdown treated with 15 vibration tests, 30 seconds each. Test were dual axis, random inputs. See H11-00009, Figures A-8 through A-19.

VI. If Qualification by Test, Then Complete:

1. [ ] Single Frequency [X] Multi-Frequency
   [X] Random
   [ ] Sine Beat
   [X] Sine Sweep for resonance search.

2. [ ] Single Axis [X] Multi-Axis
   [ ] Independent Axis [ ] In-Phase Motions

3. Number of Qualification Tests:

OBE 5 SSE 1 Other _____ (Specify)

4. Frequency Range: 1-100 Hz

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

S/S = 8 Hz F/B = 12 Hz V = 55 Hz & 90 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 and RRS graphs)
[ ] No

8. Maximum Input g Level Test:

OBE S/S = N/A F/B = N/A V = N/A
SSE S/S = 3.8 g F/B = 3.8 g V = 3.0 g

9. Laboratory Mounting:

A. [X] Bolt (No. ____, Size _____) ½"-13 panel bolted to simulated floor section
5/8"-11 to install test specimen on seismic table
[ ] Weld (Length ____) [X] Clamps where holes don't line-up Bolts and clamps simulate field mounting

B. Orientation and Fixturing: _____

10. Functional Operability Verified:

[X] Yes [ ] No [ ] Not Applicable

11. Test Results Including Modifications Made:

Met the required specifications.

12. Other Tests Performed (Such as Aging or Fragility Test, Including Results):

None.

13. Failure Modes (if appropriate): None.

14. Margins Available: [X] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, Then Complete: N/A.

1. Method of Analysis:

[ ] Static Analysis
[ ] Dynamic Analysis
[ ] Equivalent Static Analysis
[ ] Time-History
[ ] Response Spectrum

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

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

3. Model Type:

[ ] 3D [ ] 2D [ ] 1D
[ ] Finite Element [ ] Beam
[ ] Closed Form Solution [ ] Other _____

4. [ ] Computer Codes: _____

   Frequency Range and Number of Modes: _____

   [ ] Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   [ ] Absolute Sum [ ] SRSS [ ] Other _____ (Specify)

6. Damping:

   OBE _____ SSE _____ Basis for Damping Used _____

7. Support Considerations in the Model: _____

8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B.

Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____

10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

EQUIPMENT CLASSIFIED 1E BY PP[illegible] (NOT ON GE LIST OF CLASS 1E)
SEISMIC QUALIFICATION REEVALUATION OF NUCLEAR SAFETY RELATED EQUIPMENT

PANEL MPL REFERENCE: H13-P608 TITLE: POWER RANGE MONITOR CABINET : PL 791E507TYG001
LOCATION: CONTROL ROOM PANEL DIMENSIONS: 150"Wx90"Hx36"DP : REV 8

DESCRIPTION		E	SEISMIC CAPABILITY/ MALFUNCTION LIMIT			MAXIMUM EXPECTED ACCELERATION AT LOC.			REMARKS
EQUIPMENT NAME MPL NUMBER	IDENTIFICATION	C	F-B	S-S	V	F-B	S-S	V	
POWER SUPPLY, SWITCHING	112D1902G001	A	TRS	TRS	TRS	*	*	*	H11-00009
FLOW UNIT	791E392AAG001	A	TRS	TRS	TRS	*	*	*	H11-00009
APRM PAGES	145C3096BBG001, G002, G003, G004	A	TRS	TRS	TRS	*	*	*	H11-00009
ICPS PAGES	145C3143BBG001, G002, G003, G004	A	TRS	TRS	TRS	*	*	*	H11-00009
*THE NINE MILE POINT 2 - H13-P608 IS QUALIFIED BY SIMILARITY TO THE SEISMICALLY TESTED HOPE CREEK H11-P608. THE EQUIPMENT LISTED ABOVE WAS FUNCTIONALLY MONITORED AND PERFORMED SATISFACTORILY.									

DATE

SHEET NUMBER 1
LAST SHEET

3.708
12-1516 (3)

FIGURE 1A

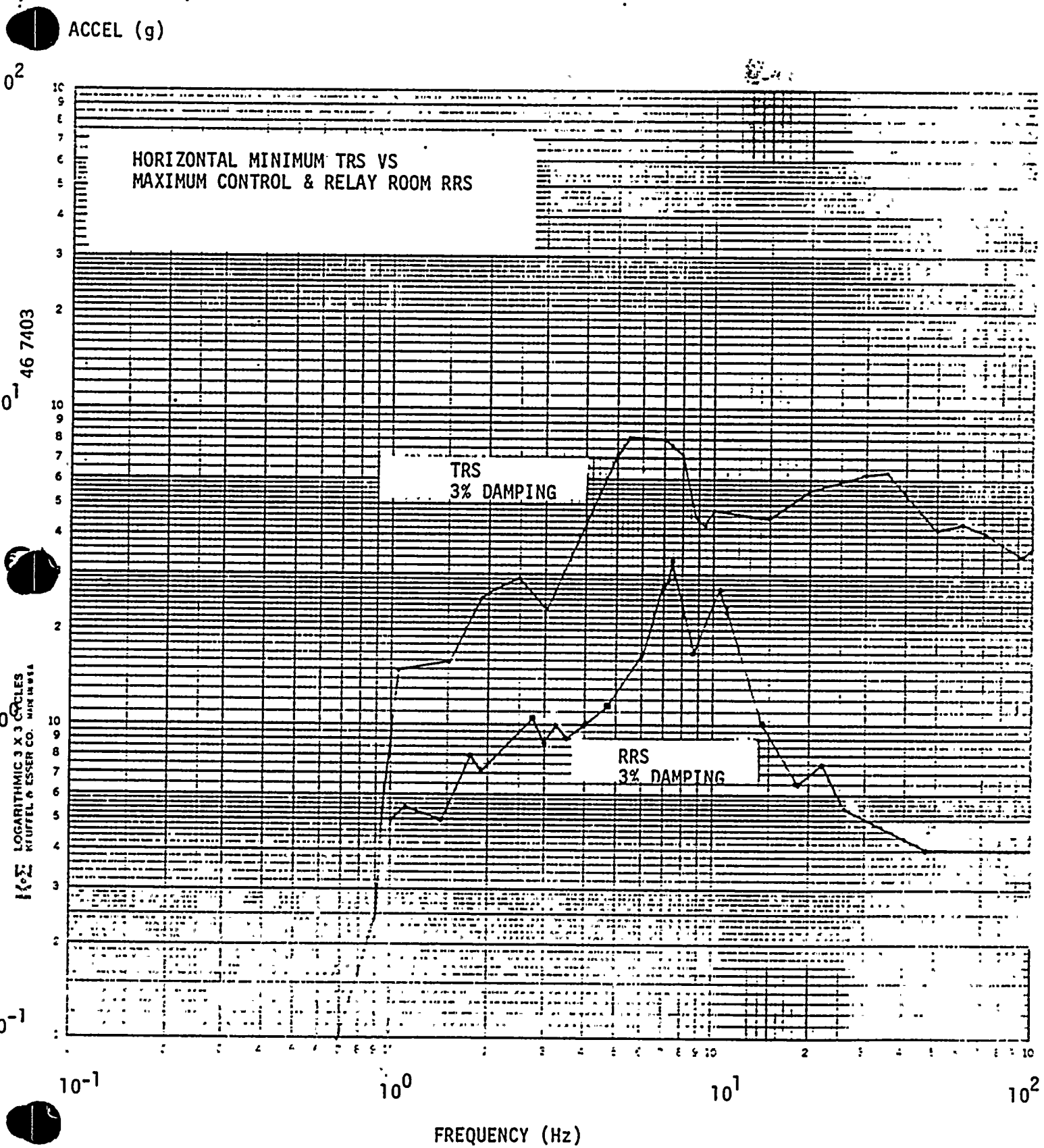
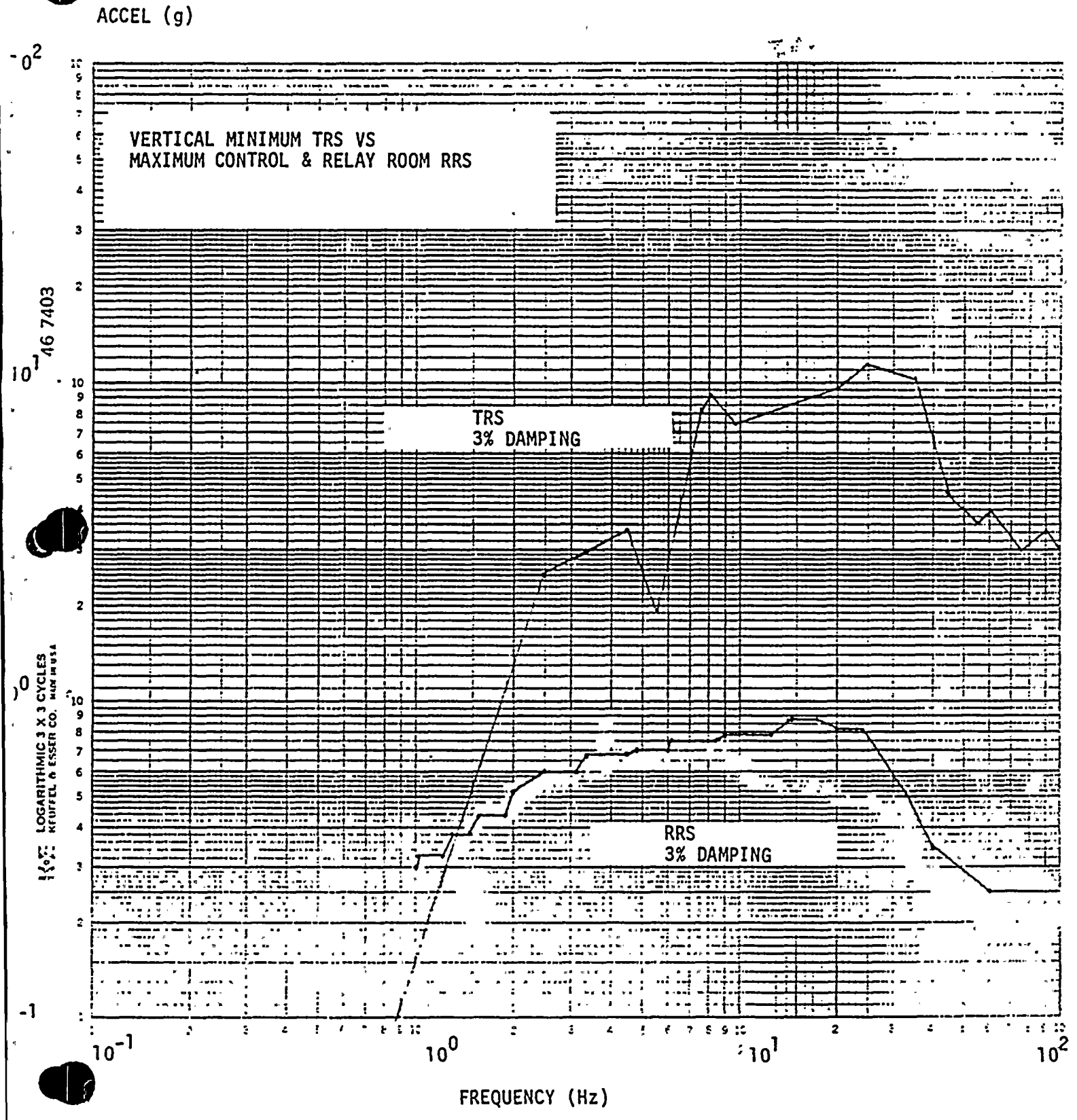
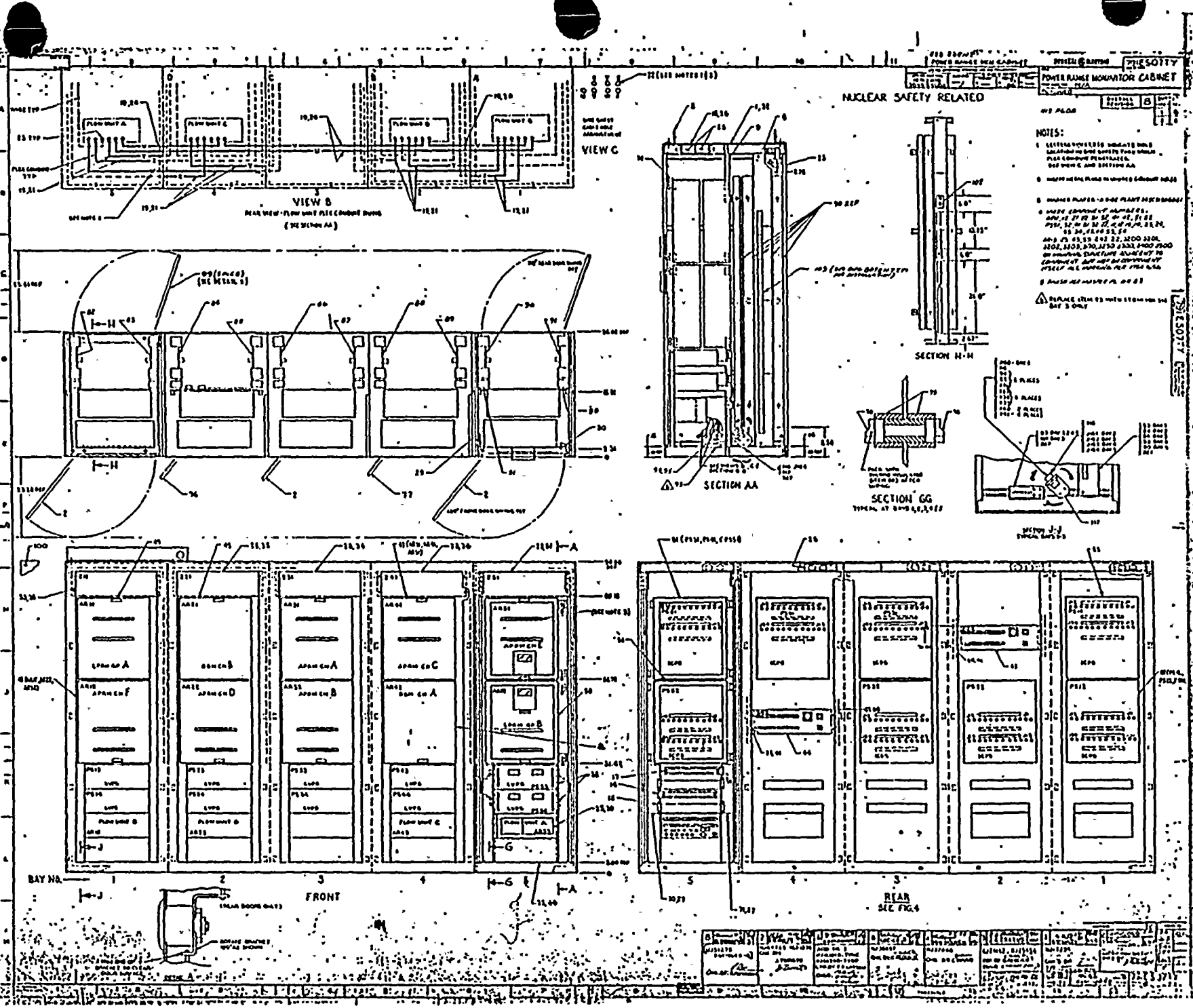
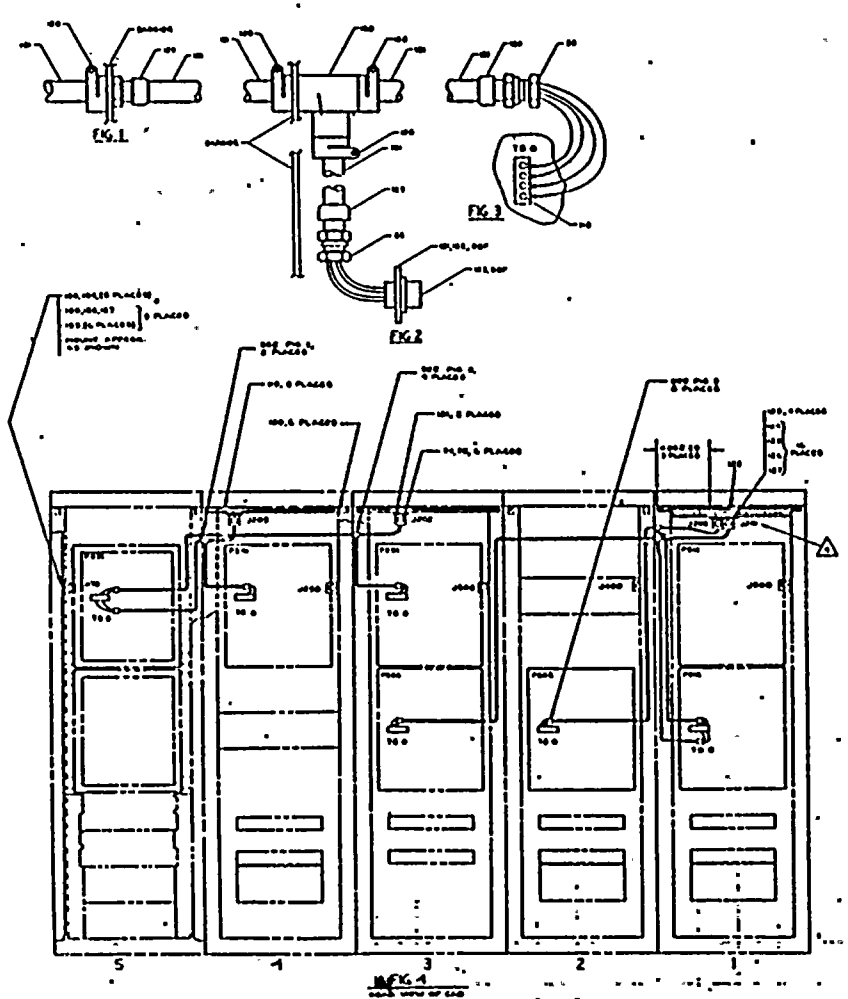

ACCEL (g)
HORIZONTAL MINIMUM TRS VS
MAXIMUM CONTROL & RELAY ROOM RRS
TRS
3% DAMPING
RRS
3% DAMPING
46 7403
LOGARITHMIC 3 X 3 CYCLES
KEUFFEL & ESSER CO.
FREQUENCY (Hz)

FIGURE 1B


ACCEL (g)
VERTICAL MINIMUM TRS VS
MAXIMUM CONTROL & RELAY ROOM RRS
TRS
3% DAMPING
RRS
3% DAMPING
LOGARITHMIC 3 X 3 CYCLES
KEUFFEL & ESSER CO.
FREQUENCY (Hz)


NUCLEAR SAFETY RELATED
POWER RANGE MONITOR CABINET
NOTES:
VIEW B
VIEW C
SECTION H-H
SECTION AA
SECTION GG
FRONT
REAR
BAY NO.
1
2
3
4
5



MPL: H22-P005

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point Nuclear Station Unit 2 Type:

1. Utility: Niagara Mohawk Power Corp. PWR _____
2. NSSS: GE BWR- 5, MK II
3. A/E: Stone & Webster Other _____

II. Component Name Local Instrument Rack

1. Scope: [x] NSSS [ ] BOP [ ] Other
2. Model Number: H22-P005 Quantity: 1
3. Size or Range: N/A
4. Vendor: General Electric Co.
5. If the component is a cabinet or panel, name and model number of the devices included: See attached device list
6. Physical Description:
   a. Appearance: Open rack
   b. Dimensions: 72"W x 30"D x 84"H
   c. Weight: 1500 lb
7. Location: Building: Rx Building
   Elevation: 261' Elev.
8. Field Mounting Conditions [x] Bolt (No. 18 , Size 5/8")
   [ ] Weld (Length ____)
   [ ] _____
9. Mounting Orientation [e.g., on floor, cantilevered, suspended, etc.]
   Floor mounted
10. a. System in which located: Reactor Vessel Level and Pressure
    b. Functional Description: Instrument support
    c. Is the equipment required for [ ] Hot Standby [ ] Cold Shutdown [x] Both [ ] Neither [ ] Other _____

11. Pertinent Reference Design Specification for Qualification Requirements: See purchase part drawings

a. [x] Seismic Input
b. [x] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[x] Yes [ ] No [ ] Partial or limited availability

IV. Equipment Qualification Method:

[ ] Test [ ] Analysis [x] Combination of Test and Analysis

Qualification Report*: Seismic Vibration Durability Qual. Test Report for Generic H22 Local Instrument Racks

(No., Title and Date): A00-794-10, Tab A

Company that Prepared Report: General Electric Co.

Company that Reviewed Report: General Electric Co.

Where Report is filed or available: General Electric Co., Wayne PA

Applicable Codes and/or Standards: IEEE 344-1975

V. Vibration Input:

1. Loads considered:
   a. [x] Seismic only
   b. [x] Hydrodynamic only
   c. [ ] Vibration from normal operation
   d. [ ] Combination of (a), (b), and (c)
2. Method of Combining RRS:
   [ ] Absolute Sum [x] SRSS [ ] _____ (other, specify)
3. Required Response Spectra** (attach the graphs): See Figures 2.1 & 2.2.

NOTE:

* If more than one report complete Items IV thru VII for each report.

** If other than RRS is used, describe methods.

MPL: H22-P005

4. Damping Corresponding to RRS: OBE N/A SSE 4%

5. Required Acceleration in Each Direction:

[x] ZPA [ ] Other _____ (specify)

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

SSE S/S = 0.56g's F/B = 0.56g's V = 0.60g's

Combined (SRSS) horizontal

6. Were fatigue effects considered:

[ ] Yes [x] No

If yes, describe how they were treated in overall qualification program: N/A

VI. If Qualification by Test, then Complete:

1. [ ] Single Frequency [x] Multi-Frequency [x]random
[ ] sine beat
[ ] _____

2. [ ] Single Axis [x] Multi-Axis
[ ] Independent Axis [ ] In-phase motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other N/A (specify)

4. Frequency Range: 1-250 Hz

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

S/S = 14.5 Hz F/B = 13.0 Hz V = 70.0 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

MPL: H22-P005

8. Maximum Input g Level Test:
   OBE S/S = N/A F/B = N/A V = N/A
   SSE S/S = 6.9g's F/B = 6.4g's V = 7.5g's

9. Laboratory Mounting:
   A. [ ] Bolt (No. ___, Size ____) Note: Panels were mounted "in a manner representation of their end use."
   [ ] Weld (Length ___) [ ] ___
   B. Orientation and Fixturing: _____

10. Functional operability verified:
    [x] Yes [ ] No [ ] Not Applicable

11. Test Results including modifications made:
    Poor quality welds broke. Instrument ouputs exceeded allowable variations. The welds were not up to spec. More thorough inspection, rather than design change is required. See A00-794-10, Index U for output variation reconciliation.

12. Other tests performed (such as aging or fragility test, including results):
    N/A

13. Failure Modes (If appropriate) N/A

14. Margins Available: [x] Input Spectrum [ ] Fragility

VII. If Qualification by Analysis, then complete: N/A

1. Method of Analysis:
   [ ] Static Analysis [ ] Equivalent Static Analysis
   [ ] 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: [ ] 3D [ ] 2D [ ] 1D
   [ ] Finite Element [ ] Beam
   [ ] Closed Form Solution [ ] Other _____

MPL: H22-P005

4. [ ] Computer Codes: _____
   Frequency Range and No. of modes
   [ ] Hand Calculations
5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:
   [ ] Absolute Sum [ ] SRSS [ ] Other: _____ (specify)
6. Damping:
   OBE _____ SSE _____ Basis for damping used: _____
7. Support Considerations in the model: _____
8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____
10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

SEISMIC QUALIFICATION REEVALUATION OF NUCLEAR SAFETY RELATED EQUIPMENT

PANEL MPL REFERENCE: H22-P005 | TITLE: RV LVL & PRESS LCL PNL A | PL 368X544TYG001
LOCATION: 261' ELEV., REACTOR BLDG. | PANEL DIMENSIONS: 72"Wx30"Dx84"H | REV 3

DESCRIPTION — EQUIPMENT NAME / MPL NUMBER	IDENTIFICATION	EC	SEISMIC CAPABILITY/ MALFUNCTION LIMIT F-B	S-S	V	MAXIMUM EXPECTED ACCELERATION AT LOC. F-B	S-S	V	REMARKS
TRANSMITTER, ABS. PRESSURE C72 N050 A	163C1558P572203	A							*
TRANSMITTER, ABS PRESSURE B22 N067 C,G	163C1558P672203	A							*
TRANSMITTER, DIFF PRESS C33 N004 C	163C1560P441203	P							*
TRANSMITTER, DIFF PRESS B22 N081 A	163C1561P512203	A	See Figures 2.1 and 2.2 for TRS/RRS Comparison						
TRANSMITTER, DIFF PRESS B22 N073 C,G	163C1561P562203	A							*
TRANSMITTER, GAGE PRESS B22 N078 A	163C1564P912203	A							*
TRANSMITTER, DIFF PRESS B22 N080 A	169C8392P472203	A							*
TRANSMITTER, DIFF PRESS C33 N008C	169C8393P58220	A							*
									*
NOTE: Rosemount 1151 transmitters were tested on the Generic H22 panels. Rosemount 1152 transmitters are qualified by similarity to the 1151's.(Ref. 4 of this report) The Generic panel TRS/NMP2 RRS comparison is shown in Figs. 2.1 & 2.3. 1151's are designated as 163C...., and 1152's are designated as 169C.....									

DATE

* These devices are being replaced for environmental qualification reasons.

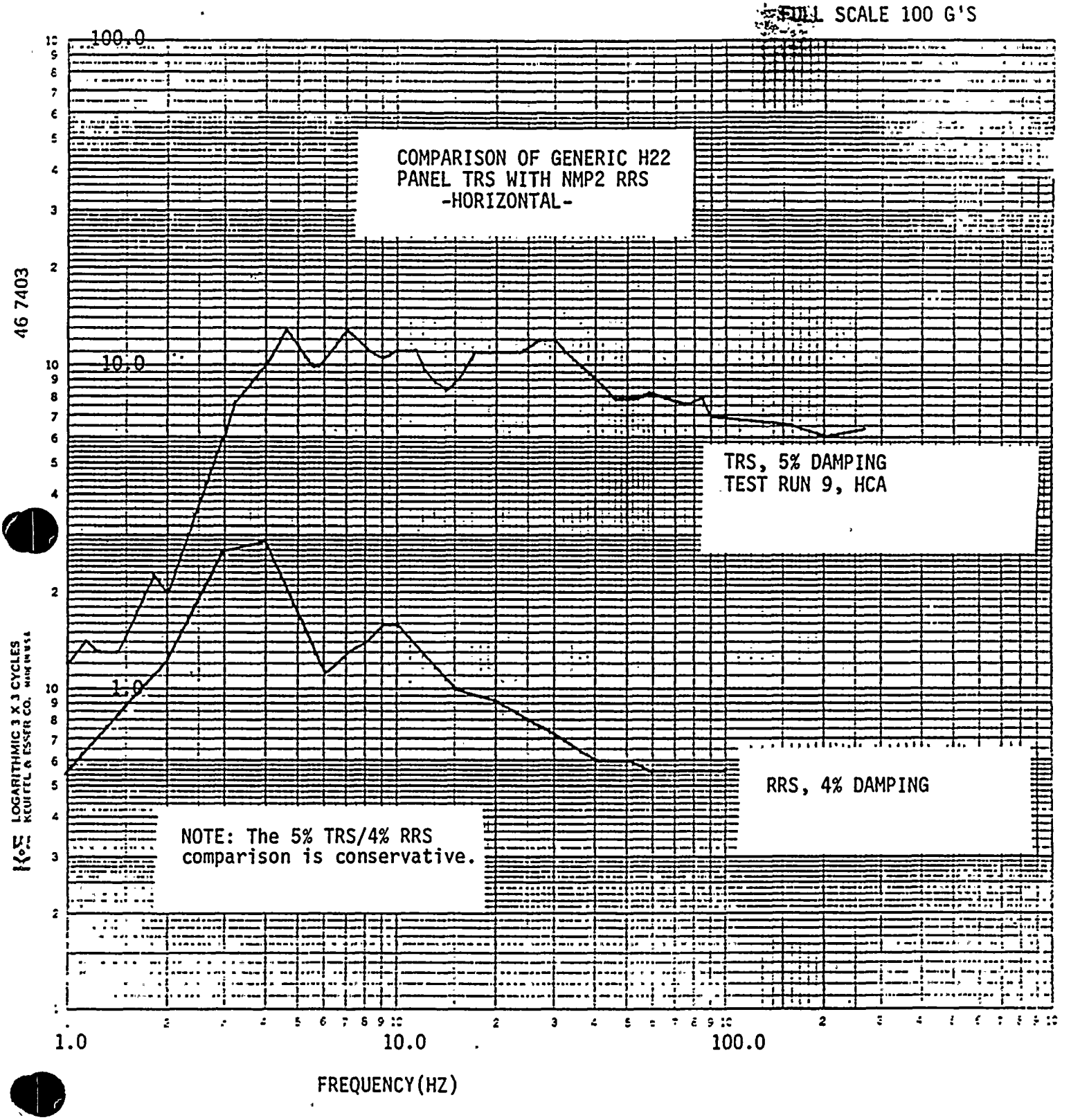

FULL SCALE 100 G'S
100.0
10.0
1.0
COMPARISON OF GENERIC H22
PANEL TRS WITH NMP2 RRS
-HORIZONTAL-
TRS, 5% DAMPING
TEST RUN 9, HCA
RRS, 4% DAMPING
NOTE: The 5% TRS/4% RRS
comparison is conservative.
46 7403
KEUFFEL & ESSER CO.
1.0
10.0
100.0
FREQUENCY(HZ)

FIGURE 2.1

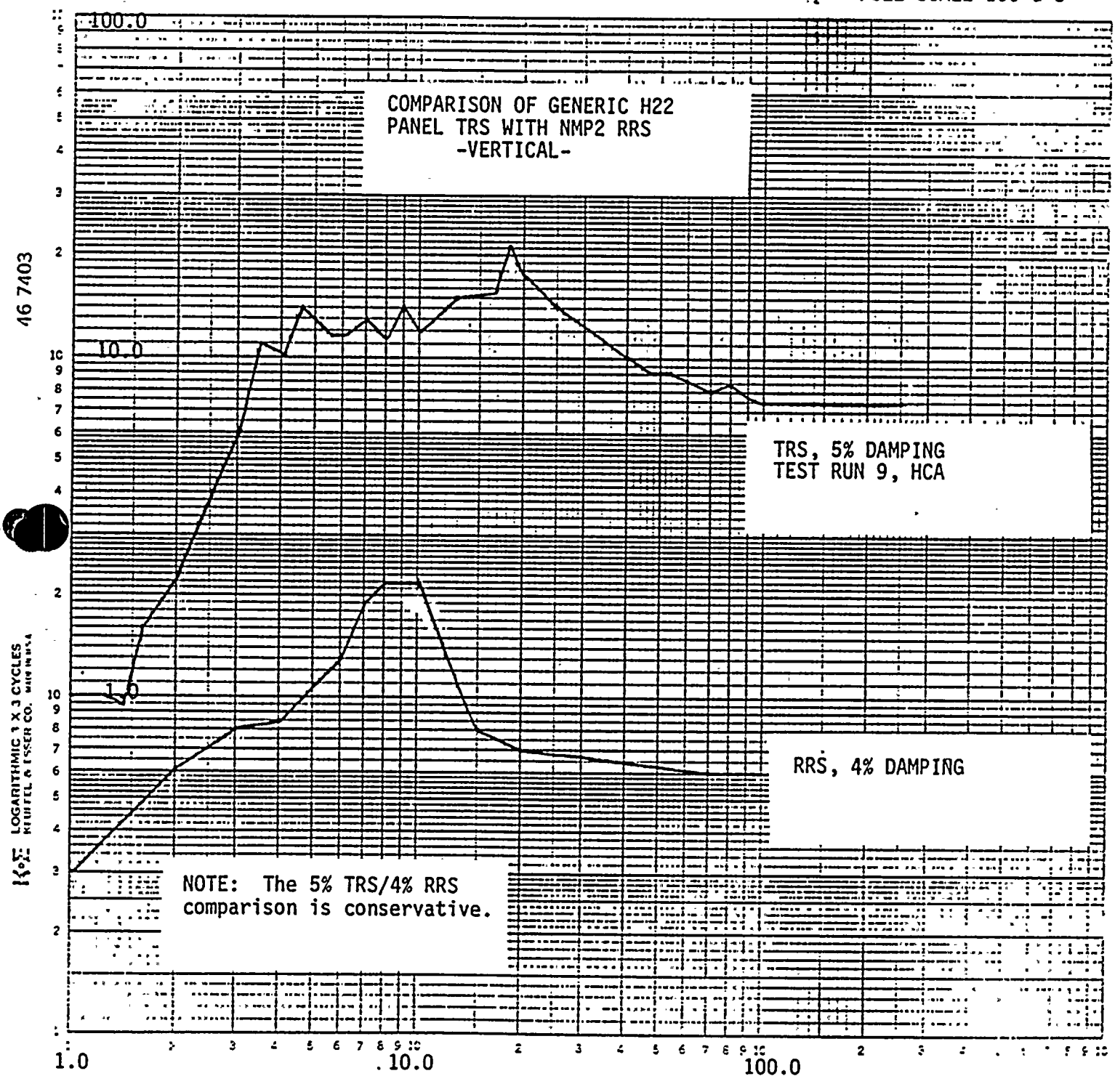

FULL SCALE 100 G'S
100.0
COMPARISON OF GENERIC H22
PANEL TRS WITH NMP2 RRS
-VERTICAL-
10.0
1.0
TRS, 5% DAMPING
TEST RUN 9, HCA
RRS, 4% DAMPING
NOTE: The 5% TRS/4% RRS
comparison is conservative.
46 7403
KEUFFEL & ESSER CO.
1.0
10.0
100.0
FREQUENCY(HZ)

FIGURE 2.2

QUALIFICATION SUMMARY

1. Panel Name: High Pressure Core Spray Switchgear

2. A. MPL or EDL Item No.: E22-S004
   B. GE Purchase Part Drawing No.:

3. Qualification Documentation

   A. Qualification Summary of Equipment (SQRT Form)
   Attached

   B. Reference Documents

Reference Number	Document Identification	Date	Title
1	Wyle Laboratories Report No. 43639-1		"Qualification Report, Metalclad Switchgear Equipment"

   C. Additional Supporting Documents

4. Requirements

This device is classified as active and thus must perform its intended function prior to, during and after the seismic events specified.

5. Demonstrated Capability

All test levels specified in test program were met or exceeded. Some problems were experienced as described below.

1. Agastat (door mounted) auxiliary relay disengaged from socket during testing in Z/Y axis. A relay latch was installed to hold the auxiliary relay in place and testing continued in the Z/X axis.

2. Some door hinges bent and broke. Hinges were repaired and/or modified to attain successful test runs.

3. Doors bolted closed with 3/8-16 grade 5 bolts during Z/Y axis testing. Sixteen successful test runs followed this modification.

4. During Z/X axis testing swing panel was secured to mounting panel with gasket material and bolted with (2) No. 10-32 screws. Thirty-two successful test runs followed this modification.

6. Rationale for Qualification

Although structural modifications were made to the units, the test data shows that the unit passed 13 test runs (RMF + SB) in the Z/Y axis prior to any modification made (minimum ZPA levels of 13 runs of 1.75g H and 1.53g V).

Tests performed in the X/Y axis with modified swing panel had minimum ZPA levels of 1.6g H and 1.7g V.

This equipment is considered qualified based on the degree of conservatism built into the test program and the tested ZPA, required ZPA (faulted) ratio of:

Z/Y; 2.8/0.24 = 11.7

X/Y; 3.0/0.24 = 12.5

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point 2 Type:

1. Utility: Niagara Mohawk Power Corp PWR
2. NSSS: General Electric Company BWR 5, MK II
3. A/E: Stone and Webster Engineering Co. Other

II. Component Name: High Pressure Core Spray Switchgear

1. Scope: [X] NSSS [ ] BOP [ ] Other
2. Model Number: P.O. No. 531/W-464946 Quantity: 1
3. Size or Range: 7.2 KV-1200A-500 MVA
4. Vendor: General Electric Company
5. If the component is a cabinet or panel, name and model number of the devices included: Unit consists of cabinets 101 and 102.
6. Physical Description:
   a. Appearance: Cabinet (7 compartments)
   b. Dimensions: 26"W x 81.5"D x 90"H (Each compartment)
   c. Weight: Not available
7. Location: Building: Diesel Generator and Control Building
   Elevation: 261 ft.
8. Field Mounting Conditions: [X] Bolt (No. 6, Size 1/2") [ ] Weld (Length) [X] 1/4 " fillet welds along back 1" long on 14" centers Front and sides of each compartment.
9. Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.):
   Floor mounted.
10. a. System in which located: HPCS
    b. Functional Description: Active, Class 1E
    c. Is the equipment required for
       [ ] Hot Standby [ ] Cold Shutdown [X] Both
       [ ] Neither [ ] Other

11. Pertinent Reference Design Specification for Qualification Requirements: _____

a. [ ] Seismic Input
b. [ ] Hydrodynamic Load Input
c. [ ] Fatigue Considerations
d. [ ] Service Conditions
e. [ ] Qualified Life

III. Is Equipment Available for Inspection in the Plant:

[X] Yes [ ] No [ ] Partial or Limited Availability

IV. Equipment Qualification Method:

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

Qualification Report:* Qualification Report Metalclad Switchgear Eqmt.

(No., Title and Date): Wyle Labs 43639-1.

Company that Prepared Report: Wyle Labs

Company that Reviewed Report: General Electric Company

Where Report is Filed or Available: General Electric, San Jose, Calif.

Applicable Codes and/or Standards: IEEE 344-1975

V. Vibration Input

1. Loads Considered:

a. [X] Seismic only
b. [ ] Hydrodynamic only
c. [ ] Vibration from normal operation
d. [ ] Combination of a, b, and c

2. Method of Combining RRS:

[ ] Absolute Sum [ ] SRSS [X] N.A. (other, specify)

3. Required Response Spectra** (attached the graphs): See Attachment 1

NOTE:

* If more than one report complete Items IV thru VII for each report.
** If other than RRS is used, describe methods.

4. Damping Corresponding to RRS: OBE 2% SSE 3%

5. Required Acceleration in Each Direction:

[X] ZPA [ ] Other _____ (Specify)

OBE S/S = 0.13 F/B = 0.13 V = 0.10
SSE S/S = 0.24 F/B = 0.24 V = 0.18

6. Were fatigue effects considered:

[ ] Yes [X] No

If yes, describe how they were treated in overall qualification program:

_____

_____

_____

VI. If Qualification by Test, Then Complete:

1. [X] Single Frequency [X] Multi-Frequency [X] Random
0.2 g resonance search [X] Sine Beat
[ ] _____

2. [X] Single Axis [ ] Multi-Axis
[ ] Independent Axis [ ] In-Phase Motions

3. Number of Qualification Tests:

OBE _____ SSE _____ Other No. of Qual Tests Greater than 6 (Specify)

4. Frequency Range: 1-35 Hz (resonance search), 1-40 Hz (random)

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

S/S = 4.5 Hz F/B = 6.14.22 Hz V = None below 33 Hz

6. Method of Determining Natural Frequencies:

[X] Lab Test [ ] In-Situ Test [ ] Analysis

7. TRS enveloping RRS using Multi-Frequency Test:

[ ] Yes
[X] No input g level envelops ZPA of RRS

8. Maximum Input g Level Test:

OBE S/S = 1.6g F/B = 1.75g V = 1.7g
SSE S/S = 3.0g F/B = 2.8g V = 2.85g

9. Laboratory Mounting:

A. [X] Bolted to simulate field mounting conditions
[ ] Weld (Length ____) [ ] _____

B. Orientation and Fixturing: _____

10. Functional Operability Verified:

[X] Yes [ ] No [ ] Not Applicable

11. Test Results Including Modifications Made:

See qualification summary.

12. Other Tests Performed (Such as Aging or Fragility Test, Including Results):

Retaining latch installed on agastat door mounted auxiliary relay.
Door hinges were modified to include three welded gussets.

13. Failure Modes (if appropriate): _____

14. Margins Available: [ ] Input Spectrum [X] Fragility

VII. If Qualification by Analysis, Then Complete: (Not Applicable)

1. Method of Analysis:

[ ] Static Analysis
[ ] Dynamic Analysis
[ ] Equivalent Static Analysis
[ ] Time-History
[ ] Response Spectrum

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

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

3. Model Type:

[ ] 3D
[ ] Finite Element
[ ] Closed Form Solution
[ ] 2D
[ ] 1D
[ ] Beam
[ ] Other _____

4. [ ] Computer Codes: _____

   Frequency Range and Number of Modes: _____

   [ ] Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   [ ] Absolute Sum [ ] SRSS [ ] Other _____ (Specify)

6. Damping:

   OBE _____ SSE _____ Basis for Damping Used _____

7. Support Considerations in the Model: _____

8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B.

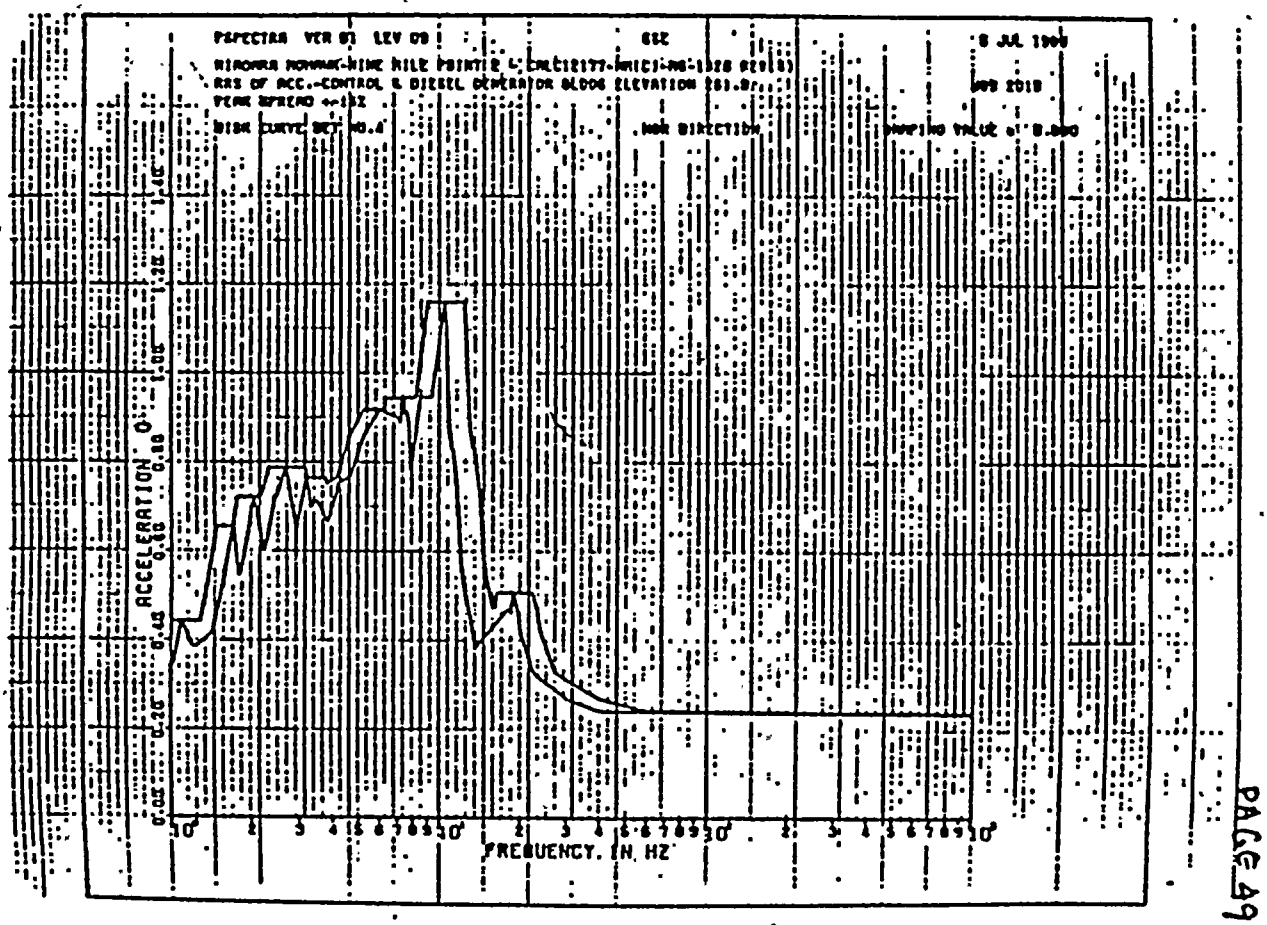
Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes: _____

10. Margins Available: [ ] Input Spectrum
    [ ] Stress or Deflection

ATTACHMENT 1

REQUIRED RESPONSE SPECTRA



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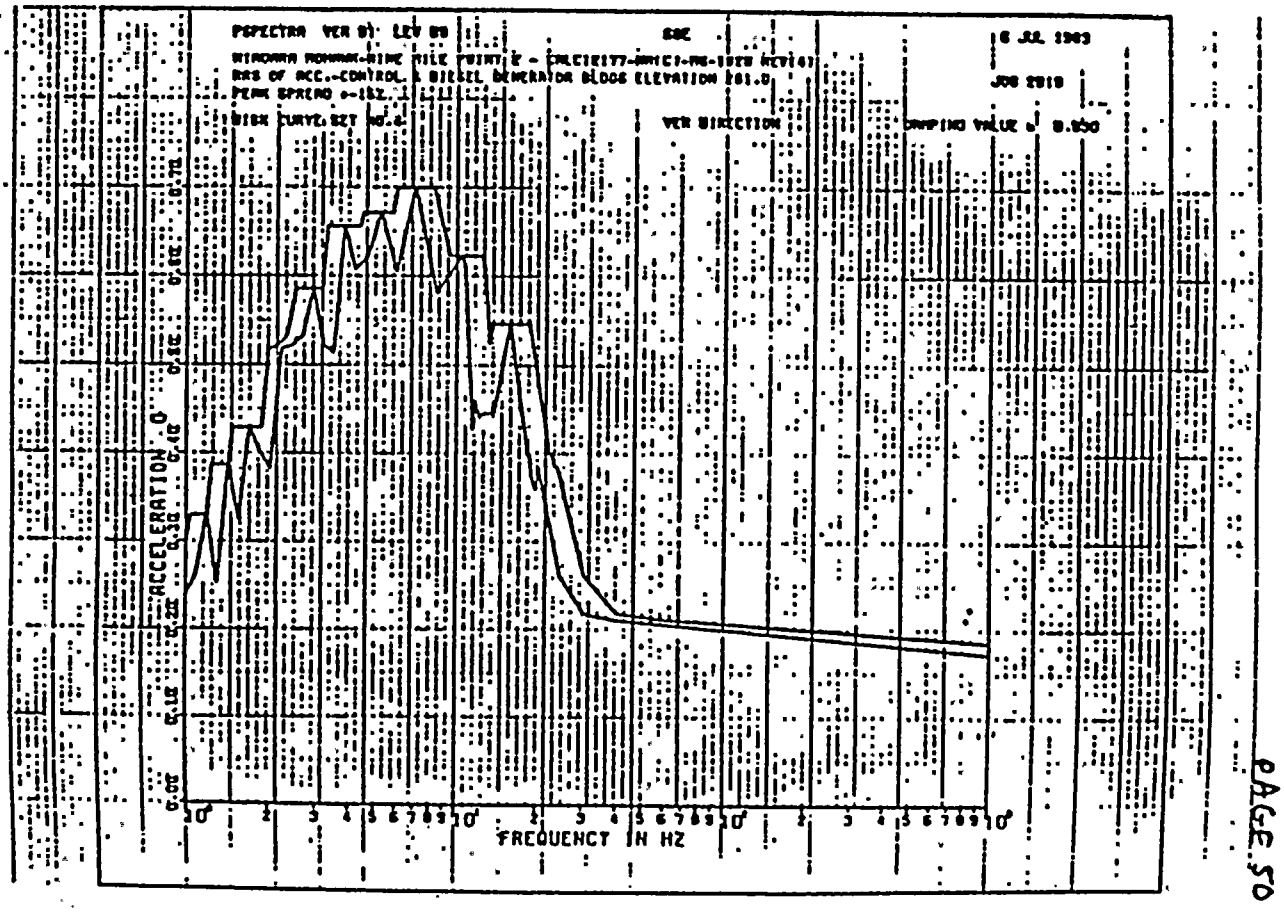
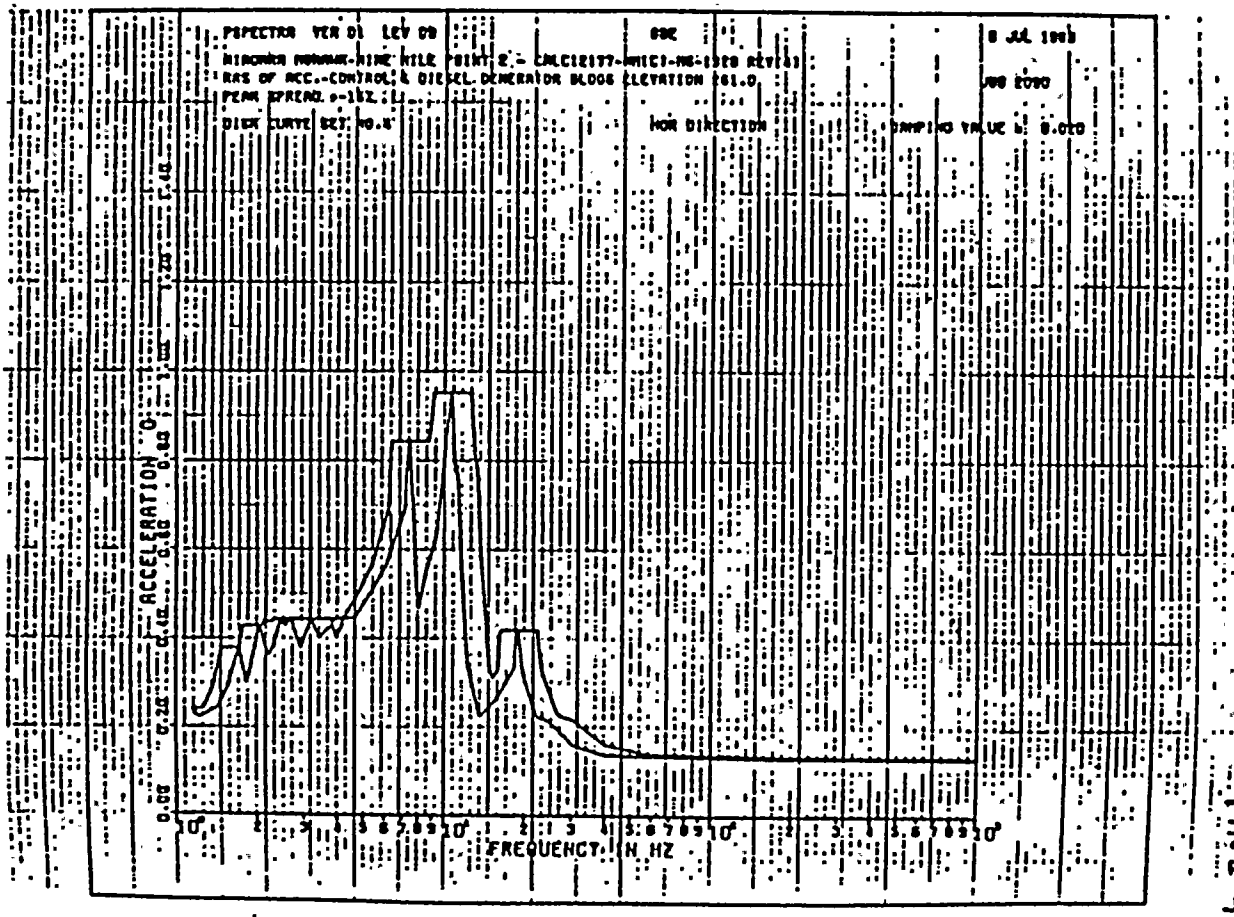
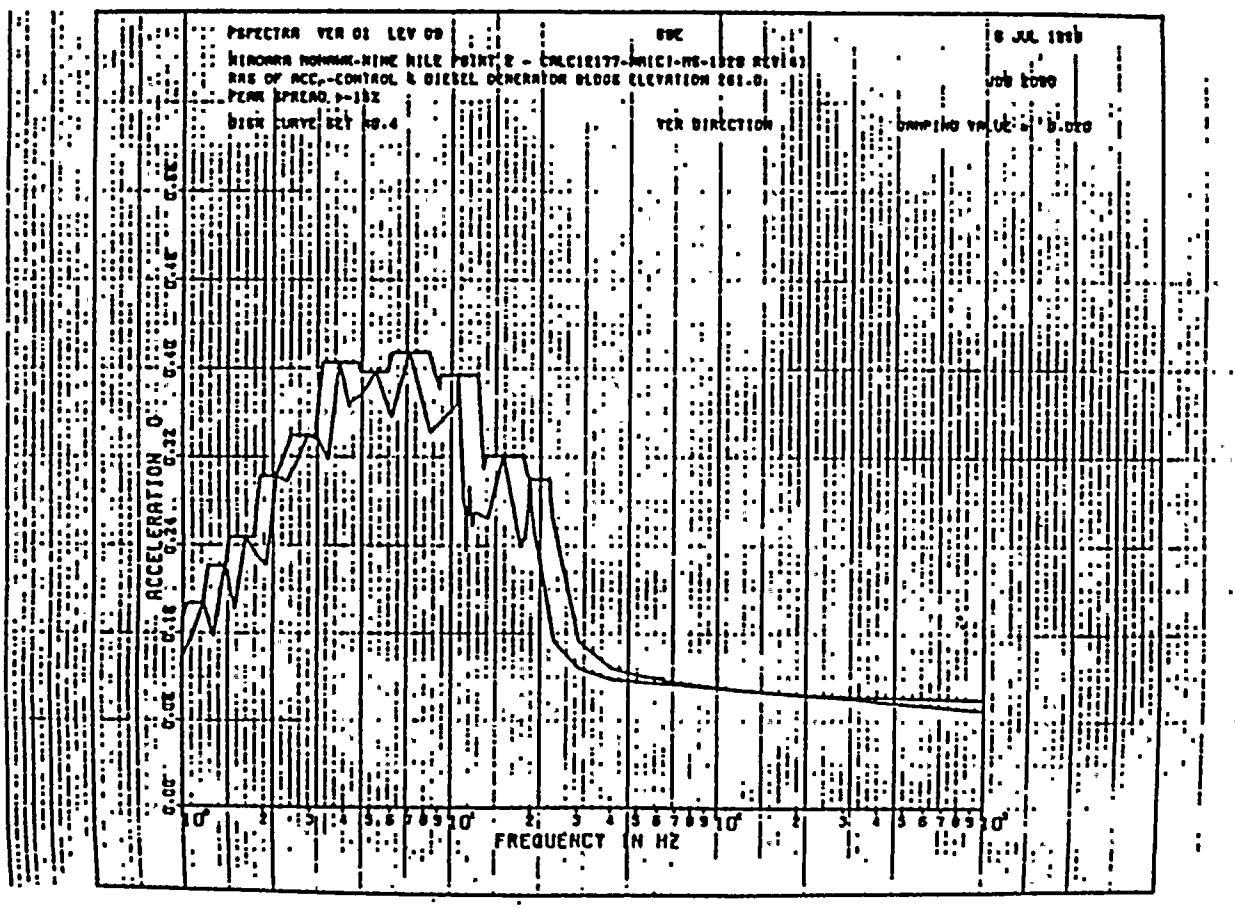


PAGE 50



PAGE 97



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PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Nine Mile Point Unit No. 2
2. Docket No.: 50-410
3. Utility: Niagara Mohawk Power Corporation
4. NSSS: General Electric Co. [ ] PWR [X] BWR
5. A/E: Stone & Webster Engineering Corporation
6. C.P. Docket Date: June 15, 1972 C.P. SER Date: June 15, 1973

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [X] NSSS [ ] BOP
2. Location:
   a. Building/Room Containment/ABS-17509 (1)
   b. Elevation 175 ft. (1)
   c. System Residual Heat Removal (RHR)
3. Component I.D. No. on P&ID dwg: E12-C002
4. If component is a [X] Pump complete II.5.
   If component is a [ ] Valve complete II.6.
5. General Pump Data

a. Pump		b. Prime-mover	
Name	Residual Heat Removal Pump	Name	RHR Induction Motor
Mfg.	Byron Jackson (2)	Mfg.	General Electric Co. (1)
Model	30DX20CKXH$_2$ (3)	Model	5K6339XC193A (1)
S/N	731-S-1096/8 (3)	S/N	JMJ 901023 (4)
Type	Vertical Centrifugal (3)	Type	Squirrel Cage (1)

*The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

a. Pump (continued)

Overall Dimensions 269 in. long (3)

Weight 17,400 lb. (dry) (3)

Mounting Method Flange (1)

Required B.H.P. 875 (7)

Parameters:	Component Design	System Normal	System Accident
Suction:	220 psi		
Discharge: Press	500 psi (2)	—	—
Temp	360°F (6)	80°F	212°F
Flow	7450 gpm (2)	7450	7450
Head	360 ft. (2)	360	360
Media	water	water	water

Required NPSH at maximum

Flow 10 ft. at 8400 (6) (7)

Available NPSH 13 ft. (2)

Operating Speed 1775 rpm (2)

Critical Speed 3658 rpm (2)

b. Prime-mover (continued)

Overall Dimensions 71 1/4 in. long (3)

Weight 7,948 lb. (4)

Mounting Method Flange (1)

H.P. 1000 (1)

Prime-mover requirements: (include normal, maximum and minimum).

Motor (voltage) 4000 (1)

Turbine (pressure) ____

n/a

If MOTOR list:

Duty cycle Continuous; SF=1.15 (1)

Stall current 820 amps (4)

Class of insulation F (VPI) (1)

List functional accessories:* none

*Functional accessories are those additional sub-components that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, speed control system, feedback, etc.) Include manufacturer and model number.

6. General Valve Data

a. Valve	b. Actuator (if not an integral unit)
Name _____	Name _____
Mfg. _____	Mfg. _____
Model _____	Model _____
S/N _____	S/N _____
Type _____	Type _____
Size _____	Size _____
Weight _____	Weight _____
Mounting Method _____	Mounting Method _____
Required Operating Torque _____	Maximum Delivered Torque _____

Parameters:	Component Design	System Normal	System Accident
Press			
Temp			
Flow			
Media			

Power requirements: (include normal, maximum and minimum).

Electrical _____

_____

_____

Pneumatic/Hydraulic ____

_____

_____

Max ΔP across valve _____

Closing time @ max ΔP _____

Opening time @ max ΔP _____

List functional accessories:* _____

_____

_____

_____

III. FUNCTION

1. Describe components normal and safety functions (include accident initiating signals, if applicable):

Normal: Cooling of fuel pool and removal of residual core heat under normal and abnormal shutdown conditions

Safety: Supply coolant to the core in the event of an accident

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [X] Containment heat removal

c. [ ] Containment isolation

d. [X] Reactor heat removal

e. [X] Reactor core cooling

f. [ ] Prevent significant release of radioactive material to environment.

g. [ ] Does the component function to mitigate the consequences of one or more of the following events? [ ] Yes [ ] No If "Yes", identify.

[X] LOCA [ ] HELB [ ] MSLB

[ ] Other _____

*Functional accessories are those additional sub-components that are required to make the valve assembly operational, (e.g., limit switches, solenoid valves, accumulators, etc.) Include manufacturer and model number.

4. Safety requirements:

[] Intermittent Operation [] During postulated event

[] Continuous Operation [] Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational.
100 days (1) (e.g., hours, days, etc.)

5. For VALVES:

Does the components [] Fail open [] Fail closed [] Fail as is

Is this the fail safe position: [] Yes [] No

Is the valve used for throttling purposes? [] Yes [] No

What is the maximum acceptable internal and external leakrate?

_____ _____

IV. QUALIFICATION

1. Reference by specific number the design codes and standards used as a guide to qualify the component:

ASME, NEMA, AF BMA, ANSI, NUREG-0588, IEEE

2. Have acceptance criteria been established and documented in the test plan(s) for the component? [X] Yes [] No

3. Are the margins* identified in the qualification documentation? [X] Yes [] No

4. Was the component that was qualified a model or an actual assembly? assembly. If a model, what was its scale? _____. If an actual assembly, was it qualified as an assembly or by sub-assemblies? (i.e., valve, actuator, pump, driver) sub-assembly

*Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

5. List all component tests performed or to be performed that demonstrate qualification:

operation, normal thermal aging, normal operational aging, radiation, seismic, design accident temperature/humidity, post accident aging

6. List all component analyses performed that demonstrate qualification:

pump stress analysis, pump and motor operability assurance analysis, gamma radiation assessment (1) (2) (5)

7. As a result of any of the tests (or analysis), were any deviations from design requirements identified? [] Yes [X] No
If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

8. Was the tested component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [X] No If "No", is installed component [] oversized or [X] undersized? (1)

9. Is component orientation sensitive? [X] Yes [] No [] Unknown If "Yes", does installed orientation conincide with test/analysis orientation? [X] Yes [] No (1)

10. List all plant loading conditions considered during tests or analysis; (e.g., normal, upset, emergency, faulted).

faulted

11. What is the fundamental frequency of the component?

18 Hz (5)

12. Does the component have a unique design or utilize unique material in its construction? (Examples are special gaskets or packing, one of a kind components, limitations on nonferrous materials, special coatings or surfaces, etc.)

[X] Yes [] No If "Yes" identify:

Polyimide, Polyester, MICA, Epoxy (1)

13. What is the design (qualified) life of the component, exclusive of normal maintenance items such as packing, bearings, seals, diaphragm, gaskets, and other elastomers?

40 years plus 100 day accident (1)

14. Which of the components normal maintenance items requires the most frequent replacement/repair? oil replacement
What is the normal time interval between replacements/repairs?

6-12 months (1)

15. List the harshest environmental conditions that the component could be exposed to during or following an accident, [e.g., temp., pressure, humidity, submergence, radiation (type and dose), etc.]:

175°F (1)

4.33×10^7 Rads (1)

Information concerning Qualification Documents for the Component

	Report Number	Report Title	Date	Company/Organization Preparing Report	Company/Organization Reviewing Report
1.	NEDC 30469	Nine Mile Pt.2 Environmental Qualification Report	12/83	General Electric Company	n/a
2.	VPF 3661-31-2	RHR Pump Design Report	8/16/77	Byron Jackson	General Electric Company
3.	VPF 3661-20-2	Pump Vendor Instruction Manual	7/25/78	Byron Jackson	General Electric Company
4.	VPF 3663-26-1	RHR Motor Instruction Manual	9/24/76	General Electric Company	
5.	DRF# E12-00039-1	Nine Mile Pt.2 RHR Pump and Motor New Loads Analysis	6/85	General Electric Company	
6.	21A1913AD	Purchase Spec. Data Sheet	6/28/77	General Electric Company	
7.	VPF 3661-59-1	Performance Data	7/7/77	Byron Jackson	General Electric Company

L12205

MPL: E21-C001

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Nine Mile Point Unit No. 2
2. Docket No.: 50-410
3. Utility: Niagara Mohawk Power Corporation
4. NSSS: General Electric Co. [ ] PWR [X] BWR
5. A/E: Stone & Webster Engineering Corporation
6. C.P. Docket Date: June 15, 1972 C.P. SER Date: June 15, 1973

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [X] NSSS [ ] BOP
2. Location: a. Building/Room Containment/ABN-17503 (1)
   b. Elevation 175 ft. (1)
   c. System Low Pressure Core Spray (LPCS)
3. Component I.D. No. on P&ID dwg: E21-C001
4. If component is a [X] Pump complete II.5.
   If component is a [ ] Valve complete II.6.
5. General Pump Data

a. Pump		b. Prime-mover	
Name	Low Pressure Core Spray Pump	Name	LPCS Induction Motor
Mfg.	Byron Jackson (2)	Mfg.	General Electric Co. (1)
Model	30DX20CKXH (2)	Model	5K6347XC95A (1)
S/N	731-S-1095 (2)	S/N	BMJ 211001 (4)
Type	Vertical Centrifugal (3)	Type	Squirrel Cage (1)

*The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

a. Pump (continued)

Overall Dimensions 271 in. long (3)

Weight 18,000 lb. (dry) (3)

Mounting Method Flange (1)

Required B.H.P. 1300 (7)

b. Prime-mover (continued)

Overall Dimensions 78 3/8 in. long (3)

Weight 10,780 lb. (4)

Mounting Method Flange (1)

H.P. 1500 (1)

Parameters:	Component Design	System Normal	System Accident
Suction:	115 psi (2)	115 psi (6)	115 psi (6)
Discharge: Press	600 psi	600 psi	600 psi
Temp	212°F (2)	80°F	212°F
Flow	6,350 gpm (2)	6350	6350
Head	714 ft. (2)	714 ft.	714 ft.
Media	water	water	water

Prime-mover requirements: (include normal, maximum and minimum).

Motor (voltage) 4000 (1)

Turbine (pressure) ____

n/a

Required NPSH at maximum Flow 4 ft. at 7700 gpm (6) (7)

Available NPSH 11 ft. (2)

Operating Speed 1780 rpm (2)

Critical Speed 4387 rpm (2)

If MOTOR list:

Duty cycle Continuous SF=1.15. (1)

Stall current 1216 amps (4)

Class of insulation F (VPI) (1)

List functional accessories:* none

*Functional accessories are those additional sub-components that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, speed control system, feedback, etc.) Include manufacturer and model number.

6. General Valve Data

a. Valve	b. Actuator (if not an integral unit)
Name _____	Name _____
Mfg. _____	Mfg. _____
Model _____	Model _____
S/N _____	S/N _____
Type _____	Type _____
Size _____	Size _____
Weight _____	Weight _____
Mounting Method _____	Mounting Method _____
Required Operating Torque _____	Maximum Delivered Torque _____

Parameters:	Component Design	System Normal	System Accident	Power requirements: (include normal, maximum and minimum).
Press				Electrical
Temp				
Flow				
Media				Pneumatic/Hydraulic
Max ΔP across valve				
Closing time @ max ΔP				
Opening time @ max ΔP				

List functional accessories:* _____

_____

_____

_____

III. FUNCTION

1. Describe components normal and safety functions (include accident initiating signals, if applicable):

Normal: none

Safety: Supply coolant to the core in the event of an accident

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [X] Reactor heat removal

e. [ ] Reactor core cooling

f. [ ] Prevent significant release of radioactive material to environment.

g. [ ] Does the component function to mitigate the consequences of one or more of the following events? [ ] Yes [ ] No
If "Yes", identify.

[X] LOCA [ ] HELB [ ] MSLB

[ ] Other _____

*Functional accessories are those additional sub-components that are required to make the valve assembly operational, (e.g., limit switches, solenoid valves, accumulators, etc.) Include manufacturer and model number.

4. Safety requirements:

[] Intermittent Operation [] During postulated event

[] Continuous Operation [] Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational.
100 days (1) (e.g., hours, days, etc.)

5. For VALVES:

Does the components [] Fail open [] Fail closed [] Fail as is

Is this the fail safe position: [] Yes [] No

Is the valve used for throttling purposes? [] Yes [] No

What is the maximum acceptable internal and external leakrate?

_____ _____

IV. QUALIFICATION

1. Reference by specific number the design codes and standards used as a guide to qualify the component:

ASME, NEMA, AF BMA, ANSI, NUREG-0588

IEEE

2. Have acceptance criteria been established and documented in the test plan(s) for the component? [X] Yes [] No

3. Are the margins* identified in the qualification documentation? [X] Yes [] No

4. Was the component that was qualified a model or an actual assembly? assembly. If a model, what was its scale? _____. If an actual assembly, was it qualified as an assembly or by sub-assemblies? (i.e., valve, actuator, pump, driver) sub-assembly

*Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

5. List all component tests performed or to be performed that demonstrate qualification:

operation, normal thermal aging, normal operational aging, radiation, seismic, design accident temperature/humidity, post accident aging (1)

6. List all component analyses performed that demonstrate qualification:

pump stress analysis, pump and motor operability assurance analysis, gamma radiation assessment (1) (2) (5)

7. As a result of any of the tests (or analysis), were any deviations from design requirements identified? [] Yes [X] No
If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

8. Was the tested component precisely identical (as to model, size, etc.) to the in-plant component? [ ] Yes [X] No If "No", is installed component [X] oversized or [ ] undersized? (1)

9. Is component orientation sensitive? [X] Yes [ ] No [ ] Unknown If "Yes", does installed orientation conincide with test/analysis orientation? [X] Yes [ ] No (1)

10. List all plant loading conditions considered during tests or analysis; (e.g., normal, upset, emergency, faulted).

faulted

11. What is the fundamental frequency of the component?

18 Hz (5)

12. Does the component have a unique design or utilize unique material in its construction? (Examples are special gaskets or packing, one of a kind components, limitations on nonferrous materials, special coatings or surfaces, etc.)

[X] Yes [ ] No If "Yes" identify:

Polyimide, Polyester, MICA, Epoxy (1)

13. What is the design (qualified) life of the component, exclusive of normal maintenance items such as packing, bearings, seals, diaphragm, gaskets, and other elastomers?

40 years plus 100 day accident (1)

14. Which of the components normal maintenance items requires the most frequent replacement/repair? oil replacement
What is the normal time interval between replacements/repairs?

6-12 months (1)

15. List the harshest environmental conditions that the component could be exposed to during or following an accident, [e.g., temp., pressure, humidity, submergence, radiation (type and dose), etc.]:

$175^{o}F$ (1)

4.33×10^{7} (1)

Information concerning Qualification Documents for the Component

	Report Number	Report Title	Date	Company/Organization Preparing Report	Company/Organization Reviewing Report
1.	NEDC 30469	Nine Mile Pt. 2 Environmental Qualification Report	12/83	General Electric Company	n/a
2.	VPF 3664-26-2	LPCS Pump Design Report	7/25/77	Byron Jackson	General Electric Company
3.	VPF 3664-17-2	Pump Vendor Instruction Manual	9/19/78	Byron Jackson	General Electric Company
4.	VPF 3663-30-1	LPCS Motor Instruction Manual	5/10/76	General Electric Company	
5.	DRF# E21-00025-1	Nine Mile Pt.2 LPCS Pump and Motor New Loads Analysis	4/16/85	General Electric Company	
6.	21A1913AC	Purchase Specification Data Sheet	6/28/77	General Electric Company	
7.	VPF 3664-71-1	Performance Data	1/5/78	Byron Jackson	General Electric Company

MPL: E22-F001

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Nine Mile Point Unit No. 2
2. Docket No.: 50-410
3. Utility: Niagara Mohawk Power Corporation
4. NSSS: General Electric Co. [ ] PWR [X] BWR
5. A/E: Stone & Webster Engineering Corporation
6. C.P. Docket Date: June 15, 1972 C.P. SER Date: June 15, 1973

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [X] NSSS [ ] BOP
2. Location: a. Building/Room Containment Building
   b. Elevation 177 ft
   c. System High Pressure Core Spray
3. Component I.D. No. on P&ID dwg: E22-F001
4. If component is a [ ] Pump complete II.5.
   If component is a [X] Valve complete II.6.
5. General Pump Data

a. Pump		b. Prime-mover	
Name		Name	
Mfg.		Mfg.	
Model		Model	
S/N		S/N	
Type		Type	

*The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

a. Pump (continued)

Overall Dimensions _____

Weight _____

Mounting Method _____

Required B.H.P. _____

Parameters:	Component Design	System Normal	System Accident
Press			
Temp			
Flow			
Head			
Media			

Required NPSH at maximum

Flow _____

Available NPSH _____

Operating Speed _____

Critical Speed _____

b. Prime-mover (continued)

Overall Dimensions _____

Weight _____

Mounting Method _____

H.P. _____

Prime-mover requirements: (include normal, maximum and minimum).

Motor (voltage) _____

_____

_____

Turbine (pressure) _____

_____

_____

If MOTOR list:

Duty cycle _____

Stall current _____

Class of insulation _____

List functional accessories:* _____

_____

_____

_____

_____

*Functional accessories are those additional sub-components that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, speed control system, feedback, etc.) Include manufacturer and model number.

6. General Valve Data

a. Valve	b. Actuator (if not an integral unit)
Name Condensate Storage Tank Suction Valve	Name Limitorque Valve Control
Mfg. Anchor/Darling Valve Co.	Mfg. Limitorque Corp.
Model (*)	Model SMB-00-10 (Ref. 1)
S/N (*)	S/N n/a
Type Gate Valve	Type Electric
Size 14"-150# (Ref.1)	Size 10 ft-lb motor torque
Weight 950# (Ref. 1)(Dry)	Weight 250# (Ref. 1)
Mounting Method Welded on pipe	Mounting Method bolted to valve
Required Operating Torque n/a	Maximum Delivered Torque n/a

Parameters:	(Ref. 2) Component Design	System Normal	System Accident	Power requirements: (include normal, maximum and minimum). (Ref.4) Electrical	Control Power
Press (psig)	100	90(Ref.6)		Motor power 575v	120v
Temp (°F)	212	40-120(Ref.3)		60hz,3 Ph.	60hz, 1Ph.
Flow	n/a	n/a	n/a		
Media (Ref. 4)	water	water	water	Pneumatic/Hydraulic	

Max ΔP across valve 90 psi(Ref.2) n/a

Closing time @ max ΔP 70sec(Ref.5)

Opening time @ max ΔP 70 sec(Ref.5)

List functional accessories:** n/a

*The valve is identified by its corresponding outline and assembly drawing

III. FUNCTION

1. Describe components normal and safety functions (include accident initiating signals, if applicable):

Normal: This valve is normally in the open position. It is closed to isolate the condensate supply.

Safety: This valve is commanded to close when the condensate storage tank volume drops to a pre-designated level.The automatic signal is received when the suppression pool suction valve E22-F015 reaches the fully opened position.The valve is to remain closed to isolate the suppression pool water from the environment.

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [X] Containment isolation

d. [ ] Reactor heat removal

e. [ ] Reactor core cooling

f. [X] Prevent significant release of radioactive material to environment.

g. [X] Does the component function to mitigate the consequences of one or more of the following events? [X] Yes [ ] No If "Yes", identify.

[X] LOCA [X] HELB [X] MSLB

[ ] Other _____

*Functional accessories are those additional sub-components that are required to make the valve assembly operational, (e.g., limit switches, solenoid valves, accumulators, etc.) Include manufacturer and model number.

4. Safety requirements:

[ ] Intermittent Operation [ ] During postulated event

[ ] Continuous Operation [X] Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational.
24 hours (Ref.4) (e.g., hours, days, etc.)

5. For VALVES:

Does the components [ ] Fail open [ ] Fail closed [X] Fail as is

Is this the fail safe position: [ ] Yes [X] No

Is the valve used for throttling purposes? [ ] Yes [X] No

What is the maximum acceptable internal and external leakrate?

10 cc/hr/in of nominal valve size (Ref. 7)

IV. QUALIFICATION

1. Reference by specific number the design codes and standards used as a guide to qualify the component: (Ref. 2)
ASME B&PV Code, Section 3, 1971, winter 1973 Edition

Case interpretation 1637, 1567

2. Have acceptance criteria been established and documented in the test plan(s) for the component? [X] Yes [ ] No

3. Are the margins* identified in the qualification documentation? [X] Yes [ ] No

4. Was the component that was qualified a model or an actual assembly? Actual. If a model, what was its scale? n/a. If an actual assembly, was it qualified as an assembly or by sub-assemblies? (i.e., valve, actuator, pump, driver) sub-assemblies

*Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

5. List all component tests performed or to be performed that demonstrate qualification:

Valve: Shell Hydrostatic test, Seat Leakage test, Static Bend tests. (Ref. 9,10)

Actuator: Thermal aging, Radiation aging, Mechanical Cycling, Vibration aging, SRV aging, Upset & Faulted Event testing, LOCA (chugging) post-aging. (Ref. 11)

6. List all component analyses performed that demonstrate qualification:

Valve Seismic Evaluation (valve structural integrity and operability) (in progress).

7. As a result of any of the tests (or analysis), were any deviations from design requirements identified? [X] Yes [ ] No
If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

During vibration aging of the SMB-00-10 actuator, the nuts used to hold the terminal block were found vibrated off the screws. The nuts were put back on and testing continued (Ref. 12).

8. Was the tested component precisely identical (as to model, size, etc.) to the in-plant component? [ ] Yes [X] No If "No", is installed component [ ] oversized or [X] undersized? (Ref. 11,12)

9. Is component orientation sensitive? [X] Yes [ ] No [ ] Unknown If "Yes", does installed orientation conincide with test/ analysis orientation? [X] Yes [ ] No (Tested vertically).

10. List all plant loading conditions considered during tests or analysis; (e.g., normal, upset, emergency, faulted).

SRV aging,upset,faulted,chugging

11. What is the fundamental frequency of the component?

48 hz(assuming cantilever beam)(Ref.2)

12. Does the component have a unique design or utilize unique material in its construction? (Examples are special gaskets or packing, one of a kind components, limitations on nonferrous materials, special coatings or surfaces, etc.)

[ ] Yes [X] No If "Yes" identify: _____

13. What is the design (qualified) life of the component, exclusive of normal maintenance items such as packing, bearings, seals, diaphragm, gaskets, and other elastomers?

40 years (Ref. 5)

14. Which of the components normal maintenance items requires the most frequent replacement/repair? Gaskets,packings
What is the normal time interval between replacements/repairs?

5 years or when valve is disassembled

15. List the harshest environmental conditions that the component could be exposed to during or following an accident, [e.g., temp., pressure, humidity, submergence, radiation (type and dose), etc.]: (Ref.8)

Temperature 340 F, Pressure 13 psig

Humidity 100% RH

Gamma 1.501 E8 Rads

Beta 1.4 E7 Rads

Information concerning Qualification Documents for the Component

Ref. No.	Report Number	Report Title	Date	Company/Organization Preparing Report	Company/Organization Reviewing Report
1	VPF# 3238-409	Assembly Drawing	Rev.3	Anchor/Darling Co.	General Electric Co.
2	VPF# 3238-614	Seismic calculation	Rev.3	Anchor/Darling Co.	G.E. Co.
3	731E932AZ	Process Diagram ,HPCS	Rev.4	G.E. Co.	G.E. Co.
4	DRF#E22-42	Function Performance Requirement	4-14-84	G.E. Co.	G.E. Co.
5	23A1361	Product Performance Qualification Spec.	Rev.2	G.E. Co.	G.E. Co.
6	22A1483AB	Design Spec Data Sheet	Rev.13	G.E. Co.	G.E. Co.
7	21A8717	Purchase Spec	Rev.3	G.E. Co.	G.E. Co.
8	23A4149	Qualification Accept Spec	Rev.2	G.E. Co.	G.E. Co.

Information Concerning Qualification Documents for the Component

Ref. No.	Report Number	Report Title	Date	Company/Organization Preparing Report	Company/Organization Reviewing Report
9	VPF 3682 -86-1	Mode Shape Determination and Valve Operability Test of Two Gate Valve Assemblies	8-25-81	Wyle Laboratories, Huntsville	General Electric Company
10	VPF 3238 -788-1	Seismic Deflection Test Report for 10" - 900# Globe Valve and 4" - 900# Gate Valve	12-16-77	Anchor/Darling Valve Company	General Electric Company
11	VPF 5485 -95-1	Nuclear Environmental Qualification Test Report on Limitorque SB-3-150 (AC) Actuator	10-12-84	Wyle Laboratories, Norco	General Electric Company
12	VPF 5485 -116-1	Nuclear Environmental Qualification Test Report on Limitorque SMB-00-10(DC) Actuator	5-20-85	Wyle Laboratories, Norco	General Electric Company

MPL: E22-C001

PUMP AND VALVE OPERABILITY ASSURANCE REVIEW

I. PLANT INFORMATION

1. Name: Nine Mile Point Unit No. 2
2. Docket No.: 50-410
3. Utility: Niagara Mohawk Power Corporation
4. NSSS: General Electric Co. [ ] PWR [X] BWR
5. A/E: Stone & Webster Engineering Corporation
6. C.P. Docket Date: June 15, 1972 C.P. SER Date: June 15, 1973

II. GENERAL COMPONENT* INFORMATION

1. Supplier: [X] NSSS [ ] BOP
2. Location: a. Building/Room Containment/SC-175108 (1)
   b. Elevation 175 ft. (1)
   c. System High Pressure Core Spray (HPCS)
3. Component I.D. No. on P&ID dwg: E22-C001
4. If component is a [X] Pump complete II.5.
   If component is a [ ] Valve complete II.6.
5. General Pump Data

a. Pump		b. Prime-mover	
Name	High Pressure Core Spray Pump	Name	HPCS Induction Motor
Mfg.	Byron Jackson (2)	Mfg.	General Electric Co. (1)
Model	30DX19CKXLH (3)	Model	5K6357XC15A (1)
S/N	731-S-1099 (3)	S/N	EMJ 519005 (4)
Type	Vertical Centrifugal (2)	Type	Squirrel Cage (1)

*The component, whether pump or valve, is considered to be an assembly composed of the body, internals, prime-mover (or actuator) and functional accessories.

a. Pump (continued)

Overall Dimensions 374 in. long (3)

Weight 38,000 lb. (dry) (3)

Mounting Method Flange (1)

Required B.H.P. 2900 (7)

Parameters:	Component Design	System Normal	System Accident
Suction:	115 psi (2)	115 psi	115 psi
Discharge: Press	1,575 psi	1575 psi	1575 psi
Temp	212°F (2)	80°F	212°F
Flow	1623 gpm (2)	1623gpm	1623gpm
Head	2830 ft. (2)		
Media	water	water	water

Required NPSH at maximum Flow 4 ft. at 7700 gpm (6) (7)

Available NPSH 11 ft. (2)

Operating Speed 1780 rpm (2)

Critical Speed 4429 rpm (2)

List functional accessories:* none

b. Prime-mover (continued)

Overall Dimensions 98 3/8 in. long (3)

Weight 20,900 lb. (4)

Mounting Method Flange (1)

H.P. 3050 (1)

Prime-mover requirements: (include normal, maximum and minimum).

Motor (voltage) 4000 (1)

Turbine (pressure) _____

n/a

If MOTOR list:

Duty cycle Continuous;SF=1.15 (1)

Stall current 2457 amps (9)

Class of insulation F (VPI) (1)

*Functional accessories are those additional sub-components that are required to make the pump assembly operational, (e.g., coupling, lubricating oil system, speed control system, feedback, etc.) Include manufacturer and model number.

6. General Valve Data

a. Valve	b. Actuator (if not an integral unit)
Name _____	Name _____
Mfg. _____	Mfg. _____
Model _____	Model _____
S/N _____	S/N _____
Type _____	Type _____
Size _____	Size _____
Weight _____	Weight _____
Mounting Method _____	Mounting Method _____
Required Operating Torque _____	Maximum Delivered Torque _____

Parameters:	Component Design	System Normal	System Accident	Power requirements: (include normal, maximum and minimum).
Press	_____	_____	_____	Electrical _____
Temp	_____	_____	_____	_____
Flow	_____	_____	_____	_____
Media	_____	_____	_____	Pneumatic/Hydraulic ____
Max ΔP across valve	_____			_____
Closing time @ max ΔP	_____			_____
Opening time @ max ΔP	_____			

List functional accessories:* _____

_____

_____

_____

III. FUNCTION

1. Describe components normal and safety functions (include accident initiating signals, if applicable):

Normal: none

Safety: supply coolant to the core in the event of an accident (1)

2. The components normal state is: [ ] Operating [X] Standby

3. Safety function:

a. [ ] Emergency reactor shutdown

b. [ ] Containment heat removal

c. [ ] Containment isolation

d. [X] Reactor heat removal

e. [ ] Reactor core cooling

f. [ ] Prevent significant release of radioactive material to environment.

g. [ ] Does the component function to mitigate the consequences of one or more of the following events? [ ] Yes [ ] No
If "Yes", identify.

[X] LOCA [ ] HELB [ ] MSLB

[ ] Other _____

*Functional accessories are those additional sub-components that are required to make the valve assembly operational, (e.g., limit switches, solenoid valves, accumulators, etc.) Include manufacturer and model number.

4. Safety requirements:

[] Intermittent Operation [] During postulated event

[] Continuous Operation [] Following postulated event

If component operation is required following an event, give approximate length of time component must remain operational.
100 days (1) (e.g., hours, days, etc.)

5. For VALVES:

Does the components [] Fail open [] Fail closed [] Fail as is

Is this the fail safe position: [] Yes [] No

Is the valve used for throttling purposes? [] Yes [] No

What is the maximum acceptable internal and external leakrate?

IV. QUALIFICATION

1. Reference by specific number the design codes and standards used as a guide to qualify the component:

ASME, NEMA, AF BMA, ANSI, NUREG-0588, IEEE

2. Have acceptance criteria been established and documented in the test plan(s) for the component? [X] Yes [] No

3. Are the margins* identified in the qualification documentation? [X] Yes [] No

4. Was the component that was qualified a model or an actual assembly? assembly. If a model, what was its scale? _____. If an actual assembly, was it qualified as an assembly or by sub-assemblies? (i.e., valve, actuator, pump, driver) sub-assembly

*Margin is the difference between design basis parameters and the test parameters used for equipment qualification.

5. List all component tests performed or to be performed that demonstrate qualification:

operation, normal thermal aging, normal operational aging, radiation, seismic, design accident temperature/humidity, post accident aging (1)

6. List all component analyses performed that demonstrate qualification:

Pump stress analysis, pump and motor operability assurance analysis, gamma radiation assessment (1) (2) (5)

7. As a result of any of the tests (or analysis), were any deviations from design requirements identified? [] Yes [X] No
If "Yes", briefly describe any changes made in tests (or analysis) or to the component to correct the deviation.

8. Was the tested component precisely identical (as to model, size, etc.) to the in-plant component? [] Yes [X] No If "No", is installed component [X] oversized or [] undersized? (1)

9. Is component orientation sensitive? [X] Yes [] No [] Unknown If "Yes", does installed orientation conincide with test/analysis orientation? [X] Yes [] No (1)

10. List all plant loading conditions considered during tests or analysis; (e.g., normal, upset, emergency, faulted).

faulted

11. What is the fundamental frequency of the component?

18 Hz (5)

12. Does the component have a unique design or utilize unique material in its construction? (Examples are special gaskets or packing, one of a kind components, limitations on nonferrous materials, special coatings or surfaces, etc.)

[X] Yes [] No If "Yes" identify:

Polyimide, Polyester, MICA, Epoxy (1)

13. What is the design (qualified) life of the component, exclusive of normal maintenance items such as packing, bearings, seals, diaphragm, gaskets, and other elastomers?

40 years plus 100 day accident (1)

14. Which of the components normal maintenance items requires the most frequent replacement/repair? oil replacement
What is the normal time interval between replacements/repairs?

6-12 months

15. List the harshest environmental conditions that the component could be exposed to during or following an accident, [e.g., temp., pressure, humidity, submergence, radiation (type and dose), etc.]:

$175^{o}F$ (1)

4.33×10^{7} Rads (1)

Information concerning Qualification Documents for the Component

	Report Number	Report Title	Date	Company/Organization Preparing Report	Company/Organization Reviewing Report
1.	NEDC 30469	Nine Mile Pt.2 Environmental Qualification Report	12/83	General Electric Company	n/a
2.	VPF # 3666-29-2	HPCS Pump Design Report	7/18/77	Byron Jackson	General Electric Company
3.	VPF # 3666-20-2	Pump Vendor Instruction Manual	6/20/78	Byron Jackson	General Electric Company
4.	VPF # 3663-22-1	RHR Motor Instruction Manual	4/14/76	General Electric Company	
5.	DRF # E22-00019-1	Nine Mile Pt.2 HPCS Pump and Motor New Loads Analysis	4/16/85	General Electric Company	
6.	21A1913AB	Purchase Specification Data Sheet	6/2/77	General Electric Company	
7.	VPF 3666-70-1	Performance Data	7/11/77	Byron Jackson	General Electric Company

REFERENCE DOCUMENTS — MPL SYS NO.

1. NUCLEAR BOILER SYS P&ID - - - - - - - - - - - - - B21-1010
2. NUCLEAR BOILER SYS FCD - - - - - - - - - - - - - B21-1030
3. RHR SYSTEM P&ID - - - - - - - - - - - - - - - - E12-1010
4. FCIC SYSTEM FCD - - - - - - - - - - - - - - - - E51-1030
5. REACTOR WATER CLEANUP SYS P&ID - - - - - - - G33-1010
6.
7. PROCESS INSTRUMENTATION SPECIFICATION - - - A62-0070
8. CLEANING OF PIPING & EQUIPMENT - - - - - - - A62-0100
9. TURBINE CONTROL DRAWING - - - - - - - - - - VPF-2753-014
10.
11. TURBINE OUTLINE DRAWING - VPF-2753-067,250 & LATER
12. LEAK DETECTION SYSTEM FCD - - - - - - - - - - E31-1010
13. SYSTEM DESIGN SPECIFICATION - - - - - - - - - E51-0010
14. PROCESS FLOW DIAGRAM - - - - - - - - - - - - E51-1020
15. RCIC SYSTEM FDS - - - - - - - - - - - - - - - E51-3050

SUPPORTING DOCUMENTS — MPL SYS NO.

1. PIPING & INSTRUMENT SYMBOLS - - - - - - - - A62-1010
2. PRESSURE INTEGRITY OF PIPING & EQUIPMENT PRESSURE PARTS - - - - - - - - - - - - - - A62-0020

MPL ITEM NO. ESI-1010

NOTES:

1. INSTRUMENT LINE DESIGN AND VALVING MUST COMPLY WITH INSTRUMENT PIPING STANDARDS. SEE REF. 7.
2. EQUIPMENT AND INSTRUMENTS ARE PROVIDED BY SYSTEM NO. (ESI) UNLESS OTHERWISE NOTED.
3. FOR INTERLOCKING REQUIREMENTS AND AUTO VALVE ACTUATION, SEE FUNCTIONAL CONTROL DIAGRAM REF. 4.
4. PIPING SHOWN IN PHANTOM LEADING TO TURBINE E002 TO BE ARRANGED AND SUPPLIED BY TURBINE VENDOR.
5. FOR VALVE STEM LEAKOFF DETAIL, SEE REF. 12.
6. PROVISION FOR CONTAINMENT ISOLATION OF INSTRUMENT LINES BY OTHERS, SEE REF. 7.
7. PIPING CONNECTED TO VESSEL HEAD SHALL BE FLANGED TO FACILITATE VESSEL HEAD REMOVAL.
8. FOR VALVE AND PIPING ARRANGEMENT REQUIREMENTS SEE REF. 13.
9. INSTRUMENTS & TEST LINES 3/4" AND UNDER IN A CLASS "A" SYSTEM MAY UTILIZE CLASS "B" QUALITY CLASSIFICATION.
10. TWO(2) SETS OF ELBOW TAPS REQUIRED. PREFERRED INSTALLATION IS ON SEPARATE ELBOWS, BUT MAY BE INSTALLED ON A COMMON ELBOW.
11. FOR LOCATION AND IDENTIFICATION OF INSTRUMENTS, SEE RCIC SYS INSTRUMENT DIA SHEET REF. 19.
12. FLUSHING CONNECTIONS SHALL BE PROVIDED IN ACCORDANCE WITH REF. 8. TEMPORARY STRAINER SCREENS SHALL BE PROVIDED IN THE SUCTION SIDE OF ALL PUMPS IN ACCORDANCE WITH REF. 8.
13. ALL MOTOR OPERATED VALVES, SOLENOIDS, AND PUMP MOTORS ARE D.C. UNLESS OTHERWISE NOTED.

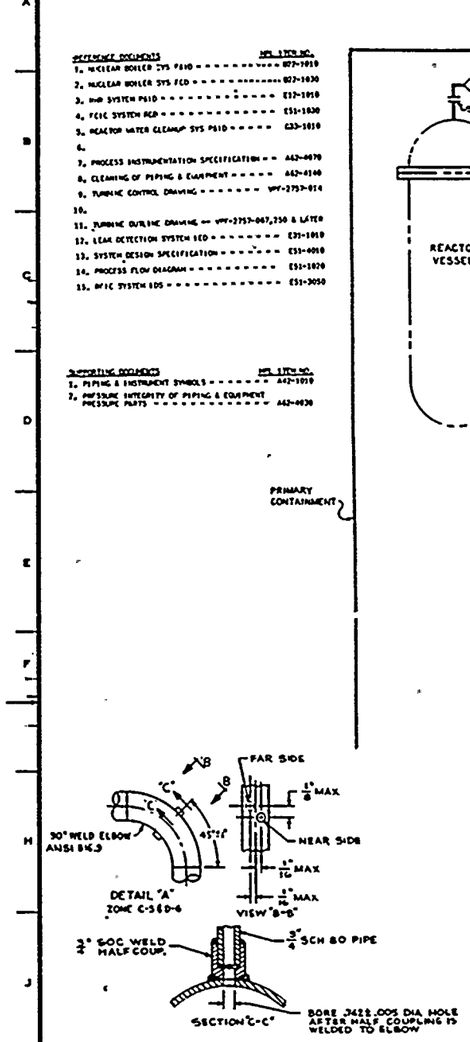

FIGURE 5.4-9

RCIC SYSTEM P&ID
SHEET 1 OF 2

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT

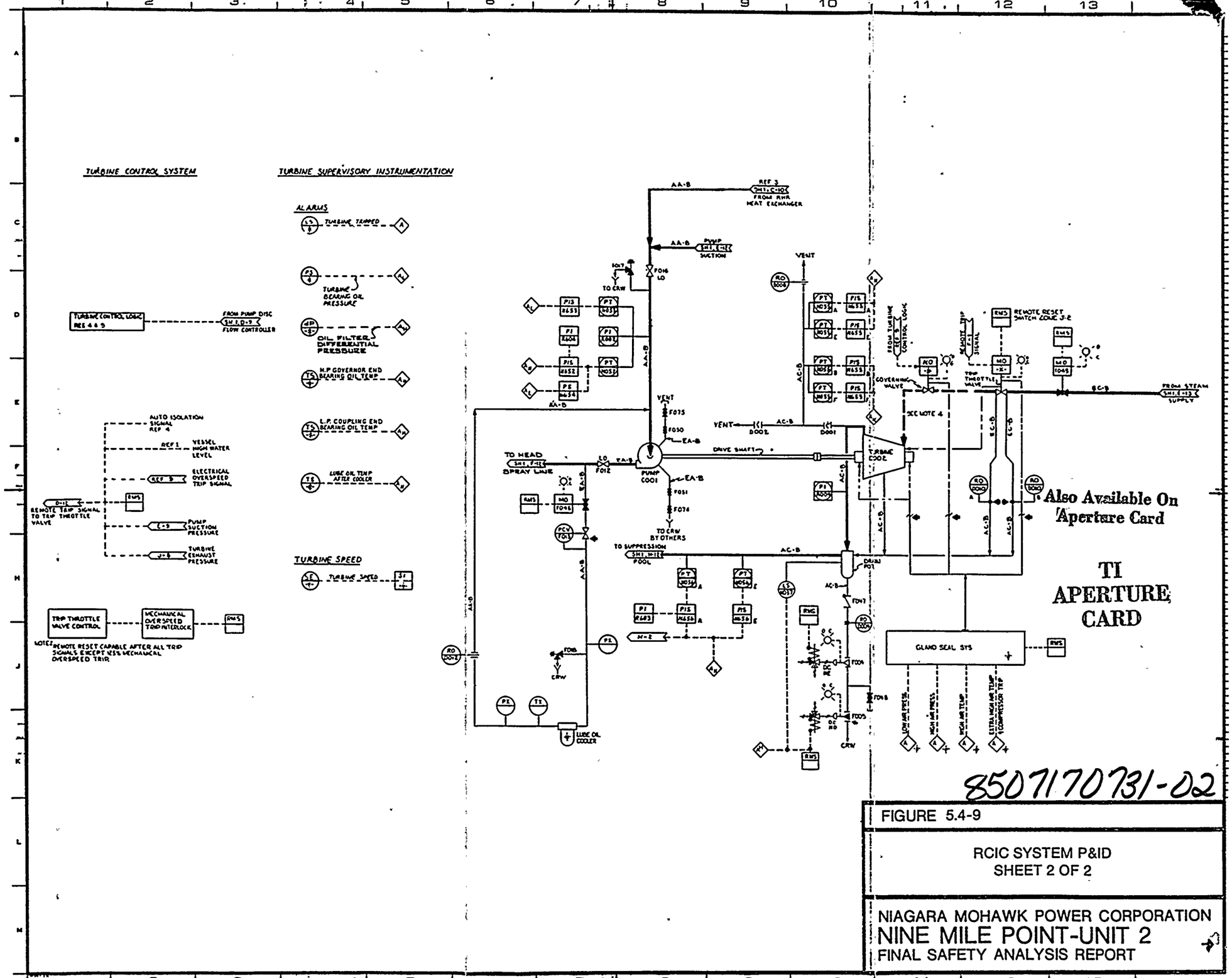

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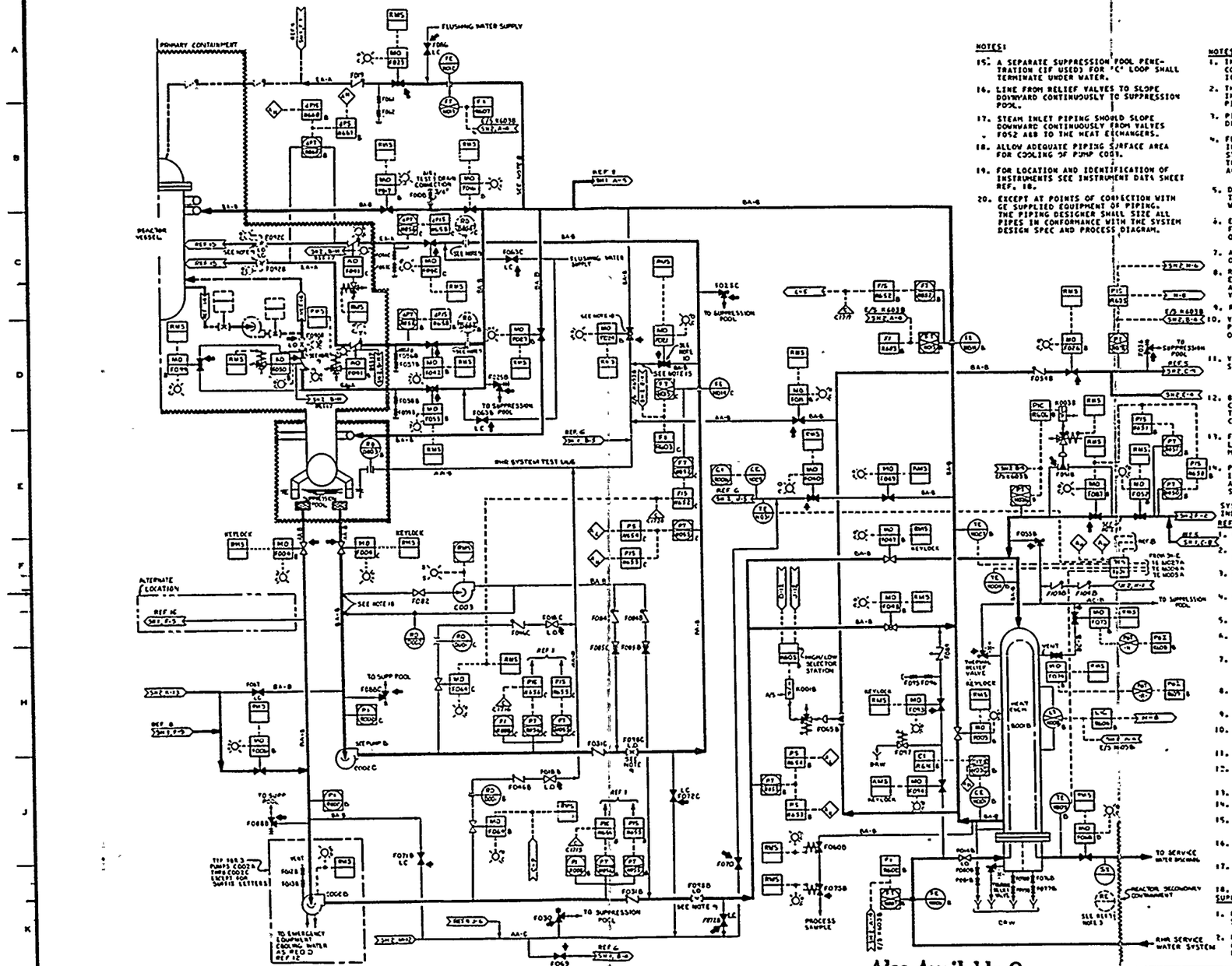
FIGURE 5.4-9

RCIC SYSTEM P&ID
SHEET 2 OF 2

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:

15. A SEPARATE SUPPRESSION POOL PENETRATION (IF USED) FOR 'C' LOOP SHALL TERMINATE UNDER WATER.
16. LINE FROM RELIEF VALVES TO SLOPE DOWNWARD CONTINUOUSLY TO SUPPRESSION POOL.
17. STEAM INLET PIPING SHOULD SLOPE DOWNWARD CONTINUOUSLY FROM VALVES F052 A&B TO THE HEAT EXCHANGERS.
18. ALLOW ADEQUATE PIPING SURFACE AREA FOR COOLING OF PUMP CODE.
19. FOR LOCATION AND IDENTIFICATION OF INSTRUMENTS SEE INSTRUMENT DATA SHEET REF. 18.
20. EXCEPT AT POINTS OF CONNECTION WITH GE SUPPLIED EQUIPMENT OR PIPING, THE PIPING DESIGNER SHALL SIZE ALL PIPES IN CONFORMANCE WITH THE SYSTEM DESIGN SPEC AND PROCESS DIAGRAM.

ECF 238X184AF (E12-1040)

NOTES:

1. INSTRUMENT LINE DESIGN & VALVING MUST COMPLY WITH INSTRUMENT PIPING SPECIFICATION REFERENCE 9.
2. THE METHOD OF MOUNTING LOCAL INSTRUMENTS IS TO BE DETERMINED BY PIPING DESIGNER.
3. PIPING HIGH POINT VENTS & LOW POINT DRAINS ARE TO BE ADDED AS NECESSARY.
4. FLUSHING CONNECTIONS SHALL BE PROVIDED IN ACCORDANCE WITH REF 2. TEMPORARY STRAINER SCREENS SHALL BE PROVIDED ON THE SUCTION SIDE OF ALL PUMPS IN ACCORDANCE WITH REF 2.
5. DISCHARGE LINES FOR COOLING WATER TO BE ROUTED UPSTREAM OF SERVICE WATER RADIATION MONITORS.
6. EQUIPMENT & INSTRUMENTS ARE PREFIXED BY SYSTEM NO. (E12) UNLESS OTHERWISE NOTED.
7. ALL MOTOR OPERATED VALVES ARE AC OPERATED UNLESS OTHERWISE NOTED.
8. REACTOR HEAD SPRAY LINE CONNECTION TO MAIN LINE SHALL BE AS CLOSE AS PRACTICABLE TO VALVE F016.
9. RECOMMENDED, BUT NOT REQUIRED.
10. VALVE SHOULD BE INSTALLED WITH PACKING GLAND(S), UPSTREAM SIDE OF DISC.
11. VALVES F005, F025A&C, F070 & F088 SHALL BE 1" RELIEF VALVES.
12. BETWEEN VALVES MO F008 & MO F009 CONSIDERATION SHOULD BE GIVEN TO THERMAL EXPANSION OF THE CONTAINED WATER.
13. FOR ADDITIONAL CONTROL ROOM LIGHTS, SYSTEM ALARMS & REMOTE MANUAL SWITCHES SEE REF 1.
14. PROVISIONS FOR CONTAINMENT ISOLATION SHALL BE IN ACCORDANCE WITH CURRENT LICENSING REQUIREMENTS.

SYSTEM SELECTION OPTIONS ARE INDICATED BY MULTIPLE MPL ITEM NO.

REFERENCE DOCUMENTS — MPL ITEM NO.

1. NUCLEAR BOILER SYS FCD-821/822-1030
2. CLEANING OF PIPING & EQUIPMENT----------A62-4140
3. RESIDUAL HEAT REMOVAL FCD----------E12-1030
4. HIGH PRESSURE CORE SPRAY P&ID----------E22-1010
5. RCIC SYSTEM P&ID--------E51-1010
6. RADWASTE SYSTEM P&ID - G33,12,31,34,35&36 -1010
7. PROCESS RADIATION MONITORING SYSTEM - D31/D14/D17/D18 - 1010
8. FUEL POOL COOLING & CLEANUP SYS P&ID - G41,644-1010
9. PROCESS INSTR ----------A62-4C70
10. RHR SYSTEM PROCESS DATA----------E12-102C
11. RHR SYS DESIGN SPEC----E12-4010
12. EMERGENCY EQUIPMENT COOLING WATER----------A62-4230
13. RCIC SYS FCD----------E51-1030
14. REAC RECIRC SYS P&ID B33/35-1010
15. NUCLEAR BOILER SYS P&ID----------B21/B22-1010
16. LOW PRESSURE CORE SPRAY P&ID ----------E21-1010
17. LEAK DETECTION SYSTEM IED----------E31-1010
18. RHR SYS IDS----------E12-1050

SUPPORTING DOCUMENTS — MPL ITEM NO.

1. PIPING & INSTRUMENT SYMBOLS----------A42-1010
2. PRESSURE INTEGRITY OF PIPING/EQUIPMENT PRESSURE PARTS----------A62-4030

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FIGURE 5.4-13

RESIDUAL HEAT REMOVAL SYSTEM P&ID SHEET 1 OF 2

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT

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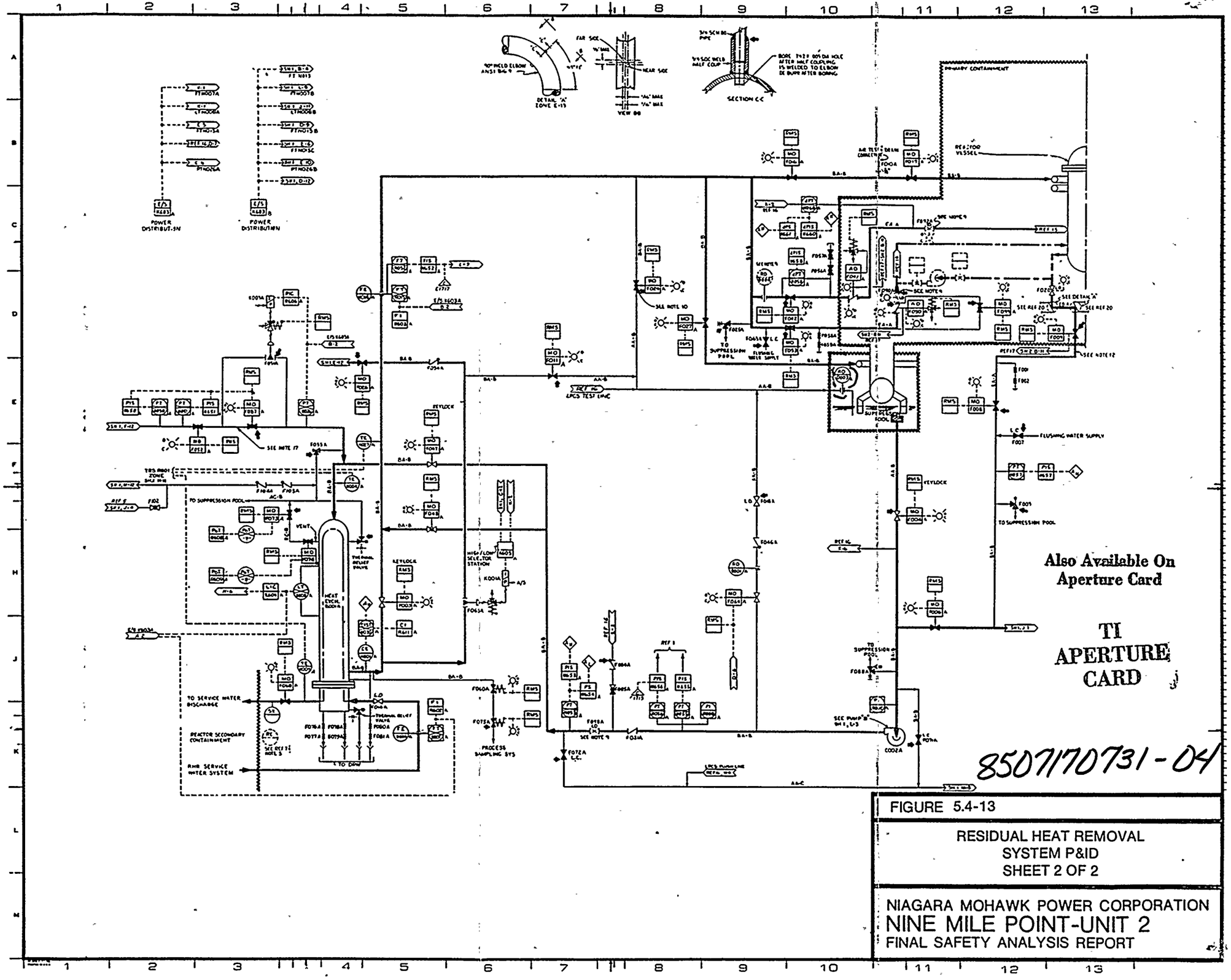

FIGURE 5.4-13

RESIDUAL HEAT REMOVAL SYSTEM P&ID SHEET 2 OF 2

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT

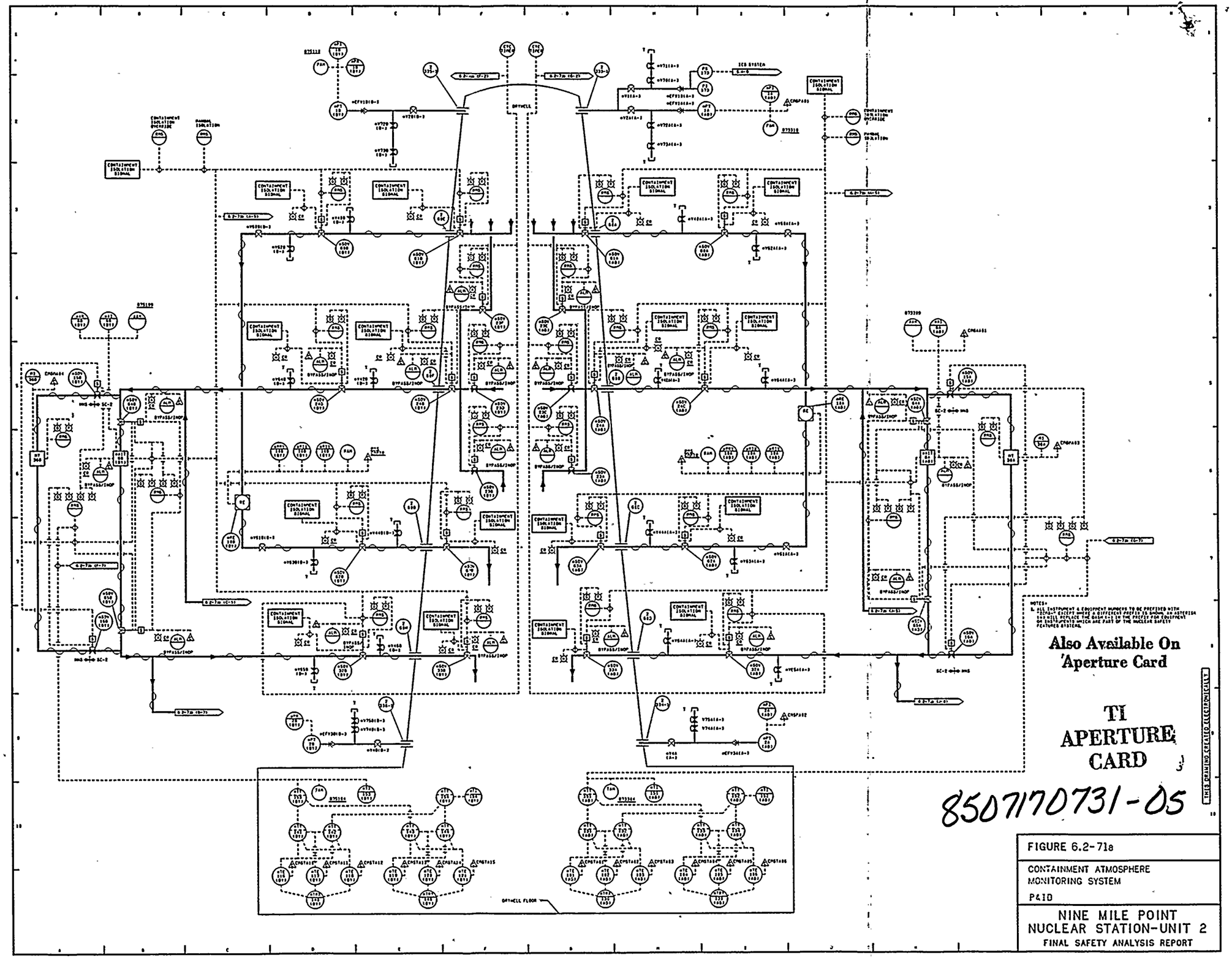

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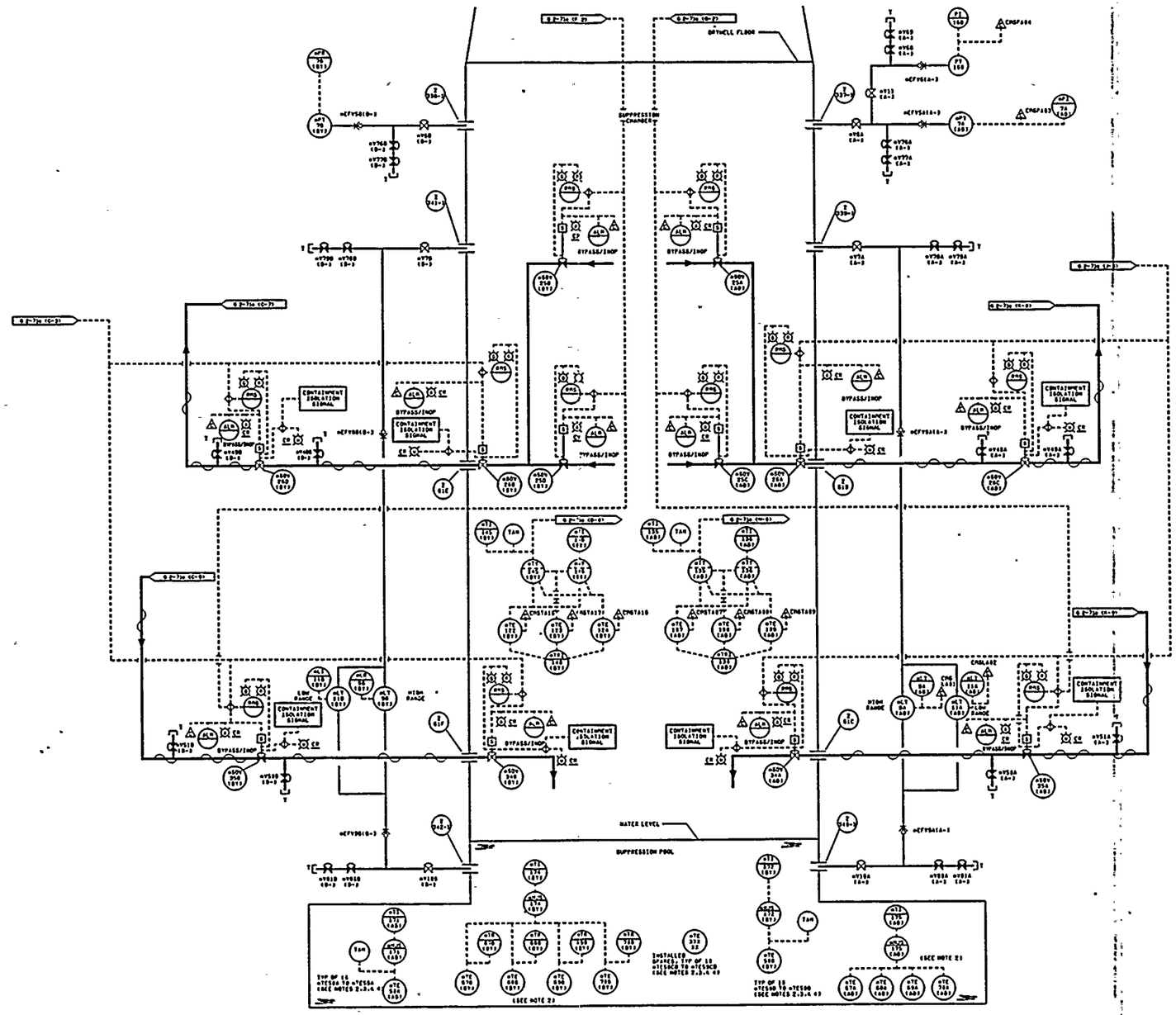
FIGURE 6.2-71a

CONTAINMENT ATMOSPHERE MONITORING SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2

FINAL SAFETY ANALYSIS REPORT



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NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED BY N2- UNLESS EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR IDENTIFICATION OF INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEMS.
2. TE5XX REPRESENTS TEMPERATURE ELEMENTS LOCATED WITHIN CONTAINMENT SPACE AND SUPPRESSION POOL.
3. ELECTRICAL OVERCROSS FOR TE 55A-D TO TE 54A-D 25+
   TE 55C = 54A 540J/TE 550 = 548 1071
   TE 55C = 54C 1C07/TE 550 = 548 1071
4. ELECTRICAL OVERCROSS FOR TE 55A-D TO TE 54A-D 25+
   TE 55A = 54A 1A07/TE 550 = 548 1071
   TE 55C = 54C 1C07/TE 550 = 548 1071

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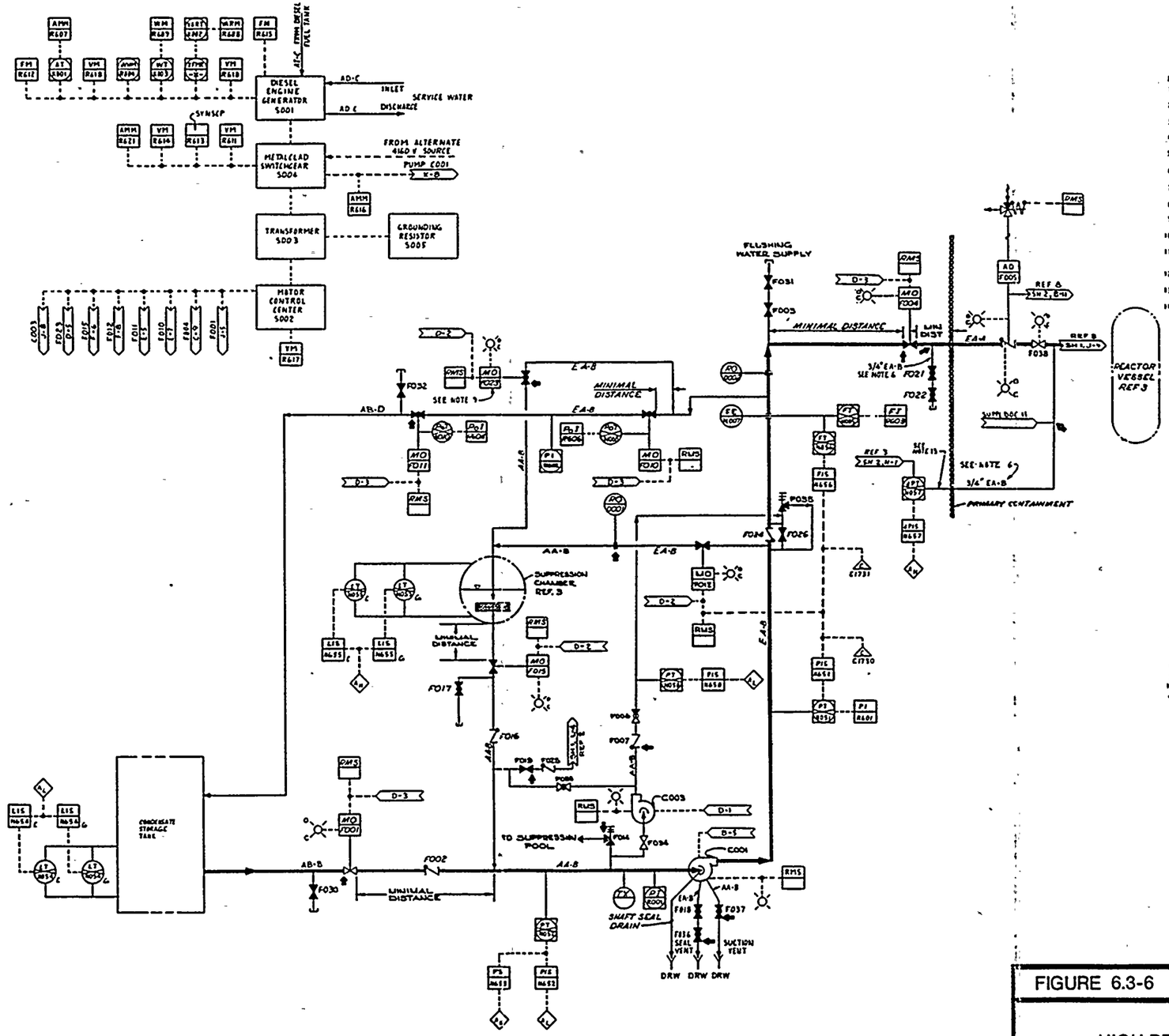
8507170731-06

FIGURE 6.2-71b

CONTAINMENT ATMOSPHERE MONITORING SYSTEM P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2

FINAL SAFETY ANALYSIS REPORT



FCF 238X185AF E22-10ID

NOTES.

1. EQUIPMENT & INSTRUMENTS ARE FURNISHED BY SYSTEM NUMBER E22 UNLESS OTHERWISE NOTED.
2. PIPING HIGH POINT VENTS AND LOW POINT DRAINS ARE TO BE ADDED AS NECESSARY.
3. CHEMICAL CLEANING CONNECTIONS (VALVES, ETC.), IF REQUIRED, ARE TO BE PROVIDED AS NECESSARY.
4. INSTRUMENT LINE DESIGN AND VALVING SHALL BE IN ACCORDANCE WITH INSTRUMENTATION SPEC., REF. 7.
5. THE METHOD OF MOUNTING LOCAL INSTRUMENTS IS TO BE DETERMINED BY PIPING DESIGNER.
6. THIS LINE MAY BE CLASS "B" IF 3/4 IS 3/4 INCH OR LESS IN DIAMETER. IF LARGER THAN 3/4 INCH THE LINE SHALL BE CLASS "A"
7. FOR LOCATION AND IDENTIFICATION OF INSTRUMENTS SEE INSTRUMENT DATA SHEET, REF. 8.
8. -
9. VALVE F023 SHALL BE INSTALLED WITH THE PACKING GLAND ON THE UPSTREAM SIDE OF THE VALVE DISC.
10. VALVE F010 SHALL BE LOCATED AS CLOSE AS PRACTICAL TO VALVE F011.
11. EXCEPT AT POINTS CONNECTION WITH GE SUPPLIED EQUIPMENT OR PIPING, PIPING DESIGNER SHALL SIZE PIPES IN CONFORMANCE WITH THE SYSTEM DESIGN SPEC. AND PROCESS DIAGRAM.
12. FOR ADDITIONAL CONTROL ROOM LIGHTS, SYSTEM ALARMS AND REMOTE MANUAL SWITCHES, SEE REF. 7 AND REF. 4.
13. PROVISION FOR CONTAINMENT ISOLATION SHALL BE IN ACCORDANCE WITH CURRENT LICENSING REQUIREMENTS.
14. FLUSHING CONNECTIONS SHALL BE PROVIDED IN ACCORDANCE WITH REF. 10. TEMPORARY STRAINER SCREENS SHALL BE PROVIDED ON THE SUCTION SIDE OF ALL PUMPS IN ACCORDANCE WITH REF. 10.

REFERENCE DOCUMENTS — DWG. ITEM NO.

1. HIGH PRESSURE CORE SPRAY P&ID ---- E22-1010
2. RHR SYSTEM P&ID ---- E22-1012
3. NUCLEAR BOILER SYSTEM P&ID ---- B22-1010
4. HIGH PRESSURE CORE SPRAY ELEC'L ONE LINE DIA ---- E22-1060
5. HIGH PRESSURE CORE SPRAY P.D. ---- E22-1020
6. HIGH PRESSURE CORE SPRAY DESIGN SPEC ---- E22-4010
7. PROCESS INSTRUMENTATION ---- A62-4070
8. LEAK DETECTION SYS P&ID ---- E31-1010
9. HIGH PRESSURE CORE SPRAY IOS ---- E22-3050
10. CLEANING OF PIPING & EQUIP. ---- A62-4160
11. STANDBY LIQUID CONTROL SYS P&ID ---- C41-1040

SUPPORTING DOCUMENTS — DWG. ITEM NO.

1. PIPING & INST SYMBOLS ---- A62-1010
2. PRESS INTEG. OF PIPING & EQUIP PRESS PARTS ---- A62-4030

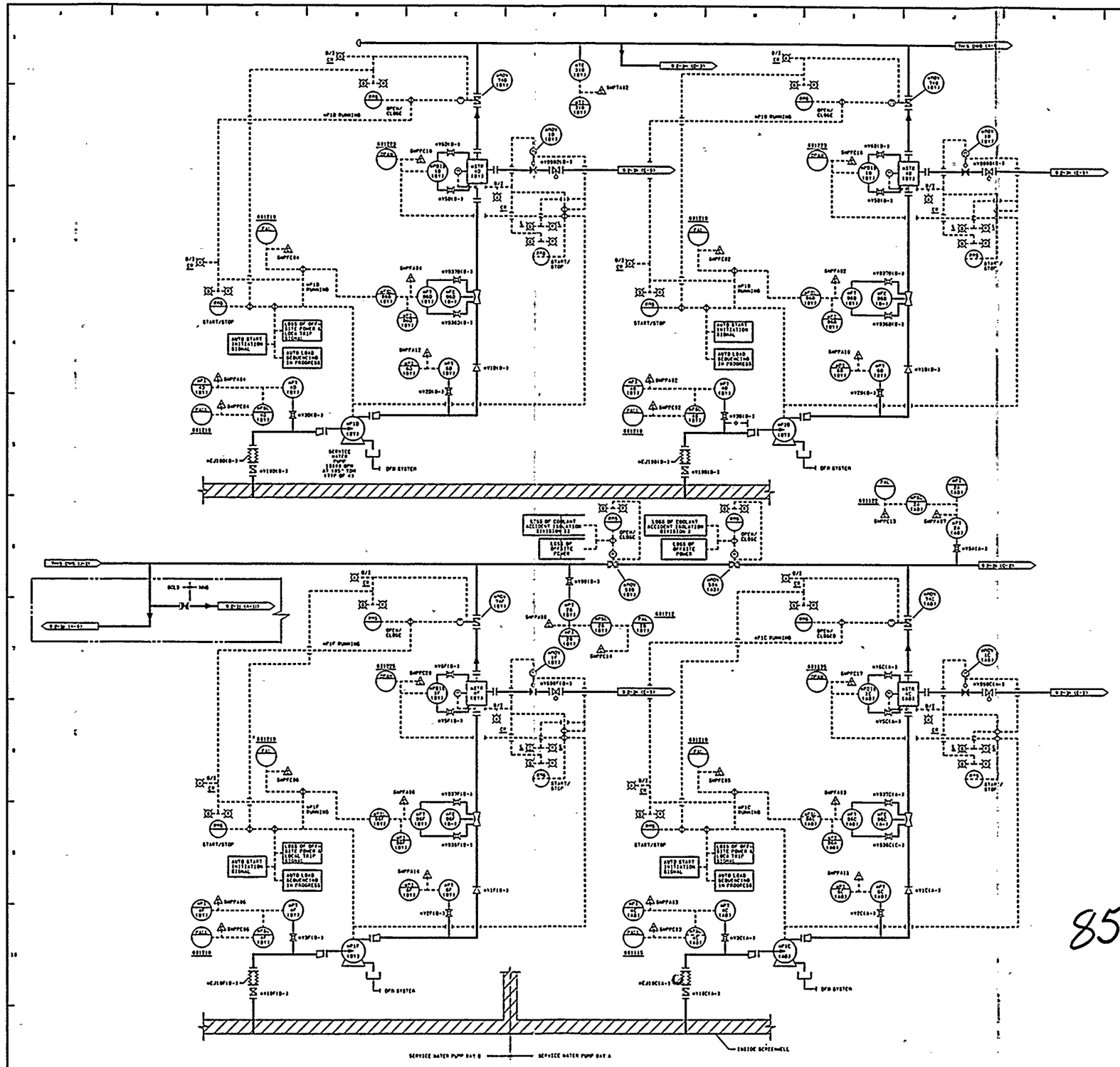
LEGEND

- WHM = WATTHOUR METER
- WM = WATTMETER
- WT = WATT TRANSDUCER
- VAM = VARMETER
- VART = VARTRANSDUCER
- AM = AMMETER
- VM = VOLTMETER
- FM = FREQUENCY METER
- SYNSCP = SYNCHROSCOPE
- SFMR = TRANSFORMER
- AT = CURRENT TRANSDUCER

FIGURE 6.3-6

HIGH PRESSURE CORE SPRAY

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "N211" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.

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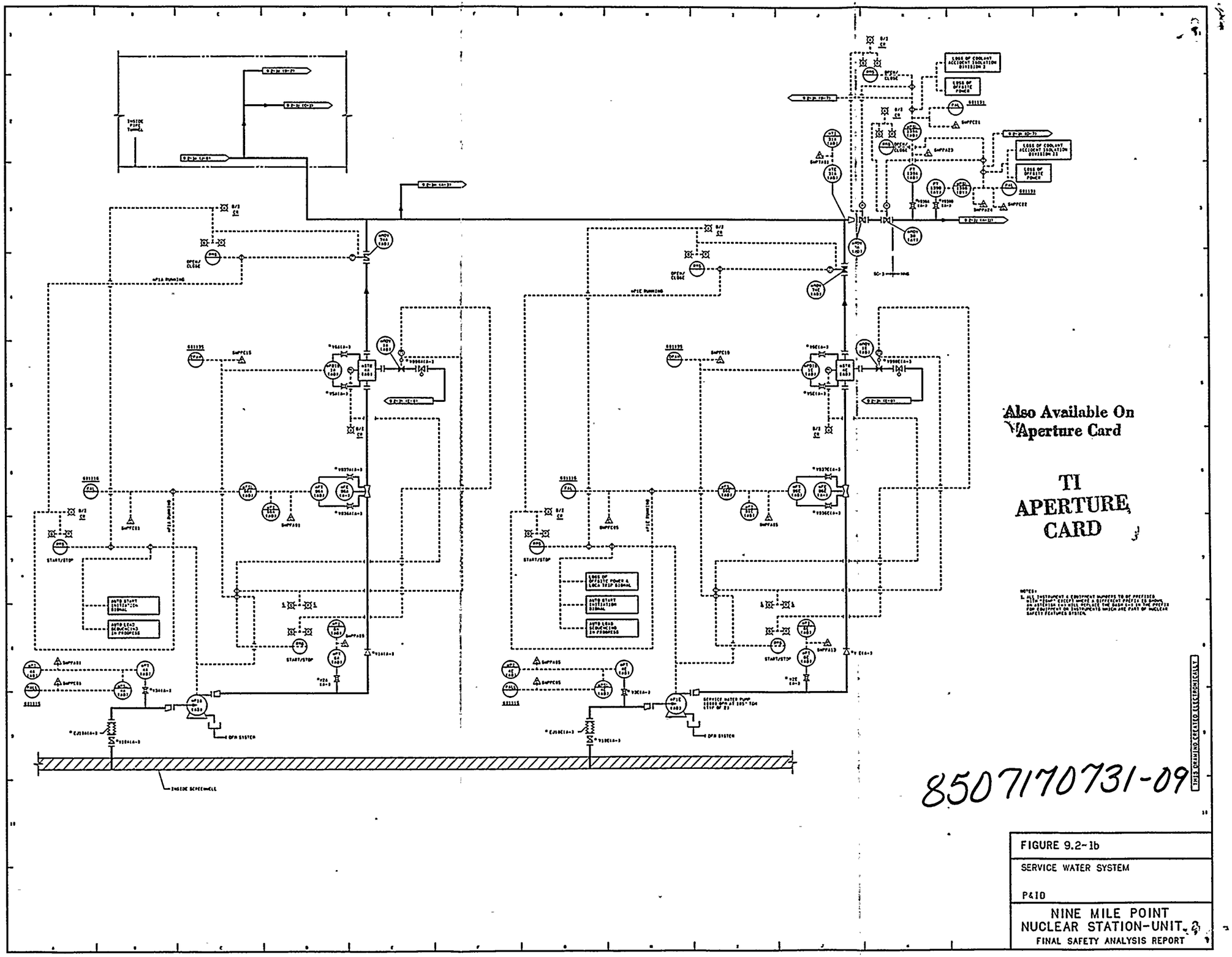
FIGURE 9.2-1a

SERVICE WATER
SYSTEM
P&ID

NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT



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NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "2NSW" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN, OR SYSTEM TAG MILE MEANS THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.

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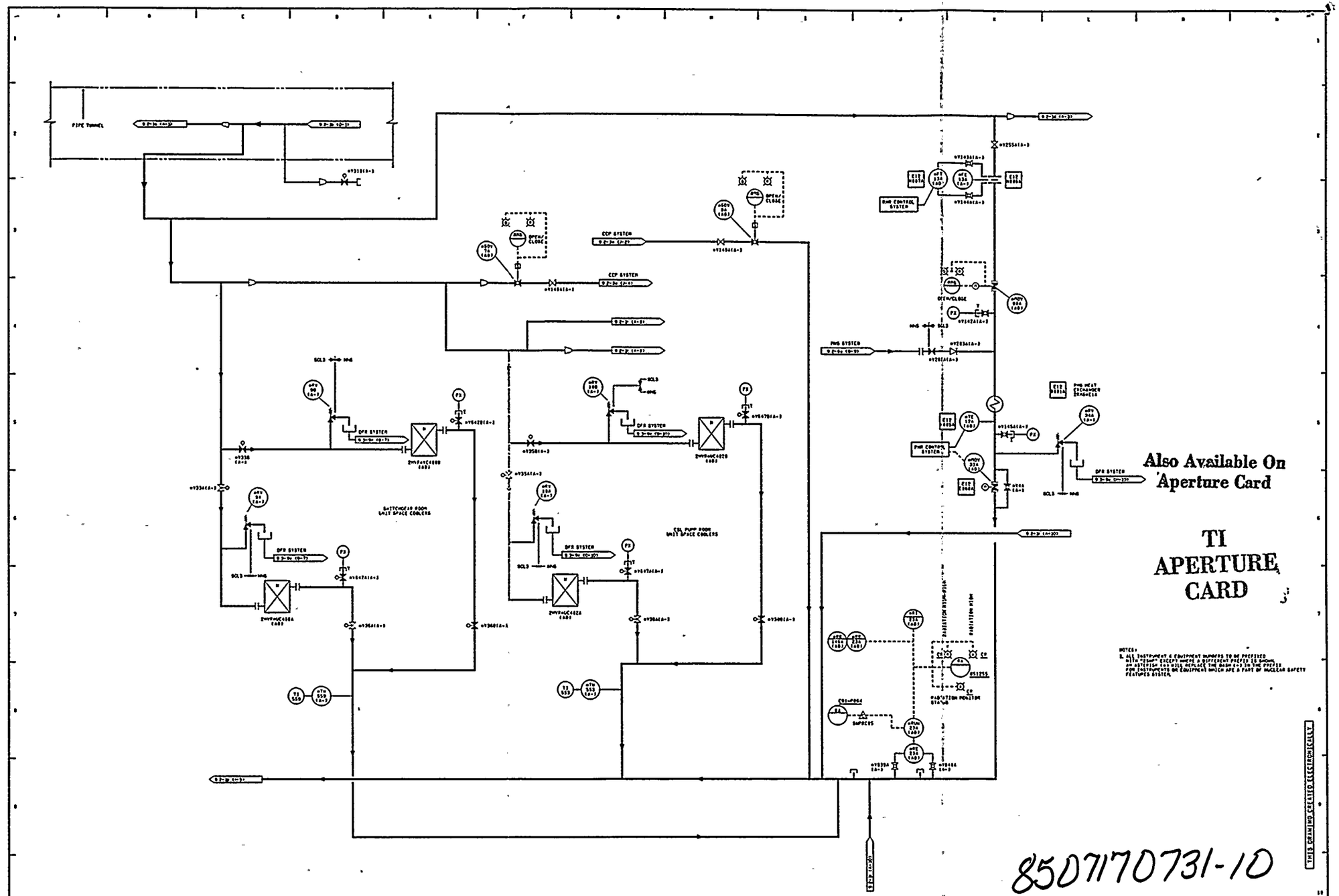
FIGURE 9.2-1b

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2

FINAL SAFETY ANALYSIS REPORT



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NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "2" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE NUMBER IN THE PREFIX FOR INSTRUMENTS OR EQUIPMENT WHICH ARE A PART OF NUCLEAR SAFETY FEATURES SYSTEM.

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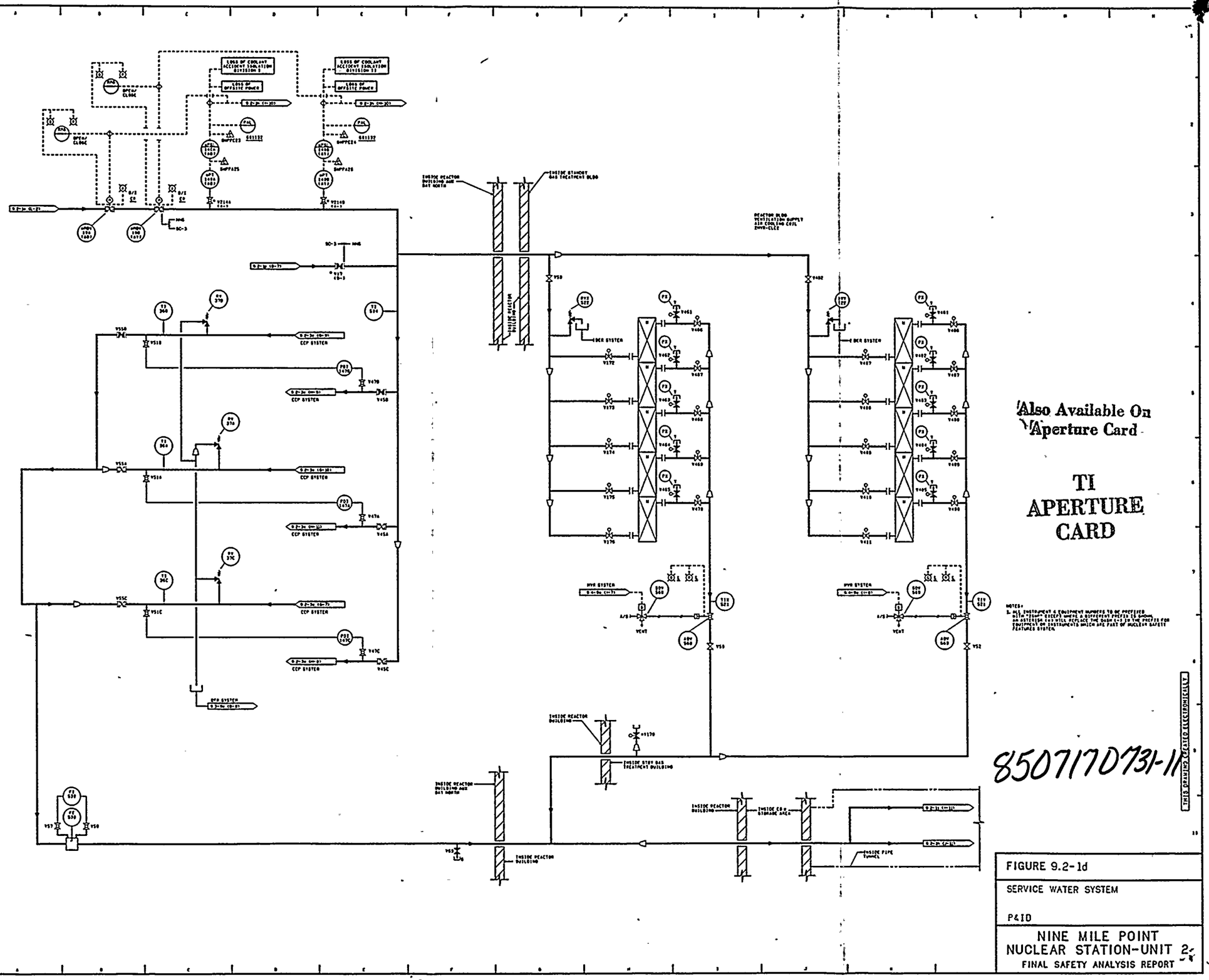
FIGURE 9.2-1c

SERVICE WATER SYSTEM
P&ID

NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT


Also Available On
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APERTURE
CARD
8507170731-11
FIGURE 9.2-1d
SERVICE WATER SYSTEM
P&ID
NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT

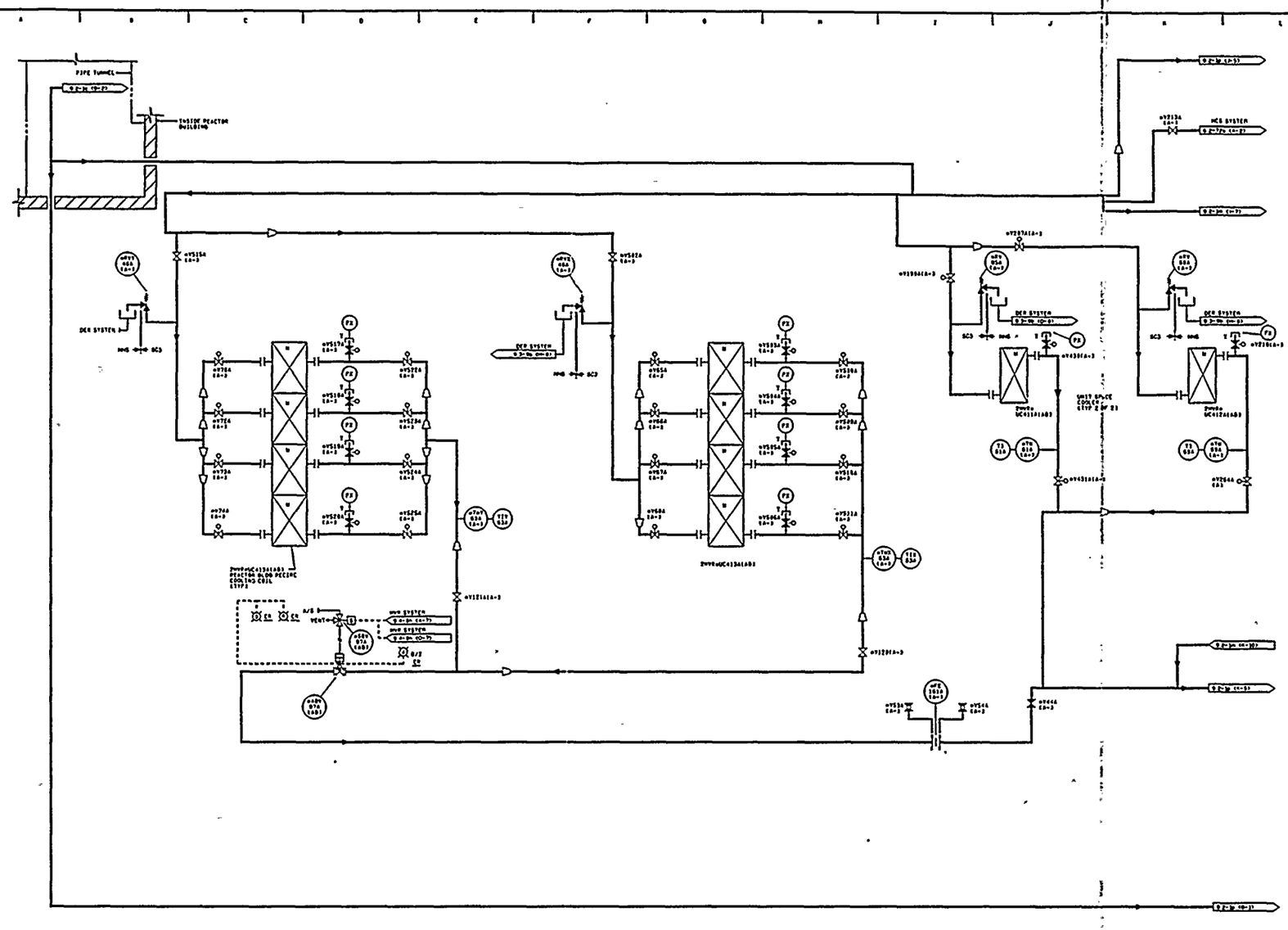

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FIGURE 9.2-1e

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2

FINAL SAFETY ANALYSIS REPORT

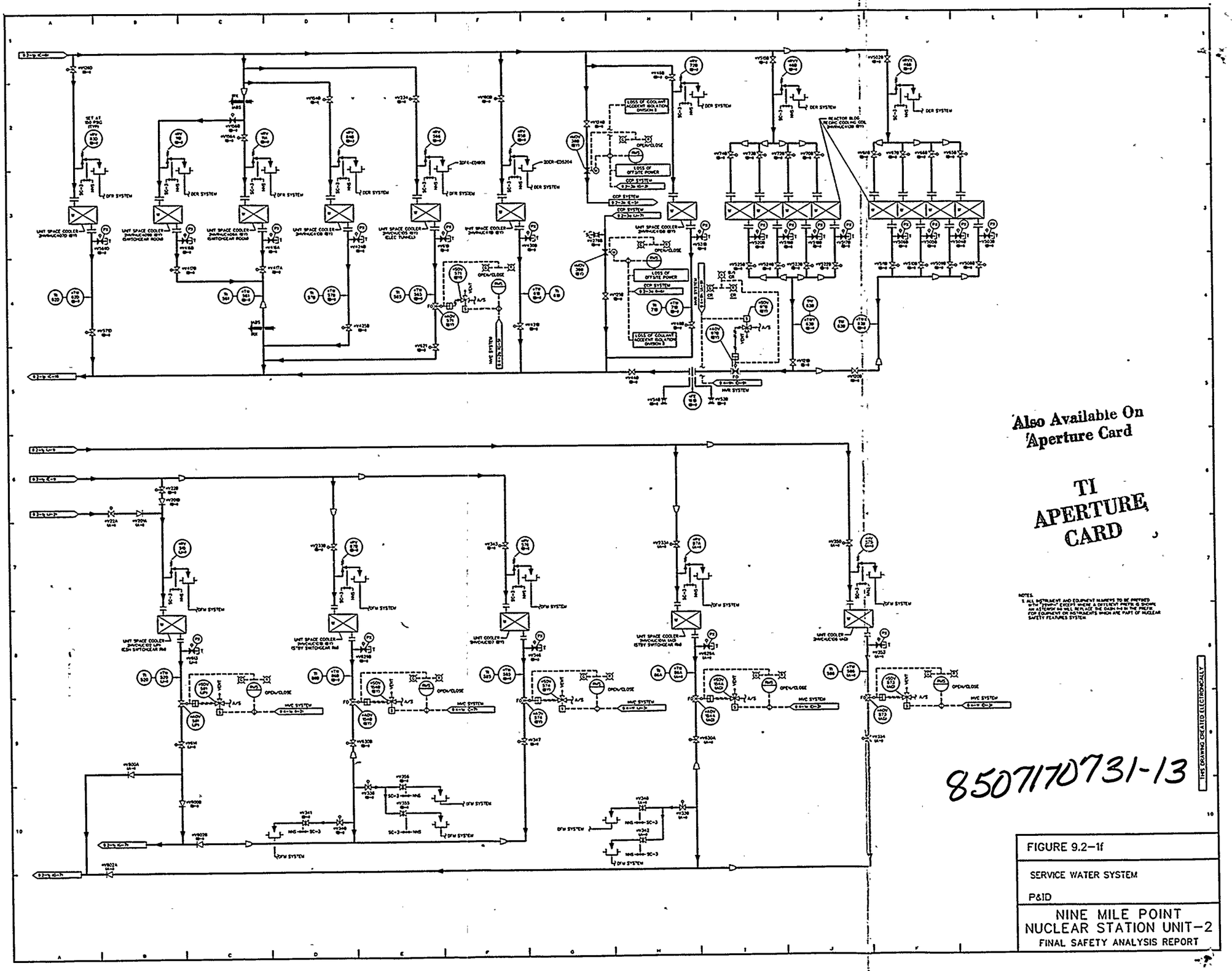

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FIGURE 9.2–1f

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION UNIT–2
FINAL SAFETY ANALYSIS REPORT

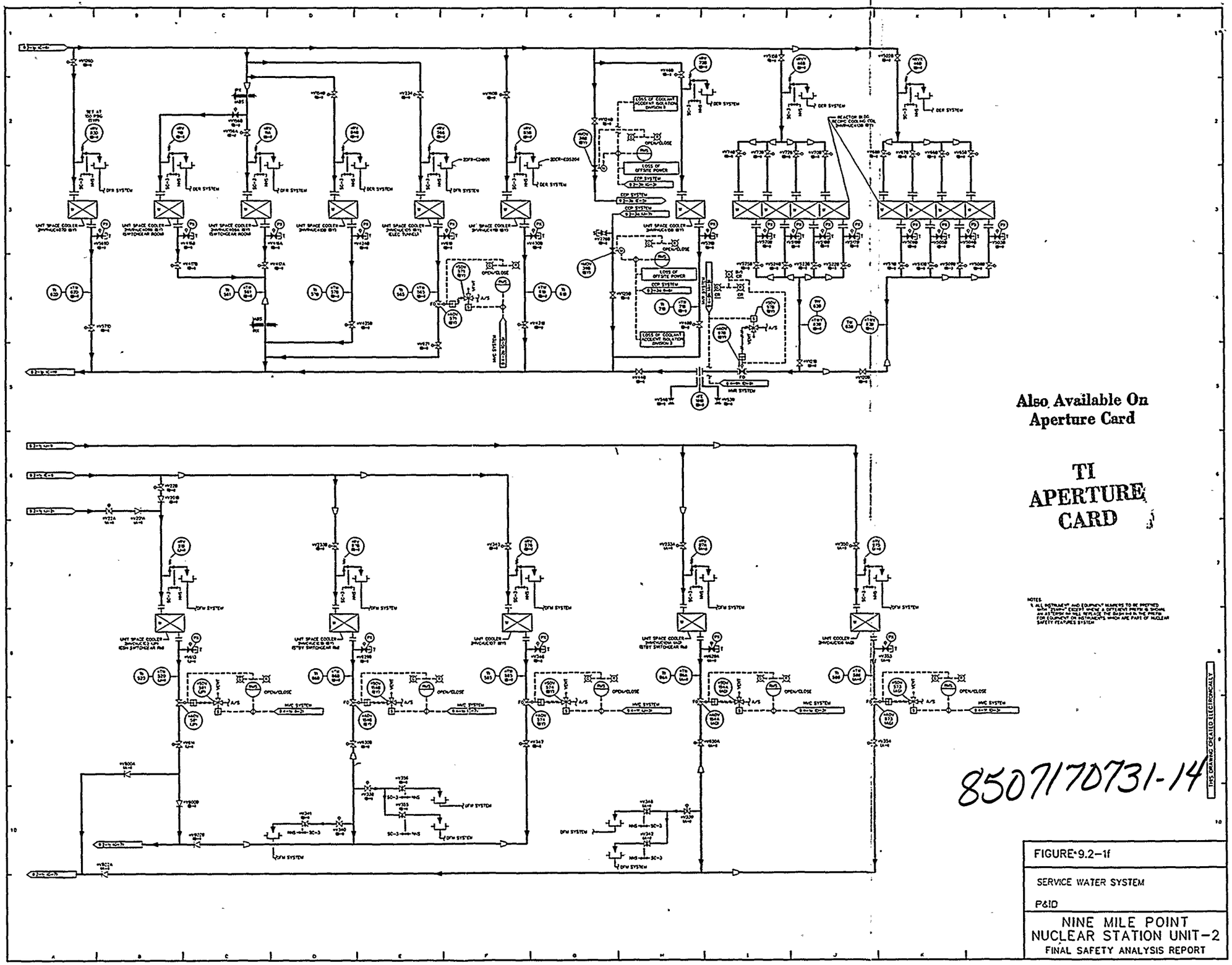

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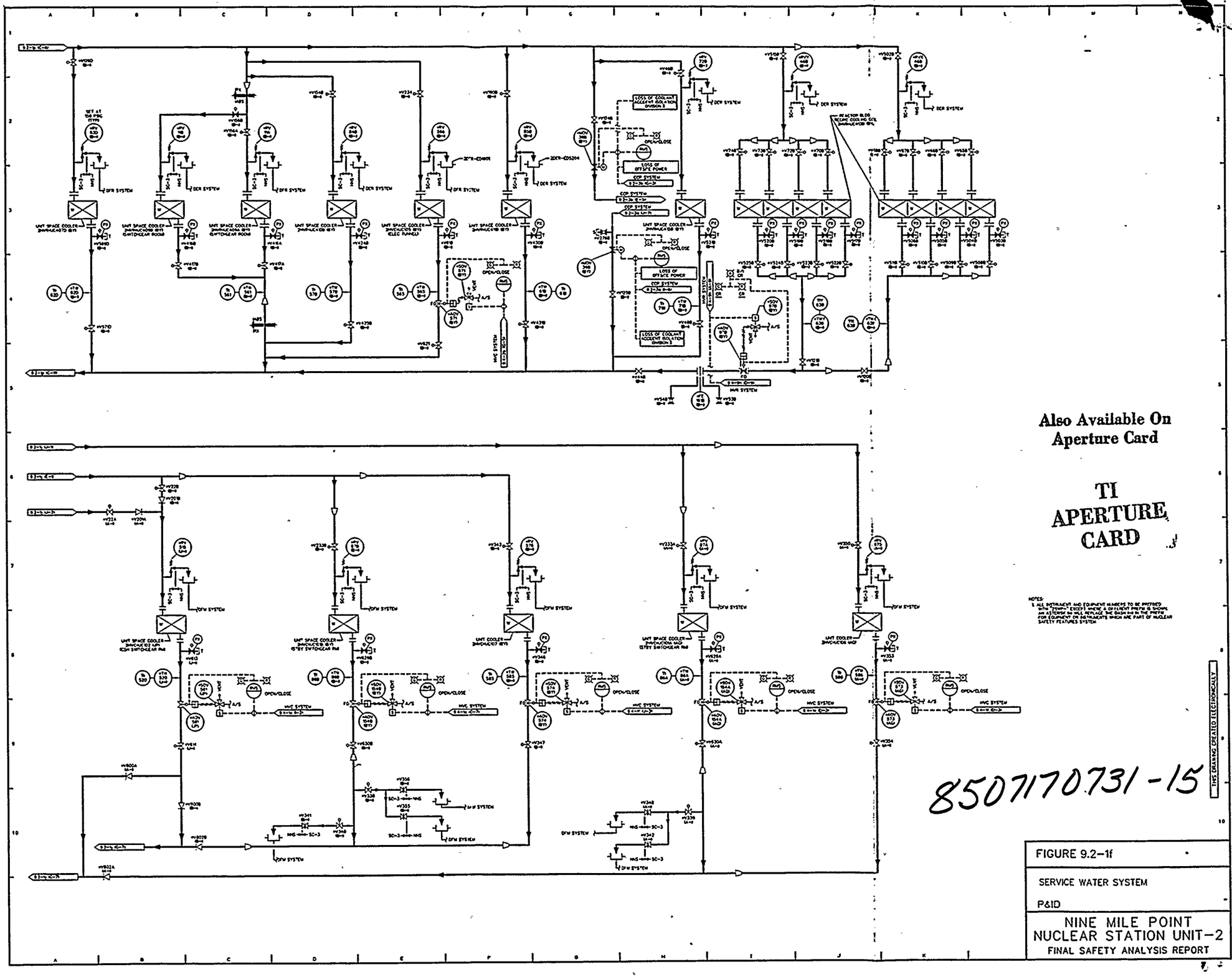
FIGURE 9.2-1f

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION UNIT-2
FINAL SAFETY ANALYSIS REPORT



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NOTES:
1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "2" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE EACH (**) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.

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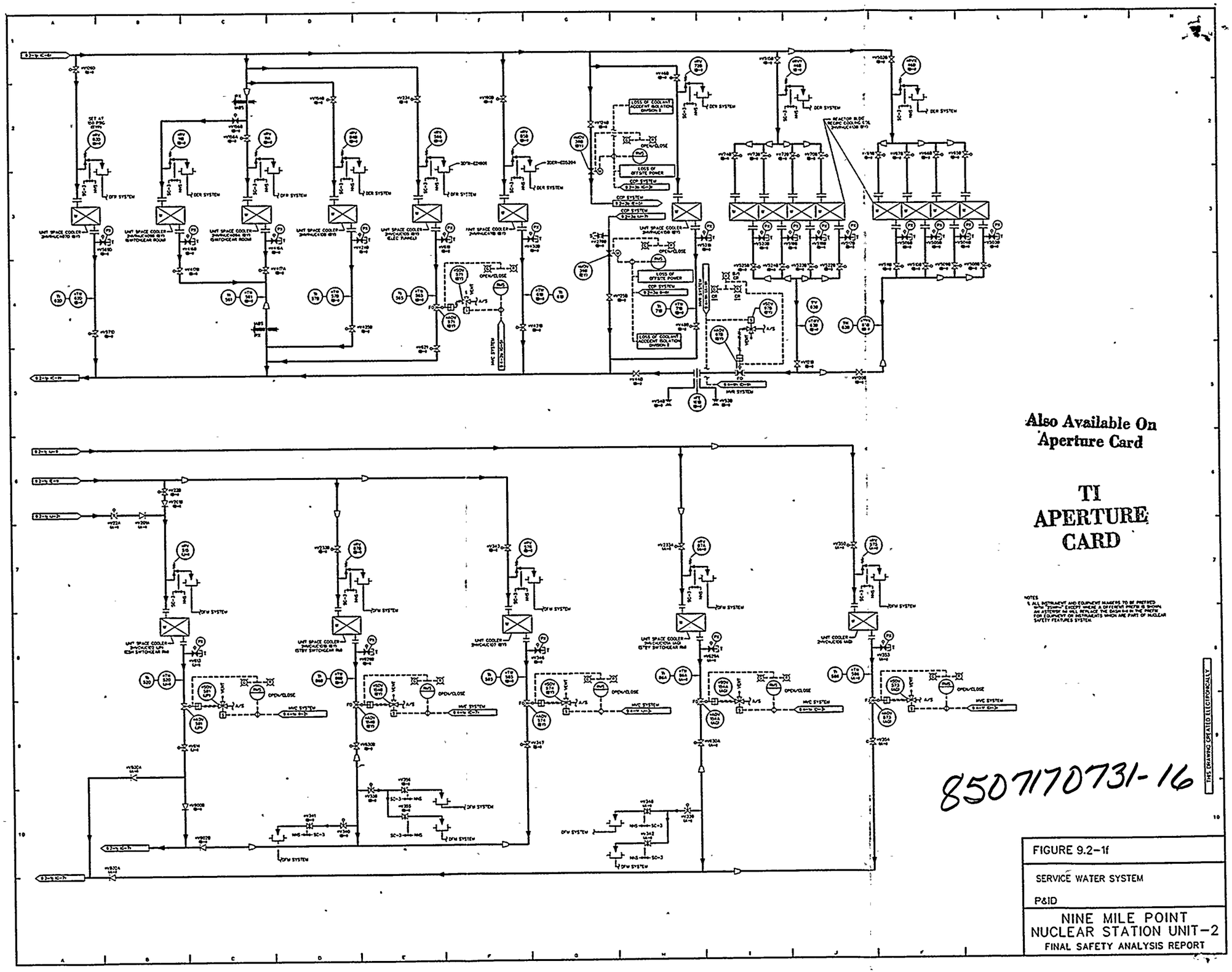
FIGURE 9.2-1f

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION UNIT-2
FINAL SAFETY ANALYSIS REPORT



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CARD

NOTES
1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "2CWS-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.

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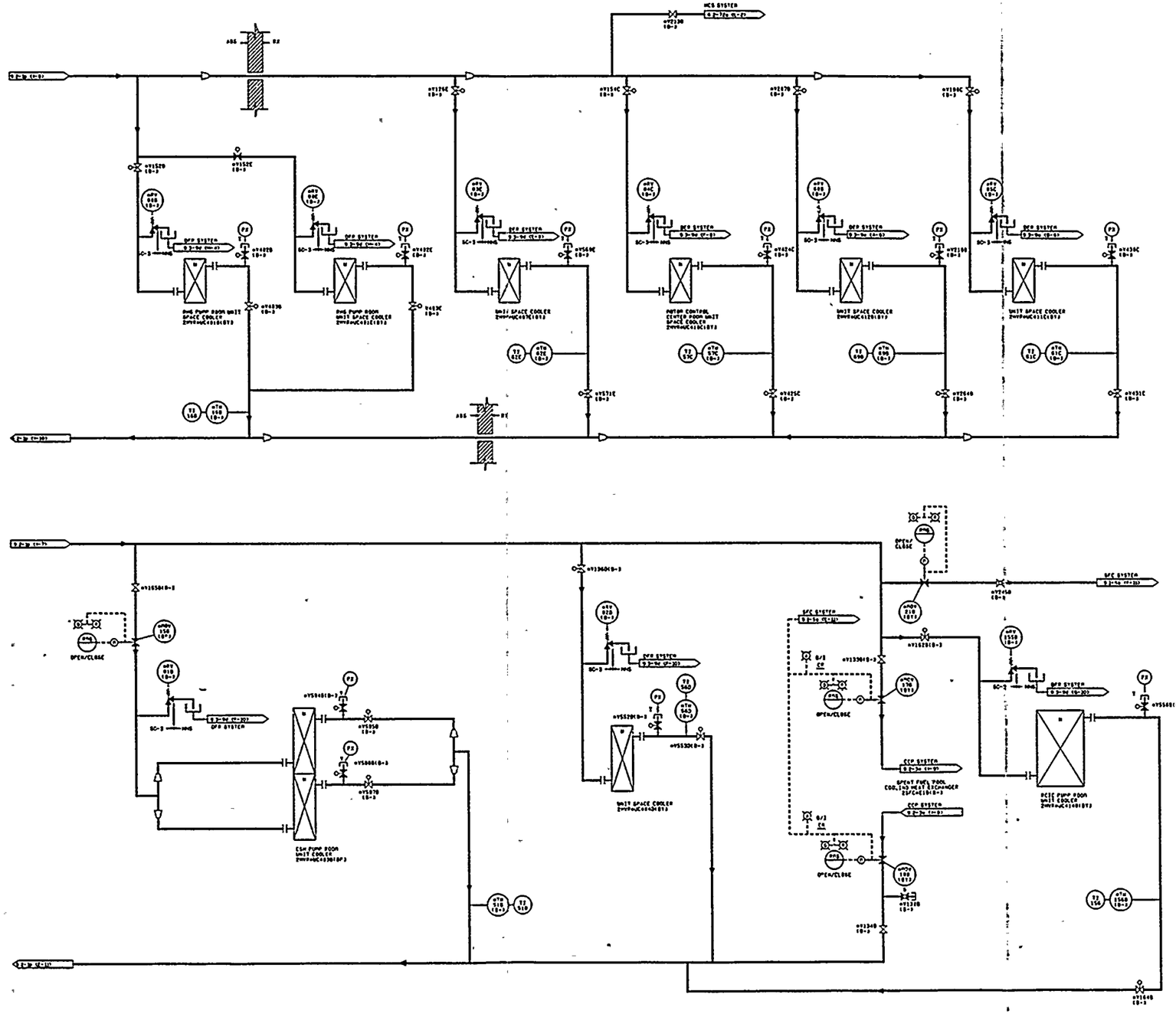
FIGURE 9.2-1f

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION UNIT-2
FINAL SAFETY ANALYSIS REPORT



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NOTES:
1. ASE, INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "1(2)NMP" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.

THIS DRAWING CONTAINS EXCEPTIONS/CLASS 1

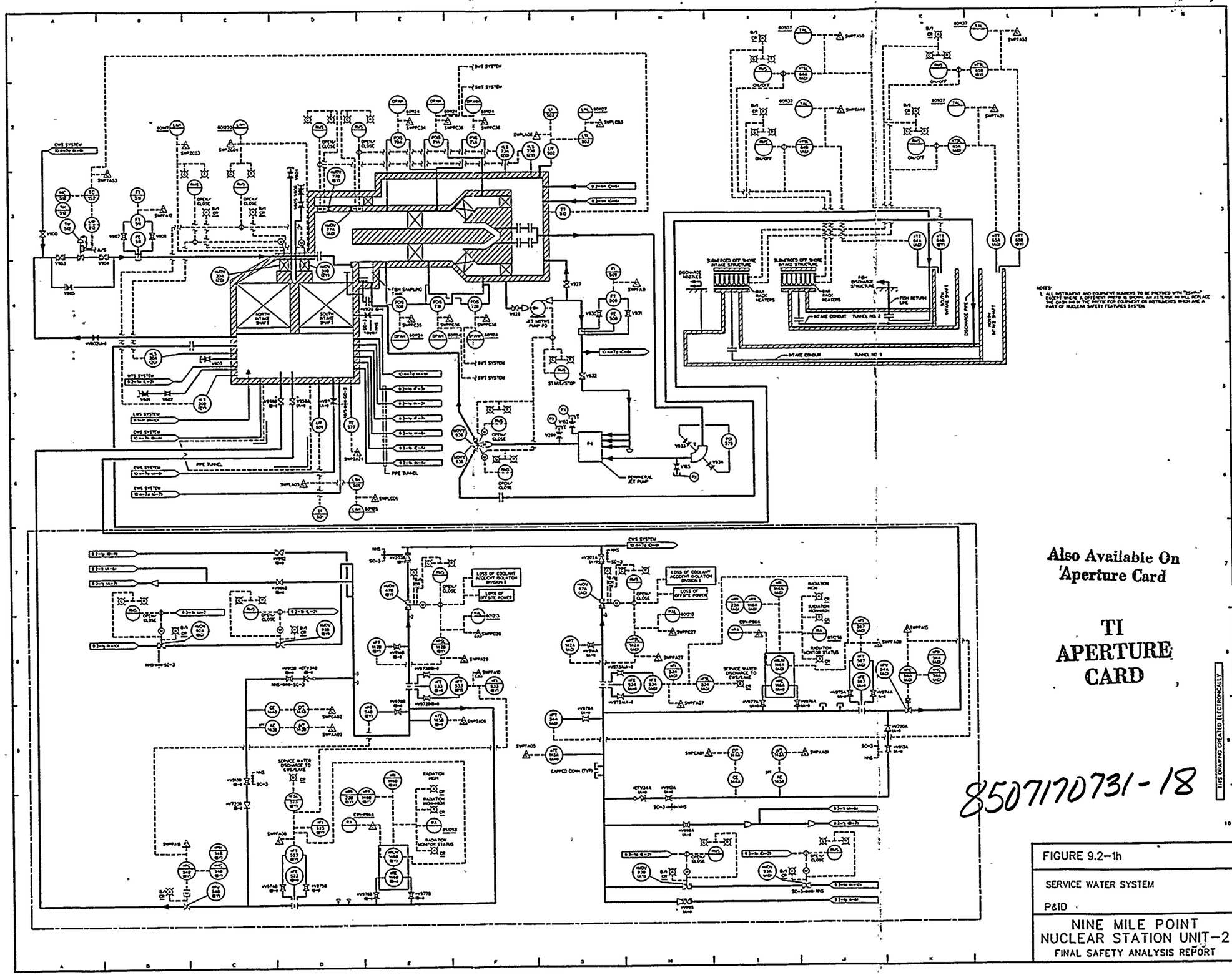
8507170731-17

FIGURE 9.2-1g

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "SWP-".
EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN AN ASTERIX (*) WILL REPLACE THE SWP# IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE A PART OF NUCLEAR SAFETY FEATURES SYSTEM.

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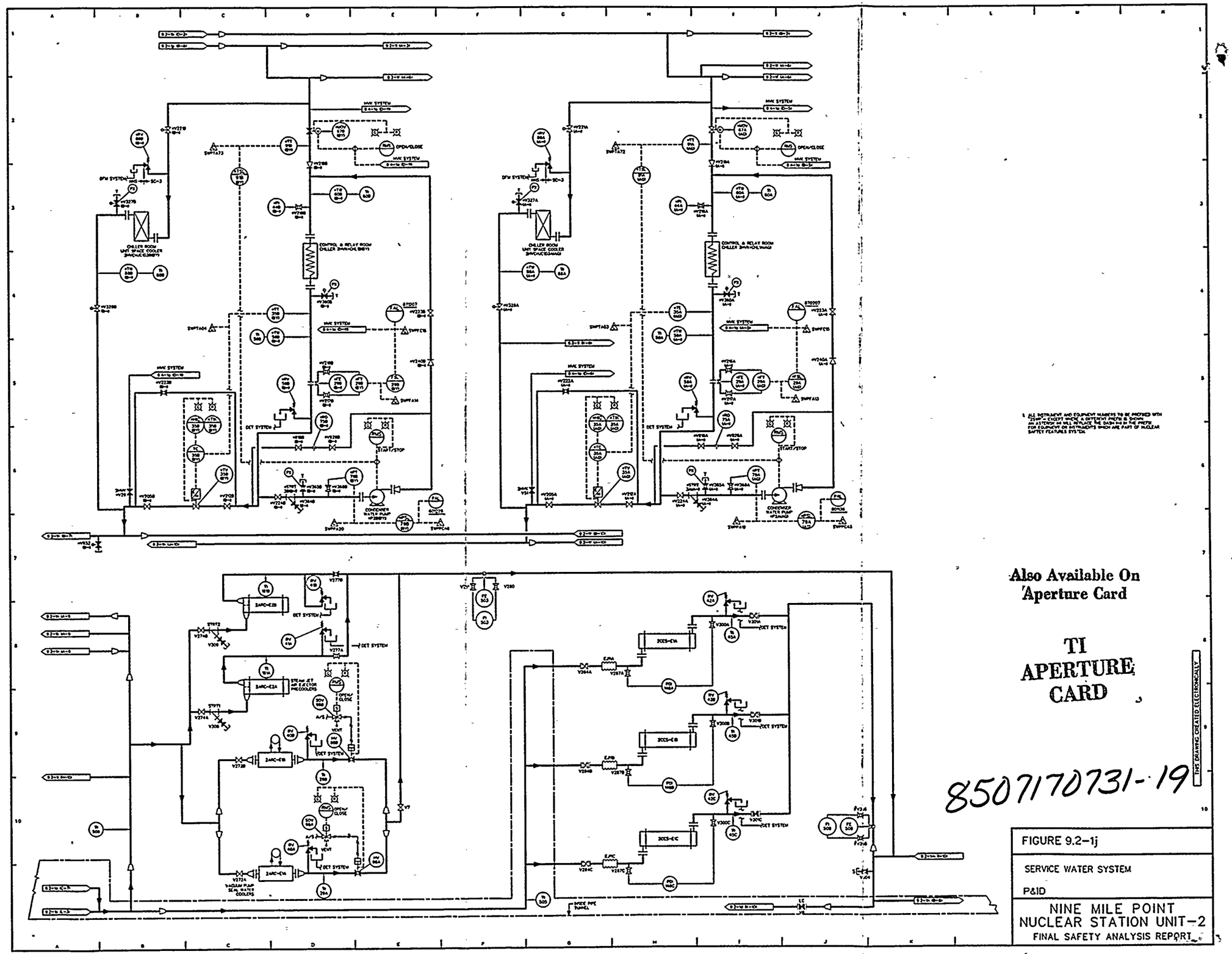
FIGURE 9.2-1h

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION UNIT-2

FINAL SAFETY ANALYSIS REPORT



1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH 2SWP — EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.

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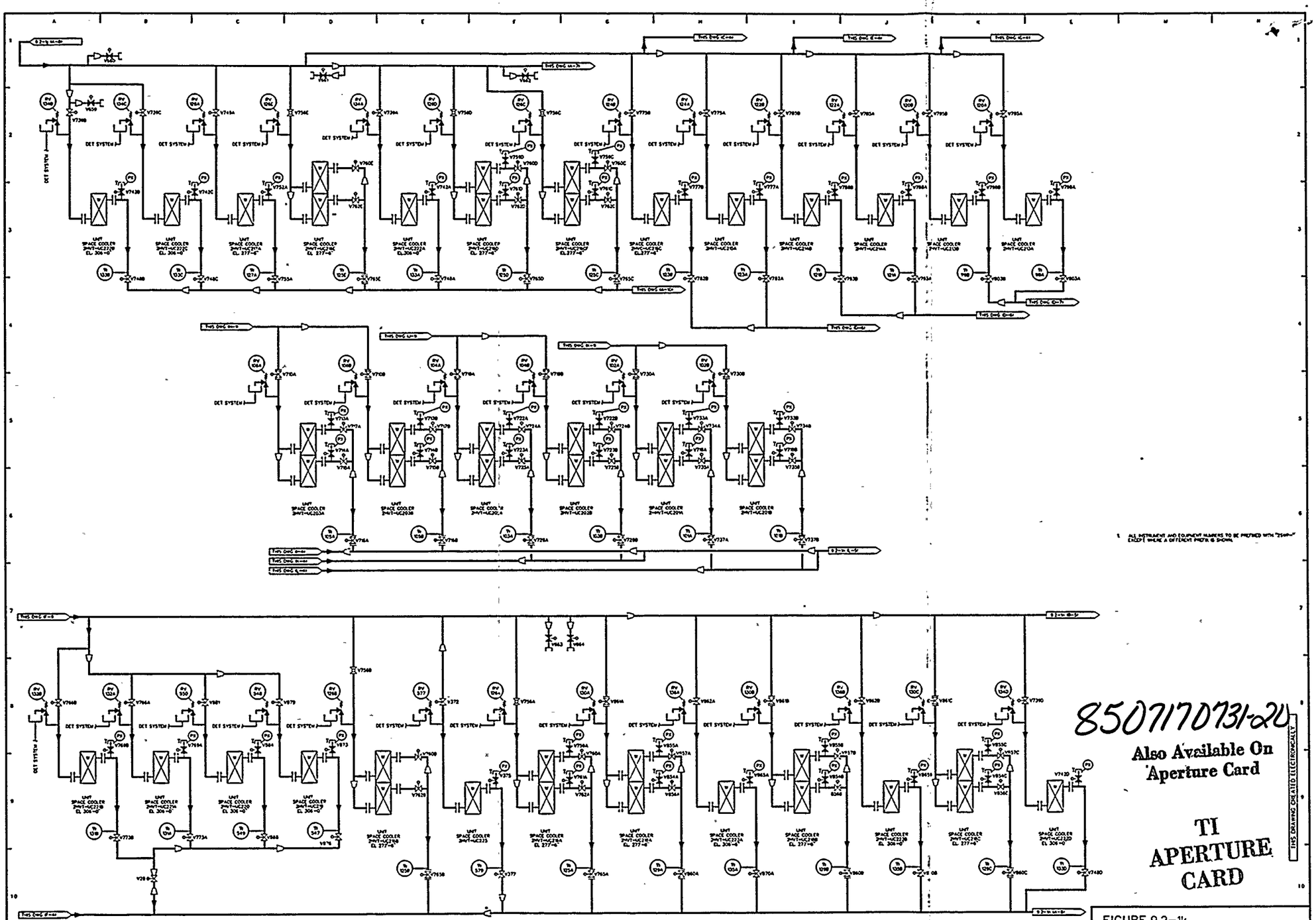
FIGURE 9.2-1j

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION UNIT-2

FINAL SAFETY ANALYSIS REPORT



1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "2SWP-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN.

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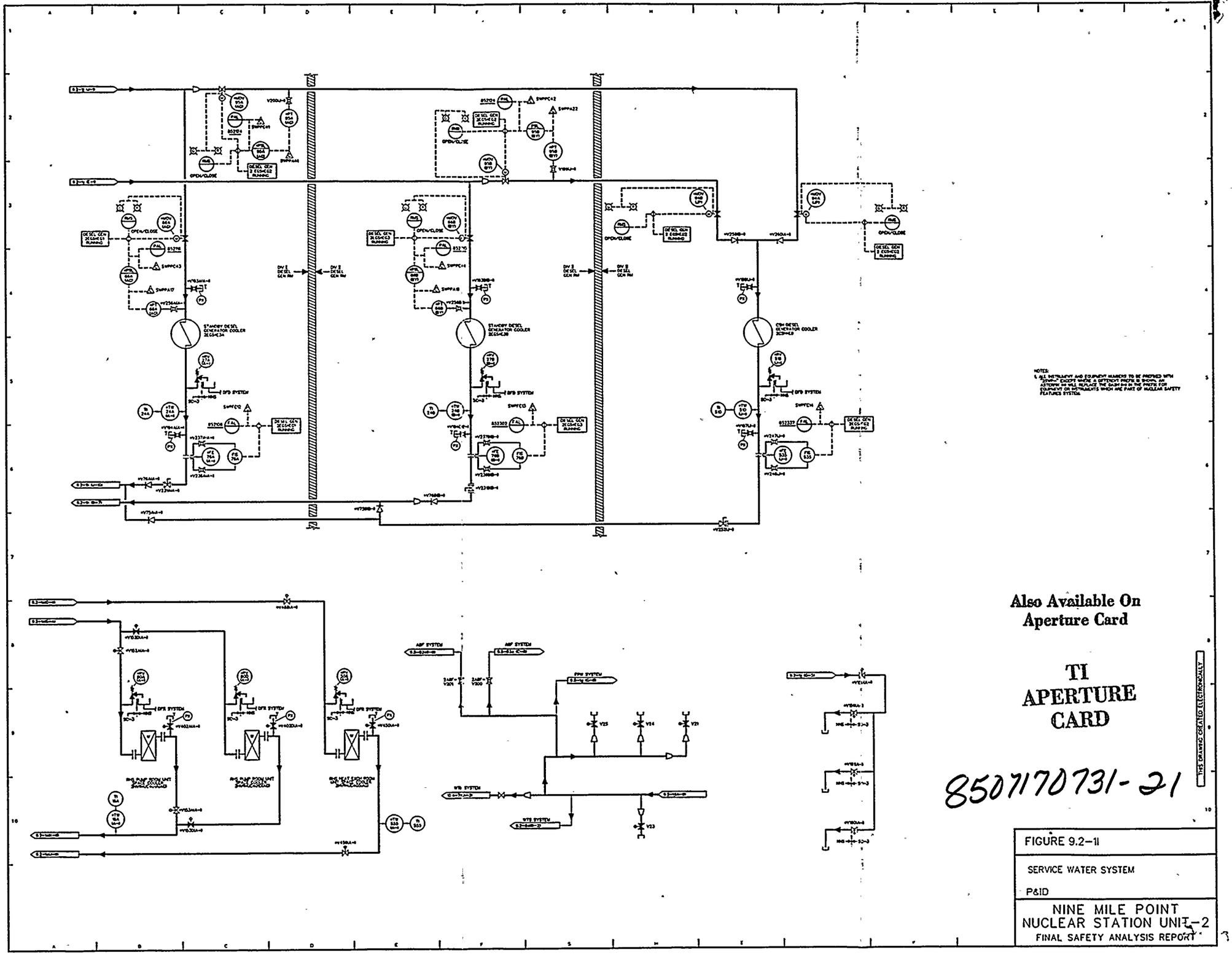
THIS DRAWING DISCLOSES TECHNOLOGY

FIGURE 9.2-1k

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION UNIT-2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "2(UNIT)" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE SYSTEM NO. IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.

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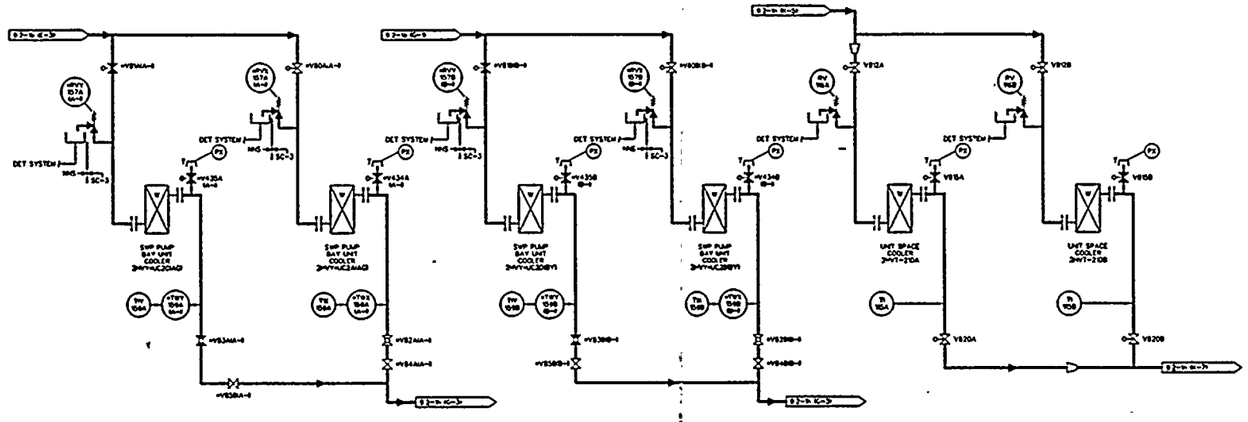
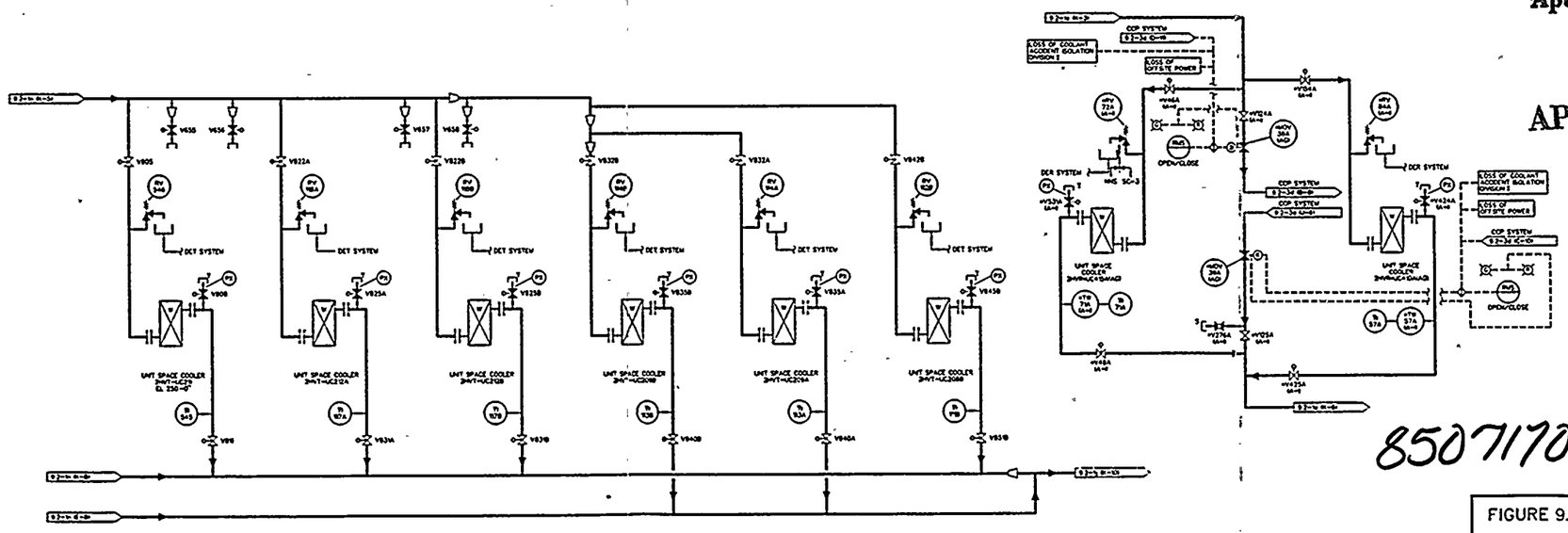
FIGURE 9.2-11

SERVICE WATER SYSTEM P&ID

NINE MILE POINT NUCLEAR STATION UNIT-2
FINAL SAFETY ANALYSIS REPORT





NOTES:

1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "24VHA" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN AND AS FOLLOWS (-A-) WILL REPLACE THE DASH NO. IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.

FIGURE 9.2–1m

SERVICE WATER SYSTEM

P&ID

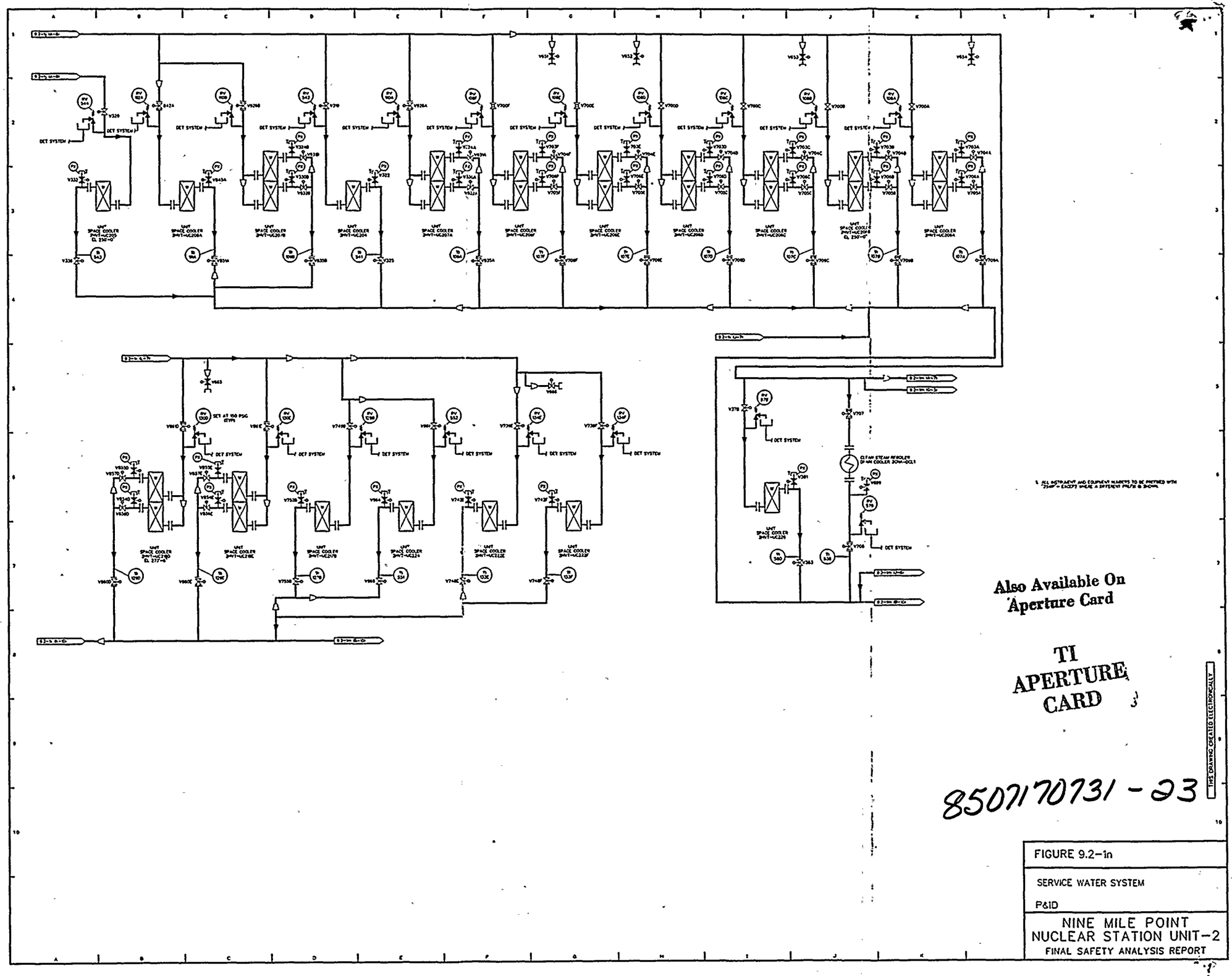


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FIGURE 9.2-1n

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION UNIT-2

FINAL SAFETY ANALYSIS REPORT

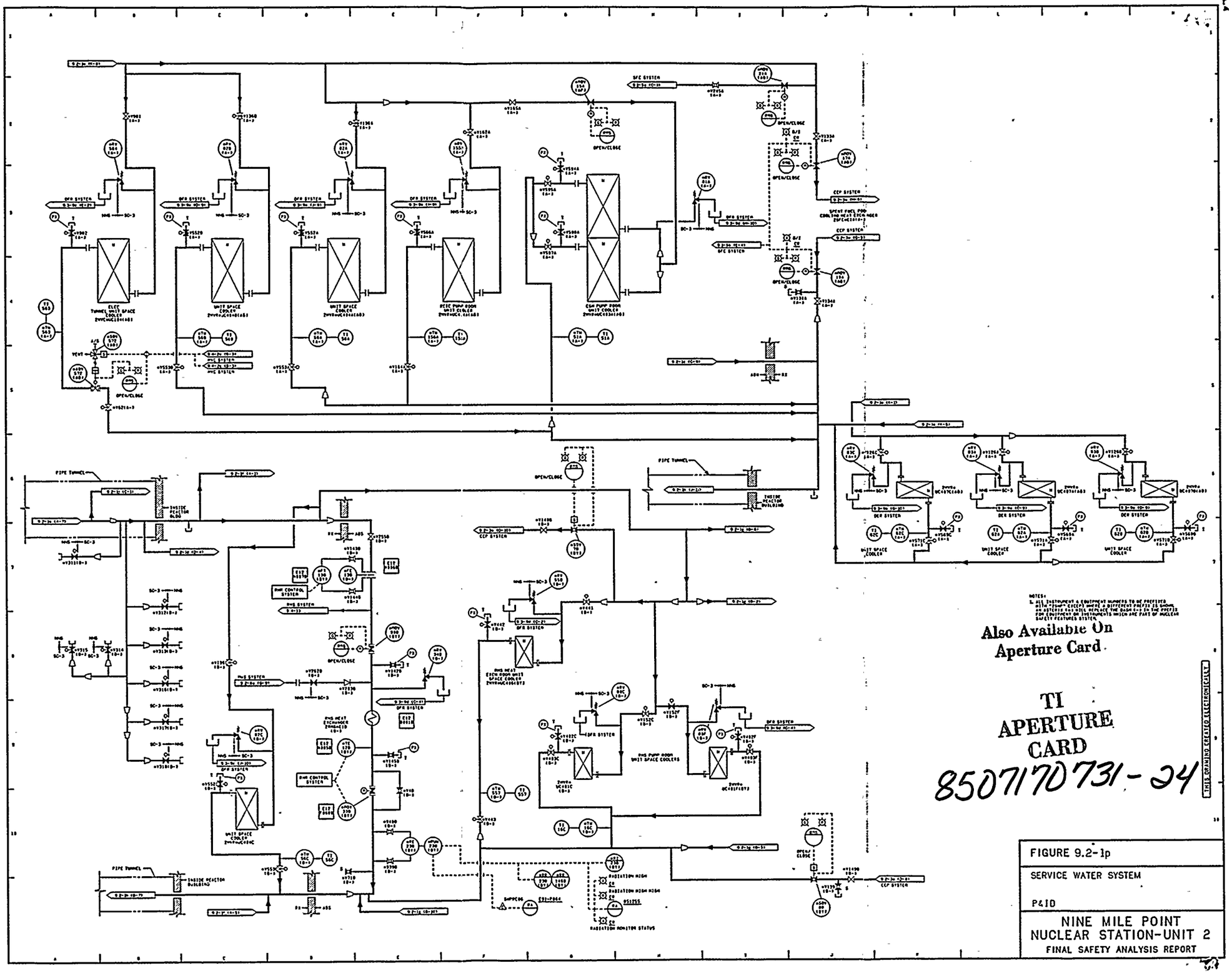

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FIGURE 9.2-1p

SERVICE WATER SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2

FINAL SAFETY ANALYSIS REPORT

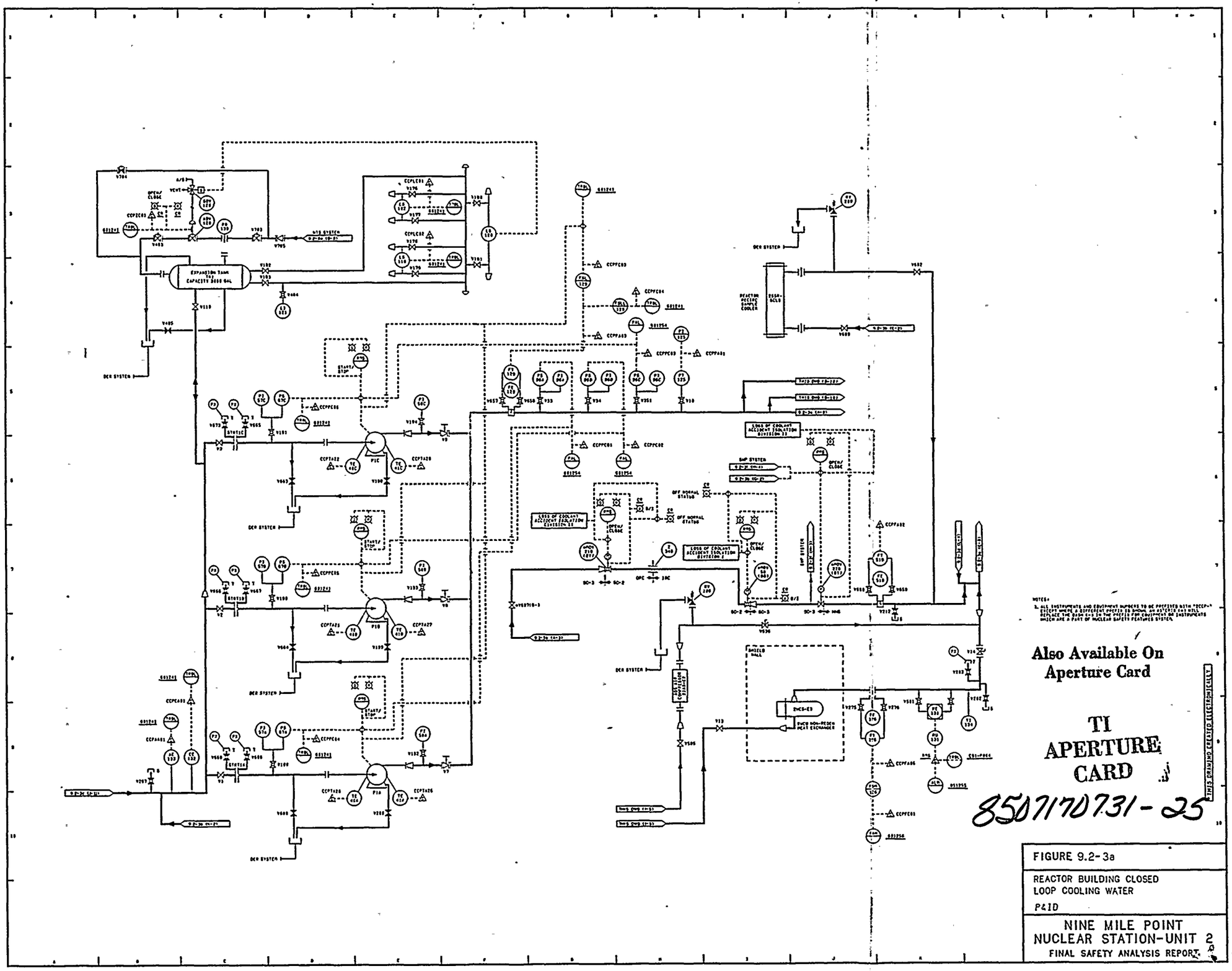

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FIGURE 9.2-3a

REACTOR BUILDING CLOSED LOOP COOLING WATER P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT

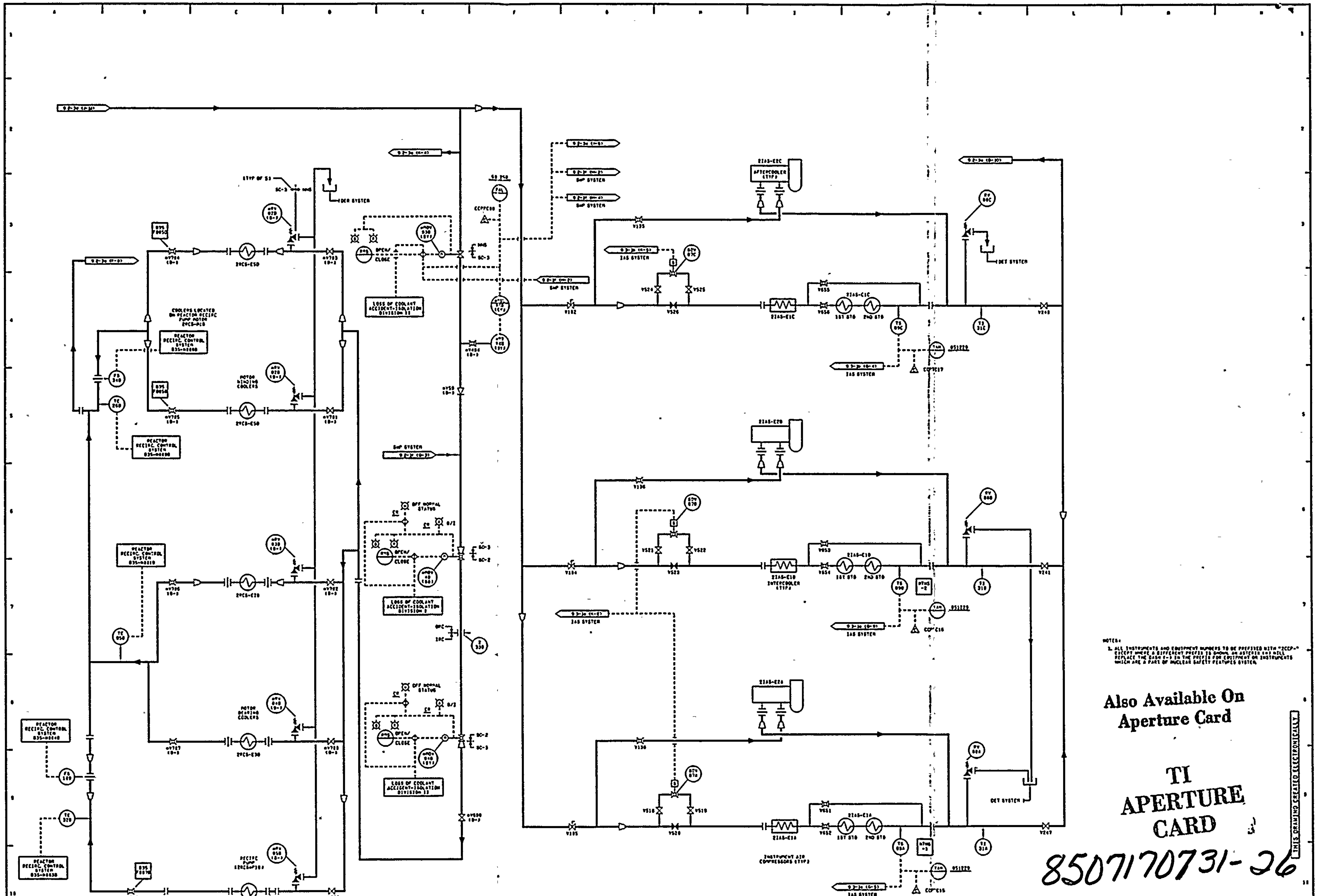

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FIGURE 9.2-3b

REACTOR BUILDING CLOSED LOOP COOLING WATER P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT

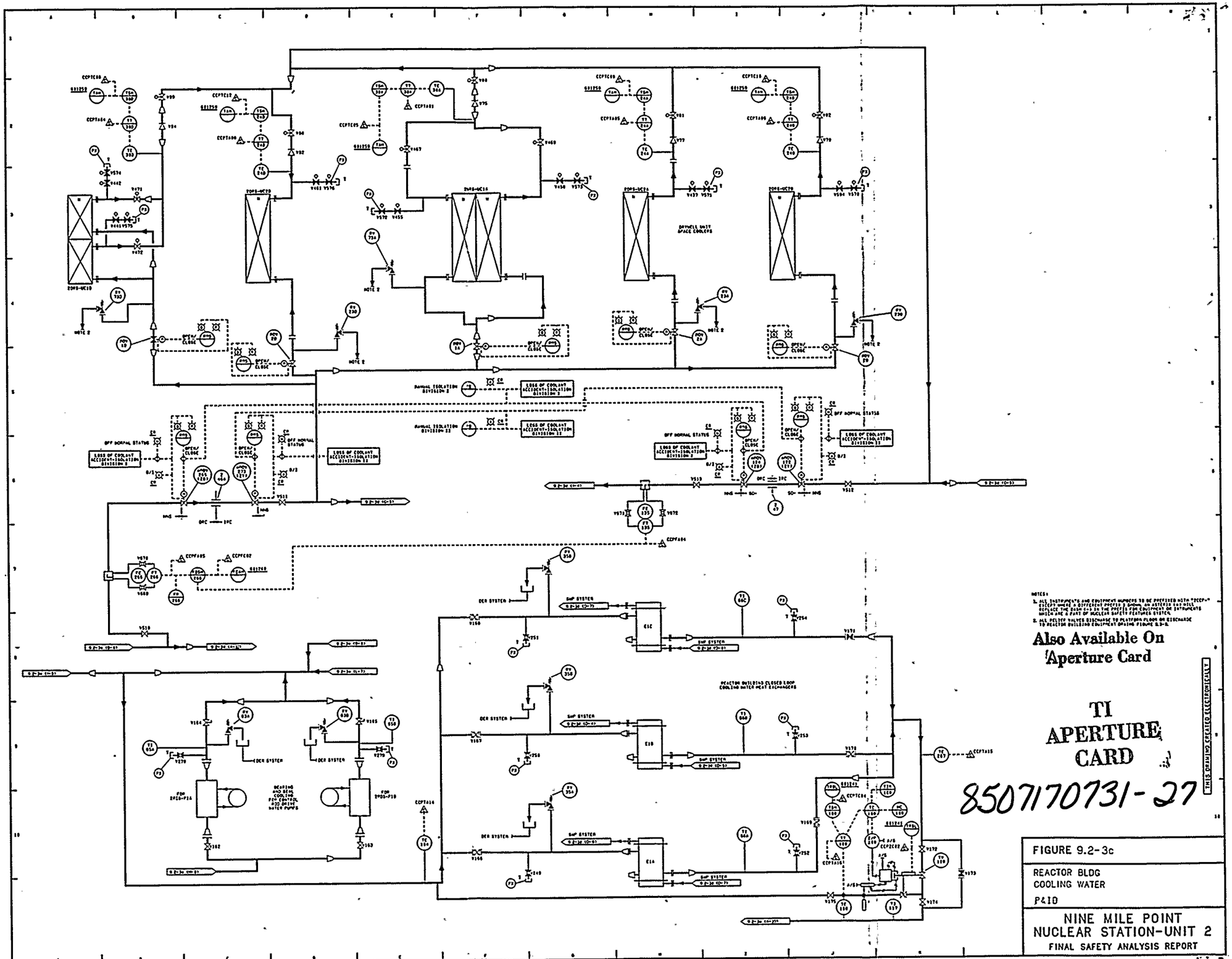
REACTOR BUILDING CLOSED LOOP COOLING WATER HEAT EXCHANGERS
REACTOR BUILDING CLOSED COOLING WATER PUMPS
DRYWELL UNIT SPACE COOLERS
Also Available On Aperture Card
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FIGURE 9.2-3c
REACTOR BLDG COOLING WATER
P&ID
NINE MILE POINT NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT

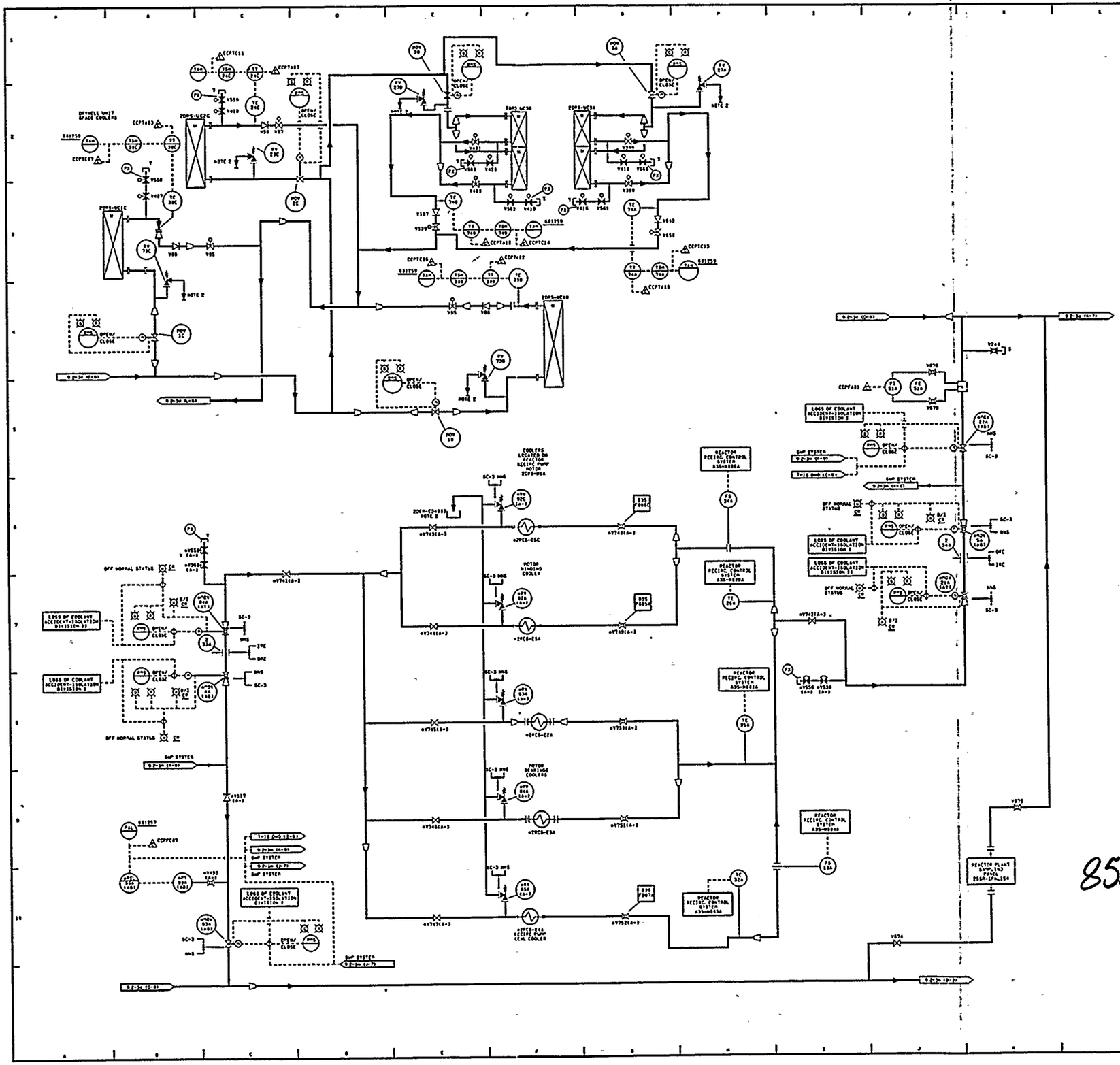

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FIGURE 9.2-3d

REACTOR BLDG COOLING WATER P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2 FINAL SAFETY ANALYSIS REPORT

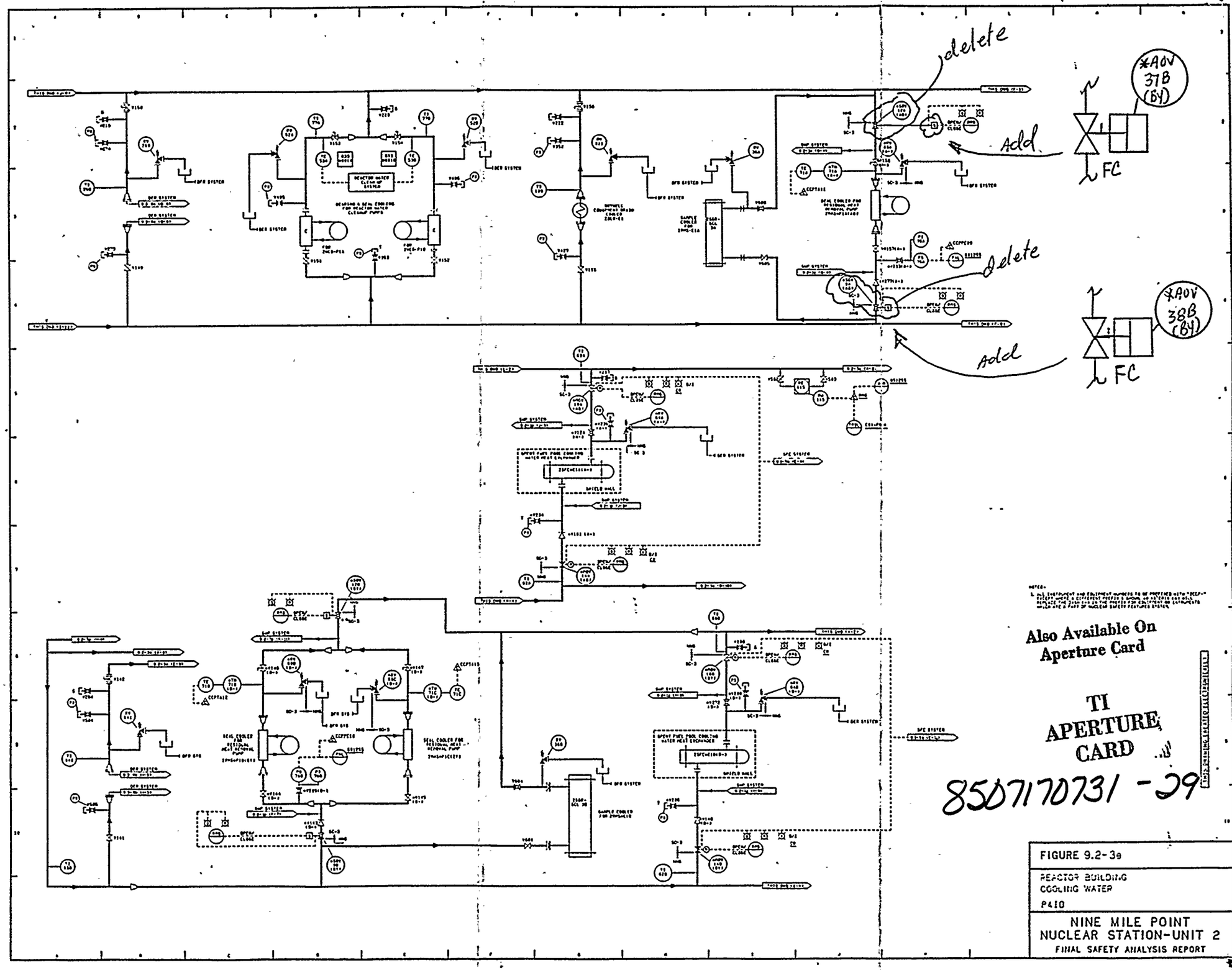

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FIGURE 9.2-3a

REACTOR BUILDING COOLING WATER P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2 FINAL SAFETY ANALYSIS REPORT

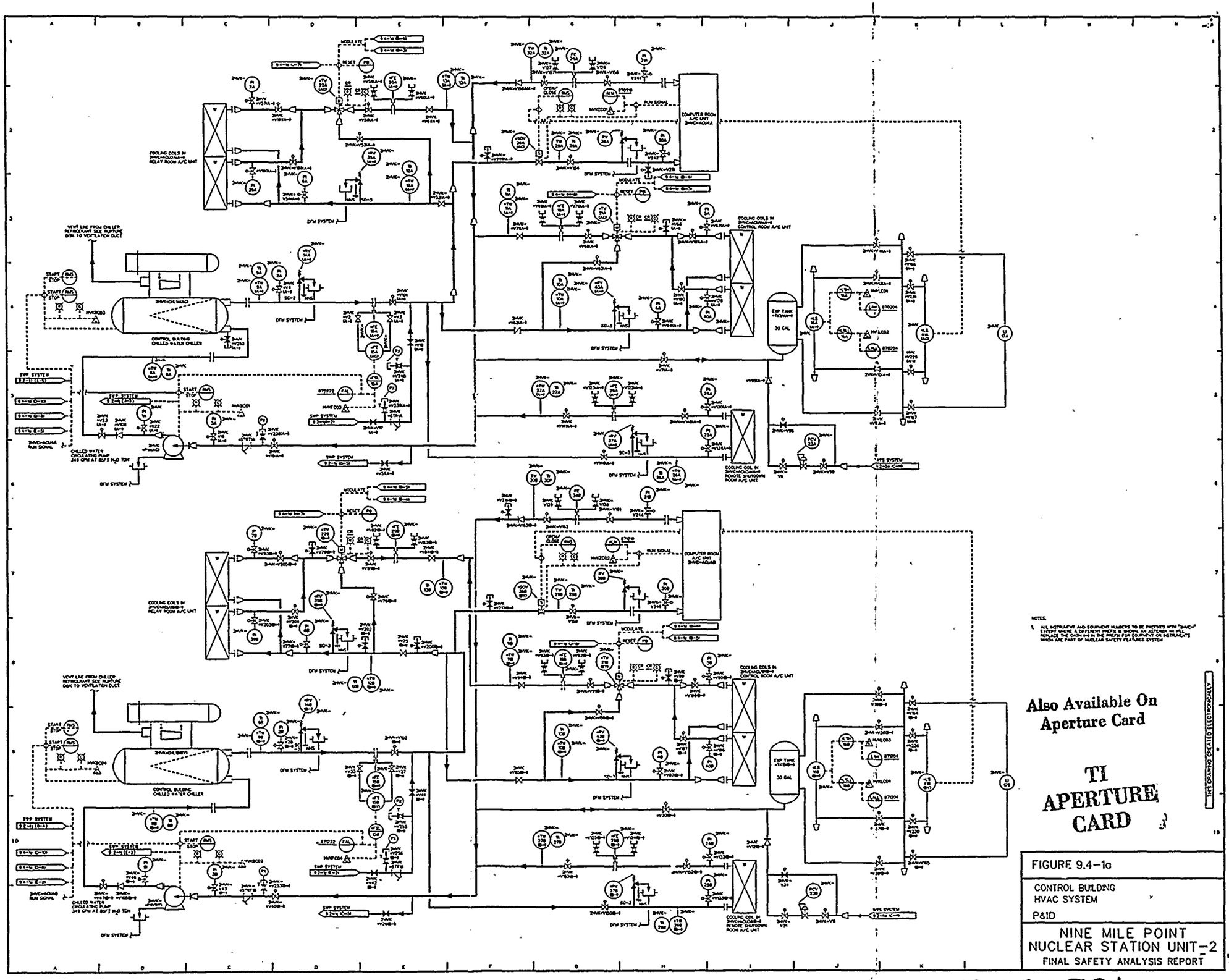

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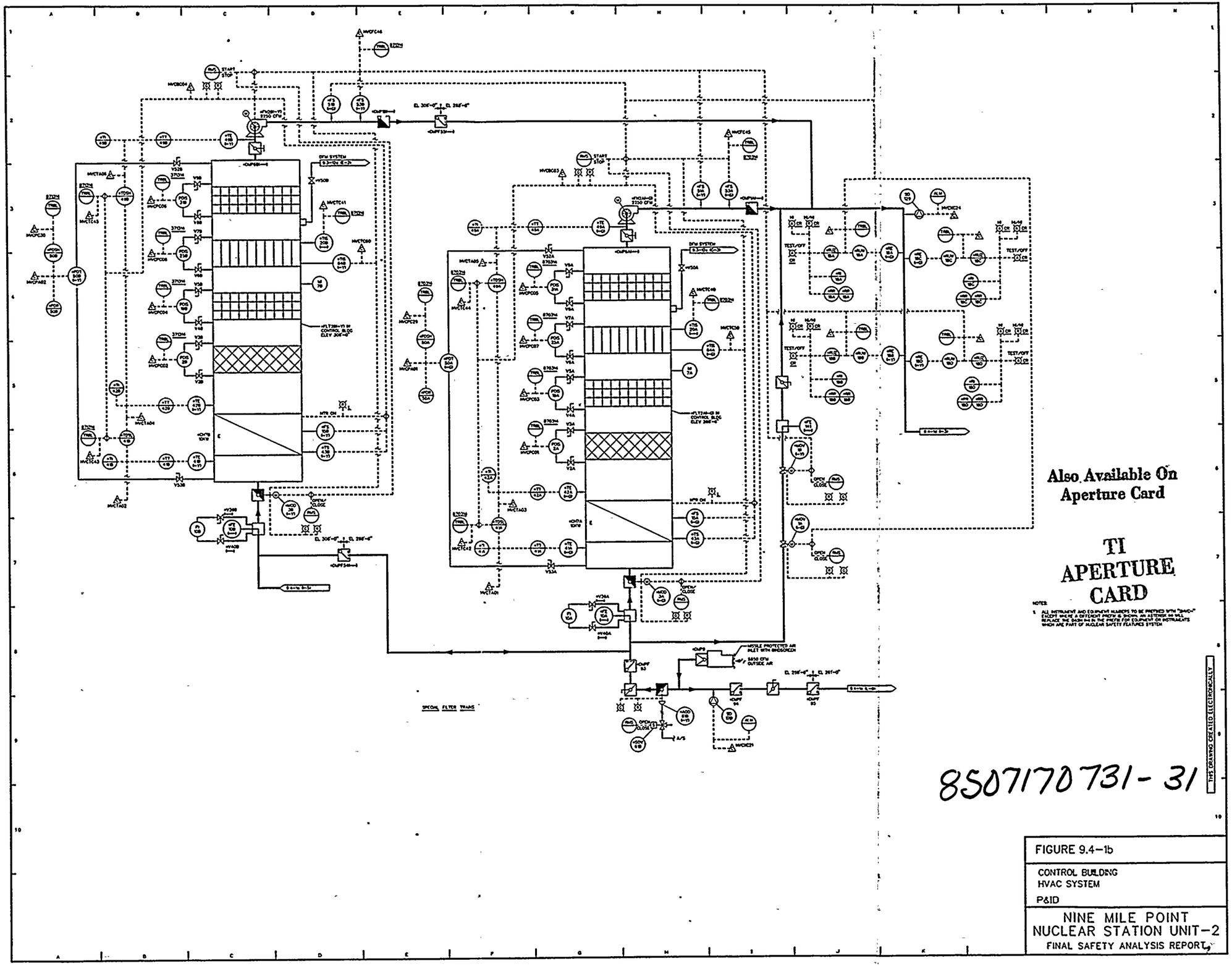
FIGURE 9.4-1a

CONTROL BUILDING HVAC SYSTEM P&ID

NINE MILE POINT NUCLEAR STATION UNIT-2 FINAL SAFETY ANALYSIS REPORT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APERTURE
CARD
NOTES:
1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "2HVC-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.
THIS DRAWING CREATED ELECTRONICALLY
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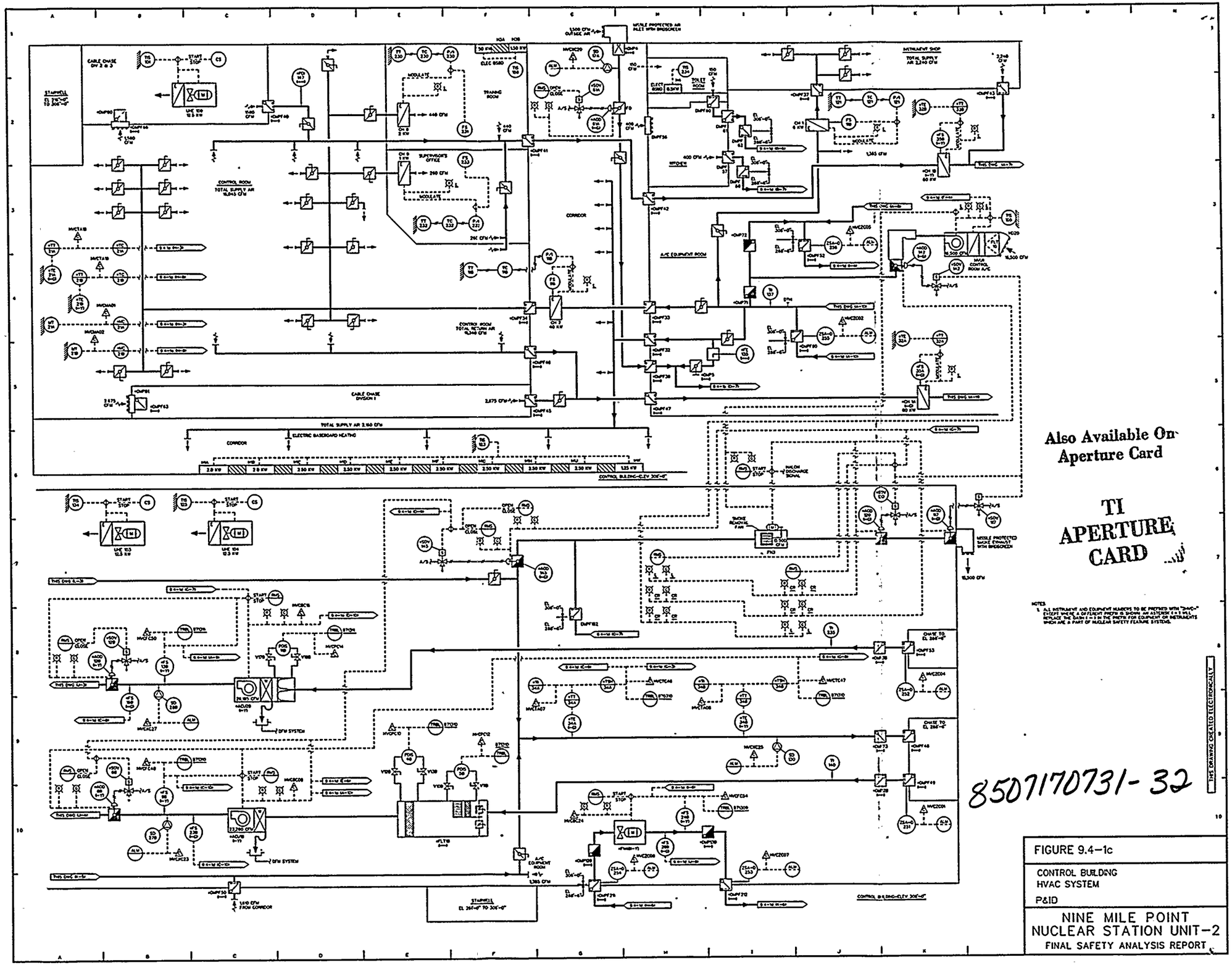
FIGURE 9.4-1b
CONTROL BUILDING
HVAC SYSTEM
P&ID
NINE MILE POINT
NUCLEAR STATION UNIT-2
FINAL SAFETY ANALYSIS REPORT



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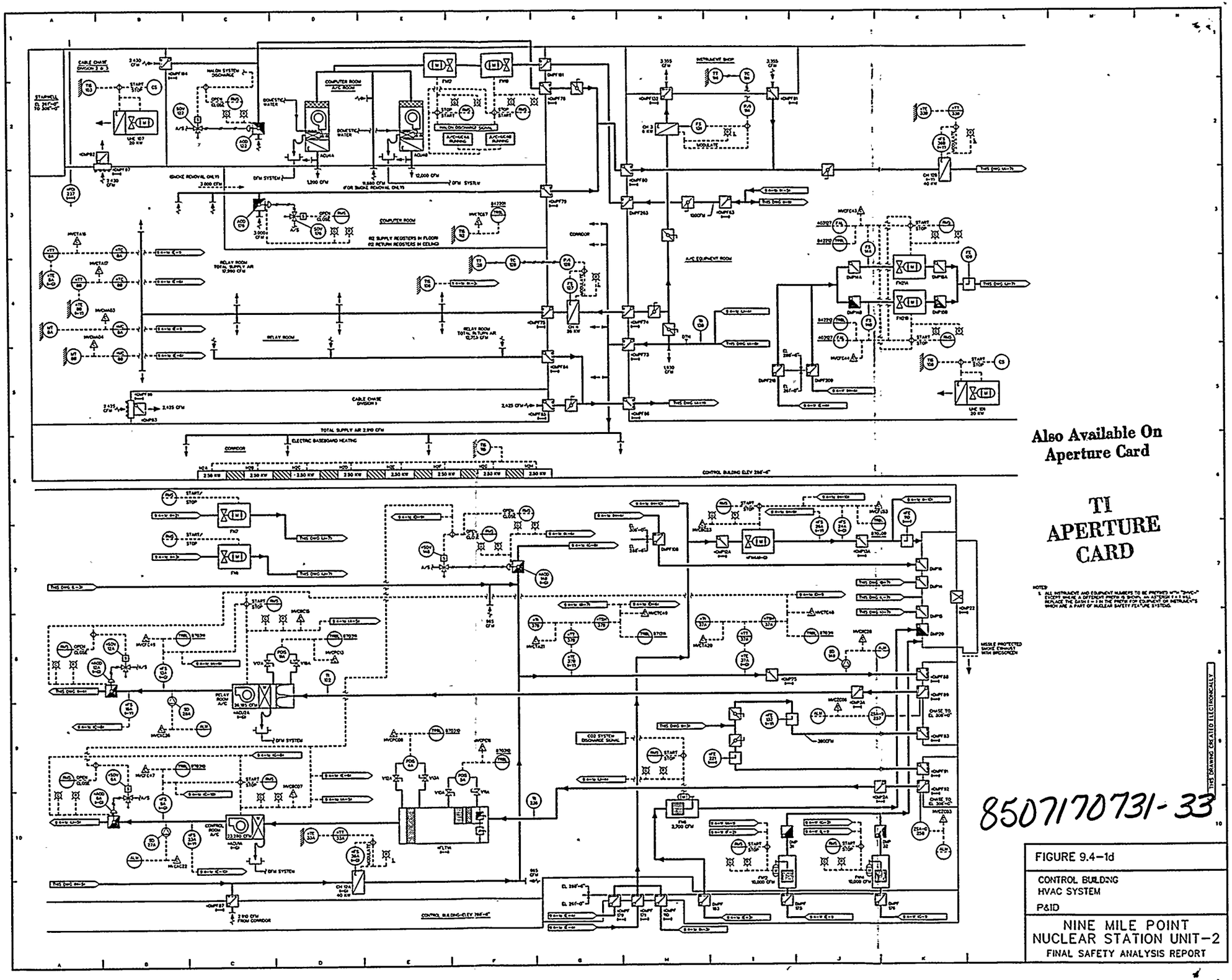
NOTES
1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "SHVC-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN OR ASTERISK (*) IS USED. REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE A PART OF NUCLEAR SAFETY FEATURE SYSTEMS.

8507170731-32

FIGURE 9.4-1c

CONTROL BUILDING
HVAC SYSTEM
P&ID

NINE MILE POINT
NUCLEAR STATION UNIT-2
FINAL SAFETY ANALYSIS REPORT



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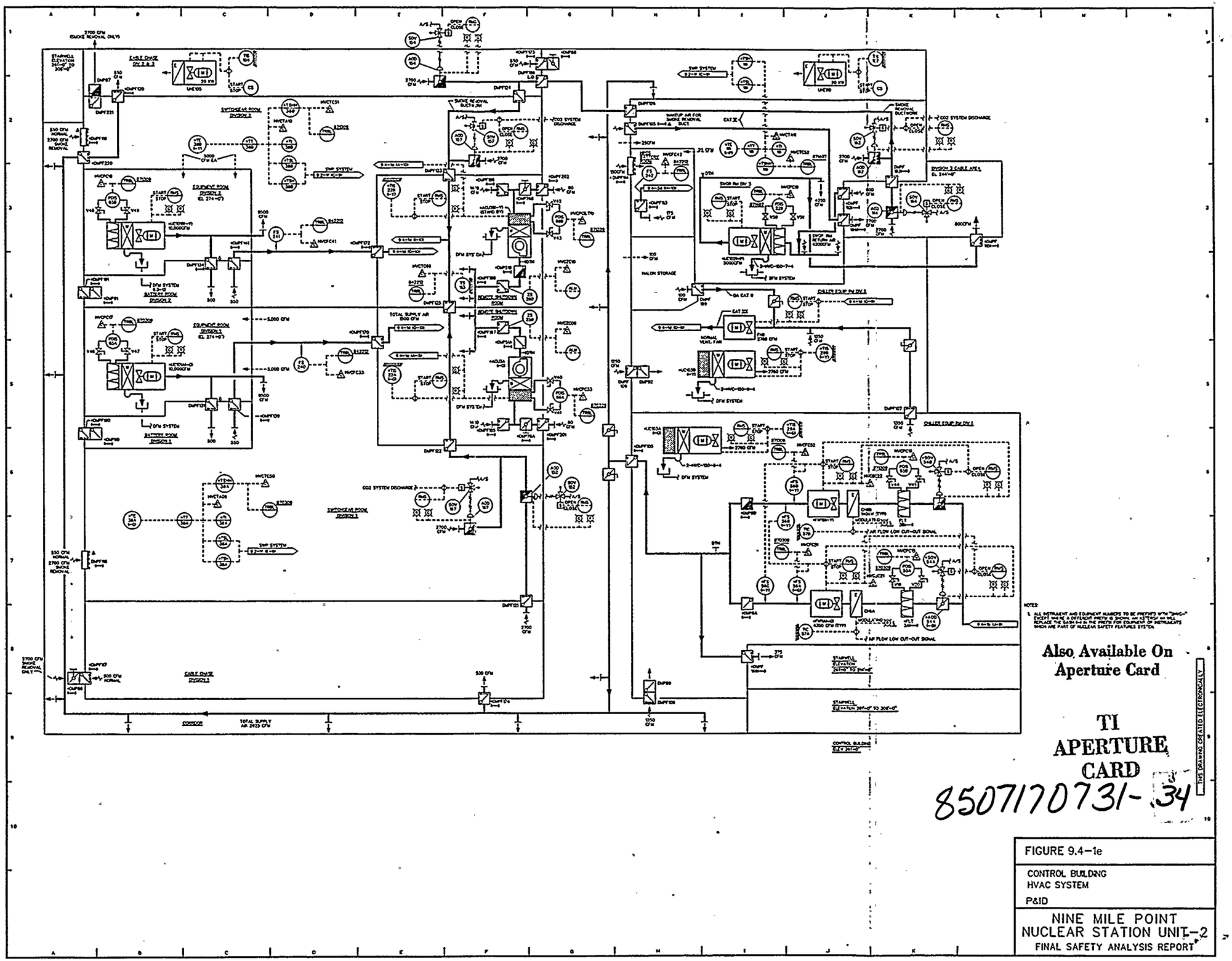
NOTES:
1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "HVAC" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE A PART OF NUCLEAR SAFETY FEATURE SYSTEMS.

8507170731-33

FIGURE 9.4-1d

CONTROL BUILDING HVAC SYSTEM P&ID

NINE MILE POINT NUCLEAR STATION UNIT-2
FINAL SAFETY ANALYSIS REPORT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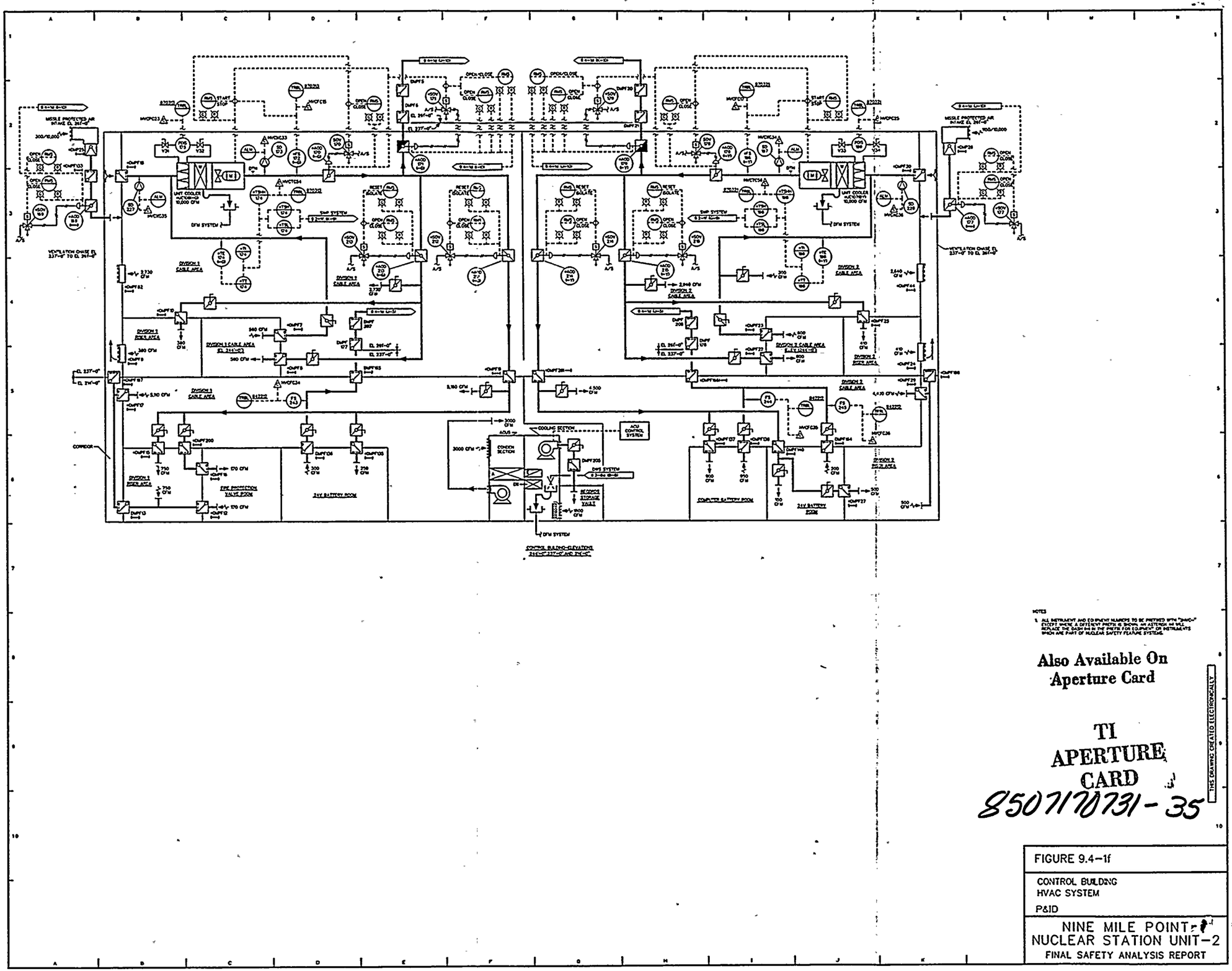
THIS DRAWING CREATED ELECTRONICALLY
FIGURE 9.4-1e
CONTROL BUILDING HVAC SYSTEM P&ID
NINE MILE POINT NUCLEAR STATION UNIT-2
FINAL SAFETY ANALYSIS REPORT



NOTES

1. ALL INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "CHVAC" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURE SYSTEMS.

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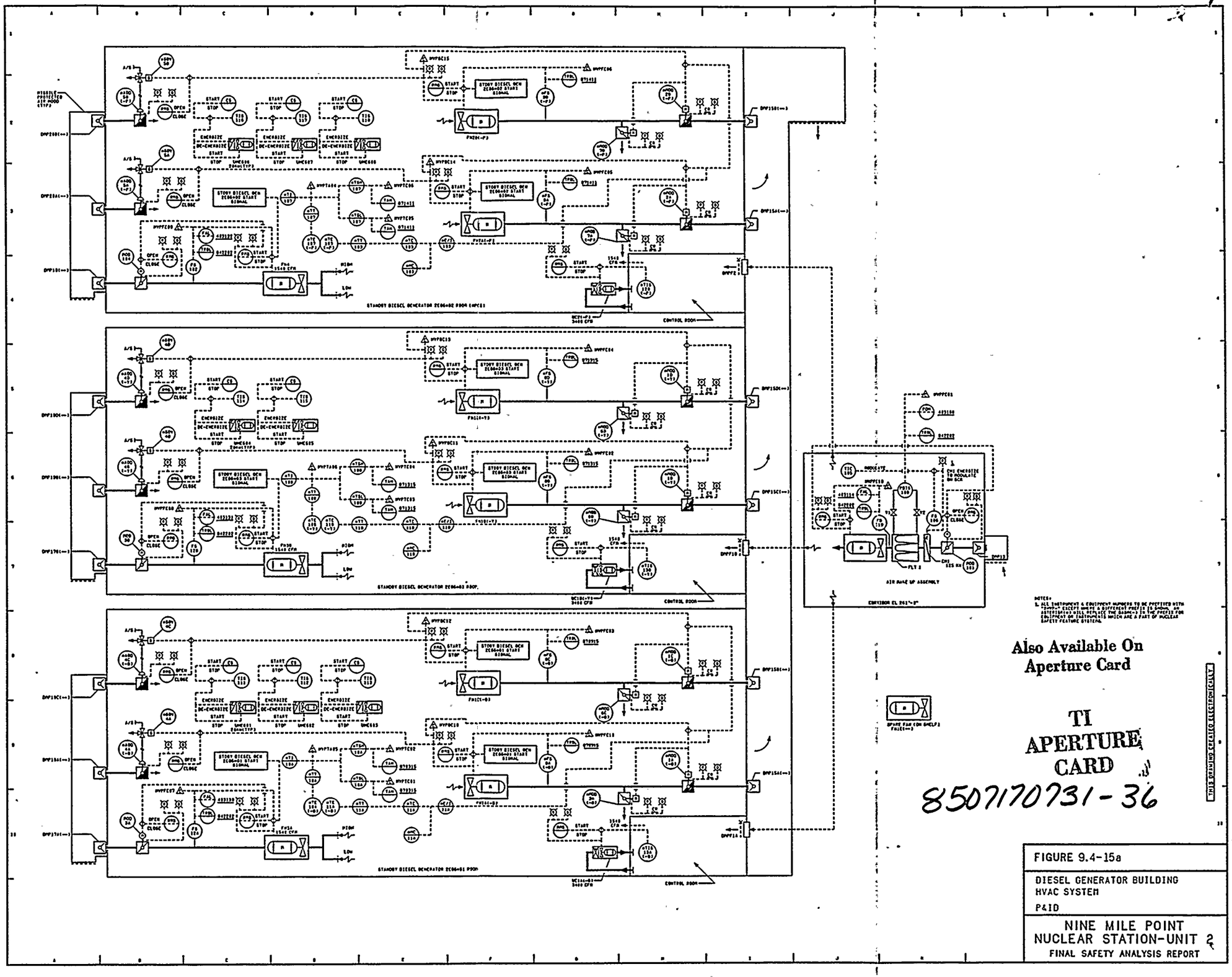
FIGURE 9.4–1f

CONTROL BUILDING
HVAC SYSTEM
P&ID

NINE MILE POINT
NUCLEAR STATION UNIT–2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "SVVP-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH(-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE A PART OF NUCLEAR SAFETY FEATURE SYSTEMS.

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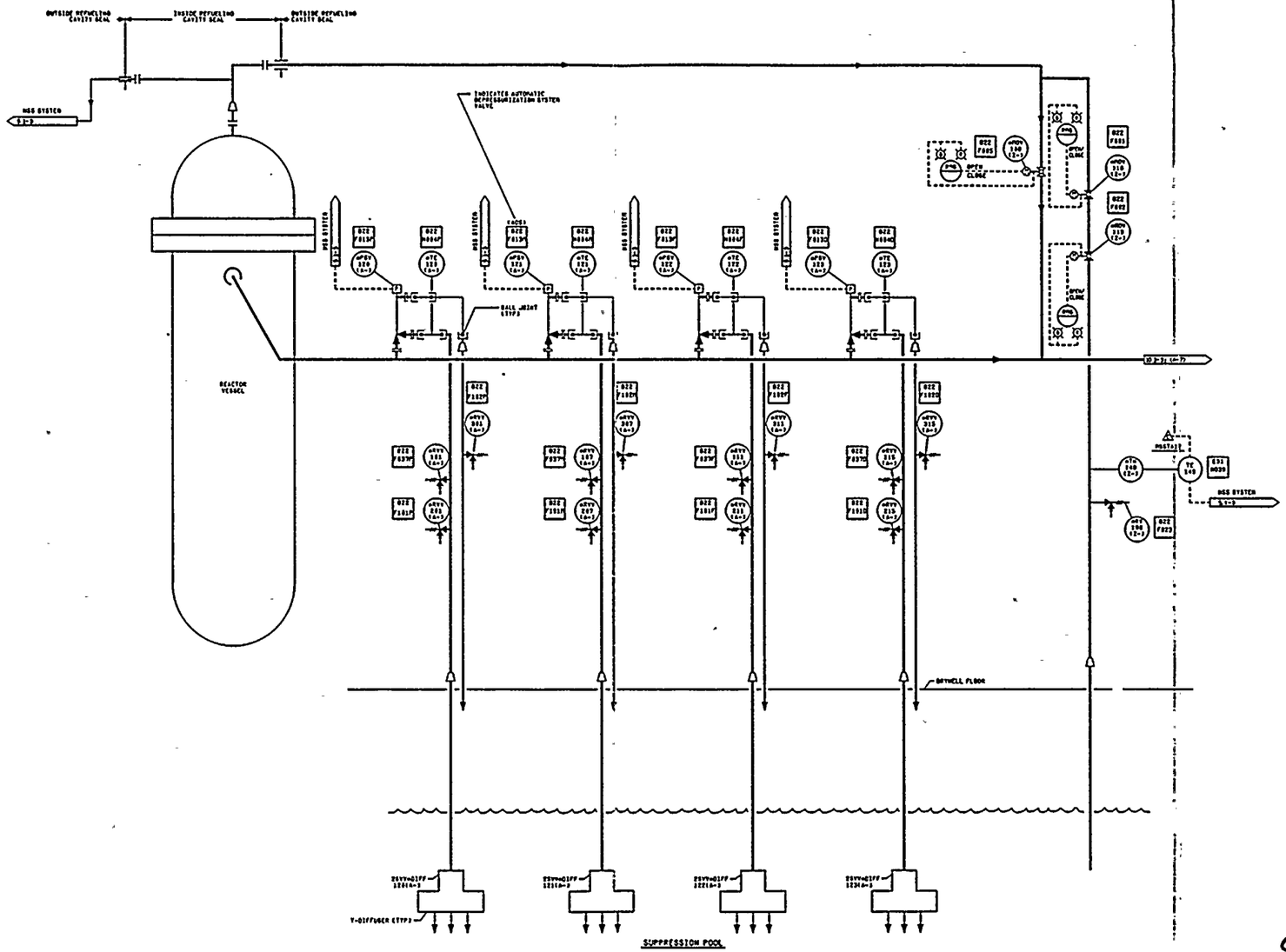
FIGURE 9.4-15a

DIESEL GENERATOR BUILDING HVAC SYSTEM P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:

1. ALL INSTRUMENTS & EQUIPMENT NUMBERS TO BE PREFIXED BY N21- UNLESS EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN N21 PREFIX WILL REPLACE THE BASE E-I-N ON THE PREFIX FOR THE EQUIPMENT OR INSTRUMENTS WHICH ARE A PART OF THE NUCLEAR SAFETY FEATURES SYSTEMS.

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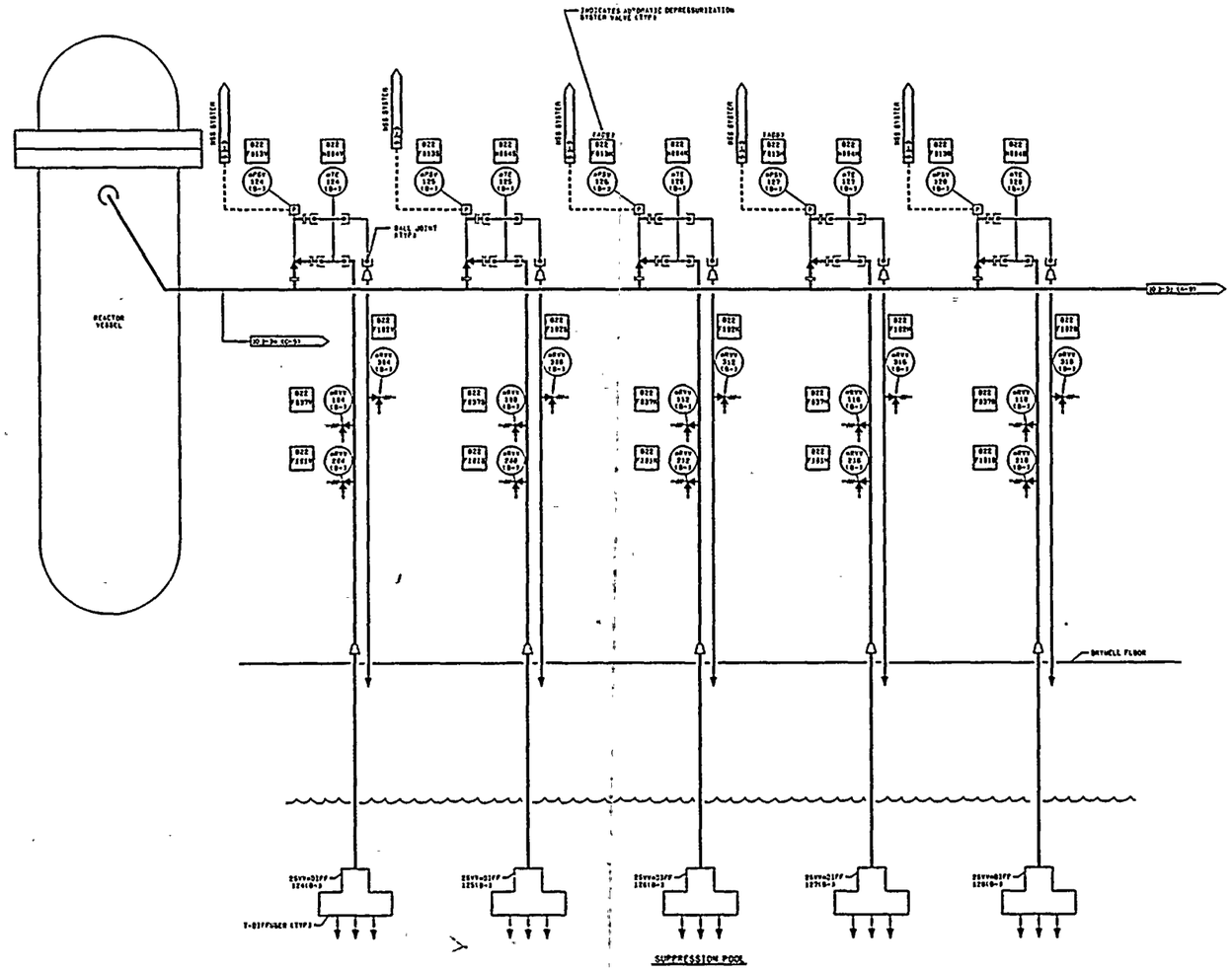
FIGURE FSAR 10.1-3a

MAIN STEAM SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "2MSL-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. (E.G. 2STM-134 WILL REPLACE THE BASE NO. 134 ON THE PROFILE FOR THE INSTRUMENTATION AND CONTROLS WHICH ARE A PART OF THE NUCLEAR SAFETY FEATURES SYSTEMS.

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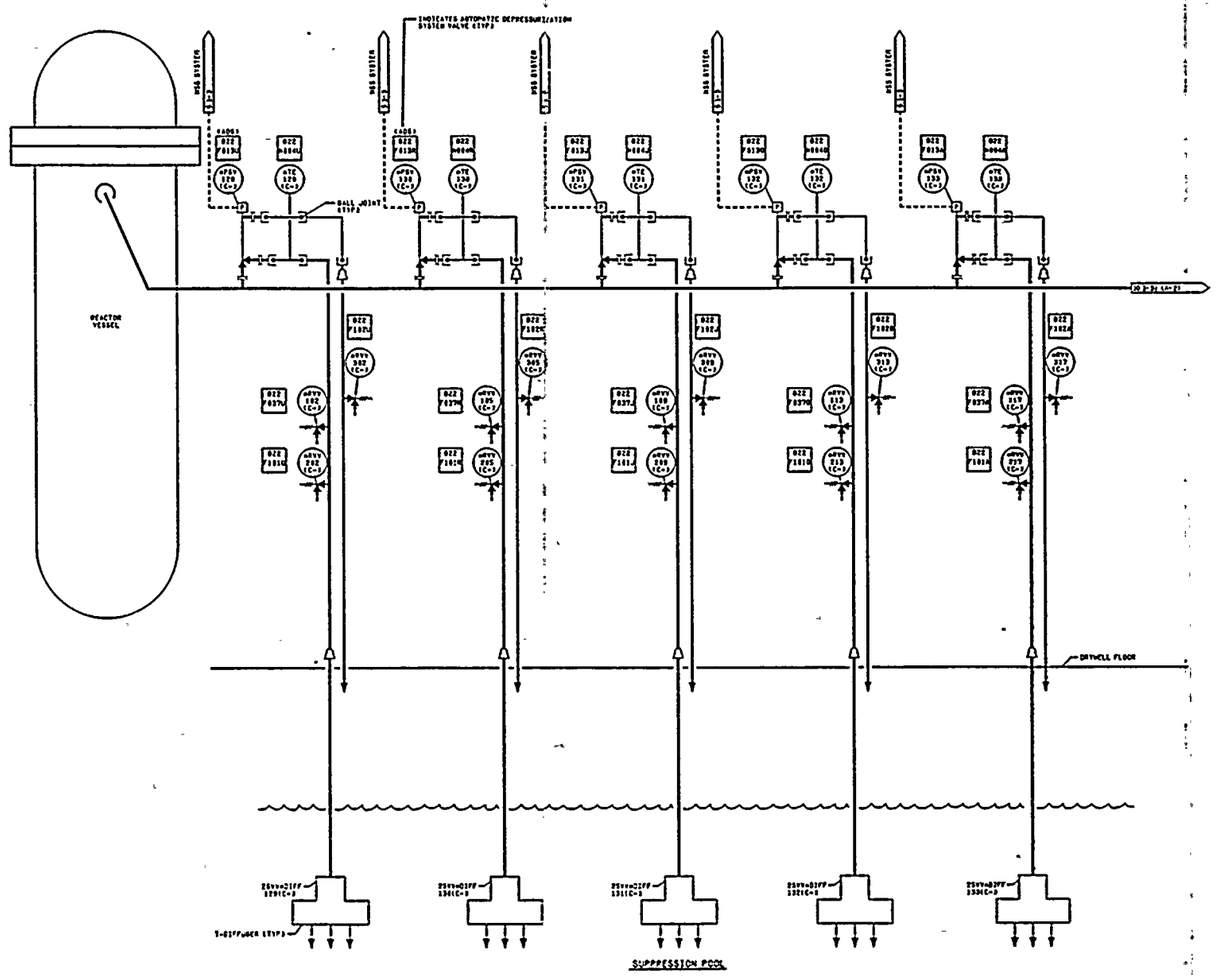
FIGURE FSAR 10.1-3b

MAIN STEAM SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2

FINAL SAFETY ANALYSIS REPORT



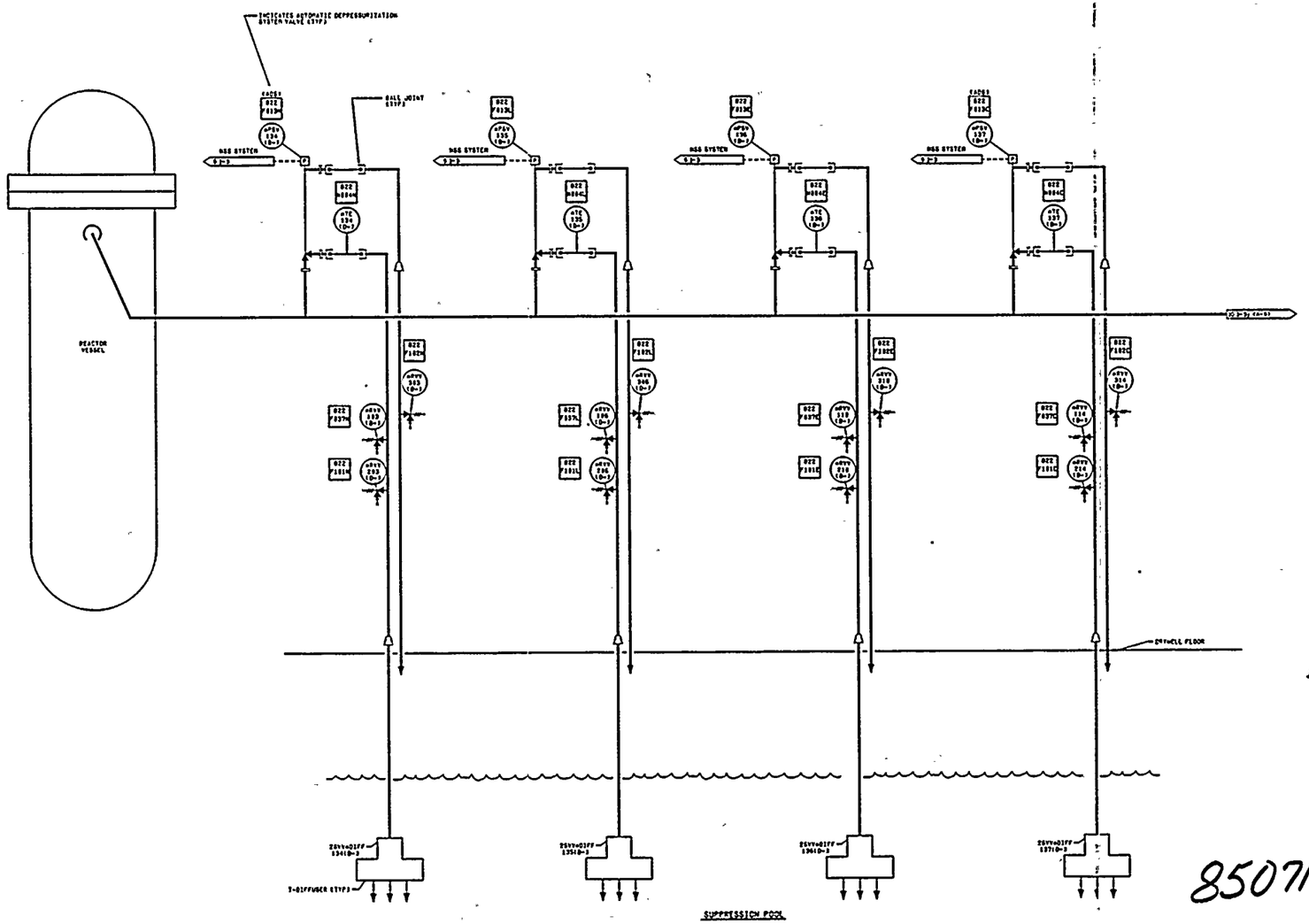
NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "N22-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR THE EQUIPMENT OR INSTRUMENTS WHICH ARE A PART OF THE NUCLEAR SAFETY FEATURES SYSTEMS.

FIGURE FSAR 10.1-3c

MAIN STEAM SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "2" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN.
2. AN ASTERISK (*) WILL REPLACE THE BASE 1-1-10 TYPE PIPING FOR THE EQUIPMENT OR INSTRUMENTS WHICH ARE A PART OF THE NUCLEAR SAFETY FEATURES SYSTEM.

Also Available On Aperture Card

TI APERTURE CARD

8507170731-40

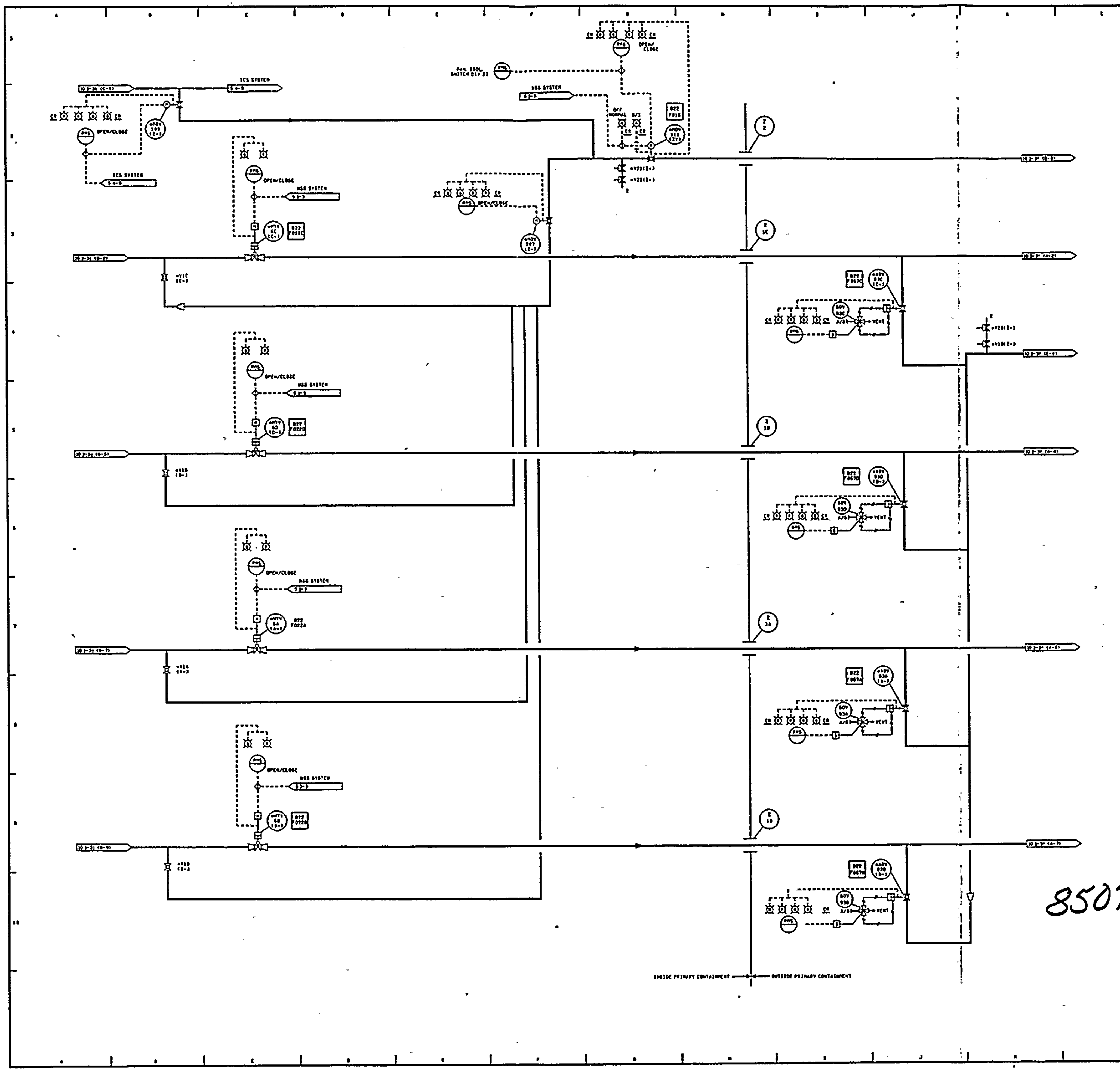
THIS DRAWING CONTAINS TECHNOLOGY

FIGURE FSAR 10.1-3d

MAIN STEAM SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "2MSS-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN ASTERISK (*) WILL REPLACE THE DASH (-) IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE A PART OF THE NUCLEAR SAFETY FEATURES SYSTEM.

Also Available On
Aperture Card

TI
APERTURE
CARD

8507170731-41

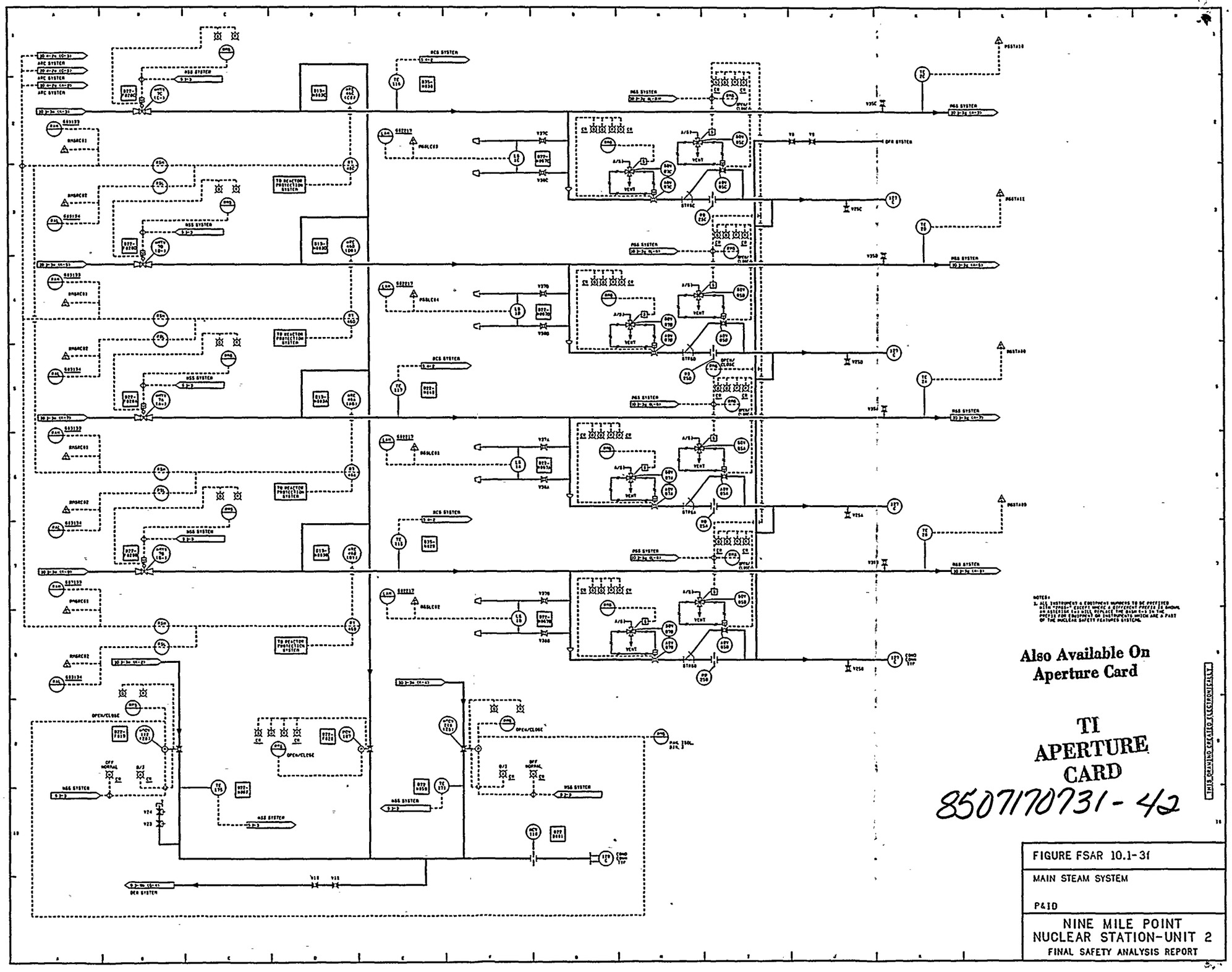
THIS DRAWING CREATED ELECTRONICALLY

FIGURE FSAR 10.1-3e

MAIN STEAM SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT


TO REACTOR PROTECTION SYSTEM
MSL SYSTEM
RCS SYSTEM
HSS SYSTEM
DFW SYSTEM
OPEN/CLOSE
NOTES:
Also Available On Aperture Card
TI APERTURE CARD
8507170731-42
FIGURE FSAR 10.1-31
MAIN STEAM SYSTEM
P&ID
NINE MILE POINT NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT

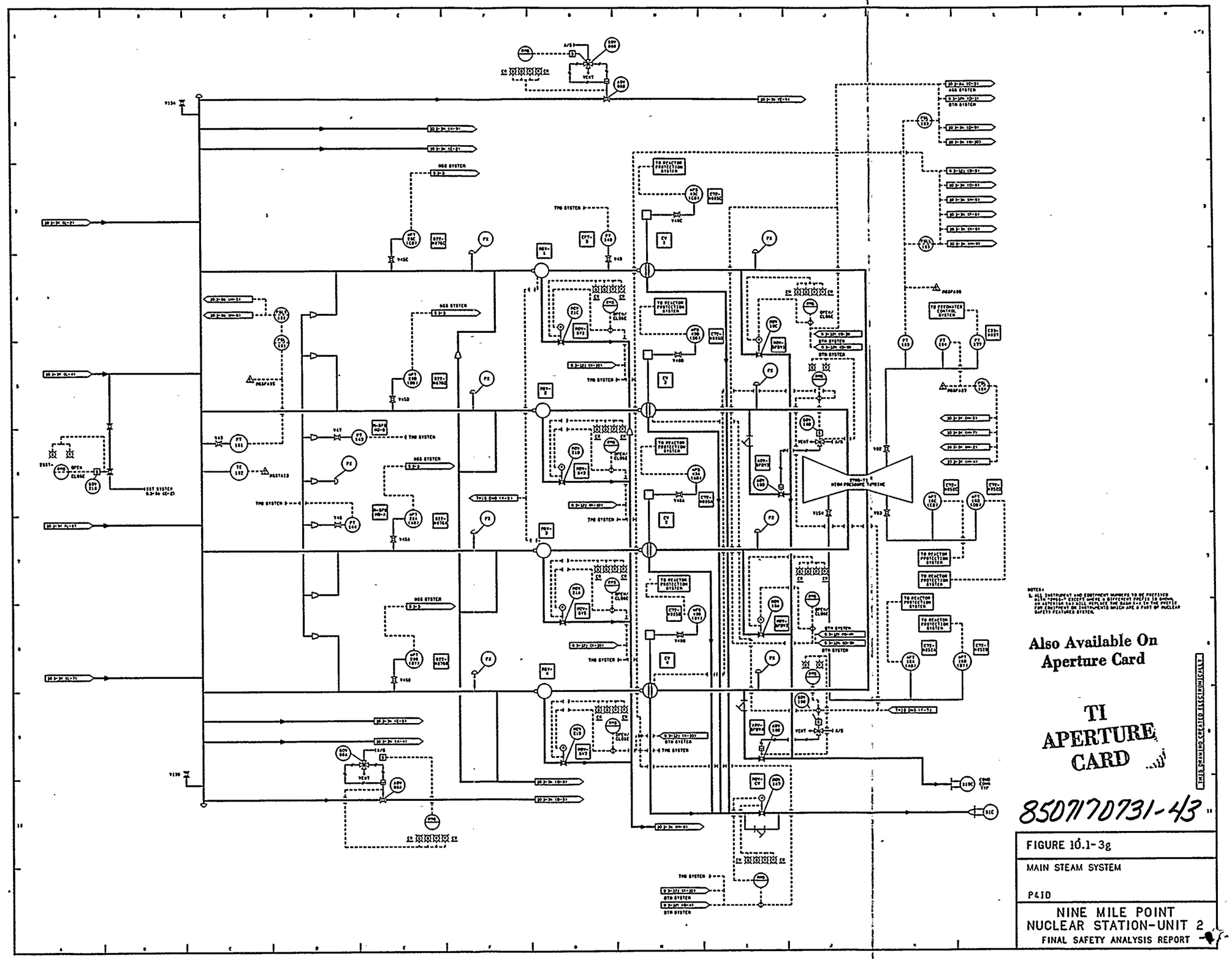
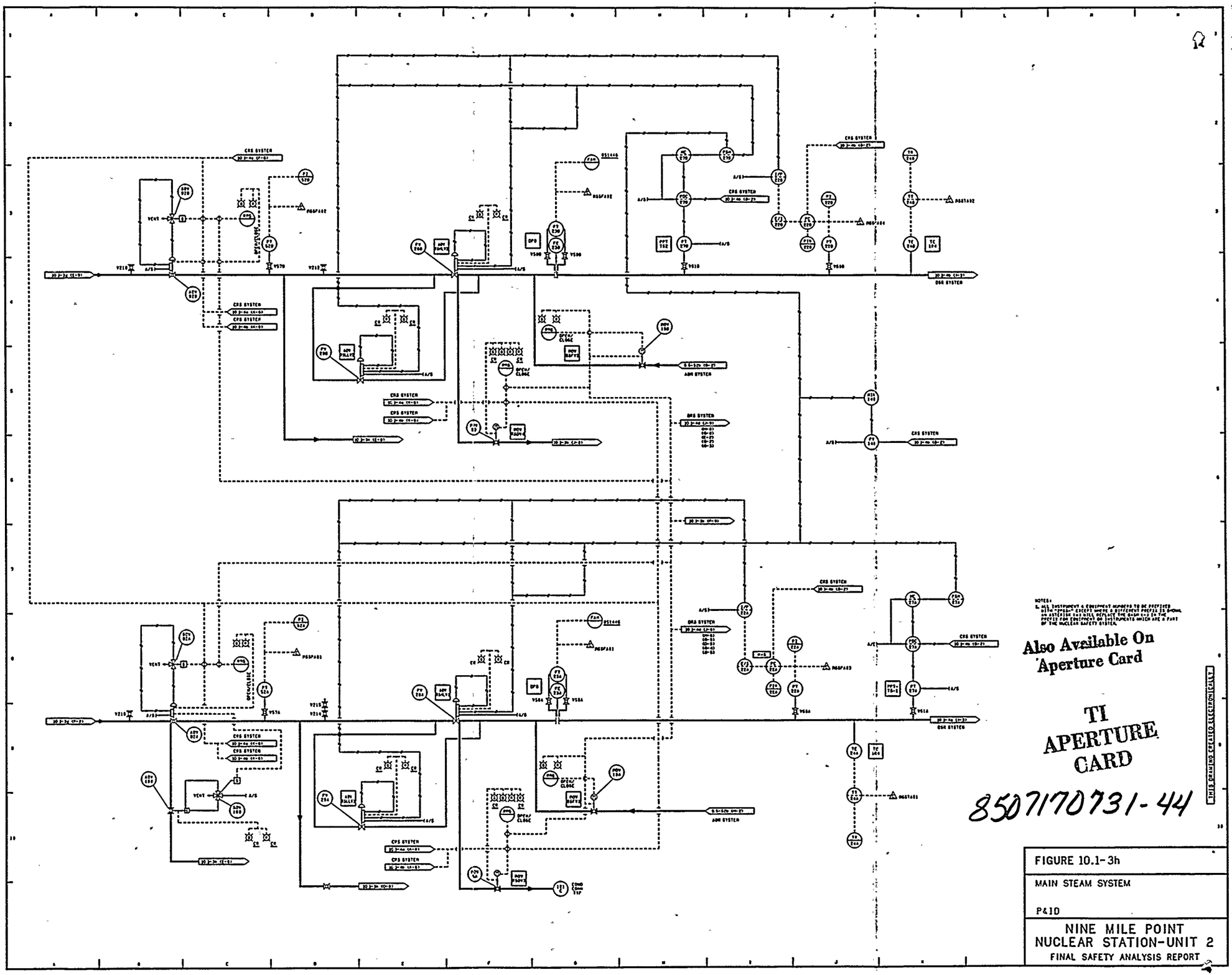


FIGURE 10.1-3g

MAIN STEAM SYSTEM

P&ID



NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "P68FA" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN EXCEPTION MAY ALSO REPLACE THE P68FA PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE A PART OF THE NUCLEAR SAFETY SYSTEM.

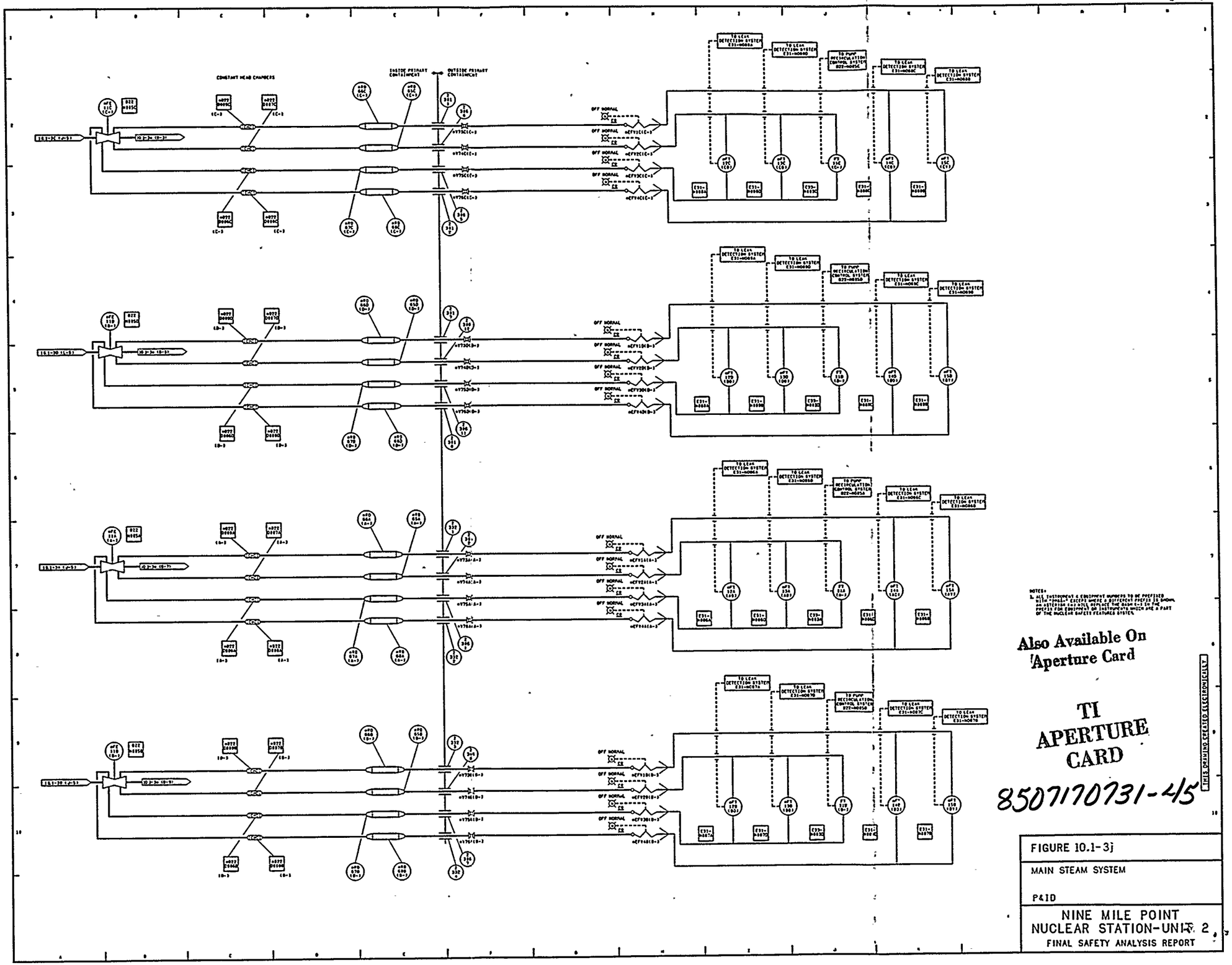
THIS DRAWING CREATED ELECTRONICALLY

FIGURE 10.1-3h

MAIN STEAM SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT & COMPONENT NOZZLES TO BE PREPIPED WITH 1"SCH. 160 NPS. EXCEPT WHERE A DIFFERENT PREPIPE IS SHOWN. AN ASTERISK (*) NEXT TO THE NOZZLE SIZE CALLS FOR PREPIPE TO BE FURNISHED ON INSTRUMENT OR SWITCH AND IS A PART OF THE NUCLEAR SAFETY FEATURES SYSTEM.

FIGURE 10.1-3j

MAIN STEAM SYSTEM

P&ID

NINE MILE POINT NUCLEAR STATION-UNIT 2

FINAL SAFETY ANALYSIS REPORT

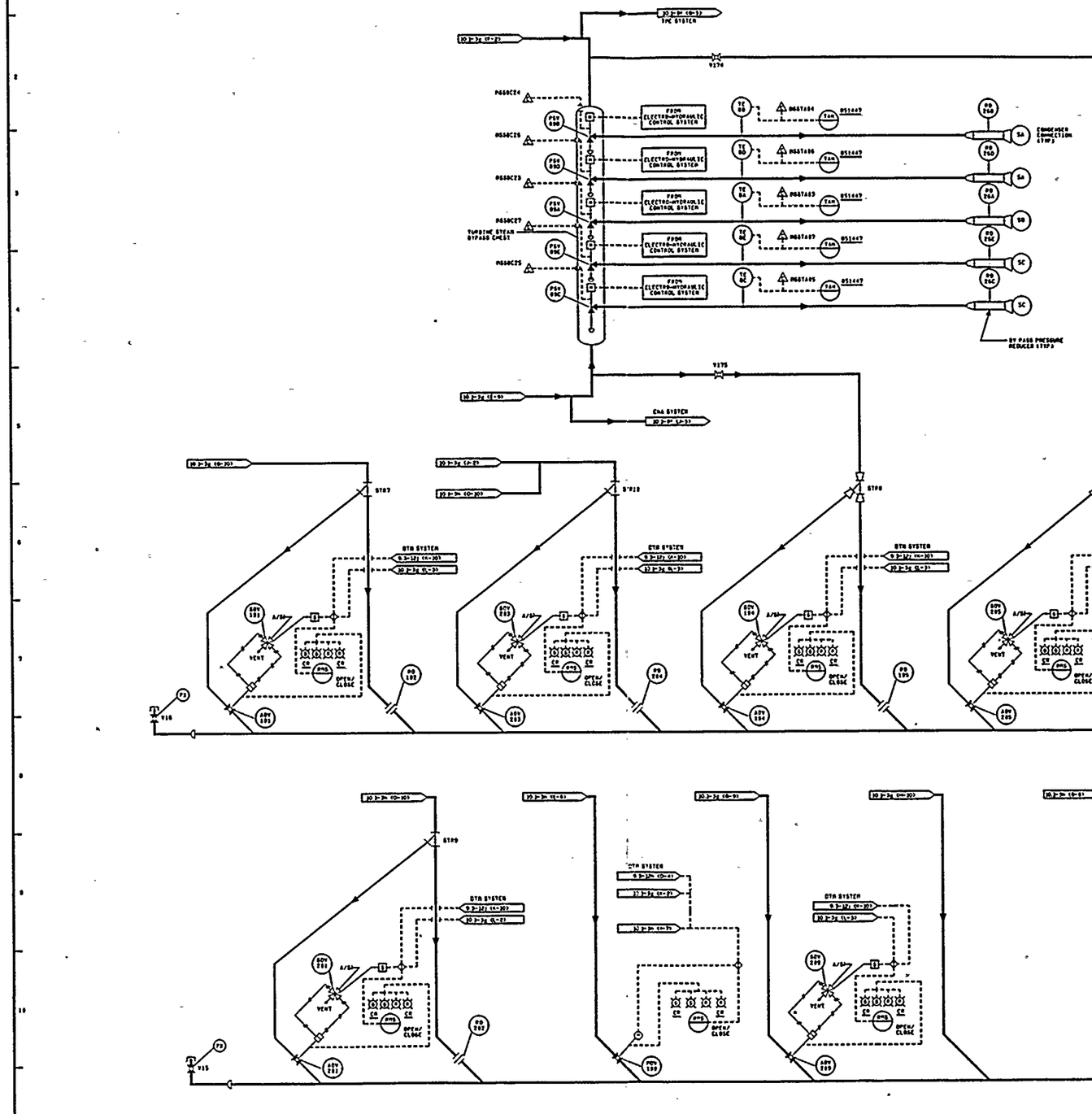
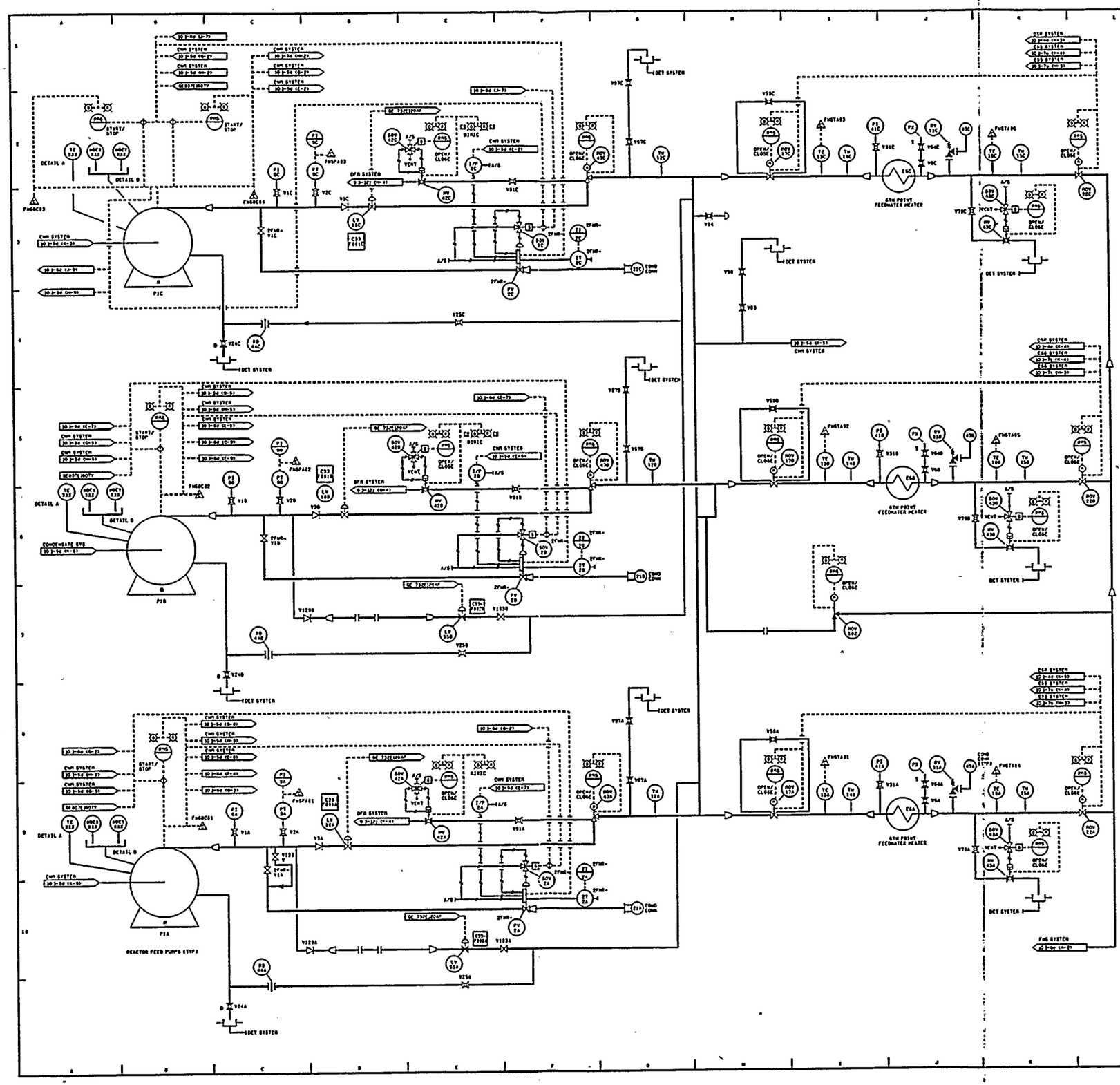


FIGURE 10.1-3k

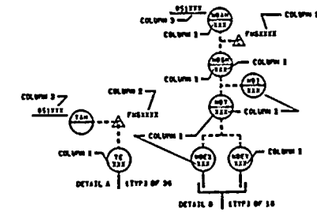
MAIN STEAM SYSTEM

P&ID



Also Available On Aperture Card

TI APERTURE CARD



CON/P	DETAIL	COL 1	COL 2	COL 3	CON/P	DETAIL	COL 1	COL 2	COL 3
P1A	A	37A	FWS7A07	051558	P1C	A	48C	FWS7A19	051558
P1A	A	38A	FWS7A10	051558	P1C	A	49C	FWS7A21	051558
P1A	A	45A	FWS7A13	051558	P1C	A	50C	FWS7A24	051558
P1A	A	46A	FWS7A16	051558	P1C	A	51C	FWS7A25	051558
P1A	A	49A	FWS7A19	051558	P1C	A	52C	FWS7A39	051558
P1A	A	50A	FWS7A22	051558	P1C	A	56C	FWS7A44	051442
P1A	A	51A	FWS7A25	051558	P1C	A	57C	FWS7A45	051442
P1A	A	52A	FWS7A20	051558	P1C	A	58C	FWS7A41	051442
P1A	A	56A	FWS7A42	051442	P1C	A	59C	FWS7A53	051442
P1A	A	57A	FWS7A45	051442	P1B	B	36A	FWS4C01	051431
P1A	A	58A	FWS7A39	051442	P1B	B	46A	FWS4C04	051431
P1A	A	59A	FWS7A49	051442	P1B	B	69A	FWS4C07	051432
P1B	A	37B	FWS7A08	051558	P1B	B	61A	FWS4C10	051432
P1B	A	38B	FWS7A11	051558	P1B	B	62A	FWS4C13	051432
P1B	A	45B	FWS7A14	051558	P1B	B	63A	FWS4C16	051432
P1B	A	48B	FWS7A17	051558	P1B	B	36B	FWS4C02	051431
P1B	A	49B	FWS7A20	051558	P1B	B	46B	FWS4C05	051431
P1B	A	50B	FWS7A23	051558	P1B	B	69B	FWS4C08	051432
P1B	A	51B	FWS7A26	051558	P1B	B	61B	FWS4C11	051432
P1B	A	52B	FWS7A29	051558	P1B	B	62B	FWS4C14	051432
P1B	A	56B	FWS7A43	051442	P1B	B	63B	FWS4C17	051432
P1B	A	57B	FWS7A46	051442	P1C	B	36C	FWS4C03	051431
P1B	A	58B	FWS7A40	051442	P1C	B	46C	FWS4C06	051431
P1B	A	59B	FWS7A54	051442	P1C	B	69C	FWS4C09	051432
P1C	A	37C	FWS7A09	051558	P1C	B	61C	FWS4C12	051432
P1C	A	38C	FWS7A12	051558	P1C	B	62C	FWS4C15	051432
P1C	A	45C	FWS7A15	051558	P1C	B	63C	FWS4C18	051432

NOTES:
1. ALL EQUIPMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "FWS" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN. AN EXCEPTION TO THIS WILL OCCUR THE BASH P-1 IN THE PREFIX FOR EQUIPMENT OR INSTRUMENTS WHICH ARE PART OF NUCLEAR SAFETY FEATURES SYSTEM.

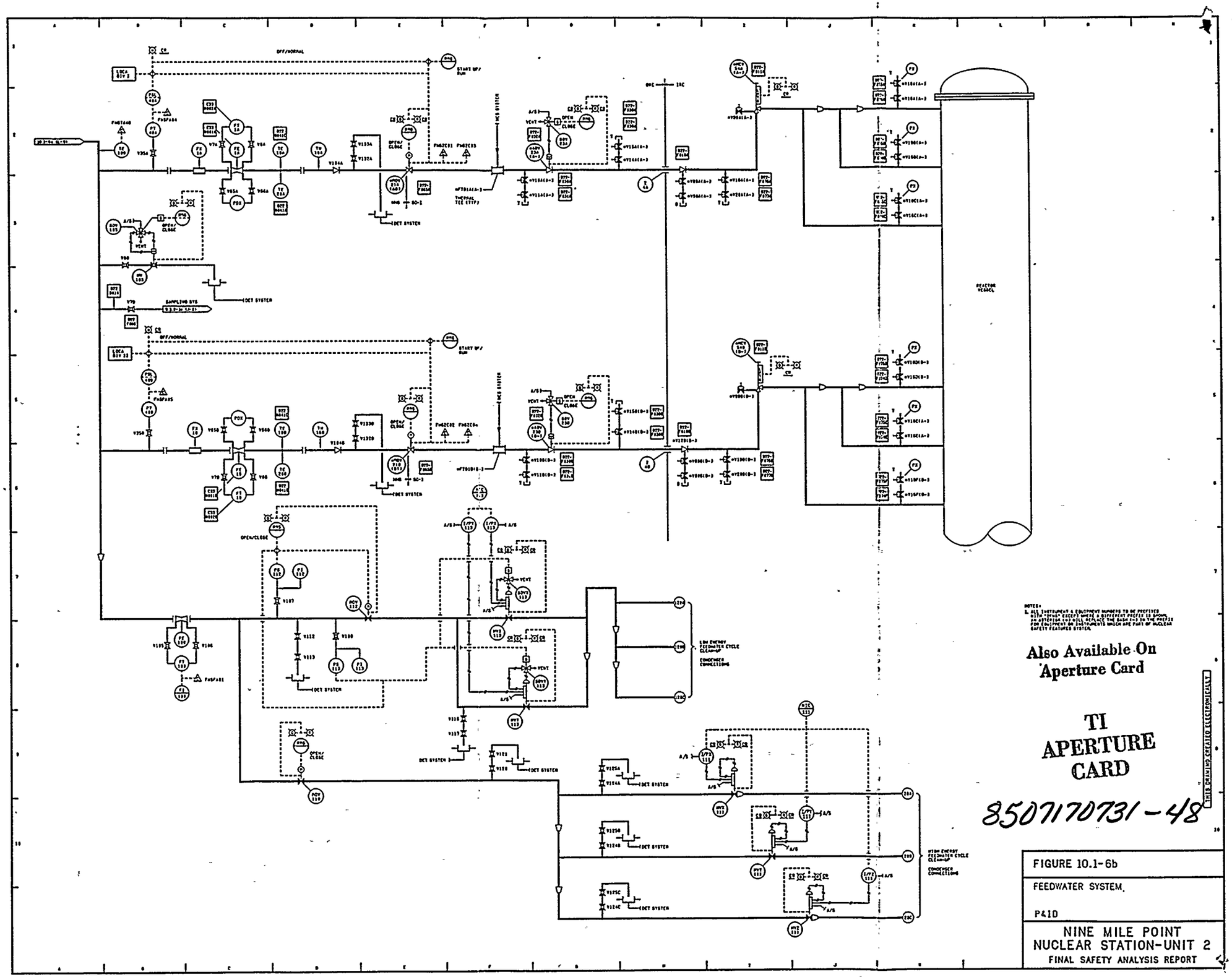
THIS DRAWING CREATED ELECTRONICALLY

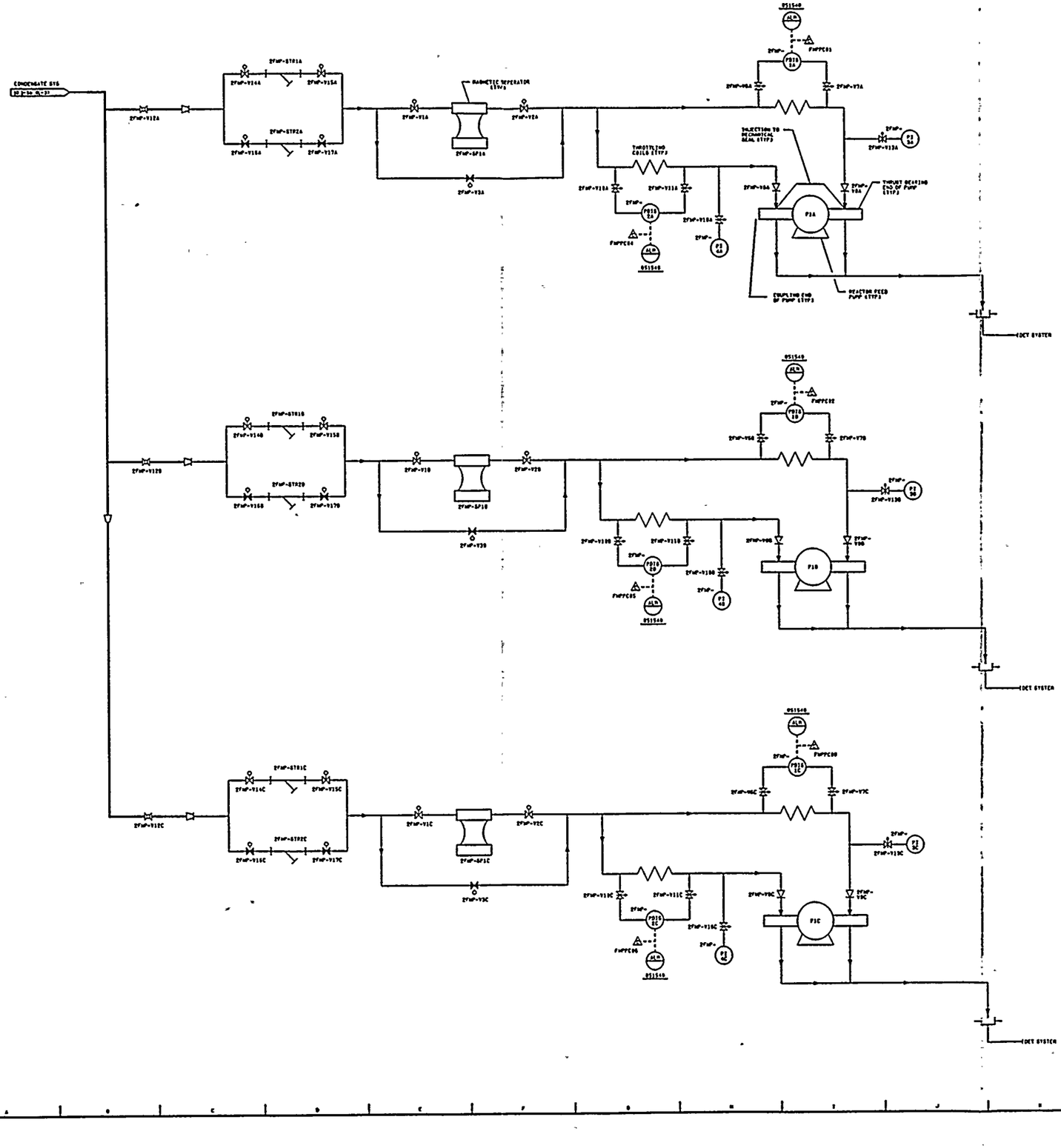
FIGURE 10.1-6a

FEEDWATER SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT


OFF/NORMAL
START UP/ RUN
FROM 684
FW82A84
FW82A85
FW82C01
FW82C03
FW82C02
FW82C04
MSIV SYSTEM
OPEN/ CLOSE
VENT
A/S
SGTS SYSTEM
SAMPLING SYS
REACTOR VESSEL
FEEDWATER CYCLE CLEAN-UP
CONDENSER CONNECTIONS
Also Available On Aperture Card
TI APERTURE CARD
8507170731-48
FIGURE 10.1-6b
FEEDWATER SYSTEM.
P&ID
NINE MILE POINT NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "2FWP" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN.

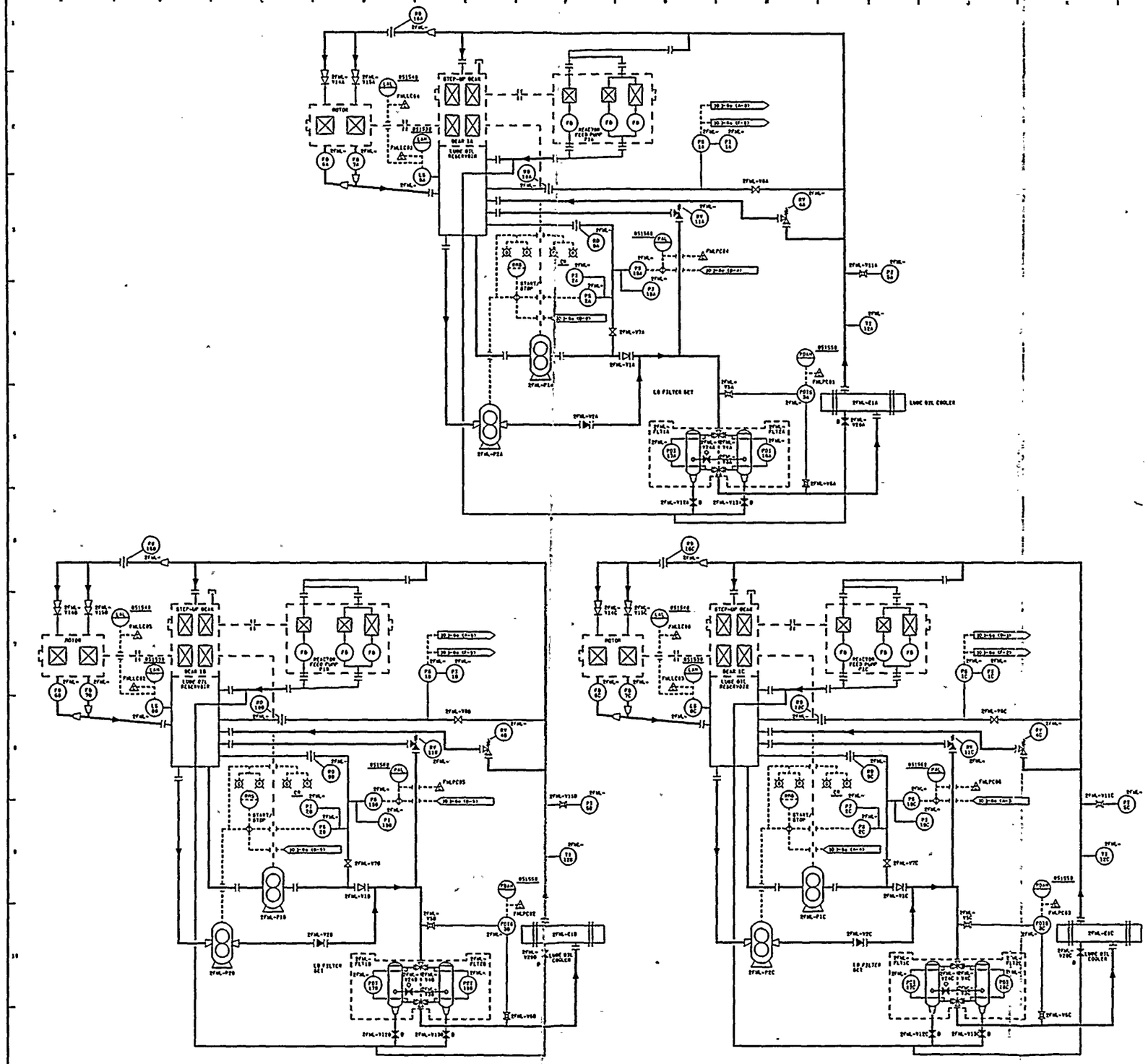
THIS DRAWING CONTAINS SAFEGUARDS INFORMATION

FIGURE 10.1-6c

FEEDWATER SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT



NOTES:
1. ALL INSTRUMENT & EQUIPMENT NUMBERS TO BE PREFIXED WITH "2FWL" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN.

THIS DRAWING CREATED ELECTRONICALLY

FIGURE 10.1-6d

FEEDWATER SYSTEM

P&ID

NINE MILE POINT
NUCLEAR STATION-UNIT 2
FINAL SAFETY ANALYSIS REPORT

SPEC. NO. NMP2-COOIC

SQRT #1

NINE MILE POINT NUCLEAR STATION UNIT 2

EQUIPMENT DYNAMIC QUALIFICATION

COMPONENT NAME: HYDROGEN/OXYGEN GAS ANALYZER PANEL

MARK NUMBERS: 2CMS* PNL66A

STONE & WEBSTER

SPEC. NO. NMP2-C001C
Revision 0

Seismic and Dynamic Qualification Summary of Equipment

I. **Plant Name:** Nine Mile Point Nuclear Station - Unit 2

1. **Utility:** Niagara Mohawk Power Corporation
2. **NSSS:** General Electric Co. **BWR:** 5 MK 2
3. **A/E:** Stone & Webster Engineering Corp. **Other**

II. **Component Name:** HYDROGEN/OXYGEN GAS ANALYZER PANEL MARK NO. 2CMS*PNL66A

1. **Scope:** ( ) NSSS (X) BOP ( ) Other
2. **Model Number:** STANDARD K-IV **Quantity:** 1
3. **Size or Range:** H_2/O_2 0-30%/0-25%
4. **Vendor:** COMSIP INC, DELPHI SYSTEM DIVIS., WHITTIER CA
5. **If the component is a cabinet or panel, name and model number of the devices included:**

   SEE ATTACHMENT A

6. **Physical Description:**
   a. **Appearance:** NEMA 12 ENCLOSURE (PANEL)
   b. **Dimensions:** 30"x30"x72"
   c. **Weight:** 1400#
7. **Location:** **Building:** AUX. BLDG. NORTH BAY
   Elevation: 240'
8. **Field Mounting Conditions** (X) Bolt (No. 6 - Size 5/8)
   ( ) Weld (Length ____)
   ( ) ____
9. **Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.)**

   FLOOR

10. a. **System in which located:** 2CMS (CONT. MONITOR SYST.)
    b. **Functional Description:** TO MONITOR PERCENT OF H_2/O_2 IN THE CONTAINM. ATMOSPHERE
    c. **Is the equipment required for** ( ) **Hot Standby** ( ) **Cold Shutdown** (X) **Both** ( ) **Neither** ( ) **Other** ____

11. Pertinent Reference Design Specifications for Qualification Requirements: NMP2-CODIC WITH ADDENDA 1 THRU 3 AND E&DCR P13,312

(a) Seismic Input
b. Hydrodynamic Load Input
c. Fatigue Considerations
d. Service Conditions
e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

(X) Yes ( ) No ( ) Partial or limited availability

(1) IV. Equipment Qualification Method: PANEL ONLY ***

( ) Test ( ) Analysis (X) Combination of Test and Analysis

Qualification Report*: SWEC SDDF # STRS 07.155-5000A

(No., Title and Date): No 1035-2, JULY 1980 SEISM. QUALIF. OF THE DELPHI IV HYDROGEN ANALYZER

Company that Prepared Report: ENGINEERING ANALYSIS & TEST CO., INC. / COMSIP INC

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975, R.G. 1:100, AISC CODE

V. Vibration Input:

1. Loads considered:
   a. (X) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

( ) Absolute Sum ( ) SRSS (√) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT - B

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

*** THE FOLLOWING SUPPLEMENTARY CALCULATIONS 12177-EM/MECH-MS-1910, 12177-EM/MECH-MS-1913 WERE PERFORMED BY SWEC.

4. Damping Corresponding to RRS: OBE 2% SSE 2%

5. Required Acceleration in Each Direct:

( ) ZPA (X) Other 1.3 TIMES ACCELER. VALUES AT FREQ. 19.0, 29.6 FROM ATTACH. B
(specify)

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

SSE S/S = .73 F/B = .73 V = .6

6. Were fatigue effects considered?

( ) Yes (X) No

If yes, describe how they were treated in overall qualification program: _____

_____

VI. If Qualfication by Test, then Complete: ONLY RESONANCE SEARCH FOR PANEL, REPORT 1035-2, PART II

1. (✓) Single Frequency ( ) Multi-Frequency ( ) Random ( ) Sine Beat ( ) _____

2. (✓) Single Axis ( ) Multi-Axis ( ) Independent Axis ( ) In-phase Motions

3. Number of Qualifications Tests: N/A

OBE _____ SSE _____ Other _____ (specify)

4. Frequency Range: 1-33HZ

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

S/S= 19. HZ F/B= 29.6HZ V= >29.6HZ

6. Method of Determining Natural Frequencies
(✓) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test N/A

( ) Yes (Attach TRS & RRS graphs)
( ) No

8. Maximum Input g Level Test: N/A

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

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

9. Laboratory Mounting:

A. (X) Bolt (No. 6 Size 1/2")
( ) Weld (Length _____) ( ) _____

B. Orientation and Fixturing: MOUTED TO THE FLOOR, SINUSOIDAL SHAKER WAS BOLTED TO A BASE PLATE OF THE PANEL

10. Functional Operability Verified:

( ) Yes ( ) No (X) Not Applicable

11. Test Results Including Modifications Made: N/A

12. Other Tests Performed (such as aging or fragility test, including results):

N/A

13. Failure Modes (If appropriate N/A)

14. Margins Available: ( ) Input Spectrum ( ) Fragility N/A

VII. If Qualification by Analysis, Then Complete:

1. Method of Analysis:

(X) Static Analysis ( ) Equivalent Static Analysis

( ) Dynamic Analysis: ( ) Time-History ( ) Response Spectrum

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

S/S = 19. HZ F/B = 29.6 HZ V = > 29.6 HZ

3. Model Type: ( ) 3D (X) 2D ( ) 1D
( ) Finite Element (X) Beam
( ) Closed Form Solution ( ) Other

THESE FREQUENCIES ARE OBTAINED FROM THE TEST MENTIONED IN THE REPORT #1032-2, PART II

4. ( ) Computer Codes: N/A

Frequency Range and No. of Modes

(X) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads: N/A

( ) Absolute Sum ( ) SRSS ( ) Other:_____ (specify)

6. Damping: N/A

OBE_____ SSE_____ Basis for the Damping Used:_____

7. Support Considerations in the Model: THE PANEL IS FREE STANDING, WITH THE BASE FIXED.

8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable
1. FRONT PANEL (BUCLING)	D.L. & SEISM.		1079PSI	3290PSI
* 2. MOUNTING BOLTS	D.L. & SEISM.		TENSION 853#/BOLT	1500#/BOLT

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability
NEGLIGIBLE		

9. Failure Modes: STRUCTURAL

10. Margins Available: ( ) Input Spectrum (X) Stress or Deflection

* By SWEC CALCULATION 12177.-EM/MECH-MS-1910

11. Pertinent Reference Design Specifications for Qualification Requirements: _____

_____

a. Seismic Input
b. Hydrodynamic Load Input
c. Fatigue Considerations
d. Service Conditions
e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

( ) Yes ( ) No ( ) Partial or limited availability

(2) IV. Equipment Qualification Method: DEVICES & SUBASSEMBLIES

(√) Test ( ) Analysis ( ) Combination of Test and Analysis

Qualification Report*: SWEC SDDF#STRS 07.155-5000A,
TEST REPORT IEEE 323-1974 PROTOTYPE QUALIFICATION FOR
(No., Title and Date): HYDROGEN ANALYZER SYSTEM No.1035-1 REV.1 & ADDEND. I SEPT. 1981

Company that Prepared Report: EA&T ENGINEERING ANALYSIS & TEST CO./COMSIP INC.

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-75, R.G. 1.100

V. Vibration Input:

1. Loads considered:
   a. (√) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS (√) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT 'C'

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2% SSE 2%

5. Required Acceleration in Each Direct: FROM ATTACHMENT C

(X) ZPA (FROM ATTACH. C) ( ) Other _____ (specify)

OBE S/S = .6g F/B = .6g V = .54g

SSE S/S = .9g F/B = .9g V = .9g

6. Were fatigue effects considered?

( ) Yes (X) No

If yes, describe how they were treated in overall qualification program: _____

VI. If Qualfication by Test, then Complete:

1. ( ) Single Frequency (X) Multi-Frequency (X) Random ( ) Sine Beat ( ) _____

2. ( ) Single Axis MOTION (X) Multi-Axis (X) Independent ~~Axis~~ ( ) In-phase Motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other _____ (specify)

4. Frequency Range: 1-40HZ

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical): N/A

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

6. Method of Determining Natural Frequencies N/A
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

(X) Yes (Attach TRS & RRS graphs) ATTACHMENT D
( ) No

8. Maximum Input g Level Test:

OBE S/S = 4g F/B = 4g V= 4g

SSE S/S = 4g F/B = 4g V = 4g

9. Laboratory Mounting: MOUNTING SIMULATES THE AS-BUILT INSTALLATION

A. ( ) Bolt (No._____ Size_____)
( ) Weld (Length_____) ( ) _____

B. Orientation and Fixturing: MOUNTED ON THE FIXTURE AND THE FIXTURE WAS ATTACHED TO THE SHAKE TABLE.

10. Functional Operability Verified:

(X) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: SUPPLEMENTAL TEST NO 1035-8 WAS PERFORMED FOR SAMPLE PUMP BECAUSE OF THE ANOMALIES OBSERVED DURING THE POST LOCA EXPOSURE.

12. Other Tests Performed (such as aging or fragility test, including results):

ALL TEST PERTINENT TO IEEE 323-1974

13. Failure Modes (If appropriate STRUCTURAL & ELECTRICAL)

14. Margins Available: (X) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

( ) Static Analysis ( ) Equivalent Static Analysis

( ) 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: ( ) 3D ( ) 2D ( ) 1D
( ) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

11. Pertinent Reference Design Specifications for Qualification Requirements: _____

_____

a. Seismic Input
b. Hydrodynamic Load Input
c. Fatigue Considerations
d. Service Conditions
e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

( ) Yes ( ) No ( ) Partial or limited availability

(3) IV. Equipment Qualification Method: SAMPLE PUMP

(X) Test ( ) Analysis ( ) Combination of Test and Analysis

Qualification Report*: SWEC SDDF #STRS 07.155-5000A "SUPPLEMENTARY TEST OF HYDROGEN ANALYZER SAMPLE PUMP FOR HYDROGEN ANALYZER SYSTEMS KIII & KIV" No 1305-8 DT. SEPT. 1982
(No., Title and Date):

Company that Prepared Report: EA&T ENGINEER. ANALYSIS & TEST Co., COMSIP INC.

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975, R.G. 1.100

V. Vibration Input:

1. Loads considered:
   a. (X) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS (√) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT C

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2% SSE 2%

5. Required Acceleration in Each Direct:

(X) ZPA ( ) Other_____
(specify)

OBE S/S = .6g F/B = .6g V = .54g

SSE S/S = .9g F/B = .9g V = .9g

6. Were fatigue effects considered?

( ) Yes (√) No

If yes, describe how they were treated in overall qualification program:_____

_____

VI. If Qualfication by Test, then Complete:

1. ( ) Single Frequency (√) Multi-Frequency (√) Random
( ) Sine Beat
( ) _____

2. ( ) Single Axis MOTION (√) Multi-Axis
(X) Independent ~~Axis~~ ( ) In-phase Motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other_____
(specify)

4. Frequency Range: 1-40HZ

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical): N/A

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

6. Method of Determining Natural Frequencies N/A
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

(X) Yes (Attach TRS & RRS graphs) ATTACHMENT D
( ) No

8. Maximum Input g Level Test:

OBE S/S = 4g F/B = 4g V= 4g

SSE S/S = 4g F/B = 4g V = 4g

9. Laboratory Mounting: MOUNTING SIMULATES THE AS-BUILT INSTALLATION

A. ( ) Bolt (No._____ Size_____)
( ) Weld (Length_____) ( ) _____

B. Orientation and Fixturing: MOUNTED ON THE TEST FIXTURE AND THE FIXTURE WAS ATTACHED TO THE SHAKE TABLE.

10. Functional Operability Verified:

(√) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: THE SAMPLE PUMP IS ACCEPTABLE TO THE REQ.'T OF IEEE-323-1974

12. Other Tests Performed (such as aging or fragility test, including results):

ALL TESTS PERTINENT TO IEEE-323-1974

13. Failure Modes (If appropriate STRUCTURAL & FUNCTIONAL)

14. Margins Available: ( ) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

( ) Static Analysis ( ) Equivalent Static Analysis

( ) 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: ( ) 3D ( ) 2D ( ) 1D
( ) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

11. Pertinent Reference Design Specifications for Qualification Requirements: _____

_____

a. Seismic Input
b. Hydrodynamic Load Input
c. Fatigue Considerations
d. Service Conditions
e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

( ) Yes ( ) No ( ) Partial or limited availability

(4) IV. Equipment Qualification Method: MOTOR

( ) Test (√) Analysis ( ) Combination of Test and Analysis

Qualification Report*: SWEC #DDF # STRS 07.155-5000A SEISMIC ANALYSIS OF HORIZ. FOOT MOUNTED MOTOR

(No., Title and Date): COMSIP, INC No 80B-A-30, SUPPLEMENT TO NUC-9

Company that Prepared Report: RELIANCE, ELECTRIC/COMSIP, INC.

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975, R.G. 1.100

V. Vibration Input:

1. Loads considered:
   a. (√) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS (√) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT 'C'

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2% SSE 2%

5. Required Acceleration in Each Direct:

( ) ZPA (X) Other _____
(specify)

OBE S/S = 3.0g F/B = 3.0g V = 2.7g

SSE S/S = 4.5g F/B = 4.5g V = 4.5g

6. Were fatigue effects considered?

( ) Yes (√) No

If yes, describe how they were treated in overall qualification program: _____

_____

VI. If Qualfication by Test, then Complete: N/A

1. ( ) Single Frequency ( ) Multi-Frequency ( ) Random
( ) Sine Beat
( ) _____

2. ( ) Single Axis ( ) Multi-Axis
( ) Independent Axis ( ) In-phase Motions

3. Number of Qualifications Tests:

OBE _____ SSE _____ Other _____
(specify)

4. Frequency Range: _____

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

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

6. Method of Determining Natural Frequencies
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

( ) Yes (Attach TRS & RRS graphs)
( ) No

8. Maximum Input g Level Test:

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

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

9. Laboratory Mounting:

   A. ( ) Bolt (No._____ Size_____)
   ( ) Weld (Length_____) ( ) _____

   B. Orientation and Fixturing: _____

10. Functional Operability Verified:

    ( ) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: _____

    _____

12. Other Tests Performed (such as aging or fragility test, including results):

    _____

    _____

13. Failure Modes (If appropriate _____)

14. Margins Available: ( ) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete:

1. Method of Analysis:

   (√) Static Analysis ( ) Equivalent Static Analysis

   ( ) Dynamic Analysis: ( ) Time-History ( ) Response Spectrum

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

   S/S = >33HZ F/B = >33HZ V = >33HZ

3. Model Type: ( ) 3D ( ) 2D (X) 1D
   ( ) Finite Element (X) Beam
   ( ) Closed Form Solution ( ) Other

4. (√) Computer Codes: RELIAN. INHOUSE COMPUTER PROGRAM #706

   Frequency Range and No. of Modes

   ( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads: N/A

   ( ) Absolute Sum ( ) SRSS ( ) Other: _____ (specify)

6. Damping: N/A

   OBE _____ SSE _____ Basis for the Damping Used: _____

7. Support Considerations in the Model: THE MOTOR IS FREE STANDING WITH THE FEET HINGED AT THE ANCHOR POINTS

8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable
MOTOR MOUNTING BOLTS	DEADW,		1116 PSI	13710 PSI
CANTILEVER FOOT	SEISMIC & OPERATION.		552 PSI	5000 PSI

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability
.0012"	SHAFT DEFLECTION RELATIVE TO BEARING	.0056"

9. Failure Modes: STRUCTURAL

10. Margins Available: ( ) Input Spectrum (√) Stress or Deflection

LOCAL

NOS. 2CMS * PNL 66A

BILL OF MATERIAL

DWG. NO. 25250

FOR

K-IV POST-LOCA

HYDROGEN AND OXYGEN

MONITORING SYSTEM

ATTACHMENT A

PG, A1 OF A6

PAGE 1 OF 6

ITEM NUMBER	QTY. PER SYSTEM	EQUIPMENT DESCRIPTION	MATERIAL CERTIFICATE REQUIRED:
1		API, mdl. no. 7045-N5-4702-0000, Indicating meter. Range; 0-200μA, blank scale, (Comsip, Inc. fabricates the % H_2 and % O_2 scales).	
2		ASCO, mdl. no. THT-8262C7N, 2-way solenoid valve. Normally closed, ¼" NPT, 120VAC, 60Hz. (Reagent-Calibration)	Body: GR.303SS Seals: Buna "N" Insulation: Class H
3 0	Delete		
4		Brooks, mdl. no. 1350-VR-2-15 ACO Flowmeter. Scale; 196A, Tube; 0-65mm, Range; 100-950ccm(air), (Analyzer bypass).	Seals: Viton Float: GR.316SS Fittings: GR.316SS
5	1	Cinch-Jones, mdl. no.'s TS-6-141 and TS-12-141, 6 point and 12 point terminal strips, respectively.	1
6		Comsip, Inc., mdl. 11719 Moisture Separator. (Comsip, Inc. modifies a Armstrong mdl. no. 11AV for this service). MODIF.	Body: ASTM-A240, GR.304 Fittings: ASTM-A479, GR.304

LOCAL

TAG NOS. 2CMS * PNL 66A.

BILL OF MATERIAL

DWG. NO. 025250

FOR

K-IV POST-LOCA

HYDROGEN AND OXYGEN

MONITORING SYSTEM

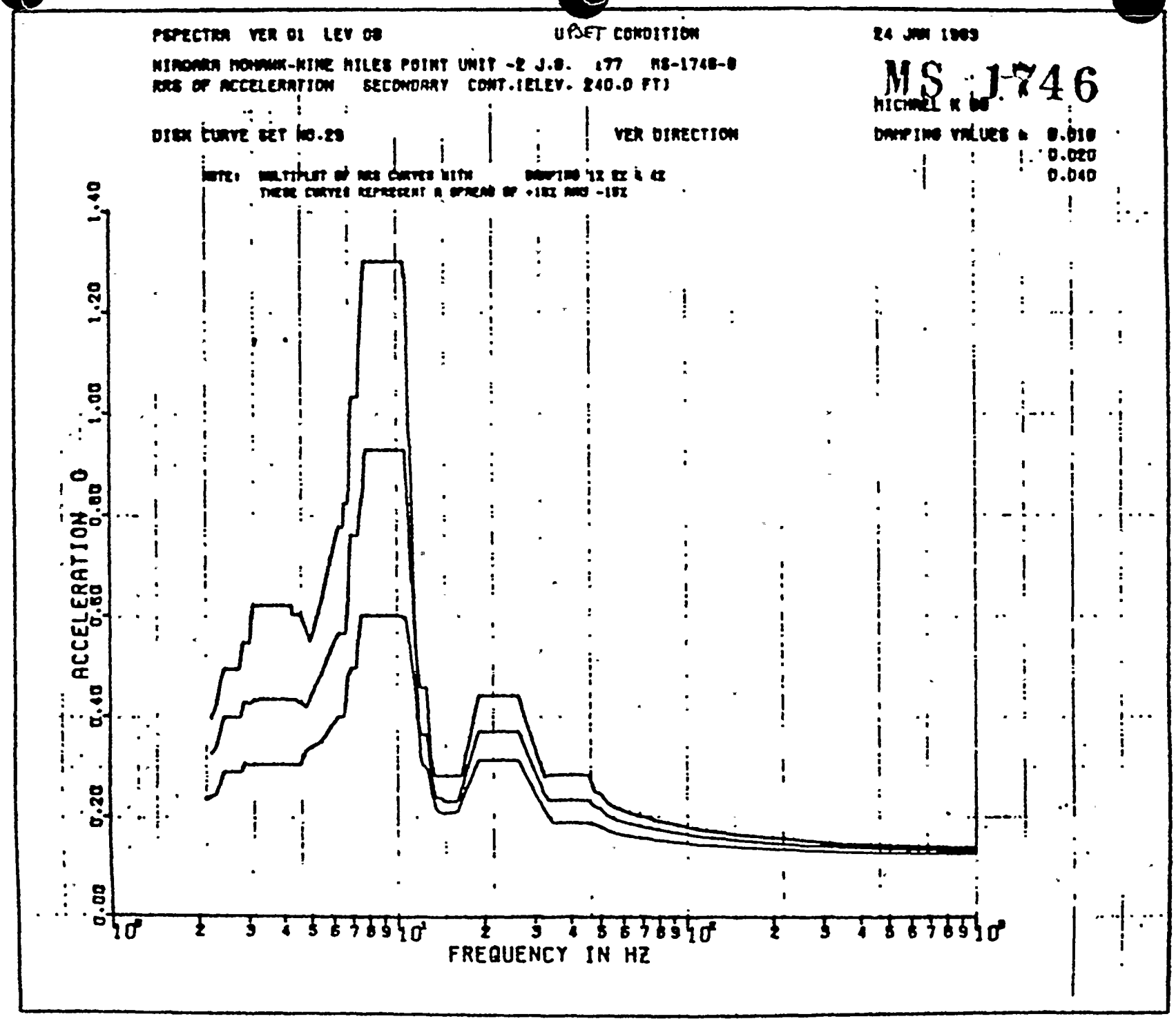
ITEM NUMBER	QTY. PER SYSTEM	EQUIPMENT DESCRIPTION	MATERIAL CERTIFICATE REQUIRED:
7		Comsip, Inc. mdl. no. 11706, Sample Pump - Motor Assembly. Reliance motor specs; 1Hp., 575 VAC, 60Hz., 3Ø, and 1.7 AMP TEFC	Motor: Certified to IEEE-344 (74) Pump Heads: ASTM-A351, GR.31 Diaphragms: Neoprene
8		Comsip, Inc., mdl. no. 11749, Air Cooled Heat Exchanger.	Tubing: ASME-SA213, GR.316 Fittings: ASTM-A479, GR.316
9		Comsip, Inc., mdl. no. 11750, Sample Hot Box Assembly.	
10	2	Comsip, Inc., mdl. no. 37009, Local Analyzer Meter Trim Assembly. (Comsip, Inc. fabricates this trim assembly to convert the 0-1VDC analyzer output to 0-200uA, for meter input.)	
11	1	Comsip, Inc., mdl. no. 11727 (R_1), Downstream pressure regulator. Set at 14.7 psia, ¼" NPT. (Comsip, Inc. modifies a Conoflow mdl. no. H21XT-XXXK for this service).	Body: ASTM-A351, GR.316 Diaphragm: GR.301SS
12	1	Comsip, Inc., mdl. no. 11728 (R_2), Downstream pressure regulator. Set at -11 to -13" Hg, ¼" NPT. (Comsip, Inc. modifies a Conoflow mdl. no. H21XT-XXXK for this service).	Body: ASTM-A351, GR.316 Diaphragm: GR.301SS

ITEM NUMBER	QTY. PER SYSTEM	EQUIPMENT DESCRIPTION	MATERIAL CERTIFICATE REQUIRED:
13		Comsip, Inc. mdl. no. 11729 (R_3 and R_4), Differential pressure regulator and fixed orifice. Regulator set at 3 psid, ¼" NPT. (Comsip, Inc. modifies a Conoflow mdl. no. H21XT-XXXK for this service.) Fixed orifice flow; 180 ccm at 3 psid.	Body: ASTM-A351, GR.316 Diaphragm: GR.301SS F.O. Assembly: GR.316SS
14		Conoflow, mdl. no. H21XT-XDXK/SSN, Differential pressure regulator. Set at 3 psig., ¼" NPT.	Body: ASTM-A351, GR.316 Diaphragm: Neoprene rubber
15a 15b		Delphi Instruments, mdl. no. B5 , Hydrogen Analyzer, (Thermal conductivity type). Consisting of the analyzer cell (15a) and analyzer indicating transmitter (15b). Dual ranges; 0-10% and 0-30% including calibration potentiometers. 0-1VDC output.	Tubing: ASTM-A213, GR.316 Cell Block: ASTM-A479, GR.31 AMP Board: I.R.T. Certs
16a 16b	1	Delphi Instruments, mdl. no. B5, Oxygen analyzer, (Thermal conductivity type). Consisting of the analyzer cell (16a) and analyzer indicating transmitter (16b). Dual range; 0-10% and 0-25% including calibration potentiometers, 0-1VDC output.	Tubing: ASTM-A213, GR.316 Cell Block: ASTM-A479, GR.31 AMP Board: I.R.T. Certs
17		General Electric, mdl. no. ET-16, Indicating lamps. 19 with red lens and 10 with amber lens. 115VAC, 60 Hz.	
18		General Electric, mdl. no.'s CR2940-UB203F (2), CR2940-UB203D, (1), CR2940-UB 203G (2), CR2940-WA202C (4). 115VAC, 60Hz. with 10Amp. continuous rating.	

ITEM NUMBER	QTY. PER SYSTEM	EQUIPMENT DESCRIPTION	MATERIAL CERTIFICATE REQUIRED:
19		General Electric, mdl. no. EB25-A12WC, Terminal block. 600V, 30 Amp. continuous rating.	
20 0	DELETED		
21		General Electric, mdl. no. CR2810A14AJ, Relay. 600V, 60 Hz., 10 Amp. continuous rating.	
22		Hoke, mdl. no. SS-4213 QGY Bellows seal valve. 3" Tube Socket weld extension.	Bellows and Plug: GR.316SS Body: ASTM-A276, GR.316
23		I.T.E.-Gould, mdl. no. P1515 and PL-2S, Breaker and breaker box, respectively. 15 Amp. rating.	
24		Marshalltown, mdl. no. 52B, Compound pressure indicator. Range:-30 in Hg to 60 psig.	Bourdon Tube and Stem: GR.316SS

ITEM NUMBER	QTY. PER SYSTEM	EQUIPMENT DESCRIPTION	MATERIAL CERTIFICATE REQUIRED:
25		Matheson, mdl. no. FM-1050-V1, Flowmeter. Inlet mounted high performance valve, size no. 1 glass tube, Float; no. 1 glass, Range; 0-60 ccm (air) direct reading tube, ¼" tube compression fittings, (Reagent gas).	End Blocks and Fittings: GR.316SS Seals: Viton
26		Matheson, mdl. no. FM-1050-V1, Flowmeter. Drilled and tapped end blocks with plug, size no. 2 glass tube, Range; 0-270 ccm (air), direct reading tube, ¼" tube compression fittings, (Cell flow).	End Blocks Float and Fittin GR.316SS Seals: Viton
27		Matheson, mdl. no. FM-1050-V1, Flowmeter. Inlet mounted utility valve, size no. 2 glass tube, Range; 0-270 ccm (air), direct reading tube, ¼" tube compression fittings, (Calibration gas).	End Blocks Float and Fittin GR.316SS Seals: Viton
28		Matheson, mdl. no. FM-1050-V1, Flowmeter. Drilled and tapped end blocks with plug, size no. 7 glass tube, Range; 3.5-35SCFH(air), direct reading tube, ¼" tube compression fittings, (Bypass flow).	End Blocks Float and Fittin GR.316SS Seals: Viton
29	1	Nupro, mdl. no. SS-4C-1/3 Check valve. Set at 1/3 psig.	Body and Components: ASTM-A479, GR.316 "O" Ring: Viton
30		Potter and Brumfield, mdl. no.'s KRP-11AG and KRP-14AG, (7) DPDT and (1) 3PDT, relays, respectively. 115VAC, 60Hz., and 10 Amp. rating.	

ITEM NUMBER	QTY. PER SYSTEM	EQUIPMENT DESCRIPTION	MATERIAL CERTIFICATE REQUIRED:
31		Static "O" Ring, mdl. no. 4N3-K5-MX-C1A, Pressure switch. Set at 20 psig decreasing, ¼" NPT.	Pressure Port, Diaphragm and Fittings: GR.316 "O" Ring: Viton
32		Static "O" Ring, mdl. no. 54N3-K411-MX-C1A, Vacuum switch. Set at -3" to -4" Hg., ¼" NPT.	Pressure Port, Diaphragm and Fittings: GR.316 "O" Ring: Viton
33		Nupro, mdl. SS-4C-85 Check Valve. Set at 85 psig	Body and Components: ASTM - A479, GR.316 "O" Ring: Viton



ATTACHMENT "B"

J-419

PG. B1 OF B4

PAGE 8 OF 8

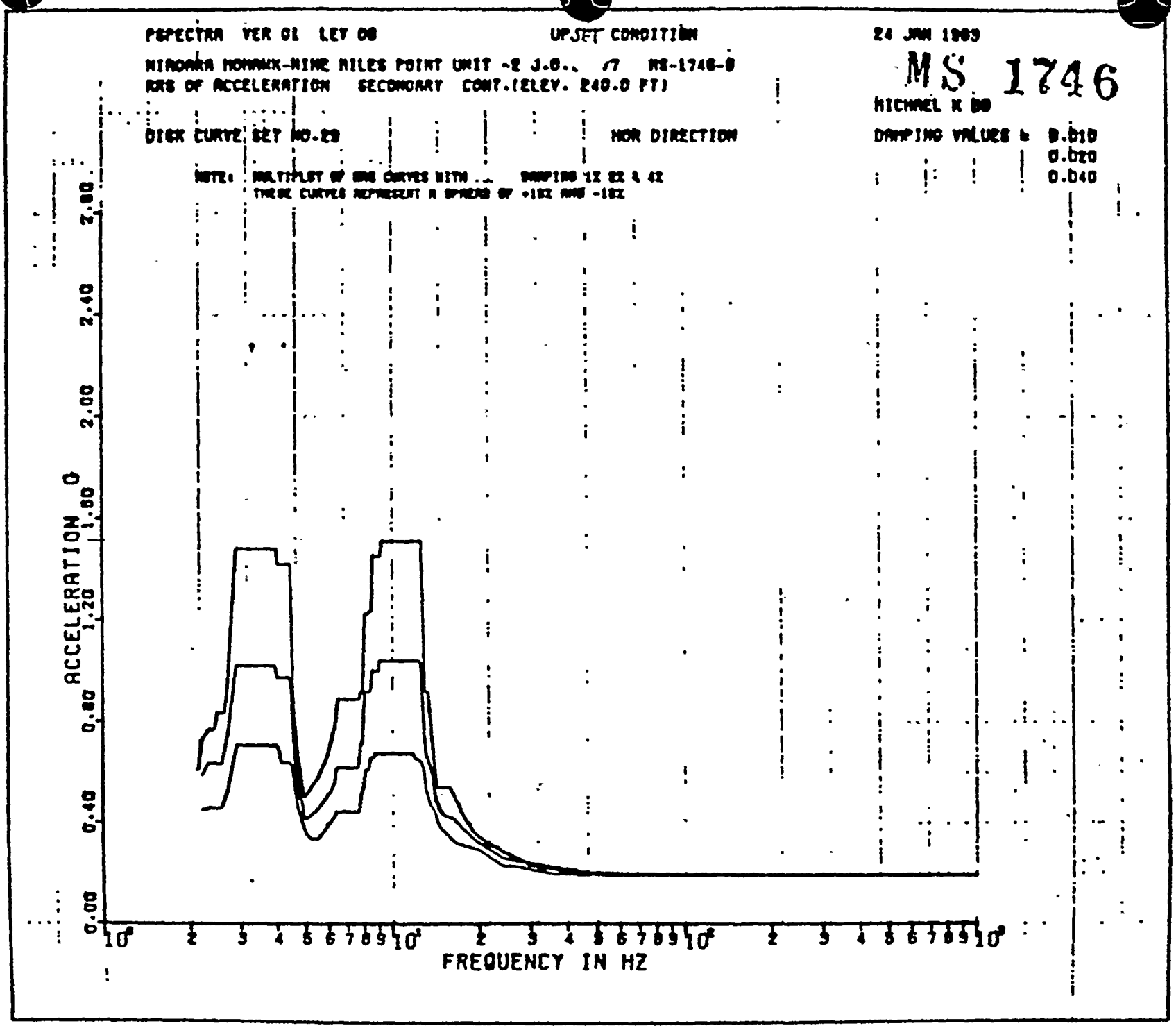


FIGURE 4A

PG 6 OF 8
FIGURE 4A

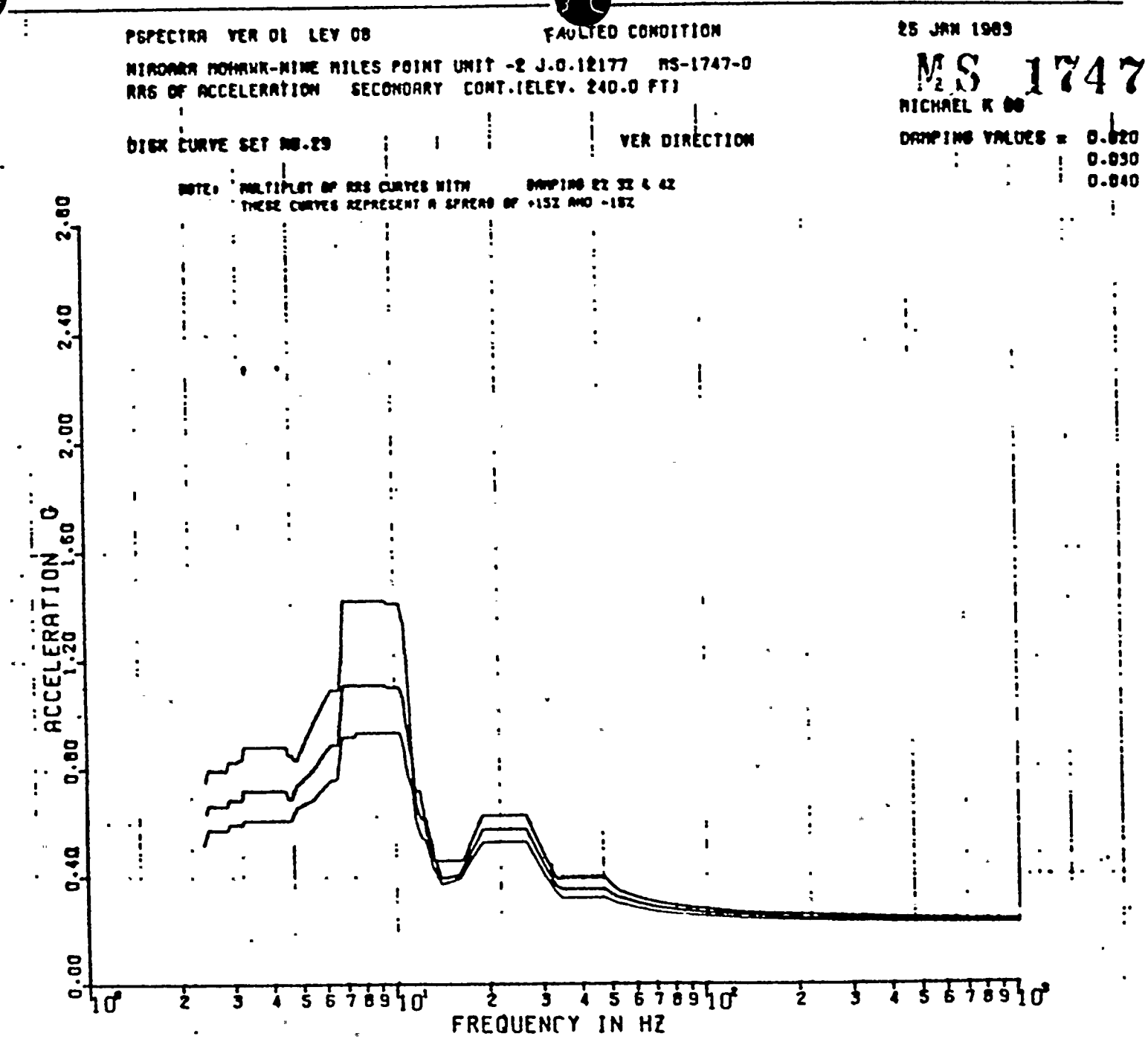


FIGURE 5A

ATTACHMENT "B"
3-6A

PG 83 OF 84

PG 1 OF 2

3-7A

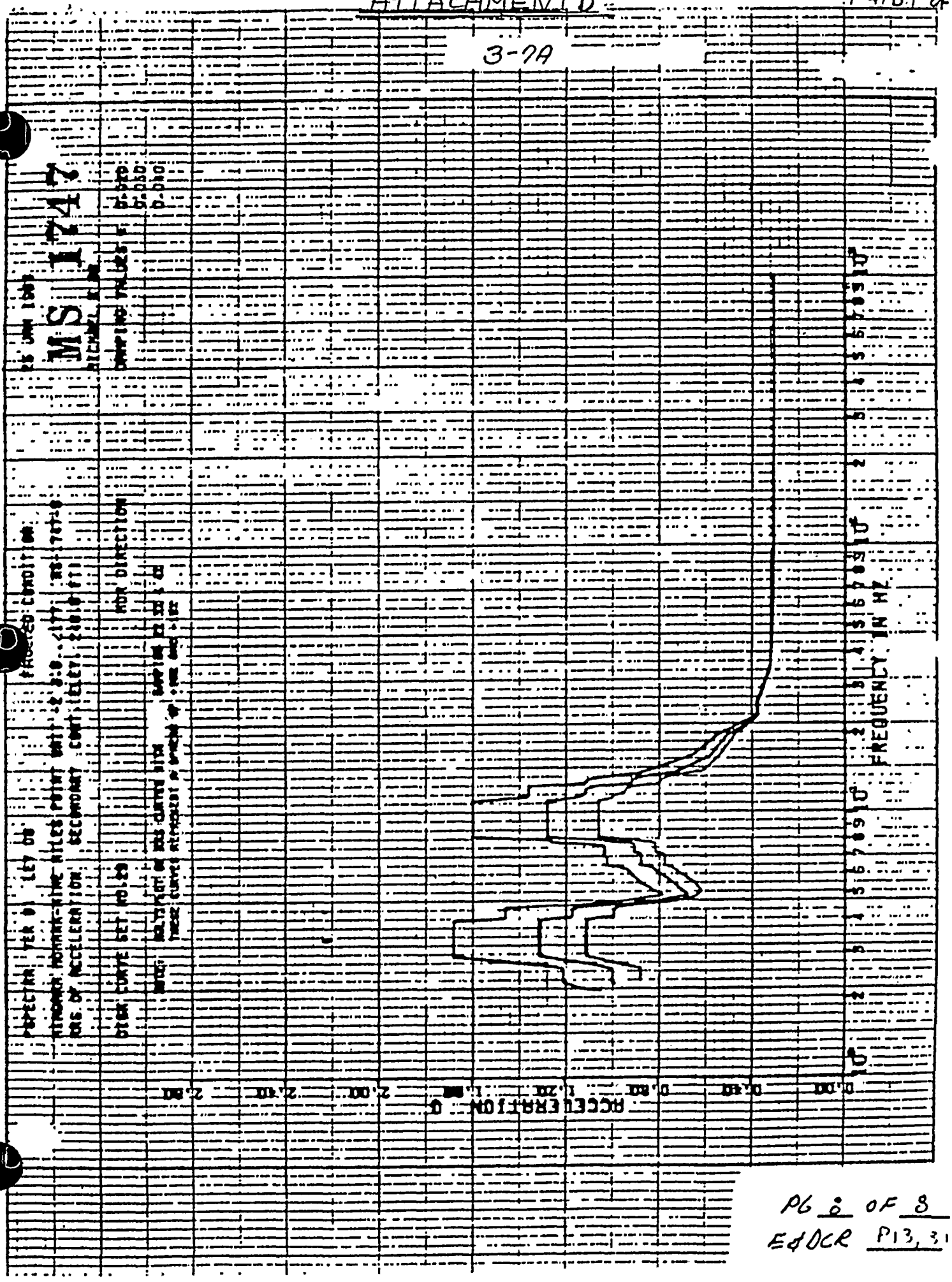
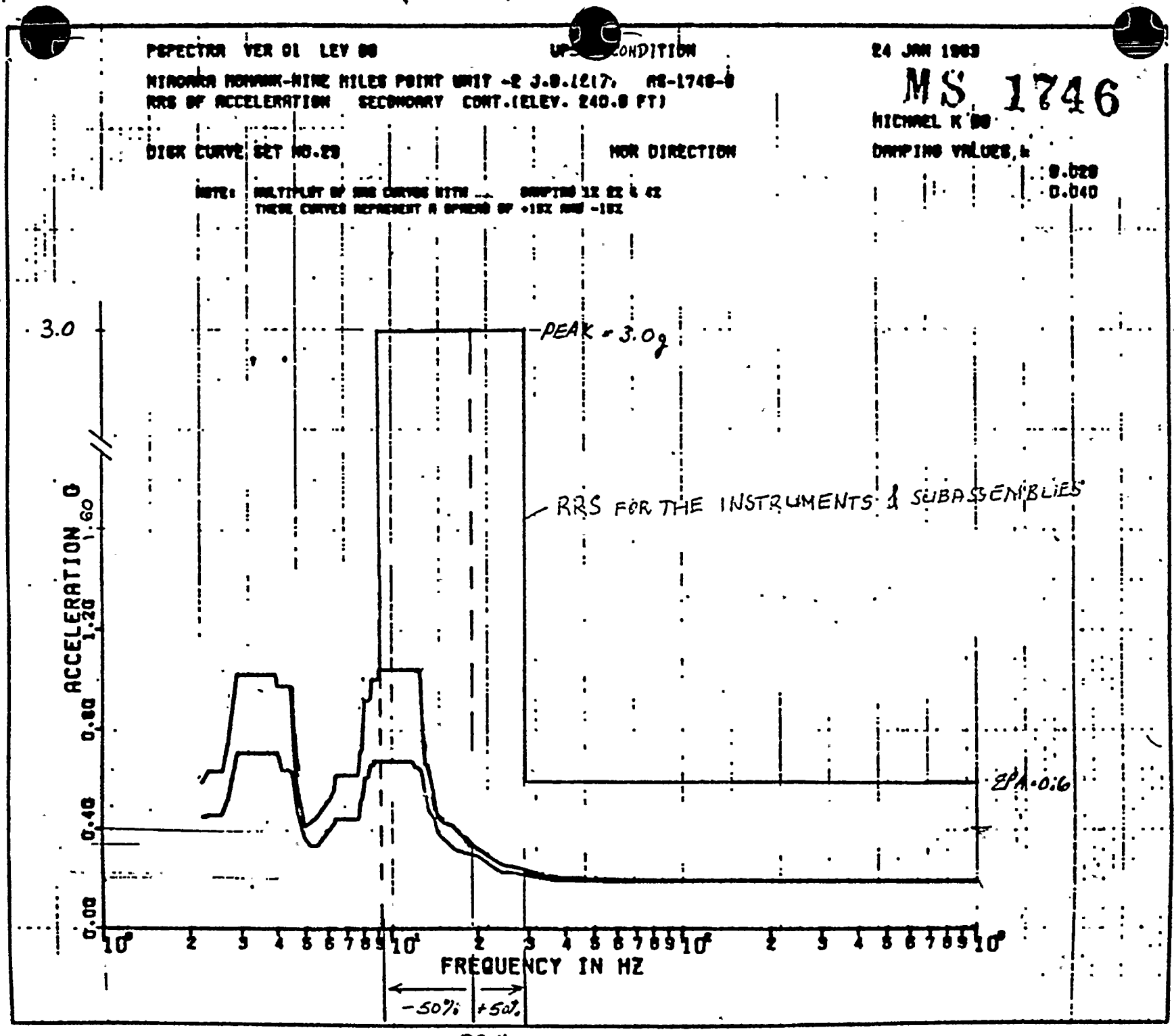


FIGURE 6

PG 8 OF 8
EDCR P13,312

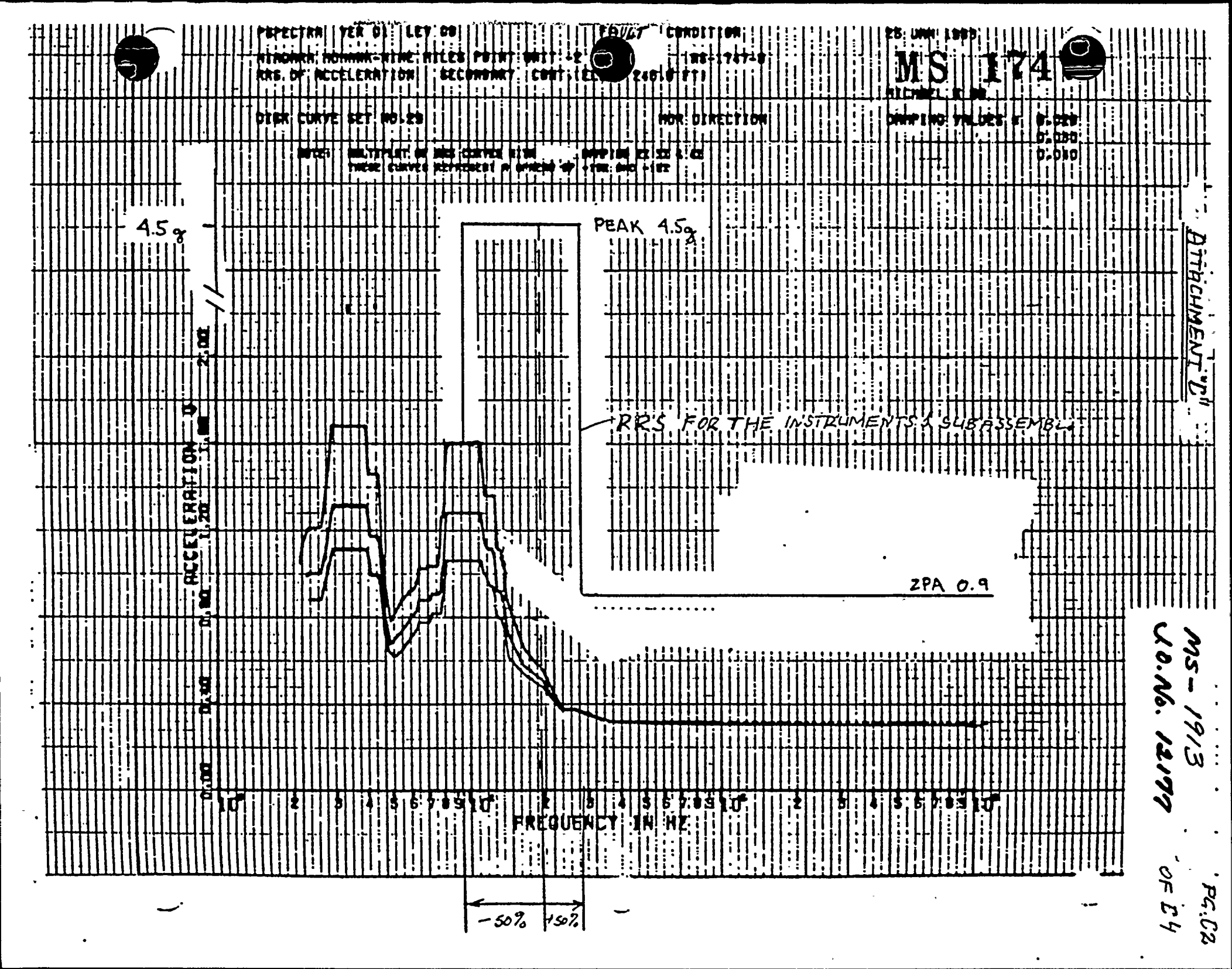


ATTACHMENT "C"

MS-1913

J.O.No. 12177

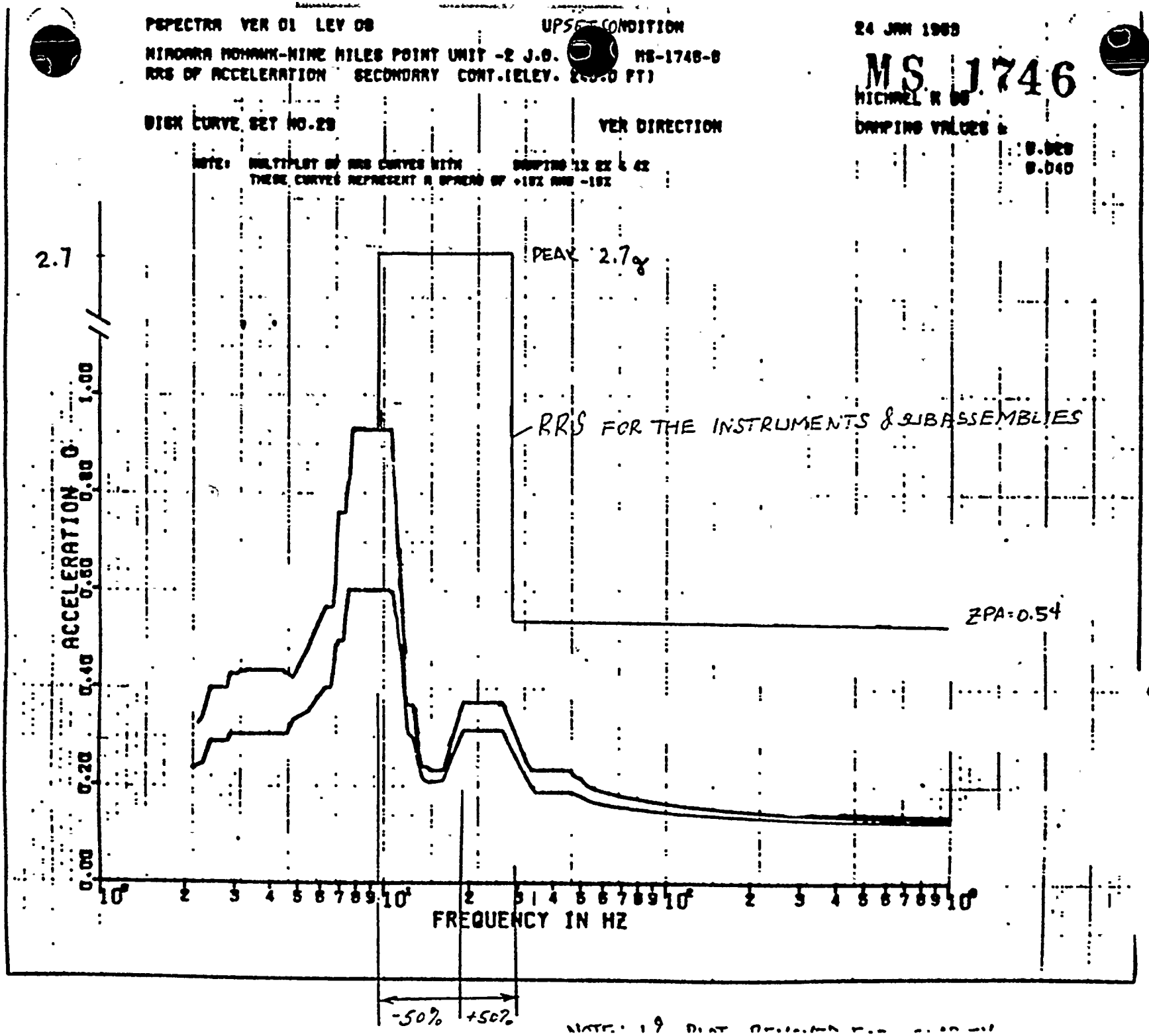
PG. C1 OF C4



ATTACHMENT "D"

MS-1913
U.O.No. 12177

PG. 62 OF 64

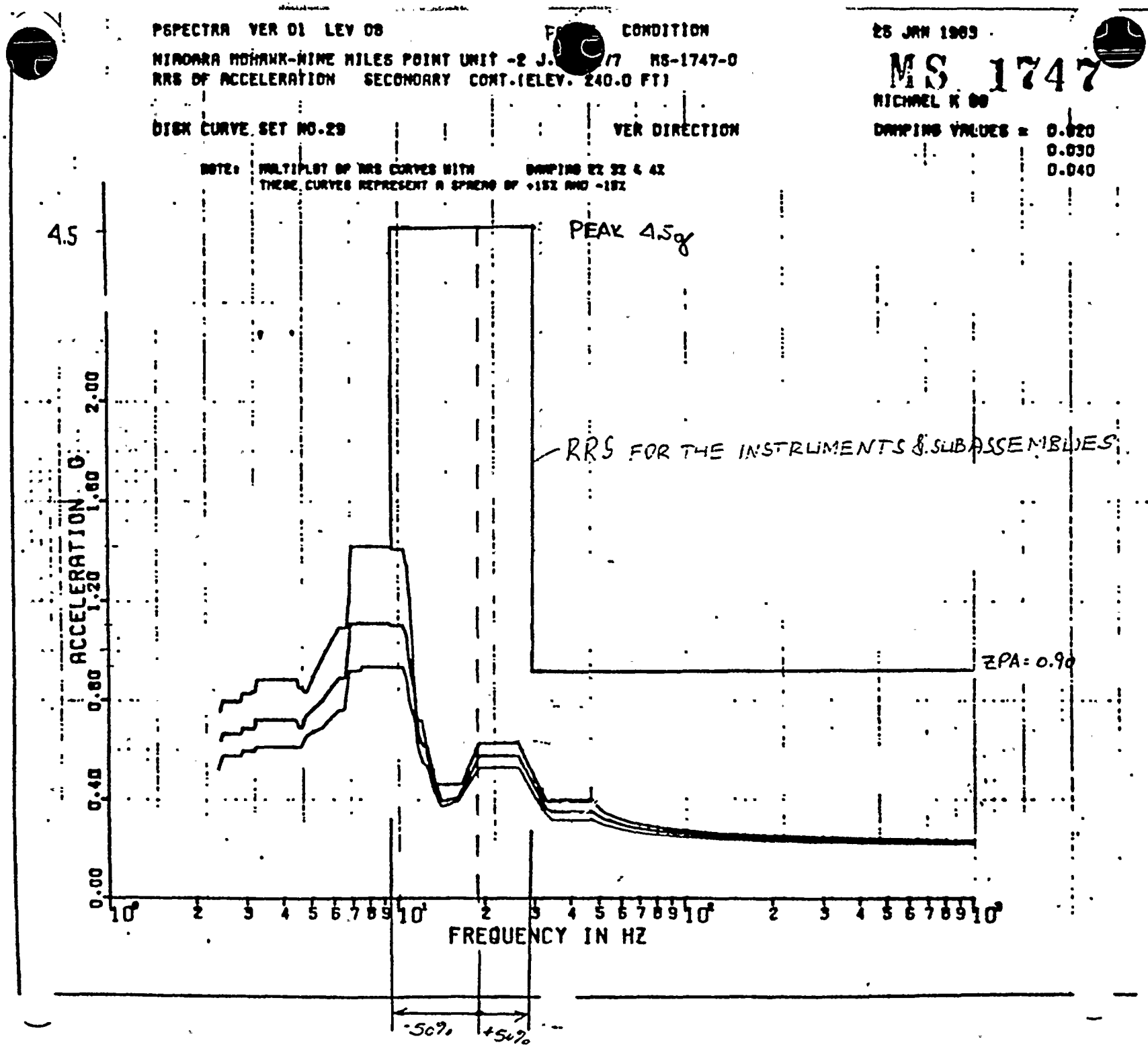


ATTACHMENT "E"

MS - 1913

J.O. No. 18177

PG. 63 OF 64

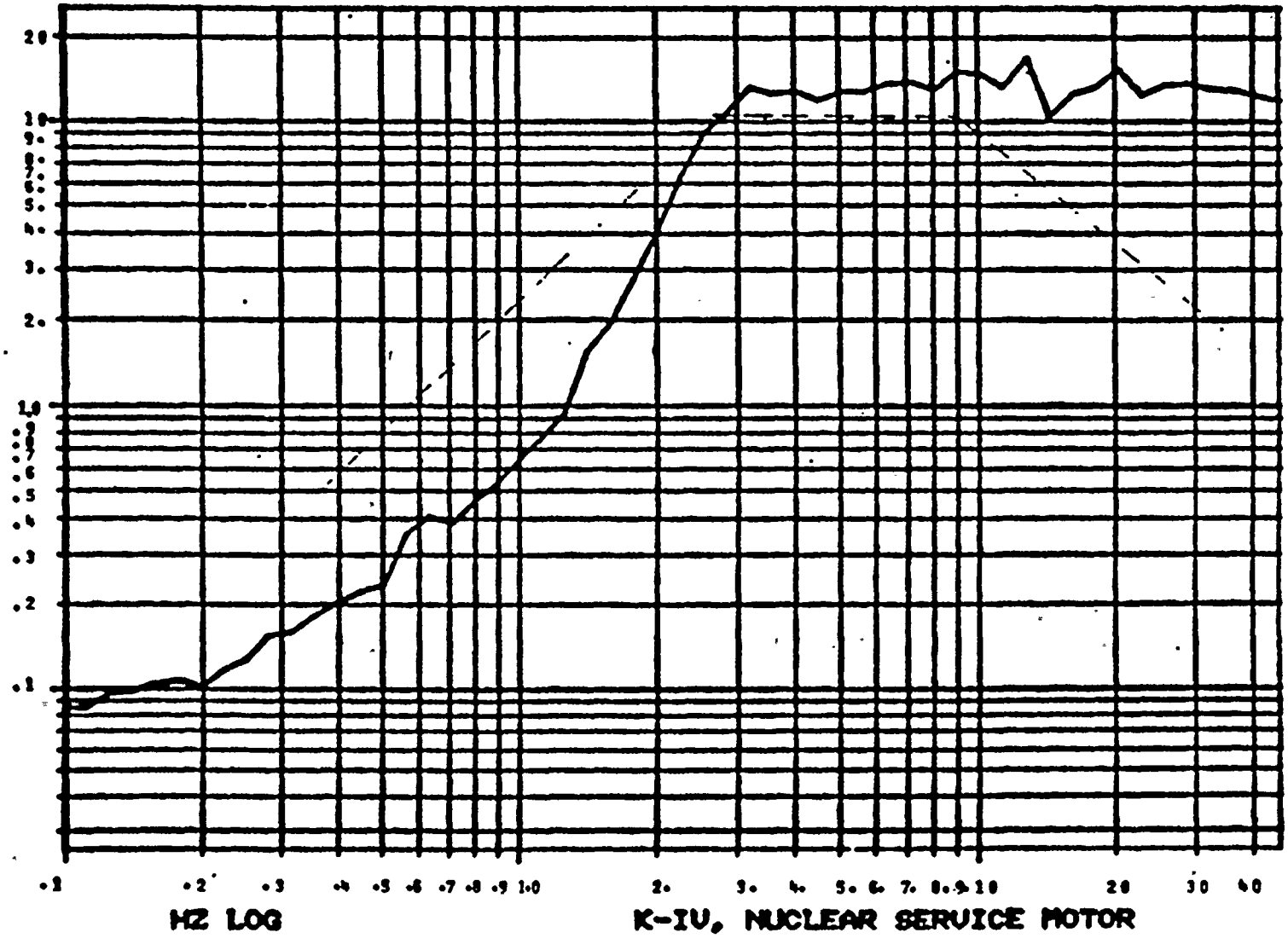


ATTACHMENT "E"

MS-1913
J.O. No. 12177

PG. C4 OF C4

SSE, VERT-LAT, REC 5, CH 1, VERT. ON FIXTURE, 3-13-80
SHOCK RESPONSE SPECTRUM



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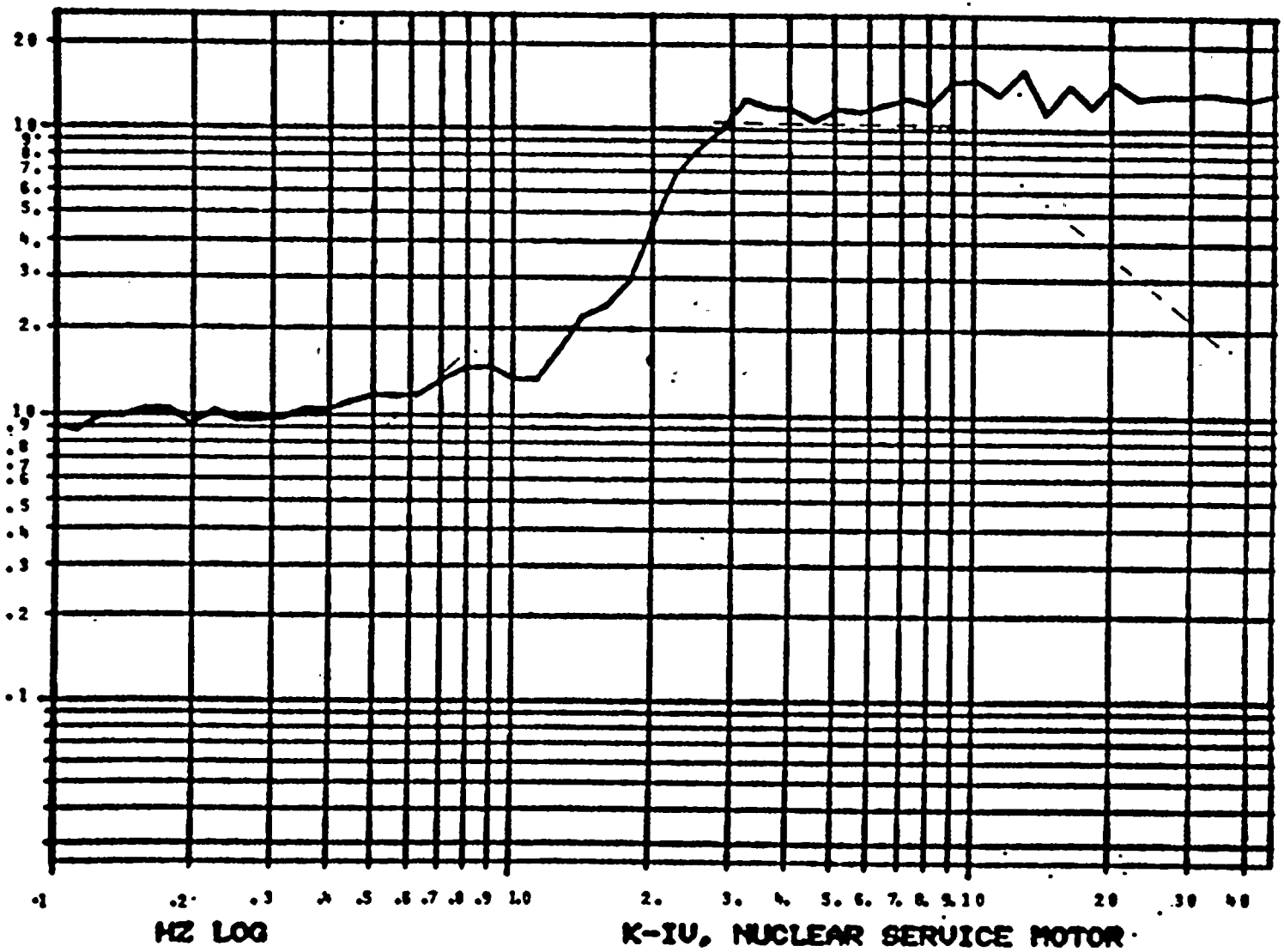
ATTACHMENT D

PG. D1 OF D 40

SSE, VERT-LAT, REC 5, CH 3, VERT. ON UNIT, 3-13-80
SHOCK RESPONSE SPECTRUM

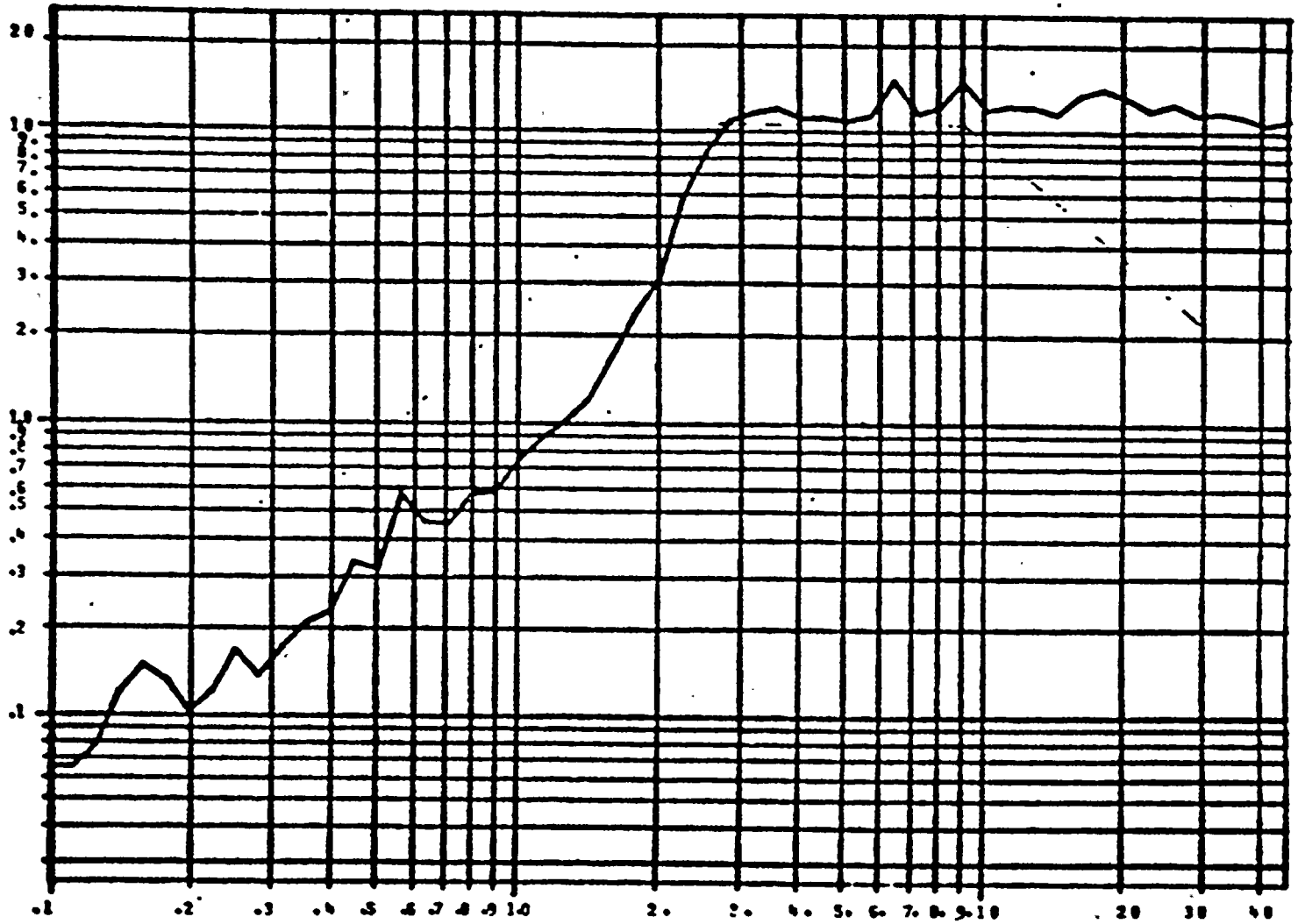


981

ATTACHMENT D

PG. D2 OF D4

SSE VERT-LAT, REC 5, CH 2, LAT. ON FIXTURE, 3-13-80
SHOCK RESPONSE SPECTRUM



HZ LOG

K-IV, NUCLEAR SERVICE MOTOR

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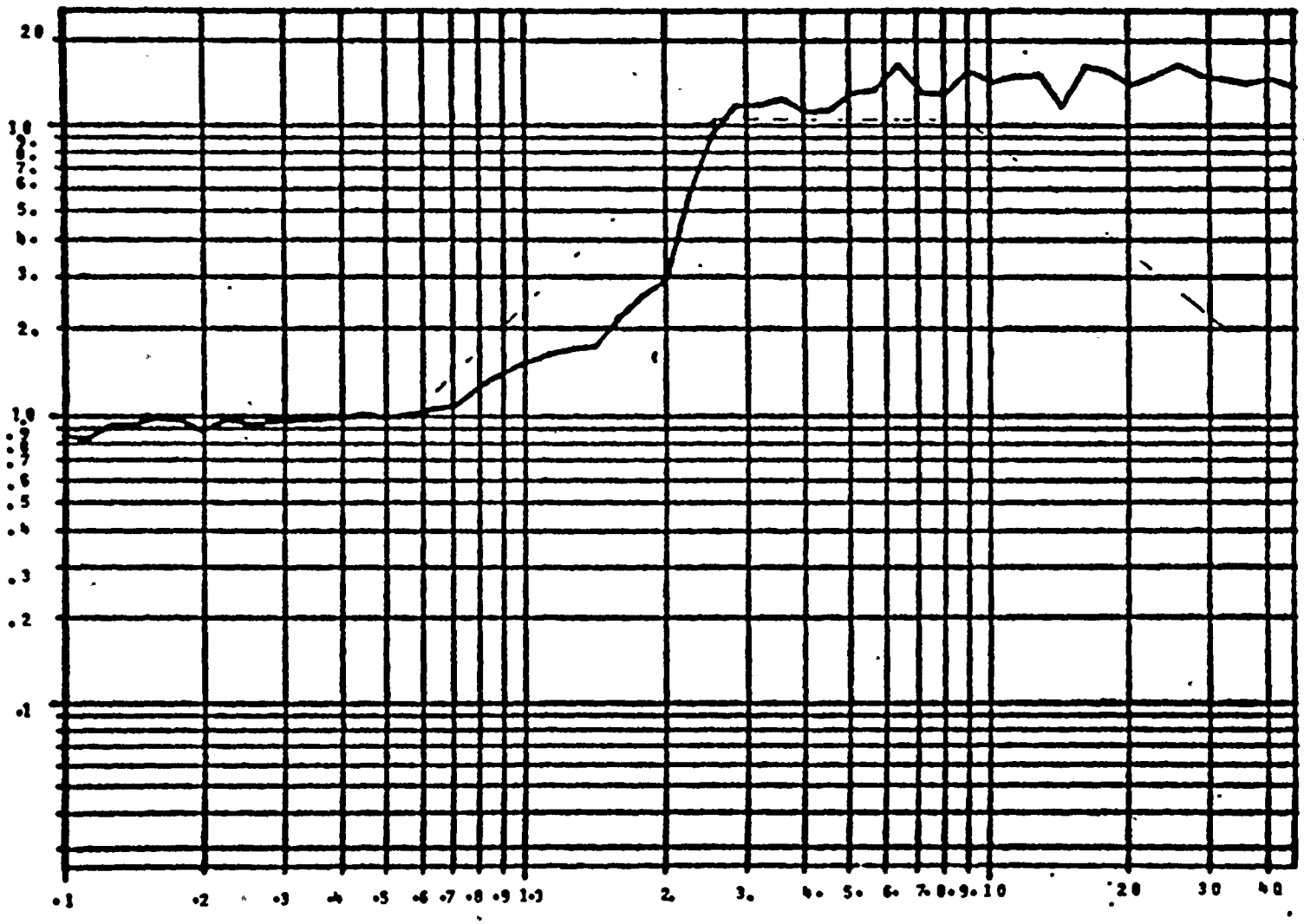
ATTACHMENT D

PG D3 OF D40

SSE, VERT-LAT, REC 5, CH 4, LAT. (ON UNIT,) 3-13-80
SHOCK RESPONSE SPECTRUM



HZ LOG

K-IV, NUCLEAR SERVICE MOTOR

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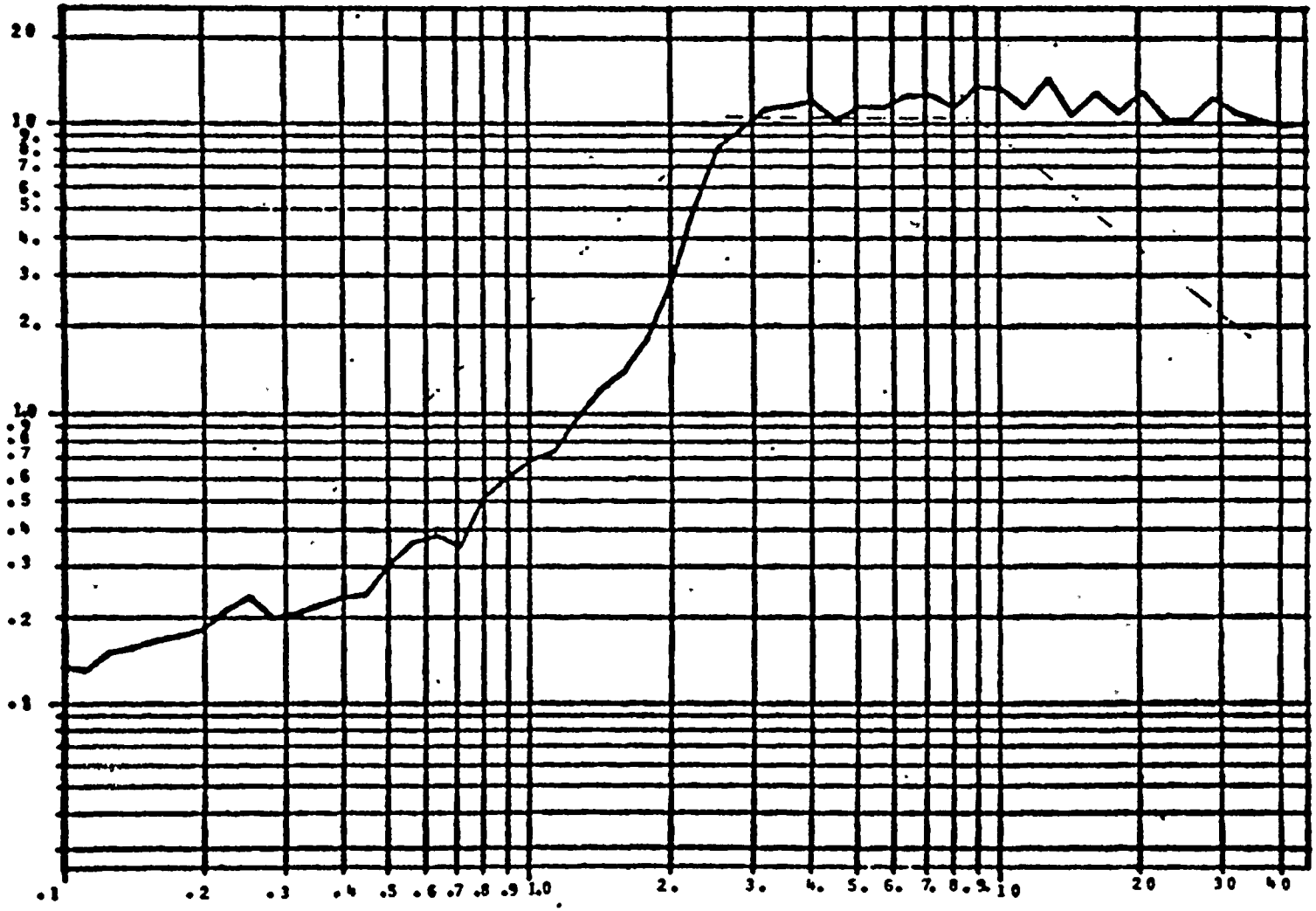
ATTACHMENT D

PG. D40 OF D40

SSE, VERT-LONG, REC 2, CH 1, VERT., ON FIXTURE, 3-13-80 LJP
SHOCK RESPONSE SPECTRUM



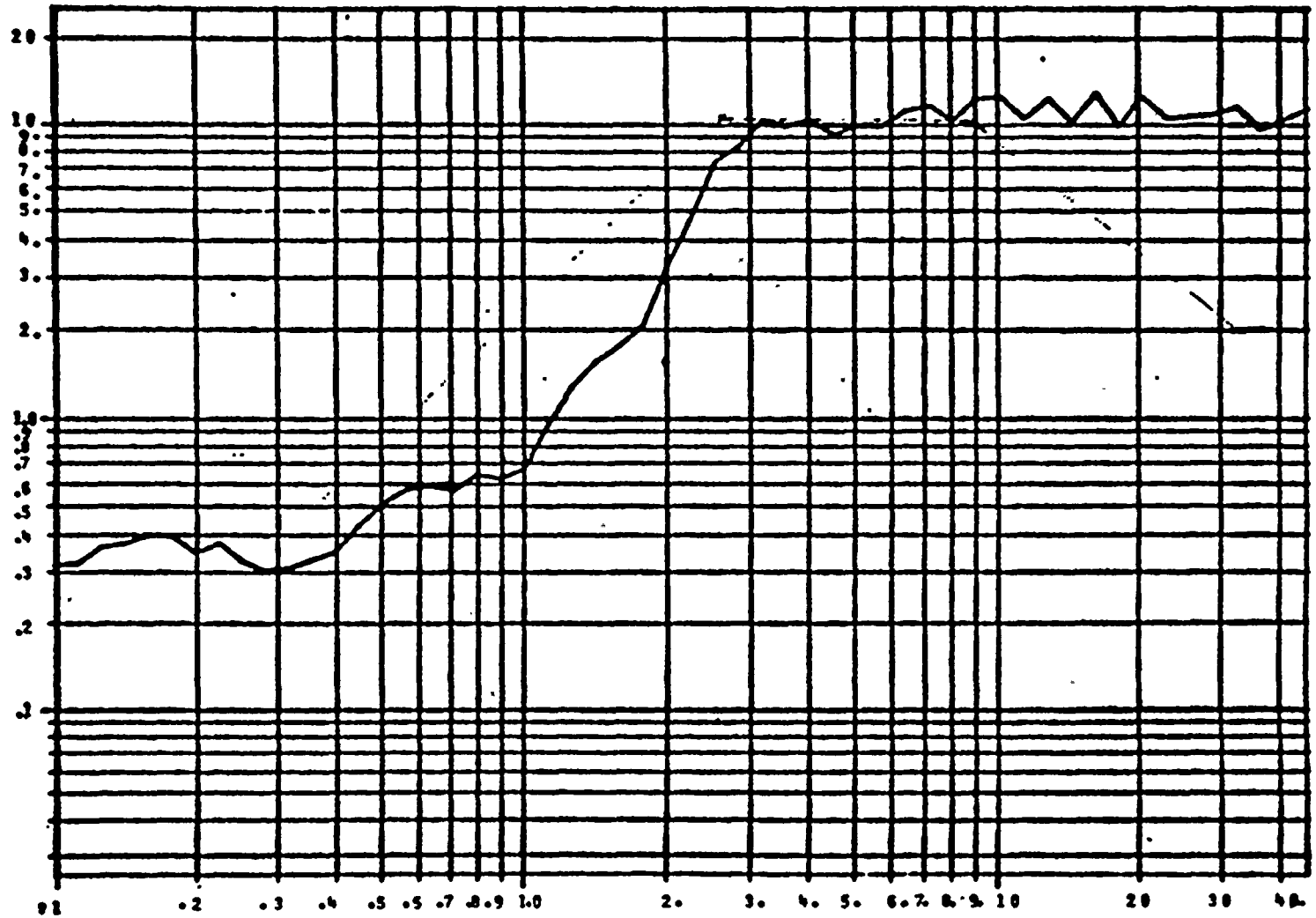
HZ LOG

K-1U, NUCLEAR SERVICE MOTOR

ATTACHMENT D

881

SSE, VERT-LONG, REC 2, CH 3, VERT., ON UNIT, 3-13-80 LJP
SHOCK RESPONSE SPECTRUM



HZ LOG

K-1V, NUCLEAR SERVICE MOTOR

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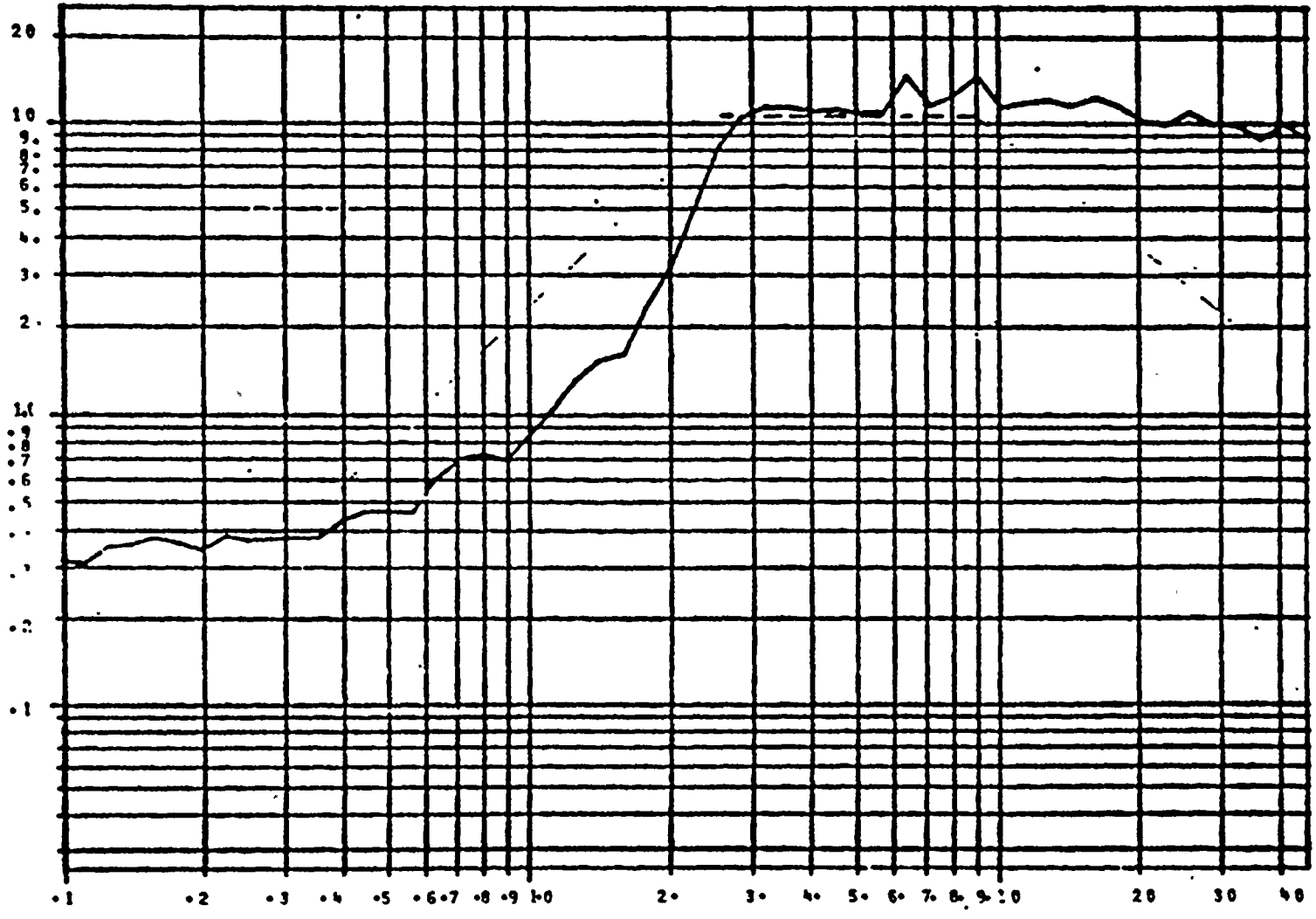
ATTACHMENT D

PG. D6 OF D40

SSE, VERT-LONG, REC 2, CH 2, HORIZ., ON FIXTURE, 3-13-80 LJP
SHOCK RESPONSE SPECTRUM



HZ LOG

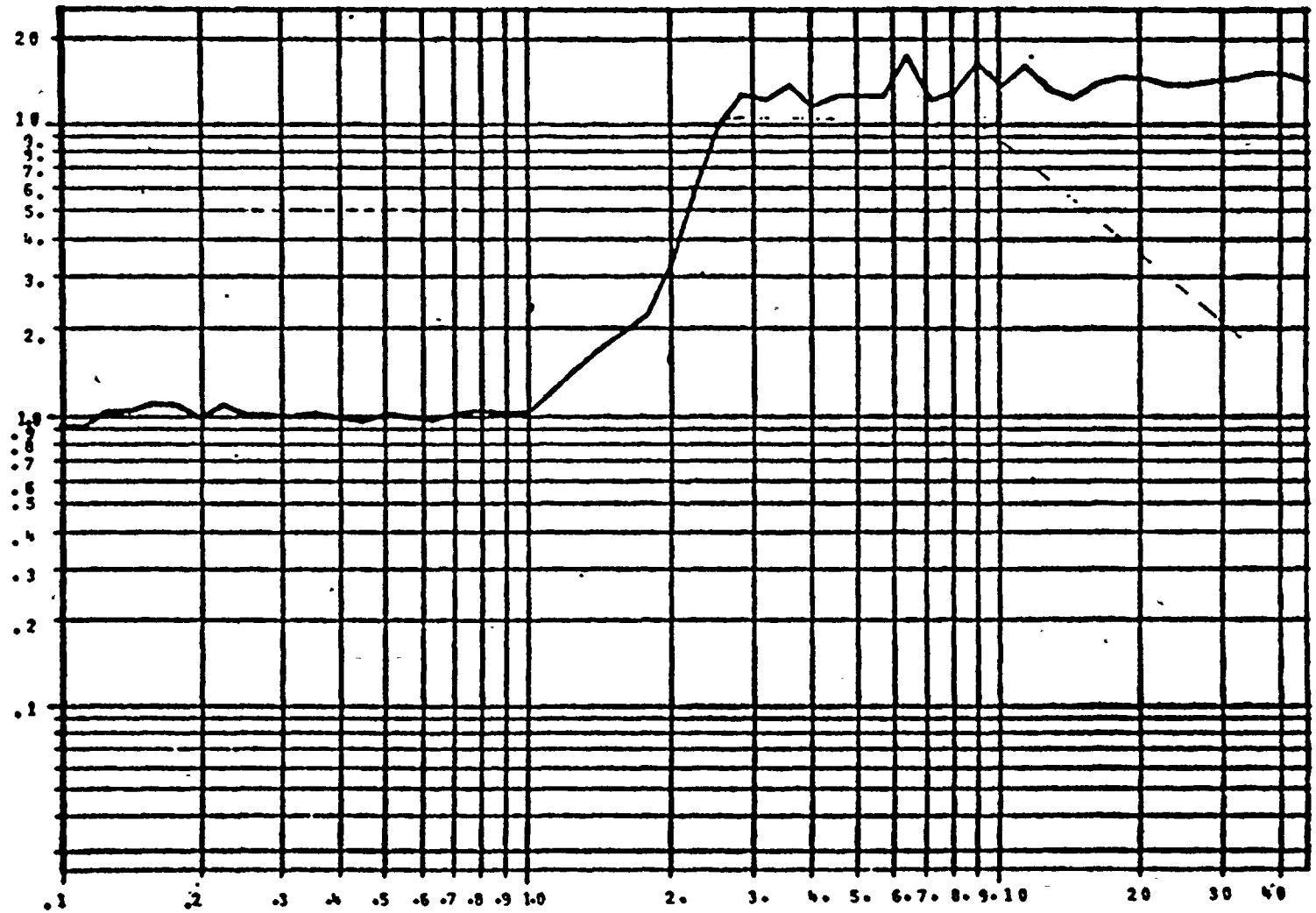
K-IV, NUCLEAR SERVICE MOTOR

ATTACHMENT D

160 190

PG. 10 OF 40

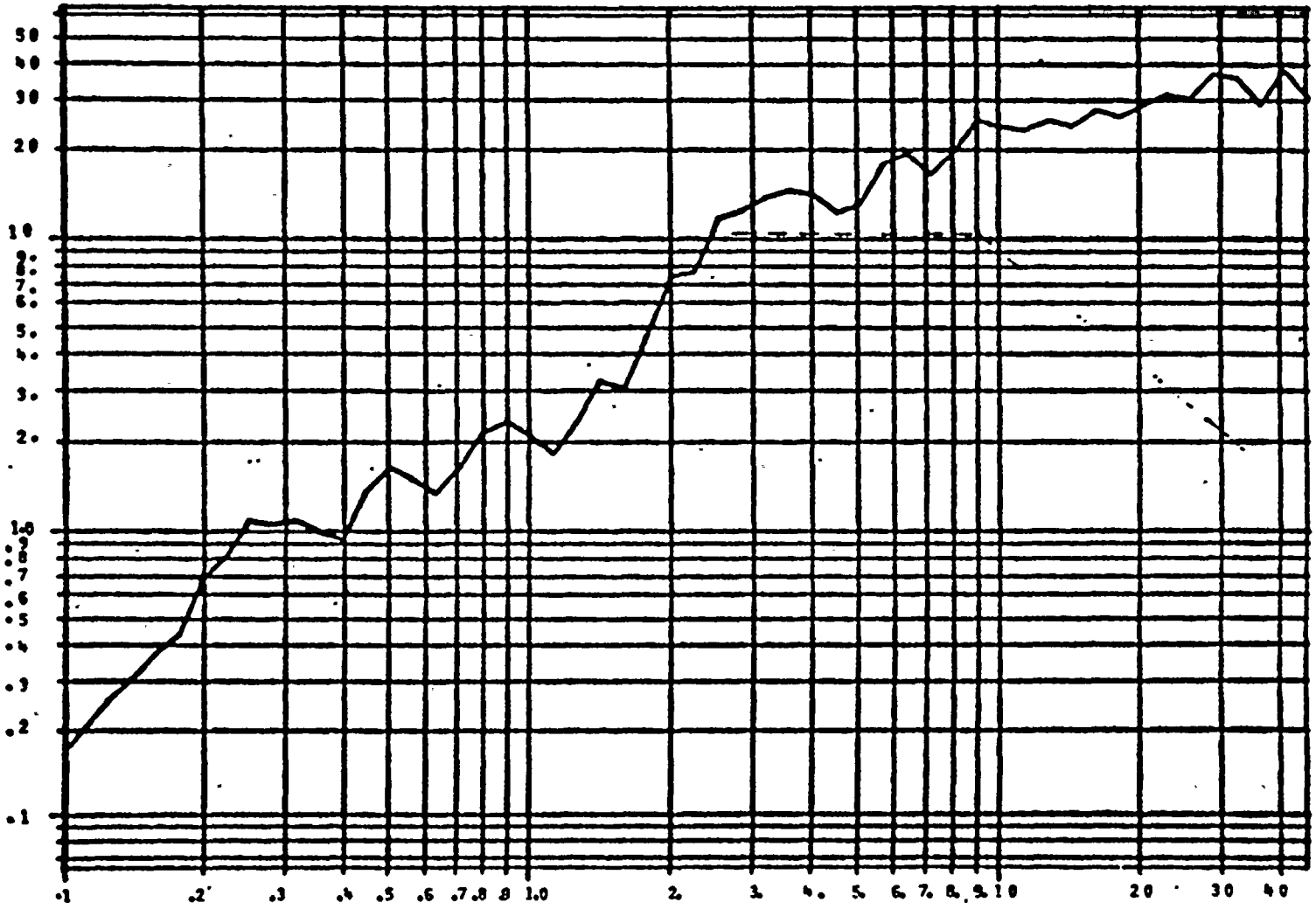
SSE, VERT-LONG, REC 2, CH 4, HORIZ. ON UNIT, 3-13-80 LJP
SHOCK RESPONSE SPECTRUM



ATTACHMENT D

191

SSE, VERT-LONG, REC 5, CH 4, LONG. ON UNIT, 3-14-80
SHOCK RESPONSE SPECTRUM

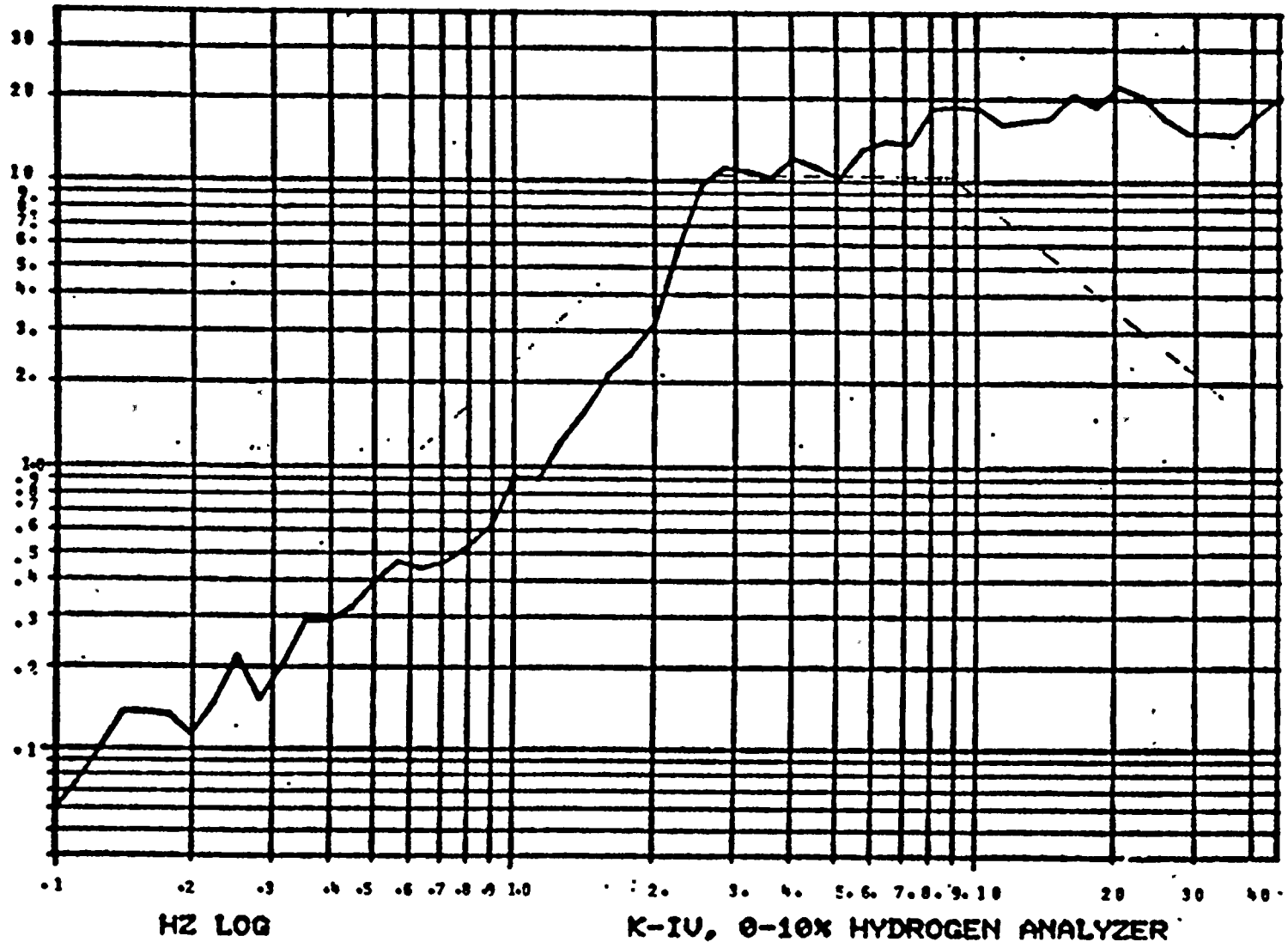


HZ LOG

K-IV, 0-10% HYDROGEN ANALYZER

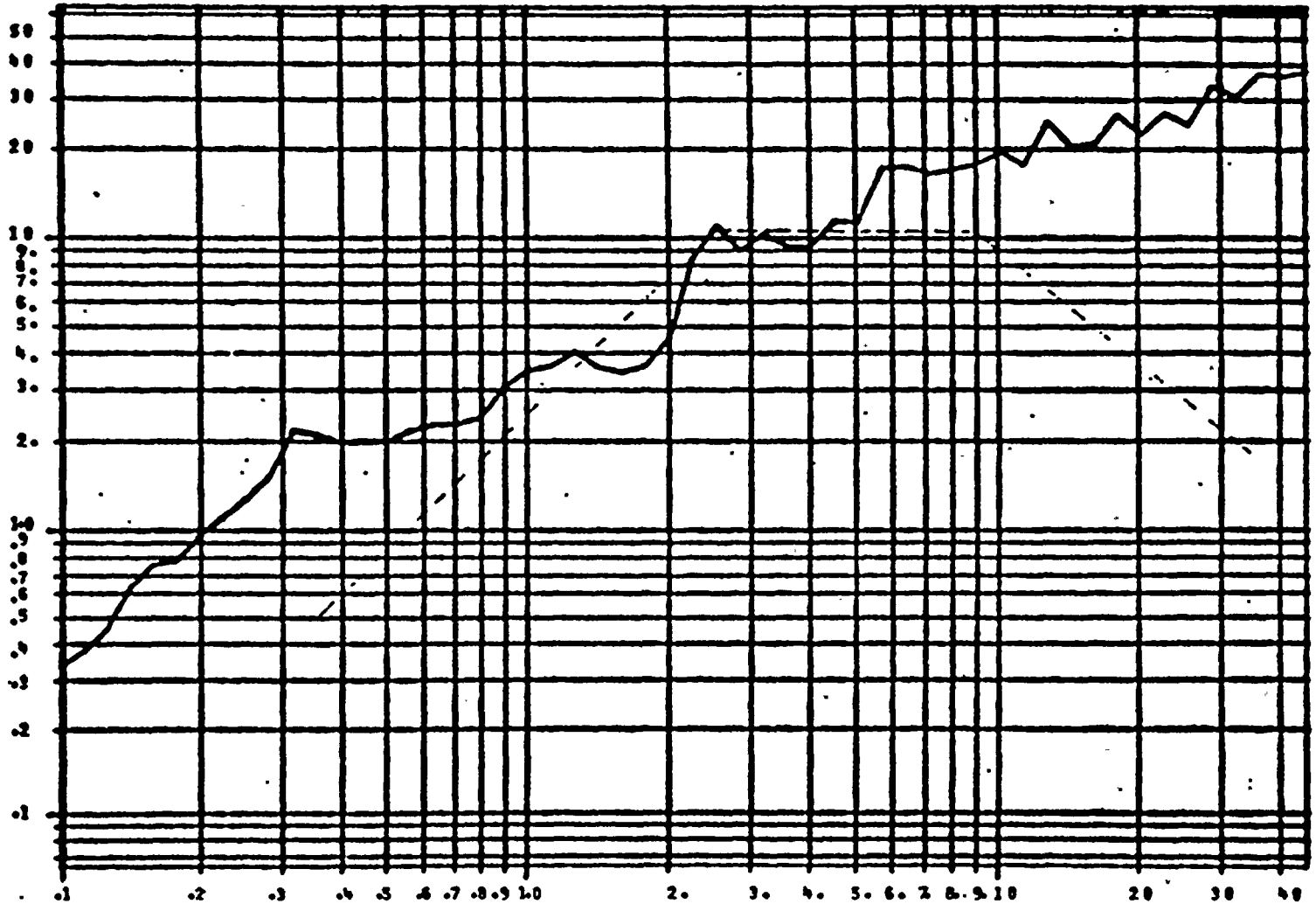
ATTACHMENT D

SSE, VERT-LONG, REC 5, CH 2, LONG. ON FIXTURE, 3-14-80
SHOCK RESPONSE SPECTRUM



ATTACHMENT D

SSE, VERT-LONG, REC 5, CH 3, VERT. ON UNIT, 3-14-80
SHOCK RESPONSE SPECTRUM



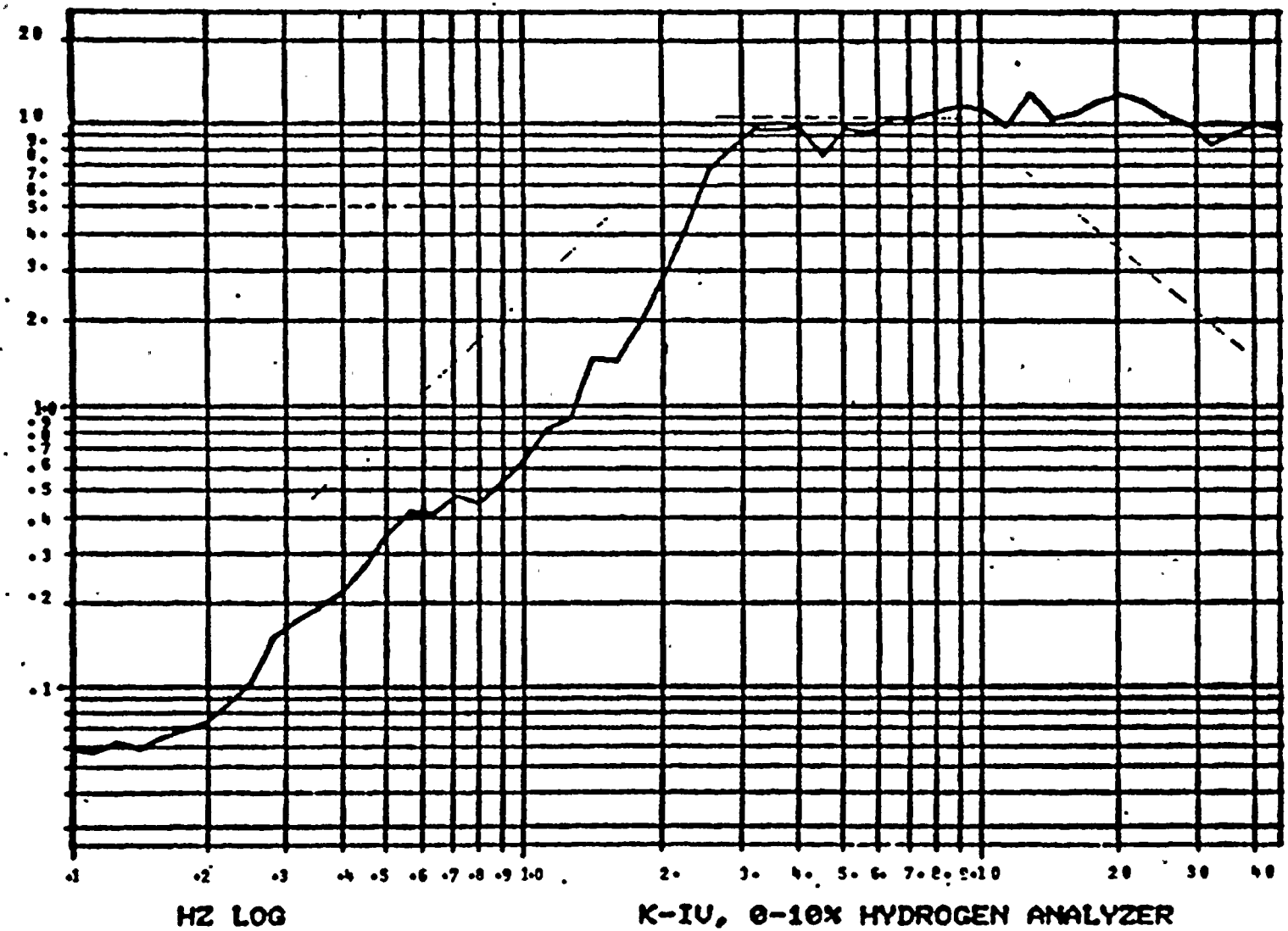
HZ LOG

K-IU, 0-10% HYDROGEN ANALYZER

ATTACHMENT D

195

SSE, VERT-LONG, REC 5, CH 1, VERT. ON FIXTURE, 3-14-80
SHOCK RESPONSE SPECTRUM

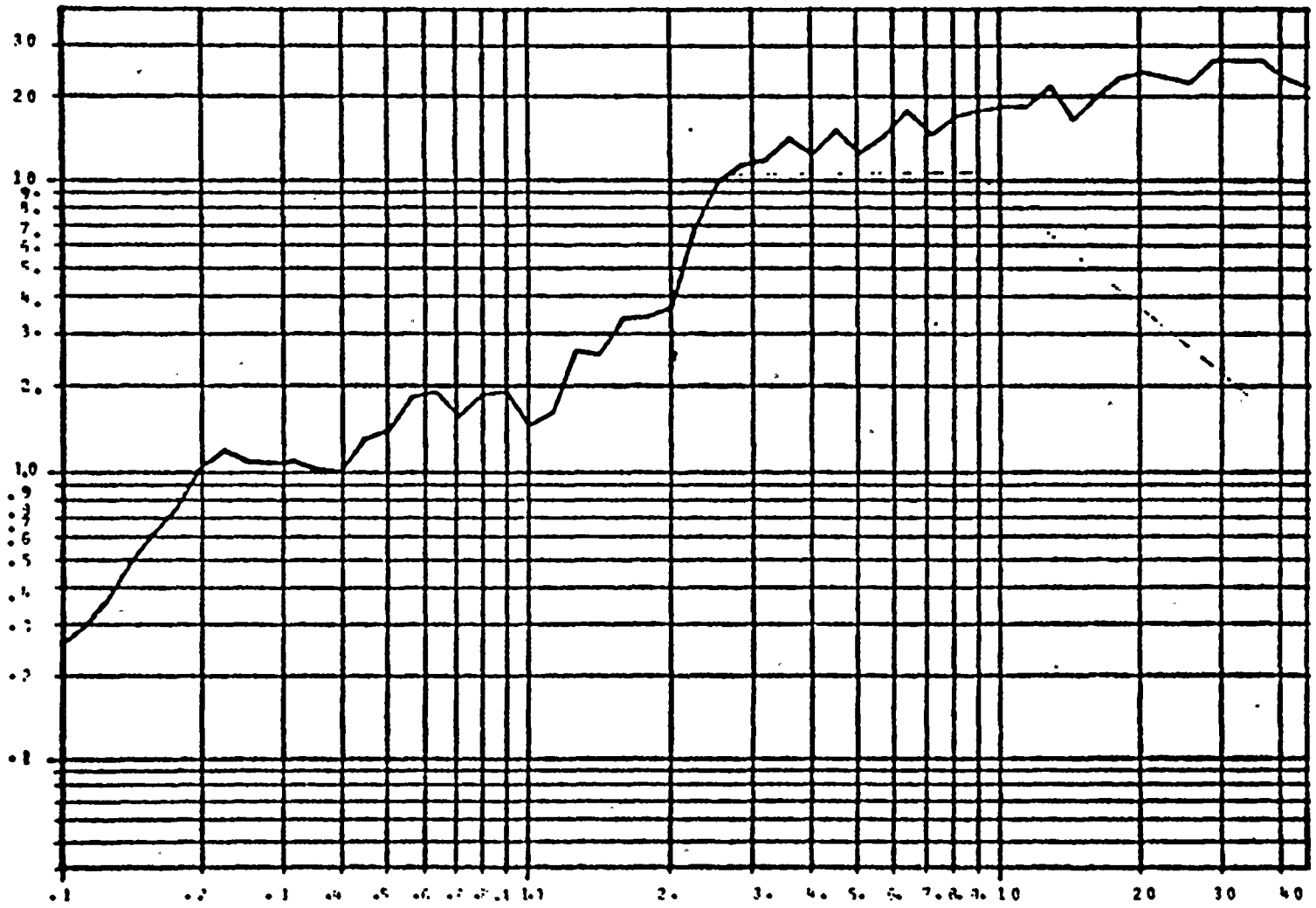


ATTACHMENT D

196

PG. D12 OF D40

SSE, VERT-LAT, REC 3, CH 4, LAT. ON UNIT, 3-14-80
SHOCK RESPONSE SPECTRUM



HZ LOG

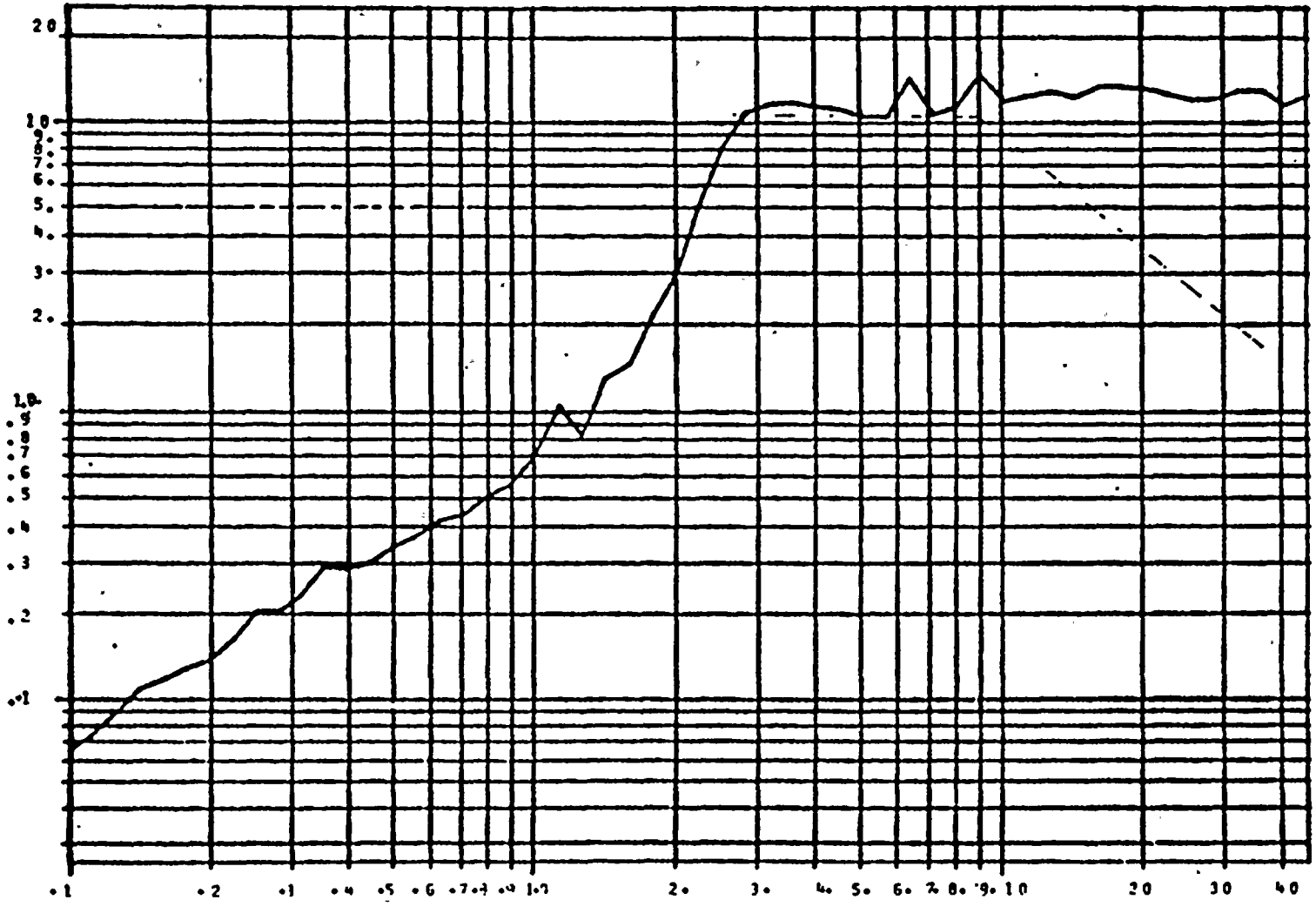
K-IV, 0-10% HYDROGEN ANALYZER

ATTACHMENT D

PG. D13 OF D40

197

SSE, VERT-LAT, REC 3, CH 2, LAT. ON FIXTURE, 3-14-80
SHOCK RESPONSE SPECTRUM



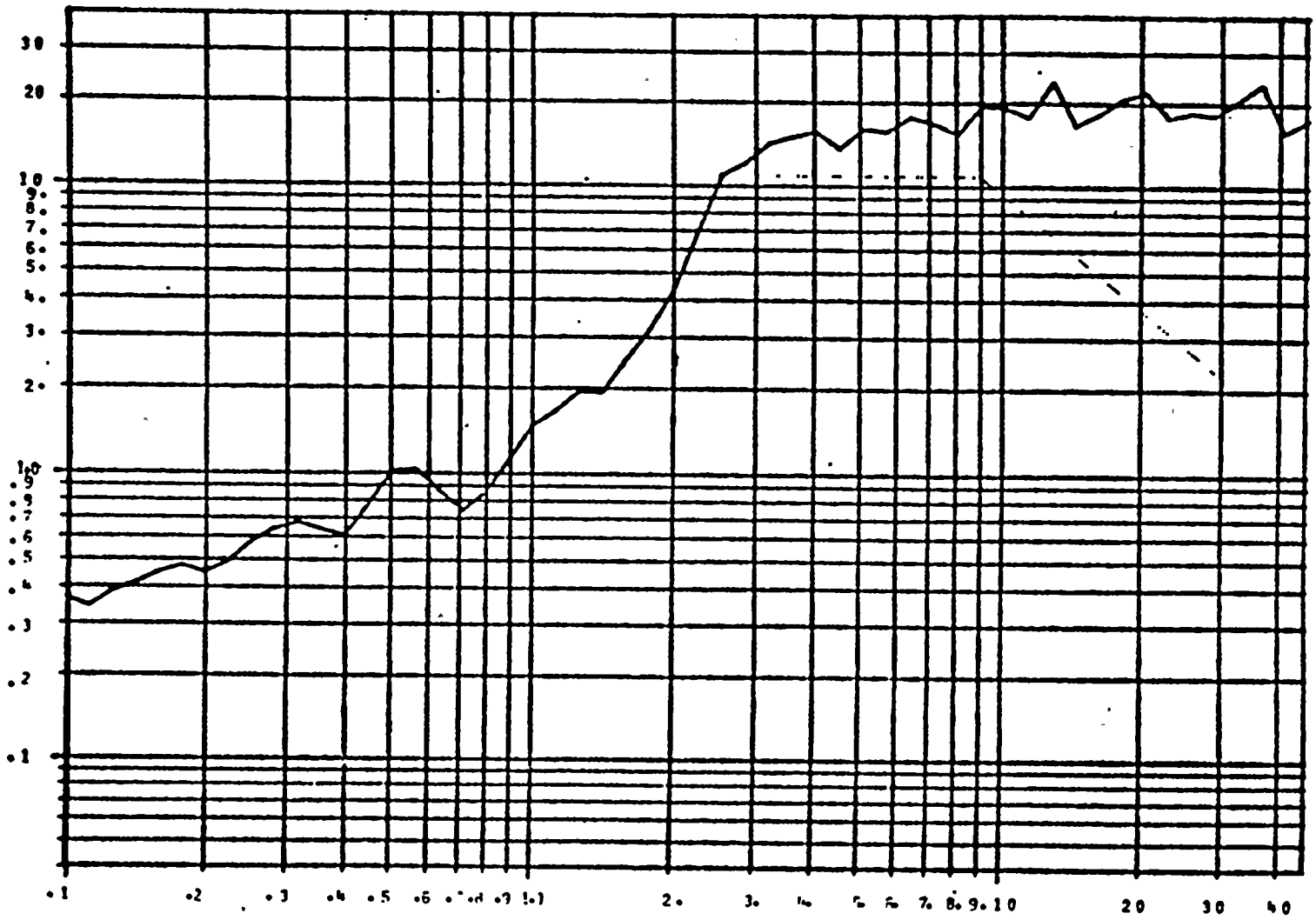
HZ LOG

K-IU, 0-10% HYDROGEN ANALYZER

ATTACHMENT D

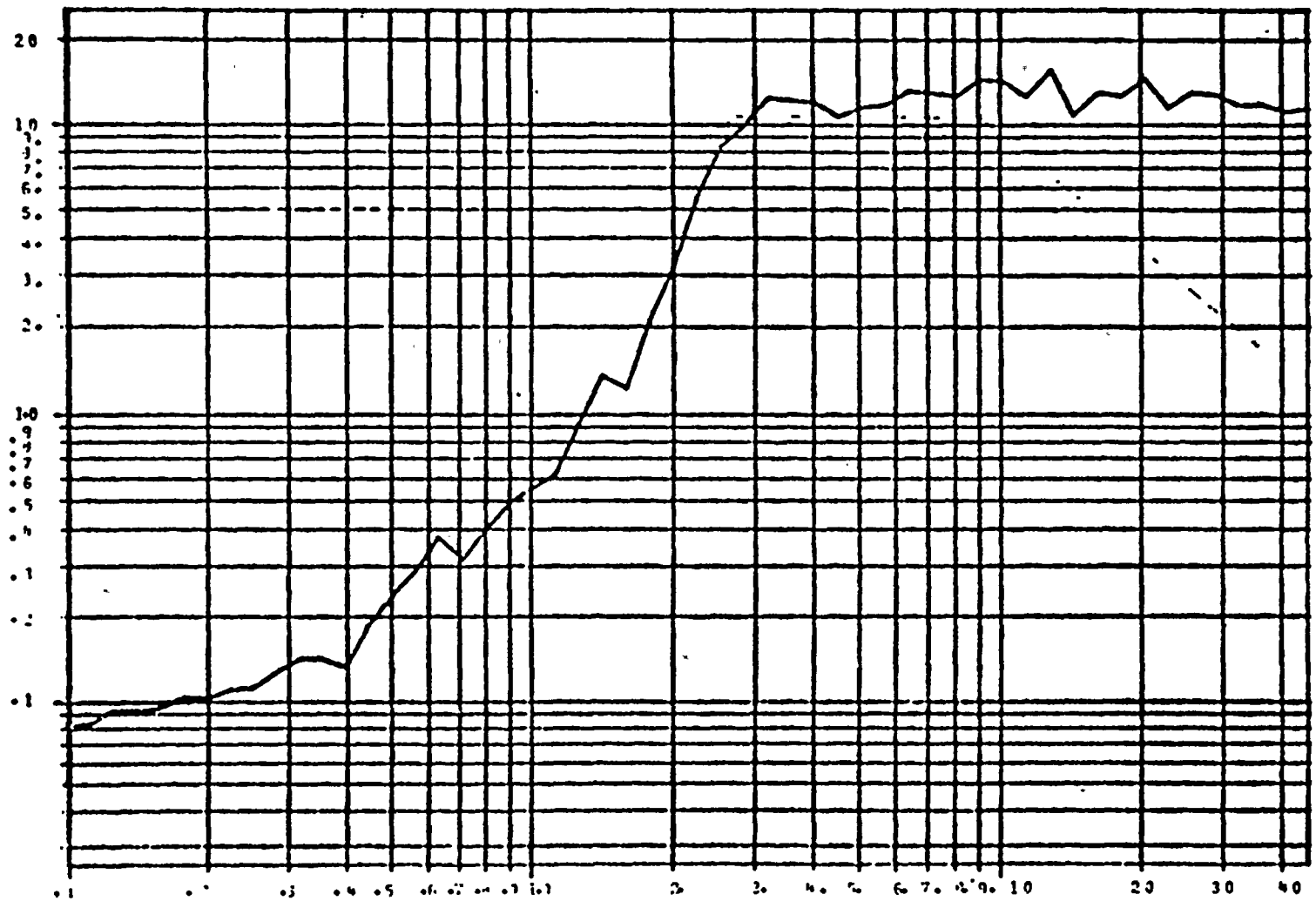
198

SSE, VERT-LAT, REC 3, CH 3, VERT. ON UNIT, 3-14-80
SHOCK RESPONSE SPECTRUM



ATTACHMENT D

SSE, VERT-LAT, REC 3, CH 1, VERT. ON FIXTURE, 3-14-80
SHOCK RESPONSE SPECTRUM



HZ LOG

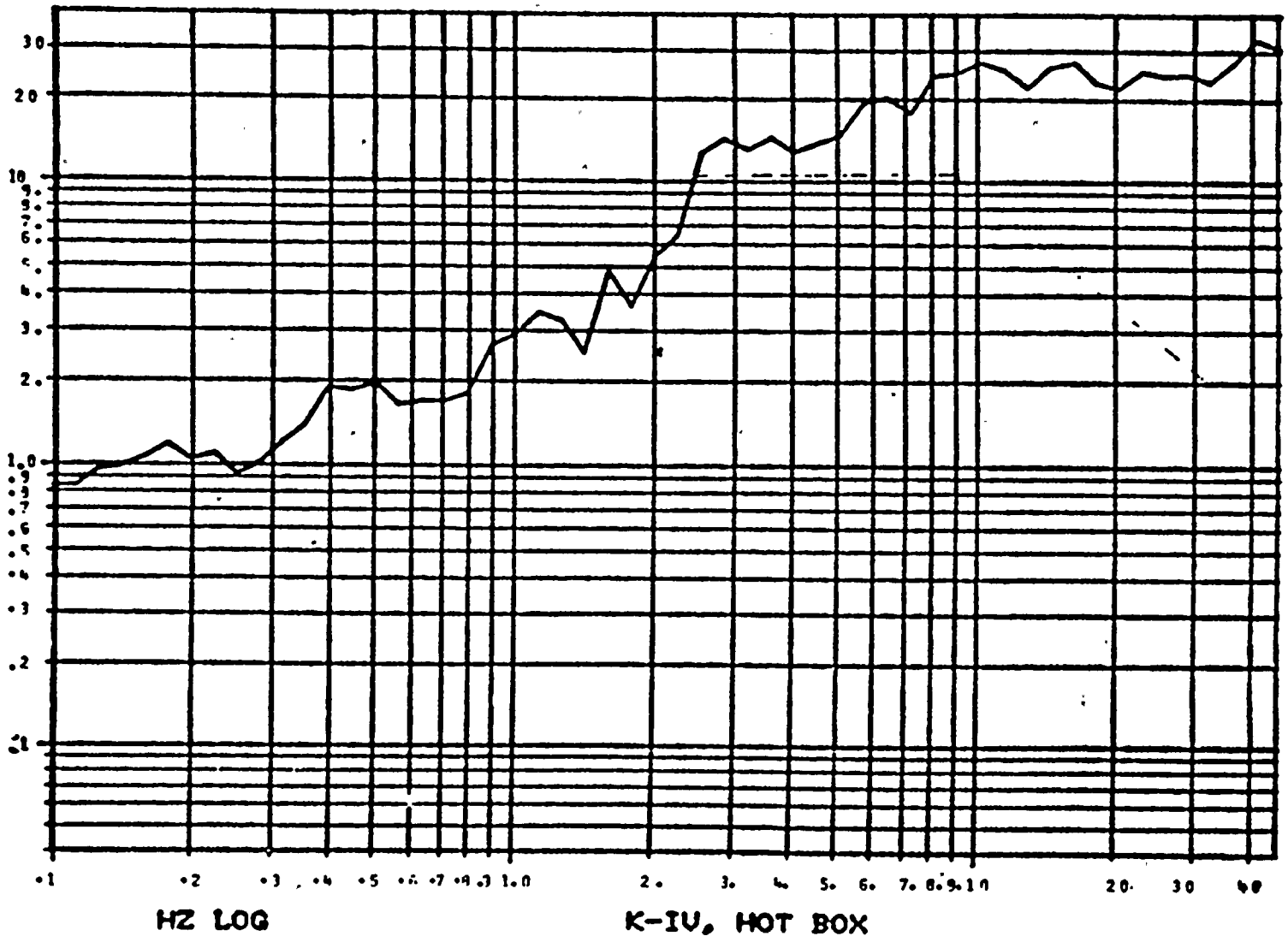
K-IV, 0-10% HYDROGEN ANALYZER

ATTACHMENT D

200

PG. D16 OF D40

SSE, VERT-LONG, REC 5, CH 4, LONG. ON UNIT, 3-17-80
SHOCK RESPONSE SPECTRUM

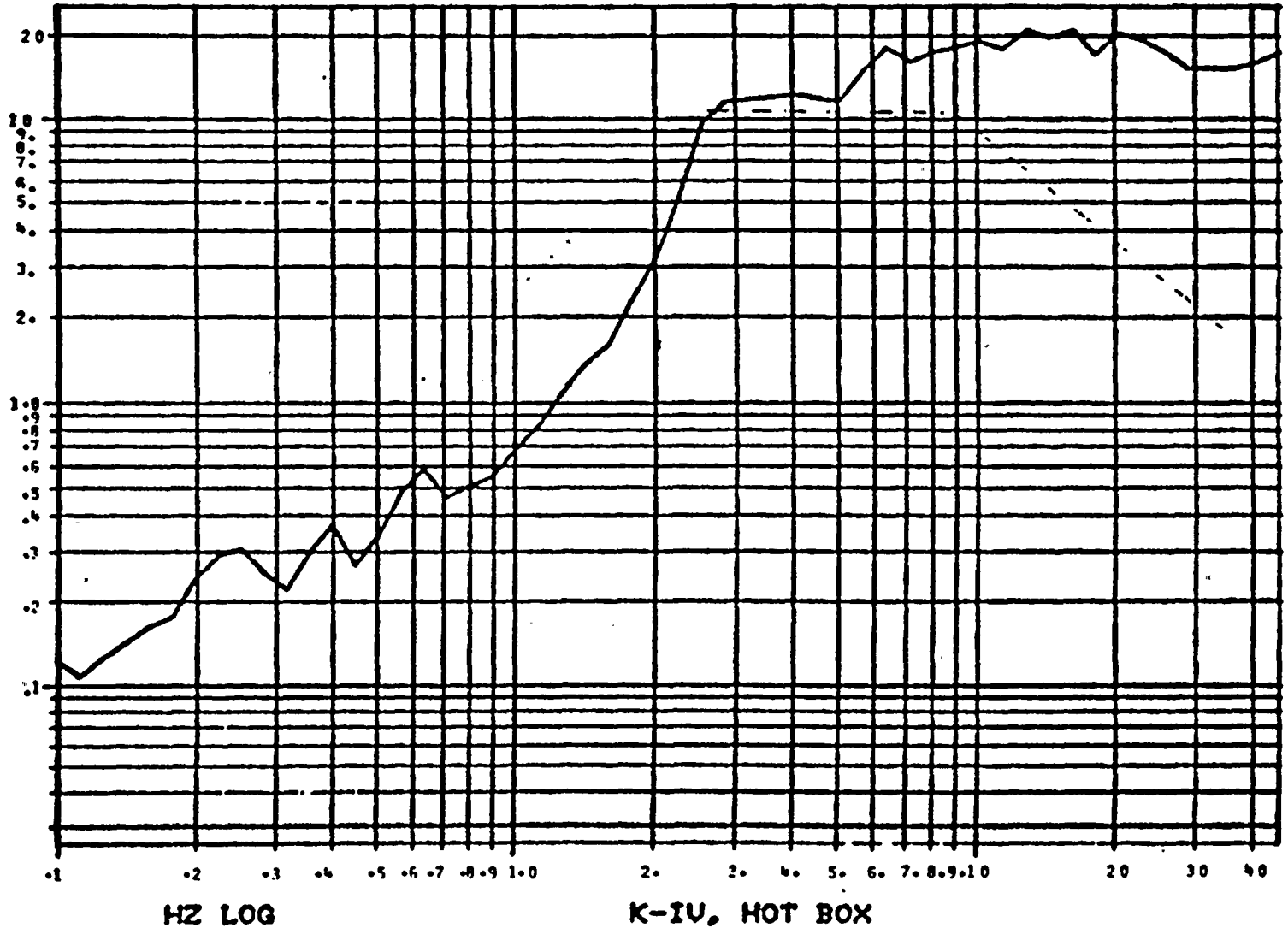


ATTACHMENT D

202

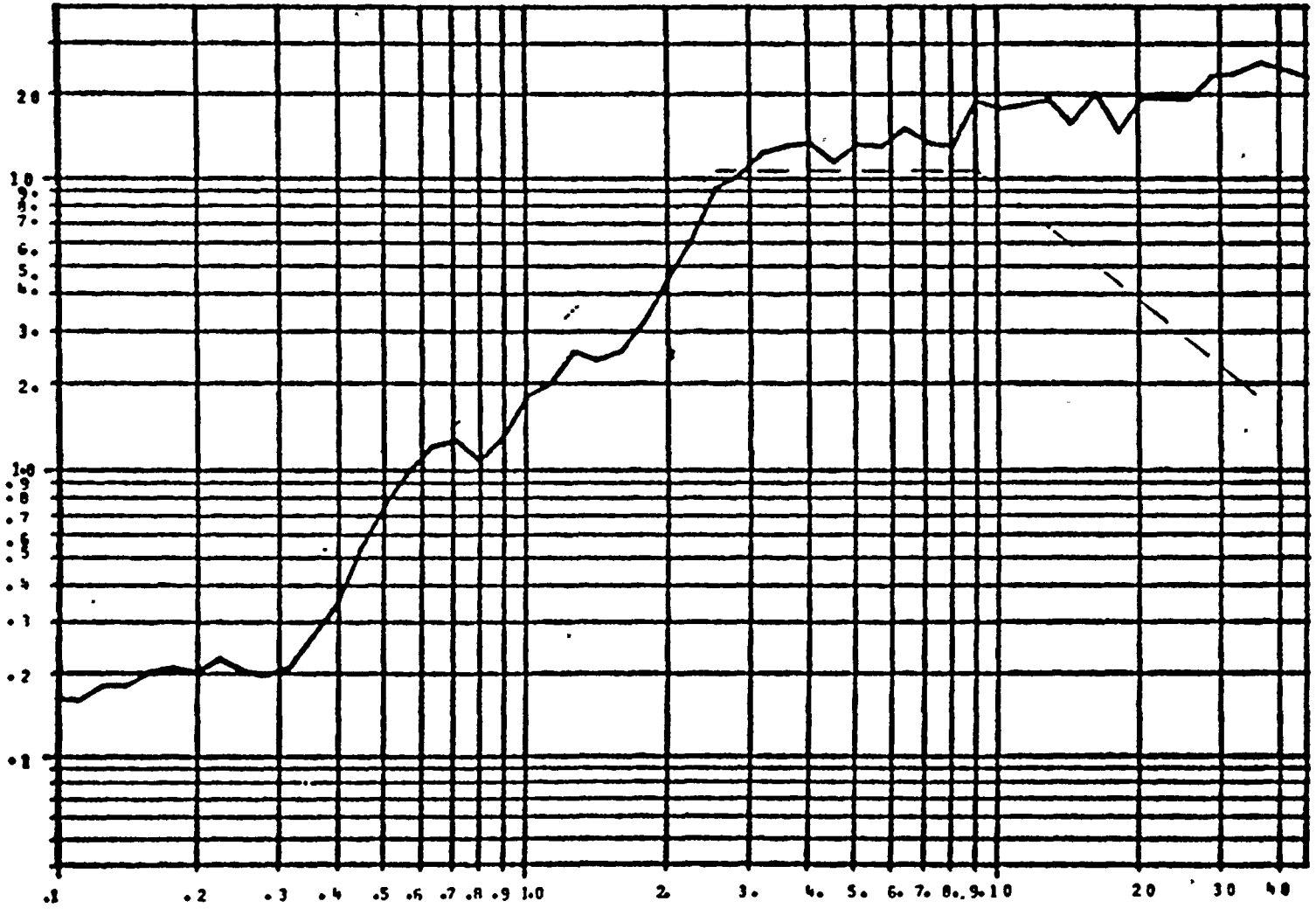
PG. 217 OF 240

SSE, VERT-LONG, REC 5, CH 2, LONG. ON FIXTURE, 3-17-80
SHOCK RESPONSE SPECTRUM



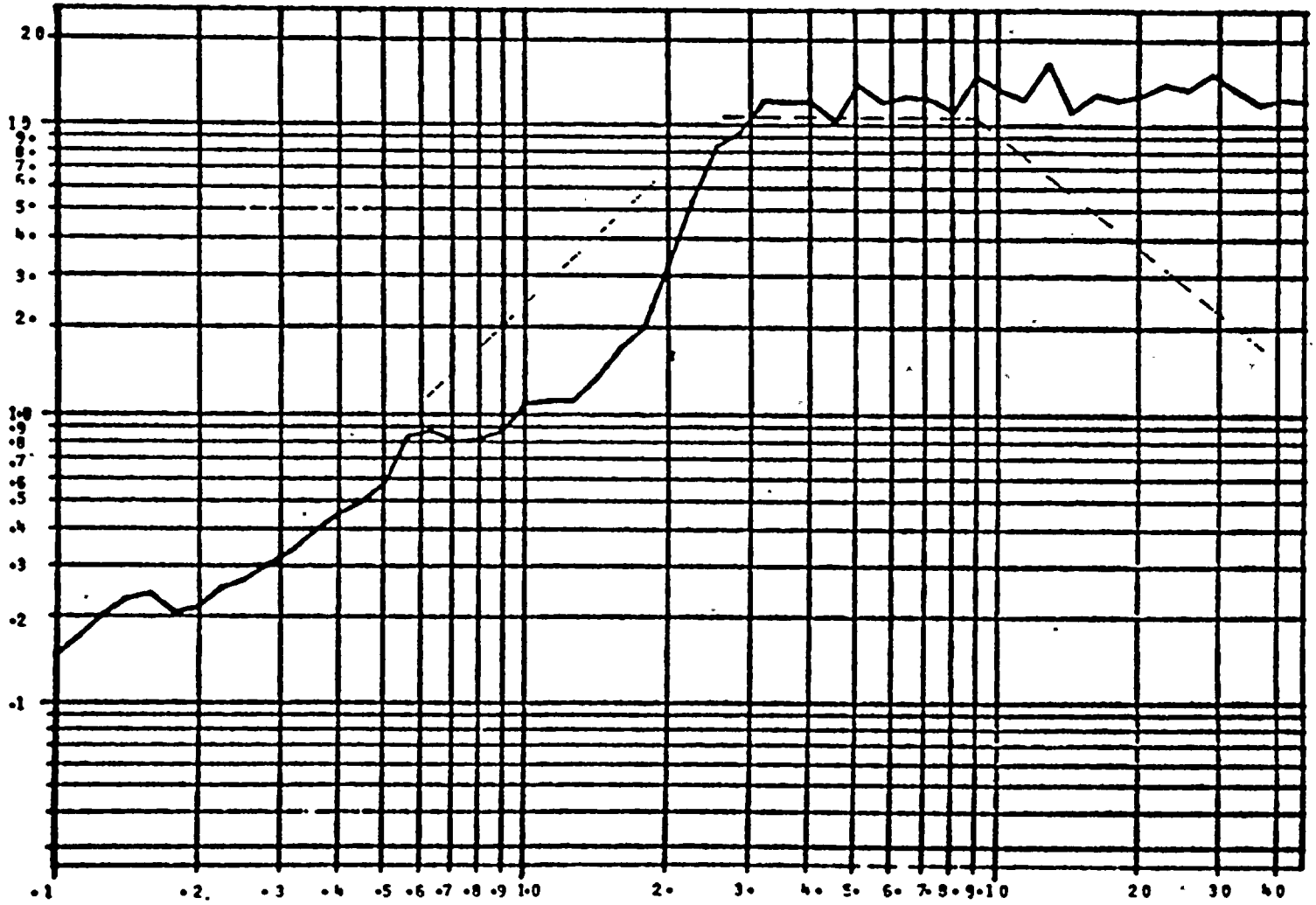
ATTACHMENT D

SSE, VERT-LONG, REC 5, CH 3, VERT. ON UNIT, 3-17-80
SHOCK RESPONSE SPECTRUM



ATTACHMENT D

SSE, VERT-LONG, REC 5, CH 1, VERT. ON FIXTURE, 3-17-80
SHOCK RESPONSE SPECTRUM



HZ LOG

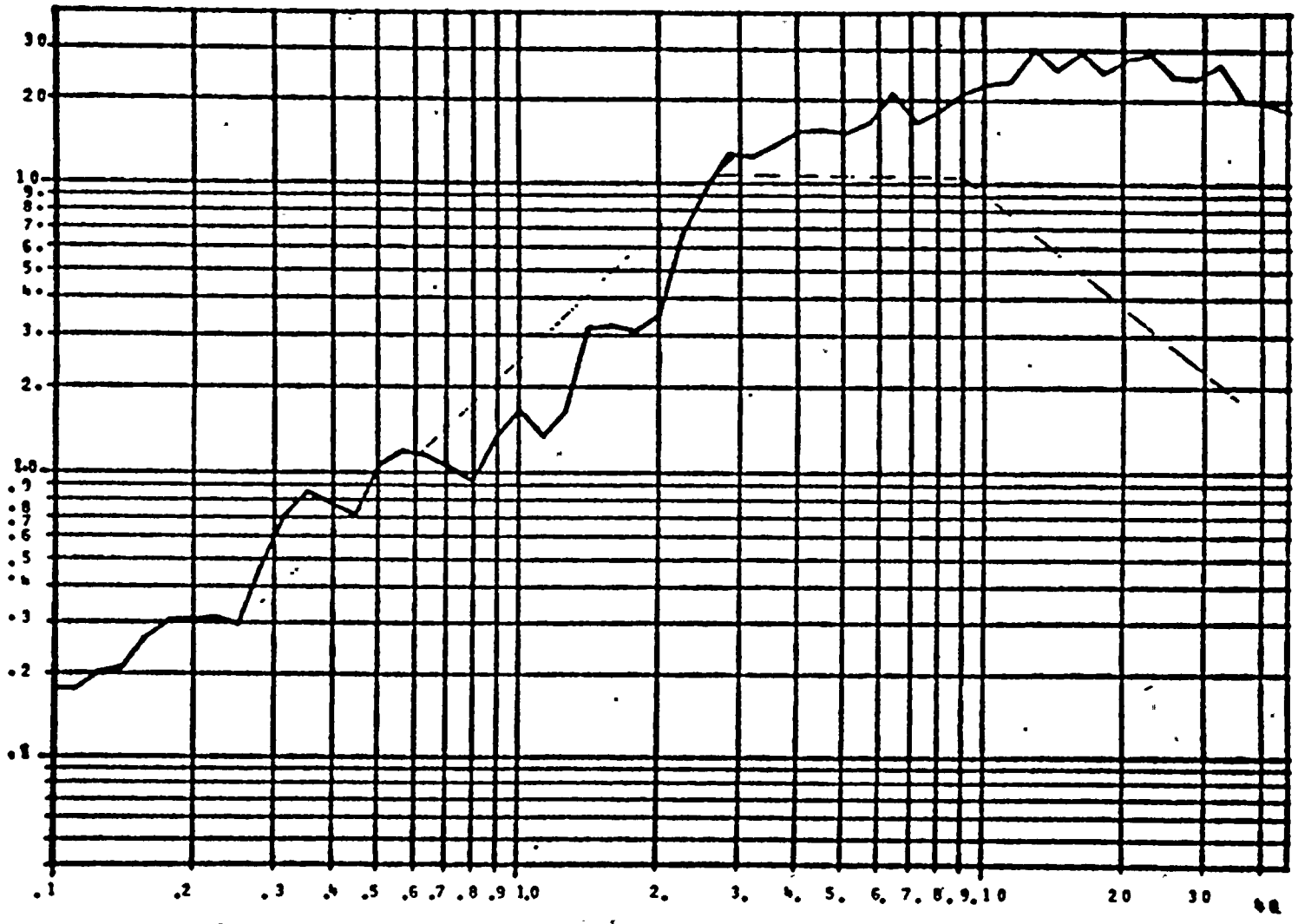
K-IU, HOT BOX

ATTACHMENT D

205

Pg. D 20 of D 40

SSE, VERT-LAT, REC 3, CH 4, LAT. ON UNIT, 3-14-80
SHOCK RESPONSE SPECTRUM

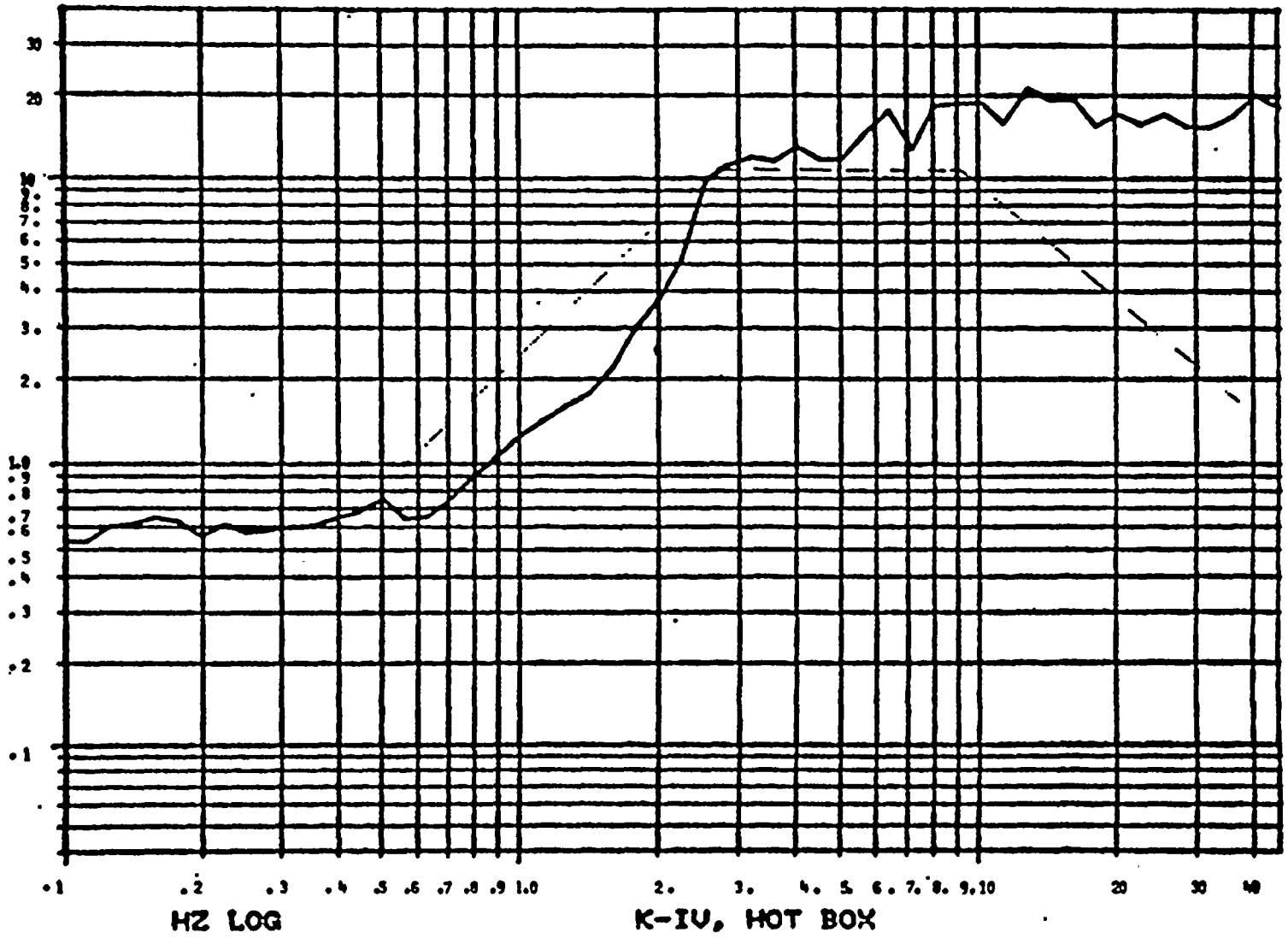


ATTACHMENT D

206

PG. 201 OF 240

SSE, VERT-LAT, REC 3, CH 2, LAT. ON FIXTURE, 3-14-80
SHOCK RESPONSE SPECTRUM

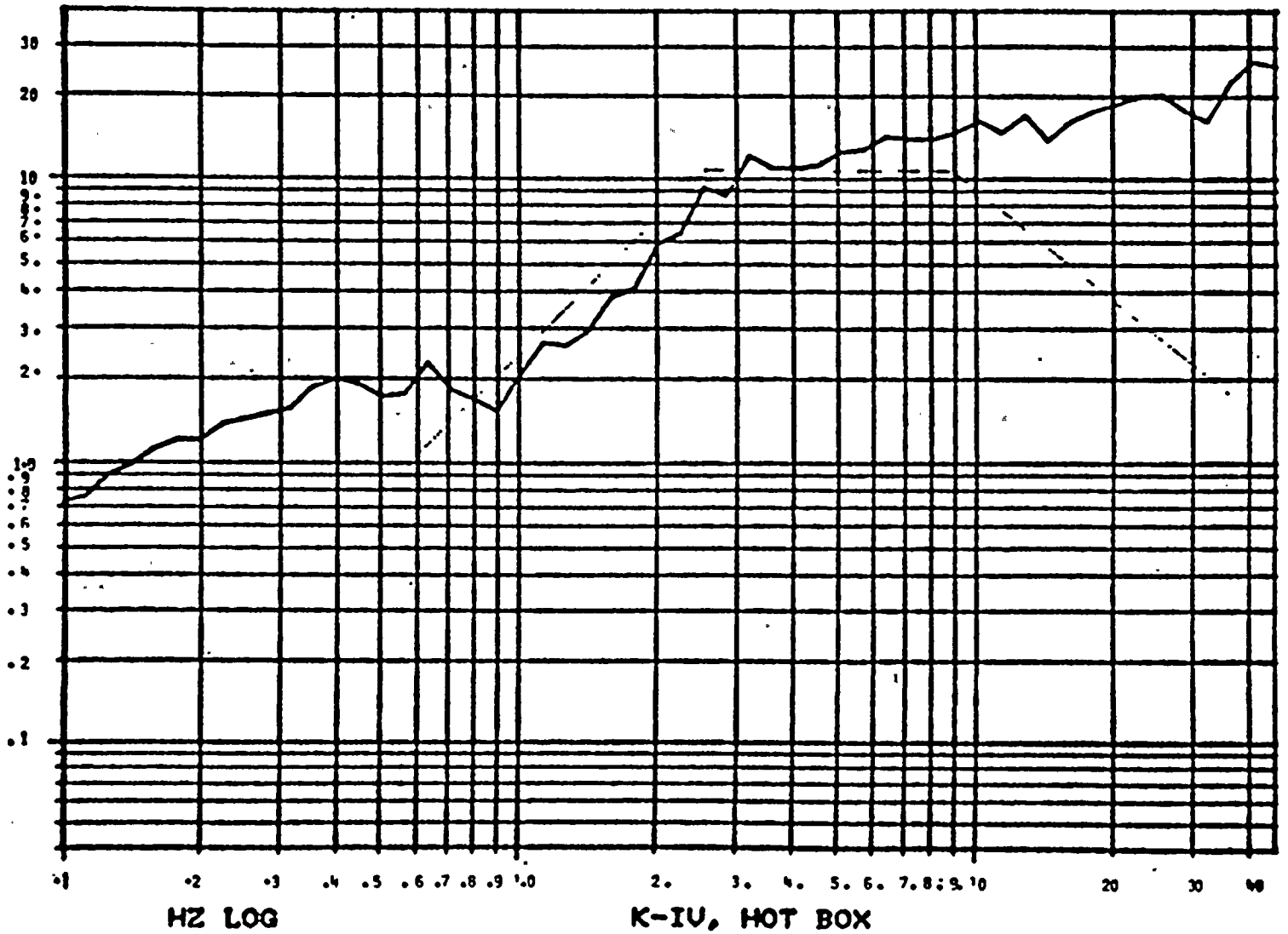


ATTACHMENT D

207

PG. D22 OF 440

SSE, VERT-LAT, REC 3, CH 3, VERT. ON UNIT, 3-14-80
SHOCK RESPONSE SPECTRUM

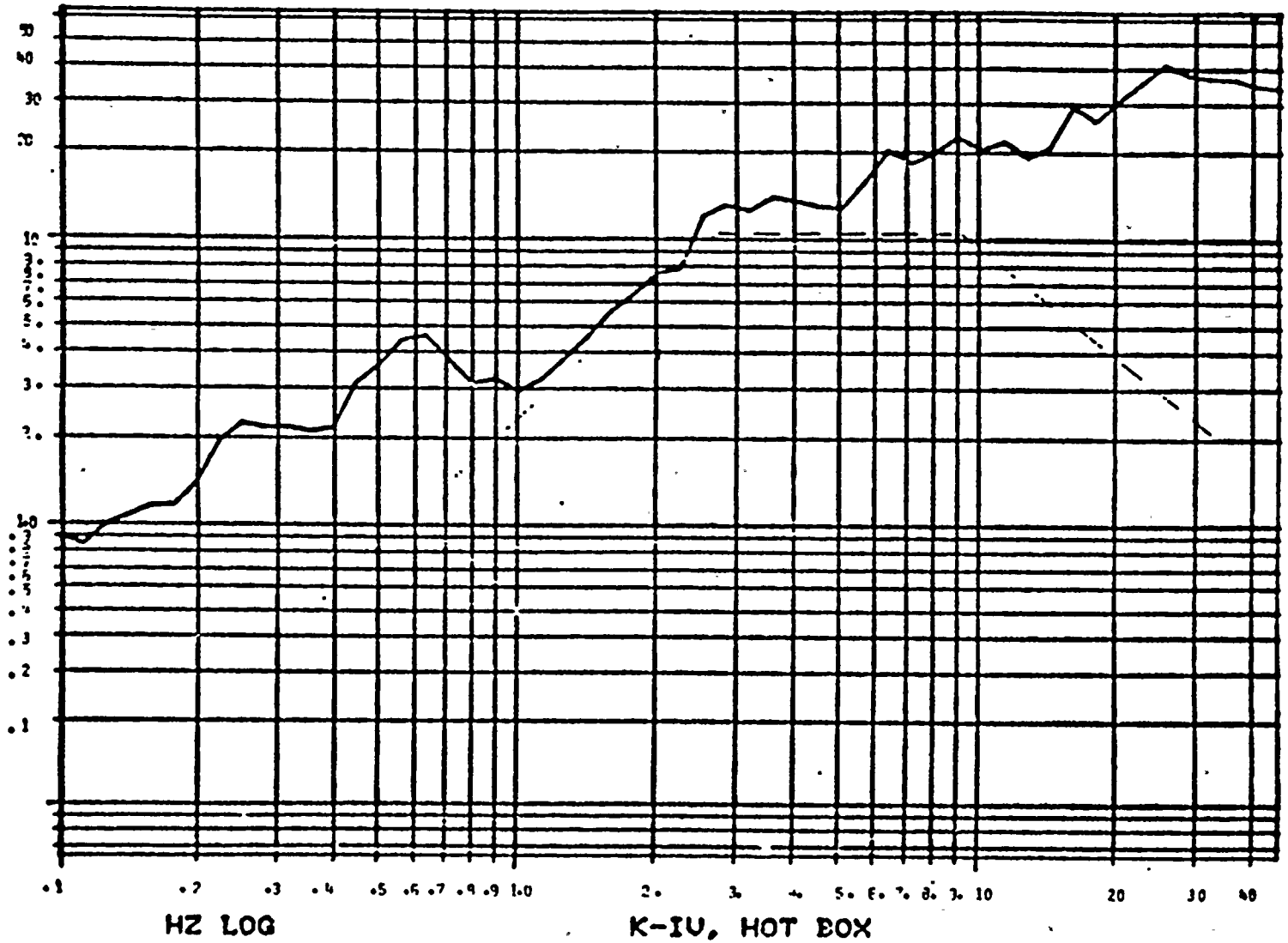


ATTACHMENT D

208

FSAR UFSAR

SSE, VERT-LAT, REC 3, CH 1, VERT. ON FIXTURE, 3-14-80
SHOCK RESPONSE SPECTRUM

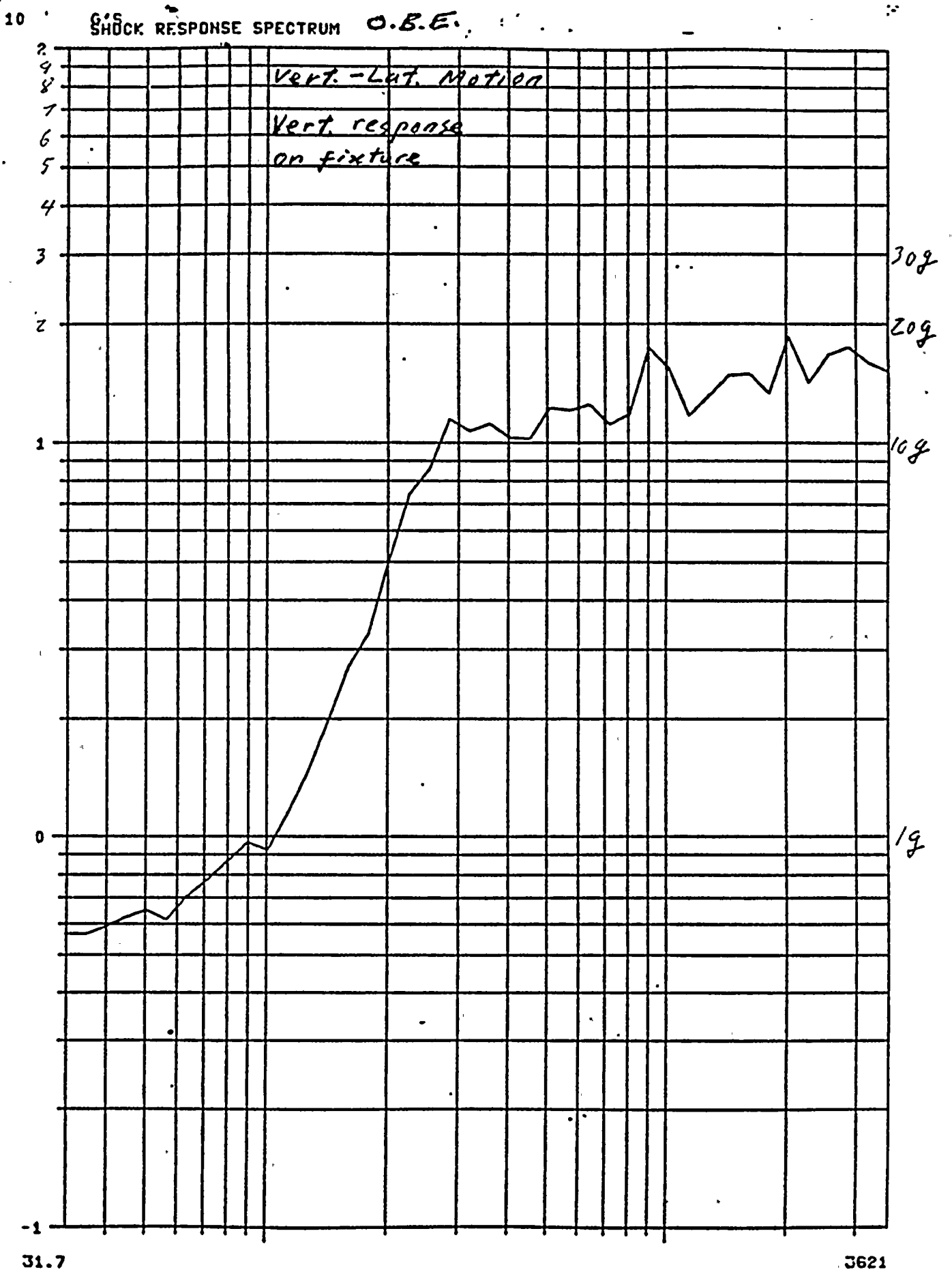


ATTACHMENT D

209

PG. D24 OF D40

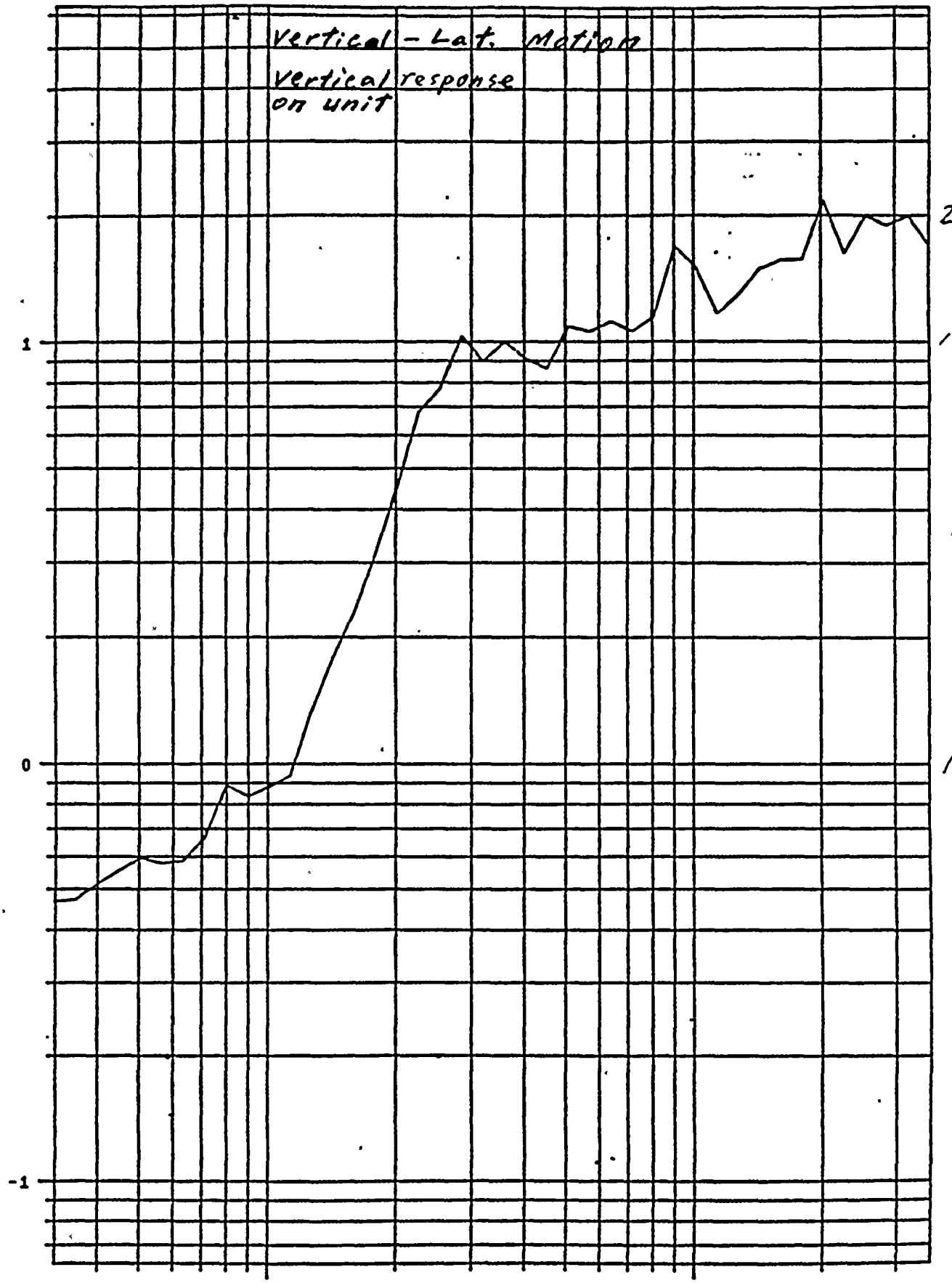
ATTACHMENT D



1082

ATTACHMENT D

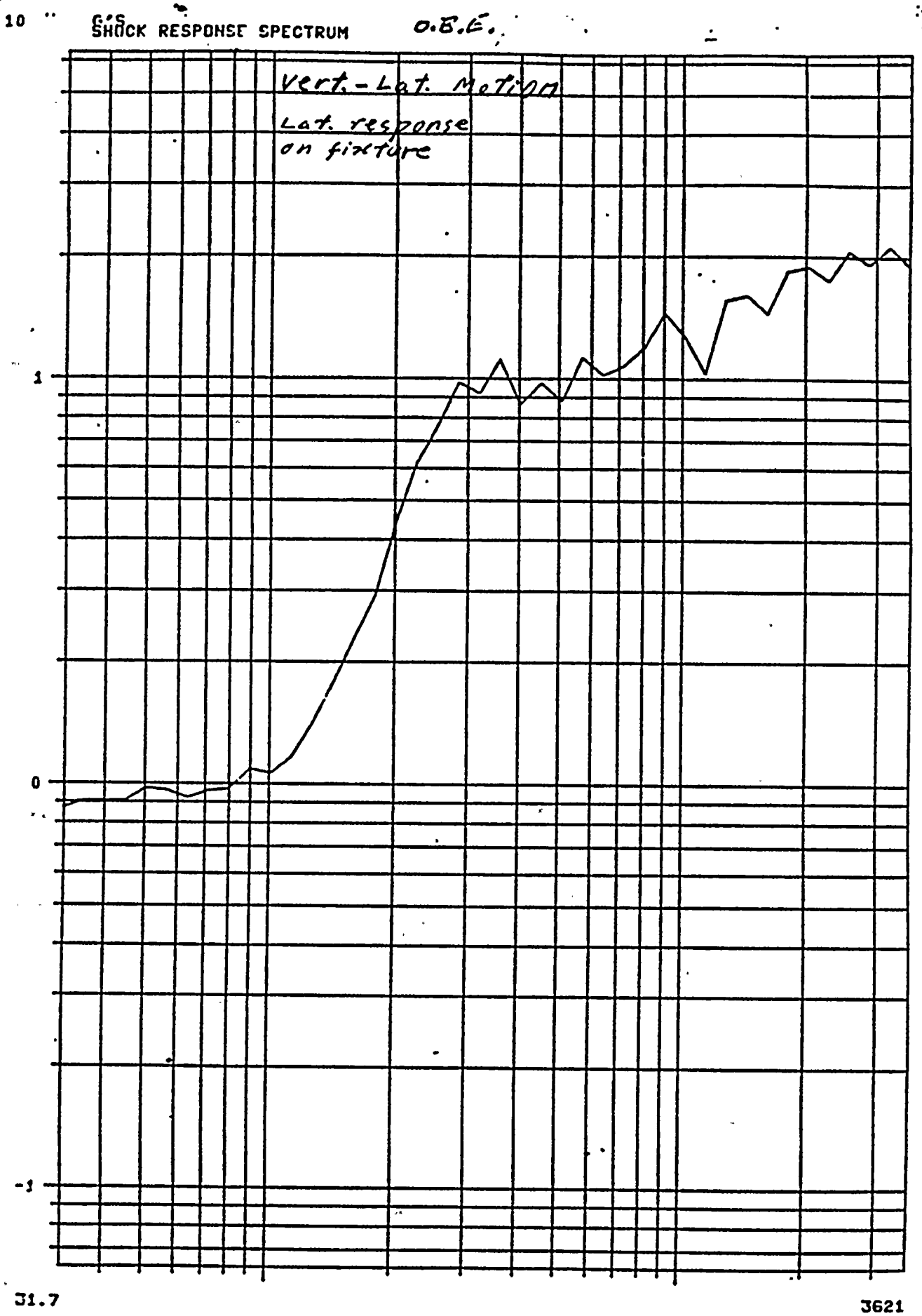
SHOCK RESPONSE SPECTRUM O.B.E.



10 $^{-2}$ HZ DCG

HVAC PUMPS

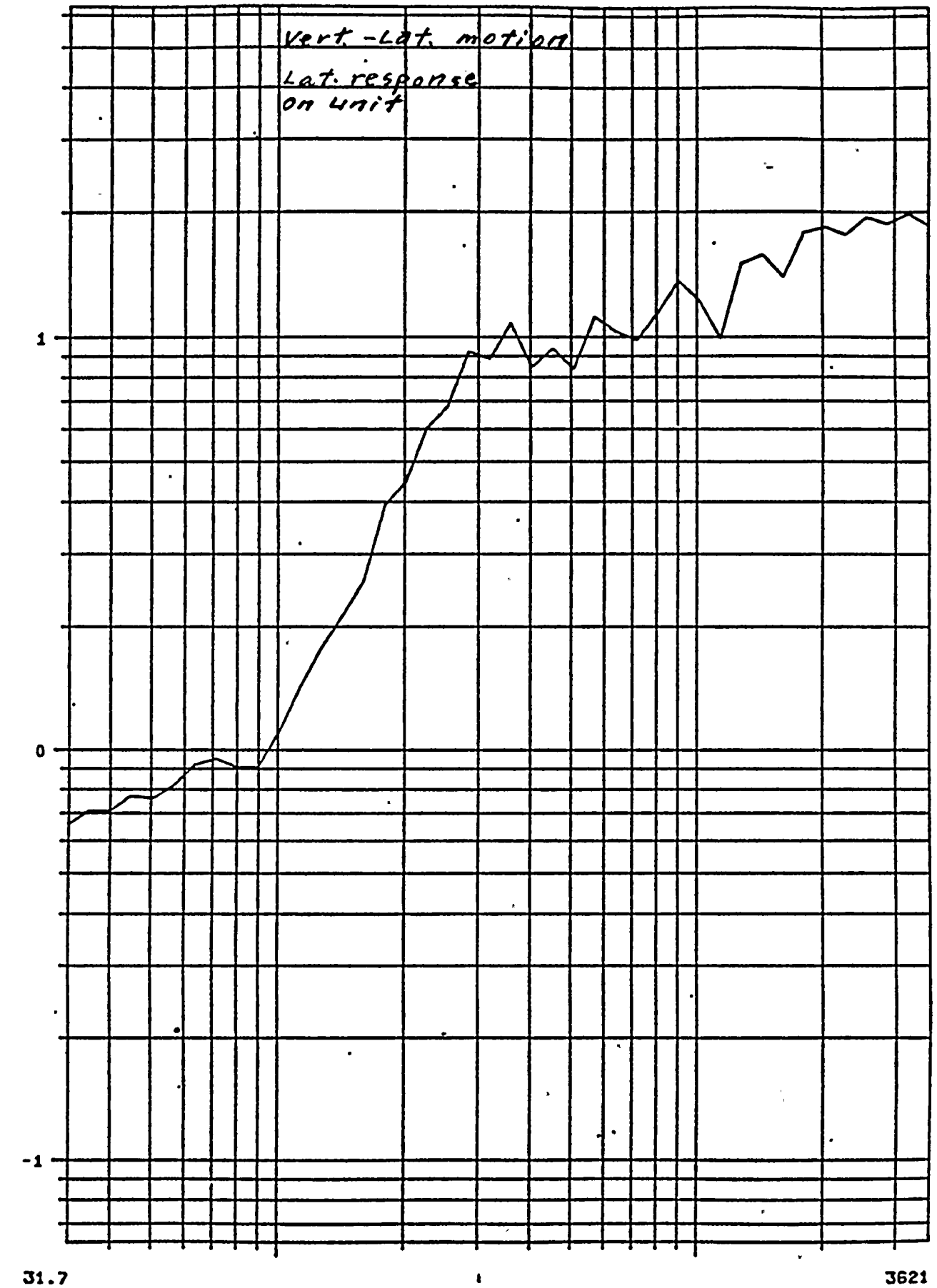
ATTACHMENT D



1086

ATTACHMENT D

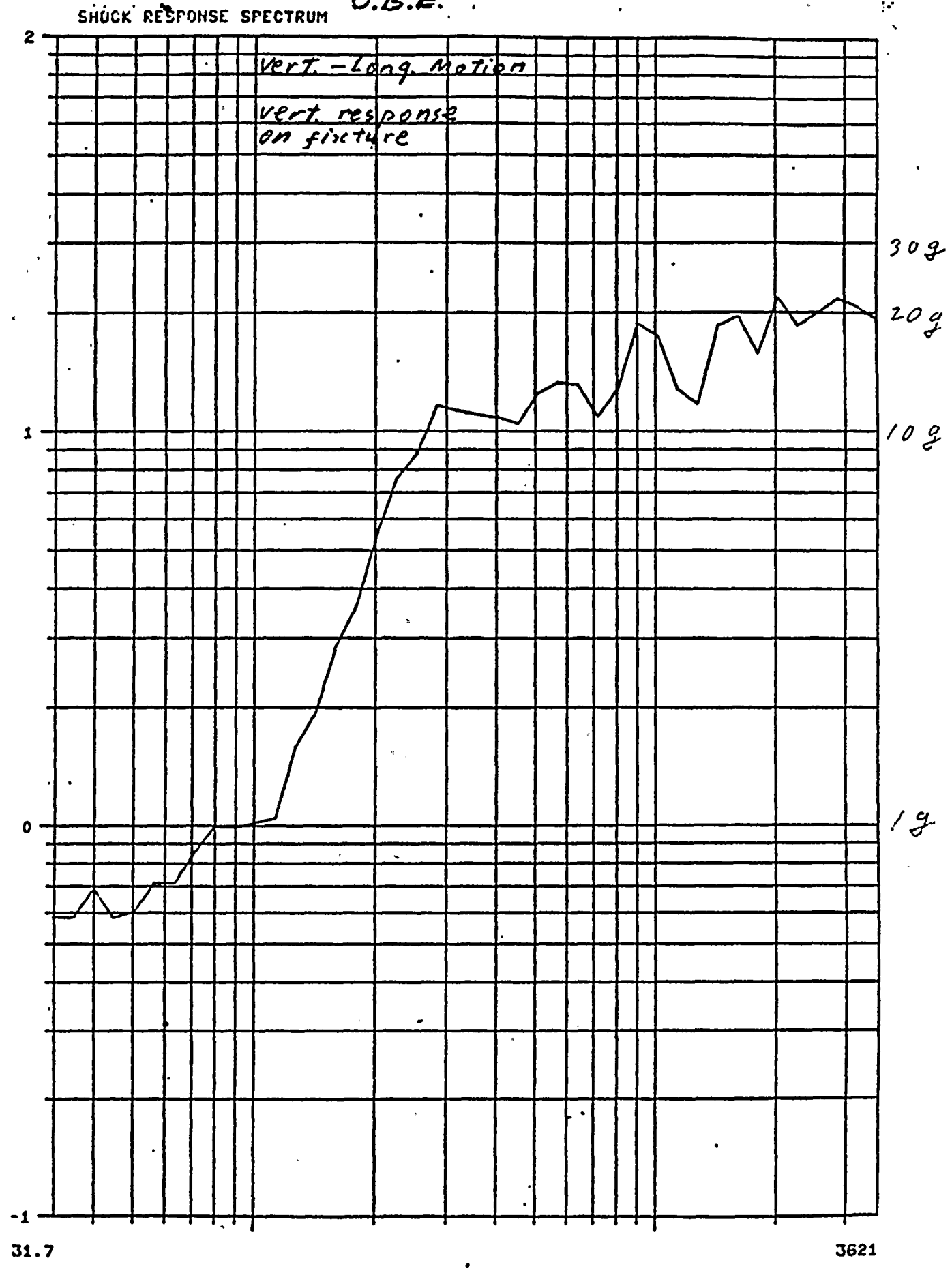
SHOCK RESPONSE SPECTRUM O.B.E.



1088

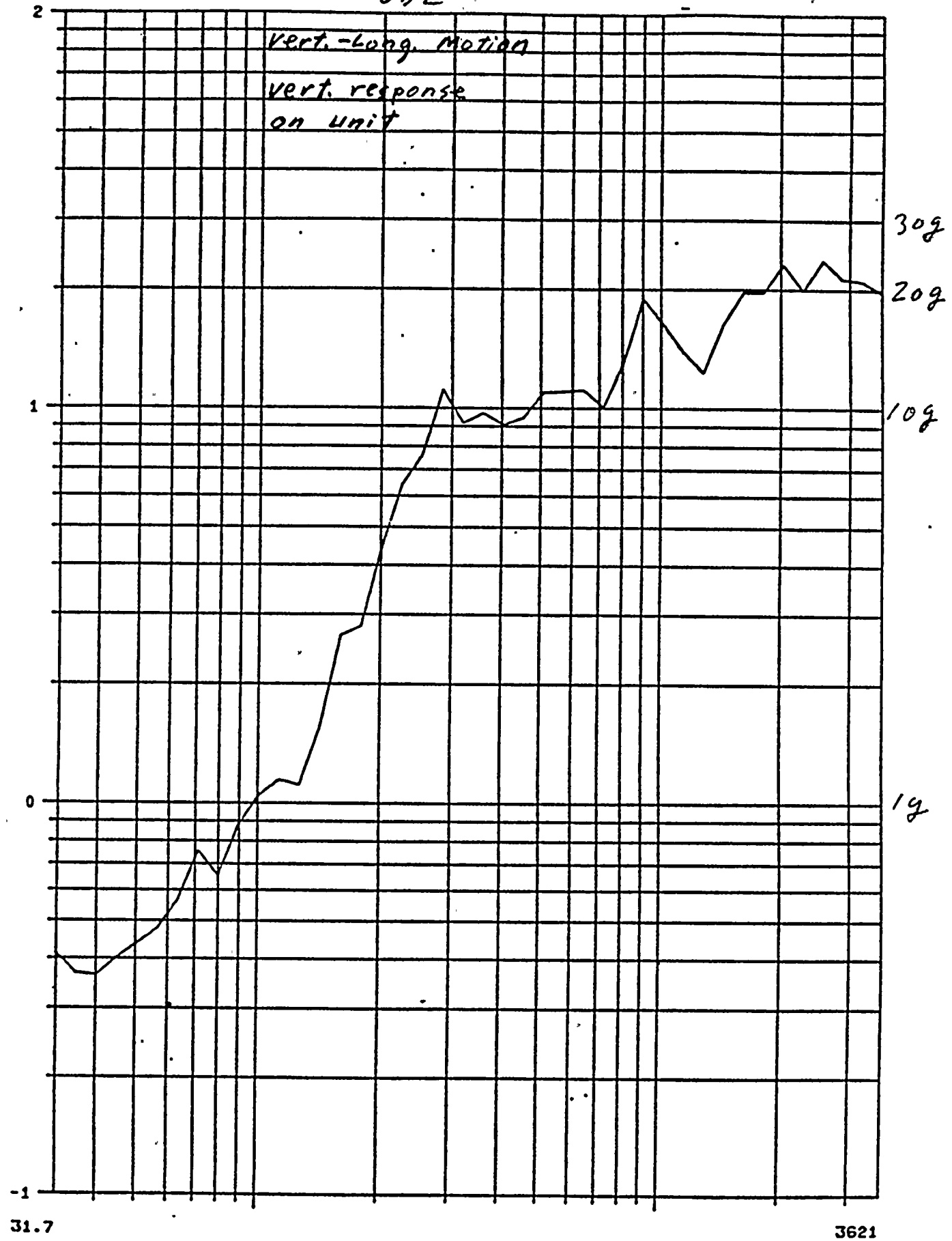
ATTACHMENT D

O.B.E.



ATTACHMENT D

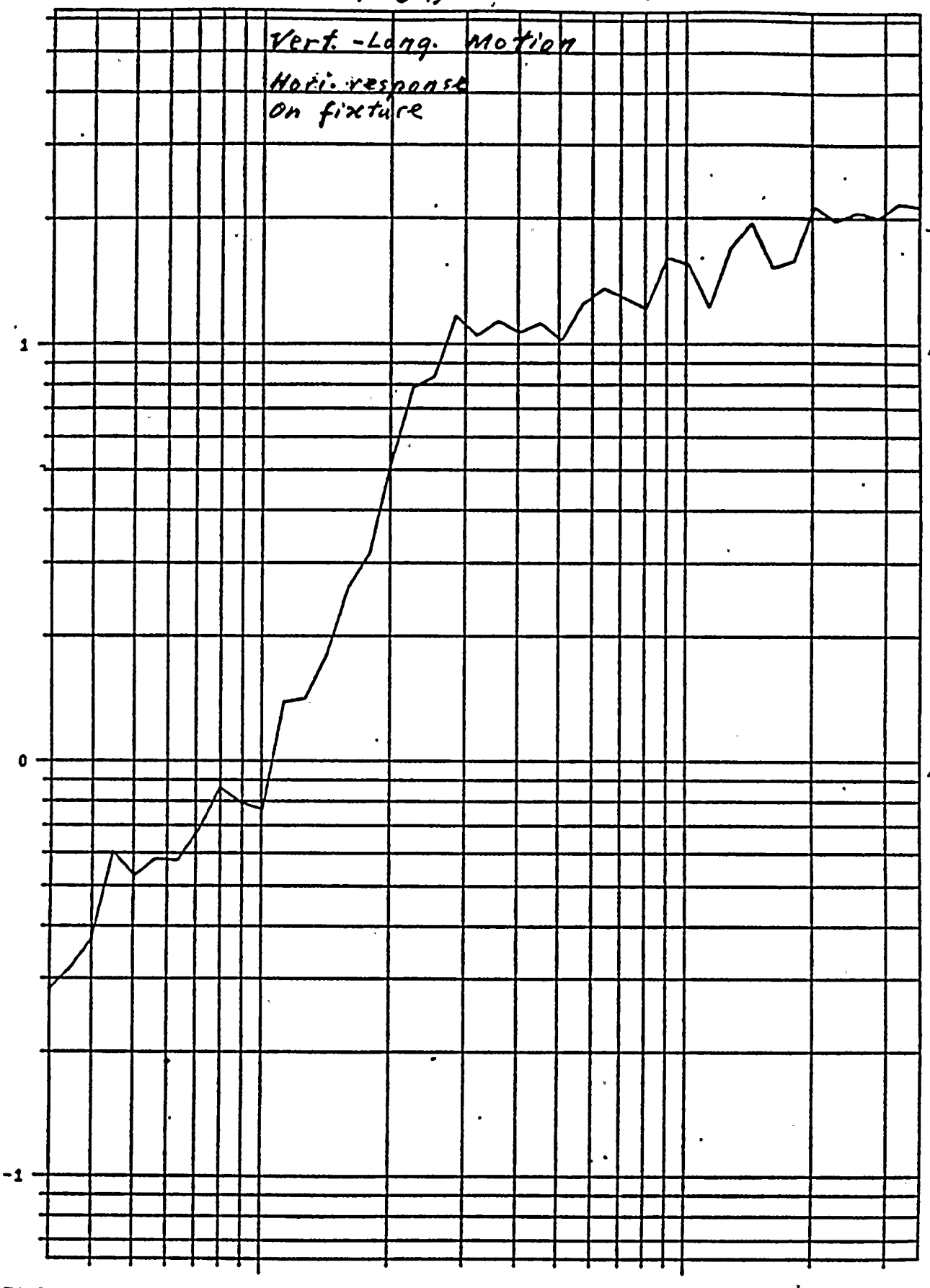
SHOCK RESPONSE SPECTRUM OBE



1092

ATTACHMENT D

SHOCK RESPONSE SPECTRUM . OBE



31.7

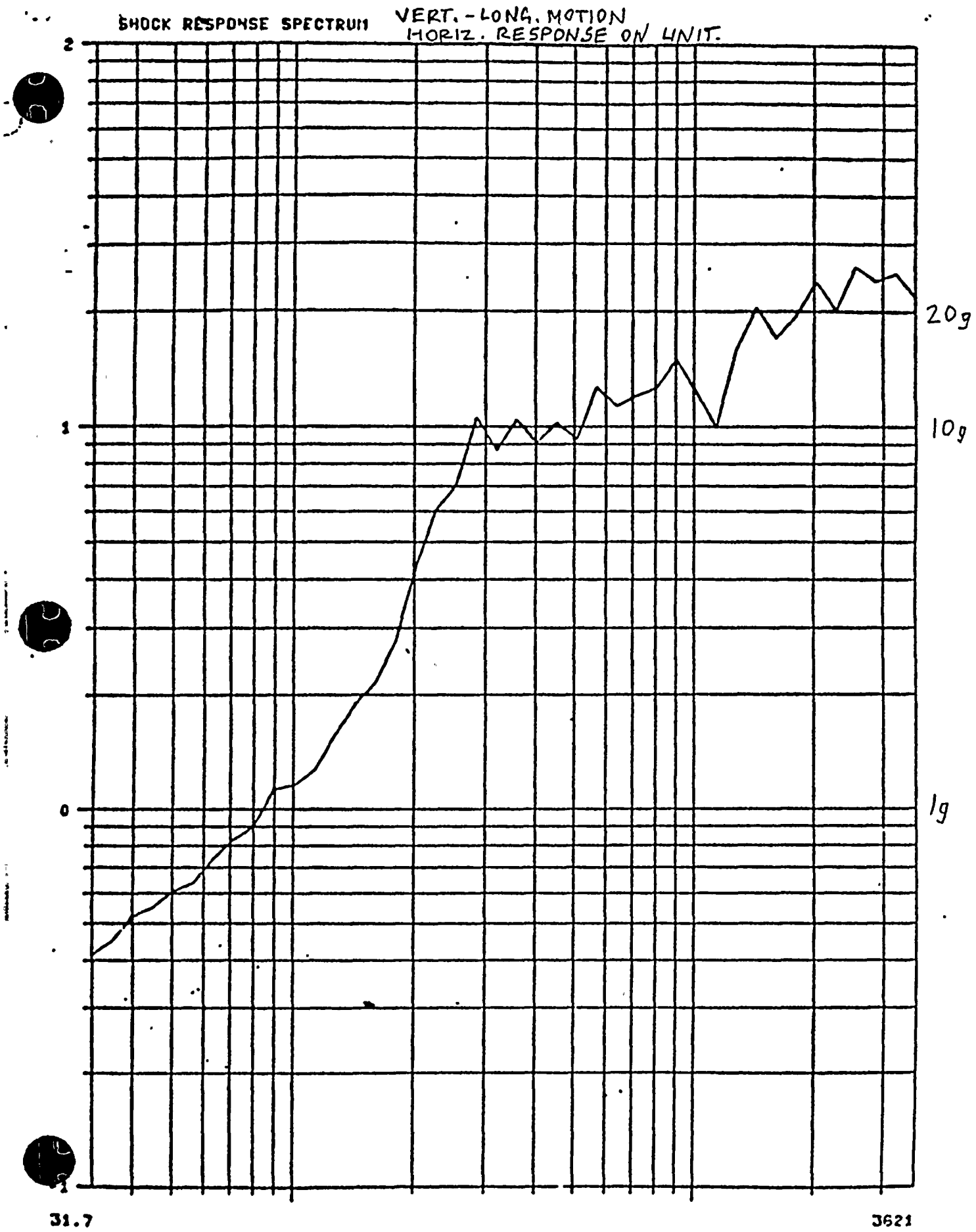
3621

10 $^{-2}$ HZ LOG

HVAC PUMPS

1094

ATTACHMENT D



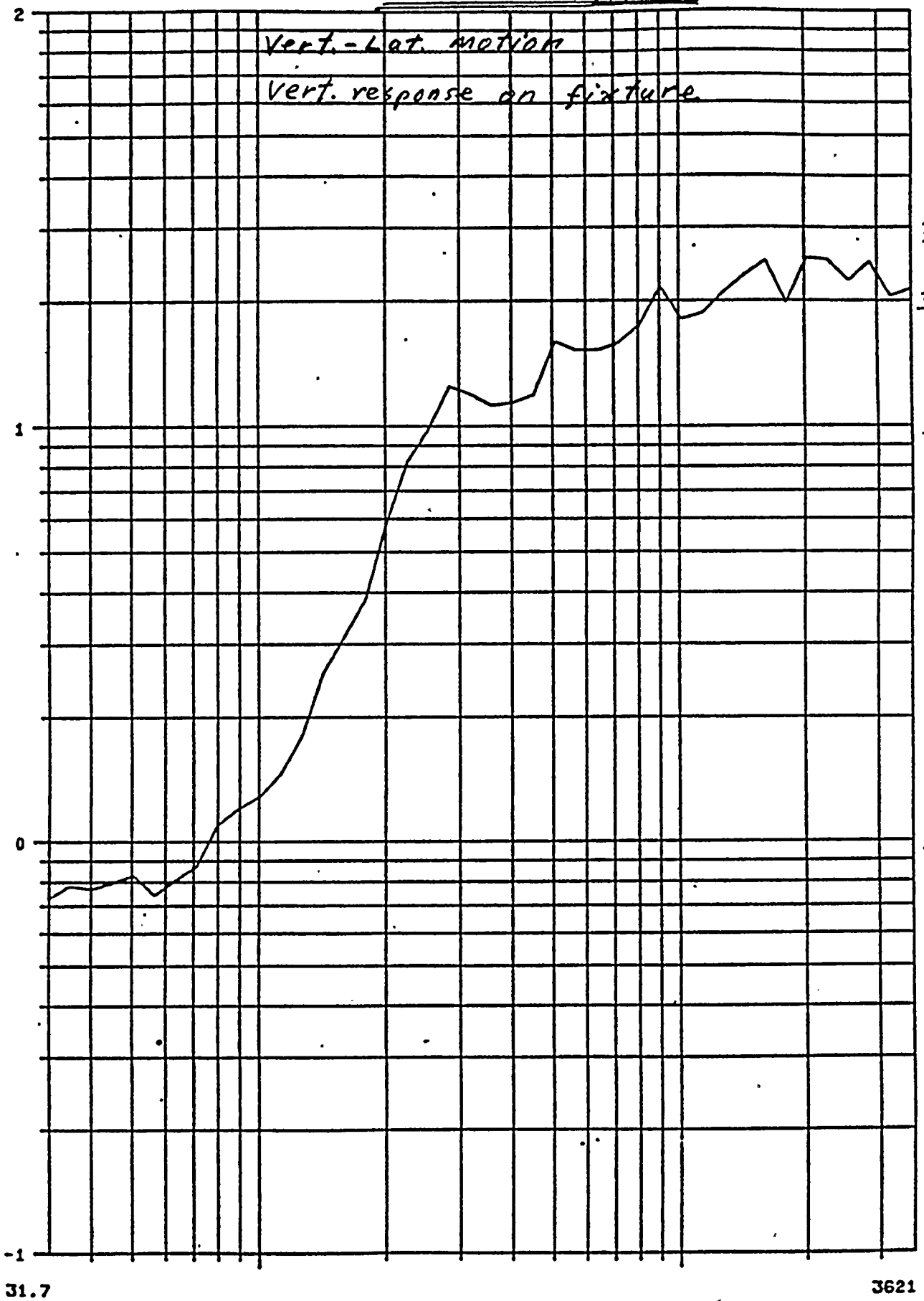
VERT. LAT. AXES. [illegible] AXIS ON [illegible]. ACC.. HI. LEVEL. PU

10 "

SSE

SHOCK RESPONSE SPECTRUM

ATTACHMENT D



10 $^{-2}$ HZ LOG

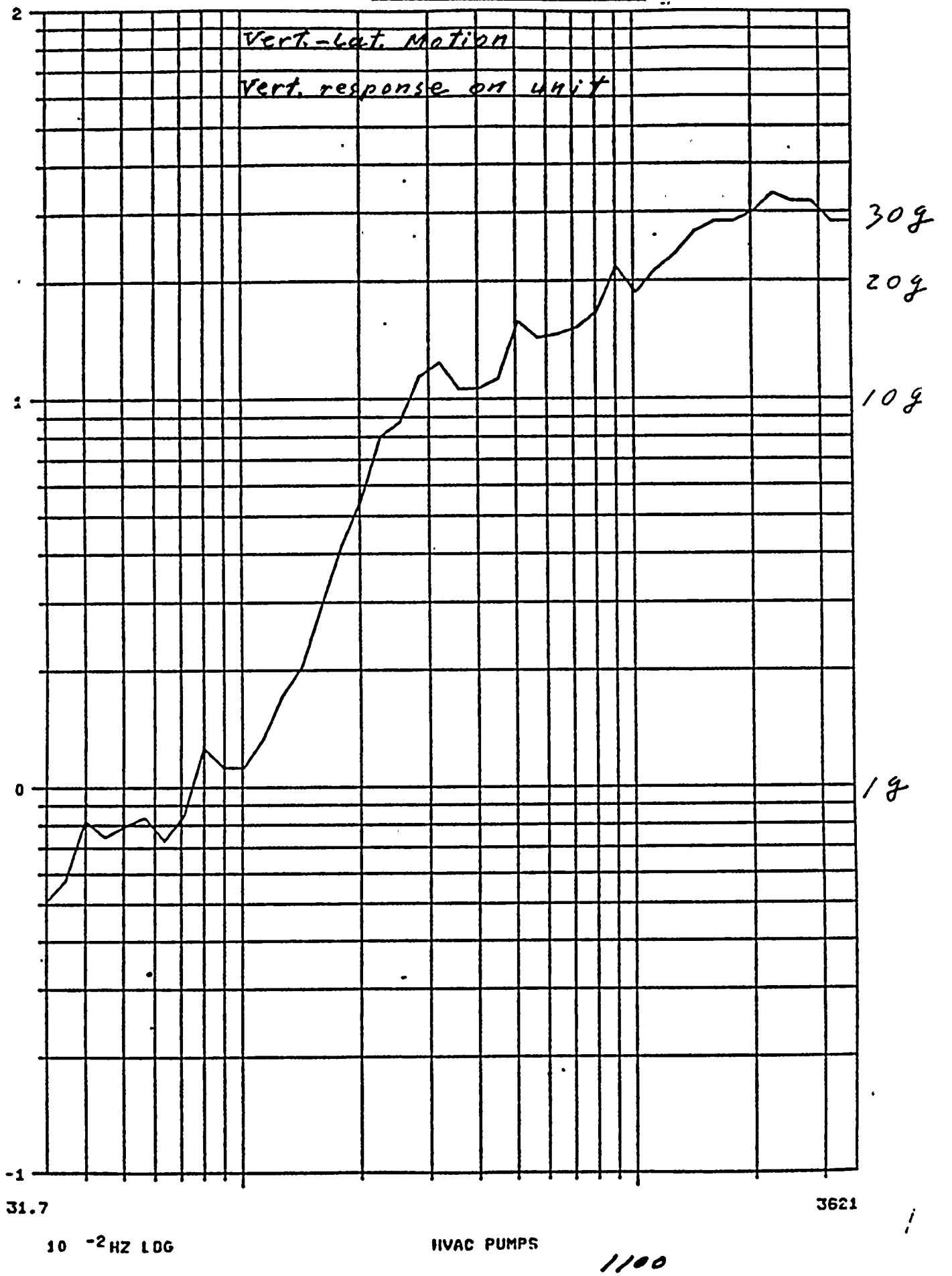
HVAC PUMPS

1098

SSE

ATTACHMENT D

SHOCK RESPONSE SPECTRUM

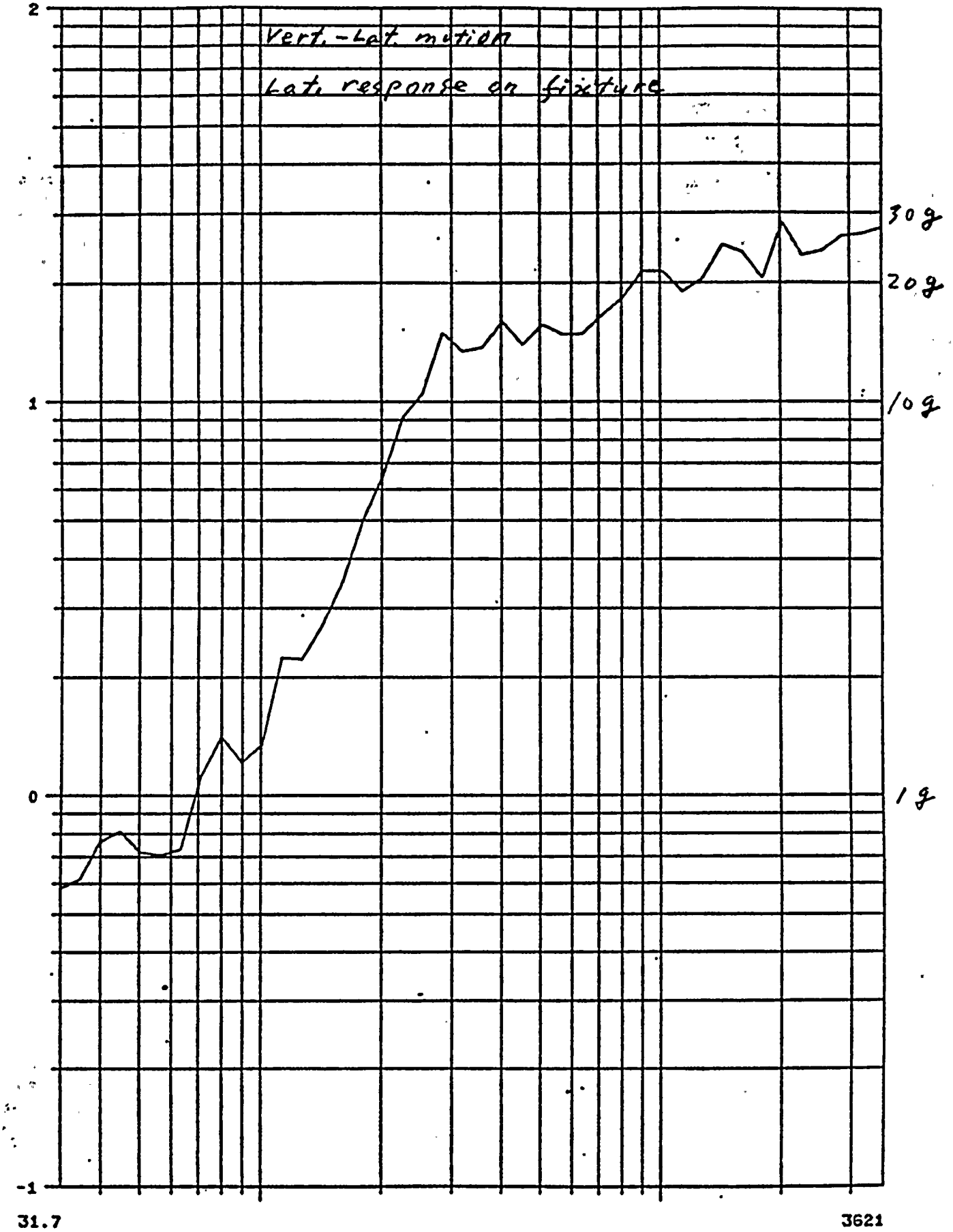


1100

ATTACHMENT D

SSE

SHOCK RESPONSE SPECTRUM

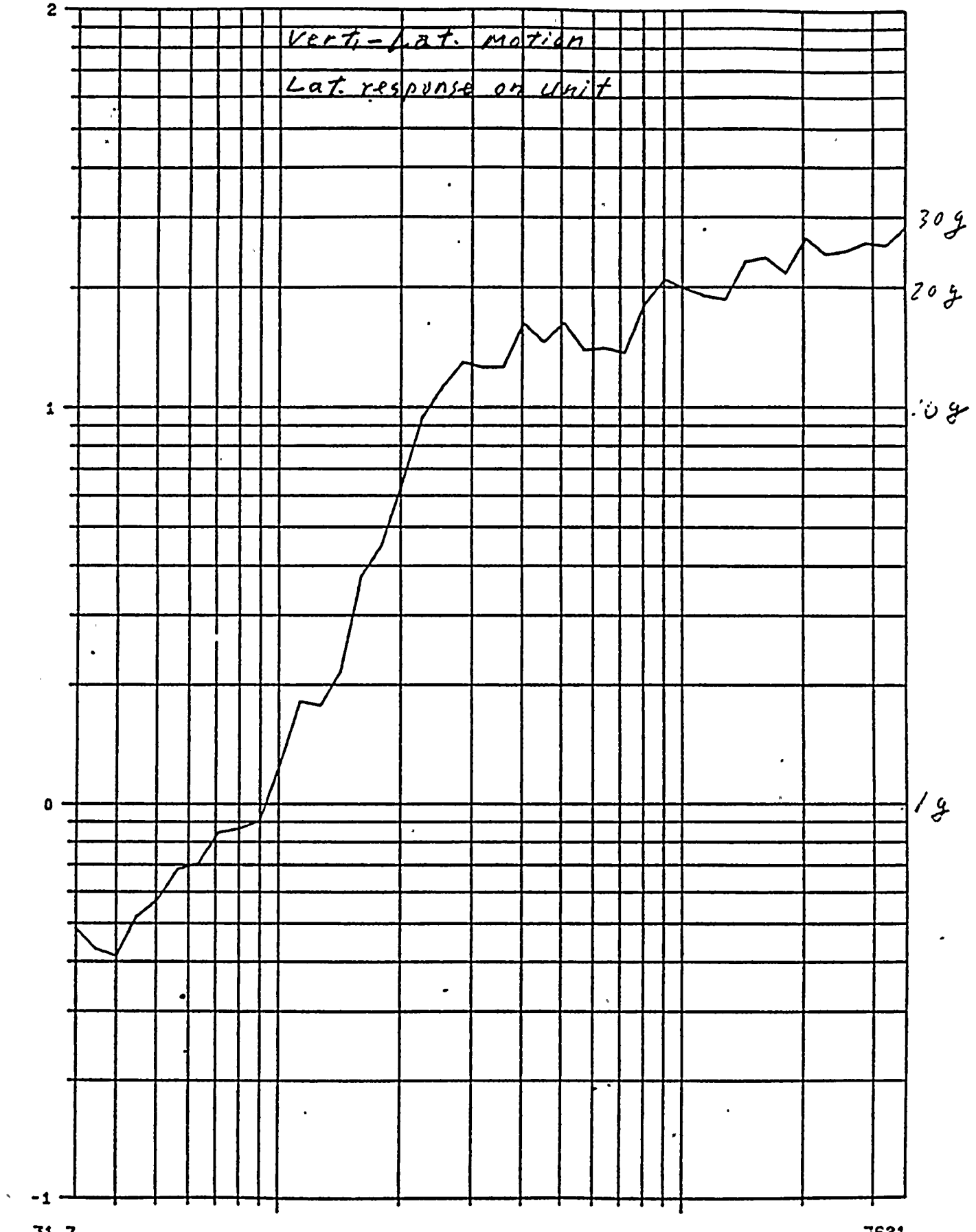


1102

ATTACHMENT D

SSE

SHOCK RESPONSE SPECTRUM



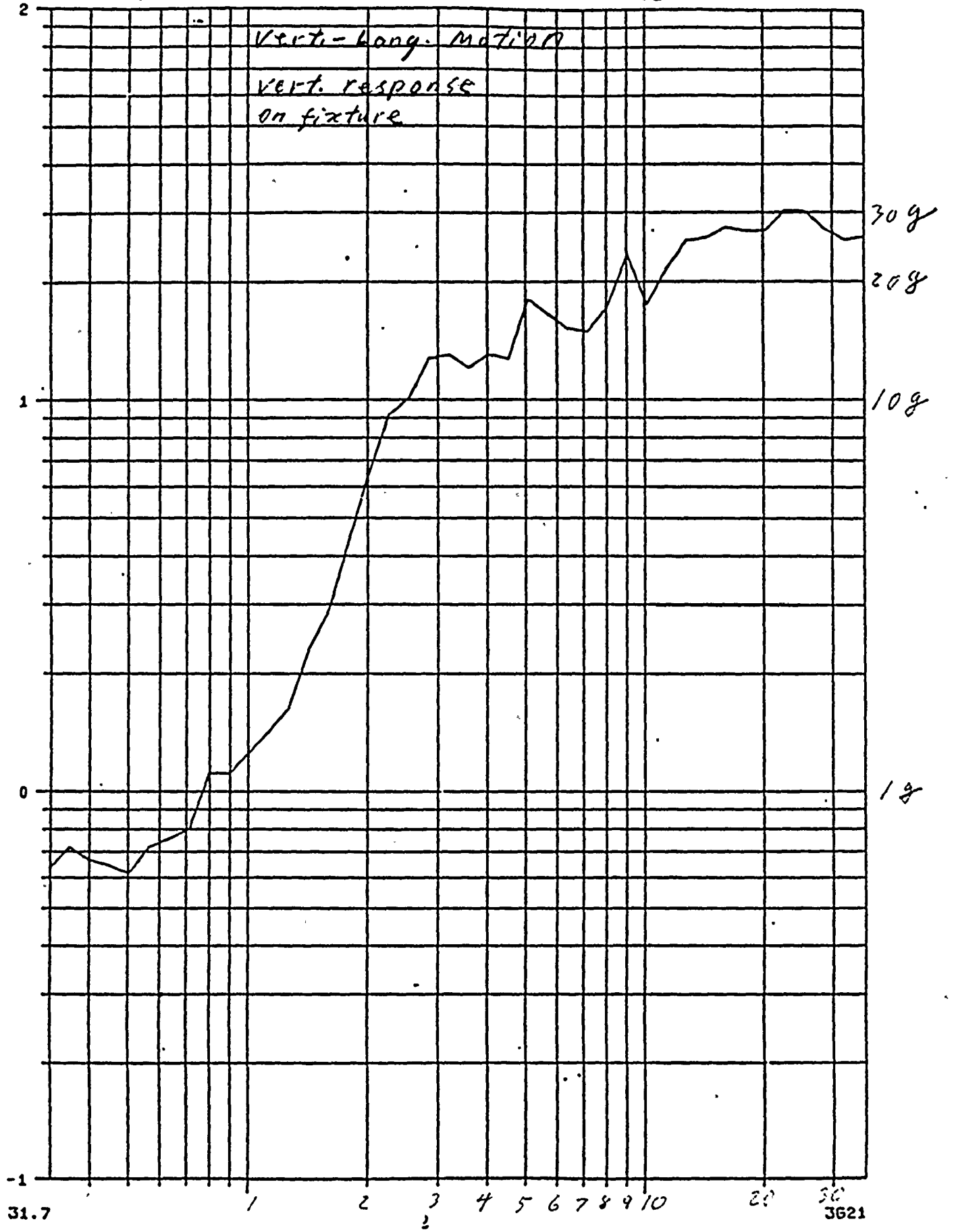
HVAC PUMPS

1104

ATTACHMENT D

SSE

SHOCK RESPONSE SPECTRUM



10 $^{-2}$ HZ LOG

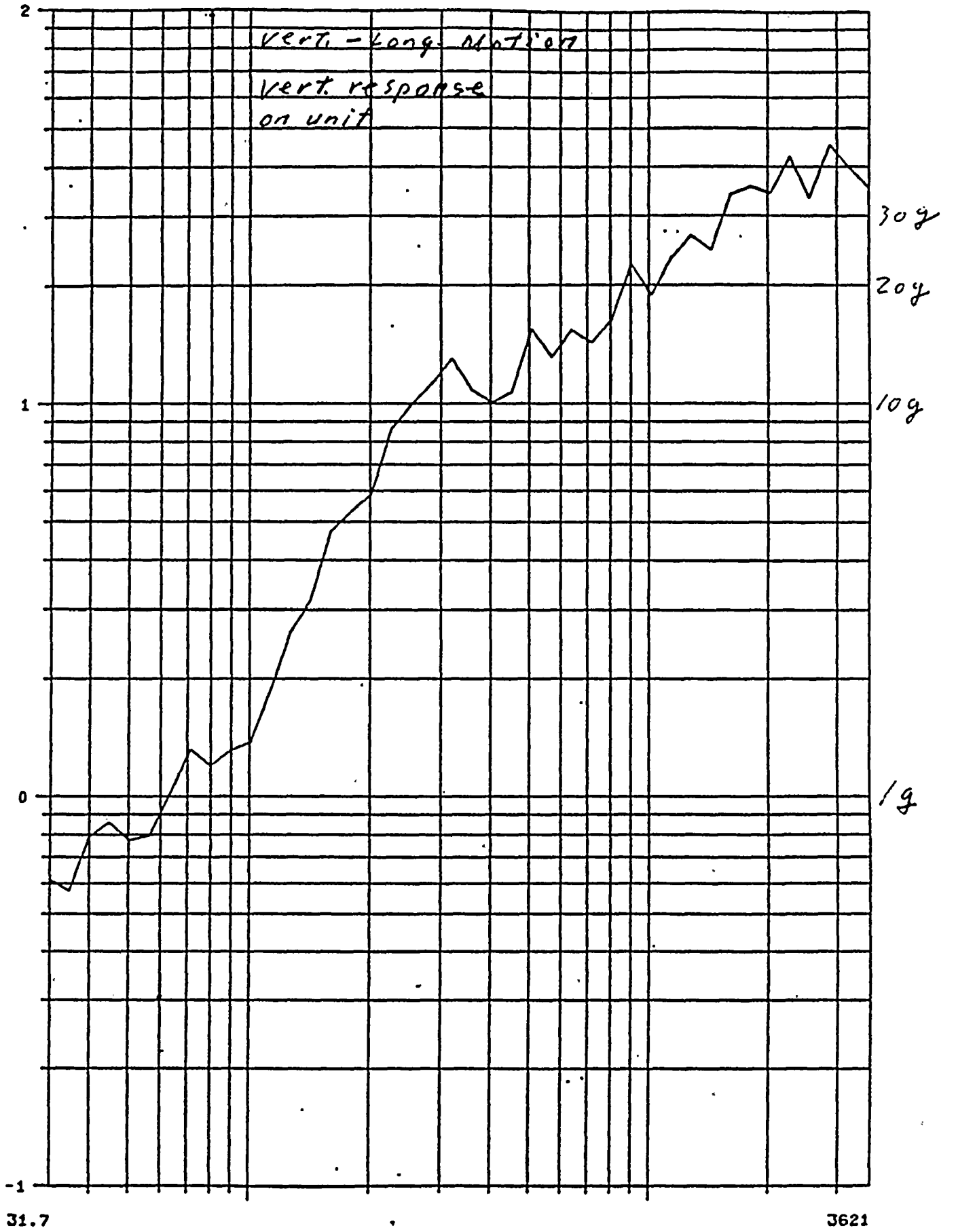
HVAC PUMPS

1106

ATTACHMENT D

SSE

SHOCK RESPONSE SPECTRUM

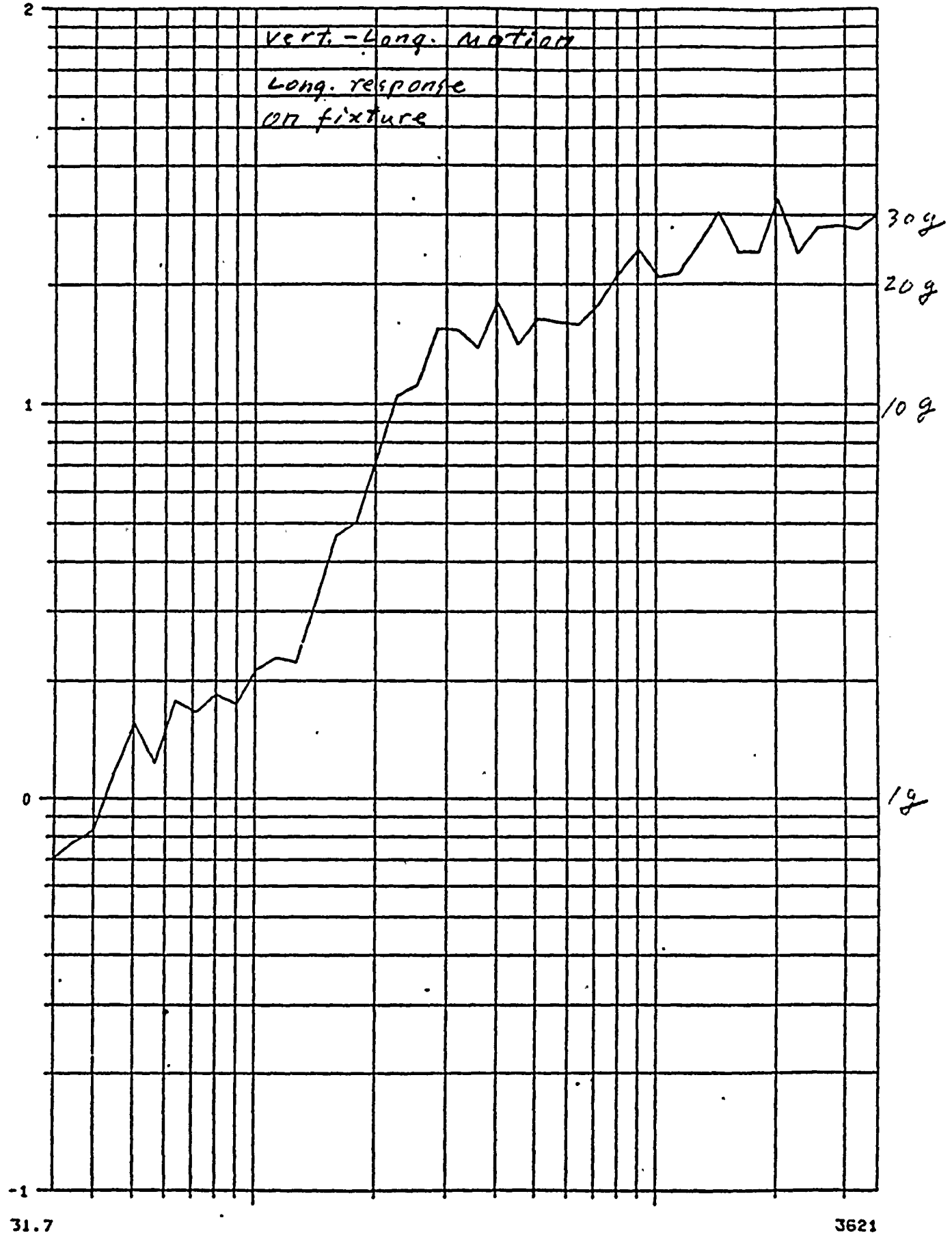


1108

ATTACHMENT D

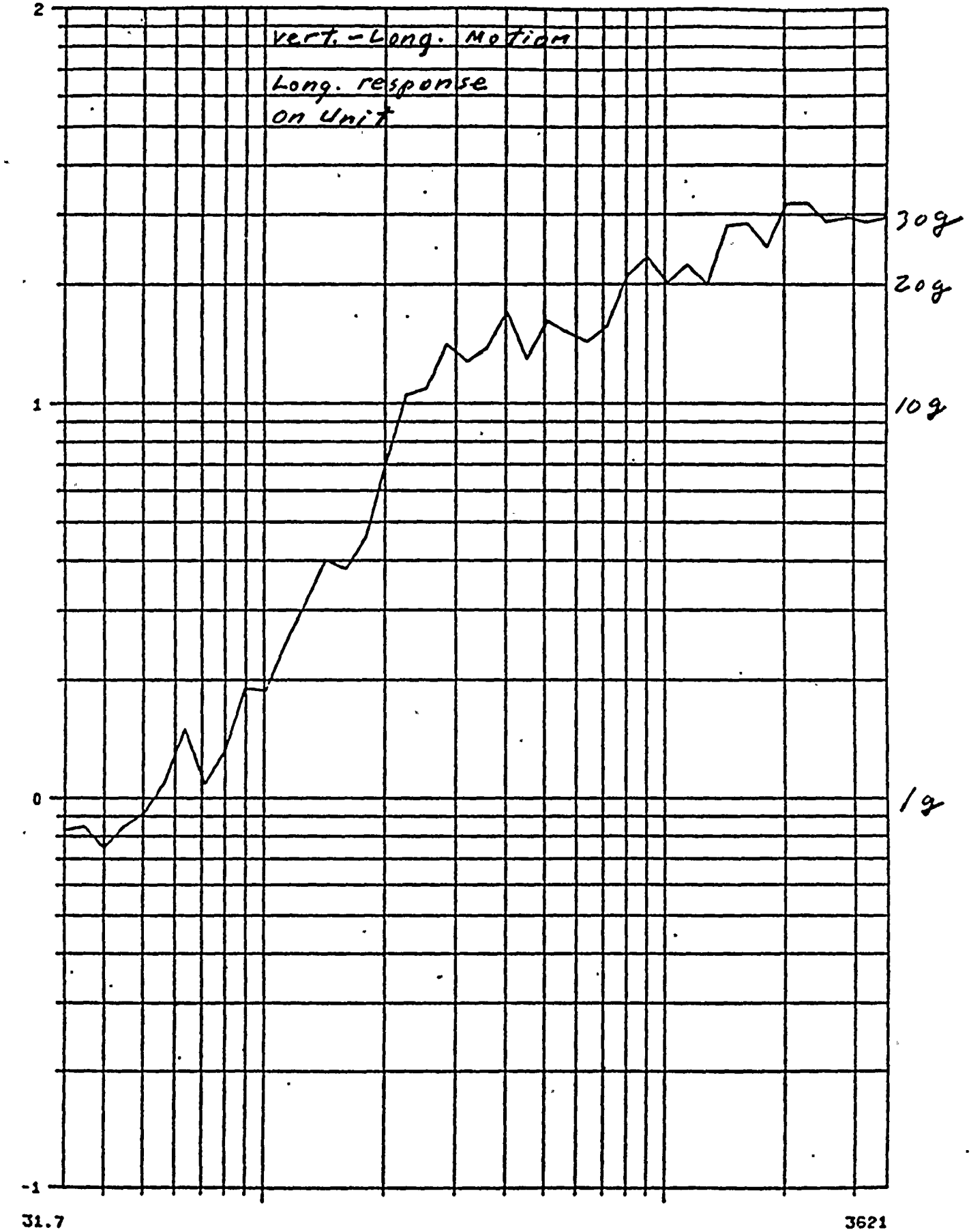
SSE

SHOCK RESPONSE SPECTRUM



ATTACHMENT D

10 G's SSE SHOCK RESPONSE SPECTRUM



SPEC. NO. C061G
SQRT # 2

NINE MILE POINT NUCLEAR STATION UNIT 2

EQUIPMENT DYNAMIC QUALIFICATION

COMPONENT NAME: REMOTE SHUTDOWN PANEL
MARK NUMBERS: 2CES*PNL405

STONE & WEBSTER

SPEC. NO. C061G
Revision 0

Seismic and Dynamic Qualification Summary of Equipment

I. **Plant Name:** Nine Mile Point Nuclear Station - Unit 2

1. **Utility:** Niagara Mohawk Power Corporation
2. **NSSS:** General Electric Co. **BWR:** 5 MK 2
3. **A/E:** Stone & Webster Engineering Corp. **Other**

II. **Component Name:** Remote Shutdown Panel Mark # 2CES*PNL405

1. **Scope:** ( ) NSSS (X) BOP ( ) Other
2. **Model Number:** N/A **Quantity:** 1 having 3 sections. Combined
3. **Size or Range:** Sec.I 103"x42"x90". Sec.II & III 137"x42"x90"
4. **Vendor:** Electromechanics
5. **If the component is a cabinet or panel, name and model number of the devices included:**

   SEE ATTACHMENT - 1

6. **Physical Description:**
   a. **Appearance:** Free Standing enclosed Cabinet.
   b. **Dimensions:** 103"x42"x90" & 137"x42"x90"
   c. **Weight:** 4500 lb (Sec.I). 3500 lb (Sec. II), 3000 lb. (Sec. III)
7. **Location:** **Building:** Control Bldg.
   Elevation: 261'-0"
8. **Field Mounting Conditions** ( ) Bolt (No. - Size -)
   1/4 (X) Weld (Length All around)
   ( )
9. **Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.)** Floor
10. a. **System in which located:** VARIOUS
    b. **Functional Description:** REMOTE SHUTDOWN
    c. **Is the equipment required for** ( ) Hot Standby ( ) Cold Shutdown (X) Both ( ) Neither ( ) Other

11. Pertinent Reference Design Specifications for Qualification Requirements: Control Panels, Spec C061G, UPTO Add. 3, E&DCR P40774, P40734

(a.) Seismic Input

b. Hydrodynamic Load Input

c. Fatigue Considerations

d. Service Conditions

e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

(X) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method:

( ) Test ( ) Analysis (X) Combination of Test and Analysis

Qualification Report*: *

(No., Title and Date): *

Company that Prepared Report: ACTON/NTS LAB/ELECTROMECHANICS

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975, R.G.1.100, AISC CODE

V. Vibration Input:

1. Loads considered:
   a. (X) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS (X) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT- II

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

*1. Seismic Structural Qualification of EM Panel 405 - Report # 18202-83N-3 Rev. 2 7/16/84
SWEC file # STRS 07.500-5010A thru C

2. SWEC. Supplemental Calc. for Remote Shutdown Panel - MS-1971

1. Report #1 Panel Analysis

11. Pertinent Reference Design Specifications for Qualification Requirements: _____

_____

a. Seismic Input
b. Hydrodynamic Load Input
c. Fatigue Considerations
d. Service Conditions
e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

( ) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method:

( ) Test (X) Analysis ( ) Combination of Test and Analysis

Qualification Report*: STRS 07.500-5010 A thru C

(No., Title and Date): Seismic Structural Qual. of EM Panel 405. # 18202-83N-3. Rev. 2 7/16/84

Company that Prepared Report: ACTON/NTS LAB/ELECTROMECHANICS

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: AISC CODE

V. Vibration Input:

1. Loads considered:
   a. (X) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

( ) Absolute Sum ( ) SRSS (X) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT- II

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2% SSE 3%

5. Required Acceleration in Each Direct:

(X) ZPA (X) Other _____ (specify)

OBE S/S = 0.13 F/B = 0.13 V = 0.10

SSE S/S = 0.24 F/B = 0.24 V = 0.19

6. Were fatigue effects considered?

( ) Yes (X) No

If yes, describe how they were treated in overall qualification program: _____

VI. If Qualfication by Test, then Complete: N/A

1. ( ) Single Frequency ( ) Multi-Frequency ( ) Random ( ) Sine Beat ( ) _____

2. ( ) Single Axis ( ) Multi-Axis ( ) Independent Axis ( ) In-phase Motions

3. Number of Qualifications Tests:

OBE _____ SSE _____ Other _____ (specify)

4. Frequency Range: _____

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

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

6. Method of Determining Natural Frequencies
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

( ) Yes (Attach TRS & RRS graphs)
( ) No

8. Maximum Input g Level Test:

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

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

9. Laboratory Mounting:

   A. ( ) Bolt (No._____ Size_____)
      ( ) Weld (Length_____) ( ) _____

   B. Orientation and Fixturing: _____

10. Functional Operability Verified:

    ( ) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: _____

    _____

12. Other Tests Performed (such as aging or fragility test, including results):

    _____

    _____

13. Failure Modes (If appropriate_____)

14. Margins Available: ( ) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete:

1. Method of Analysis:

   (X) Static Analysis ( ) Equivalent Static Analysis

   ( ) Dynamic Analysis: ( ) Time-History ( ) Response Spectrum

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

   S/S = > 33.0 Hz F/B = > 33.0 Hz V = > 33.0 Hz

3. Model Type: (X) 3D ( ) 2D ( ) 1D
   (X) Finite Element ( ) Beam
   ( ) Closed Form Solution ( ) Other

4. ( ) Computer Codes: STARDYNE

Frequency Range and No. of Modes N/A

( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads: N/A

( ) Absolute Sum (X) SRSS ( ) Other: _____ (specify)

6. Damping:

OBE 2 % SSE 3% Basis for the Damping Used: FSAR

7. Support Considerations in the Model: fixed in Six (6) dof at support welds.

8. Critical Structural Elements:

A.

Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable
Mounting Weld	Seismic & Dead Wt.	-	5653.7 Psi	21000 Psi

B.

Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability
0.0082 inch	Enclosure	N/A

9. Failure Modes: Structural failure

10. Margins Available: (X) Input Spectrum (X) Stress or Deflection

Input g has more than 30% margin.

Stress has 271 % margin.

2. Device Test Reports

11. Pertinent Reference Design Specifications for Qualification Requirements: _____

_____

a. Seismic Input

b. Hydrodynamic Load Input

c. Fatigue Considerations

d. Service Conditions

e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

( ) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method: NOT AVAILABLE YET

( ) Test ( ) Analysis ( ) Combination of Test and Analysis

Qualification Report*: _____

(No., Title and Date): _____

Company that Prepared Report: _____

Company that Reviewed Report: _____

Where Report is filed or available: _____

Applicable Codes and/or Standards: _____

V. Vibration Input:

1. Loads considered:
   a. ( ) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS ( ) _____ (other, specify)

3. Required Response Spectra** (attach the graphs): _____

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE_____ SSE_____

5. Required Acceleration in Each Direct:

( ) ZPA ( ) Other_____
(specify)

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

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

6. Were fatigue effects considered?

( ) Yes ( ) No

If yes, describe how they were treated in overall qualification program:_____

_____

VI. If Qualfication by Test, then Complete:

1. ( ) Single Frequency ( ) Multi-Frequency ( ) Random
( ) Sine Beat
( ) _____

2. ( ) Single Axis ( ) Multi-Axis
( ) Independent Axis ( ) In-phase Motions

3. Number of Qualifications Tests:

OBE_____ SSE_____ Other_____
(specify)

4. Frequency Range:_____

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

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

6. Method of Determining Natural Frequencies
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

( ) Yes (Attach TRS & RRS graphs)
( ) No

8. Maximum Input g Level Test:

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

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

9. Laboratory Mounting:

   A. ( ) Bolt (No._____ Size_____)
      ( ) Weld (Length_____) ( ) _____

   B. Orientation and Fixturing:_____

10. Functional Operability Verified:

    ( ) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made:_____

    _____

12. Other Tests Performed (such as aging or fragility test, including results):

    _____

    _____

13. Failure Modes (If appropriate_____)

14. Margins Available: ( ) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete:

1. Method of Analysis:

   ( ) Static Analysis ( ) Equivalent Static Analysis

   ( ) 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: ( ) 3D ( ) 2D ( ) 1D
   ( ) Finite Element ( ) Beam
   ( ) Closed Form Solution ( ) Other

4. ( ) Computer Codes:_____ _____

   Frequency Range and No. of Modes

   ( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   ( ) Absolute Sum ( ) SRSS ( ) Other:_____
   (specify)

6. Damping:

   OBE_____ SSE_____ Basis for the Damping Used:_____

7. Support Considerations in the Model:_____

8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes:_____

10. Margins Available: ( ) Input Spectrum ( ) Stress or Deflection

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-9CES114 2CES*PNL905								
	D12-2RSSN07	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS08		DH-04
	D14-2RSSN07	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS14		DH-04
	D14-2RSSN08	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS14		DH-04
	D20-2RSSN08	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS14		DH-04
	D21-2RSSN08	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS14		DH-04
	D22-2RSSN08	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS14		DH-04
	D23-2RSSN08	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS14		DH-04
	D7-2RSSN07	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS12		DH-04
	D7-2RSSN08	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS13		DH-04
	D8-2RSSN07	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS12		DH-04
	D8-2RSSN08	H	1	NSR-I	DIODE, TYPE 1N4004, G.E. CO. CAT. NO. 137C6234P004	ESK-11RSS13		DH-04
	F1-2CECA06	H	1	II	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-001	ESK-7CEC14		FU-24
	F1-2RSSA01	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-001	ESK-11RSS12		FU-24
	F1-2RSSA03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS01		FU-27

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C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-9CES114 2CES*PNL905								
	F1-2RSSA04	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE	ESK-7RSS01		FU-02
+	F1-2RSSA05	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE	ESK-7RSS02		FU-02
	F1-2RSSB01	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-001	ESK-11RSS13		FU-24
	F1-2RSSB03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS03		FU-27
	F1-2RSSB04	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE	ESK-7RSS01		FU-02
+	F1-2RSSB05	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE	ESK-7RSS02		FU-02
	F1-2RSSN04	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS11		FU-25
	F1-2RSSN07	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 5 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS07		FU-26
	F1-2RSSN08	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS06		FU-25
	F2-2RSSA01	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-001	ESK-11RSS12		FU-24
	F2-2RSSA03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS01		FU-27
	F2-2RSSB01	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-001	ESK-11RSS13		FU-24

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-9CES114 2CES*PNL405								
	F2-2RSSB03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS03		FU-27
	F2-2RSSN04	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS11		FU-27
	F2-2RSSN07	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS07		FU-25
	F2-2RSSN08	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS06		FU-25
+	F3-2RSSA01	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE	ESK-11RSS12		FU-02
	F3-2RSSA03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS02		FU-27
+	F3-2RSSB01	H	1	NSR-I	FUSE BLOCK, 30 AMP, SINGLE POLE WITH 3 AMP FUSE	ESK-11RSS1[illegible]		FU-02
	F3-2RSSB03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS04		FU-27
	F3-2RSSN07	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 5 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS07		FU-26
	F3-2RSSN08	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 5 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS06		FU-26
	F4-2RSSA03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS02		FU-27

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C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	F4-2RSSB03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS04		FU-27
	F4-2RSSN07	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS07		FU-25
	F4-2RSSN08	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS06		FU-25
	F5-2RSSA03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS09		FU-27
	F5-2RSSB03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS03		FU-27
	F5-2RSSN07	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS07		FU-25
	F5-2RSSN08	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 3 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS06		FU-25
	F6-2RSSA03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS01		FU-27
	F6-2RSSB03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS03		FU-27
	F7-2RSSA03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS01		FU-27
	F7-2RSSB03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS04		FU-27

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	F8-2RSSA03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS02		FU-27
	F8-2RSSB03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS04		FU-27
	F9-2RSSA03	H	1	NSR-I	FUSE BLOCK, 30 AMP, TWO POLE WITH 10 AMP FUSE, BUCHANAN TYPE "NQ", CAT. NO. 0361-002	ESK-11RSS02		FU-27
	ID-405-F	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI		NP-11
	ID-405-R	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI		NP-11
	LT-2RHSA24	H	1	NSR-I	SET OF ROUND INDICATING LIGHTS, 120VAC, GREEN (LEFT), RED (RIGHT)	ESK-6RHS26	ITEM 60	LT-03
	LT-2RHSB24		1	NSR-I	SET OF ROUND INDICATING LIGHTS, 120VAC, GREEN (LEFT), RED (RIGHT)	ESK-6RHS26	ITEM 61	LT-03
	LT1-2RSSN04	H	1	NSR-I	SET OF ROUND INDICATING LIGHTS, 120VAC, GREEN (LEFT), RED (RIGHT)	ESK-11RSS11	ITEM 22	LT-03
	LT2-2RSSN04	H	1	NSR-I	SET OF ROUND INDICATING LIGHTS, 120VAC, GREEN (LEFT), RED (RIGHT)	ESK-11RSS11	ITEM 23	LT-03
	NP-405-A	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 200	NP-11
	NP-405-B	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 201	NP-11
	NP-405-C	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 202	NP-11

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	NP-405-D	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 203	NP-11
	NP-405-E	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 204	NP-11
	NP-405-F1	H	1	NSR-I	NAMEPLATE, PANEL IDENTIFICATION, 1/4 HIGH CHARACTERS FOR LINES 1 & 2, 3/16 HIGH CHARACTERS FOR LINE 3, 6.00 IN. X 1.50 IN.	ESK-2H,FIG.VII		NP-07
	NP-405-F2	H	1	NSR-I	NAMEPLATE, PANEL IDENTIFICATION, 1/4 HIGH CHARACTERS FOR LINES 1 & 2, 3/16 HIGH CHARACTERS FOR LINE 3, 6.00 IN. X 1.50 IN.	ESK-2H,FIG.VII		NP-07
	NP-405-G	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 205	NP-11
	NP-405-H	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 206	NP-11
	NP-405-I	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 207	NP-11
	NP-405-J	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 208	NP-11
	NP-405-K	H	1	NSR-I	PANEL IDENTIFICATION PLATE, .250 HIGH CHARACTERS, 2 LINES MAX, 4.50 IN. X 1.00 IN.	ESK-2H,FIG.XI	ITEM 209	NP-11
	NP-405-R1	H	1	NSR-I	NAMEPLATE, PANEL IDENTIFICATION, 1/4 HIGH CHARACTERS FOR LINES 1 & 2, 3/16 HIGH CHARACTERS FOR LINE 3, 6.00 IN. X 1.50 IN.	ESK-2H,FIG.VII		NP-07

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	NP-405-R2	H	1	NSR-I	NAMEPLATE, PANEL IDENTIFICATION, 1/4 HIGH CHARACTERS FOR LINES 1 & 2, 3/16 HIGH CHARACTERS FOR LINE 3, 6.00 IN. X 1.50 IN.	ESK-2H,FIG.VII		NP-07
	PS-2CECA06	H	1	II	POWER SUPPLY, BAILEY CONTROLS CO., TYPE 7000, AC/DC PWR SUPPLY. INPUT: 120V, 60HZ, 3.3 AMP. OUTPUT: 24VDC/24VAC, 6A.DC, 3A.AC. PART NO. 8080B02P0001. (DIM 19H X 5.25H X 8.75D)	ESK-7CEC14		PS-10
	RACK-405	H	1	II	RACK, BAILEY CONTROLS CO., TYPE 761, CAT. NO. 761000AAAA1			FB511
	RACK-405-A	H	1	NSR-I	ANALOG NEST WITH POWER SUPPLY, 120VAC, 60HZ, 2A, FOXBORO CAT. NO. N-2ANU-P+PS9A			FB503
	RACK-405-B	H	1	NSR-I	ANALOG NEST WITH POWER SUPPLY, 120VAC, 60HZ, 2A, FOXBORO CAT. NO. N-2ANU-P+PS9A			FB503
	RACK-405-C		1		-		DELETED	
	RACK-405-D	H	1	NSR-I	ANALOG NEST WITH POWER SUPPLY, 120VAC, 60HZ, 2A, FOXBORO CAT. NO. N-2ANU-P+PS9A			FB503
	RACK-405-E	H	1	NSR-I	ANALOG NEST WITH POWER SUPPLY, 120VAC, 60HZ, 2A, FOXBORO CAT. NO. N-2ANU-P+PS9A			FB503
	RACK-405-F		1		-		DELETED	
	RACK-405-G	H	1	II	ANALOG NEST WITH POWER SUPPLY, 120VAC, 60HZ, 2A, FOXBORO CAT. NO. N-2ANU-P+PS9A			FB503
	SH1-2RSSN80	H	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-6RHS29	ITEM 104	CS522
	SH10-2RSSN89	H	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-11RSS01	ITEM 97	CS522

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	SH11-2RSSN90	M	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-11RSS10	ITEM 54	CS522
	SH12-2RSSN91	M	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-5RHS01	ITEM 96	CS522
	SH13-2RSSN92	M	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-6RHS33	ITEM 106	CS522
	SH14-2RSSN93	M	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-6RHS37	ITEM 102	CS522
	SH15-2RSSN94	M	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-5RHS02	ITEM 100	CS522
	SH16-2RSSN95	M	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-11RSS04	ITEM 101	CS522
	SH17-2RSSN96	M	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BF	ESK-5SHP02	ITEM 103	CS525

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C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	SH18-2RSSN97	H	1	NSR-I	TRANSFER SHITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-6SHP18	ITEM 311	CS522
	SH19-2ICSN02	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6ICS02	ITEM 10	CS528
	SH19-2RSSN98	H	1	NSR-I	TRANSFER SHITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-6SHP18	ITEM 312	CS522
	SH2-2RSSN01	H	1	NSR-I	TRANSFER SHITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-6ICS02	ITEM 105	CS522
	SH21A-2SHPA01	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE SBH, PER ESK-3F, DETAIL AL1	ESK-5SHP01	ITEM 1	CS147
	SH21B-2SHPB01	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE SBH, PER ESK-3F, DETAIL AL1	ESK-5SHP02	ITEM 4	CS147
	SH21C-2SHPC01	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE SBH, PER ESK-3F, DETAIL AL1	ESK-5SHP03	ITEM 2	CS147
	SH21D-2SHPD01	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE SBH, PER ESK-3F, DETAIL AL1	ESK-5SHP04	ITEM 5	CS147

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-9CES114 2CES*PNL405								
	SH21E-2SHPE01	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE SBH, PER ESK-3F, DETAIL AL1	ESK-5SHP05	ITEM 3	CS147
	SH21F-2SHPF01	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE SBH, PER ESK-3F, DETAIL AL1	ESK-5SHP06	ITEM 6	CS147
	SH22-2ICSN05	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG3'	ESK-11ICS02	ITEM 20	CS530
	SH24-2ICSN11	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6ICS03	ITEM 8	CS528
	SH25-2ICSN03	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-11ICS01	ITEM 17	CS528
	SH27-2ICSN0P	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-11ICS10	ITEM 19	CS531
	SH28-2ICSN15	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG3'	ESK-11ICS07	ITEM 15	CS530
	SH3-2RSSN82	H	1	NSR-I	TRANSFER SHITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-11ICS02	ITEM 51	CS522

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-9CES114 2CES*PNL405								
	SH30A-2SHPA20	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6SHP25	ITEM 30	CS531
	SH30B-2SHPB20	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6SHP25	ITEM 44	CS531
	SH31A-2RHSA01	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH'	ESK-5RHS01	ITEM 28	CS532
	SH31B-2RHSB01	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH'	ESK-5RHS02	ITEM 42	CS532
	SH32A-2RHSA02	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS02	ITEM 27	CS531
	SH32B-2RHSB02	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS29	ITEM 41	CS531
	SH33A-2RHSA20	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS04	ITEM 26	CS531
	SH33B-2RHSB20	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS30	ITEM 40	CS531
	SH35-2RHSA21	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS23	ITEM 25	CS528

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-9CES114 2CES*PNL905								
	SH37A-2RHSA17	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS19	ITEM 34	CS528
+	SH37B-2RHSB17	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS34	ITEM 48	CS528
	SH39A-2RHSA18	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS20	ITEM 35	CS528
	SH39B-2RHSB18	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS37	ITEM 49	CS528
	SH9-2RSSN8Z	H	1	NSR-I	TRANSFER SHITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-11ICS03	ITEM 52	CS522
	SH40A-2RHSA06	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS07	ITEM 32	CS531
	SH40B-2RHSB06	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS33	ITEM 46	CS531
	SH41A-2RHSA25	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS28	ITEM 36	CS528

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C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	SH41B-2RHSB25	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS38	ITEM 50	CS528
	SH45A-2RHSA04	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS05	ITEM 31	CS528
	SH45B-2RHSB04	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS31	ITEM 45	CS528
	SH46A-2RHSA05	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS06	ITEM 29	CS531
	SH46B-2RHSB05	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS35	ITEM 43	CS531
	SH5-2RSSN84	H	1	NSR-I	TRANSFER SHITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-11ICS01	ITEM 53	CS522
	SH51-2RHSB21	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS32	ITEM 24	CS528
	SH52-2ICSN12	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-11ICS05	ITEM 16	CS528

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	SH55-2RHSA22	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS39	ITEM 85	CS528
	SH57A-2RHSA19	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG3'	ESK-6RHS25	ITEM 33	CS530
	SH57B-2RHSB19	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG3'	ESK-6RHS36	ITEM 47	CS530
	SH59-2RHSA23	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS24	ITEM 86	CS528
	SH6-2RSSN85	H	1	NSR-I	TRANSFER SHITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-6RHS02	ITEM 55	CS522
	SH60-2RHSB26	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6RHS40	ITEM 87	CS528
	SH61-2ICSN24	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-6ICS04	ITEM 12	CS528
	SH62A-2RHSA54	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS41	ITEM 124	CS531

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	SH62B-2RHSB54	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH1'	ESK-6RHS42	ITEM 125	CS531
	SH7-2RSSN86	H	1	NSR-I	TRANSFER SHITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-6RHS06	ITEM 56	CS522
	SH71A-2RSSA01	H	1	NSR-I	PUSHBUTTON, G.E. TYPE CR2940 PER ESK-3B, DETAIL "N2"	ESK-11RSS12	ITEM 157	CS-10
	SH71B-2RSSB01	H	1	NSR-I	PUSHBUTTON, G.E. TYPE CR2940 PER ESK-3B, DETAIL "N2"	ESK-11RSS13	ITEM 181	CS-10
	SH72-2ICSN30	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-11ICS17	ITEM 300	CS528
	SH73-2SHPA24	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC GREEN (LEFT), RED (RIGHT) G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H3	ESK-6SHP18	ITEM 301	CS-03
	SH74-2SHPB24	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC GREEN (LEFT), RED (RIGHT) G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H3	ESK-6SHP18	ITEM 302	CS-03
	SH75-2SHPC24	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC GREEN (LEFT), RED (RIGHT) G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H3	ESK-6SHP19	ITEM 303	CS-03
	SH76-2SHPD24	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC GREEN (LEFT), RED (RIGHT) G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H3	ESK-6SHP19	ITEM 304	CS-03

15R29

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	SH77-2SHPE24	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC GREEN (LEFT), RED (RIGHT) G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H3	ESK-6SHP20	ITEM 305	CS-03
	SH78-2SHPF24	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC GREEN (LEFT), RED (RIGHT) G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H3	ESK-6SHP20	ITEM 306	CS-03
	SH79-2SHPA18	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC GREEN (LEFT), RED (RIGHT) G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H3	ESK-6SHP17	ITEM 307	CS-03
	SH8-2RSSN87	H	1	NSR-I	TRANSFER SHITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BE	ESK-6RHS20	ITEM 57	CS522
	SH80-2SHPB16	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC GREEN (LEFT), RED (RIGHT) G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H3	ESK-6SHP17	ITEM 308	CS-03
	SH81-2RSSA04	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H	ESK-7RSS01	ITEM 309	CS-46
	SH82-2RSSB04	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H	ESK-7RSS01	ITEM 310	CS-46
	SH83-2RSSA05	H	1	NSR-I	CONTROL SHITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H	ESK-7RSS02	ITEM 313	CS-46

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	SH84-2RSSB05	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, 120VAC, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE CR2940 PER ESK-3B, DETAIL H	ESK-7RSS02	ITEM 314	CS-46
+	SH85-2ICSN08	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-11ICS13	ITEM 315	CS528
+	SH86-2ICSN13	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BG1'	ESK-11ICS13	ITEM 316	CS528
	SH9-2RSSN88	H	1	NSR-I	TRANSFER SWITCH, 3 BANKS, 16 STAGES PER BANK, TANDEM OPERATION, KEYLOCK TYPE HANDLE, KEY REMOVABLE IN ANY POSITION, G.E. CO. TYPE SB-9, PER ESK-3K, DETAIL BF	ESK-5SHP01	ITEM 58	CS525
	TRIM-405	H	1	II	TRIM SEPARATOR, 3/8" WIDTH X LENGTH AS REQUIRED, BLACK FORMICA, FORMICA CORP. NO. 909, OR ENGINEERING APPROVED EQUIVALENT		QTY AS REQUIRED	SE-01
	ZRS	H	1	NSR-I	DIGITAL ISOLATOR CARD FILE UNIT, CONSISTING OF (4) INPUT CARDS, G.E. CO. NO. DIA001 AND (4) OUTPUT CARDS, G.E. CO. NO. DIB002, EACH CONTAINING (10) COMMON CIRCUITS (TOTAL OF 40) RATED AT 120VAC INPUT, 125VDC OUTPUT	SEE TABLE Z		IC-01
	ZSR	H	1	NSR-I	DIGITAL ISOLATOR CARD FILE UNIT, CONSISTING OF (4) INPUT CARDS, G.E. CO. NO. DIA001 AND (4) OUTPUT CARDS, G.E. CO. NO. DIB002, EACH CONTAINING (10) COMMON CIRCUITS (TOTAL OF 40) RATED AT 120VAC INPUT, 125VDC OUTPUT	SEE TABLE Z		IC-01

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	ZTR.	H	1	NSR-I	DIGITAL ISOLATOR CARD FILE UNIT, CONSISTING OF (4) INPUT CARDS, G.E. CO. NO. DIA001 AND (4) OUTPUT CARDS, G.E. CO. NO. DIB002, EACH CONTAINING (10) COMMON CIRCUITS (TOTAL OF 40) RATED AT 125VDC INPUT, 125VDC OUTPUT	SEE TABLE Z		IC-05
	ZUR	H	1	NSR-I	DIGITAL ISOLATOR CARD FILE UNIT, CONSISTING OF (4) INPUT CARDS, G.E. CO. NO. DIA001 AND (4) OUTPUT CARDS, G.E. CO. NO. DIB002, EACH CONTAINING (10) COMMON CIRCUITS (TOTAL OF 40) RATED AT 125VDC INPUT, 125VDC OUTPUT	SEE TABLE Z		IC-05
	1-1-2ADSA01	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH2'	ESK-11RSS01	ITEM 77	CS527
	1-1-2ADSB01	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH2'	ESK-11RSS03	ITEM 79	CS527
	1-1-2RSSN07	H	1	NSR-I	CONTROL SWITCH, PUSHBUTTON WITH COLLAR, CUTLER HAMMER TYPE 10250T, PER ESK-3L, DETAIL BJ1	ESK-11RSS07	ITEM 7	CS506
	1-1-2RSSN08	H	1	NSR-I	CONTROL SWITCH, WITH ONE ROUND INDICATING LIGHT, WHITE COLOR CAP, G.E. CO. TYPE CR2940, SWITCH, PER ESK-3L, DETAIL BL	ESK-11RSS06	ITEM 14	CS524
	1-2-2ADSA01	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH2'	ESK-11RSS01	ITEM 38	CS527
	1-2-2ADSB01	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH2'	ESK-11RSS03	ITEM 75	CS527

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CESxPNL405								
	1-2-2RSSN07	H	1	NSR-I	PUSHBUTTON (MOMENTARY CONTACT) SWITCH, WITH ONE ROUND INDICATING LIGHT, WHITE COLOR CAP, G.E. CO. TYPE CR2940, SWITCH, PER ESK-3L, DETAIL BK3	ESK-11RSS07	ITEM 11	CS523
	1-2CHSA02	H	1	NSR-I	TEMPERATURE SELECTOR, G.E. CO. TYPE SB1, PER ESK-3E, DETAIL XZ	ESK-11RSS05	ITEM 91	CS-63
	1-2CHSB02	H	1	NSR-I	TEMPERATURE SELECTOR, G.E. CO. TYPE SB1, PER ESK-3E, DETAIL XZ	ESK-11RSS05	ITEM 92	CS-63
	1-2HVCA20	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE SBH, PER ESK-3F, DETAIL AL1	ESK-6HVC13	ITEM 99	CS147
	1-2HVCB20	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN (LEFT), RED (RIGHT), G.E. CO. TYPE SBH, PER ESK-3F, DETAIL AL1	ESK-6HVC13	ITEM 98	CS147
	1-3-2ADSA01	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH2'	ESK-11RSS02	ITEM 37	CS527
	1-3-2ADSB01	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH2'	ESK-11RSS04	ITEM 39	CS527
	1-3-2RSSN07	H	1	NSR-I	CONTROL SWITCH, PUSHBUTTON (MOMENTARY), G.E. CO. TYPE CR2940, PER ESK-3L, DETAIL BK1	ESK-11RSS07	ITEM 18	CS533
	1-4-2ADSA01	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH2'	ESK-11RSS02	ITEM 76	CS527
	1-4-2ADSB01	H	1	NSR-I	CONTROL SWITCH AND ONE SET OF ROUND INDICATING LIGHTS, GREEN(LEFT), RED(RIGHT), G.E. CO. TYPE SBH, PER ESK-3L, DETAIL 'BH2'	ESK-11RSS04	ITEM 78	CS527

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C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	1-4-2RSSN07	H	1	NSR-I	CONTROL SWITCH, PUSHBUTTON (MOMENTARY), G.E. CO. TYPE CR2940, PER ESK-3L, DETAIL 'BK2'	ESK-11RSS07	ITEM 9	CS526
	1-5-2RSSN07	H	1	NSR-I	CONTROL SWITCH, WITH ONE ROUND INDICATING LIGHT, WHITE COLOR CAP, G.E. CO. TYPE CR2940, SWITCH, PER ESK-3L, DETAIL BL	ESK-11RSS08	ITEM 13	CS524
	2CHS*TT50AA/52AA	H	1	NSR-I	TEMPERATURE TRANSMITTER, INPUT: 10-1200 DEGREES FAHRENHEIT, OUTPUT: 0-10VDC, FOXBORO CO., CAT. NO. N-2AI-P2V		ITEM 221	FB507
	2CHS*TT51BB/53BB	H	1	NSR-I	TEMPERATURE TRANSMITTER, INPUT: 10-1200 DEGREES FAHRENHEIT, OUTPUT: 0-10VDC, FOXBORO CO., CAT. NO. N-2AI-P2V		ITEM 238	FB507
	2CHS*TT54AA/56AA	H	1	NSR-I	TEMPERATURE TRANSMITTER, INPUT: 10-1200 DEGREES FAHRENHEIT, OUTPUT: 0-10VDC, FOXBORO CO., CAT. NO. N-2AI-P2V		ITEM 222	FB507
	2CHS*TT55BB/57BB	H	1	NSR-I	TEMPERATURE TRANSMITTER, INPUT: 10-1200 DEGREES FAHRENHEIT, OUTPUT: 0-10VDC, FOXBORO CO., CAT. NO. N-2AI-P2V		ITEM 239	FB507
	2CHS*TT58AA	H	1	NSR-I	TEMPERATURE TRANSMITTER, INPUT: 10-1200 DEGREES FAHRENHEIT, OUTPUT: 0-10VDC, FOXBORO CO., CAT. NO. N-2AI-P2V		ITEM 223	FB507
	2CHS*TT59BB	H	1	NSR-I	TEMPERATURE TRANSMITTER, INPUT: 10-1200 DEGREES FAHRENHEIT, OUTPUT: 0-10VDC, FOXBORO CO., CAT. NO. N-2AI-P2V		ITEM 240	FB507
	2ISC-TR28B/TR30B	H	1	(I)	TEMPERATURE RECORDER, 2 PEN, FOXBORO CO. CAT. NO. N-2A7-S-2R6, USED WITH RACK MODULE, FOXBORO CO. CAT. NO. N-2AX+DSP, AND FIREPROOF CABLE, FOXBORO CO. CAT. NO. N-2AK-FF010		ITEM 246	FB508
	2ISC-TT28/30B	H	1	II	THERMOCOUPLE SIGNAL CONVERTER, INPUT: +-15VDC @ 30MA MAX, OUTPUT: 0-10VDC, FOXBORO CO., CAT. NO. 2AI-T2V		ITEM 241	FB505
+	2RHS*FI60A	H	1	NSR-I	INDICATOR, FLOW SCALE:0-8400 GPM			FI-01

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
+	2RHS*FI60B	H	1	NSR-I	INDICATOR, FLOW SCALE:0-8400 GPH			FI-01
	2RHS*FY60A	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 218	FB501
	2RHS*FY60B	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 234	FB501
	2RHS*PHRS60A	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 217	FB500
	2RHS*PHRS60B/113	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS	(2RSS*PHRS113)	ITEM 235	FB500
	2RHS-TR120		1			-	DELETED	
	2RSS*E/I106	H	1	NSR-I	VOLTAGE TO CURRENT CONVERTER, DUAL ELEMENT MODULE, 1ST ELEMENT - INPUT: 0-10VDC, OUTPUT: 4-20MADC, 2ND ELEMENT - INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AS-I3I+P		ITEM 224	FB502
	2RSS*FIC106	H	1	NSR-I	FLOW INDICATING CONTROLLER, FOXBORO CO. CAT. NO. N-250HH+HCN-S, USED WITH RACK MODULE, FOXBORO CO. CAT. NO. N-2AC+A4, AND FIREPROOF CABLE, FOXBORO CO. CAT. NO. N-2AK-FF010		ITEM 21	FB504
	2RSS*FY106	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 225	FB501
	2RSS*LI101	H	1	NSR-I	INDICATOR, LEVEL SCALE:366"-599"			LI-01
	2RSS*LI105	H	1	NSR-I	INDICATOR, LEVEL SCALE:192'-217'			LI-01

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	2RSS*LI112	H	1	NSR-I	INDICATOR, LEVEL SCALE:366"-599"			LI-01
	2RSS*LI114	H	1	NSR-I	INDICATOR, LEVEL SCALE:192'-217'			LI-01
	2RSS*LI115	H	1	NSR-I	INDICATOR, LEVEL SCALE:517"-599"			LI-01
	2RSS*LI116	H	1	NSR-I	INDICATOR, LEVEL SCALE:517"-599"			LI-01
	2RSS*PI102	H	1	NSR-I	INDICATOR, PRESSURE SCALE:0-1500 PSI			PI-01
	2RSS*PI113	H	1	NSR-I	INDICATOR, PRESSURE SCALE:0-1500 PSI			PI-01
	2RSS*PHRS101/102	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 215	FB500
	2RSS*PHRS105/112	H	1	NSR I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 233	FB500
	2RSS*PHRS106		1		-		DELETED	
	2RSS*PHRS115/114	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 216	FB500
	2RSS*SI107	H	1	NSR-I	INDICATOR, RPM SCALE:0-6000 RPM			RI-01
+	2RSS*TI103	H	1	NSR-I	INDICATOR, TEMPERATURE SCALE:50-250 DEG F			TI-01
+	2RSS*TI104	H	1	NSR-I	INDICATOR, TEMPERATURE SCALE:50-250 DEG F			TI-01

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	2RSS-LI1A	H	1	II	INDICATOR, LEVEL SCALE:0-51'			LI-01
	2RSS-LI1B	H	1	II	INDICATOR, LEVEL SCALE:0-51'			LI-01
	2RSS-PI108	H	1	II	INDICATOR, PRESSURE SCALE:0-300 PSI			PI-01
	2RSS-PI109	H	1	II	INDICATOR, PRESSURE SCALE:0-300 PSI			PI-01
	2RSS-PI110	H	1	II	INDICATOR, PRESSURE SCALE:0-300 PSI			PI-01
	2RSS-PI111	H	1	II	INDICATOR, PRESSURE SCALE:0-300 PSI			PI-01
	2RSS-PHRS1A	H	1	II	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 242	FB500
	2RSS-PHRS1B	H	1	II	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 243	FB500
	2RSS-PHRS108/109	H	1	II	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 244	FB500
	2RSS-PHRS110/111	H	1	II	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 245	FB500
	2RSS-TI12A	H	1	II	INDICATOR, TEMPERATURE SCALE:0-600 DEG F			TI-01
	2RSS-TI12B	H	1	II	INDICATOR, TEMPERATURE SCALE:0-600 DEG F			TI-01

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C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-9CES114 2CES*PNL405								
	2RSS-TI140	H	1	II	INDICATOR, TEMPERATURE SCALE:0-600 DEG F			TI-01
	2RSS-TR10A	H	1	II	RECORDER, BAILEY CONTROLS CO., TYPE 772, 2 PEN, SCALE: 0-600 DEG F, CAT. NO. 772225CABA2 WITH SHELVE CAT. NO. 762020AAAA1 AND CABLE CAT. NO. 763100EABA1 SCALE:0-600 DEG F			RC-36
	2RSS-TR10B	H	1	II	RECORDER, BAILEY CONTROLS CO., TYPE 772, 2 PEN, SCALE: 0-600 DEG F, CAT. NO. 772225CABA2 WITH SHELVE CAT. NO. 762020AAAA1 AND CABLE CAT. NO. 763100EABA1 SCALE:0-600 DEG F			RC-36
	2RSS-TTX10A	H	1	II	MILLIVOLT CONVERTER, BAILEY CONTROLS CO., TYPE 7401, CAT. NO. 740111AAAA2 WITH COLD JUNCTION COMPENSATOR, CAT. NO. 6204K60G0702			MC-01
	2RSS-TTX10B	H	1	II	MILLIVOLT CONVERTER, BAILEY CONTROLS CO., TYPE 7401, CAT. NO. 740111AAAA2 WITH COLD JUNCTION COMPENSATOR, CAT. NO. 6204K60G0702			MC-01
	2RSS-TTY10A	H	1	II	MILLIVOLT CONVERTER, BAILEY CONTROLS CO., TYPE 7401, CAT. NO. 740111AAAA2 WITH COLD JUNCTION COMPENSATOR, CAT. NO. 6204K60G0702			MC-01
	2RSS-TTY10B	H	1	II	MILLIVOLT CONVERTER, BAILEY CONTROLS CO., TYPE 7401, CAT. NO. 740111AAAA2 WITH COLD JUNCTION COMPENSATOR, CAT. NO. 6204K60G0702			MC-01
	2RSS-TT12A	H	1	II	TEMPERATURE TRANSMITTER, FOXBORO CO., CAT. NO. 2AI-T2V+T+T		ITEM 247	FB510
	2RSS-TT12B	H	1	II	TEMPERATURE TRANSMITTER, FOXBORO CO., CAT. NO. 2AI-T2V+T+T		ITEM 248	FB510

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	2RSS-TT140	H	1	II	TEMPERATURE TRANSMITTER, FOXBORO CO., CAT. NO. 2AI-T2V+T+T		ITEM 249	FB510
	2SHP*FI200A		1	NSR-I	INDICATOR, FLOW SCALE:0-12,000 GPH			FI-01
	2SHP*FI200B	H	1	NSR-I	INDICATOR, FLOW SCALE:0-12,000 GPH			FI-01
	2SHP*FI200C	H	1	NSR-I	INDICATOR, FLOW SCALE:0-12,000 GPH			FI-01
	2SHP*FI200D	H	1	NSR-I	INDICATOR, FLOW SCALE:0-12,000 GPH			FI-01
	2SHP*FI200E	H	1	NSR-I	INDICATOR, FLOW SCALE:0-12,000 GPH			FI-01
	2SHP*FI200F	H	1	NSR-I	INDICATOR, FLOW SCALE:0-12,000 GPH			FI-01
	2SHP*FI201A	H	1	NSR-I	INDICATOR, FLOW SCALE:0-8,000 GPH			FI-01
	2SHP*FI201B	H	1	NSR-I	INDICATOR, FLOW SCALE:0-8,000 GPH			FI-01
	2SHP*FY200A	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 210	FB501
	2SHP*FY200B	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 231	FB501
	2SHP*FY200C	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 213	FB501
	2SHP*FY200D	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 230	FB501

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C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESH-4CES114 2CES*PNL405								
	2SHP*FY200E	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 212	FB501
	2SHP*FY200F	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 232	FB501
	2SHP*FY201A	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 220	FB501
	2SHP*FY201B	H	1	NSR-I	SQUARE ROOT UNIT, INPUT: 0-10VDC, OUTPUT: 0-10VDC LINEAR FLOW SIGNAL, FOXBORO CO., CAT. NO. N-2AP+SQE		ITEM 237	FB501
	2SHP*PHRS200F116	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS	(2RSS*PHRS116)	ITEM 229	FB500
	2SHP*PHRS200A/C	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 211	FB500
	2SHP*PHRS200B/D	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 228	FB500
	2SHP*PHRS200E	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 214	FB500
	2SHP*PHRS201A	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 219	FB500

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	2SHP*PHRS201B	H	1	NSR-I	CURRENT TO VOLTAGE CONVERTER, DUAL ELEMENT MODULE, INPUT: 4-20MADC, OUTPUT: 0-10VDC, FOXBORO CO. CAT. NO. N-2AI-I3V AND TEST PLUGS		ITEM 236	FB500
	3-1-2ADSA01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS01		CR500
	3-1-2ADSB01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS03		CR500
	3-2-2ADSA01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS01		CR500
	3-2-2ADSB01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS03		CR500
	3-2RSSA04	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-7RSS01		CR501
	3-2RSSB04	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-7RSS01		CR501
	3-3-2ADSA01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS02		CR500
	3-3-2ADSB01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS04		CR500
	3-4-2ADSA01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS02		CR500
	3-4-2ADSB01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS04		CR500
	3X1-2RSSA01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-11RSS12		CR501
	3X1-2RSSB01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-11RSS13		CR501
	3X1-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS07		CR500
	3X1-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS06		CR500
	3X10-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS08		CR500
	3X11-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS08		CR500
	3X12-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS08		CR500
	3X13-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS07		CR500
	3X14-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS14		CR500
	3X14-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS14		CR500

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 2CES*PNL405								
	3X15-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS14		CR500
	3X15-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS14		CR500
	3X16-2RSSN07	H	1	NSR I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS07		CR500
	3X17-2RSSN07	H	1	NSR I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS07		CR500
	3X18-2RSSN07	H	1	NSR I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS08		CR500
	3X19-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS08		CR500
	3X2-2RSSA01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-11RSS12		CR501
	3X2-2RSSB01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-11RSS13		CR501
	3X2-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS07		CR500
	3X2-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS06		CR500
	3X20-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS08		CR500
	3X20-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS14		CR500
	3X21-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS08		CR500
	3X21-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS14		CR500
	3X22-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS14		CR500
	3X23-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS14		CR500
	3X3-2RSSA01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-11RSS12		CR501
	3X3-2RSSB01	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-11RSS13		CR501
	3X3-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS07		CR500
	3X4-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS12		CR500
	3X4-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS13		CR500
	3X5-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS12		CR500

C	DEVICE	PROV BY	QTY	QA CAT	DESCRIPTION	REFERENCE	REMARKS	COMP ID
ESK-4CES114 20&S*PNL405								
	3X5-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS13		CR500
	3X6-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS12		CR500
	3X6-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS13		CR500
	3X7-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS12		CR500
	3X7-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS13		CR500
	3X8-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS12		CR500
	3X8-2RSSN08	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS13		CR500
	3X9-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS08		CR500
	3X96-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS08		CR500
+	3X97-2RSSN07	H	1	NSR-I	RELAY, TIME DELAY, AGASTAT TYPE ETR, 125VDC, TDPU, 0.5-15 SEC	ESK-11RSS08		CR503
	3X98-2RSSN07	H	1	NSR-I	RELAY, AGASTAT TYPE EGPD, 125VDC	ESK-11RSS07		CR500
+	3X99-2RSSN07	H	1	NSR-I	RELAY, TIME DELAY, AGASTAT TYPE ETR, 125VDC, TDPU, 1-30 SEC	ESK-11RSS08		CR502
	33X-2RHSA02	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-6RHS02		CR501
	33X-2RHSA20	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-6RHS04		CR501
	33X-2RHSA21	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-6RHS23		CR501
	33X-2RHSB02	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-6RHS29		CR501
	33X-2RHSB20		1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-6RHS30		CR501
	33X-2RHSB21	H	1	NSR-I	RELAY, AGASTAT TYPE EGPI, 120VAC	ESK-6RHS32		CR501

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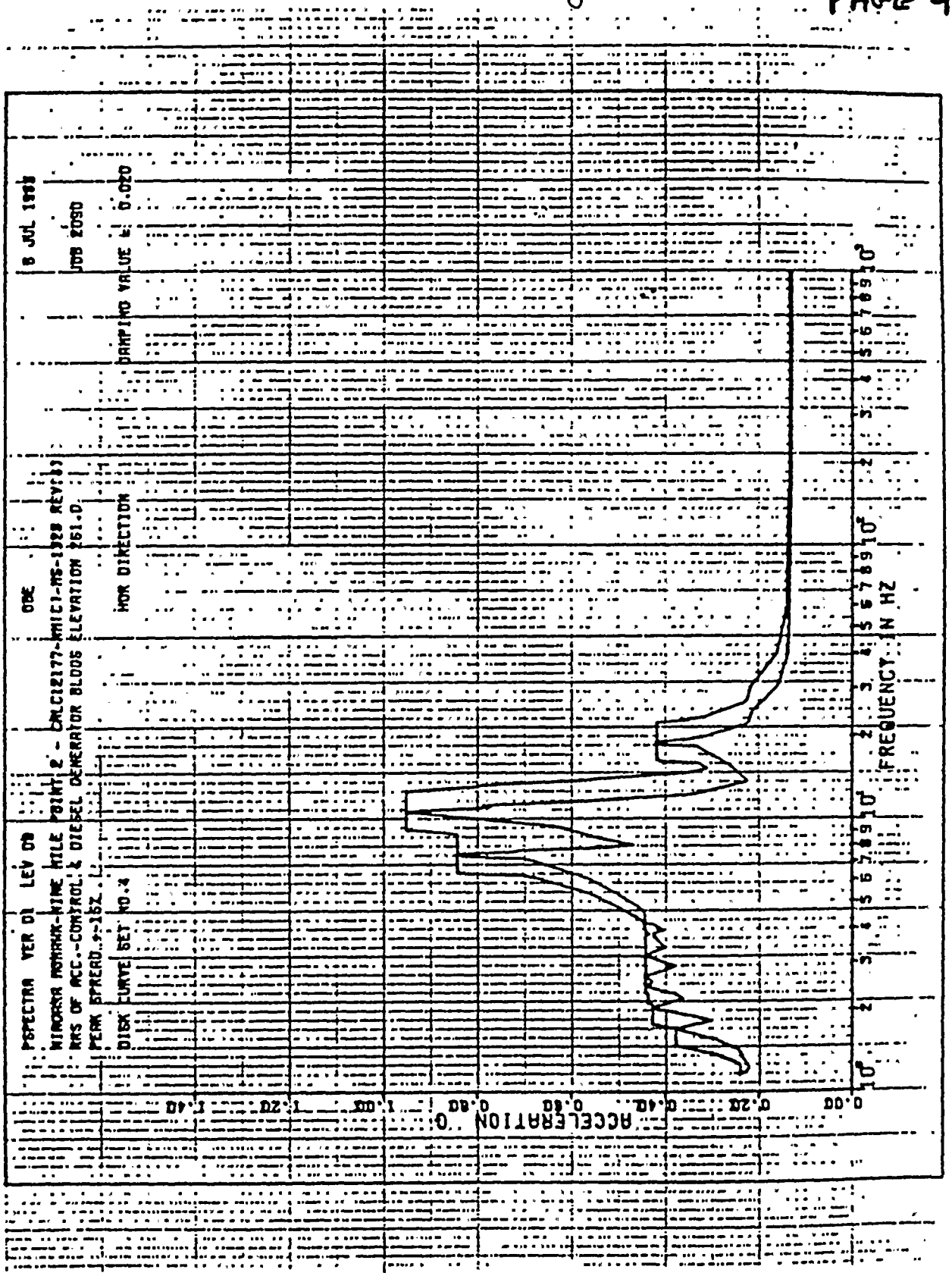

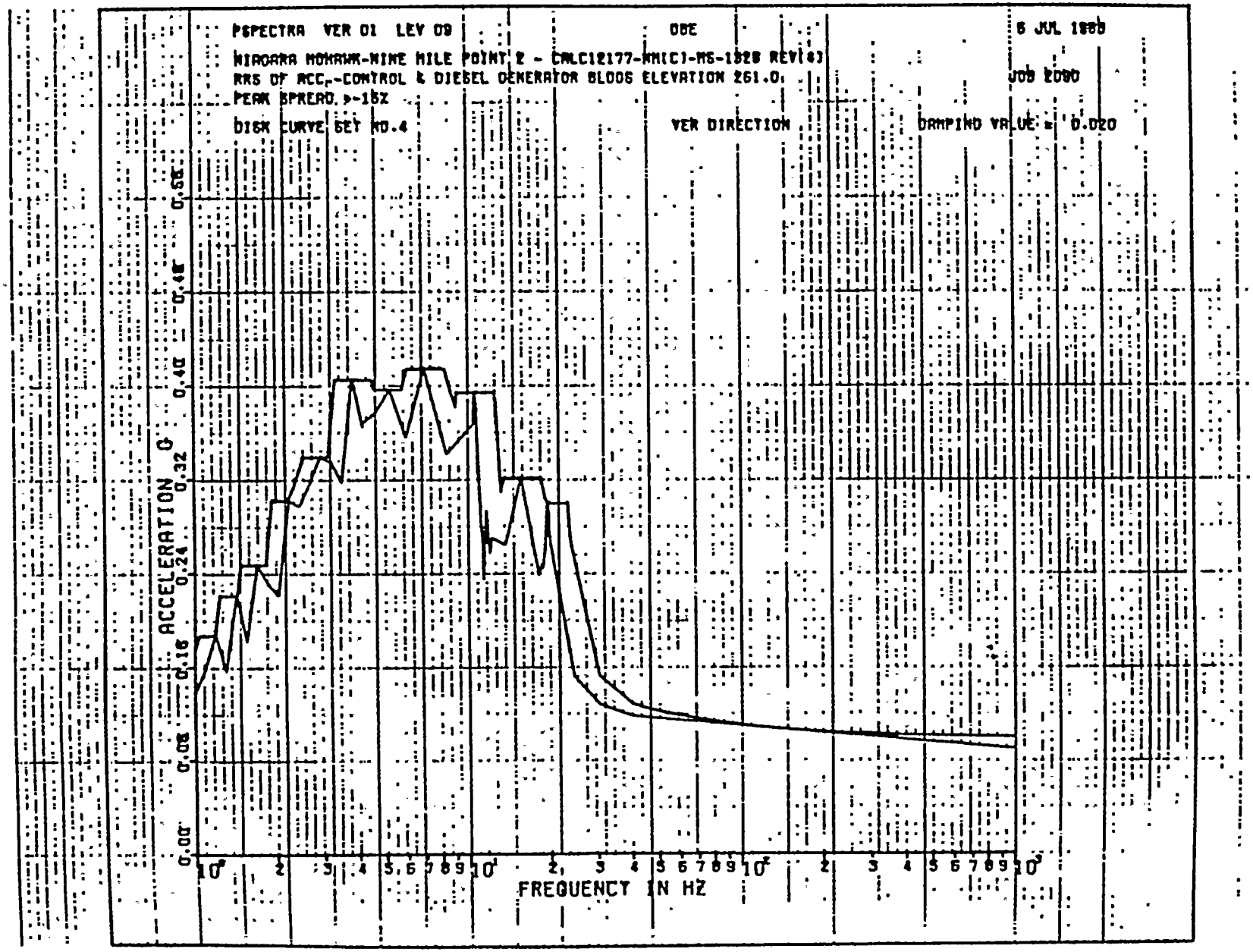
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6 JUL 1989
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RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0
JOB 2090
PEAK SPREAD 9-15%
DISK CURVE SET NO.4
VER DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
10
2
3
4
5
6
7
8
9
10
2
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2
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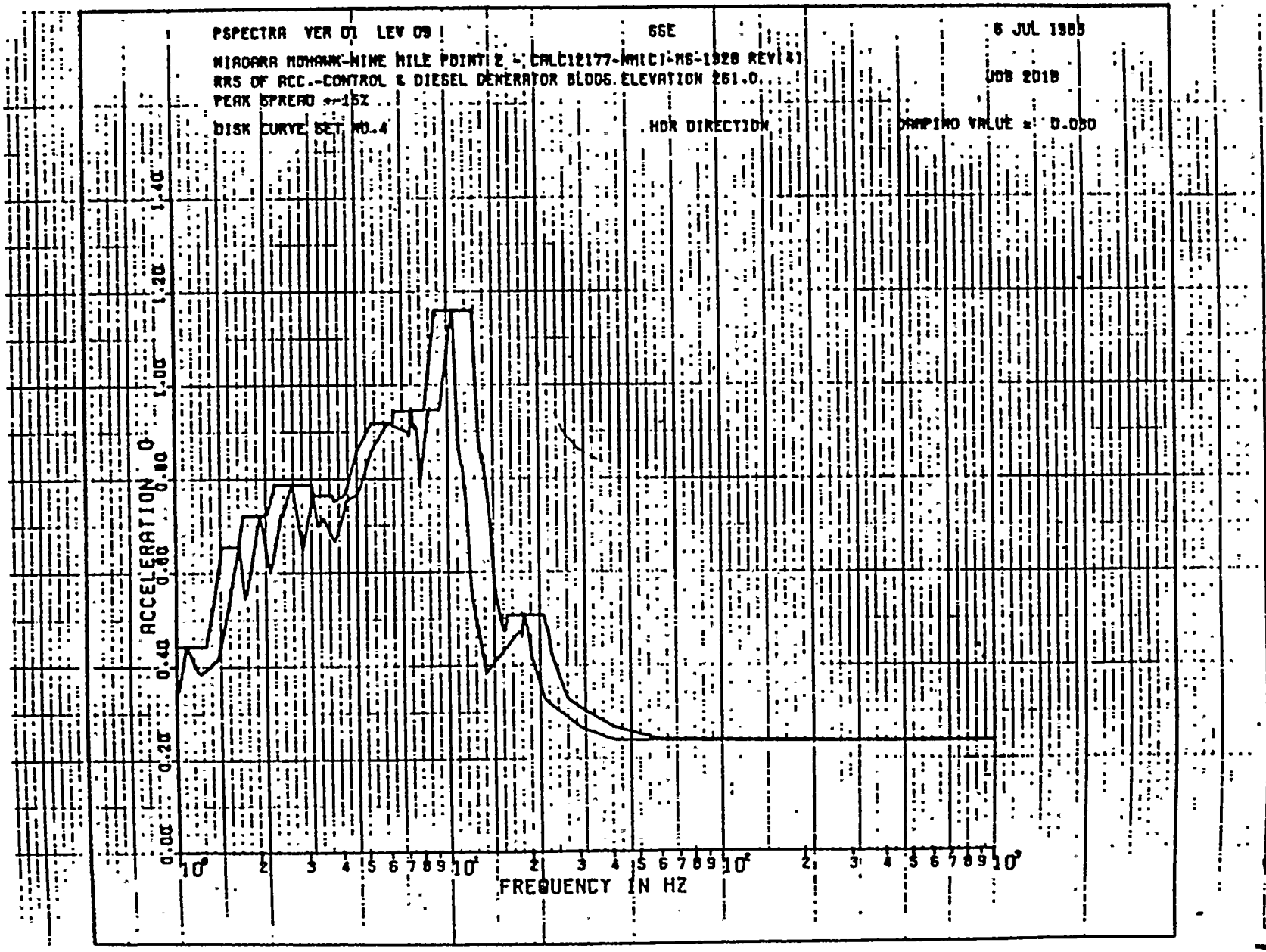
FREQUENCY IN HZ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66E
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RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS. ELEVATION 261.0.
UDB 2018
PEAK SPREAD +-15%
DISK CURVE SET NO.4
HOR DIRECTION
DAMPING VALUE = 0.050
ACCELERATION G
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
FREQUENCY IN HZ
10
2
3
4
5
6
7
8
9
10
2
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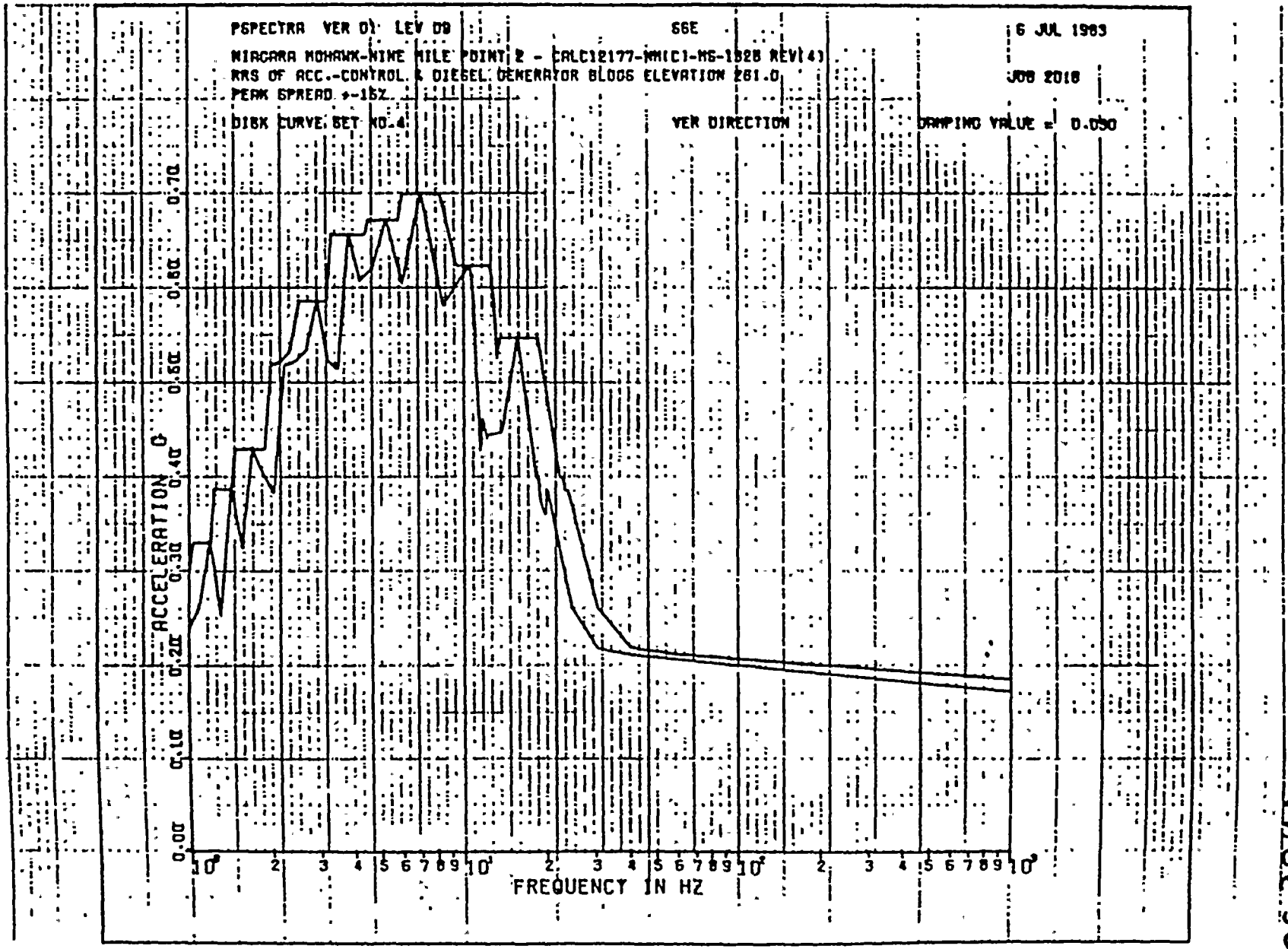
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JOB 2018
PEAK SPREAD +-15%
DISK CURVE SET NO.4
VER DIRECTION
DAMPING VALUE = 0.050
ACCELERATION G
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
FREQUENCY IN HZ

PAGE 50

SPEC. NO. C061P

SQRT #3

NINE MILE POINT NUCLEAR STATION UNIT 2

EQUIPMENT DYNAMIC QUALIFICATION

COMPONENT NAME: LOCAL INSTRUMENT RACK

MARK NUMBERS: 2CES*RAK107

STONE & WEBSTER

SPEC. NO. C061P
Revision 0

Seismic and Dynamic Qualification Summary of Equipment

I. **Plant Name:** Nine Mile Point Nuclear Station - Unit 2

1. **Utility:** Niagara Mohawk Power Corporation
2. **NSSS:** General Electric Co. **BWR:** 5 MK 2
3. **A/E:** Stone & Webster Engineering Corp. **Other**

II. **Component Name:** Local Instrument Rack MARK NO. 2CES*RAK107

1. **Scope:** ( ) NSSS (✓) BOP ( ) Other
2. **Model Number:** N/A **Quantity:** 1
3. **Size or Range:** N/A
4. **Vendor:** Mercury Co.
5. **If the component is a cabinet or panel, name and model number of the devices included:**
   1. Pressure Switches : Dresser M/B461 } Cat. II
   2. Pressure Indicators: Helicoid M/440R } Cat. II
6. **Physical Description:**
   a. **Appearance:** Rectangular Framework
   b. **Dimensions:** 6'-6" x 6'-6" x 2'-8"
   c. **Weight:** 1170 lb.
7. **Location:** **Building:** Reactor Building
   Elevation: Fl. El. 261'
8. **Field Mounting Conditions** (✓) Bolt (No. 24 Size 1/2") ( ) Weld (Length) ( )
9. **Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.)**
   Floor mounted
10. a. **System in which located:** LMS
    b. **Functional Description:** Leakage monitoring system Instrument Rack
    c. **Is the equipment required for** ( ) Hot Standby ( ) Cold Shutdown (✓) Both ( ) Neither ( ) Other

Spec No. COGIP

11. Pertinent Reference Design Specifications for Qualification Requirements: Spec No. COGIP, Local Instrument Racks, and Addendum No.1 thru No.5.
Also E & DCR No. C90582B

(a.) Seismic Input
b. Hydrodynamic Load Input
c. Fatigue Considerations
d. Service Conditions
e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

(✓) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method:

( ) Test (✓) Analysis ( ) Combination of Test and Analysis

Qualification Report*: 1. No. 14781, Seismic Structural Analysis of Niagara Mohawk Nine Mile Nuclear Station Unit #2 Transmitter Racks, 7-29-82, SDDF NO. STRS 07.510-5000B.
(No., Title and Date): 2. (Cont'd below)***

Company that Prepared Report: Acton Environmental Testing Corp. for report 1 and Nuclear Qualification Services for report 2.
Company that Reviewed Report: SWEC

Where Report is filed or available: Nine Mile Site

Applicable Codes and/or Standards: NRC Regulatory Guides 1.92 & 1.100, AISC Code, IEEE Std. 344-1975

V. Vibration Input:

1. Loads considered:
a. (✓) Seismic only
b. ( ) Hydrodynamic only
c. ( ) Vibration from normal operation
d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

( ) Absolute Sum ( ) SRSS (✓) N.A. (other, specify)

3. Required Response Spectra** (attach the graphs): Attachment A

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

***
2. NO. 1131, Seismic Qualification of the Mercury Company Terminal Block Housing Relocation for Racks 2CES*RAK 105 & 107 for Nine Mile Station per SW Spec COGIP, 1-27-83, SDDF NO. STRS 07.510-5001A.

4. Damping Corresponding to RRS: OBE 2 % SSE 3 %

5. Required Acceleration in Each Direct:

( ) ZPA (✓) Other Rigid range
(specify)

OBE S/S = 0.24 F/B = 0.24 V = 0.25

SSE S/S = 0.40 F/B = 0.40 V = 0.44

6. Were fatigue effects considered?

( ) Yes (✓) No

If yes, describe how they were treated in overall qualification program:_____

_____

VI. If Qualfication by Test, then Complete: N. A.

1. ( ) Single Frequency ( ) Multi-Frequency ( ) Random
( ) Sine Beat
( ) _____

2. ( ) Single Axis ( ) Multi-Axis
( ) Independent Axis ( ) In-phase Motions

3. Number of Qualifications Tests:

OBE_____ SSE_____ Other_____
(specify)

4. Frequency Range:_____

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

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

6. Method of Determining Natural Frequencies
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

( ) Yes (Attach TRS & RRS graphs)
( ) No

Spec No. C061P

8. Maximum Input g Level Test:

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

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

9. Laboratory Mounting:

A. ( ) Bolt (No._____ Size_____)
( ) Weld (Length_____) ( ) _____

B. Orientation and Fixturing: _____

10. Functional Operability Verified:

( ) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: _____

_____

12. Other Tests Performed (such as aging or fragility test, including results):

_____

_____

13. Failure Modes (If appropriate _____)

14. Margins Available: ( ) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete:

1. Method of Analysis:

(✓) Static Analysis ( ) Equivalent Static Analysis

( ) Dynamic Analysis: ( ) Time-History ( ) Response Spectrum

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

S/S = 44 HZ F/B = > 44 HZ V = > 44 HZ

3. Model Type: (✓) 3D ( ) 2D ( ) 1D
(✓) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

4. (✓) Computer Codes: STARDYNE-3(R), April 1, '82

   Frequency Range and No. of Modes

   ( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   ( ) Absolute Sum (✓) SRSS ( ) Other: _____ (specify)

6. Damping:

   OBE 2% SSE 3% Basis for the Damping Used: FSAR

7. Support Considerations in the Model: The frame work is free standing and restrained at the base mounting locations

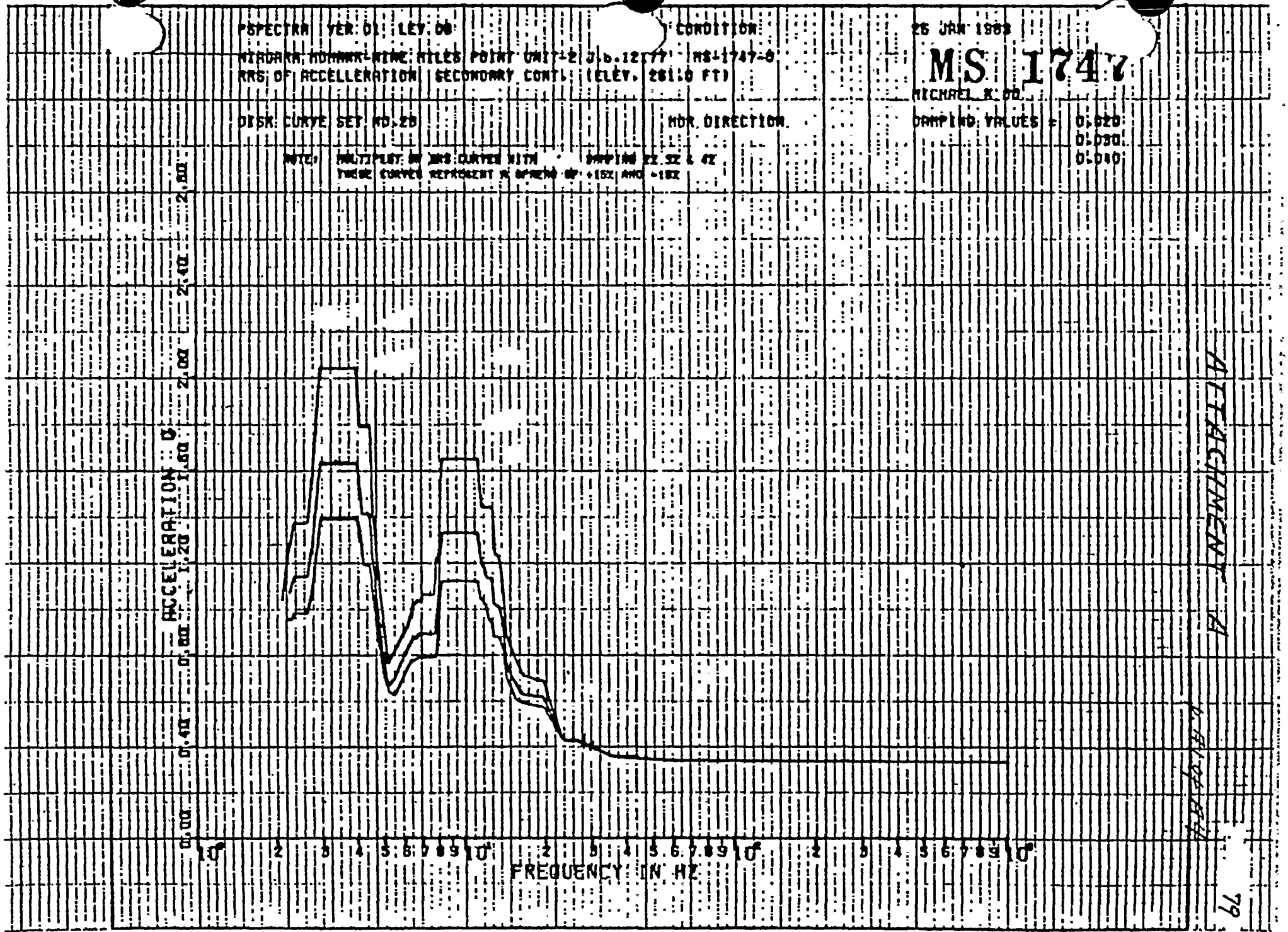
8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress, psi	Stress Allowable, psi
1. Side beam	SSE+DL		2375	24000
2. Rear beam	"		2129	24000
3. Side plate	"		353	16000
4. Terminal Housing skin	"		376	16000
5. Unistrut	"		1451	24000
6. Housing Mount bolts	"		2226	60000
7. Rack Mount bolts	"		13497	60000

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability
Negligibly Small		

9. Failure Modes: Structural

10. Margins Available: ( ) Input Spectrum (✓) Stress or Deflection



ATTACHMENT A

Attachment A

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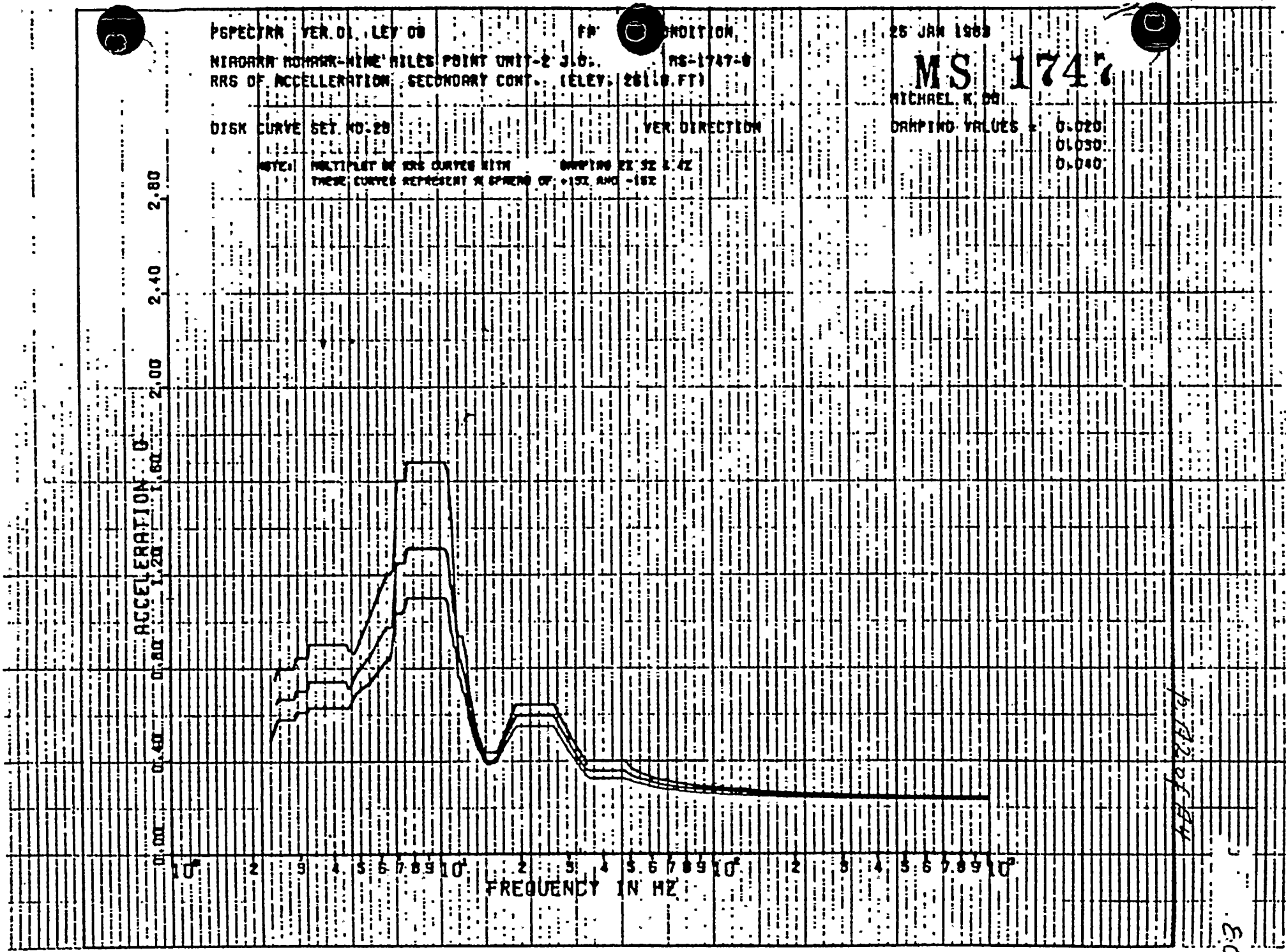
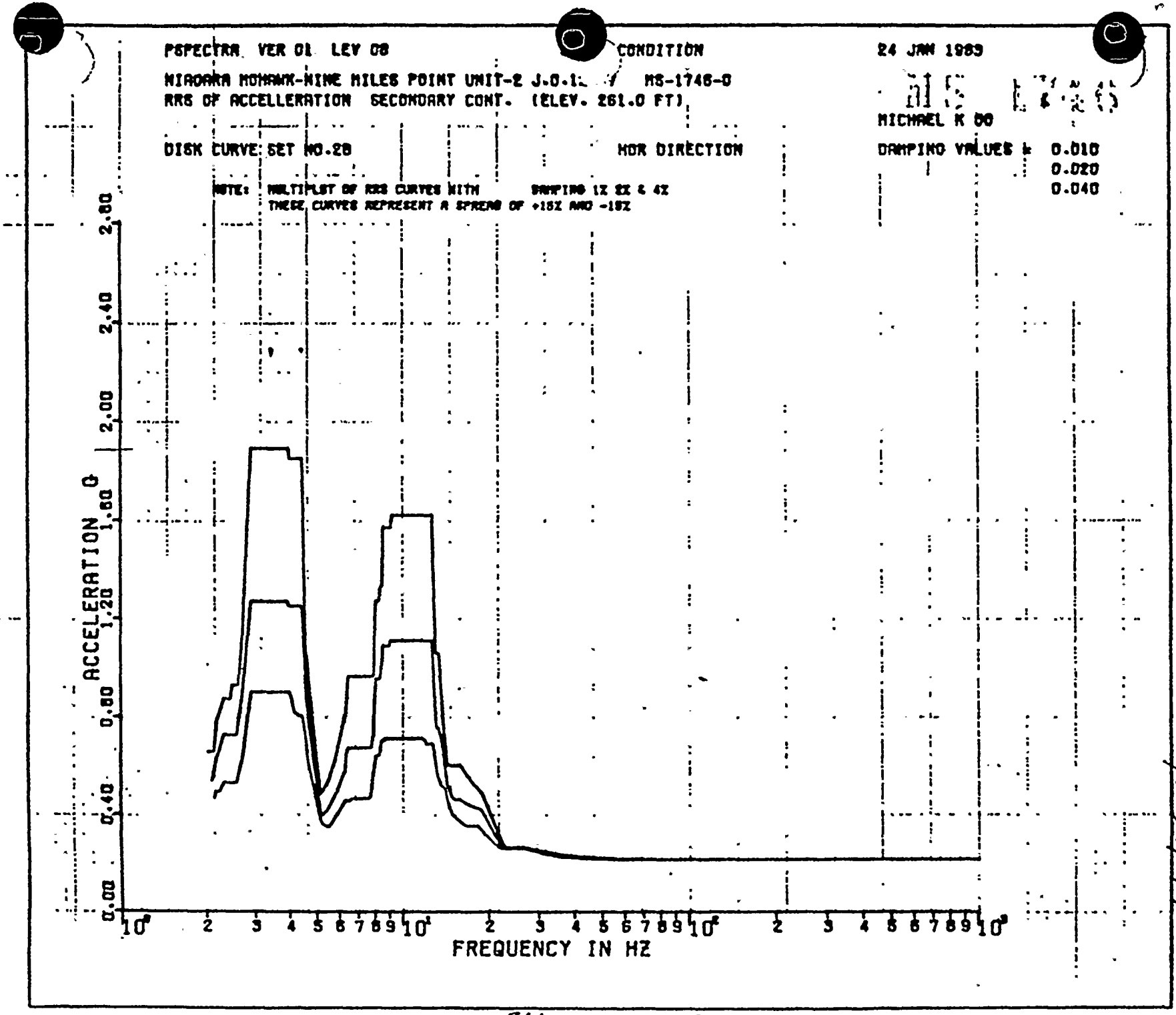


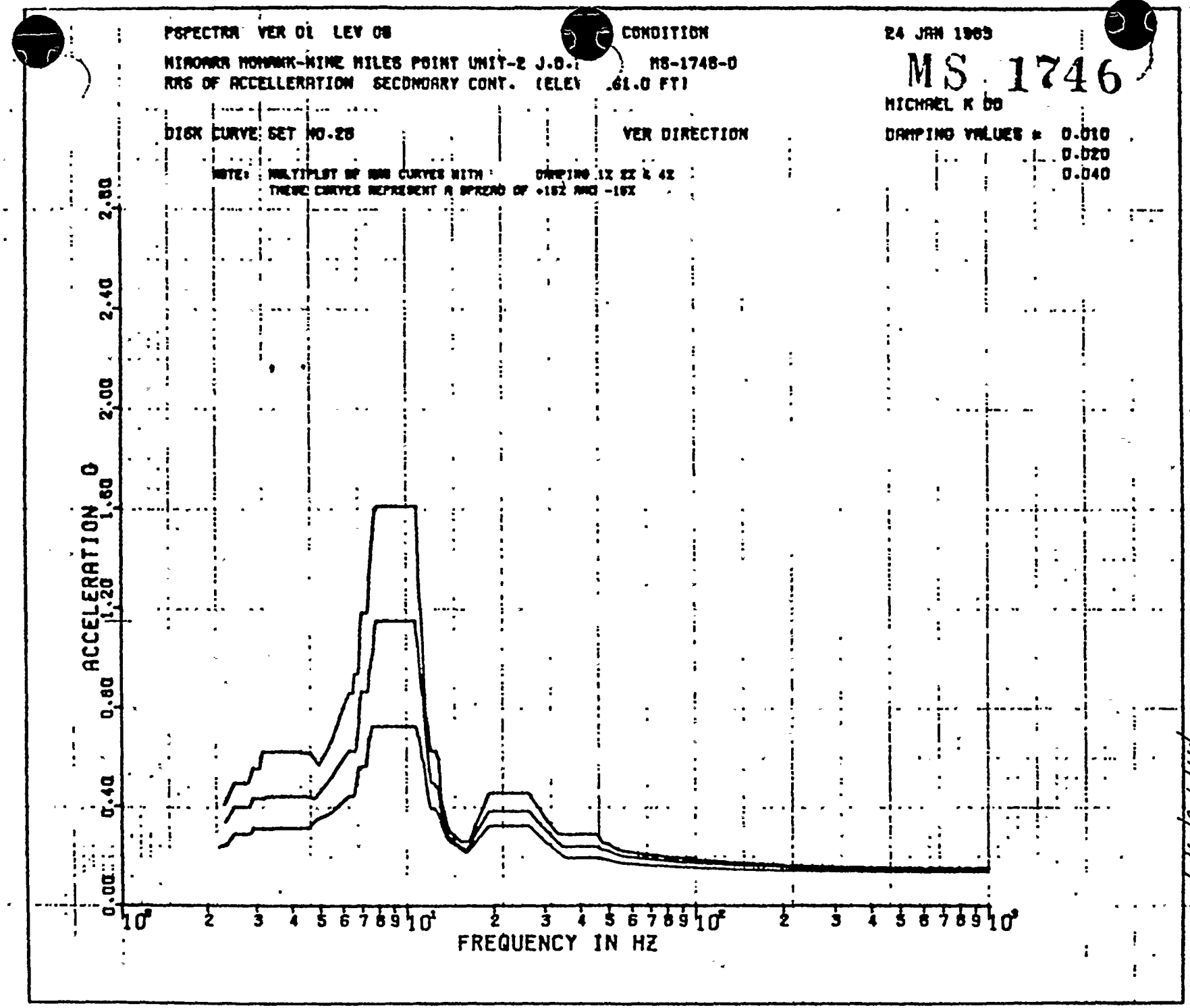
Attachment A



Attachment A

pg. A3 of A4

PASC # 77



Attachment A

SPEC. NO. C071L

SQRT #4

NINE MILE POINT NUCLEAR STATION UNIT 2

EQUIPMENT DYNAMIC QUALIFICATION

COMPONENT NAME: PRESSURE SWITCH

MARK NUMBERS: 2CCP * PSLX90A

STONE & WEBSTER

SPEC. NO. C071L
Revision 0

Seismic and Dynamic Qualification Summary of Equipment

I. **Plant Name:** Nine Mile Point Nuclear Station - Unit 2

1. **Utility:** Niagara Mohawk Power Corporation
2. **NSSS:** General Electric Co. **BWR:** 5 MK 2
3. **A/E:** Stone & Webster Engineering Corp. **Other**

II. **Component Name:** PRESSURE SWITCH (LOW) OUTPUT CARD
Mark # 2CCP*PSLX90A

1. **Scope:** ( ) NSSS (X) BOP ( ) Other
2. **Model Number:** 2AO-L2C-R (ECEP 10213) **Quantity:** 1
3. **Size or Range:** 0-10 V DC input, 100 mA @ 28 V DC OUTPUT
4. **Vendor:** FOXBORO
5. **If the component is a cabinet or panel, name and model number of the devices included:**

   N/A

6. **Physical Description:**
   a. **Appearance:** ELECTRONIC GADGET
   b. **Dimensions:** 4.5" X 1.8" X 3.0"
   c. **Weight:** 3.59 lb
7. **Location:** **Building:** CB (Relay Room) Rack 2CEC*P896
   Elevation: 288'-6"
8. **Field Mounting Conditions** (X) Bolt (No. 6 - Size $\frac{1}{2}$-20) Welded Studs (Rack)
   ( ) Weld (Length)
   (X) Attached to the rack with Screws.
9. **Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.)**

   On rack N-2ES (Foxboro)

10. a. **System in which located:** Plant Component Cooling Water
    b. **Functional Description:** Switch for low pressure alarm for Reactor recirculating pump cooler and control of motor operator valves.
    c. **Is the equipment required for** ( ) **Hot Standby** ( ) **Cold Shutdown** (X) **Both** ( ) **Neither** ( ) **Other**

11. Pertinent Reference Design Specifications for Qualification Requirements: C071L - control room instrumentation and racks. Rev. 1 & Add 1 to Rev. 7, E&DCR P02502 Dated 1/12/85

(a.) Seismic Input

b. Hydrodynamic Load Input

c. Fatigue Considerations

d. Service Conditions

e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

(X) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method:

(X) Test ( ) Analysis ( ) Combination of Test and Analysis

Qualification Report*: SWEC SDDF# IEEE 7.520-5007 A

(No., Title and Date): QOAAB34 Rev. A. Type Test Report 2A0-L2C-R Style A 7/30/79

Company that Prepared Report: FOXBORO/ACTON/NTS LAB.

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975, R.G. 1.100

V. Vibration Input:

1. Loads considered:
   a. (X) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS (X) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT 'I'

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2% SSE 3%

5. Required Acceleration in Each Direct:

(X) ZPA ( ) Other _____ (specify)

OBE S/S = 0.20 F/B = 0.20 V = 0.1

SSE S/S = 0.32 F/B = 0.32 V = 0.2

6. Were fatigue effects considered?

( ) Yes (X) No

If yes, describe how they were treated in overall qualification program: _____

VI. If Qualfication by Test, then Complete:

1. ( ) Single Frequency (X) Multi-Frequency (X) Random ( ) Sine Beat ( ) _____

2. ( ) Single Axis (X) Multi-Axis ( ) Independent Axis (X) In-phase Motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other _____ (specify)

4. Frequency Range: 0.5 to 100 Hz

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical): Not Available

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

6. Method of Determining Natural Frequencies N/A
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

(X) Yes (Attach TRS & RRS graphs) Attachment II
( ) No

8. Maximum Input g Level Test:

OBE S/S = 1.0g F/B = 1.0g V = 1.0g

SSE S/S = 1.6g F/B = 1.6g V = 1.6g

9. Laboratory Mounting: (FOR RACK)

A. (X) Bolt (No. 6 Size $\frac{1}{2}$-20)
( ) Weld (Length) ( )

B. Orientation and Fixturing: Mounted on N-2ES Rack. with Screws

10. Functional Operability Verified:

(X) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: Chattered within acceptable level. Modifications were not reqd.

12. Other Tests Performed (such as aging or fragility test, including results):

All tests pertinent to IEEE 323-1974

13. Failure Modes (If appropriate ELectrical, Structural)

14. Margins Available: (X) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

( ) Static Analysis ( ) Equivalent Static Analysis

( ) 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: ( ) 3D ( ) 2D ( ) 1D
( ) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

4. ( ) Computer Codes:_____ _____

   Frequency Range and No. of Modes

   ( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   ( ) Absolute Sum ( ) SRSS ( ) Other:_____
   (specify)

6. Damping:

   OBE_____ SSE_____ Basis for the Damping Used:_____

7. Support Considerations in the Model:_____

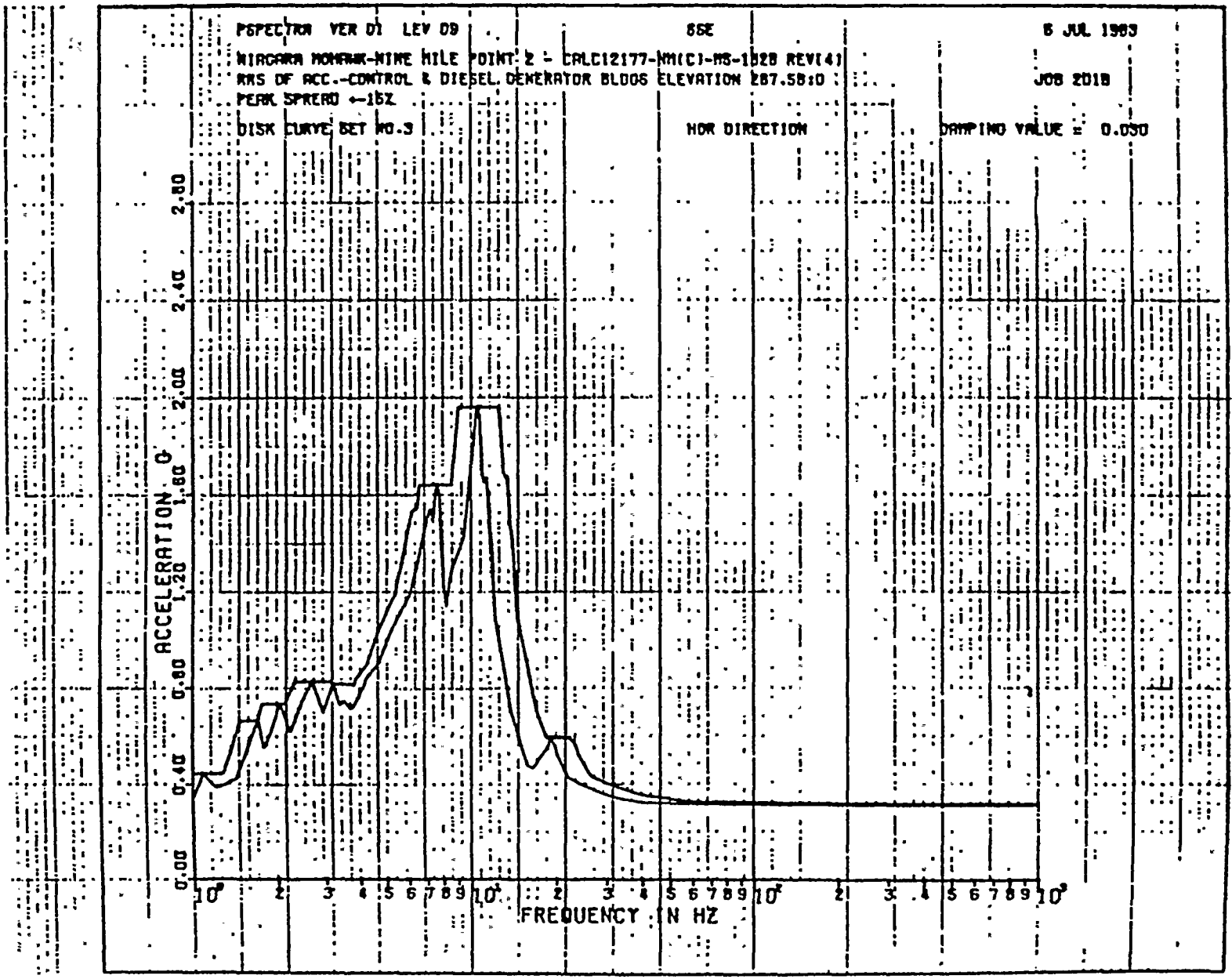
8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes:_____

10. Margins Available: ( ) Input Spectrum ( ) Stress or Deflection



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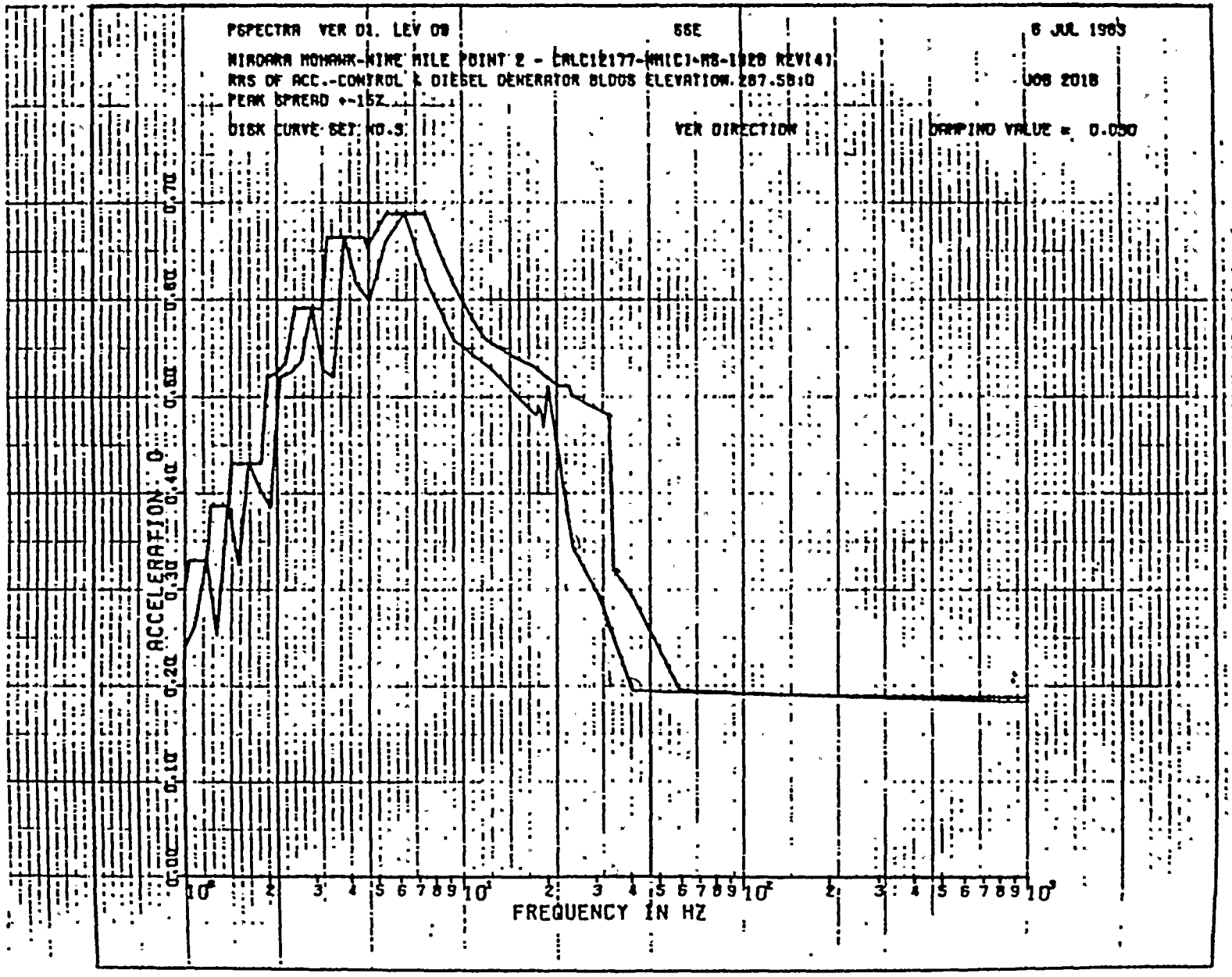
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SSE
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UGS 2018
PEAK SPREAD +-15%
DISK CURVE SET NO.5
VER DIRECTION
DAMPING VALUE = 0.050
ACCELERATION, G
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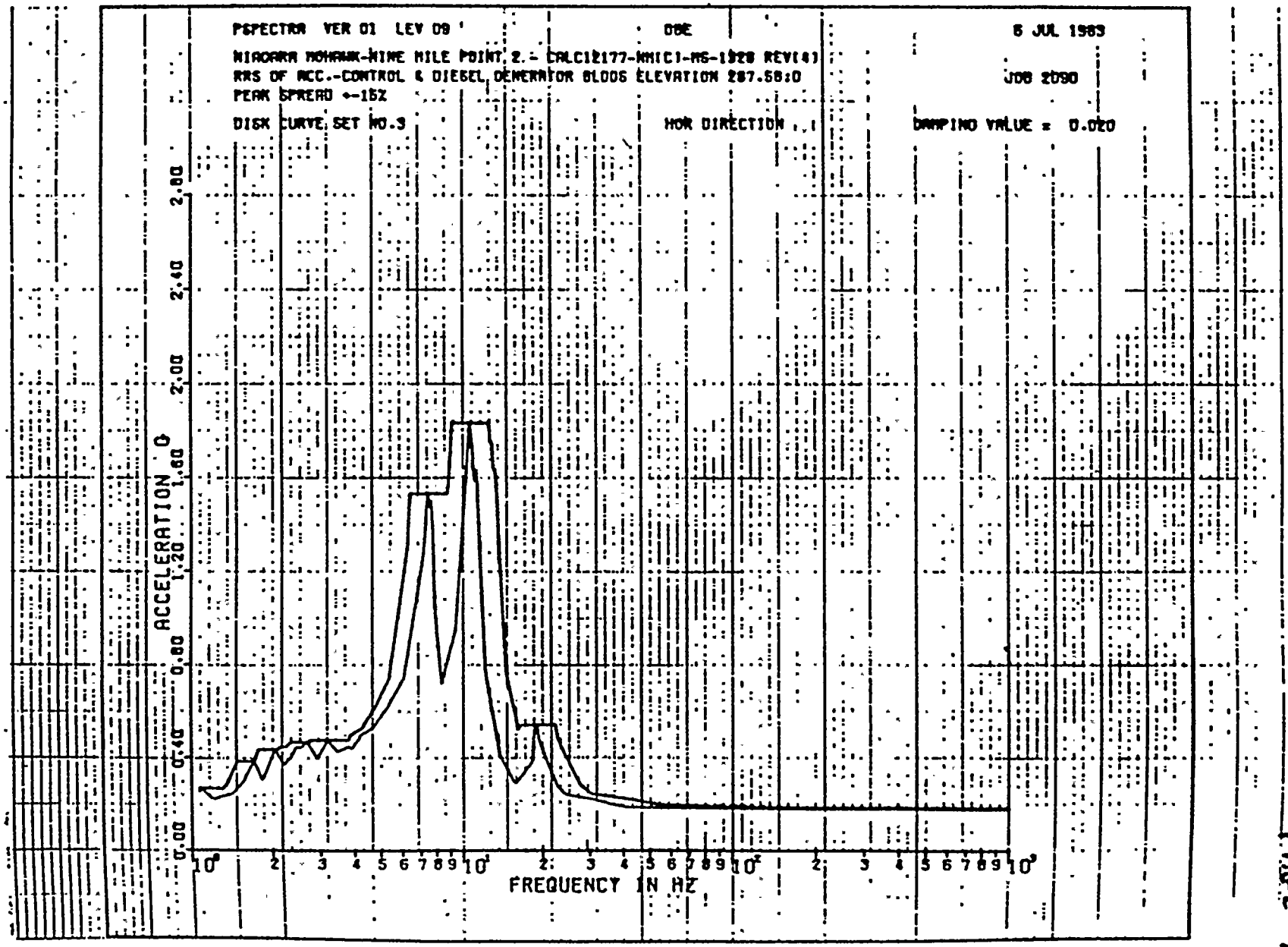
0.30
0.40
0.60
0.70
FREQUENCY IN HZ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OBE
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JOB 2090
PEAK SPREAD +-15%
DISK CURVE SET NO.3
HOR DIRECTION , 1
DAMPING VALUE = 0.020
ACCELERATION G
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0.40
0.80
1.20
1.60
2.00
2.40
2.80
FREQUENCY IN HZ

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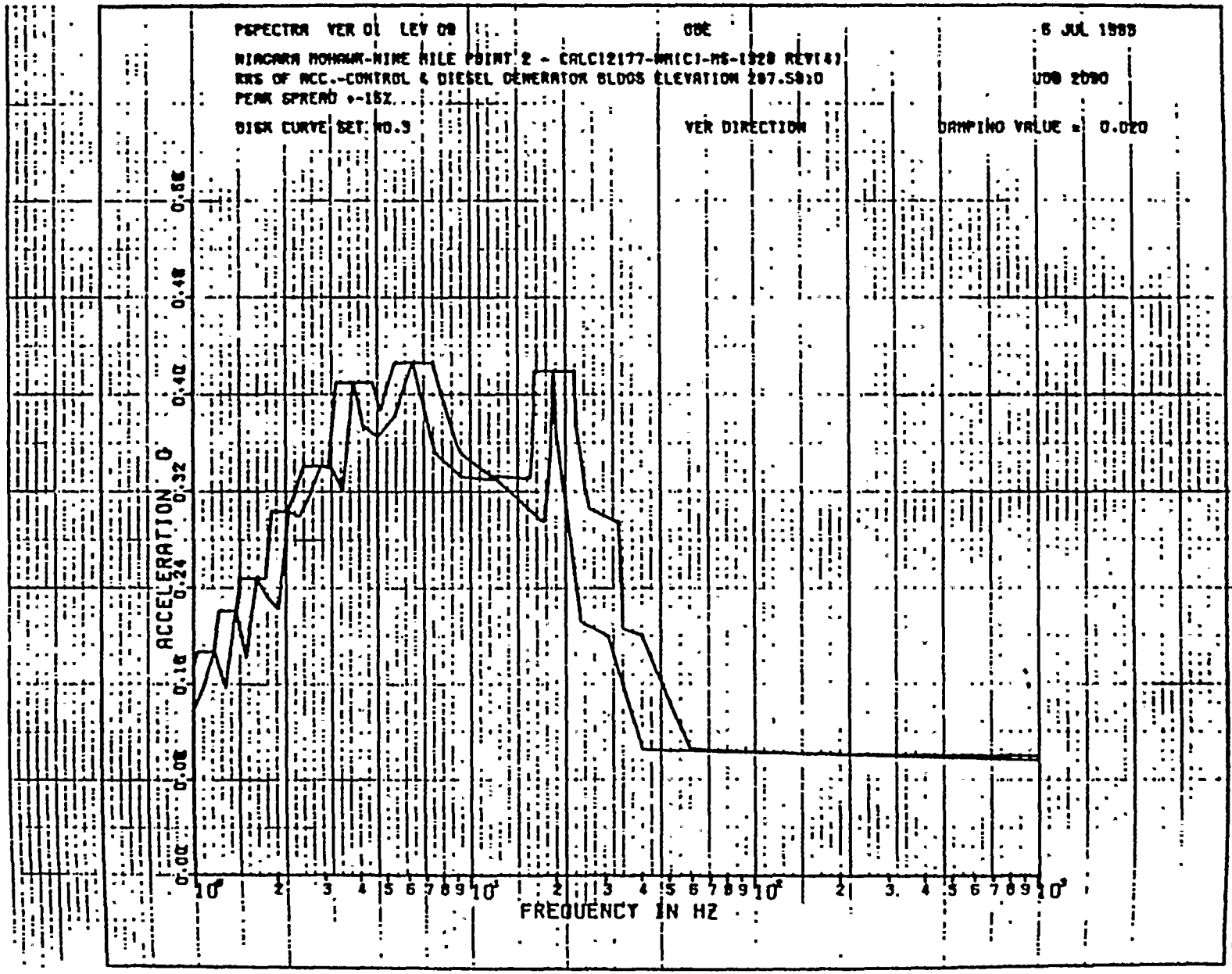
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OBE
6 JUL 1988
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-MMIC1-MS-1928 REV(4)
RRS OF RCC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 287.5&10
UDB 2090
PEAK SPREAD +-15%
DISK CURVE SET NO.3
VER DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
10
2
3
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10
FREQUENCY IN HZ

Attachment - II
(2 Pages)

FIGURE 1B
GENERIC OBE FLOOR-LEVEL TEST RESPONSE SPECTRA,
N-2ES STYLE B RACK

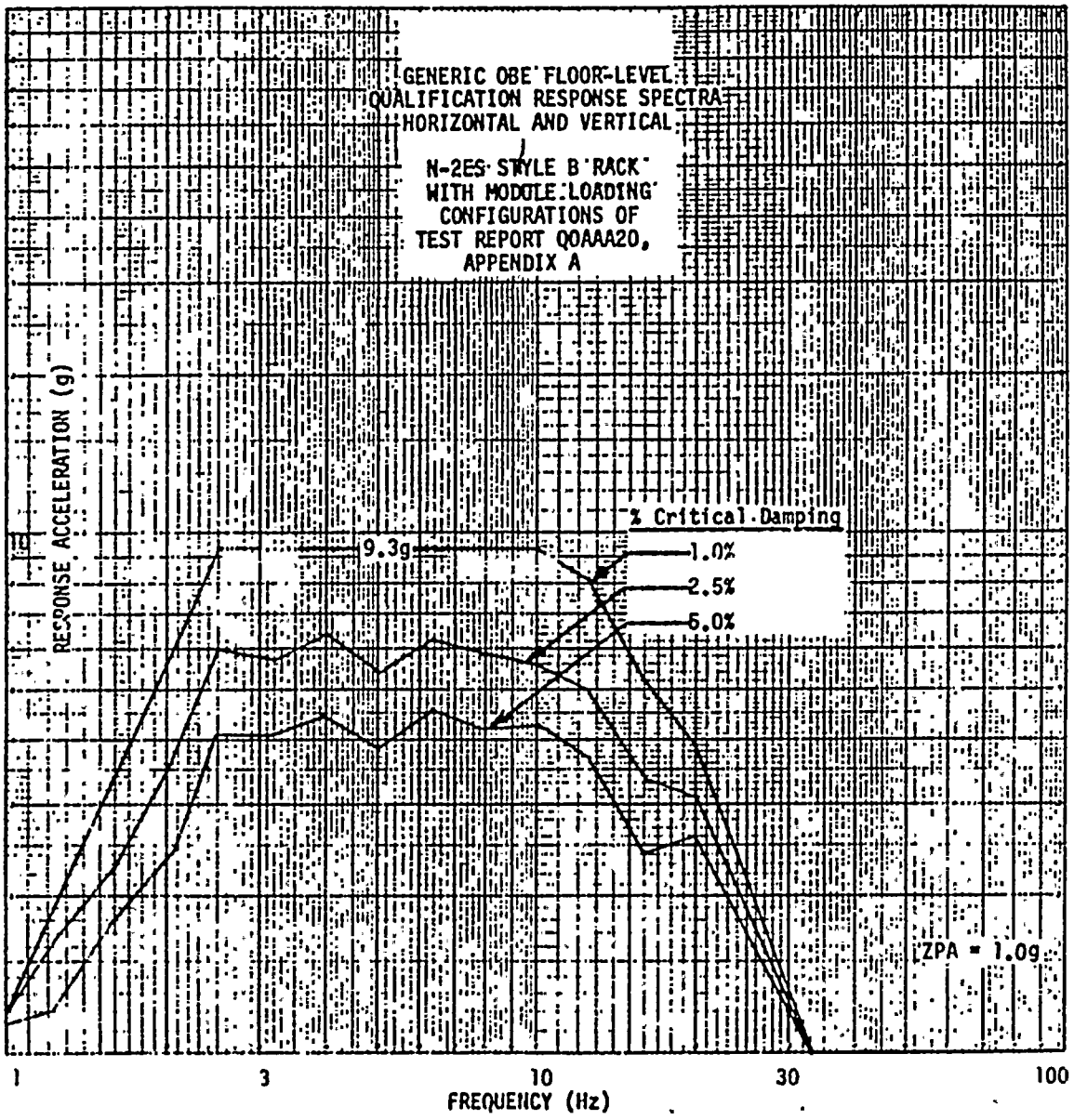
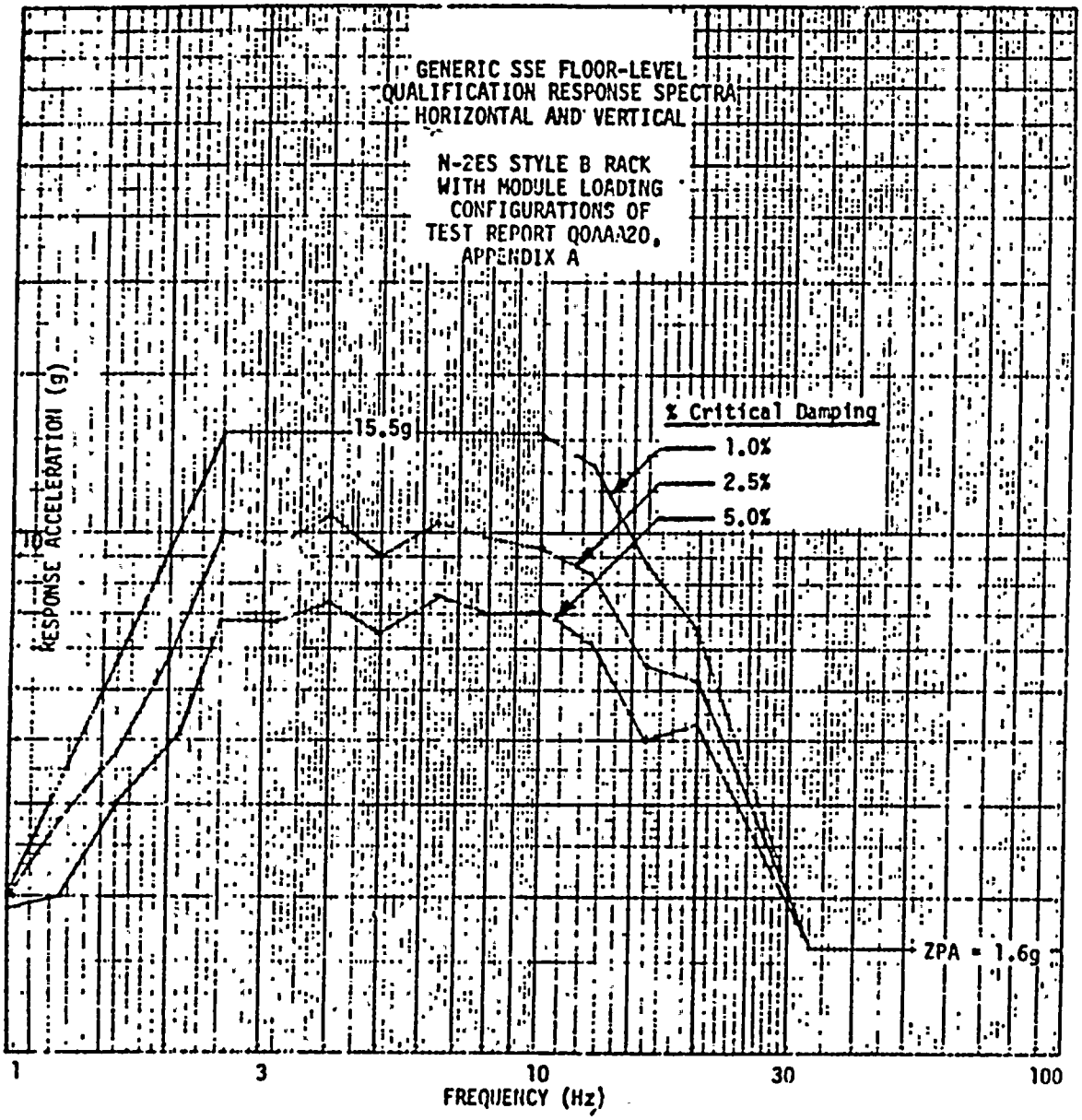


FIGURE 1A
GENERIC SSE FLOOR-LEVEL TEST RESPONSE SPECTRA,
N-2ES STYLE B RACK



SPEC. NO. C071L

SQRT #5

NINE MILE POINT NUCLEAR STATION UNIT 2

EQUIPMENT DYNAMIC QUALIFICATION

COMPONENT NAME: SIGNAL SELECTOR

MARK NUMBERS: 2CMS *TY131

STONE & WEBSTER

SPEC. NO. C071L
Revision 0

Seismic and Dynamic Qualification Summary of Equipment

I. **Plant Name:** Nine Mile Point Nuclear Station - Unit 2

1. **Utility:** Niagara Mohawk Power Corporation
2. **NSSS:** General Electric Co. **BWR:** 5 MK 2
3. **A/E:** Stone & Webster Engineering Corp. **Other**

II. **Component Name:** Signal Selector. Mark # 2CMS *TY 131

1. **Scope:** ( ) NSSS (X) BOP ( ) Other
2. **Model Number:** 2AP + SSL **Quantity:** 1
3. **Size or Range:** 0-10 Volt. D.C.
4. **Vendor:** FOXBORO
5. **If the component is a cabinet or panel, name and model number of the devices included:**
   N/A
6. **Physical Description:**
   a. **Appearance:** ELECTRONIC GADGET
   b. **Dimensions:** 4.2" x 0.8" x 1.7"
   c. **Weight:** 1.49 lb
7. **Location:** **Building:** CB (Relay Room) on Rack 2CEC * P890
   Elevation: 288'-6".
8. **Field Mounting Conditions** (X) Bolt (No. 6 - Size ¼-20) Welded Studs (Rack)
   ( ) Weld (Length)
   (X) 'AP' is attached with screws, SSL is clipped on 'AP'
9. **Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.)**
   On rack N-2ES (Foxboro)
10. a. **System in which located:** Containment Atmosphere Monitoring.
    b. **Functional Description:** Containment area high temp. Selector
    c. **Is the equipment required for** ( ) Hot Standby ( ) Cold Shutdown (X) Both ( ) Neither ( ) Other

11. Pertinent Reference Design Specifications for Qualification Requirements: C071L - Control room Instrumentation and racks. Rev.1 & Add 1 to Rev. 1, ERDCR P02502 Dated 1/12/85

(a.) Seismic Input

b. Hydrodynamic Load Input

c. Fatigue Considerations

d. Service Conditions

e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

(X) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method:

(X) Test ( ) Analysis ( ) Combination of Test and Analysis

Qualification Report*: SWEG SDDF # IEEE 7.520 - 5006 A

(No., Title and Date): QDAAB38 Rev. A - Type Test Report for 2AP+SSL Style B. 3/14/79

Company that Prepared Report: NTS / ACTON / FOXBORO

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975, RG. 1.100

V. Vibration Input:

1. Loads considered:
   a. (X) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS (X) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT 'I'

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2% SSE 3%

5. Required Acceleration in Each Direct:

(X) ZPA ( ) Other_____
(specify)

OBE S/S = 0.20 F/B = 0.20 V = 0.10

SSE S/S = 0.32 F/B = 0.32 V = 0.2

6. Were fatigue effects considered?

( ) Yes (X) No

If yes, describe how they were treated in overall qualification program:_____

VI. If Qualfication by Test, then Complete:

1. ( ) Single Frequency (X) Multi-Frequency (X) Random
( ) Sine Beat
( ) _____

2. ( ) Single Axis (X) Multi-Axis
( ) Independent Axis (X) In-phase Motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other_____
(specify)

4. Frequency Range: 0.5 to 100 Hz

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical): Not Available

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

6. Method of Determining Natural Frequencies N/A
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

(X) Yes (Attach TRS & RRS graphs) Attachment II
( ) No

8. Maximum Input g Level Test:

OBE S/S = 1.0 F/B = 1.0 V= 1.0

SSE S/S = 1.6 F/B = 1.6 V = 1.6

9. Laboratory Mounting: (FOR RACK)

A. (X) Bolt (No. 6 Size $\frac{1}{2}$-20)
( ) Weld (Length _____) ( ) _____

B. Orientation and Fixturing: MOUNTED ON N-2ES Rack with Screws.

10. Functional Operability Verified:

(X) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: The equipment successfully passed the test. No modifications needed.

12. Other Tests Performed (such as aging or fragility test, including results):

All tests pertinent to IEEE 323-1974

13. Failure Modes (If appropriate Structural, Electrical)

14. Margins Available: (X) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

( ) Static Analysis ( ) Equivalent Static Analysis

( ) 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: ( ) 3D ( ) 2D ( ) 1D
( ) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

4. ( ) Computer Codes:_____ _____

   Frequency Range and No. of Modes

   ( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   ( ) Absolute Sum ( ) SRSS ( ) Other:_____
   (specify)

6. Damping:

   OBE_____ SSE_____ Basis for the Damping Used:_____

7. Support Considerations in the Model:_____

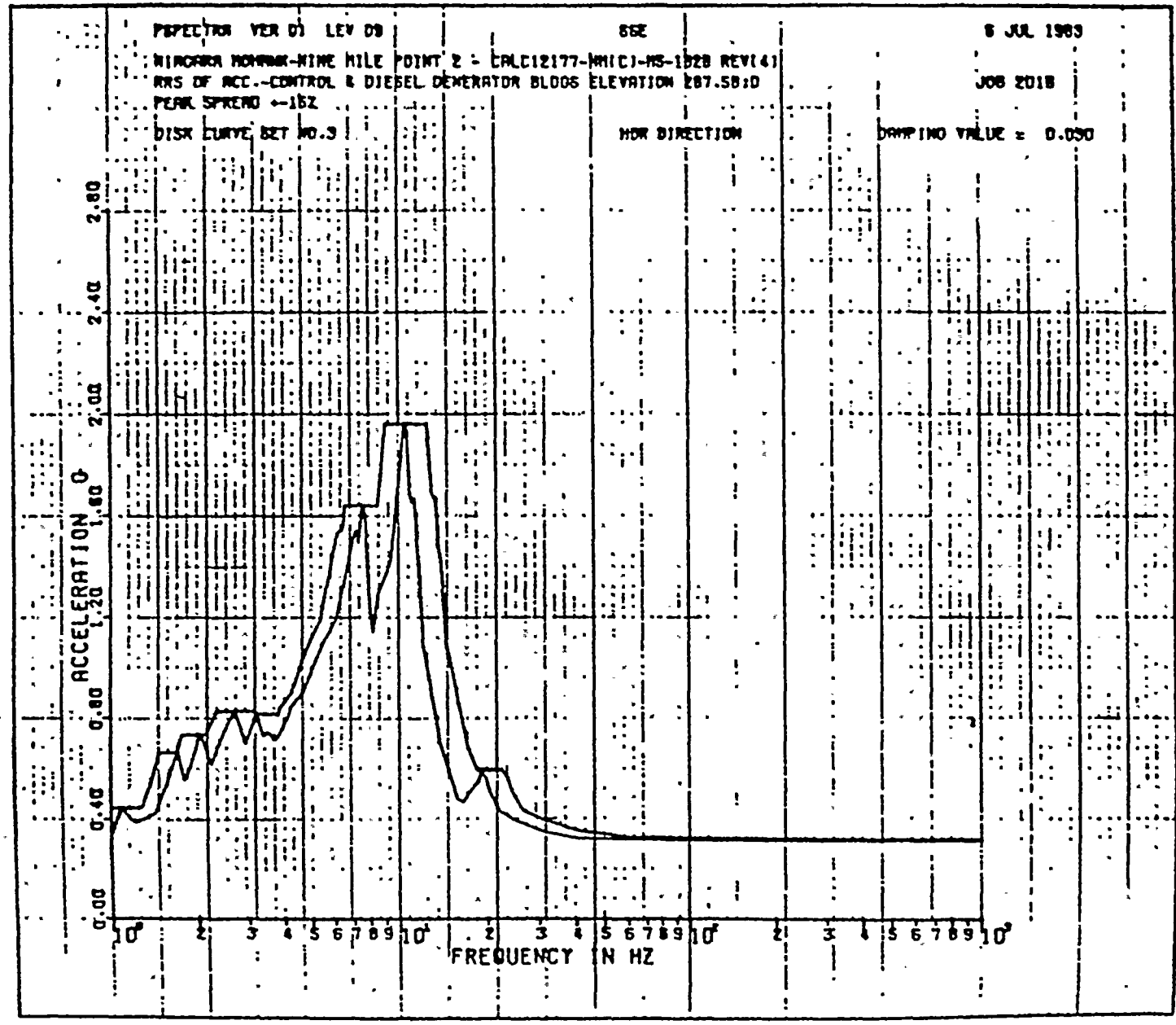
8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

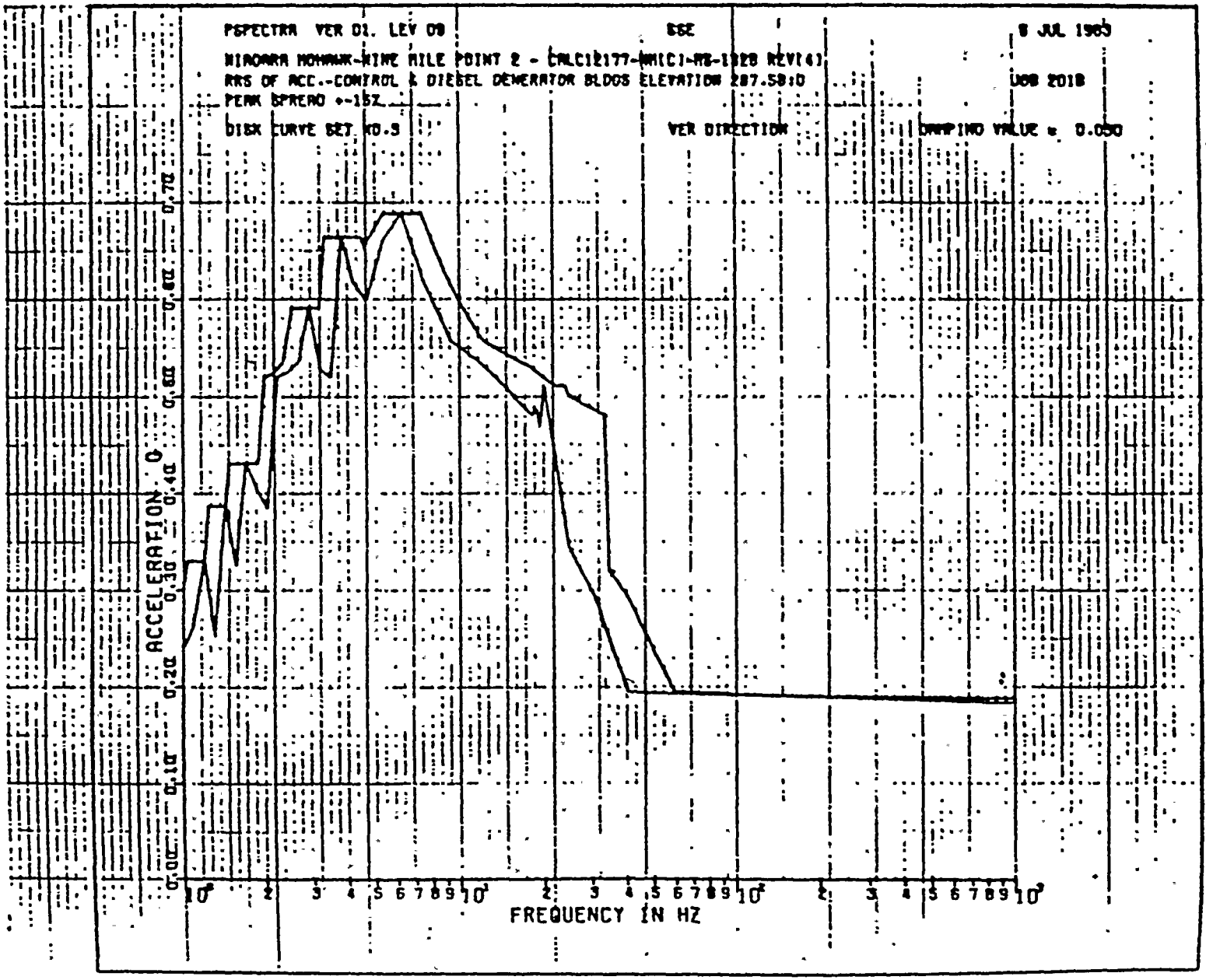
9. Failure Modes:_____

10. Margins Available: ( ) Input Spectrum ( ) Stress or Deflection



Attachment - I
(4 Pages)

PAGE 47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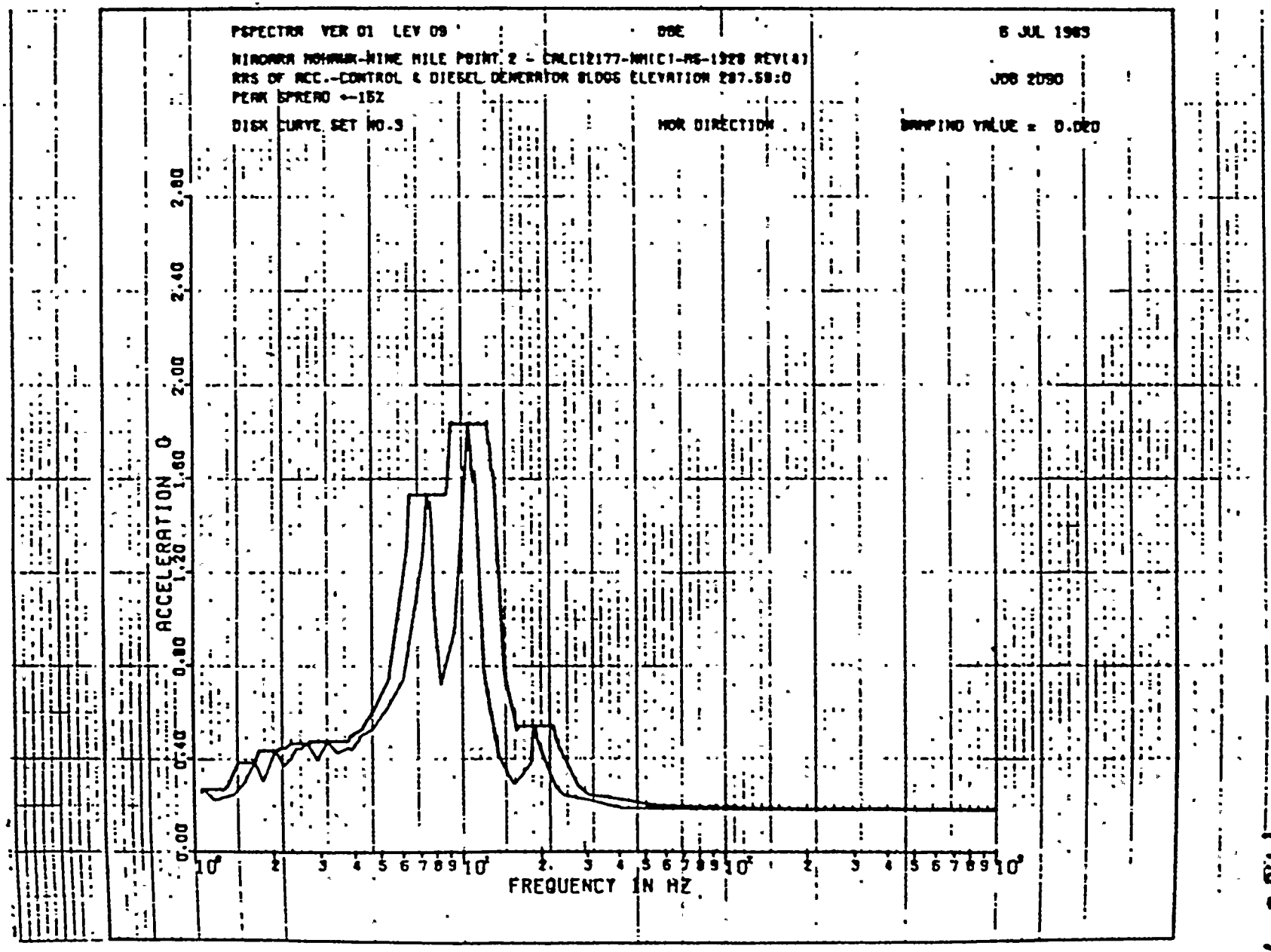
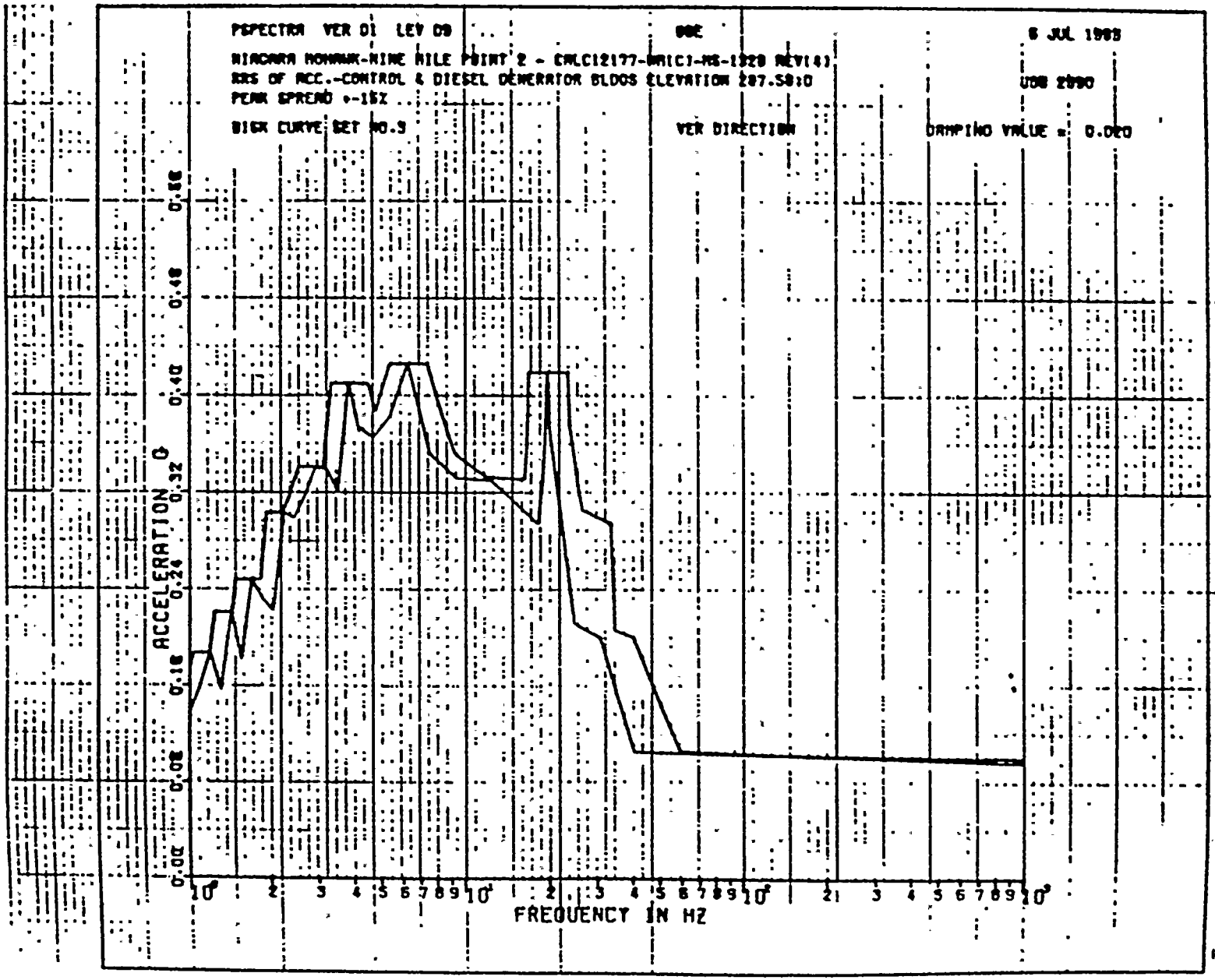
SSE
8 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-(MIC)-MS-1328 REV(4)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 287.58:0
USB 2018
PEAK SPREAD +-15%
DISK CURVE SET NO.3
VER DIRECTION
DAMPING VALUE = 0.050
ACCELERATION G
0.00
0.10
0.20
0.30
0.40
0.60
0.70
FREQUENCY IN HZ


PSPECTRA VER 01 LEV 09
DOE
6 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NMIC1-RS-1928 REV(4)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 287.58:0
JOB 2090
PEAK SPREAD +-15%
DISK CURVE SET NO.3
HOR DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.40
0.80
1.20
1.60
2.00
2.40
2.80
FREQUENCY IN HZ

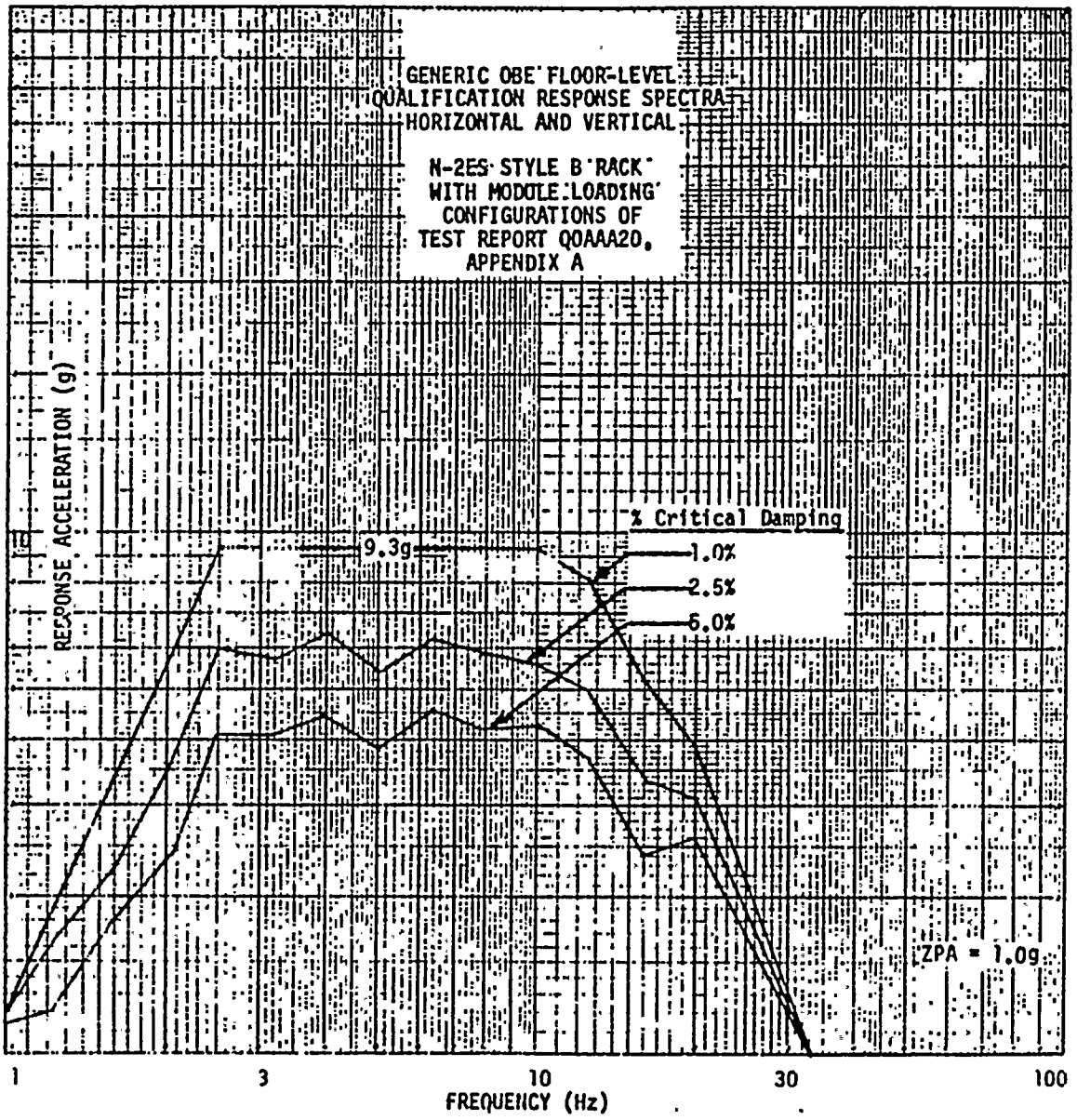
PAGE 95


SPECTRA VER 01 LEV 09
6 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-MRIC1-MS-1328 REV(4)
USB 2990
PEAK SPREAD +-15%
VER DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
FREQUENCY IN HZ

Attachment - II
(2 Pages)

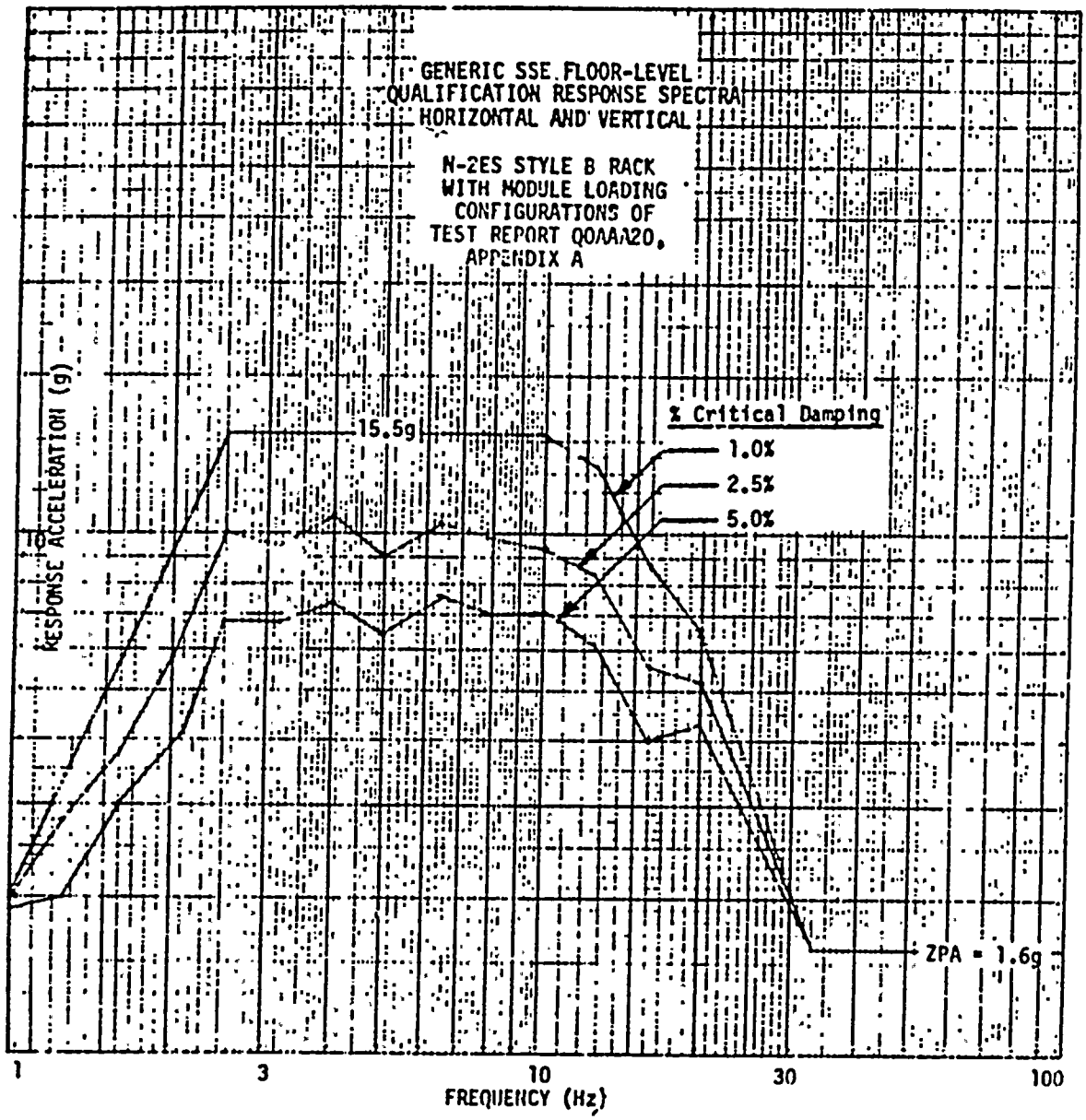
TARG
FOR

FIGURE 1B
GENERIC OBE FLOOR-LEVEL TEST RESPONSE SPECTRA,
N-2ES STYLE B RACK



assemblies

FIGURE 1A
GENERIC SSE FLOOR-LEVEL TEST RESPONSE SPECTRA,
N-2ES STYLE B RACK



SPEC. NO. C071L

SQRT #6

NINE MILE POINT NUCLEAR STATION UNIT 2

EQUIPMENT DYNAMIC QUALIFICATION

COMPONENT NAME: RELAY LOGIC CARD

MARK NUMBERS: 2HVP * TYV 11A

STONE & WEBSTER

SPEC. NO. C071L
Revision 0

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point Nuclear Station - Unit 2

1. Utility: Niagara Mohawk Power Corporation
2. NSSS: General Electric Co. BWR: 5 MK 2
3. A/E: Stone & Webster Engineering Corp. Other

II. Component Name: RELAY LOGIC CARD · Mark# 2HVP*TYV11A

1. Scope: ( ) NSSS (X) BOP ( ) Other
2. Model Number: 2AX+DSR Quantity: 1
3. Size or Range: 120VAC, 5A / 28VDC, 5A
4. Vendor: FOXBOKO
5. If the component is a cabinet or panel, name and model number of the devices included:
   N/A
6. Physical Description:
   a. Appearance: ELECTRONIC GADGET
   b. Dimensions: 4.6" X 1" X 0.6"
   c. Weight: 0.93 lb
7. Location: Building: CB (Relay Room) on Panel 2CEC*P829
   Elevation: 288'-6".
8. Field Mounting Conditions (X) Bolt (No. 6 - Size $\frac{1}{2}$-20) Welded Studs (Racks)
   ( ) Weld (Length) Screws
   (X) 'DSR' is mounted on Rack with 'AX' is clipped on 'DSR'
9. Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.)
   On rack N-2ES (FOXBORO)
10. a. System in which located: Standby DG Bldg. Ventillation.
    b. Functional Description: Standby Diesel Generator Room temp. control.
    c. Is the equipment required for ( ) Hot Standby ( ) Cold Shutdown (X) Both ( ) Neither ( ) Other

II. Pertinent Reference Design Specifications for Qualification Requirements: C071L - Control Room Instrumentation and racks. Rev. 1 & Add. 1 to Rev. 1; E&DCR P02502

(a) Seismic Input

b. Hydrodynamic Load Input

c. Fatigue Considerations

d. Service Conditions

e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

(X) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method:

(X) Test ( ) Analysis ( ) Combination of Test and Analysis

Qualification Report*: SWEC SDDF # IEEE 7.520 - 5005A

(No., Title and Date): QOAAB40 Rev. A. Type test report for 2AX+DSR style B 2/23/79

Company that Prepared Report: ACTON / NTS / FOXBORO

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975, RG. 1.100

V. Vibration Input:

1. Loads considered:
   a. (X) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS (X) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT 'I'

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2% SSE 3%

5. Required Acceleration in Each Direct:

(X) ZPA ( ) Other _____ (specify)

OBE S/S = 0.20 F/B = 0.20 V = 0.10

SSE S/S = 0.32 F/B = 0.32 V = 0.2

6. Were fatigue effects considered?

( ) Yes (X) No

If yes, describe how they were treated in overall qualification program: _____

VI. If Qualfication by Test, then Complete:

1. ( ) Single Frequency (X) Multi-Frequency (X) Random ( ) Sine Beat ( ) _____

2. ( ) Single Axis (X) Multi-Axis ( ) Independent Axis (X) In-phase Motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other _____ (specify)

4. Frequency Range: 0.5 to 100 Hz.

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical): Not Available

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

6. Method of Determining Natural Frequencies N/A
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

(X) Yes (Attach TRS & RRS graphs) Attachment 'II'
( ) No

8. Maximum Input g Level Test:

OBE S/S = 1.0 F/B = 1.0 V= 1.0

SSE S/S = 1.6 F/B = 1.6 V = 1.6

9. Laboratory Mounting: (FOR RACK)

A. (X) Bolt (No. 6 Size $\frac{1}{2}$-20)
( ) Weld (Length) ( )

B. Orientation and Fixturing: MOUNTED ON N-2ES RACK with screws.

10. Functional Operability Verified:

(X) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: The equipment successfully passed the seismic tests. No modification needed.

12. Other Tests Performed (such as aging or fragility test, including results):

All tests pertinent to IEEE 323-1974

13. Failure Modes (If appropriate Structural, Electrical)

14. Margins Available: (X) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

( ) Static Analysis ( ) Equivalent Static Analysis

( ) 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: ( ) 3D ( ) 2D ( ) 1D
( ) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

4. ( ) Computer Codes:_____ _____

   Frequency Range and No. of Modes

   ( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   ( ) Absolute Sum ( ) SRSS ( ) Other:_____
   (specify)

6. Damping:

   OBE_____ SSE_____ Basis for the Damping Used:_____

7. Support Considerations in the Model:_____

8. Critical Structural Elements:

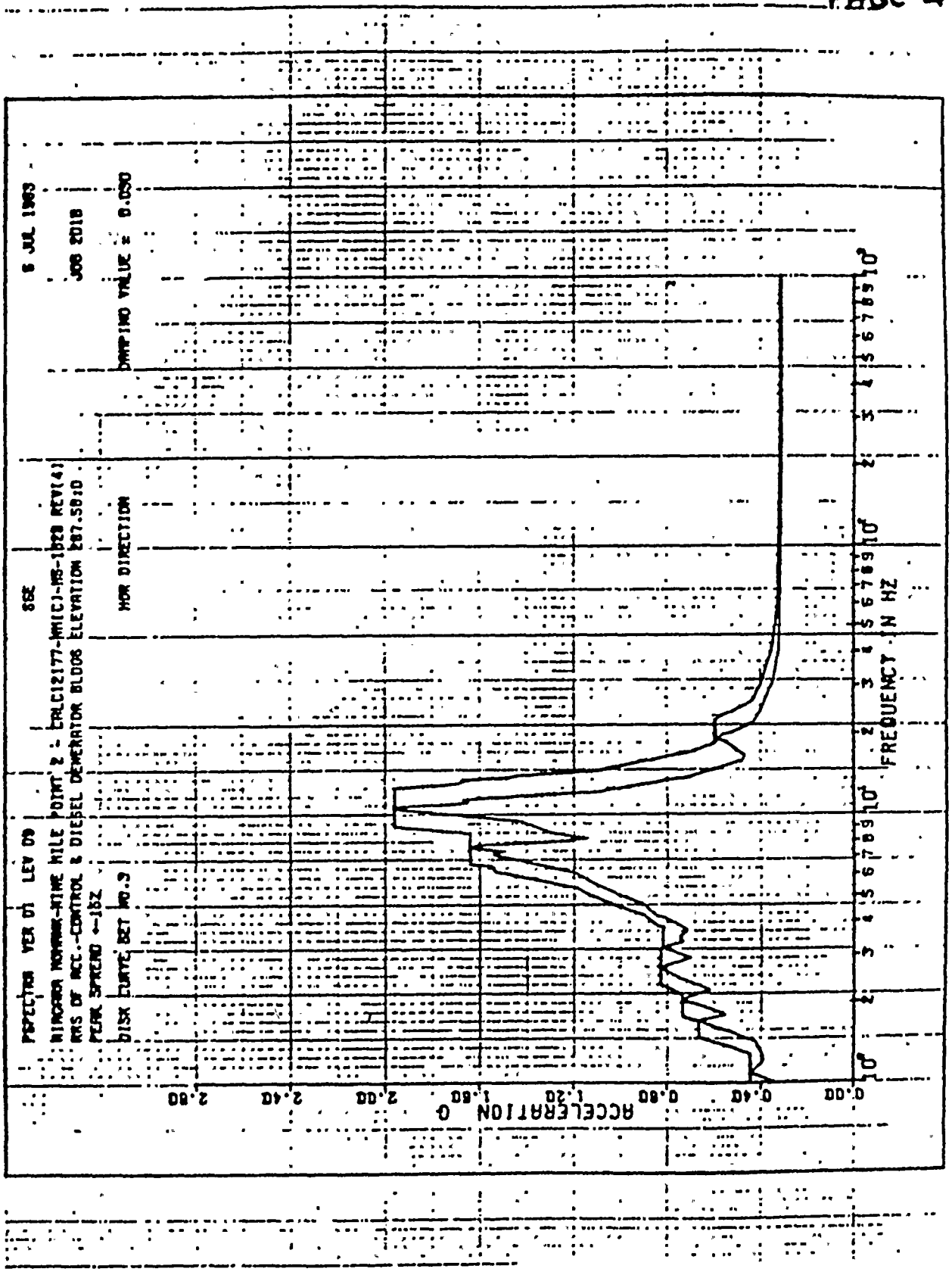
A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

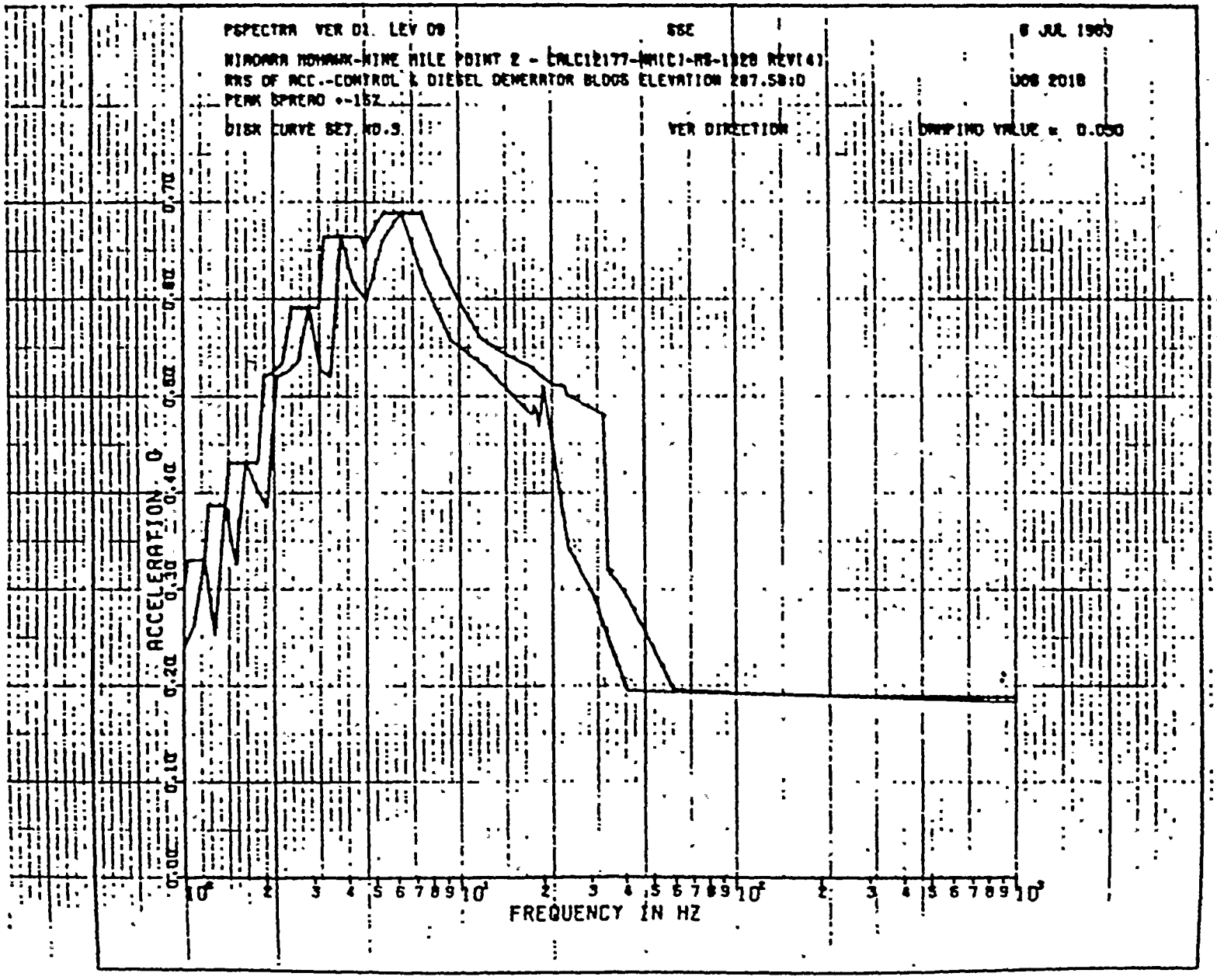
B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes:_____

10. Margins Available: ( ) Input Spectrum ( ) Stress or Deflection

Attachment 'I'
(4 Pages)




PSPECTRA VER 01. LEV 09
SSE
8 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NM(C)-RS-1328 REV(4)
RMS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 287.58:0
JOB 2018
PEAK SPREAD +-15%
DISK CURVE SET NO.9
VER DIRECTION
DAMPING VALUE = 0.050
ACCELERATION, G
0.00
0.10
0.20
0.30
0.40
0.60
0.80
0.70
10
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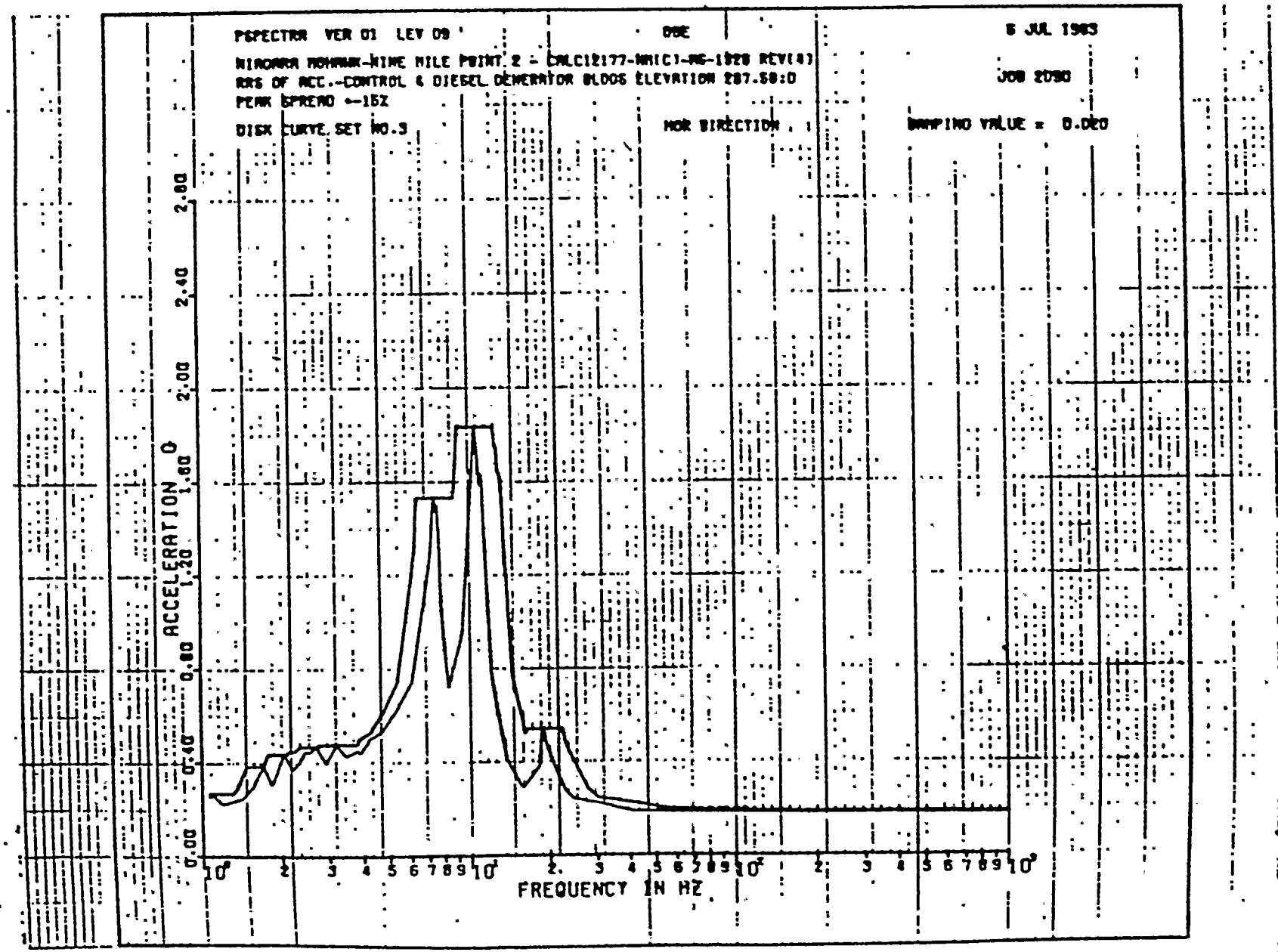
FREQUENCY IN HZ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OBE
6 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NMIC1-RG-1928 REV(4)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 287.58:0
JOB 2090
PEAK SPREAD =-15%
DISK CURVE SET NO.3
HOR DIRECTION , 1
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.40
0.80
1.20
1.60
2.00
2.40
2.80
FREQUENCY IN HZ

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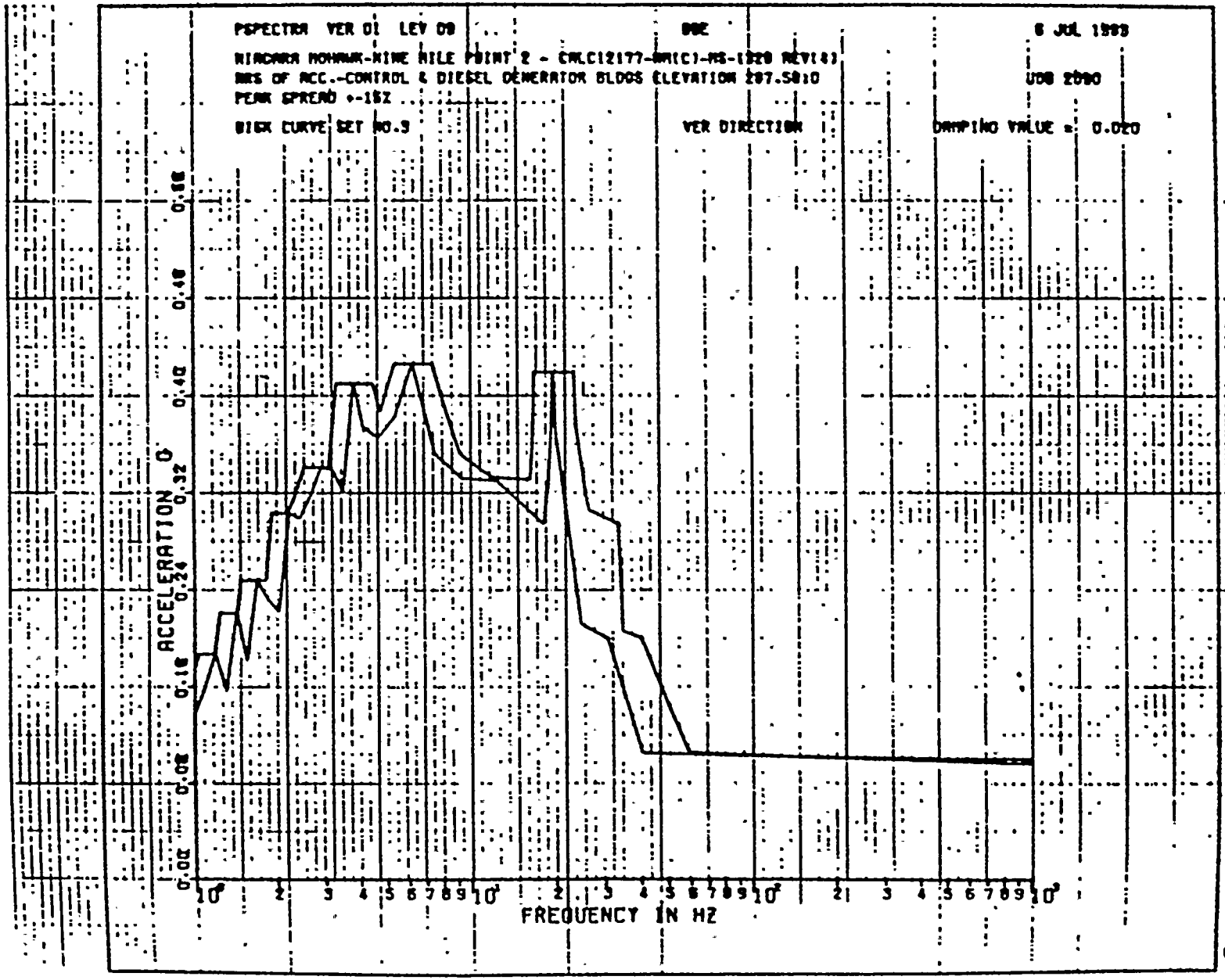
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8 JUL 1993
RANCHO MOHAUK-NINE MILE POINT 2 - CALC12177-MM(C)-MS-1220 REV(4)
BRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 287.5&10
USB 2090
PEAK SPREAD +-15%
BIEK CURVE SET NO.9
VER DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
FREQUENCY IN HZ

Attachment - II
(2 Pages)

FIGURE 1B
GENERIC OBE FLOOR-LEVEL TEST RESPONSE SPECTRA,
N-2ES STYLE B RACK

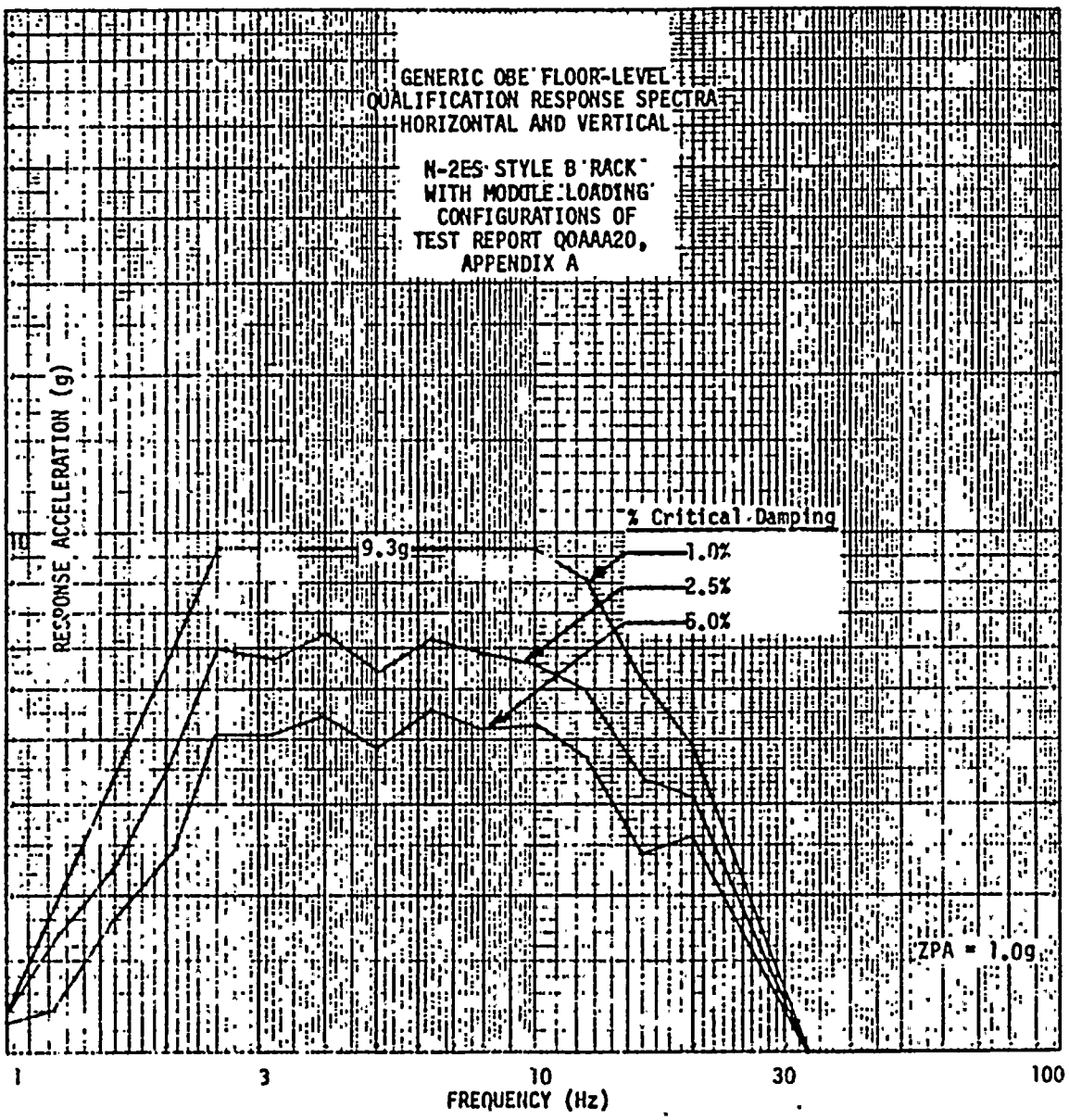
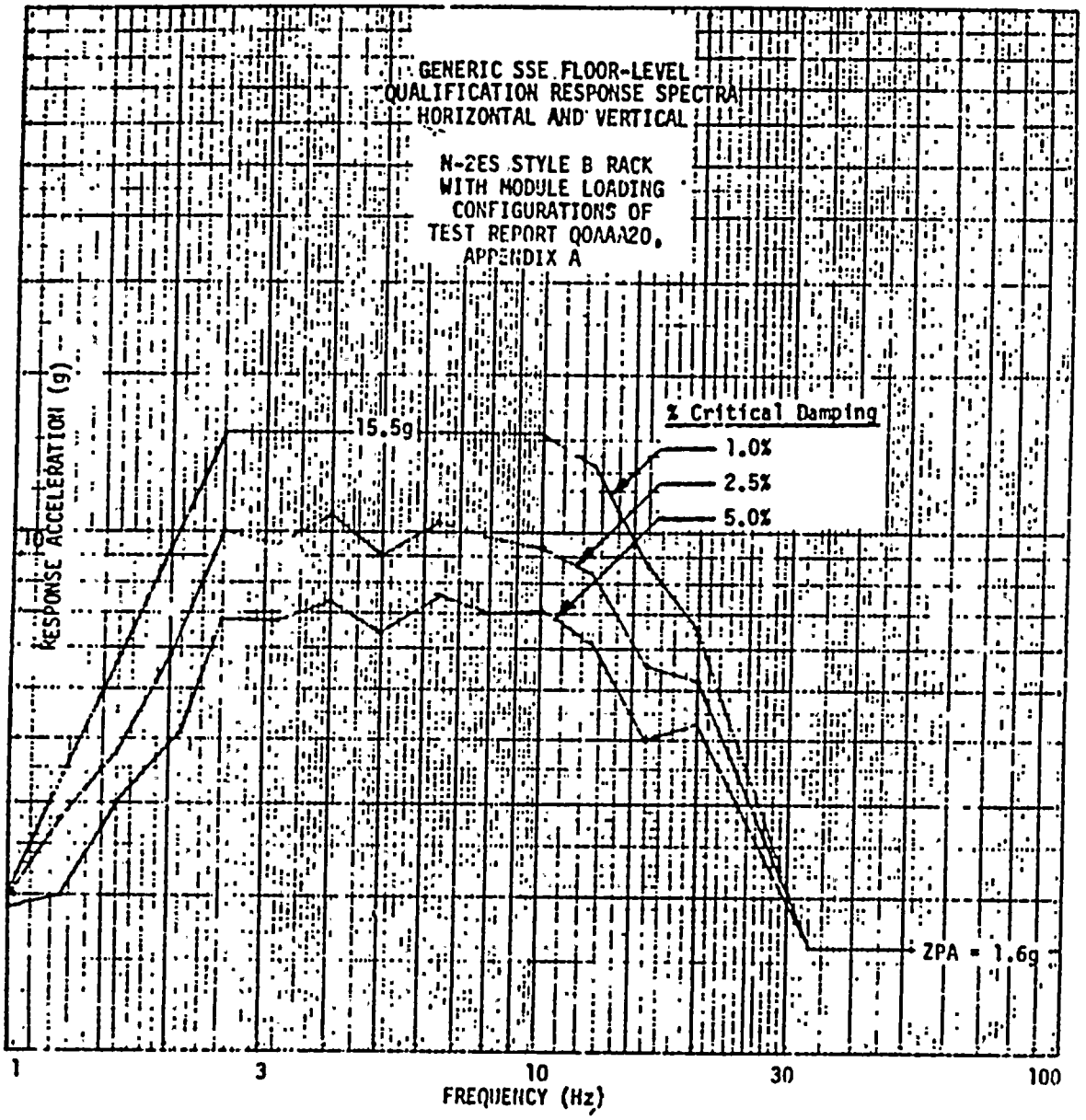


FIGURE 1A
GENERIC SSE FLOOR-LEVEL TEST RESPONSE SPECTRA,
N-2ES STYLE B RACK



SPEC. NO. C071L

SQRT # 7

NINE MILE POINT NUCLEAR STATION UNIT 2

EQUIPMENT DYNAMIC QUALIFICATION

COMPONENT NAME: POWER SUPPLIES

MARK NUMBERS: 2CEC * PWRS 828

STONE & WEBSTER

SPEC. NO. C071L
Revision 0

Seismic and Dynamic Qualification Summary of Equipment

I. **Plant Name:** Nine Mile Point Nuclear Station - Unit 2

1. **Utility:** Niagara Mohawk Power Corporation
2. **NSSS:** General Electric Co. **BWR:** 5 MK 2
3. **A/E:** Stone & Webster Engineering Corp. **Other**

II. **Component Name:** POWER SUPPLIES mark # 2CEC # PWRS 824

1. **Scope:** ( ) NSSS (X) BOP ( ) Other
2. **Model Number:** 2ARPS-A6 **Quantity:** 1
3. **Size or Range:** ±15VDC, 5A
4. **Vendor:** FOXBORO
5. **If the component is a cabinet or panel, name and model number of the devices included:**
   N/A
6. **Physical Description:**
   a. **Appearance:** BOX TYPE
   b. **Dimensions:** 3.8" x 6.8" x 6.3" approx
   c. **Weight:** 53.5 lb Approx
7. **Location:** **Building:** CB (Relay room) on Rack 2CEC # P828
   Elevation: 288'-6".
8. **Field Mounting Conditions** (X) Bolt (No. 6 - Size $\frac{1}{2}$-20) Welded Studs (Rack)
   ( ) Weld (Length)
   (X) attached to the Rack with Screws
9. **Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.)** On rack N-2ES (FOXBORO)
10. a. **System in which located:** VARIOUS
    b. **Functional Description:** BOP INSTRUMENT POWER SUPPLY
    c. **Is the equipment required for** ( ) Hot Standby ( ) Cold Shutdown (X) Both ( ) Neither ( ) Other

11. Pertinent Reference Design Specifications for Qualification Requirements: C071L - Control room instrumentation and racks. Rev. 1 & Add. 1 to Rev. 1, E&DCR P02502 dated 1/17/85

(a.) Seismic Input

b. Hydrodynamic Load Input

c. Fatigue Considerations

d. Service Conditions

e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

(X) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method:

(X) Test ( ) Analysis ( ) Combination of Test and Analysis

Qualification Report*: SWEC SDDF # IEEE 7.520-5018A

(No., Title and Date): Q0AAB25 Rev. A Type test report for 2ARPS-AG-B+BB2 3/30/79

Company that Prepared Report: ACTON / NTS / FOXBORO

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975, RG. 1.100

V. Vibration Input:

1. Loads considered:
   a. (X) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS (X) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): ATTACHMENT I

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2% SSE 3%

5. Required Acceleration in Each Direct:

(X) ZPA ( ) Other _____ (specify)

OBE S/S = 0.20 F/B = 0.20 V = 0.10

SSE S/S = 0.32 F/B = 0.32 V = 0.20

6. Were fatigue effects considered?

( ) Yes (X) No

If yes, describe how they were treated in overall qualification program: _____

VI. If Qualfication by Test, then Complete:

1. ( ) Single Frequency (X) Multi-Frequency (X) Random ( ) Sine Beat ( ) _____

2. ( ) Single Axis (X) Multi-Axis ( ) Independent Axis (X) In-phase Motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other _____ (specify)

4. Frequency Range: 0.5 to 100 Hz

5. Natural Frequencies in Each Direction (Side/Side, Front/Back, Vertical): Not Available

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

6. Method of Determining Natural Frequencies N/A
( ) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

(X) Yes (Attach TRS & RRS graphs) Attachment 'II'
( ) No

8. Maximum Input g Level Test:

OBE S/S = 1.0 F/B = 1.0 V= 1.0

SSE S/S = 1.6 F/B = 1.6 V = 1.6

9. Laboratory Mounting: (FOR RACK)

A. ( ) Bolt (No. 6 Size $\frac{1}{2}$-20)
( ) Weld (Length) ( )

B. Orientation and Fixturing: MOUNTED ON N-2ES RACK with screws.

10. Functional Operability Verified:

(X) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: The equipment successfully passed the test.

12. Other Tests Performed (such as aging or fragility test, including results):

All tests pertinent to IEEE 323-1974

13. Failure Modes (If appropriate Structural, Electrical)

14. Margins Available: (X) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

( ) Static Analysis ( ) Equivalent Static Analysis

( ) 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: ( ) 3D ( ) 2D ( ) 1D
( ) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

4. ( ) Computer Codes:_____ _____

   Frequency Range and No. of Modes

   ( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   ( ) Absolute Sum ( ) SRSS ( ) Other:_____
   (specify)

6. Damping:

   OBE_____ SSE_____ Basis for the Damping Used:_____

7. Support Considerations in the Model:_____

8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

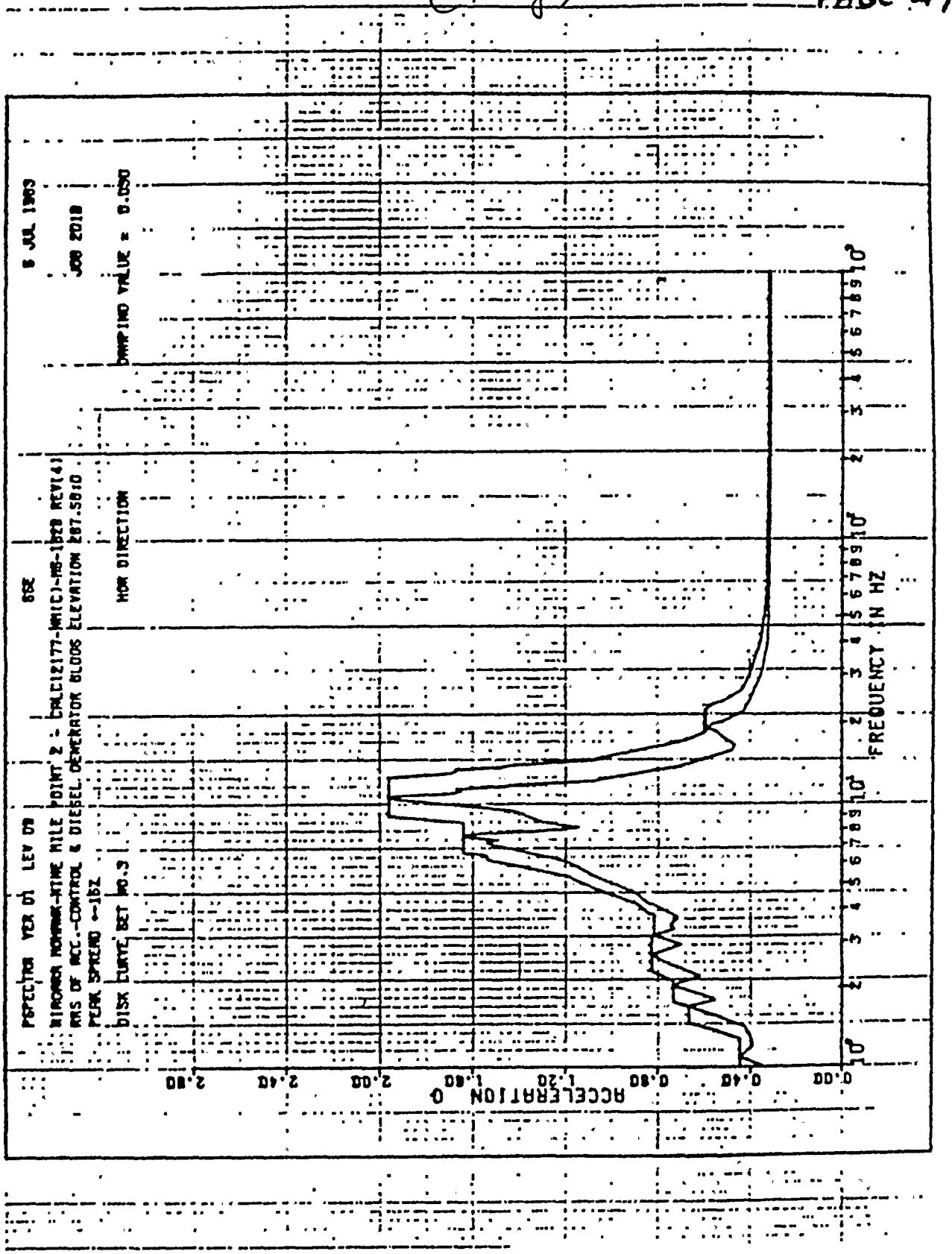
B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

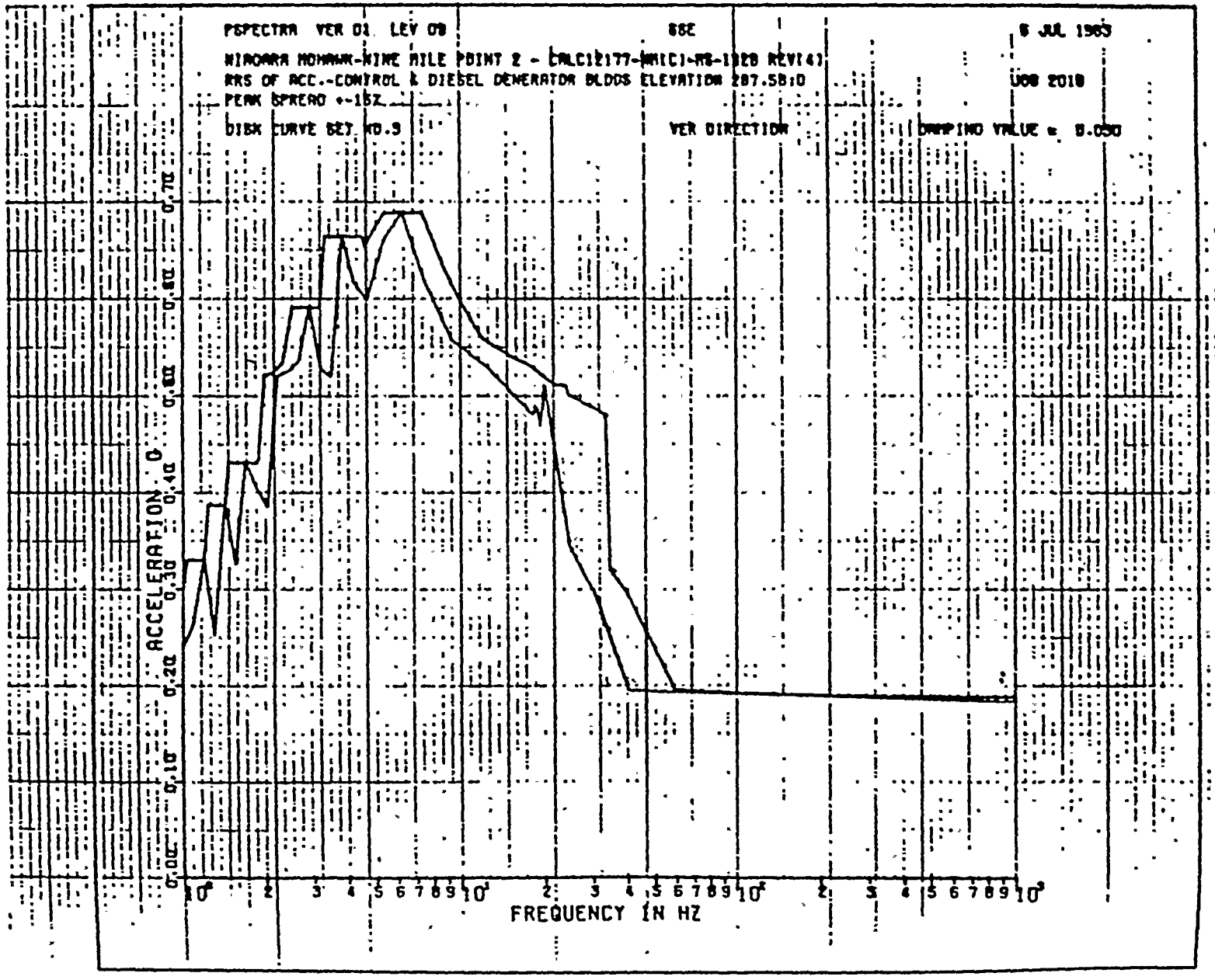
9. Failure Modes:_____

10. Margins Available: ( ) Input Spectrum ( ) Stress or Deflection

Attachment - I

(4 Pages)




PSPECTRA VER 01 LEV 08
SSE
6 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-MICI-MS-1328 REVI41
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 287.58:0
USB 2018
PEAK SPREAD +-15%
DISK CURVE SET NO.9
VER DIRECTION
DAMPING VALUE = 0.050
ACCELERATION G
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
10
2
3
4
5
6
7
8
9
10
2
3
4
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6
7
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9
10
2
3
4
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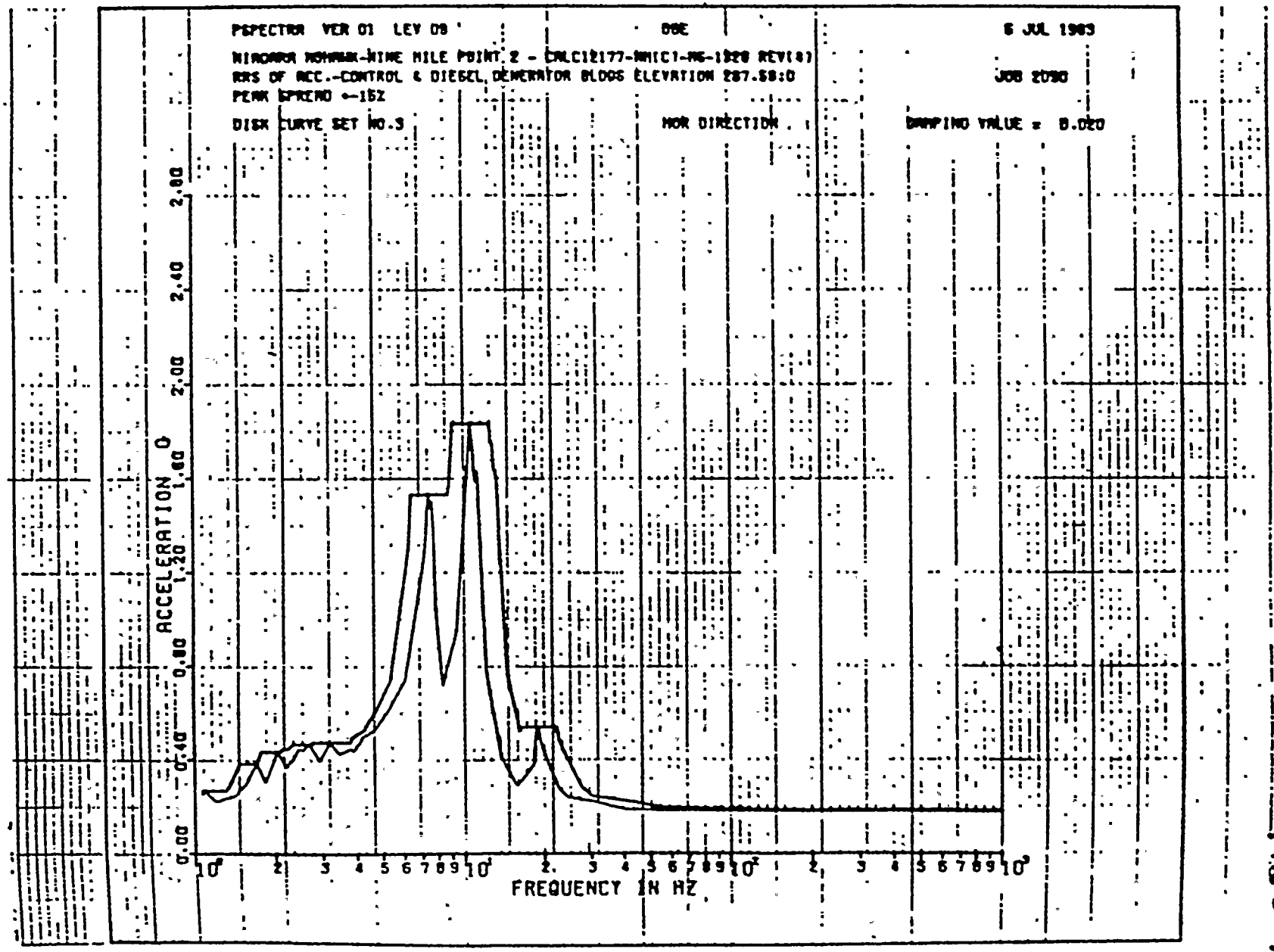
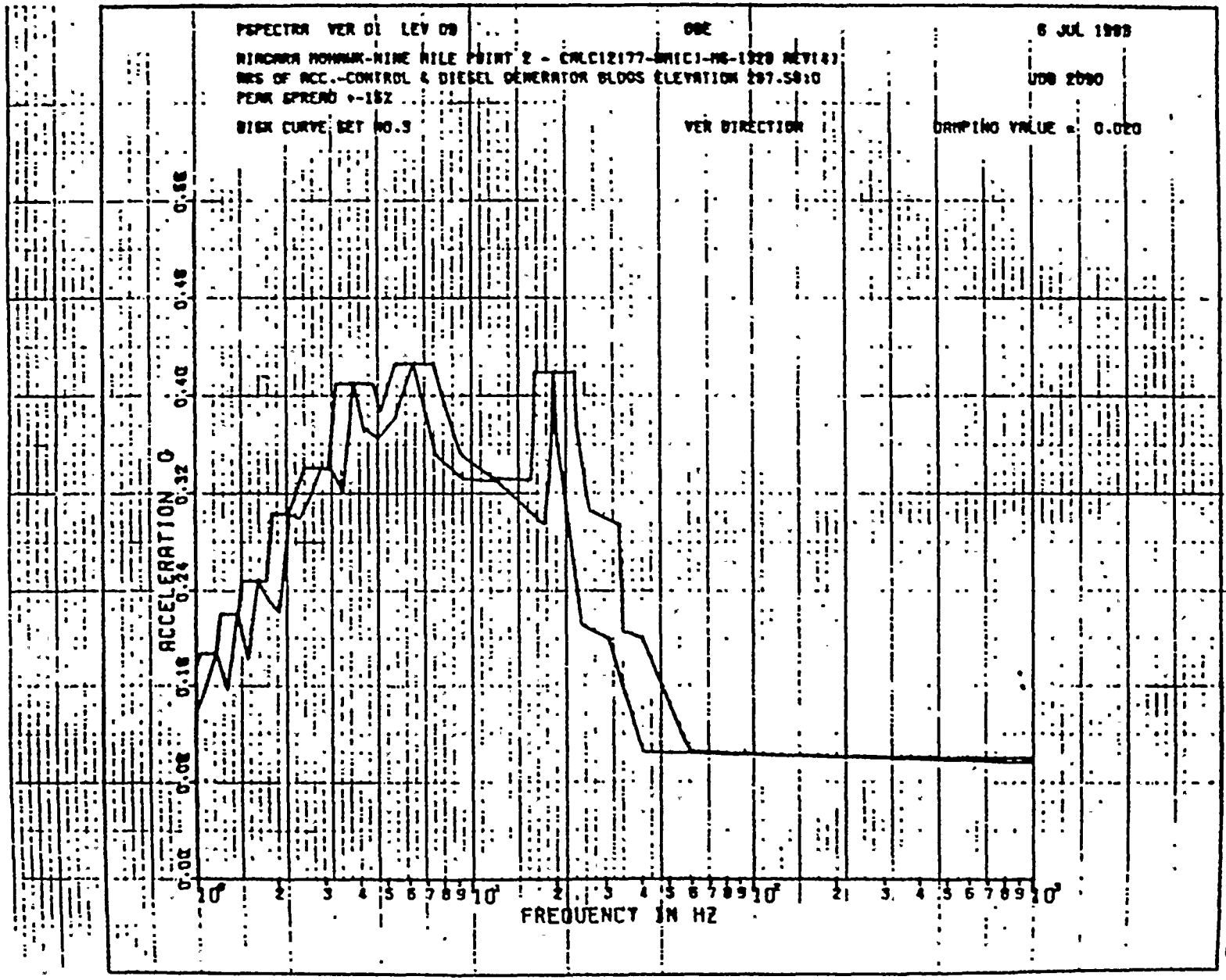
8
9
10
FREQUENCY IN HZ


PSPECTRA VER 01 LEV 08
OBE
6 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NMIC1-MS-1328 REV(8)
RRS OF REC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 287.58:0
JOB 2090
PEAK SPREAD =-15%
DISK CURVE SET NO.3
HOR DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.40
0.80
1.20
1.60
2.00
2.40
2.80
FREQUENCY IN HZ


PSPECTRA VER 01 LEV 00
OBE
6 JUL 1993
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-SMIC1-NS-1320 REV(4)
RES OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 287.50:0
UDB 2090
PEAK SPREAD +-15Z
BIEK CURVE SET NO.9
VER DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
10
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FREQUENCY IN HZ

Attachment - II
(2 Pages)

FIGURE 1B
GENERIC OBE FLOOR-LEVEL TEST RESPONSE SPECTRA,
N-2ES STYLE B RACK

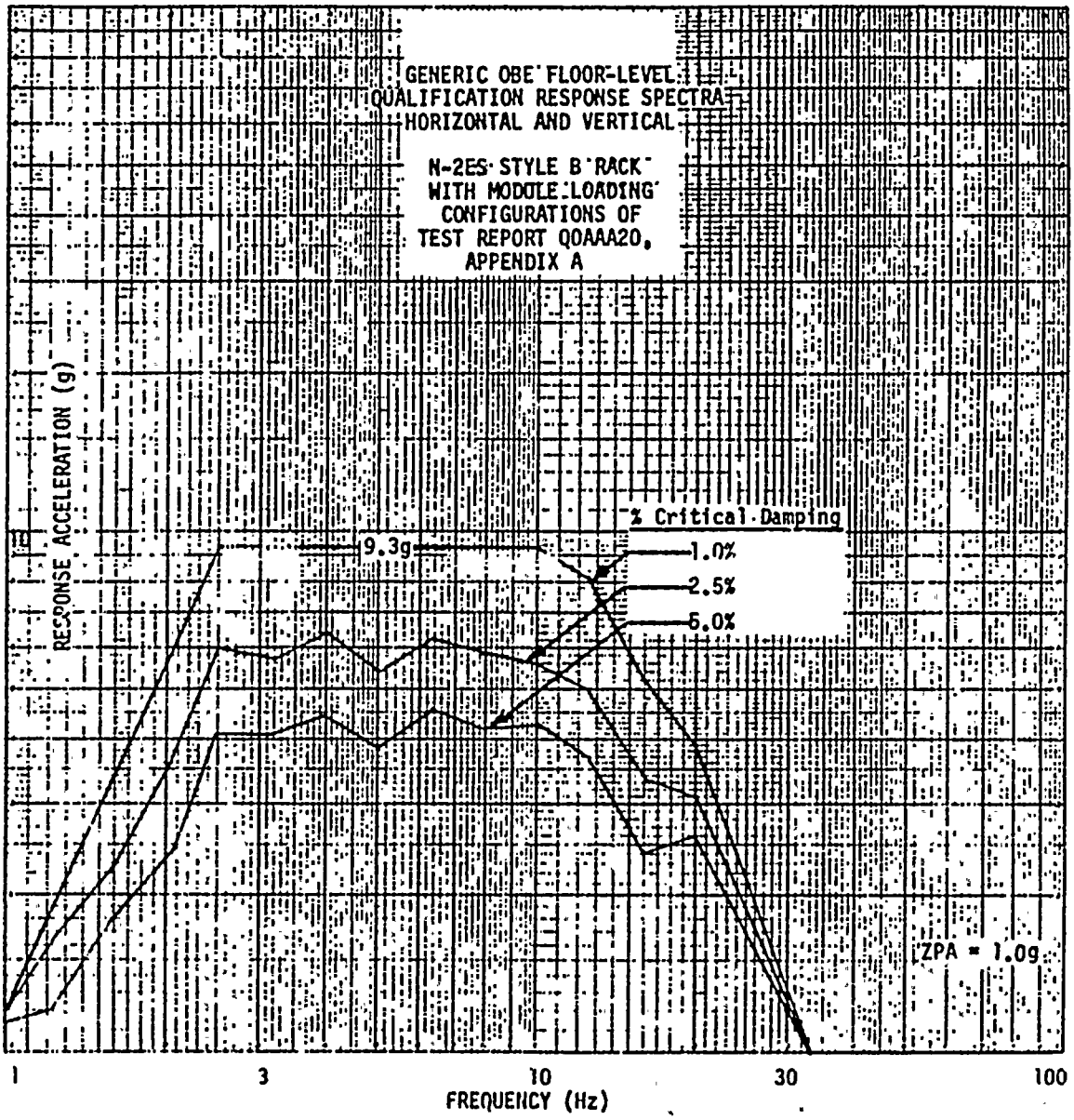
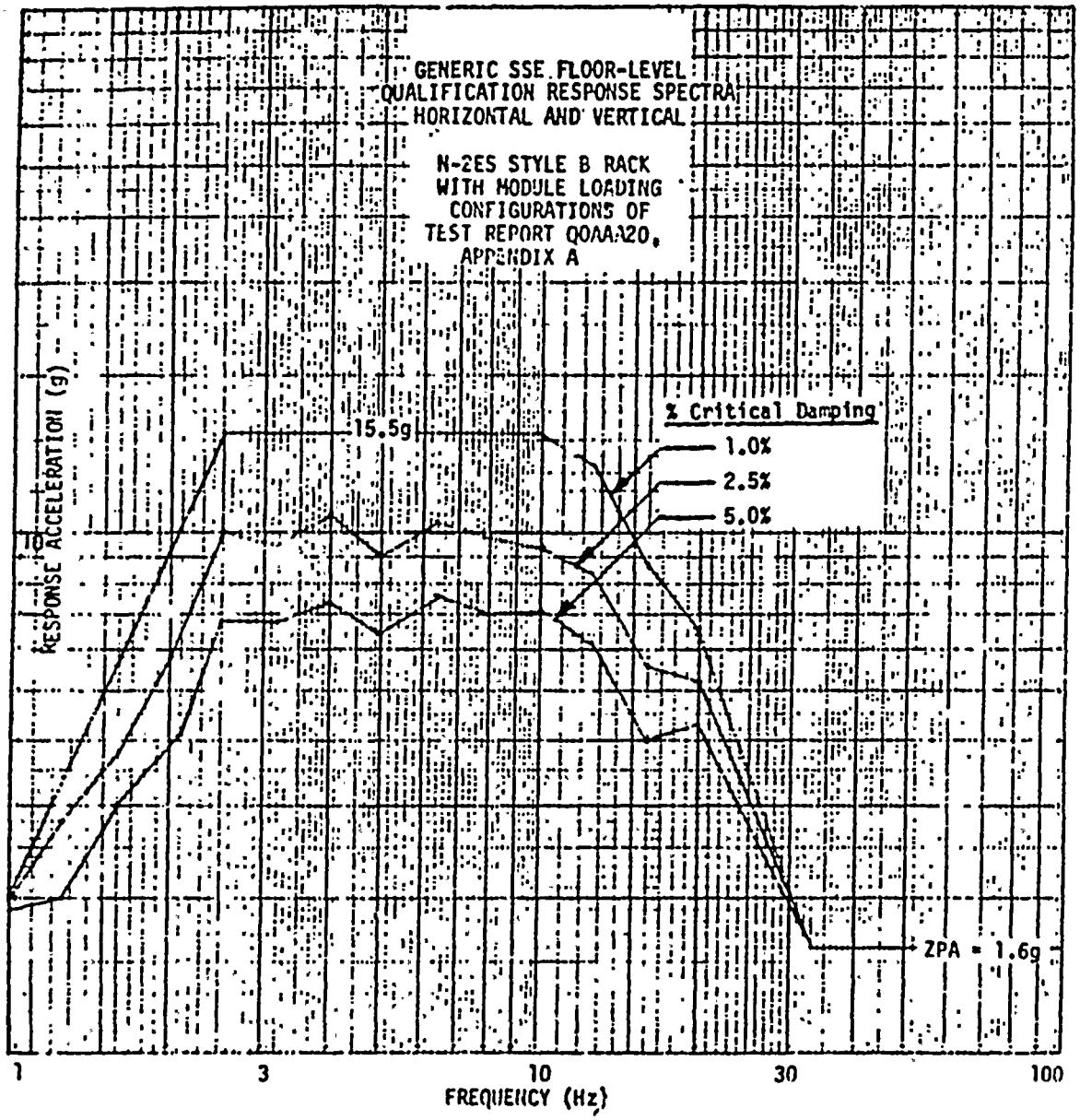


FIGURE 1A
GENERIC SSE FLOOR-LEVEL TEST RESPONSE SPECTRA,
N-2ES STYLE B RACK



SPEC. NO. NMP2-E014T
SQRT #8

NINE MILE POINT NUCLEAR STATION UNIT 2

EQUIPMENT DYNAMIC QUALIFICATION

COMPONENT NAME: 600V AC PANELBOARD

MARK NUMBERS: 2EJS * PNL100A

STONE & WEBSTER

SPEC. NO. NMP2-EQ-KAT
Revision —

Seismic and Dynamic Qualification Summary of Equipment

I. Plant Name: Nine Mile Point Nuclear Station - Unit 2

1. Utility: Niagara Mohawk Power Corporation

2. NSSS: General Electric Co. BWR: 5 MK 2

3. A/E: Stone & Webster Engineering Corp. Other

II. Component Name: PANELBOARD; 600V AC; MARK # 2EJS*PNL100A

1. Scope: ( ) NSSS (X) BOP ( ) Other

2. Model Number: SERIES 6PNLB Quantity: 1

3. Size or Range: 600V

4. Vendor: BROWN-BOVERI ELECTRIC, INC.

5. If the component is a cabinet or panel, name and model number of the devices included: SEE ATTACHMENT "A"

6. Physical Description:

a. Appearance: RECTANGULAR BLICK WITH FRONT DOOR

b. Dimensions: 38" WIDE x 17" DEEP x 90" HIGH

c. Weight: 480 LB

7. Location: Building: CONTROL BUILDING

Elevation: 261 FT.

8. Field Mounting Conditions ( ) Bolt (No. - Size .)
( ) Weld (Length)
(X) (8) 1/2" DIA. WELD STUDS.

9. Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.)
WALL MOUNTED TO INTERMEDIATE STRUCTURE OF SQUARE TUBING

10. a. System in which located: EJS SYSTEM - 600V AC MAIN DISTRIBUTION PANEL

b. Functional Description: 600V AC POWER SUPPLY

c. Is the equipment required for ( ) Hot Standby ( ) Cold Shutdown (X) Both ( ) Neither ( ) Other

11. Pertinent Reference Design Specifications for Qualification Requirements: NMP2 - E014T REV. 2 WITH ADDENDUM #1

(a.) Seismic Input

b. Hydrodynamic Load Input

c. Fatigue Considerations

d. Service Conditions

e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

(✓) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method:

(✓) Test ( ) Analysis ( ) Combination of Test and Analysis

Qualification Report*: SEW FILE NO. STRS 01.420-5000B

(No., Title and Date): "SEISMIC CERTIFICATION REPORT FOR CLASS 1E ELECTRICAL EQUIPMENT," JUNE 1983

Company that Prepared Report: BROWN-BOVERI ELECTRIC, INC.

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975, R.G. 1.100

V. Vibration Input:

1. Loads considered:
   a. (✓) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS ( ) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): SEE ATTACHMENT "B"

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2% SSE 3%

5. Required Acceleration in Each Direct:

(✓) ZPA ( ) Other _____ (specify)

OBE S/S = 0.13 F/B = 0.13 V = 0.10

SSE S/S = 0.24 F/B = 0.24 V = 0.19

6. Were fatigue effects considered?

( ) Yes (✓) No

If yes, describe how they were treated in overall qualification program: N/A

VI. If Qualfication by Test, then Complete:

1. ( ) Single Frequency (✓) Multi-Frequency (✓) Random ( ) Sine Beat ( ) _____

2. ( ) Single Axis (✓) Multi-Axis (✓) Independent Motions ( ) In-phase Motions

3. Number of Qualifications Tests:

OBE 5 SSE 2 Other _____ (specify)

4. Frequency Range: 1 HZ TO 50 HZ.

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

S/S= 17 HZ F/B= 9.8 HZ V= 25 HZ

6. Method of Determining Natural Frequencies
(✓) Lab Test ( ) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

(✓) Yes (Attach TRS & RRS graphs) SEE ATTACHMENT "C"
( ) No

8. Maximum Input g Level Test:

OBE S/S = 1.95 F/B = 1.90 V= 1.15

SSE S/S = 1.45 F/B = 1.40 V = 0.72

9. Laboratory Mounting:

A. (✓) Bolt (No. 8 Size ½"-13) GRADE 2
( ) Weld (Length) ( )

B. Orientation and Fixturing: SPECIMEN BOLTED TO A FIXTURE WHICH SIMULATES A WALL. THE FIXTURE WAS WELDED TO THE TEST TABLE

10. Functional Operability Verified:

(✓) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made:

SEE ATTACHMENT "D"

12. Other Tests Performed (such as aging or fragility test, including results):

ALL TESTS IN ACCORDANCE WITH IEEE 323-1974

13. Failure Modes (If appropriate STRUCTURAL & ELECTRICAL)

14. Margins Available: (✓) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

( ) Static Analysis ( ) Equivalent Static Analysis

( ) 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: ( ) 3D ( ) 2D ( ) 1D
( ) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

4. ( ) Computer Codes:_____ _____

   Frequency Range and No. of Modes

   ( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   ( ) Absolute Sum ( ) SRSS ( ) Other:_____
   (specify)

6. Damping:

   OBE_____ SSE_____ Basis for the Damping Used:_____

7. Support Considerations in the Model:_____

8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes:_____

10. Margins Available: ( ) Input Spectrum ( ) Stress or Deflection

NMPR-6014T

ATTACHMENT "A"

DEVICE LIST - SEE ATTACHED PAGES 9, 10, 11 & 12
FROM SEISMIC CERTIFICATION REPORT
NO. 48-53423-SSA

SEISMIC EVALUATION TABLE
of
Class 1E Resale Components
53423-B0009

Ref. Pc. No.	Component Description	Type–(Manufacturer) Catalog Number	Reference Accelerometers		Reqd. Accel. Level	Component Documentation		Comments	
			No. – Dir.	ZPAF		Test Reference Identification	Avail. Accel. Level	Certification Status	Notes Paragraph 4.0
1	Circuit Breaker	LL 600A 3P (IA) LL3B600	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1
2	Pressure Wire Connector	LL (2) 3/0-500MCM (IA) TA2-J500	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
3	Circuit Breaker Frame	JL 400A 3P (IA) JL3F400	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
4	Circuit Breaker Trip	JL 150A 3P (IA JL3T150	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
5	Circuit Breaker Trip	JL 100A 3P (IA) JL3T100	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
6	Pressure Wire Connector	JJ/JL #4-300MCM (IA) TA1-J300	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
7	Circuit Breaker	HE 20A 3P (IA) HE3 B020	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1
8	Circuit Breaker	HE 45A 3P (IA) HE3 B045	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1
9	Circuit Breaker	HE 60A 2P (IA) HE2 B060	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1
10	Circuit Breaker	HE 70A 3P (IA) HE3 B070	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1

SEISMIC EVALUATION TABLE
of
Class 1E Resale Components
53423-B0009

Ref. Pc. No.	Component Description	Type-(Manufacturer) Catalog Number	Reference Accelerometers		Reqd. Accel. Level	Component Documentation		Comments	
			No. – Dir.	ZPAF		Test Reference Identification	Avail. Accel. Level	Certification Status	Notes Paragraph 4.0
12	Ground Lug	#6-250MCM (IS) 870309-B	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
13	Series 6 Neutral Lug	(2)4/0-750MCM (CFC) BA750CIT	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
14	Series 6 Neutral Lug	#6-350MCM (CFC) BA350B	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
15	Series 6 Neutral Lug	#14-1/0 (Volta) 9868-0042	-	-	0.20V 0.45H	Test Progran No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
16	Circuit Breaker	JJ 400A NonAuto (IA) JJ3S400	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
17	Circuit Breaker	HE 30A 3P (IA) HE3 B030	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1
18	Circuit Breaker	EH 150A 2 P (IA) EH 2B150	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1
19	Pressure Wire Connector	EE/HE #14-1/0 (IA) TAI E100	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
20	Circuit Breaker	EE 30A 2P (IA) EE2 B030	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1
21	Circuit Breaker	EE 20A 1P (IA) EE1 B020	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1

SEISMIC EVALUATION TABLE
of
Class 1E Resale Components
53423-B0009

Ref. Pc. No.	Component Description	Type–(Manufacturer) Catalog Number	Reference Accelerometers		Reqd. Accel. Level	Component Documentation		Comments	
			No. – Dir.	ZPAF		Test Reference Identification	Avail. Accel. Level	Certification Status	Notes Paragraph 4.0
22	Circuit Breaker	EE 30A 1P (IA) EE1 B030	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1
23	Circuit Breaker	EE 20A 2P (IA) EE2 B020	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.A 4.1
24	Fusible Switch	VB 30-30A 2P (ID) V7A2211	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
25	Fusible Switch	VB 60-60A 2P (ID) V7B2222	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
26	Fuse	RKI 30A (IC) A2K30R	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
27	Fuse	RKI 60A (IC) A2K60R	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
28	Fusible Switch	VB 200A 2P (ID) V7E2204MS	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
29	Fusible Switch	VB 30-30A 2P (ID) V7B2211	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
30	Fusible Switch	VB 30-30A 2P (ID) V7B2211R	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
31	Fusible Switch	VB 200A 2P (ID) V7E2204	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1

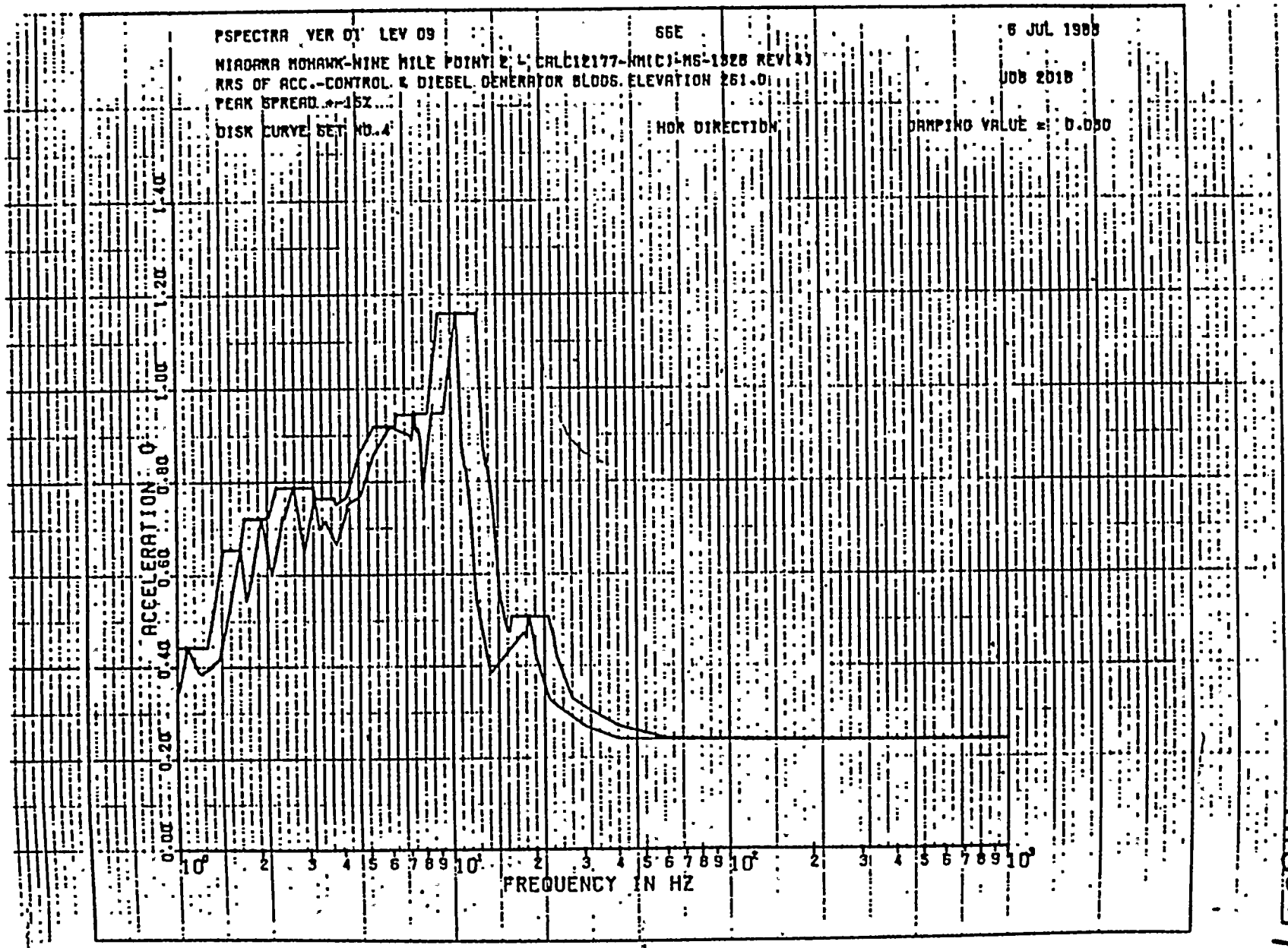
SEISMIC EVALUATION TABLE
of
Class 1E Resale Components
53423-B0009

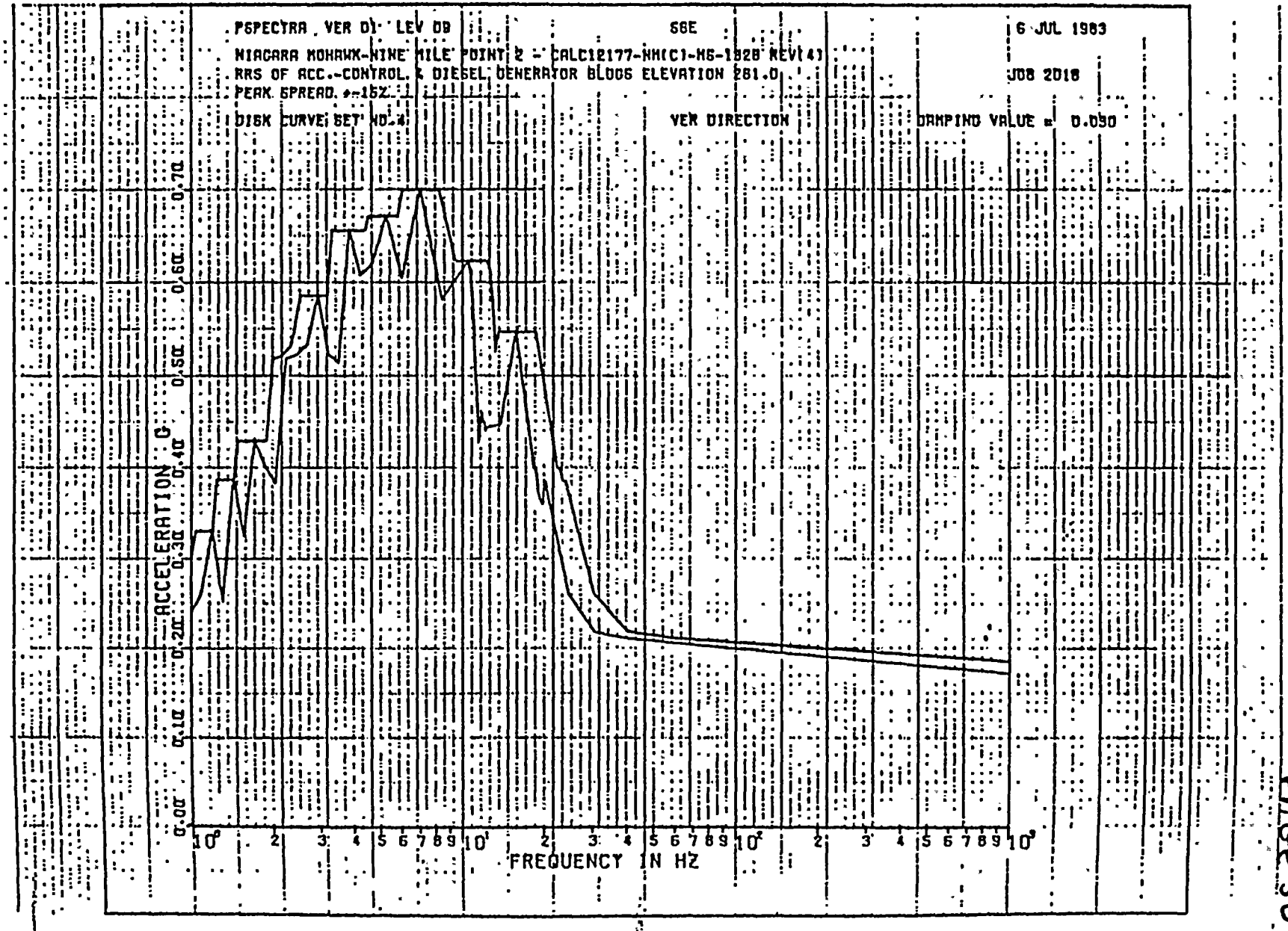
Ref. Pc. No.	Component Description	Type--(Manufacturer) Catalog Number	Reference Accelerometers		Reqd. Accel. Level	Component Documentation		Comments	
			No. – Dir.	ZPAF		Test Reference Identification	Avail. Accel. Level	Certification Status	Notes Paragraph 4.0
32	Rej. Fuse Clip Adapter	200A 3P. (ID) W55366	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
33	Fuse	RK5 30A (IC) FT30R	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
34	Fuse	RK5 200A (IC) FT200R	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.C 4.1
35	Shunt Trip	JL 120VAC (IA) S01JL0R0	-	-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1
36	Aux. Switch	JL (IA) A01JL0L0		-	0.20V 0.45H	Test Program No. 45662-1	0.68V 1.45H	Certified	4.B 4.1

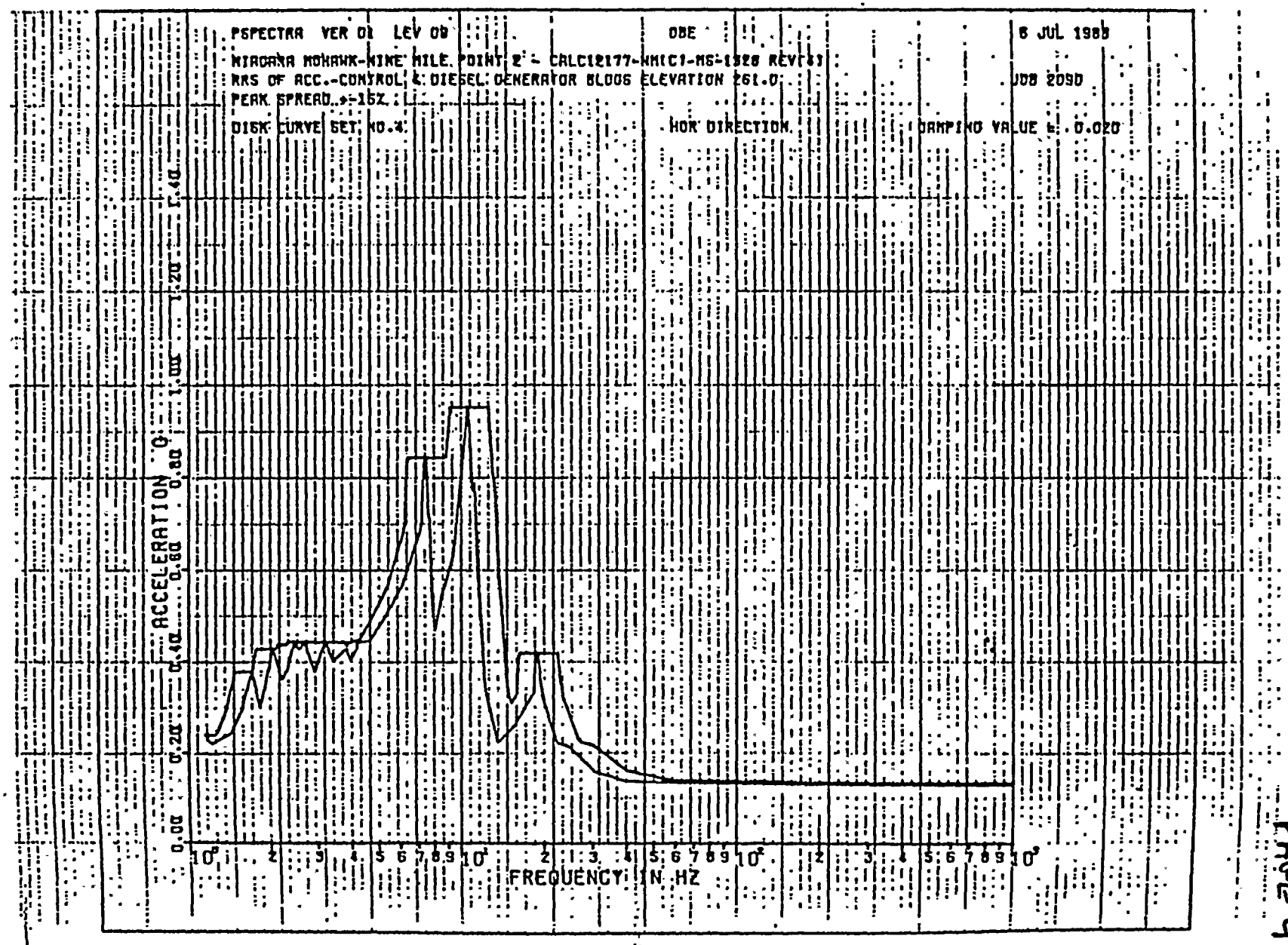
ATTACHMENT "B"

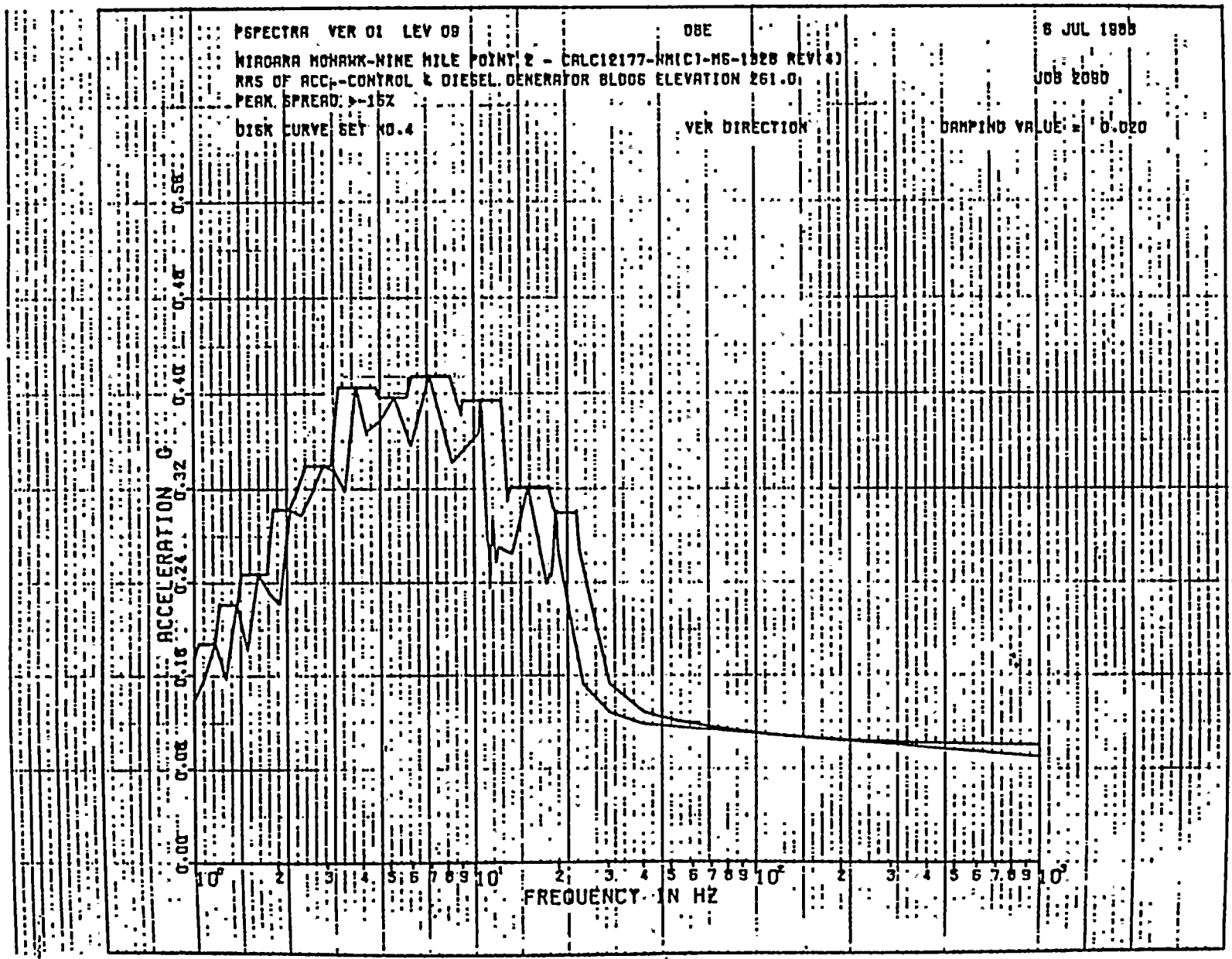
RRS FOR CONTROL BUILDING EL. 261 FT

PAGE NO.	DESCRIPTION
49	HORIZONTAL RRS - 3% SSE
50	VERTICAL RRS - 3% SSE
97	HORIZONTAL RRS - 2% OBE
98	VERTICAL RRS - 2% OBE


PSPECTRA VER 01 LEV 09
6 JUL 1988
NIAGARA MOHAWK-NINE MILE POINT 2 L CALC12177-MM(C)-MS-1328 REV(4)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS. ELEVATION 261.0
PEAK SPREAD = 15%
DISK CURVE SET NO.4
HOR DIRECTION
DAMPING VALUE = 0.050
ACCELERATION G
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
10^0
2
3
4
5
6
7
8
9
10^1
2
3
4
5
6
7
8
9
10^2
2
3
4
5
6
7
8
9
10^3
FREQUENCY IN HZ


PSPECTRA , VER 01 LEV 00
SSE
6 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NM(C)-MS-1828 REV(4)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 281.0
JOB 2018
PEAK SPREAD +-15%
DISK CURVE SET NO.4
VER DIRECTION
DAMPING VALUE = 0.050
ACCELERATION G
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
10^0
2
3
4
5
6
7
8
9
10^1
2
3
4
5
6
7
8
9
10^2
2
3
4
5
6
7
8
9
10^3
FREQUENCY IN HZ


PSPECTRA VER 01 LEV 00
OBE
6 JUL 1988
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NMIC1-MS-1328 REV(1)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0'
JOB 2090
PEAK SPREAD = +-15%
DISK CURVE SET NO.4
HOR DIRECTION
DAMPING VALUE = 0.020
ACCELERATION 'G'
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
10^0
2
3
4
5
6
7
8
9
10^1
2
3
4
5
6
7
8
9
10^2
2
3
4
5
6
7
8
9
10^3
FREQUENCY IN HZ


PSPECTRA VER 01 LEV 09
OBE
6 JUL 1988
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NMIC1-M6-1328 REV(4)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0
JOB 2080
PEAK SPREAD: +-15%
DISK CURVE SET NO.4
VER DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
FREQUENCY IN HZ

ATTACHMENT "C"

TRS FROM TEST REPORT

PAGE NO.	DESCRIPTION
20	FRONT-TO-BACK 3% SSE
21	VERTICAL 3% SSE
22	SIDE-TO-SIDE 3% SSE
23	FRONT-TO-BACK 2% OBE
24	VERTICAL 2% OBE
25	SIDE-TO-SIDE 2% OBE

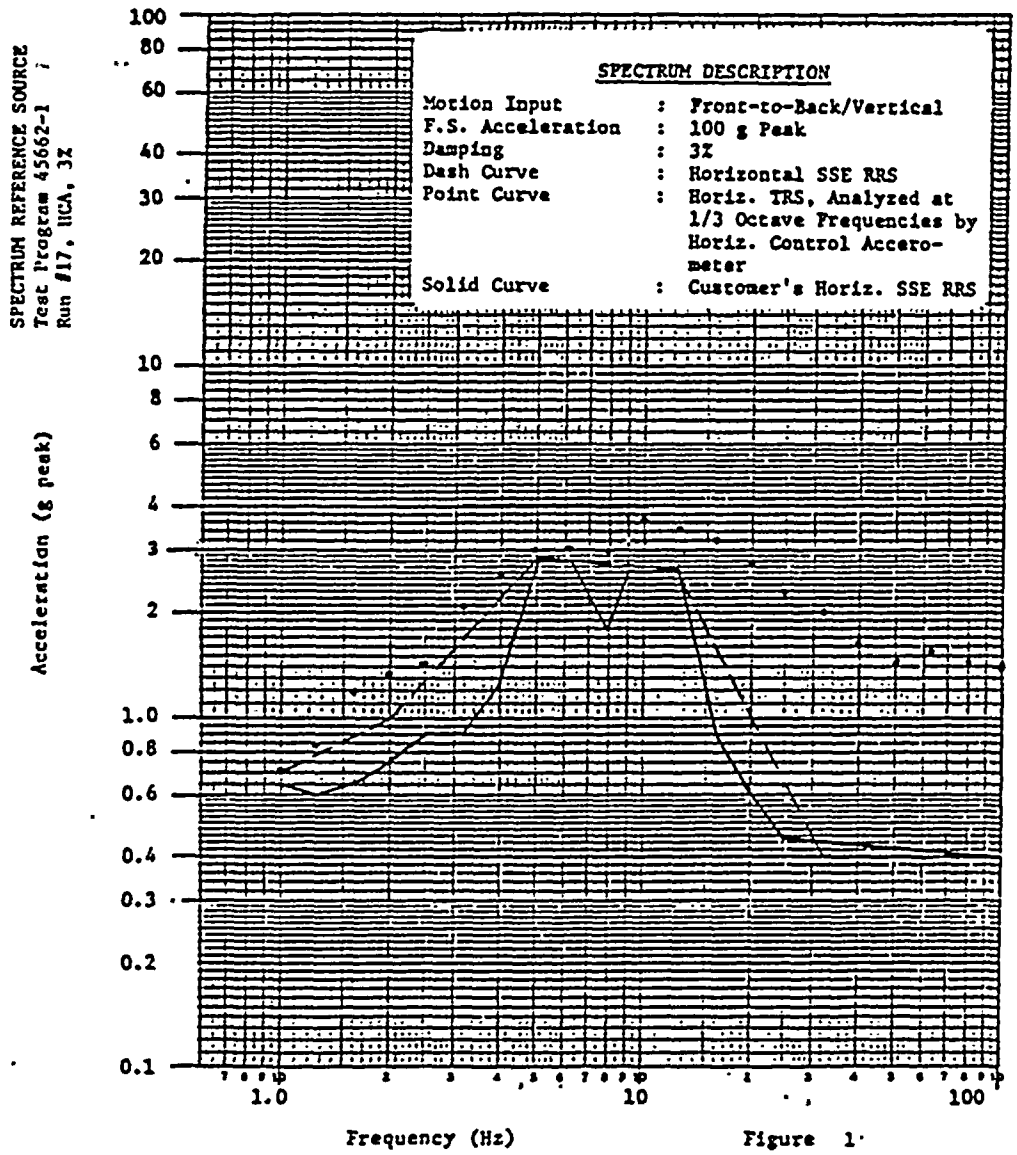


Figure 1

COMPARISON OF THE TEST PROGRAM'S HORIZONTAL SSE RRS TO THE HORIZONTAL FRONT-TO-BACK TRS OF THE 600V PANELBOARD TEST SPECIMEN

:LG NO 636 - FULL LOG 3 X 3

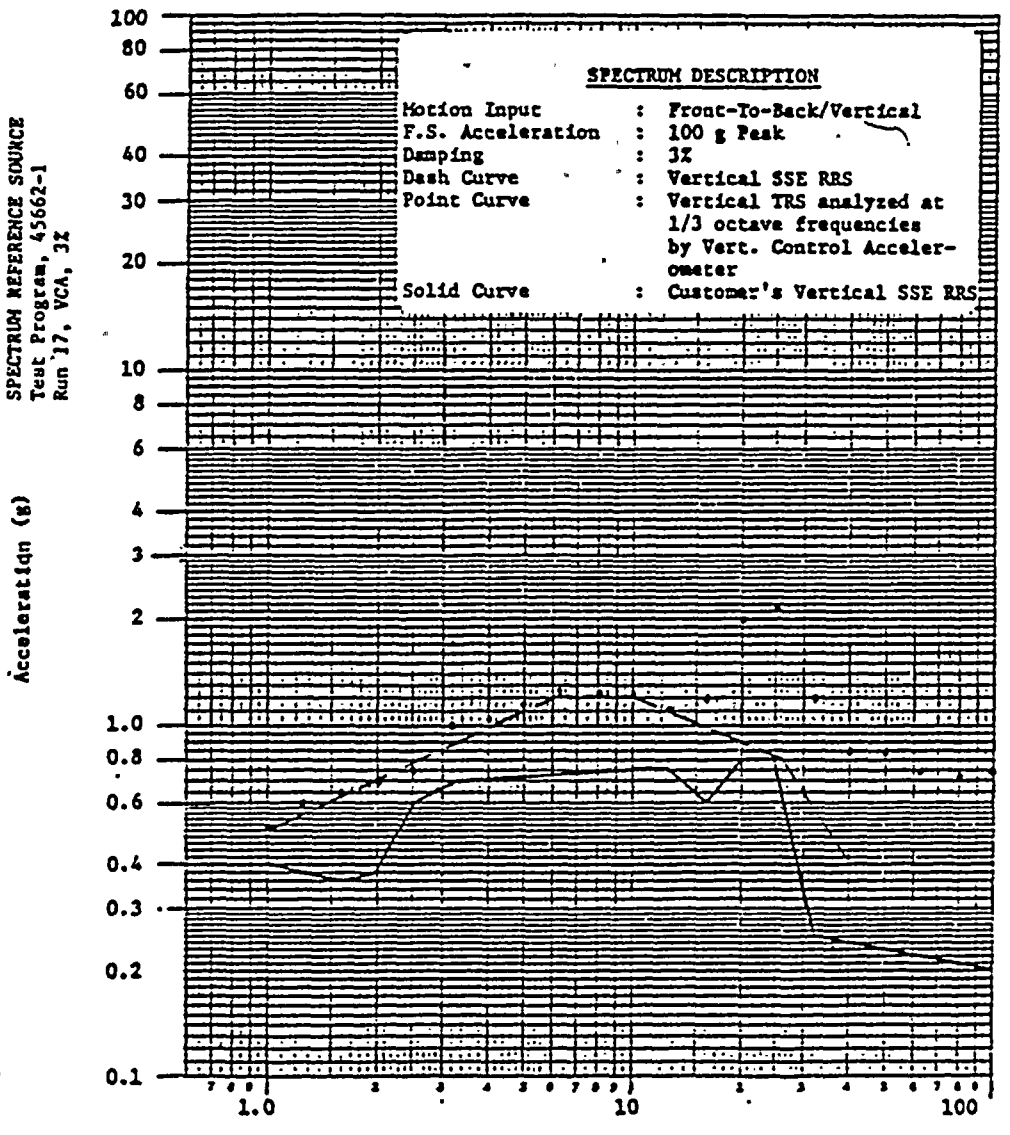


Figure 2

COMPARISON OF THE TEST PROGRAM'S VERTICAL SSE RRS TO THE VERTICAL FRONT-TO-BACK TRS OF THE 600V PANELBOARD TEST SPECTRUM

ELOG NO. 684 - FULL LOG 3 X 3

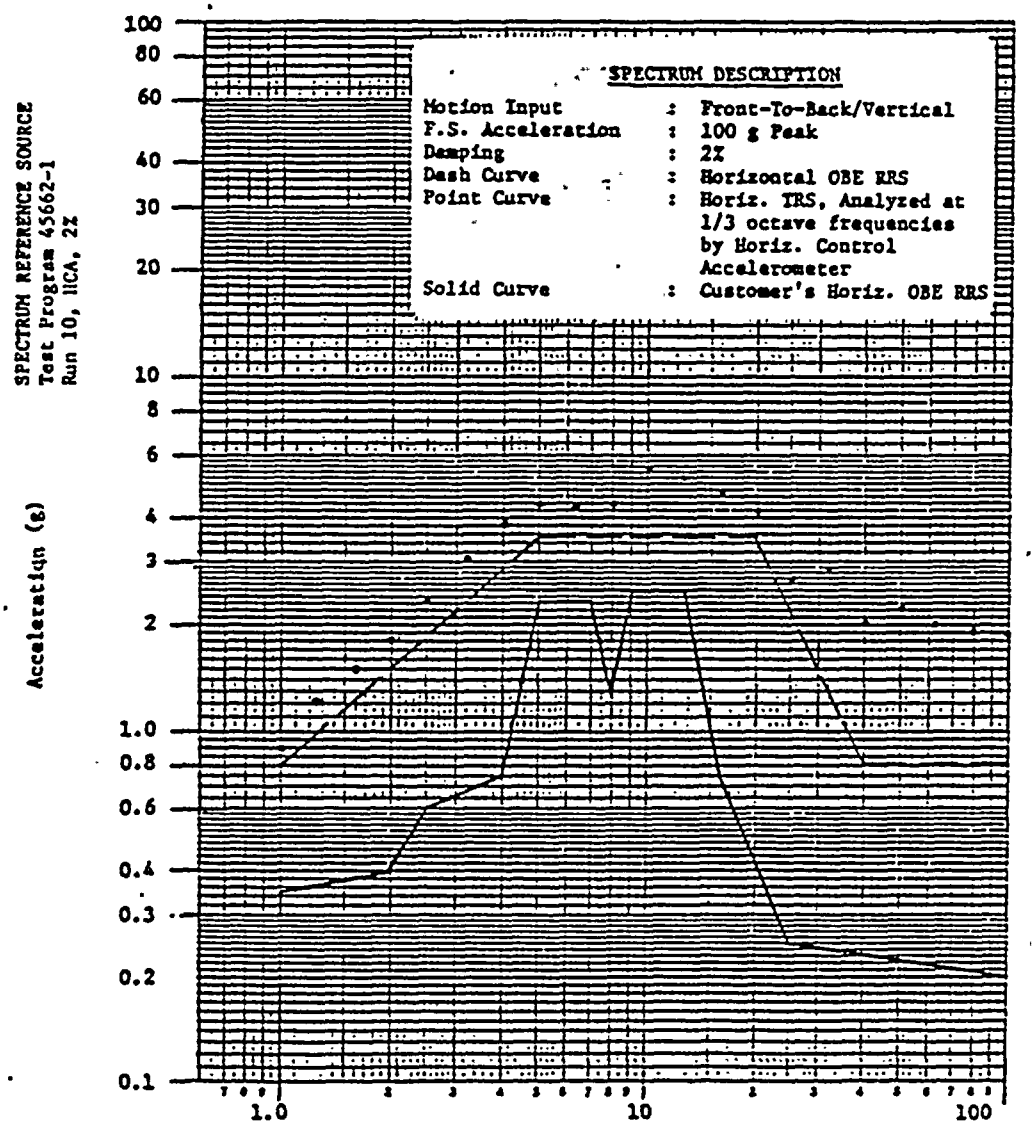


Figure 4

COMPARISON OF THE TEST PROGRAM'S HORIZONTAL OBE RRS TO THE HORIZONTAL FRONT-TO BACK TRS OF THE 600V PANELBOARD TEST SPECIMEN

) NO. 636 - FULL LOG 3 X 3

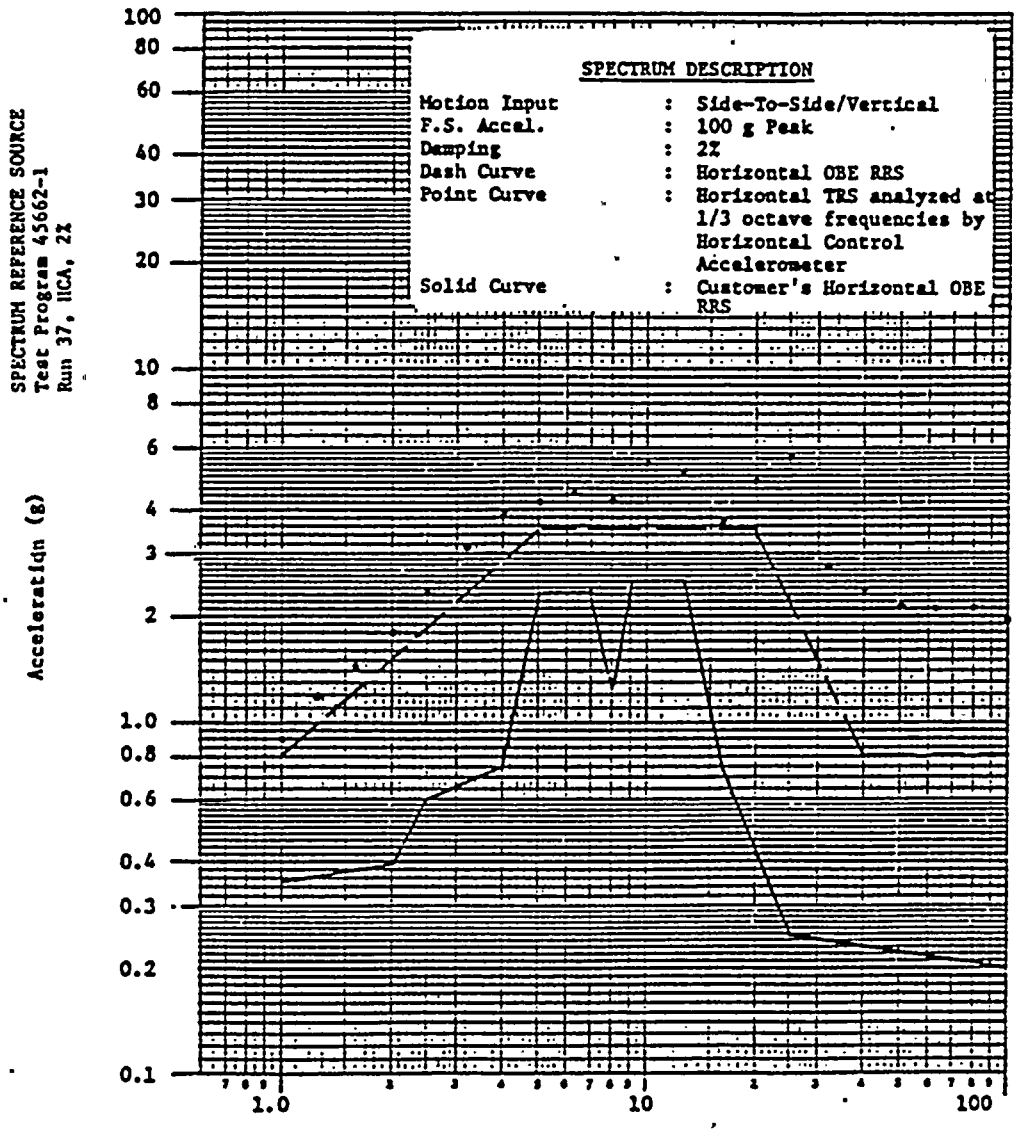


Figure 6 -

COMPARISON OF THE TEST PROGRAM'S HORIZONTAL OBE RRS TO THE HORIZONTAL SIDE-TO-SIDE TRS OF THE 600V PANELBOARD TEST SPECIMEN

TADELG NO. 684 - FULL LOG 3 X 3

ATTACHMENT D

VI.11

The equipment sucessfully passed the test after gussets were added to the LL38600 circuit breaker along with three (3) self-tapping screws between the circuit breaker and the front cover panel. Also, although the test specimen itself was not modified, it was determined that on the NMP2 panelboards the clearance of the openings between the JL3 circuit breakers and the front cover panel would be increased to prevent intereference and resultant edge chipping of the molded breaker case as experienced during testing.

SPEC. NO. NMP2-E015F
SQRT #9

NINE MILE POINT NUCLEAR STATION UNIT 2

EQUIPMENT DYNAMIC QUALIFICATION

COMPONENT NAME: 4,160V METAL-CLAD SWITCHGEAR
MARK NUMBERS: 2ENS*SWG101

STONE & WEBSTER

GE SWITCHGEAR SEISMIC QUALIFICATION STATUS SUMMARY

2ENS*SWG101

NMP2-E015F

Seismic qualification of the subject equipment is not complete. During review of the vendor submitted qualification reports it was discovered that a questionable amount of differences, primarily in the front door assembly configurations and weights, existed between the seismically tested switchgear and the NMP2 equipment. SWEC therefore performed in-situ vibration tests on the NMP2 field installed equipment in order to establish adequacy of the existing qualification data for applicability to the NMP2 equipment. The test data indicated that some field modifications are required to obtain seismic response characteristics that will fall within existing qualification parameters. Additional in-situ vibration testing will be performed on the modified equipment to assure that acceptable response characteristics are obtained. The final test report is scheduled to be submitted by 9/30/85.

SPEC. NO. NMP2-E015F
Revision 0

Seismic and Dynamic Qualification Summary of Equipment

I. **Plant Name:** Nine Mile Point Nuclear Station - Unit 2

1. **Utility:** Niagara Mohawk Power Corporation
2. **NSSS:** General Electric Co. **BWR:** 5 MK 2
3. **A/E:** Stone & Webster Engineering Corp. **Other**

II. **Component Name:** 4160V METAL-CLAD SWITCHGEAR; MARK NO. 2ENS*SWG101

1. **Scope:** ( ) NSSS (X) BOP ( ) Other
2. **Model Number:** S.O. 959594 **Quantity:** 1
3. **Size or Range:** 4160V - 250 MVA
4. **Vendor:** GENERAL ELECTRIC
5. **If the component is a cabinet or panel, name and model number of the devices included:**

   SEE ATTACHMENT "A"

6. **Physical Description:**
   a. **Appearance:** RECTANGULAR BLOCK - LINEUP OF 17 UNITS
   b. **Dimensions:** 37 FT 8 IN WIDE X 81.5 IN. DEEP X 93.4 IN. HIGH
   c. **Weight:** 48,950 LBS
7. **Location:** **Building:** CONTROL BUILDING
   Elevation: 261 FT.
8. **Field Mounting Conditions** (X) Anchor Bolts (No. 2- Size 5/8") AT REAR OF EACH UNIT
   (X) Weld (Length *) SEE BELOW
   ( )
9. **Mounting Orientation (e.g., on floor, cantilevered, suspended, etc.)**

   FLOOR MOUNTED

10. a. **System in which located:** SWITCHGEAR, STANDBY 4160V SYSTEM 4.16KV STANDBY EMERGENCY
    b. **Functional Description:** POWER SUPPLY
    c. **Is the equipment required for** ( ) Hot Standby ( ) Cold Shutdown (X) Both ( ) Neither ( ) Other

* - PLUG WELD AT EACH MOUNTING HOLE PLUS A 1 INCH LONG FILLET WELD ADJACENT EACH PLUG WELD (TYP. 6 PLACES EACH UNIT)

11. Pertinent Reference Design Specifications for Qualification Requirements: NMP2-E015F WITH ADDENDA 1 THRU 6; EEDCR# P40,952

(a) Seismic Input
b. Hydrodynamic Load Input
c. Fatigue Considerations
d. Service Conditions
e. Qualified Life

III. Is Equipment Available for Inspection in the Plant:

(X) Yes ( ) No ( ) Partial or limited availability

IV. Equipment Qualification Method:

(X) Test ( ) Analysis ( ) Combination of Test and Analysis

Qualification Report*: 1.) SEW:FILE NO. STRS 01.320-5000C, CERTIFIED SEISMIC REPORT ON REQUISITION #320-68150, DATED 11-4-83
2.) SEW REPORT #12177.00-65C-AV1, IN-SITU VIBRATION

(No., Title and Date): TEST REPORT ON G-E SWITCHGEAR 2ENS*SWG103; 6-5-85

Company that Prepared Report: 1) GENERAL ELECTRIC; 2) SWEC

Company that Reviewed Report: SWEC

Where Report is filed or available: NMP2 SITE

Applicable Codes and/or Standards: IEEE 344-1975; R.G. 1.100

V. Vibration Input:

1. Loads considered:
   a. (X) Seismic only
   b. ( ) Hydrodynamic only
   c. ( ) Vibration from normal operation
   d. ( ) Combination of (a), (b), and (c)

2. Method of Combining RRS:

   ( ) Absolute Sum ( ) SRSS ( ) N/A (other, specify)

3. Required Response Spectra** (attach the graphs): SEE ATTACHMENT "B"

NOTE:
*If more than one report complete items IV thru VII for each report.
**If other than RRS is used, describe method.

4. Damping Corresponding to RRS: OBE 2%,4% SSE 2%,4%

5. Required Acceleration in Each Direct:

(X) ZPA ( ) Other _____ (specify)

OBE S/S = 0.13 F/B = 0.13 V = 0.10

SSE S/S = 0.24 F/B = 0.24 V = 0.19

6. Were fatigue effects considered?

( ) Yes (X) No

If yes, describe how they were treated in overall qualification program: N/A

VI A. If Qualfication by Test, then Complete: FOR 26" WIDE UNITS

1. ( ) Single Frequency (X) Multi-Frequency (X) Random ( ) Sine Beat ( ) _____

2. ( ) Single Axis (X) Multi-Axis (X) Independent MOTION ( ) In-phase Motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other _____ (specify)

4. Frequency Range: 1 HZ TO 35 HZ

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

S/S= 7.6 HZ F/B= 13 HZ V= 15 Hz LAB TEST

S/S= * SEE BELOW F/B= * V= * IN-SITU TEST

6. Method of Determining Natural Frequencies
(X) Lab Test (X) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

(X) Yes (Attach TRS & RRS graphs) SEE ATTACHMENT "C"
( ) No

* - FINAL IN-SITU TEST DATA WILL BE OBTAINED AFTER FIELD MODIFICATIONS HAVE BEEN COMPLETED.

8. Maximum Input g Level Test:

OBE S/S = .0.45 F/B = 0.48 V= 0.70

SSE S/S = 0.90 F/B = 1.00 V = 1.40

9. Laboratory Mounting:

A. ( ) Bolt (No._____ Size_____)
(X) Weld (Length *) ( )
* - PLUG WELD AT EACH MOUNTING HOLE PLUS A 1" LONG FILLET WELD ADJACENT EACH PLUG WELD (TYP. 8 PLACES EACH UNIT)

B. Orientation and Fixturing: MOUNTED DIRECTLY TO TEST TABLE

10. Functional Operability Verified:

(X) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: _____

12. Other Tests Performed (such as aging or fragility test, including results):

ALL TESTS PERTINENT TO IEEE 323-1974

13. Failure Modes (If appropriate ELECTRICAL & STRUCTURAL)

14. Margins Available: (X) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

( ) Static Analysis ( ) Equivalent Static Analysis

( ) 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: ( ) 3D ( ) 2D ( ) 1D
( ) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

4. Damping Corresponding to RRS: OBE_____ SSE_____

5. Required Acceleration in Each Direct:

( ) ZPA ( ) Other_____
(specify)

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

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

6. Were fatigue effects considered?

( ) Yes ( ) No

If yes, describe how they were treated in overall qualification program:_____

_____

VIB If Qualfication by Test, then Complete: FOR 36" WIDE UNIT

1. ( ) Single Frequency (X) Multi-Frequency (X) Random
( ) Sine Beat
( ) _____

2. ( ) Single Axis (X) Multi-Axis
(X) Independent MOTION ( ) In-phase Motions

3. Number of Qualifications Tests:

OBE 5 SSE 1 Other_____
(specify)

4. Frequency Range: 1HZ TO 35HZ

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

S/S= 4.8HZ F/B= 7.8HZ V= 7.4HZ LAB TEST
S/S= * SEE BELOW F/B= * V= * IN-SITU TEST

6. Method of Determining Natural Frequencies
(X) Lab Test (X) In-Situ Test ( ) Analysis

7. TRS Enveloping RRS Using Multi-Frequency Test

(X) Yes (Attach TRS & RRS graphs) SEE ATTACHMENT "C"
( ) No

* - FINAL IN-SITU TEST DATA WILL BE OBTAINED AFTER FIELD MODIFICATIONS HAVE BEEN COMPLETED.

8. Maximum Input g Level Test:

OBE S/S = 1.3 F/B = 1.25 V= 0.95

SSE S/S = 1.3 F/B = 1.2 V = 0.95

9. Laboratory Mounting:

A. ( ) Bolt (No._____ Size_____)
(X) Weld (Length ✱) ( ) _____

✱ - PLUG WELD AT EACH MOUNTING HOLE PLUS A 1" LONG FILLET WELD ADJACENT EACH PLUG WELD (TYP. 8 PLACES EACH UNIT)

B. Orientation and Fixturing: MOUNTED DIRECTLY TO TEST TABLE

10. Functional Operability Verified:

(X) Yes ( ) No ( ) Not Applicable

11. Test Results Including Modifications Made: _____

12. Other Tests Performed (such as aging or fragility test, including results):

ALL TEST PERTINENT TO IEEE 323-1974

13. Failure Modes (If appropriate ELECTRICAL & STRUCTURAL)

14. Margins Available: (X) Input Spectrum ( ) Fragility

VII. If Qualification by Analysis, Then Complete: N/A

1. Method of Analysis:

( ) Static Analysis ( ) Equivalent Static Analysis

( ) 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: ( ) 3D ( ) 2D ( ) 1D
( ) Finite Element ( ) Beam
( ) Closed Form Solution ( ) Other

4. ( ) Computer Codes:_____ _____

   Frequency Range and No. of Modes

   ( ) Hand Calculations

5. Method of Combining Dynamic Responses from Seismic and Other Dynamic Loads:

   ( ) Absolute Sum ( ) SRSS ( ) Other:_____
   (specify)

6. Damping:

   OBE_____ SSE_____ Basis for the Damping Used:_____

7. Support Considerations in the Model:_____

8. Critical Structural Elements:

A. Identification Location	Governing Load or Response Combination	Seismic Stress	Total Stress	Stress Allowable

B. Maximum Critical Deflection	Location	Maximum Allowable Deflection to Assure Functional Operability

9. Failure Modes:_____

10. Margins Available: ( ) Input Spectrum ( ) Stress or Deflection

ATTACHMENT "A"

DEVICE LIST

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING AC	QTY	L/U	UNT	REV
			MMARY OF METALCLAD EQUIPMENT-V/L					12
			MMARY OF METALCLAD EQUIPMENT-V/L					2
			PPARY OF METALCLAD EQUIPMENT-V/L					55
			PPARY OF METALCLAD EQUIPMENT-V/L					52
			PPARY OF METALCLAD EQUIPMENT-V/L					41
			MMARY OF METALCLAD EQUIPMENT-V/L					29
			RPARY OF METALCLAD EQUIPMENT-V/L					44
			PPARY OF METALCLAD EQUIPMENT-V/L					33
			RMARY OF METALCLAD EQUIPMENT-V/L					30
20J	005		AM AB40 100/5A	50103131LSPK2	001	01	104	
					001	01	105	
					001	01	106	
					001	01	108	
					001	01	115	
20N	001		AM AB40 300/5A	50103131LSRX2	001	01	107	
20P	006		AM AB40 400/5A	50103131LSSC2	003	01	102	55
					003	01	114	55
20W	003		AM AB40 1000/5A	50103131LSSS2	003	01	101	61
20Y	009		AM AB40 1500/5A	50103131LSTC2	003	01	110	
					003	01	111	
					003	01	113	
223	001		VM AB40 5250A150V	50103021PZUL2	001	01	112	
3AH	001		PK-2 TEST PLG 4 POLE GEH-1023	0061295336001	001	01	XS	10 10
3AJ	001		PK-2 TEST PLG 6 POLE GEH-1023	0061295336002	001	01	XS	10 10
382	047		ET16 IND LIGHT 125V	0116867386043	002	01	103	
					003	01	101	
					003	01	102	
					002	01	103	
					002	01	104	
					002	01	105	

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. 002 SH NO 001

FINAL 03/29/83 REV NO. 70

REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

NK-	QTY-DEV LOC	DESCRIPTION	ORDERING AC	QTY L/U UNT	REV
				002 01 106	
				002 01 107	
				002 01 108	
				002 01 109	55
				003 01 110	
				003 01 111	
				012 01 112	37
				003 01 113	
				002 01 114	
				002 01 115	
		2000 OHMS			
38A	023	ET16 RED	COLOR CAP 0208A3768P002	001 01 100	
				001 01 101	
				001 01 102	
				001 01 103	
				001 01 104	
				001 01 105	
				001 01 106	
				001 01 107	
				001 01 108	
				001 01 109	55
				001 01 110	
				001 01 111	
				008 01 112	37
				001 01 113	
				001 01 114	
				001 01 115	
		TRANSLUCENT			
388	015	ET16 GREEN	COLOR CAP 0208A3768P003	001 01 100	
				001 01 101	
				001 01 102	
				001 01 103	
				001 01 104	
				001 01 105	
				001 01 106	
				001 01 107	
				001 01 108	
				001 01 109	55
				001 01 110	

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCPILLAN SUMM NO. 0269A4394 CONT ON SH. 003 SH NO 002

FINAL 03/29/83 REV NO. 70

DEVICE SUMMARY OF METALCLAD EQUIPMENT

RK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/C	UNT	REV
					001	01	111	
					001	01	113	
					001	01	114	
					001	01	115	
			TRANSLUCENT					
3EF	009		ET16 AMBER COLOR CAP	0208A3768F007	001	01	101	
					001	01	102	
					001	01	110	
					001	01	111	
					004	01	112	37
					001	01	113	
			TRANSPARENT					
			INTERNALLY DISCONNECT SEAL-IN CONTACT					
611	017		GE 115V HEATER	408466020	001	01	099	
					001	01	100	
					001	01	101	
					001	01	102	
					001	01	103	
					001	01	104	
					001	01	105	
					001	01	106	
					001	01	107	
					001	01	108	
					001	01	109	
					001	01	110	
					001	01	111	
					001	01	112	
					001	01	113	
					001	01	114	
					001	01	115	
			250 WATTS					
710	001		DISPLAY NP	NPF60844B5	001	01	104	61
726	004		EL MOTOR ASM 125VDC	0149C9619G002	004	01	XS	69
720	004		MAN EL WRENCH	0132C7771G003	004	XS		34

REQ NO 32C-68150 SO NO 923594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. 004 SH NO 003

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

NR-	QTY-CEV LCC	DESCRIPTION	ORDERING NO	QTY L/U UNT	REV
738	004	RELAY TEST PLUG GEI-25372	12XLA12A1	004 XS	34
739	004	TEST PROBE (4 PL)	12XCA11A1	004 01 XS	34
73C	004	TEST COUPLER	0066518705G001	004 01 XS	34
740	001	STAT AUX SW TEST LINKS	0099209576001	001 XS	
74C	004	INSPECTION CABINET DC CL 8998745	0899805896001	004 XS	61
767	001	BREAKER TOOL	0213X0201G01C	001 XS	
7EA	002	SPRING BLOCK DEV	8105C93046G01	002 XS	
7RG	060	TEN*S OF FT #6 NATVAR4006		060 01 AAA	33
7RJ	020	TEN*S OF FT #4 NATVAR4004		020 01 AAA	33
7RL	005	TEN*S OF FT #2 NATVAR4002		005 01 AAA	33
7RM	005	TEN*S OF FT #0 NATVAR4051		005 01 AAA	33
980	003	AUX. CT	750X01G217	001 01 110	12
				001 01 111	12
				001 01 113	12
		TYPE JAR-0 RATED 0.5/5 AMPS			12
		OUT. A-9688967 PROVICE COPIES OF			12
		ANSI-C57.13 TEST REPORTS PROVIDE			12
		CERT. OF COMPLIANCE THAT POLARITY AND			12
		DIELECTRIC TESTS HAVE BEEN PERFORMED			12
		FORWARD TO E.F. MC MILLAN GENERAL ELEC.			12
		CO. P.O.BOX 488 BURLINGTON IOWA 52601			12
		MARK AS FOLLOWS "FOR S.O.929594"			12
903	010	GRD.SENSOR CT	827X25	001 01 101	2
				001 01 102	2
				001 01 103	2
				001 01 104	2
				001 01 105	2

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CA SH. 005 SH NO 004

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
					001	01	106	2
					001	01	107	2
					001	01	108	2
					001	01	114	2
					001	01	115	2
			RATED 50/5 AMPS TYPE JCB-C					2
			CLT A-8949891					2
			PROVIDE COPIES OF ANSI-C57.13 TEST					2
			PROVIDE CERTIFICATE OF COMPLIANCE THAT					2
			POLARITY AND DIELECTRIC TESTS HAVE					2
			BEEN PERFORMED. FORWARD TO E.F.MC MILLAN					2
			GENERAL ELEC. CO. P.O.BOX 488 BURLINGTON					2
			IOWA 52601 . MARK AS FOLLOWS "FOR S.O.					2
			929594".					2
904	003		JCSO CT 800/5 750X1069		003	01	101	2
			OUT 9925225					2
			PROVIDE COPIES OF ANSI-C57.13 TEST					2
			PROVIDE CERTIFICATE OF COMPLIANCE THAT					2
			POLARITY AND DIELECTRIC TESTS HAVE					2
			BEEN PERFORMED. FORWARD TO E.F.MC MILLAN					2
			GENERAL ELEC. CO. P.O.BOX 488 BURLINGTON					2
			IOWA 52601 . MARK AS FOLLOWS "FOR S.O.					2
			929594".					2
905	006		JCSO CT 1000/5 750X1060		006	01	101	2
			OUT 9925225					2
			PROVIDE COPIES OF ANSI-C57.13 TEST					2
			PROVIDE CERTIFICATE OF COMPLIANCE THAT					2
			POLARITY AND DIELECTRIC TESTS HAVE					2
			BEEN PERFORMED. FORWARD TO E.F.MC MILLAN					2
			GENERAL ELEC. CO. P.O.BOX 488 BURLINGTON					2
			IOWA 52601 . MARK AS FOLLOWS "FOR S.O.					2
			929594".					2
906	015		JCSO CT 1500/5 750X1062		003	01	110	2
					009	01	111	2
					003	01	113	2
			OUT 9925225					2
			PROVIDE COPIES OF ANSI-C57.13 TEST					2
			PROVIDE CERTIFICATE OF COMPLIANCE THAT					2

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
			POLARITY AND DIELECTRIC TESTS HAVE					2
			BEEN PERFORMED. FORWARD TO E.F.MC MILLAN					2
			GENERAL ELEC. CO. P.O.BOX 488 BURLINGTON					2
			IOWA 52601 . MARK AS FOLLOWS "FOR S.O.					2
			929594".					2
907	006		JCSO CT 2000/5	750X10697	003	01	110	2
					003	01	113	2
			QLT 5925225					2
			PROVIDE COPIES OF ANSI-C37.13 TEST					2
			PROVIDE CERTIFICATE OF COMPLIANCE THAT					2
			POLARITY AND DIELECTRIC TESTS HAVE					2
			BEEN PERFORMED. FORWARD TO E.F.MC MILLAN					2
			GENERAL ELEC. CO. P.O.BOX 488 BURLINGTON					2
			IOWA 52601 . MARK AS FOLLOWS "FOR S.O.					2
			929594".					2
910	006		TIME OVERCURR. RELAY 12IFC51BC1A		003	01	102	4
					003	01	114	4
			1 TO 12 AMPS WITH 6 TO 150 AMP INST.					4
			ELEMENT 60 HZ. C1 CASE					4
			CONN 0208A8515 I/B GEK-49827					4
			THIS DEVICE MUST BE QUALIFIED FOR					4
			NUCLEAR 1E USE.					4
			PROVIDE CERT. OF COMPLIANCE THAT TESTS					27
			HAVE BEEN PERFORMED PER ANSI-C37.90					27
			SEC.8. FORWARD TO E.F. MC MILLAN					27
			GENERAL ELEC. CO. P.O. BOX 488					27
			BURLINGTON IOWA 52601. MARK AS					27
			FOLLOWS "FOR S.O. 929594"					27
914	018		TIME OVERCURR. RELAY 12IFC51AC1A		003	01	102	4
					003	01	110	55
					006	01	111	55
					003	01	113	55
					003	01	114	4
			1 TO 12 AMPS 60 HZ. C1 CASE					4
			CONN 0208A8514 I/B GEK-49827					4
			THIS DEVICE MUST BE QUALIFIED FOR					4
			NUCLEAR 1E USE.					4
			PROVIDE CERT. OF COMPLIANCE THAT TESTS					29

REQ NO 320-6815C SO NO 929594

EAGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CN SH. 007 SH NO 006

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

FIELD CHANGES BY S/W E/DCR # P40,803 7-20-84 CDL

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING AC	QTY L/U UNT	REV
		HAVE BEEN PERFORMED PER ANSI-C37.90			29
		SEC. 8 FORWARD TO E.F. MC MILLAN			29
		GENERAL ELEC. CO. P.O. BOX 488			29
		BURLINGTON IOWA 52601. MARK AS			29
		FOLLOWS "FOR S.O. 929594"			29
917	~~010~~ 009 (D)	INST. OVERCURR. RELAY 12HFC21B1A	001	01 102	4
			001	01 103	4
			001	01 104	4
			001	01 105	4
			001	01 106	4
			001	01 107	4
			(D) ~~001~~	~~01 108~~	4
			001	01 109	55
			(D) ~~001~~	~~01 111~~	4
			↓ ~~001~~	~~01 114~~	55
			001	01 114	31
			001	01 115	4
		0.5 TO 4.0 AMPS 60 HZ. C1 CASE			4
		CONN 0269A3074 I/B GEK-49826			4
		THIS DEVICE MUST BE QUALIFIED FOR			4
		NUCLEAR 1E USE.			4
		PROVIDE CERT. OF COMPLIANCE THAT TESTS			29
		HAVE BEEN PERFORMED PER ANSI-C37.90			31
		SEC. 8 FORWARD TO E.F. MC MILLAN			29
		GENERAL ELEC. CO. P.O. BOX 488			29
		BURLINGTON IOWA 52601. MARK AS			29
		FOLLOWS "FOR S.O. 929594"			29
91A	002	WESTINGHOUSE STYLE 1520F55A08	002	01 112	57
		TIMER TYPE TD-5 1.5 TO 30 SEC.			57
		125 VOLTS D.C. FT-11 CASE			57
		INT. CONN. 187A293.			57
		THIS DEVICE MUST BE QUALIFIED FOR			57
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION			57
		IS REQUIRED PER G.E. SPECS. SED-323-1			57
		COMPLIANCE WITH QUALITY REQUIREMENTS			57
		OF FEDERAL REGULATION 10CFR50 PER G.E.			57
		SPECS. S80-50-1 IS REQUIRED. A			57
		CERTIFICATE OF COMPLIANCE IS REQUIRED.			57
		ALSO PROVIDE CERTIFICATE OF COMPLIANCE			57

REQ NO 320-68150 SO NO 929594

EAGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CN SH. 008 SH NO 007

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

REV. REV

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY L/U UNT	REV
		THAT TESTS HAVE BEEN PERFORMED PER			57
		ANSI-C37.90 SEC.8. FORWARD TO E.F.			57
		MC MILLAN GEN.ELECTRIC CO. P.O.BOX			57
		488 BURLINGTON IOWA 52601. MARK AS			57
		FOLLOWS "FOR S.O.929594"			57
91B	C25	INSTRUCTION BOOKS	0269A4394-91B	025 01 XS	57
		FOR WESTINGHOUSE TYPE TO-5 TIMER			57
		ORDERED ON MK.91A. FORWARD TO			57
		E.F.MC MILLAN GENERAL ELEC. CO.			57
		P.O. BOX 488 BURLINGTON IOWA 52601			57
		MARK AS FOLLOWS "FOR S.O. 929594"			57
91N	014	TYPE EJ-1 FUSE CAT.	9F60B80002	003 01 101	61
				002 01 109	61
				009 01 112	61
		RATED 4800 VOLTS ZE			61
91P	010	EQUIP-BROWN BOVERI	22355140	002 01 104	61
				002 01 105	61
				002 01 106	61
				002 01 108	61
				002 01 115	61
		OVERCURRENT RELAY TYPE ITE-51L WITH 0.5			61
		TO 2 AMP TIME UNIT 60HZ			61
		THIS DEVICE MUST BE QUALIFIED FOR NUCLEAR			61
		1E USE.IEEE-323 QUALIFICATION IS REQUIRED			61
		PER G.E.SPECS.SBD-323-1. COMPLIANCE WITH			61
		QUALITY REQUIREMENTS OF FEDERAL			61
		REGULATION 10CFR50 PER G.E.SPECS.SBD-50-1			61
		IS REQUIRED. A CERTIFICATE OF COMPLIANCE			61
		IS REQUIRED. ALSO PROVIDE CERTIFICATE OF			61
		COMPLIANCE THAT TESTS HAVE BEEN			61
		PERFORMED PER ANSI-37.90 SEC.8. FORWARD			61
		TO E.F. MC MILLAN GEN.ELECTRIC CO. P.O.			61
		BOX 488 BURLINGTON IOWA 52601. MARK AS			61
		FOLLOWS "FOR S.O.929594"			61
		PRODUCTION ORDERING PLS.NOTE THAT THIS			61
		MATERIAL WAS ORDERED IN ADVANCE ON			61
		W/A K-45264. DO NOT DUPLICATE ORDER.			61

REQ NO 320-68128 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. 009 SH NO 008.

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY	L/L	UNT	REV
91R	025	INSTRUCTION BOOKS	0269A4394-51R	025	01	XS	E1
		FOR TYPE ITE-51L RELAYS ORDERED ON MK.					E1
		91P. FORWARD TO E.F. MC MILLAN GEN.					E1
		ELECTRIC CO. P.O. BOX 488 BURLINGTON					E1
		IOWA 52601. MARK AS FOLLOWS "FOR S.O.					E1
		929594"					E1
91T	010	GOULD-BROWN BOVERI CAT.238S3575		002	01	104	E1
				002	01	105	E1
				002	01	106	E1
				002	01	108	E1
				002	01	115	E1
		OVERCURR.RELAY TYPE ITE-50D WITH 0.8 TO3					E1
		AMP P.U.RANGE AND 1 TO 30 SEC.TIMER 60 HZ					E1
		THIS DEVICE MUST BE QUALIFIED FOR NUCLEAR					E1
		1E USE.IEEE-323 QUALIFICATION IS REQUIRED					E1
		PER G.E.SPECS.SBD-323-1. COMPLIANCE WITH					E1
		QUALITY REQUIREMENTS OF FEDERAL					E1
		REGULATION 10CFR50 PER G.E.SPECS.SBD-50-1					E1
		IS REQUIRED. A CERTIFICATE OF COMPLIANCE					E1
		IS REQUIRED. ALSO PROVIDE CERTIFICATE OF					E1
		COMPLIANCE THAT TESTS HAVE BEEN					E1
		PERFORMED PER ANSI-C37.90 SEC.8. FORWARD					E1
		TO E.F. MC MILLAN GEN.ELECTRIC CO. P.O.					E1
		BOX 488 BURLINGTON IOWA 52601. MARK AS					E1
		FOLLOWS "FOR S.O.929594"					E1
		PRODUCTION ORDERING PLS.NOTE THAT THIS					E1
		MATERIAL WAS ORDERED IN ADVANCE ON					E1
		L/A A-45266. DO NOT DUPLICATE ORDER.					E1
91U	025	INSTRUCTION BOOKS	0269A4394-91U	025	01	XS	E1
		FOR TYPE ITE-50D RELAYS ORDERED ON MK.91T					E1
		FORWARD TO E.F. MC MILLAN GEN. ELECTRIC					E1
		CO. P.O.BOX 488 BURLINGTON.IOWA 52601.					E1
91W	010	INST.OVERCURR. RELAY	12HFC2182A	002	01	104	E1
				002	01	105	E1
				002	01	106	E1
				002	01	108	E1
				002	01	115	E1
		2 TO 50 AMPS. 60 HZ C1 CASE					E1

REQ NO 320-68150 SO NO 929594

BY E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. 010 SH NO 009

FINAL 03/29/83 REV NO. 70

REV.

REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING AC	QTY L/U UNT	REV
		CONN 0269A3074 I/B GEK-49826			E1
		THIS DEVICE MUST BE QUALIFIED FOR			E1
		NUCLEAR 1E USE. PROVIDE CERTIFICATE OF			61
		COMPLIANCE THAT TESTS HAVE BEEN			61
		PERFORMED PER ANSI-C37.90 SEC.8.			E1
		FORWARD TO E.F.MC MILLAN GEN.ELECTRIC CO			E1
		P.O.BOX 488 BURLINGTON IOWA 52601			E1
		MARK AS FOLLOWS "FOR S.O.929594"			61
		PRODUCTION ORDERING PLS.NOTE THAT THIS			E1
		MATERIAL WAS ORDERED IN ADVANCE ON			E1
		W/A M-45268. DO NOT DUPLICATE ORDER.			E1
928	001	LOSS OF EXCIT. RELAY 12CEH51A1A	001	01 101	4
		5 APPS 115 VOLTS 125/250V DC CONTROL			4
		M1 CASE CONN 0227A2540 I/B GEK-27887			4
		PROVIDE CERT. OF COMPLIANCE THAT TESTS			29
		HAVE BEEN PERFORMED PER ANSI-C37.90			29
		SEC. 8 FORWARD TO E.F. MC MILLAN			29
		GENERAL ELEC. CO. P.O. BOX 488			29
		BURLINGTON IOWA 52601. MARK AS			29
		FOLLOWS "FOR S.O. 929594"			29
922	001	OVER POWER RELAY 12ICW51A2A	001	01 101	4
		S1 CASE CONN 362A630 I/B GEK-2056			4
		PROVIDE CERT. OF COMPLIANCE THAT TESTS			29
		HAVE BEEN PERFORMED PER ANSI-C37.90			29
		SEC. 8 FORWARD TO E.F. MC MILLAN			29
		GENERAL ELEC. CO. P.O. BOX 488			29
		BURLINGTON IOWA 52601. MARK AS			29
		FOLLOWS "FOR S.O. 929594"			29
924	004	GND.DIREC O/C RELAY 12CJCG15K1A	002	01 110	61
			002	01 113	61
		0.5 TO 2.0 AMPS 120 VOLTS 60 HZ.			6
		P1 CASE CONN C104A3984 I/B GEK-41828			6
		PROVIDE CERT. OF COMPLIANCE THAT TESTS			29
		HAVE BEEN PERFORMED PER ANSI-C37.90			29
		SEC. 8 FORWARD TO E.F. MC MILLAN			29
		GENERAL ELEC. CO. P.O. BOX 488			29
		BURLINGTON IOWA 52601. MARK AS			29
		FOLLOWS "FOR S.O. 929594"			29

REQ NO 32C-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. 011 SH NO 010

FINAL 03/29/83 REV NO. 70

DEVICE SUMMARY OF METALCLAD EQUIPMENT

ITM-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY	L/U UNT	REV
928	006	DIREC O/C RELAY	12CJC15E3A	003	01 110	6
				003	01 113	6
		2 TO 8 AMP .120 VOLTS 60 HZ				6
		M1 CASE CONN 418A875 I/B GEH-2044				6
		INTERNALLY DISCONNECT SEAL-IN CONTACT				6
		WHERE IT NORMALLY CONNECTS TO STUD 2.				6
		PROVIDE CERT. OF COMPLIANCE THAT TESTS				29
		HAVE BEEN PERFORMED PER ANSI-C37.90				29
		SEC. 8 FORWARD TO E.F. MC MILLAN				29
		GENERAL ELEC. CO. P.O. BOX 488				29
		BURLINGTON IOWA 52601. MARK AS				29
		FOLLOWS "FOR S.O. 929594"				29
929	001	GEN.FLD.GRD.DET. RLY.	12PJG11E3A	001	01 100	6
		120/240 VOLTS 60 HZ.				6
		M1 CASE CONN 0148A4029 I/B GEI-90608				6
		PROVIDE CERT. OF COMPLIANCE THAT TESTS				29
		HAVE BEEN PERFORMED PER ANSI-C37.90				29
		SEC. 8 FORWARD TO E.F. MC MILLAN				29
		GENERAL ELEC. CO. P.O. BOX 488				29
		BURLINGTON IOWA 52601. MARK AS				29
		FOLLOWS "FOR S.O. 929594"				29
9[illegible]	001	INST. VOLT. RELAY	12NGV13B21A	001	01 100	6
		120 VOLTS 60 HZ 70 TO 100 VOLT DROPOUT				6
		RANGE S1 CASE CONN 0195A4941				6
		I/B GEI-90805				6
		THIS DEVICE MUST BE QUALIFIED FOR				6
		NUCLEAR 1E USE.				6
		PROVIDE CERT. OF COMPLIANCE THAT TESTS				29
		HAVE BEEN PERFORMED PER ANSI-C37.90				29
		SEC. 8 FORWARD TO E.F. MC MILLAN				29
		GENERAL ELEC. CO. P.O. BOX 488				29
		BURLINGTON IOWA 52601. MARK AS				29
		FOLLOWS "FOR S.O. 929594"				29
936	001	TIME DELAY VOLT RLY.	12IAV53L1A	001	01 101	6
		115 VOLTS 60 HZ S2 CASE				8
		CONN #-6556476 I/B GEH-1814				8
		THIS DEVICE MUST BE QUALIFIED FOR				8
		NUCLEAR 1E USE				8

REQ NO 320-68150 SO NO 929594

EAGR E.F. MCMILLAN SUMM NO. C263A4394 CONT GR SH. 012 SH NO 011

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

REV.

(E) FLD. CHGS. BY S&W E&DCR # P40,885 COL 11-2-89	(G) FLD CHGS BY S&W E&DCR # P40885A. COL 3/6/85

DEVICE SUMMARY OF METALCLAD EQUIPMENT

REF	QTY-DEV	LOC	DESCRIPTION	ORDERING AC	QTY	L/U	UNT	REV
			PROVIDE CERT. OF COMPLIANCE THAT TESTS					29
			HAVE BEEN PERFORMED PER ANSI-C37.90					29
			SEC. 8 FORWARD TO E.F. MC MILLAN					29
			GENERAL ELEC. CO. P.O. BOX 488					29
			BURLINGTON IOWA 52601. MARK AS					29
			FOLLOWS "FOR S.O. 929594"					29
93A	019		OHMITE RESISTORS CAT.3602		001	01	100	69
					002	01	101	69
					001	01	102	69
					002	01	111	69
					010	01	112	69
					002	01	114	69
					001	01	115	69
			FIXED TYPE 50 OHMS 100 WATTS					69
			PROD. ORDERING NOTE THIS MATERIAL WAS					69
			ORDERED IN ADVANCE ON W/A A43989.					69
			ON JAN.13 1983. DO NOT DUPLICATE ORDER					69
93B	020 (E)(G)		OHMITE RESISTORS CAT.06048	(G)(E) 00#2	001	01	100	69
					002	01	101	69
					001	01	102	69
					002	01	111	69
					010	01	112	69
					002	01	114	69
					001	01	115	69
			FIXED TYPE 125 OHMS 100 WATTS					69
			PROD. ORDERING NOTE THIS MATERIAL WAS					69
			ORDERED IN ADVANCE ON W/A N43989 ON					69
			JAN. 13 1983. DO NOT DUPLICATE ORDER.					69
93C	013		WESTINGHOUSE CAT.	498A020G01 ~~[illegible]~~ (E)(G) 129A5!4G01	001	01	101	67
					001	01	102	67
					001	01	103	67
					001	01	104	67
					001	01	105	67
					001	01	106	67
					001	01	107	67
					001	01	108	67
					001	01	110	67
					001	01	111	67

REQ AC 320-68150 SO NO 929594

EAGR E.F. MCMILLAN SUMM NO. 3269A4394 CONT ON SH. 013 SH NO 012

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

FLD CHGS. BY S&W
© E&DCR# P40,675
COL 7-20-84

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
					001	01	113	E7
					001	01	114	E7
					001	01	115	E7
			TEST SWITCH 10 POLE TYPE FT-1					E7
			THIS DEVICE MUST BE QUALIFIED FOR					E7
			NUCLEAR 1E USE. IEEE-323 QUALIFICATION					E7
			IS REQUIRED PER G.E. SPECS.SBD-323-1.					E7
			COMPLIANCE WITH QUALITY REQUIREMENTS					E7
			OF FEDERAL REGULATION 10CFR50 PER G.E.					E7
			SPEC. SBD-150-1 IS REQUIRED.					E7
			A CERTIFICATE OF COMPLIANCE IS REQUIRED					E7
			PRODUCTION ORDERING NOTE THIS MATERIAL					E7
			WAS ORDERED ON W/A N-44090 DATED JAN.					E7
			21 1983. DO NOT DUPLICATE ORDERING.					E7
	001		WESTINGHOUSE CAT.	1164046	001	01	XS	E7
			TEST PLUG.					E7
			PRODUCTION ORDERING NOTE THIS ITEM					E7
			WAS ORDERED ON W/A N-44090 DATED JAN.					E7
			21 1983. DO NOT DUPLICATE ORDERING.					E7
93E	001		WESTINGHOUSE CAT.	0784618G04	001	01	XS	E7
			TEST PLUG.					E7
			PRODUCTION ORDERING NOTE THIS ITEM					E7
			WAS ORDERED ON W/A N-44090 DATED					E7
			JAN. 21 1983. DO NOT DUPLICATE ORDERING					E7
©93G	029		WESTINGHOUSE CAT.	129A542G01	004	01	104	E7
					004	01	105	E7
					004	01	106	E7
					004	01	108	E7
					003	01	110	E7
					003	01	111	E7
					003	01	113	E7
					004	01	115	E7
			TEST SWITCH 10 POLE TYPE FT-1					E7
			THIS DEVICE MUST BE QUALIFIED FOR					E7
			NUCLEAR 1E USE. IEEE-323 QUALIFICATION					E7
			IS REQUIRED PER G.E. SPECS.SBD-323-1.					E7
			COMPLIANCE WITH QUALITY REQUIREMENTS					E7
			OF FEDERAL REGULATION 10CFR50 PER G.E.					E7

REQ NO 320-68150 SO NO 929594

MGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CA SH. 014 SH NO 013

FINAL 03/29/83 REV NO. 70

REV.

REV

© FLD CHGS. BY S&W
E&DCR # P40,675
COL 7-20-84

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING AC	QTY	L/U	CNT	REV
			SPEC. SSD-50-1 IS REQUIRED.					67
			A CERTIFICATE OF COMPLIANCE IS REQUIRED.					67
			PRODUCTION ORDERING NOTE THIS PATERIAL					67
			WAS ORDERED ON W/A N-44097 DATED JAN.					67
			21 1983. DO NOT DUPLICATE ORDERING.					67
93H	001		WESTINGHOUSE CAT.	129A062G01	001	01	XS	67
			TEST PLUG.					67
			PRODUCTION ORDERING NOTE THIS ITEM					67
			WAS ORDERED ON W/A N-44097 DATED					67
			JAN. 21 1983. DO NOT DUPLICATE ORDERING.					67
©93J	002		EXR.POSITION SWITCH	9128B17486003	001	01	110	69
					001	01	113	69
			TYPE SB-1 3 A AND 3 B CONTACTS.					69
			THIS DEVICE MUST BE QUALIFIED FOR					69
			NUCLEAR 1E USE.					69
			PRODUCTION ORDERING NOTE THAT THIS					69
			MATERIAL WAS ORDERED IN ADVANCE ON					69
			W/A N44466. ON MAR.9 1983. DO NOT					69
			DUPLICATE ORDERING.					69
93K	002		AUX.RELAY	12HFA151A2H CD33	001	01	111	69
					001	01	112	69
			125 VOLTS D.C. OUT.AND CONN 0104A8526					69
			I/B GEK-45484					69
			THIS DEVICE MUST BE QUALIFIED FOR					69
			NUCLEAR 1E USE. PROVIDE CERT. OF					69
			COMPLIANCE THAT TESTS HAVE BEEN					69
			PERFORMED PER ANSI-C37.90 SEC.8.					69
			FORWARD TO E.F.MC MILLAN GENERAL ELEC.					69
			CO. P.O.BOX 483 BURLINGTON IOWA 52601.					69
			PRODUCTION ORDERING NOTE THAT THIS					69
			PATERIAL WAS ORDERED IN ADVANCE ON					69
			W/A N44466. ON MAR. 9 1983. DO NOT					69
			DUPLICATE ORDERING.					69
93L	003		FUSE BLOCK	GE8431-3	002	01	101	69
					001	01	XS	69
			3 POLE 250 VOLTS 30 AMPS.					69
			PRODUCTION ORDERING NOTE THAT THIS					69

REQ AO 320-68150 SO NO 929594

ENGR E.F. MCPILLAN SUMM NO. 0269A4394 CONT CA SH. 015 SH NO 014

FINAL 03/29/83 REV NO. 70

EVICE SUMMARY OF METALCLAD EQUIPMENT

DE C	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
	MATERIAL WAS ORDERED IN ADVANCE ON					69
	W/A N44308 ON FEB.16 1983. DO NOT					69
	DUPLICATE ORDERING.					69
	GOULD-SHAWMUT FUSE	OT20	010	01	AAA	69
	RATED 250 VOLTS 20 AMPS					69
	THIS DEVICE MUST BE QUALIFIED FOR					69
	NUCLEAR 1E USE. IEEE-323 QUALIFICATION					69
	IS REQUIRED PER G.E. SPECS. SBD-323-1					69
	COMPLIANCE WITH QUALITY REQUIREMENTS					69
	OF FEDERAL REGULATION 10CFR50 PER					69
	G.E. SPEC. SBD-50-1 IS REQUIRED. A					69
	CERT. OF COMPLIANCE IS RQUIRED.					69
	PRODUCTION ORDERING NOTE THAT THIS					69
	MATERIAL WAS ORDERED IN ADVANCE ON					69
	W/A N44308 ON FEB. 16 1983. DO NOT					69
	DUPLICATE ORDERING.					69
	GOULD-SHAWMUT FUSE	OT60	010	01	AAA	69
	RATED 250 VOLTS 60 AMPS.					69
	THIS DEVICE MUST BE QUALIFIED FOR					69
	NUCLEAR 1E USE. IEEE-323 QUALIFICATION					69
	IS REQUIRED PER G.E. SPECS. SBD-323-1					69
	COMPLIANCE WITH QUALITY REQUIREMENTS					69
	OF FEDERAL REGULATION 10CFR50 PER					69
	G.E. SPEC. SBD-50-1 IS REQUIRED. A					69
	CERT. OF COMPLIANCE IS RQUIRED.					69
	PRODUCTION ORDERING NOTE THAT THIS					69
	MATERIAL WAS ORDERED IN ADVANCE ON					69
	W/A N44308 ON FEB. 16 1983. DO NOT					69
	DUPLICATE ORDERING.					69
	TIME OVERCURR. REPLAY	12IFC51AD2A	001	01	099	69
	0.5 TO 4 AMPS. 60 HZ C1 CASE					69
	CONN 0208A8514 I/B GEK-49827.					69
	THIS DEVICE MUST BE QUALIFIED FOR					69
	NUCLEAR 1E USE. PROVIDE CERT. OF					69
	COMPLIANCE THAT TEST HAVE BEEN					69
	PERFORMED PER ANSK-C37.90 SEC.8.					69
	FORWARD TO E.F. MC MILLAN GENERAL ELEC.					69
	CO. P.O. BOX 488 BURLINGTON IOWA 52601					69

50 SO NO 929594

MILLAN SUMM NO. 0269A4394 CONT ON SH. 016 SH NO 015

/83 REV NO. 79

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H NO 016

LSP-1144

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
955	001		AM AE40 1500/2.5A	50-103131L6PZ	001	01	103	
960	012		THOUSAND FT.NO.14 WIRE SI-57279		012	01	AAA	59
			WULKENE SUPREME 41 STRANDS GREY.					59
			THIS MATERIAL MUST BE QUALIFIED FOR					59
			NUCLEAR 1E USE.					59
			THIS WIRE WAS ORDERED IN ADVANCE ON					59
			W/A N-55169 DATED JAN. 25 1982.					59
			DO NOT DUPLICATE ORDER.					59
961	002		THOUSAND FT.NO.12 WIRE SI-57279		002	01	AAA	59
			WULKENE SUPREME 65 STRANDS GREY					59
			THIS MATERAIL MUST BE QUALIFIED FOR					59
			NUCLEAR 1E USE.					59
			THIS WIRE WAS ORDERED IN ADVANCE ON					59
			W/A N-55169 DATED JAN.25 1982.					59
			DO NOT DUPLICATE ORDER.					59
962	002		THOUSAND FT.NO.12 WIRE SI-57279		002	01	AAA	59
			WULKENE SUPREME 65 STRANDS WITH TIN					59
			COPPER SHIELD.					59
			THIS MATERIAL MUST E QUALIFIED FOR					59
			NUCLEAR 1E USE.					59
			THIS WIRE WAS ORDERED IN ADVANCE ON					59
			W/A N-55169 DATED JAN. 25 1982.					59
			DO NOT DUPLICATE ORDER.					59
963	002		THOUSAND FT.NO.10 WIRE SI-57279		002	01	AAA	59
			GEK-7393 CONN 0208A2421 48/125/250VDC S1					
			THIS MATERAIL MUST BE QUALIFIED FOR					59
			NUCLEAR 1E USE.					59
			THIS WARE WAS ORDERED IN ADVANCE ON					59
			W/A N-55169 DATED JAN. 25 1982.					59
			DO NOT DUPLICATE ORDER.					59
			SUPPLY CERTIFICATE OF COMPLIANCE THAT					
			TESTS PER ANSI-C37.90 SECTION-9 HAVE BEEN					
			MADE					
			FOWARD TO W. MOYERS. BLDG 1, GENERAL					
			ELECTRIC CO.BURLINGTON, IA.					
964	002		THOUSAND FT.NO.10 WIRE SI-57279		002	01	AAA	59

REQ NO 320-68150 SO NO 929594

ER E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. 018 SH NO 017

FINAL 03/29/83 REV NO. 70

REV. REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY L/U UNT	REV
		GEK-45494 OL & CONN 006178972			
		COPPER SHIELD.			59
		THIS MATERIAL MUST BE QUALIFIED FOR			59
		NUCLEAR 1E USE.			59
		THIS WIRE WAS ORDERED IN ADVANCE			59
		ON W/A N-55169 DATED JAN. 25 1982.			59
		DO NOT DUPLICATE ORDER.			59
		SUPPLY CERTIFICATE OF COMPLIANCE THAT			
		TESTS PER ANSI-C37.90 SECTION-9 HAVE BEEN			
		MADE			
		FOWARD TO W.MOYERS. BLDG 1. GENERAL			
		ELECTRIC CO. BURLINGTON. IA.			
965	002	THOUSAND FT.NO.8 WIRE SI-57279	002	01 AAA	59
		GEK-45487 OL & CONN 006077058			
		THIS MATERIAL MUST BE QUALIFIED FOR			59
		NUCLEAR 1E USE.			59
		THIS WIRE WAS ORDERED IN ADVANCE			59
		ON W/A N-55169 DATED JAN. 25 1982.			59
		DO NOT DUPLICATE ORDER.			59
		SUPPLY CERTIFICATE OF COMPLIANCE THAT			
		TESTS PER ANSI-C37.90 SECTION-9 HAVE BEEN			
		MADE			
		FOWARD TO W. MOYERS. BLDG 1. GENERAL			
		ELECTRIC CO. BURLINGTON. IA.			
966	001	THOUSAND FT.NO. 6 WIRE SI-57279	001	01 AAA	59
		NULKENE SUPREME 133 STRANDS			59
		THIS MATERIAL MUST BE QUALIFIED FOR			59
		NUCLEAR 1E USE.			59
		THIS WIRE WAS ORDERED IN ADVANCE ON			59
		W/A N-55169 DATED JAN. 25 1982.			59
		DO NOT DUPLICATE ORDER.			59
963	008	RESISTOR 1 MEG-OHM 0269A4394 PK-983	001	01 100	
			002	01 101	57
			001	01 102	
			002	01 111	
			001	01 112	57
			001	01 114	
		IRC/TRW TYPE MEF 1 PERCENT TO			

REQ AC 320-68150 SO NO 929594

EAGR E.F. MCPILLAN SUMM NO. 0269A4394 CONT CA SH. 019 SH NO 018

FINAL 03/25/83 REV NO. 70

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
985	016	CAPACITOR 1 MFD	61F880A105	002	01	103	57
				004	01	101	57
				002	01	102	57
				004	01	111	57
				002	01	112	57
				002	01	114	57
		10 PERCENT TOL. 400V NON-INDUCTIVE COMPUTER GRADE					
950	100	YCS NYLON ROPE 1/8INCH	0269A4394-MK990	100	01		
9A1	021	ALX. CT	750X01620	003	01	102	16
				006	01	110	16
				003	01	111	16
				006	01	113	16
				003	01	114	16
		TYPE JAR-0 RATED 5/5 AMPS.					16
		OUT. A-9688967 PROVIDE COPIES OF					16
		ANSI-C57.13 TEST REPORTS. PROVIDE					16
		CERT. OF COMPLIANCE THAT POLARITY AND					16
		DIELECTRIC TESTS HAVE BEEN PERFORMED					16
		FORWARD TO E.F. MC MILLAN GENERAL ELEC.					16
		CO. P.O.BOX 488 BURLINGTON IOWA 52601					16
		MARK AS FOLLOWS "FOR S.O.929594"					16
9A2	004	JVM-3 POT. TRANSF.	643X94	001	01	109	37
				002	01	112	16
				001	01	112	37
		2 FUSE TYPE OUT 8949741 RATED					16
		4200-120 VOLTS. PROVIDE COPIES OF					16
		ANSI-C57.13 TEST REPORTS. PROVIDE					16
		CERT. OF COMPLIANCE THAT POLARITY AND					16
		DIELECTRIC TESTS HAVE BEEN PERFORMED					16
		FORWARD TO E.F. MC MILLAN GENERAL ELEC					16
		CO. P.O.BOX 488 BURLINGTON IOWA 52601					16
		MARK AS FOLLOWS "FOR S.O. 929594"					16
9A3	006	JVM-3 POT. TRANSF.	643X93	003	01	101	16
				003	01	112	16
		1 FUSE TYPE OUT 8949740 RATED					16
		4200-120 VOLTS PROVIDE COPIES OF					16

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CA SH. D20 SH NO C19

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

REV.

REV

FLD CHGS. BY S&W
E&DCR # P40,675
COL 7-20-84

DEVICE SUMMARY OF METALCLAD EQUIPMENT

NO-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
			ANSI-C37.13 TEST REPORTS. PROVIDE CERT. OF COMPLIANCE THAT POLARITY AND DIELECTRIC TESTS HAVE BEEN PERFORMED FORWARD TO E.F. MC MILLAN GENERAL ELEC. CO. P.O.BOX 488 BURLINGTON IOWA 52601 MARK AS FOLLOWS "FOR S.O.929594"					16
9A4	~~001~~ 004 ©		JE-27 AUX. POT. TRANS. 760X9062 120-120 VOLTS OUT A-9688894 PROVIDE COPIES OF ANSI-C37.13 TEST REPORTS. PROVIDE CERT. OF COMPLIANCE THAT POLARITY AND DIELECTRIC TESTS HAVE BEEN PERFORMED. FORWARD TO E.F. MC MILLAN GENERAL ELEC. CO. P.O. BOX 488 BURLINGTON IOWA 52601. MARK AS FOLLOWS "FOR S.O. 929594"	001 © 003	C1 01	101 112	16
9A5	001		AUX. POT. TRANS. 760X996-1 TYPE YT-1557 199/115-115 VOLTS OUT HB 7910 PG.32. PROVIDE COPIES OF ANSI-C37.13 TEST REPORTS. PROVIDE CERT. OF COMPLIANCE TAHT POLARITY AND DIELECTRIC TEST HAVE BEEN PERFORMED. FORWARD TO E.F. MC MILLAN GENERAL ELEC. CO. P.O.BOX 488 BURLINGTON IOWA 52601 MARK AS FOLLOWS "FOR S.O. 929594"	001	C1	101	16
9A6	003		UNDERVOLT. RELAY 69 VOLTS 60 HZ S1 CASE CCNA 0195A4941 I/B GEI-90805 THIS DEVICE MUST BE QUALIFIED FOR NUCLEAR 1E USE. PROVIDE CERT. OF COMPLIANCE THAT TESTS HAVE BEEN PERFORMED PER ANSI-C37.90 SEC.8 FORWARD TO E.F. MC MILLAN GENERAL ELEC. CO. P.O.BOX 488 BURLINGTON IOWA 52601. MARK AS FOLLOWS "FOR S.O. 929594"	12NGV13824A	003	01	112	16
9A7	001		UNDERFREQ. RELAY	12SFF31A1A	001	C1	112	16

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CH SH. D21 SH NO D20

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY L/U UNT	REV
		120 VOLTS 60 HZ. M1 CASE			16
		CONN 0273A9084 I/B GEK-49923			16
		THIS DEVICE MUST BE QUALIFIED FOR			16
		NUCLEAR 1E USE. PROVIDE CERT. OF			16
		COMPLIANCE THAT TESTS HAVE BEEN			16
		PERFORMED PER ANSI-C37.90 SEC.8			16
		FORWARD TO E.F.MC MILLAN GENERAL			16
		ELEC. CO. P.O.BOX 488 BURLINGTON			16
		IOWA 52601. MARK AS FOLLOWS "FOR			16
		S.O. 929594"			16
9A8	001	PROV.MTG.& WIR.& ASM.	0269A4394-9A8	001 01 112	16
		FOR EXT. RESISTORS 100 OHMS AND 350			16
		OHMS FURN. WITH SFF RELAY MK.9A7.			65
		OUTLINE 0273A9565			16
	006	PK-2 TEST BLOCK	0133C85766006	002 01 110	19
				002 01 111	16
				002 01 113	19
		4 POLE CURRENT. THIS DEVICE MUST			16
		BE QUALIFIED FOR NUCLEAR 1E USE.			16
983	006	JKS-3 CT 100/5	671X24	001 01 099	16
				001 01 104	16
				001 01 105	16
				001 01 106	16
				001 01 108	42
				001 01 115	16
		OUT A-8949911 PROVIDE COPIES OF			16
		ANSI-C57.13 TEST REPORTS. PROVIDE			16
		CERT. OF COMPLIANCE THAT POLARITY			16
		AND DIELECTRIC TESTS HAVE BEEN			16
		PERFORMED. FORWARD TO E.F.MC MILLAN			16
		GENERAL ELEC.CO. P.O. BOX 488			16
		BURLINGTON IOWA 52601. MARK AS			16
		FOLLOWS "FOR S.O.929594"			16
984	016	JKS-3 CT 300/5	671X28	003 01 103	16
				002 01 104	16
				002 01 105	16
				002 01 106	16

REQ NO 320-68150 SO NO 929594

E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. 022 SH NO 021

FINAL 03/29/83 REV NO. 70

REV. REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY	L/U	URT	REV
				003	01	107	16
				002	01	108	16
				002	01	115	16
		OUT A-8949911 PROVIDE COPIES OF					16
		ANSI-C57.13 TEST REPORTS. PROVIDE					16
		CERT. OF COMPLIANCE THAT POLARITY					16
		AND DIELECTRIC TESTS HAVE BEEN					16
		PERFORMED. FORWARD TO E.F. MC MILLAN					16
		GENERAL ELEC. CO. P.O.BOX 488					16
		BURLINGTON IOWA 52601. MARK AS					16
		FOLLOWS "FOR S.O. 929594"					16
9EA	012	JKS-3 CT 400/5	671X29	006	01	102	55
				006	01	114	55
		OUT A-8949911 PROVIDE COPIES OF					55
		ANSI-57.13 TEST REPORTS. PROVIDE					55
		CERT. OF COMPLIANCE THAT POLARITY					55
		AND DIELECTRIC TESTS HAVE BEEN					55
		PERFORMED. FORWARD TO E.F. MC MILLAN					55
		GENERAL ELEC. CO. P.O. BOX 488					55
		BURLINGTON IOWA 52601. MARK AS					55
		FOLLOWS "FOR S.O. 929594". NOTE THIS					55
		MATERIAL WAS ORDERED IN ADVANCE ON					55
		W/A N51676. DO NOT DUPLICATE ORDER.					55
9C3	001	LCCXCLT RELAY	12HEA61C239X2	001	01	102	23
		OUT. AND CONN 0165A7677 THIS DEVICE					23
		MUST BE QUALIFIED FOR NUCLEAR 1E					23
		USE. PROVIDE CERT. OF COMPLIANCE					23
		THAT TESTS HAVE BEEN PERFORMED PER					23
		ANSI-C37.90 SEC.8 FORWARD TO E.F.					23
		MC MILLAN GENERAL ELEC.CO. P.O. BOX					23
		488 BURLINGTON IOWA 52601. MARK AS					23
		FOLLOWS "FOR S.O. 929594"					23
9C4	024	WESTINGHOUSE CAT.	129A531G01	002	01	099	23
				004	01	101	67
				002	01	102	23
				001	01	103	23
				001	01	104	67
				001	01	105	67

REQ NO 320-68156 SO NO 929594

EAGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CA SH. 023 SH NO 022

FINAL 03/25/83 REV NO. 73

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
					001	01	106	67
					001	01	107	23
					001	01	108	67
					002	01	110	67
					001	01	111	67
					002	01	113	67
					004	01	114	63
					001	01	115	67
			TEST SWITCH 10 POLE TYPE FT-1					23
			THIS DEVICE MUST BE QULALIFIED FOR					23
			NUCLEAR 1E' USE. IEEE-323					23
			QUALIFICATION IS REQUIRED PER G.E.					23
			SPECS. SBD-323-1. COMPLIANCE WITH					23
			QUALITY REQUIREMENTS OF FEDERAL					23
			REGULATION 10CFR50 PER G.E. SPEC.					23
			SBD-50-1 IS REQUIRED. A CERTIFICATE					23
			OF COMPLIANCE IS REQUIRED.					23
906	025		IASTRUCTION BOOKS	0269A4394-906	025	01	XS	23
			FOR WESTINGHOUSE TYPE FT-1 TEST					23
			SWITCHES ORDERED ON MK. 904					67
			FORWARD TO E.F.MC MILLAN GENERAL ELEC					23
			CO. P.O. BOX 488 BURLINGTON IOWA 52601.					23
			MARK AS FOLLOWS "FOR S.O. 929594"					23
907	009		TIMING RELAY	12SAM11B21A	002	01	099	23
					002	01	110	23
					002	01	111	23
					001	01	112	23
					002	01	113	23
			0.03 TO 1.0 SECONDS S1 CASE					23
			CONK 0238A2421 I/B GEK-7393					23
			THIS DEVICE MUST BE QUALIFIED FOR					23
			NUCLEAR 1E USE. PROVIDE CERT. OF					23
			COMPLIANCE THAT TESTS HAVE BEEN					23
			PERFORMED PER ANSI-C37.90 SEC. 8					23
			FORWARD TO E.F. MC MILLAN GENERAL ELEC					23
			CO P.O. BOX 48. BURLINGTON IOWA					23
			52601. MARK AS FOLLOWS "FOR S.O.					23
			929594".					23

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. 024 SH NO 023

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

REV.

REV

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-CEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
9C8	003		TIMING RELAY	12SAM11B22A	001	01	109	61
					001	01	112	23
					001	01	114	61
			0.05 TO 3.0 SECONDS S1 CASE					52
			CCNA 0208A2421 I/B GEK-7393					52
			THIS DEVICE MUST BE QUALIFIED FOR					52
			NUCLEAR 1E USE. PROVIDE CERT. OF					52
			COMPLIANCE THAT TESTS HAVE BEEN					52
			PERFORMED PER ANSI-C37.90 SEC. 8					52
			FORWARD TO E.F. MC MILLAN GENERAL ELEC					52
			CO P.O. BOX 488 BURLINGTON IOWA					52
			52601. MARK AS FOLLOWS "FOR S.O.					52
			929594".					52
9C9	008		AUXILIARY RELAY	12HFA99AG1A C051	001	01	100	23
					001	01	101	23
					004	01	112	63
					002	01	XS	50
			10 VOLTS D.C. DRAWOUT TYPE S2 CASE					23
			OUT 6209272 CONN 0269A3054					23
			I/B GEK-49812					23
			THIS DEVICE MUST BE QUALIFIED FOR					23
			NUCLEAR 1E USE. PROVIDE CERT. OF					23
			COMPLIANCE THAT TESTS HAVE BEEN					23
			PERFORMED PER ANSI-C37.90 SEC. 8					23
			FORWARD TO E.F. MC MILLAN GENERAL ELEC.					23
			CO. P.O. BOX 488 BURLINGTON IOWA					23
			52601. MARK AS FOLLOWS "FOR S.O.					23
			929594".					23
			NOTE THAT FOUR OF THESE DEVICES					69
			MOUNTED IN UNIT 112 WILL HAVE THE					69
			CONTACT ARRANGEMENT ALTERED BY THE					69
			CUSTOMER AT JOBSITE TO A MODIFIED					69
			CODE 51 BY MAKING POSITION 3 NORMALLY					69
			CLOSED AND POSITION 4 NORMALLY OPEN.					69
			WITH POSITIONS 1,2,5 AND 6 REMAINING AS					69
			NORMALLY OPERN.					69
9F1	008		AUXILIARY RELAY	12HFA99AG1A C042	001	01	101	23
					001	01	102	23
					002	01	111	23

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCPILLAN SUMM NO. 0269A4394 CONT CA SH. 025 SH NO 024

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
					001	C1	112	23
					001	01	114	23
					002	01	XS	50
			10 VOLTS D.C. DRAWOUT TYPE S2 CASE					23
			OUT 6209272 CONN 0269A3054					23
			I/B GEK-49812					23
			THIS DEVICE MUST BE QUALIFIED FOR					23
			NUCLEAR 1E USE. PROVIDE CERT. OF					23
			COMPLIANCE THAT TESTS HAVE BEEN					23
			PERFORMED PER ANSI-C37.90 SEC. 8					23
			FORWARD TO E.F. MC MILLAN GENERAL ELEC					23
			CO. P.O. BOX 488 BURLINGTON IOWA					23
			52601. MARK AS FOLLOWS "FOR S.O.					23
			929594"					23
	005		AUXILIARY RELAY	12HFA151A2F C033	002	01	100	23
					001	01	105	39
					001	01	111	61
					001	01	115	39
			125 VOLTS D.C. OUT. AND CONN 6178972					23
			I/B GEK-45484					23
			THIS DEVICE MUST BE QUALIFIED FOR					23
			NUCLEAR 1E USE. PROVIDE CERT. OF					23
			COMPLIANCE THAT TESTS HAVE BEEN					23
			PERFORMED PER ANSI-C37.90 SEC. 8					39
			FORWARD TO E.F. MC MILLAN GENERAL ELEC					23
			CO. P.O. BOX 488 BURLINGTON IOWA					23
			52601. MARK AS FOLLOWS "FOR S.O.					23
			929594"					23
9F3	002		AUXILIARY RELAY	12HFA151A2F CC06	001	01	104	23
					001	01	106	23
			125 VOLTS D.C. OUT AND CONN 6178972					23
			I/B GEK-45484					23
			THIS DEVICE MUST BE QUALIFIED FOR					23
			NUCLEAR 1E USE. PROVIDE CERT. OF					23
			COMPLIANCE THAT TESTS HAVE BEEN					23
			PERFORMED PER ANSI-C37.90 SEC. 8					23
			FORWARD TO E.F. MC MILLAN GENERAL ELEC					23
			CO. P.O. BOX 488 BURLINGTON IOWA					23
			52601. MARK AS FOLLOWS "FOR S.O.					23

REQ NO 320-68150 SO NO 929594

E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. 026 SH NO 025

FINAL .03/29/83 REV NO. 70

REV. REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
			929594"					23
9F4	C02		AUXILIARY RELAY	12HFA151A2F C024	001	01	100	23
					001	01	112	23
			125 VOLTS D.C. OUT. AND CONN. 9178972					23
			I/B GEK-45484					23
			THIS DEVICE MUST BE QUALIFIED FOR					23
			NUCLEAR 1E USE. PROVIDE CERT. OF					23
			COMPLIANCE THAT TESTS HAVE BEEN					23
			PERFORMED PER ANSI-C37.9/ SEC. 8					23
			FORWARD TO E.F. MC MILLAN GENERAL ELEC					23
			CO. P.O. BOX 488 BURLINGTON IOWA					23
			52601. MARK AS FOLLOWS "FOR S.O.					23
			\929594"					23
9F6	003		AUXILIARY RELAY	12HFA151A2F C042	001	01	106	23
					002	01	108	23
			12K VOLTS D.C. OUT AND CONN 6178972					23
			I/B GEK-45484					23
			THIS DEVICE MUST BE QUALIFIED FOR					23
			NUCLEAR 1E USE. PROVIDE CERT. OF					23
			COMPLIANCE THAT TESTS HAVE BEEN					23
			PERFORMED PER ASNI-C37.90 SEC. 8					23
			FORWARD TO E.F. MC MILLAN GENERAL ELEC					23
			CO. P.O. BOX 488 BURLINGTON IOWA					23
			929594"					23
9G1	001		GND.DIREC. O/C RELAY 12CJC615K2A		001	01	100	25
			1 TO 4 AMPS 120 VOLTS 60 HZ P1 CASE					25
			CONN 0184A8984 I/B GEK-41828					25
			PROVIDE CERTIFICATE OF					35
			COMPLIANCE TAHT TESTS HAVE BEEN					25
			PERFORMED PER ANSI-C37.90					25
			SEC.E. FORWARD TO E.F. MC MILLAN					25
			GEN.ELECTRIC CO. P.O. BOX 488					25
			BURLINGTON IOWA 52601 MARK AS					25
			FOLLOWS "FOR S.O. 929594"					25
9G5	015		CNT.EKR.CONTR. SW.	16SB189X2	001	01	100	25
					001	01	101	25
					001	01	102	25

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CA SH. 027 SH NO 026

FINAL 03/29/83 REV NO. 73

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

FLD. CHGS. BY S&W
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COL 7-20-84

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DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
					001	01	103	25
					001	01	104	25
					001	01	105	25
					001	01	106	25
					001	01	107	25
					001	01	108	25
					001	01	109	55
					001	01	110	25
					001	01	111	25
					001	01	113	25
					001	01	114	25
					001	01	115	25
			3 STG. GEH-908. THIS DEVICE MUST					25
			BE QUALIFIED FOR NUCLEAR 1E USE					25
967	~~010~~012 ©		STA. AUX. SWITCH	0063535706001	001	01	100	25
					© ~~001~~	~~01~~	~~101~~	25
					001	01	102	25
					001	01	103	25
					001	01	104	25
					001	01	105	25
					001	01	106	25
					001	01	107	25
					001	01	108	25
					001	01	109	55
					001	01	111	25
					© ~~001~~	~~01~~	~~113~~	25
					001	01	114	25
					001	01	115	25
			TYPE SB-12 6 A AND 6 B GEI-74670					25
			THIS DEVICE MUST BE QUALIFIED FOR					25
			NUCLEAR 1E USE.					25
969	013		BKR.POSITION SWITCH	0128B1748G002	001	01	100	37
					001	01	101	25
					001	01	102	25
					001	01	103	25
					001	01	104	25
					001	01	105	25
					001	01	106	25
					001	01	107	25

REQ NO 32C-68150 SO NO 929594

ENGR E.F. MCFILLAN SUMM NO. 0269A4394 CONT ON SH. 028 SH NO 027

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

REV. REV

© FLD. CHGS. BY S&W E&DCR # P40,675 COL 7-20-84	Ⓕ FLD. CHG'S BY S&W E&DCR # P40,973 COL 1-25-85

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY L/U UNT	REV
				001 01 108	25
				001 01 109	55
				001 01 111	25
				001 01 114	25
				001 01 115	25
		TYPE SB-1 2 A AND 2 B GEH-908			37
		THIS DEVICE MUST BE QUALIFIED FOR			37
		NUCLEAR 1E USE.			37
9GA	003	STA. AUX. SWITCH	0063535706012	001 01 101	65
				001 01 110	65
				001 01 113	65
		TYPE SB-12 10 A AND 10B GEI-74670			65
		THIS DEVICE MUST BE QUALIFIED FOR			65
		NUCLEAR 1E USE.			65
		PRODUCTION ORDERING NOTE THIS			65
		MATERIAL WAS ORDERED IN ADVANCE ON			65
		W/A N-52269 ON JUNE 14 1982. DO NOT			65
		DUPLICATE ORDERING.			65
9H2	~~036~~ 036 ©	AUXILIARY RELAY	12HGA111J2	© 002 01 100	63
				004 01 101	27
				002 01 102	27
				004 01 103	63
				Ⓕ ~~001 01 104~~	63
				001 01 105	63
				Ⓕ ~~001 01 106~~	63
				004 01 107	63
				Ⓕ ~~001 01 108~~	63
				003 01 110	65
				002 01 111	27
				007 01 112	63
				003 01 113	65
				001 01 114	27
				001 01 115	63
		125 VOLTS D.C. FRONT CONN. WITH			27
		COVER. OUT & CONN 006375626			27
		I/B GEK-45487			27
		THIS DEVICE MUST BE QUALIFIED FOR			27
		NUCLEAR 1E USE. PROVIDE CERT. OF			27
		COMPLIANCE THAT TESTS HAVE BEEN			27

REQ NO 320-66150 SO NO 929594

ENGR E.F. MCPILLAN SUMM NO. 0269A4394 CONT CA SH. 029 SH NO 028

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

FLD. CHGS. BY S&W
© E&DCR# P40,675
COL 7-20-84

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
		PERFORMED PER ANSI-C37.90 SEC.8.					27
		FORWARD TO E.F. MC MILLAN GENERAL					27
		ELEC. CO. P.O. BOX 488 BURLINGTON					27
		IOWA 52601 MARK AS FOLLOWS "FOR					27
		S.O. 929594"					27
9H3	003	AGASTAT CAT.	E7012PAL	001	01	104	27
				001	01	106	27
				001	01	108	27
		TIMING RELAY 125 VOLTS D.C. 0.1 TO 1 (5 ©)					27
		SECOND TIME DELAY ON PICKUP					27
		THIS DEVICE MUST BE QUALIFIED FOR					27
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION					27
		IS REQUIRED PER G.E. SPECS.SBC-323-1.					27
		COMPLIANCE WITH QUALITY REQUIREMENTS					27
		OF FEDERAL REGULATION 10CFR50 PER					27
		G.E.SPECS. SBC-50-1 IS REQUIRED. A					27
		CERTIFICATE OF COMPLIANCE IS REQUIRED.					27
		ALSO PROVIDE CERTIFICATE OF COMPLIANCE					27
		THAT TESTS HAVE BEEN PERFORMED PER					27
		ANSI-C37.90 SEC.8. FORWARD TO E.F.					27
		MC MILLAN GENERAL ELEC. CO. P.O. BOX					27
		488 BURLINGTO IOWA 52601. MARK AS					27
		FOLLOWS "FOR S.O.929594"					27
9H4	002	AGASTAT CAT.	E7012PBL	© 001	01	~~100~~ 112	27
				© 001	01	101	27
		TIMING RELAY 125 VOLTS D.C. 0.5 TO 5 (5 ©)					27
		SECONDS TIME DELAY ON PICKUP -					27
		THIS DEVICE MUST BE QUALIFIED FOR					27
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION					27
		IS REQUIRED PER G.E. SPECS.SBC-323-1.					27
		COMPLIANCE WITH QUALITY REQUIREMENTS					27
		OF FEDERAL REGULATION 10CFR50 PER					27
		G.E.SPECS. SPBC-50-1 IS REQUIRED. A					27
		CERTIFICATE OF COMPLIANCE IS REQUIRED.					27
		ALSO PROVIDE CERTIFICATE OF COMPLIANCE					27
		THAT TESTS HAVE BEEN PERFORED PER					27
		ANSI-C37.90 SEC.8. FORWARD TO E.F.					27
		MC MILLAN GENERAL ELEC. CO. P.O. BOX					27
		488 BURLINGTON IOWA 52601. MARK AS					27

REQ NO 320-68150 SO NO 929594

E.F. MCPILLAR SUMM NO. 0269A4394 CONT ON SH. 030 SH NO 029

FINAL 03/29/83 REV NO. 70

REV. REV

(C) FLD. CHGS. BY S&W E&DCR# P40,675 COL 7-20-84	(F) FLD CHGS BY S&W E&DCR #P40,973 COL 1-25-85

DEVICE SUMMARY OF METALCLAD EQUIPMENT

NO-	QTY-DEV LOC	DESCRIPTION	ORDERING AC	QTY L/U UNT	REV
		FOLLOWS "FOR S.O.929594"			27
9H5	~~012~~ 016 (C)	AGASTAT CAT.	E7012PCL	001 01 103	27
				(F) 001 01 104	27
				001 01 105	27
				(F) 001 01 106	27
				001 01 107	27
				(F) 001 01 108	27
				(C) 001 01 112	63
				001 01 115	27
		TIMING RELAY 120 VOLTS D.C. 1.5 TO 15 (5) (C)			27
		SECONDS TIME DELAY ON PICKUP.			27
		THIS DEVICE MUST BE QUALIFIED FOR			27
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION			27
		IS REQUIRED PER G.E. SPECS.SBC-323-1.			27
		COMPLIANCE WITH QUALITY REQUIREMENTS			27
		OF FEDERAL REGULATION 10CFR50 PER			27
		G.E.SPECS. S8D-50-1 IS REQUIRED. A			27
		CERTIFICATE OF COMPLIANCE IS REQUIRED.			27
		ALSO PROVIDE CERTIFICATE OF COMPLIANCE			27
		THAT TESTS HAVE BEEN PERFORMED PER			27
		ANSI-C37.9/ SEC.8. FORWARD TO E.F.			27
		MC MILLAN GENERAL ELEC. CO. P.O. BOX			27
		488 . BURLINGTON. IOWA 52601. MARK AS			27
		FOLLOWS "FOR S.O.929594"			27
9H6	006	AGASTAT CAT.	E7012PDL	001 01 101	27
				001 01 104	27
				001 01 105	27
				001 01 106	27
				001 01 108	27
				001 01 115	27
		TIMING RELAY 120 VOLTS D.C. 5 TO 50 (5) (C)			27
		SECONDS TIME DELAY ON PICKUP			27
		THIS DEVICE MUST BE QUALIFIED FOR			27
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION			27
		IS REQUIRED PER G.E. SPECS.SBC-323-1.			27
		COMPLIANCE WITH QUALITY REQUIREMENTS			27
		OF FEDERAL REGULATION 10CFR50 PER			27
		CERTIFICATE OF COMPLIANCE IS REQUIRED.			27
		CERTICICATE OF COMPLIANCE IS REQUIRED.			27

REQ AO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CA SH. 031 SH NO 030

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

FLD. CHGS. BY S&W
© E&DCR # P40,676
CoL 7-20-84

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
		ALSO PROVIDE CERTIFICATE OF COMPLIANCE					27
		THAT TESTS HAVE BEEN PERFORMED PER					37
		ANSI-C37.90 SEC.8. FORWARD TO E.F.					27
		MC MILLAN GENERAL ELEC. CO. P.O. BOX					27
		488 BURLINGTON IOWA 52601. MARK AS					27
		FOLLOWS "FOR S.O.929594"					27.
9H7	001	AGASTAT CAT. 5© E7012PEL		001	01	112	63
		TIMING RELAY 125 VOLTS D.C. 20 TO 200					55
		SECONDS TIME DELAY ON PICKUP					55
		THIS DEVICE MUST BE QUALIFIED FOR					55
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION					55
		IS REQUIRED PER G.E. SPECS.SBC-323-1.					55
		COMPLIANCE WITH QUALITY REQUIREMENTS					55
		OF FEDERAL REGULATION 10CFR50 PER					55
		G.E.SPECS. SBC-50-1 IS REQUIRED. A					55
		CERTIFICATE OF COMPLIANCE IS REQUIRED.					55
		ALSO PROVIDE CERTIFICATE OF COMPLIANCE					55
		THAT TESTS HAVE BEEN PERFORMED PER					55
		ANSI-C37.90 SEC.8. FORWARD TO E.F.					55
		MC MILLAN GENERAL ELEC. CO. P.O. BOX					55
		488 BURLINGTON IOWA 52601. MARK AS					55
		FOLLOWS "FOR S.O.929594"					55
9H8	025	INSTRUCTION BOOKS	0269A4394-9H8	025	01	XS	27
		FOR AGASTAT TIMING RELAYS ORDERED ON					27
		MKS. 9H3 AND 9H4 AND 9H5 AND 9H6 AND					27
		9H7. FORWARD TO E.F. MC MILLAN					27
		GENERAL ELEC. CO. P.O. BOX 488					27
		BURLINGTON IOWA 52601. MARK AS					27
		FOLLOWS "FOR S.O.929594"					27
9J1	050	BLANK NAMEPLATES	0269A4394-9J1	050	01	AAA	33
		SIMILAR TO 0183B2130 P-50 EXCEPT					33
		OUTSIDE WHITE WITH GREEN CORE					33
		DIMENSIONS 1 X 4 3/6					33
9J2	600	BLANK NAMEPLATES	0269A4394-9J2	600	01	AAA	33
		SIMILAR TO 0183B2130 P-5 EXCEPT					33
		OUTSIDE WHITE WITH GREEN CORE					33
		DIMENSIONS 5/8 X 2 3/4					33

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. D32 SH NO D31

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

NO-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
9J3	400		BLANK NAMEPLATES	0269A4394-9J3	400	01	AAA	33
			SIMILAR TO 018382130 P-35 EXCEPT					33
			OUTSIDE WHITE WITH GREEN CORE					33
			DIMENSIONS 5/8 X 4 1/2					33
9J4	030		BLANK NAMEPLATES	0269A4394-9J4	030	01	AAA	37
			SIMILAR TO 018382130 P-37 EXCEPT					37
			OUTSIDE WHITE WITH GREEN CORE					37
			DIMENSIONS 5/8 X 1 3/4					37
9L1	011		LOCKOUT RELAY	12HEA61A223X2	001	01	101	37
					001	01	102	37
					001	01	103	37
					001	01	104	37
					001	01	105	37
					001	01	106	37
					001	01	107	37
					001	01	108	37
					001	01	111	37
					001	01	114	37
					001	01	115	37
			OUT AND CONN 0165A7675					37
			THIS DEVICE MUST BER QUALIFIED FOR					37
			&LCLEAR 1E USE. PRJVIDE CERT. OF					37
			COMPLIANCE THAT TESTS HAVE BEEN					37
			PERFORMED PER ANSI-C37.90 SEC.8.					37
			FORWARD TO E.F. MC MILLAN GEN.ELEC.					37
			CO. P.O. BOX 488 BURLINGTON IOWA					37
			52601. MARK AS FOLLOWS "FOR S.O. 929594"					37
9L2	007		LOCKOUT RELAY	12HEA&18235X2	002	01	099	37
					001	01	101	37
					002	01	110	37
					002	01	113	37
			OUT AND CONN 0165A7676					37
			THIS DEVICE MUST BE QUALIFIED FOR					37
			&'CLEAR 1E USE. PROVICE CERT. OF					37
			COMPLIANCE THAT TESTS HAVE BEEN					37
			PERFORMED PER ANSI-C37.90 SEC.8.					37
			FORWARD TO E.F. MC MILLAN GEN.ELEC.					37
			CO. P.O.BOX 488 BURLINGTON IOWA					37

REQ NO 320-68150 SO NO 929594

EAGR E.F. MCFILLAN SUMM NO. 0269A4394 CONT CA SH. 033 SH NO 032

FINAL 03/29/83 REV NO. 70

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

FLD. CHGS BY S&W
© E&DCR# P40675
COL 7-20-84

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING AC	QTY L/U UNT	REV
		52601. MARK AS FOLLOWS "FOR S.O. 929594"			37
9L4	001	VOLTMETER SWITCH	10AA304	001 01 112	37
		2 STAGE GEH-2038			37
		THIS DEVICE MUST BE QUALIFIED FOR			37
		NUCLEAR 1E USE.			37
© 9N5 SHOWN ALREADY ON MK9GA	001	~~STR. AUX. SWITCH~~	~~0048D387G012~~	~~001 01 110~~	~~37~~
		~~TYPE 38-12 10 A ANC 10 B~~			~~37~~
		~~GEI-74670. THIS DEVICE MUST BE~~			~~37~~
		~~QUALIFIED FOR NUCLEAR 1E USE.~~			~~37~~
9N6	003	GROUND SENSOR CT	827X25	001 01 110	52
				001 01 111	37
				001 01 113	52
		RATED 50/5 AMPS. TYPE JC8-0			52
		PROVIDE COPIES OF ANSI-C57.13 TEST			37
		PROVIDE COPIES OF ANSI-C57.13 TEST			52
		REPORTS. PROVIDE CERT. OF COMPLIANCE			52
		THAT POLARITY AND DIELECTRIC TESTS			52
		HAVE BEEN PERFORMED. FORWARD TO			52
		E.F. MC MILLAN GEN.ELECTRIC CO.			52
		P.O. BOX 488 BURLINGTON IOWA 52601.			52
		MARK AS FOLLOWS "FOR S.O. 929594"			52
9N7	004	AGASTAT CAT.	E7012PFL	002 01 105	37
		5 ©		002 01 115	37
		TIMING RELAY 120 VOLTS D.C. 1 TO 10			37
		MINUTES TIME DELAY ON PICKUP.			37
		THIS DEVICE MUST BE QUALIFIED FOR			37
		NUCLEAR 1E USE. IEEE-323			37
		QUALIFICATION IS REQUIRED PER G.E.			37
		SPECS. S8D-323-1. COMPLIANCE WITH			37
		QUALITY REQUIREMENTS OF FEDERAL			37
		REGULATION 10CFR50 PER G.E. SPECS.			37
		S8D-50-1 IS RQUIRED. A CERTIFICATE			37
		OF COMPLIANCE IS REQUIRED. ALSO			37
		PROVIDE CERTIFICATE OF COMPLIANCE THAT			37
		TESTS HAVE BEEN PERFORMED PER			37
		ANSI-C37.90 SEC. 8. FORWARD TO			37
		E.F. MC MILLAN GEN.ELECTRIC CO.			37

REQ NO 320-68150 SO NO 929594

MGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT ON SH. C34 SH NO 033

FINAL 03/29/83 REV NO. 70

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
		P.O. BOX 488 BURLINGTON IOWA 52601.					37
		MARK AS FOLLOWS "FOR S.O.929594"					37
9P8	001	TEST SWITCH	16S81CH984SSS2V	001	01	100	37
		3 STG. ENGRAVE ESCUTCHEON					37
		NORM- RESET- TEST (F.V.) FURNISH					37
		RP-78847-A ENGRAVED TEST SWITCH.					37
		THIS DEVICE MUST BE QUALIFIED FOR					37
		NUCLEAR 1E USE.					37
9P9	003	WCLT.RESTR. O/C RELAY	12IJCV51B21A	003	01	101	39
		1 TO 4 AMPS TIME AND 4 TO 16 AMPS					39
		INST. 60 HZ. S1 CASE CONN K-6556474					39
		THIS DEVICE MUST BE QUALIFIED FOR					39
		NUCLEAR 1E USE. PROVIDE CERT. OF					39
		COMPLIANCE THAT TESTS HAVE BEEN					39
		PERFORMED PER ANSI-C37.90 SEC. 8.					39
		FORWARD TO E.F. MC MILLAN GEN.ELEC.CO.					39
		P.O.BOX 488 BURLINGTON IOWA 52601.					39
		MARK AS FOLLOWS "FOR S.O. 929594"					39
9A6	009	GOULD-BROWN BOVERI	238S0545	003	01	110	55
				003	01	111	55
				003	01	113	55
		OVERCURRENT RELAY TYPE ITE-50H					52
		WITH 0.8 TO 8 AMP HIGH D.O. INST.					52
		200 AMPS. FOR 1 SEC. 60 HZ.					52
		THIS DEVICE MUST BE QUALIFIED FOR					52
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION					55
		IS REQUIRED PER G.E. SPECS. SED-323-1					52
		COMPLIANCE WITH QUALITY REQUIREMENTS					52
		OF FEDERAL REGULATION 10CFR50 PER G.E.					52
		SPECS. S80-50-1 IS REQUIRED. A					52
		CERTIFICATE OF COMPLIANCE IS REQUIRED.					52
		ALSO PROVIDE CERTIFICATE OF COMPLIANCE					52
		THAT TESTS HAVE BEEN PERFORMED PER					52
		ANSI-C37.90 SEC.8. FORWARD TO E.F.					52
		MC MILLAN GEN.ELECTRIC CO. P.O.BOX					52
		488 BURLINGTON IOWA 52601. MARK AS					52
		FOLLOWS "FOR S.O.929594"					52

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. C269A4394 CONT ON SH. 035 SH NO 034

FINAL 03/29/83 REV NO. 73

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
9N7	025		INSTRUCTION BOOKS	0269A4394-9N7	025	C1	XS	52
			FOR TYPE ITE-50H RELAY ORDERED ON					52
			MK.9N6. FORWARD TO E.F. MC MILLAN					52
			GEN. ELEC. CO. P.O. BOX 488					52
			BURLINGTON IOWA 52601. MARK AS					52
			FOLLOWS "FOR S.O. 929594"					52
9A8	002		AUX.VOLTAGE RELAY	12HAA15H2F	002	01	101	53
			125 VOLTS D.C. FLUSH MOUNTING					53
			OUT 0127A9555 CONN 0269A3026					53
			I/B GEI-83964					53
			PROVIDE CERTIFICATE OF COMPLIANCE THAT					53
			TESTS HAVE BEEN PERFORMED PER					53
			ANSI-C37.90 SEC. 8. FORWARD TO					53
			E.F. MC MILLAN GEN.ELECTRIC CO.					53
			P.O. BOX 488 BURLINGTON IOWA 52601					53
			MARK AS FOLLOWS "FOR S.O.929594"					53
9A9	001		VOLTAGE BALANCE RELAY	12CFV811E1A	001	01	100	53
			120V 60 HZ 125/250 VDC M2 CASE					53
			CONN 0246A6890 GEK-41831					53
			PROVIDE CERTIFICATE OF COMPLIANCE THAT					53
			TESTS HAVE BEEN PERFORMED PER					53
			ANSI-C37.90 SEC.8. FORWARD TO E.F.					53
			MC MILLAN GEN. ELECTRIC CO.					53
			P.O. BOX 488 BURLINGTON IOWA 52601.					53
			MARK AS FOLLOWS "FOR S.O.929594"					53
9X1	001		AUXILIARY RELAY	12HMA111B2	001	01	101	53
			125 VDC OUT 6400789 GEK-45489					53
			THIS DEVICE MUST BE QUALIFIED FOR					53
			NUCLEAR 1E USE. PROVIDE CERT. OF					53
			COMPLIANCE THAT TESTS HAVE BEEN					53
			PERFORMED PER ANSI-C37.90 SEC.8.					53
			FORWARD TO E.F. MC MILLAN GEN. ELECTRIC					53
			CO. P.O. BOX 488 BURLINGTON IOWA 52601					53
			MARK AS FOLLOWS "FOR S.O.929594"					53
921	012		THOUSAND TERMINALS	0269A4394-921	012	C1	AAA	33
			A-M-P CAT. 53418-1 RING TONGUE					33
			NUCLEAR PIDG TYPE NO. 10 STUD					33

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. 0269A4394 CONT CN SH. 036 SH NO 035

FINAL 03/29/83 REV NO. 70

REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
			NO.14 WIRE. THESE TERMINALS MUST					33
			COMPLY WITH G.E. SPECS. S8D-323-1,					33
			G.E. SPECS. S8D-50-1 AND 10CFR21.					33
			A CERTIFICATE OF COMPLIANCE IS REQUIRED					33
922	C02		THOUSAND TERMINALS	0269A4394-9Z2	002	01	AAA	33
			A-M-P CAT. 53419-1 RING TONGUE					33
			NUCLEAR PIDG TYPE 1/4 STUD AC.14					33
			WIRE. THESE TERMINALS MUST COPPLY					33
			WITH G.E. SPECS. S8D-323-1, G.E. SPECS.					33
			S8D-50-1 AND 10CFR21. A CERTIFICATE					33
			OF COMPLIANCE IS REQUIRED.					33
923	C02		THOUSAND TERMINALS	0269A4394-9Z3	002	01	AAA	33
			A-M-P CAT. 53425-1 RING TONGUE					33
			NUCLEAR PIDG TYPE. NO. 10 STUD					33
			AC.10 WIRE. THESE TERMINALS MUST COMPLY					33
			WITH G.E. SPECS. S8D-323-1, G.E. SPECS.					33
			S8D-50-1 AND 10CFR21. A CERTIFICATE OF					33
			COMPLIANCE IS REQUIRED.					33
924	C02		THOUSAND TERMINALS	0269A4394-924	002	01	AAA	33
			A-M-P CAT. 53426-1 RING TONGUE					33
			NUCLEAR PIDG TYPE. 1/4 STUD NO.10 WIRE					33
			THESE TERMINALS MUST COMPLY WITH G.E.					33
			SPECS. S8D-323-1, G.E. SPECS. S8D-50-1					33
			AND 10CFR21. A CERTIFICATE OF					33
			COMPLIANCE IS REQUIRED.					33
925	C05		HUNDRED TERMINALS	0269A4394-925	005	01	AAA	33
			A-M-P CAT. 53978-1 RING TONGUE					33
			NUCLEAR PLASTIGRIP TYPE NO.10 STUD					33
			NO.8 WIRE. THESE TERMINALS MUST					33
			COMPLY WITH G.E. SPECS. S8D-323-1,					33
			G.E. SPECS. S8D-50-1 AND 10CFR21. A					33
			CERTIFICATE OF COMPLIANCE IS REQUIRED					33
926	C05		HUNDRED TERMINALS	0269A4394-926	005	01	AAA	33
			A-M-P CAT. 53943-1 RING TONGUE					33
			NUCLEAR PLASTIGRIP TYPE 1/4 STUD					33
			NO.8 WIRE. THESE TERMINALS MUST COMPLY					33

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCPILLAN SUMM NO. C269A4394 CONT CA SH. 037 SH NO 036

FINAL 03/29/83 REV NO. 70

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY	L/U UNT	REV
		WITH G.E. SPECS. SBD-323-1, G.E. SPECS.				33
		SBD-50-1 AND 10CFR21. A CERTIFICATE				33
		OF COMPLIANCE IS REQUIRED.				33
927	005	HUNDRED TERMINALS	0269A4394-527	005	01 AAA	33
		A-M-P CAT. 53975-1 RING TONGUE				33
		NUCLEAR PLASTIGRIP TYPE NO.10 STUD				33
		NO. 6 WIRE. THESE TERMINALS MUST				33
		COMPLY WITH G.E. SPECS. SBD-323-1,				33
		G.E. SPECS. SBD-50-1 AND 10CFR21.				33
		A CERTIFICATE OF COMPLIANCE IS REQUIRED.				33
928	005	HUNDRED TERMINALS	0269A4394-928	005	01 AAA	33
		A-M-P CAT. 53946-1 RING TONGUE				33
		NUCLEAR PLASTIGRIP TYPE 1/4 STUD				33
		NO.6 WIRE. THESE TERMINALS MUST COMPLY				33
		WITH G.E. SPECS. SBD-323-1, G.E. SPECS.				33
		SBD-50-1 AND 10CFR21. A CERTIFICATE				33
		OF COMPLIANCE IS REQUIRED.				33
92A	070	GOULD- SHAWMUT FUSE OT35		070	01 AAA	41
		RATED 250 VOLTS 35 AMPS				41
		THIS DEVICE MUST BE QUALIFIED FOR				41
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION				41
		IS REQUIRED PER G.E. SPECS.SBD-323-1.				41
		COMPLIANCE WITH QUALITY REQUIREMENTS				41
		OF FEDERAL REGULATION 10CFR50 PER				41
		G.E. SPECS. SBD-50-1 IS REQUIRED.				41
		A CERTIFICATE OF COMPLIANCE IS REQUIRED				41
92B	060	GOULD- SHAWMUT FUSE OT15		060	01 AAA	41
		RATED 250 VOLTS 15 AMPS				41
		THIS DEVICE MUST BE QUALIFIED FOR				41
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION				41
		IS REQUIRED PER G.E. SPECS.SBD-323-1.				41
		COMPLIANCE WITH QUALITY REQUIREMENTS				41
		OF FEDERAL REGULATION 10CFR50 PER				41
		G.E. SPEC. SBD-50-1 IS REQUIRED.				41
		A CERTIFICATE OF COMPLIANCE IS REQUIRED				41
92C	070	GOULD- SHAWMUT FUSE OT10		070	01 AAA	41

REV

REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

NH-	QTY-DEV	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
			RATED 250 VOLTS 10 AMPS.					41
			THIS DEVICE MUST BE QUALIFIED FOR					41
			NUCLEAR 1E USE. IEEE-323 QUALIFICATION					41
			IS REQUIRED PER G.E. SPECS.SBC-323-1.					41
			COMPLIANCE WITH QUALITY REQUIREMENTS					41
			OF FEDERAL REGULATION 10CFR50 PER					41
			G.E. SPEC. SBO-50-1 IS REQUIRED					41
			A CERTIFICATE OF COMPLIANCE IS REQUIRED					41
92D	030		GOULD SHAWMUT FUSE OT6		030	01	AAA	41
			RATED 250 VOLTS 6 AMPS.					41
			THIS DEVICE MUST BE QUALIFIED FOR					41
			NUCLEAR 1E USE. IEEE-323 QUALIFICATION					41
			IS REQUIRED PER G.E. SPECS.SBC-323-1.					41
			COMPLIANCE WITH QUALITY REQUIREMENTS					41
			OF FEDERAL REGULATION 10CFR50 PER					41
			G.E. SPEC. SBO-50-1 IS REQUIRED.					41
			A CERTIFICATE OF COMPLIANCE IS REQUIRED					41
92E	004		TIME OVERCURR. RELAY	12IFC66KD1A	002	C1	103	52
					002	C1	107	41
			2.5 TO 7.5 AMP WITH 6 TO 150 AMP					52
			INST. ELEMENT AND 2 TO 8 AMP. HI DROP					52
			OUT INST. UNIT. LONG TIME CURVE 60 HZ.					52
			C1 CASE CONN 0275A3237 I/B GEK-49949					52
			THIS DEVICE MUST BE QUALIFIED FOR					52
			NUCLEAR 1E USE. PROVIDE CERT. OF					52
			COMPLIANCE THAT TESTS HAVE BEEN					52
			PERFORMED PER ANSI-C37.90 SEC.8.					52
			FORWARD TO E.F. MC MILLAN GEN.ELEC.CO.					52
			P.O. BOX 488 BURLINGTON IOWA 52601.					52
			MARK AS FOLLOWS "FOR S.O. 929594"					52
92F	003		AUXILIARY RELAY	12HFA154E22F CC42	001	31	104	41
					001	01	106	41
					001	01	108	41
			ELEC.RESET TYPE WITH 125 VOLT D.C.					41
			OPERATE AND RESET COILS. OUT. AND					41
			CONA. 0362A0574 I/B GEK-45486					41
			THIS DEVICE MUST BE QUALIFIED FOR					41
			NUCLEAR 1E USE. PROVIDE CERT. OF					41

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCPILLAN SUMM NO. 0269A4394 CONT ON SH. 039 SH NO 038

FINAL 03/29/83 REV NO. 70

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-DEV LOC	DESCRIPTION	ORDERING NO	QTY L/U UNT	REV
		COMPLIANCE THAT TESTS HAVE BEEN			41
		PERFORMED PER ANSI-C37.90 SEC.8.			41
		FORWARD TO E.F. MC MILLAN GEN.ELEC.CO.			41
		P.O.BOX 488 BURLINGTON IOWA 52601.			41
		MARK AS FOLLOWS "FOR S.O. 929594"			41
92G	CC5	AUXILIARY RELAY	12HFA99A61A CD33	C02 01 114	61
				C02 01 115	63
				C01 01 XS	50
		10 VOLTS D.C. DRAWOUT TYPE S2 CASE			44
		CUT 6209272 CONN 0269A3054			44
		I/B GEK-49812			44
		THIS DEVICE MUST BE QUALIFIED FOR			44
		NUCLEAR 1E USE. PROVIDE CERT.OF			44
		COMPLIANCE THAT TESTS HAVE BEEN			44
		PERFORMED PER ANSI-C37.90 SEC.8			44
		FORWARD TO E.F. MC MILLAN GENERAL ELEC.			44
		CO. P.O.BOX 488 BURLINGTON IOWA			44
		52601. MARK AS FOLLOWS "FOR S.O.			44
		929594"			44
92H	002	AUXILIARY RELAY	12HFA99A61A CD24	001 01 115	61
				001 01 XS	50
		10 VOLTS D.C. DRAWOUT TYPE S2 CASE			44
		CUT 6209272 CONN 0269A3054			44
		I/B GEK-49812			44
		THIS DEVICE MUST BE QUALIFIED FOR			44
		NUCLEAR 1E USE. PROVIDE CERT. OF			44
		COMPLIANCE THAT TESTS HAVE BEEN			44
		PERFORMED PER ANSI-C37.90 SEC.8			44
		FORWARD TO E.F. MC MILLAN GENERAL ELEC.			44
		CO. P.O. BOX 488 BURLINGTON IOWA			44
		52601. MARK AS FOLLOWS "FOR S.O.			44
		929594"			44
92J	001	AUXILIARY RELAY	12HFA99A61A CD42	001 01 112	63
		10 VOLTS D.C. DRAWOUT TYPE S2 CASE			46
		CUT 6209272 CONN 0269A3054			46
		I/B GEK-49812			46
		THIS DEVICE MUST BE QUALIFIED FOR			46
		NUCLEAR 1E USE. PROVIDE CERT. OF			46

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCMILLAN SUMM NO. C269A4394 CONT ON SH. 040 SH NO 039

FINAL 03/29/83 REV NO. 70

REV.

DEVICE SUMMARY OF METALCLAD EQUIPMENT

MK-	QTY-CEV LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV
		COMPLIANCE THAT TESTS HAVE BEEN					46
		PERFORMED PER ANSI-C37.90 SEC.8.					46
		FORWARD TO E.F. MC MILLAN GENERAL ELEC					46
		CO. P.O.BOX 488 BURLINGTON IOWA					46
		52601. MARK AS FOLLOWS *FOR S.O.					46
		929594*					46
92K	003	AUXILIARY RELAY	12HFA151A6F GC51	003	01	112	46
		12 VOLTS D.C. OUT AND CONN 6178972					46
		I/B GEK-45484					46
		THIS DEVICE MUST BE QUALIFIED FOR					46
		NUCLEAR 1E USE. PROVIDE CERT. OF					46
		COMPLIANCE THAT TESTS HAVE BEEN					46
		PERFORMED PER ANSI-C37.90 SEC.8.					46
		FORWARD TO E.F. MC MILLAN GENERAL ELEC.					46
		CO. P.O. BOX 488 BURLINGTON IOWA					46
		52601. MARK AS FOLLOWS *FOR S.O.					46
		929594*					46
92L	003	AUXILIARY RELAY	12HFA151A6H CC51	003	01	112	69
		12 VOLTS D.C. OUT AND CONN 6178972					46
		I/B GEK-45484					46
		THIS DEVICE MUST BE QUALIFIED FOR					46
		NUCLEAR 1E USE. PROVIDE CERT. OF					46
		COMPLIANCE THAT TESTS HAVE BEEN					46
		PERFORMED PER ANSI-C37.90 SEC.8					46
		FORWARD TO E.F. MC MILLAN GENERAL ELEC.					46
		CO. P.O. BOX 488 BURLINGTON IOWA					46
		52601 MARK AS FOLLOWS *FOR S.O.					46
		929594*					46
92M	008	G.E.SELECTOR SW. CAT. CR2940YN200ED		008	01	112	48
		CYLINDER LOCK TYPE EQUIPPED WITH					48
		ONE CR2940U203 DOUBLE CONTACT BLOCK					48
		FOR TOTAL OF TWO NORMALLY OPEN AND					48
		TWO NORMALLY CLOSED MAINTAINED					48
		CONTACTS AND COMPLETE WITH NAMEPLATE					48
		NF160806C6 ENGRAVED OFF-ON (FRONT					48
		VIEW) WITH KEY REMOVABLE IN OFF					48
		POSITION ONLY. SEND 2 COPIES OF OUTLINE					48
		AND CONNECTION DWGS. TO E.F. MC MILLAN					48

REQ NO 320-68150 SO NO 929594

ENGR E.F. MCFILLAN SUMM NO. 0269A4394 CONT CA SH. D41 SH NO C40

FINAL 03/29/63 REV NO. 73

GENERAL ELECTRIC

SUMMARY OF SWITCHGEAR EQUIPMENT

FLD. CHGS. BY S&W
E&DCR# P40,803
COL 7-20-84

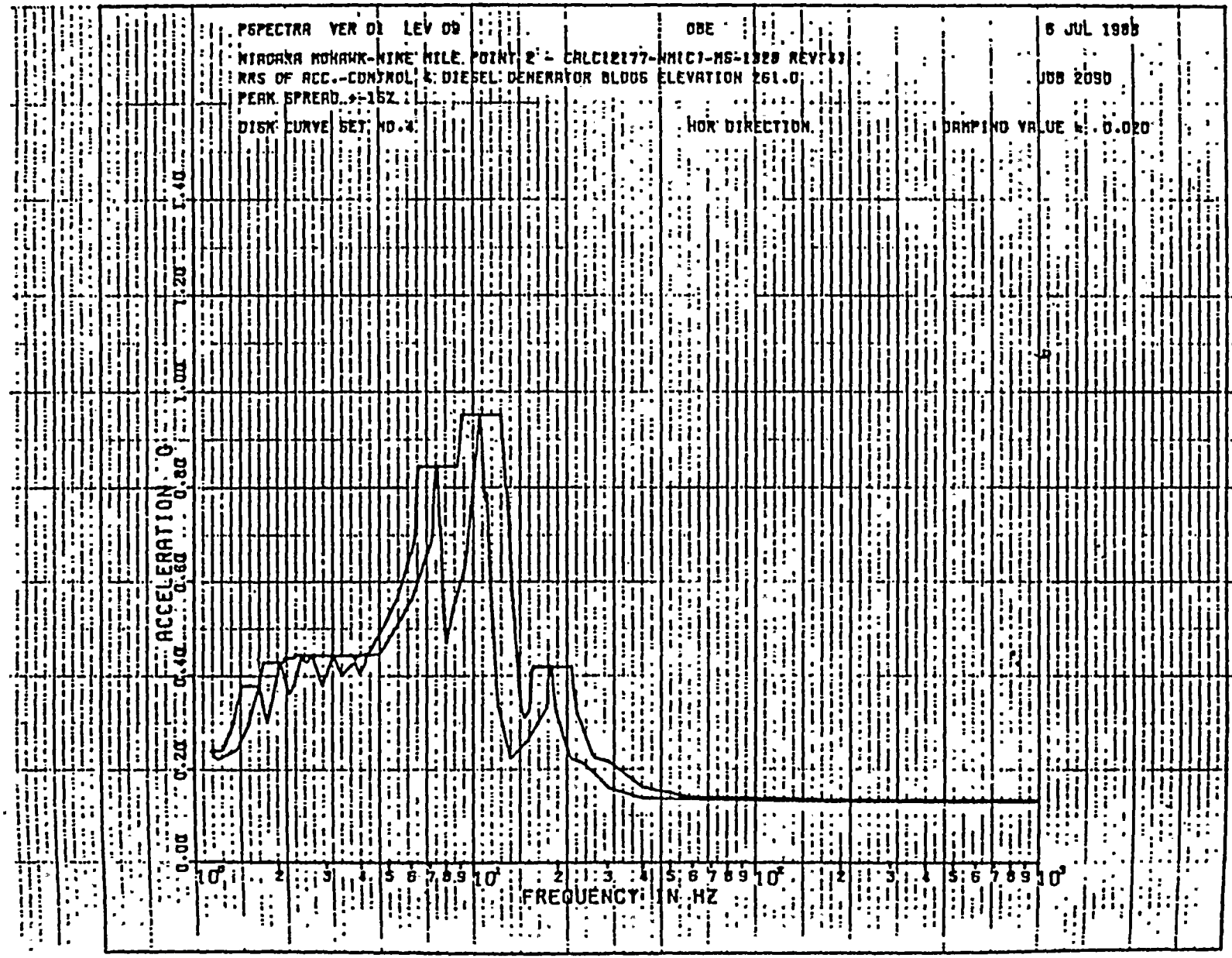
:VICE SUMMARY OF METALCLAD EQUIPMENT

:EM	LOC	DESCRIPTION	ORDERING NO	QTY	L/U	UNT	REV	L/U UNT REV
								01 112 50
								50
								50
								50
								01 XS 52
								52
								52
								52
		GEN. ELEC. CO. P.O. BOX 488 BURLINGTON					48	52
		IOWA 52601.					48	52
		THIS DEVICE MUST BE QUALIFIED FOR					48	
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION					48	01 111 52
		IS REQUIRED PER G.E. SPECS. SEC-323-1					48	52
		COMPLIANCE WITH QAULITY REQUIREMENTS					48	52
		OF FEDERAL REGULATION 10CFR50 PER					48	52
		G.E. SPEC. S80-50-1 IS REQUIRED.					46	52
		A CERTIFICATE OF COMPLIANCE IS REQUIRED.					48	52
								52
		INSTRUCTION BOOKS	0269A4394-9ZN	025	01	XS	48	52
		FOR G.E. SELECTOR SWITCH ORDERED ON					48	52
		MK.9ZN. FORWARD TO E.F. MC MILLAN					48	
		GE. ELEC. CO. P.O.BOX 488 BURLINGTON					48	01 XS 52
		IOWA 52601. MARK AS FOLLOWS "FOR S.O.					48	52
		929594"					46	52
		(D)						52
		GOULD-BROWN BOVERI	211R0175	003	01	114	70	52
		UNDERVOLTAGE RELAY TYPE ITE-27H					48	52
		160 VOLTS 20-400 HZ.					48	
		THIS DEVICE MUST BE QUALIFIED FOR					48	
		NUCLEAR 1E USE. IEEE-323 QUALIFICATION					48	01 109
		IS REQUIRED PER G.E. SPECS. S80-323-1					48	01 111
		COMPLIANCE WITH QUALITY REQUIREMENTS					48	01 114
		OF FEDERAL REGULATION 10CFR50 PER G.E.					48	
		SPECS. S80-50-1 IS REQUIRED. A					48	
		CERTIFICATE OF COMPLIANCE IS REQUIRED.					48	
		ALSO PROVIDE CERTIFICATE OF COMPLIANCE					48	
		THAT TESTS HAVE BEEN PERFORMED PER					48	
		ANSI-C37.90 SEC.8. FORWARD TO E.F.					48	
		MC MILLAN GEN.E.ECTRIC CO. P.O. BOX					48	
		488 BURLINGTON IOWA 52601. MARK AS					48	
		FOLLOWS "FOR S.O.929594"					48	
		INSTRUCTION BOOKS	0269A4394-9ZQ	025	01	XS	48	
		FOR TYPE ITE-27H RELAY ORDERED ON					48	
		MK. 92P. FORWARD TO E.F. MC MILLAN					48	1 NO D42
		GEN.ELEC. CO. P.O.BOX 488 BURLINGTON					48	
		IOWA 52601 MARK AS FOLLOWS "FOR S.O.					48	
		929594"					48	

LSP-1144

ATTACHMENT "B"

RRS FOR CONTROL BUILDING - EL. 261 FT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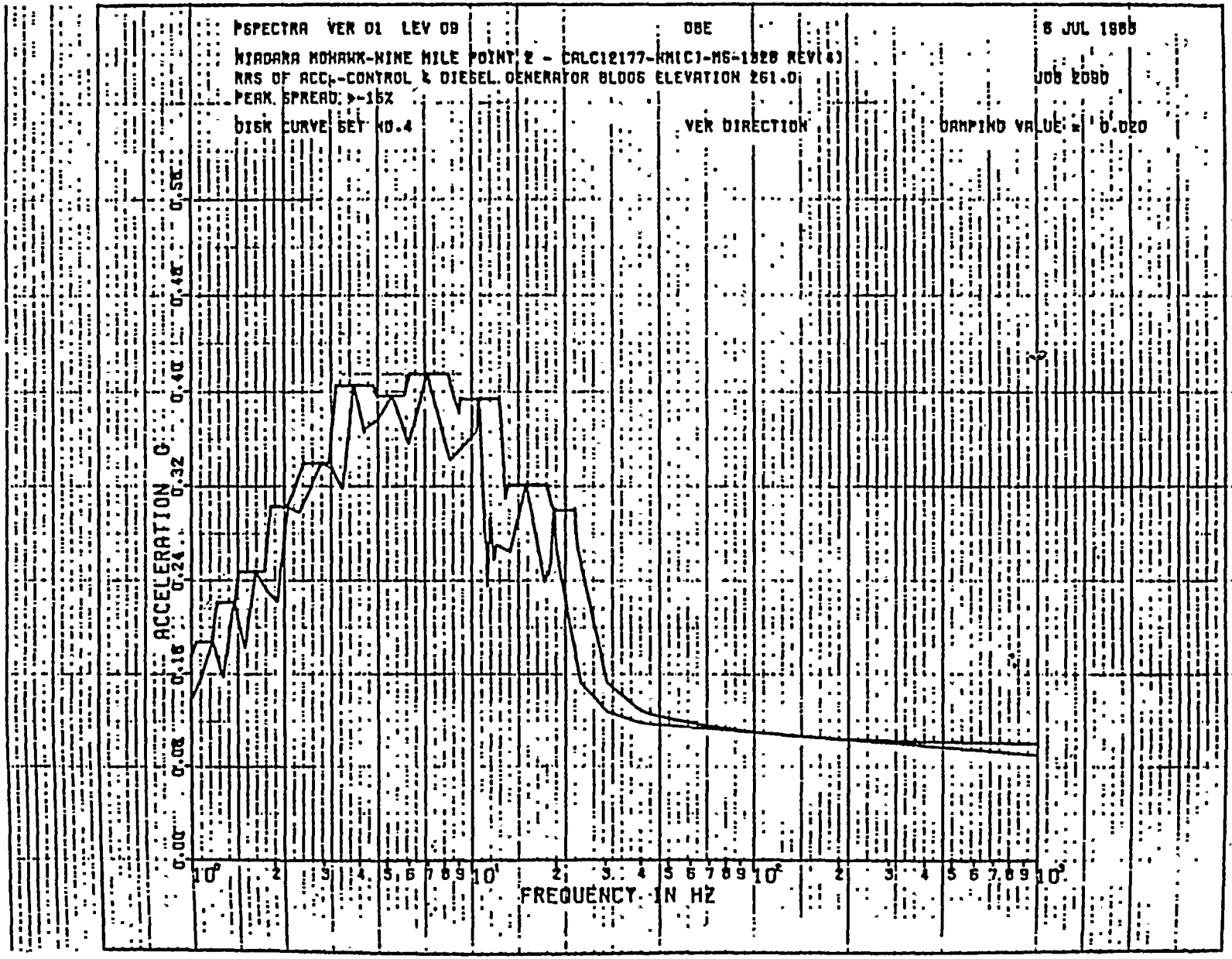
OBE
6 JUL 1988
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NMIC1-MS-1328 REV 1
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0
JOB 2090
PEAK SPREAD >-15%
DISK CURVE SET NO.4
HOR DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
FREQUENCY IN HZ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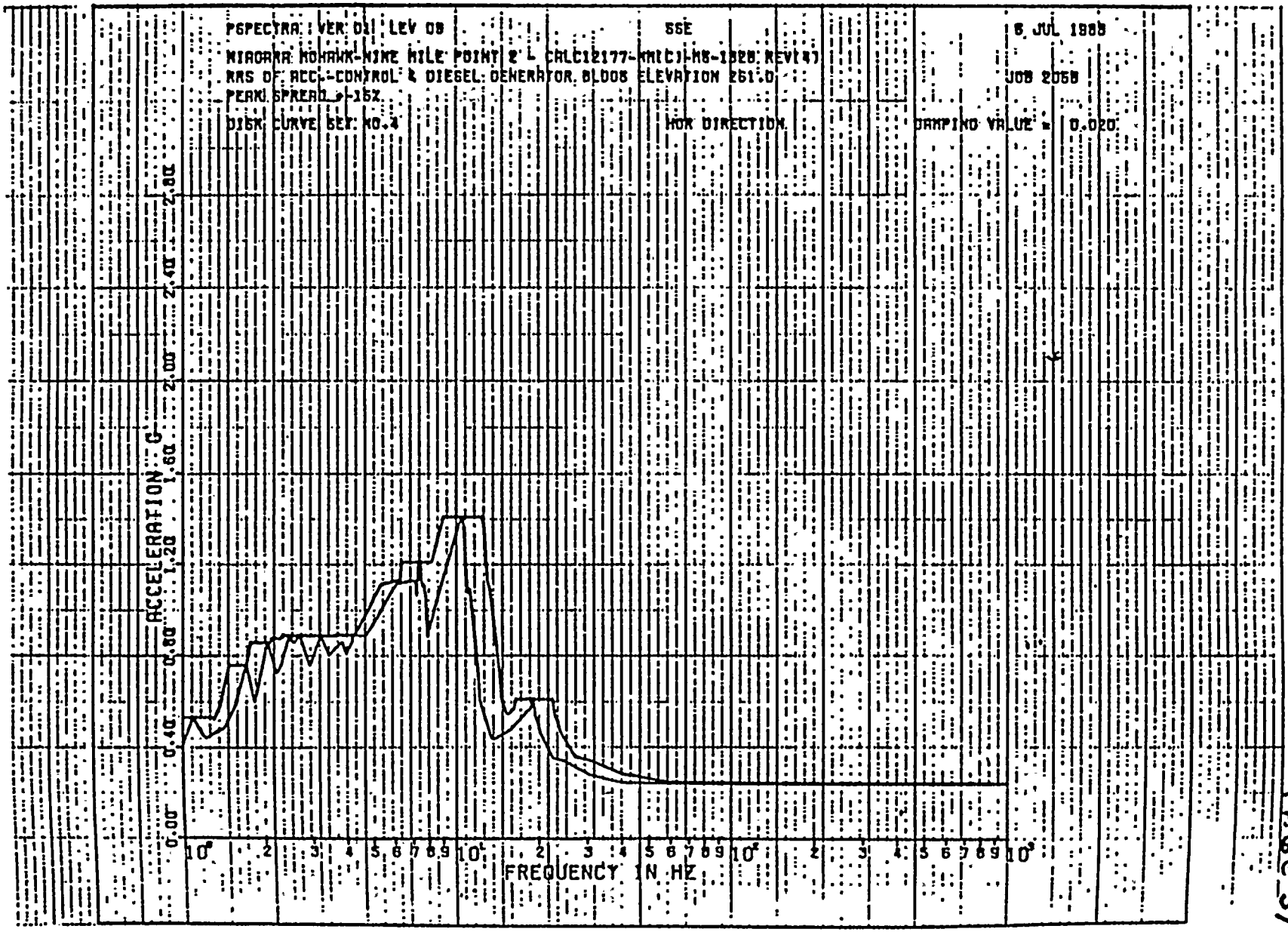
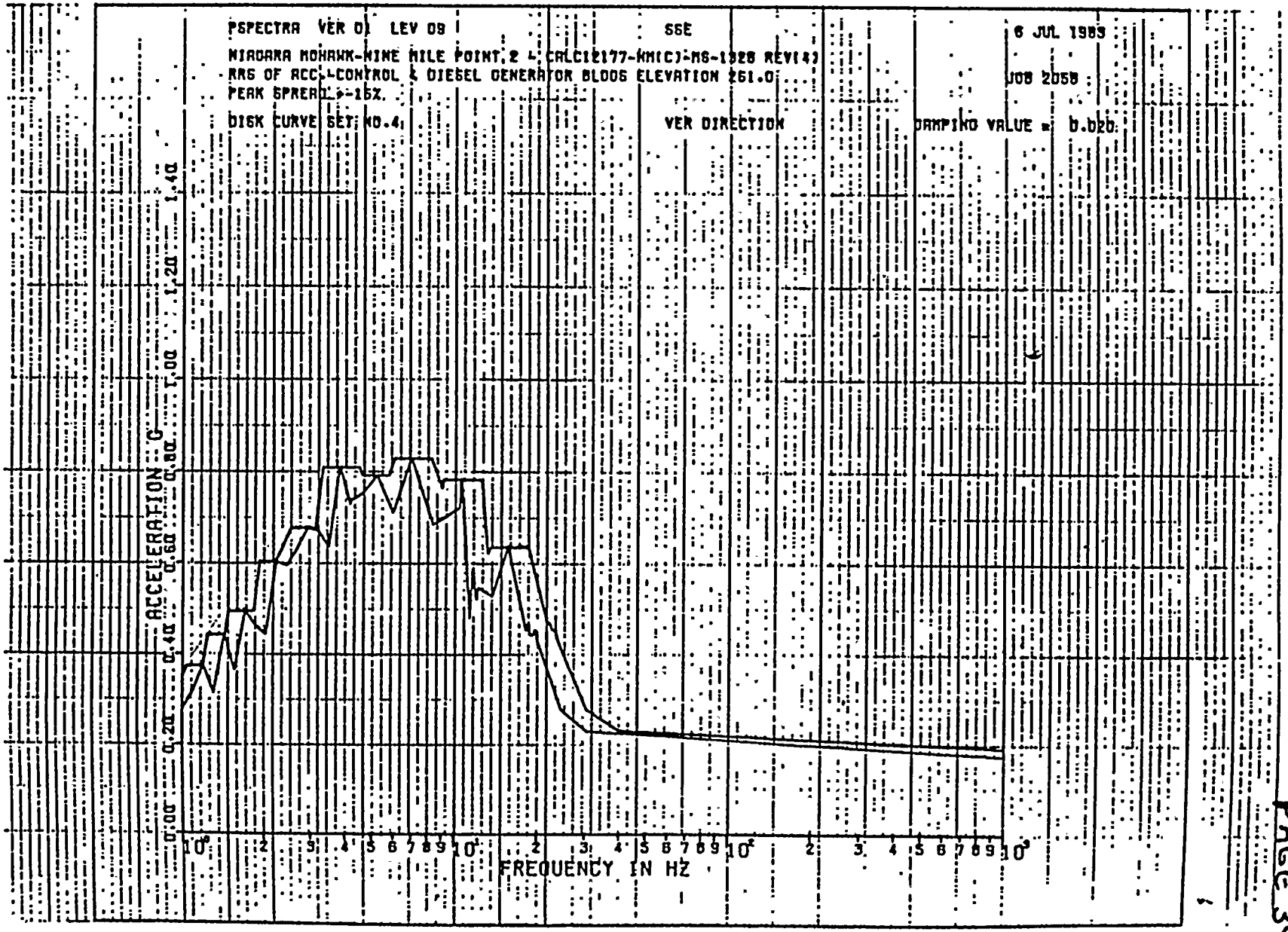
OBE
6 JUL 1988
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-RMIC1-MS-1328 REV(4)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0
JOB 20880
PEAK SPREAD: +-15%
DISK CURVE SET NO.4
VER DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
10^0
2
3
4
5
6
7
8
9
10^1
2
3
4
5
6
7
8
9
10^2
2
3
4
5
6
7
8
9
10^3
FREQUENCY IN HZ

PAGE 98


SPECTRA : VER 01 LEV 08
SSE
6 JUL 1988
NIAGARA MOHAWK-NINE MILE POINT 2 L CALC12177-MI(C)-MS-1328 REV(4)
JOB 2058
RMS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0
PEAK SPREAD = 15%
DISK CURVE SET NO.4
HOR DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00
0.40
0.80
1.20
1.60
2.00
2.40
2.80
10
2
3
4
5
6
7
8
9
FREQUENCY IN HZ

PAGE 37


PSPECTRA VER 01 LEV 09
SSE
6 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-MM(C)-MS-1328 REV(4)
RRS OF ACC'L-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0
JOB 2058
PEAK SPREAD = 15%
DISK CURVE SET NO.4
VER DIRECTION
DAMPING VALUE = 0.020
ACCELERATION G
0.00 0.20 0.40 0.60 0.80 1.00 1.20 1.40
FREQUENCY IN HZ
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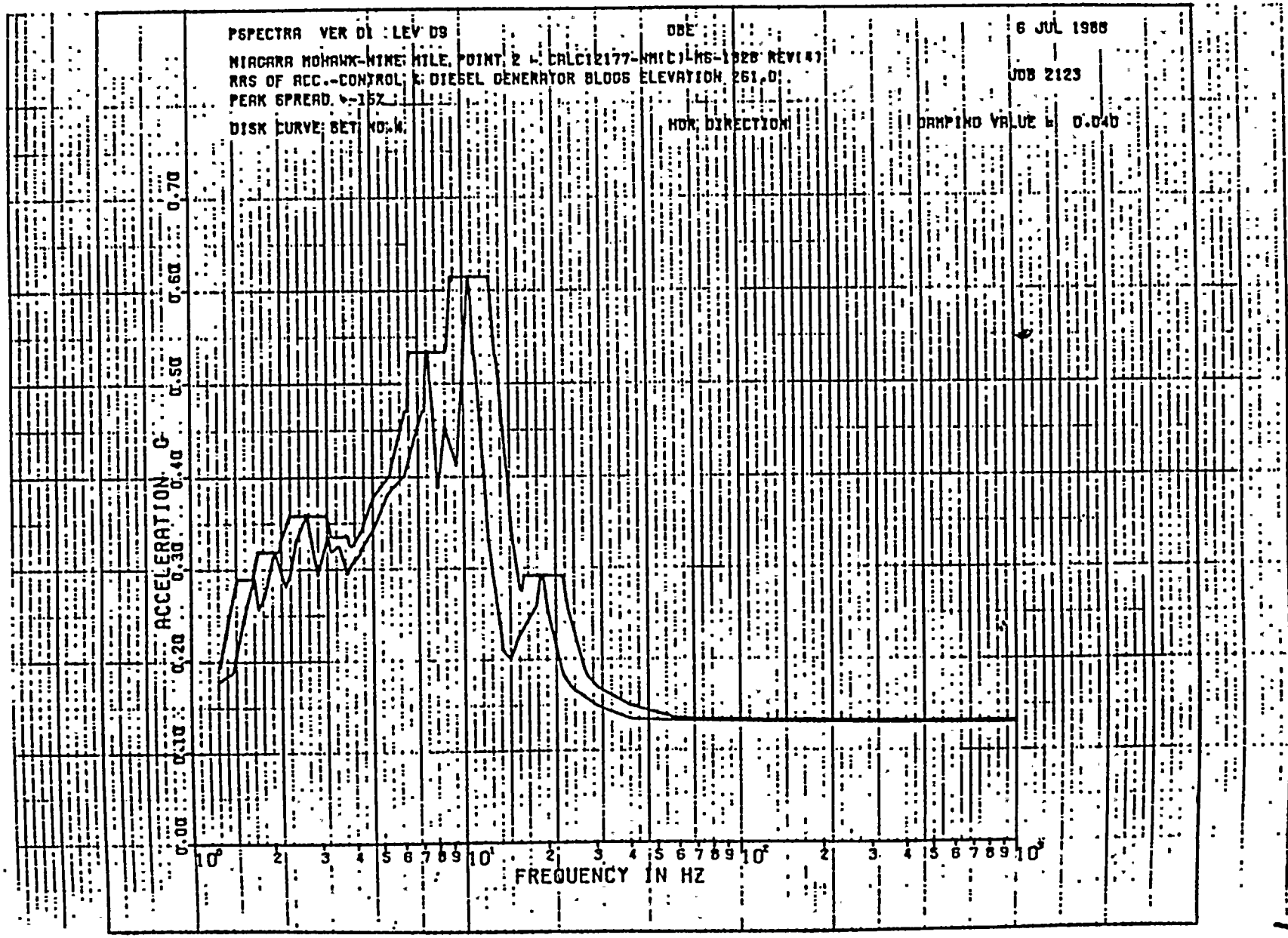
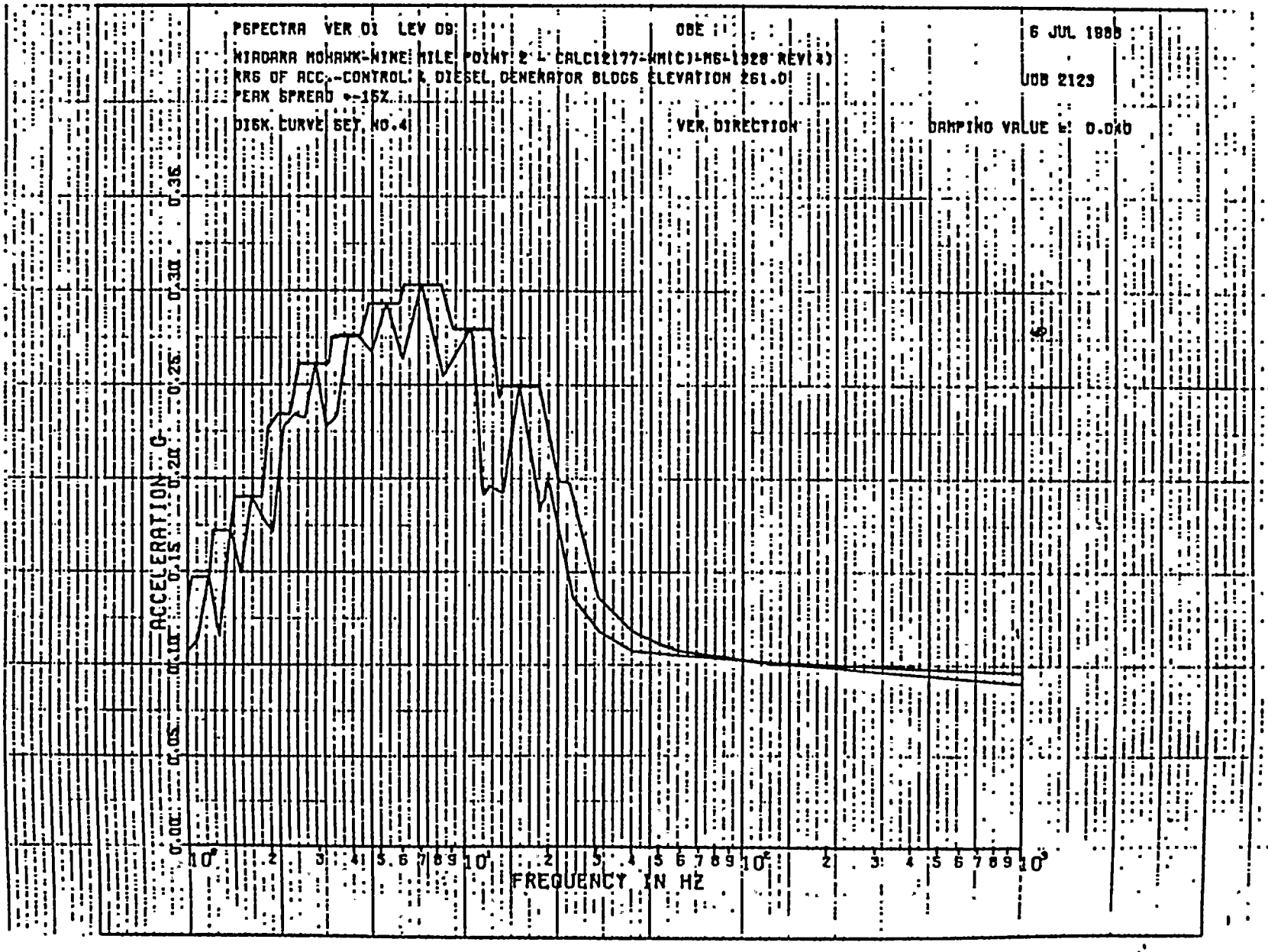

PSPECTRA VER 01 : LEV 09
OBE
6 JUL 1988
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-MM(C)-MS-1928 REV(4)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0'
ODB 2123
PEAK SPREAD = 15%
DISK CURVE SET NO. 4
HOR. DIRECTION
DAMPING VALUE = 0.040
ACCELERATION G
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
10⁰
2
3
4
5
6
7
8
9
10¹
2
3
4
5
6
7
8
9
10²
2
3
4
5
6
7
8
9
10³
FREQUENCY IN HZ


PSPECTRA VER 01 LEV 09
OBE
6 JUL 1988
NIAGARA MOHAWK-NINE MILE POINT 2 L CALC12177-NM(C)-MS-1328 REV(4)
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0'
UDB 2123
PEAK SPREAD +-15%
DISK. CURVE SET NO.4
VER. DIRECTION
DAMPING VALUE = 0.040
ACCELERATION - G
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
10
2
3
4
5
6
7
8
9
10
2
5
4
5
6
7
8
9
10
2
3
4
5
6
7
8
9
10
FREQUENCY IN HZ

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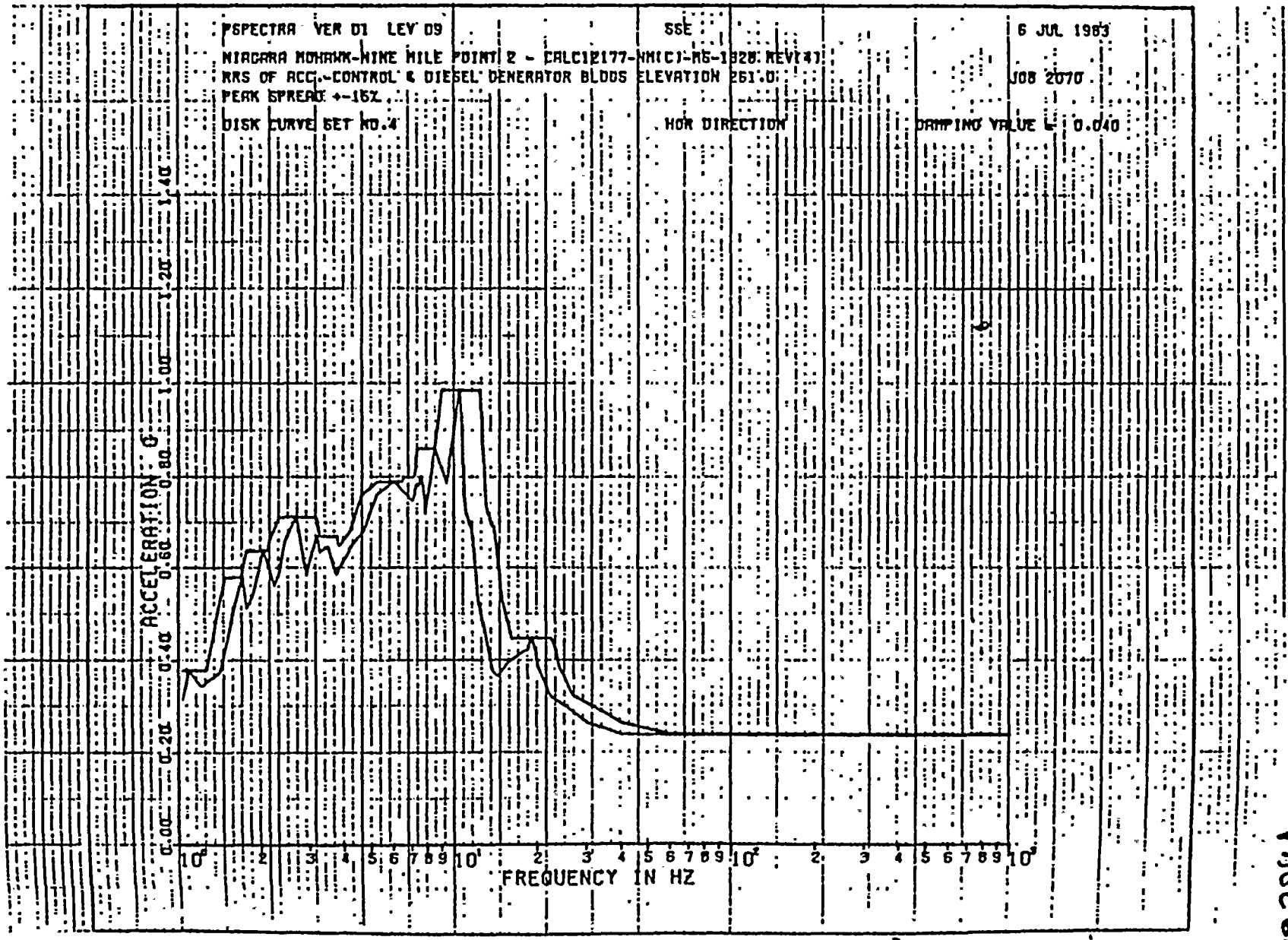
PSPECTRA VER 01 LEV 09
SSE
6 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NMI(C)-MS-1328 REV[4]
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0
JOB 2070
PEAK SPREAD +-15%
DISK CURVE SET NO.4
HOR DIRECTION
DAMPING VALUE = 0.040
ACCELERATION G
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
10
2
3
4
5
6
7
8
9
FREQUENCY IN HZ

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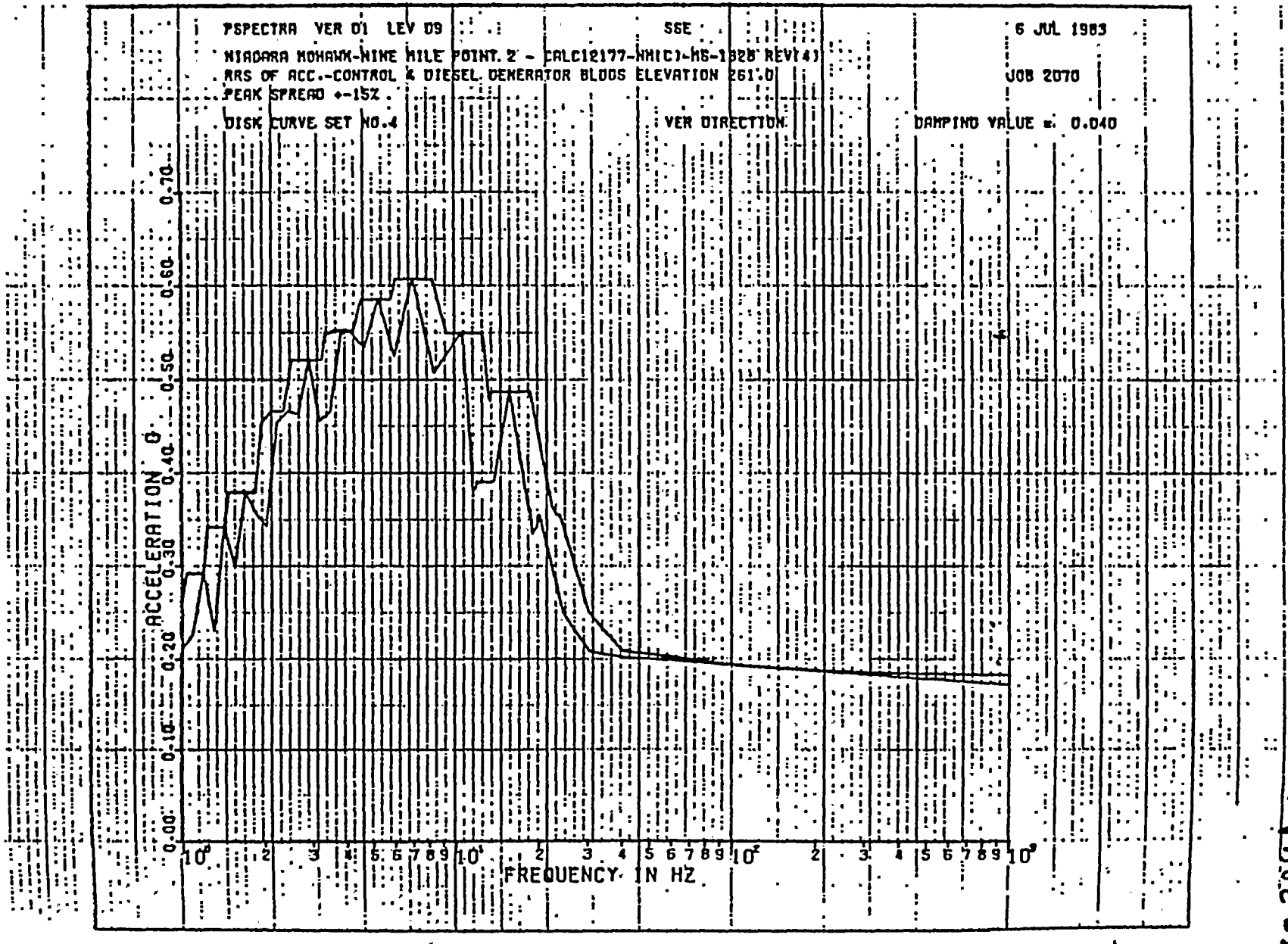
PSPECTRA VER 01 LEV 09
SSE
6 JUL 1983
NIAGARA MOHAWK-NINE MILE POINT 2 - CALC12177-NMIC1-MS-1328 REV(4)
JOB 2070
RRS OF ACC.-CONTROL & DIESEL GENERATOR BLDGS ELEVATION 261.0
PEAK SPREAD +-15%
DISK CURVE SET NO.4
VER DIRECTION
DAMPING VALUE = 0.040
ACCELERATION G
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
FREQUENCY IN HZ

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ATTACHMENT "C"

TRS FROM QUALIFICATION REPORT

FOR 26" WIDE UNITS (REF. WYLE #43968-1)

DESCRIPTION	PAGE NO.
HORIZONTAL (S-S & F-B) 2% OBE	10
VERTICAL 2% OBE	11
HORIZONTAL (S-S & F-B) 2% SSE	12
VERTICAL 2% SSE	13

FOR 36" WIDE UNITS (REF. WYLE #44365-1)

DESCRIPTION	PAGE NO.
HORIZONTAL (S-S & F-B) 5% OBE	19
VERTICAL 5% OBE	16
HORIZONTAL (S-S & F-B) 5% SSE	18
VERTICAL 5% SSE	17

ATTACHMENT "C"

TRS FROM QUALIFICATION REPORT

FOR 26" WIDE UNITS (REF. WYLE #43968-1)

DESCRIPTION	PAGE NO.
HORIZONTAL (S-S & F-B) 2% OBE	10
VERTICAL 2% OBE	11
HORIZONTAL (S-S & F-B) 2% SSE	12
VERTICAL 2% SSE	13

FOR 36" WIDE UNITS (REF. WYLE #44365-1)

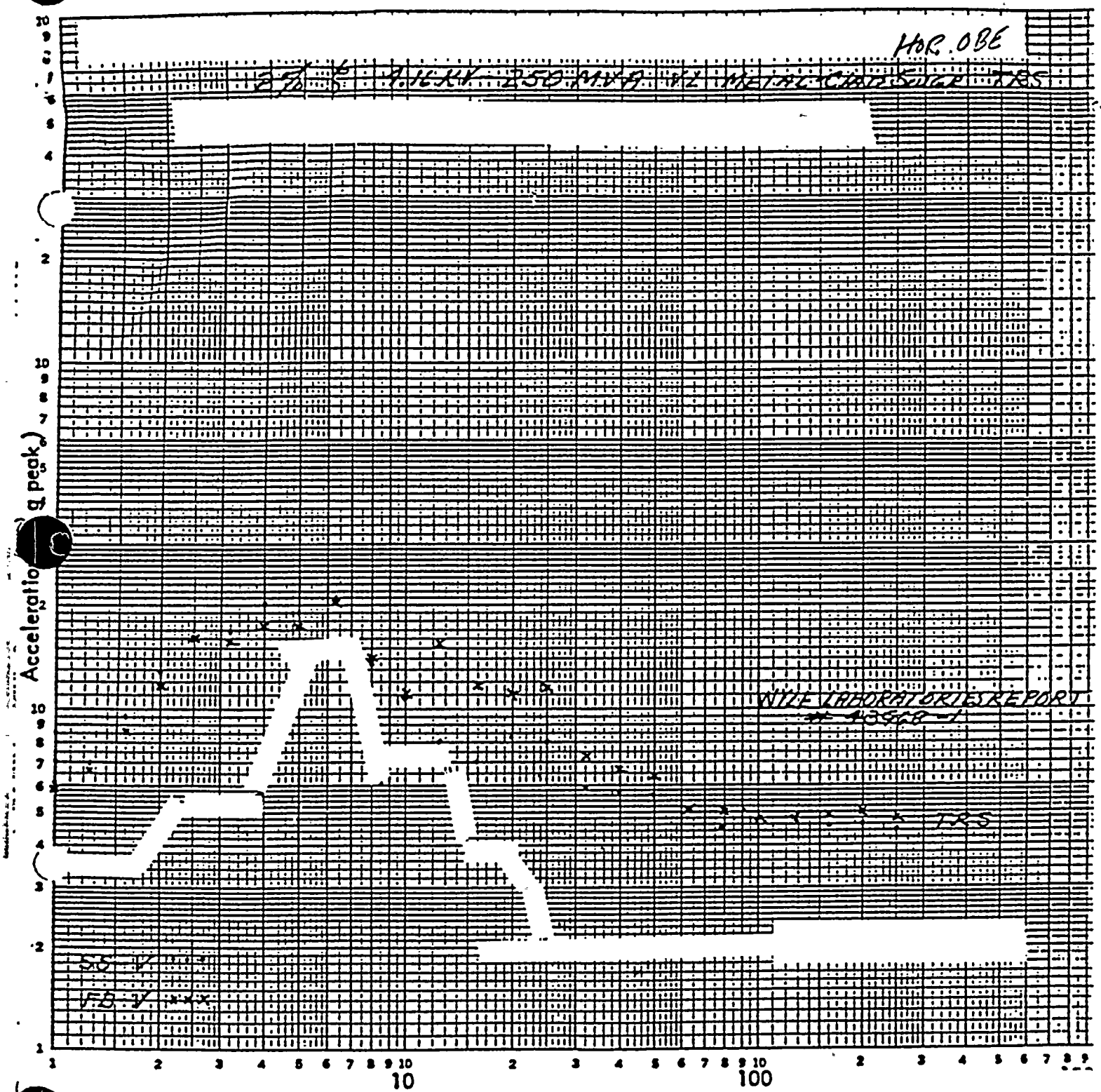
DESCRIPTION	PAGE NO.
HORIZONTAL (S-S & F-B) 5% OBE	19
VERTICAL 5% OBE	16
HORIZONTAL (S-S & F-B) 5% SSE	18
VERTICAL 5% SSE	17

FIG. 1

FULL SCALE SHOCK SPECTRUM (g Peak)

1.0 ☐ 10 ☐ 100 ☒ 1000 ☐

DAMPING [2 %]



Frequency (Hz)

AXIS HORIZONTAL

LOCATION NO. HCA

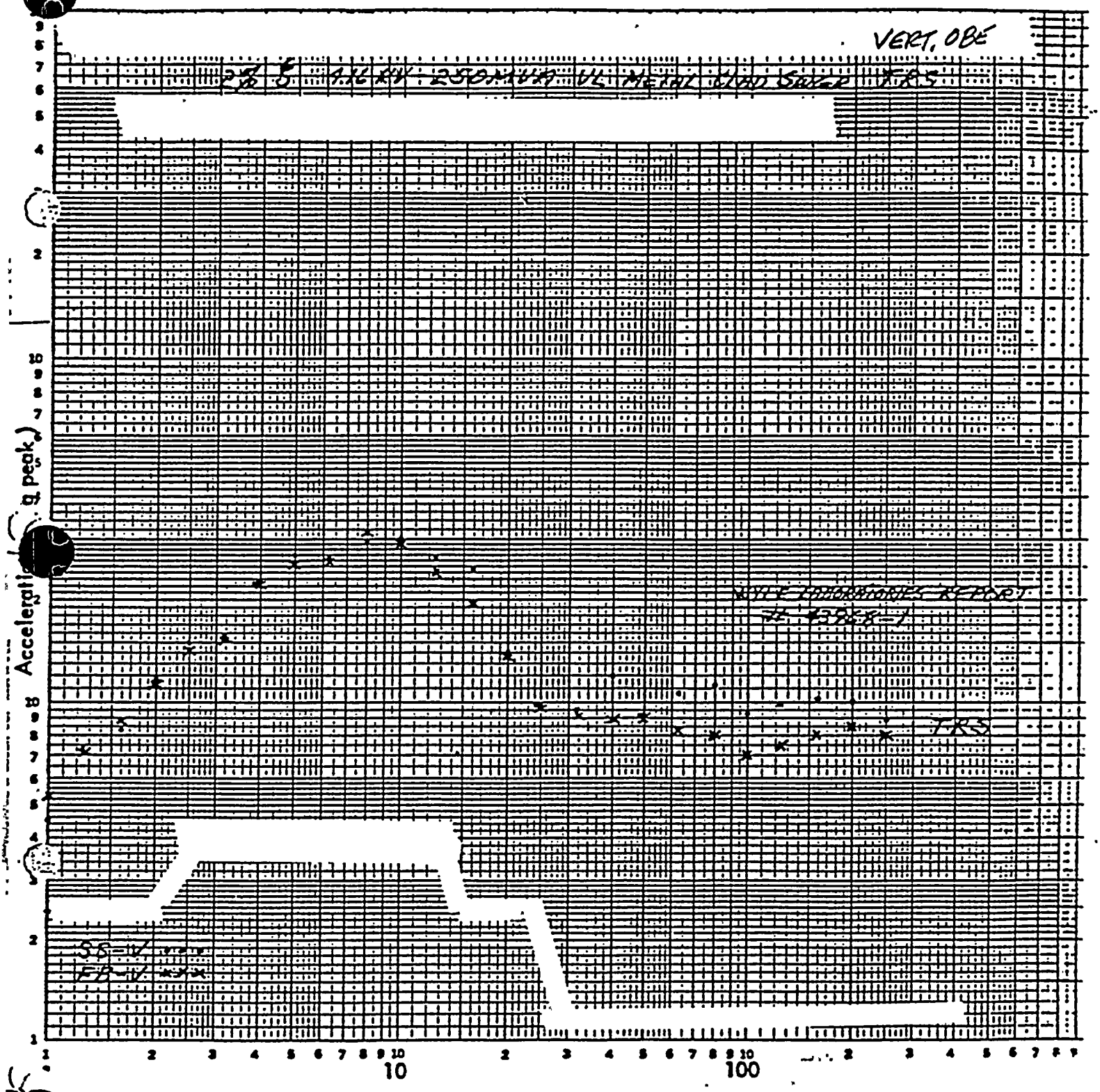
John F. Mikinnnin
6/29/82

FIG 2

FULL SCALE SHOCK SPECTRUM (g Peak)

1.0 ☐ 10 ☐ 100 ☒ 1000 ☐

DAMPING [2 %]



John K. Hashimmia
6/29/82

AXIS VERTICAL

LOCATION NO. VCA

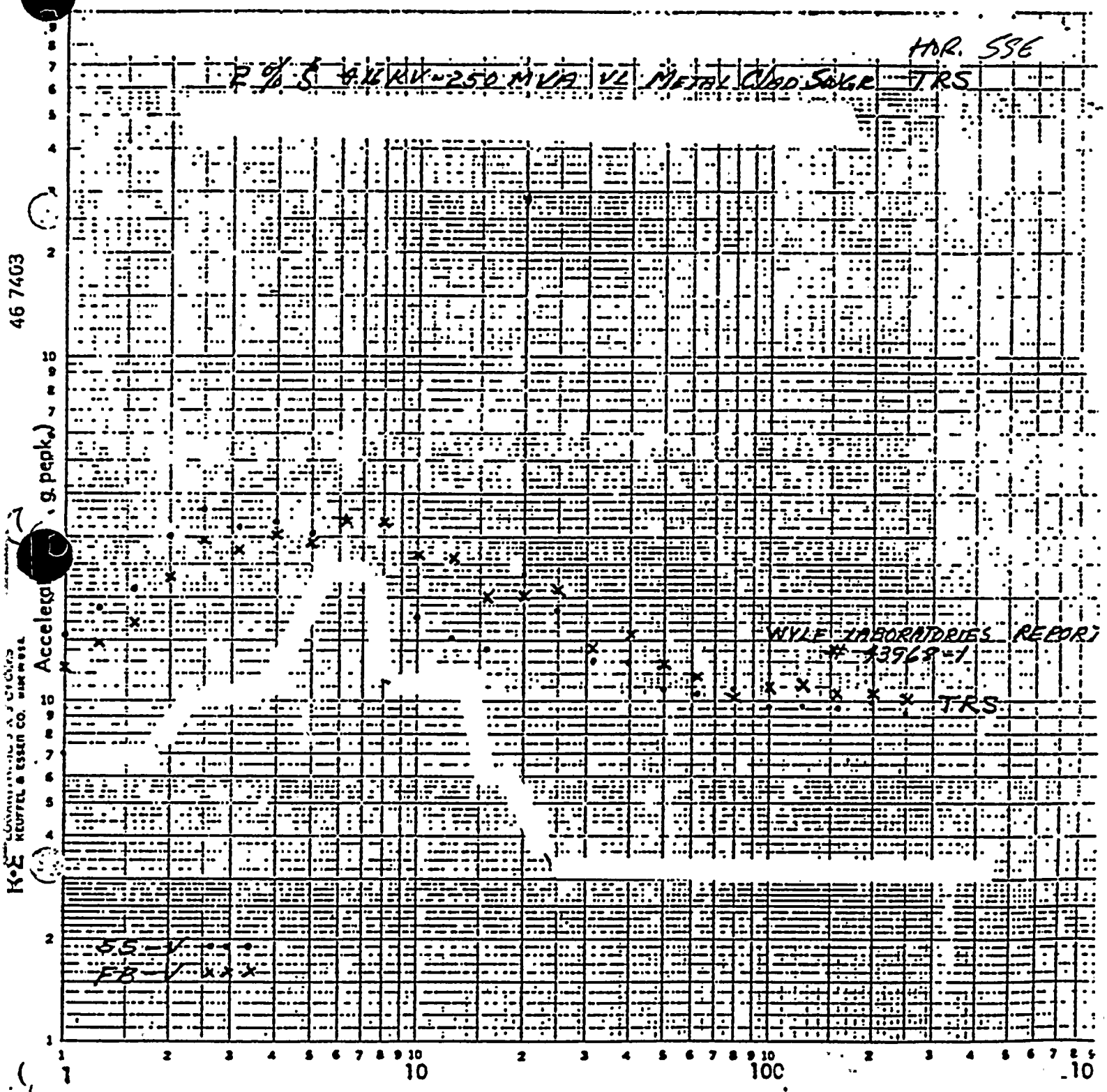
TEST RUN NO. 9••• 19×××

FIG. 3

FULL SCALE SHOCK SPECTRUM (g Peak)

1.0 ☐ 10 ☐ 100 ☒ 1000 ☐

DAMPING 2%



John K. Miskimmin
6/29/82

AXIS HORIZONTAL

LOCATION NO. HCA

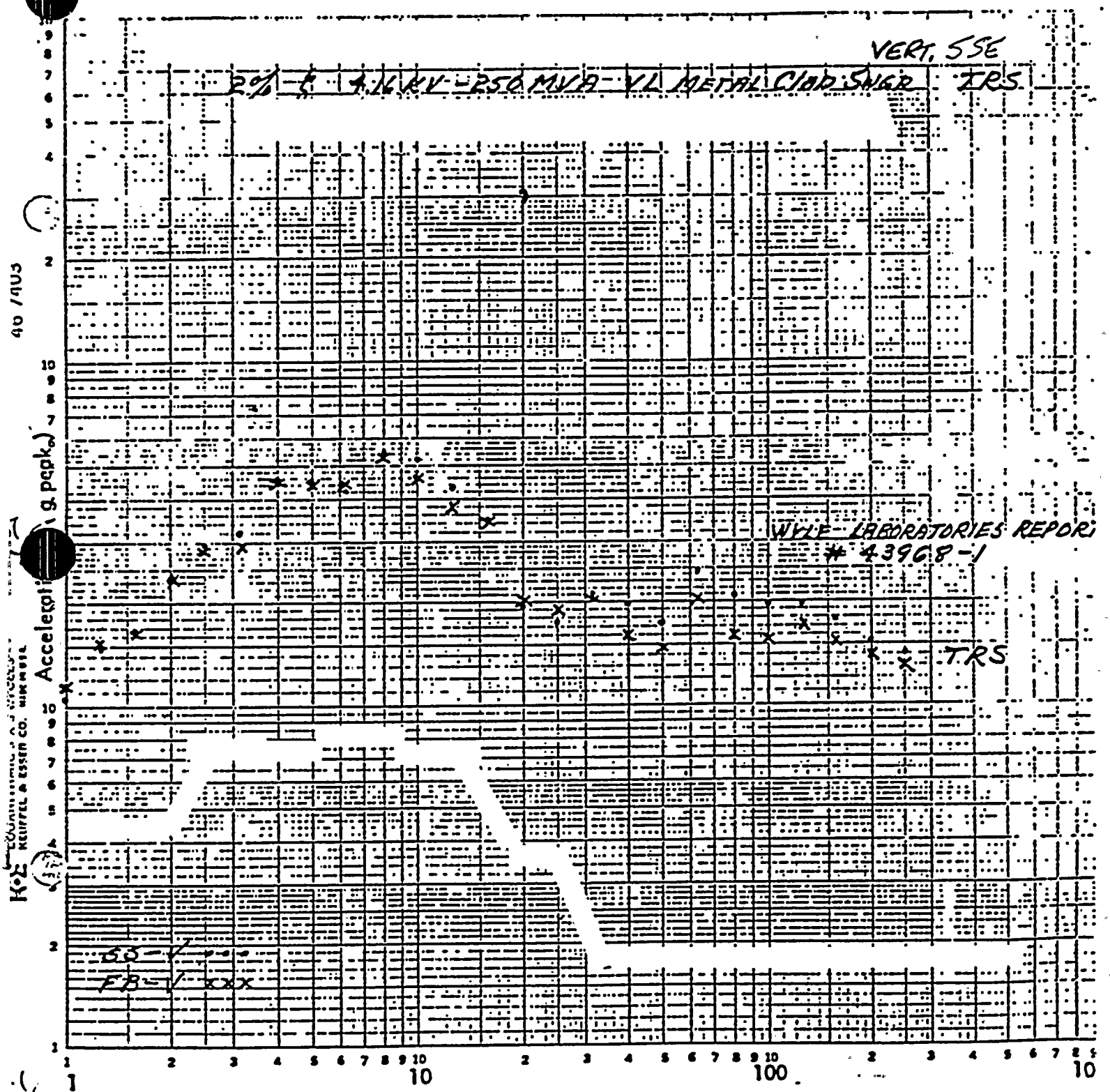
TEST RUN NO. 12 ••• 23 xxx

FIG. 4

FULL SCALE SHOCK SPECTRUM (g Peak)

1.0 ☐ 10 ☐ 100 ☒ 1000 ☐

DAMPING [2 %]



John K. Mikimmia
6/29/82

AXIS VERTICAL

LOCATION NO. VCB

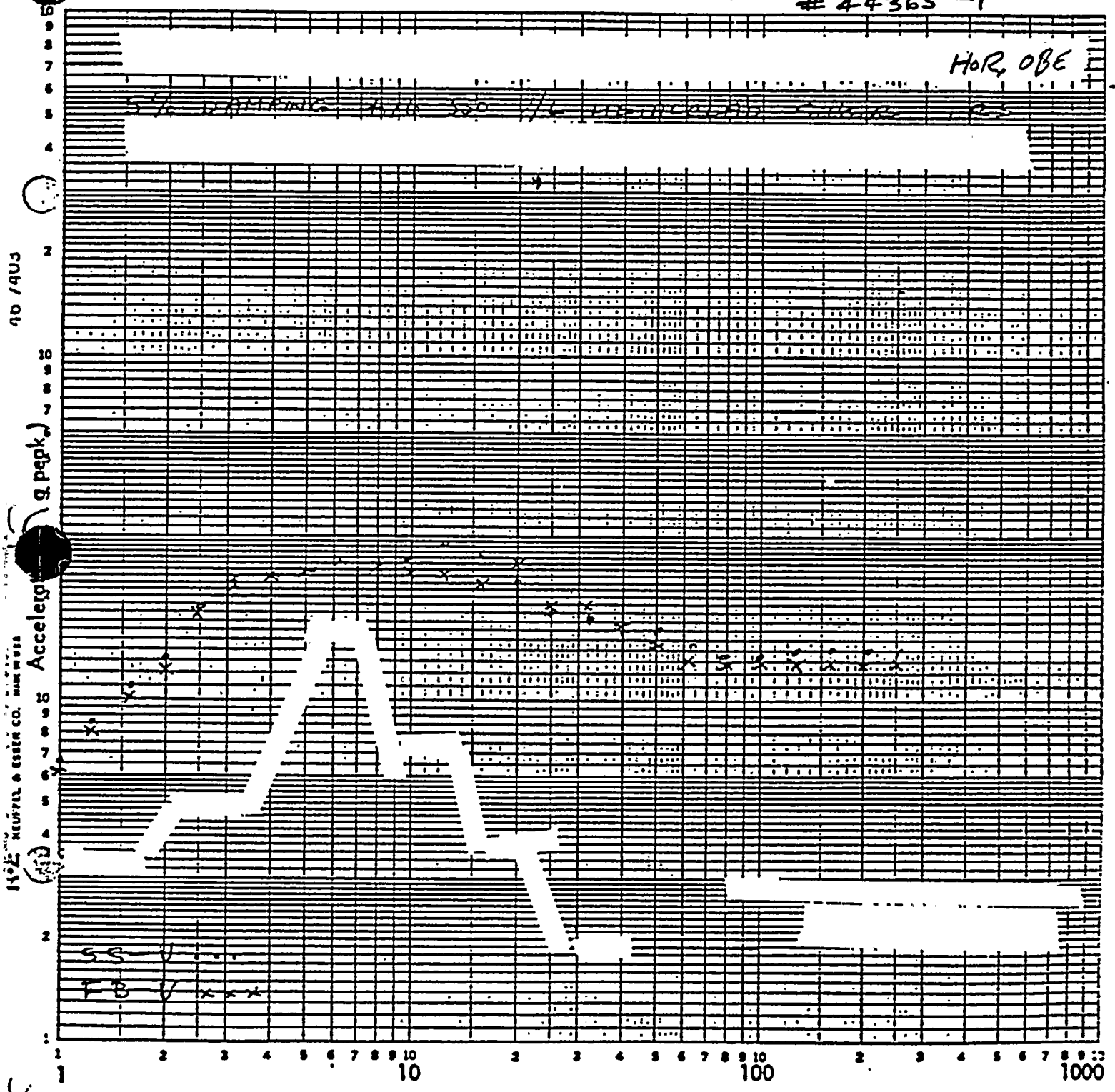
TEST RUN NO. [illegible]

FIG. 8

FULL SCALE SHOCK SPECTRUM (g Peak)

1.0 ☐ 10 ☐ 100 ☒ 1000 ☐

DAMPING [5%] WYLE LABORATORIES REPORT #44365-1



AXIS HORIZONTAL

LOCATION NO. HCA

TEST RUN NO. 10 11 40 x xx

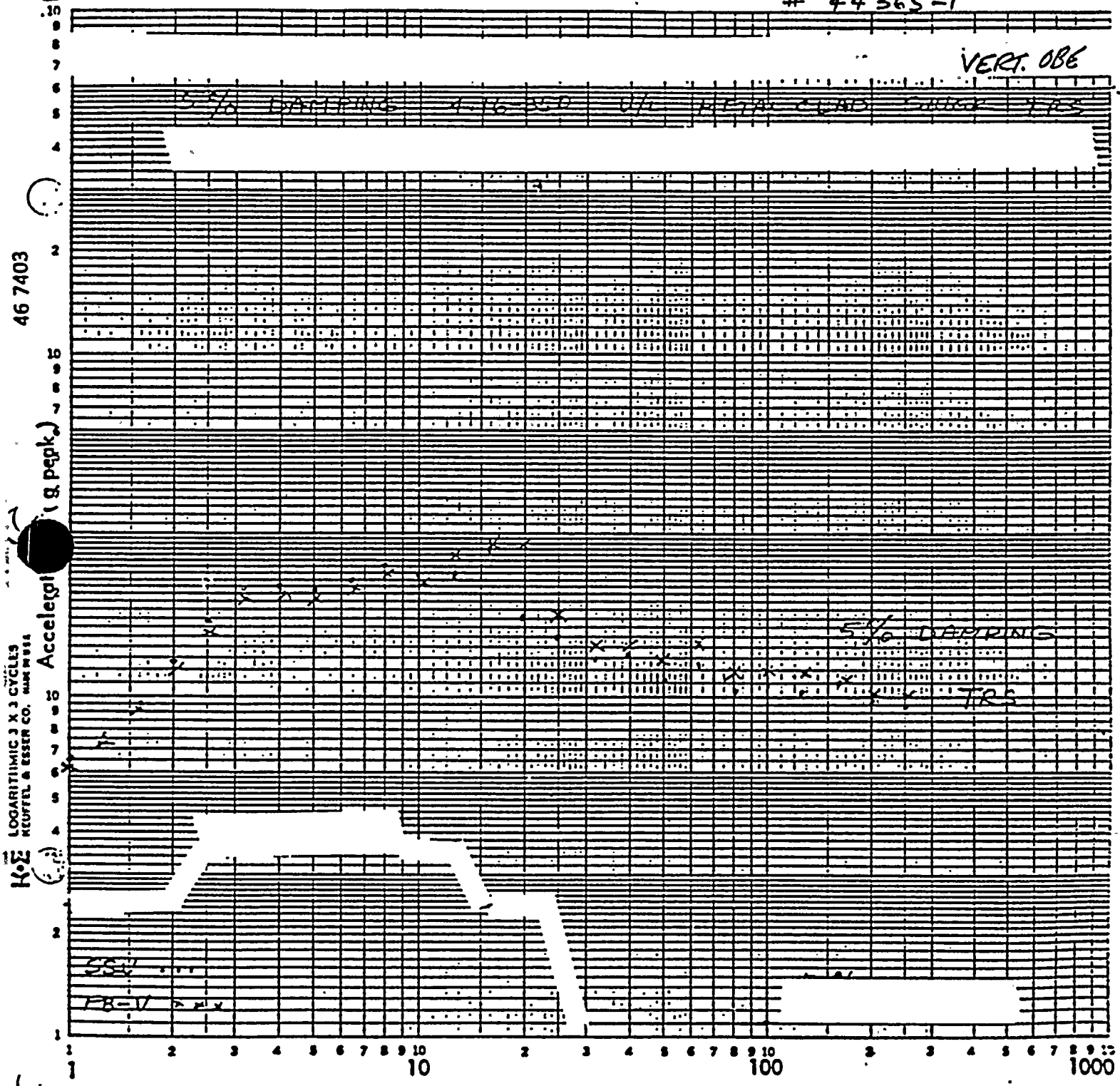
R.M. KORTE
8/17/82

FIG. 5

FULL SCALE SHOCK SPECTRUM (g Peak)

1.0 ☐ 10 ☐ 100 ☒ 1000 ☐

DAMPING [5%] WYLE LABORATORIES REPORT # 44365-1



R. M. KORTE
8/17/82

AXIS VERTICAL

LOCATION NO. VCA

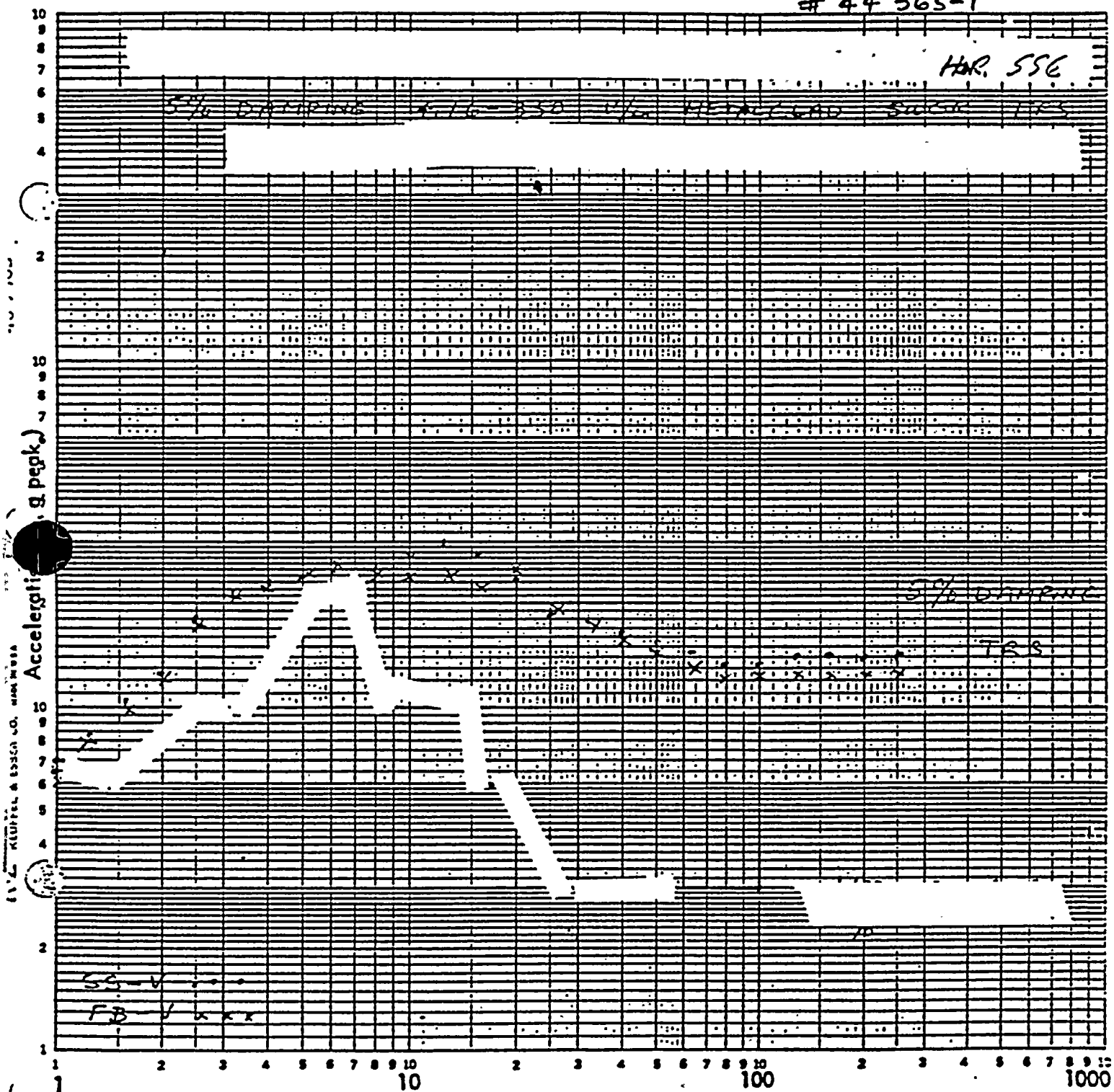
TEST RUN NO. 10 ... 40 x x x

FIG. 7

FULL SCALE SHOCK SPECTRUM (g Peak)

1.0 ☐ 10 ☐ 100 ☒ 1000 ☐

DAMPING [5%] WYLE LABORATORIES REPORT #44365-1



AXIS HORIZONTAL

LOCATION NO. HCA

TEST RUN NO. 11 ... 41 x x x

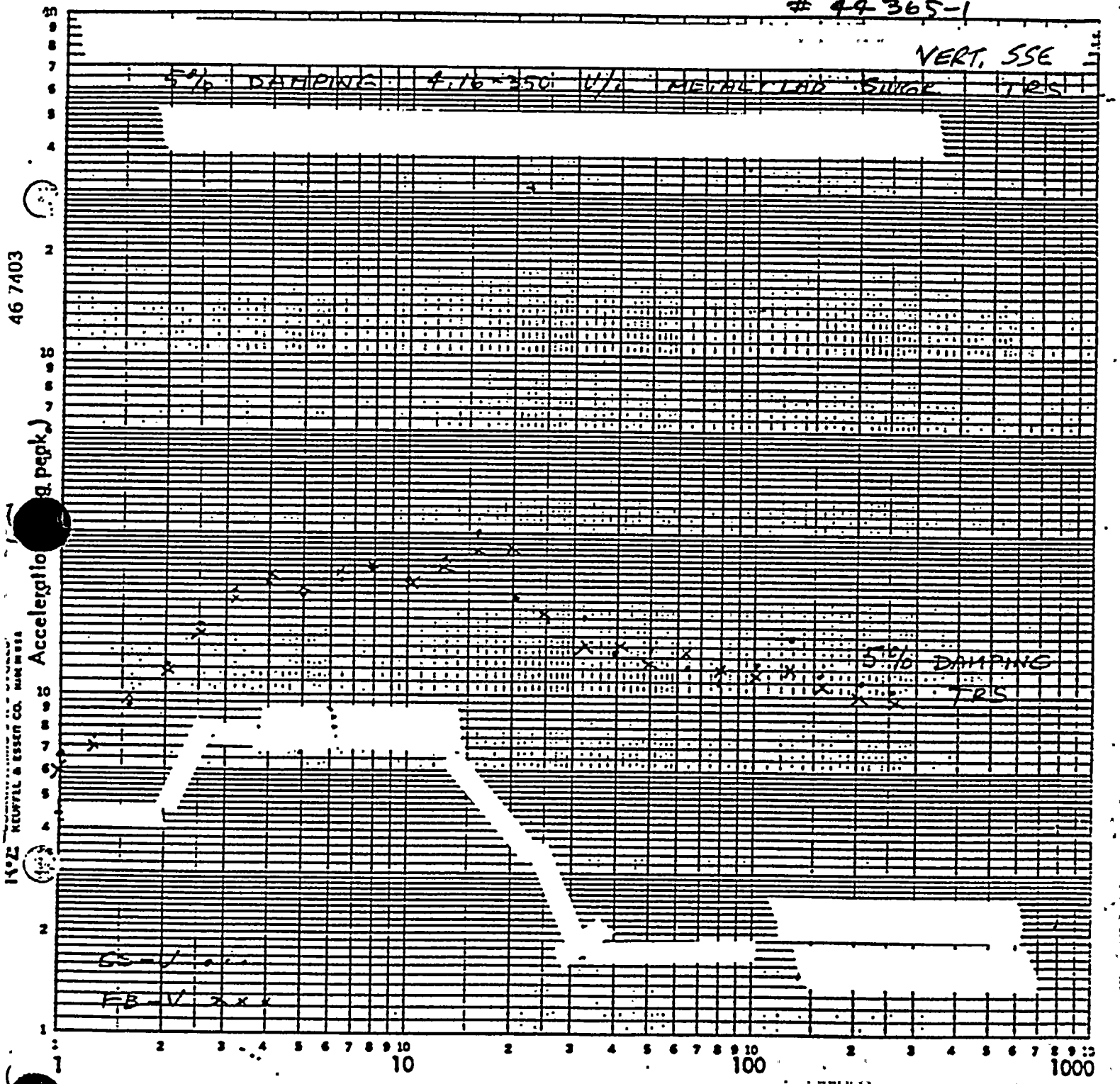
R.M. KORTE
8/17/82

FIG. 6

FULL SCALE SHOCK SPECTRUM (g Peak)

1.0 ☐ 10 ☐ 100 ☒ 1000 ☐

DAMPING [5%] WYLE LABORATORIES REPORT # 44-365-1



R.M. KORTE
8/17/82

AXIS VERTICAL

LOCATION NO. VCA

TEST RUN NO. 11..., 41 ×××