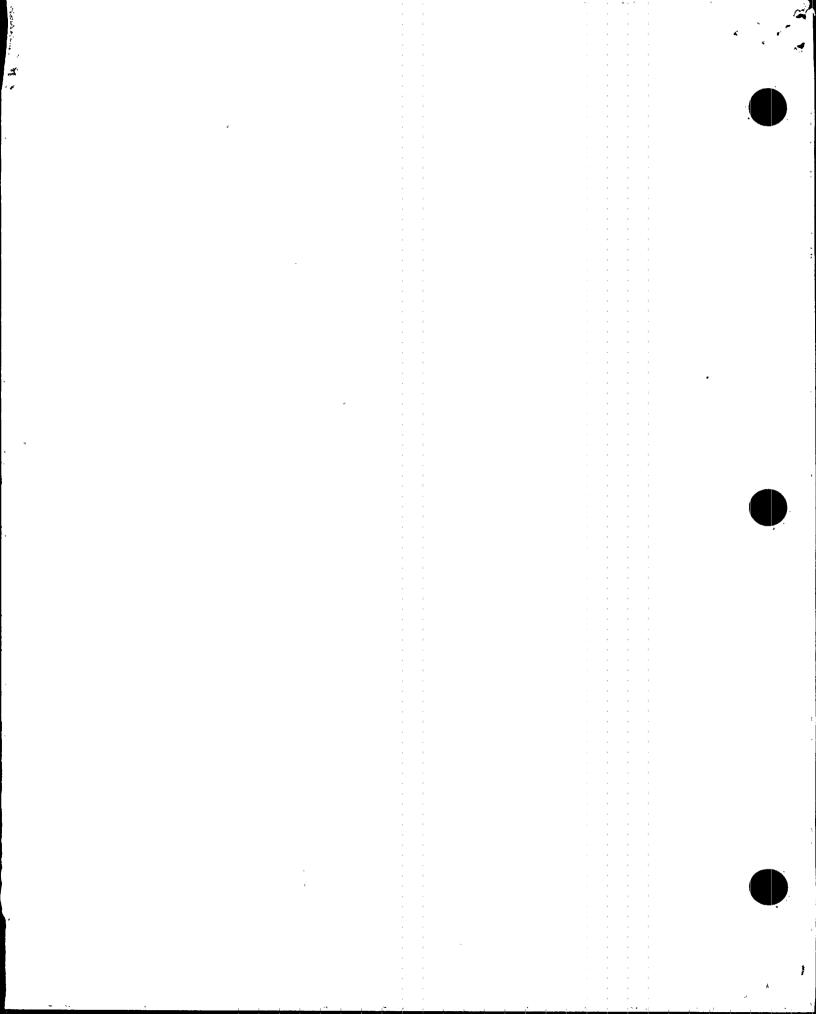
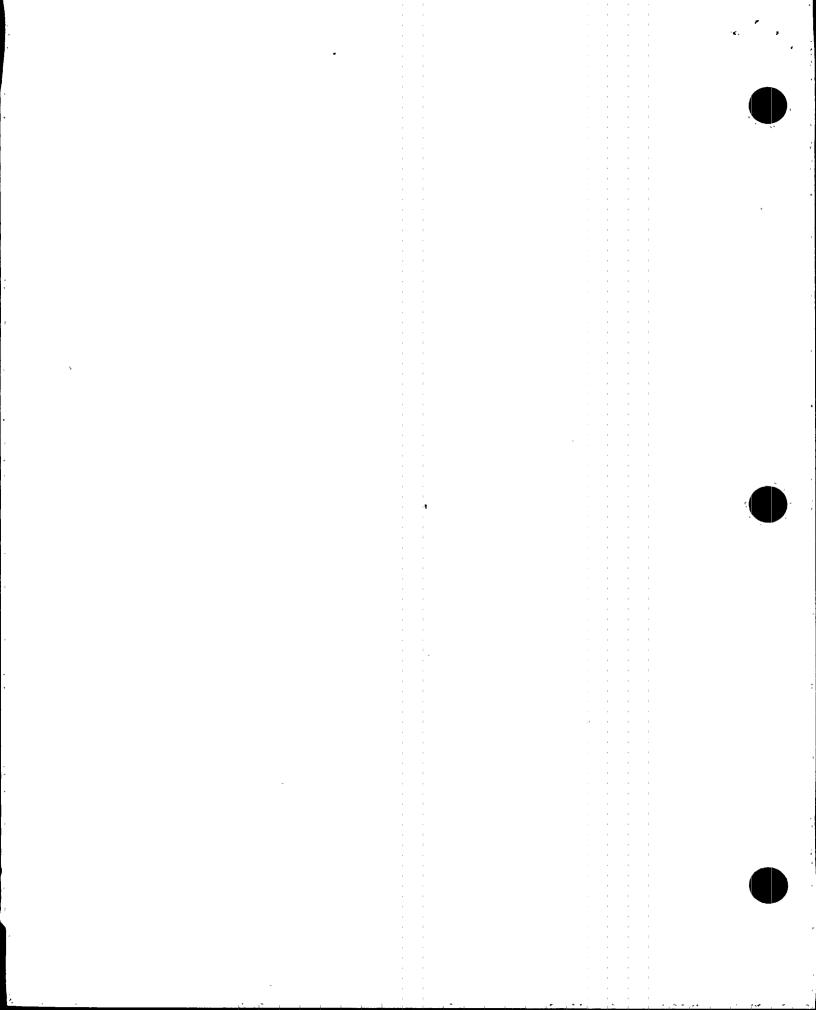
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0	Original issue		
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1	Revised to incorporate FDCNS F-31259A, F- F-31658A, and F-31869A for DCN W 22555	B1672A, 4. ·	•
	Shts Revised: 1, 4,9,24,47,184,240,187-190,209, Shts Added : 30, App, C (CI-C3)	2.	
•	Shts Replaced : 25,55,191,210,185 Shts Deleted : NONE	• .	
	Legibility evaluated and Shrs 25,55 accepted for issue. 210,185 a Platha Rpp. C (C	ind	8- <i>31-9</i> f
	Signature Date Total pages		
2	REVISED TO INCORPORATE UDP. CEB-011-018		6-8-95
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•	PAGES REVISED: 1,2,4,16 PAGES DELETED: NONE.		
	Total sheets		
3	REVISED TO INCORPORATE WALKDOWN & OUTLIERS F REVISED PG.NO: 1,2,4,9,172,175,235 TO 238,A		
2	PG A 135.		10-10-92
, ,	REPLACED PG.ND'- 5 TO8, 10 THRU 13, 170, 229 7 240, APPENDIX A, PG A2 THRU		
	ADDED PG. No: - 30, 8.1, 11.1, 11.2, 177.1 To 177.2		•
	239.1 TO 239.4 , APPENDIX A-	· PG A 5-1,	
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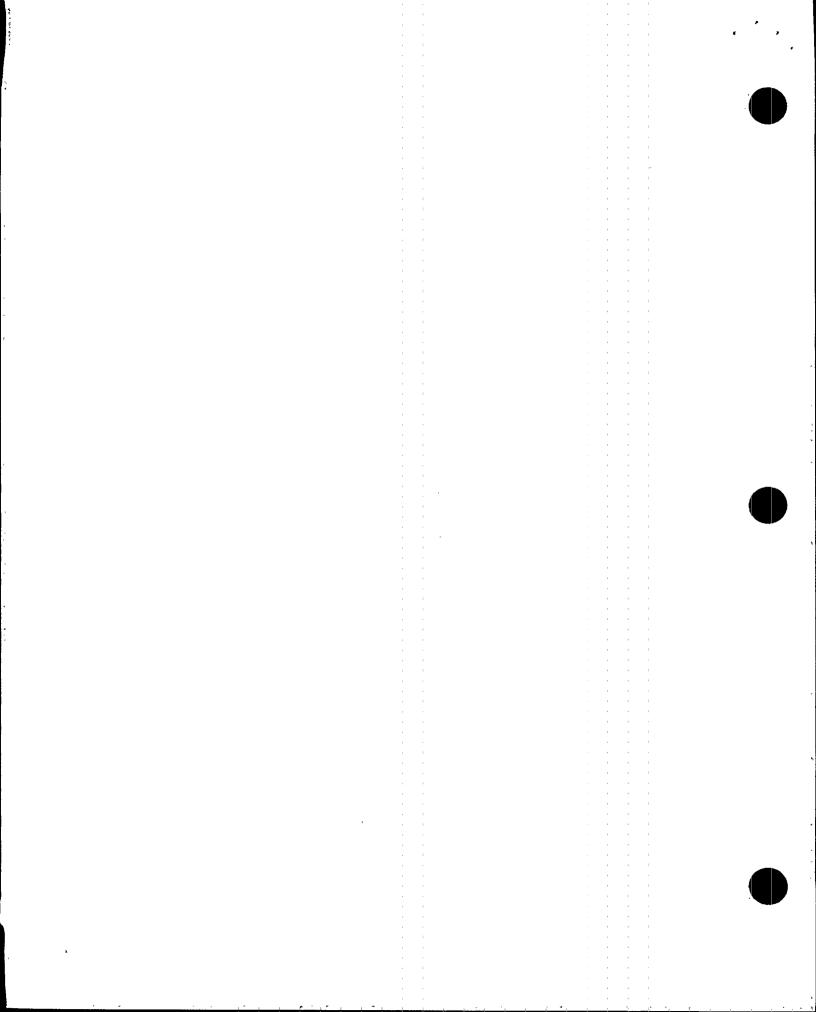
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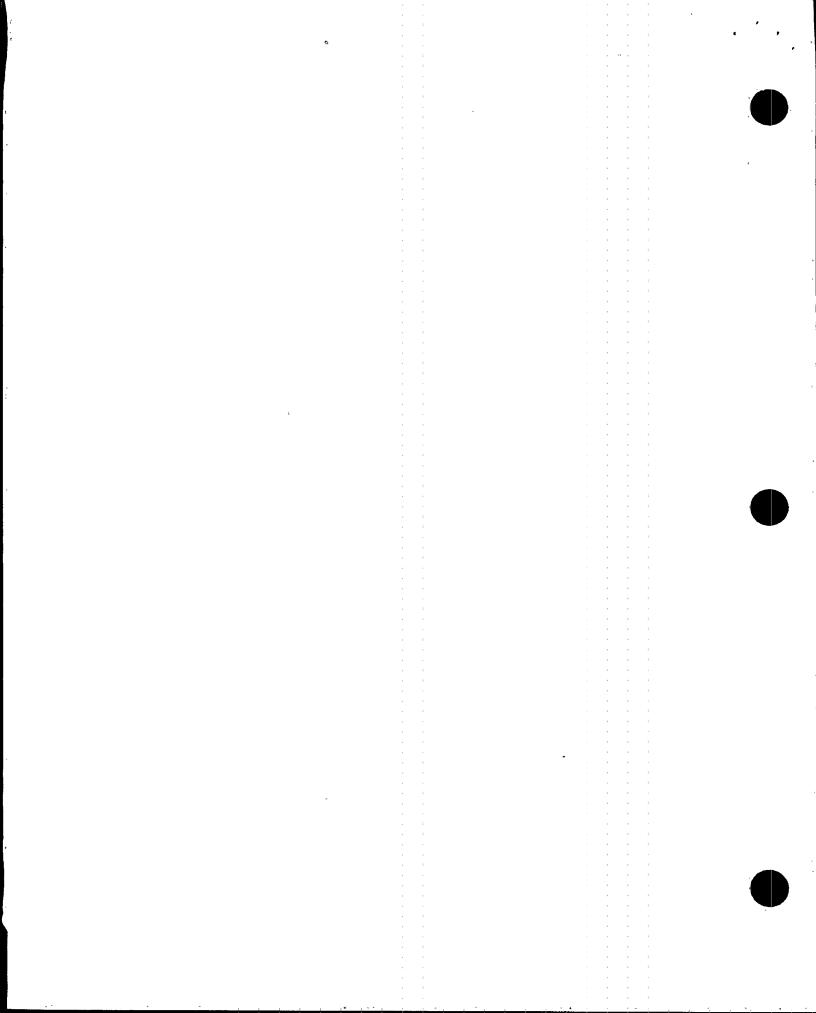
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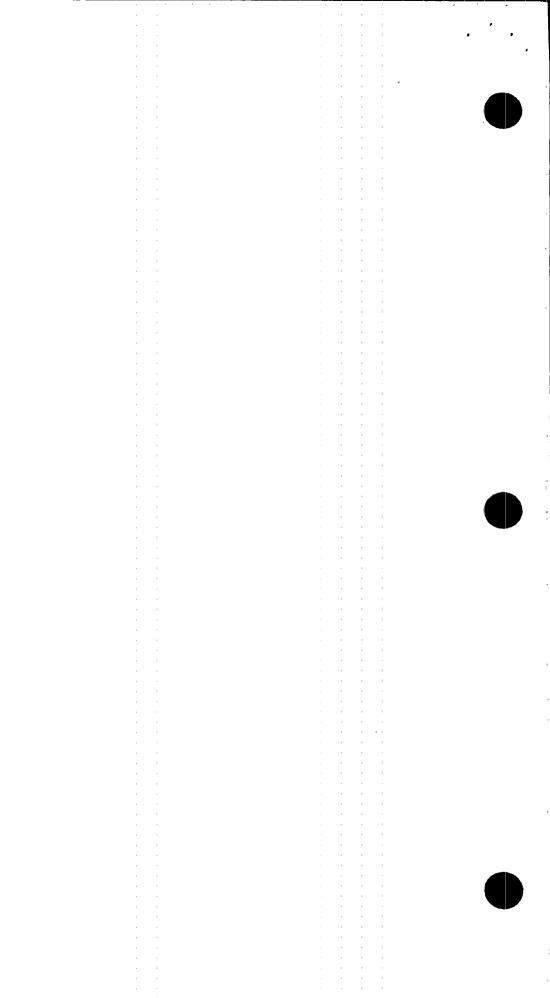
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4	Revised to incorporate additional walkdowns wi and minor clarifications. Revised pages: 197, 222, 240, Appendix D, page Added pages: 1a, 2a, 3d, Appendix D, page D14, D16, D17 Replaced pages: 177.23, 229, A92.1 Deleted pages: None Microfilm only the Revised, Added and Replaced	D6 D15,	24] - 76
5	REVISED TO MAKE MINOR CLARIFICATIONS & CO MINOR OMMISSIONS REVISED PG No: - 19, 29, APPENDIX A, SHT AII, A 117, A128, A135-1, A145, A146, A14 A 167, A 168 ADDED PG NO: - 30, 94.1 THRY 94.6	А 53,A76	26F-676
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Calculation No.	Revision
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. Alternate Calculation	
. Qualification Test	
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computations, judgements, ass	sumptions, and logic are based on accepted engineering
methods.	
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<u>Method 3:</u> In the qualification test method, identify the QA documented source(s) where testing adequately demonstrates the adequacy of this calculation and explain.

The above referenced calculation was independently reviewed and found to be adequate based on accepted sound engineering methods.

Date

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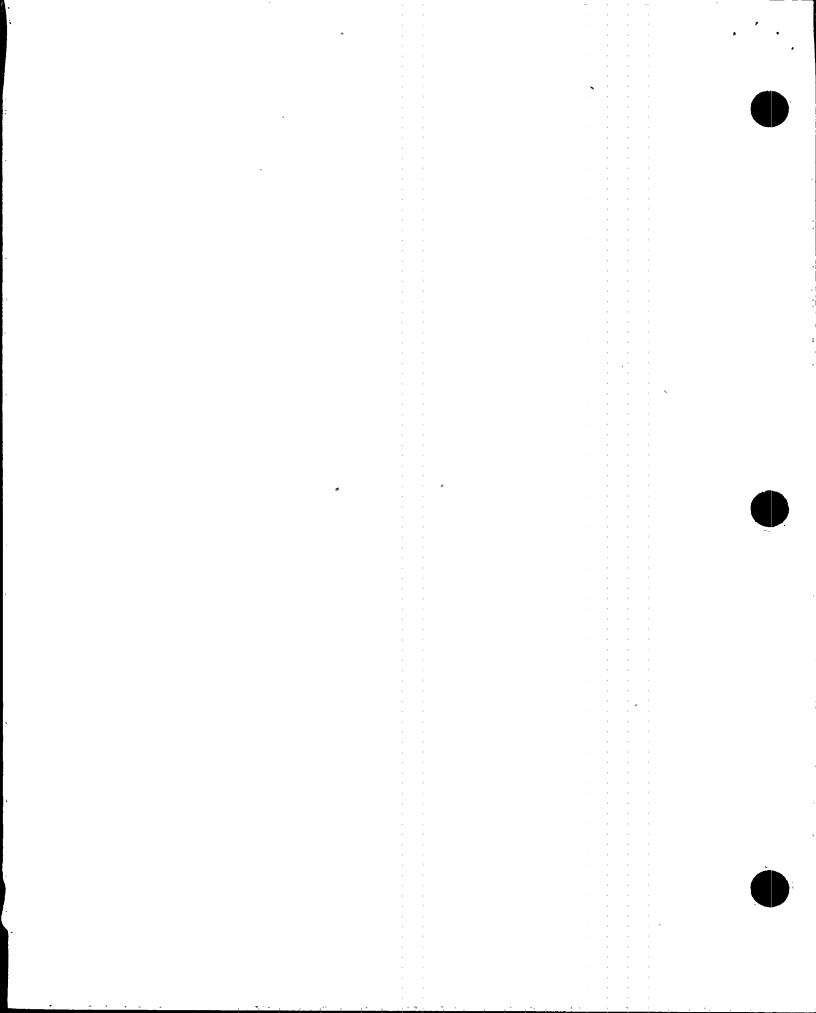
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Design Verifier (Independent Reviewer)

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This Sht. Added at Rev. 1.

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ЗЬ Sheet iii-b

CALCULATION DESIGN VERIFICATION FORM . (INDEPENDENT REVIEW)

CD-Q0000-931227 Calculation No.

Revision

Method of design verification (independent review) used (check method used):

- 1. Design Review /
- 3. Oualification Test

Justification (explain below):

- <u>Method 1:</u> In the design review method, justify the technical adequacy of the calculation and explain how the adequacy was verified (calculation is similar to another, based on accepted handbook methods, appropriate sensitivity studies included for confidence, etc.).
- <u>Method 2:</u> In the alternate calculation method, identify the pages where the alternate calculation has been included in the calculation package and explain why this method is adequate.
- <u>Method 3:</u> In the qualification test method, identify the QA documented source(s) where testing adequately demonstrates the adequacy of this calculation and explain.

The above referenced calculation was independently reviewed and found to be adequate based on accepted sound engineering methods.

Design Verifier (Independent Reviewer)









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Calculation CD-Q<u>0000 - 93/227</u> R<u>3</u>

Method of design verification (independent review) used (check method used):

- I. Design Review
- 2 Alternate Calculation
- **3** Qualification Test

Justification (explain below)

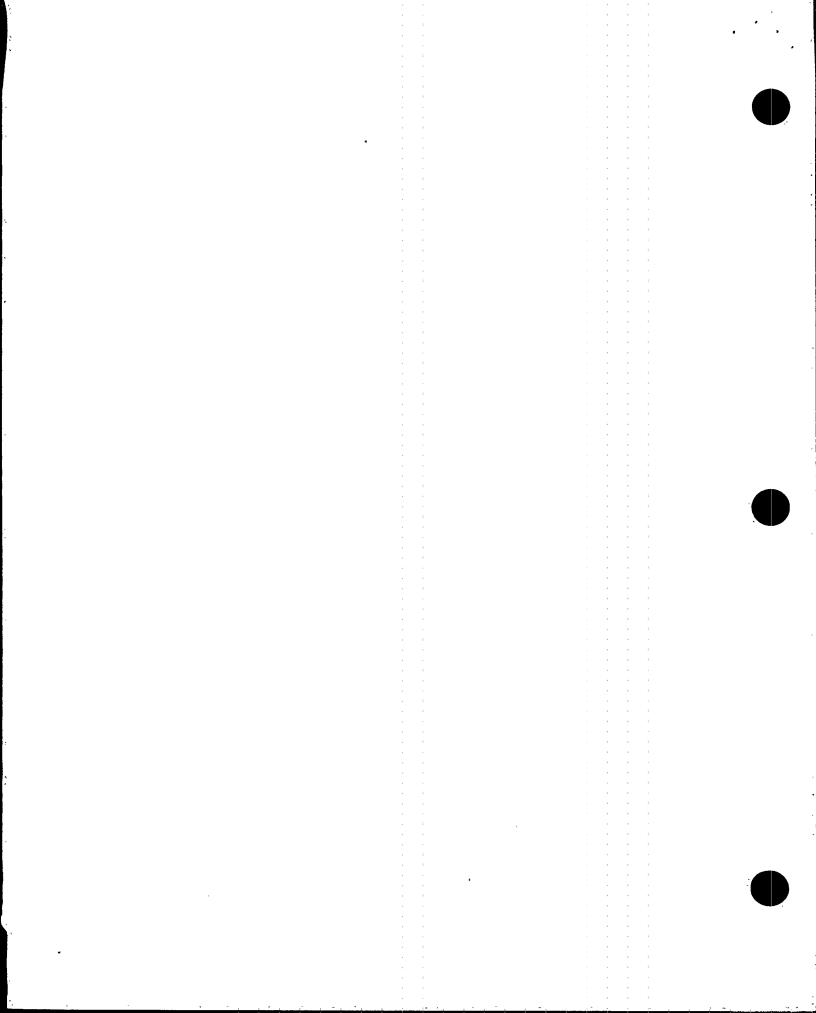
- <u>Method 1:</u> In the design review method, justify the technical adequacy of the calculation and explain how the adequacy was verified (calculation is similar to another, based on accepted handbook methods, appropriate sensitivity studies included for confidence, etc.)
- <u>Method 2</u> In the alternate calculation method, identify the pages where the alternate calculation has been included in the calculation package and explain why this method is adequate.
- <u>Method 3</u> In the qualification test method, identify the QA documented source(s) where testing adequately demonstrates the adequacy of this calculation and explain.

The above calculation revision so noted has been reviewed by the Design Review Methodology and has been determined to be technically adequate based on the design input information contained herein using accepted handbook and/or computer applications and sound engineering practices and techniques.

10-10-95

Design Verifier (Independent Reviewer) Date

This sheet added by Revision 3



Calculation CD - Qc000- 931227 Rev. 4

Method of design verification (independent review) used (check method used):

_____ 1. Design Review

_____ 2. Alternate Calculation

_____ 3. Qualification Test

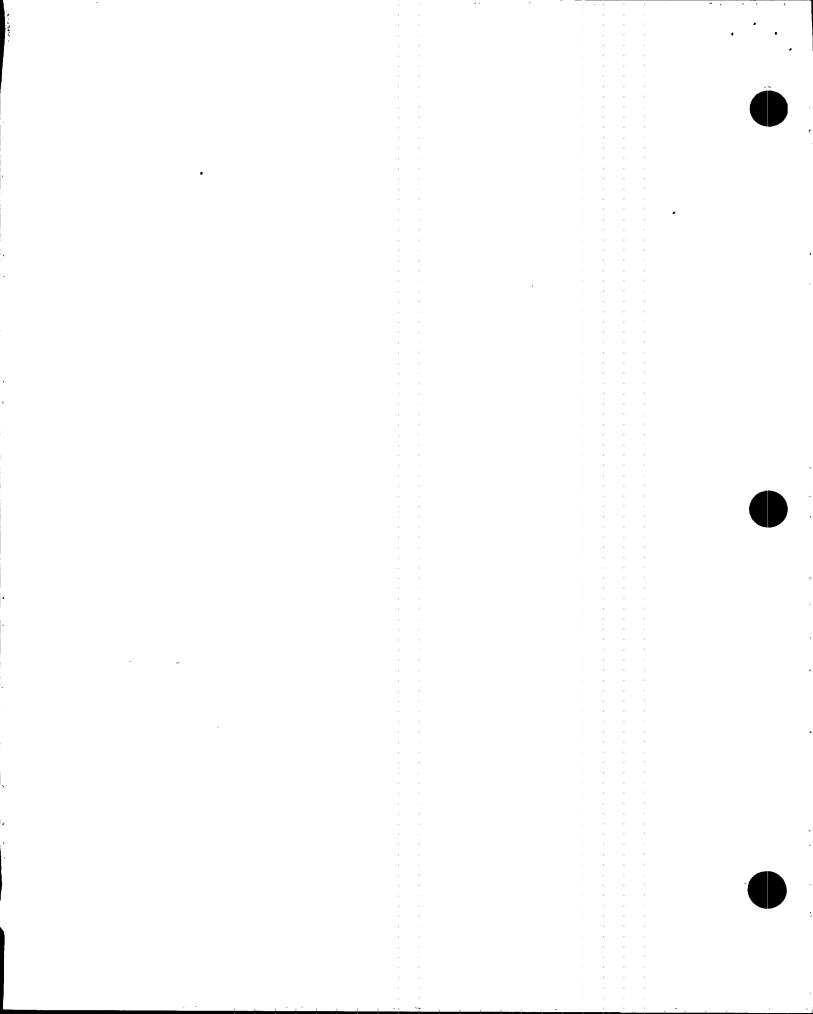
Justification (explain below):

- Method 1: In the design review method, justify the technical adequacy of the calculation and explain how the adequacy was verified (calculation is similar to another, based on accepted handbook methods, appropriate sensitivity studies included for confidence, etc).
- Method 2: In the alternate calculation method, identify the pages where the alternate calculation has been included in the calculation package and explain why this method is adequate.
- Method 3: In the qualification test method, identify the QA documented source(s) where testing adequately demonstrates the adequacy of this calculation and explain.

The above calculation revision so noted has been reviewed by the Design Review Methodology and has been determined to be technically adequate based on the design input information contained herein using accepted handbook and/or computer applications and sound engineering practices and techniques.

01-23-96 sign Verifier Date

This sheet added by Revision <u>4</u>



Calculation CD - 20000 - 93/227 Rev. 5

Method of design verification (independent review) used (check method used):

1. Design Review

2. Alternate Calculation

3. Qualification Test

Justification (explain below):

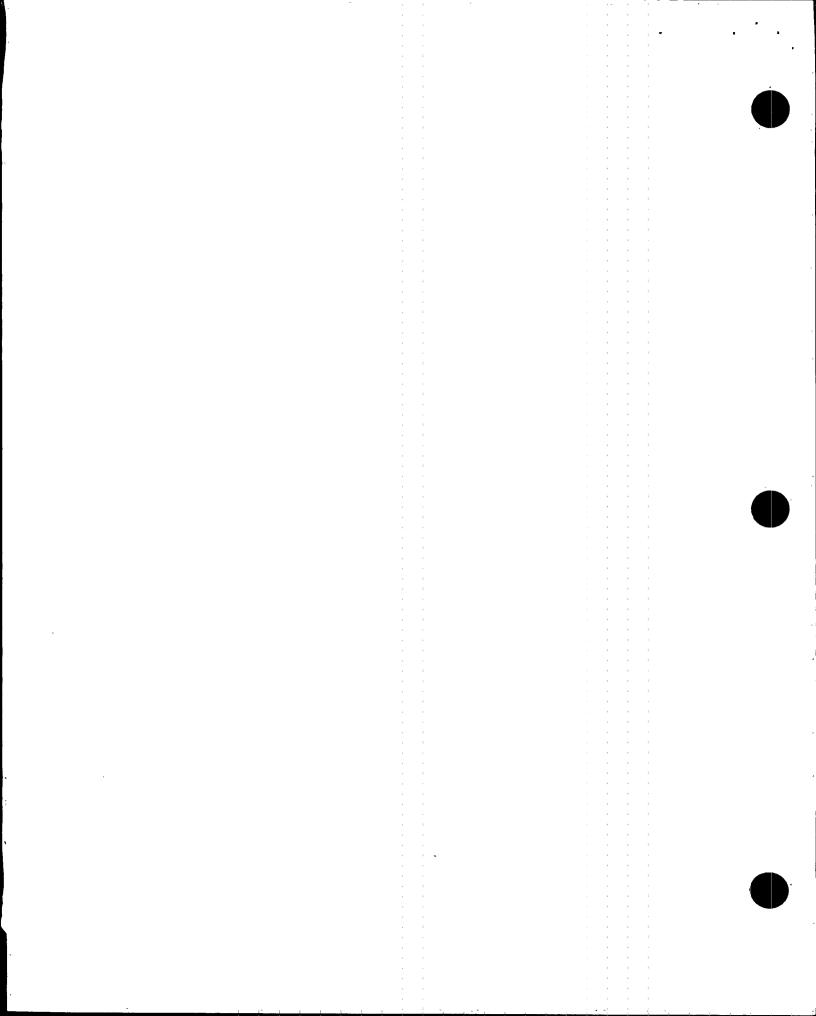
- In the design review method, justify the technical adequacy of the calculation Method 1: and explain how the adequacy was verified (calculation is similar to another, based on accepted handbook methods, appropriate sensitivity studies included for confidence, etc).
- Method 2: In the alternate calculation method, identify the pages where the alternate calculation has been included in the calculation package and explain why this method is adequate.
- In the qualification test method, identify the QA documented source(s) where Method 3: testing adequately demonstrates the adequacy of this calculation and explain.

The above calculation revision so noted has been reviewed by the Design Review Methodology and has been determined to be technically adequate based on the design input information contained herein using accepted handbook and/or computer applications and sound engineering practices and techniques.

02-15-96 Date

Design Verifier

This sheet added by Revision 5



Calculation CD - 20000-93/227 Rev. 6

Method of design verification (independent review) used (check method used):

1. Design Review

_____ 2. Alternate Calculation

_____ 3. Qualification Test

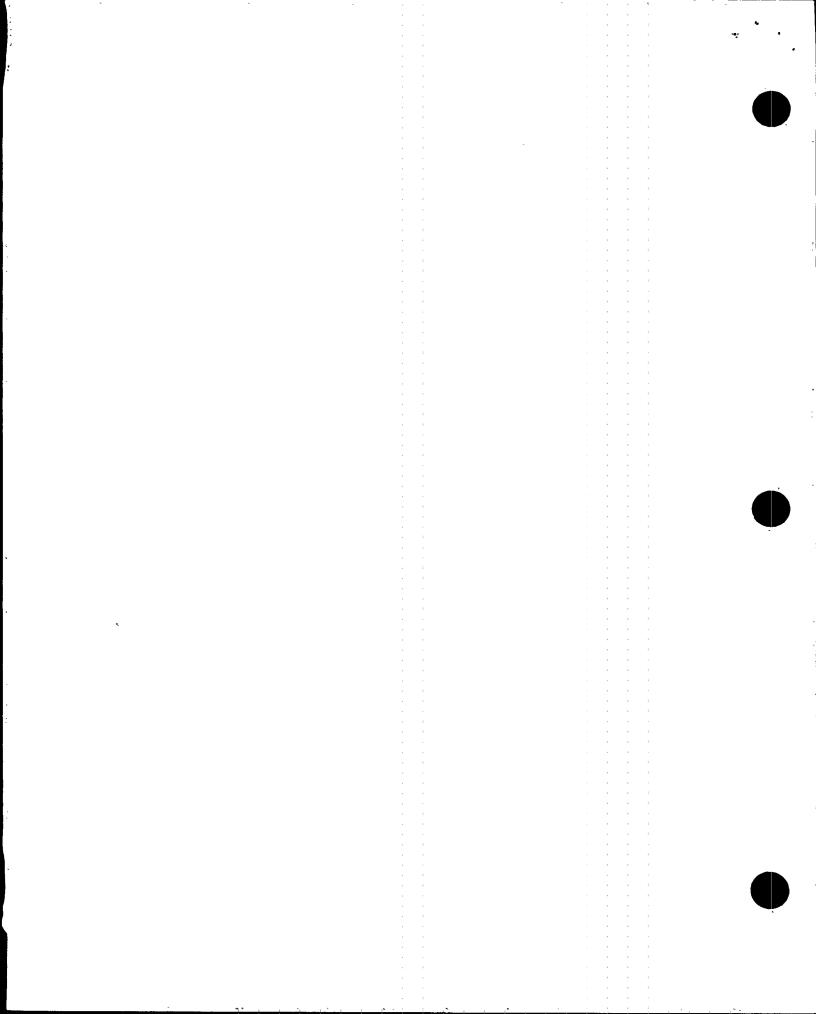
Justification (explain below):

- Method 1: In the design review method, justify the technical adequacy of the calculation and explain how the adequacy was verified (calculation is similar to another, based on accepted handbook methods, appropriate sensitivity studies included for confidence, etc).
- Method 2: In the alternate calculation method, identify the pages where the alternate calculation has been included in the calculation package and explain why this method is adequate.
- Method 3: In the qualification test method, identify the QA documented source(s) where testing adequately demonstrates the adequacy of this calculation and explain.

The above calculation revision so noted has been reviewed by the Design Review Methodology and has been determined to be technically adequate based on the design input information contained herein using accepted handbook and/or computer applications and sound engineering practices and techniques.

Anond C. Rehvain **Design Verifier** Date

This sheet added by Revision <u>6</u>



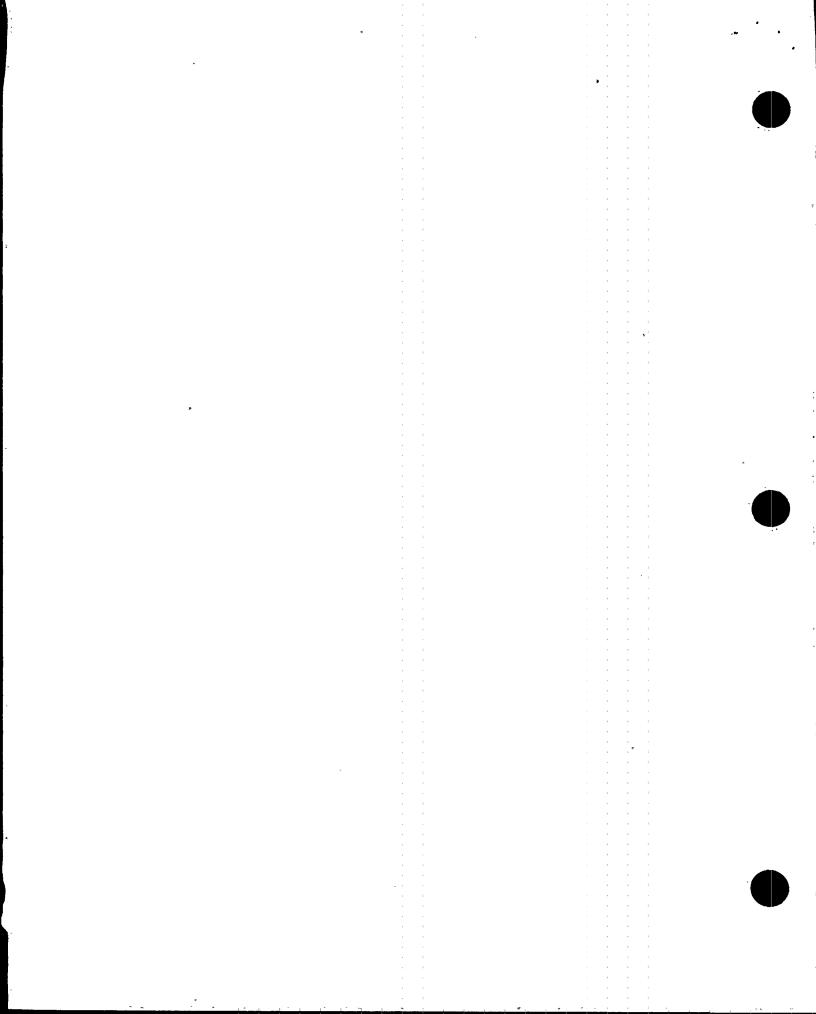
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Rev. Orighn the bate 6/7/95 Z Chkd. 22 Date 6/8/95 INDEX /	Prepared By CUL Date 8/30/94 Checked By <u>2112</u> Date 8-31-94
ITEM	PAGE
CALCULATION COVER SHEET	∴ ¹
REVISION LOG	. 2
INDEPENDENT REVIEW FORM	3,3a,3b,3c1/R2/K
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OUTLIER INDEX TABLE	5
1.0 PURPOSE	9
2.0 ASSUMPTION	. 9
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4.0 DESIGN INPUT DATA	11
5.0 COMPUTATIONS	14
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5.2 QUALIFICATION OF OUTLIERS	169
6.0 SUMMARY OF RESULTS	229
7.0 CONCLUSION	240
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APPENDIX B (DCN W22555A AND COPY OF DCA'S) RJEDCH F38457, APPENDIX C (CATALOG INFORMATION).	B1- B13 B16 C1-C3 R1
APPENDIX _ D (NRC REVIEW SHEETS)	DI-D13 F: F(R3.
APPENDIX-E (PEER REVIEW SHEETS)	EI-E6 183.
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SYSTEM BY A46 PROGRAM

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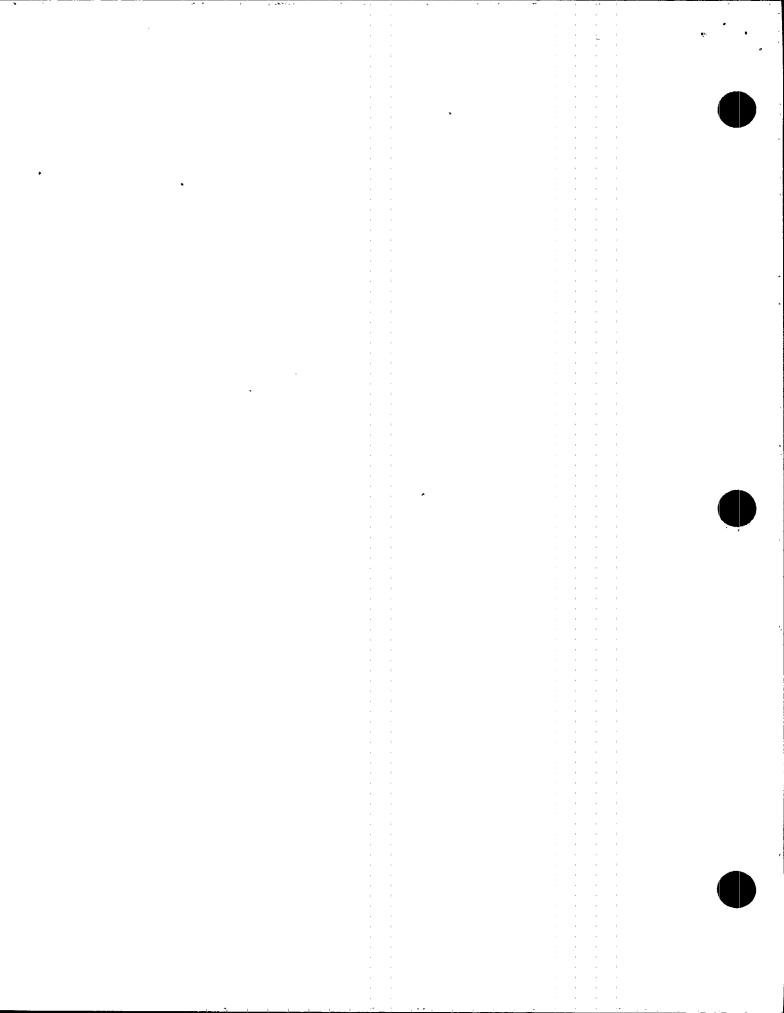
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OUTLIER INDEX TABLE

AREA NO.	PROBLEM NO.	REFERENCE PAGE		
		CALC PAGE NO	APPENDIX PAGE NO.	
9 NE CORNER RM	9-01		Аб	
	21-01		λ 7 ·	
	21-02		X 8	
	21-03	170-176	A10	
	21-04	16-25	A11	
	21-05		۸14 `	
	21-06	2634	A17 ⁻	
	21-07		A21	
	21-08	186-191	· <u>д</u> 23	
	21-09		A25	
	21-10		A27	
21 REACTOR	21-11		А29	
· 0 3	21-12 .	170-176	А31	
El 565'	21-13	170-176	А33	
	21-14		<u>дз5</u>	
•	21-15	172,184,185	, A 37	
	21-16		А39	
	21-17	170 -174, 177,192-194	λ41	
	21-18		A44 ·	
	21-19		A47	
	21-20	195-199	A50	
	21-21		А53	
	21-22		A55	
	21-23	192-194	А57	
	21-24		A 60	

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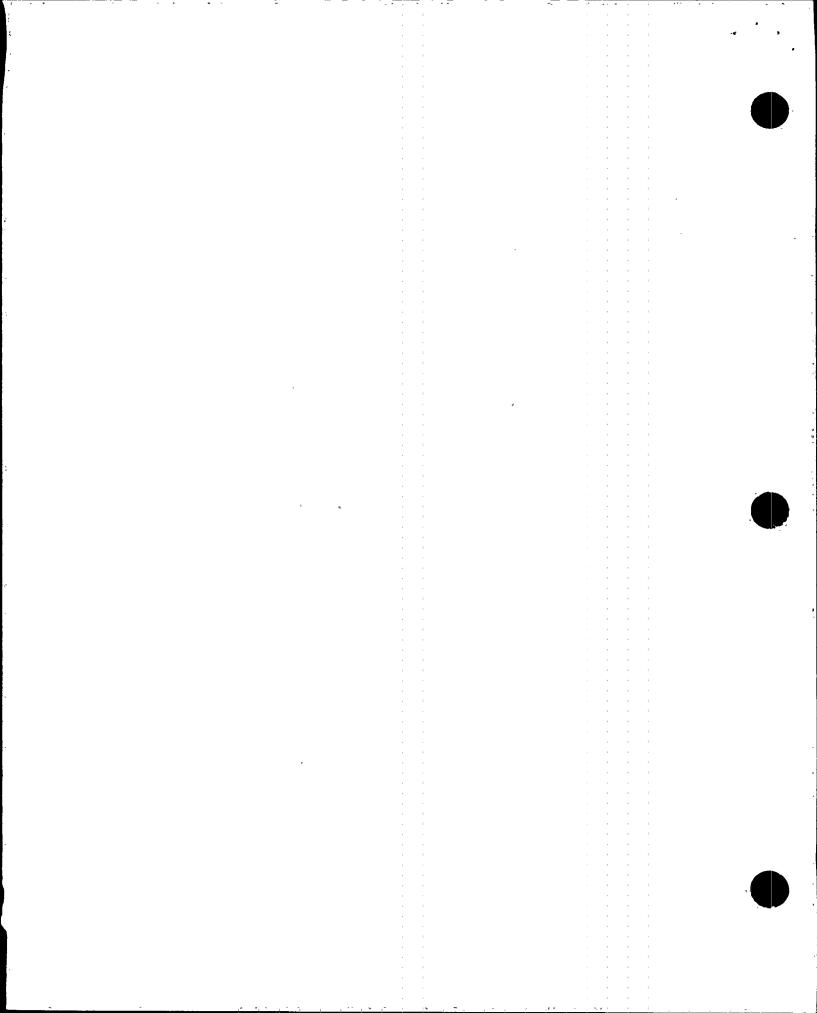
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AREA NO.	PROBLEM NO.	REFERENCE PAGE		
		CALC PAGE NO	APPENDIX PAGE NO.	
21	21-25	35-44	. A62	
REACTOR	21-26	177.1-177.22	λ64.1	
U3 EL. 565'-0"	21-27		A64.2	R
	21-28		λ64.3	
	22-01		A65	
	22-02	(A 67.1)	л67	R
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	22-07		λ 77	
22 React	22-08		084	
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•	22-10		A86	
	22-11	205-207	A88	
	22-12		A 90	
	22-13		λ91	
ч	22-14	-	A92·	
	22-15	177.23	A92.1	R
	22-16		A92.2	
	23-01		А93	
	23-02	45-72	λ 97	
6	23-03		A1 00	
23 REACTOR	23-04 .	170-174, 178, 208-210	A102	
U3 El 621'	23-05	170-174, 178, 211-213	A104	
	23-06		A106	
	23-07		A109	
	23-08		A 113	

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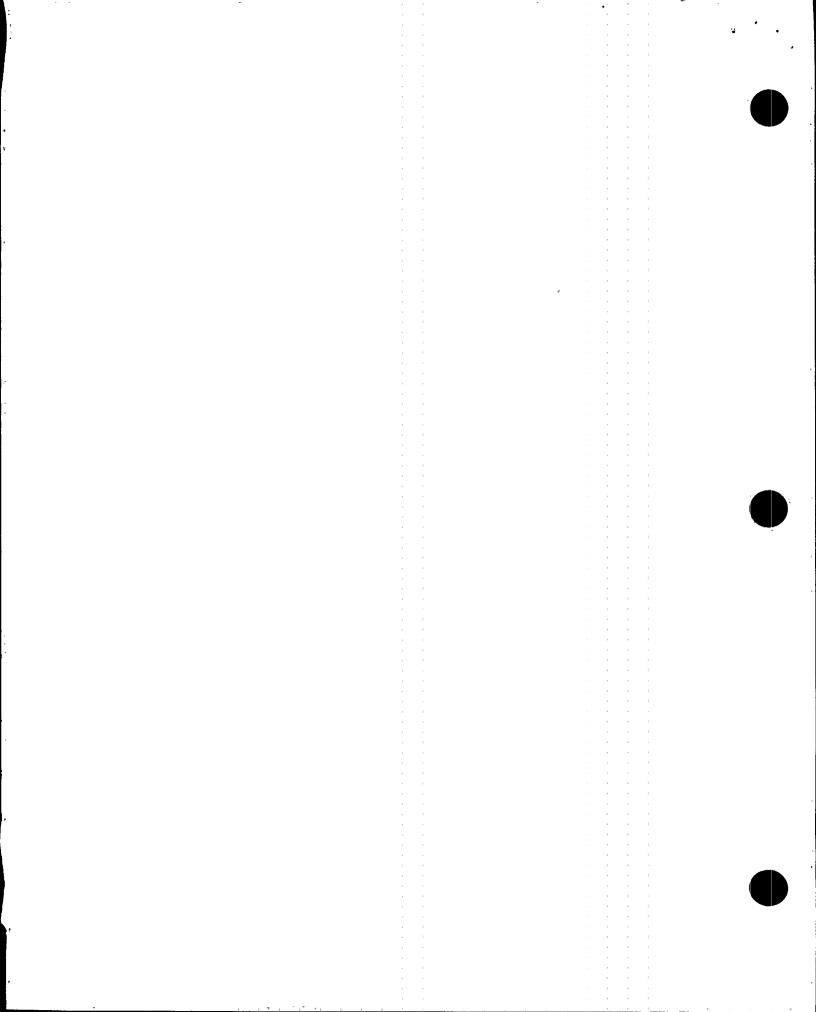
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23 REACTOR. 43 EL. 621:0"	23-09	214-215	λ115		
24	24-01	<u>.</u>	· A117		
REACTOR U3 E1 639'	24-02		A118	ļ.,	
	27-01		A192		
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	27-03		A196		
	27-04		A197	.	
	27-05	172	A198		
	27-06		A199		
	27-07		A200		
	27-08		A 201	R3	
27 DRYWELL	27-09		<u>д203</u>		
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	27-11		A207		
	27-12		А209		
	27-13		· A211		
_	27-14		A213		
	27-15		A215		
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	27-17		А220	3.21.9	
	27-18		A221		
	29-01		а119	88	
	29-02	170-174, 179	A121	B	
	29-03	216-220	A123	10	
29 Control Bay	29-04	(200-2200)RG	А125	Propuse By D	
UI EL 606	29-05		A127 ·	ξŜ	
	29-06		A12 8	o nev	
	29-07		Л129		
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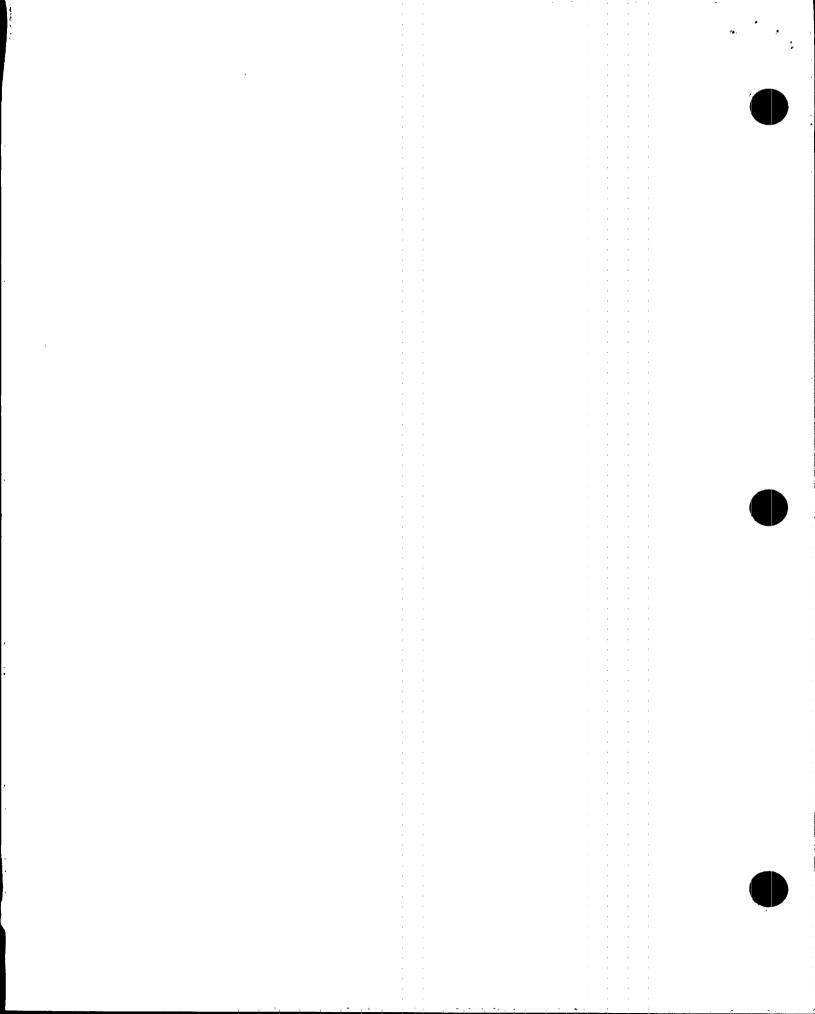
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AREA NO.	PROBLEM NO.	REFERENCE PAGE		
		CALC PAGE NO	APPENDIX PAGE NO.	
31	31-01	192-194	A132	
CONTROL BAY U2 EL 593'	31-02	•	A134	
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	32-01	2200-220 ERC	A136	
	32-02		A137	
	32-03		A138	
32	32-04		A139	
Control Bay U2 E1 606'	32-05		A140	
02 MI 000	32-06	•	· A141	
	32-07	73-94	A142	• •
	32-08		А145	
	32-09	R6	A146	
	32-10	CD-Q2031-883494	A147	
34 Control Bay U3 El 593'	34-01		A14 8	
	35-01	170-174, 180	л149	
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	35-03		A151	2.3
35 CONTROL BAY	35-04	A152-1	A152	12 4
U3 EL 606'	35-05	95–113	А153	24 B
	35-06	114-133	A156	2 00 03 22.9
	35-07		A158	ACR
	35-08		۸159	
39	39-01	170-174, 181	A160	Property By ACC
	39-02	,	A162	1 2 3
	39-03 .		A164	o Mev
TORUS U3	39-04		A167	
	39-05		A168.	•
45 U3 D.G BLDG	45-01	134-140	A170	
46 SBGT	46-01	170-174, 182	A173	

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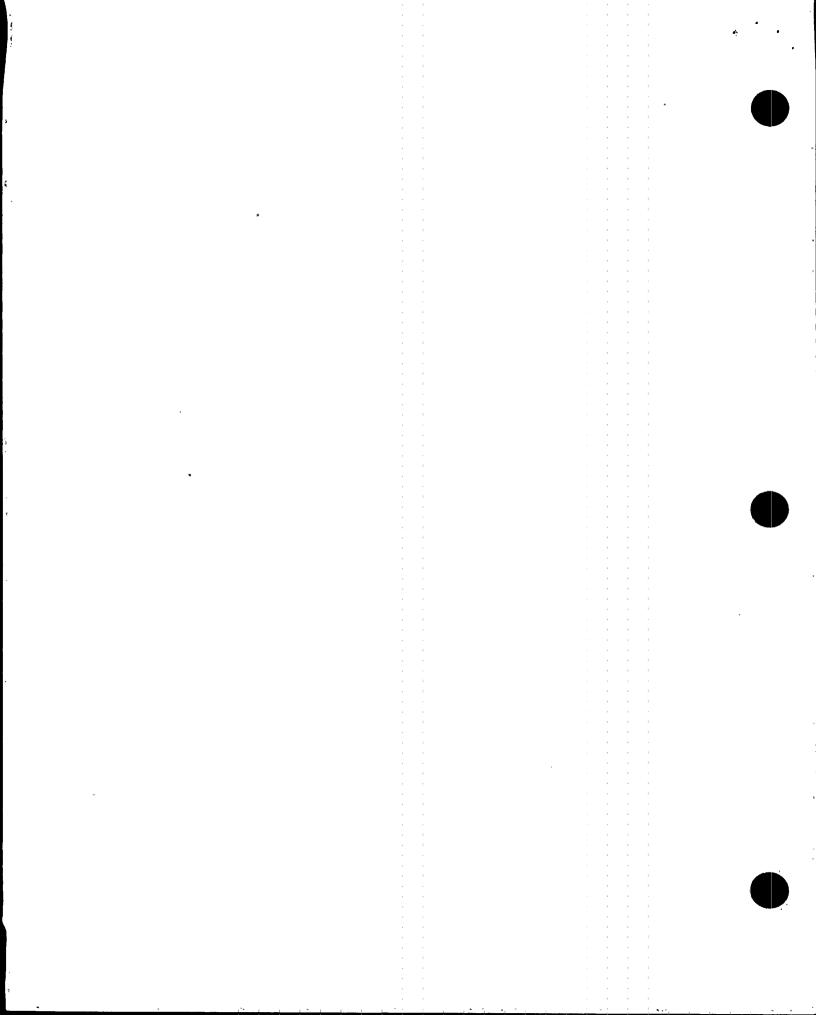
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AREA NO.	PROBLEM	REFERENCE PAGE		Ĩ
7		CALC PAGE NO	APPENDIX PAGE NO.	
48 INTAKE PUMP HOUSE	48-01	221-225	A174	
49 CABLE TUNNEL .	49-01	A 177.1	A176	1R6
	49-02	226-228	A178	
	49-03		A180	•
	49-04	141-168	A182	
	50-01		A186	
50 REACTOR U1-U3 EL 664'	50-02		A188	
	50-03	170-174, 183	A190	
	50-04		A191	

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QUALIFICATION OF CABLE TRAY AND CONDUIT SYSTEM BY A46 PROGRAM

SHEET 3 OF	
CD-Q0000-9312	27 _ Rev. 1
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REV Prepared SyACR-Dete 10-6-95 3 **1.0 PURPOSE:** Che:ked By 000

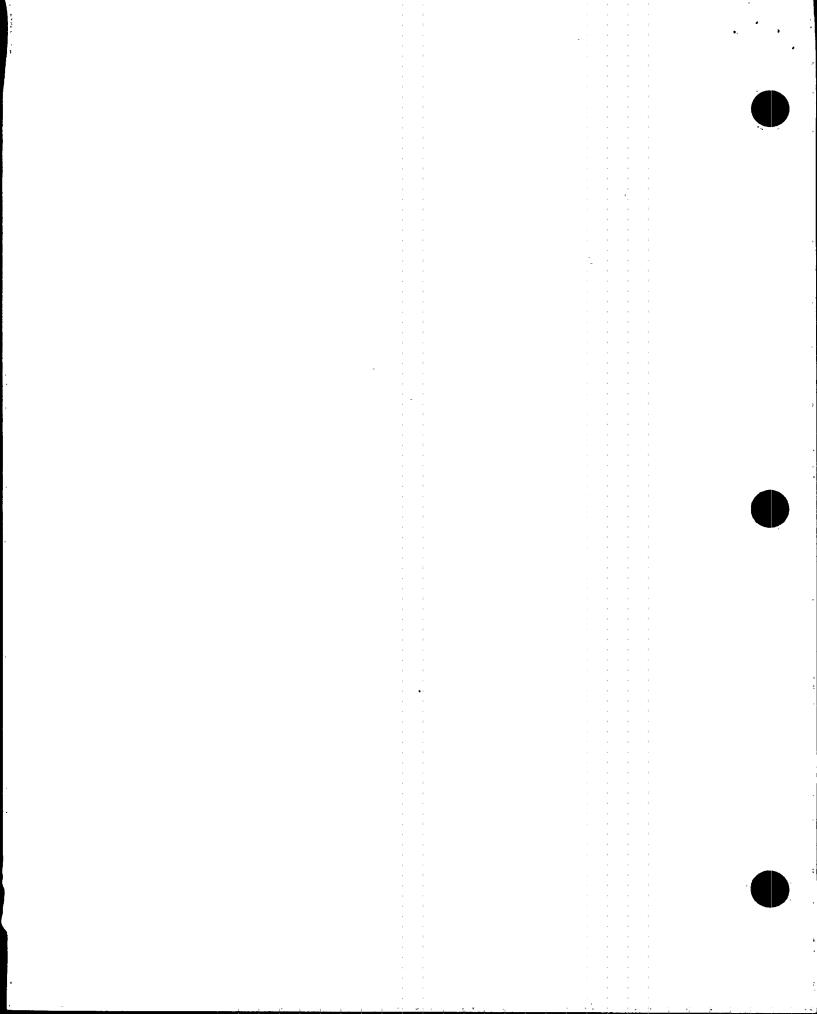
Purpose of this calculation is to qualify existing cable tray and conduit supports by A46 program. Field walkdown for A46 program was performed for all cable tray and conduit supports located in Reactor Building unit 3 (except Drywell), Control Bay Area for all three RS units, unit 3 Diesel Generator building, Standby Gas Treatment Building, Cable Tunnel and Pump House. The A46 program review for drywell shall-be-done under a seperate DCN. Outliers were identified as per GIP walkdown procedure. Few Analytical samples were selected in the field based on major different types of raceway support configurations in the plant and most heavily loaded support for each configuration. Revision 1 to this calculation provides evoluations For FDENS F 31259A, F31672A, F31658A, & F31869A. R. The purpose of the calculations is not to estimate actual seismic response and system performance during an earthquake. Rather, the purpose of the calculations is to show that cable tray and conduit supports are at least as rugged as those that performed well as evidenced by past experience.

Date 10-10-9

2.0 ASSUMPTIONS:

No unverified assumptions made in this calculation. Any assumption made are within the GIP guideline or design criteria BFN-50-C-7104.

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1	Checked By <u>21/61</u> : Date <u>8:3-94</u>



QUALIFICATION OF CABLE TRAY AND CONDUIT

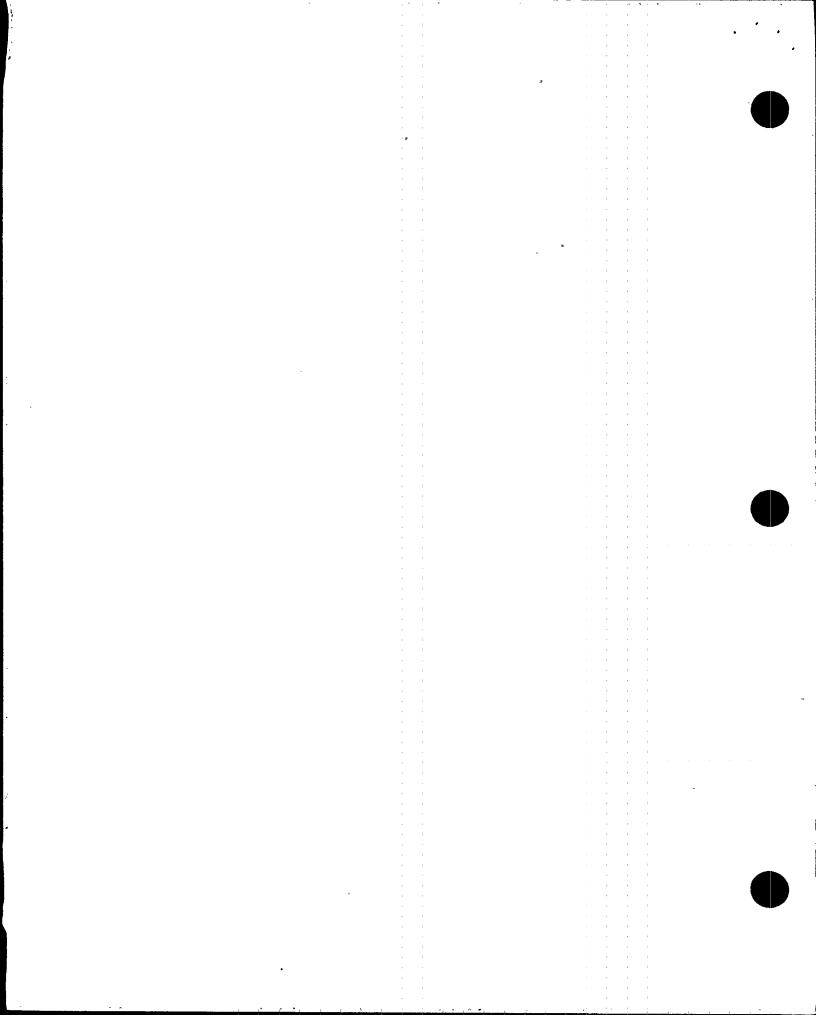
SHEET <u>10</u> OF CALC. # CD-Q0000-931227 COMPUTED <u>Ack</u>DATE <u>10-9-95</u> CHECKED <u>and</u> DATE <u>10-10-95</u>

3.0 <u>REFERENCES:</u>

- 1) Generic Implementation Procedure (GIP) for seismic verification of nuclear plant equipment by SQUG.
- 2) AISC Steel Construction Manual 8th Edition.
- 3) EPRI Report NP-7151, "Cable Tray and Conduit System seismic evaluation guidelines," EPRI, March 1991.
- 4) EPRI Report NP-5228, Revision 1, "Seismic Verification of Nuclear Plant Equipment Anchorage," EPRI, June 1991.
- 5) EPRI Report NP-7150, "The Performance of Raceway Systems in Strong Motion Earthquakes," EPRI, March 1991.
- EPRI Report NP-7152, "Seismic Evaluation of Rod Hanger Supports for Electrical Raceway Systems," EPRI, March 1991.
- 7) P-W Industries catalog for cable tray system.
- 8) NEMA Standard VE 1-1984, "Metallic Cable Tray Systems"
- 9) BFN MARS Report
- 10) Civil Design Standard DS-C1.7.1
- 11) Design of Welded Structures by Blodgett
- 12) · UNISTRUT Nuclear Power Engineering Catalog
- 13) DCN W22555A
- 14) Work Request No.C314988, C069712 & C165048 R3
- 15) Design Criteria BFN-50-C-7104
- 16) Work Request # C165050 & # C030297
- 17) TVA calc. # CD-Q0000-940339 calculation of basic parameters for A-46 and individual plant examination of external events (IPEEE) seismic program.
- 18) TVA calc. # CD-Q0999-940356- Concrete Anchors for USI-A46 and IPEEE review.

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QUALIFICATION OF CABLE TRAY AND CONDUIT

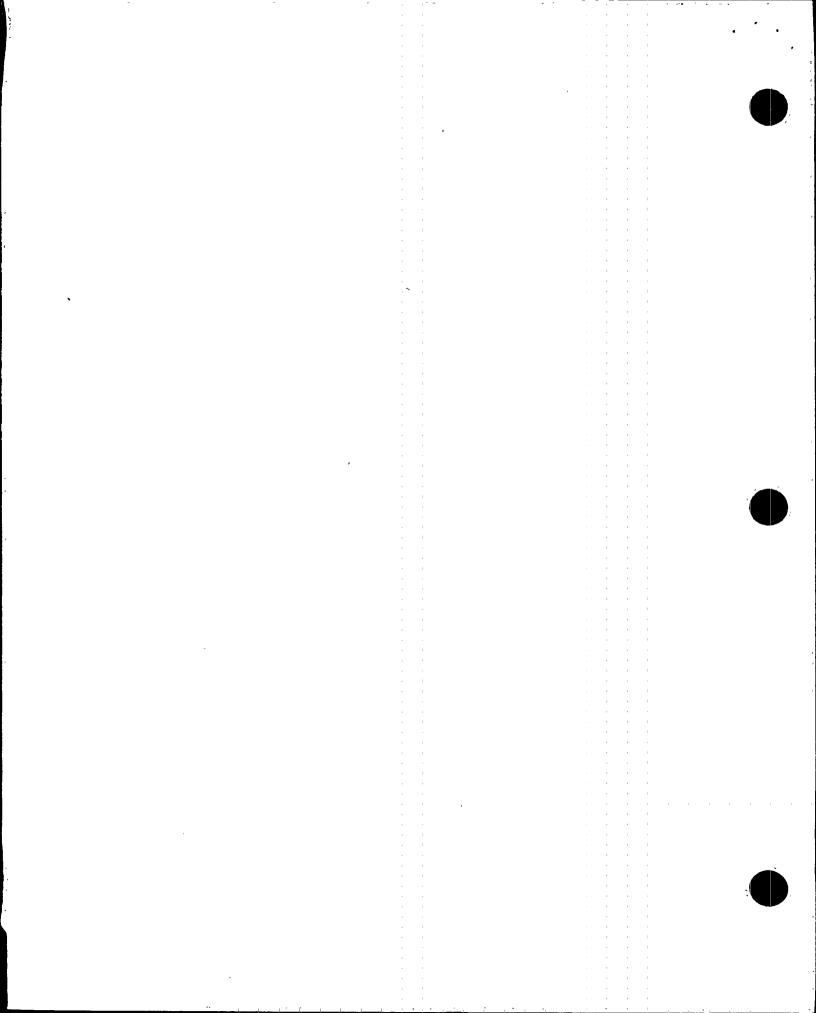
SHEET <u>II</u> OF CALC. # CD-Q0000-931227 COMPUTEDACR DATE <u>10-9-95</u> CHECKED <u>04</u> DATE <u>10-9-95</u>

DESIGN INPUT DATA:

- 1. CABLE TRAY WEIGHT INCLUDING 4" OF CABLE AND FLAMASTIC FILL EQUALS 25 PSF.
 - 2. CABLE TRAY: STANDARD LADDER TYPE, SYSTEM NO. 1402, RUNGS SPACED AT 6".
 - 3. STRUCTURAL STEEL MAT'L = A36 UNLESS OTHERWISE NOTED.
 - 4. WELDING ELECTRODE = E70XX.
 - 5. CONCRETE f'c = 3000 PSI.
 - 6. GIP BOUNDING SPECTRUM VS SSE GROUND RESPONSE SPECTRUM ANCHORED TO 0.2g AT 5% DAMPING. SINCE BOUNDING SPECTRUM COMPLETELY ENVELOPES SITE SPECTRUM, THE FINDINGS OF EXPERIENCE DATABASE ARE VALID FOR THIS SITE (REFER SHEET 11.2).
 - 7. REACTOR BUILDING SEISMIC RESPONSE SPECTRA FROM MARS REPORT (REF. 9), SUPERIMPOSED ON ROD FATIGUE BOUNDING SPECTRA ANCHORED TO 0.33g, 0.50g, & 0.75g. THIS INFORMATION WILL BE USED FOR ROD FATIGUE EVALUATION (REFER SHEET 13).
 - 8. DIESEL GENERATOR BUILDING SEISMIC RESPONSE SPECTRA FROM MARS REPORT (REF. 9) SUPERIMPOSED ON ROD FATIGUE BOUNDING SPECTRA ANCHORED TO 0.33g, 0.50g, & 0.75g. THIS INFORMATION WILL BE USED FOR ROD FATIGUE EVALUATION (REFER SHEET 12).
- 9. STRENGTH GAIN OF CONCRETE DUE TO AGING (FROM 3000 PSI TO 3600 PSI) MAY BE CONSIDERED (REF. 10).
- 10. ANCHORAGE TYPE:

THE PROMINENT ANCHORAGE TYPE USED FOR THIS PLANT HAS BEEN SELF DRILLING EXPANSION ANCHORS(SSD'S). OTHER TYPES SUCH AS WEDGE BOLTS AND UNDERCUT ANCHORS, WHICH HAVE HIGHER STRENGTHS THAN SSD'S HAVE ALSO BEEN USED. IT IS POSSIBLE, PARTICULARLY IN EARLIER STAGES OF CONSTRUCTION (LATE 60'S AND EARLY 70'S), THAT LEAD CINCH ANCHORS MIGHT HAVE BEEN USED IN SOME PLACES. LEAD ANCHORS PER GIP ARE OUTLIERS AND THEIR ALLOWABLE PULLOUT AND SHEAR VALUES PER REF. 10 ARE LESS THAN THOSE OF SSD'S. HOWEVER GIP DOES NOT REQUIRE THE REMOVAL OF EACH AND EVERY BOLT TO VERIFY THE ANCHOR TYPE AND THEREFORE

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QUALIFICATION OF CABLE TRAY AND CONDUIT

SHEET <u>11.1</u> OF CALC. # CD-Q0000-931227 COMPUTED <u>ACR</u> DATE <u>10-9-95</u> CHECKED <u>CM</u> DATE <u>10-10-97</u>

DESIGN INPUT DATA (CON'T):

IN CASES, WHERE THE TYPE OF ANCHOR IS NOT KNOWN, THE ANCHORS WILL BE ASSUMED TO BE SSD'S. NO SIGNIFICANT DEGRADATION OF THE FUNCTIONALITY OF THE SUPPORT IS LIKELY, IF, INFREQUENTLY AND UNKNOWN TO THE ENGINEER, AN INSTALLED LEAD ANCHOR IS EVALUATED USING SSD ALLOWABLES. THE JUSTIFICATION FOR THIS CONCLUSION IS DOCUMENTED IN TVA CALC. AT REF. 18.

IF THE TYPE OF ANCHOR IS KNOWN OR DETERMINED TO BE A LEAD ANCHOR, THE SUPPORT SHALL BE TREATED AS AN OUTLIER AND EVALUATED ACCORDINGLY.

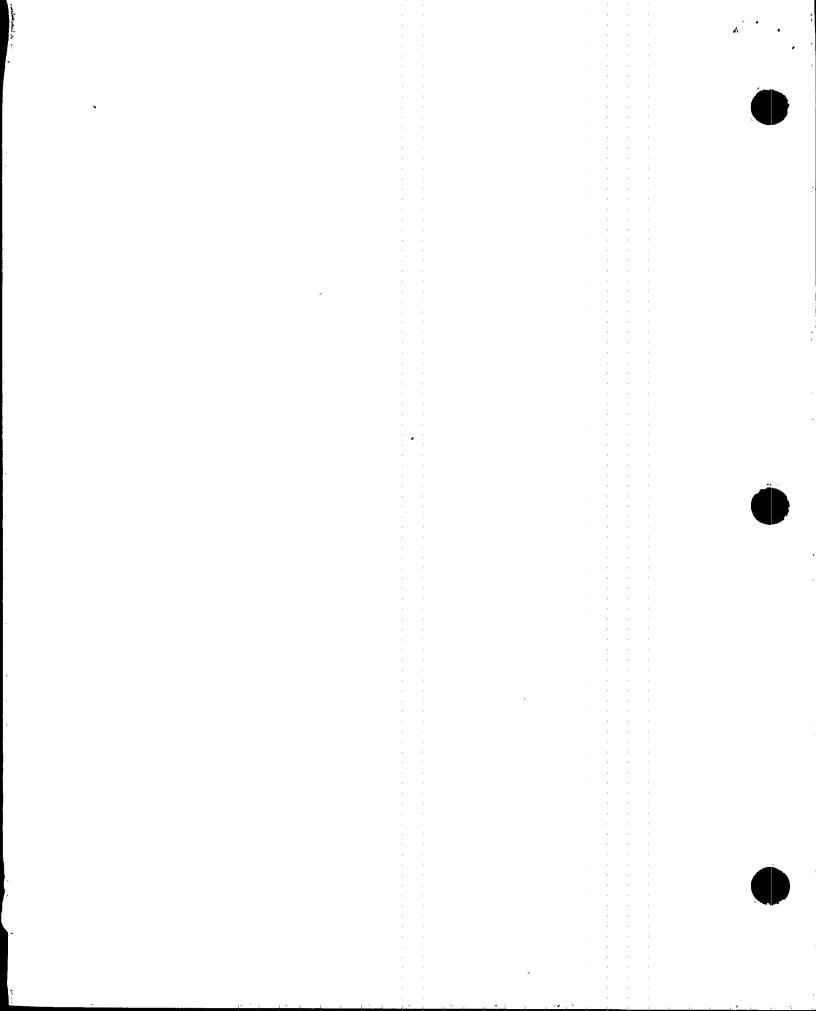
11. EXPANSION ANCHOR CAPACITIES: (Ref 1, Appendix C)

PULLOUT CAPACITY = GIP CAP. x (3600/4000)= 0.9 x GIP

SHEAR CAPACITY = GIP CAP. x (.65+3000/10000)= 0.95 x GIP

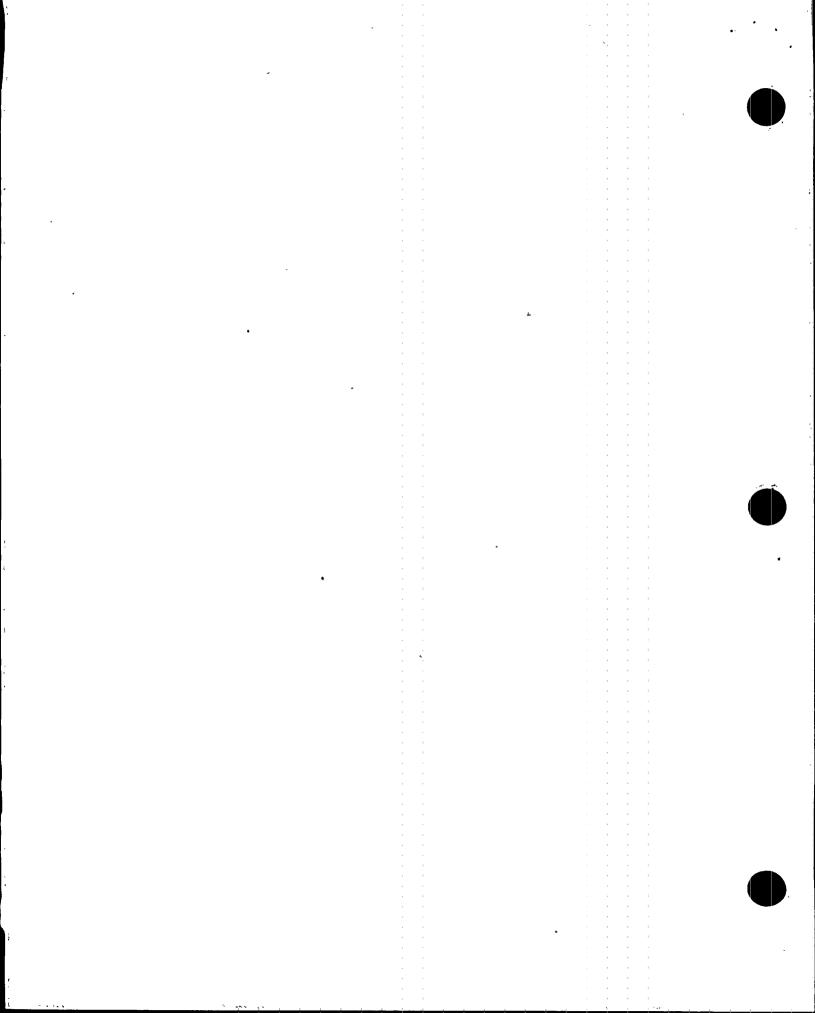
ANCHOR BOLT SIZE (IN)	PULLOUT CAPACITY (LBS)	SHEAR CAPACITY (LBS)
3/8	$0.9 \times 1460 = 1314$	$0.95 \times 1420 = 1349$
1/2	$0.9 \times 2290 = 2061$	$0.95 \times 2380 = 2261$
5/8	$0.9 \times 3170 = 2853$	$0.95 \times 3790 = 3600$
3/4	$0.9 \times 4690 = 4221$,0.95 x 5480 = 5206

ALLOWABLES FOR SSD'S PER REF.10 ARE MORE CONSERVATIVE AS COMPARED TO THE VALUES CALCULATED ABOVE. IT IS THEREFORE ACCEPTABLE TO ALSO USE ALLOWABLES FOR SSD'S PER REF.10.



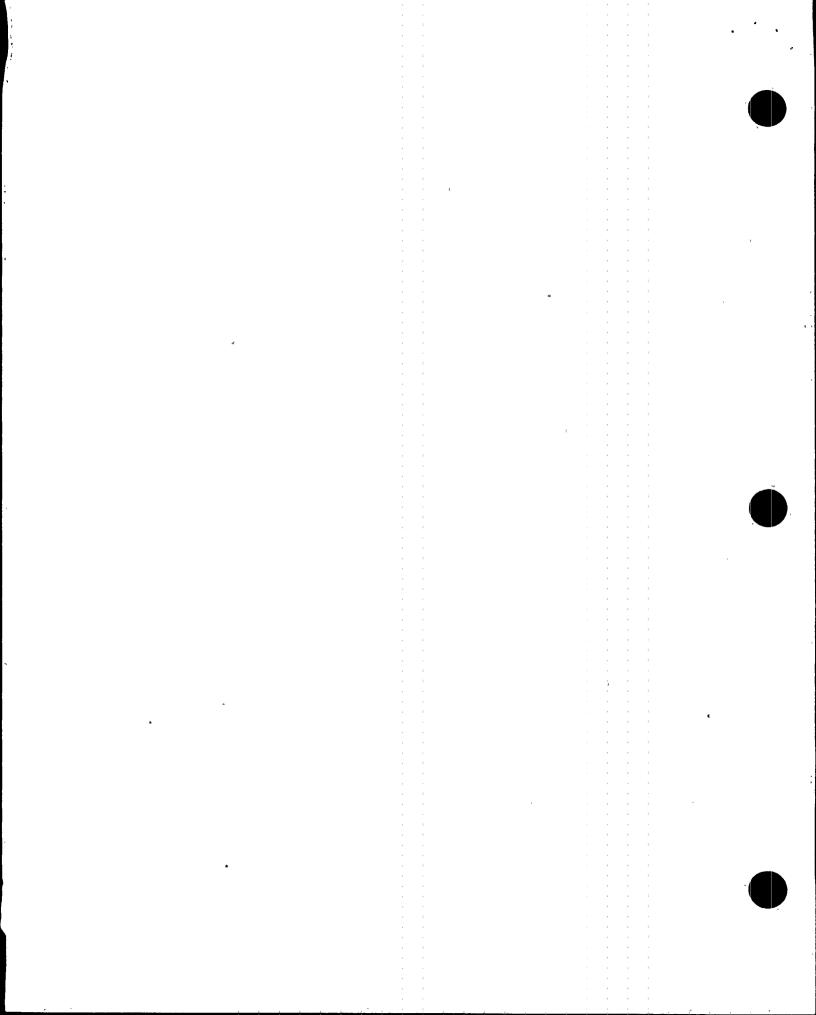
<u>OUALIFICATION OF CABLE TRAY AND CONDUIT</u> SYSTEM BY A46 PROGRAM	SHEET 170 OF
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OVERSPAN QUALIFICATION OF	OUTLIER NUMBER:
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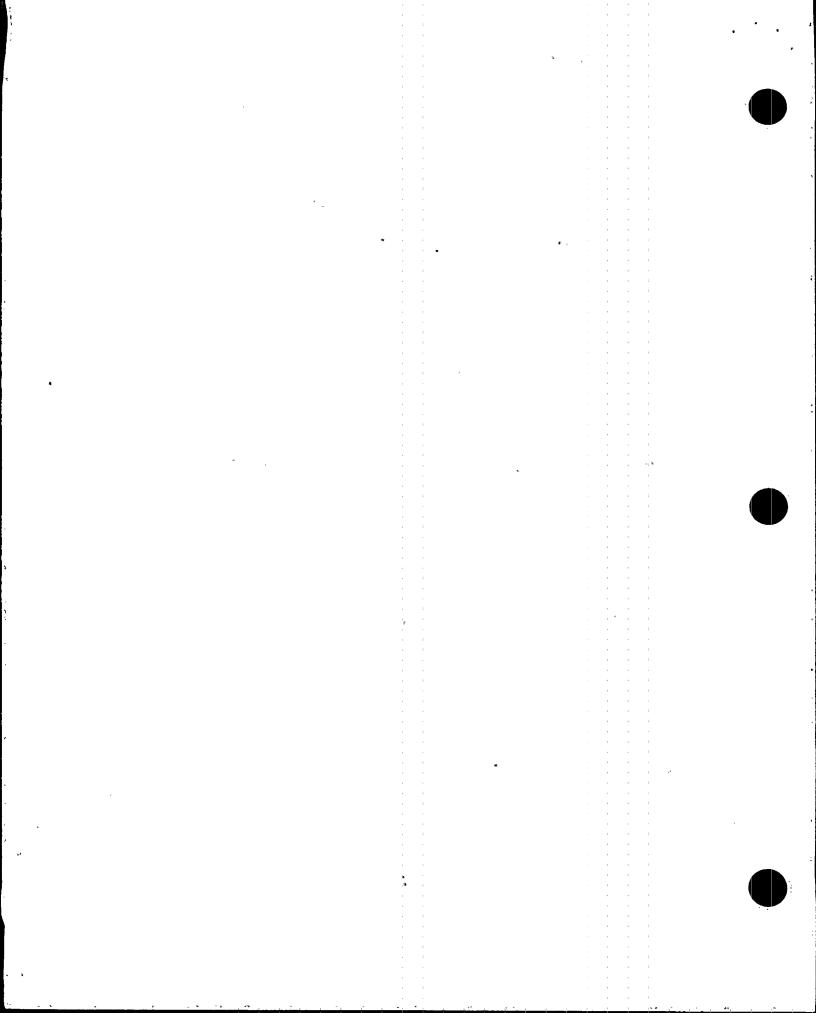
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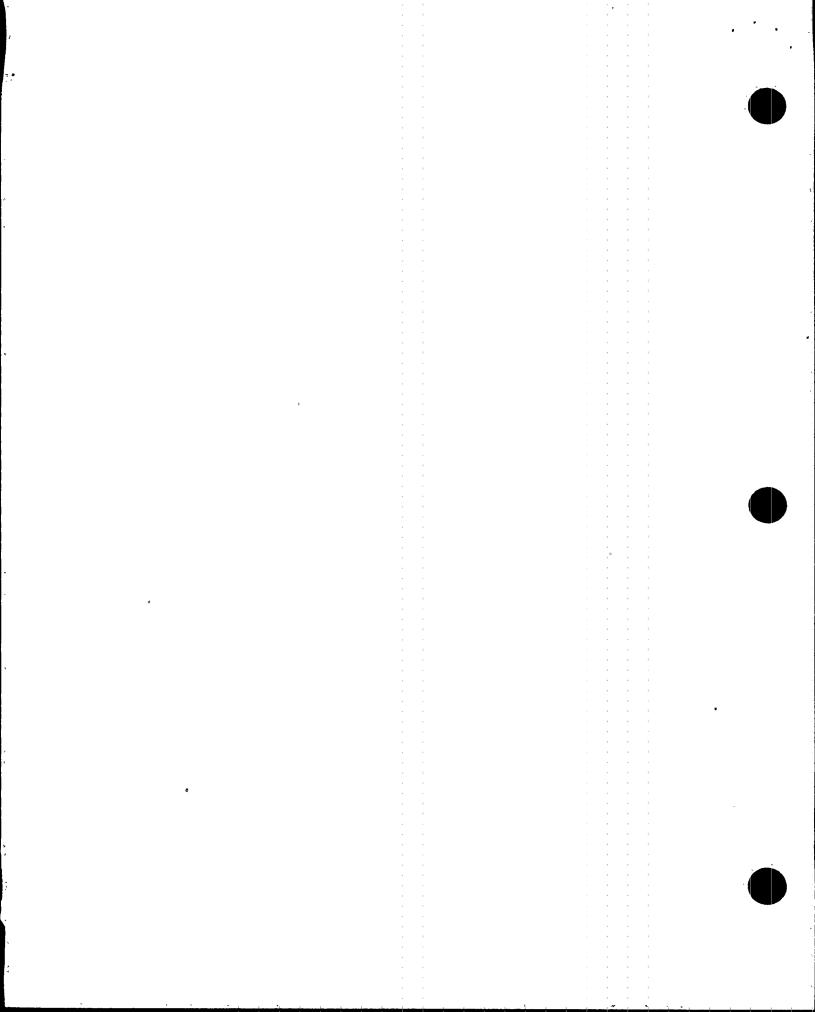
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Prepared ByACR Data 10-6-95 REV Checked By any Dato 10-10-91 3.

S.S. FRILS



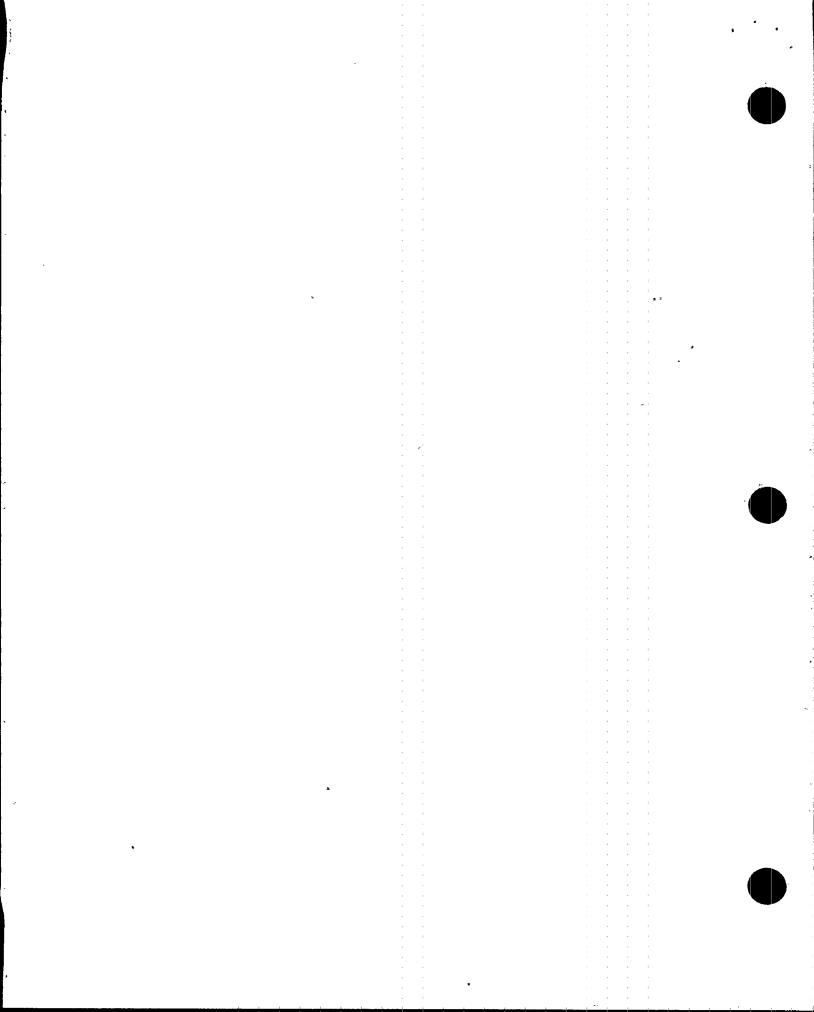
SHEET 173 OF Stall CD-0000-931227 COMPUTED 8 4 DATE 11-18-97 CHECKED ACIZ DATE 11-29-9 curations! LOAD STEEL. AL DEAC 1. 4 # IFT. 0.7#/FT しこうち 3/2 Þ C 2:2#147 1.1#167 ۲ weight =. \$ 40 3 . (# | FT · 1.8#)FT 1/2 ø WEIGHS -20 2.84) FT. 5·1^{#1FT} z' いそくにれら 4 000 12.8#/FT 7.9# FT 3' WEIGHS 020 ð 11030 (WM ۲ ۲



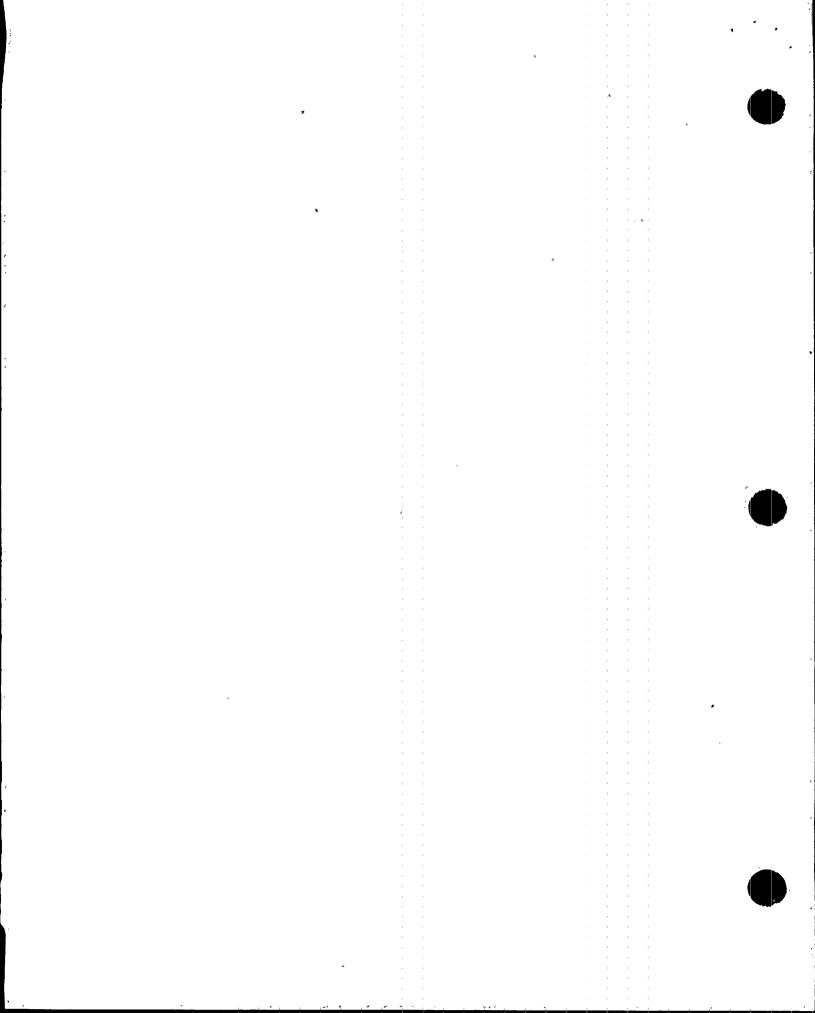
SHEET 174 OF BENO CD-90000-93122 COMPUTED P. S. G DATE 11-18-93 •• CHECKED ACR DATE 11-29-9 Ø 1/2 cms 3/4 1 conid CPAD. A= 0,494142 A = 0.3331 A = 0.799 I=0:087129 P41 .012.0 = I I = 0.037 144 = 0.071 IN3 5 = 0.326, 183 5 = 0.133 10 S A = :0.623. 12 91 = 0:334 in 9 = 0, 421 m 3 \$ 0000 2 to cons D A = 1 07. 142 A = 2.231N2 I = 0.000.1NA I = 3.02 1149 5 = 1.72 IN3 8 = 0 561 W3 :; n = 0.787 in 1.1614. シニ

1030 (WM-7-75)

٢٧A



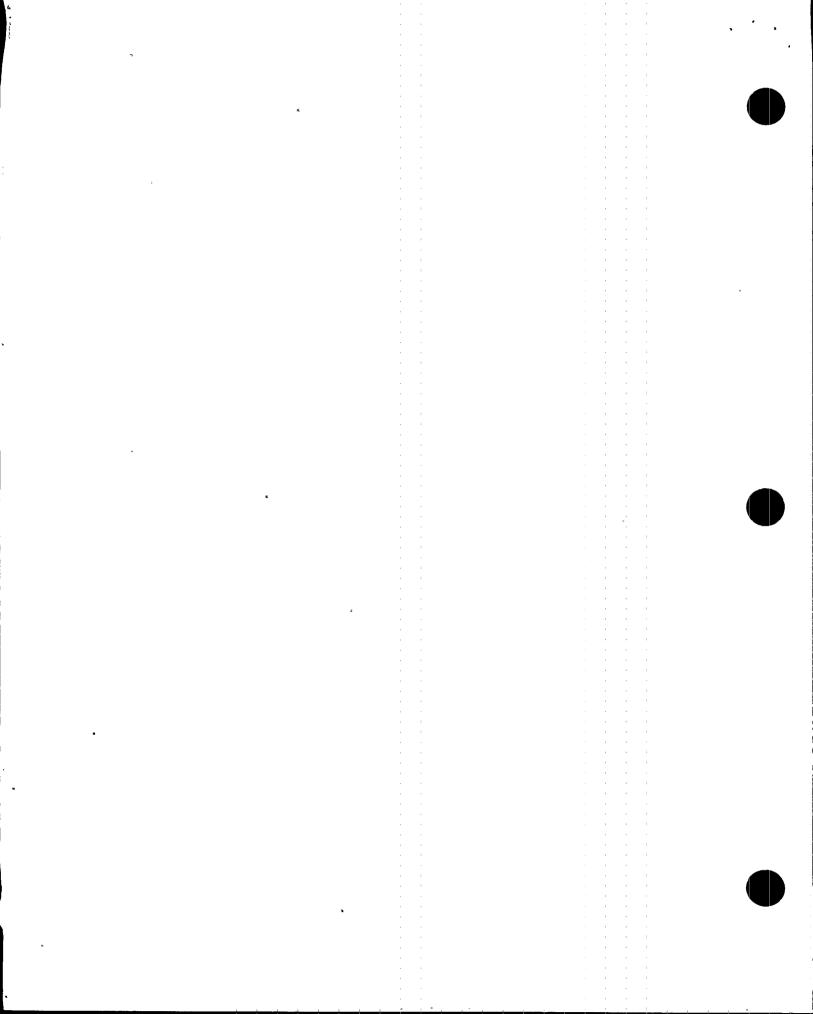
SHEET 180 OF COMPUTED P.SC DATE 11-15-93 12-6-93 CHECKED 35-01 & 35-02 WEATED AT 617 SLAS & CENTROL BAY OHE 621 = 0.8623x2=1.74 (REF. 3-E.W-5.7) On Quar = 0.2506x2=0.51 (REF 3-4-5.7) D'AMETER DE COMO = 1" SPACE = 15'- 34. WEight = 2.2#/FT. (0.133#/m) FOR STEEL SUERNS 1.1# FT FOR AL unitina 5 = 0,33 = 0.037 MAMONT (NER-T) = 2.2×1.51,1×(15)² = 9.3.43 FT.LGS 5 D1 = m = 93:43X12 = 8430 880. $\Delta_1 = \frac{5}{389} \times 0.183 \times 1.51 \cdot (180)^4 = 1.497.$ moment. (marz) = 2.2× 1.74× (15)2=107.66FTLBJ 652= m = 107.66×12 = 9713 135 $= \frac{5}{34} \times \frac{0.163 \times 1.74 \times (180)^4}{23 \times 10^6 \times 0.087} = 1.725.101.$ to = [[tob]2 + (tob]2]12 = [8430]2 + (9713)]-12861 $\Delta = (\Delta_1^2 + \Delta_2^2)^{V_2} = [[1.497]^2 + (1.725)^{V_2} = 2.284^{\circ}(...)^{V_2}$ SFR D.L. my = 1:497 = 0.991 (4/81) < 1/20 014.

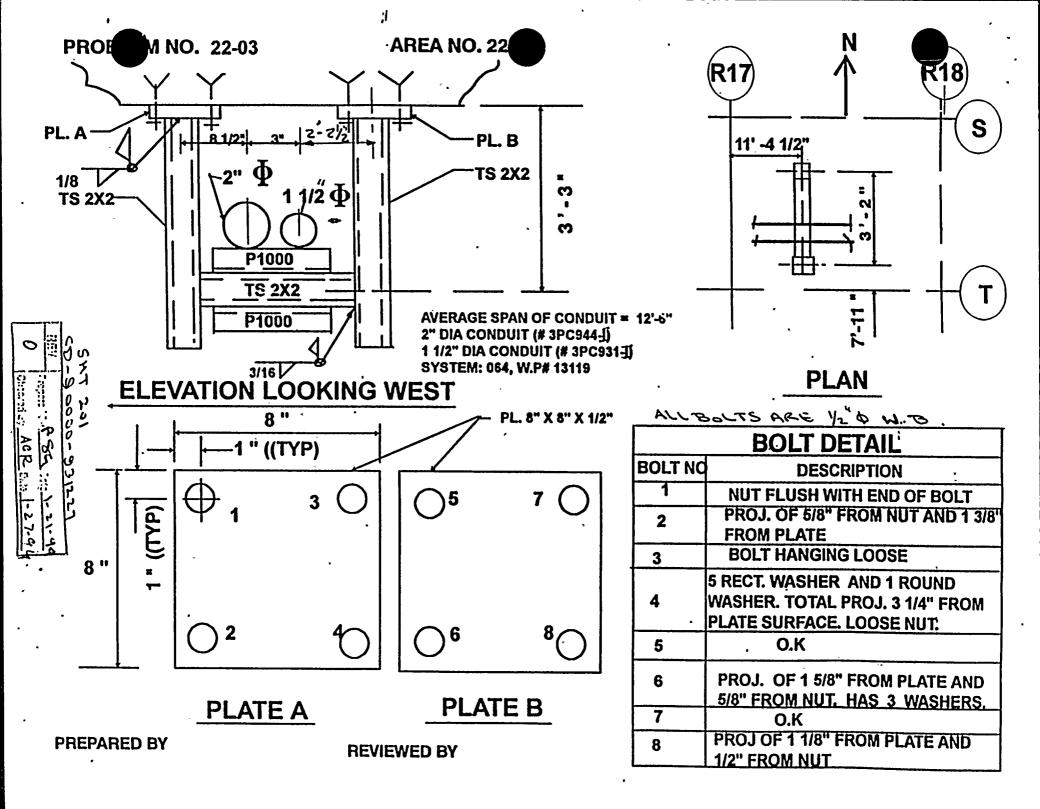


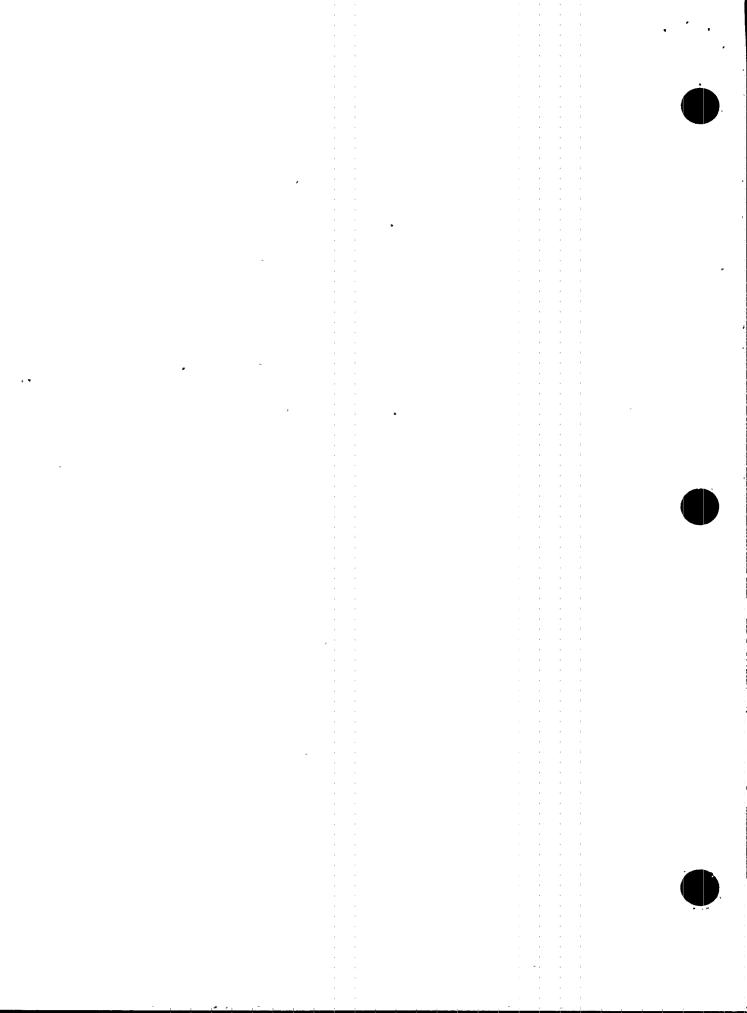
•	QUALIFI	CAI	TION	OF	CABLE	TRAY	AND	CONDUIT		Sheet 200 Of
	SYSTEM	BY	A46	PRO	DGRAM					CD-Q0000-931227
	^									COMPUTED Pru DATE 1-21-94
					· · · · · · · · · · · · · · · · · · ·	<u></u> .			•	CHECKED ACR DATE 1-27-9

PROBLEM NO 22-03

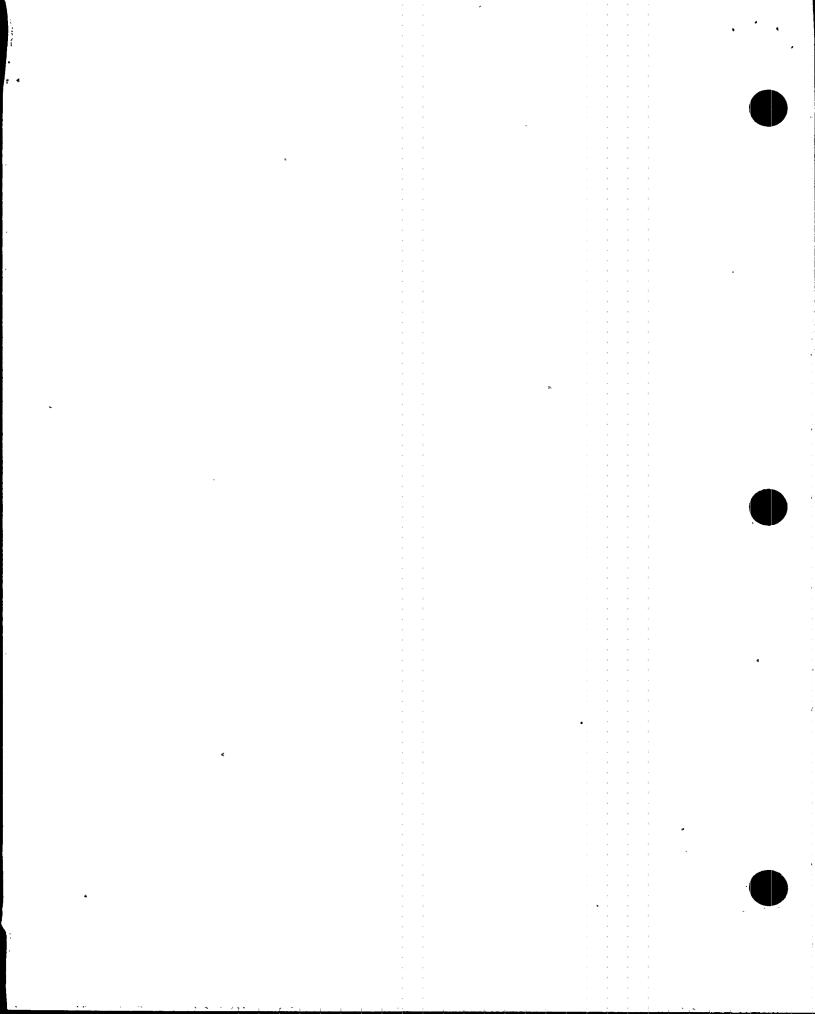
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SHEE 202 OF BENIO CD- 90000-931227 COMPUTED P.S. DATE 11-4-93 CHECKED ACR DATE 1-27-94 .. PR-B. No 22-03 DEAD NEIGHT CALCULATION. 2" & Coras, SRAN 12-6" = 5.1×12.5= 64#. 1/2 & como, separ 12-6' = 3.6 ×12.5 = 45#. <u>//</u>// ' ('é REACTION Q -57.0 - 64 × 27.5 + 45 × 24.5 - 50+32 - 82# 8^{1}_{2} 13^{1}_{1} $2 \le \sqrt{2}$ C 3 7 (= (64+45) - 82 = 27# SELF WT !! TS 2x2 - WT SAIX1 - 65 4. PLODE .-- WT. 19×5 - 107 R. 1/2 X3 X8 - wT. 13.6× 8 × 2 = 18#. 884. TOTAL SELFWIT AT EACH JANT = 23 = 44^H. : LOARD AT. 57. 0 82+44 = 1267. · 57. @ 27+49 =71#. u



54EET 20) OF BENIS <u>CD-20000-931227</u> COMPUTED R. S. MDATE 11- 4-93 CHECKED ACR DATE 1-27-94 PROB NO 22-03 SO FOR 3 TIMES DEAD WAD LORD AT 5T.1 = 126×3 = 378# 6 BOLT 3 IS HANGING 4 to LOOSE AND IS: NOT ConstOERED For ۲ Bupy to s Brid Boses BUT 4 IS GROSECTIME out 3/4 ANDMUT is +0 A+LOOSE, SO BOLT iS NOT considered for Amalysis BURLOSES. Fr = 378 M2= 378×3 = 1134#" TENSION / BOLT = = = + + + + + + = 567# CAPACITY OF YZ & WEDLE COLT, (REF. GIP PLC. 2-2) Pullout colacity = 2290# SHEAR CARRON = 3383 #1. RED - Time FACTOR FOR CONCRETE STREACTHE 0.75 - But in TERPRETTION = 567 2290×0.75 = 0.33

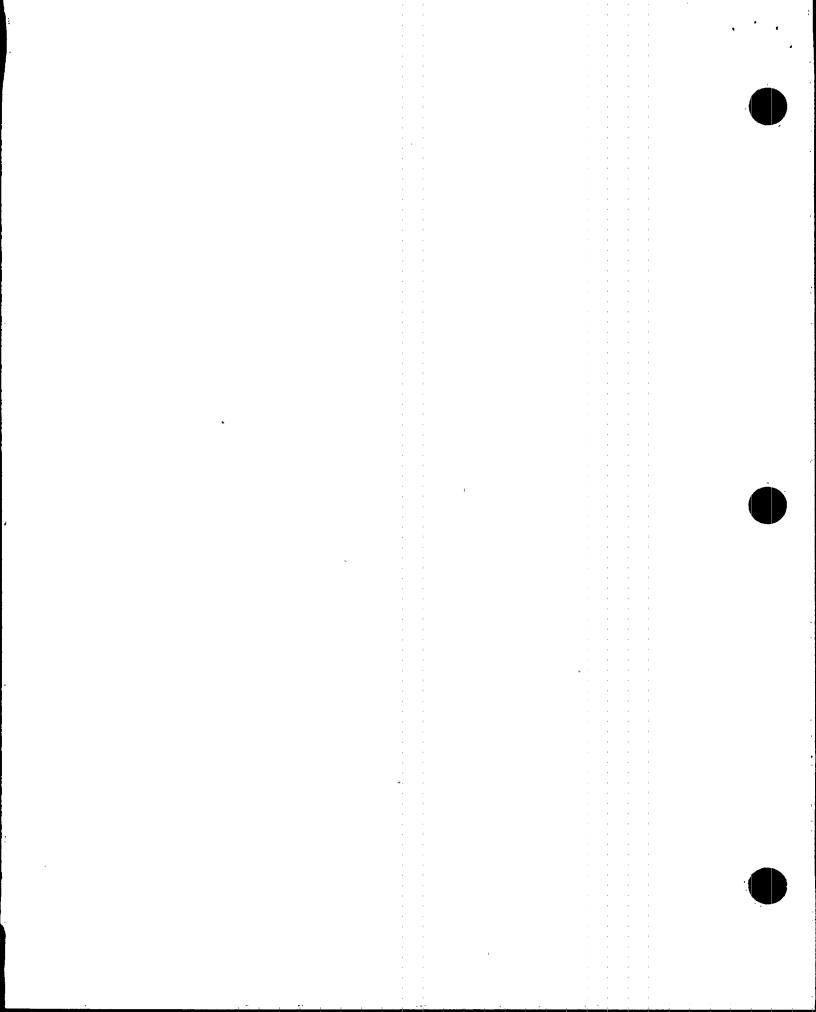


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-EET 204 OF CO-Q0000- 931227 COMPUTED P- 14 . DATE 11-5-93 . CHECKED ACROATE 1-27-94 PROB 10 22-03. ATE STRESS. M = 1134 キレ 6 = 5 = 1134 = 3402 PSE 627KME OK. SUPPORT is ACCEPTABLE IN AS 15 55 moition. I VA 11030 (WM-



· .	-			BR SEISMI PROBLEI	IC VERIF	RRY UNIT CATION 22-03	3 Sheet	(osvs)		
.1.	OUTL:	IER ID	ENTIFICA	TION, E	DESCRIPT	ION, AND	LOCAT	ION		
	BUIL	DING _	REACTOR					AREA 1	NO. <u>22</u>	
	ROOM	OR RO	W/COLUMN	I <u>R17-R</u>	<u>18/ S-T</u>	، 		FLOOR	EL. <u>593</u>	
•	ITEM	(CIRC	LE ONE }	CABL	E TRAY		COND	TIL		
2.	OUTLI	IER ISS	SUE DEFII	NITION		•				•
•	a.	(Chec	ify all k more t fied.)	the sc han on	reening e if se	guideli veral gu	nes wh Idelin	nich an nes cou	re not m ild not	et. be
		Cable	and Con	Iduit R	aceways				•	
		Other	ed Analy	Perfo		Concerns	<u> </u>	-		
	b.	liste	d outlie	r issu	es were	or the o resolve o be ver	d, the	enthe	signato	l the ries dequacy):
		at ce one bo attacl Three	iling. C olt is h hed sket adjacen	ut of anging ch and t supp	the four loose a photos orts hav	r bolts	on Sou her bo ail. ems fo	olt's n	le base p ut is lo	bose. See
. 3.			UTLIER I		•	FOR RES	OLUTIC	N NO	MODIFIC	- ' - '
	INVOI	LVED. 1	NO FURTH	ER ACT	ION REQU	JIRED.		/14 . 140		
		•								

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on this page will satisfy the requirements for this item to be verified for seismic adequacy:

Approved by:

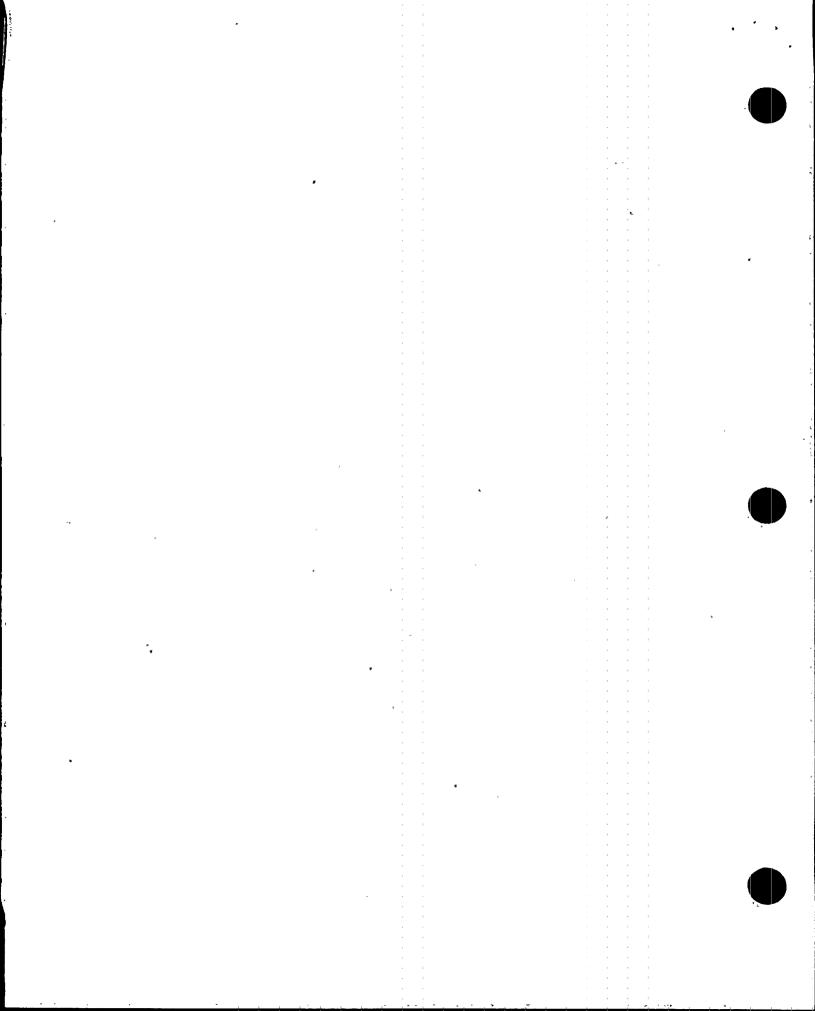
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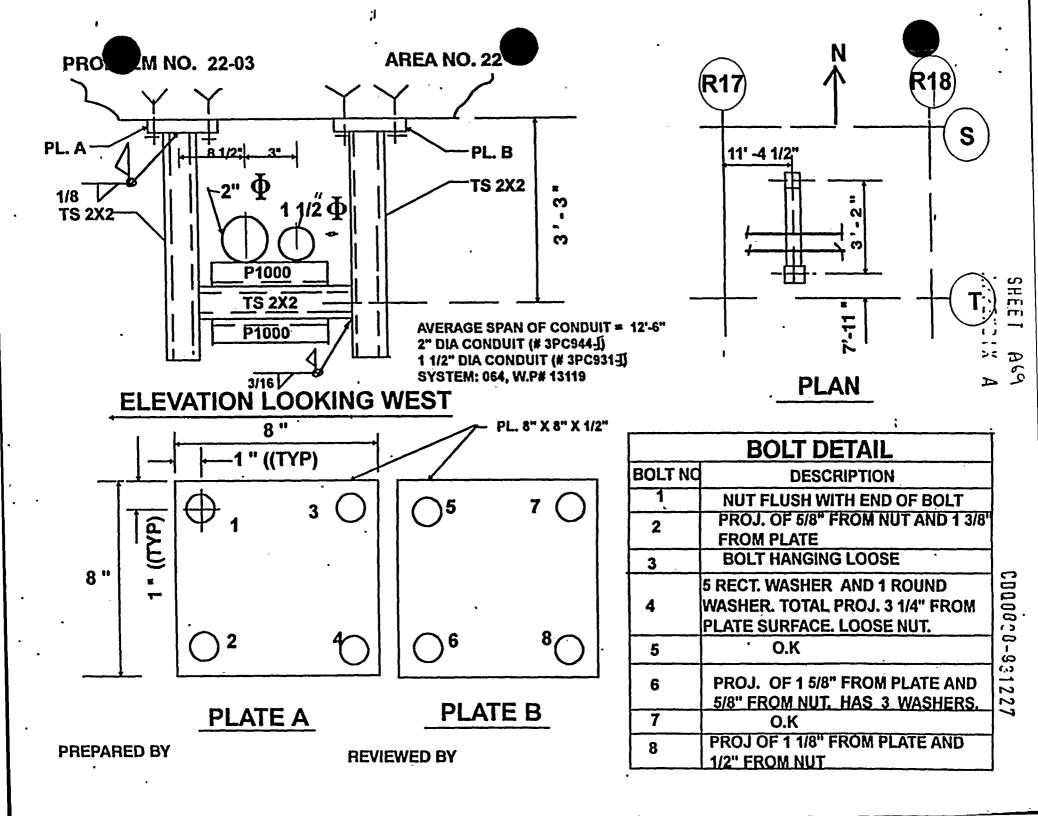
PARTHA S. GHOSAL PRINT OR TYPE NAME S.

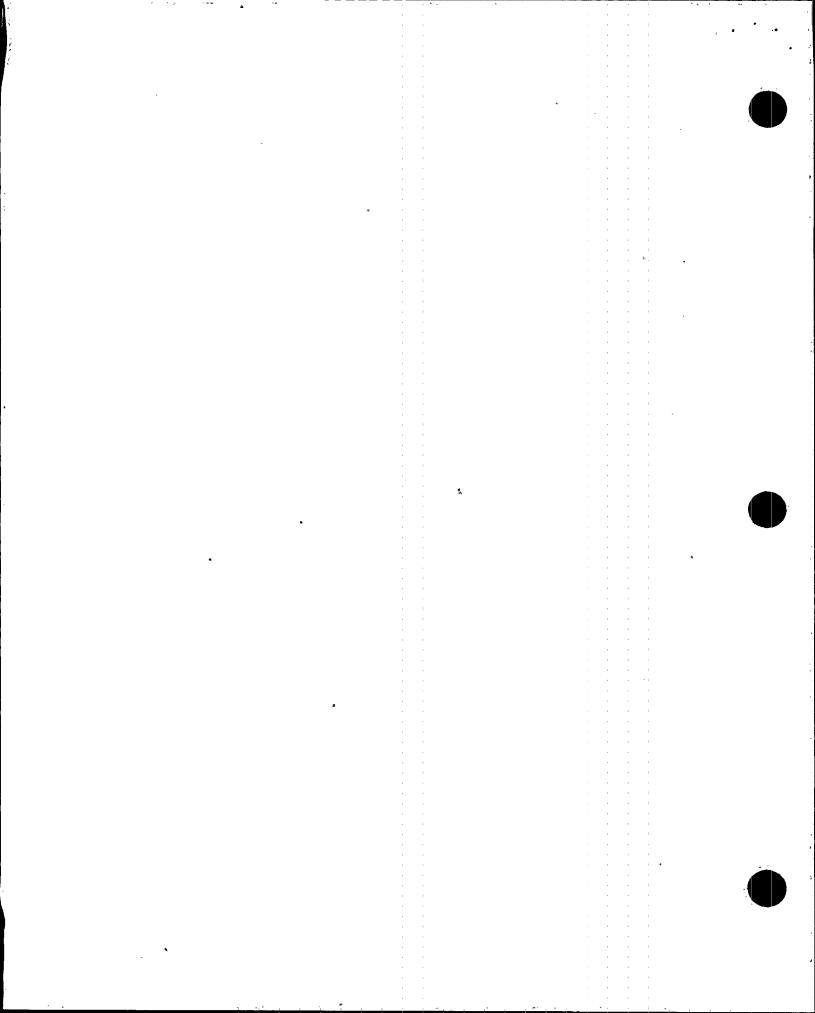
ANAND RELWANI PRINT OR TYPE NAME P. S. Grand

Anand C. Relución SIGNATURE <u>12 - 60 - 93</u> DATE

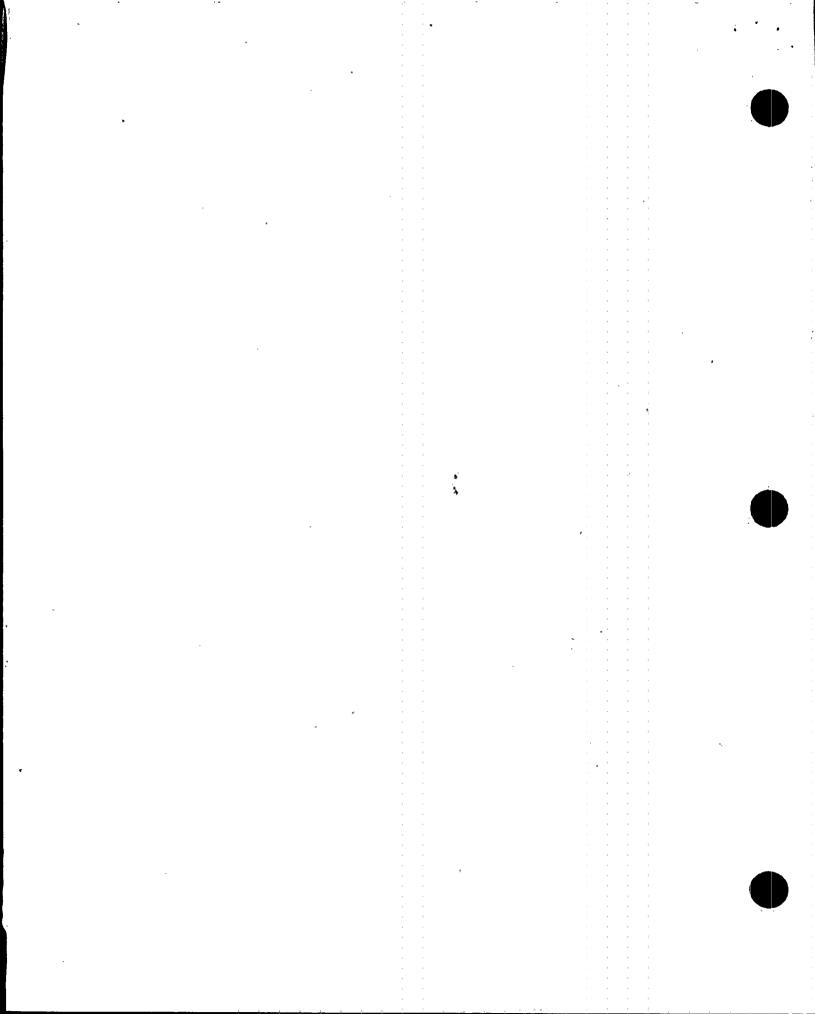
12-10-93 DATE







SHEET ATO PROB. NO. 22 50 1918-931227 APPETDIX Ā LKG EAST (F)A LKG NORTH SOUTH PLATE -SOUTH PLATE 3 B Lica West - Star Fri 35) LKG, North 22-03.



-		BROWNS FERRY UNIT 3 OUTLIER SEISMIC VERIFICATION SHEET (OSVS) APPENDIX A PROBLEM NO. 35-01
1.	OUTL	IER IDENTIFICATION, DESCRIPTION, AND LOCATION
	BUIL	DING CONTROL BAY AREA NO. 35
	ROOM	OR ROW/COLUMN SPREADING ROOM FLOOR EL. 606
*	ITEM	(CIRCLE ONE) CABLE TRAY CONDUIT
2.	OUTL	IER ISSUE DEFINITION
	a.	Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)
		Cable and Conduit Raceways
		Inclusion Rules X Other Seismic Performance Concerns Limited Analytical Review Other
	b.	Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item to be verified for seismic adequacy):
:		1" Diameter conduit (R435) running vertically by face of R21 wall, has a span of 15'-0" (against allowable of 12'-0"). Also a 2" diameter conduit by its side (MRA 792889) has a span of 15'-0" (against allowable of 14'-0").
		•
3.	MEŤHO	DD OF OUTLIER RESOLUTION (OPTIONAL)
	This	support qualified by calculation CD-Q3999-890678. For conduit

qualification see calc. CD-Q0000-931227. Over span acceptable.

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on this page will satisfy the requirements for this item to be verified for seismic adequacy:

Approved by:

ANAND C. RELWANI PRINT OR TYPE NAME

PARTHA S. GHOSAL PRINT OR TYPE NAME

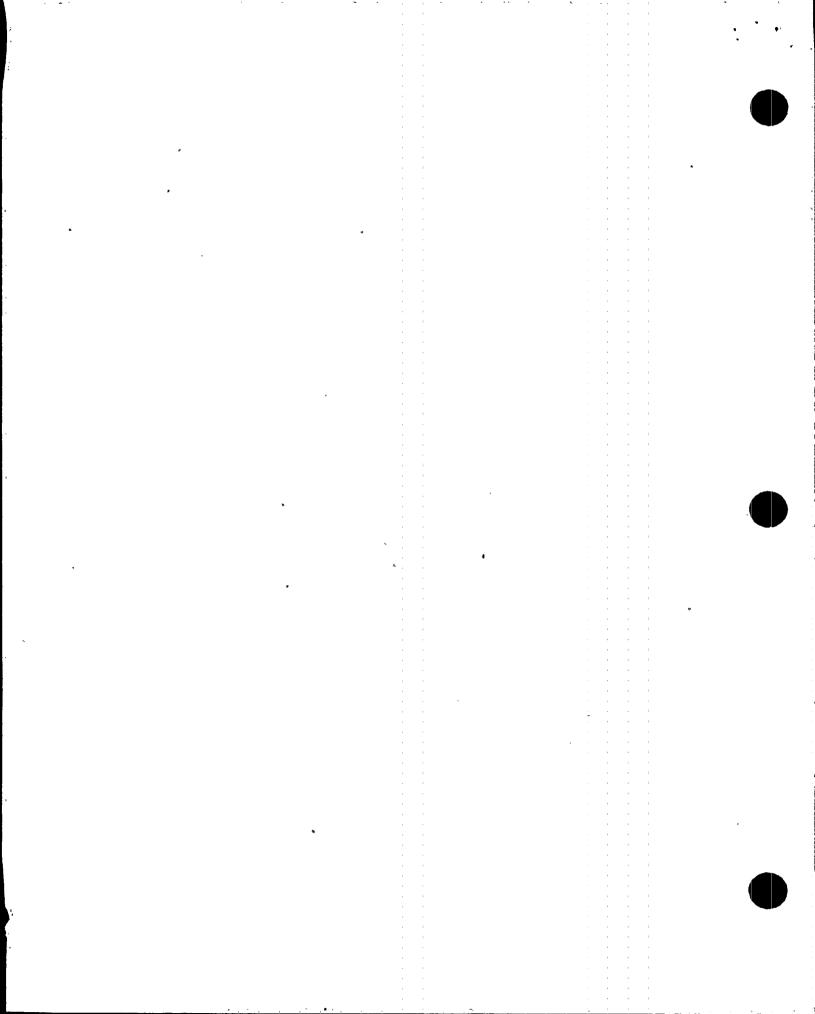
Arond	C٠	Rehsan		
SIGNAT	URE	-		
$\nabla \in$	$ \sim $	9 9 9		

SIGNATURE

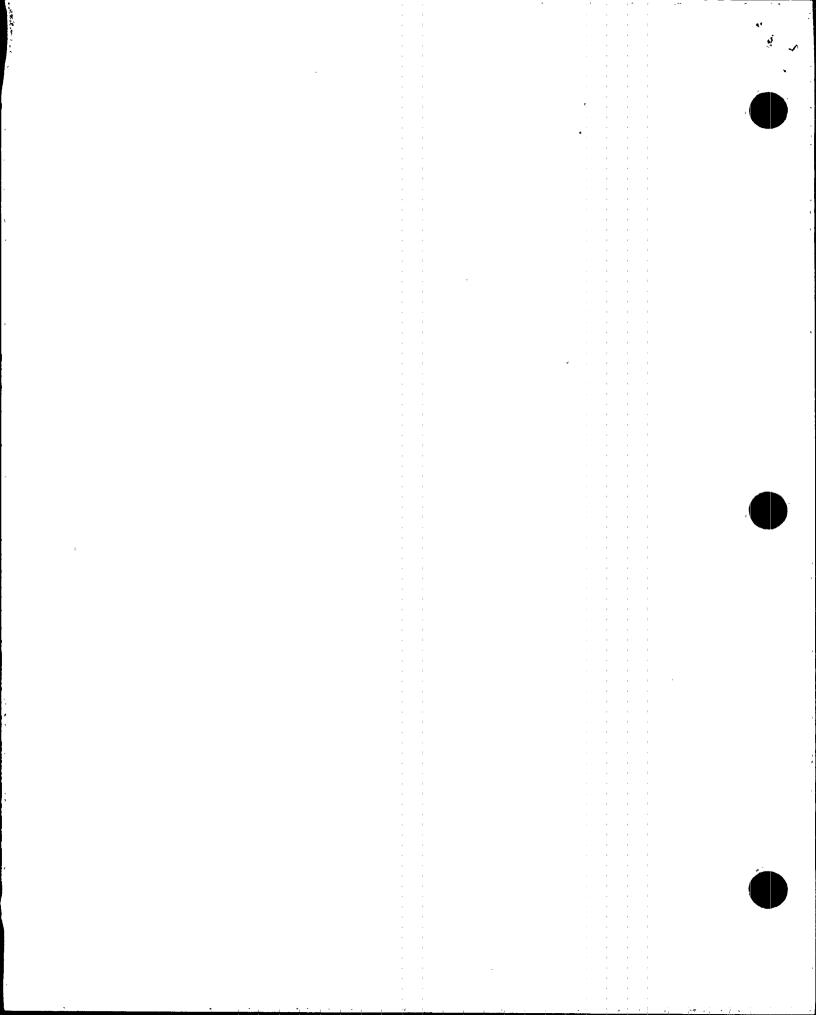
12-10-93. DATE

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12-10-DATE



20	TVA 10697 (DNE-6-86)	الدينة الإستانية: الله 		ULATIONS	SH SH	EET OF 7-QA	Record	
ķ.	TITLE SEISMIC QUALIFICATION	N OF CON	DUIT AND SU	PPORTS		PLANT/UNIT BFN/3	, .	
-	I'REPARING ORGANIZATION BFEPC8	I KEY NOU	JNS (Consult R	IMS DESCRIP	TORS LIST)	•	· · · · · · · · · · · · · · · · · · ·	
BRANCH/PROJECT IDENTIFIERS Each time these calculations are issued, preparers must ensure that the original (RO) F						st the original (RO) RIM	AS accession	
	3175900 BFEPC803223	Rev	(for RI	MS' use)	(0)	RIMS accession num	ber :	
	CD-Q3999-890678	RO	860804	B0037	B22	<u>'86 0 7 2 9</u>	112	
	APPLICABLE DESIGN DOCUMENT(S)	RL	861218	E0036	9 B22	'861126) 151	
	BFN-50-723 RO; '	R2	370223	C0020	(9)B22	'870219	106	
•	SAR SECTION(S) UNID SYSTEM(S)	R.3. B	90620F	0039(PBC4	'89 0614	227	
-	Revision O ECN No. (or indicate Not Applicable)	R1	R2	R3	Safety-related?	Yes 🗗 🛛 N		
1		P0864	P0864	80864	Statement of P	roblem		
1 -	Prepared, 1	. Ejantear		ER.S. Den		N·OF A CONDUIT		
	Checked	M.D. um	les th	C.P. Jones		JPPORT RESULTIN		
			C. J. Boting	A.L. REUSCHE	FIELD INSE			
	Approved	. D. Cating	1. D. Woung	FOR JAR		<i>;</i>		
	Bretto 2	Britte	DonBalt	mtxPorus	-			
	Date	1-26-8L	211-87	4/12/8A		• • • •	8	
	List all pages added			il, LLL E Za			•	
	List all pages deleted				•	•	·	
	by this revision.			NA		ORIGIN	TAT	
~-	by this revision.			<u>i, 1a, 3</u>		-OX-2011	an a anti-traine a statistica	
	Abstract These calculations contain an unverified assumption(s) that must be verified later. Yes No X THE FOLLOWING CALCULATIONS DESIGN/DETAIL CONDUIT SUPPORT 48B810-167 A DRAWING WITH THE SAME DESIGNATION WILL BE ISSUED CONCURRENTLY WITH THIS CALCULATION. THIS ISSUE CORRECTS DISCREPANCY NO. 27-002 DISCOVERED DURING A FIELD INSPECTION.							
	REMOVED UNVERIN			and the second sec	· '67			
	ficiet - unverti			ON, SEE	SHEET 2	Lay R3		
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	Microfilm and store calculations in R XX Microfilm and return calculations to:	218-59 24		EDB F3		Microfilm and destroy BFN;ENG Address: COMPLEX	R TRAILER	
	c: RIMS, SL 28 C·K			¢ •		, ,	· ·	



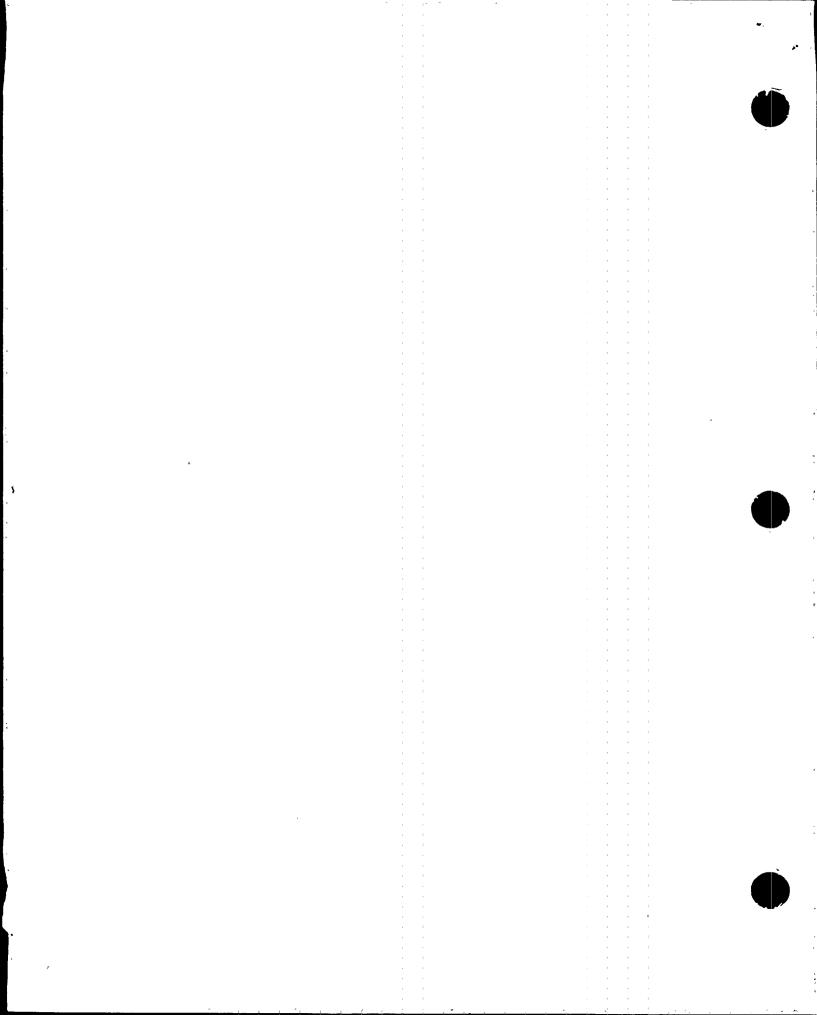
	•••	SHEET. L	a anterna pomo ca
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	Title:	CONDUIT SUPPORT 48B810-167 CPDFEPC8-	DN LO
	Revision No.	DESCRIPTION OF REVISION	Date
•	, ·	Incorporatel FCR 86-631RO	11-26-86
11 · ·	2	Inconponentes. FCR: 87-113RU	
•	3	REMOVED UNVERIFIED ASSUMPTION ; SEE SHEET 22	2-19-5
• • • •			6-12-8

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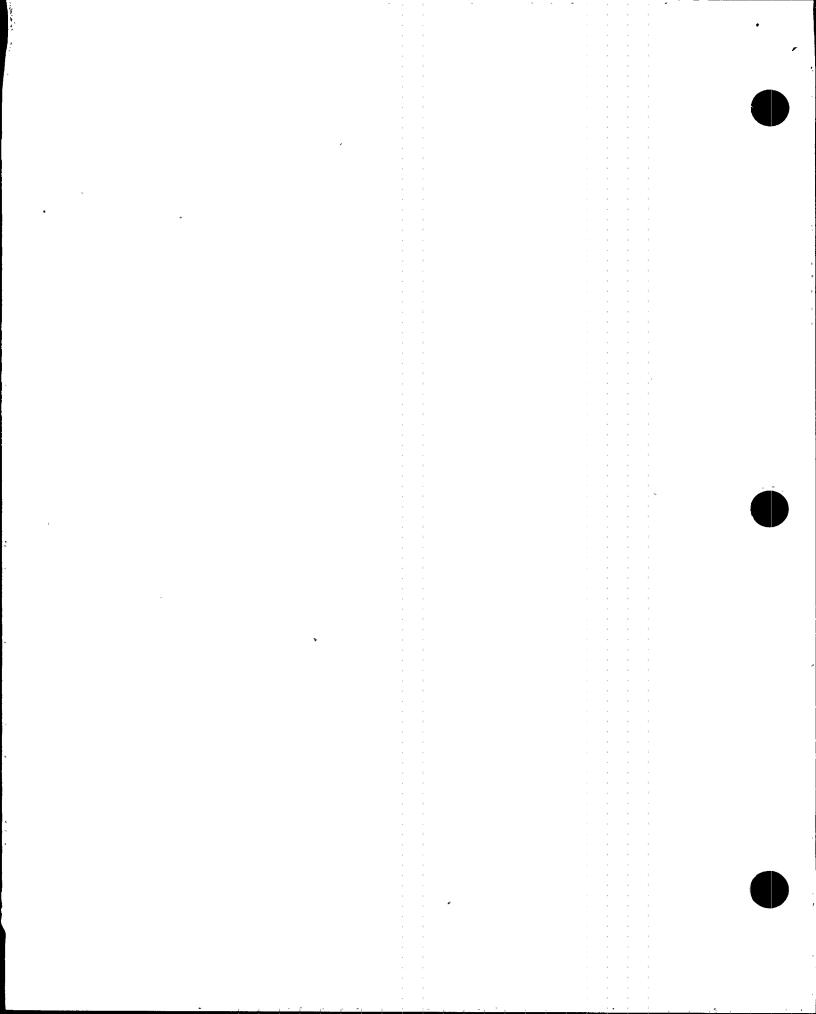


SHEET: LL

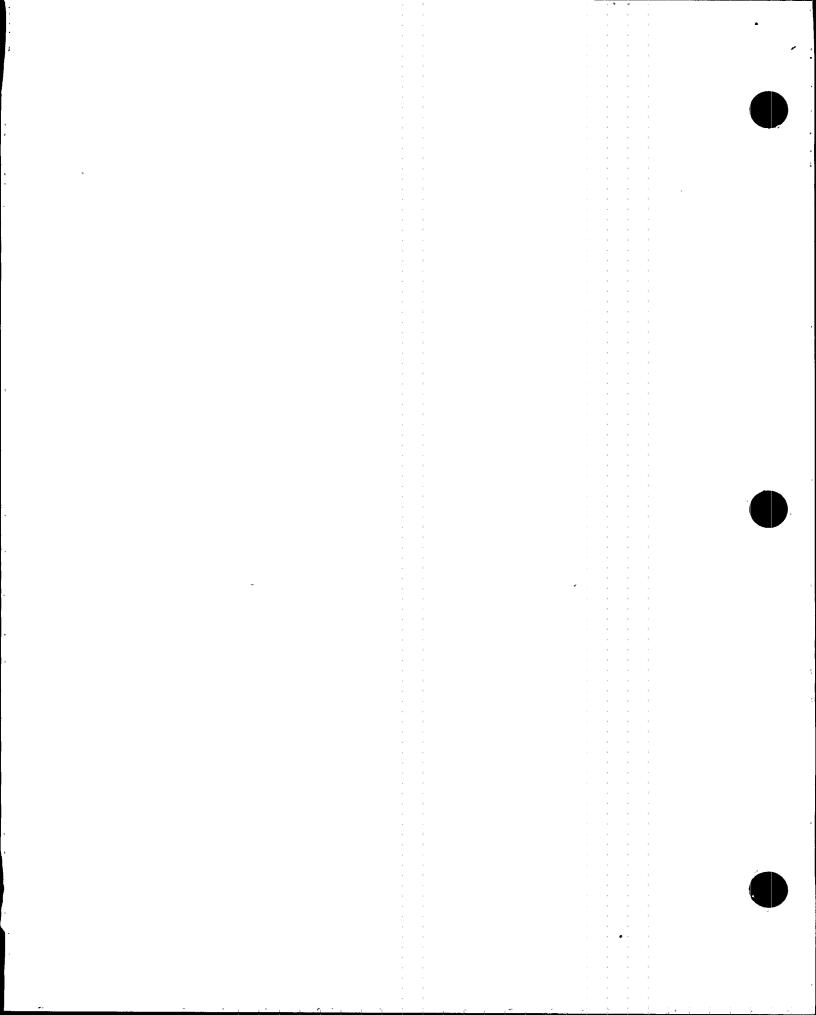
CALCULATION DESIGN VERIFICATION (INDEPENDENT REVIEW) FORM

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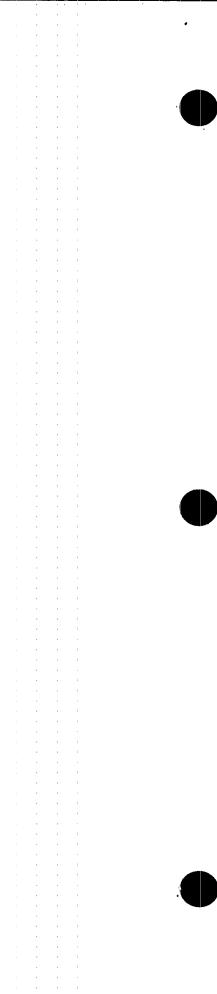
		CALCULATION DESIG	IN VERIFICATION	(INDEPENDE:	NI XEVIEW) F(DRM
	609399	19890678	- R3	•	• •	
	Ca	lculation No.	Revision			
	Method of	design verification	(independent r	eview) used	(check meth	od used):
		n Review.	<u> </u>	•	r	
		nate Calculation fication Test				
٨	Justifica	tion (explain below)	:	,	•••	
in an	• <u>Method 1</u> f	-In the design revie calculation and ex similar to another sensitivity studies	plain how the a , based on acce	dequacy was pted handbo	verified (c ok methods,	alculation is
	<u>Xethod 2</u> :	In the alternate calculat alternate calculat and explain why the	ion has been in	cluded in t	y the pages the calculati	where the on package
	<u>Xethod 3</u> :	'In the qualification source(s) where team calculation and exp	sting adequatel	identify t y demonstra	he QA docume tes the adeq	nted uacy of this
	to be t	iect calculation at echnically adequate ic are in accordanc	in that comput	cations, ju	dgements, as	been found
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			. <u>C</u>	Vesizan	lomia egilier	<u>5-12-89</u> Date
			()	Independent	Reviewer)	



SHEET LLL CONDUIT SUPPORT RESOLUTION OF UVA (CDQ 3999 890678) PROS: BFN TINU COMPUTED BRS DATE 5-11-29 CHECKED CPJ DATE 5-12-89 TABLE OF CONTENTS TITLE PAGE COVER SHEET REVISION LOG INDEPENDENT REVIEW SHEET LL iii TABLE OF CONTENTS PURPOSE امه Assumptions مه REFERENCES 1a CONCLUSION 12 BODY OF CALCULATION 2 THRU 7 RESOLUTION OF UVA 20 - イネ I 1 0 3 0 (WM 7-75)



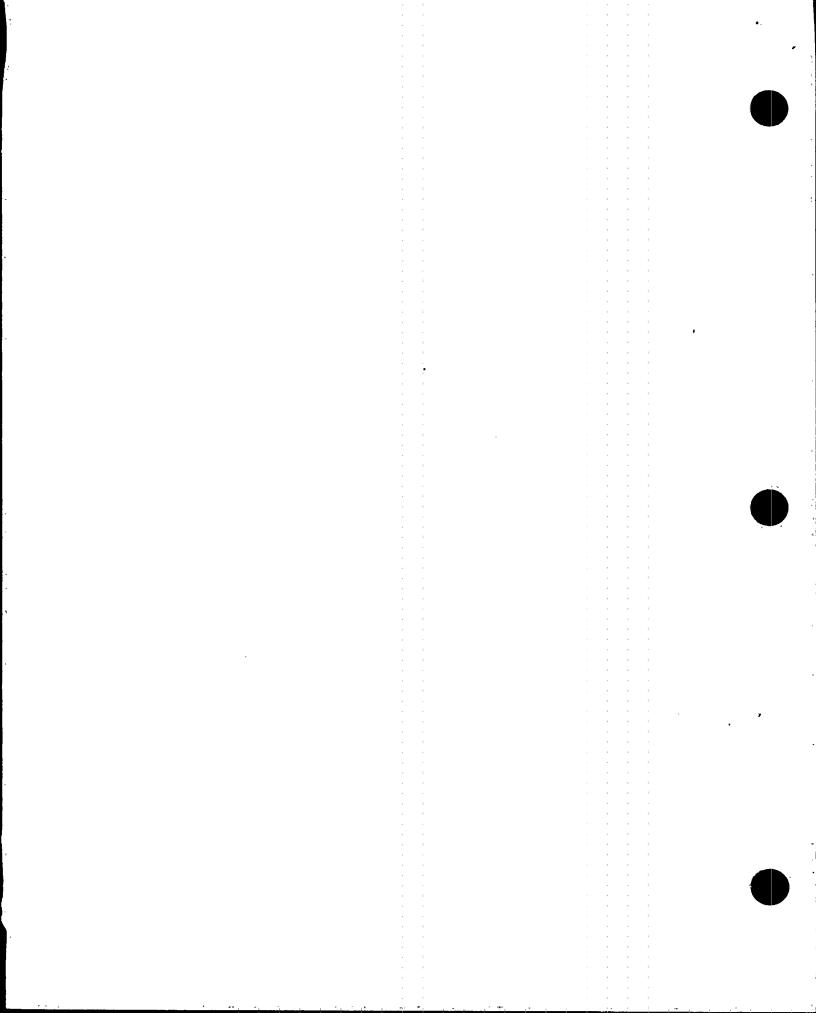
12 - 7 CONDUIT SUPPORT DWG. 488810- Ve7_ BEN/UNIT 3 · . · · · . CALC: TD BFEPC8 0323 ع ATE 6-12-9 DISCREPANCY NO.: 27-002 - 375 6 -THEFTER Design Support for (i) 2 4 AL, Conduit Lines Purpose: (1) 11/2" of AL (1) 1"4 Assumptions; SSE Conditions Conduit Clamp is Adoquate BRS-5. 11-89 R3 -Per Dynamic Load Test Done at Wyle Lab. Pinz, E70 XX Electrodes see JHG'ET References: BFN-50-723 AISC Manual 8th Edition Unistrut Cat. 10R Blodgett 'Design of Welded Structures' DS-C1.6.9 (TABLE 1C) CEB 840124 007 RA Cfs 5-12-89 -Conclusion: Calculations Show This Support To Be Adequate And Heets All Criteria 2219A **cV** 7.15



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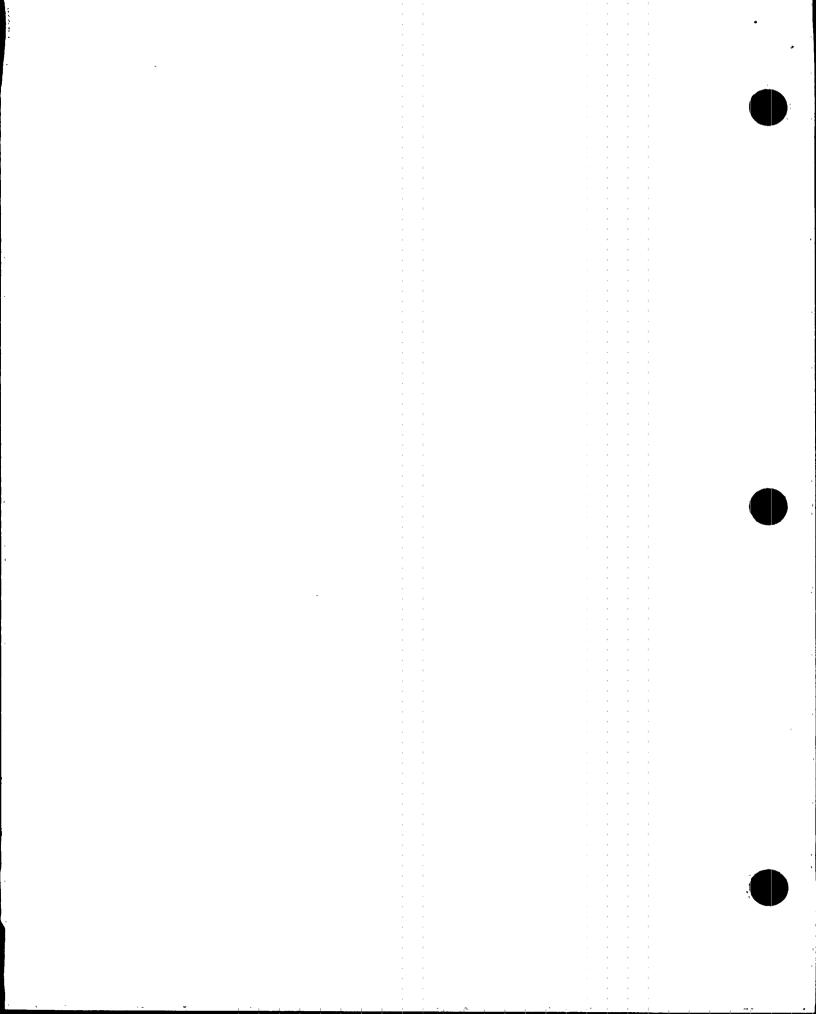
'n

CONDUIT SUPPORT SHEET DWG 428210-167 REAL UNIT CALL ID PFEPCLO323 Dr.c.k. 27-002 COMPUTED KEK DATE 6-12-56 CHECKED VIC DATE 6-19-86 (1.) 2' & ALUM. CONDUIT, 16 fe SPAN, =-WAY CONDUIT SUPPORT FOR (1) 1/2⁺4 " " (1) 1⁺4 " " , IC FE SPAN , 3-WAY 11 , 19 ft SPAN , 3- WAY C(19 Ft IE MAX SPAN 1"4) NEW LZX2X 1/4. Support Geometry: EXST (Z) Typ 2.58" " 1/2"3 2.28" " 1/4"4 (No GIP ENIT PICCO .81 SEE LOADS : (REF EFN-50-723) $1/2^{#}$ $F_{x} = 16^{#}$ $F_{y} = 25^{#}$ $F_{z} = 9^{#}$ $|_{+}^{u} + F_{z} = 35^{+}$ $+ F_{z} = 35^{+}$ $+ F_{z} = 10^{+}$ Fx=93 214 $F_{2} = 45^{+}$ $F_{2} = 22^{+}$ (TABLE-22-28-1-)---(-TABLE-AZ-18-4)--(TABLE-AZ-16-3) ETTEFHESS -- EUPPORT STIFFNESS IS RIGHD- By ENGINEERING --JUDGEMENT AND MEETS STIFTNESS TO AS PER FOR 86-631-RO) 5.2/2011 11(25/80 L2X2) 12×2×1/4 (Typ) LOADS @ PL. 'A' R.A 35/8" - THERE WILL EE NO ME OF MY FROM THE 2" \$ or 1/2" \$. Mz & My From 1" & WILL RE VERY SMALL BY ENGINIFERING JUDGHEMENT. Exist Placo Pt:B' Fx = 92+35=128 (F(1"+" THANFERS THANKERS THANKERS PL: B') Ey = 65#31 = 96# -EXIST W33 Ez = 22+10#= 32* $M_{\chi} = a(F_{\gamma_{21}+} + \frac{b}{c}F_{\gamma_{1}+})$ = $(8!(65^{\pm} + 125(31^{\pm})) = 65^{\text{M}\pm}$ 11030 (WM-7-75) 95/2 $M_{\chi} = .81(65 + \frac{6}{9.625} \times 31) = 68 \text{ in } \#$

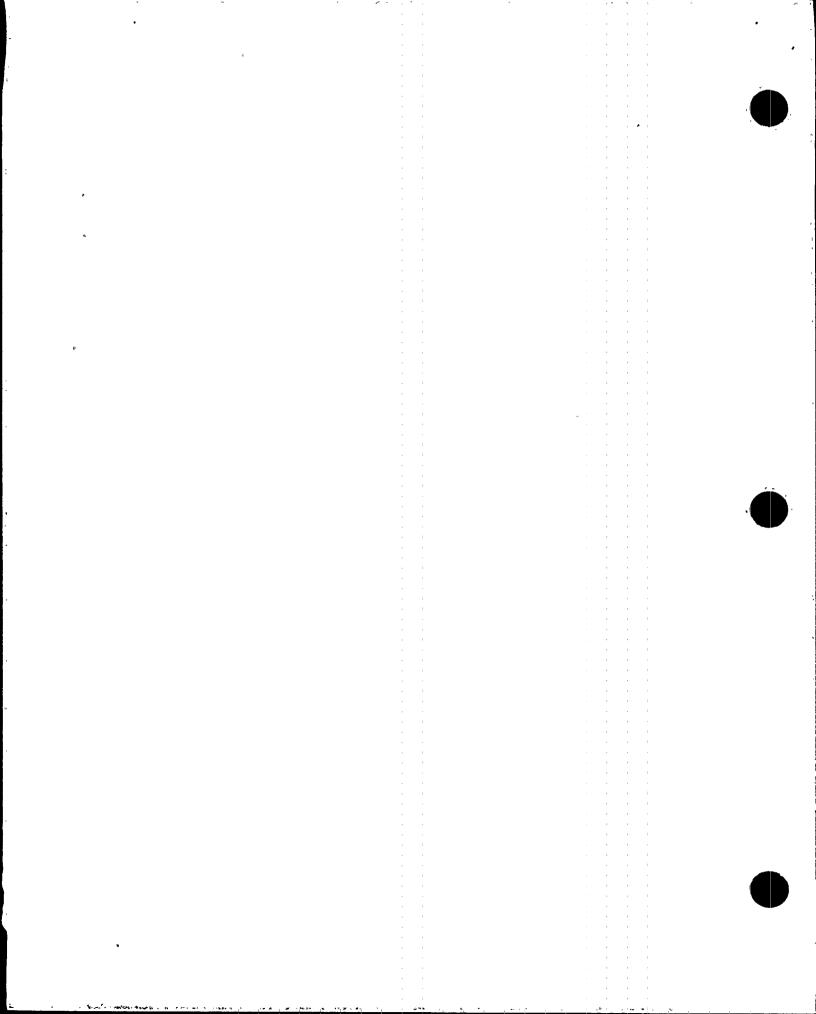


SHEET La OF T CONDUIT SUPPORT BEN | UNIT 3 RESOLUTION OF UVA COMPUTED BRS DATE 5/11/8 CDQ 3999 89 06 78 (BFPC 80 323) CHECKED CPU DATE 5-12-89 14 AL PIII3 CLAMP CEB 840124007 TABLE AL-18-3 Fx = 35 = LAT 下二 22万 $\frac{35}{12} + \frac{31}{958} + \frac{10}{208} = .24 < 1.25$ Fy= 31 = YERT E= 10 = AXIAL F3 = 108 . PILIS CLAMPS ARE AVEQUATE The ALL PILIE CLAMP TABLE A1-18-4 DS-CI.G.9 (TABLE IC) Fi = 285 Fx = 16 = LAT $F_{2} = 1240 \quad \frac{16}{285} + \frac{25}{1240} + \frac{9}{83} = .18 < 1.c$ $F_y = 25 = VERT$ FZ= 9 = AXIAL F3 = '83 . . PILIS CLAMPS ARE ADEQUA 2" ¢ AL PINT CLAMP PS-C1.6.9 (TABLE 1C) TAPLE A2 - 2B - 1 Fi = 380 Fx = 93 = LAT $f_{2} = 1660 \quad \frac{93}{380} + \frac{65}{1660} + \frac{22}{200} = .39 < 1.0$ Fy = 65 = Vert F3 = 200 Fz= 22 = AXIAL . PILLT CLAMPS ARE ADEQUAT

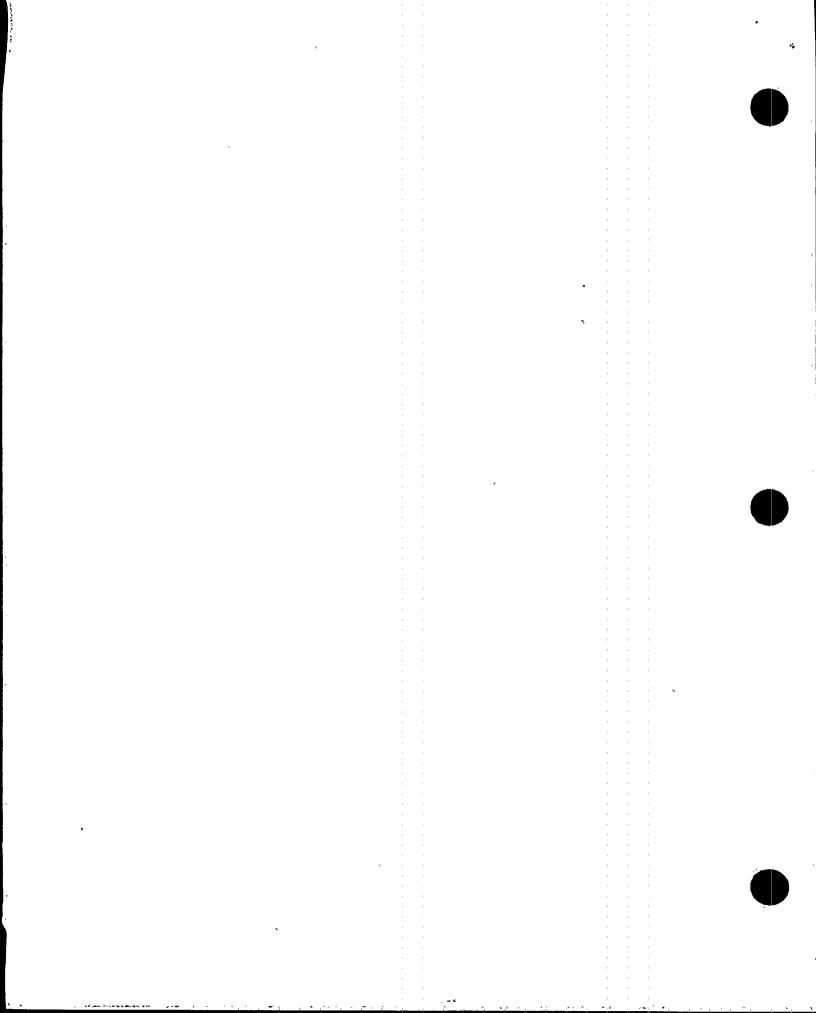
(GZ-1-MM) 08:011 -1/

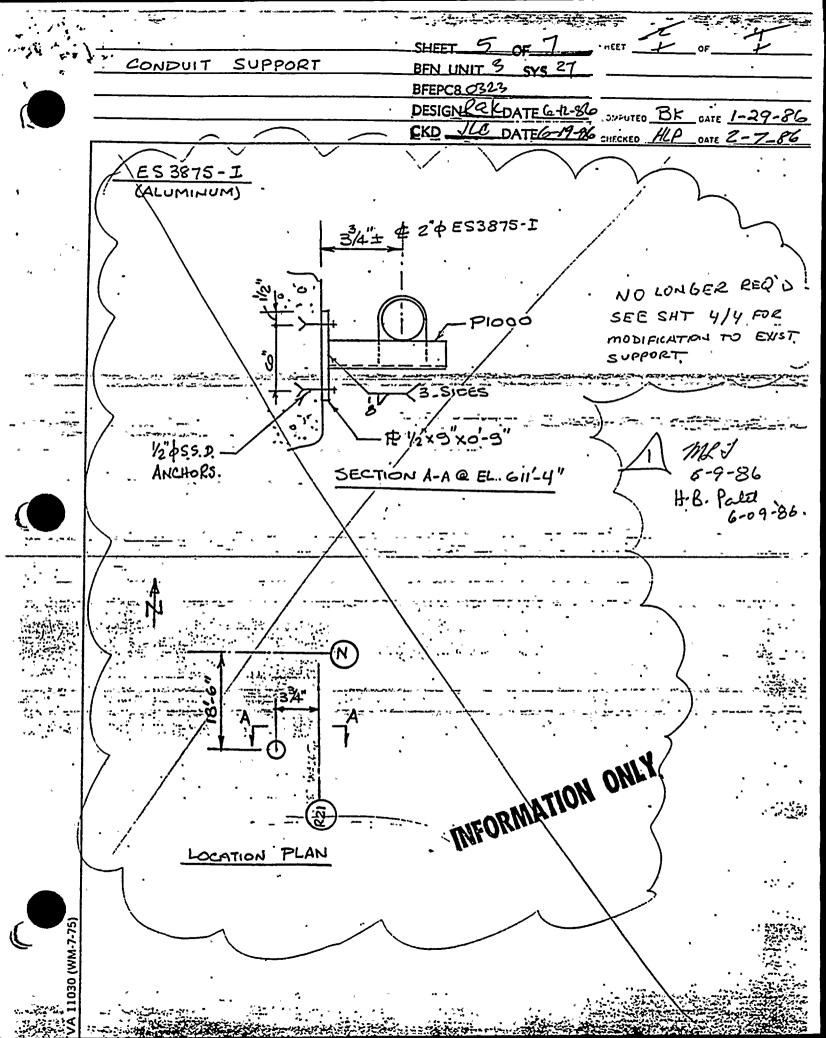


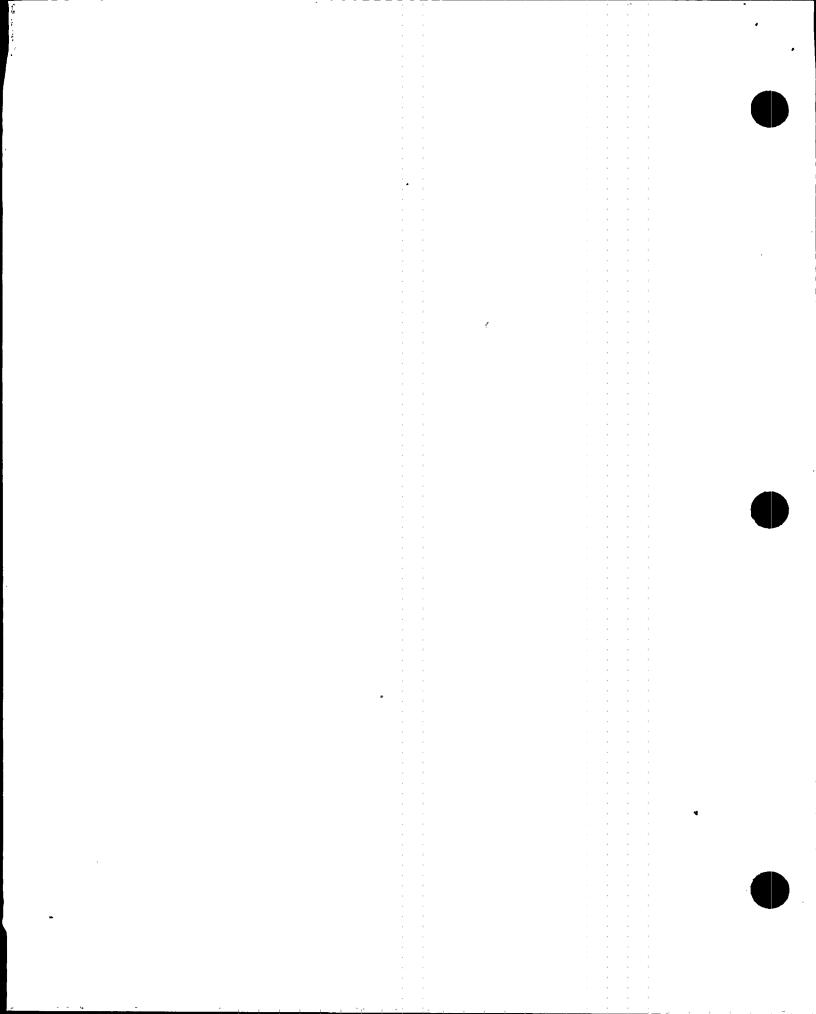
ن ، ب^کت ، ^بر ، ب CONDUIT SUPPORT SHEET 3 OF OWG 488810-167 BFN UNIT. CALL ID BEEPCB0323 COMPUTED REK DATE 6-12-56 DISCR, 27-002 CHECKED VLC DATE 6-19-86 CONSIDERING THE SMALL LOADS AND SHOLT LENGTH OF PLOD, Placo 400 2/12/87 840 2/12/87 THE PLOOD IS ADEQUATE BY ENGINEERING JUDGEMENT A "Existing "Existing" UNISTANT Describer in TS 6 27 will be Replaced with USE Plose. New MATCHIAL PERFERBT-OBRO, Becase existing & DAMAS ... Deuts 48600-550 mill Dethic Reported. -LZXZX1/4 CONSIDERING THE EMALL LOADS, THE LZXZX14" IS ADEQUATE BY ENGINEEZING JUDGEMENT. USE LZXZX1/4. Brig 5-11-89 z"& PIII7 LAMP (ASSUMED ADEQUATE, NEIGHEATION 11/2 6 PILIS CLAMP ESTINGT SEE SHEET Za PIII3_ CAMP PILIS & PILIT CLAMPS USE. Pills RE Cp1 ;-12-Note - FCR - 86-631. Ro ----- $\frac{1000}{f_{w}} = \left[\frac{31}{3.75} + \frac{68}{.177} \right]^{2} + \left[\frac{96}{.75} \right]^{2} + \frac{76}{.177} + \frac{76}{.177} + \frac{76}{.177} \right]^{2}$ M Pouron 11/25/80 (128) 415 #1 IN 5. Ejankan "1/25/86 = 0.032 < 1/B" . WELD 15 0.16 415_ -0:4×33000 15 ACCE PTA BLE FCQ - 86-631 - 60 WELDES WELD PATTERN : WELD PICOD TO LZXZX /4 × A=3.75 USE LOADS AT PL'A' (SEE SH.2) 75"] + 65 = 399 */ 3.75 177 399 =. 03" < 1/6", USE 1/8" FILLET WELD. WELD LZXXX /4 TO EXIST W33 FLANGE: ADECILIATE BY COMPARISON TO THE WELD CALC ABOVE. USE "4" FILLET WELD (MIN LIEC) VA 11030 (WM-7-75) THIS SUMPORT & ADEQUATE & MEETS ALL CRITERIA,

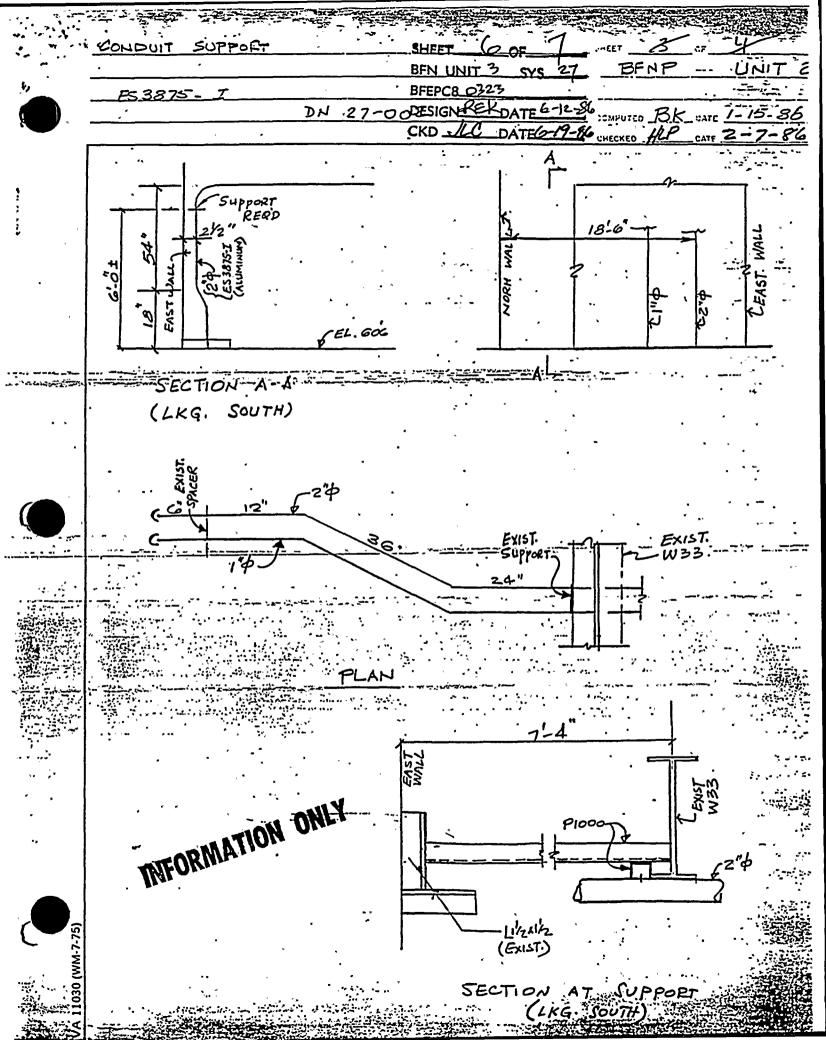


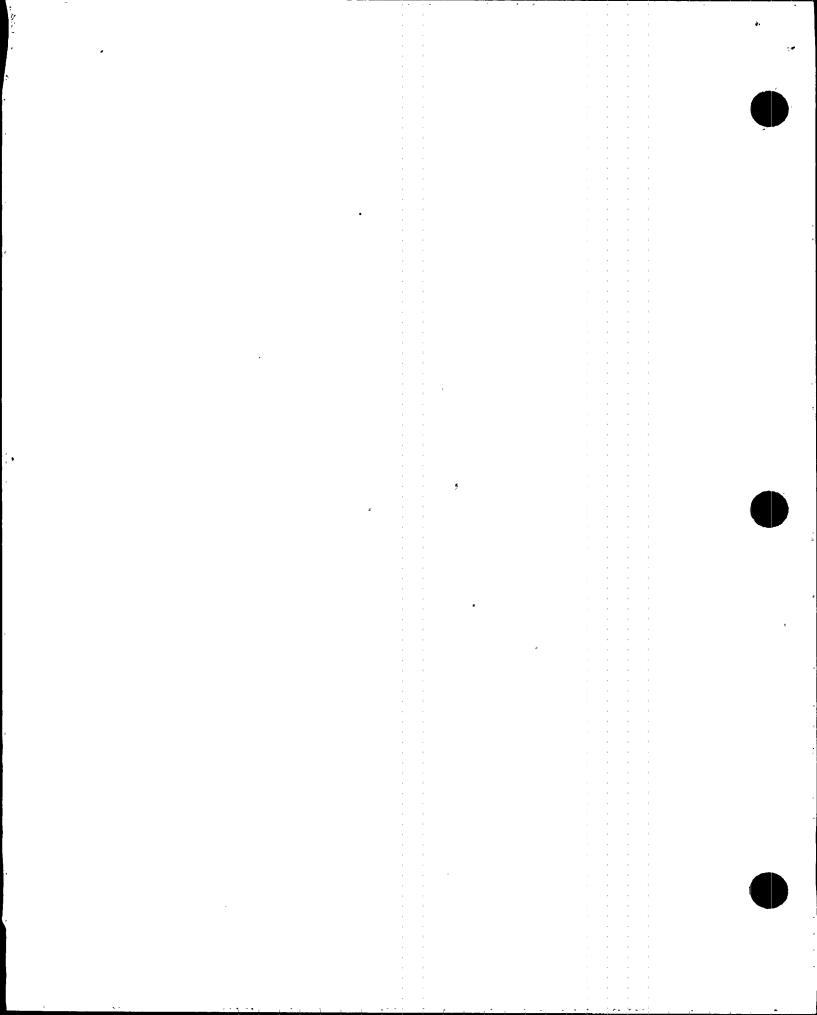
FORM 6.3 SHEET SHT AN DISCREPANCY RESOLUTION BEN UNIT. **BFEPC8** DISCREPANCY NO. 27-002 DESIGN LOCATION Vol 27 . U3 Gble sprending Pm El 606 SEISMIC INTEGRITY EVALUATION CATEGORY DESCRIPTION OF DISCREPANCY: 2" O Conduit ES 3875-I has An overspan condition And A support that is not adequate to carry conduit lands __OF___ SHEET: Y BFN UNIT 3 SYS 27 BFEPC80323 DESIGN REKDATE 6-12-56 CKD JLC DATEG-19-06 INFORMATION ONLY **RECOMMENDED ACTION:** hold support and modify existing support As detailed on attached shis. Al throughon to-7-86 H.B.Pale 6-09-36. Rev. (1). SEE SHT. #4 FOR MODIFICATION. DESIGNER CHECKER

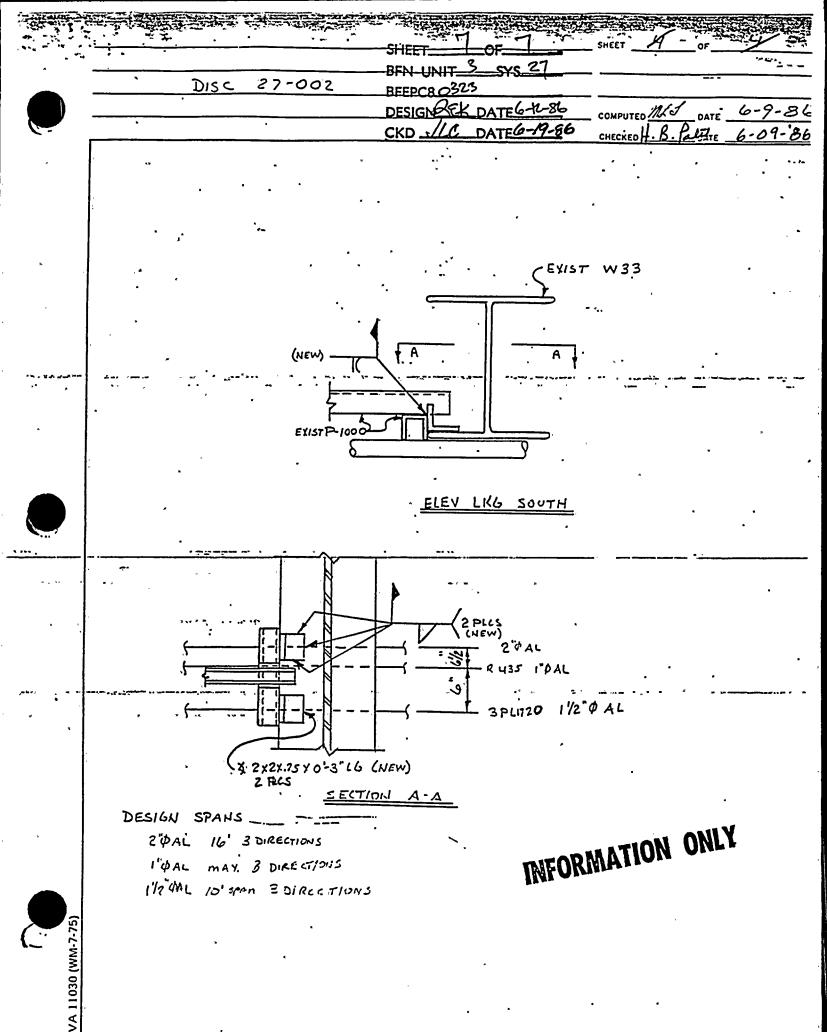


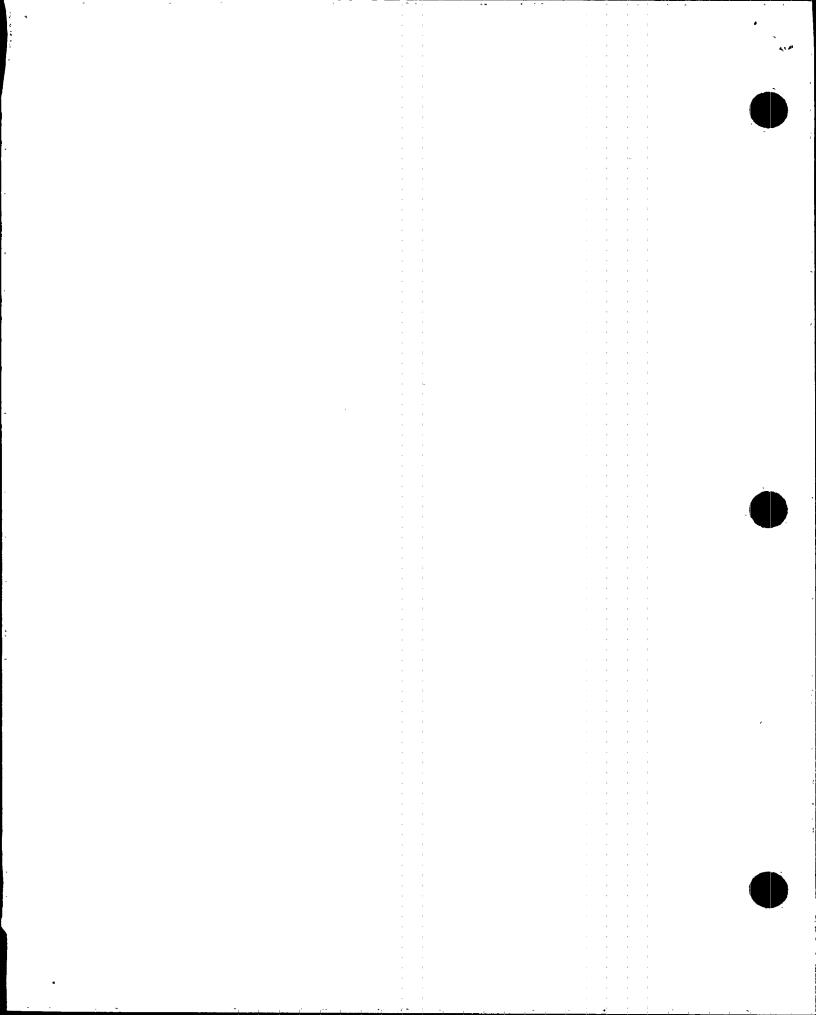












ATTACHMENT 10

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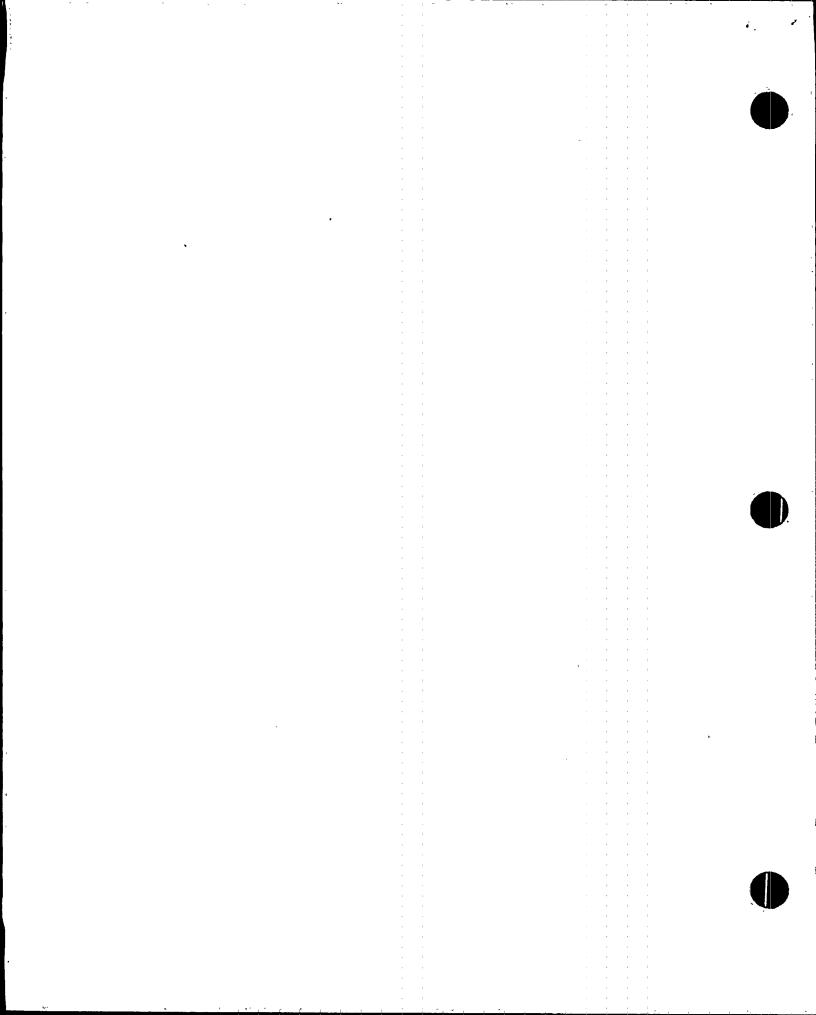




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	SSEL LINE No. 1018						
	4 I	Revision Status	2, (()	Cori) N	ected U	, 6/28/	91
	SCREENING EVALUATION WORK SHEET (SEWS)	Sheet 1 o	f ,2	- -	Z-		
	۲.						
	Equip. ID No. <u>2-FI-74-50</u> Equip. Class <u>20 - Instr.</u>	& Control	Pane	ls	<u>& Cab</u>	<u>inets</u>	
	Equipment Description RHR/LOOA I FLOW IN DICATOR	2					
	Location: Bldg. \underline{CB} Floor El. $\underline{6/7}$ Room, Row/Col						
ł	Manufacturer, Model, Etc. (optional)						
	SEISMIC CAPACITY VS DEMAND1. Elevation where equipment receives seismic input2. Elevation of seismic input below about 40' from grad3. Equipment has fundamental frequency above about 8 Hi4. Capacity based on: Existing Documentation Bounding Spectrum5. Demand based on: Ground Response Spectrum 1.5 x Bounding Spectrum Conserv. Des. In-Str. Resp. Spec Realistic M-Ctr. In-Str. Resp. 5Does capacity exceed demand?	Z Y DC BS - GR AB C. CR			N/A Y	N U	
	<u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*)) re met by intent without meeting the specific wording of the explain the reason for this conclusion in the COMMENTS sectors 1. Equipment is included in earthquake experience equipment class	the caveat tion below)	rul	e a	nd		
	2. No computers or programmable controllers	Ŷ	N	Ŭ	N/A N/A N/A N/A		
	3. No strip chart recorders	Ŷ	N	U	N/A	•	
	 Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain 						
•	essential relays 6. Drawers and equipment on slides restrained	Ŷ	N	U	N/A		
	from falling out	Y	N	ប	N/A		
	7. All doors secured by latch or fastener	Y			N/A		
1	 8. Attached lines have adequate flexibility 9. Anchorage adequate (See checklist below for details)) Y			N/A		
1	 9. Anchorage adequate (See checklist below for details) 10. Relays mounted on equipment evaluated 	Y			N/A N/A		
	11. Have you looked for and found no other adverse conce Is the intent of all the caveats met for Bounding Spectrum	erns? Y	N	Ŭ	N/A	N U N//	١
•	ANCHORAGE						
	1. Appropriate equipment characteristics determined						
	(mass, CG, natural freq., damping, center of rotation 2. Type of anchorage covered by GIP	on) Y Y	N N	ม บ	N/A N/A		
	3. Sizes and locations of anchors determined	Y	N	Ŭ	N/A		



SCREENING EVALUATION WORK SHEET (SEWS)

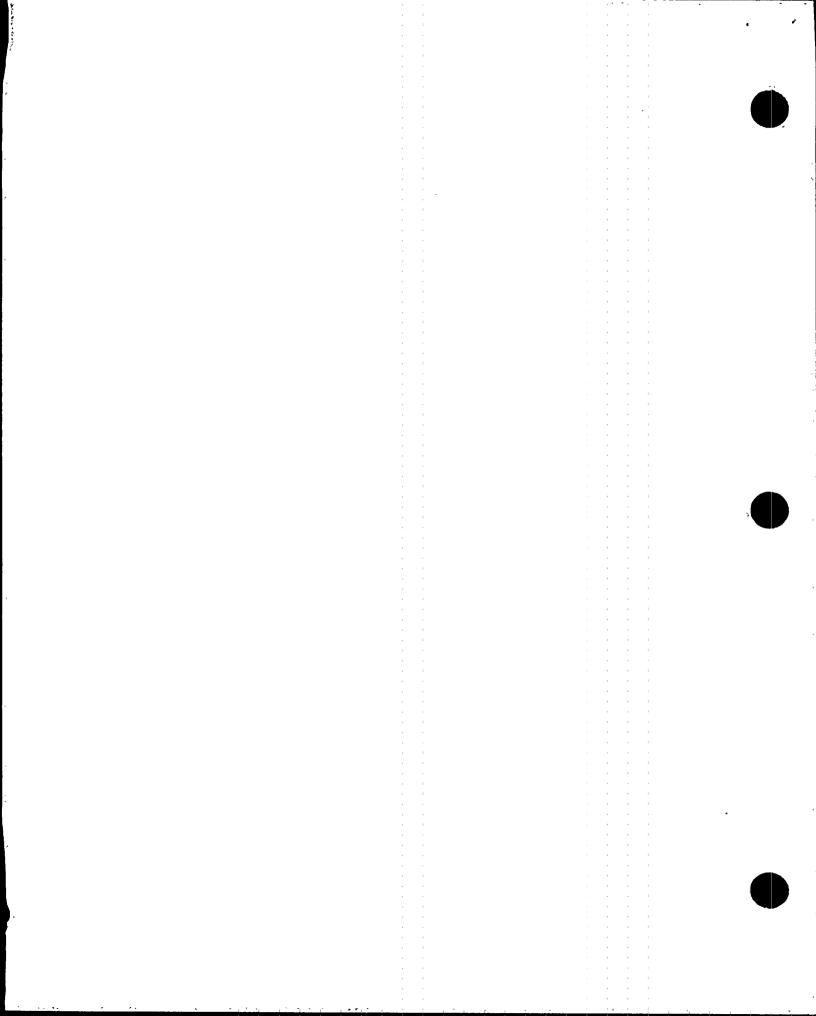
Revision 2, Corrected, 6/28/91Sheet 2 of 2 - 7

Equi	p. ID No. 2-F1-74-50 Equip. Class 20 - Instr. & Cont	rol	Pane	<u>els</u>	- <u>& Cabinets</u>
Equi	pment Description RHR/LOOP I Frow MAGRAN		<u>_</u>	<u>.</u>	
ANC	lORAGE_(Cont/d)				
	Adequacy of anchorage installation evaluated				
	(weld quality and length, nuts and washers, expansion				
1	anchor tightness, etc.)	Y	N	U	N/A
5.	Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing.				
	free-edge distance, concrete strength/condition, and				
	concrete cracking	v	N		N 7A
6.	For bolted anchorages, gap under base less than	1	п	U	N/A
	1/4-inch	Y	N	П	N/A
7.		•		Ŭ	N/A
_	under base, capacity reduction for expansion anchors	Y	N	U	N/A
8.					
•	action on anchors considered	Y	N	U	N/A
У.	Strength of equipment base and load path			• .	•
• 10	to CG adequate	Y	N	U	N/A
10	 Embedded steel, grout pad or large concrete pad adequacy evaluated 	v	••		
are	anchorage requirements met?	T	N	U	N/A
					YNU
INTE	RACTION EFFECTS				
1.	Soft targets free from impact by nearby				
	equipment or structures	Y	N	U	N/A
2.					•
•	free from all impact by nearby equipment or structures	Y	N	U	N/A ·
3.		Y	N	U	N/A
4.		••	••		
5.	not likely to collapse	Ý.	N	U	N/A
	Have you looked for and found no other adverse concerns?	Y	И	U	N/A
13 6	durpmente li ee of interaction effects:				YNU
<u>IS E</u>	QUIPMENT SEISMICALLY ADEQUATE?				(Y) N U
СОММ	ENTS				

COMMENTS 1. SEE THE FOLLOWING PAGES FOR THE SCIFEMATTIC SIAGRANS FOR 55EZ LINE NOS 1018, 1019, 1046, 1047, 31018, 31019, 31013 And 31044

2. 3 ÉE SSEZ # 9040 & 9041 FOR THE EVALUATTON OF THIS COMPONENT. QUALIFIED BY "RULE OF THE BOX"

evaluated by:	J.R. LISSUE	Date: 10/17/95
	Kay-	10-17-7
	G.20-2	



EQE INTERNATIONAL

SHEET NO. 3 BY JAD DATE 8-25-51 2 AAG / IDERE JOB NO. 50147 JOB_ BEND DATE _8/25:14 FLOW INSTRUMENTATION RUC CALC. NO. SUBJECT_ CHKT

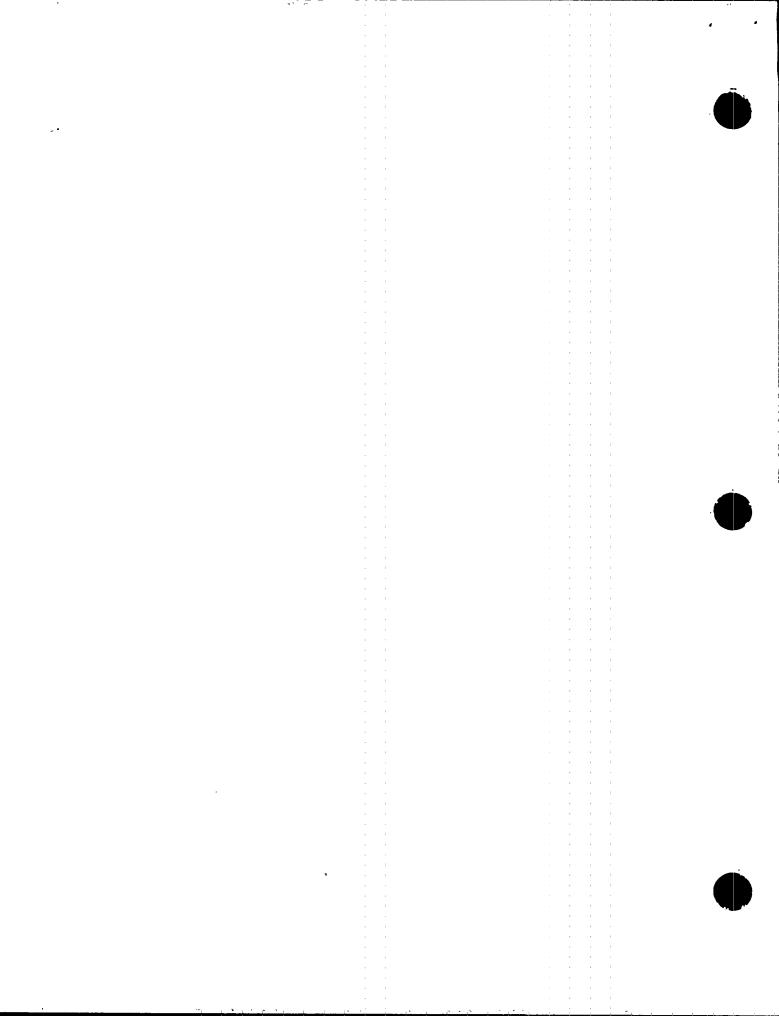
REF. DLWGS: 47E2610-74-1,2

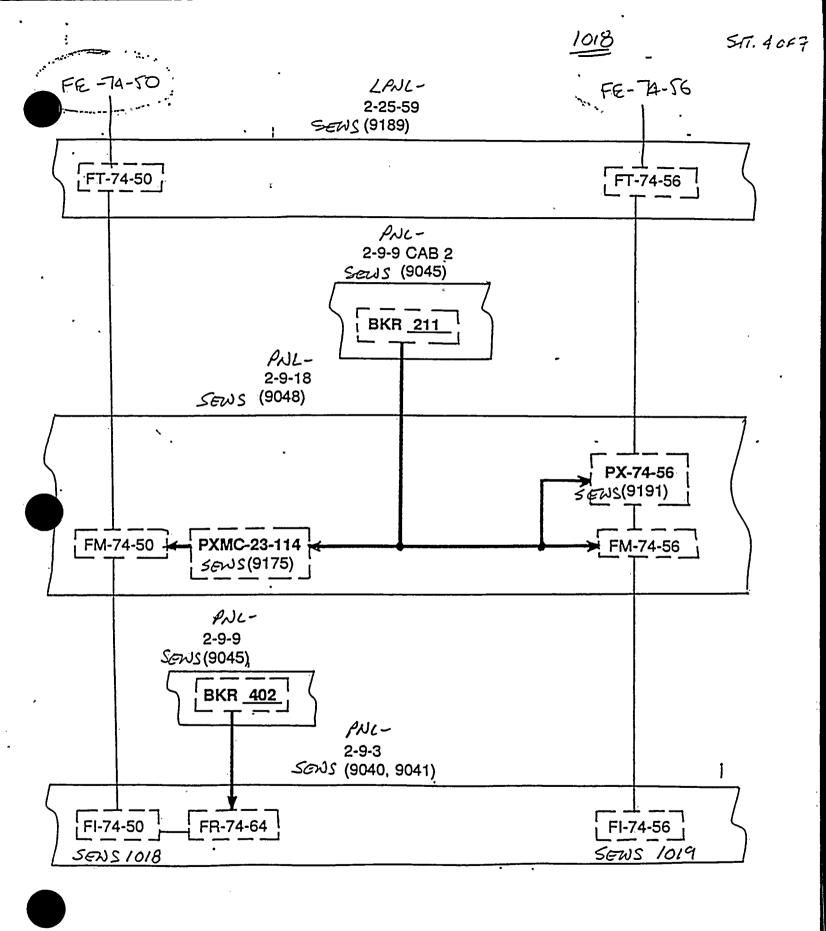
THE FOLLOWING AFF- THE INSTRUMENTS WHICH CONSTITUTE LOOPS; (TYP UNITS 2 { 3) THE RUR FLOW INSTRUMENTATION NOTE 3 NOTRO NOTE 1 NOUNTRED NUNFA QU MOUSTED CATTROL RAI PRIVEL a) RACK al pick FM-74-10 FE-74-50 57-74-50 FS - 74-50 FI - 74-50 9-3, 9-18 PANFIL FR - 74-64 EKR-211,402 9-9 PAREL PX-71-56 F7-74.16 FE-74.56 9-3, 9-18 FM-74-56 PONEL F1-79-56 PXMC-23-14 PX-74-70 FE-74-70 FT-74-70 9-3, 1-19 FM-74.70 PANEL FI-74-70

FM-74-70 FI-74-70 FI-74-70 FI-74-70 BH-R-322,402 & PANEL 9-3, 1-19 BH-R-322,402 & PANEL 9-9. PXMC-23-115. FE-74-64 FS-74-64 FI-74-64 FR-74-64 FR-74-64

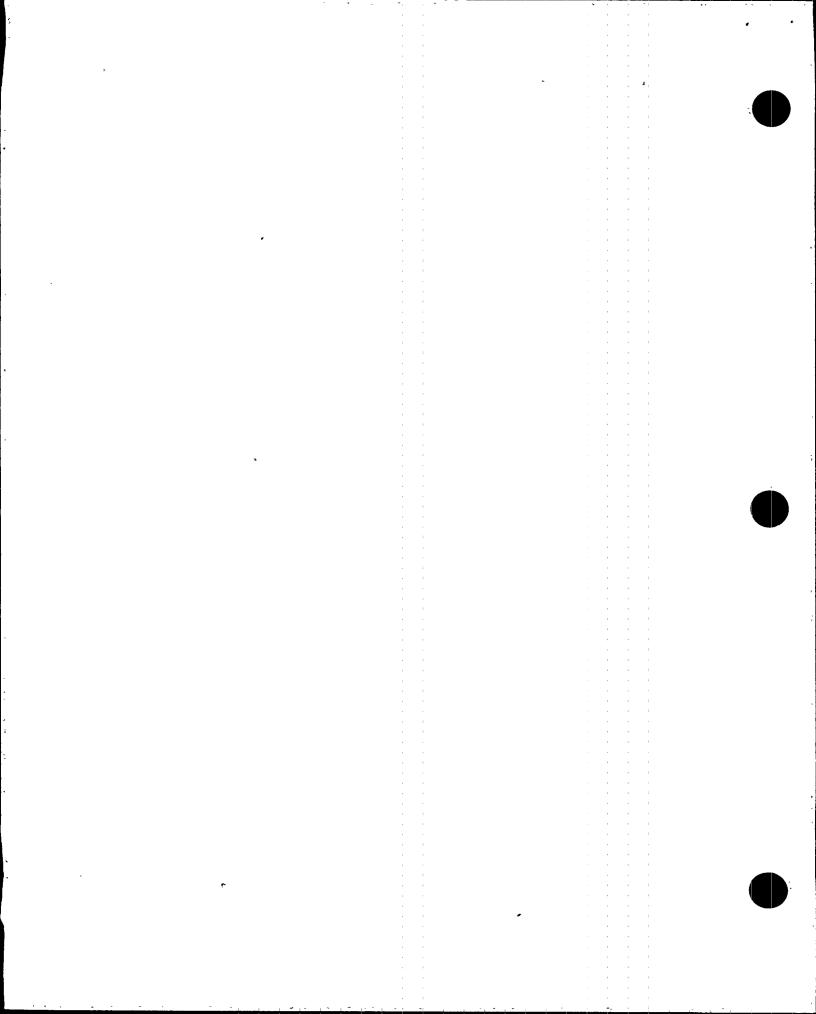
NOTE (D: THESE ARE PASSIVE IN-LINE COMPONENTS OF RUGICIED CONSTRUCTION : SEISMICALLY ADEQUETE.

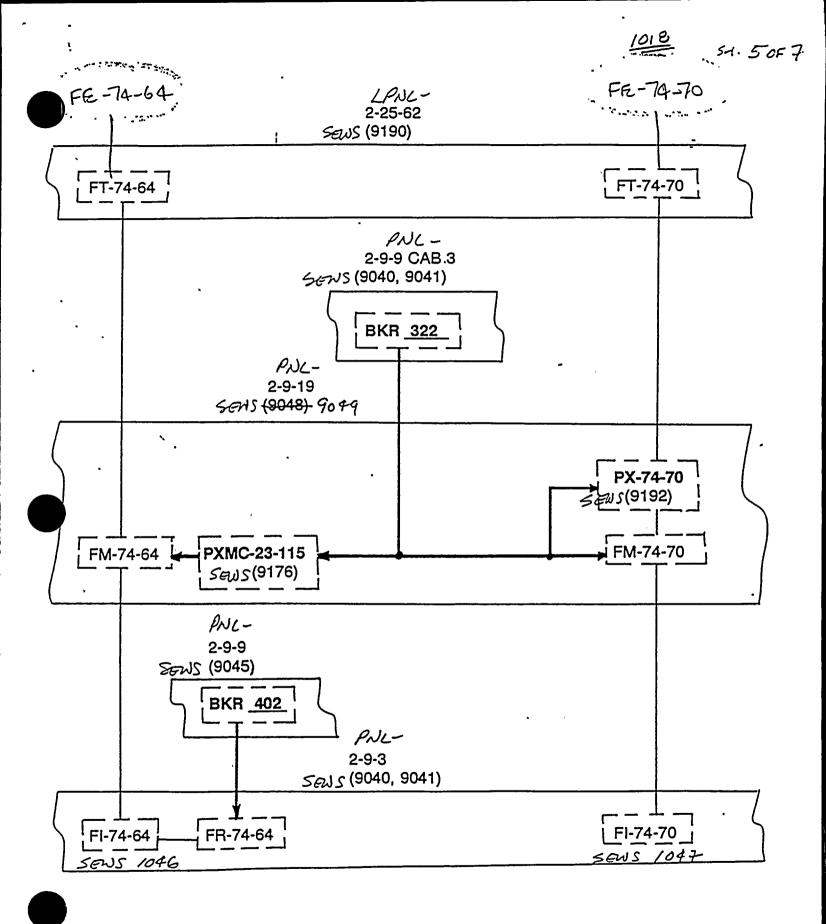
NOTE (2); SEISMILALLY QUALIFIED EY SEWS FIVELULTION For SEEZ #5 9189 & 9190 (WITZ) AND 39200 & 39201 (UNIT 3) ~ (SEE PAGES 5-8). QUALIFIED BY "RULE OF THE BOX" NOTE (3): SEISMILALLY QUALIFIED EY "RULE OF THE BOX" BY THE EVALUATION FOR THE RESPECTIVE CONTROL ROOM PANEL OR THE INDIVIDUAL COMPONENT SELIS FORM (SEE PAGES 4-7)



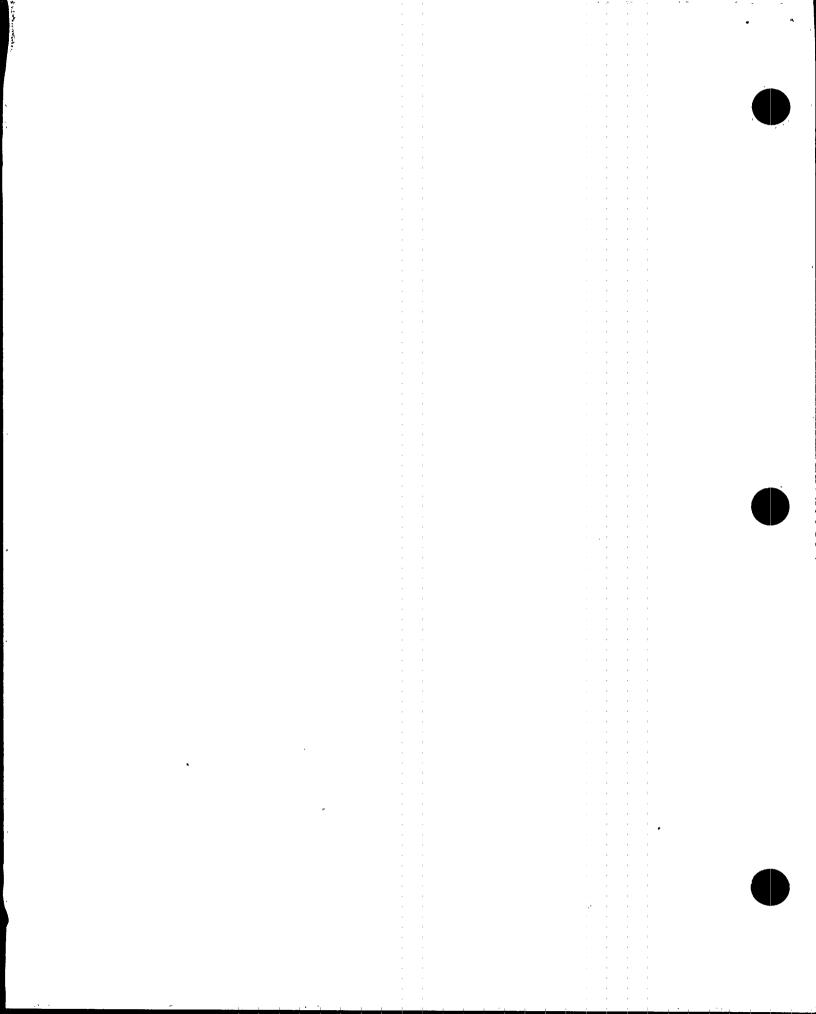


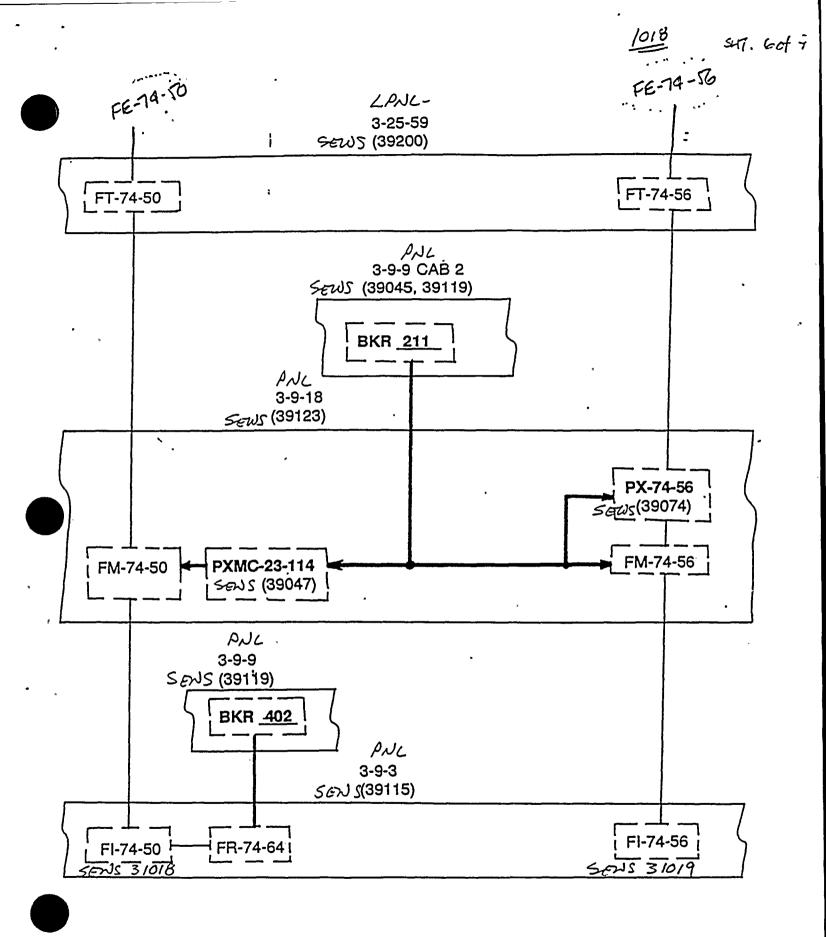
2-FI-74-50 AND 2-FI-74-56



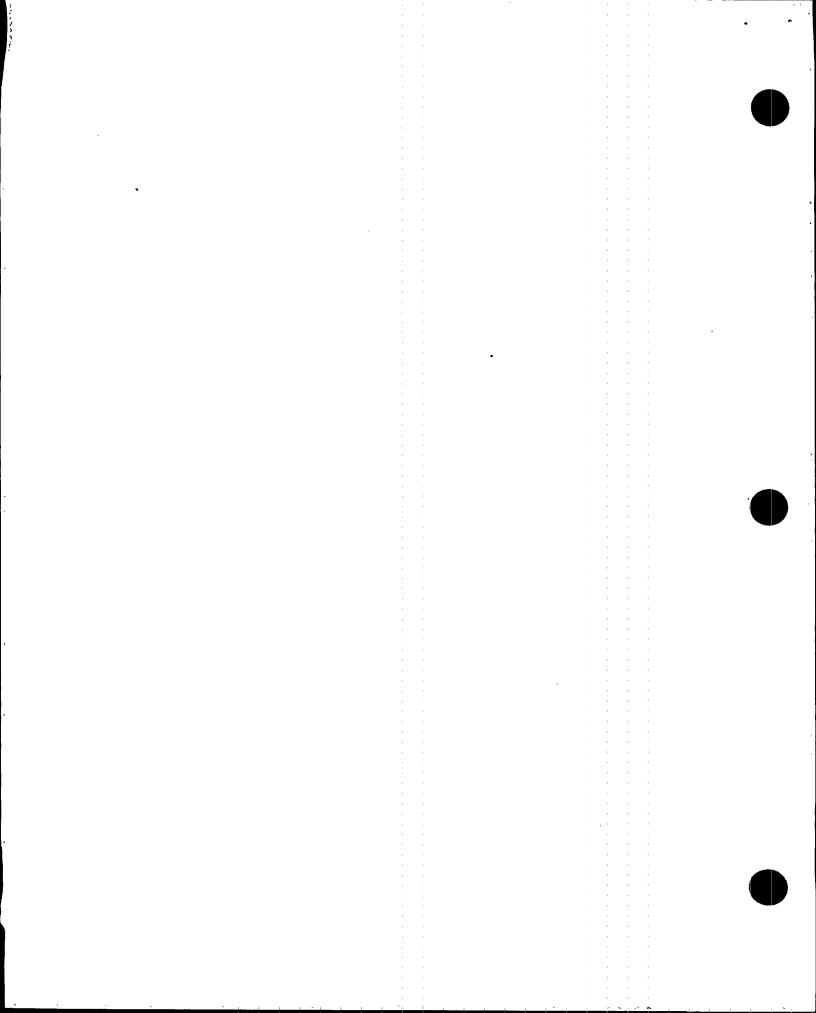


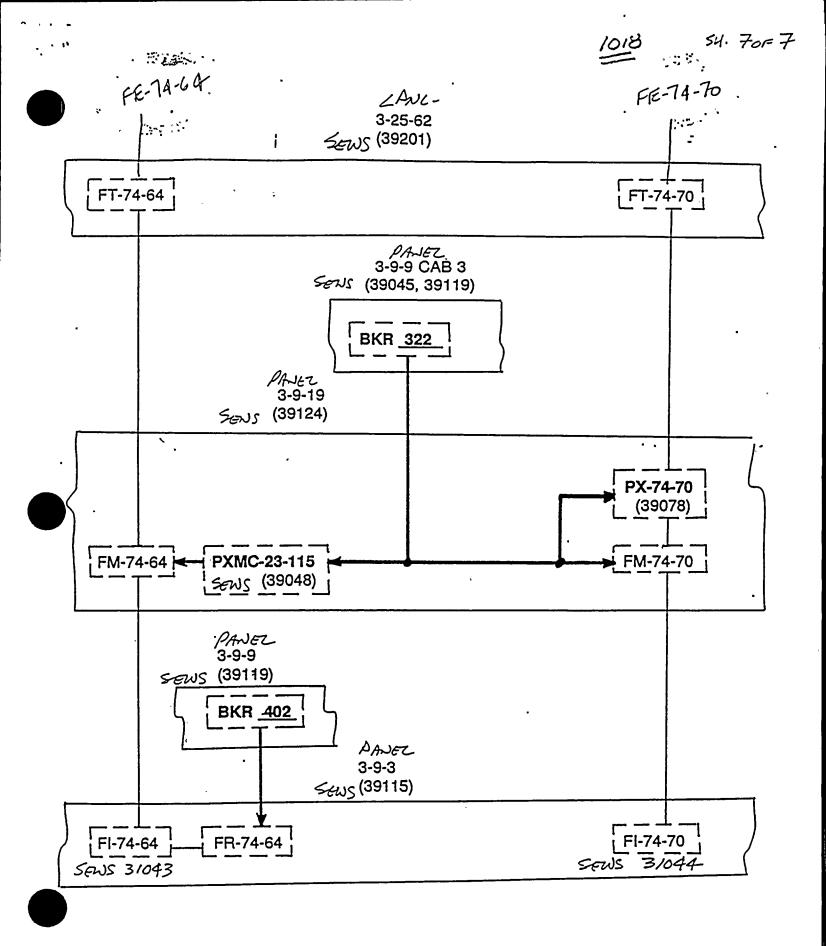
2-FI-74-64 AND 2-FI-74-70



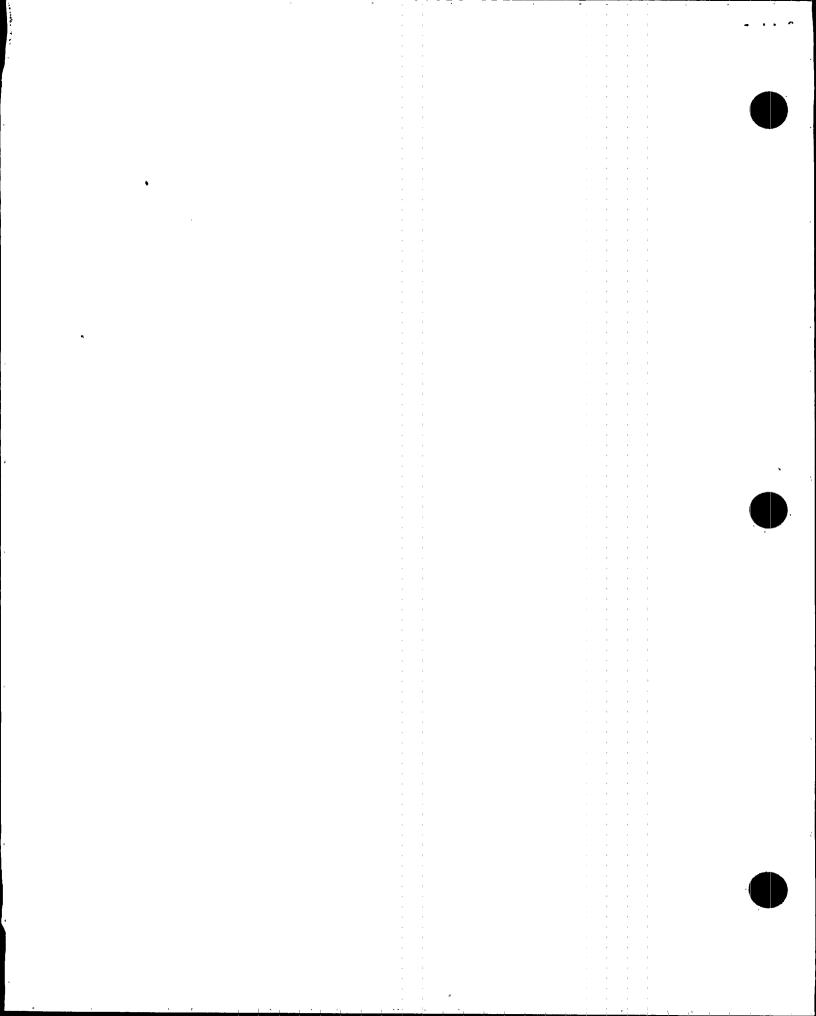


3-FI-74-50 AND 3-FI-74-56





3-FI-74-64 AND 3-FI-74-70



SEL Line No. <u>/8/8</u>	Statu Sheet		Ф N 1	U	
IPEEE SUPPLEMENTAL SCREENING EVALUA	TION WOR	KSHEET	•		:
quip. ID No. 2-FJ-74-50 Equip. Class 20			×		
quipment Description					
ELAY WALKDOWN					
I. Does spot check of essential relays indicate γ relays present and properly mounted?	N U	. N/A			
2. Are essential relays required to function . Y during earthquake screened out?	N U	N/A			
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.	*				.*
other relay concerns? Y	N U	N/A			
equirements for relays satisfied?			YN	U	
STEM INTERACTION EFFECTS	·				
. No potential sources could flood or spill onto Y cabinet?	N U	N/A			•
SCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACT eets if necessary)	ORY (Use	addit	ional		
SEE THE SEWS FOR SSE	2#_	<u>9040</u>	190	<u>+1</u>	
FOR THE EVALUATION OF THIS	Com	'Ar)EN	<u> </u>	-
			•		
<i>,</i>					
EONIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDE	DING REL	AY CHA	TTER?		
EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVESTI		YES_	_ ио		
iluated by: J.R. Disser2	Date: _	<u>10/2</u>	0/9.5	<u> </u>	•
iluated by: <u>blin O. Izan</u>	Date: _	10/2	195		

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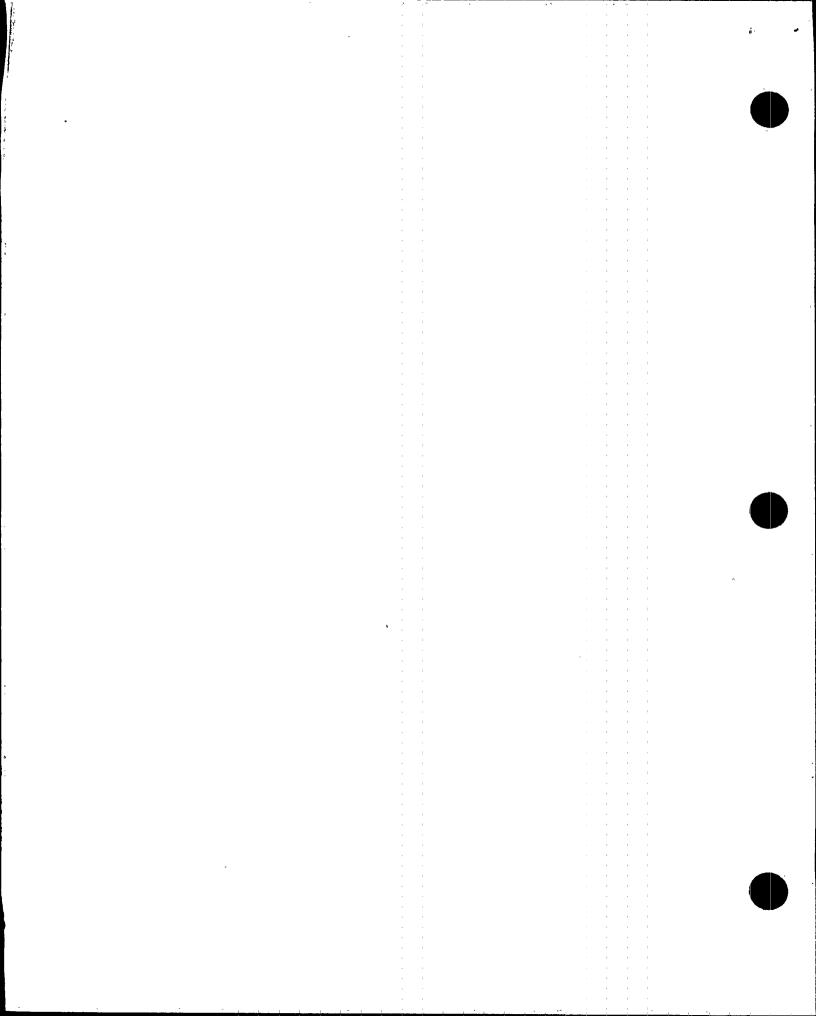
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55EL # 7187	•
	ision 2, Corrected, 6/28/91 tus (Y N U
SCREENING EVALUATION WORK SHEET (SEWS) She	et 1 of 34
Equip. ID No. <u>Z-LPNL-925-0059</u> Equip. Class <u>18 - Inst</u>	ruments on Racks
Equipment Description LOCAL PANEL 25-59 Location: Bldg. <u>RB</u> Floor El. <u>519</u> Room, Row/Col <u>7</u>	- p 2
Manufacturer, Model, Etc. (optional)	
 SEISMIC CAPACITY VS DEMAND Elevation where equipment receives seismic input Elevation of seismic input below about 40' from grade Equipment has fundamental frequency above about 8 Hz Capacity based on: Existing Documentation Bounding Spectrum GERS 	519 D N U DOC UN U N/A NOTE / DOC US GERS
5. Demand based on: Ground Response Spectrum 1.5 x Bounding Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Does capacity exceed demand?	ABS CRS
 CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) those met by intent without meeting the specific wording of the case of the reason for this conclusion in the COMMENTS section 1 Equipment is included in earthquake experience equipment class No computers or programmable controllers Steel frame and sheet metal structurally adequate Adjacent racks which are close enough to impact or sections of multi-bay racks are bolted together if they contain essential relays Natural frequency relative to 8 Hz limit considered Attached lines have adequate flexibility 	aveat rule and below) (Y = N = U = N/A $(Y = N = U = N/A = A/07c^{-2} = -, 4$ $(Y = N = U = N/A = A/07c^{-2} = -, 4$ $(Y = N = U = N/A = A/07c^{-2} = -, 4$
 7. Anchorage adequate (See checklist below for details) 8. Relays mounted on equipment evaluated 	APN U N/A APN U N/A Note 4 Y N U N/A
9. Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum?	ÔN U N/A ÔN U N/A
<u>CAVEATS - GERS</u> (Identify with an asterisk (*) those caveats which met by intent without meeting the specific wording of the caveat and explain the reason for this conclusion in the COMMENTS section 1. Equipment is included in the generic seismic testing equipment class 2. Meets all Bounding Spectrum caveats 3. Component is a pressure, temperature, level or flow transmitter	: rule
· ·	



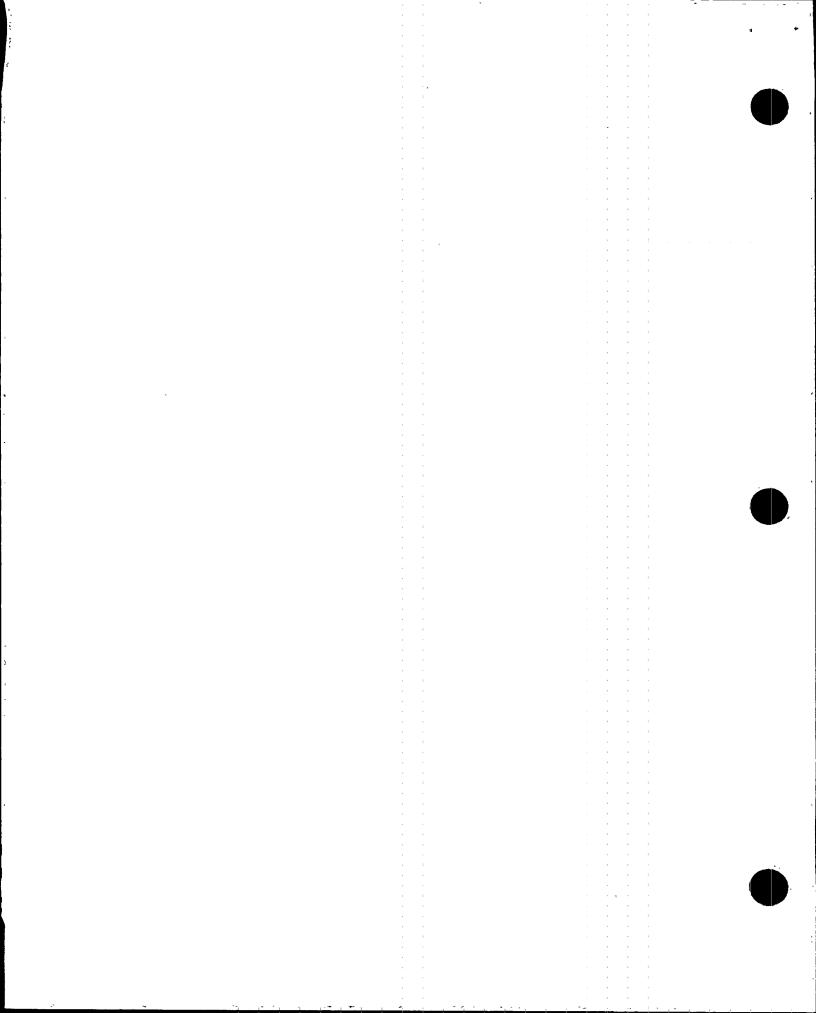
SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2, Corrected, 6/28/91 Sheet 2 of 2 4

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Equip. ID No 2-LPNL-925-0059 Equip. Class <u>18 - Inst</u>	mumante en Backa
Equipment Description <u>LOCAL PANEL 25-59</u>	and ments on Racks
 <u>CAVEATS - GERS (Cont'd)</u> 4. Component is one of the specific makes and models tested, as listed in Appendix B 5. Necessary function of component not sensitive to seismically induced system perturbations (e.g., sloshing) 	Y N U NA
 6. No vacuum tubes 7. All external mounting bolts in place 8. Demand based on amplified portion of 3% damped floor response spectrum if estimated natural frequency of rack less than 33 Hz 9. Rack capable of structurally transferring GERS level seismic loads to anchorage Is the intent of all the caveats met for GERS? 	Y N U NAP Y N U NAP
 ANCHORAGE Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP Sizes and locations of anchors determined Adequacy of anchorage installation evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.) Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking For bolted anchorages, gap under base less than 1/4-inch Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors Base has adequate stiffness and effect of prying action on anchors considered Strength of equipment base and load path to CG adequate Embedded steel, grout pad or large concrete pad adequacy evaluated Are anchorage requirements met?	P N U N/A N U N/A N U N/A N U N/A N U N/A N U N/A N U N/A Y N U N/A N U N/A
 Soft targets free from impact by nearby equipment or structures If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures Attached lines have adequate flexibility 	Y N U N/A Y N U N/A T N U N/A

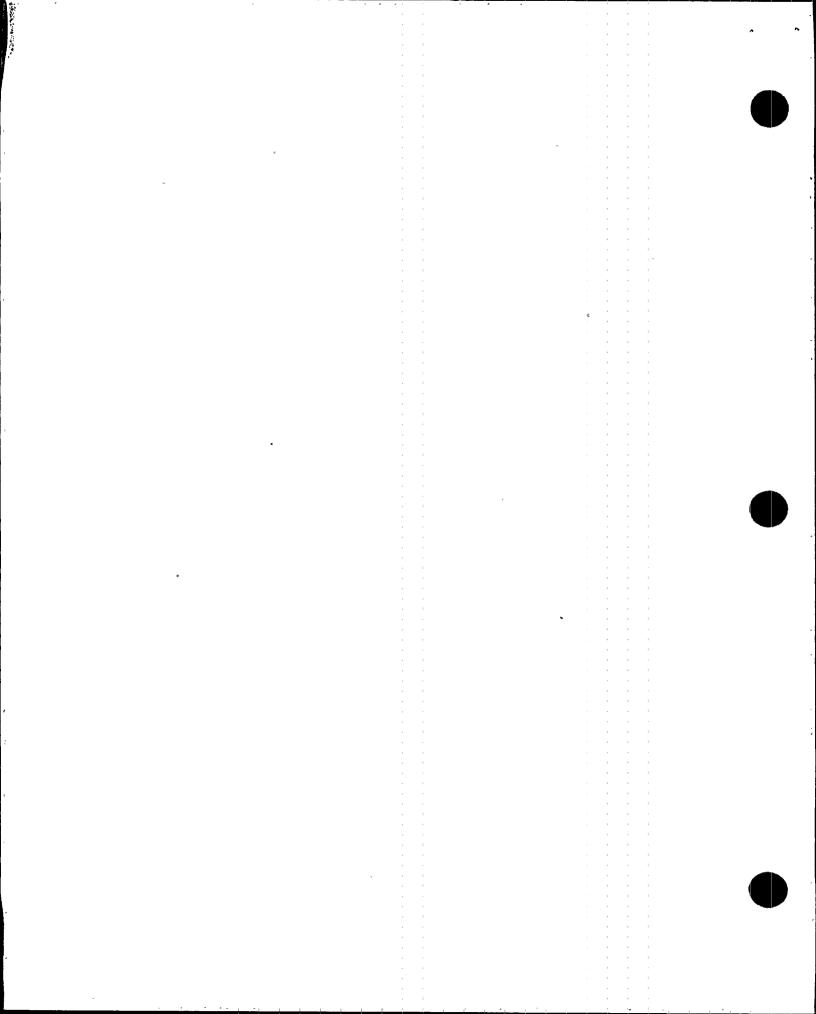
6.18-2

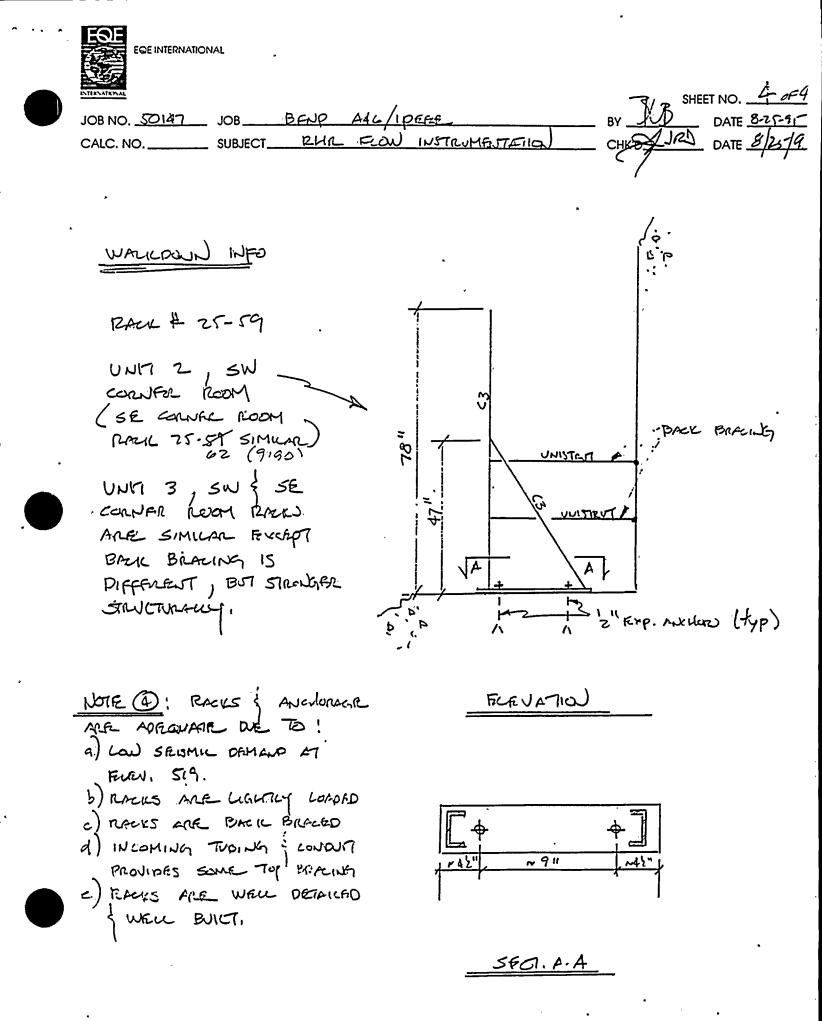


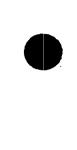
Revision 2, Corrected, 6/28/91 SCREENING EVALUATION WORK SHEET (SEWS) Sheet 3 of 24 Equip. ID No. Z-CPNL-925-0059 Equip. Class 18 - Instruments on Racks Equipment Description __ LOCAL PANEL 25-59 INTERACTION EFFECTS (Cont'd) Overhead equipment or distribution systems are not likely to collapse 5. Have you looked for and found no other adverse concerns? Is equipment free of interaction effects? EOUIPMENT SEISMICALLY ADEQUATE? COMMENTS 1) As the panel is well braced, it is judged to respond > 8 HZ, =) Panel is well constructed of steel channels. Framing judged to be sersmically adequate. 3) Using the Reduced Inspection Alternative of Appendix C of . He GIP, neglecting 1/3 of the anchor botts, the rack anchorne is still jurged to be seismically adequate. Therefore anchor bolt tightness testing is not required

Evaluated by:	X.D. Jucinito	Date:	9-13-25
	- RAN-		9-19-51
PITOTO	24 13:14		•

6.18-3





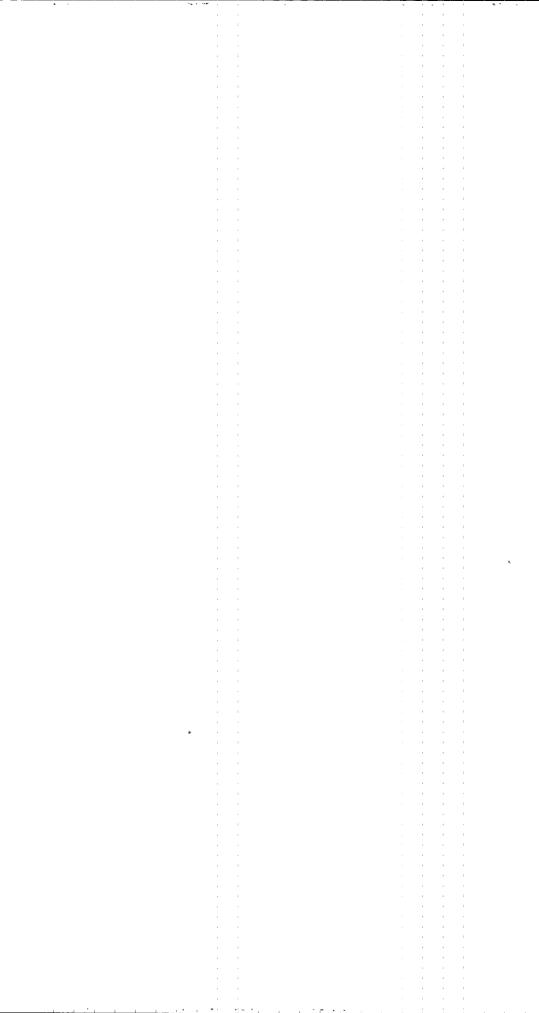


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Status	()	N	U
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Sheet 1 of 1

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N/A

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>2-LPNL-925-0059</u> Equip. Class <u>18 - Instruments on Racks</u> Equipment Description <u>LOCAL PANEL 25-59</u>

RELAY WALKDOWN

1.	Does spot check of essential relays indicate relays present and properly mounted?	Y	N	U N/A .
2.	Are essential relays required to function during earthquake screened out?	Y	N	U N/A
	If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.			
3.	No other relay concerns?	. Y	N	U N/A
q	irements for relays satisfied?			() N U

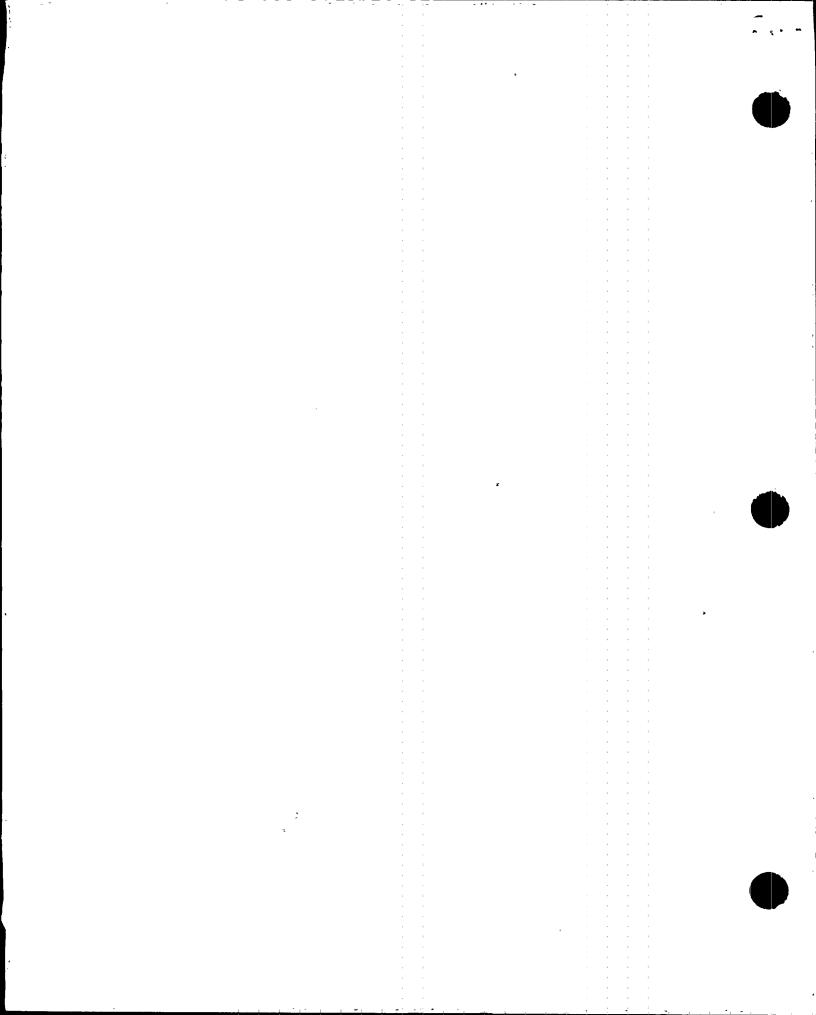
SYSTEM INTERACTION EFFECTS

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1. No potential sources could flood or spill onto () N cabinet?

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

IS EQUIPMENT FREE OF NEED FOR FURTHER INV	ESTIGATION, EXCLUDING RELAY CHATTER?
YES NO	
EQUIPMENT FREE OF NEED FOR FURTHER REL	AY CHATTER INVESTIGATION? YES NO
Evaluated by:	Date: <u>9-(9.9,</u>
Evaluated by: AD, August	Date: <u>9-19-45</u>

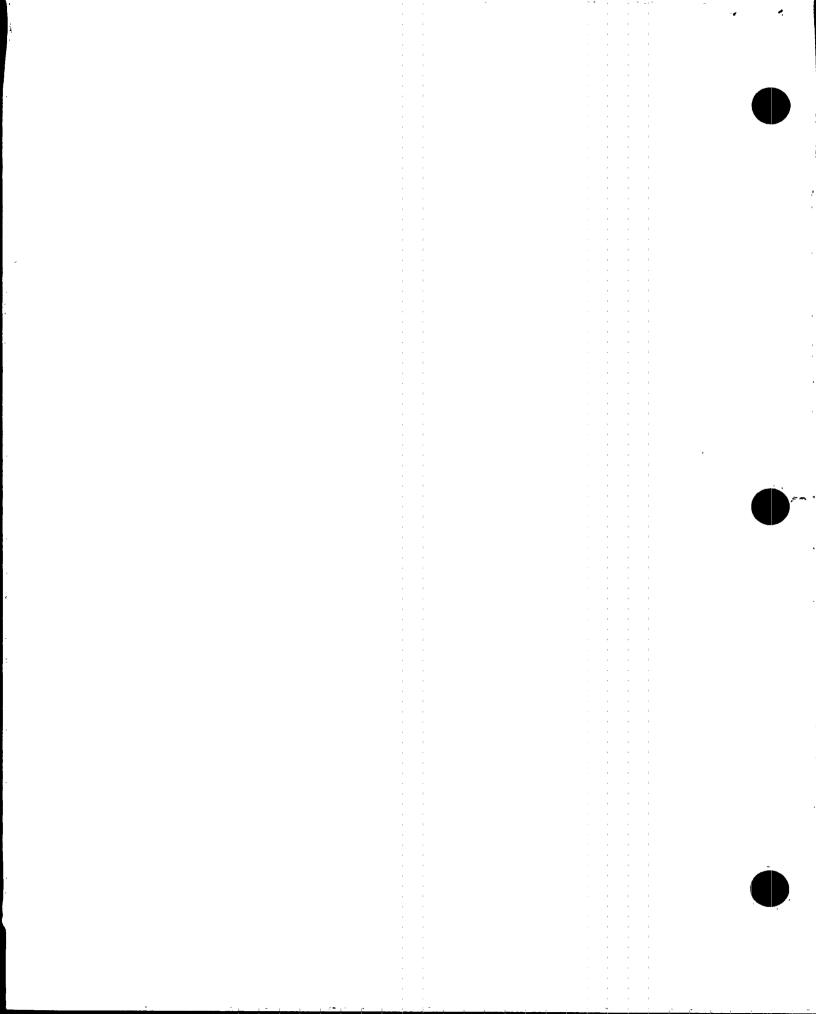


SSEL L	ine No. <u>9045</u> St	atus	Y (Ŵ) U
N	SCREENING EVALUATION WORK SHEET (SEWS) Sh	eet 1 of	2	
Equip.	ID No. <u>2-PNLA-009-0009</u> Equip. Class <u>20 - Instr. &</u>	<u>Control</u>	Pane	<u>ls & Cabinets</u>
Equipm	ent Description <u>PANEL 9-9</u>			
Locati	on: Bldg. <u>CB</u> Floor El. <u>617</u> Room, Ro	w/Co1 <u>U</u>	<u>2 MCI</u>	₹
Manufa	cturer, Model, Etc. (optional but recommended)G	E		
1. 2. 3. 4. 5. Does ca	<u>C CAPACITY VS DEMAND</u> Elevation where equipment receives seismic input Elevation of seismic input below about 40' from grade Equipment has fundamental frequency above about 8 Hz Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. apacity exceed demand? (Indicate at right (*) and in <u>MMENTS</u> if a special exception to enveloping of seismic mand spectrum is invoked per Section 4.2 of the GIP.)	ODC BS (ABS) GER GRS AGS - CRS	N U S	(grode @ 550') N/A (1) () N U (2)*
are met explain 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11.	<u>S - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those t by intent without meeting the specific wording of the of the reason for this conclusion in the COMMENTS section Equipment is included in earthquake experience equipment class No computers or programmable controllers No strip chart recorders Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain essential relays Drawers and equipment on slides restrained from falling out All doors secured by latch or fastener Attached lines have adequate flexibility Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated $AF=4.5$ Have you looked for and found no other adverse concerns?	caveat ri below) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	1]e a 1 U 1 U 1 U 1 U	N/A N/A N/A N/A N/A N/A N/A (G) N/A N/A (G) N/A N/A (G) N/A N/A (G) N/A N/A (G) N/A
ANCHORA 1. 2. 3.	AGE Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP Sizes and locations of anchors determined	666	1 U 1 U 1 U	N/A N/A N/A

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SCREENING EVALUATION WORK SHEET (SEWS) Sheet 2 of 2

𝒮 N U N/A (4)

N/A (7),(9)

Y(N)U(7)

Y (N)U (7)

outlier OSVS- 9045

N/A (10)

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U N/A

U N/A(8)

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Equip. ID No. 2-PNLA-009-0009 Equip. Class 20 - Instr. & Control Panels & Cabinets Equipment Description PANEL 9-9 ANCHORAGE (Cont'd)

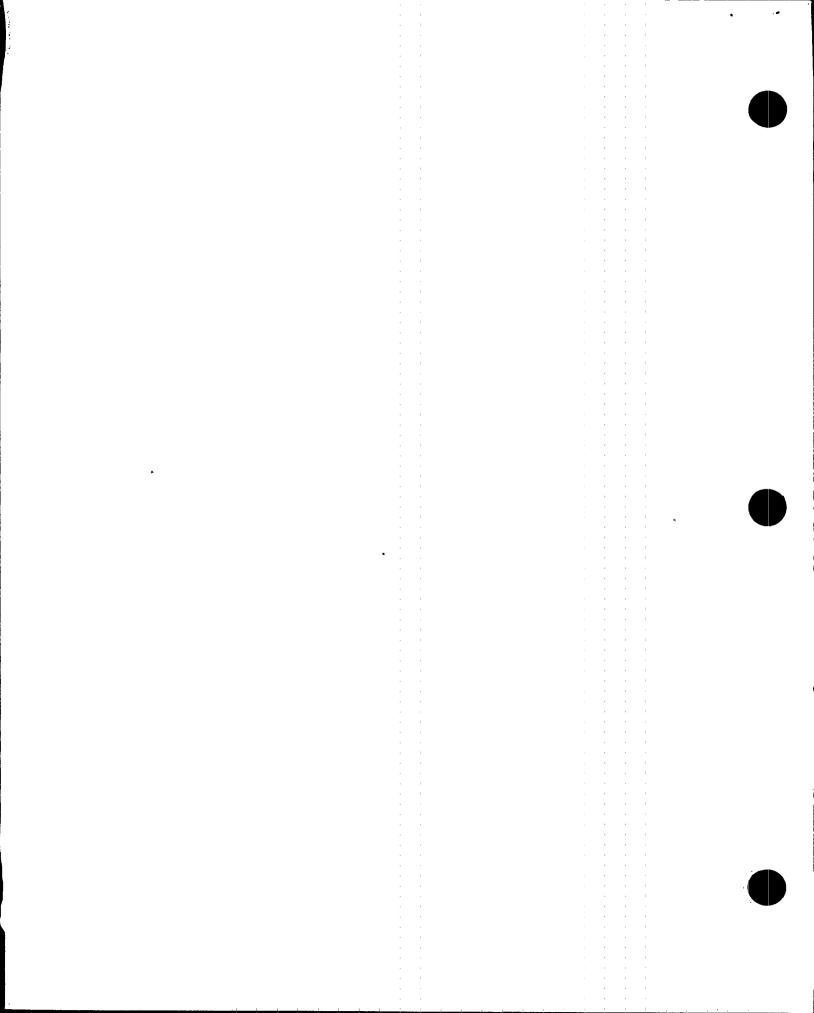
- Anchorage installation adequate, e.g., 4. weld quality and length, nuts and washers, expansion anchor tightness (Y) N U N/A Factors affecting anchorage capacity or margin of 5. safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking (Ý) N U N/A For bolted anchorages, gap under base less than 6. 1/4-inch N/A7. Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors U N/A 8. Base has adequate stiffness and effect of prying action on anchors considered (V) N N/A U Strength of equipment base and load path 9. \bigotimes to CG adequate Ν U N/A Embedded steel, grout pad or large concrete 10. pad adequacy evaluated U N/A (Y) N Are anchorage requirements met? (Y) N U (5) INTERACTION EFFECTS Soft targets free from impact by nearby 1.
 - equipment or structures
 - 2. If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures
 - 3. Attached lines have adequate flexibility
 - Overhead equipment or distribution systems are 4. not likely to collapse
- Have you looked for and found no other adverse concerns? 5. Is equipment free of interaction effects?

IS EQUIPMENT SEISMICALLY ADEQUATE?

COMMENTS

- For notes 1 thm 7 see SEWS for 3-PNLA-009-0009 (SSEL 39119).
- 8) Blockwall @ front of the panel qualified per IERs 80-11 program (Ry. DHG. 2-4/N-1202-1, wall "
- 9) Breathing apparatus boxes are stacked up a about 5' away from this panel. It is judged That These boxes are for enough not to come any interaction with this pand in a DBE. .k
- 10) Flex conduct @ top of

_____ Date: <u>11/16/95</u> 11/17/35 Evaluated by: _______

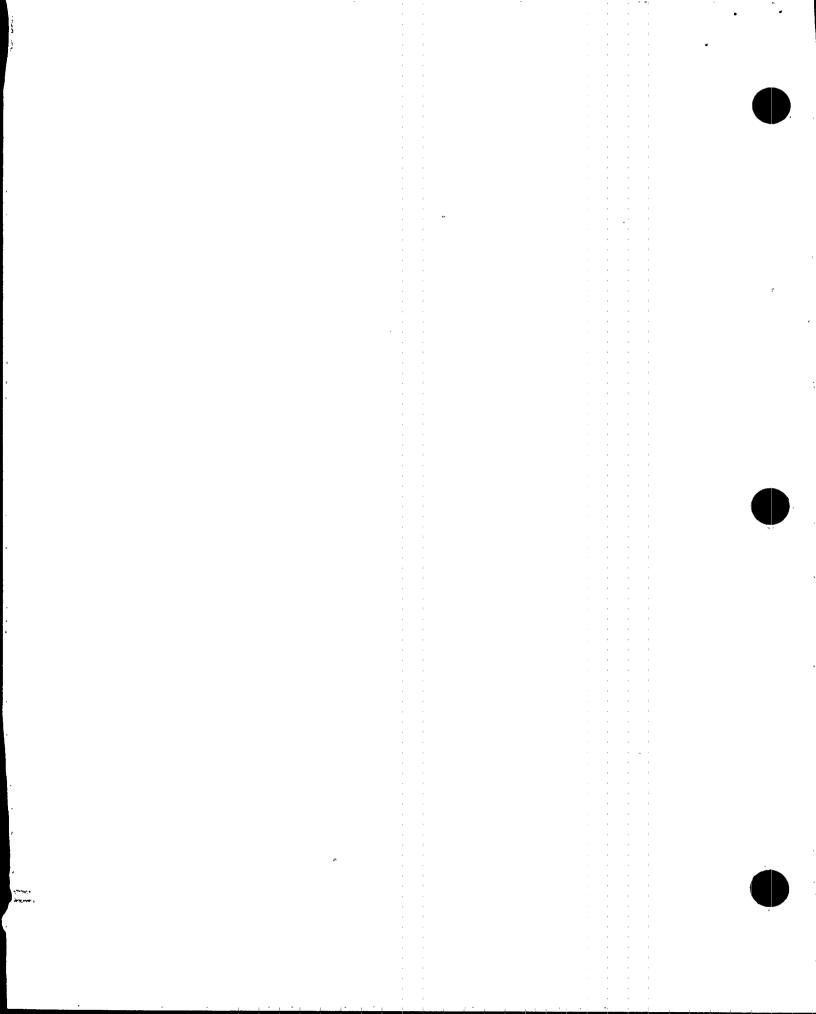


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Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. 2-PNLA-009-0009 Equip. Class 20 - Instr. & Control Panels & Cabinets Equipment Description <u>PANEL 9-9</u> **RELAY WALKDOWN** $(\dot{\mathbf{y}})$ 1. Does spot check of essential relays indicate Ν U N/A relays present and properly mounted? 2. Are essential relays required to function Y Ν U (N/A) during earthquake screened out? If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis. 3. No other relay concerns? Y N U N/A Requirements for relays satisfied? () N U SYSTEM INTERACTION EFFECTS 1. No potential sources could flood or spill onto (Y) N U N/A cabinet? DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary) i) the entry door to the area where this panel is located is attached to south This parrel. The door stelf door not have any lutines to secure side of cabil of The door. The banying of the door to the frame in a DBE may potentially cause relay chatter. IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING RELAY CHATTER? YES NO S EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVESTIGATION? NO / (see note 1) YES sbove Evaluated by: Date: 11-16-95 1/17/35 Evaluated by: Date:



	SSEL	. Lin	e No.	9045				- .	Shee	t 1 of 2		
					ER SEI		S-9045 RIFICATI	Ion sheet	(OSVS)			
	1.	OUTI	LIER I	DENTIFICAT	ION, D	ESCRIPT	ION, ANE	LOCATIO	N			
		Equ	ipment	ID Number	2-PN	LA-019-	0.09	Equipmen	t Class	20 - Inst	<u>ir. 4 Con</u> trol	. Anels
		Equi	ipment	Location:	Bldg	<u> </u>		Floor	Elevatio	on <u>617</u>	,	
		Ro	oom or	Row/Colum	n <u>/</u>	1CR UZ		Base E	levation	1 <u>617</u>	,	
		Equi	ipment	Descriptio	on <u>p</u>	NL 9-9	7	- <u> </u>				
	2.			SSUE DEFIN				•				
		a.	Iden (Cheo	tify all th ck more tha	ne scre an one	eening g if seve	uidelin eral gui	es which delines	are not could no	: met. ot be sat	isfied.)	
Γ,			Elect Capac Cavea Ancho	orage nic Interac	emand		Shell Anchor	<u>and Heat</u> Buckling Bolts an age Conno ility of	* nd Embed ections		*	-
			Capac Mount	<u>itial Relay</u> city vs. De cing, Type, cation	mand		Inclus Other	<u>and Condu</u> ion Rules Seismic I d Analyt	s Performa	nce Conc	erns	
				ll bucklin ge, flat-b					l piping	only app	ply to	
		b.	outli	ibe all th er issues item of eq	were r	esolved	, then t	the signa	tories	would cor	nsider	
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SSEL	Line	e No. <u>9045</u> OUTLIER SEISMIC VERIFICATION SHEET (OSVS) Equipment ID Number <u>2-PNLA-009-0009</u>	езспћав relays in See a Hached informa 9-16-96	96-91-6
3.		POSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)	esser See 1	Zr. (
	a. b.	Define proposed method(s) for resolving outlier. <u>Provide letch or positively restrain This door</u> <u>from impacting its frame;</u> <u>OR alternatively if it could be shown that this panel</u> <u>does not contain any estimated relays than the outlier could be</u> Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency). <u>N/A</u>	F There are no F & panel 2-9-9. S: 5 memo. KUG	Jone

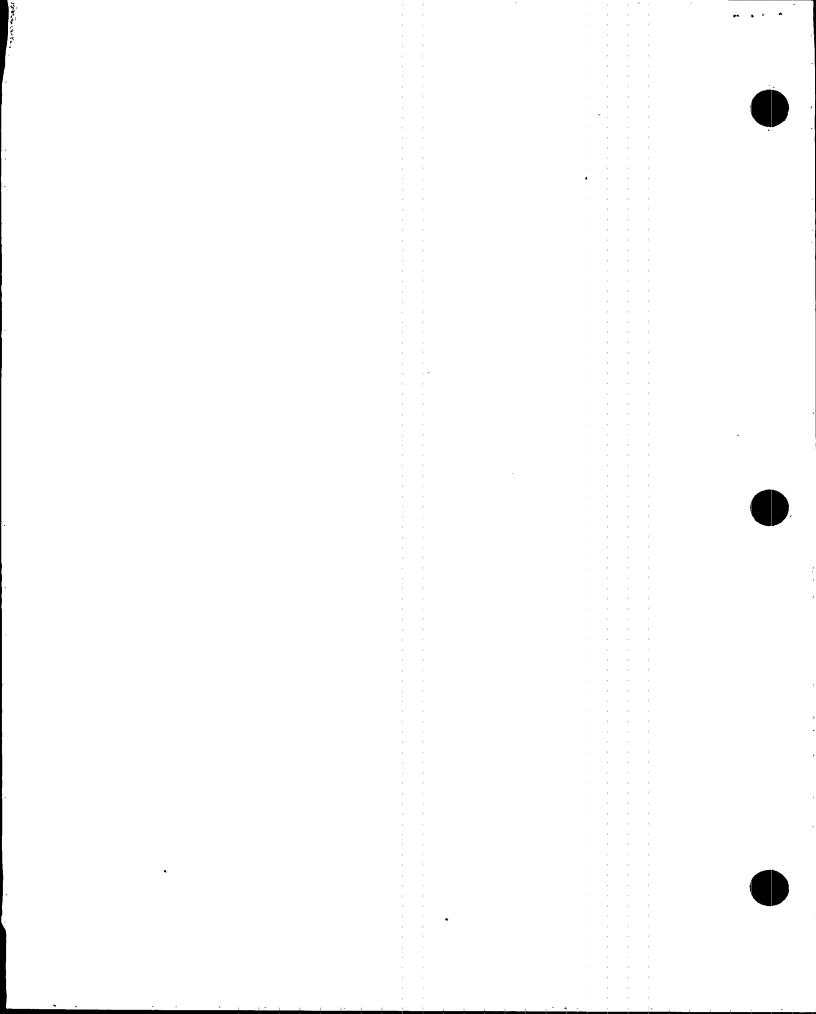
4. CERTIFICATION:

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The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

FARZIN R. BEIGI	Fami R. Beiej	11-16-95.
Print or Type Name	<u> </u>	Date
bin D. DIZON, R.E. Print or Type Name	John O. Dian	11/17/95
Print or Type Name	Signature	Date
Print or Type Name	Signature	Date



INFORMAL

September 16, 1996

REVIEW FOR ESSENTIAL RELAYS IN PANELS 2-PNLA-009-0003A, 2-PNLA-009-0003B, 2-PNLA-009-0004, 2-PNLA-009-0009, 2-PNLA-009-0020, AND 2-PNLA-009-0021.

Modifications to panels 2-PNLA-009-0003A (SSEL No. 9040), 2-PNLA-009-0003B (SSEL No. 9041), 2-PNLA-009-0004 (SSEL No. 9042), 2-PNLA-009-0009 (SSEL No. 9045), 2-PNLA-009-0020, and 2-PNLA-009-0021 (SSEL No. 9050) were determined to possibly be required under the USI A-46 program, resulting from outliers OSVS-9040-2, OSVS-9045, and OSVS-9050, if these panels contain essential relays. A review of the Browns Ferry Nuclear Plant USI A-46 Seismic Evaluation Report, May 1996, Revision 0, Appendix A determined that there are no essential relays installed in these panels. This review resolves outliers OSVS-9040-2, OSVS-9045, and OSVS-9050. Note that modifications may be required resulting from other outliers on these panels.

Review performed by

K. H. Gromek

date

Verified by

B. M. Pedroso

9-16-96 date



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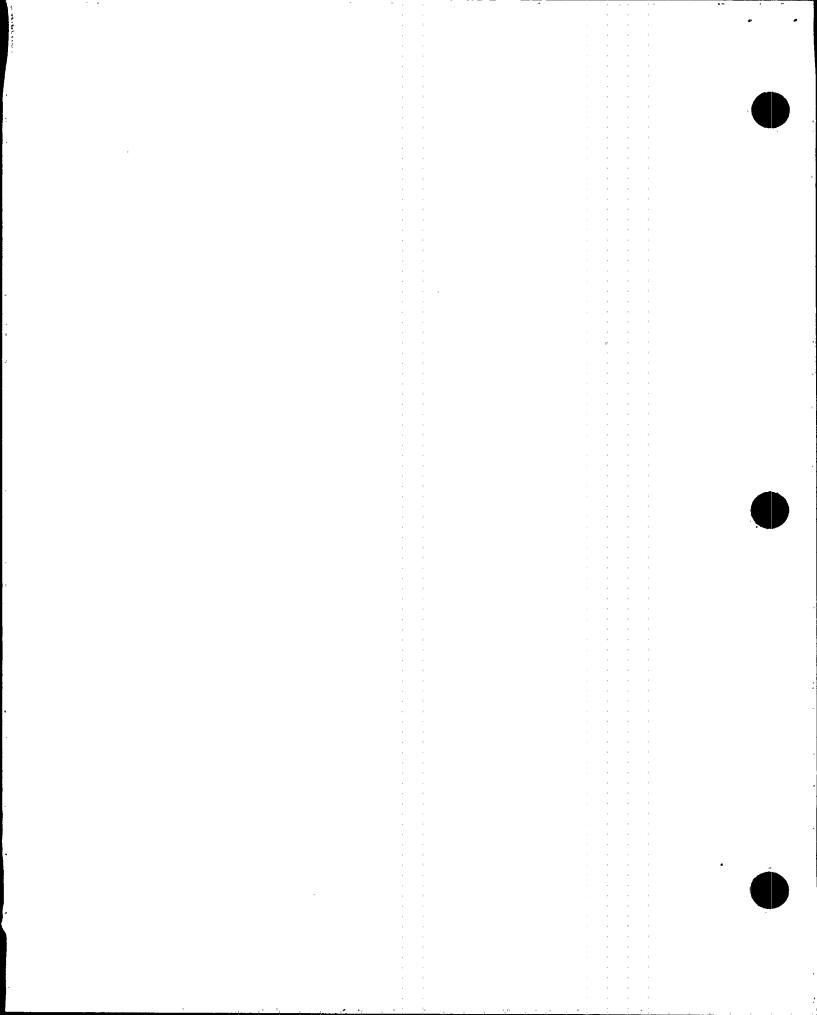
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SSEL Line No. 39119 YNVU Status SCREENING EVALUATION WORK SHEET (SEWS) Sheet 1 of Z4 Equip. ID No. 3-PNLA-009-0009 Equip. Class 20 - Instr. & Control Panels & Cabinets Equipment Description _ PNL 9-9 (I&C CONT PWR, CAB 2&3) Location: Bldg. CB Floor El. 617 Room, Row/Col U3 MCR Manufacturer, Model, Etc. (optional but recommended) GE SEISMIC CAPACITY VS DEMAND <u>GI7</u> <u>Y W U (grode</u> 563') W N U N/A (1) 1. Elevation where equipment receives seismic input Elevation of seismic input below about 40' from grade 2. Equipment has fundamental frequency above about 8 Hz 3. Capacity based on: Existing Documentation DOC 4. Bounding Spectrum 1.5 x Bounding Spectrum BS 3 e • • • • • • ABS GERS GERS 5. Demand based on: Ground Response Spectrum GRS 1.5 x Ground Response Spectrum AGS Conserv. Des. In-Str. Resp. Spec. CRS Realistic M-Ctr. In-Str. Resp. Spec. (RRS) $(\bigcirc N U(z)^{*}$ Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.) CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) Equipment is included in earthquake experience 1. ② N U N/A equipment class 2. No computers or programmable controllers No strip chart recorders 3. 4. Steel frame and sheet metal structurally adequate (Ŷ) N U N/A 5. Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain essential relays $(\widehat{\mathbf{Y}})$ N U N/A Drawers and equipment on slides restrained 6. from falling out 7. All doors secured by latch or fastener Attached lines have adequate flexibility 8. 9. Anchorage adequate (See checklist below for details) 10. Relays mounted on equipment evaluated $A_{F=4.5}$ 11. Have you looked for and found no other adverse concerns? **(2)** N U N/A Is the intent of all the caveats met for Bounding Spectrum? ANCHORAGE Appropriate equipment characteristics determined 1. D N U N/A, See sketch N U N/A on P 4) (mass, CG, natural freq., damping, center of rotation) 2. Type of anchorage covered by GIP ŶN U N/A 3. Sizes and locations of anchors determined

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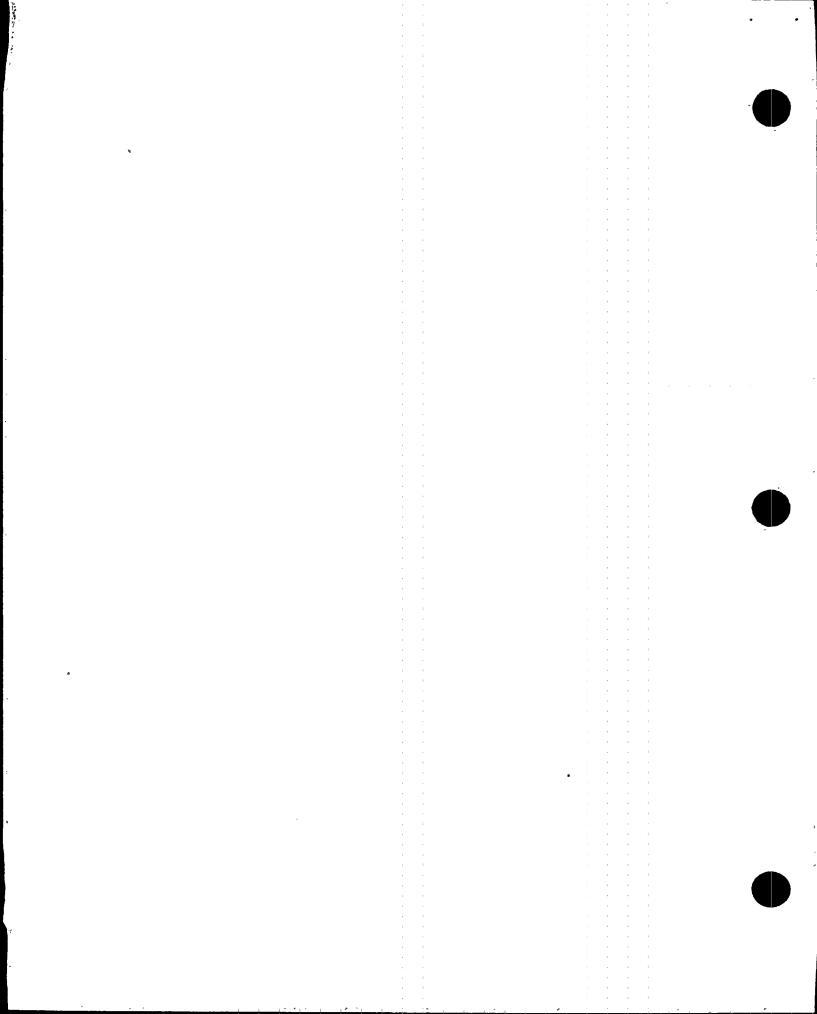


SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 2 of 24

Equip. ID No. 3-PNLA-009-0009 Equip. Class 20 - Instr. & Control Panels & Cabinets Equipment Description PNL 9-9 (I&C CONT PWR, CAB 2&3) ANCHORAGE (Cont'd) 4. Anchorage installation adequate, e.g., weld quality and length, nuts and washers, expansion anchor tightness (Y) N U N/A Factors affecting anchorage capacity or margin of 5. safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and (V) N concrete cracking U N/A For bolted anchorages, gap under base less than 6. (N/A)1/4-inch Factors affecting essential relays considered: gap 7. under base, capacity reduction for expansion anchors (Y) N' U N/A Base has adequate stiffness and effect of prying 8. (\mathfrak{P}) action on anchors considered N U N/A 9. Strength of equipment base and load path (\mathfrak{P}) Ν to CG adequate U N/A Embedded steel, grout pad or large concrete 10. (Y) N U N/A pad adequacy evaluated Are anchorage requirements met? (Y) N U (5) INTERACTION EFFECTS Soft targets free from impact by nearby 1. 🛈 Ñ U N/A(4) equipment or structures If equipment contains sensitive relays, equipment 2. Y (N) U N/A (7), (8) free from all impact by nearby equipment or structures (Y) N U 3. Attached lines have adequate flexibility N/A Overhead equipment or distribution systems are 4. VNU VNU not likely to collapse N/A N/A 9\ Have you looked for and found no other adverse concerns? 5. Y (N) U (7), (r) Is equipment free of interaction effects? Y (D) U(7), (8) IS_EQUIPMENT SEISMICALLY ADEQUATE? COMMENTS - For notes 1 thm 6 see page 3 of 4. note 7) The frame of the entry door to this area is connected to the south side of this panel. The door latch is broken and the door may impact the frame in a DEE and may cause relay charter in This panel. authier OSVS-39119 note 3) unanchored bookshalf, chairs and desk in front of the panel as well as unanchored printer, computer and storage cabinet in the back of the panel are the close and image cause seismic interaction. Outlier OSVS-39119 valuated by: Fanni Ber $\dot{\leftarrow}$ 0 117 5

nate i Blockwall near this punch is qualified per DWC. 3-41N-1203-1, Rui.2 (Wall #91) on part of IEC 30-" program.



EQE INTERNATIONAL

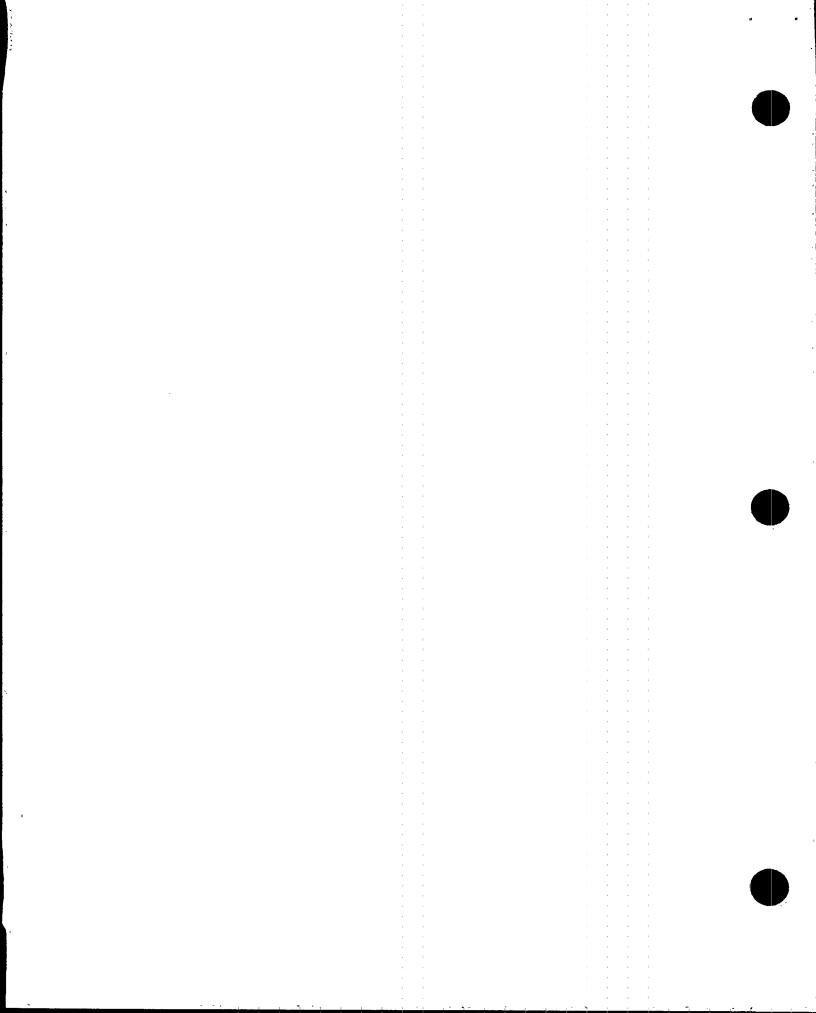


INTERNATIONAL	SHEET NO. <u> 국 4</u>
JOB NO. 50147 JOB TVA / BEND A.46 / IPEEE	BY 7 Ber DATE 11-16-95
CALC. NO. WA SUBJECT Attach - to SEWS for Panel 3-9-9	CHKD JODA DATE 11/95
(3322 3477)	Y

Notes:

- 1) The panel 3-9-9 is part of a long line up of panels (3-9-9+3-9-25+ 3-9-46 + 3-9-47 + 3-9-44). All these panels are bolled to their adjacent panels by 1/2 \$ to 5/8" & batts along the height of the punels @ front and back sides. The panels are heavily welded to their sill channel by I"x1"x 31/2" steel bars as shown on the sketch on the next page. The panels are constructed of 3/32. sheet metal and are reinforced with "A corner posts 763×3×14")" on well as "bon and top" troming angles. The internel components are rigidly mounted and heavy contilerend controllers are also supported rigidly at their cartilevered and. The lowest natural frequency of this panel is judged to be greater than & HZ. Additionally, a simple but conservative frequency estimation calculation performed for a similar panel (see SEWS for panel 3-9-54, SSEL 39133), showed the overall panel made frequency is about 11.4 HZ. (see also GE seismic qualification of electrical equipment Report NEDO-10678, CEB-CQS-82.4 which shows that The frequency of similar panels and internal components are about or greater than 8 HZ from the results of shake table tests and resonant truguency search tests)
- 2) Per Calc. CD-Q0000-940339, The In-structure response spectra @ EL.G21' of the RB (seismic Demand) exceeds the 1.5×B.S. (seismic capacity) in the frequency range of 5 to 7 HZ. Since the Lowest frequency of this poinch is greater than 7 HZ the <u>intent</u> of the seismic capacity VI. demand Criteria of the GIP is met.
- 3) panel sides are continuous and are reinforced by the mounting bars / plates or Unistrut Channels. An in-cabinet amplification factor of 4.5 is reasonable and consistent with the recommendation provided in EPRI NP-71485L for this type of panel.
- 4) Fluorescent lights inside the panels have wire mesh coge around them old
- 5) welds at anchorane points are ok by reference to Clarlation no. CD-40009-871685, "Mounting Details for Control Room Panels," Rev. 5.

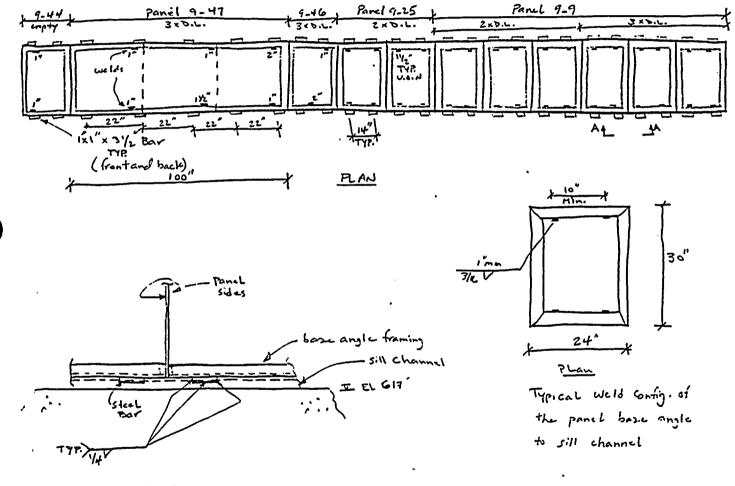
6) slight door rotting @ closed position judged acceptable and not to invoce relian Charlier.



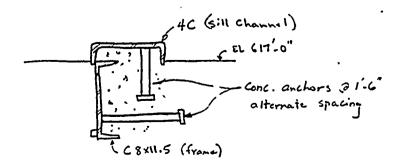
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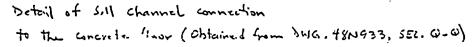
SHEET NO. 444 BY 7 Bein DATE 11-15-95 JOB NO. SOI47 JOB TVA /BEND A.46 / IPEEE SENS G. Panel 3-9-9 (SSEL. 39119) CHKD 1.0. Diz DATE _1/1 7/55 CALC. NO. AA SUBJECT Attack to.

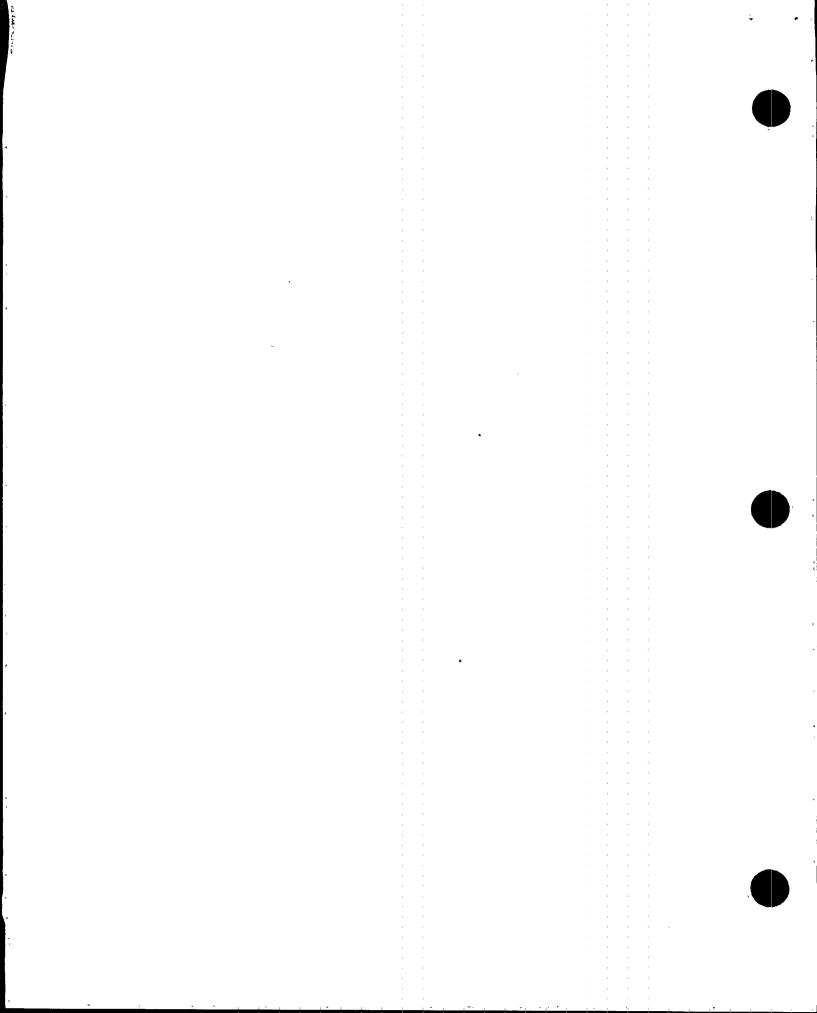
Panel height = 98 1/2 thickness = 3/32



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Status Y 🕅 U.

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Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>3-PNLA-009-0009</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u> Equipment Description <u>PNL 9-9 (I&C CONT PWR, CAB 2&3)</u>

RELAY WALKDOWN

1.	Does spot check of essential relays indicate relays present and properly mounted?	(\mathfrak{P})	N	U	N/A
2.	Are essential relays required to function during earthquake screened out?	Ϋ́	N	U	NA
	If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.				-
3.	No other relay concerns?	Y	N	U	N/A

equirements for relays satisfied?

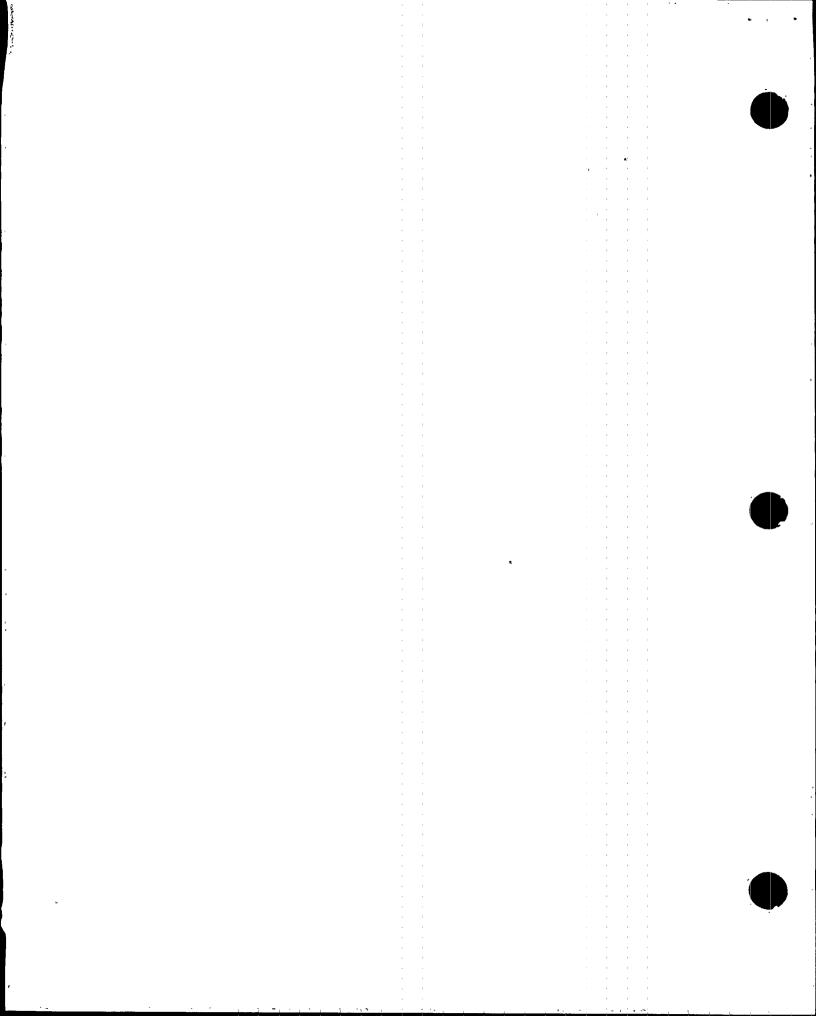
SYSTEM INTERACTION EFFECTS

1. No potential sources could flood or spill onto (Y) N U N/A cabinet?

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

1) Unanchored bookshelf, chains, desk, computer, printer and storage cabinet either in font or the back of this panel may cause seismic interaction in a DBE and chatter relays inside this panel. See <u>outlier</u> 0505-39119

IS EQUIPMENT F	NO			·				
S EQUIPMENT F	REE OF NEED	FOR FURTHER	RELAY CHAT	TTER INVEST	IGATION?	YES	NO / lee ~	stei)
Evaluated by:	- Farr	<u>i Benj</u>	····		Date: _			
Evaluated by:		O. Dim	<u> </u>	<u></u>	Date: _	11/17/95		



SSEL Line No. <u>39/19</u>

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05VS - 39119

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

Sheet 1 of 2

1.	OUT	LIER IDENTIFICATION, DESCRIPTION, AND LOCATION
	Equ	ipment ID Number 3-PNLA-009-0009 Equipment Class 20-Instr. & Control panels
	Equ	ipment Location: Bldg. <u>CB</u> Floor Elevation <u>617</u>
	R	com or Row/Column <u>U3 MCR</u> Base Elevation <u>617</u>
	Equ	ipment Description <u>PNL 9-9 (I&C PWR, CAB 2 & 3)</u>
2.	OUTI	LIER ISSUE DEFINITION
	a.	Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)
		Mechanical and Image: Tanks and Heat Exchangers Capacity vs. Demand Image: Shell Buckling* Caveats Image: Anchor Bolts and Embedment Anchorage Image: Anchorage Connections Seismic Interaction Image: Flexibility of Attached Piping* Other Other
		Essential Relays Cable and Conduit Raceways Capacity vs. Demand Inclusion Rules Mounting, Type, Other Seismic Performance Concerns Location Other Other Other
		* Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.
	b.	Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy): Thearea entry Marka entry
		to this panel) has broken latch and its impact in a DBE
		2) Unanchored bookshelf, chaire, dask in front at this panel, as well as unanchored computer, printer and storage cabinet.
		may cause seismic interaction with this panel in a DBE.
		This interaction may cause relay chatter inside this panel.
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RESOLUES

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ESSENTIAL

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OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

Equipment ID Number 3_ PN LA-009-0009

- 3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)
 - Define proposed method(s) for resolving outlier. a.

1) Provide Latch or positively restrain the door 2) Provide anchorage for the said mise. items or remove

them from the area Atternatively of it is shown that there are no essential relays in

Provide information needed to implement proposed method(s) for b. resolving outlier (e.g., estimate of fundamental frequency).

... This panel Then the outlier is resolved as is and

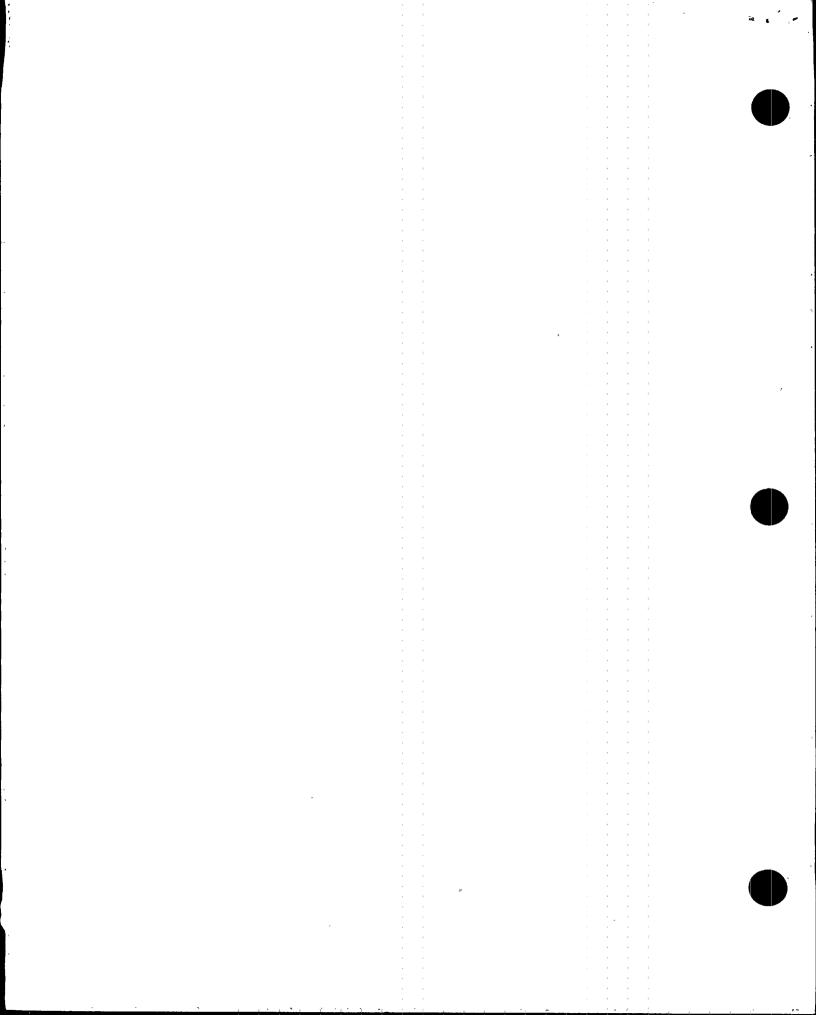
no further action is regicl.

4. **CERTIFICATION:**

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

FARZIN R BEIGI	Farri R. Bein	11-16-95
Print or Type Name	Signature (Date
bth O. DIZON, RE. Print or Type Name	John O. Dizm	"/17/95
Print or Type Name	Signature	Date
		· · · · · · · · · · · · · · · · · · ·
Print or Type Name	Signature	Date

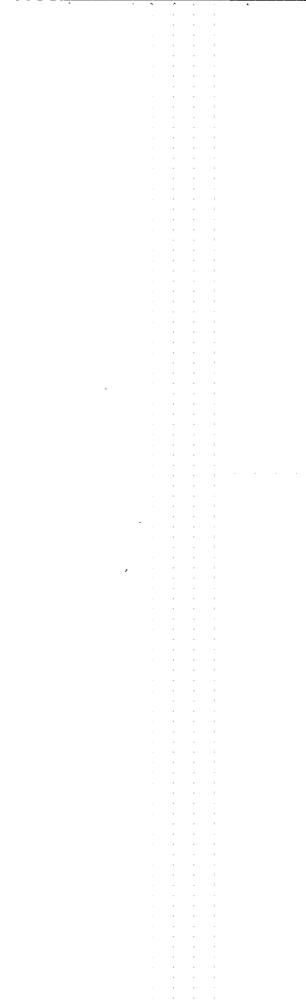


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SCREENING EVALUATION WORK SHEET (SEWS) She	et l (of 2	! 6	-	
Equip. ID No. <u>2-LI-3-58A</u> Equip. Class <u>20 - Instr. & C</u>	ontrol	<u>Pa</u>	nel	<u>s & C</u>	<u>abinets</u>
Equipment Description <u>RPV LEVEL INSTRUMENT</u>					
Location: Bldg. <u>CR</u> Floor El Room, Row	/Col _				······
Manufacturer, Model, Etc. (optional but recommended)	-				
Bounding Spectrum 1.5 x Bounding Spectrum GERS 5. Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec.	GR AG CR	S RS RS S S			NU
<u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) thos are met by intent without meeting the specific wording of the c explain the reason for this conclusion in the COMMENTS section	aveat	rul	wh e ai	ich nd	
 Equipment is included in earthquake experience equipment class 				N/A	
 No computers or programmable controllers No strip chart recorders 			U U	N/A N/A	
 Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or 			Ŭ		
panels, are bolted together if they contain essential relays	Y	Ν	U	N/A	
Drawers and equipment on slides restrained from falling out	Y	Ν	11	N/A	
7. All doors secured by latch or fastener	Ý	N		N/A	
8. Attached lines have adequate flexibility	Y	N	U	N/A	
9. Anchorage adequate (See checklist below for details)	Ŷ			N/A	
10. Relays mounted on equipment evaluated 11. Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum?	Y Y			N/A N/A .Y	N U N/A
NCHORAGE					
1. Appropriate equipment characteristics determined	v	ы	,,	M / A-	
 (mass, CG, natural freq., damping, center of rotation) 2. Type of anchorage covered by GIP 	Y Y			n/a N/a	
3. Sizes and locations of anchors determined	Ŷ	N	Ū	N/A	



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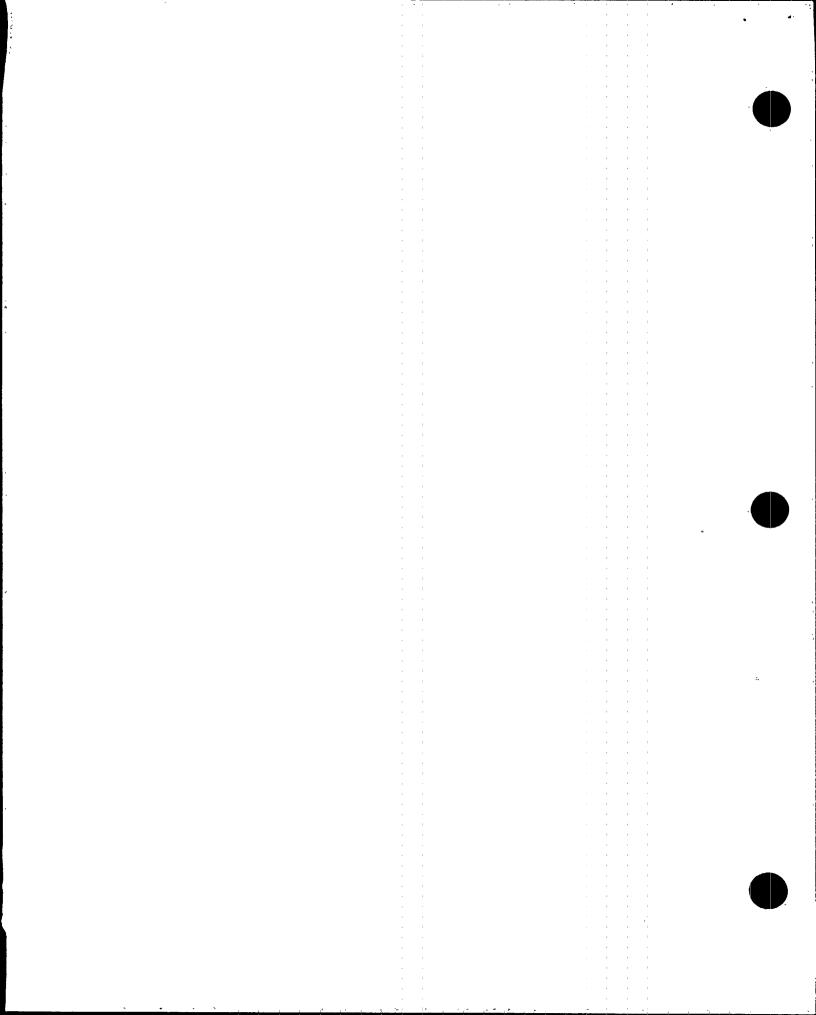


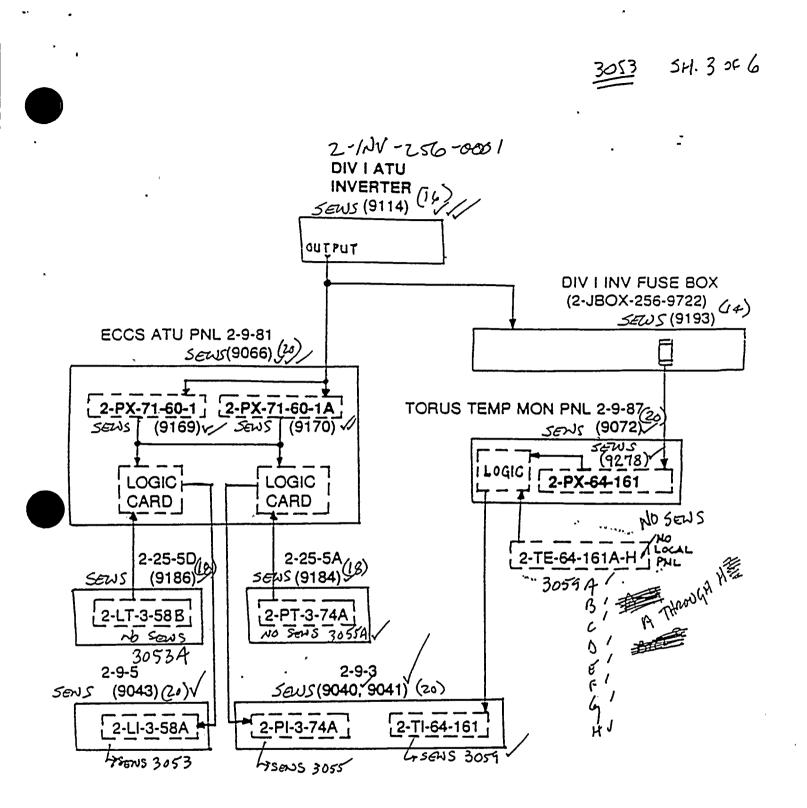
SCREENING EVALUATION. WORK SHEET (SEWS) Sheet 2 of 26

Equip. ID No. 2-LI-3-58A Equip. Class 20 - Instr. & Control Panels & Cabinets Equipment Description RPV LEVEL INSTRUMENT ANCHORAGE (Cont'd) Anchorage installation adequate, e.g., 4. weld quality and length, nuts and washers; expansion anchor tightness Y N U N/A Factors affecting anchorage capacity or margin of 5. safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking Y NU N/A 6. For bolted anchorages, gap under base less than 1/4-inch Y NU N/A Factors affecting essential relays considered: gap 7. under base, capacity reduction for expansion anchors Ν U N/A Base has adequate stiffness and effect of prying 8. action on anchors considered γ N U N/A 9. Strength of equipment base and load path Y N U N/A to CG adequate Embedded steel, grout pad or large concrete 10. Y'N U N/A pad adequacy evaluated N U re anchorage requirements met? INTERACTION EFFECTS Soft targets free from impact by nearby 1. equipment or structures Y N U N/A If equipment contains sensitive relays, equipment 2. free from all impact by nearby equipment or structures U N/A N U N/A Attached lines have adequate flexibility Ν 3. 4. Overhead equipment or distribution systems are not likely to collapse N U N/A Y N U N/A Have you looked for and found no other adverse concerns? 5. YNU Is equipment free of interaction effects? IS EQUIPMENT SEISMICALLY ADEQUATE? AN U COMMENTS 1. FOR SCHEMETIC OF THE INSTRUMENTATION LOOP SER PAGES 6-9. ALL COMPONENTS IN THE LOOP ARE QUALIFIED BY THE SENS OF THE RACK OR DANKE ON WHICH THEY ARE MONTHED OR THE SOUSFOR THE INSINISTIC CONFORMENT. 2. TE-64-161A-H AND TE-64-162A-H ARE QUALIFIED IN THE SEWS FOR SSEZ # 3059 AND 3060 (UNIT 2), And 33057 AND 33058 (UNIT 3).

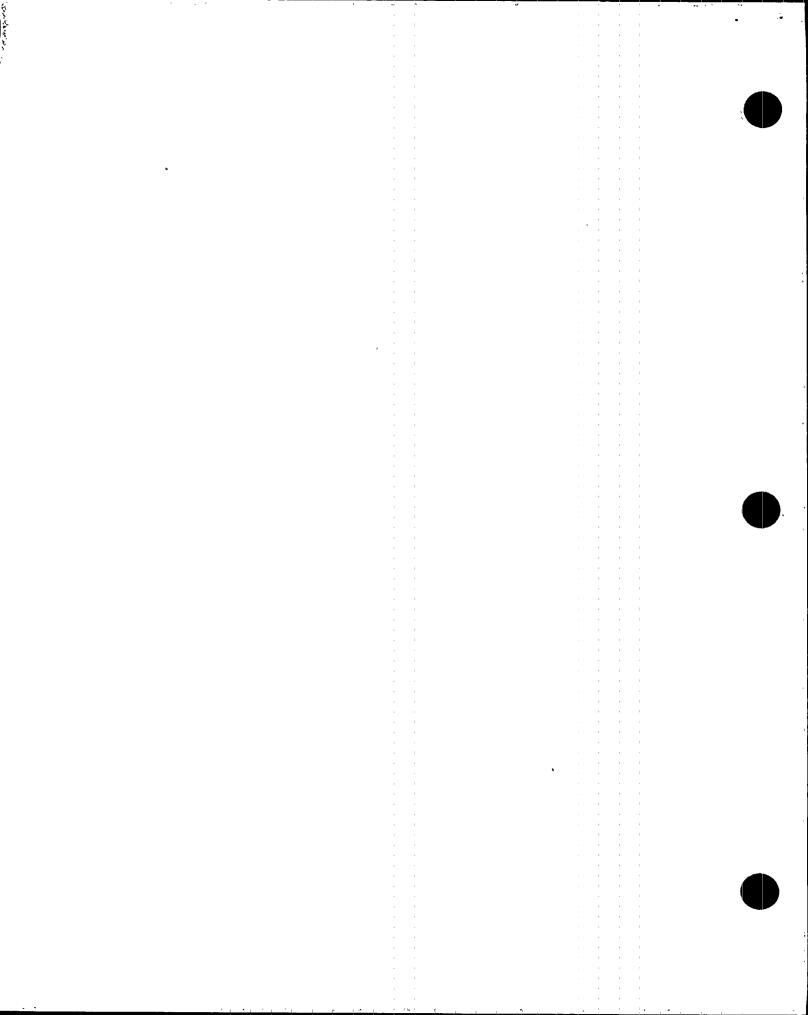
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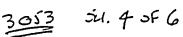
9043, QUALIFICO BY "RULE OF THE BOY.".

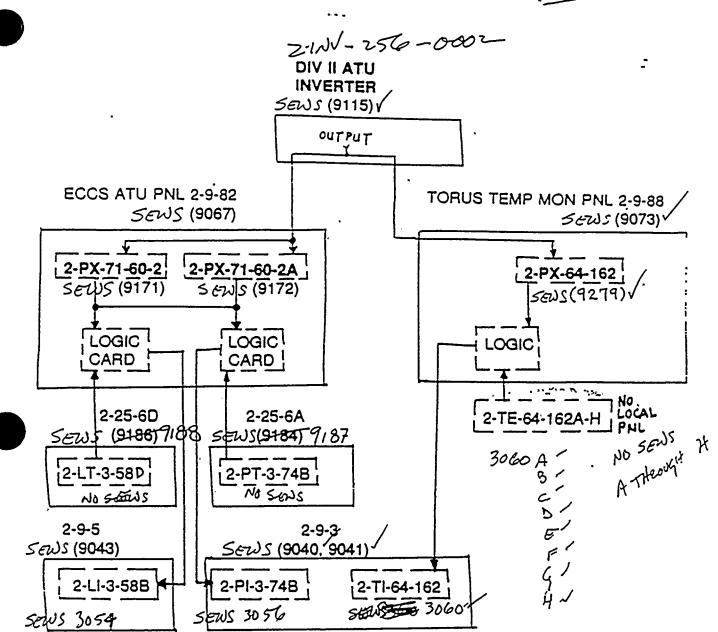




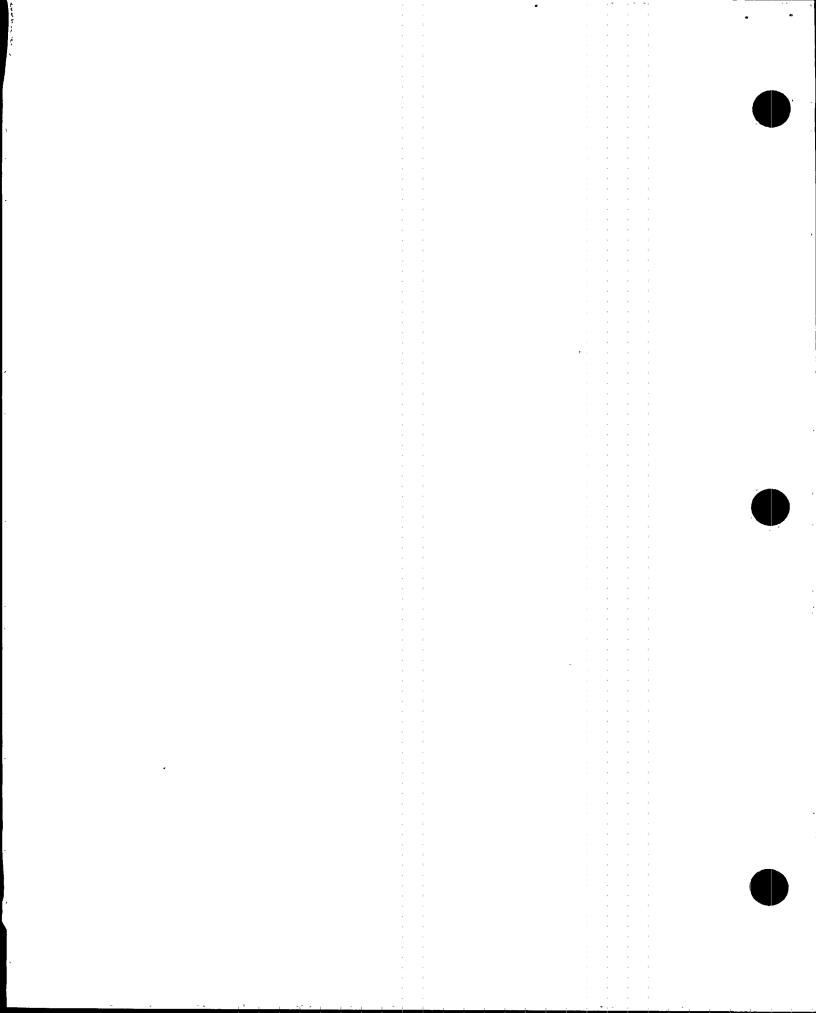
UNIT 2 : DIV I ATU INVERTER AND POWER SUPPLIES

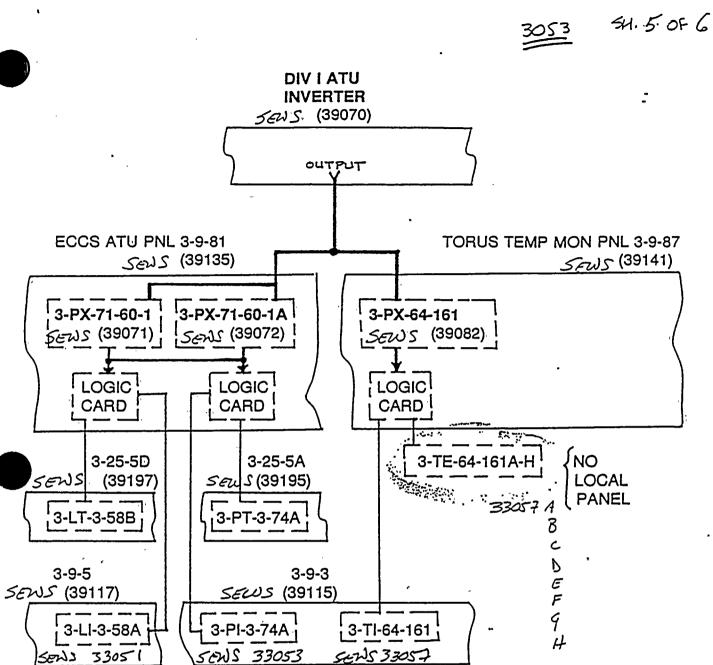






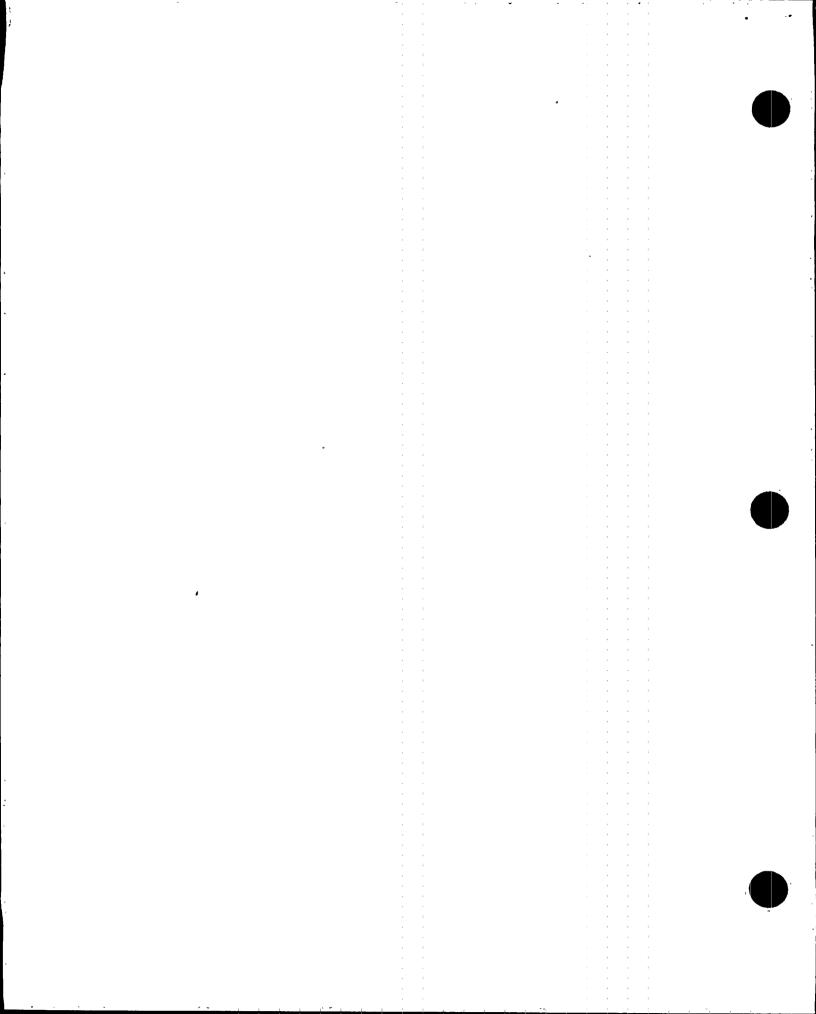
UNIT 2 : DIV I I ATU INVERTER AND POWER SUPPLIES

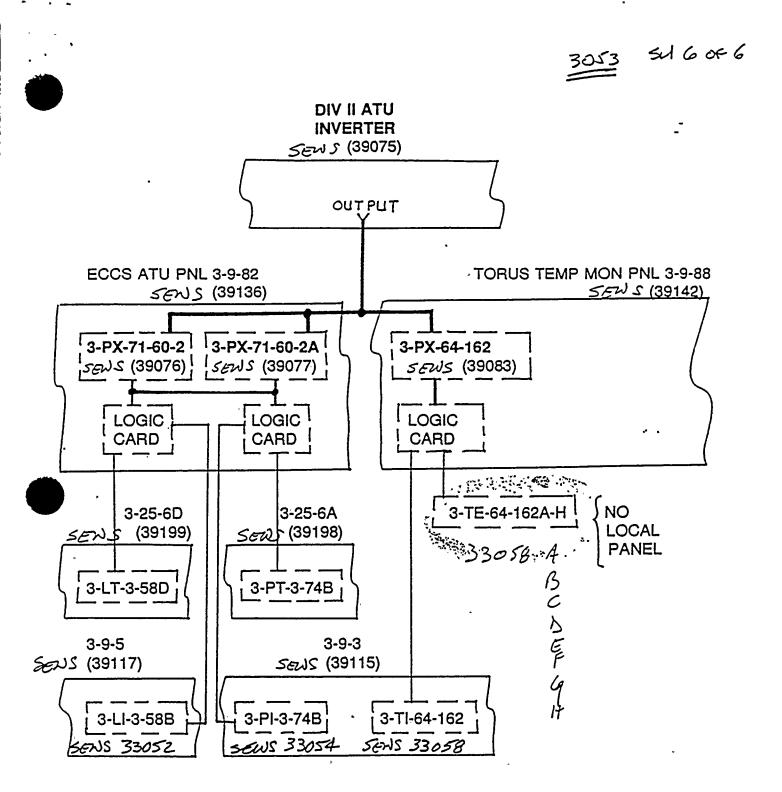




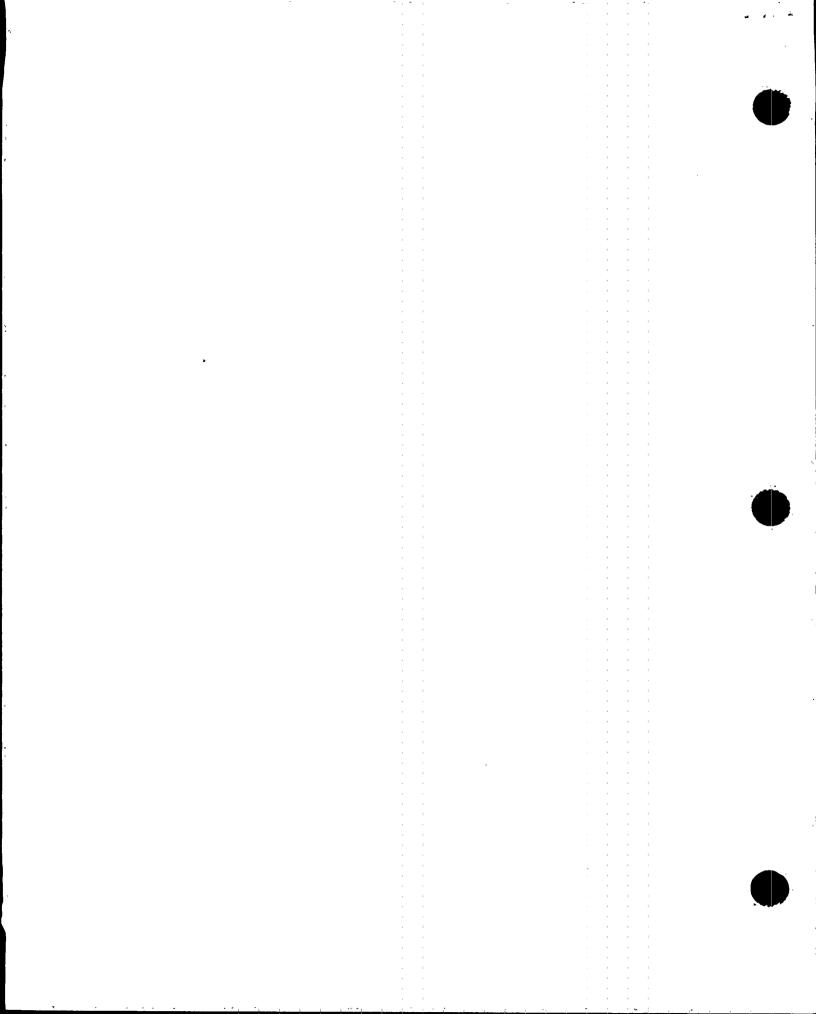
UNIT 3 : DIV I ATU INVERTER AND POWER SUPPLIES

4

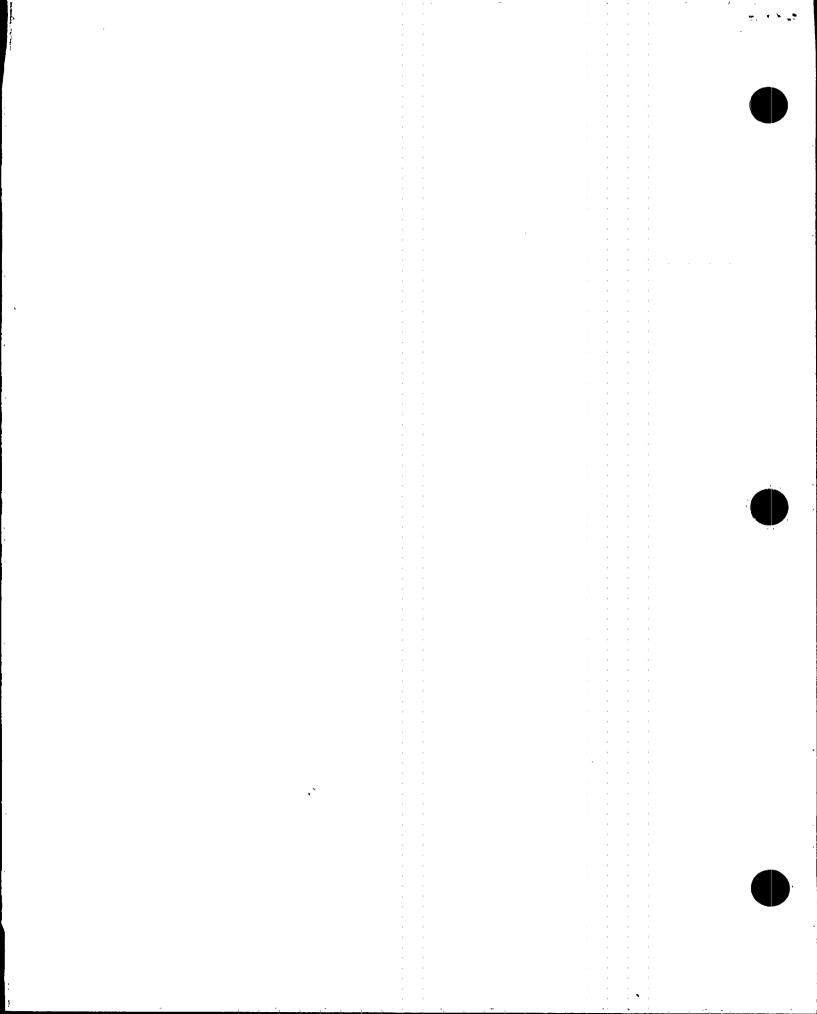




UNIT 3 : DIV II ATU INVERTER AND POWER SUPPLIES



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EL Line No. <u>305</u> 3		Sta	atus	G	л (บ	
		She	eet i	l of]	•		
IPEEE SUPPLEMENTAL SCREENING EVAL	UAT	ION V	ORK	SHEET			-
uip. ID No. 2-11-3-58A Equip. Class 20							
uipment Description							_ <u>,</u>
LAY WALKDOWN							
. Does spot check of essential relays indicate relays present and properly mounted?	Y	N	U	N/A			
. Are essential relays required to function during earthquake screened out?	Y	N	U	N/A			
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.		·.•			•		
. No other relay concerns?	Y	М.	U	N/A			
quents for relays satisfied?					Y	N U	
STEM INTERACTION EFFECTS		•					
. No potential sources could flood or spill onto cabinet?	Y	N	U	N/A			
SCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFA	ACTO	DRY ((Use	addit	iona	1	
SEE THE SEWS FOR SS	E	2.₹	<u>i</u>	904	-3		
FOR THE EVALUATION OF TH	hs	$\dot{\ }$	<i>э</i> М.	Ar	IEr	5.	
-							
EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXC	CLUC	DING	REL/	AY CHA	TTER	?	
EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVE	ESTI	[GAT]	ION?	YES_	<u></u> , N	0	ه ۸
aluated by: J.R. DISSAR		Dat	:e:_	<u>10/2</u>	<u>0/9</u>	<u>s</u> '	
aluated by:		Dat	:e: _	10/2	<u>-/93</u>	<u> </u>	



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, S	SEL #	9136				·			
	.				Rev Sta	ision 2 tus	2, c oi	rrecte N U	d, 6/28/91
		SCREENING	EVALUATION W	<u>DRK_SHEET</u> (SEWS	i) She	et 1 of	÷ 3		
	Equip. ID No	. Z-LPUL-	925-005D	Equip. Class _	<u> 18 - Inst</u>	rument	s_on	Racks	
-				PANEL Z				_	
				593 Room, Roi			RI	0	
I			(optional)						
	2. Elevat 3. Equipm 4. Capaci	tion where eq tion of seism nent has fund ity based on: l based on:	uipment receiv ic input below amental freque Existing Doc Bounding Spe GERS Ground Respo 1.5 x Boundi Conserv. Des Realistic M-	nse Spectrum	n grade t 8 Hz . Spec.		S	·	л <i>ьте 1</i>
• 1	explain the r 1. Equipm equipm 2. No com 3. Steel 4. Adjace sectio if the	eason for the ent is inclue ent class puters or pro- frame and sho nt racks which ns of multi-ly contain ess	meeting the s is conclusion ded in earthqu ogrammable con eet metal stru ch are close e oay racks are sential relays	cturally adequa nough to impact bolted together	g of the ca 5 section 1 te ; or	aveat r below)	NU NU NU NU NU	N/A N/A N/A N/A	Note 2
	6. Attach 7. Anchor 8. Relays 9. Have y	ed lines have age adequate mounted on e ou looked for	e adequate fle (See checklis equipment eval and found no	t below for det	ails) concerns?	X	N U N U N U	N/A N/A N/A	Notes 1 & Z Note Z N U N/A
	met by intent and explain t 1. Equipm çquipm 2. Meets	without meet he reason for ent is includ ent class all Bounding ent is a pres	ing the speci this conclus led in the gen Spectrum caves	sk (*) those ca fic wording of ion in the COMM eric seismic te ats ture, level or	the caveat IENTS secti esting	: rule ion bel Y Y	ow) NU NU NU	NA NA NA	

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SCREENING EVALUATION WORK SHEET (SEWS)

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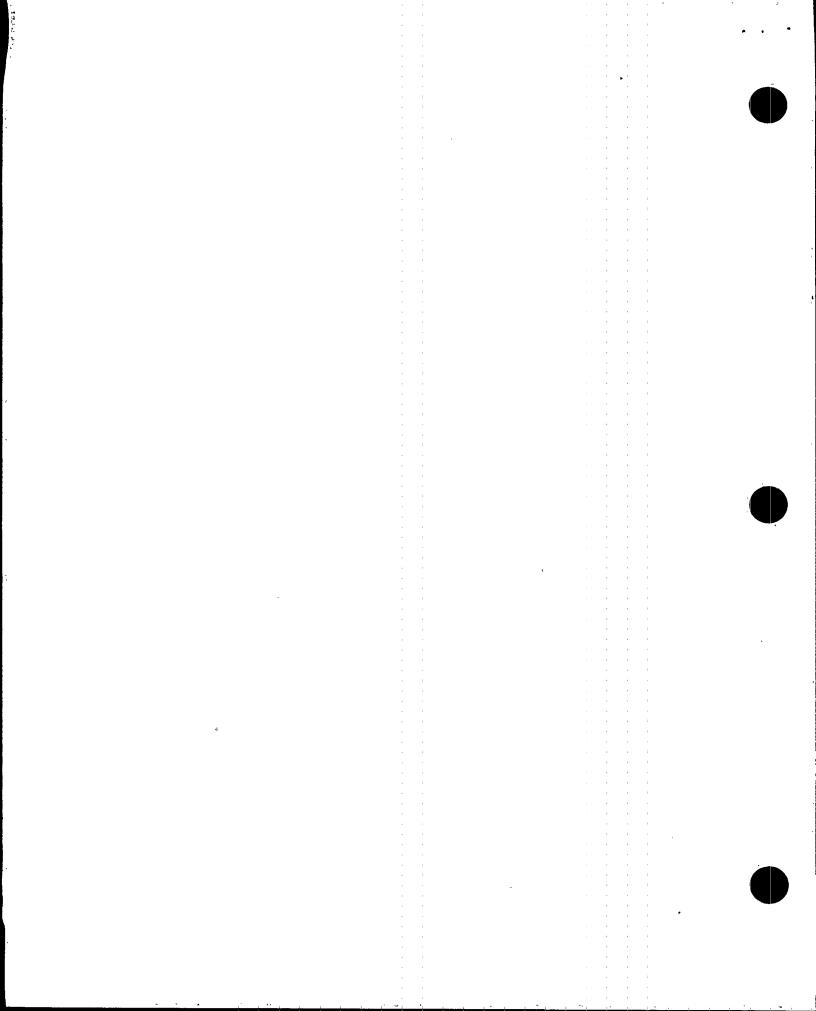
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Revision 2, Corrected, 6/28/91 Sheet 2 of 3

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	10 110 Z-1 Pall-92505D = 1 00	
	D. ID NO. Z-LPNL-925-005 D Equip. Class <u>18 - Ins</u>	
Equip	oment Description CDCAL PANE: 25-5	D
CAVEA 4.		
5.	seismically induced system perturbations (e.g.,	Y N U (MA)
6.	sloshing) No vacuum tubes	Y N U ALA
7.	All external mounting bolts in place	Y N U NKA
8.	Demand based on amplified portion of 3% damped floor response spectrum if estimated natural	YNU, LY/A*
•	frequency of rack less than 33 Hz	Y N U NA
9.	Rack capable of structurally transferring GERS	
Ic th	level seismic loads to anchorage e intent of all the caveats met for GERS?	Y N U NA
43 611	a meene of all the caveals met for dekst	Y N UNA.
ANCHO	RAGE	
1.	Appropriate equipment characteristics determined	
-	(mass, CG, natural freq., damping, center of rotation)	ON U N/A
2.	Type of anchorage covered by GIP	🗸 N U NA
	Sizes and locations of anchors determined	ATNUN/A
	Adequacy of anchorage installation evaluated	
-	(weld quality and length, nuts and washers, expansion	
5.	anchor tightness, etc.)	Y N U N/A
Ű.	Factors affecting anchorage capacity or margin of safety considered, embedment longth anchor considered	
	safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and	
	concrete cracking	(Y)N U N/A
6.	For bolted anchorages, gap under base less than	Y N U N/A
	1/4-inch	🕐 N U N/A
7.	Factors affecting essential relays considered: gap	
	under base, capacity reduction for expansion anchors	Y N U NA
8.	Base has adequate stiffness and effect of prying	
-	action on anchors considered	🕐 N U N/A
9.	Strength of equipment base and load path	
10	to CG adequate	🏠 N U N/A
10.		· · · · · ·
Are ar	pad adequacy evaluated achorage requirements met?	Y N U NA N U
	inining i chari cacing act	
INTERA	ACTION EFFECTS C T	
1.	Soft targets free from impact by nearby	
	equipment or structures	() N U N/A
2.	If equipment contains sensitive relays, equipment	
	free from all impact by nearby equipment or structures	Y N U (N/A)
	Attached lines have adequate flexibility	ON U N/A FLOW. CK
		Y N U NA ON U NA FLOR OK OIL Componen
		cr. ··· Componen
		,



SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2, Corrected, 6/28/91 Sheet 3 of 3

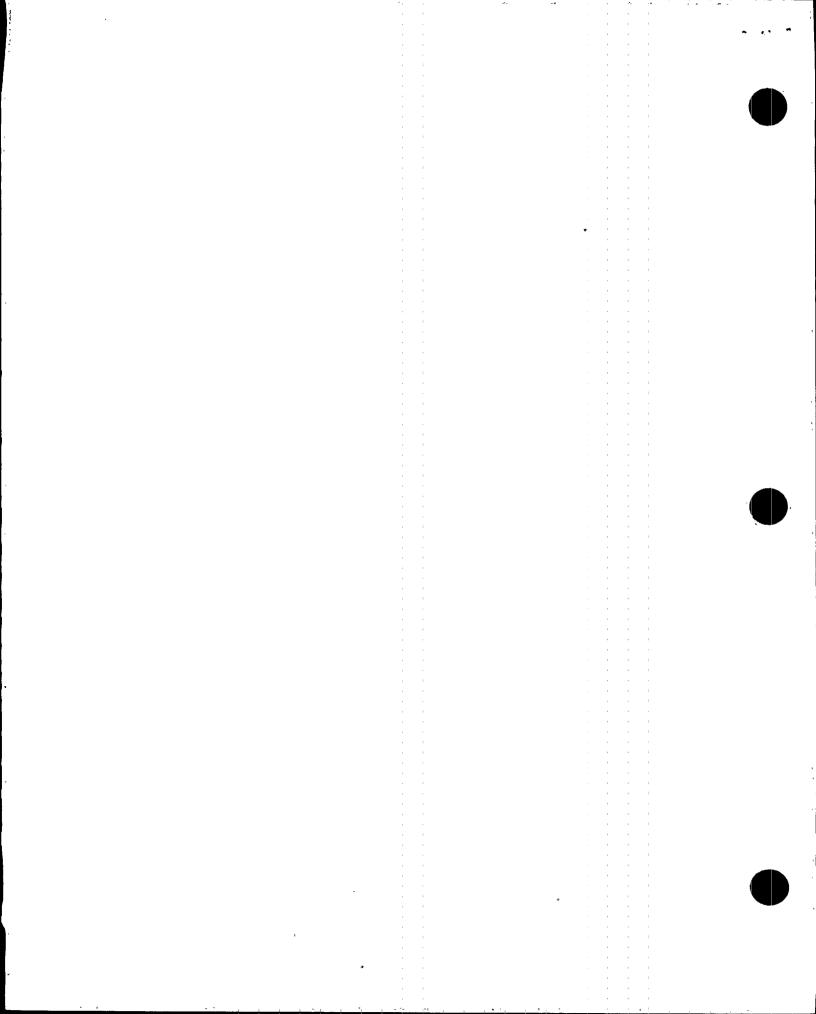
Equip. ID No. Z-LPAL -925-005 D Equip. Class 18 - Instruments on Racks Equipment Description _____ COCAL PANEL 25-INTERACTION EFFECTS (Cont'd) Overhead equipment or distribution systems are 4. not likely to collapse U'N/A Have you looked for and found no other adverse concerns? 11 5. Is equipment free of interaction effects? IS EQUIPMENT SEISMICALLY ADEQUATE?

COMMENTS

For notes see 2-LPNL-925-6D

PHOTO 13-11:41

houte Date: 4-12 Evaluated by: 6.18-3



Status	(Y)N

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Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>2-LPNL-925-005D</u> Equip. Class <u>18 - Instruments on Racks</u> Equipment Description <u>LOCAL PANEL 25-5D</u>

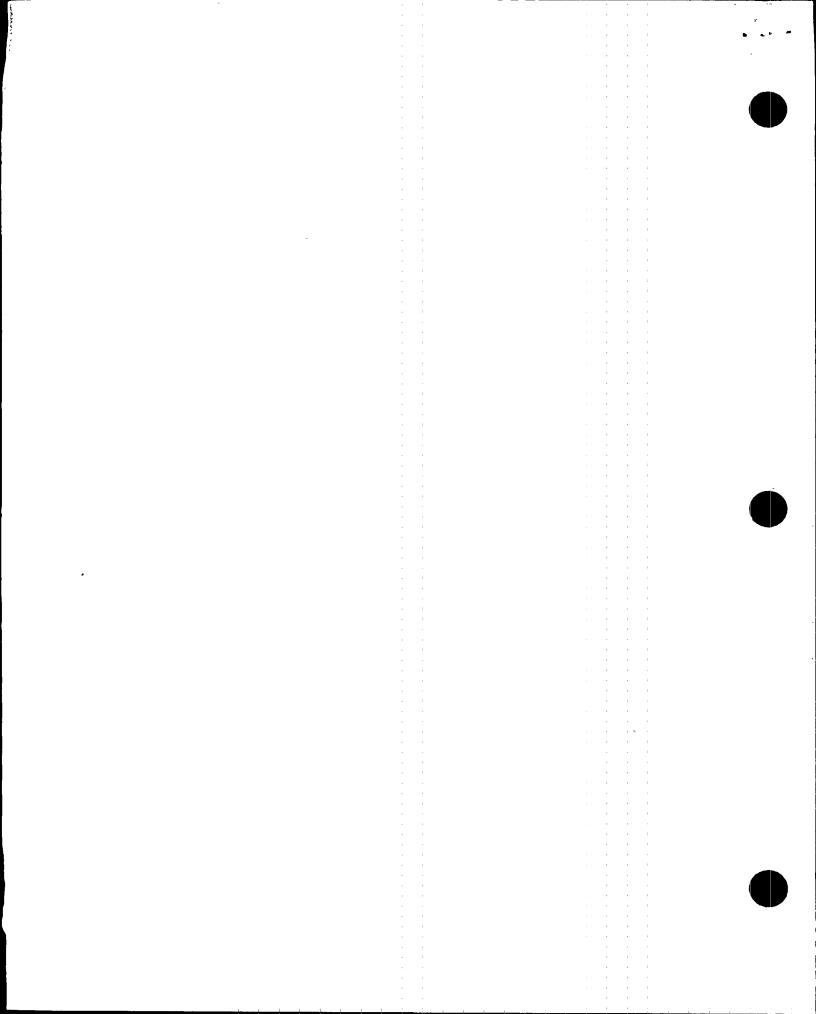
RELAY WALKDOWN

cabinet?

 Does spot check of essential relays indicate relays present and properly mounted? 	Ŷ	N	U	NA
2. Are essential relays required to function during earthquake screened out?	Y	N	ປ	MA
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.				• .
3. No other relay concerns?	Y	N	U	(NTA)
Requirements for relays satisfied?				. 🔊 N U
SYSTEM INTERACTION EFFECTS				
1. No potential sources could flood or spill onto	\mathcal{O}	N	U	N/A

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

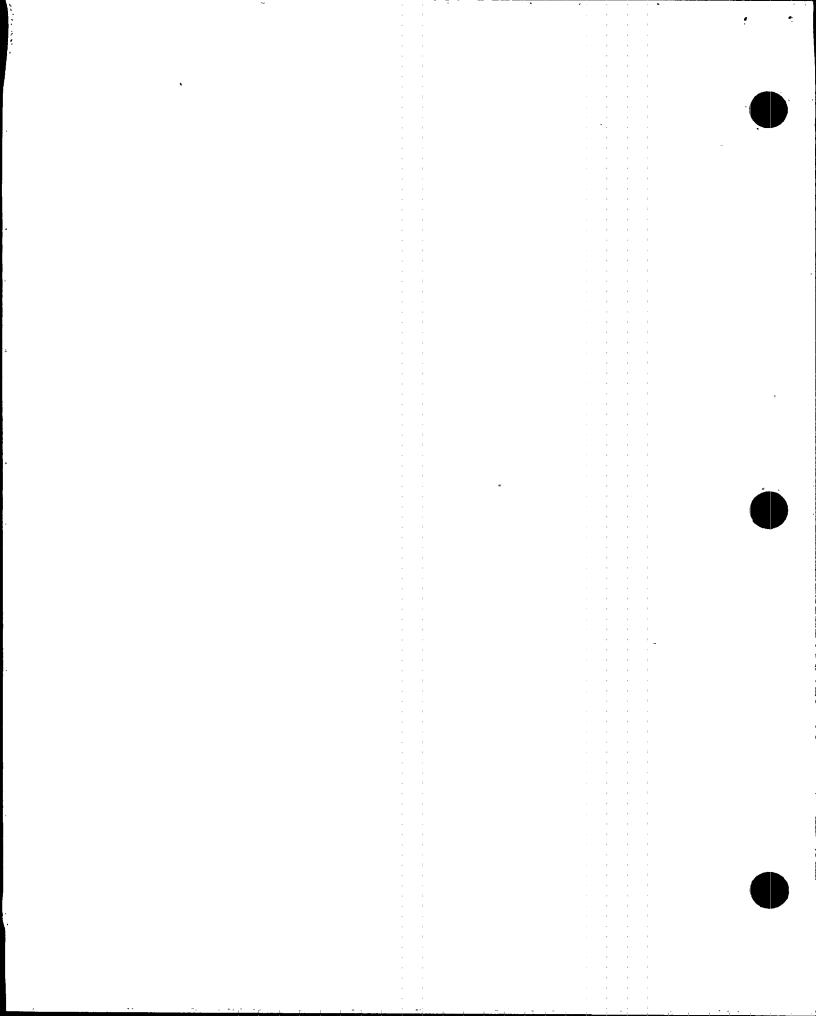
IS EQUIPMENT	FREE OF NEED	FOR FURTHER	INVESTIGATION	, EXCLUDING REL	AY CHATTER?
IS EQUIPMENT	FREE OF NEED	FOR FURTHER	RELAY CHATTER	INVESTIGATION?	YES NO
Evaluated by:	_lln	¥		 •	9-19-91
Evaluated by:	- X	D. Juens	5	Date:	9-19-95
		· · · · · · · · · · · · · · · · · · ·		•	



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			Revision 2, for Status Y N	rected, 6/28/91 U
	SCREENING	EVALUATION WORK SHEET (SEWS)	Sheet 1 of 3	
		-925-006D Equip. Class <u>18</u>		lacks
Equip	ment Description	LOCAL PANIEL 25-	67	·
Locati	ion: Bldg. <u>P.B</u>	Floor El. <u>503</u> Room, Row/Co	n <u> </u>	2
Manufa	acturer, Model, Etc.	(optional)		
<u>SEISMI</u> 1. 2. 3. 4. 5.	Elevation of seism Equipment has fund	uipment receives seismic input ic input below about 40' from gr amental frequency above about 8 Existing Documentation Bounding Spectrum GERS	vade Hz Hz GERS GERS ABS Hec. CRS	3 N/A NOTE 1
	capacity exceed dema	nd?		W R U
re me explai 2. 3. 4. 5. 6. 7.	n the reason for th Equipment is inclu equipment class No computers or pr Steel frame and sh Adjacent racks whi sections of multi- if they contain es Natural frequency Attached lines have Anchorage adequate	relative to 8 Hz limit considere e adequate flexibility (See checklist below for detail)	the caveat rule a ction below) Y N U Y N U Y N U M U Y N U S) Y N U N U N U N U N U N U	nd N/A N/A No== 2 N/A N/A No== 152 N/A N/A No== 152 N/A
8. 9. Is the	Relays mounted on (Have you looked for	equipment evaluated r and found no other adverse con caveats met for Bounding Spectrum	cerns? (Y) N U	N/A N/A (Y)N U N/A
met by	intent without meet plain the reason for Equipment is inclue equipment class Meets all Bounding	with an asterisk (*) those cavea ting the specific wording of the r this conclusion in the COMMENT ded in the generic seismic testin Spectrum caveats ssure, temperature, level or flor	caveat rule S section below) ng Y N U Y N U	N/A N/A N/A

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SCREENING EVALUATION WORK SHEET (SEWS)

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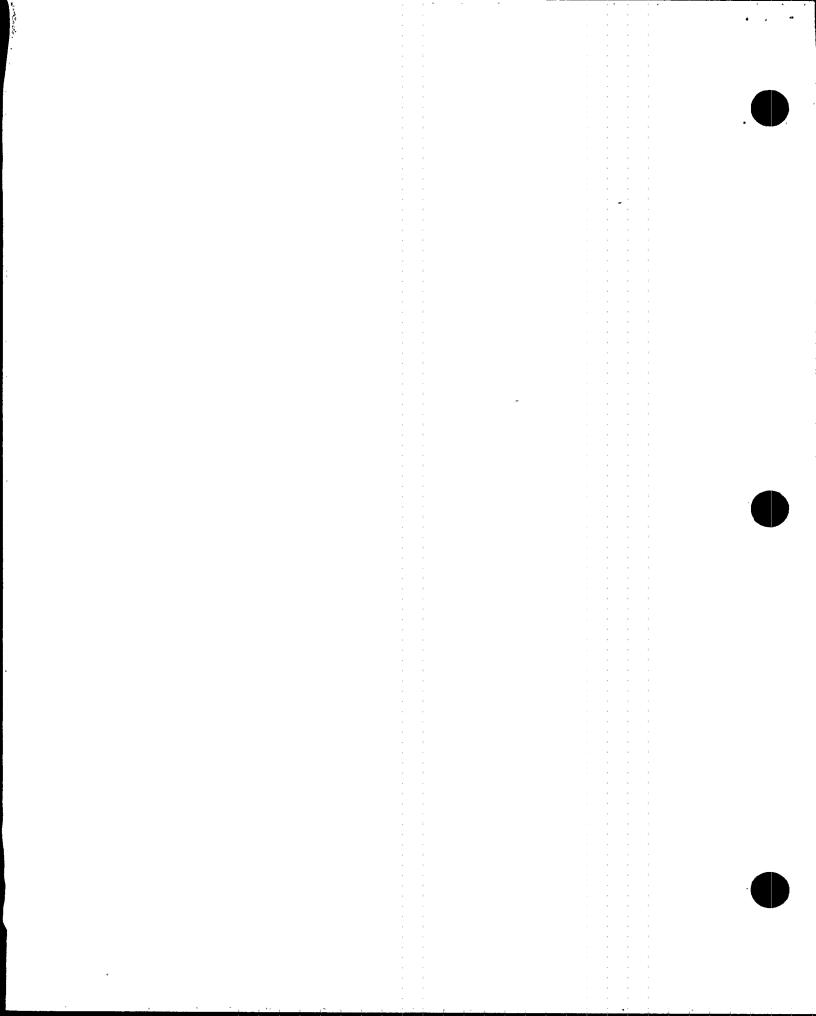
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Revision 2, Corrected, 6/28/91 Sheet 2 of 3

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Equit p	ID No.2-LPNL-925-006D Equip. Class 18 - Ins	truments_on_Racks
	nent Description LOCAL PANEL 25-6D	
CAVEAT	CEDS (Cont(d)	
<u>LAVEA</u>	<u>S - GERS (Cont'd)</u> Component is one of the specific makes and models	,
5.	tested, as listed in Appendix B Necessary function of component not sensitive to seismically induced system perturbations (e.g.,	Y N U (NTA)
_	sloshing)	Y N U (NZA)
<u>6</u> .	No vacuum tubes	Y N U NA Y N U NA
7.	All external mounting bolts in place	Y N U MA
8.	Demand based on amplified portion of 3% damped floor response spectrum if estimated natural frequency of rack less than 33 Hz	YNU
9.	Rack capable of structurally transferring GERS	
	level seismic loads to anchorage	YNU NA
Is the	intent of all the caveats met for GERS?	Y N U N/A
ANOUSS		
ANCHOR		
1.	Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation)	
2.	Type of anchorage covered by GIP	N U N/A N U N/A
3.	Sizes and locations of anchors determined	ÓN U NÁ
	Adequacy of anchorage installation evaluated	
	(weld quality and length, nuts and washers, expansion	^
-	anchor tightness, etc.)	Ý NUN/A .
5.	Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and	
	concrete cracking	YN U N/A
6.	For bolted anchorages, gap under base less than	
	1/4-inch	Ý NUN/A
7.	Factors affecting essential relays considered: gap	
•	under base, capacity reduction for expansion anchors	Y N U (N/A)
8.	Base has adequate stiffness and effect of prying	
9.	action on anchors considered	(Y) N U N/A
3.	Strength of equipment base and load path to CG adequate	Ý NUN/A
10.		
	pad adequacy evaluated	Y N U N/A
Are and	chorage requirements met?	Y N U N/A Y N U
	CTION EFFECTS	
1.	Soft targets free from impact by nearby	\sim
	equipment or structures	(Y) N U N/A Mick 3
2.	If equipment contains sensitive relays, equipment	
	free from all impact by nearby equipment or structures Attached lines have adequate flexibility	Y N U N/A
	Accached Times have adequate Trexibility	Y N U NTA TN U NTA FLEX OK for all Components
		Componente
	G.18-2	1 5



SCREENING EVALUATION WORK SHEET (SEWS) Revision 2, Corrected, 6/28/9 Sheet 3 of 3
Equip. ID No. 2-LPAIL-925-000 Equip. Class 18 - Instruments on Racks
Equipment Description <u>LOCAL PANEL 25-6D</u>
INTERACTION EFFECTS (Cont'd) 4. Overhead equipment or distribution systems are not likely to collapse 5. Have you looked for and found no other adverse concerns? Y N U N/A Is equipment free of interaction effects?
IS EQUIPMENT SEISMICALLY ADEQUATE?
COMMENTS
1. Panel is well braced. Judged to respond > BHZ.
2. 36
We lood zist zit zit We lood zist zit zit zit zit zit zit zit zit zit zi
3. Alearby fire actinguisies judged adequately supported.
Evaluated by: <u>A.O. Augustai</u> Date: <u>9-18-95</u> <u>9-19-95</u>
P-6-3 13-11=22

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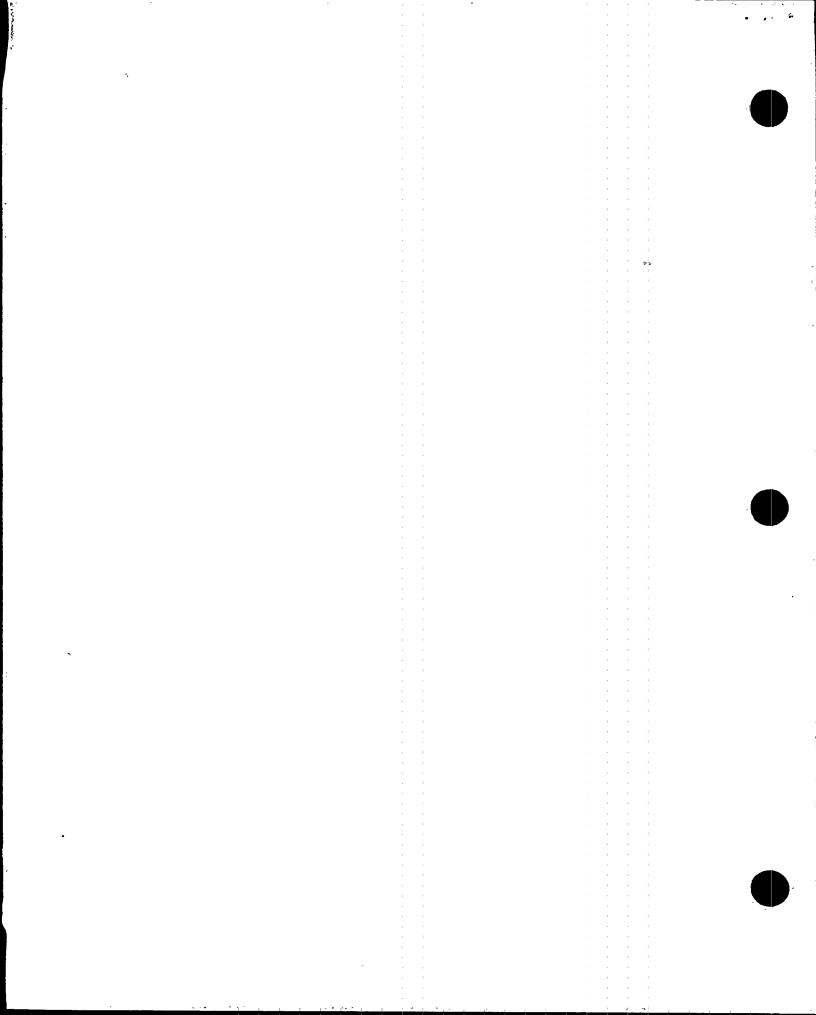
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Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

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Equip. ID No. <u>2-LPNL-925-006D</u> Equip. Class <u>18 - Instruments on Racks</u> Equipment Description LOCAL PANEL 25-6D

RELAY WALKDOWN

- 1. Does spot check of essential relays indicate relays present and properly mounted?
- 2. Are essential relays required to function during earthquake screened out?

If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.

3. No other relay concerns?

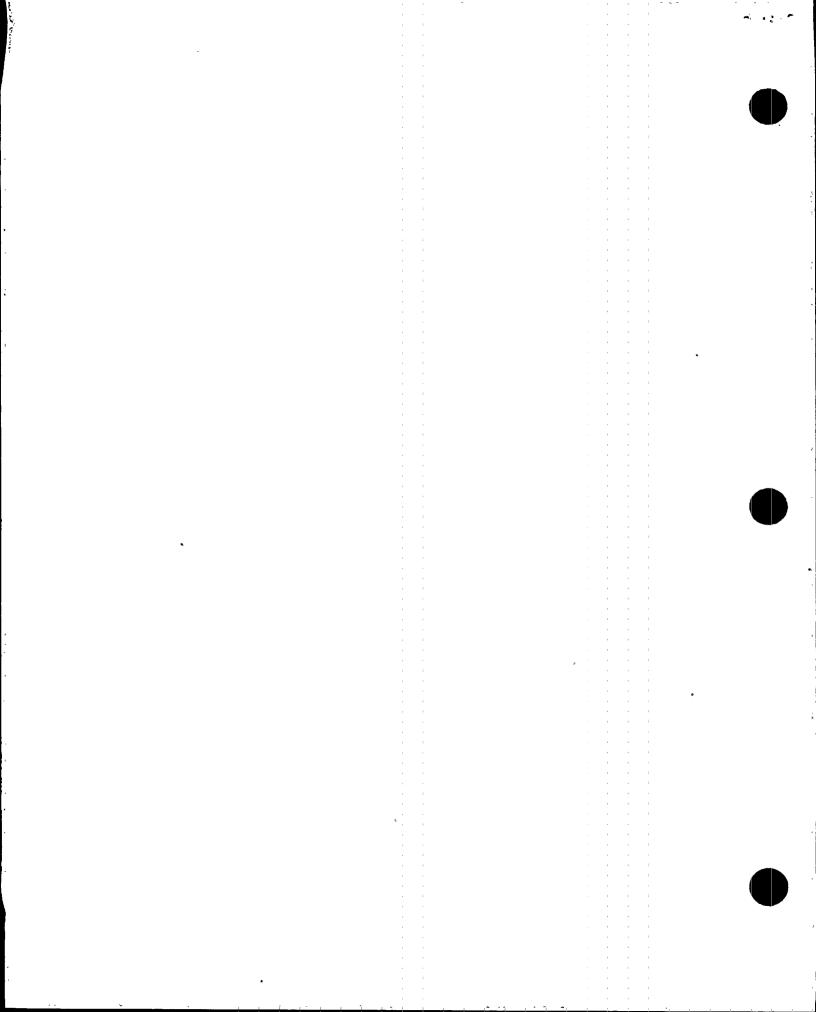
Requirements for relays satisfied?

SYSTEM INTERACTION: EFFECTS

1. No potential sources could flood or spill onto cabinet?

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLU	UDING RELA	AY CHATTER?
YES NO		
IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVEST	TIGATION?	YESNO
Evaluated by:		9-1955
Evaluated by:	Date:	9-19-20 1

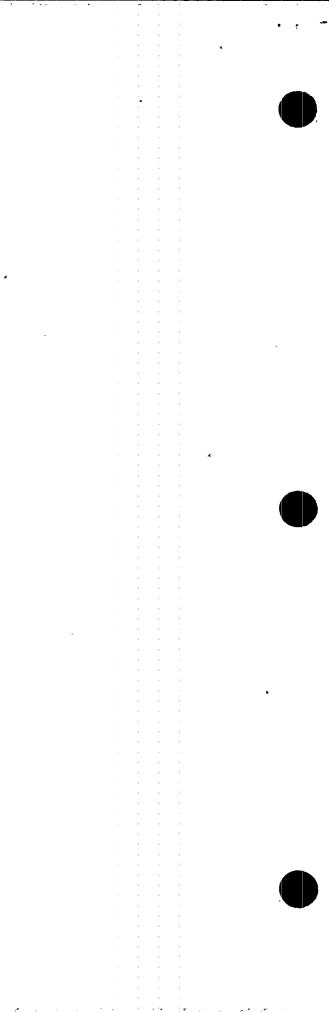


	tern a	He 4 9	of Electric
	ion 2A s		1
SCREENING_EVALUATION_WORK_SHEET (SEWS) Sheet			
		ſ	-
Equip. ID No. 2-NM-92-7/41A Equip. Class 20 - Instr. & Contr	ro] Pa	<u>nels</u>	& Cabinets
Equipment Description <u>Channel</u> "A" IRM Indicator			<u></u>
Location: Bldg. <u>CB</u> Floor El. <u>617</u> Room, Row/Col <u>Uni</u>	+21	ACR	2
Manufacturer, Model, Etc. (optional but recommended)			<u></u>
SEISMIC CAPACITY VS DEMAND 1. Elevation where equipment receives seismic input 2. Elevation of seismic input below about 40' from grade 3. Equipment has fundamental frequency above about 8 Hz 4. Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS	YI	1 U	/ N/A N/A
5. Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)	GRS AGS CRS RRS		YNU
<u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those are met by intent without meeting the specific wording of the cav explain the reason for this conclusion in the COMMENTS section be	eat ru	s wi le a	nich and
 Equipment is included in earthquake experience equipment class No computers or programmable controllers No strip chart recorders Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or 	Y N Y N Y N Y N	U U	N/A N/A N/A N/A
panels, are bolted together if they contain essential relays 6. Drawers and equipment on slides restrained	YN	U	N/A
from falling out 7. All doors secured by latch or fastener 8. Attached lines have adequate flexibility 9. Anchorage adequate (See checklist below for details) 10. Relays mounted on equipment evaluated 11. Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum?		บ บ บ	N/A N/A N/A N/A N/A N/A Y N U N/A
ANCHORAGE 1. Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) 2. Type of anchorage covered by GIP 3. Sizes and locations of anchors determined	Y N Y N Y N	U	N/A N/A N/A

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SSEL Line no. 3065

SCREENING EVALUATION WORK SHEET (SEWS)

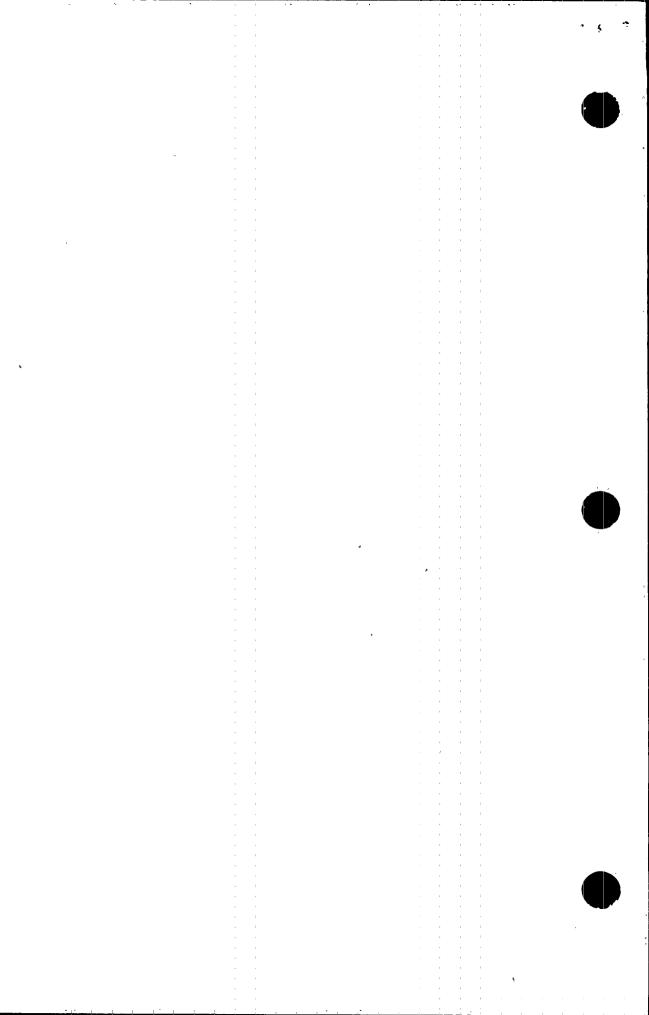
Revision 2A Sheet 2.of 2

Equip	ID No. <u>2-NM-92-7/41A</u> Equip. Class <u>20 - Instr. & Cont</u> ment Description <u>Channel</u> "A" <u>IRM</u> Indicator			<u> </u>		
	RAGE (Cont'd)					
<u>Anchor</u> 4.	Anchorage installation adequate, e.g.,					
••	weld quality and length, nuts and washers, expansion					
	anchor tightness	Y	N	U	N/A	
5.	Factors affecting anchorage capacity or margin of					
	safety considered: embedment length, anchor spacing,					
	free-edge distance, concrete strength/condition, and	Y	N	п	N/A	
6.	concrete cracking For bolted anchorages, gap under base less than	4		0	iy n	
0.	1/4-inch	Y	N	U	N/A	
7.	Factors affecting essential relays considered: gap	•		•	.,	
	under base, capacity reduction for expansion anchors	Y	N	U	N/A	
8.	Base has adequate stiffness and effect of prying					
	action on anchors considered	Ŷ	N	U	N/A	
9.	Strength of equipment base and load path	v			A1 / A	
••	to CG adequate	, T	n	U	N/A	
10.		v	N	11	N/A	
	pad adequacy evaluated chorage requirements met?	•		U	א צ	U
Are at						v
INTERA	CTION_EFFECTS .					
1.	Soft targets free from impact by nearby					
	equipment or structures	Y	N	U	N/A	
2.	If equipment contains sensitive relays, equipment					
	free from all impact by nearby equipment or structures	Ŷ	N	Ü	N/A	
3.	Attached lines have adequate flexibility	Y	N	U	N/A	
4.	Overhead equipment or distribution systems are	v	M		N /A	
-	not likely to collapse	v V	ม	11	N/A N/A	
5.	Have you looked for and found no other adverse concerns?	1	11	v	יער א ץ	н і
is equ	ipment free of interaction effects:				1 11	0
IS FOR	IPMENT SEISMICALLY ADEQUATE?				(P)N	U

<u>COMMENTS</u>

The above equipment item is adequately nounfed on Panel 2-9-12 (SSEL # 9403) and is evaluated by the rule of the box per GIP. Refer to SEWS for SSEL # 9403 for detailed evaluation of the control panel.

du O. Diza Date: <u>4/12/96</u> Evaluated by: J.R. DISSER



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SEL Line No. 3065	Status (Y) N U
	Sheet 1 of 1
IPEEE SUPPLEMENTAL SCREENING EVAL	UATION WORKSHEET
a server 2-144 Grazicit a server 20 - lust	r & Capel Re ale & Colimate
Equip. ID No. <u>2-NM-92-7/41A</u> Equip. Class <u>20-lnst</u> Equipment Description <u>Channel</u> "Á" IRM Ind	1. J Control Fanklis + Cround 5
Equipment Description <u>Channel</u> A <u>IRM</u> Ind	Licator
RELAY WALKDOWN	
I. Does spot check of essential relays indicate relays present and properly mounted?	Y N U (N/A)
2. Are essential relays required to function during earthquake screened out?	Y N U NA
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.	- -
No other relay concerns?	Y N U NA
Requirements for relays satisfied?	(Y) N U
SYSTEM INTERACTION EFFECTS	
1. No potential sources could flood or spill onto cabinet?	Y N U (N/A)
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISF sheets if necessary)	
Refer to the SEWS package for Pane	l 2-9-12 (SSEL #9403)
EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXP YES NO	CLUDING RELAY CHATTER?
IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INV	
Evaluated by: John O. Dim	Date: <u>4/18/96</u>
Evaluated by J.R. DISSER	Date: <u>4/19/96</u> '

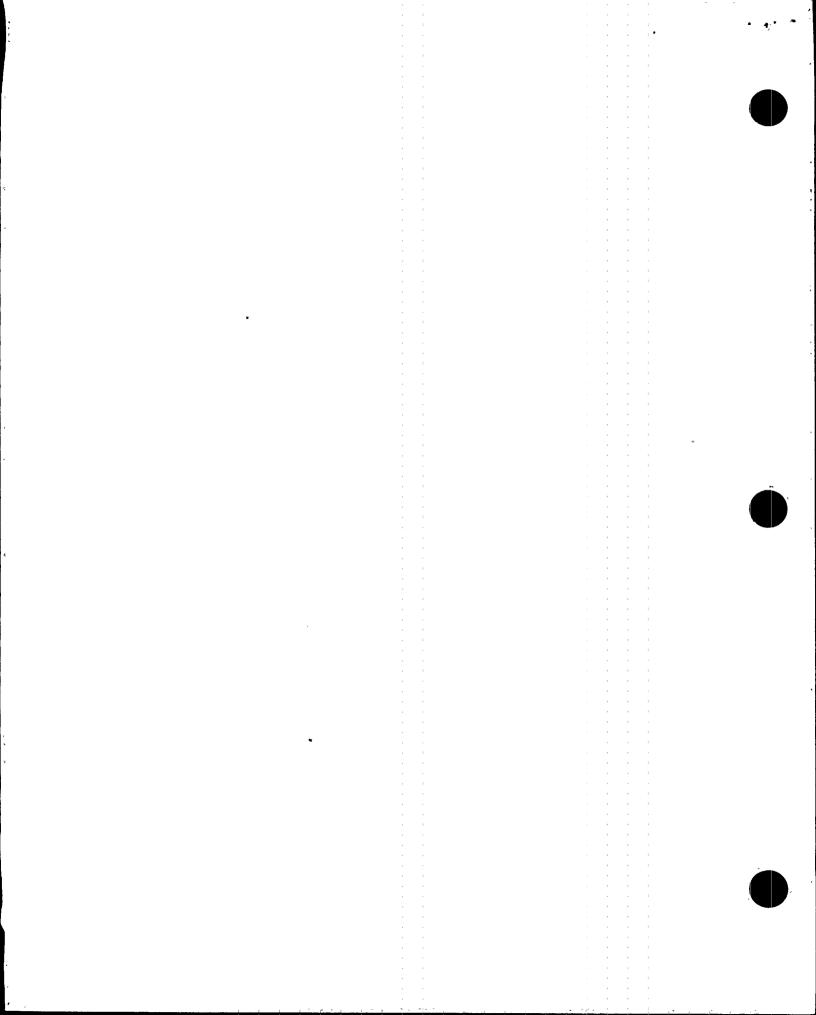
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	[INTENIT]
55EL # 9403	
Revi	sion 2A us Y N U
SCREENING EVALUATION WORK SHEET (SEWS) Shee	t 1 of 2
Equip. ID No. 2-PNLA-009-012 Equip. Class 20 - Instr. & Cont	trol Panels & Cabinets
Equipment Description <u>Panel 2-9-12</u>	
Location: Bldg. <u>CB</u> Floor El. <u>$617'$</u> Room, Row/Col <u>N</u>	icr
Manufacturer, Model, Etc. (optional but recommended)	
SEISMIC CAPACITY VS DEMAND 1. Elevation where equipment receives seismic input 2. Elevation of seismic input below about 40' from grade 3. Equipment has fundamental frequency above about 8 Hz 4. Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS 5. Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)	$\begin{array}{c} 617' \\ \hline Y (N) U N/A \\ \hline D N U N/A \\ \hline D OC \\ BS \\ \hline GERS \\ GERS \\ GRS \\ AGS \\ CRS \\ RRS \\ \hline Y N U^{(2)} \end{array}$
 <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those are met by intent without meeting the specific wording of the ca explain the reason for this conclusion in the COMMENTS section b Equipment is included in earthquake experience equipment class No computers or programmable controllers No strip chart recorders Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or 	veat rule and
 panels, are bolted together if they contain essential relays Drawers and equipment on slides restrained from falling out All doors secured by latch or fastener Attached lines have adequate flexibility Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated AF = 4.5 Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum? 	$ \begin{array}{c} (Y) \\ N \\ U \\ N \\ V \\ N \\ V \\ N \\ U \\ N \\ U \\ N \\ V \\ N \\ U \\ N \\ A \\ (S) \\ N \\ V \\ N \\ U \\ N \\ A \\ (S) \\ (S) \\ N \\ V \\ V$
ANCHORAGE 1. Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) 2. Type of anchorage covered by GIP 3. Sizes and locations of anchors determined	N U N/A N U N/A N U N/A



SSEL # 9403

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SCREENING EVALUATION WORK SHEET (SEWS)

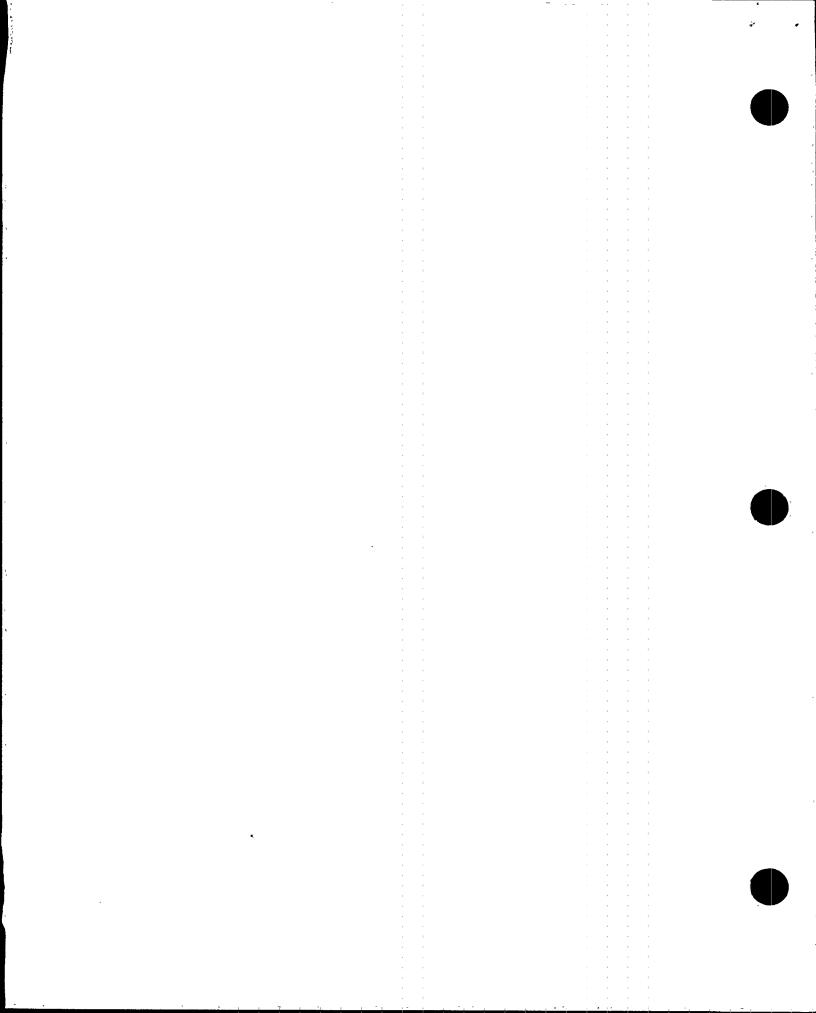
Revision 2A Sheet 2 of 2

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	Equip. ID No. Z-PALA-009-012 Equip. Class 20 - Instr. & Cont	trol Panels & Cabinets
	Equipment Description Panel 2-9-12	
:	 ANCHORAGE (Cont'd) Anchorage installation adequate, e.g., weld quality and length, nuts and washers, expansion anchor tightness Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking For bolted anchorages, gap under base less than 1/4-inch (Madds) Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors Base has adequate stiffness and effect of prying action on anchors considered Strength of equipment base and load path to CG adequate Embedded steel, grout pad or large concrete pad adequacy evaluated Are anchorage requirements met? 	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
	 <u>INTERACTION EFFECTS</u> 1. Soft targets free from impact by nearby equipment or structures 2. If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures 3. Attached lines have adequate flexibility 4. Overhead equipment or distribution systems are not likely to collapse 5. Have you looked for and found no other adverse concerns? Is equipment free of interaction effects? 	$ \begin{array}{c} (Y) \\ (Y) $
	IS EQUIPMENT SEISMICALLY ADEQUATE?	YNU
	<u>COMMENTS</u> - For notes 1-5, refer to the sews package for (SSEL # 39119) based on similar configure	Panel 3-9-9 tion.
	6. Latches to the doors are loose and may caus during a seismic event,	e velay challer
	Evaluated by: <u>J.R. Disser</u> J.R. Disser	Date: <u>4/19/95</u> <u>4/19/96</u>
	\leq /	、 •

G.20-2

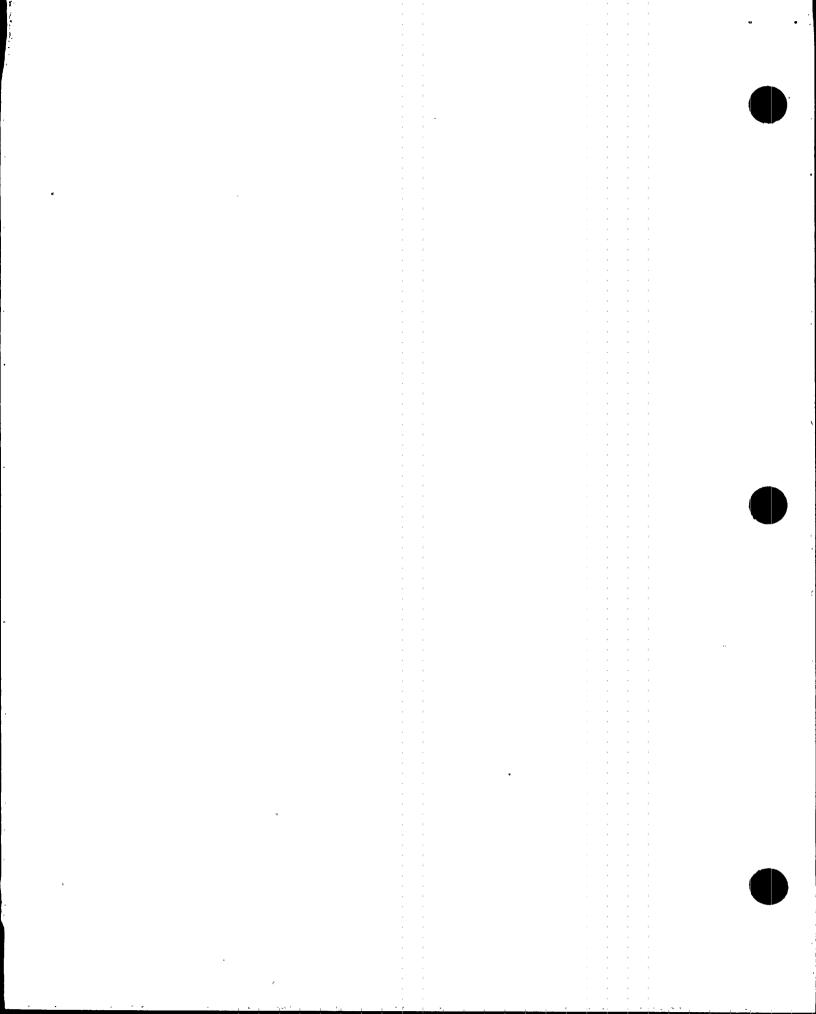


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	SSEL Line No. <u>9403</u>	S	tatus	; `	Y N U	
	AI	S	heet	1 of 3	1	
	IPEEE SUPPLEMENTAL SCREENING EVALUA	TION	WORK	SHEET		
	Equip. ID No. 2-PNLA - 009-012 Equip. Class 20 - I&	C	Pan	els +	Cabinet	5
	Equipment Description Panel 2-9-12				·····	
	RELAY WALKDOWN					
	1. Does spot check of essential relays indicate relays present and properly mounted?) N	U	N/A	•	
	2. Are essential relays required to function Y during earthquake screened out?	N	U	N/A)	
	If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.			• .		•
•	3. No other relay concerns?) и	U	N/A		
	Requirements for relays satisfied?				Y N U	(1)
	SYSTEM INTERACTION EFFECTS					
	1. No potential sources could flood or spill onto C cabinet?) N	U	N/A		
	DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACT sheets if necessary)	TORY	(Use	addit	ional	
	1. See outlier OSVS # 9403 for potential concerns.	rel	lay c	hatte	The second secon	
	Concerns.		/			
	IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLU	JDING	REL	AY CHA	TTER?	

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IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER	INVESTIGATION? YES NO \vee ()
Evaluated by: Dizn	Date: <u>4/19/96</u> '
Evaluated by:	Date: 4/19/96
27	



55EL # 9:403

Revision 2 Corrected, 6/28/91

05VS #9403

Sheet 1 of 2

Exhibit 5-1

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION
 Equipment ID Number 2-PNLA-009-012 Equipment Class 20

 Equipment Location: Building <u>CB</u> Floor Elevation <u>617'</u>
 Room or Row/Column <u>MCP</u> Base Elevation <u>617'</u>

 Equipment Description <u>Pawel</u> 2-9-12

2. OUTLIER ISSUE DEFINITION

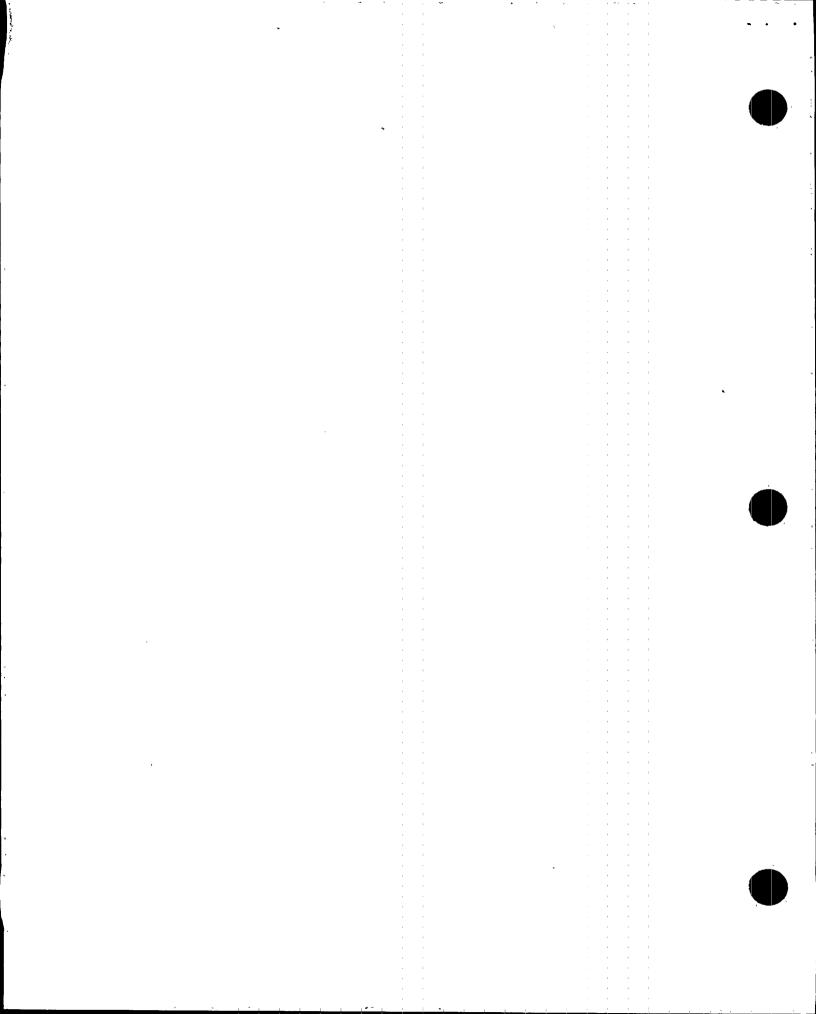
a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Mechanical and <u>Electrical Equipment</u> Capacity vs. Demand Caveats Anchorage Seismic Interaction Other		Tanks and Heat Exchangers Shell Buckling ¹ Anchor Bolts and Embedment Anchorage Connections Flexibility of Attached Piping ¹ Other	
<u>Essential Relays</u> Capacity vs. Demand Mounting, Type, Location Other	<u> </u>	<u>Cable and Conduit Raceways</u> Inclusion Rules Other Seismic Performance Concerns Limited Analytical Review Other	

1 Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.

b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):

this panel are a Cersmuc



SSEL #. 9403

Revision 2 Corrected, 6/28/91

05VS# 940.3

Sheet 2 of 2

Exhibit 5-1 (Cont'd)

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

Equipment ID Number 2- PNLA-009-012

- 3. <u>PROPOSED</u> METHOD OF OUTLIER RESOLUTION (OPTIONAL)
 - a. Define proposed method(s) for resolving outlier.

thes or verify that there epair losso la relay in 2550

There are no essential relaus in panel 2-9-12. see a Hached intormal memo dated 9-17-96. KHG

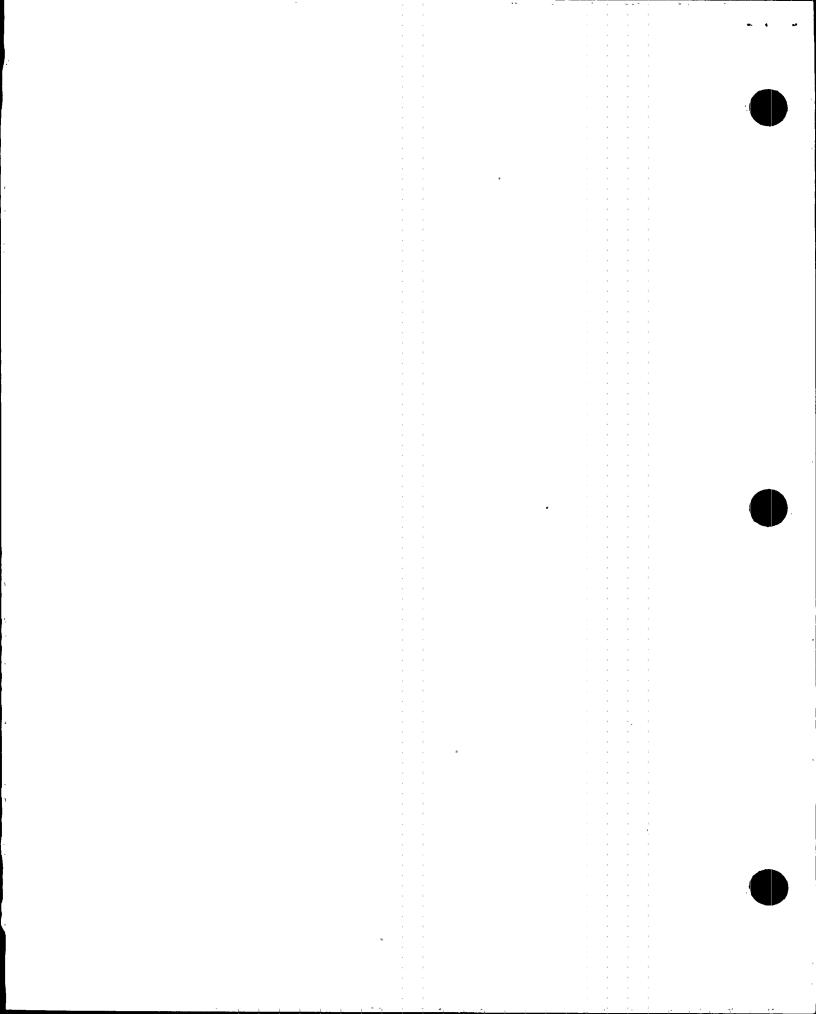
b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

JOHN O. DIZON, PE	John O. Díza	4/19/96
Print or Type Name	Signature	Date
JAMES R. DISSER	<u> </u>	\$1,9/95
Print or Type Name	Signature	Date
Print or Type Name	Signature	Date



INFORMAL

September 17, 1996

REVIEW FOR ESSENTIAL RELAYS IN PANELS 2-PNLA-009-0012 and 2-PNLA-009-0036A

Modifications or repair to panels 2-PNLA-009-0012 (SSEL No. 9403) and 2-PNLA-009-0036A (SSEL No. 9307) were determined to possibly be required under the USI A-46 program, resulting from outliers OSVS-9403, OSVS-9307-1, and OSVS-9307-2, if these panels contain essential relays. A review of the <u>Browns Ferry Nuclear Plant USI A-46 Seismic Evaluation</u> <u>Report</u>, May 1996, Revision 0 (R92 960624 850), Appendix A determined that there are no essential relays in these panels. This review resolves outliers OSVS-9403, OSVS-9307-1, and OSVS-9307-2.

Review performed by

H. Gromek

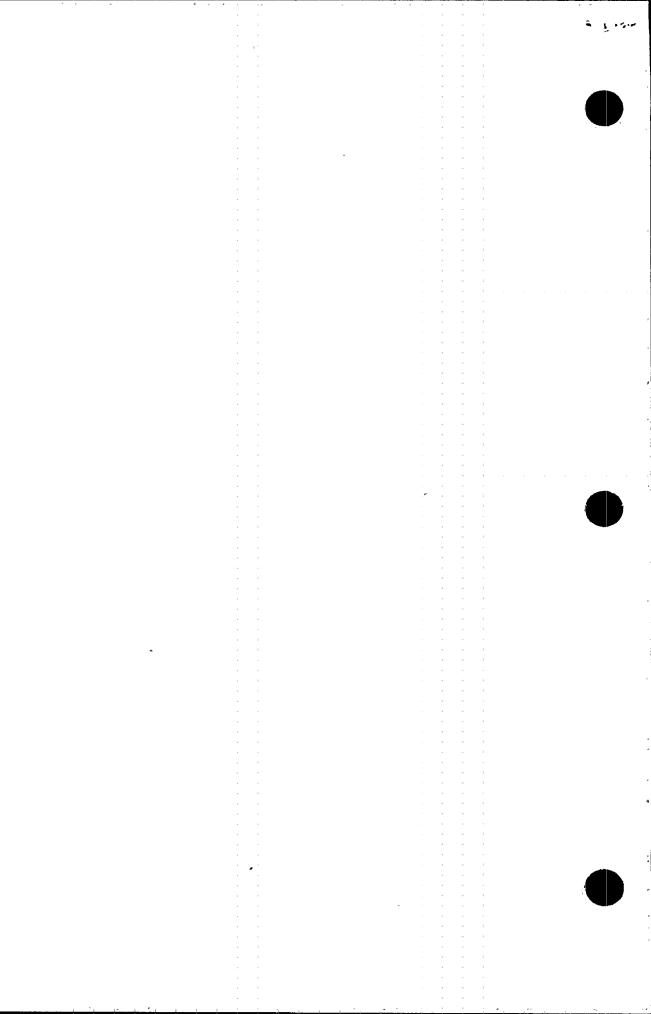
date

Verified by

Anand C. Relie and A. C. Relwani

9-17-96 date





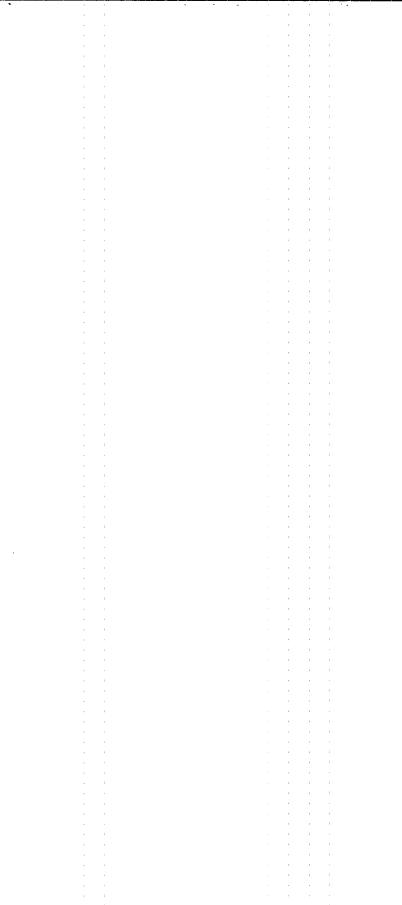
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SEL Line No. <u>9168</u>	Status (Y) N U
SCREENING EVALUATION WORK SHEET (SEWS)	Sheet 1 of 1
Equip. ID No. <u>2-PX-64-678</u> Equip. Class <u>00 -</u>	. •
Equipment Description <u>POWER SUPPLY (PNL 2-9-19 ; SUPPORTS</u>	2-PI-64-67B)
Location: Bldg. <u>CB</u> Floor El. <u>593</u> Room	, Row/Col <u>U2 AIR</u>
Manufacturer, Model, Etc. (optional but recommended)	

*** THE EQUIPMENT CLASS FOR THIS PIECE OF EQUIPMENT HAS NOT BEEN DETERMINED

This equipment is housed in Panel 2-9-19. See SEWS for Z-PNLA-009-0019 (SSEL NO. 9049) for evaluation.

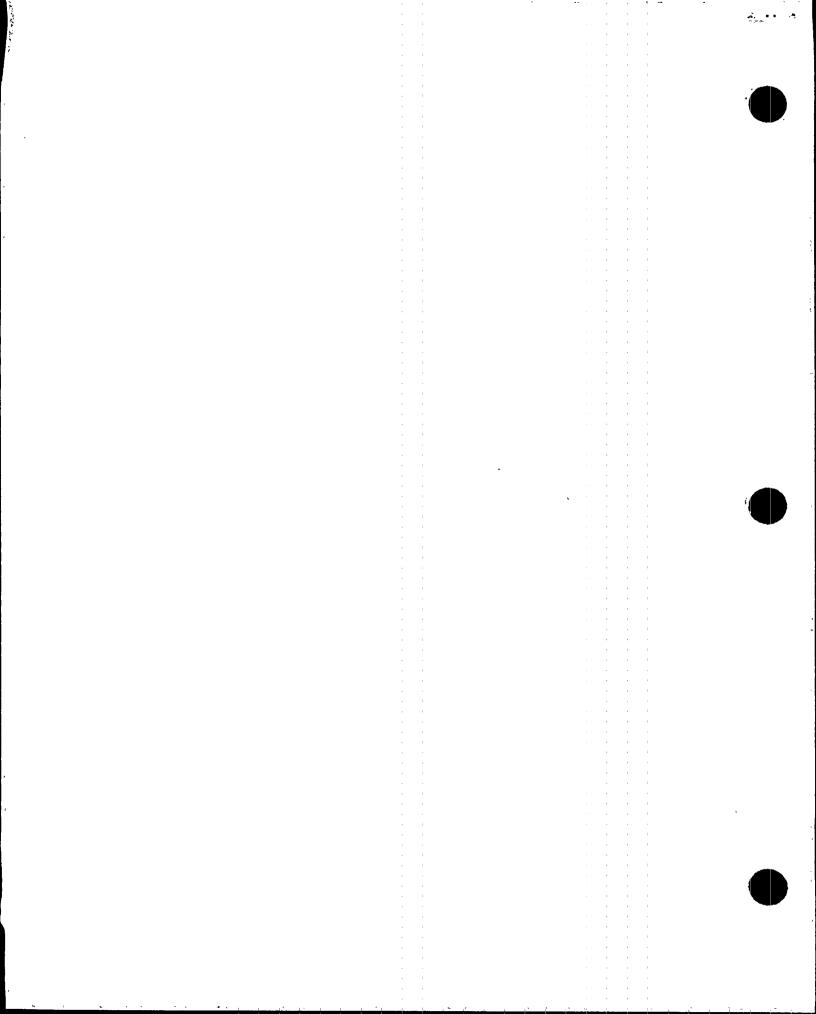
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valuated by:	Forzi Rei	Date:	7-21-95
	chim O. Dizon		7/21/95
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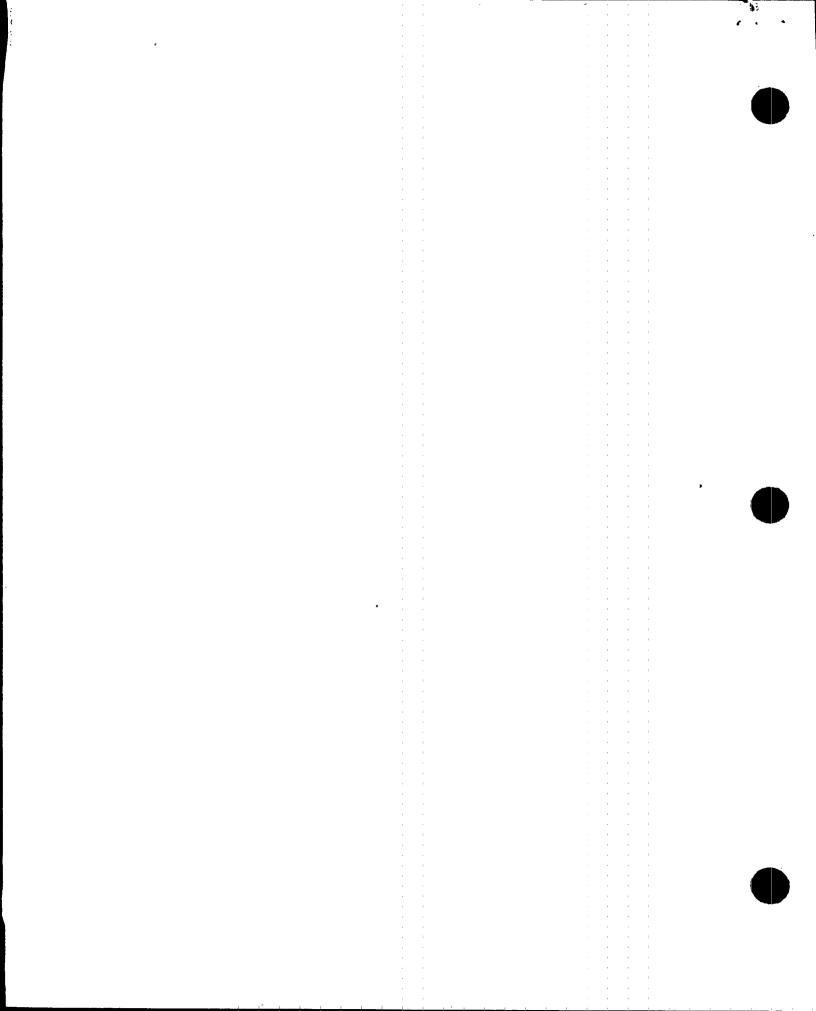
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SEL Line No. <u>9168</u>		Sta	atus	(V N	U
		She	et	1 of	1	
IPEEE SUPPLEMENTAL SCREENING EV	<u>ALUATI</u>	ON V	IORK	<u>SHEET</u>		-
Equip. ID No. <u>2-PX-64-678</u> Equip. Class <u>00 -</u>				(70)		<u> </u>
Equipment Description <u>POWER SUPPLY (PNL 2-9-19 ; SUP</u>	PURIS	2-21	64	<u>-6/8)</u>		
RELAY WALKDOWN						
 Does spot check of essential relays indicate relays present and properly mounted? 	Y	N	U	N/A)	
2. Are essential relays required to function during earthquake screened out?	Y	N	U	N/A)	
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.					Ø/ g	
3. No other relay concerns?	,Y	N	U	N/A		
Requirements for relays satisfied?			•		Y . I	N U (NA) (1)
SYSTEM INTERACTION EFFECTS						Ŭ
1. No potential sources could flood or spill onto cabinet?	Ŷ	N	U	N/A		
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATIS sheets if necessary)	SFACTO	RY (Use	addit	ional	l
1) 2-PX-64-67B is housed in panel 29-19 (SEL¥	190	49). An	. <u></u> 01	sentie L
relays within this panel will be evalua	ted	Se	para	artem	ل اند	the
1) 2-PX-64-67B is housed in Panel 29-19 (relays within this panel will be evalua A-46 relay review program.			•)	
IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, B YES NO	EXCLUD	ING	REL	AY CHA	TTER	?
IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER IN	VESTI	GATI	ON?	YES	Z NO)
Evaluated by: <u>Force Rej</u>	-	Dat	e: _	7-2	<u>'-95</u> 1	,
Evaluated by:	-	Dat	e: .	7/21/	95	/

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SEL Line No. <u>9049</u>	Status / 🗭 N U
SCREENING EVALUATION WORK SHEET (SEWS)	Sheet 1 of 2
Equip. ID No. <u>2-PNLA-009-0019</u> Equip. Class <u>20 - Instr.</u>	& Control Panels & Cabinets
Equipment Description <u>PANEL 9-19</u>	·····
Location: Bldg. <u>CB</u> Floor El. <u>593</u> Room,	Row/Col U2 AIR
Manufacturer, Model, Etc. (optional but recommended) <u>GE</u>	,
SEISMIC CAPACITY VS DEMAND 1. Elevation where equipment receives seismic input 2. Elevation of seismic input below about 40' from grade 3. Equipment has fundamental frequency above about 8 Hz 4. Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum	(Y)N U N/A (・) DOC 個分 ABS
GERS 5. Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec Realistic M-Ctr. In-Str. Resp. Spec	pec. RRS
pes capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)	(Pef. care.
<u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) to are met by intent without meeting the specific wording of the explain the reason for this conclusion in the COMMENTS section	ne caveat rule and
 Equipment is included in earthquake experience equipment class 	Q N U N/A
2. No computers or programmable controllers <u>ok</u> 3. No strip chart recorders	(Y) N U N/A(") (O) N U N/A (O) N U N/A (O) N U N/A
 Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or 	Ô N U N∕A
panels, are bolted together if they contain essential relays	· ② N U N/A (3),(10)
Drawers and equipment on slides restrained from falling out	ØNUN∕A
7. All doors secured by latch or fastener	ØNUN∕A ØNUN∕A
 Attached lines have adequate flexibility Anchorage adequate (See checklist below for details) 	ØNU'N/AG)
 Relays mounted on equipment evaluated AF = 4.5 Have you looked for and found no other adverse concerning the intent of all the caveats met for Bounding Spectrum? 	② N U N/A ③ N U N/A ④ N U N/A ④ N U N/A() ④ N U N/A(い) ⑦ N U N/A (い) ⑦ N U N/A
 Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation Type of anchorage covered by GIP Sizes and locations of anchors determined 	(Y) = (Y)

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SSEL Line No. 9049

S. HERRICHTER.

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SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 2 of 2

Equip. ID No. <u>2-PNLA-009-0019</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u> Equipment Description <u>PANEL 9-19</u>

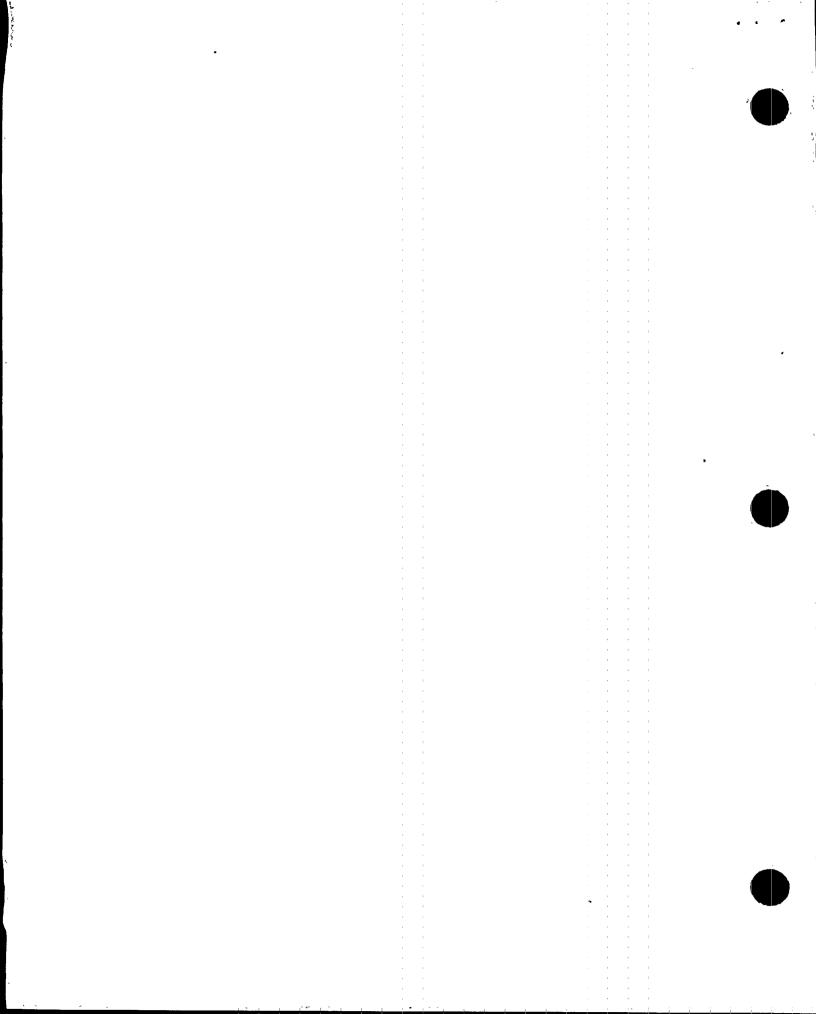
ANCHORAGE (Cont'd)

Anchorage installation adequate, e.g., 4. weld quality and length, nuts and washers, expansion $(\mathcal{V} \ N \ U \ N/A \ (7)$ anchor tightness Factors affecting anchorage capacity or margin of 5. safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and (\tilde{Y}) N U concrete cracking N/A 6. For bolted anchorages, gap under base less than \bigotimes N U 1/4-inch N/A 7. Factors affecting essential relays considered: gap Ø N U N/A (2) under base, capacity reduction for expansion anchors 8. Base has adequate stiffness and effect of prying \bigotimes action on anchors considered U N/A Strength of equipment base and load path 9. Ø to CG adequate Ν U N/A Embedded steel, grout pad or large concrete 10. Y N U (N/A pad adequacy evaluated N U(2) Are anchorage requirements met? INTERACTION EFFECTS Soft targets free from impact by nearby 1. (Ŷ) N U N/A equipment or structures 2. If equipment contains sensitive relays, equipment \heartsuit N free from all impact by nearby equipment or structures U N/A Attached lines have adequate flexibility Ν U N/A (6) 3. Overhead equipment or distribution systems are 4. \oslash U N/A (7) not likely to collapse N (Y) N U 5. Have you looked for and found no other adverse concerns? N/A (9) ØNU Is equipment free of interaction effects? (T) N U IS EQUIPMENT SEISMICALLY ADEQUATE?

COMMENTS

For noter 1 thm 12 see notor 1-12 on SEWS for 2-PNLA-009-0018 (SSEL NO. 9048).

Date: valuated by:



K	SEL	Line	No'.	9049

Status	Ō	Ν	U

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Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

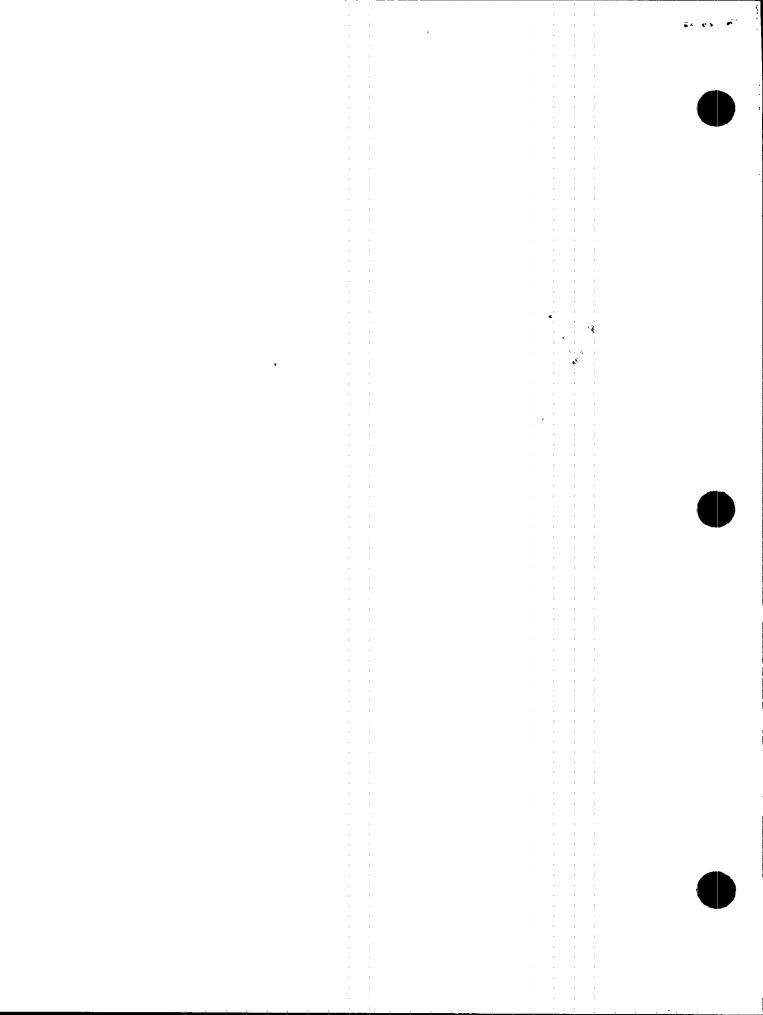
Equip. ID No. <u>2-PNLA-009-0019</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u> Equipment Description <u>PANEL 9-19</u>

RELAY WALKDOWN

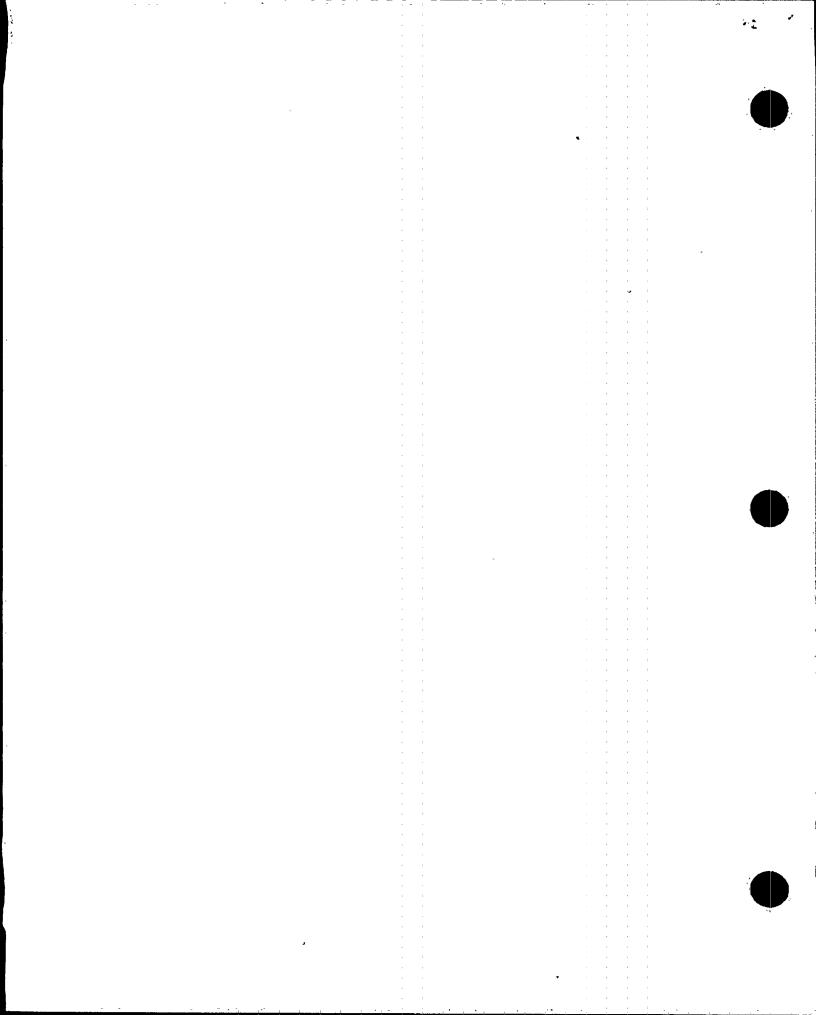
(Y)	N	U	N/A
Y	N	U	NA
			•
(N	U	N/A
			() N U
		•	
Ö	N	U	N/A
	Ý Y Ý	Y N	YNU (YNU

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

	IPMENT ES <u>./</u>	FREE OF NO	NEED FO	R FURTHER	INVEST	FIGATION,	EXCLUDING	RELA	Y CHATTER?	
IS EQU	IPMENT	FREE OF	NEED 'FO	R FURTHER	RELAY	CHATTER	INVESTIGATI	ON?	YES <u>/</u> NO	
Evaluat	ted by:		Fare	: Ber			Dat	:e:	9-15-95	/
Evaluat	ted by:		John	0. Dru	<u>~</u>		Dat	:e:	9/15/95	′



Norman and a second sec			
SSEL Line No. 9048 St	tatus	\bigotimes	NU
SCREENING EVALUATION WORK SHEET (SEWS) SH	neet l o	f ¥7	
Equip. ID No. <u>2-PNLA-009-0018</u> Equip. Class <u>20 - Instr. &</u>	<u>Control</u>	Pane	<u>ls & Cabinets</u>
Equipment Description <u>PANEL 9-18</u>			
Location: Bldg. <u>CB</u> Floor El. <u>593</u> Room, Ro	w/Co1 _	U2 AII	۲
Manufacturer, Model, Etc. (optional but recommended) <u>GE</u>			
<u>SEISMIC CAPACITY VS DEMAND</u> 1. Elevation where equipment receives seismic input 2. Elevation of seismic input below about 40' from grade 3. Equipment has fundamental frequency above about 8 Hz 4. Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS	SO DOS A	N U C S	ეიძს დ 550 N/A (1)
5. Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)	AGS AGS CRS . RRS) ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	() N U Ruf. calc. cD-90000-940339)
<u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) the are met by intent without meeting the specific wording of the explain the reason for this conclusion in the COMMENTS section 1. Equipment is included in earthquake experience	caveat r below)	rule a	Ind
equipment class 2. No computers or programmable controllers 3. No strip chart recorders 4. Steel frame and sheet metal structurally adequate 5. Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or	ଟେଟି	N U N U N U N U	N/A (") N/A (") N/A N/A
 panels, are bolted together if they contain essential relays 6. Drawers and equipment on slides restrained from falling out 7. All doors secured by latch or fastener 8. Attached lines have adequate flexibility 9. Anchorage adequate (See checklist below for details) 10. Relays mounted on equipment evaluated AF=4.5 11. Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum? 	ଚିଚିଚିତ୍ର	NU NU NU NU NU	
ANCHORAGE 1. Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) 2. Type of anchorage covered by GIP 3. Sizes and locations of anchors determined	Ŷ	N U N U N U	



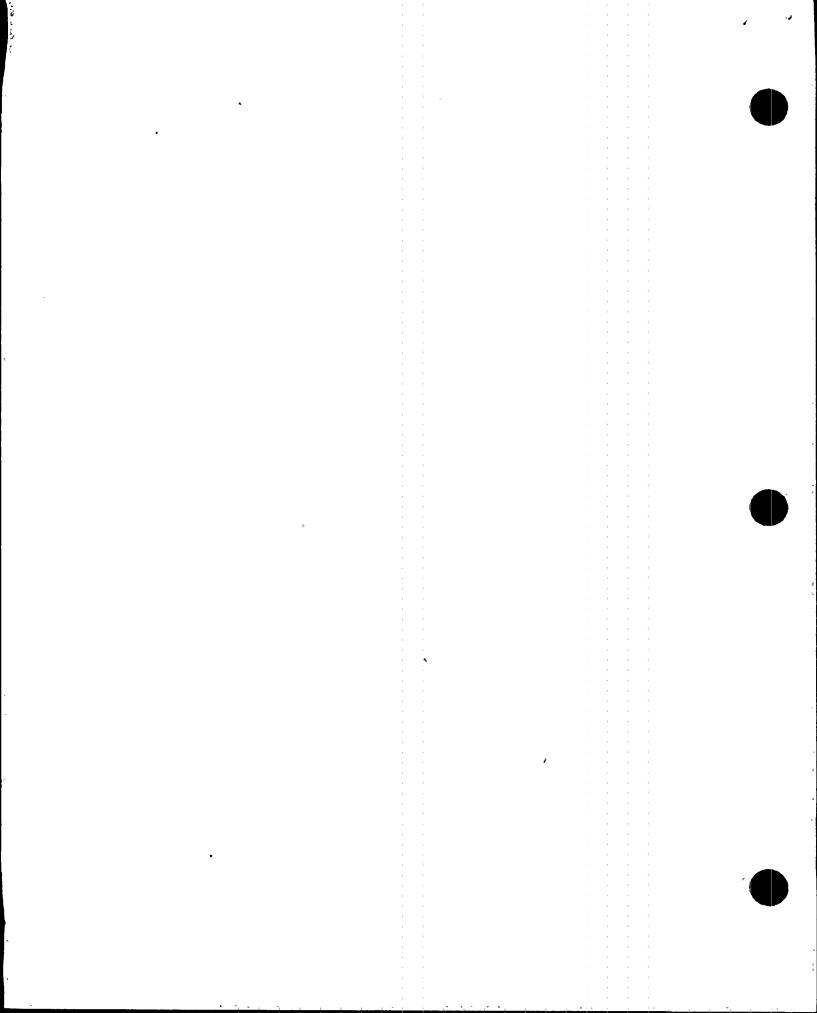
SSEL Line No. 9048

	SCREENING EVALUATION WORK SHEET (SEWS) Sheet	t 2 o	fź	? ₇	
Equip.	ID No. <u>2-PNLA-009-0018</u> Equip. Class <u>20 - Instr. & Cor</u>	ntrol	Pa	ne	<u>ls & Cabinets</u>
Equipme	nt Description <u>PANEL 9-18</u>	 			
	<u>GE (Cont'd)</u>				
4. 5.	Anchorage installation adequate, e.g., weld quality and length, nuts and washers, expansion anchor tightness Factors affecting anchorage capacity or margin of	Ð	N	U	N/A (2)
6.	safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking For bolted anchorages, gap under base less than	Ŷ	N	U	N/A
	1/4-inch	$\langle \! \! \mathcal{Y} \!$	N	U	N/A
	Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors Base has adequate stiffness and effect of prying	Ŷ	N	U	N/A (2)
	action on anchors considered	$\langle \! \! Y \! \! \rangle$	N	U	N/A
	Strength of equipment base and load path to CG adequate Embedded starl grout and on lange concepts	(\mathcal{Y})	N·	U	N/A
	Embedded steel, grout pad or large concrete pad adequacy evaluated horage requirements met?	Y	N	U	(N) (Y) N U (z)
· ·	TION_EFFECTS				
	Soft targets free from impact by nearby				
	equipment or structures	\bigotimes	N	U	N/A
3.	If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures Attached lines have adequate flexibility	8	N N	U U	N/A N/A (G)
4.	Overhead equipment or distribution systems are not likely to collapse Have you looked for and found no other adverse concerns?		N N		N/A (7) N/A (9)
Is equi	pment free of interaction effects?	0			YN U
<u>IS EQUI</u>	PMENT_SEISMICALLY_ADEQUATE?				(Y)N U
COMMENT					
For	notes 1 thm 10 see pages 3 thru 7 of this SEWS. are present in the AIR samely there				
No te 11)	notes 1 thm 10 see pages 3 thru 7 of this SEWS. mare present in the AIR panels, they programble controllers pare either mounted on the from and their reair is independently supported by a memb	nt fac	e o thai	κά +	the punch spans the

and their rear is independently supported by a member that spans the panel in the back or they have their own rigid support system inside the panel. Note 12) By referring to notes I and 10, and EPRI Report NP-7148-5L, an in-cabinet

Date: <u>9-15-95</u> 9/15/95 Fonci Bei valuated by: Jam

amplification factor of 4.5 is appropriate for theme panels.

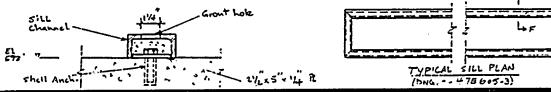


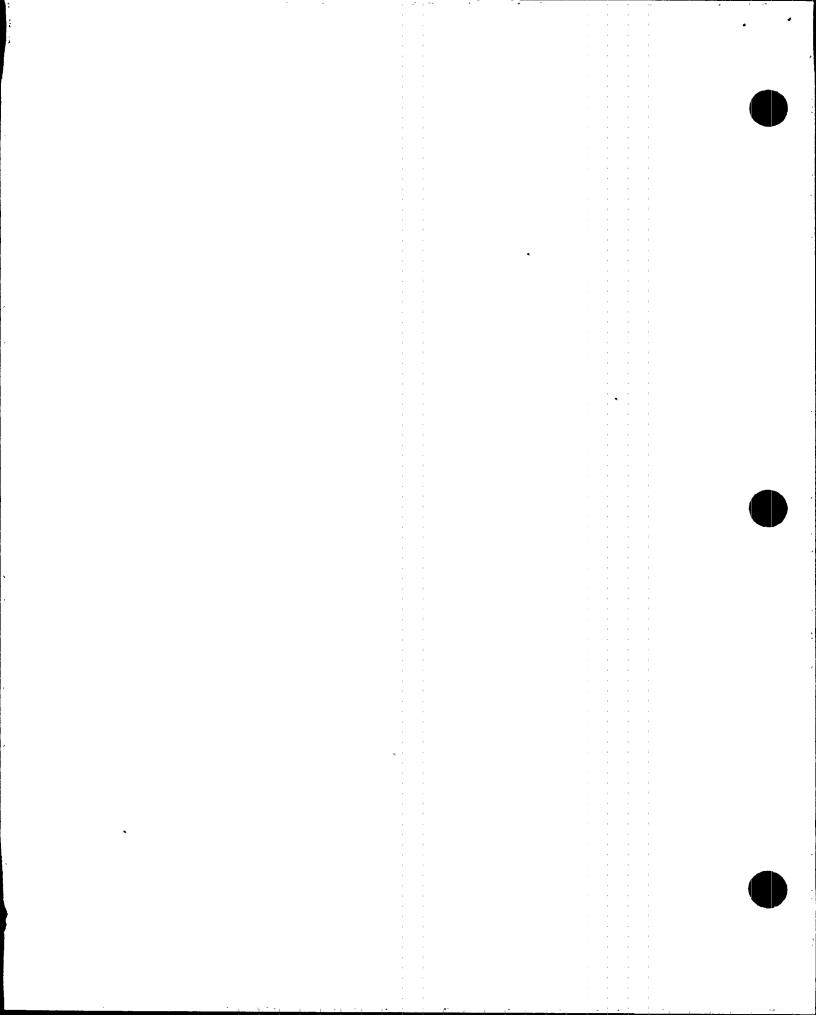
SSEL No. 9048

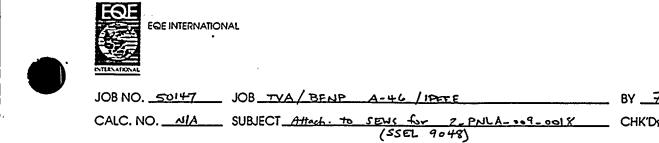
EQE INTERNATIONAL

1) panel is in a row of other similar panels which are all botted together. These panels (9-19, 9-18, 9-30, 9-38, 9-28, 9-27) are all constructed of heavy gage metal (X=3/32). The front and sides of these panels where internal components are attached are reinforced. The panels base configuration consist, of base angles (L2X3X/4) which are welded to the sill channel. There are many top ontry conduct with short spans that either span to another set of panels in an adjacent row (~ 4'away) or have independent nigid supports. The depth of these panels is 30". Based on the above discussion it can be judged, that, the panel frequency is at wort 8 HE. (Also, similar panels, were shake table tested and showed to have fundament trequeng of about 10 HZ. Eventhough the tested panels are classified as switchboards, the configuration is similar to these panels)

2) The anchorage of the sill channel to the theor is not visible. The detail shown on DWG. 0-47E605-3 (section F-F) indicates The following anchor configuration for the sill channel. However, the detail does not indicate at what interval this anchorage should be provided for the sill channel. Conservatively, Capacity Vs. clemand calculation performed on the following shuets, determined that a min. of 7 such details are regil per side (FdB) of channel. Total length of sill channel is 29/side. This means that @ ne7, one such detail is regide at about every 5'. The detail is such that the anchor bolts could only be installed at the location of 1/4 & grant hales provided on top of the sill channel. Grant hales are tipically provided at every 2'-34 Since the anchors could only be tightneed through the grant holes, as the above referenced detainy indicates, it is reasonable to assume that them are anchors at every 2'-3' per sill channel. Therefore, it is judged that then are adequate anchorage for them panels.







BY _7Berg DATE 9-15 -95 CHKD. O. Dizon DATE 9/15/95 2-PNLA- 009-0018

SHEET NO. <u>수 너 7</u>

2 (cont'd)

Anchorage Evaluation:
$$(conservatively, ignore top restraint provided by The conduct)$$

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@ f=8 HZ

ah = 0.6g (Rif. HARS Report, RB EL 593, DBE, 5% Damping)

av= 0.16 g (ZPA) Fh = 10,135 * 0.6 g × 1.25 = 7601. #

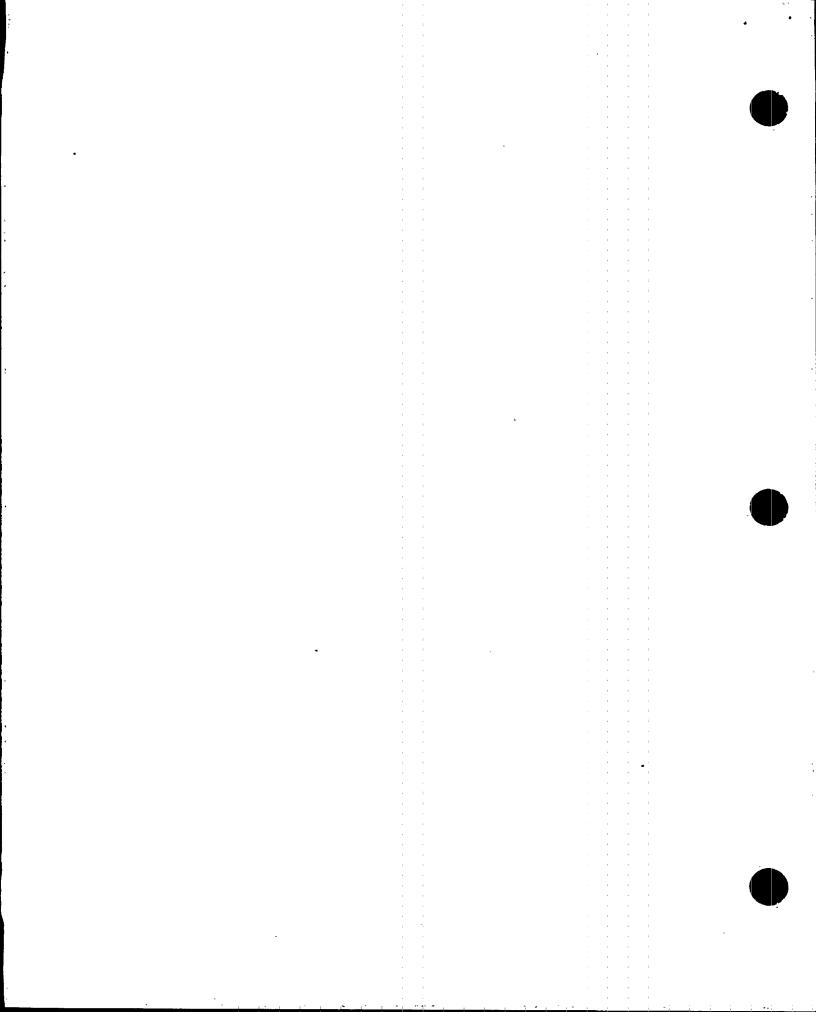
$$1/2^{\#} \varphi$$
 shell anchor bolts
 $T_{q11} = 2,290^{\#} \times 0.75 \times \frac{3600}{4000} = 1546.$ Ibs
 $V_{q11} = 2.380^{\#} \times 0.75 = 1785.$ Ibs

$$\mathcal{T} = \left[\left(\frac{7601 \times 45^{"}}{(30^{"} - 3^{"}) n} \right)^{2} + \left(\frac{2027}{2n} \right)^{2} \right]^{1/2} - \frac{10/35}{2n} \equiv 1546$$

where n is the regide no. of anchor bolts per sill channel

$$\left(\frac{1.605 \times 10^{3}}{h^{2}} + \frac{1.027 \times 10^{6}}{h^{2}}\right)^{1/2} = \frac{10135 + 3092 n}{2n}$$

$$\left(\frac{1.615 \times 10^{3}}{h^{2}}\right)^{1/2} = \frac{10135 + 3092 n}{2n} \implies \frac{7626 \times 2}{3092} = n \implies n=5$$



EQE	EQE INTERNATIONAL			
			,	

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INTERNATIONAL	SHEET NO. <u>5 of 7</u>
JOB NO. 50147 JOB TVA/BENP A-46/IPEEE	BY 78-5 DATE 9-15-95
CALC. NO. <u>NA</u> SUBJECT <u>Athch. to SEWS for 2-PNLA-009-0018</u> (SSEL 9048)	CHK'D J.O. D'Z DATE -/15/55
2 (cont'd)	

$$- V = \left(\frac{7601}{2n}\right) \sqrt{2} \equiv 1785$$

$$\Rightarrow n = 3$$

$$Try \quad n = 5 \quad \Rightarrow \quad V = 1075. \qquad \Rightarrow \frac{V}{V_{11}} = 0.60$$

$$\Rightarrow T = 1528. \qquad \Rightarrow \frac{T}{T_{611}} = 0.99$$

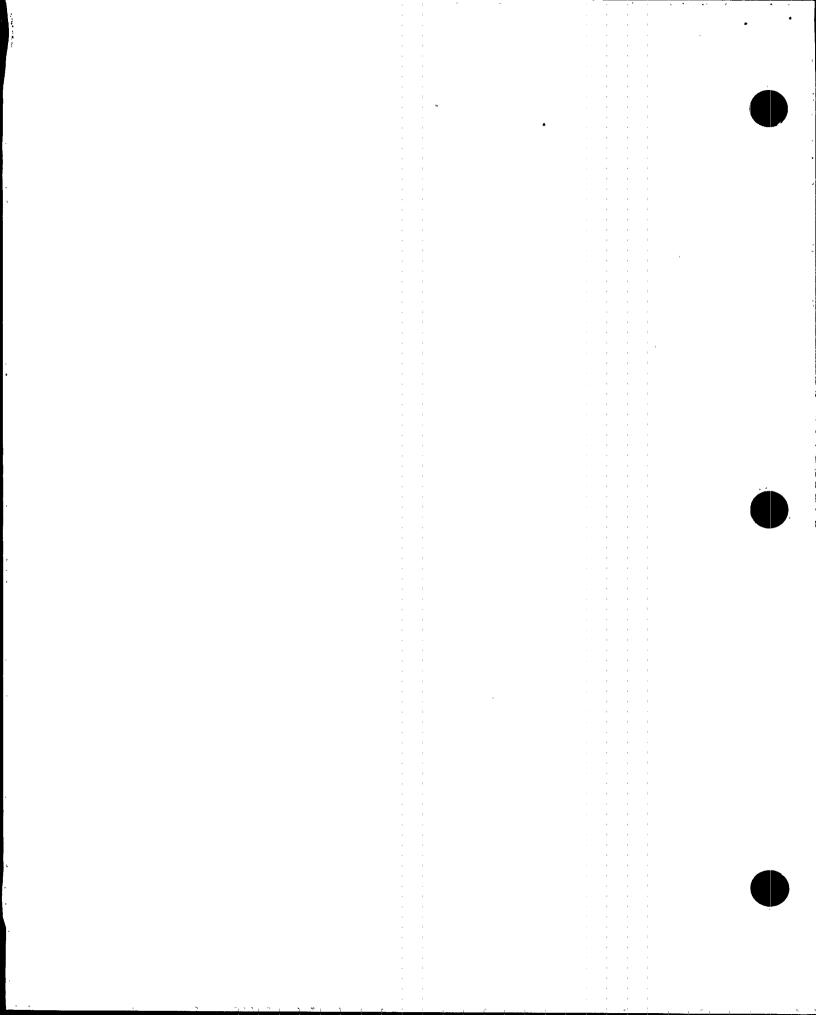
$$TR = 0.7 (0.19) + 0.6 = 1.3 \quad 7 1.0 \qquad \longrightarrow \text{ War 6 anchori}$$

$$- @n=6 - V = 896 # \rightarrow \frac{\sqrt{8}}{8n} = 0.50$$

$$T = 1274 # \rightarrow \frac{T}{Tan} = 0.82$$

$$IR = 0.7 (0.82) + 0.50 = 1.07 > 1.0 \rightarrow war n=7$$

For typical growt hole spacing of
$$2^{\prime} \cdot 3^{\prime}$$
, when $n = \frac{29^{\prime}}{3^{\prime}} = 9.7 + w_{2} = n = 10$
 $- \Theta n = 10 \rightarrow V = 537 \rightarrow \frac{V}{V_{avi}} = 0.3 \cong .3 = .3$
 $\rightarrow T = 764. \rightarrow \frac{T}{T_{avi}} = 0.49 < 1.0 = 0.44$



EQE INTERNATIONAL

SHEET NO. <u>6 of 7</u> JOB NO. <u>50147</u> JOB <u>TVA / BEND A-46 / IPEEE</u> BY <u>7Bein</u> DATE <u>-15-</u> CALC. NO. <u>NIA</u> SUBJECT <u>Attach to SETUS for 2-PNLA-009-0018</u> CHKD. 0. <u>Dizo</u> DATE <u>9/15/95</u>

Notez (Cont'd) .

- Evaluation of welds @ panel base to sill channel interface:

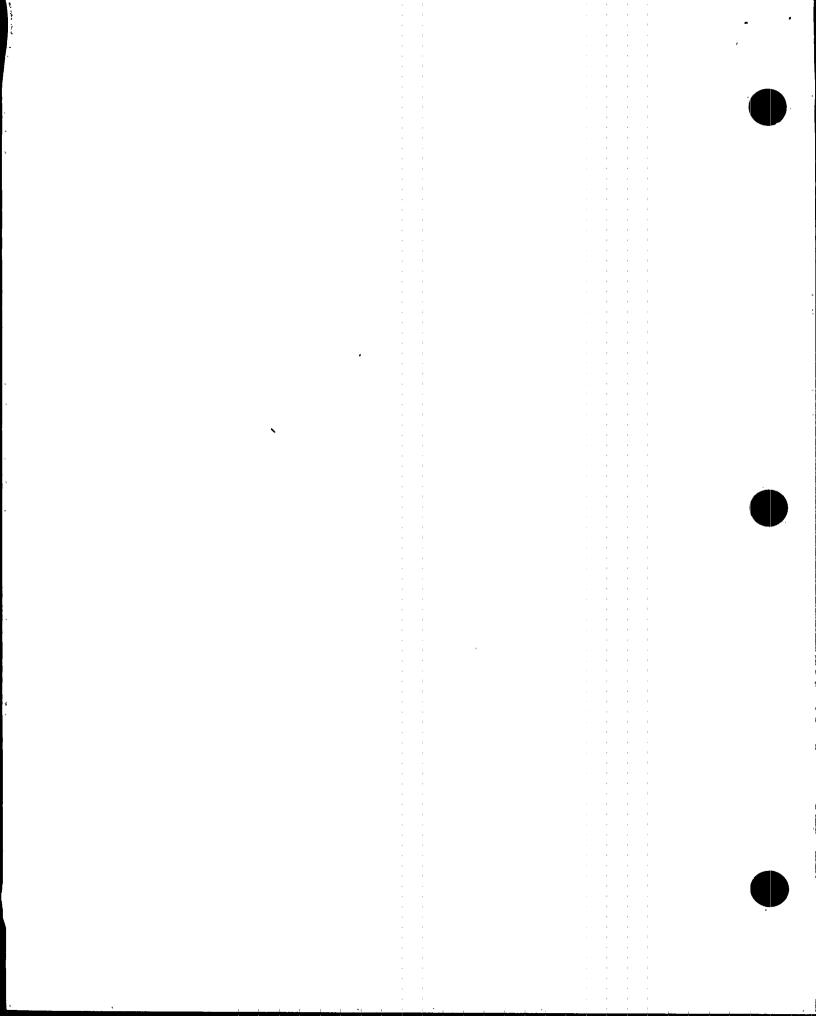
The connection of the panel to the sill channel is by providing weld on the inside of the panel bare framing. Since, the panel base framing is $L \Im x 2'' x 1/4'' it is judged that the bare is rigid enough "$ to adequately transfer the load from the panel sides to the welds,and as such the weld configuration (w.r.t welding on the inside edgeof the angle) is adequate.

Total length of weld per sill channel = @ Back : 26" @ Front : 29.5"

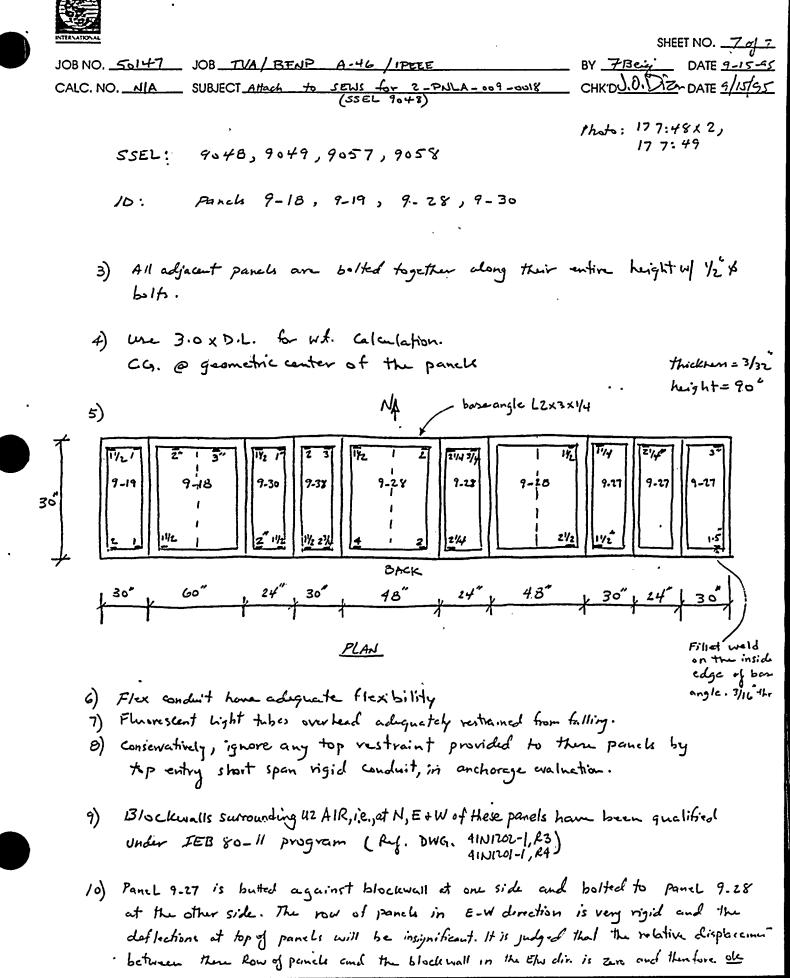
 $use \frac{26''}{2} = 13''$

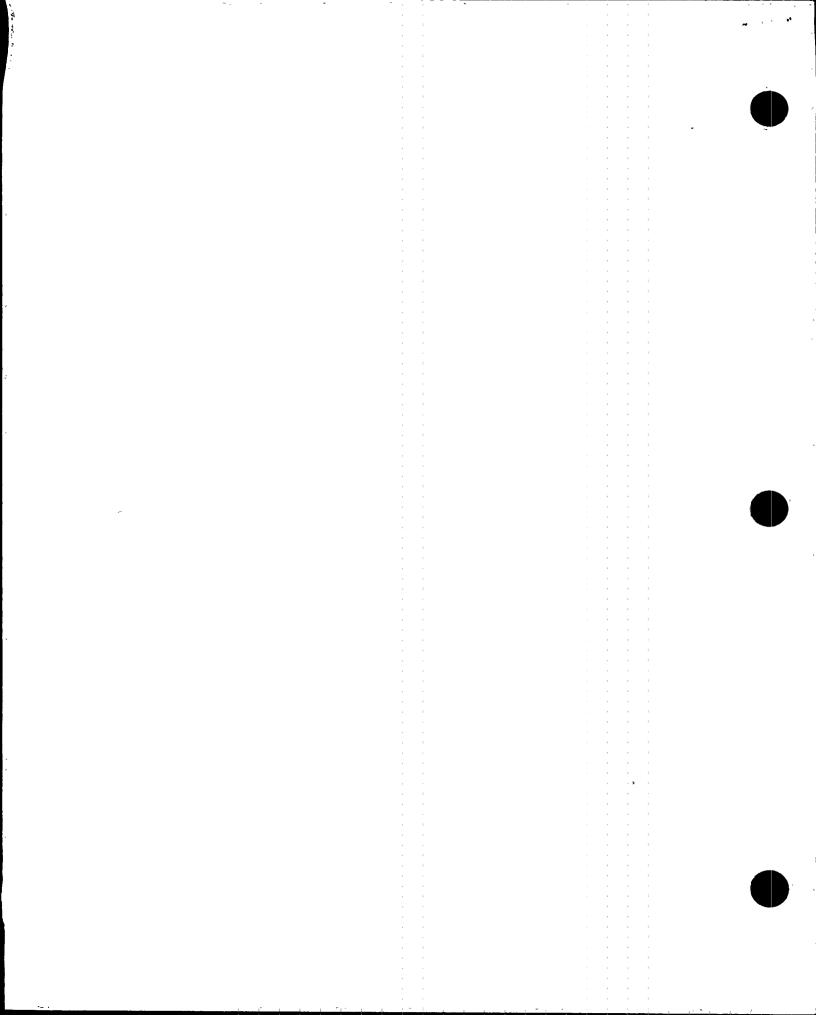
Conservative, to account for some deficient welds and overall weld positioning and quality Conservative. 3/12" could be u

par Table C. 6-Z of GIP every inch of a 1/8" weld is equivalent to a 1/2"\$ expansion anchor bolt. Therefore, by comparison to the regid no. of 1/2 \$ EXP. anchors per sill channel (7 total): the welds are not the weak link in the bad puth and judged ok (13-1/2"\$)



EQE INTERNATIONAL





Status (Y) N U

Sheet'l of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>2-PNLA-009-0018</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u> Equipment Description <u>PANEL 9-18</u>

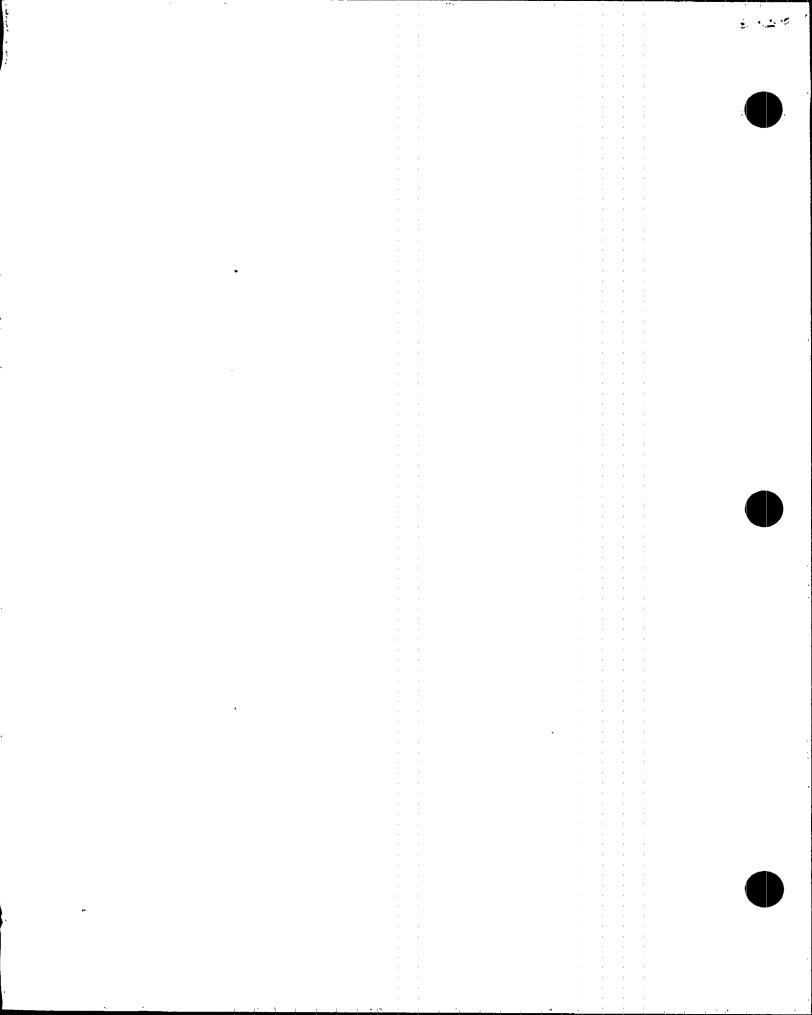
RELAY WALKDOWN

 Does spot check of essential relays indicate relays present and properly mounted? 	Ò	N	U	N/A
2. Are essential relays required to function during earthquake screened out?	Y	N	U	N/A
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.				
3. No other relay concerns?	· (Y)	N	U	N/A
Requirements for relays satisfied?				(Y) N U
SYSTEM INTERACTION EFFECTS				
1. No potential sources could flood or spill onto cabinet?	\bigcirc	N	U	N/A

.

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

IS EQUIPMENT	FREE OF NO	NEED FOR	FURTHER	INVEST	IGATION,	EXCLUDING RE	LAY CHATTER?	
IS EQUIPMENT	FREE OF	NEED FOR	FURTHER	RELAY	CHATTER	INVESTIGATION	? YES <u>/</u> NÓ_	
Evaluated by:		Torza	<u>i Dei</u>			Date:	9-15-95	
Evaluated by:		-Jam	0. Dr	zm_		Date:	9/15/95	′



SSEL Line No. <u>939</u>3

Status (Y) N U Sheet 1 of 1 SCREENING EVALUATION WORK SHEET (SEWS) Equip. ID No. 2-AMP-092-0007/41A Equip. Class 00 - Other

Equipment Description IRM Ch. "A" Voltage Preamplifier 7-34A Location: Bldg. <u>2B</u> Floor El. <u>565</u> Room, Row/Col <u>5/RIO</u> Manufacturer, Model, Etc. (optional but recommended) <u>GE</u>

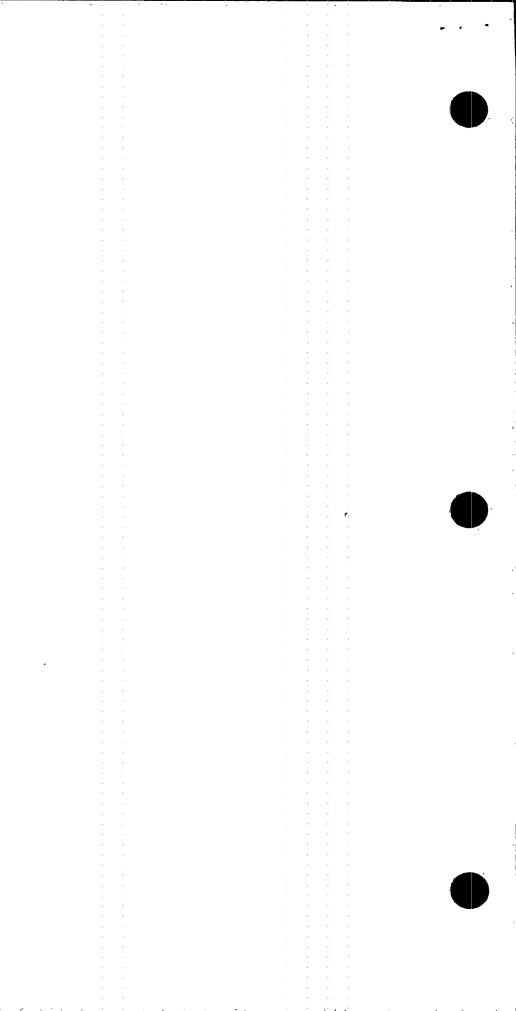
IS EQUIPMENT SEISMICALLY ADEQUATE?

(Y) N U

COMMENTS

This component is adequately mounted inside Panel 2-LPNL-925-0027 and is evaluated by rule of the box per GIP. Refer to SEWS package for 2-LPNL-925-0027 (SSEL# 9395) for detailed evaluation of the panel,

, Evaluated by:	John O. Diron		Date:	4/19/96
	· /	I.R. AISSER		4/19/96
\leq				



SSEL Line No. <u>9393</u> AI

Status	(Y) N	U

Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. 2-AMP-092-0007/41A Equip. Class 00 - Other Equipment Description IRM Ch. "A" Voltage Preamplifier 7-34A **RELAY WALKDOWN** 1. Does spot check of essential relays indicate Y Ν U N/A relays present and properly mounted? 2. Are essential relays required to function Y Ν N/A during earthquake screened out? If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis. U (N/A 3. No other relay concerns? Y Ν Ϋ́ U N Requirements for relays satisfied? SYSTEM INTERACTION EFFECTS (Y) N U N/A 1. No potential sources could flood or spill onto cabinet?

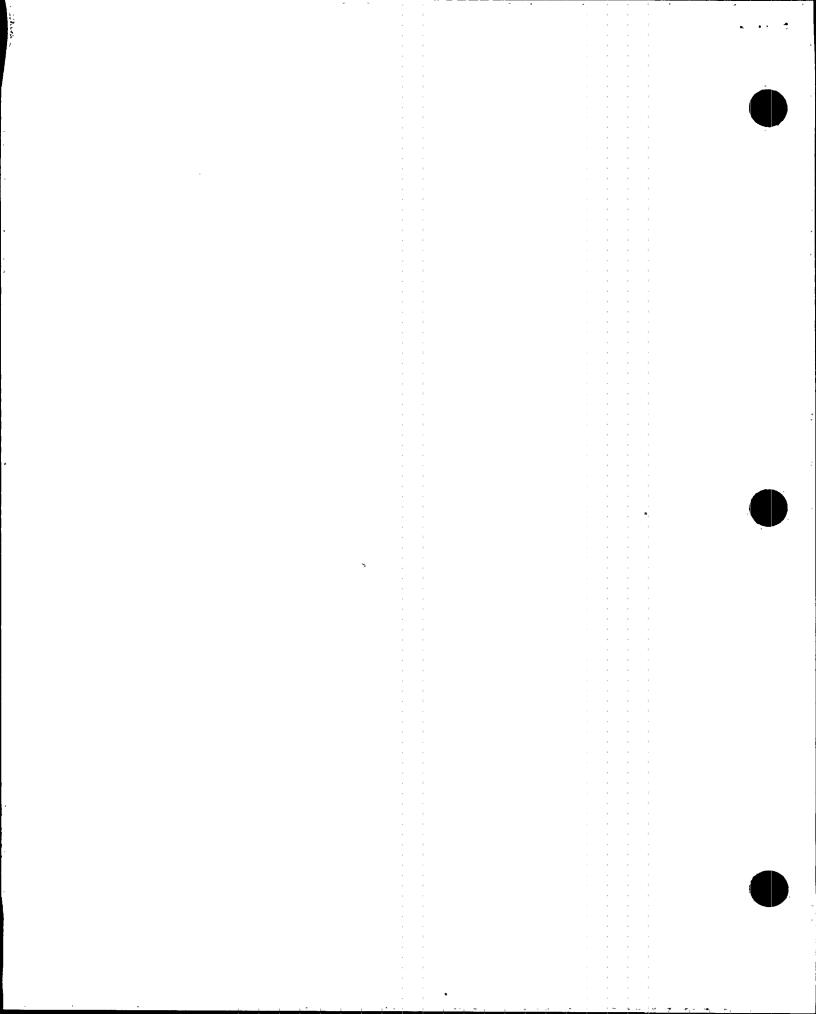
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

See SEWS for SSEL # 93.95



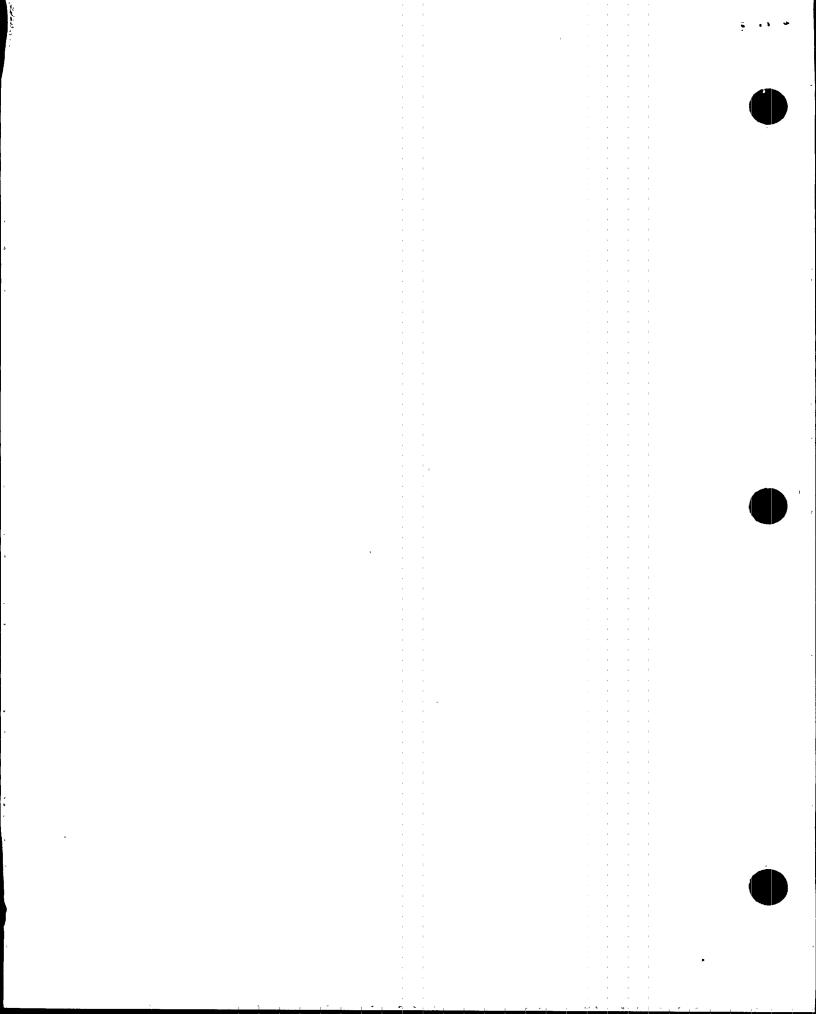
IS	EQUIPMENT	FREE OF	NEED F	FOR FURT	HER INVES	TIGATION,	, EXCLUDING	RELAY	CHAITER?	
									YES NO	-
Eva	aluated by	: <u>A</u>	mas	Diza			Dat	te:	4/19/96	-
Eva	aluated by	Č.	1		<u> </u>	R. DISSE	R Dat	te:	4/19/96	





	55EL Line no. 9395
	Revision 2A Status (Y) N U
	SCREENING EVALUATION WORK SHEET (SEWS) Sheet 1 of 3
	Equip. ID No. 2-LPNL-925-0027 Equip. Class 14 - Distribution Panels
	Equipment Description Panel 2-25-27 IRM PREAMP, RPS I
	Location: Bldg. <u>RB</u> Floor El. <u>565</u> Room, Row/Col <u>S/RIO</u>
1	Manufacturer, Model, Etc. (optional but recommended)
1	SEISMIC CAPACITY VS DEMANDEff. Grade1. Elevation where equipment receives seismic input5705502. Elevation of seismic input below about 40' from gradeY) N U N/A5503. Equipment has fundamental frequency above about 8 HzY) N U N/AY) N U N/A4. Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERSDOC
	5. Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr.'In-Str. Resp. Spec. Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.) GRS AGS CRS RRS RRS Y N U <i>Paf. Calc.</i> <i>CD-Q0000-946339</i>
	CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) 1. Equipment is included in earthquake experience equipment class 2. Contains only circuit breakers and switches 3. All latches and fasteners in door secured 4. Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together if they contain essential relays 5. Wall- or floor-mounted NEMA-type enclosure 6. Anchorage adequate (See checklist below for details) 7. Relays mounted on equipment evaluated 8. Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum? (I) MA (I)
	CAVEATS - GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)1. Equipment is included in the generic seismic testing equipment classY N U N/A2. Meets all Bounding Spectrum caveatsY N U N/A3. Use panelboard GERS unless unit is free-standing and designated as a switchboard by manufacturerY N U N/A4. M "Quicklag" Type E circuit breakers are not in distribution panelY N U N/A5. All adjacent cabinets or sections of multi-bay assemblies bolted togetherY N U N/A

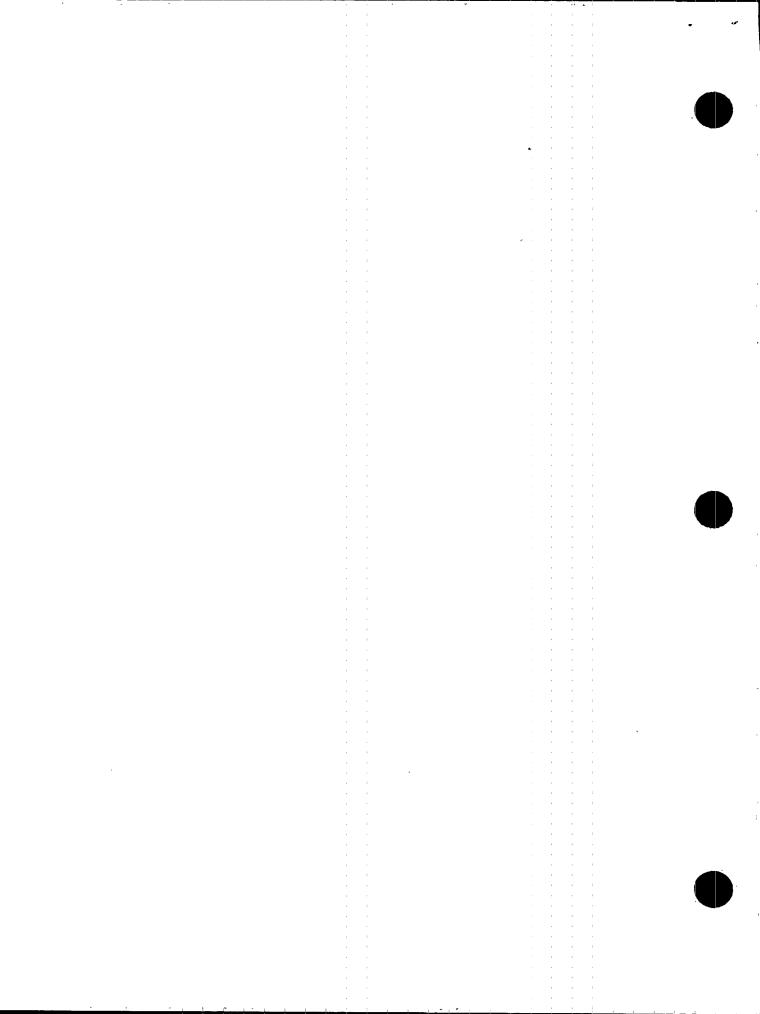
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SSEL Line n	9395	
Bet Line A	Revis	tion 2A 2 of 3
Equip. ID No. Equipment Des	2-LPNL-925-0027 Equip. Class <u>14 - Dist</u> cription <u>Panefi-25-27</u> IRM PREAMP, RPS	ribution Panels <i>エ</i>
	riate equipment characteristics determined	
2. Type of 3. Sizes 4. Anchor	CG, natural freq., damping, center of rotation) of anchorage covered by GIP and locations of anchors determined rage installation adequate, e.g.,	V N U N/A N U N/A N U N/A
anchor 5. Factor	uality and length, nuts and washers, expansion tightness s affecting anchorage capacity or margin of considered: embedment length, anchor spacing,	() N U N/A
free-e concre	dge distance, concrete strength/condition, and te cracking lted anchorages, gap under base less than	(Y) N U N/A (Y) N . U N/A (3)
. 7. Factor	es affecting essential relays considered: gap base, capacity reduction for expansion anchors	Y N U NA
📥 8. Base b	as adequate stiffness and effect of prying on anchors considered	(Ŷ) N U N/A
9. Streng	th of equipment base and load path adequate	Ý N U N/A
10. Embedo	ed steel, grout pad or large concrete	YNUNA
	requirements met?	(Y) N U··· (4)
INTERACTION E		•
	argets free from impact by nearby ent or structures	Ý NUN/A
	ipment contains sensitive relays, equipment rom all impact by nearby equipment or structures	Y N U NA T N U NA
3. Attach	ed lines have adequate flexibility ad equipment or distribution systems are	Y N U N/A N U N/A
not li 5. Have y	kely to collapse ou looked for and found no other adverse concerns? free of interaction effects?	N U N/A N U N/A N U N/A N U
IS EQUIPMENT	SEISMICALLY ADEQUATE?	(YN U
See re	st page for walkdown notes	

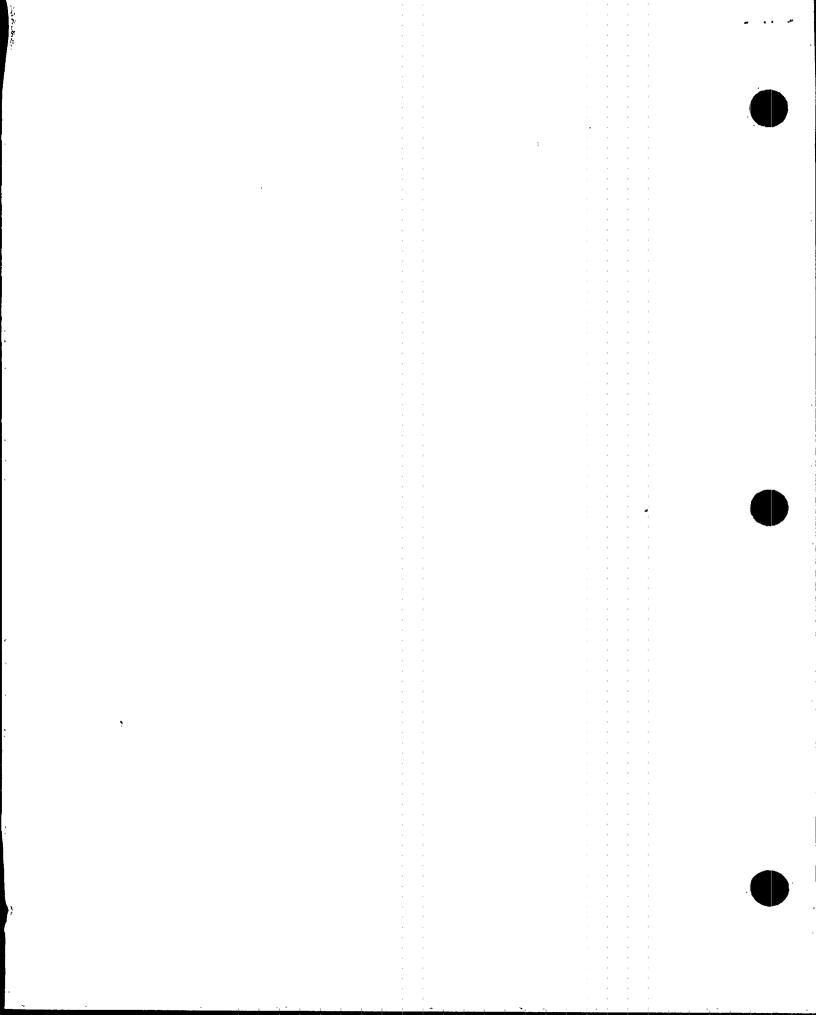
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55EL Line no. 9395 Revision 2A EVALUATION WORK SHEET (SEWS) Sheet 3 of 3 Equip. ID No. 2-LPNL-925-0027 Equip. Class <u>14 - Distribution Panels</u> Equipment Description Panel2-25-27 IRM PREAMP. RPS I <u>COMMENTS</u> 1 - Typical Hoffman single door enclosure, size: 30"W × 36"H × 16"D (NEMA type, 14 gage). A total of 6 preamplifiers are rigidly maunted to the enclosure back panel. Two pulse preamps. on top row, and 2 voltage preamps. on the middle and bottom rows. 2 - The panel enclosure is rigidly mounted to the wall by 4-1/2 of exp. anchors (2 on top + 2 at the leston), The preamplifiers are light weight and are vigitly nounted on 18" thick plate which is bolted to the back of panel with 4 - 3/8" & welded studs. Top entry conduit are well supported. Overall frequency is judged to be >8 hz. (Also, per EPRI TR-102/80, similar wall-mounted distribution panels exhibited a lowest natural frequency of >12 hz per test results. 3 - Gap between the enclosure and the wall is about 1/2" due to the presence of ground wire behind the panel. Stacksof washers are provided at each of the bolt lo cations, thus considered adequate. 4 - Panel/anchorage configuration is enveloped by the bounding Calculation performed for SSEL # 39051, with Large margins.

Evaluated by:	dun O. Diza	Date: 4/19/96
_	J.R. DISSER	4/19/96
\leq	. /	- / /



SSEI AI	Line No. <u>9395</u>		Sta	itus	\bigcirc
AI		•	She	et l	of 1
	IPEEE SUPPLEMENTAL SCREENING E	VALUAT	ION W	IORKS	HEET
Equi	ip. ID No. <u>2-LPNL-925-0027</u> Equip. Class <u>74-</u>	Distr	ibu-	tion	Panels
Equi	ipment Description Panel 2-25-27 IRM	PREA	MΡ	R	PS I
	AY WALKDOWN Does spot check of essential relays indicate relays present and properly mounted?	۰ Y	N	U	N/A
2.	Are essential relays required to function during earthquake screened out?	Y	N	U (N/A
	If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.				
3.	No other relay concerns?	Ŷ	N	U	N/A
Requ	uirements for relays satisfied?				Ŷ

U Ν

U

N/A

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SYSTEM INTERACTION EFFECTS

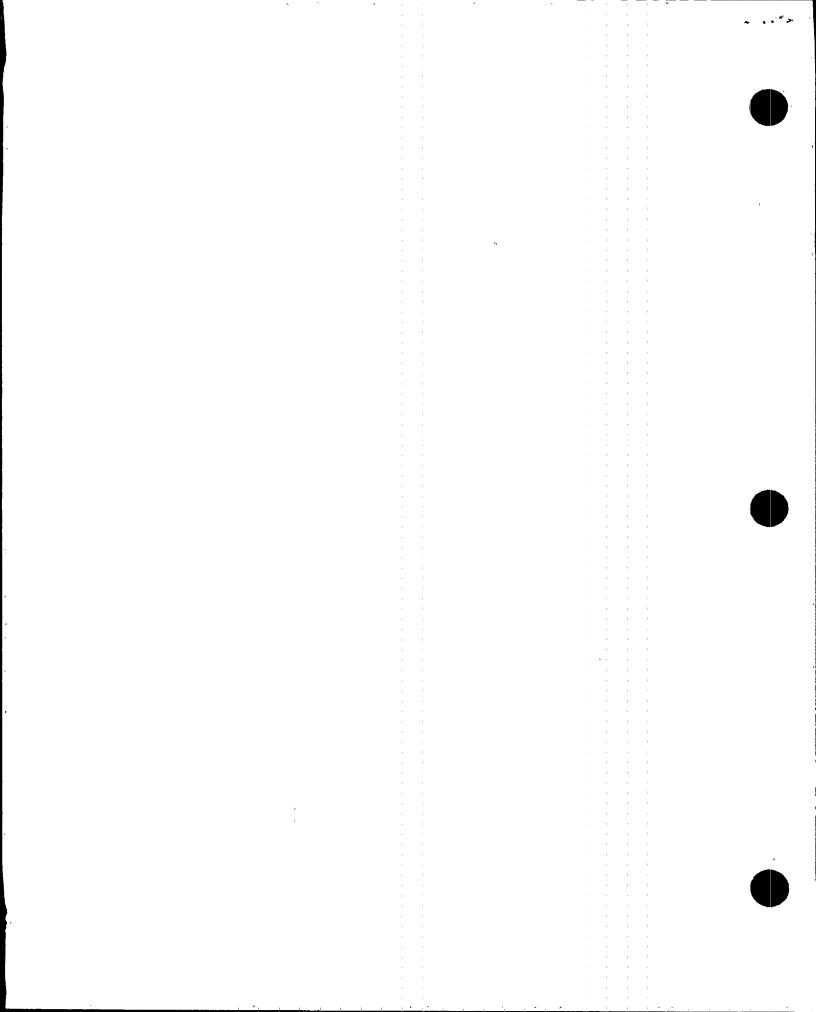
: ...

1. No potential sources could flood or spill onto cabinet?

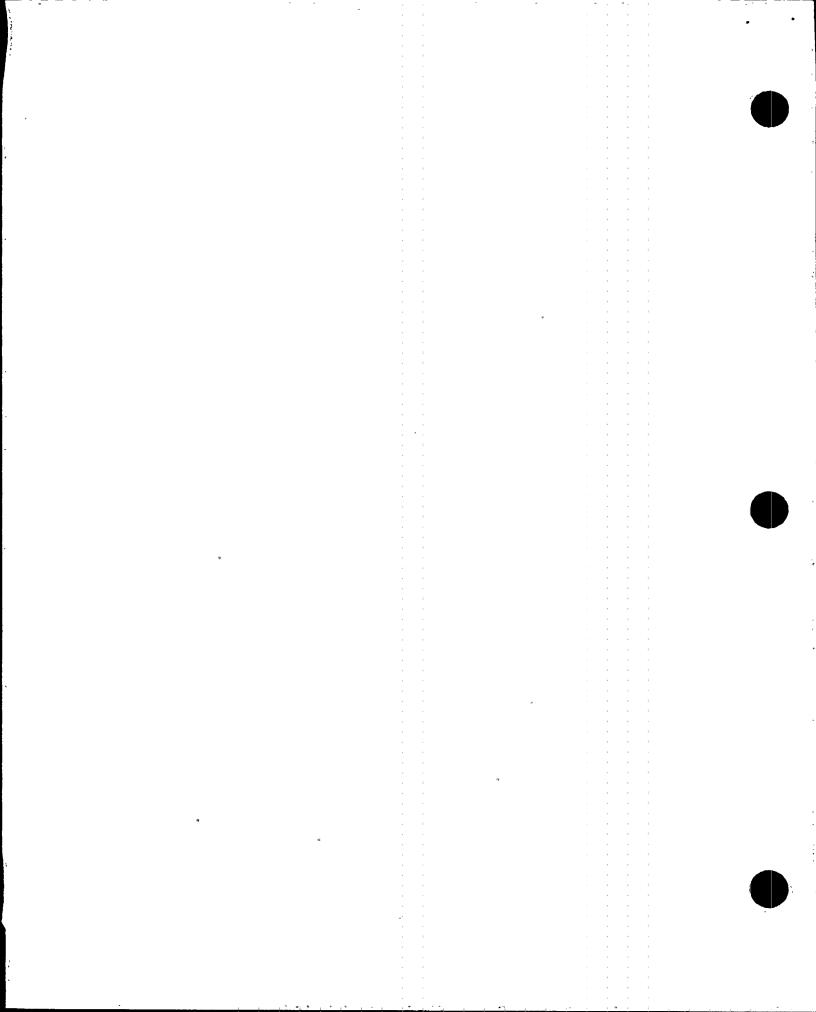
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING RELAY CHATTER? IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVESTIGATION? NO YES V 4/19/96 din Oi Date: Evaluated by: Date: Evaluated by: R DISSER





SSEL Line No. 39051 (Ŷ) N U Status SCREENING EVALUATION WORK SHEET (SEWS) Sheet 1 of 34Equip. ID No. 3-JBOX-253-7162 Equip. Class 14 - Distribution Panels Equipment Description I&C BUS 3B BREAKER BOX Location: Bldg. U3 RB Floor El. 593 Room, Row/Col SD BD RM F Manufacturer, Model, Etc. (optional but recommended) GE F225 + 1600 line circuit breakers SEISMIC CAPACITY VS DEMAND 599 Elevation where equipment receives seismic input 1. grude @ 563 Elevation of seismic input below about 40' from grade (Y) N 2. Equipment has fundamental frequency above about 8 Hz (Y) N U N/A(2)3. Capacity based on: Existing Documentation DOC 4. Bounding Spectrum (BS) 1.5 x Bounding Spectrum ABS GERS GERS 5. Demand based on: Ground Response Spectrum GRD 1.5 x Ground Response Spectrum AGS Conserv. Des. In-Str. Resp. Spec. CRS Realistic M-Ctr. In-Str. Resp. Spec. RRS Does capacity exceed demand? (Indicate at right (*) and in (Y) N U <u>COMMENTS</u> if a special exception to enveloping of seismic (Kinf. cale demand spectrum is invoked per Section 4.2 of the GIP.) CD_0000-940379 <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) Equipment is included in earthquake experience 1: (\mathbf{v}) equipment class N U N/A 2. U Contains only circuit breakers and switches N N/A All latches and fasteners in door secured Ν U 3. N/A Adjacent cabinets which are close enough to impact, 4. or sections of multi-bay cabinets, are bolted together if they contain essential relays Ý (N/A) N U ØN N 5. Wall- or floor-mounted NEMA-type enclosure U N/A (1)U Anchorage adequate (See checklist below for details) N/A 6. Relays mounted on equipment evaluated Y N U (NTA) 7. Ø) N U 8. Have you looked for and found no other adverse concerns? N/A Is the intent of all the caveats met for Bounding Spectrum? (Y) N U N/A CAVEATS - GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) Equipment is included in the generic seismic testing 1. U (N/A equipment class Y N Meets all Bounding Spectrum caveats Y 2. Ν U (N/A Use panelboard GERS unless unit is free-standing and 3. designated as a switchboard by manufacturer Υ Ν W "Quicklag" Type E circuit breakers are not in 4. distribution panel Y Ν 5. <u>All</u> adjacent cabinets or sections of multi-bay U (N/A Y Ν assemblies bolted together YNU(Ň/À Is the intent of all the caveats met for GERS?

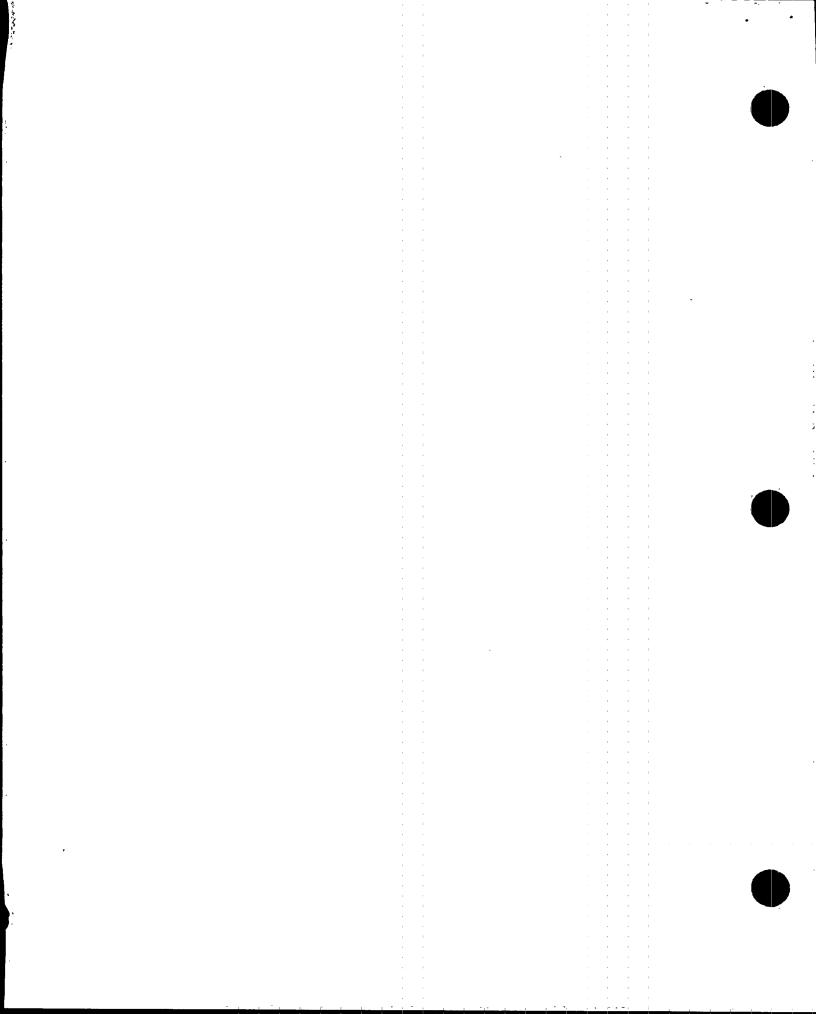


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SCREENING EVALUATION WORK SHEET (SEWS) Sheet 2 of 24

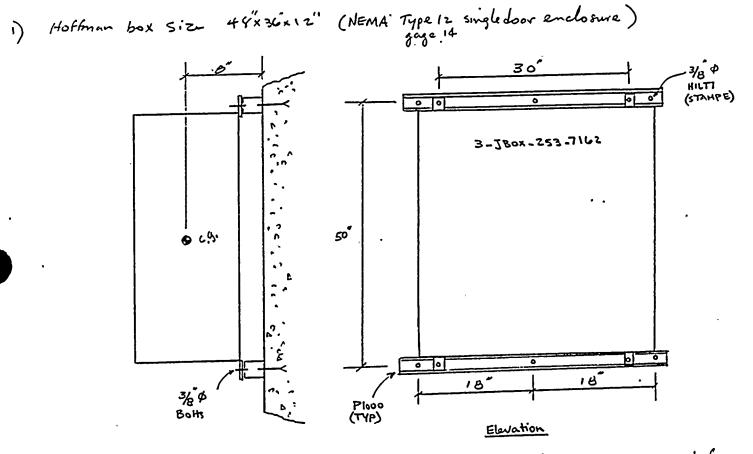
Equip	. ID No. <u>3-JBOX-253-7162</u> Equip. Class <u>14 - Distributio</u>	n Panels	S		
	ment Description <u>I&C BUS 3B BREAKER BOX</u>				
ANCHO	2 , DAGE				
ANCHOR 1.	Appropriate equipment characteristics determined				
1.	(mass, CG, natural freq., damping, center of rotation)	(V) N	11	N/A(1, 4)	
2.	Type of anchorage covered by GIP	Ϋ́Ν	й	N/A (1, 4) N/A	
3.	Sizes and locations of anchors determined	Ø N	Ŭ	N/A	
4.	Anchorage installation adequate, e.g.,		Ŭ	iyn ,	
	weld quality and length, nuts and washers, expansion				
	anchor tightness	(Y) N	н	N/A	
5.	Factors affecting anchorage capacity or margin of		Ŭ		•
•••	safety considered: embedment length, anchor spacing,				
	free-edge distance, concrete strength/condition, and				
	concrete cracking	(V) N	U	N/A	
6.	For bolted anchorages, gap under base less than		Ŭ		
••	1/4-inch	· (Y) N	U	N/A	
7.	Factors affecting essential relays considered: gap		•	.,	
• •	under base, capacity reduction for expansion anchors	Y N	U	(N/A)	
8.	Base has adequate stiffness and effect of prying		-		
- •	action on anchors considered	(Y) N	U	N/A	
9.	Strength of equipment base and load path	•	•		
	to CG adequate	(Ý) N	U	N/A	
10.	Embedded steel, grout pad or large concrete		Ŭ	iy n	
	pad adequacy evaluated	Y N	U	NTA)	
$\Delta re an$	chorage requirements met?		Ŭ	ΟNU ζ ^ι	٢٦
					1)
INTERA	CTION EFFECTS				
1.	Soft targets free from impact by nearby				
* •	equipment or structures	Ϋ́Ν	U	N/A	
2.	If equipment contains sensitive relays, equipment		U	ių n	
٤.	free from all impact by nearby equipment or structures	Y N	U	N7A	
3.	Attached lines have adequate flexibility	€D·N	Ŭ		
		Û N	U	N/A (3)	
4.	Overhead equipment or distribution systems are	ΘN		NI / A	
F	not likely to collapse		U	N/A	
5.	Have you looked for and found no other adverse concerns?	(Y N	U	N/A	
is equ	ipment free of interaction effects?			ON U	
12 EUU	IPMENT SEISMICALLY ADEQUATE?			() N U	

See next pages for wotes.



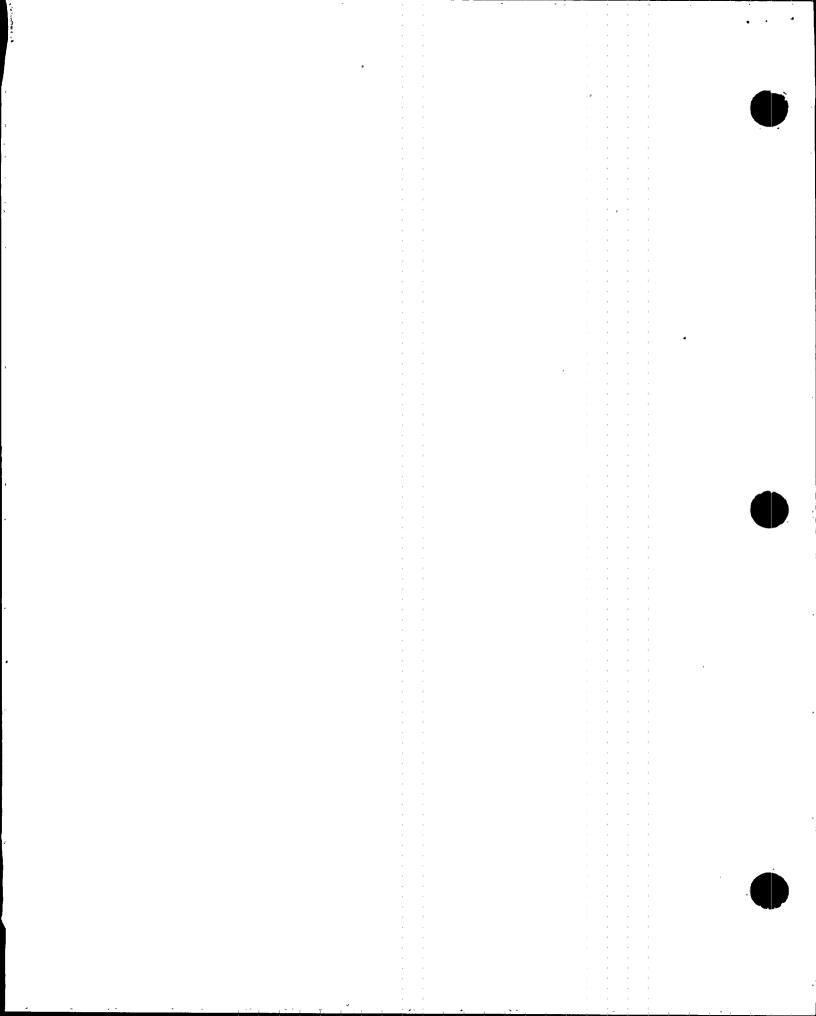
<u>SCREENING EVALUATION WORK SHEET</u> (SEWS) Sheet 3 of $\mathcal{X}_{\mathcal{Y}}$

Equip. ID No. <u>3-JBOX-253-7162</u> Equip. Class <u>14 - Distribution Panels</u> Equipment Description <u>I&C BUS 3B BREAKER BOX</u> <u>COMMENTS</u>

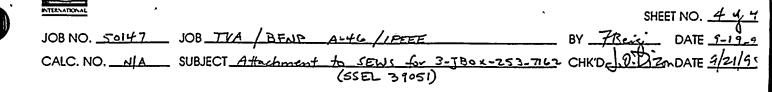


- 2) Box is Wall-mount and is visibly supported. Light w.d. breakers are mounted on 1/8° thick plate which is botted to the back of the panel with 8-4/2" unlided studie. - f>8HZ (Also, per EPRI Report TR-102180 the Lowest natural frequency of wall-mount
 - distribution panels from test results indicate (>12HZ)
- 3) Flex conduit we adequate flexibility. Top entry rigid conclust supported from wall. Relative displacement between the conduits the box =0" - flexibility ok

Foni Bei valuated by: Date: 9-18-95 9/21/95



EQE INTERNATIONAL



4) Anchorage EValuation:

$$NEMA Type 12$$

$$Typically gage uf (Holdman Brideboor enclowne)$$
Wit. = 3.0 x $\frac{490}{123}$ xollsiz[($(+0 \times 36) + (36 \times 12) + (40 \times 12)$] = 365[#]
1 conservative
Concervatively une peak accelerations $O RB$, EL. 637.

$$T_{k} = 2.403 \rightarrow F_{k} = 2.403 \times 125 \times 365^{*} = 1132.^{*}$$

$$a_{k} = 2.403 \rightarrow F_{k} = 2.403 \times 1.25 \times 365^{*} = 132.^{*}$$

$$T = \left[\left(\frac{1132}{6} \right)^{2} + \left(\frac{1132 \times 8}{36 \times 2} \right)^{2} + \left(\frac{333 \times 9}{50 \times 3} \right)^{2} \right]^{\frac{1}{2}} + \frac{365 \times 8}{50 \times 2}$$

$$= 247^{\frac{1}{2}}$$

$$V = \left[\left(\frac{1132}{6} \right)^{2} + \left(\frac{333}{6} \right)^{3} \right]^{\frac{1}{2}} + \frac{365}{6} = 257.^{\frac{1}{2}}$$
For $\frac{3}{6}$ is $H/L77$ is

$$T_{k11} = 1.46 \times \frac{3660}{4000} \times 0.75. = 0.986$$

$$V_{a11} = 1.42 \times 752.1065^{\frac{1}{2}} + \frac{257}{1065} - 0.24 < 0.3$$

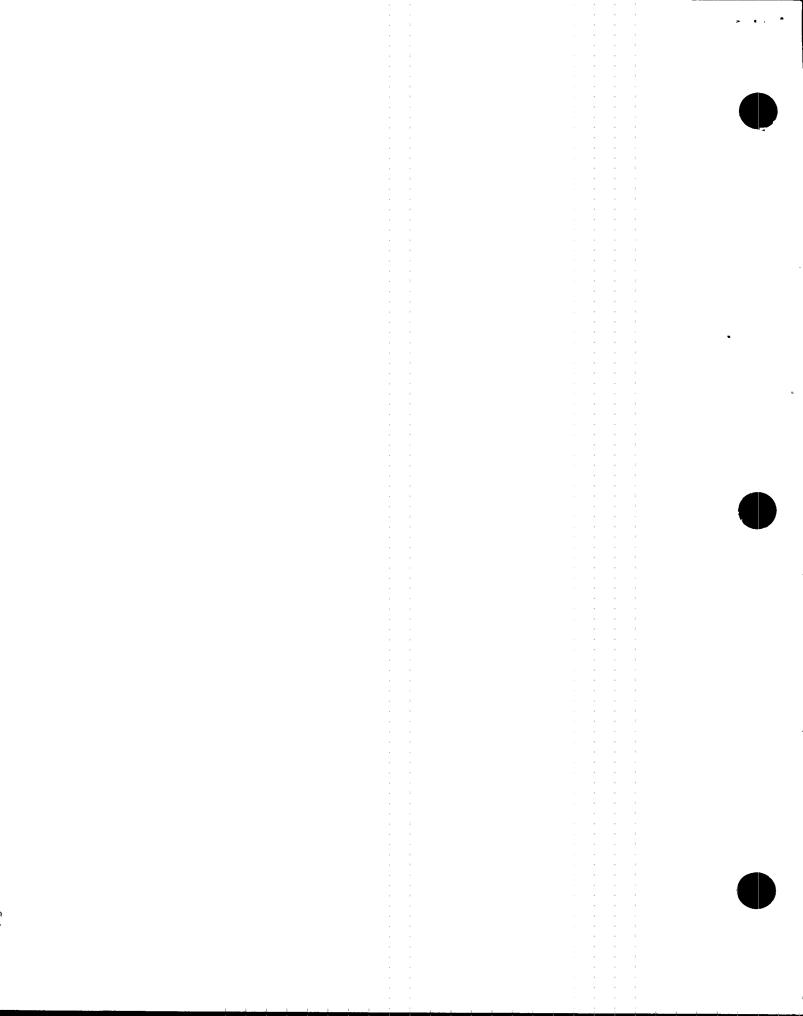
$$\frac{11}{T_{a11}} = \frac{241}{766} = 0.25 < 1.0$$
which bolds

$$T_{\frac{1}{2}} = \frac{241}{76} + \left(\frac{333 \times 8}{50 \times 2} \right)^{2} \int^{\frac{1}{2}} + \frac{365 \times 8}{50 \times 2} = 357.^{\frac{1}{2}}$$
For $\frac{3}{4}$ is unished bolds

$$T_{\frac{1}{2}} = \frac{247}{766} = 0.25 < 1.0$$

$$\frac{11}{1000^{4}} (Red, Unished For the form of the$$

(Also calc. CD_Q3253_900448, Rev. 1 conservatively qualifies the suchorage config. of This 20x?.



* + e +

Status 🔍 N U

Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>3-JBOX-253-7162</u> Equip. Class <u>14 - Distribution Panels</u> Equipment Description <u>I&C BUS 3B BREAKER BOX</u>

RELAY WALKDOWN

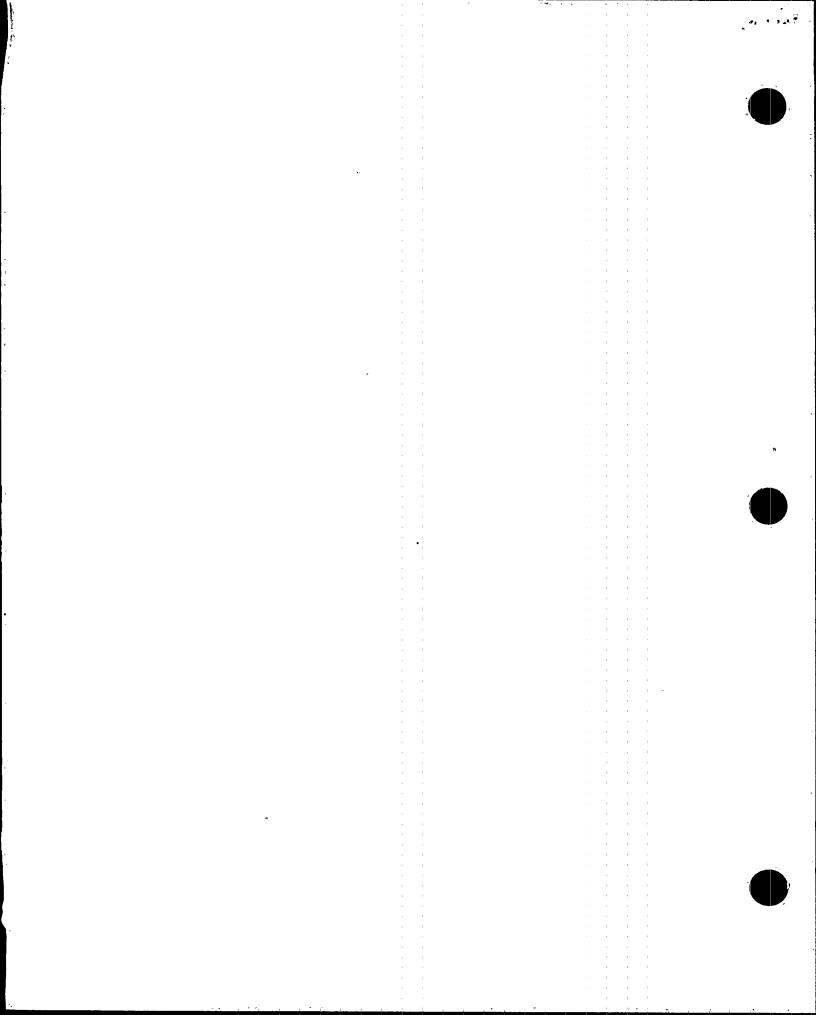
1.	Does spot check of essential relays indicate relays present and properly mounted?	Y	N	U	NA
	Are essential relays required to function during earthquake screened out?	Y	N	ປ	NA
	If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.			-	
3.	No other relay concerns?	Y	N	U	N/A)
Requ	irements for relays satisfied?				• 🕐 N U

SYSTEM INTERACTION EFFECTS

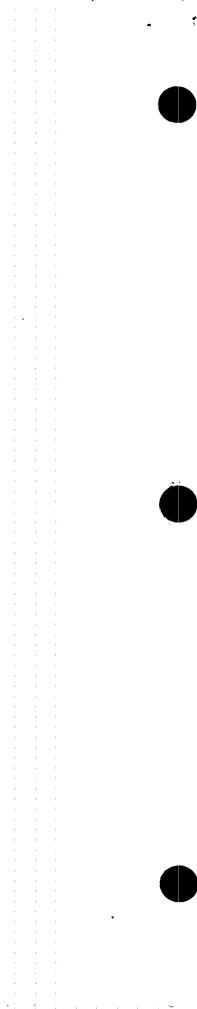
1. No potential sources could flood or spill onto (Y) N U N/A cabinet?

DESCRIBE POTENTIAL PROBLEMS. INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

IS EQUIPMENT	FREE OF NO	NEED FOR	FURTHER	INVEST	FIGATION,	EXCLUDING	RELAY	CHATTER?	
IS EQUIPMENT	FREE OF	NEED FOR	FURTHER	RELAY	CHATTER	INVESTIGATI	ON?	YES <u>/</u> NO_	_
Evaluated by	:	Fan	<u>i Bei</u> g			Dat	e:	9-18-95	
Evaluated by	•	_ Ann	0.Di=	zon_		Date	e:	9/21/95	'



INSTRUMENTATION LOOP	>						
SEL Line No. <u>33055</u> Statu	S	0	Dr	I U			
SCREENING EVALUATION WORK SHEET (SEWS) Sheet	10	of	<u> </u>	ک -			
Equip. ID No. <u>3-XR-64-159</u> Equip. Class <u>20 - Instr. & Con</u>	trol	Pa	inel	s & C	<u>abinets</u>		
Equipment Description <u>TORUS LEVEL AND DRYWELL PRESSURE INSTRUMEN</u>	T						
Location: Bldg. <u>CB</u> Floor El. <u>617</u> Room, Row/Col							
Manufacturer, Model, Etc. (optional but recommended)							
SEISMIC CAPACITY VS DEMAND Elevation where equipment receives seismic input Elevation of seismic input below about 40' from grade Equipment has fundamental frequency above about 8 Hz Capacity based on: Existing Documentation Bounding Spectrum S Bounding Spectrum S Command based on: Ground Response Spectrum S x Grou	DO BS AB GE GR AG	N C S RS S S S	U	N/A	N U		
<u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)							
 Equipment is included in earthquake experience equipment class No computers or programmable controllers 	Y Y	N N	U	N/A N/A			
3. No strip chart recorders	Y	N	U	N/A			
 Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or 	Y	N	U	N/A			
panels, are bolted together if they contain essential relays	Y	N	U	N/A			
Drawers and equipment on slides restrained from falling out	Y	N	U	N/A			
All doors secured by latch or fastener	Y	N	U	N/A			
 8. Attached lines have adequate flexibility 9. Anchorage adequate (See checklist below for details) 	Y Y	N N	U	N/A N/A			
10. Relays mounted on equipment evaluated	Ý	N	U	N/A			
11. Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum?	Y	Ν	U	N/A	N U N/A		
ICHORAGE							
1. Appropriate equipment characteristics determined							
(mass, CG, natural freq., damping, center of rotation)	·Y Y	N N	U	N/A N/A			
 Type of anchorage covered by GIP Sizes and locations of anchors determined 	Ý	N	U	N/A			



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SEL Line No. <u>33055</u>

SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 2 of 2 5

YNU

Equip. ID No. 3-XR-64-159 Equip. Class 20 - Instr. & Control Panels & Cabinets

Equipment Description TORUS LEVEL AND DRYWELL PRESSURE INSTRUMENT

ANCHORAGE (Cont'd)

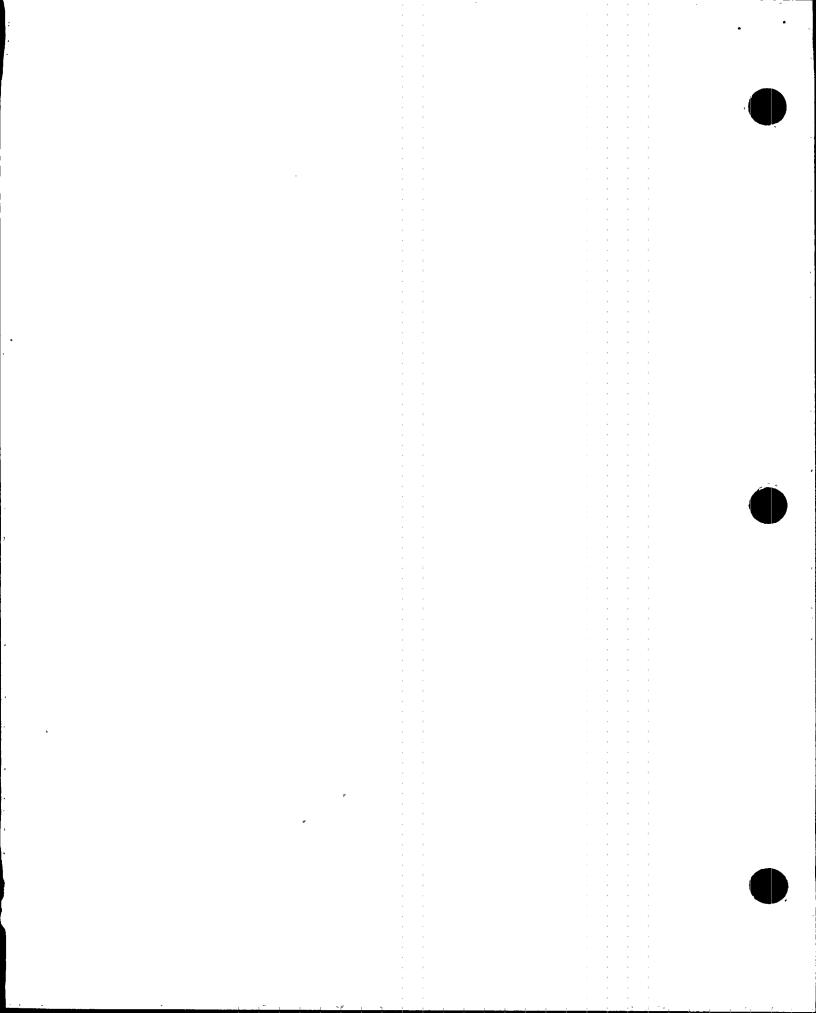
ANCHUR	AGE (CONT d)						
4.	Anchorage installation adequate, e.g.,						
	weld quality and length, nuts and washers, expansion						
	anchor tightness	Y	Ν	U	N/A		
5.	Factors affecting anchorage capacity or margin of				.,		
	safety considered: embedment length, anchor spacing,						
	free-edge distance, concrete strength/condition, and						
	concrete cracking	Y	N	11	N/A		
6.	For bolted anchorages, gap under base less than	•		U	ių A		
۷.	1/4-inch	v	N	п	N/A		
7.		1	14	U	N/ H		
1.	Factors affecting essential relays considered: gap	v	м	11	NI / A		
0	under base, capacity reduction for expansion anchors	·1	N	U	N/A		
8.	Base has adequate stiffness and effect of prying						
•	action on anchors considered	Ŷ	N	U	N/A		
9.	Strength of equipment base and load path						
	to CG adequate	Ŷ	N	U	N/A		
10.	Embedded steel, grout pad or large concrete						
	pad adequacy evaluated	Y	N	U	N/A		
re an	chorage requirements met?				Y	N	U
INTERA	CTION EFFECTS						
1.	Soft targets free from impact by nearby						
••	equipment or structures	v	N	U	N/A		
2.	If equipment contains sensitive relays, equipment		13	v	щл		
٤.	froe from all impact by nearby equipment on structures	Y	M	п	N/A		
2	free from all impact by nearby equipment or structures	Ý	N	U			
3.	Attached lines have adequate flexibility	Ť	N	IJ	N/A		
4.	Overhead equipment or distribution systems are						
_	not likely to collapse	Y	N	U			
5.	Have you looked for and found no other adverse concerns?	Y	N	U	N/A		
Is equ	ipment free of interaction effects?				4 Y	1 U	ļ

IS EQUIPMENT SEISMICALLY ADEQUATE?

COMMENTS

1. SEE SENS FOR 2-XR-64-159 (SSEC # 3057) Z. FOR EVALUATION OF THIS CONFONENT SEE SSEC # 39115. QUALIFIC BY "RULE OF THE BOX."

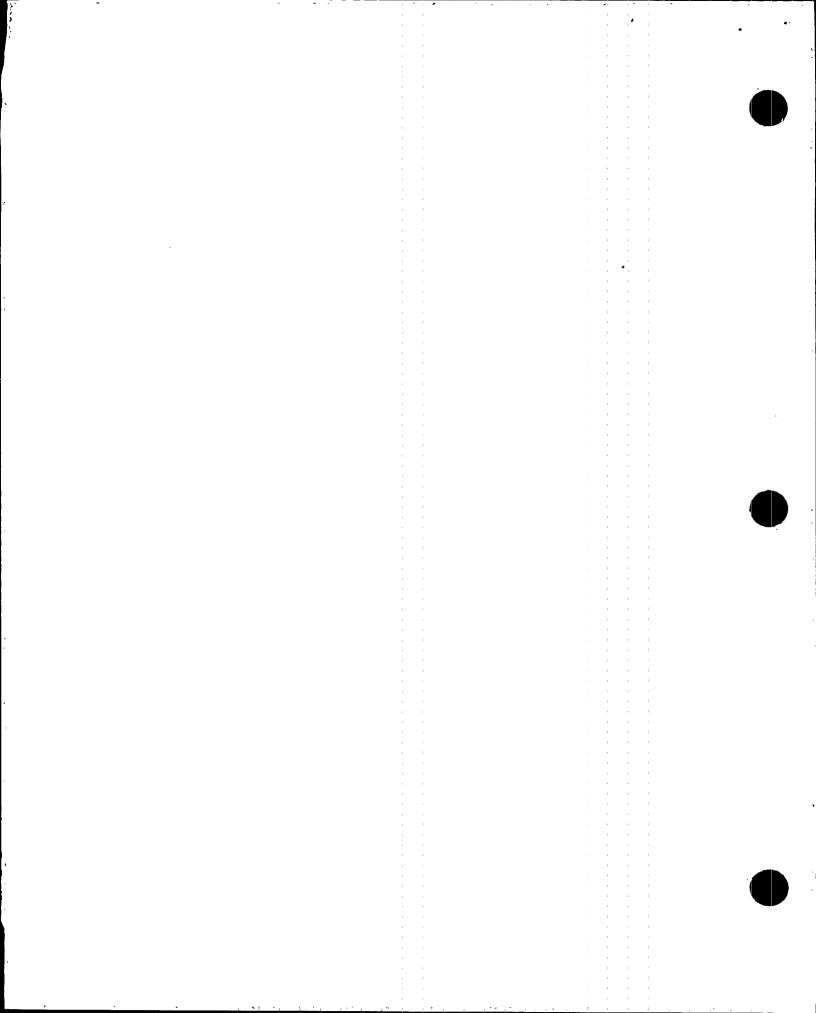
J.R. MISSER Date: 10 valuated by:



,	33055A	Revision 2, Corrected, 6/28/91
		Status (Y) N U
	SCREENING EVALUATION WORK SHEET (SEWS)	Sheet 1-of-3-30F 5
	Equip. ID No. <u>3-LT-64-159B</u> Equip. Class <u>18-</u>	Instruments on Racks
	Equipment Description TORUS LEVEL TRANSMITTER	· · · · · · · · · · · · · · · · · · ·
	Location: Bldg. <u>RB</u> Floor El. <u>579</u> Room, Row/Col	TORUS ROOM
	Manufacturer, Model, Etc. (optional)	
	SEISMIC CAPACITY VS DEMAND 1. Elevation where equipment receives seismic input 2. Elevation of seismic input below about 40' from grad 3. Equipment has fundamental frequency above about 8 Hi 4. Capacity based on: Existing Documentation Bounding Spectrum GERS	
.	5. Demand based on: Ground Response Spectrum 1.5 x Bounding Spectrum Conserv. Des. In-Str. Resp. Spec Realistic M-Ctr. In-Str. Resp. S Does capacity exceed demand?	GRS D ABS CRS CRS
	 <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) are met by intent without meeting the specific wording of the explain the reason for this conclusion in the COMMENTS sector. 1. Equipment is included in earthquake experience equipment class 2. No computers or programmable controllers 3. Steel frame and sheet metal structurally adequate 4. Adjacent racks which are close enough to impact or sections of multi-bay racks are bolted together if they contain essential relays 5. Natural frequency relative to 8 Hz limit considered 6. Attached lines have adequate flexibility 7. Anchorage adequate (See checklist below for details) 8. Relays mounted on equipment evaluated 9. Have you looked for and found no other adverse concerts 	the caveat rule and tion below) $(Y \ N \ U \ N/A)$ $(Y \ N \ U \ N/A)$
	 <u>CAVEATS - GERS</u> (Identify with an asterisk (*) those caveats met by intent without meeting the specific wording of the cand explain the reason for this conclusion in the COMMENTS Equipment is included in the generic seismic testing equipment class Meets all Bounding Spectrum caveats Component is a pressure, temperature, level or flow transmitter 	aveat rule section below)

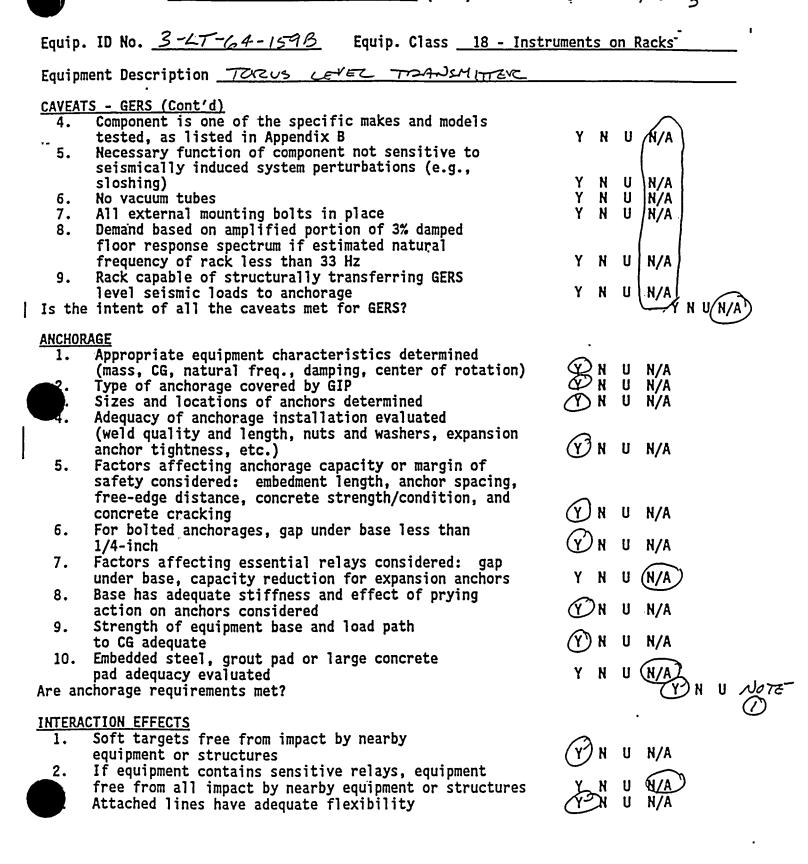
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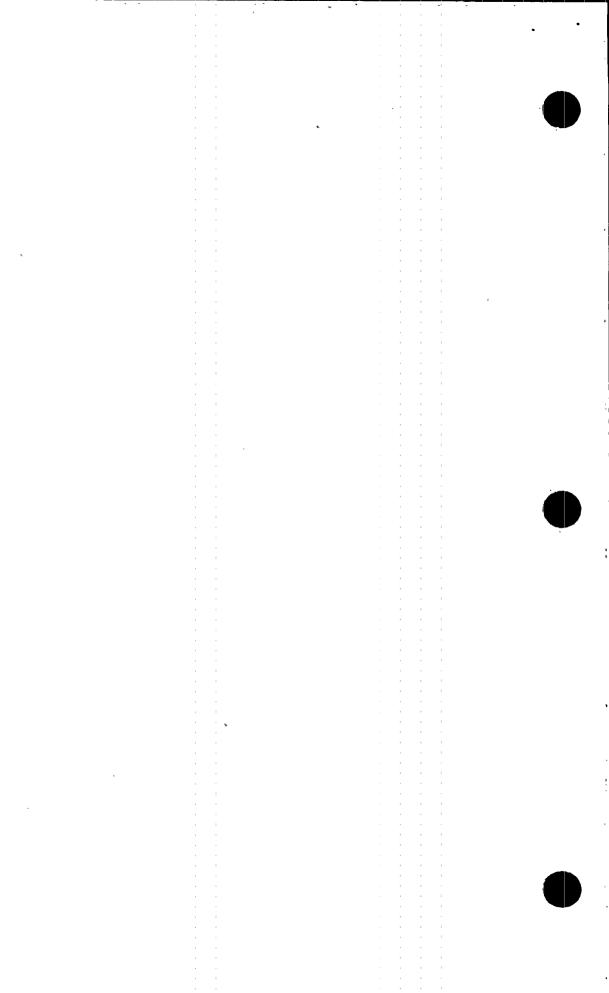
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SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2, Corrected, 6/28/91 Sheet 2_of 3 4 of 5





SCREENING EVALUATION_WORK_SHEET (SEWS)

Revision 2, Corrected, 6/28/91 Sheet 3-of 3- 5-07- 5-

'N 'U

 Equip. ID No. 3-LT=64-1553
 Equip. Class 18 - Instruments on Racks

 Equipment Description
 TRANSHITTERE

 INTERACTION EFFECTS (Cont'd)
 TRANSHITTERE

 4. Overhead equipment or distribution systems are not likely to collapse
 N U N/A

 5. Have you looked for and found no other adverse concerns?
 N U N/A

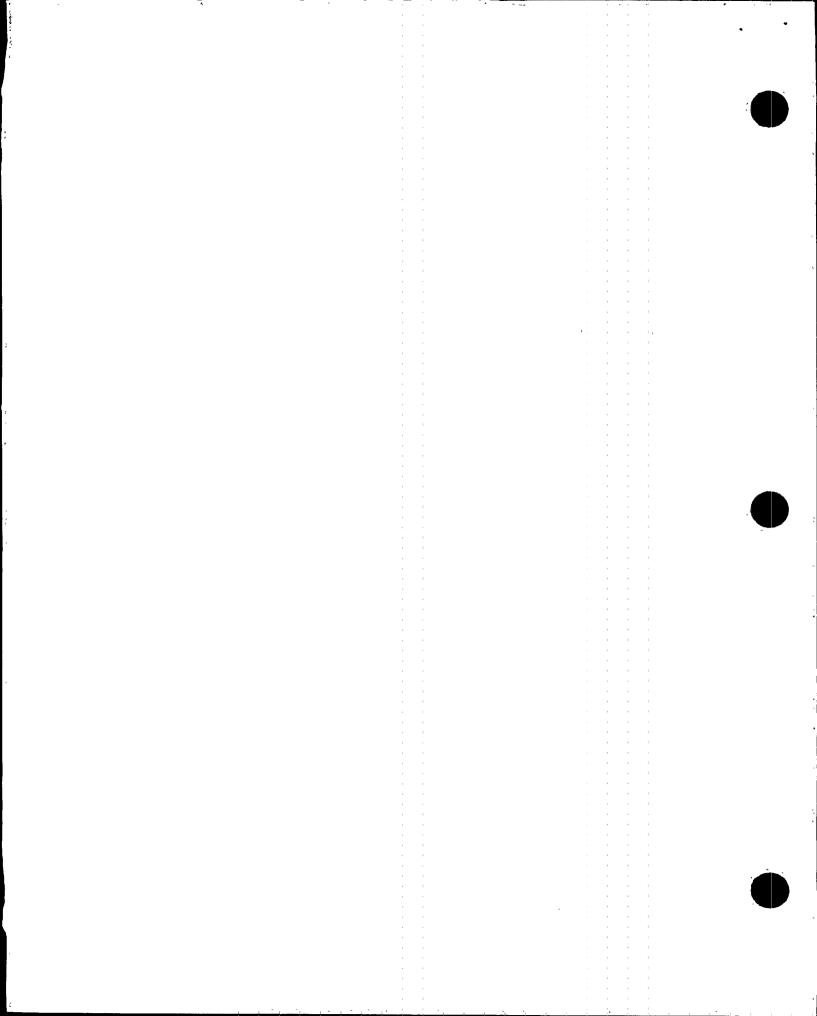
5. Have you looked for and found no other adverse concerns? Is equipment free of interaction effects?

IS EQUIPMENT SEISMICALLY ADEQUATE?

COMMENTS

D MOUNTING & ANCHORAGE OK BY TUG TEST LIGHT WETGHT, WALL MOUNTES.

J.R. SISSER Date: _ Evaluated by: 10

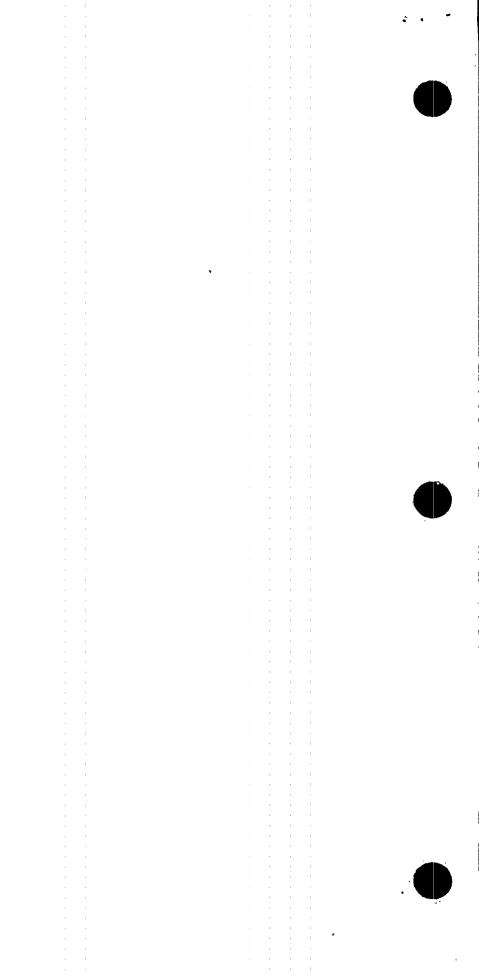


SEL Line No. 33055 A	Status	Y N	U
	Sheet 1	of l	
IPEEE SUPPLEMENTAL SCREENING EVALUATI	ON WORKSI	IEET	-
SEE PAURIC 9-3 3- LT-64-1593	•	•	
Equip. ID No. 3-XR-64-159 Equip. Class 20 - Instr.	& Contro	ol Panels	& Cabinets
Equipment Description <u>TORUS LEVEL AND DRYWELL PRESSURE INS</u>	TRUMENT		
THIS FORT APPLIES TO 3-0		-159B	only.
RELAY WALKDOWN	•		
 Does spot check of essential relays indicate Y relays present and properly mounted? 	N U (N/A	
2. Are essential relays required to function Y during earthquake screened out?	NU (17A)	
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.		٨	
3. No other relay concerns? Y	NU	N7A	
Requirements for relays satisfied?		(N U
SYSTEM INTERACTION EFFECTS			
1. No potential sources could flood or spill onto cabinet?	NU	N/A	
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTO sheets if necessary)	RY (Use a	dditiona	I
· ·			
			-
IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING YES \checkmark NO	ING RELAY	CHATTER	?
IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVESTIG	GATION?	YES <u>/</u> NO)
Evaluated by:	Date:	9-15-55	,

Date: <u>9-15-35</u>,

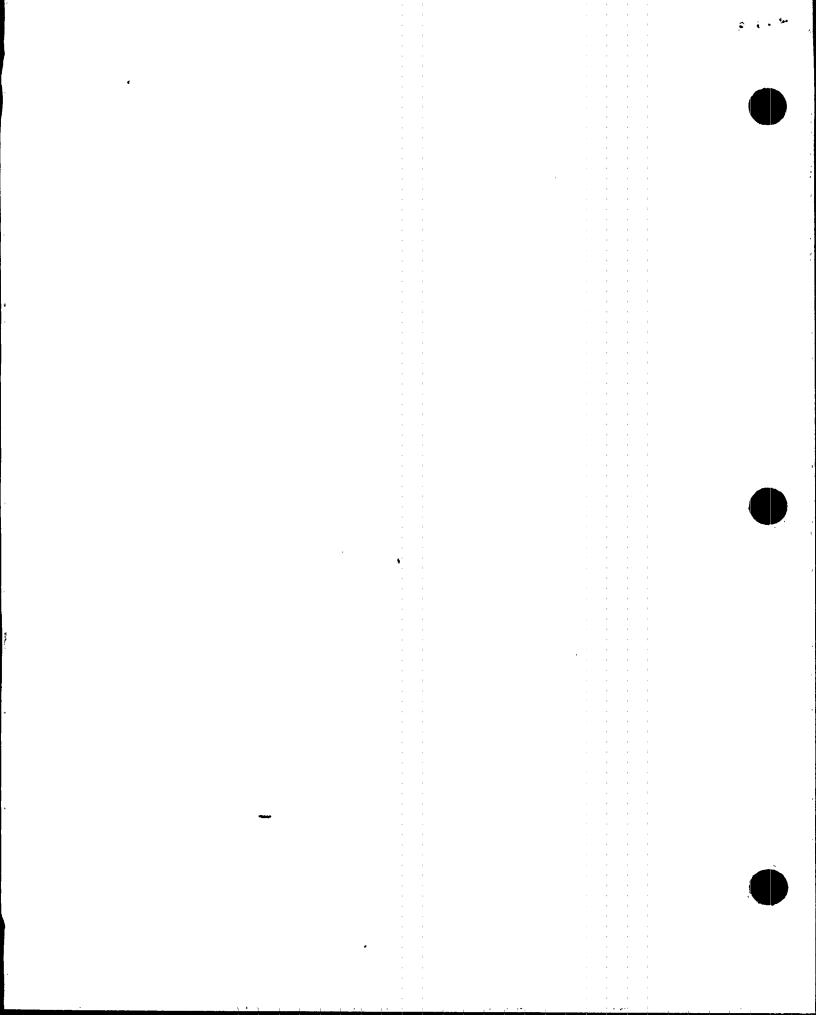
A.O. Augusta

Evaluated by: _

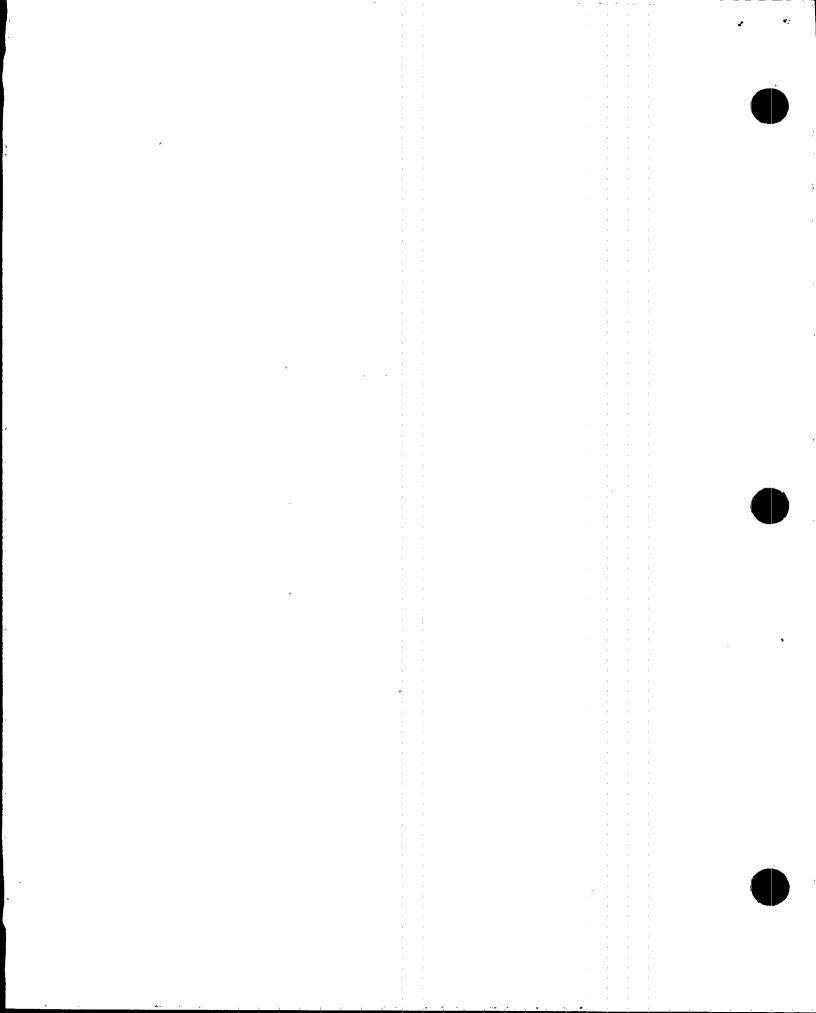


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SEL Line No. <u>33055</u>			atus eet	(1-of 1) N	U	
IPEEE SUPPLEMENTAL SCREENING EVALU	UATI	ON	WORK:	SHEET			÷
juip. ID No. <u>3-XR-64-159</u> Equip. Class <u>20</u>							
juipment Description							
ELAY WALKDOWN							
!. Does spot check of essential relays indicate relays present and properly mounted?	Y	N.	U.	N/A			
Are essential relays required to function during earthquake screened out?	Ŷ	N	U	N/A			
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.		·.^			, *		
other relay concerns?	Y	N	U	N/A	×		
equimements for relays satisfied?			٠		Y N	I U	
STEM INTERACTION EFFECTS		•					
. No potential sources could flood or spill onto cabinet?	Y	N	U	N/A			
SCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFA eets if necessary)	CTOP	RY (Use	addit	ional		
SEE THE SEWS FOR SS	Q	_ #	۔ 	3911.	5		
FOR THE EVALUATION OF TH	<i>55</i>		sM,	Son	EN	7	-
EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXC. NO_{1}	LUDI	[NG	RELA	Y CHA	TTER?	<i>.</i>	
EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVE	STIC	ĢŢI	ON?	YES_	NO		
aluated by: J.R. DISSOR		Dat	:e: _	10/2	<u>0/95</u>	<u>`</u> '	
aluated by:		Dat	:e: _	10/2	0/95	_'	



INSTRUMENTATION LOOP	•					
305 7	- us	Ċ	ት ነ	U V		
I <u>SCREENING EVALUATION WORK SHEET</u> (SEWS) Shee SRE PANEL 9-3	t 1 (
Equip. ID No. <u>2-XR-64-159</u> Equip. Class <u>20 - Instr. & Co</u>	ntroi	<u>1 Pa</u>	anel	<u> s & (</u>	<u>abi</u>	<u>nets</u>
Equipment Description TORUS LEVEL INSTRUMENT						
Location: Bldg. <u>CR</u> Floor El. <u>617</u> Room, Row/	Co1 _			-		;
Manufacturer, Model, Etc. (optional but recommended)						
 SEISMIC CAPACITY VS DEMAND Elevation where equipment receives seismic input Elevation of seismic input below about 40' from grade Equipment has fundamental frequency above about 8 Hz Capacity based on: Existing Documentation Bounding Spectrum	DC BS AB GE GR AG CR	N N N N N N N N N N N N N N N N N N N				
Realistic M-Ctr. In-Str. Resp. Spec. Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.) <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those are met by intent without meeting the specific wording of the cave explain the reason for this conclusion in the COMMENTS section be	/eat	ats rul	wh e a	ich	NU	J
 Equipment is included in earthquake experience equipment class 	Y			N/A		
 No computers or programmable controllers No strip chart recorders 	Y Y	N N	U U			
 Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain 	Ŷ	N	Ū	N/A		
essential relays	Y	N	U	N/A		
6. Drawers and equipment on slides restrained from falling out	Y	N	U	N/A		
7. All doors secured by latch or fastener	Ý	N	U	N/A		
 Attached lines have adequate flexibility Anchorage adequate (See checklist below for details) 	Y Y	N		N/A		
9. Anchorage adequate (See checklist below for details) 10. Relays mounted on equipment evaluated	Ŷ	N N	Ŭ	N/A N/A		
11. Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum?	Ý	N	Ŭ	N/A	NU	I N/A
ANCHORAGE						
 Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP Sizes and locations of anchors determined 	Y Y Y	N N N	บ บ บ	N/A N/A N/A		



· 3057 SSEL Line No. <u>3069</u>

SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 2 of 27

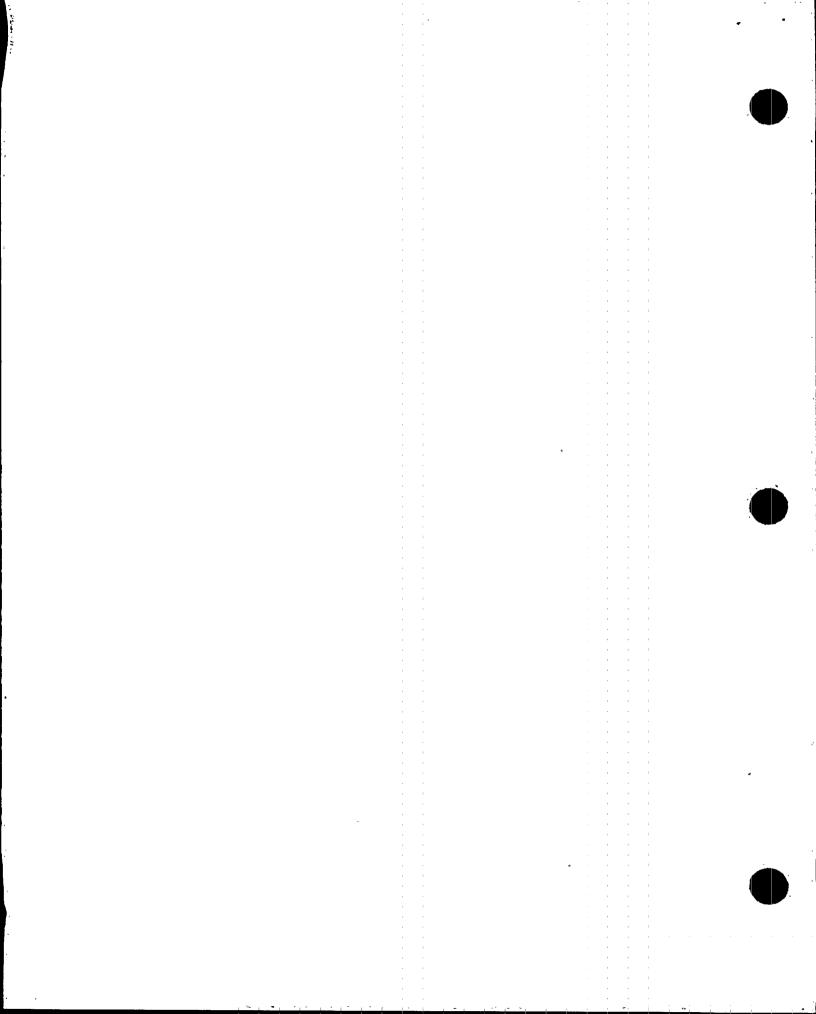
Equip. ID No. 2-XR-64-159 Equip. Class 20 - Instr. & Control Panels & Cabinets Equipment Description TORUS LEVEL INSTRUMENT ANCHORAGE (Cont'd) Anchorage installation adequate, e.g., 4. weld quality and length, nuts and washers, expansion anchor tightness Y N U N/A 5. Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking Y U N/A N 6. For bolted anchorages, gap under base less than 1/4-inch N U N/A 7. Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors U N/A Base has adequate stiffness and effect of prying 8. action on anchors considered U N/A Ν Strength of equipment base and load path 9. to CG adequate Y N U N/A Embedded steel, grout pad or large concrete 10. Y N U N/A pad adequacy evaluated Are anchorage requirements met? N U INTERACTION EFFECTS Soft targets free from impact by nearby 1. equipment or structures Y N U N/A If equipment contains sensitive relays, equipment 2. free from all impact by nearby equipment or structures U N/A N Attached lines have adequate flexibility Ν 3. U N/A 4. Overhead equipment or distribution systems are not likely to collapse N U N/A Have you looked for and found no other adverse concerns? 5. Y N U N/A Is equipment free of interaction effects? YNU IS_EQUIPMENT SEISMICALLY ADEQUATE? γули COMMENTS 1. FOR INSTRUMENTATION LOOP SCHEMATIC SEE PAGES 6 \$7. ALL COMPONENTS ARE QUALIFIED BY THE SEWS FOR THEIR SUPPORTING RACK OR PANEL OR BY THE SENS FOR THE

2. Z-LT-64-159 B IS QUALIFICD ON PAGES 3,4 \$5 OF THIS

INDIVIDUAL COMPONENTS

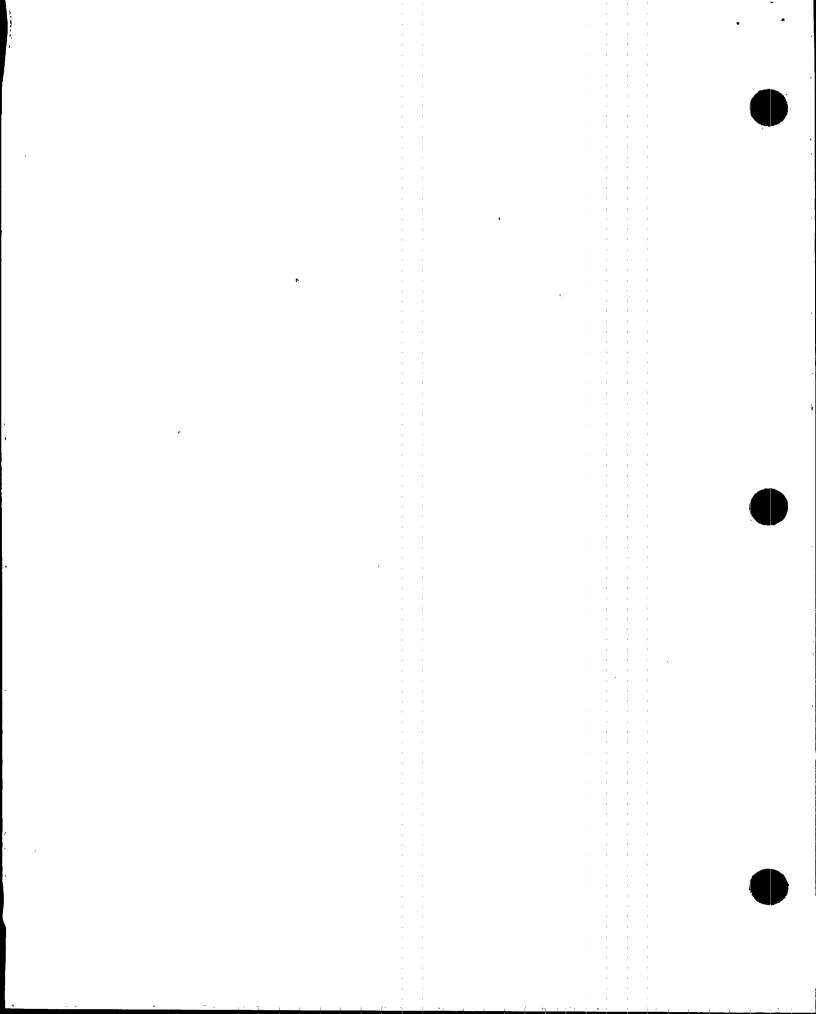
_____ J.R. SISSUR Date: 10/17/95 Evaluated by:

3. FOR THE EVALUATION OF THIS COMPONENT SEE THE SENS FER SSEL LINE NOS. 9040/9021. QUALIFIED BY "RULE OF THE BAX".



SSEC # 305.7 A	
	Revision 2, Corrected, 6/28/91 Status Y N U
SCREENING EVALUATION WORK SHEET (SEWS)	Sheet \mathcal{X} of \mathcal{A}^7
Equip. ID No. <u>2-LT-C4-159B</u> Equip. Class <u>18</u>	- Instruments on Racks
Equipment Description TOWS LEVEL INSTRUMEN	T (TRANSMITHER)
Location: Bldg. Tous Floor El. 519 Room, Row/Co	1
Manufacturer, Model, Etc. (optional) ROSEMOUNT	·····
SEISMIC CAPACITY VS DEMAND 1. Elevation where equipment receives seismic input 2. Elevation of seismic input below about 40' from gra 3. Equipment has fundamental frequency above about 8 [4. Capacity based on: Existing Documentation Bounding Spectrum GERS	HZ DONUN/A
5. Demand based on: Ground Response Spectrum 1.5 x Bounding Spectrum Conserv. Des. In-Str. Resp. Spe Realistic M-Ctr. In-Str. Resp. Does capacity exceed demand?	GERS GRS ABS ec. CRS Spec. RRS
 CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*)) are met by intent without meeting the specific wording of explain the reason for this conclusion in the COMMENTS see 1. Equipment is included in earthquake experience equipment class 2. No computers or programmable controllers 3. Steel frame and sheet metal structurally adequate 4. Adjacent racks which are close enough to impact or sections of multi-bay racks are bolted together if they contain essential relays 5. Natural frequency relative to 8 Hz limit considered 6. Attached lines have adequate flexibility 7. Anchorage adequate (See checklist below for details 8. Relays mounted on equipment evaluated 9. Have you looked for and found no other adverse concounts 	the caveat rule and ction below) P N U N/A N U N/A
<u>CAVEATS - GERS</u> (Identify with an asterisk (*) those caveat met by intent without meeting the specific wording of the and explain the reason for this conclusion in the COMMENTS 1. Equipment is included in the generic seismic testin equipment class 2. Meets all Bounding Spectrum caveats 3. Component is a pressure, temperature, level or flow transmitter	caveat rule S section below) Ig Y N U N/A Y N U N/A

.

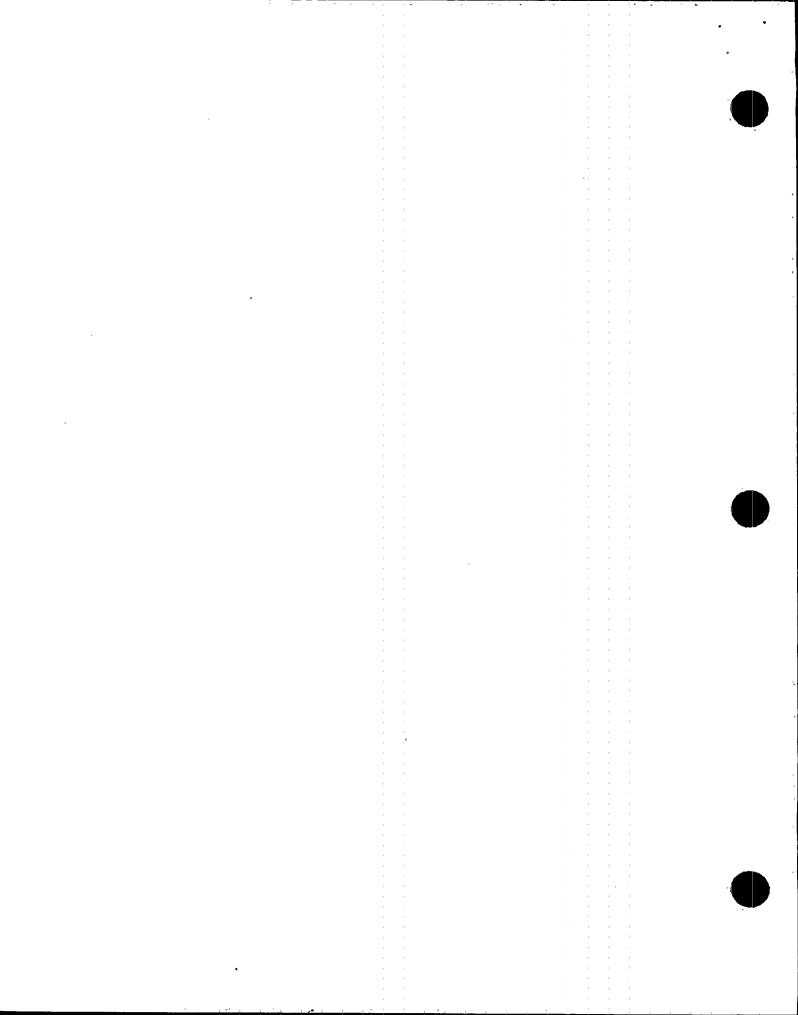


SCREENING EVALUATION WORK SHEET (SEWS)

1

Revision 2, Corrected, 6/28/91Sheet 2 of 3_7

Equip. ID No. <u>2-CT-L4-L59B</u> Equip. Class <u>1</u>	8 - Instruments on Racks
Equipment Description <u>TORUS</u> LEUFL TRANSMITTE	iR
CAVEATS - GERS (Cont'd)	
4. Component is one of the specific makes and model	s a
tested, as listed in Appendix B	Y N U NA
5. Necessary function of component not sensitive to	
seismically induced system perturbations (e.g.,	
sloshing)	Y N U (N/A)
6. No vacuum tubes	Y N U N/A Y N U N/A
 All external mounting bolts in place Demand based on amplified portion of 3% damped 	Y N U N/A
floor response spectrum if estimated natural	
frequency of rack less than 33 Hz	Y N U N/A
9. Rack capable of structurally transferring GERS	
level seismic loads to anchorage	Y N U (N/A)
is the intent of all the caveats met for GERS?	YNUN7A
	9
<u>INCHORAGE</u>	
1. Appropriate equipment characteristics determined	
(mass, CG, natural freq., damping, center of rot 2. Type of anchorage covered by GIP	ation) (Y) N U N/A (Y) N U N/A
Sizes and locations of anchors determined	Y N U N/A Y N U N/A
Adequacy of anchorage installation evaluated	
(weld quality and length, nuts and washers, expan	nsion
anchor tightness, etc.)	Ý N U N/A
5. Factors affecting anchorage capacity or margin o	f
safety considered: embedment length, anchor spa	
free-edge distance, concrete strength/condition,	and
concrete cracking	· · · · · · · · · · · · · · · · · · ·
6. For bolted anchorages, gap under base less than	
1/4-inch	. CYNUN/A
7. Factors affecting essential relays considered:	gap · · ·
under base, capacity reduction for expansion and	
8. Base has adequate stiffness and effect of prying	
action on anchors considered	Y N U N/A
9. Strength of equipment base and load path	
to CG adequate	
10. Embedded steel, grout pad or large concrete pad adequacy evaluated	Y N U (NA)
re anchorage requirements met?	OHUNY AND
n e anonorage i equit ementos meet	
NTERACTION EFFECTS	
1. Soft targets free from impact by nearby	•
equipment or structures	(Y) N U N/A
2. If equipment contains sensitive relays, equipment	
free from all impact by nearby equipment or stru	
Attached lines have adequate flexibility	ctures Y N U (N/A) Y N U N/A



- SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2, Corrected, 6/28/91 Sheet 3 of 3 5 7

U K_Y

Equip. ID No. 2-LT-64-159B Equip. Class 18 - Instruments on Racks

Equipment Description Torus LEVEL TRANSMITTER

INTERACTION EFFECTS (Cont'd)

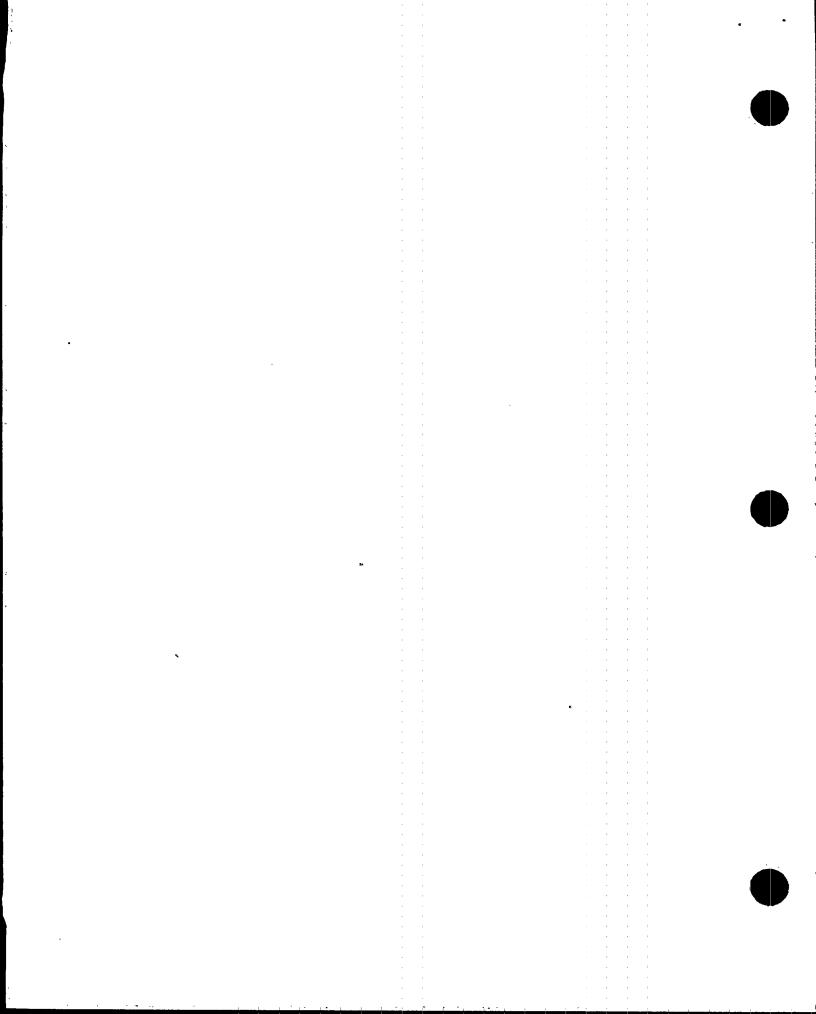
- 4. Overhead equipment or distribution systems are not likely to collapse
- 5. Have you looked for and found no other adverse concerns? \bigcirc N U N/A Is equipment free of interaction effects?

IS EQUIPMENT SEISMICALLY ADEQUATE?

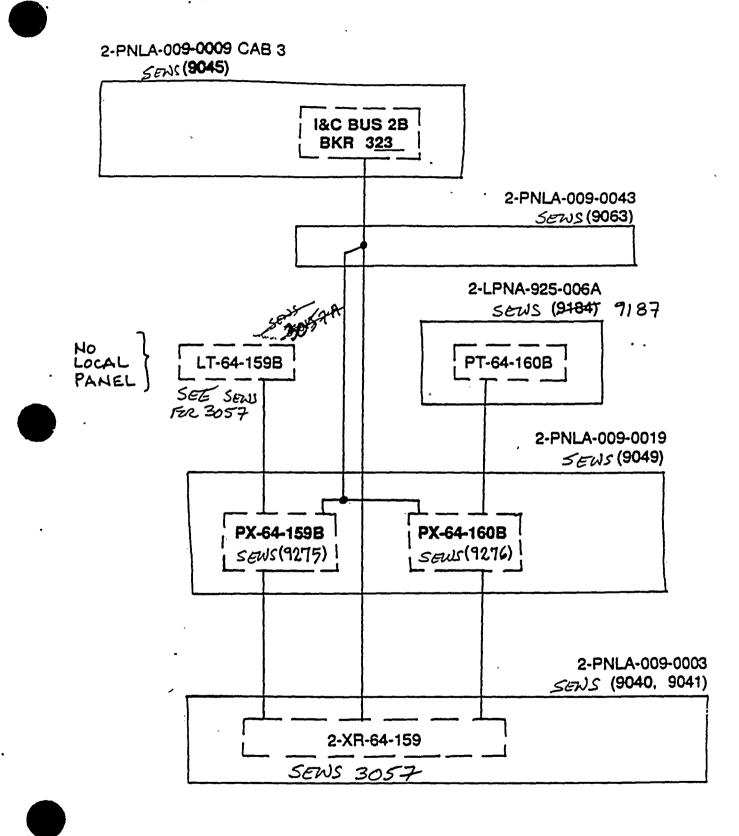
COMMENTS

O MOUNTING & ANCHORAGE OF BY TUG TEST ; LIGHTWEIGHT, WALL MOUNTED

••	Evaluated by:	They	_	Date:	9-14-9-
		A.D.	Augustin		9-14-95
<u>.</u>	PUOTO	14 13:14-	G.18-3		



3057 51. 6 057

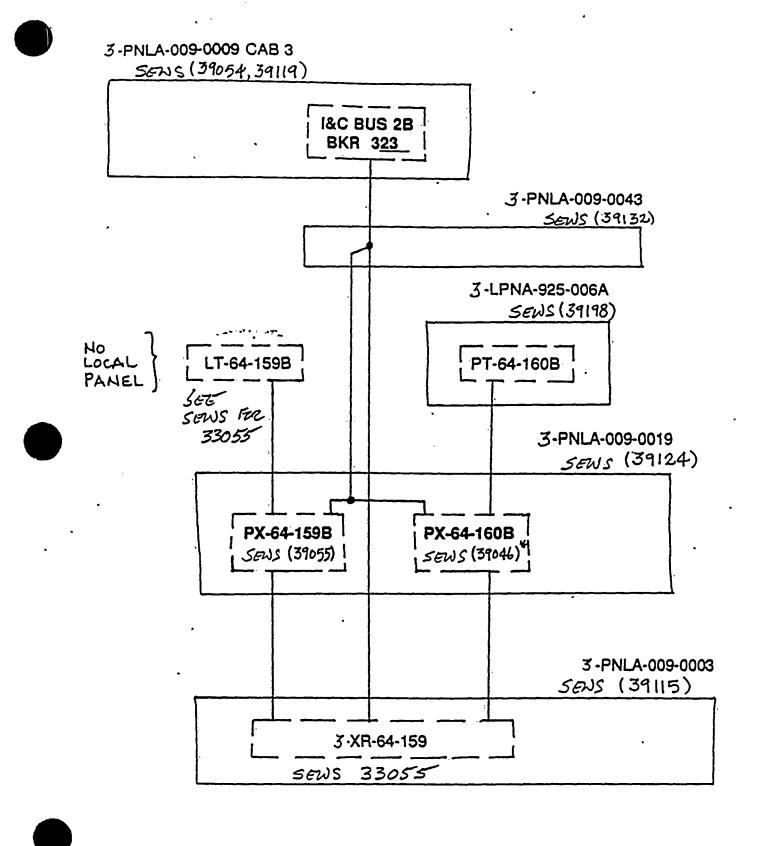


UNIT 2 : I&C BUS B POWER SUPPLIES



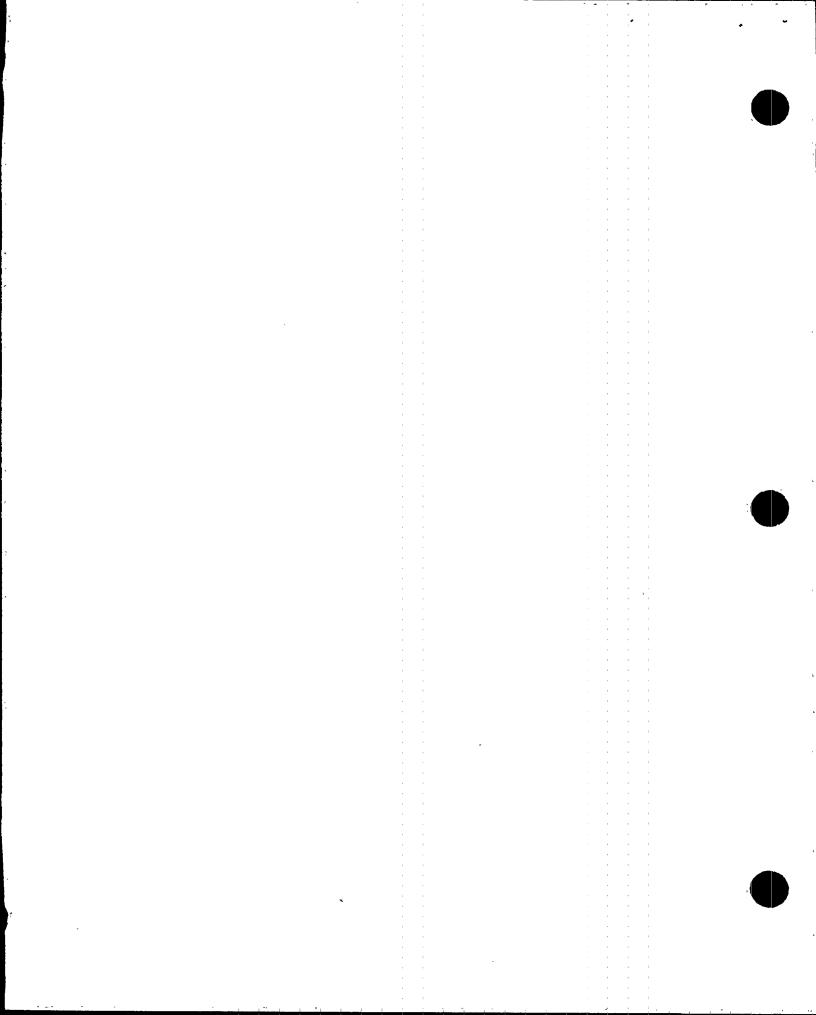
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UNIT 3: 1&C BUS B POWER SUPPLIES

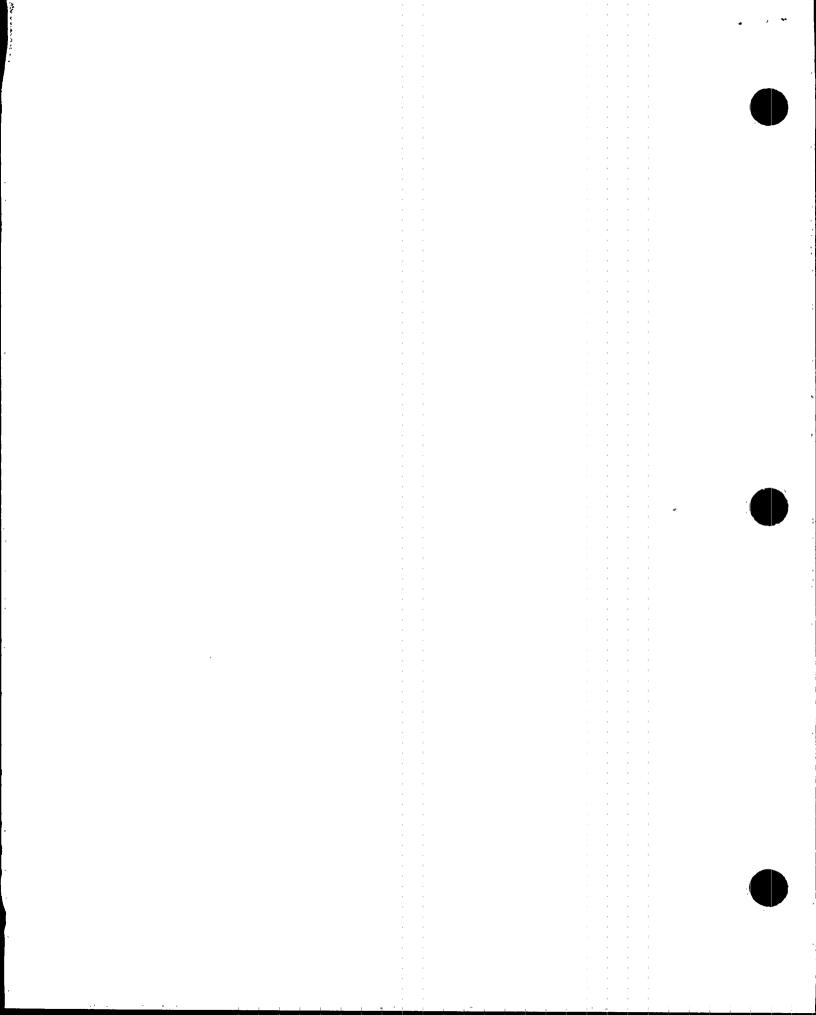
DONE * 39046 15 CURRENTLY 20 = 3-PX-64-15 THIS WILL BE REVISED TO 3-PX-64-1601 (LOCATION: PUL 9-19)



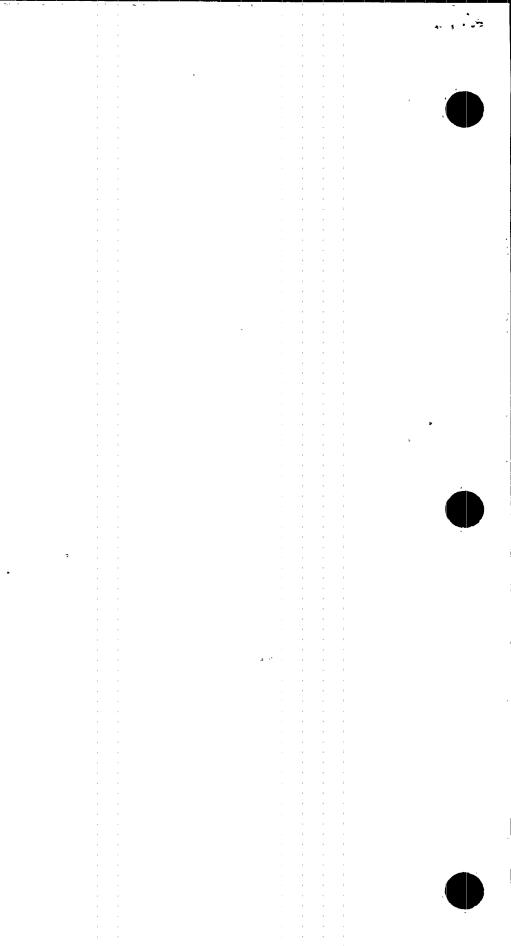
3057				
SSEL Line No. 3069	Sta	itus	(Y) N	I U.
. 1	She	et 1	of l	
SEE PANEL 93 - IPEEE SUPPLEMENTAL SCREENING EVALUA	TION W	IORKSI	HEET ·	
Equip. ID No. $(2-XR-64-159)$ Equip. Class 20° Inst	r. & C	ontro	 o] Panel	s & Cabinet
Equipment Description TORUS LEVEL INSTRUMENTS	<u></u>			
THIS FORM APPLIES TO RELAY WALKDOWN ONCY	Z.	-27	CA-	159B
1. Does spot check of essential relays indicate Y relays present and properly mounted?	N	U (NA	
2. Are essential relays required to function Y during earthquake screened out?	N	U	N/A	
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.		-		
3. No other relay concerns? Y	N	U (N/A)	
Requirements for relays satisfied?			Ø	N U
SYSTEM INTERACTION EFFECTS				
1. No potential sources could flood or spill onto (Y) cabinet?) n	U	N/A	
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACT sheets if necessary)	TORY (L	Jse a	dditiona	1
IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLU	JDING F	RELAY	CHATTER	<u>}</u> ?

.

IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVI	ESTIGATION	YESNO
Evaluated by:	Date:	9-14-95
Evaluated by:	Date:	9-16.45



	•
SSEL Line No. <u>3057</u>	Status Y N U
AI	Sheet 1 of 1
IPEEE SUPPLEMENTAL SCREENING EVALUA	TION WORKSHEET
Equip. ID No. <u>2-XR-64-159</u> Equip. Class <u>20</u>	
Equipment Description	
RELAY WALKDOWN	
1. Does spot check of essential relays indicate relays present and properly mounted?	Y N U N/A
2. Are essential relays required to function	YNUN/A
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.	. <u>^</u>
3. No other relay concerns?	NUN/A
Recomments for relays satisfied?	YNU.
SYSTEM INTERACTION EFFECTS	
1. No potential sources could flood or spill onto y cabinet?	'NUN/A
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFAC sheets if necessary)	
SEE THE SEWS FOR SSO	2# <u>9040/9041</u>
FOR THE EVALUATION OF THE	S COMPONENT
IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCL	UDING RELAY CHATTER?
IS MENT FREE OF NEED FOR FURTHER RELAY CHATTER INVES	TIGATION? YESNO
Evaluated by. J.R. DISSOR	Date: 10/20/95'
Evaluated by: D. Dizon	Date: 10/20/95



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SSEL L	ine No. <u>39115</u>	Status	_	D.n
	SCREENING EVALUATION WORK SHEET (SEWS)	Sheet 1 of	2	
	ID No. <u>3-PNLA-009-0003</u> Equip. Class <u>20 - Instr.</u> ent Description <u>REACTOR SD & CONT. COOLING PNL</u>	<u>& Control f</u>	<u>anel</u>	<u>s & Cabinets</u>
	on: Bldg. <u>CB</u> Floor El. <u>621</u> Room,		MCR	· <u>· · · · · · · · · · · · · · · · · · </u>
	·			
Manutac	cturer, Model, Etc. (optional but recommended)	<u> </u>		
1. 2. 3. 4.	<u>CAPACITY VS DEMAND</u> Elevation where equipment receives seismic input Elevation of seismic input below about 40' from grade Equipment has fundamental frequency above about 8 Hz Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS	DOC BS GERS	Ŭ	(5rade @ 563) N/A (1)
Does ca <u>COM</u>	Demand based on: I.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Sp spacity exceed demand? (Indicate at right (*) and in- <u>MENTS</u> if a special exception to enveloping of seismic and spectrum is invoked per Section 4.2 of the GIP.)	ec. RRS		@N U (2)*
are met explain 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. Is the	<u>S - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) t by intent without meeting the specific wording of th the reason for this conclusion in the COMMENTS secti Equipment is included in earthquake experience equipment class No computers or programmable controllers No strip chart recorders Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain essential relays Drawers and equipment on slides restrained from falling out All doors secured by latch or fastener Attached lines have adequate flexibility Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated $AmPF = 4.5$ Have you looked for and found no other adverse concer intent of all the caveats met for Bounding Spectrum?	e caveat ru on below) N N N N N N N N N N N N N N N N N N N	ופ מו ע ע ע ע ע ע ע ע ע ע	nd
2.	<u>GE</u> Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation Type of anchorage covered by GIP Sizes and locations of anchors determined) Q Q N N N	U U U	N/A () N/A (N/A *

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SSEL Line No. 39115

SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 2 of 2

(10)

Y(N)U

Equip. ID No. <u>3-PNLA-009-0003</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u>

Equipment Description <u>REACTOR SD & CONT. COOLING PNL</u>

ANCHORAGE (Cont'd)

Anchorage installation adequate, e.g., 4. weld quality and length, nuts and washers, expansion 𝖤 N U N/A anchor tightness 5. Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and (Y) N concrete cracking U N/A For bolted anchorages, gap under base less than 6. 1/4-inch Y Ν U (N/A)7. Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors (Y) N U N/A Base has adequate stiffness and effect of prying 8. action on anchors considered U N/A 9. Strength of equipment base and load path to CG adequate WN.U N/A Embedded steel, grout pad or large concrete 10. pad adequacy evaluated Ƴ N U N∕A Are anchorage requirements met? ADNUC) INTERACTION EFFECTS Soft targets free from impact by nearby 1. (Y) N U N/A (6) equipment or structures If equipment contains sensitive relays, equipment 2. ΥN free from all impact by nearby equipment or structures U' N/A 3. (Y) Attached lines have adequate flexibility U N/A Overhead equipment or distribution systems are 4. (♀) N U N/A (Ÿ) N U N/A not likely to collapse 5. Have you looked for and found no other adverse concerns? Is equipment free of interaction effects? ØΝ U

IS EQUIPMENT SEISMICALLY ADEQUATE?

COMMENTS

For Notes 1-3, 5, 6, 8-9 See the corresponding notes on SEWS for 2-PULA-009-0003A (SSEL 9040) Notes 4 + 7 not used.

_____ Date: <u>//-27-95</u> and Beig Evaluated by: 1/28/95 (10) All adjacent bench board panels are bolted together by 1/2 to 78 & botts. However, between panels 9-3 and 9-2, only one bolt is present (bottom) 4/19/91 at the rear, The upper 3 bolts are all missing in Onthier # 39115.



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SSEL Line No. 39115

	Y '	۱.
Status	Y/N	/ 1

q/alas

Sheet I of 1

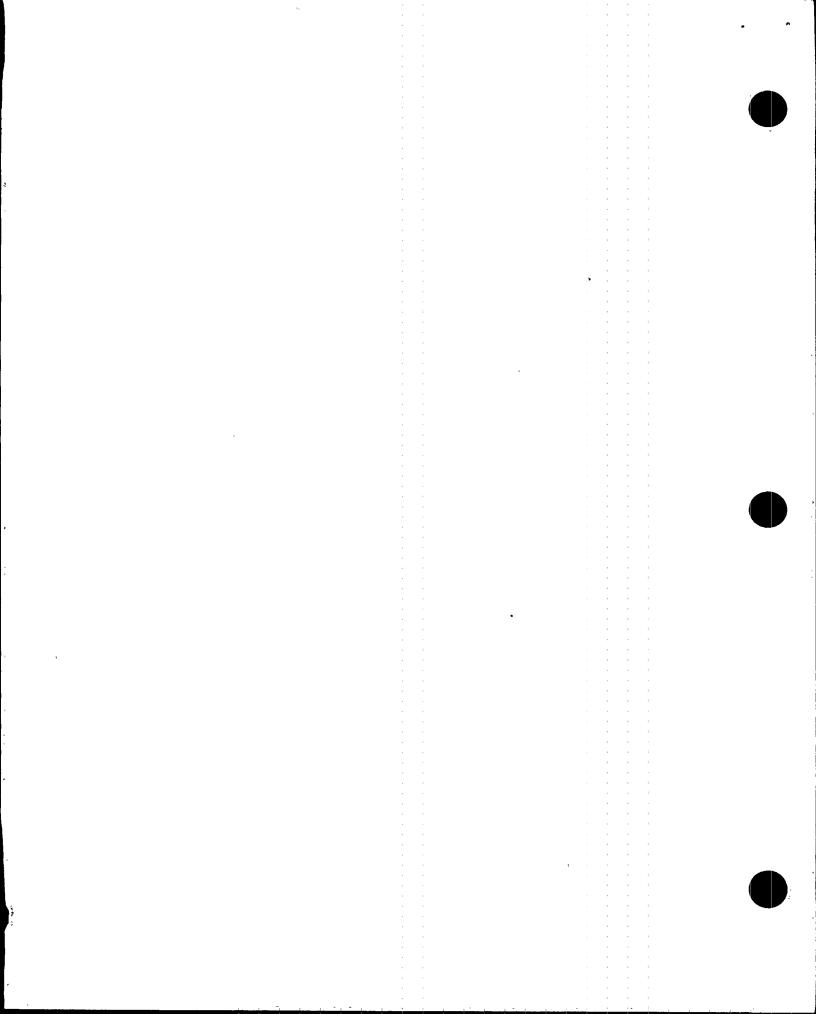
IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>3-PNLA-009-0003</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u> Equipment Description <u>REACTOR SD & CONT. COOLING PNL</u>

RELAY WALKDOWN

	•
1. Does spot check of essential relays indicate relays present and properly mounted?	• • • • • • • • • • • • • • • • • • •
2. Are essential relays required to function during earthquake screened out?	Y N U NA
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.	۳. ۱
3. No other relay concerns?	Y NU N/A
Requirements for relays satisfied?	· Y N U ()
SYSTEM INTERACTION EFFECTS	
1. No potential sources could flood or spill onto cabinet?	OÙN U N∕A
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSA sheets if necessary)	TISFACTORY (Use additional
1. See: 05VS# 39115 for relay ch	hatter concern JoD. 4/19/96

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING RELAY CHATTER? .NO____ YES_,/_ IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVESTIGATION? YES ___ NO \checkmark 0.) Evaluated by: tam: Roi Date: <u>//- 27-95</u> Date: N/2 Evaluated by: _ trun

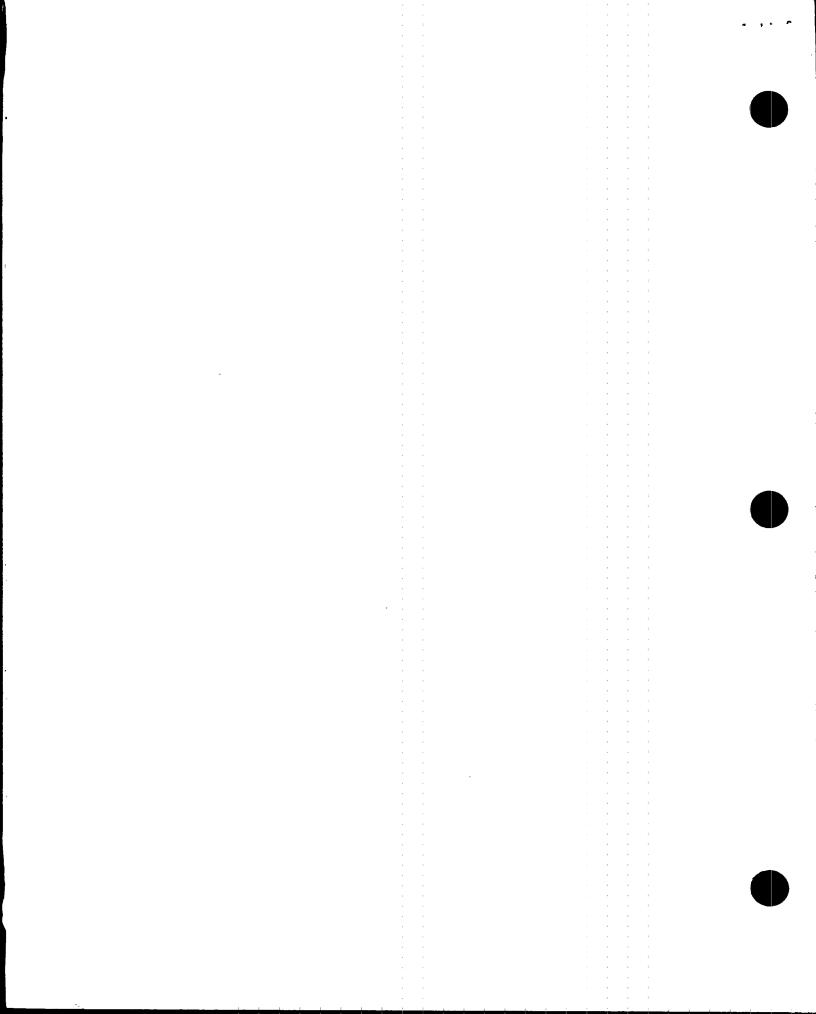


SSEL	Line	No. <u>39115</u>	Sheet 1 of 2 OSVS # 39115				
		OUTLIER SEISMIC VERIFICATION SHEET (OSVS)					
1.	OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION						
	Equipment ID Number <u>3-PNLA-009-0003</u> Equipment Class <u>20</u>						
	Equipment Location: Bldg. CB Floor Elevation $617'$						
	Room or Row/Column Unit 3 MCR Base Elevation 617'						
	Equipment Description Panel 3-9-3						
2.		OUTLIER ISSUE DEFINITION					
	a.	Identify all the so (Check more than on	creening guidelines which are not met. Ne if several guidelines could not be satisfied.)				
		Mechanical and <u>Electrical Equipmen</u> Capacity vs. Demand Caveats Anchorage Seismic Interaction Other	Anchor Bolts and Embedment				
-		<u>Essential Relays</u> Capacity vs. Demand Mounting, Type, Location Other	<u>Cable and Conduit Raceways</u> Inclusion Rules Other Seismic Performance Concerns Limited Analytical Review Other				
		* Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.					
	b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):						
	nce between Panels 3-9-2 and						
		3-9-3, the upper 3 bolts connecting the					
		two panels are missing in the rear thus					
		may cause relay chatter in the event of an					
		earthqueke. Only the bottom bolt is present.					
		two panels are missing in the rear, thus, may cause relay chatter in the event of an earthqueke. Only the bottom bolt is present. Panels are connected at top + bottom in front.					
/							

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SSEL	Line	No.	39115	Sheet 2 of 2		7
ł			OUTLIER SEISMIC VERIFICATION SHEET (O	-	A A	Š,
			Equipment ID Number 3-PNLA-00	19-0003		Ż
3.	<u>PROP</u>	<u>OSED</u>	METHOD OF OUTLIER RESOLUTION (OPTIONAL)	*	\bigcirc	, L.
Υ.	a. b.	 Prov	ine proposed method(s) for resolving outlie <u>nstall a connection bott at the</u> <u>orner between Panels 3-9-2</u> with the flace are no essent <u>Panel 3-9-3</u> vide information needed to implement proposed plving outlier (e.g., estimate of fundament	$\frac{1}{2} \frac{1}{2} \frac{1}$	REVIEW OF THE ESSENTIAL REUMAS LIST	INDICATES NO ESSENTIAL RECAYS ARE

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

JOHN O. DIZON Ð Print or Type Name Signature J.R. DISSER Print or Type Name Signature

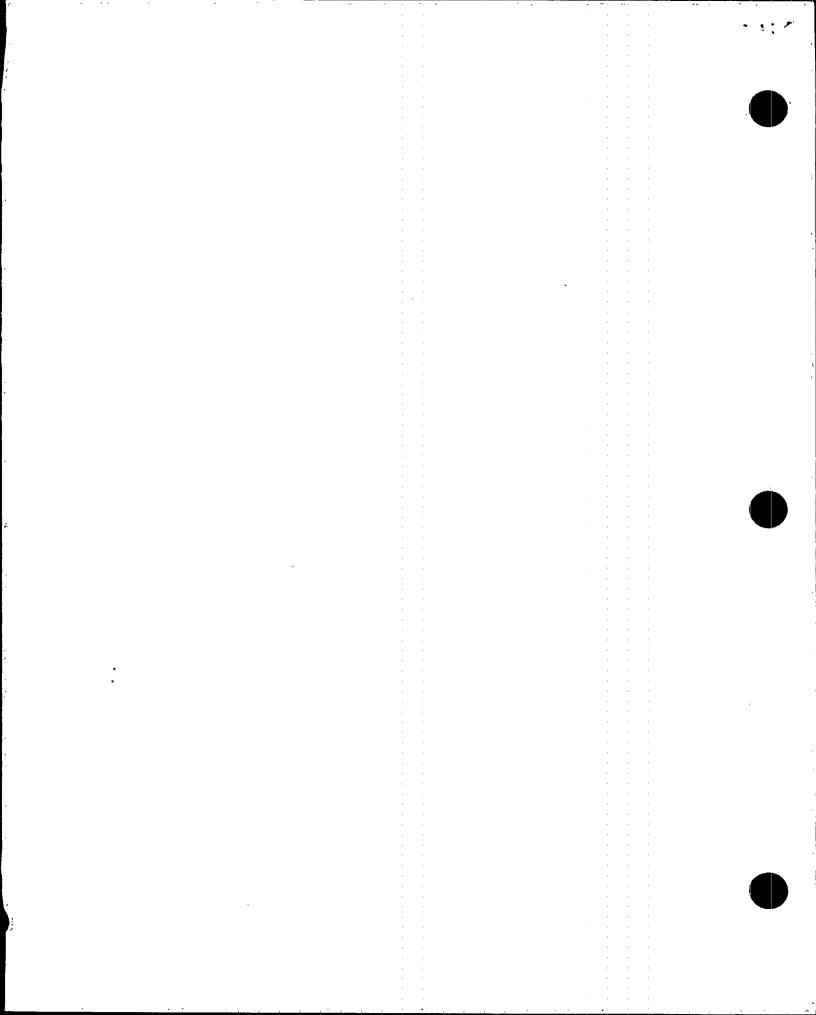
Print or Type Name

Signature

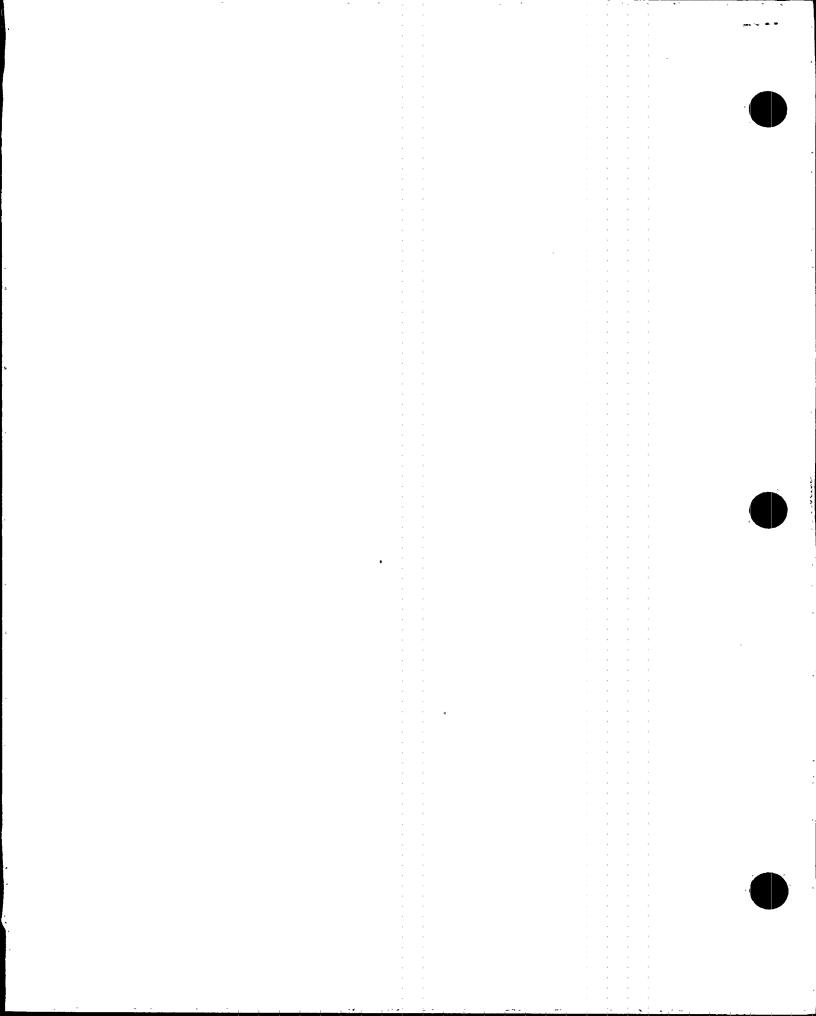
Date

15 RESERVED

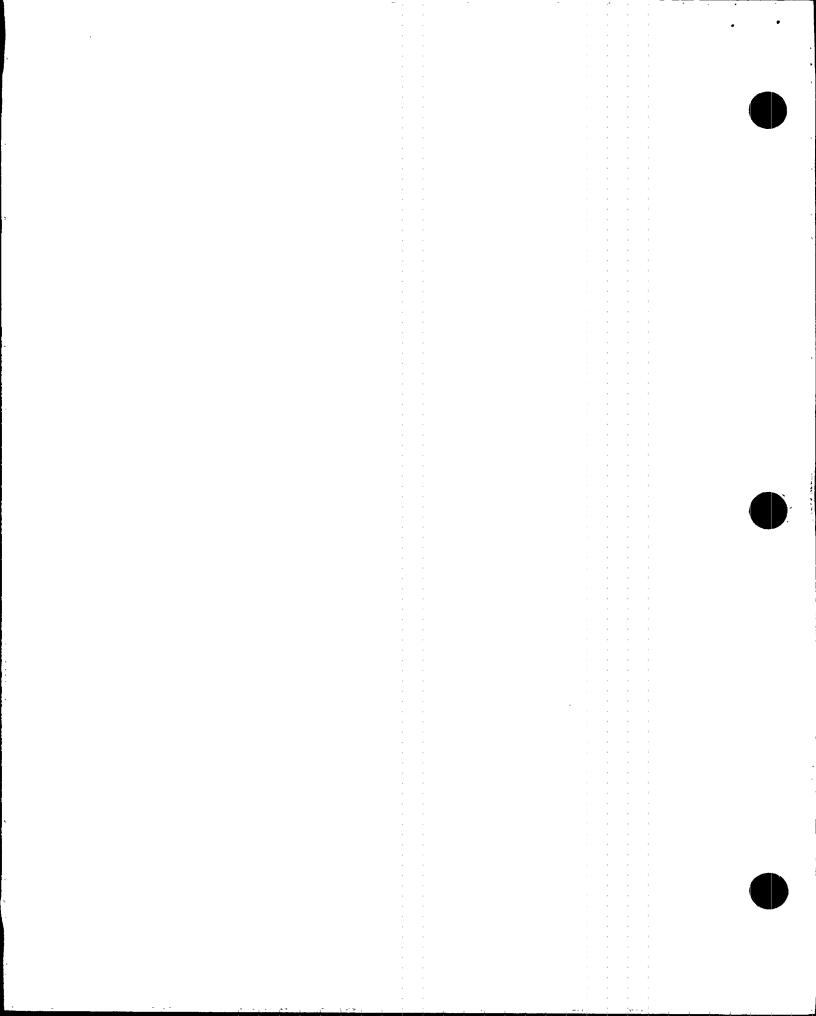
RESENT IN 3- PNLA- 009-003,



ATTACHMENT 11



· .		[IN TENT]
SSEL Line No. 9028 Stat	us Q) и и
SCREENING EVALUATION WORK SHEET (SEWS) Shee	t l of,3	4
		-
Equip. ID No. <u>2-BDBB-268-0002E</u> Equip. Class <u>01 - Motor Contr</u>	ol Cente	rs
Equipment Description _ <u>480V_RMOV_BD_2E</u>		
Location: Bldg. <u>RB</u> Floor El. <u>621^{'-3"}</u> Room, Row/	Co1 <u>U-R</u>	3
Manufacturer, Model, Etc. (optional but recommended) <u>International</u>	ral sui	thboard corp
SEISMIC CAPACITY VS DEMAND1Elevation where equipment receives seismic input2.Elevation of seismic input below about 40' from grade3.Equipment has fundamental frequency above about 8 Hz4.Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS5.Demand based on:Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec.	Solution N DOC BS GERS GERS GRS AGS CRS	<u>'-3"</u> U (grade E 563') U N/A (1)
Realistic M-Ctr. In-Str. Resp. Spec. Spes capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)	(RS)	⊗nu (2)*
<u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those are met by intent without meeting the specific wording of the ca explain the reason for this conclusion in the COMMENTS section b	veat rule	which and
 Equipment is included in earthquake experience equipment class 600 V rating or less Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, 	Q N Q N	U N/A' U N/A
are bolted together if they contain essential		U N/A (4),(12)
relays 4. Attached weight (except conduit) less	(Y) N	U N/A (4),(12)
than about 100 lbs per cabinet assembly		U N/A U N/A
6. General configuration similar to NEMA Standards		U N/A U N/A
 Cutouts in lower half less than 6 in. wide and 12 in. high All doors secured by latch or fastener Natural frequency relative to 8 Hz limit considered Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated AF=3.0 Have you looked for and found no other adverse concerns? the intent of all the caveats met for Bounding Spectrum? 	8898 2 2 2 2	U N/A U N/A U N/A(7) (**) U N/A (2) (* ?) U N/A U N/A (1) N U N/A



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SCREENING EVALUATION WORK SHEET (SEWS)

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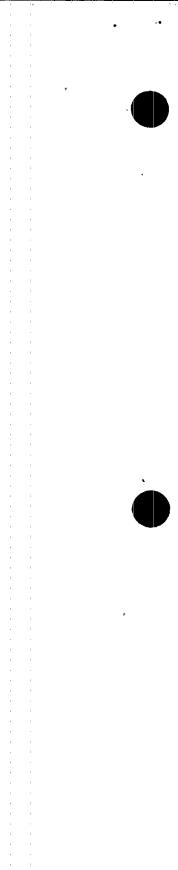
Sheet 2 of 34

Equip. ID No. 2-BDBB-268-0002E Equip. Class 01 - Motor Control Centers

Equipment Description _ 480V RMOV BD 2E

<u>CAVEATS - GERS</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule , and explain the reason for this conclusion in the COMMENTS section below)

1. 2. 3. 4. 5. 6. 7. 8. 9.	Equipment is included in generic seismic testing equipment class Meets all Bounding Spectrum caveats Floor mounted cabinet Maximum weight per section less than 800 pounds Base anchorage utilizing MCC base channels Adequate strength and stiffness in load transfer path from anchorage to base frame (only for "function after" GERS) Essential relays have GERS > 4.5g (only for "function during" GERS) Able to reset starters (only for "function after" GERS) <u>All</u> adjacent cabinets or sections of multi-bay assemblies bolted together intent of all the caveats met for GERS?	Y	N N N N		N/A N/A N/A N/A N/A
					YNU(N/À)
ANCHOR					
1.	Appropriate equipment characteristics determined	Ø	M	11	N/A(6,7),(1+)
2.	(mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP	ଟ୍ଟର	N N	Ŭ	N/A ()
3.	Sizes and locations of anchors determined	ର୍ ଜ	Ň	Ŭ	N/A) (
4.	Anchorage installation adequate, e.g.,	0	••	-	
5.	weld quality and length, nuts and washers, expansion anchor tightness Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing,	Ð	N	U	N/A
	free-edge distance, concrete strength/condition, and	\bigotimes	N		XI / A
6.	concrete cracking For bolted anchorages, gap under base less than	Ø	N	U	N/A
0.	1/4-inch	$\langle \mathfrak{D} \rangle$	N	U	N/A
7.	Factors affecting essential relays considered: gap	Ŷ		v	
	under base, capacity reduction for expansion anchors	(\mathbf{Y})	N	U	N/A
8.	Base has adequate stiffness and effect of prying	\sim			·
	action on anchors considered	$\widehat{\boldsymbol{\varphi}}$	N	U	N/A
9.	Strength of equipment base and load path	Ð			NI / A
10.	to CG adequate Embedded steel, grout pad or large concrete	(L.)	N	U	N/A
10.	pad adequacy evaluated	Ŷ	N	U	N/A
kre and	chorage requirements met?	<u> </u>		v	.,
		\bigotimes	2	U	(0),(0)



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<u>SCREENING EVALUATION WORK SHEET</u> (SEWS) Sheet 3 of 34

Equip. ID No. <u>2-BDBB-268-0002E</u> Equip. Class <u>01 - Motor Control Centers</u> Equipment Description <u>480V RMOV BD 2E</u>

INTERACTION EFFECTS

1.	Soft targets free from impact by nearby · equipment or structures	(Y) N	U	N/A
2.	If equipment contains sensitive relays, equipment free from all impact by nearby equipment		Ŭ	iy A
	or structures	ΩN	U	N/A
	Attached lines have adequate flexibility	κ) N	Ŭ	N/A N/A (13)
4.	Overhead equipment or distribution systems are not likely to collapse Have you looked for and found no other adverse concerns? ipment free of interaction effects?	_		
5.	Have you looked for and found no other adverse concerns?	(Ŷ) Ň	U	N/A
Is equ	ipment free of interaction effects?	U		Øn u
<u>IS EQU</u>	IPMENT SEISMICALLY ADEQUATE?			() N ()

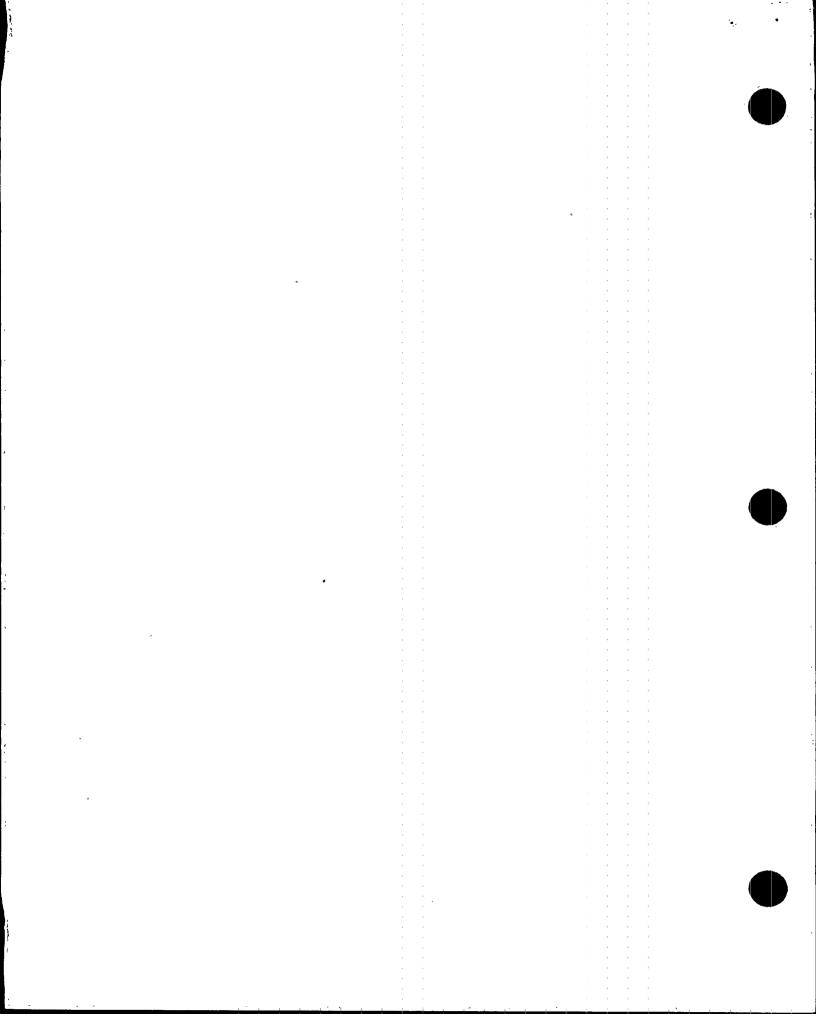
COMMENTS

This MCC has 5 pays. The two end bays are 20"x 36° (dupl x 90° hersht and the three middle hays are 20"x 20" x 90". Then boys are all be Hed together. The period sheet metal thickness is 3/32 and the sidepanels are continuous without any extents. The bose and internal framing members are $L1/2 \times 11/2$. Each of the bays are betted to sill channel by 4-3/9° d be 1ts. Eventhough no top bracing is provide. it is judged that the lowest frequency of this Mcc 1s greater than 8 HE due to characteristics listed above.

2) per calc. CD-Q0000-94.339, Figure B.I, the In-structure spectra @ EL.621 of RB exceeds the 1.5x Dounding spectrum (sensic capacity) in the frequency irange of 5.0 to 7 HZ. Since the banst natural frequency of this Acc is greater than 7 HZ (see notel) and there are no exceedances above 7 HZ, the intent of the GIP (capacity Vs. demand criteria is met.

- For notes 3, 4, 6, 7, 9, 10 see SEWS for 3-BDBB-268-00-3D (SSEL 39016).

toni cvaluated by: Date: 10-10-95 . .. 10/10/95



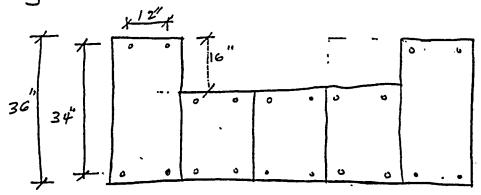
EQE INTERNATIONAL

SHEET NO. <u>4014</u> JOB NO. <u>50147</u> JOB <u>TVA / BFNP A-46 / IPEEE</u> BY <u>7Reit</u> DATE <u>10-10-1</u> CALC. NO. <u>AllA</u> SUBJECT <u>Attackment to SEWS for 2-BNEB-268-0002</u>E CHKD. <u>OTDize</u> DATE <u>10/10/95</u> (SS EL 9028)

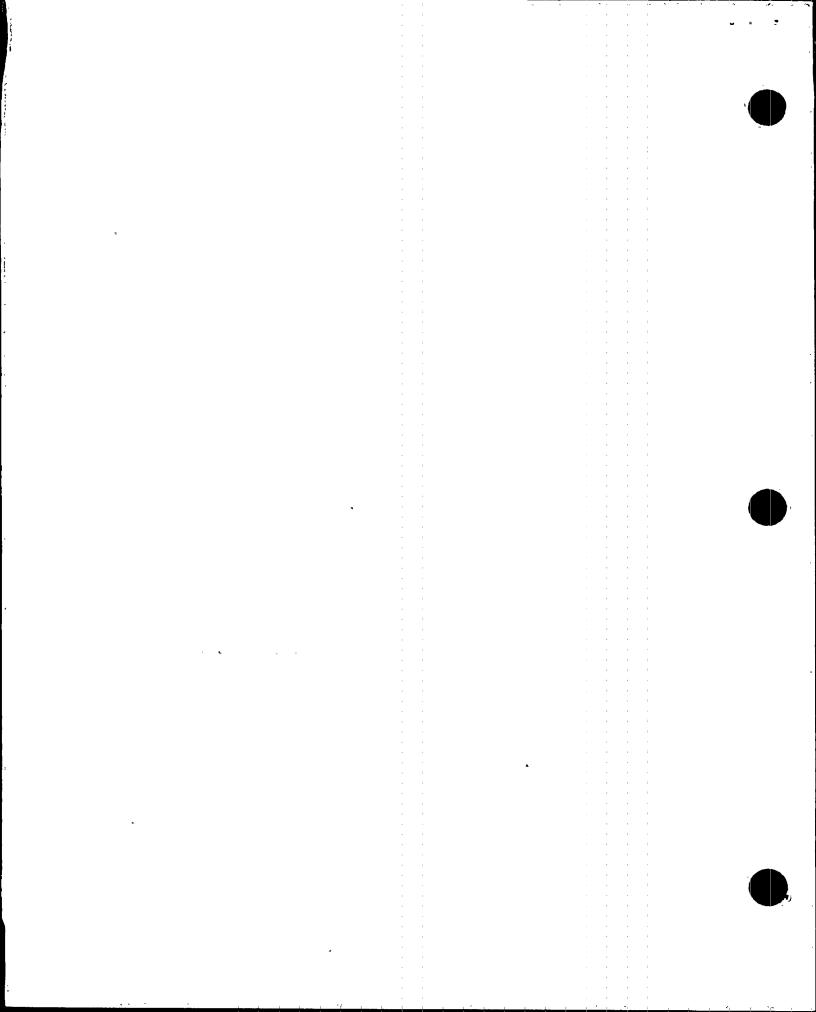
(DWG. 2-45N390-2', and 48N1125-1)

11) Only one top entry rigid conduit with a ~ 12' span to rigid support. -> can not provide adequate top nestraint

1t) The bare of each bay is made of 611/4.x11/4.x 3/16 which is then bolted to sill channel by 4-3/8" & bolts. The sill channels are welded all along their front to the embedded plate.



15) Speaker overhead judged to have adequate anchorage. No interaction oh



Status	(Y) N	U
~~~~~		

N/A

Sheet 1 of 1

# IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>2-BDBB-268-0002E</u> Equip. Class <u>01 - Motor Control Centers</u> Equipment Description <u>480V RMOV BD 2E</u>

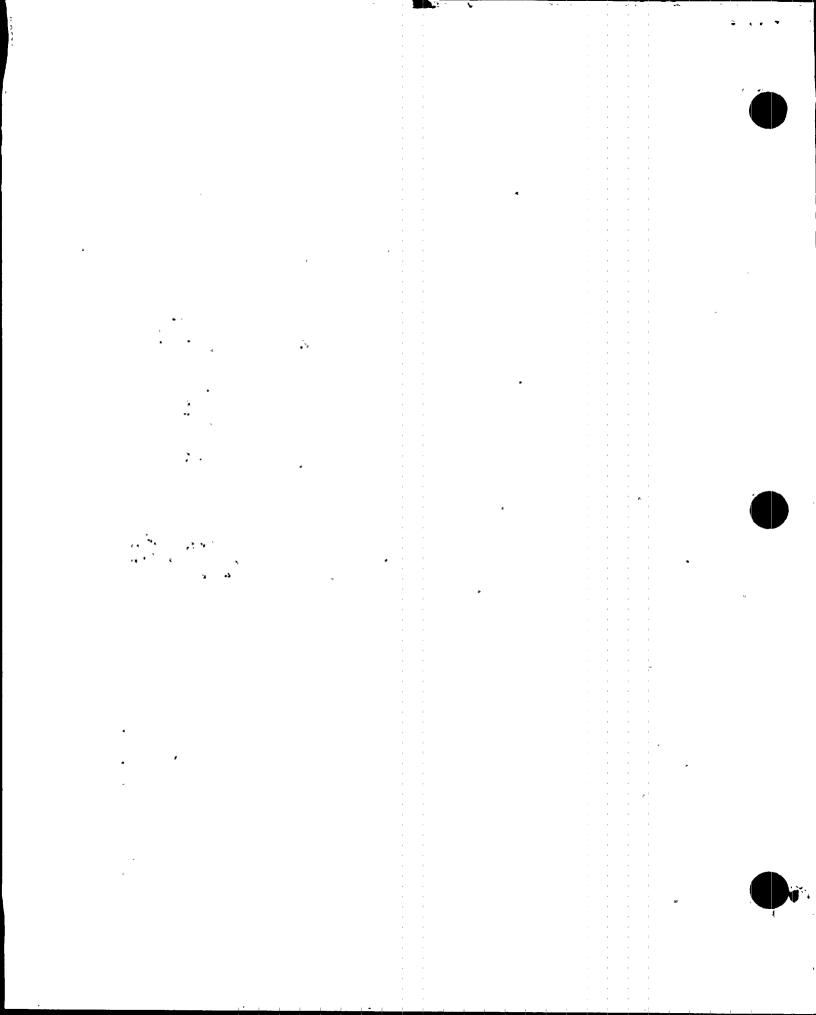
### RELAY WALKDOWN

<ol> <li>Does spot check of essential relays indicate relays present and properly mounted?</li> </ol>	Ý	N	U	N/A
2. Are essential relays required to function during earthquake screened out?	Y	N	U	N/A)
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.				
3. No other relay concerns?	. (Y)	N	U	N/A
Requirements for relays satisfied?				(V) N U

SYSTEM INTERACTION EFFECTS

1. No potential sources could flood or spill onto (Y) N U cabinet?

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

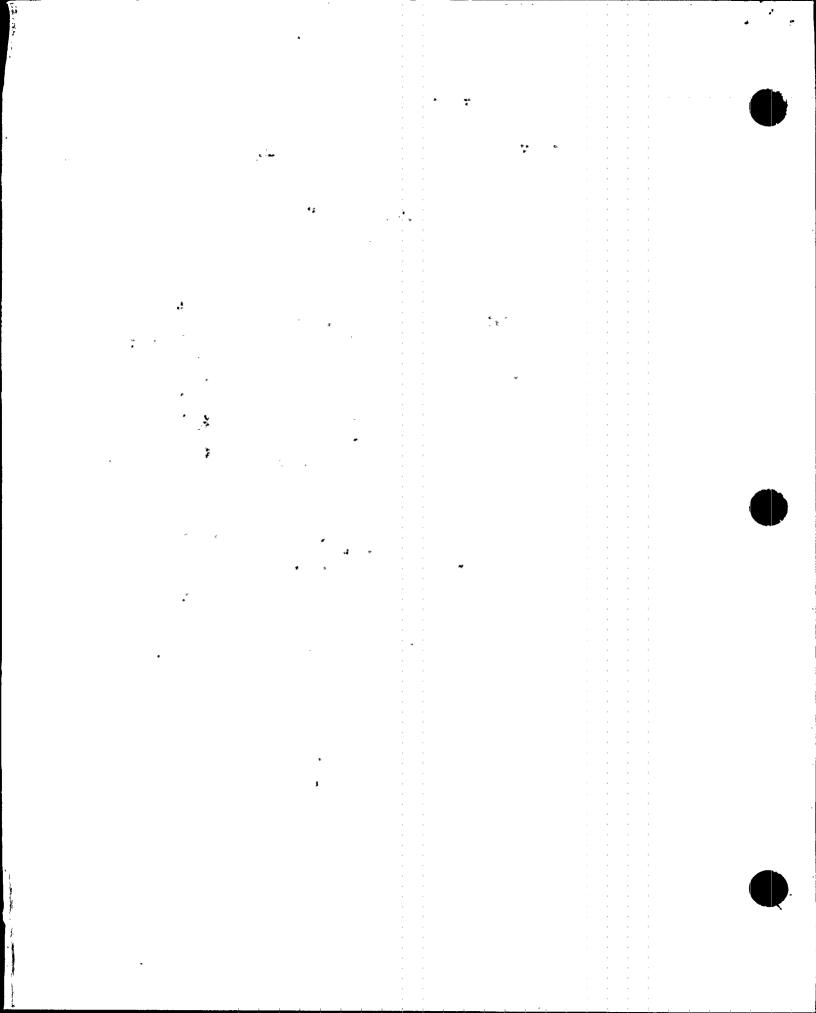


#### SSEL Line No. 39016 Status YNU Sheet 1 of 3 12. SCREENING EVALUATION WORK SHEET (SEWS) Equip. ID No. <u>3-BDBB-268-0003D</u> Equip. Class <u>01 - Motor Control Centers</u> Equipment Description 480V RMOV BOARD 3D Floor El. 593 Room, Row/Col U,R17 Location: Bldg. U3-RB Manufacturer, Model, Etc. (optional but recommended) International Switchboard com-SEISMIC CAPACITY VS DEMAND 1 Elevation where equipment receives seismic input 593 (VN U. (grade @ 562') Elevation of seismic input below about 40' from grade 2. O N U N/A (1)3. Equipment has fundamental frequency above about 8 Hz Capacity based on: Existing Documentation DOC 4. Bounding Spectrum (BS) 1.5 x Bounding Spectrum ABS GERS **GERS** 5. Demand based on: Ground Response Spectrum GRS 1.5 x Ground Response Spectrum AGS Conserv. Des. In-Str. Resp. Spec. CRS Realistic M-Ctr. In-Str. Resp. Spec. RRS Does capacity exceed demand? (Indicate at right (*) and in: (I) N U <u>COMMENTS</u> if a special exception to enveloping of seismic (Rof. calc. demand spectrum is invoked per Section 4.2 of the GIP.) CD-Q000-940339) CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) 1. Equipment is included in earthquake experience equipment class N/A U 600 V rating or less U 2. N/A 3. Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together if they contain essential (Y) N U N/A(4) relavs Attached weight (except conduit) less 4. than about 100 lbs per cabinet assembly ΟΩN U N/A Externally attached items rigidly anchored 5. Ν U N/A U General configuration similar to NEMA Standards N/A 6. Cutouts in lower half less than 6 in. wide and 7. 12 in. high All doors secured by latch or fastener 8. Natural frequency relative to 8 Hz limit considered 9. 10. Anchorage adequate (See checklist below for details) ON U Relays mounted on equipment evaluated AF=3.0N/A 11.

- 12. Have you looked for and found no other adverse concerns?
  - s the intent of all the caveats met for Bounding Spectrum?

ØN U N/A

ON U N/A



## SCREENING EVALUATION WORK SHEET (SEWS)

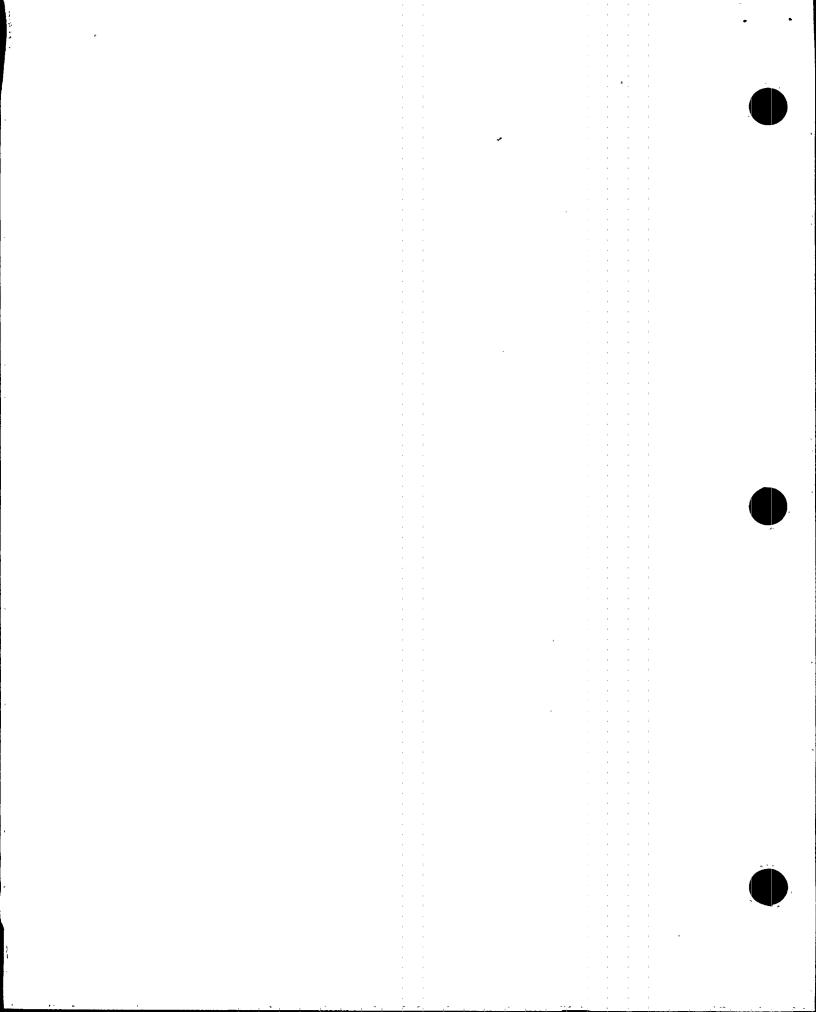
Sheet 2 of \$12

Equip. ID No. 3-BDBB-268-0003D Equip. Class 01 - Motor Control Centers

Equipment Description <u>480V RMOV BOARD 3D</u>

<u>CAVEATS - GERS</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below)

1.	Equipment is included in generic seismic testing					
	equipment class	Y	N	U	N/A	١
2.	Meets all Bounding Spectrum caveats	Ŷ	N	U	N/A	
3.	Floor mounted cabinet	Y	N	U	N/A	
4.	Maximum weight per section less than 800 pounds	Y	N	U	N/A	
5.	Base anchorage utilizing MCC base channels	Y	Ň	U		ł
6.	Adequate strength and stiffness in load transfer					
	path from anchorage to base frame (only for "function					
_	after" GERS)	Ϋ́	Ν	U	N/A	
7.	Essential relays have GERS > 4.5g (only for					
_	"function during" GERS)	Y	N	U	N/A	
8.	Able to reset starters (only for	• • •			1	
•	"function after" GERS)	ΓY	N	U	N/A	
9.	<u>All</u> adjacent cabinets or sections of multi-bay			••	1	
<b>v</b> . 1	assemblies bolted together	Y	N	U	W/A	
is the	intent of all the caveats met for GERS?				)	(NUN/A)
. ANCHOR	AGE .					
1.	Appropriate equipment characteristics determined					
1.	(mass, CG, natural freq., damping, center of rotation)	0	N	U	NIZA	(6,7)
2.	Type of anchorage covered by GIP	<i>S</i>	N N	Ŭ	N/A	
3.	Sizes and locations of anchors determined	ଚଚଚ	N N N	Ŭ		<u>}</u>
3. 4.	Anchorage installation adequate, e.g.,	Ŷ	14	U	N/A	Ą
4.						
	weld quality and length, nuts and washers, expansion anchor tightness	Ð	A1	U	N/A	
5.		4	N	U	NZA	
5.	Factors affecting anchorage capacity or margin of					
	safety considered: embedment length, anchor spacing,					
	free-edge distance, concrete strength/condition, and	$\varphi$		U	NI / A	(11)
c	concrete cracking	Ψ	N	U	N/A	
6.	For bolted anchorages, gap under base less than	$\heartsuit$	61			
7	1/4-inch	$\Psi$	N	U	N/A	
7.	Factors affecting essential relays considered: gap	(1)	11		N1 / A	
•	under base, capacity reduction for expansion anchors	$(\mathbf{Y})$	N	U	N/A	
8.	Base has adequate stiffness and effect of prying	6				
•	action on anchors considered	$\bigotimes$	N	U	N/A	
9.	Strength of equipment base and load path	0				
10	to CG adequate	$(\mathcal{Q})$	N	U	N/A	
10.	Embedded steel, grout pad or large concrete	ري				(11)
<b>A</b>	pad adequacy evaluated		N	U	N/A	
Are and	chorage requirements met?	$\sim$				
		$(\mathbf{Y})$	Ν	U		(3),(10)
		-				

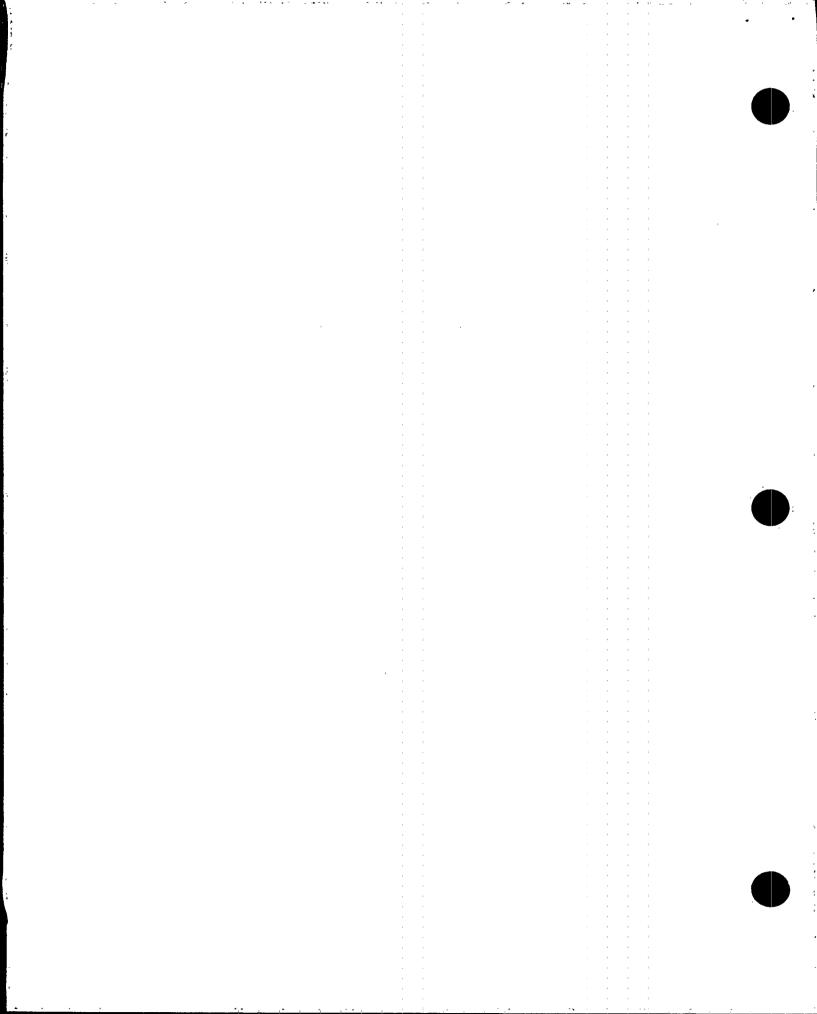


### SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 3 of  $3_{12}$ 

Equip. ID No. 3-BDBB-268-0003D Equip. Class 01 - Motor Control Centers Equipment Description _480V RMOV BOARD 3D INTERACTION_EFFECTS 1. Soft targets free from impact by nearby 𝒮 N U N∕A equipment or structures 2. If equipment contains sensitive relays, equipment free from all impact by nearby equipment Y (N) U. N/A (Y) or structures (Y) N U N/A Attached lines have adequate flexibility 3. 4. Overhead equipment or distribution systems are 𝒫 N U 𝒫 N U N/A not likely to collapse Have you looked for and found no other adverse concerns? 5. N/A Y @ U (8) Is equipment free of interaction effects? IS EQUIPMENT SEISMICALLY ADEQUATE? Y(N)U (8) COMMENTS 1) See note 1 on SEWS for 2-BOBB-268-0002E (SSEL 9028). -> (78HZ 2) note no. not used. 3) The weak links in the load path to the anchor point are judged to be The 3/8"\$ bolts connecting the MCC to The sill channel & the 3/4" & Red head anchor bolts @ sill. The welds @ sill to 34 th and less critical. See Note 10 for anchorage evaluation. See payer +-10 for notes +-10. 11) Some cracks noted on the exterior faces of the tapered grout prod. Judged to be not critical. (sur page 11 for bolt handing evaluation) 20 mp3/26 B 2/23/96

valuated by:	Fami Beier	Date:	10-10-45
) -	John O. Dizan	_	10/10/95



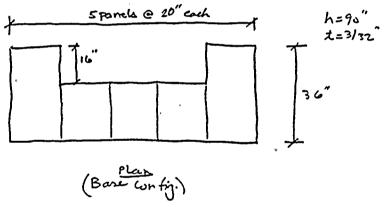
EQE INTERNATIONAL



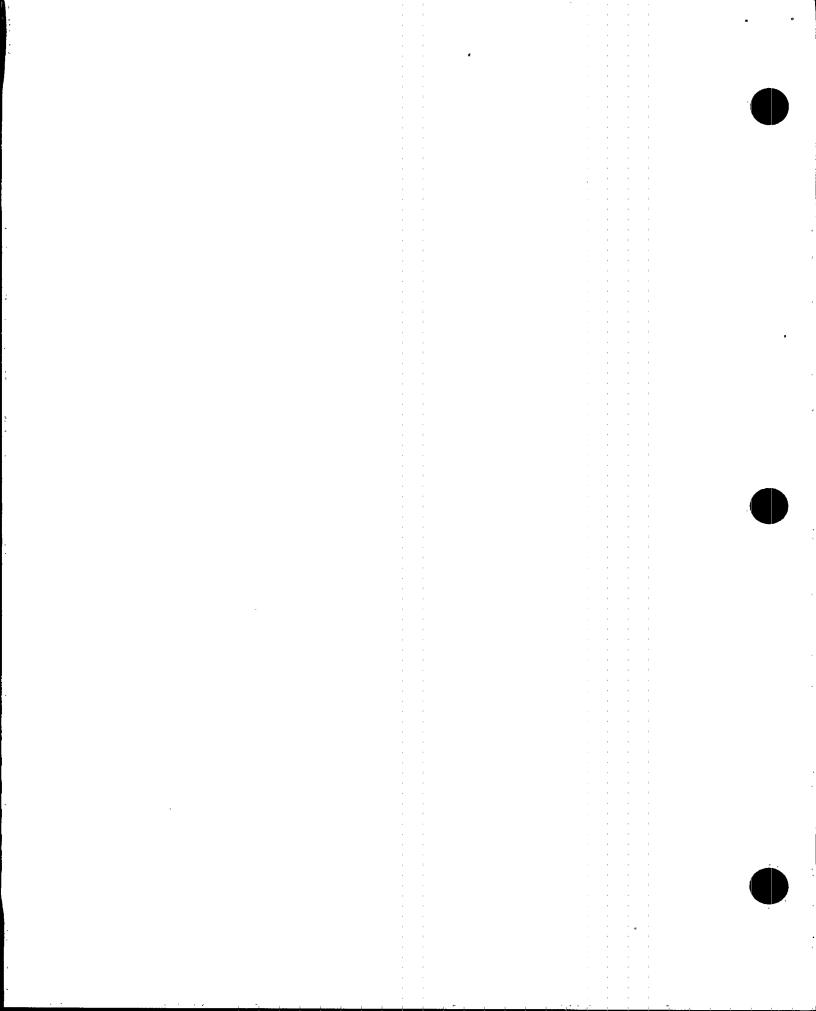
SHEET NO. <u>4 of 12</u> JOB NO. <u>50147</u> JOB <u>TVA/BENP A-46/IPEEE</u> BY <u>FRee:</u> DATE <u>10-10-9</u> CALC. NO. <u>N/A</u> SUBJECT <u>Attachment to SEWS for 3-BDBE-26K-00-33</u> CHKD D. Jaw DATE <u>10/055</u> (SSEL 39016)

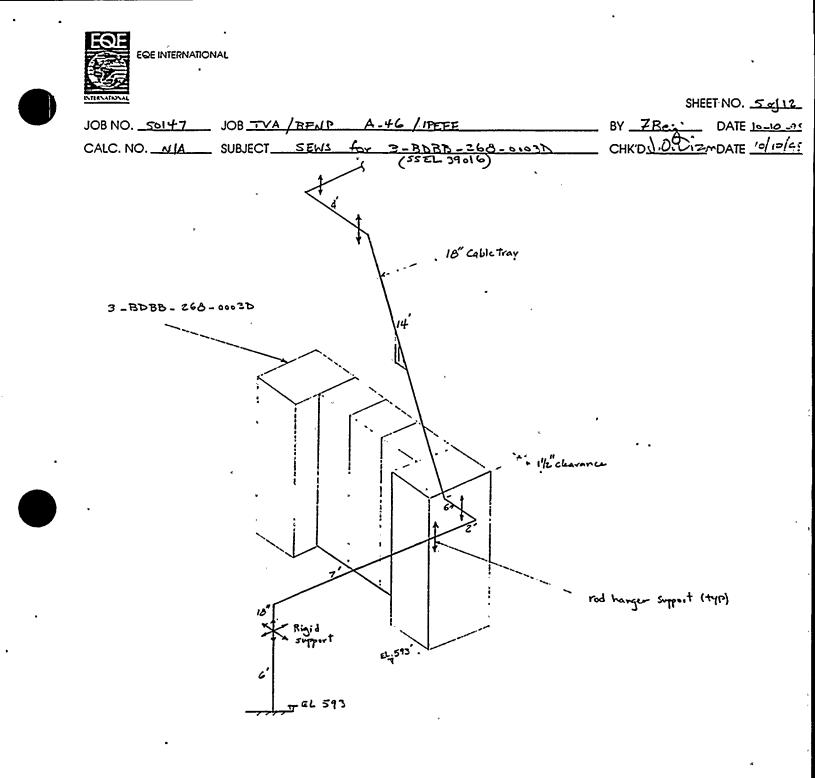
SSEL <u>39016</u> 3-BDBB-268-0003D 480V RMOV BD 3D (DWG. 3-45N389 and 48N1125-1) (International Switchhourd Corporation)

- 5) Top restraint not provided by the top entry conduct (3-21/2"4, 8-3" i; Conduit span to the first support~ 12'
- 6) Each bay is botted to the sill channel by 4-3/8° \$ botts. The sill channel is welded to embedded plate which is on a 11/2" topered grout pad.
- 7) The base of each unit Consists of L11/2×11/2×1/4 angles and the internal framing consists of L11/2×11/2×3/32 to 1/8 angles and the side paircls are continuous (no atout in the sheet metric between the adjacent bays)

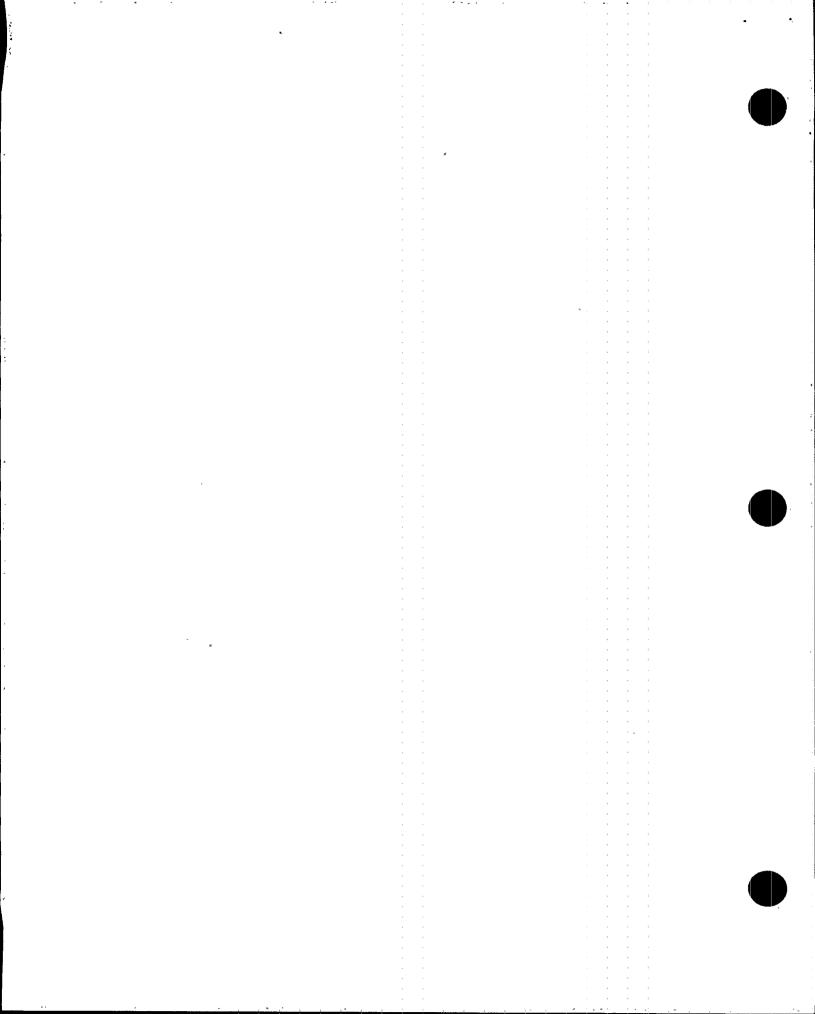


- 8) Long Cable tray vertical riser has about 11/2" chearance to this equipment. The cable tray is supported by rod hangers (~ 20' rods) and will swing and impact this equipment. - <u>outline</u> OSVS_39016 (see sketch on the next pg.)
- 9) Breakers in compartments ID and 5D are type K-6005 (GOULD Manui). There breakers are about 12° above the break of the equipment and are insurted on rails which are connected to a rigid "slatform" plate 3/32 the The primary and secondary contacts are in the "BD" configuration but there is a grounding bar @ about the C.G. of the breaker which Will restrain the breaker from side to side movement





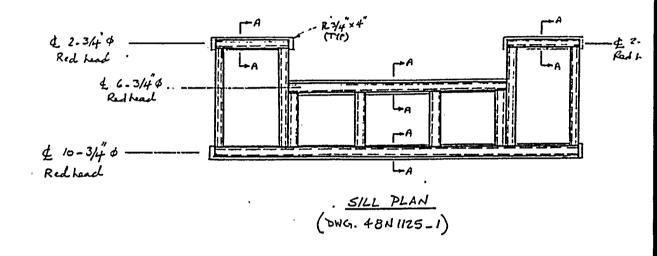
Configuration of the Interaction of the 18" Cable Tray with MCC (Interaction Documented in Outlier Osvs_39016)

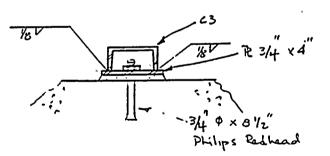


SHEET NO. 6 5 12 JOB NO. 50147 JOB TVA BENP A-46 / IPEFE BY JR.e. DATE 10-10-3.3088-268.0003D CHKD. O.Bizm DATE 10/10/9. CALC. NO. __//A_ SUBJECT Attachment to (SSEL 39016)

10) Anchorage EValuation :

EQE INTERNATIONAL



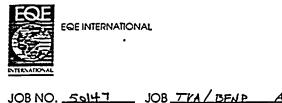


A-A

- Each bay is bolted to the sill Channel by 4-3/g"\$ botts:
  - $\overline{V_{all}} = 20 \times 1.7 \times 0.11 (m^2) = 3.74^{k}$   $\overline{V_{all}} = 10 \times 1.7 \times 0.11 (m^2) = 1.870^{k}$
- Sill channel is anchored by 3/40 Red heads to the concrete floor:

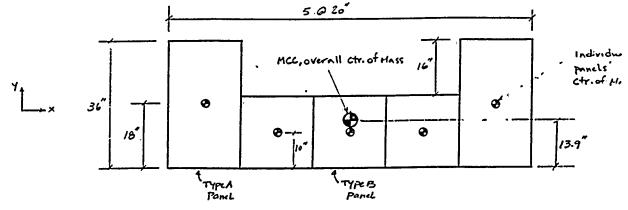
 $T_{all_{2}} = 4.69^{\mu} \times \frac{3600}{4000} \times 0.75 = 3.166^{\mu} \times \frac{3600}{400} \times 0.75 = 3.166^{\mu} \times \frac{7}{6ll_{1}} = 3.74^{\mu}$   $V_{all_{2}} = 5.48^{\mu} \times 0.75 = 4.11^{\mu} \times \frac{1.37^{\mu}}{6ll_{1}} = 1.37^{\mu}$   $= 5.48^{\mu} \times 0.75 = 4.11^{\mu} \times \frac{1.37^{\mu}}{6ll_{1}} = 1.37^{\mu}$ 

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INTERNATIONAL		SHEET NO. 70F12
JOB NO. 50147 JOB THA/ BENP	A-46 / IPEEE	BY <u>7 Beiz</u> DATE 10-10-15
CALC. NO. MA SUBJECT SEWS	(SSEL 39016)	CHKD 1.0. Dien DATE 1910/95

Note 10 (contà) .



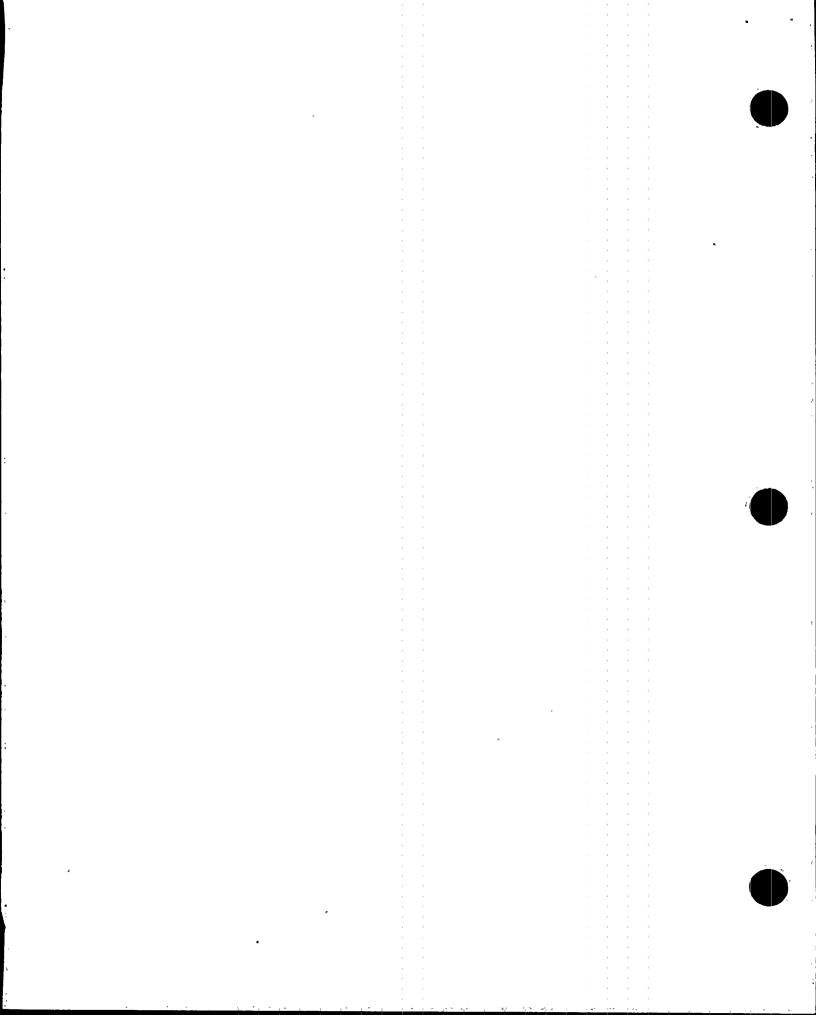
Dead with of type A panel per App. c of GIP: D.wt.A = 3.0x  $\frac{490}{12^3} \times \frac{3}{32} \times 2 \left[ (20 \times 90) + (36 \times 90) + (36 \times 20) \right] = 9.19.*$ 

Dead wt. of type B panel: D.w.t. = 3.0 ×  $\frac{490}{12^3}$  ×  $\frac{3}{32}$  × 2 [(20×20) + (20×90) + (20×90)] = 638.*

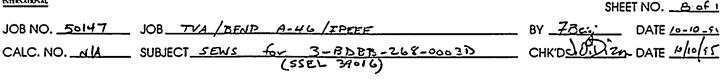
$$Y_{c.q.} = \frac{(2 \times 919 \times 18) + (3 \times 638 \times 10)}{(2 \times 919) + (3 \times 638)} = 13.9^{*}$$

Overall center of mass @ (x=50, y=.13.9)Overall center of rigidity @ (x=46+4=50), y=12.2+1=13.2

Eccentriaty = 13.9-13.2 = 0.7" - too small, can be neglected

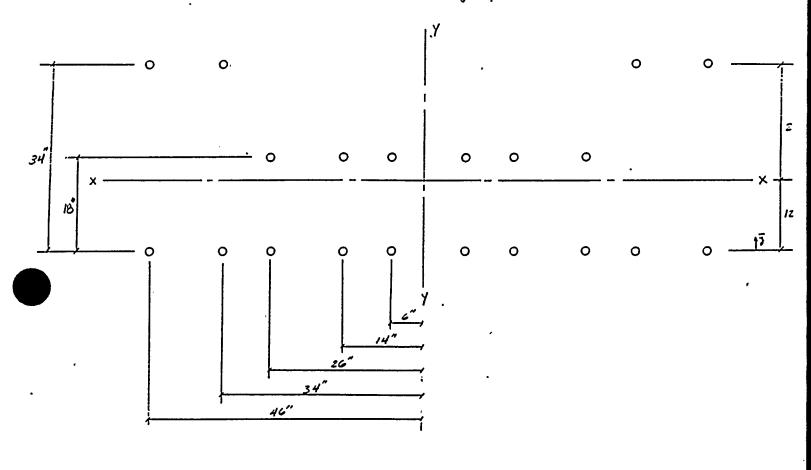


QE	, EQE INTERNATIONA
	•

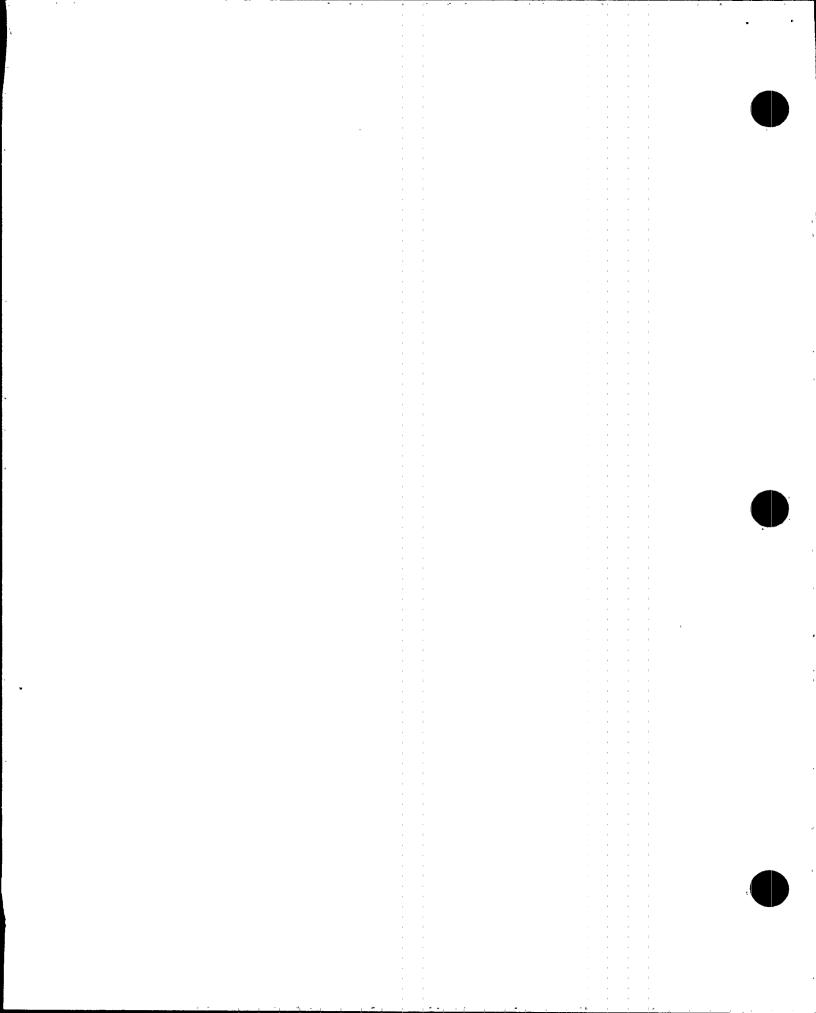


Nite 10 (cont'd)

- Determination of section modulus of bolt group:



$$\begin{split} \overline{Y} &= \frac{(6 \times 18)^{+} (4 \times 34)}{20} = 12.2^{*} \\ T_{xx} &= 4(21.8)^{2} + 4(12.2)^{2} + 6(18-12.2)^{2} + 6(12.2)^{2} = 3591. \quad in^{2} \\ S_{xx} &= \frac{3591}{21.8} = 165. \quad in \qquad (for moments acting out of plane of the boltgroup \\ T_{YY} &= 4(6^{2} + 14^{2} + 26^{2} + 34^{2} + 46^{2}) = 16720. \quad in^{2} \\ S_{YY} &= \frac{16720}{46} = 363. \quad in \qquad (for moments acting out of plane of the boltgroup \\ T_{p} &= T_{xx} + T_{YY} = 3591 + 16720 = 20,311. \quad in^{2} \\ S_{p} &= \frac{20,311}{5(21+3)^{2} + (42)^{2}1/2} = 399. \quad in \end{split}$$



EQE INTERNATIONAL



INTERNATIONAL		SHEET NO. <u>9 of 12</u>
JOB NO. 50147 JOB TVA/BENP	A-46 / IPEEE	BY _7/303 DATE 10-10-95
CALC. NO. <u>AIA</u> SUBJECT <u>servis</u> for	3-BDBB-268-0003D (SSEL 39016)	BY _7/303 DATE 10-10-95 CHK'D1), 2. 212-DATE 10/10(15
Note 10 (Cont'd)	·	

-Determine Loads

- Conservatively consider 2-3"\$ and 1-21/2"\$ rigid Conduit, with 6' tributary span @ top of each buy:

$$W_{1}^{*} c_{end.} = 5 \text{ barge } \times (2 \times 12 - 8^{\#/} + 1 \times 8.9^{\#/}) \times 6' = 1035.^{\#} (0^{9} 90'' \text{ above base})$$

$$- W_{1}^{*} c_{able} = 25 \times 1.5 \times (1.5' + 7' + 2' + 5' + 14') \times 2/_{3} \times 2.0 = 1250.^{\#} (0^{90''} \text{ above base})$$

$$- W_{1}^{*} c_{able} = 2 \times 919^{\#} + 3 \times 638^{\#} = 3752^{\#} (0^{9} 45'' \text{ above base})$$

-Accelerations:  $a_h = 1.09$  (Cf = 8HE, RB, EL. 621¹, DBE, 5%)

av= 0.16g (ZPA)

Acceleration to use, including 1.25 increase factor for Hed. Centered spectra:

$$\rightarrow \alpha_{h} = 1.0g \times 1.25 = 1.25g$$
  
 $\rightarrow \alpha_{v} = 0.16g \times 1.25 = 0.20g$ 

- Seismic Loads :

$$F_{x} = 1250^{\#} + (1035^{\#} \times 1.25g) + (3752^{\#} \times 1.25g) = 7234.$$
  

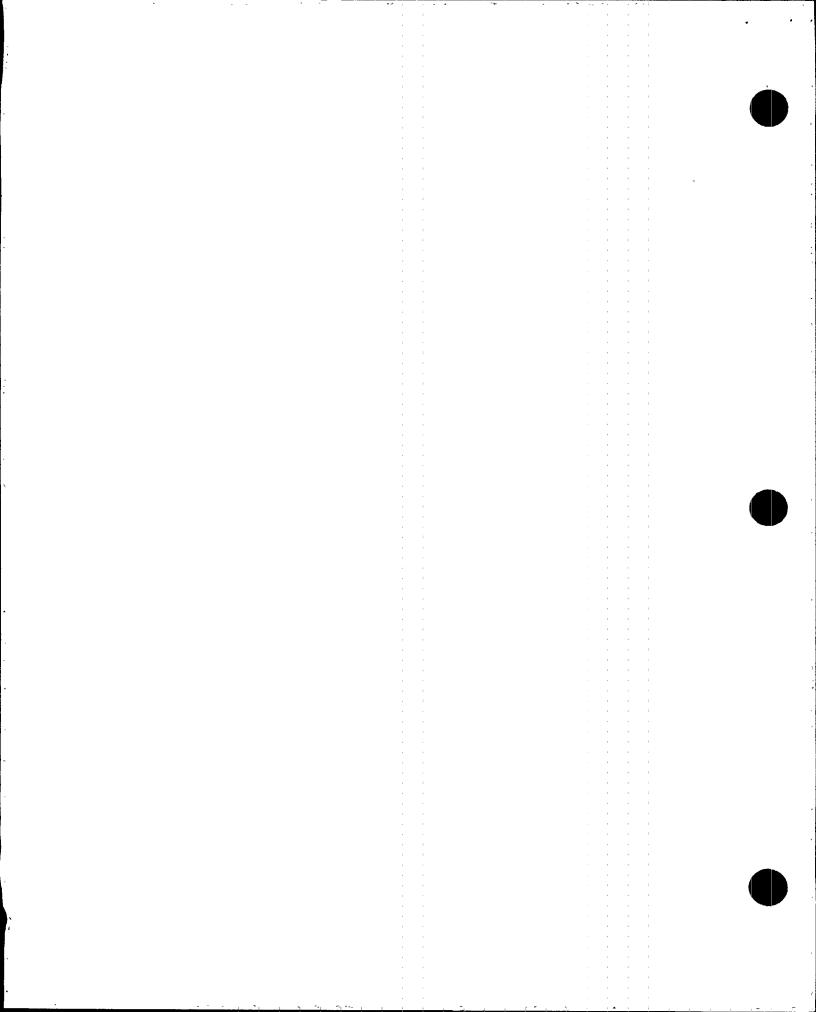
$$F_{y} = (1035^{\#} \times 1.25g) + (3752^{\#} \times 1.25g) = 5984.$$
  

$$F_{z} = (1035^{\#} \times 1.25g) \times 0.2g = 957.$$
  

$$M_{x} = (1035^{\#} \times 1.25g \times 90'') + (3752^{\#} \times 1.25g \times 45'') = 327, 488.$$
  

$$M_{y} = (1250^{\#} \times 90'') + (1035^{\#} \times 1.25g \times 90'') + (3752^{\#} \times 1.25g \times 45'') = 439, 988.$$
  

$$M_{z} \approx 0$$



## EQE INTERNATIONAL

ore to (GRT d)  
Shear per 
$$\frac{3}{8} \neq \frac{5984}{5\times4}$$
  
 $f_{V} = \frac{469}{0.11 \text{ m}^{2}} = 4.3 \text{ Ksi}$ 

shear - tension interaction:

$$26(1.7) - 1.8(4.3) = 36.5 \text{ Ksi} > F_{f} = 1.7 \times 20^{\text{Ki}} = 34^{\text{Ksi}}$$

$$\implies \text{use } F_{f} = 34. \text{ Ksi}$$

$$= Tension \quad per \quad \frac{3}{8} \neq \quad bolt:$$

$$T = \sqrt{\left(\frac{327, 488^{*''}}{165''}\right)^{2} + \left(\frac{439, 188^{*'}}{363}\right)^{2} + \left(\frac{957}{5\times4}\right)^{2}} - \frac{1035^{*} + 3752^{*'}}{5\times4} = 2087.^{*'}}{5\times4}$$

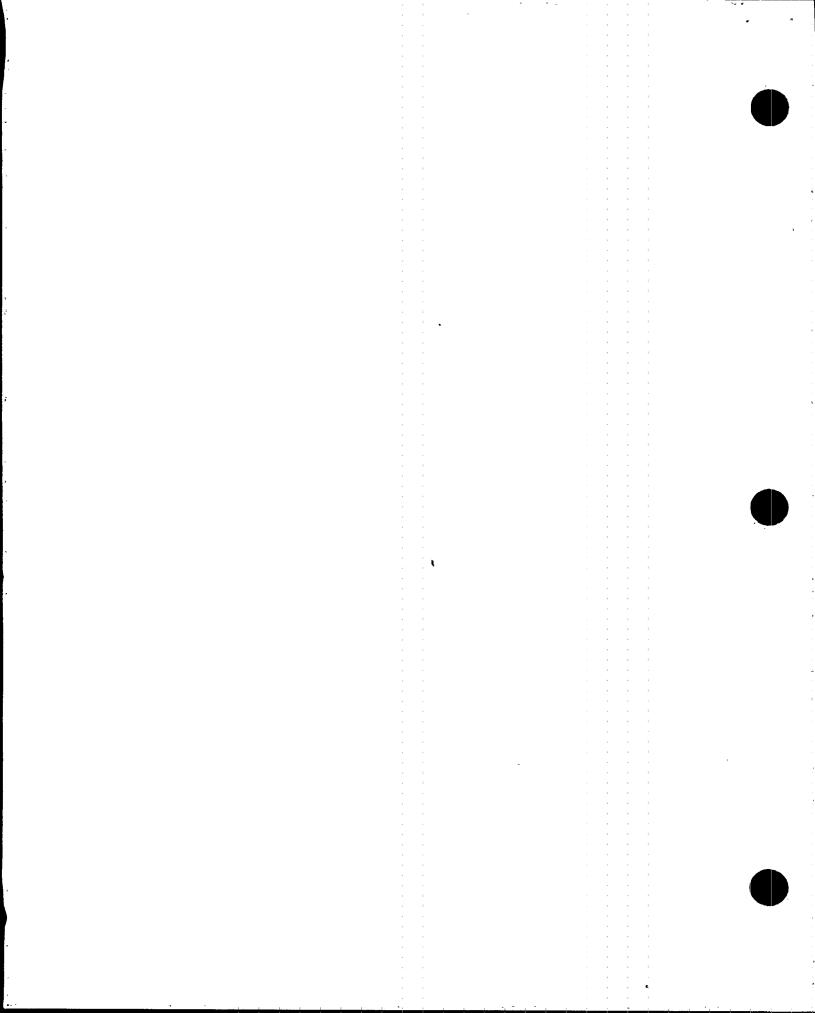
$$f_{g} = \frac{2087^{*'}}{0.11 \ln^{2}} = 19. \quad Ksi \quad < F_{g} = 34 \quad Ksi \quad ok$$

$$\frac{f_{\star}}{F_{\star}} = 0.56 \quad \langle 1.0 \quad ok$$

- Check 3/4" & Anchor bolts:

Conservatively, use the same Sxx & Syy as for 3/g \$ bolts.

Therefore: 
$$V = 469^{\#} < V_{a_{11}2} = 4.11^{\#}$$
,  $\frac{V}{V_{a_{11}}} = 0.11 < 0.3$  ok  
 $T = 2087^{\#} < T_{a_{11}2} = 3.166^{\#}$ ,  $\frac{T}{T_{a_{11}}} = 0.66 < 1.0$  ok



EQE INTERNATIONAL



SHEET NO. 11 . f 12

JOB NO. <u>50147</u> JOB <u>TVA/REND AHL /IPEEE</u> BY 78-_ DATE <u>2/23/4</u> for 3-808B-268-0003D (SSEL 39016) CHK'D 10.1912 DATE 2/23/4 CALC. NO. _____ SUBJECT_SETVS

- Note 11 (contá from Page 3)

EValuation of 6014 bending due to creck in the grout pad (e.g., the grout pad, since is cracked, is conservatively assumed to provide no Latteral support to the anchor bolts and there for these bolts will be subject to bendin Demand Tension =  $208.7 \times \frac{0.69}{1.09} = 1252^{\#}$ Demand Shear =  $469^{\#} \times \frac{0.69}{1.09} = 281^{\#}$ Demand Shear =  $469^{\#} \times \frac{0.69}{1.09} = 281^{\#}$ 

(Note: 2087 * and 469 * were obtained for this equipment (see page 10) using an acceleration value corresponding to EL. 621' of the RB for, bounding purposes. This equipment is actually boated @ EL. 593' of RB and the corresponding ecceleration value is a 6g)

The following evaluation is consistent with the EPRI document titled, " Recommen Approaches for resolving Anchorage outliers,": E = 2.5 (average grout thickness)

 $Z = \frac{d^3}{6} = \frac{.75^3}{6} = .07 \text{ in}^3 \qquad (\text{Plastic Section Hochulus of the bolt})$ 

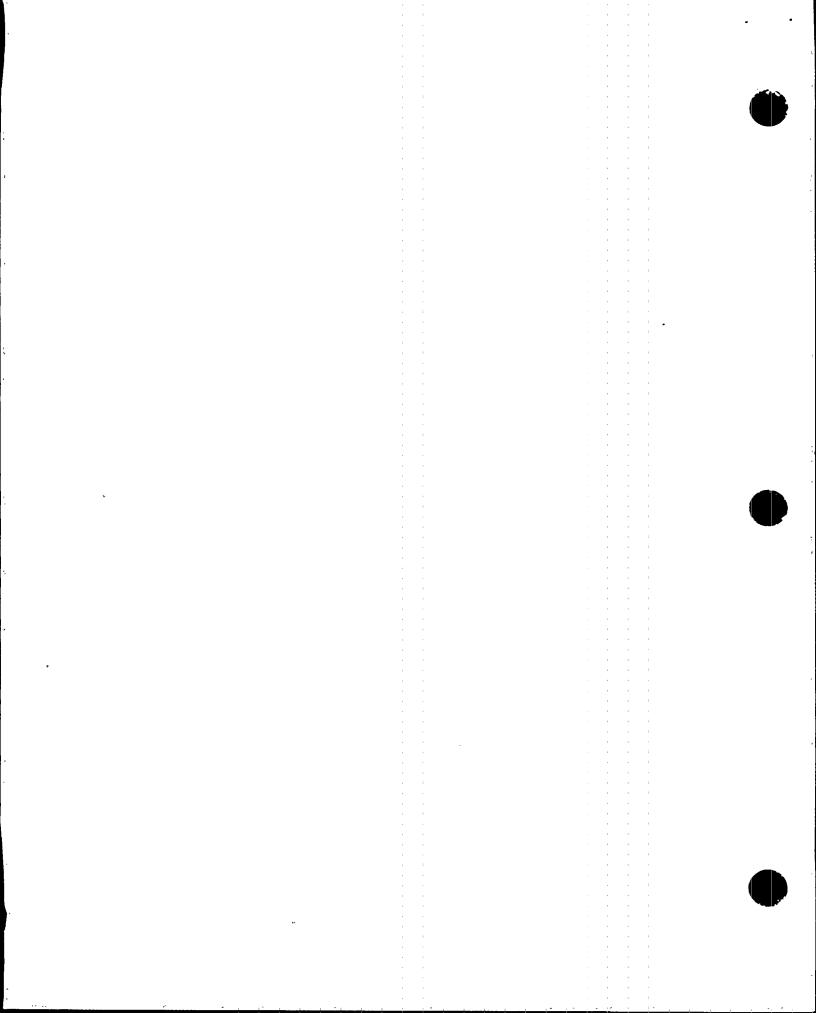
$$A = \frac{\pi d^{2}}{4} = \frac{\pi (.75)^{2}}{4} = .442 \text{ in}^{2}$$

$$F = \frac{107}{2.5} \left( \frac{7}{36} - \frac{1.252}{.442} \right) = 0.93$$

. Shear load corresponding to forming Plastic Linge @ the concrete Surface

$$V_{B} = \frac{2(F_{Y} - F_{A}) + M_{c}}{e + 2d_{b}}$$

$$M_{c} = 5.4 f_{c} d_{b}^{3} = 5.4 (3.6) (.75)^{3} = 8.2 \text{ K-IN}$$



	SHEET NO. <u>12 مح اع</u>
JOB NO. <u>SOLY7</u> JOB YVA/BENP A44/IPEEE	BY 7Ber DATE 2/23/2
CALC. NO. N/A SUBJECT SEWS for 3-BDBB-268-0003D (SSEL 37016)	CHKD Ld. Dirm DATE 2/23/9

$$V_{B} = \frac{.07 (36 - 1.225/.442) + 8.2}{2.5 + 2(.75)}$$

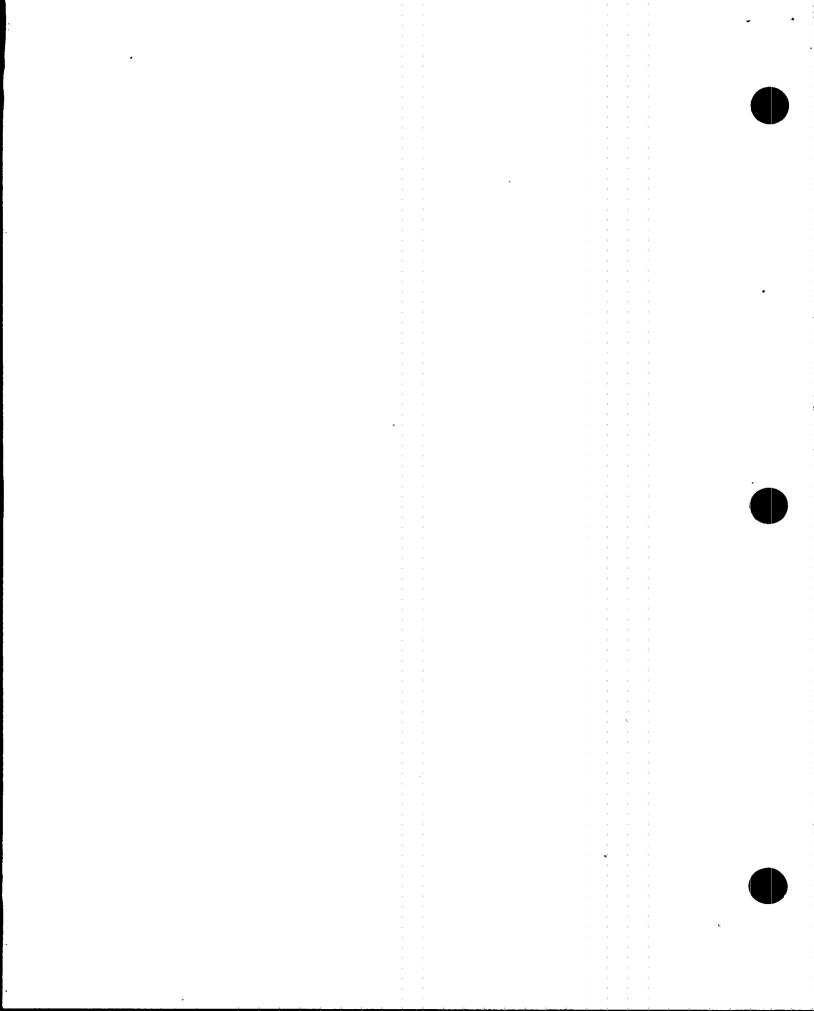
shear load corresponding to forming plastic hinge in the embedded portion of the bott

 $\frac{V}{V_{\rm B}} = \frac{.291}{2.63} = 0.11$ 

EQE INTERNATIONAL

Additional pullout load on the anchorage due to bolt bending, P', is regligible. (<5[#]) per sect. 1.3 of the above referenced EPRI document on resolving anchorage outliers.

... As shown above the bolt bending is insignificant, resulting bolt interaction remains same.



Status Y (N) U

Sheet 1 of 1

# IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>3-BDBB-268-0003D</u> Equip. Class <u>01 - Motor Control Centers</u> Equipment Description <u>480V RMOV BOARD 3D</u>

# RELAY WALKDOWN

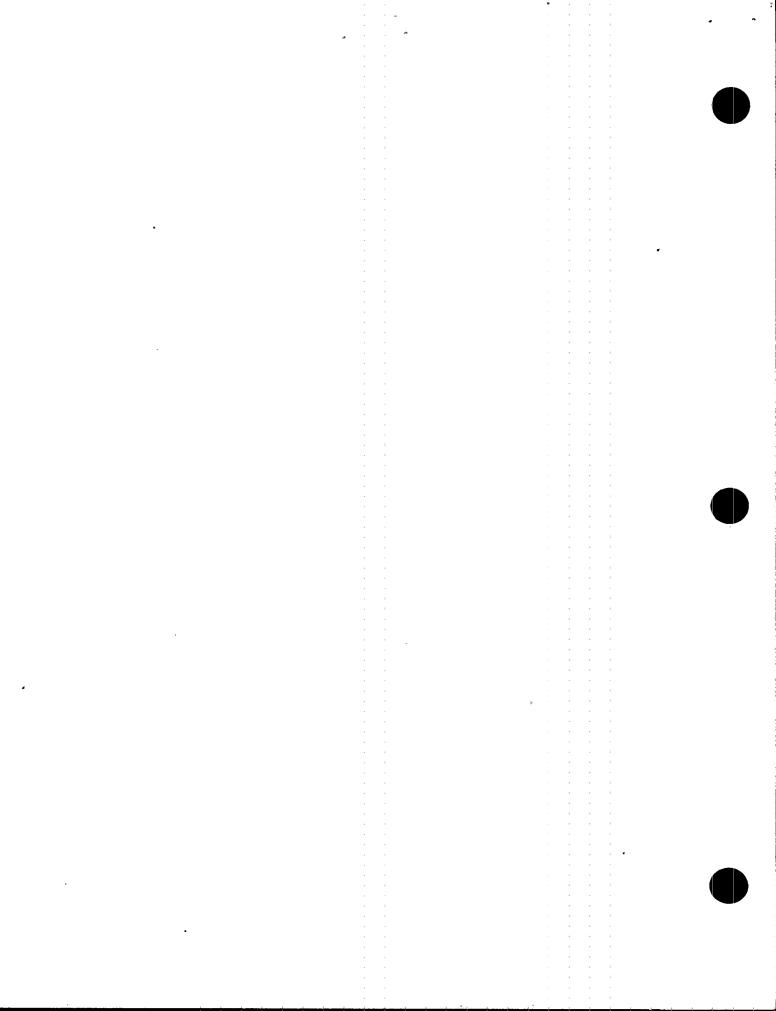
<ol> <li>Does spot check of essential relays indicate relays present and properly mounted?</li> </ol>	B	N	U	N/A	
2. Are essential relays required to function during earthquake screened out?	Y	N	U	NA	
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses an details of mounting plates that support relays for later analysis.	nd			· • •	
3. No other relay concerns?	Y	$(\mathbb{N})$	U	N/A (1)	
Requirements for relays satisfied?				۲ (N) U (۱۵۰	tr 1)
SYSTEM INTERACTION EFFECTS					
1. No potential sources could flood or spill onto cabinet?	<b>b</b>	N	U	N/A	
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNS sheets if necessary)	SATISFACTO	RY (	Use	additional	
Notel) A long cable tray vertical riser has abo The cable tray is supported by ~20' Lon swing in a seismic event and impact +	nt ille c ig rock he	leara anger Thin	nce rs, o	to this equipment. and therefore will	٠
Unacceptable if the nec includes essen	itial rela	ys	۳ کا حو	outlier OSVS-390	16
IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION YES / NO ( I FEEE EAL. rey d)	DN, EXCLUD	ING	RELA	Y CHATTER?	
IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTE	ER INVESTI	GATI	ON?	YES NO (su no	ماد ا
Evaluated by: Farri Bairi		Dat	e:	10-10-95 abo	ve -

12m

Evaluated by: _

C)67

Date: <u>10/10/95</u>



-: SSEL	Line	05V5-39016 No. <u>39016</u>		Sheet 1 of 2
		OUTLIER SEIS	SMIC VER	RIFICATION SHEET (OSVS)
1.	OUTL	IER IDENTIFICATION, DE	SCRIPTI	ON, AND LOCATION
	Equi	pment ID Number <u>3-BDB</u>	B-268-	0002D Equipment Class <u>01-MCC</u>
2-	Equi	pment Location: Bldg.	<u>U3-R</u>	B Floor Elevation <u>593</u>
	Ro	om or Row/Column	<u>LRI7</u>	Base Elevation
	Equi	pment Description	480 1	V RMOV BOARD 3D
2.	OUTL	IER ISSUE DEFINITION		•
	a.	Identify all the scre (Check more than one	ening g if seve	uidelines which are not met. ral guidelines could not be satisfied.)
		Mechanical and <u>Electrical Equipment</u> Capacity vs. Demand Caveats Anchorage Seismic Interaction Other		Tanks and Heat ExchangersShell Buckling*Anchor Bolts and EmbedmentAnchorage ConnectionsFlexibility of Attached Piping*Other
		<u>Essential Relays</u> Capacity vs. Demand Mounting, Type, Location Other		<u>Cable and Conduit Raceways</u> Inclusion Rules Other Seismic Performance Concerns Limited Analytical Review Other
		* Shell buckling and large, flat-bottom,	flexibi vertica	lity of attached piping only apply to . al tanks.
	b.	outlier issues were r	esolved,	the outlier (i.e., if all the listed , then the signatories would consider verified for seismic adequacy):

•

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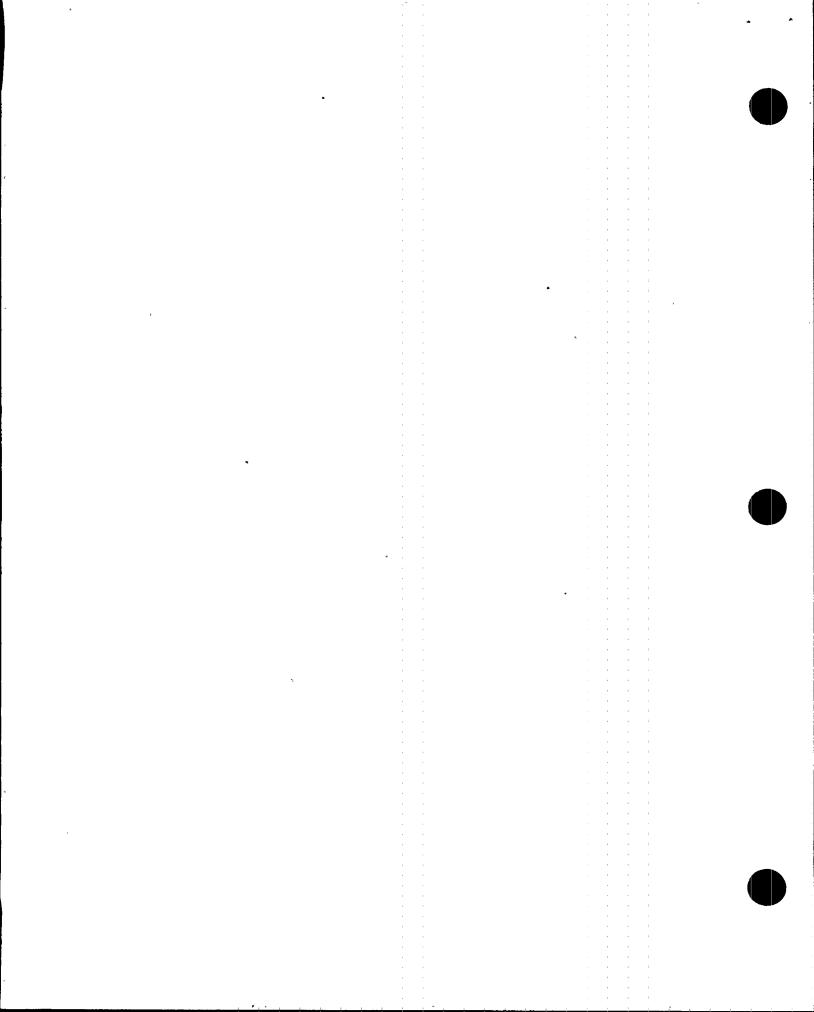
•

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"

•

A long Cable tray vertical riser has	about 11/2"
<u>clearance</u> to this equipment. The c	
supported by ~ 20' Lone rod hangers	and therefore
will suling in a seismic event and in	<u>npact the MCC</u> .
This impact is potentially unacceptable	if the MCC
includes essential relays	<u> </u>
•	



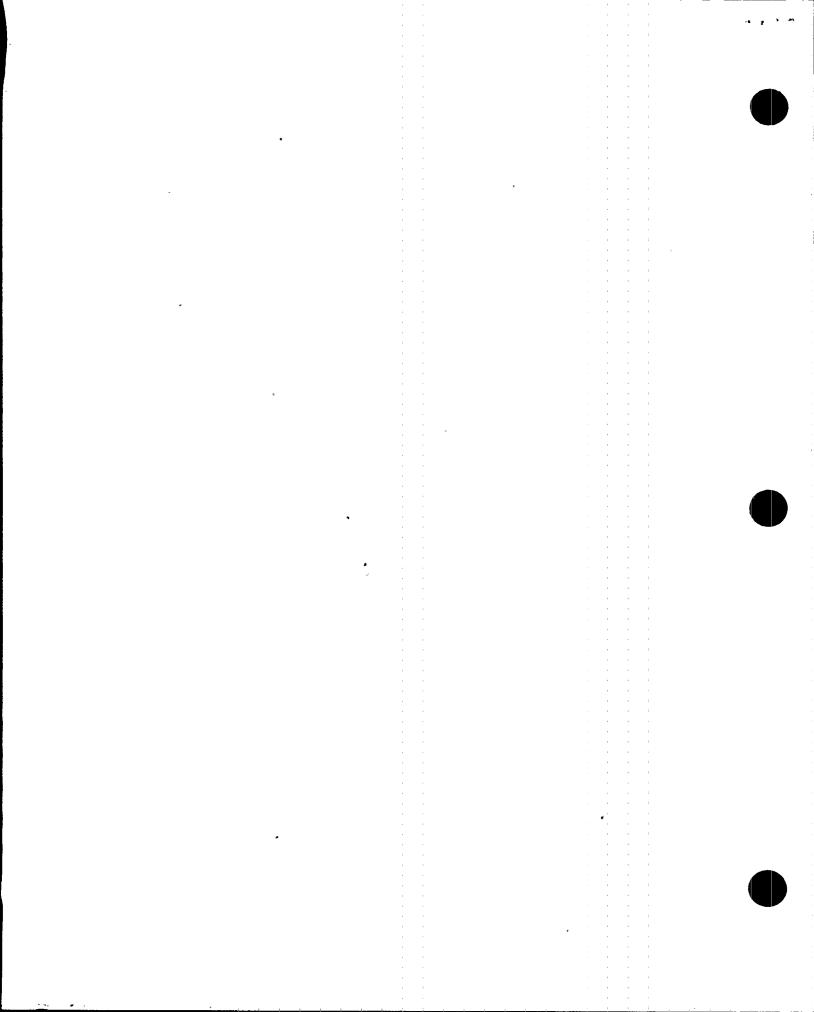
		05	vs - 39016	>			Sheet 2 of 2
SSEL	Line	No.	39016				
			OUT	LIER SEISMIC	VERIFICATIO	N SHEET (	OSVS)
				Equipment ID	Number <u>3-8</u>	BDBB - 26	<u>8-</u> 000 3 D
3.	<u>PROPO</u>	<u>OSED</u>	METHOD O	F OUTLIER RE	SOLUTION (OP	TIONAL)	
-	a.	Defi	ne propo	sed method(s	) for resolv	ing outli	er.
		De	termine.	; f this Ma	<u>contains</u>	essential	relaye. 1F
							•
		<u></u>	proclud	e this imp	<u>ct. 1f ;+ j</u>	s determs	and that the MCC
		_do	es not co	ntain event	ial velage +	hen this	antities is renalized.
	b.	Prov reso	ide infor lving out	rmation neede tlier (e.g.,	ed to impleme estimate of	ent propos fundament	sed method(s) for tal frequency).
		<u></u> Ω	EE SENS	for this	2quipment f	or anchor	age evaluation
		īn	cluding_	impact load	s from adj	acent cal	sle tray.
						<u> </u>	-
		.,			•		
						gi	
		3. <u>PROP</u> - a.	SSEL Line No. 3. <u>PROPOSED</u> a. Defi <u>b.</u> Prov reso <u>S</u>	SSEL Line No. <u>390/6</u> OUT 3. <u>PROPOSED</u> METHOD O a. Define propo <u>Determine</u> <u>yes</u> , thun <u>to proclud</u> <u>does not ca</u> b. Provide infor resolving out <u>SEE SEWS</u>	OUTLIER SEISMIC Equipment ID 3. <u>PROPOSED</u> METHOD OF OUTLIER RES a. Define proposed method(s) <u>Determine if this Mcc</u> <u>yes, then the Cable</u> <u>to proclude this impo</u> <u>does not contain exact</u> b. Provide information needer resolving outlier (e.g., <u>SEE SEWS for this e</u>	SSEL Line No. <u>390/6</u> OUTLIER SEISMIC VERIFICATIO Equipment ID Number <u>3-1</u> 3. <u>PROPOSED</u> METHOD OF OUTLIER RESOLUTION (OP a. Define proposed method(s) for resolv <u>Determine if this Mcc contains</u> <u>yes, then the cable tray needs</u> <u>to proclude this impact. If it is</u> <u>does not contain essential veloce to</u> b. Provide information needed to implement to <u>SEE SEWS for this equipment to</u>	SSEL Line No. <u>39016</u> OUTLIER SEISMIC VERIFICATION SHEET ( Equipment ID Number <u>3-BDBB-26</u> 3. <u>PROPOSED</u> METHOD OF OUTLIER RESOLUTION (OPTIONAL) a. Define proposed method(s) for resolving outling <u>Determine</u> if this Mcc contains execution <u>yes, then the cable tray needs to be</u> <u>to proclude this impact. If it is determine</u> <u>does not contain essential velow then this</u>

# 4. CERTIFICATION:

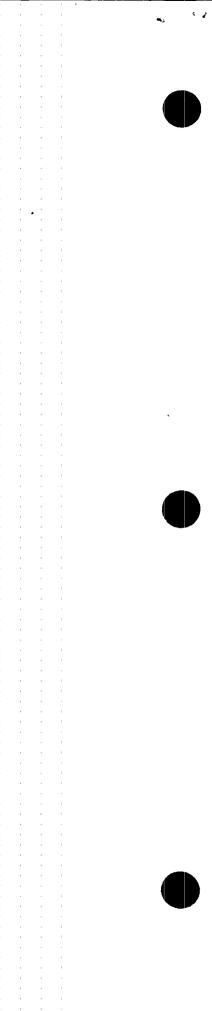
The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

FARZIN R. BEIGI	Forzi R. Bei	<u> </u>
Print or Type Name	Signature O	Date
JOHN O. DIZON, RE.	John O. Dizan	10/10/95
Print or Type Name	Signature	Date
Print or Type Name	Signature	Date



INTENT SSEL Line No. 9020 Status Y (N) U SCREENING EVALUATION WORK SHEET (SEWS) Sheet 1 of 3 Equip. ID No. 2-BDBB-231-0002A Equip. Class 02 - Low Voltage Switchgear Equipment Description 480V SHDN BD 2A _____ Floor El. <u>621'-</u>3* Location: Bldg. RB Room, Row/Col S-R13 Manufacturer, Model, Etc. (optional but recommended) . GE TYPE ARD-5 - Breaker types AK -2A - 25 -1, AK - 6A - 25, AK - 2A - 505 - 2 SEISMIC CAPACITY VS DEMAND Elevation where equipment receives seismic input 1. 621-3 2. Elevation of seismic input below about 40' from grade YCNU 3. Equipment has fundamental frequency above about 8 Hz () N U N/A (+) 4. Capacity based on: Existing Documentation **D0**0 Bounding Spectrum BS. 1.5 x Bounding Spectrum (ABS) GERS GERS 5. Demand based on: Ground Response Spectrum GRS 1.5 x Ground Response Spectrum AGS Conserv. Des. In-Str. Resp. Spec. CRS Realistic M-Ctr. In-Str. Resp. Spec. RRS loes capacity exceed demand? (Indicate at right (*) and in (Ŷ)N U (5)* <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.) <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) 1. Equipment is included in earthquake experience equipment class (Y) N U N/A (') 𝒮 N U N∕A 2. 600 V rating or less (Y) N 3. Side-to-side restraint of draw-out circuit U N/A(2,3,4) breakers is provided 4. Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together (Y) N if they contain essential relays U N/A (9) 5. Attached weight (except conduit) less than about 100 lbs per cabinet assembly N U N/A (8) 6. Externally attached items rigidly anchored N U N/A 7. General configuration similar to ANSI C37.20 Standards N U N/A 8. Cutouts in lower half of cabinet side sheathing less than 30% of width of side panel wide and less than 60% of width of side panel high excluding bus transfer compartment Ν U N/A Ϋ́Ν All doors secured by latch or fastener 9. U N/A ÜNUN/A(6) 10. Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated A = 4.5Have you looked for and found no other adverse concerns? (Y) N U N/A (12) 11. Y (N) U N/A (8) 12. Y(N) U N/A (8) Is the intent of all the caveats met for Bounding Spectrum? (See outlier OSVS-9020)



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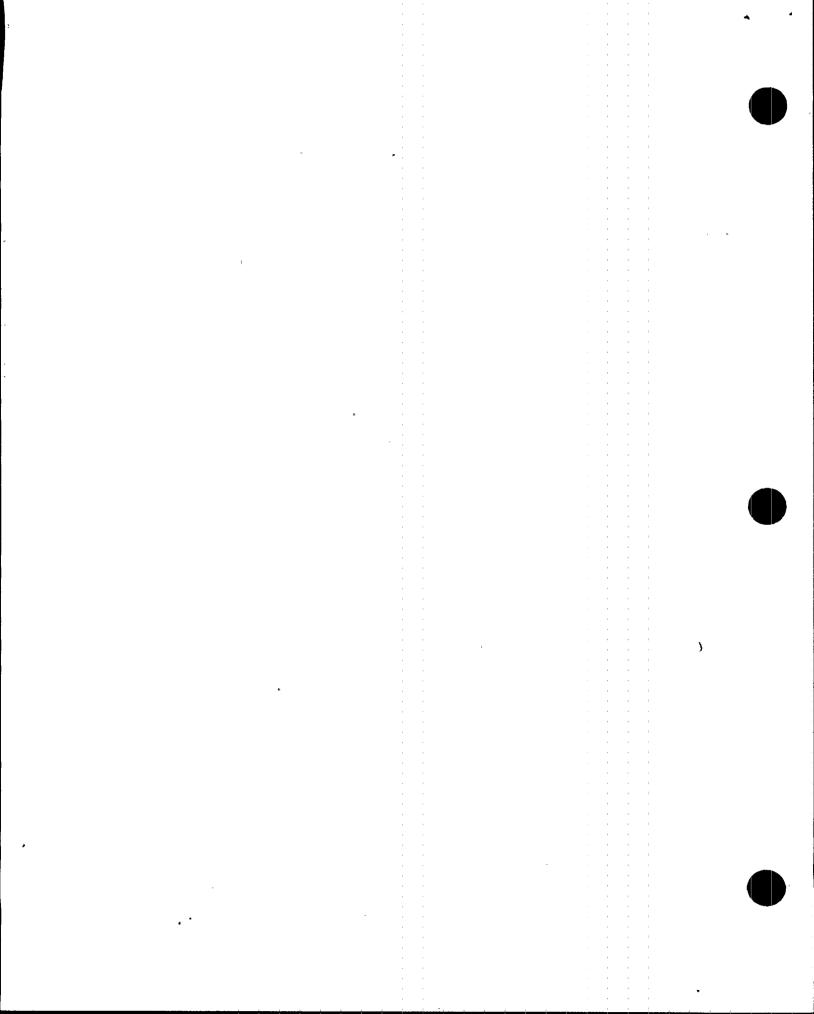
## SCREENING EVALUATION WORK SHEET (SEWS) She

Sheet 2 of 3

Equip. ID No. 2-BDBB-231-0002A Equip. Class 02 - Low Voltage Switchgear

Equipment Description 480V SHDN BD 2A

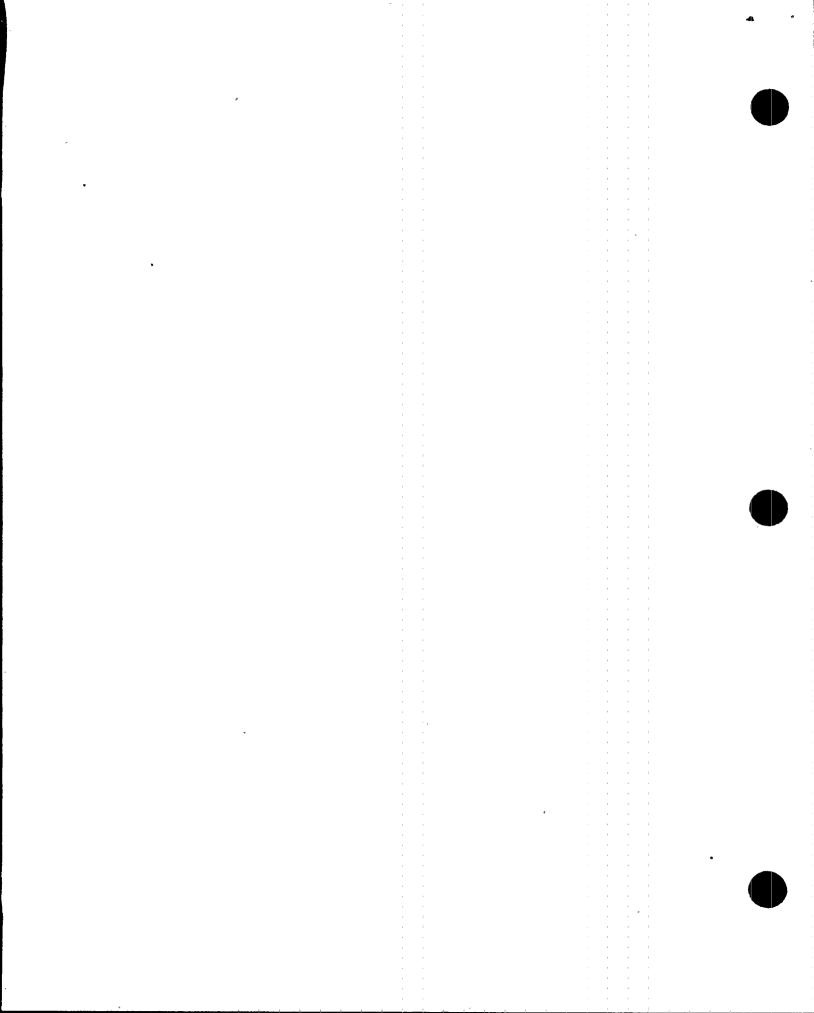
<u>CAVEATS - GERS</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) Equipment is included in generic seismic testing equipment 1. class N U 2. Meets all Bounding Spectrum caveats N U Y 3. Floor-mounted enclosure Υ Ν U 4. Manufactured by major vendor (ITE/Brown Boveri, Westinghouse, or GE) Υ Ν U 5. Maximum weight per section less than 1600 lbs U Y N Base anchorage adequate (See checklist below for details) U 6. Y Ν Relays used for breaker function are not on "Low Ruggedness Relays" list 7. Y U \$1/A) Ν 8. Relay evaluation completed for all relays that are essential to other equipment or cause unacceptable lockout Y N U /N/A 9. For 2.5 g level GERS, vertical restraint prevents breaker uplift U Y N (N/A) 10. For 2.5 g level GERS, outside corners of end units are reinforced, if needed N/A <u>All</u> adjacent cabinets or sections of multi-bay 11. assemblies bolted together Y N U (N/A Is the intent of all the caveats met for GERS? Y N U(N/A ANCHORAGE Appropriate equipment characteristics determined 1. Ø N (mass, CG, natural freq., damping, center of rotation) U N/A Type of anchorage covered by GIP 2. ØΝ U N/A (6) 3. Sizes and locations of anchors determined  $(\mathfrak{V})$ N U N/A 4. Anchorage installation adequate, e.g., weld quality and length, nuts and washers, expansion anchor tightness (Y) N U N/A 5. Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking ⟨**N/A** For bolted anchorages, gap under base less than 6. 1/4-inch (Y) N/A 7. Factors affecting essential relays considered: gap (Y) under base, capacity reduction for expansion anchors Ν U N/A 8. Base has adequate stiffness and effect of prying action on anchors considered N/A 9. Strength of equipment base and load path (Y) to CG adequate U N/A Embedded steel, grout pad or large concrete 10. (Y) N U pad adequacy evaluated N/A (Y) N U (G) Are anchorage requirements met?



#### SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 3 of 3

Equip. ID No. 2-BDBB-231-0002A Equip. Class 02 - Low Voltage Switchgear Equipment Description 480V SHDN BD 2A INTERACTION EFFECTS Soft targets free from impact by nearby 1. (Y) N U N/A equipment or structures 2. If equipment contains sensitive relays, equipment Y (1) Ü N/A (8) 05+5-90. (1) N U N/A (11) free from all impact by nearby equipment or structures Attached lines have adequate flexibility 3. Overhead equipment or distribution systems are 4. (𝔥) N U N/A (𝔹)
(𝔥) N U N/A (𝔹) not likely to collapse 5. Have you looked for and found no other adverse concerns? Is equipment free of interaction effects? Y (D) (8) IS EQUIPMENT SEISMICALLY ADEQUATE? YNU(() COMMENTS For Notes 1 thru 5 and B thru 12, See SEWS for 1.BDBB:-. 231-0001A (SSEL NO. 901B). e 6) Switchgear is attached to the embedded sill channel by plug wolds, as shown below.  $5/8 \xrightarrow{+} \longrightarrow + \log slotted hole @ the$  $<math>\frac{1}{4} \xrightarrow{-} + \log slotted hole @ the$  $<math>\frac{1}{4} \xrightarrow{-} + \log slotted hole @ the$ base of SG, Physicilla uj 1/8 welds = $Weld length = <math>\pi(5/8) + (1-5/2) \times 2 = 2.71$  6° long slotted. hates at ba of SG, Mun SG Base Per note 6 on SEWS for BD 1A (SSEL 9018), The resultant pull out load por phymeld is the = 1.12K The shear load per weld is:  $V_{\chi} = \frac{14000^{\#}}{24} = 583^{\#} = V_{\chi}$  (D.L. = 14^k, Af. CENS for SSEL # 4018) =>  $f_{\omega} = \left[ 583^2 + 583^2 \right]^{1/2} = 824^{+1}$ Shear - Tension Interaction:  $F_{W} = \underbrace{0.707 \times \frac{10}{8} \times 2.71}_{\text{tensile}} \times 30.6 \overset{\text{Ksi}}{=} 1.832 \overset{\text{Ksi}}{=} \frac{1.832}{1.832} \left\{ \left( \frac{1.12}{1.832} \right)^2 + \left( \frac{.824}{7.329} \right)^2 = 0.39 \\ \text{(I.0 } \underline{0} \underline{1} \\ \text{(I.0 } \underline{0} \\ \text{(I.0 } \underline{$ Evaluated by: <u>fonce Bey</u> _____ Date: <u>9-5-75</u> 1 9/15/95 Note 7) - Blockwalls in the area are qualified per IEB 80-11 program. (Ry. DWG. 41N1202-1, R3; Walls 63 \$64)



SSEL Line No. _9020.

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Status	Y	$\mathbb{N}$	U
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Sheet 1 of 1

# IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>2-BDBB-231-0002A</u> Equip. Class <u>02 - Low Voltage Switchgear</u> Equipment Description <u>480V SHDN BD 2A</u>

**RELAY WALKDOWN** 

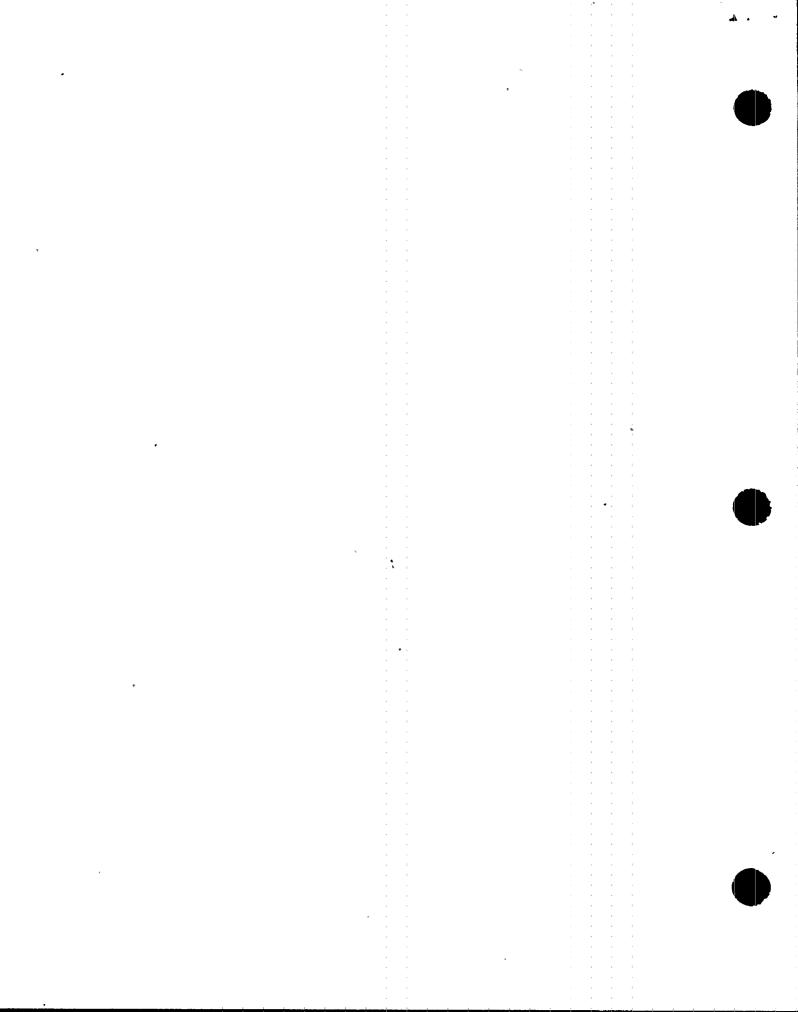
<ol> <li>Does spot check of essential relays indicate relays present and properly mounted?</li> </ol>	Ŷ	N	U	N/A		
2. Are essential relays required to function during earthquake screened out?	Y	N	U	N/A		
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.	•					
3. No other relay concerns?	Y	$(\mathbb{N})$	U	N/A		
Requirements for relays satisfied?					Y 🔊 U	(י)
SYSTEM INTERACTION EFFECTS						

1. No potential sources could flood or spill onto (Y) N U N/A cabinet?

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

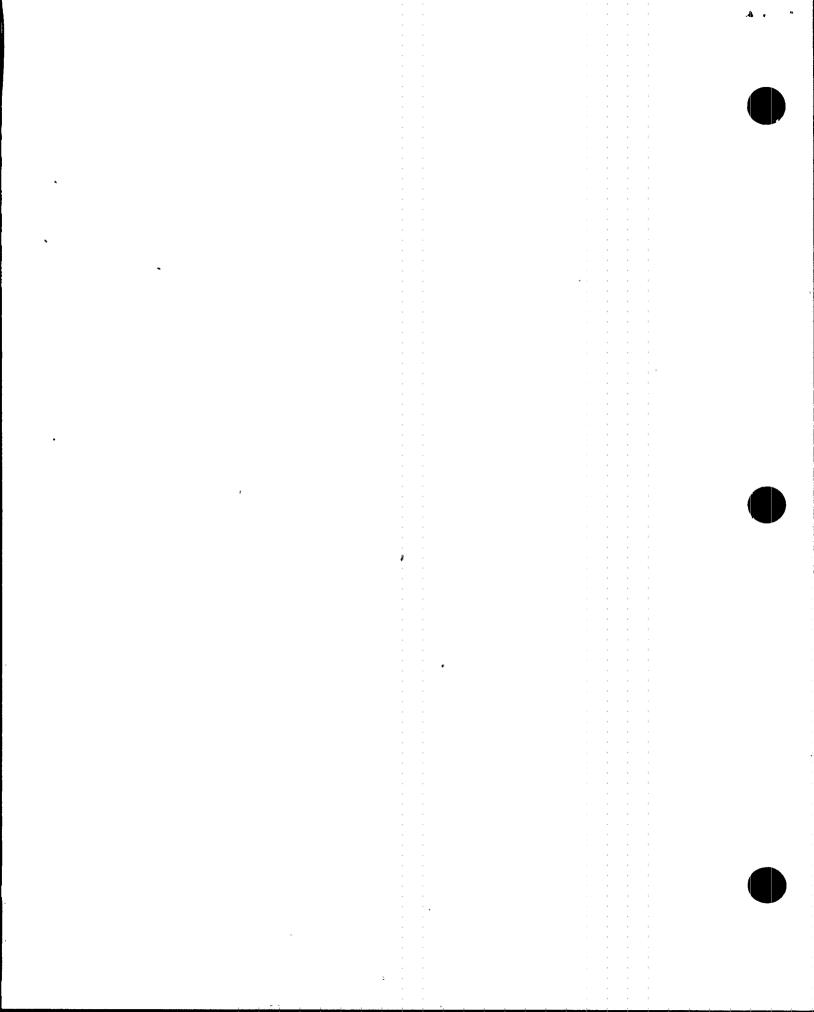
1) Breaker lifting device mounted over one of the bays is not restrained from movement on its rails and would potentially slide and impact the rail stops in a seismic event. This impact could potentially cause relay chatter. - outlier (OSVS-9020)

IS			NEED FOR FURTHER			AY CHATTER?	2
	YES_	NO	(Candidate for	IPEER Anchory	e Elkelmation)		
-15	EQUIPMENT	FREE OF	NEED FOR FURTHER	RELAY CHATTER	INVESTIGATION?	YES NO	) / (note 1)
			Forzi Besi			9.5-15	
Eva	aluated by:		Jen O. Diz	(m	Date: _	9/15/95	/



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Breaker lifting device is mounted over the top of one of the switchgear bays. The lifting device is free to more on its rails. In a seismic event the lifting device would potentially slick and impact the rail stops which would then potentially cause chatter of relays mounted inside this switchgear



SSEL LINE NO. 9020

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Revision 2 Corrected, 6/28/91

Sheet 2 of 2

# OSVS-9020 Exhibit 5-1 (Cont'd)

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

Equipment ID Number 2-BDBB-231-0002A

3. <u>PROPOSED</u> METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Provide a positive restraining mechanism for this litting device so that it will not slide on its seismic event or when is not in use. -> ISSUE Work Request

. b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

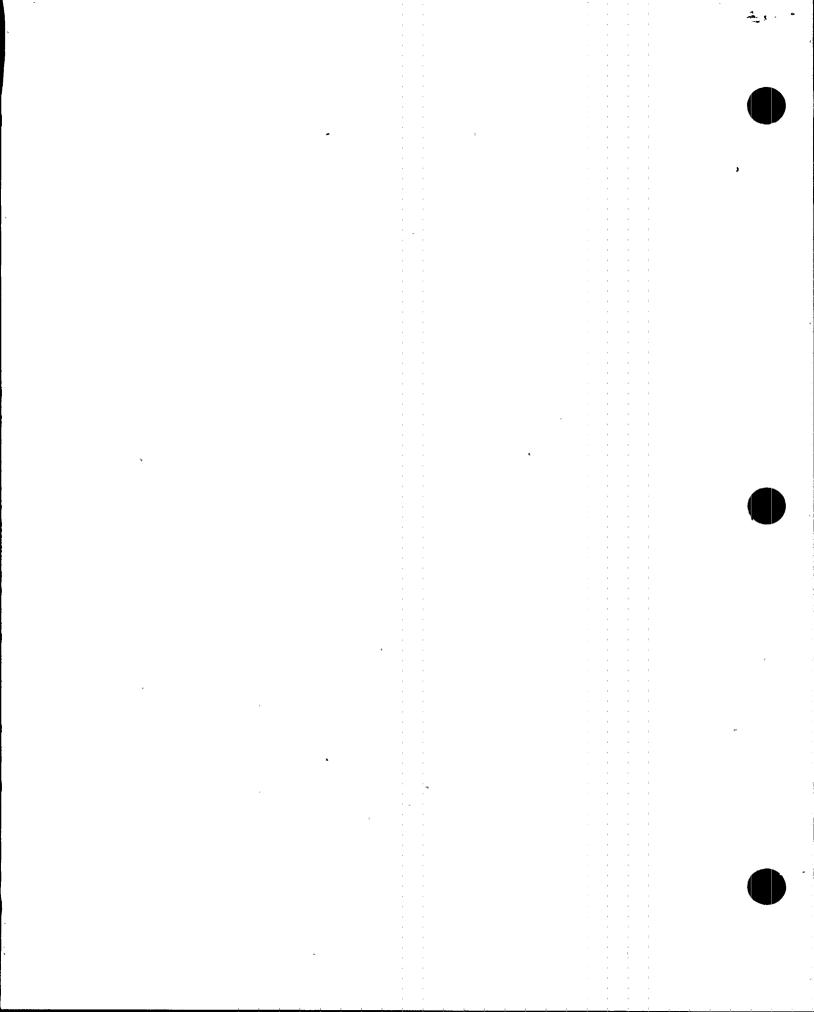
RAWI	N(	<u> 2-48 B</u>	900 - 2	160	Res E	AND		
ALCUL	47104	CDQO	999 96	0092	Rev	04761576,	1554ED	
4 0	civ 7	39883	A To	Res	OLVE	OUTLIST.		

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

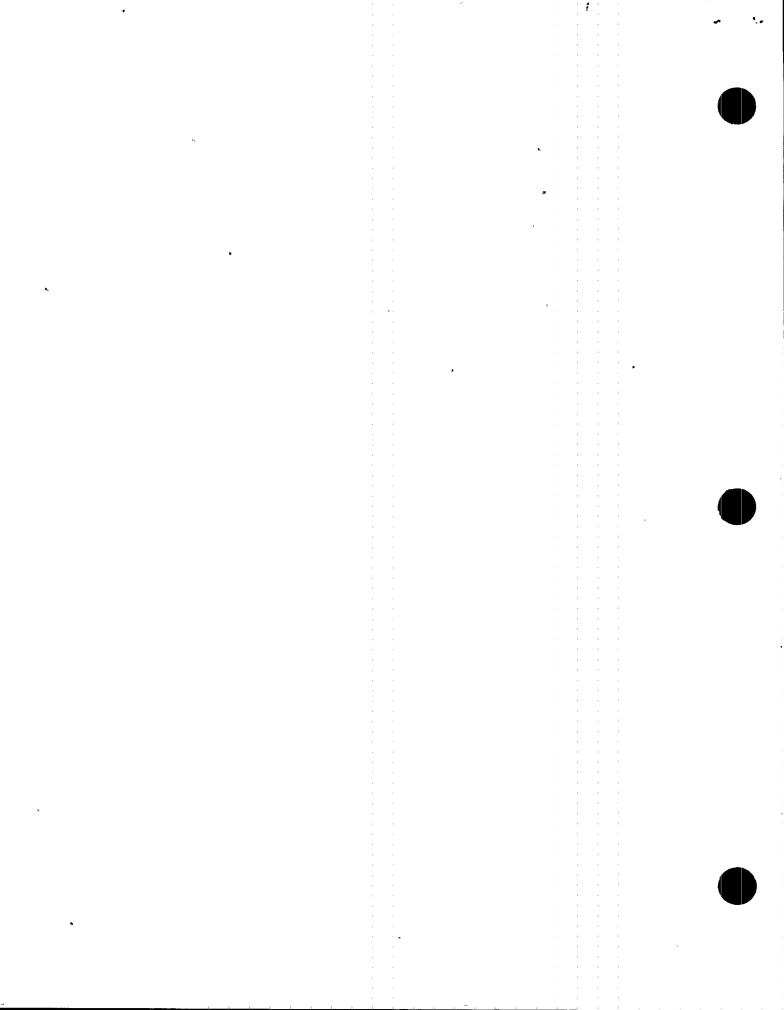
Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

-FARZIN R. BEIGH	Forzi Beizi	9-5-95
<u>FARZIN R. BEIGI</u> Print or Type Name	Signature 0	Date
JOHN D. DIZON P.E.	chen O. Dizan	9/15/95
<u>Print or Type Name</u>	Signature	Date
Print or Type Name	Signature	Date
	5-11	



V (N) V SSEL Line No. 9018 Status Sheet 1 of 3'B SCREENING EVALUATION WORK SHEET (SEWS) Equip. ID No. <u>1-BDBB-231-0001A</u> Equip. Class <u>02 - Low Voltage Switchgear</u> Equipment Description _480V SHDN BD 1A Floor El. 621'-3" Room, Row/Col S-R1 Location: Bldg. RB Manufacturer, Model, Etc. (optional but recommended) . GE Low Vo Hage Power CB. TYPE AK-2A-15-1 · GE TYPE AND-5 SG SEISMIC CAPACITY VS_DEMAND 1. Elevation where equipment receives seismic input 621-3 2. Elevation of seismic input below about 40' from grade V CD U Equipment has fundamental frequency above about 8 Hz 𝔍 N U N/A (4) 3. 4. Capacity based on: Existing Documentation DOC Bounding Spectrum BS 1.5 x Bounding Spectrum (ABS) GERS GERS Ground Response Spectrum 5. Demand based on: GRS 1.5 x Ground Response Spectrum AGS Conserv. Des. In-Str. Resp. Spec. CRS Realistic M-Ctr. In-Str. Resp. Spec. RRS ØNU(5)* Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.) <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) 1. Equipment is included in earthquake experience equipment class (Y) N U N/A (') Ƴ N U N∕A 2. 600 V rating or less ØΝ U N/A (4),(2),(3) Side-to-side restraint of draw-out circuit 3. breakers is provided 4. Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together 𝔍 N U N/A (9) if they contain essential relays 5. Attached weight (except conduit) less () N U N/A (B) than about 100 lbs per cabinet assembly (V) N U Externally attached items rigidly anchored N/A 6. (Y) N U General configuration similar to ANSI C37.20 Standards N/A 7. Cutouts in lower half of cabinet side sheathing 8. less than 30% of width of side panel wide and less than 60% of width of side panel high excluding bus transfer compartment OV N U N/A ŴŇ U All doors secured by latch or fastener N/A 9. Y 🕦 U Anchorage adequate (See checklist below for details) N/A (6) 10. Ø N U N/A (12) Relays mounted on equipment evaluated AF=7.0 11. Y (N) U N/A (9) Have you looked for and found no other adverse concerns? 12. s the intent of all the caveats met for Bounding Spectrum? Y NDU N/A (6,

INTENT



# SCREENING EVALUATION WORK SHEET (SEWS) Sheet

•

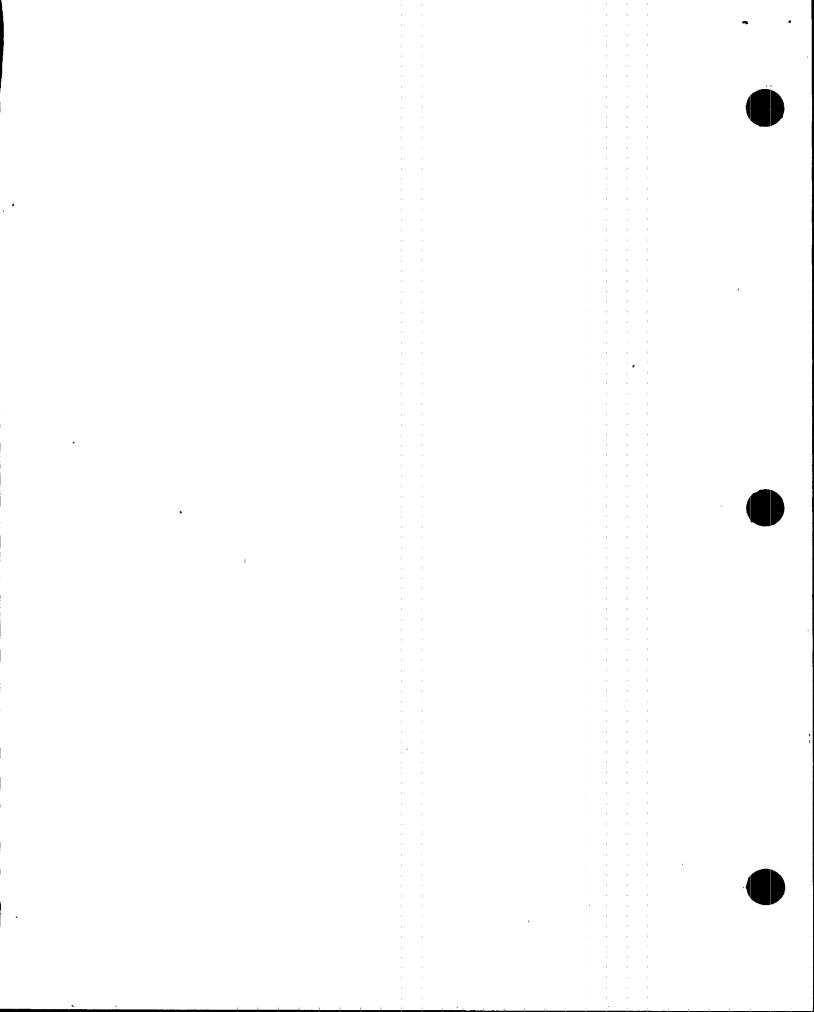
Sheet 2 of 3 8

Equip. ID No. 1-BDBB-231-0001A Equip. Class 02 - Low Voltage Switchgear

Equipment Description _ 480V SHDN BD 1A

•

met by	<u>S - GERS</u> (Identify with an asterisk (*) those caveats which intent without meeting the specific wording of the caveat r n the reason for this conclusion in the COMMENTS section bel Equipment is included in generic seismic testing equipment	ule	an	d.	
2. 3. 4.	class Meets all Bounding Spectrum caveats Floor-mounted enclosure	Y Y Y	N N N	บ บ บ	
	Manufactured by major vendor (ITE/Brown Boveri, Westinghouse, or GE)	Y	N	U	
5. 6.	Maximum weight per section less than 1600 lbs	Y Y	N N	U U	
7.	Base anchorage adequate (See checklist below for details) Relays used for breaker function are not on	I	ÎN.	U	N/A
	"Low Ruggedness Relays" list	Y	N	U	\$ <b>Z</b> B
8.	Relay evaluation completed for all relays that are				•
1	essential to other equipment or cause unacceptable lockout	v	N	п	N/A
9.	For 2.5 g level GERS, vertical restraint prevents	•			
•	breaker uplift	Y	N	U	N/A
10.	For 2.5 g level GERS, outside corners of end units				(17)
11.	are reinforced, if needed <u>All</u> adjacent cabinets or sections of multi-bay	Y	. N	U	NZA
	assemblies bolted together	Y	N	U	NA
Is the	intent of all the caveats met for GERS?	•		-	NA YNUNA
ANCHORA					_
	Appropriate equipment characteristics determined				
••	(mass, CG, natural freq., damping, center of rotation)	$\bigotimes$	N	U	N/A
2.	Type of anchorage covered by GIP	$\tilde{\mathbb{Q}}$	N	Ŭ	N/A N/A (6) N/A
	Sizes and locations of anchors determined	$(\mathfrak{O})$	N	U	N/A
4.	Anchorage installation adequate, e.g.,				
	weld quality and length, <u>nuts and washers</u> , expansion anchor tightness	$(\mathbf{i})$	N	U	N/A
5.	Factors affecting anchorage capacity or margin of	Ŷ	••	•	
	safety considered: embedment length, anchor spacing,				
	free-edge distance, concrete strength/condition, and	v			1170
	concrete cracking For bolted anchorages, gap under base less than	Y	N	U	N/A
0.	1/4-inch	Ð	N	U	N/A
7.	Factors affecting essential relays considered: gap	•			
		Ø	N	U	N/A
8.	Base has adequate stiffness and effect of prying	ഹ	М		NZA .
9.	action on anchors considered Strength of equipment base and load path	Ψ	И	0	N/A ·
	to CG adequate	Ø	N	U	N/A
10.					•
	pad adequacy evaluated	Q	N	U	N/A Y (N) U (6)
Are and	horage requirements met?				



### SCREENING EVALUATION WORK SHEET (SEWS)

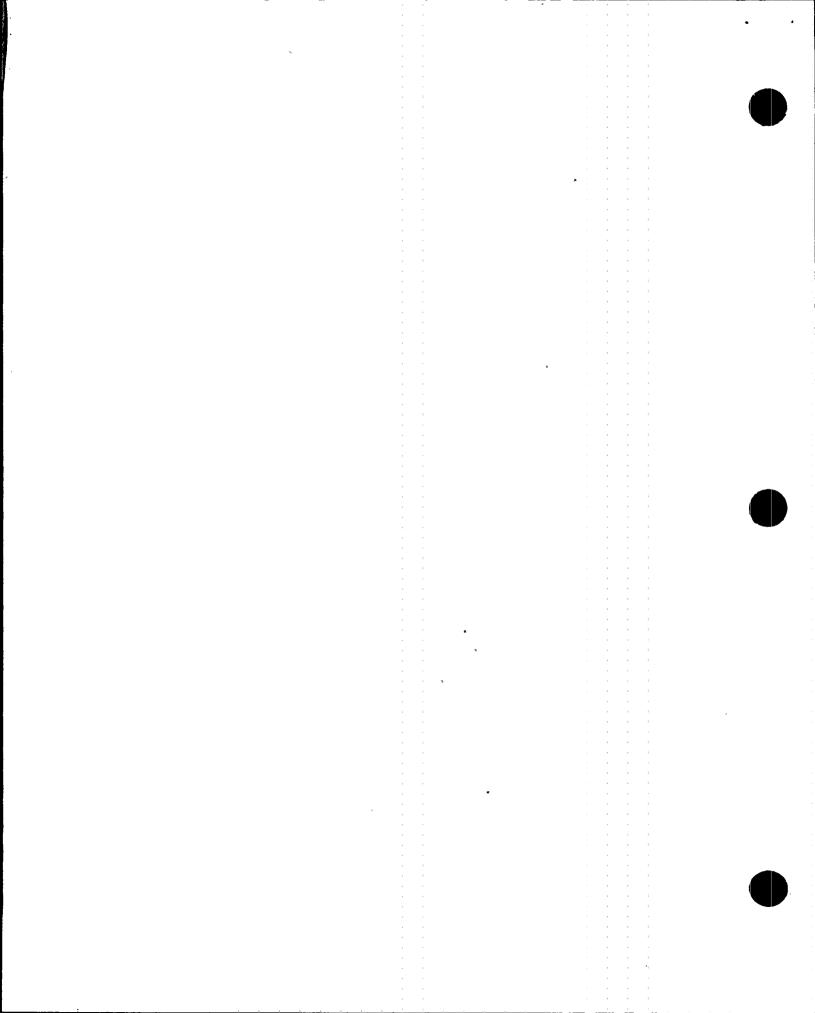
Sheet 3 of 3's

Equip. ID No. <u>1-BDBB-231-0001A</u> Equip. Class 02 - Low Voltage Switchgear Equipment Description <u>480V SHDN BD 1A</u> INTERACTION_EFFECTS 1. Soft targets free from impact by nearby equipment or structures (Y) N U N/A 2. If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures  $(\mathbb{N})$ U N/A (8) 3. Attached lines have adequate flexibility ŇU N/A (") 4. Overhead equipment or distribution systems are N/A (10) not likely to collapse U (Y) N (Ť) Ň Ŭ Ň/A (Ŧ) Have you looked for and found no other adverse concerns? 5. Y (U) U (8) Is equipment free of interaction effects? Y(N)U (6,8) IS EQUIPMENT SEISMICALLY ADEQUATE? COMMENTS 1) Equipment consists of B barge. Each bay is 20" to 27" wide, co deep and 90" tall, which , is within GIP size parameters for low voltage switch gears Circuit breakers are of drawout type and have rail support system from the switchgear sheet metal howsing. Each breaker is also restrained by two "worm Gear" type racking mechanism. 3) Orientation and type of primary and secondary contacts are adequate to prevent damage or disconnection. - secondary contacts - primary contacts Back of the Breaken 4) This switchgear is manufactured by GE and is well represented in The Earthqueke experience

bata base. Per App. B.2 of the GIP this type of switch gear are determined to be scienically rugged based on the EQ batebase. Due to the aspectivatio of this type of switch years (overall dimension = 181" × 60" × 90"(h), all bays an adaptately holted together on their sides and attached to each other Q top) the overall flexibility of the SG is due to shear flexibility. Per EPRI Report TR-102180 the Gwent natural frequency of typical Switch years with the above dimensions has been shown to be greater than BHE through testing of 2-3 bay units. (Actually, the side to-side frequency of 2.3 bay units were shown to be less than 8HE and the front-to-back to be greater than 8HE. Howeve

Date: 8/30/45 toni Bein Evaluated by:

due to the fact that the actual lineup for this swichgear is comprised of 8 bags which are all connected to each other they frequency of side to side will be through shear. Flexibility of the entire unit and lowert have aventer than 8 4=)



**QE INTERNATIONA** 



SHEET NO. 4 of 8 JOB NO. 50147.05 JOB TVA / BENT A-46/IDEEE BY TBain DATE <u>3.3.</u> 6 SEWS OF 1-BOBB-231-0001A CHKDLOTT DATE 9/5/95 CALC. NO. ___/A___ SUBJECT_Attach.

Note 4 (contid) - the frequency associated with the individual breakers is judged to be greater than 8 HZ due to their rigid mounting inside the SG cubicle and adequate restrainte provided against breaker sliding out or moving side to size

The frequency of a typical heavy panel door is estimated below: (panel edges, conservatively, simply supported)

.× -	Relay,	est-wef=7 lbs
		+ = 3 lbs
o <u>-</u>	ر ۸	a = 2 lbs

Thickness if the door panel = 12 gage = 01"  $\omega = uniform \ back \ per signt \ including \ panel \ weight$  $= \frac{(6 \times 7^{\#} + 7 \times 3^{\#} + 13 \times 2^{\#})}{27'' \times 90''} + 0.283 \ hy_3 \times 0.1''$ 

= 0.0649  $l_{J,N^2}$ From Rof. Roark É Young, 5th ed., table 36, carello  $a_{L}^{\prime} = \frac{27}{90} = 0.3 - K_1 = 10.9$ 

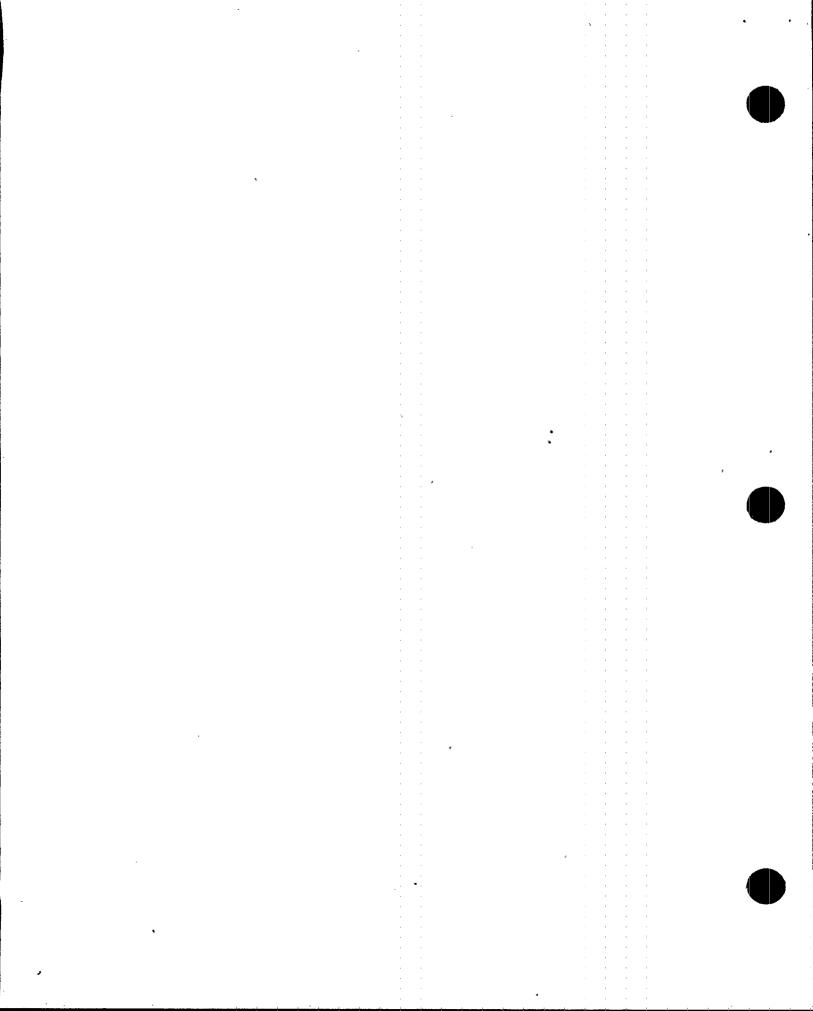
 $f = \frac{\mu_n}{2\pi} \sqrt{\frac{Dg}{\omega_a t}}$ D = Et³/₁₂ (1-v²) = 29×10⁶ × .1³/₁₂ (1-.3²) = 2656.

$$f = \frac{10.9}{2\pi} \sqrt{\frac{2656 \times 386.4}{.0649 \times 274}} = \frac{9.5}{7.5} HZ$$

(This frequency is actually conservative since the additional stiffening of the panel provided by the relay boxes is not considered.)

154100	2 <del>1</del> 1/4	<u>ינ'</u> י	Sim	ዮን	Suy	rpor	Tedy
f	<u>ا</u>			5			Pan I''
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Typical SG Dour							

with Relain



QE INTERNATION

SHEET NO. 5 5 8

244

or datails

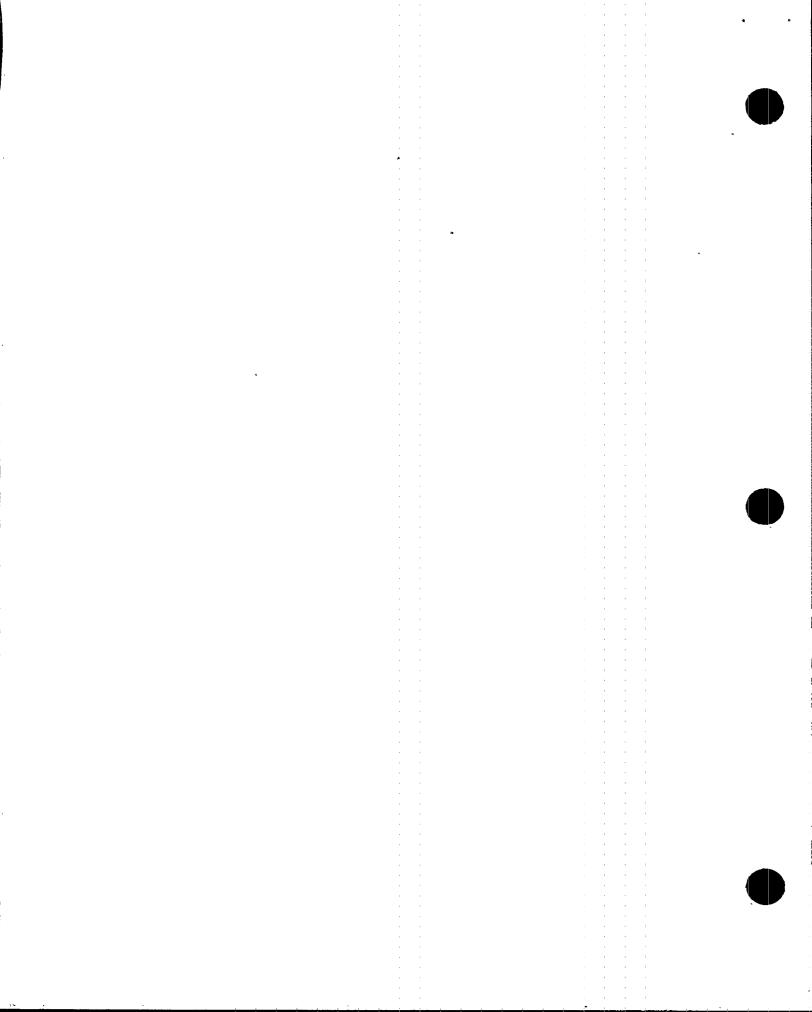
JOB NO. <u>50147.05</u> JOB <u>TVA / AFN P A.46 / IPEEE</u> BY <u>7 Rein</u> DATE <u>1/30/46</u> CALC. NO. <u>N/A</u> SUBJECT <u>A Hack. to SEWS for I-BDBB-231-0001A</u> CHKDJ.O.J.Z. DATE <u>9/5/95</u> (SSEL 9018)

- 5) Per Calc. CD-Q0000-940339, the In-structure response spectra at EL. 621' of the RB (@ 5% Damping, DBE) exceeds the 1.5x Bounding spectrum in the frequency range of about 5.0 to 6.8 HZ. since, the lowest natural frequency of this switchgear is greater than 6.8 HZ the <u>intent</u> of the GIP seismic capacity vs. demand criteria is met.
- 6) Anchorage Evaluation:
  - Equipment Wt. = 14000 1bs (R.J. DWG. 1-45N336)
  - From MARS Report:
    - $a_{L} = 1.0 g$  (GEL. 621' JRB, 5%, JADE spectra, Gf=YHZ)

 $a_V = 0.16 q$  (ZPA)  $\rightarrow F_h = 14^k \times 1.0 \times 1.25 = 17.5^k$ ,  $F_V = 14^k \times 0.16 \times 1.25 = 2.8^k$ . Pull out per  $\frac{1}{2}\phi$  connecting bolt.@ base:

$$T = \left[ \left( \frac{17.5 \times 90^{1/2}}{50^{1/2} \times 8} \right)^{2} + \left( \frac{2.8^{k}}{24} \right)^{2} \right]^{1/2} - \frac{14^{k}}{24} = 1.12^{k}$$

Note: The  $1/2^{''} \phi$  bolt at one location was removed and it was observed that there are 4 to 5 thread showing inside the hole in the embedded channel. The total depth of the 4-5 threads was measured to be at least  $1/2^{''}$ . Therefore, it was concluded that there is a welded nut underside of the channel web and that the method of connection is not drill and Tap into channel web (thickness of channel web =  $3/10^{''}$  for C4x5.4 member) Tensile stress area of  $1/2^{''} \phi$  Bolt, AISC,  $3^{Th}$  el.  $T_{all} = 0.142 \times 20 \times 1.7 = 4.828^{-16}$   $\gg T_{2}1.12^{''}$  old



QE INTERNATIONAL



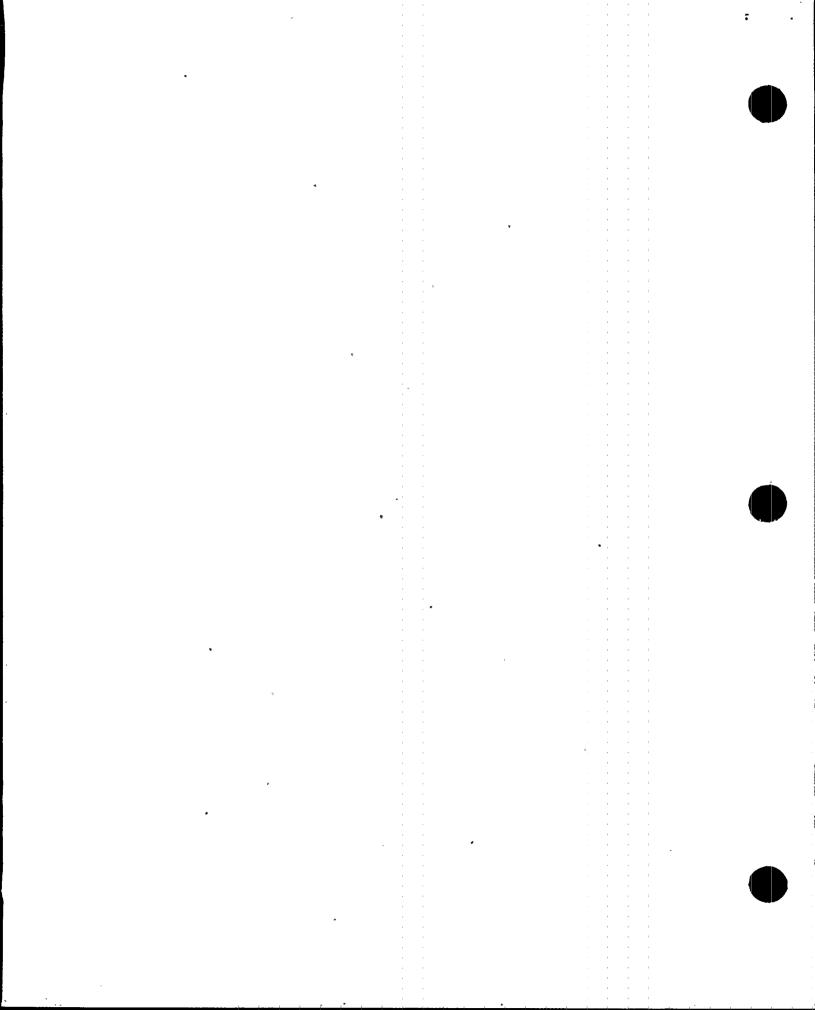
SHEET NO. <u>6 018</u> JOB NO. <u>50147.05</u> JOB <u>TVA / BENP A-46 / IPEEE</u> BY <u>7Be-i</u> DATE <u>i/30/</u> CALC. NO. <u>N/A</u> SUBJECT <u>ATTach. to SEWS for HOBBE-231-0001A</u> CHKD <u>10.</u> <u>JIZ</u> DATE <u>c/5/93</u> (SSEL 9018)

Note 6 (cont'd) :

- shear per 1/2" & connecting balt @ bose :

since the holes at the base of the switchgear compartments are long slotted holes the connection need to be of friction-type. connection which is achieved by the use of high strength bolts (A325 or A490 bolts) with hardened washers. These are no markin on the bolt heads to identify them as high strength bolts and perbwg. 48E1300-1 the bolt material shall conform to A36 or equivalent Therefore, the only shear resistance provided is through the friction between the base of the equipment and the concrete floor, which is not adequate to resist sliding of the equipment under seismic hads. I contier (05VS-901B-02)

12) Per EPRI REPORT NP_714B-SL an effective in-cabinet amplification functor of 7 is considered appropriate for this type 4f Switchgear.



QE INTERNATIONA

INTERNATIONAL				SHEE	TNO. <u>7 of 8</u>
JOB NO. <u>50147.05</u>	JOB TVA/EPJP	A-46	IPEEE	BY <u>72ei</u> 31 - 000 1A CHKB 0.DZm	DATE _8-30
CALC. NO. NIA	SUBJECT Attach. to	SENS -Gr	1- BDBB- 2	31 - 000 1A CHK'D O.D.Zm	DATE 9/5/95
	دء.	SEL 9018)			,

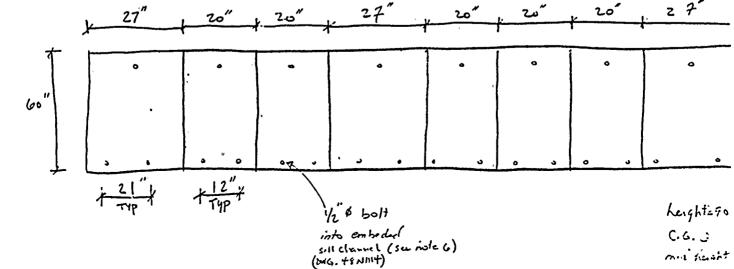
SSEL: 90/8,9019

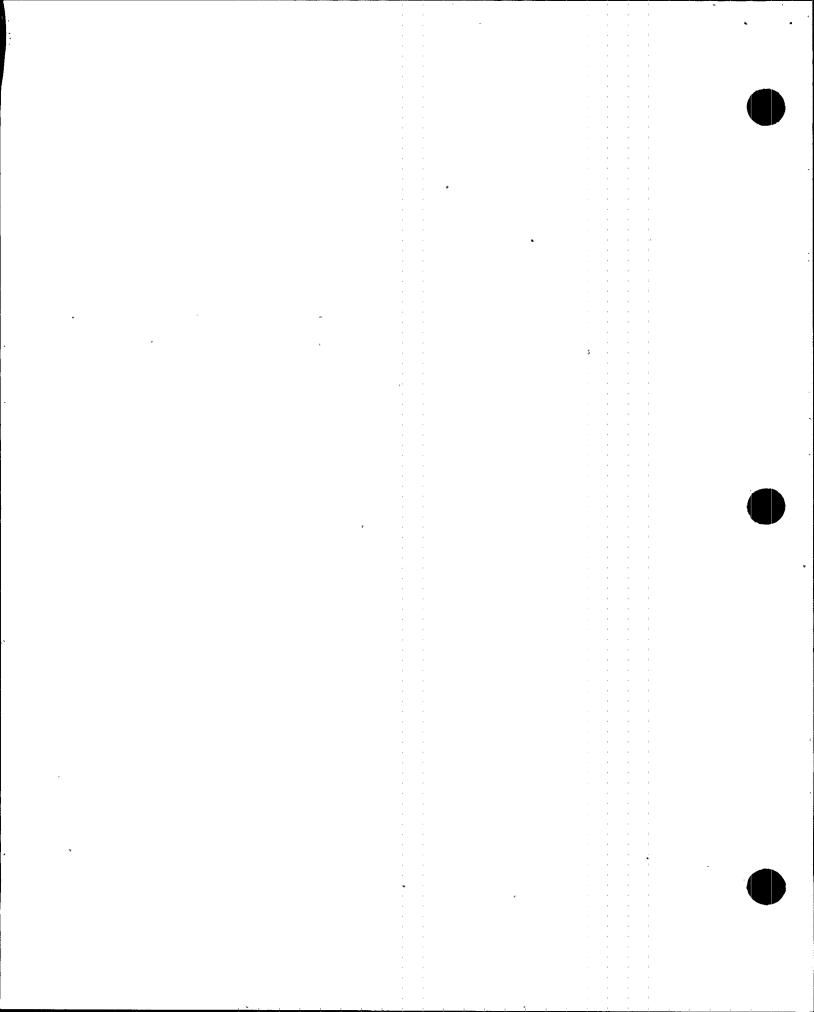
10: 1-BDBB-231-0001A, 0001B (480 V SHD BD 1A 4 1B)

TYPE: GE low voltage power CB, A1K-2A-15_1

Note 7) Block Walls & North and east side of the Board IA / qualified per IEB 80-11 Program (R1. Walls 28930, DWG. 41N1201-1, R4).

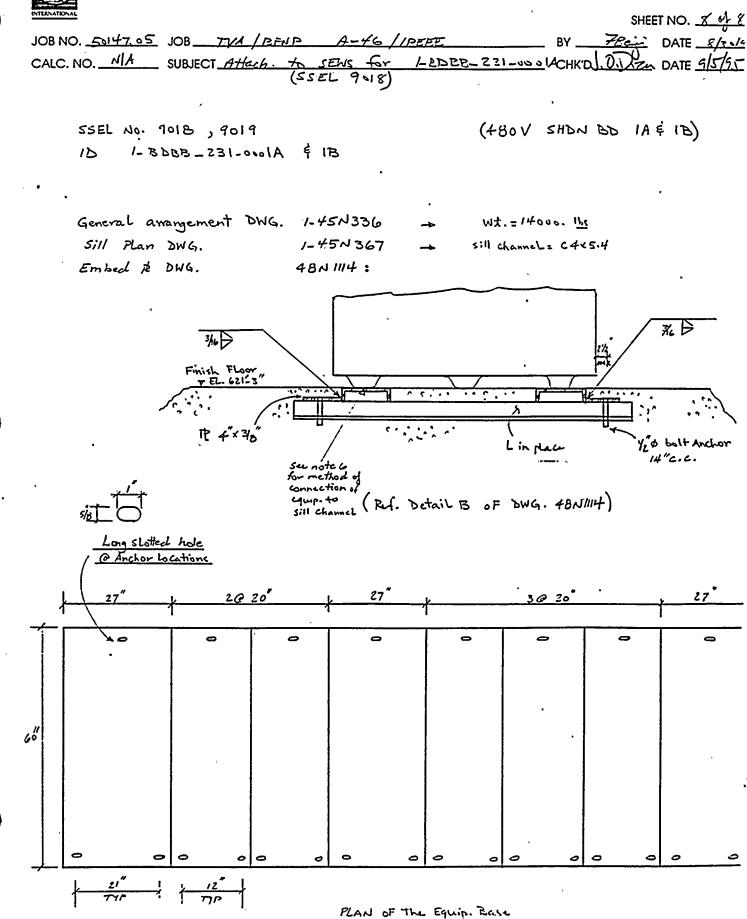
- Note B) Litting device on top of bay NO. 1 and 2 is not possitively restrained and could more on its rails and impart impact Louds to the panels. Since the panels include relays this interaction is a seismic concern. _> Outlier (OSVS-9018-01) (Ht. \$100#)
- · Note 9) panels are bolted to their adjacent panels w/ 12-1/4 & bolts @ each side. it
- Note 10) Funorescent light tubes are of compression fitting type and judged not to become a falling hazard in a seismic event. ou
- Notell) Top antry conduit an mostly red hung and have a legente Hexibility.

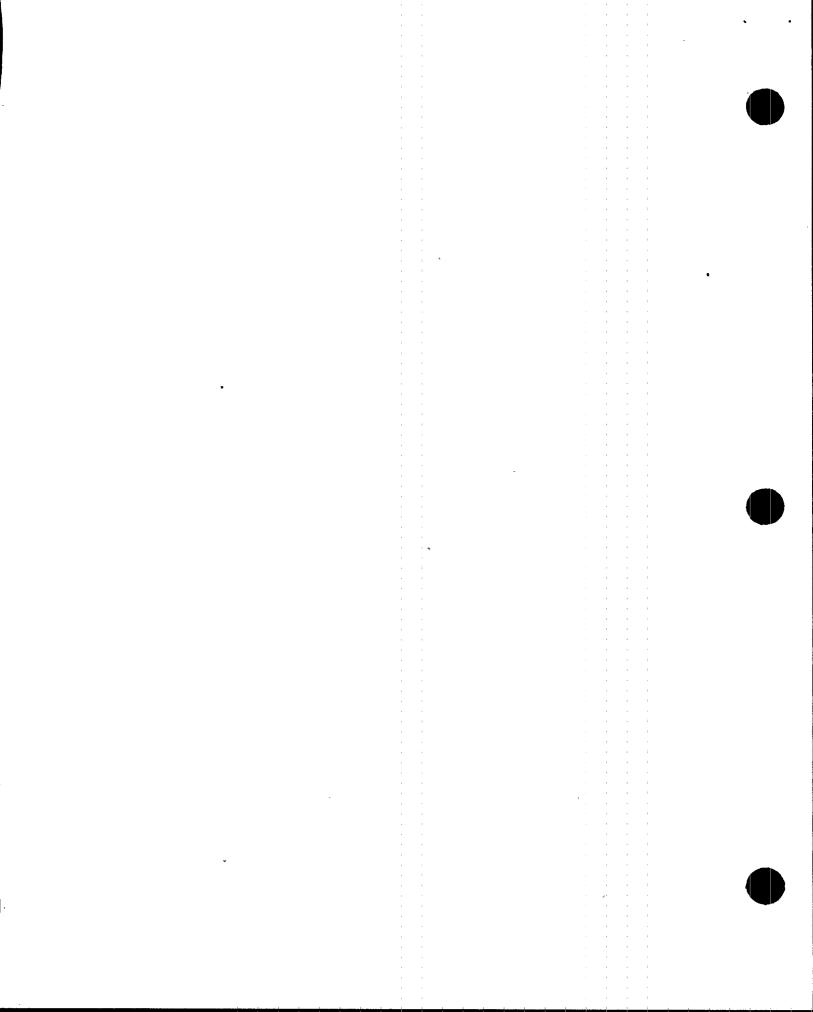




EQE INTERNATIONAL







Status Y (N) U

Sheet 1 of 1

## IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>1-BDBB-231-0001A</u> Equip. Class <u>02 - Low Voltage Switchgear</u> Equipment Description <u>480V SHDN BD 1A</u>

RELAY WALKDOWN

						•
<ol> <li>Does spot check of essential relays indicate relays present and properly mounted?</li> </ol>	Ø	N	U	N/A		
2. Are essential relays required to function during earthquake screened out?	Y	N	U	(N/A)		•
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.			-			
3. No other relay concerns?	Y	N	U	N/A		
Requirements for relays satisfied?					Y 🕦 U	(1), (2)
SYSTEM INTERACTION EFFECTS				•		
1. No potential sources could flood or spill onto cabinet?	Ý	N	U	N/A		
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATI	SFACTO	· RY (	Use	addit	ional	

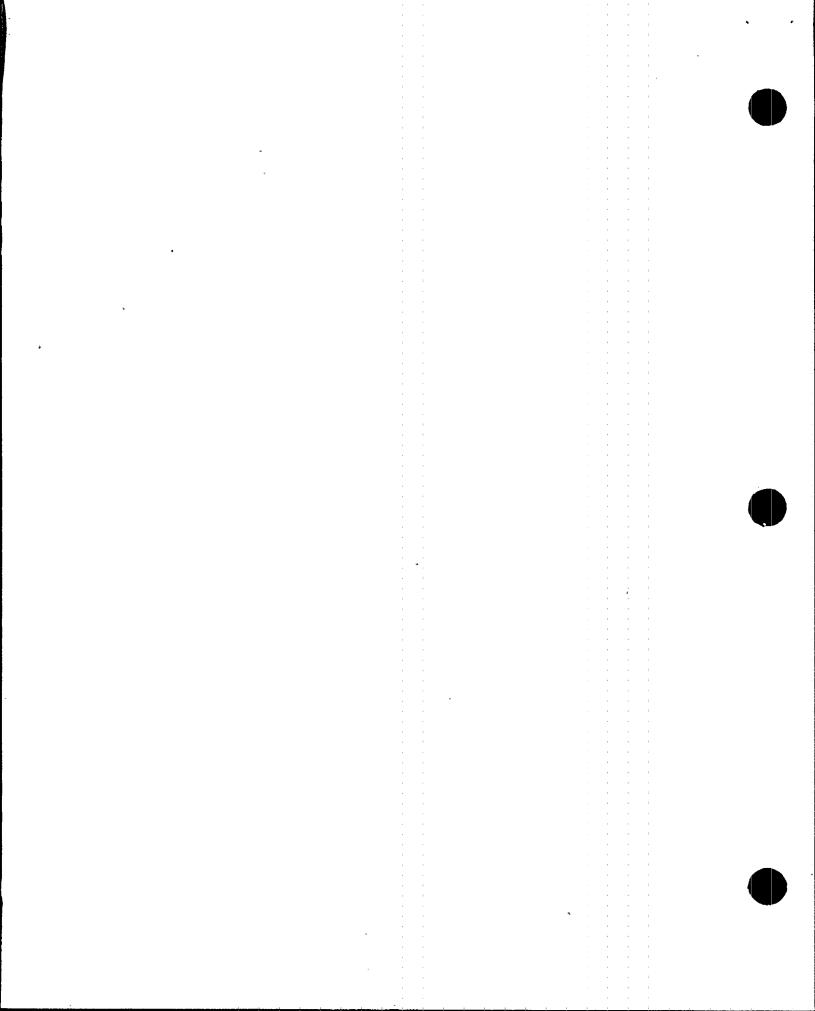
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

1) Anchorage provided for the equipment is not adequate to resist shear load caused from lateral seismic loads. _ <u>outlier(Osvs-9018-02)</u> 2) Breaker lifting device mounted over one of the baye is not restrained from .

movement on its rails and would potentially slide and impact the rail stops in a seismic event. This a could potentially cause relay chatter. - outlier impact (0545-9018-01)

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, EXCLUDING RELAY CHATTER? YES____ NO____ (See Note 1 above)

IS EQUIPMENT FREE	E OF NEED FOR FURTHER RELAY CHATTE	ER INVESTIGATION?	YES NO (see notes 1
Evaluated by:	Fanzi Bezi	Date: _	8-30-95-
Evaluated by:	John O. Dizan	Date: _	9/5/95



SSEL	LINE	NO.	9018

Revision 2 Corrected, 6/28/91

(05x5-9018-01)

Sheet 1 of 2

### Exhibit 5-1

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

1. OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION

Equipment ID Number 1-8288-231-0001A Equipment Class 02-LVSG

Equipment Location: Building ULRE Floor Elevation 621-3

Room or Row/Column<u>s.Ri</u> Base Elevation <u>Gzi-3</u>

Equipment Description 480 Volt SHUTDOWN BOARD IA

2. OUTLIER ISSUE DEFINITION.

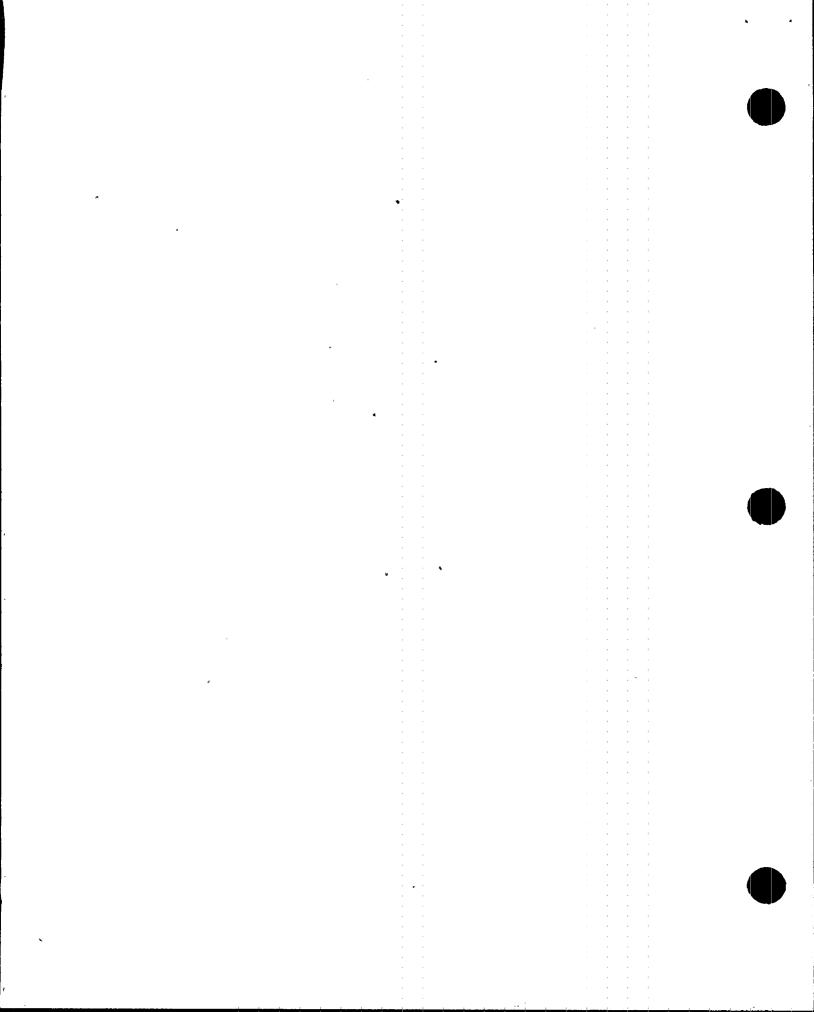
a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Mechanical and Electrical Equipment Tanks and Heat Exchangers Shell Buckling' Capacity vs. Demand Anchor Bolts and Embedment Caveats Anchorage Anchorage Connections Flexibility of Attached Piping¹ Seismic Interaction Other Other Cable and Conduit Raceways Inclusion Rules Essential Relays Other Seismic Performance Concerns Capacity vs. Demand Limited Analytical Review Mounting, Type, Location Other Other

1 Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.

b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):

Breaker lifting device is mounted over the top Litting durice is Switchgear bang. The move on its rails in Seismic. avent the potentia lly slicke and impact which would then potentiall rail Stops relays mounted inside this_ Switc



SSEL LINE NO. 9018

Revision 2 Corrected, 6/28/91

Sheet 2 of 2.

# osvs_9018-1 Exhibit 5-1 (Cont'd)

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

Equipment ID Number 1- BDBB-231-0001A

3. <u>PROPOSED</u> METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Provide positive restraining a mechanism Lifting_ this device so that 11 in nt · 14 raile <lide in Seismin event ~~~ L or when not <u></u> in 11 60 ISSUE WORK Request

. b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

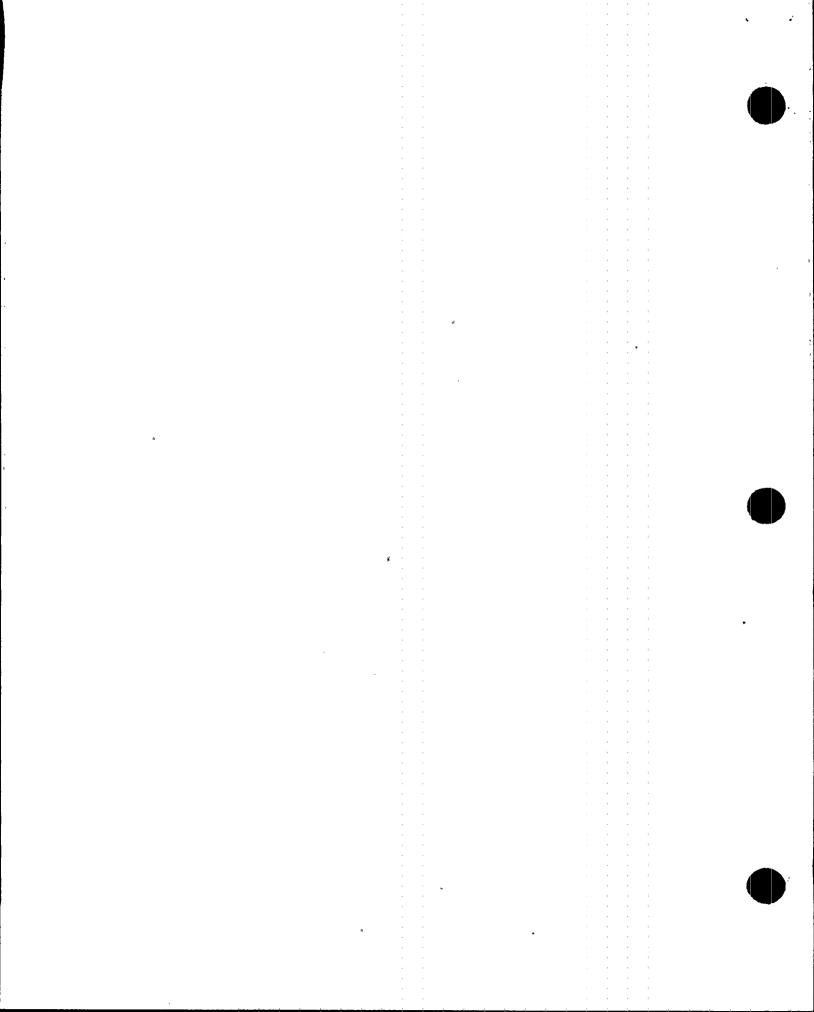
N/A ·		 <u> </u>	
		 	· · · · · · · · · · · · · · · · · · ·
·······	<u>.</u>	 	

### 4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

FARZIN BEIGI	Forzi Beigi	8-30-15
Print or Type Name	Signature ()	Date
JOHN O. DRON, PE	- the O. Dim	9/5-195
Print or Type Name	Signature	Date
Print or Type Name	Signature	Date
	5-11	



	SEL	LINE	NO.	9018	
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S

Revision 2 Corrected, 6/28/91

(05V5-9018-02)

Sheet 1 of 2

### Exhibit 5-1

# OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

1. OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION

Equipment ID Number 1-BOBB-Z31-0001A Equipment Class 02 - LVSG

Equipment Location: Building UL-RB Floor Elevation 621-3"

Room or Row/Columns_RI Base Elevation 621-3"

Equipment Description 480 VOLT SHUTDOWN BOARD IA

#### 2. OUTLIER ISSUE DEFINITION

Identify all the screening guidelines which are not met. a. (Check more than one if several guidelines could not be satisfied.)

Mechanical and Electrical Equipment Capacity vs. Dem Caveats Anchorage Seismic Interact Other

Other

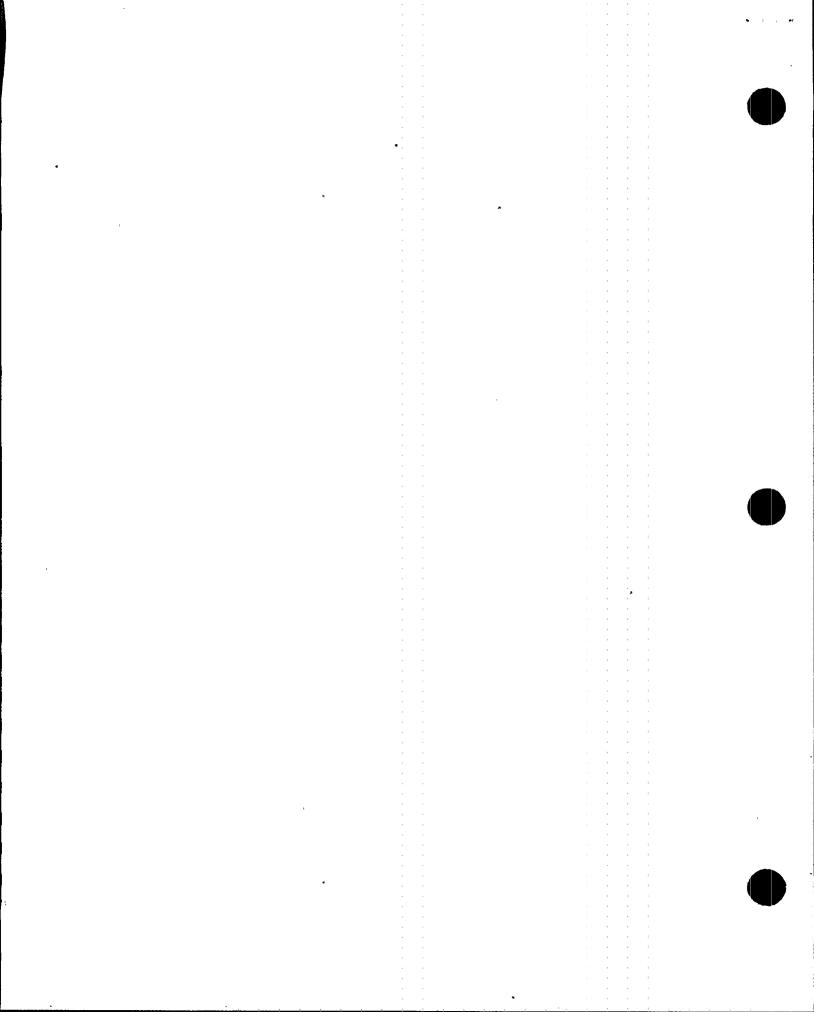
Capacity vs. Demand Caveats Anchorage Seismic Interaction Other	Shell Buckling ¹ Anchor Bolts and Embedment Anchorage Connections Flexibility of Attached Piping ¹ Other	
<u>Essential Relays</u> Capacity vs. Demand Mounting, Type, Location	 <u>Cable and Conduit Raceways</u> Inclusion Rules Other Seismic Performance Concerns Limited Analytical Review Other	

Tanks and Heat Exchangers

1 Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.

b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):

anchorace does not provide adequate Equipment for seismic induced LateraL ( Base anchorage to The embedded Lanc- c Lotted conjournet base 51



SSEL LINE NO. 9018

Revision 2 Corrected, 6/28/91

05V5-9018.	-2	
Exhibit	5-1	(Cont'd)

Sheet 2 of 2.

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

Equipment ID Number 1- BDBB-231-0001A

3. <u>PROPOSED</u> METHOD OF OUTLIER RESOLUTION (OPTIONAL)

a. Define proposed method(s) for resolving outlier.

Provide adequate anchorage for the equipment to resist shear loads. One option is to provide adequate amount of plug welds & the location of slotted holes in the hose of the equipment, similar to low voltage switchgears in whit 2.

. b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

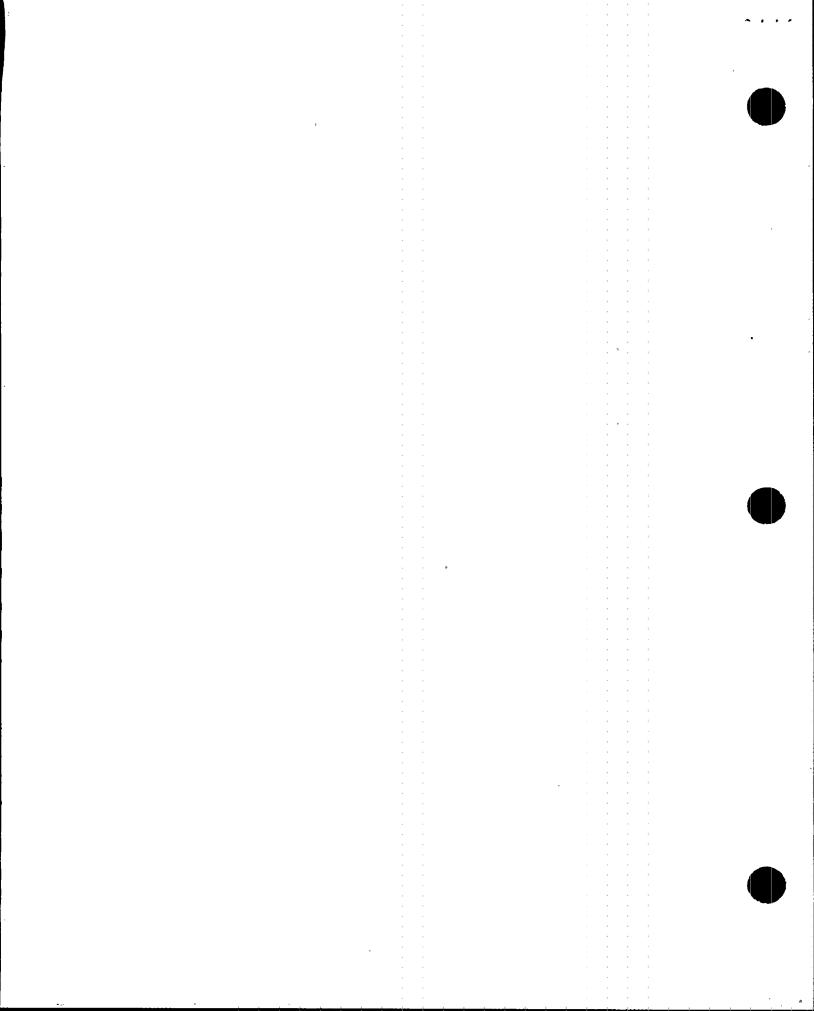
_____

4. CERTIFICATION:

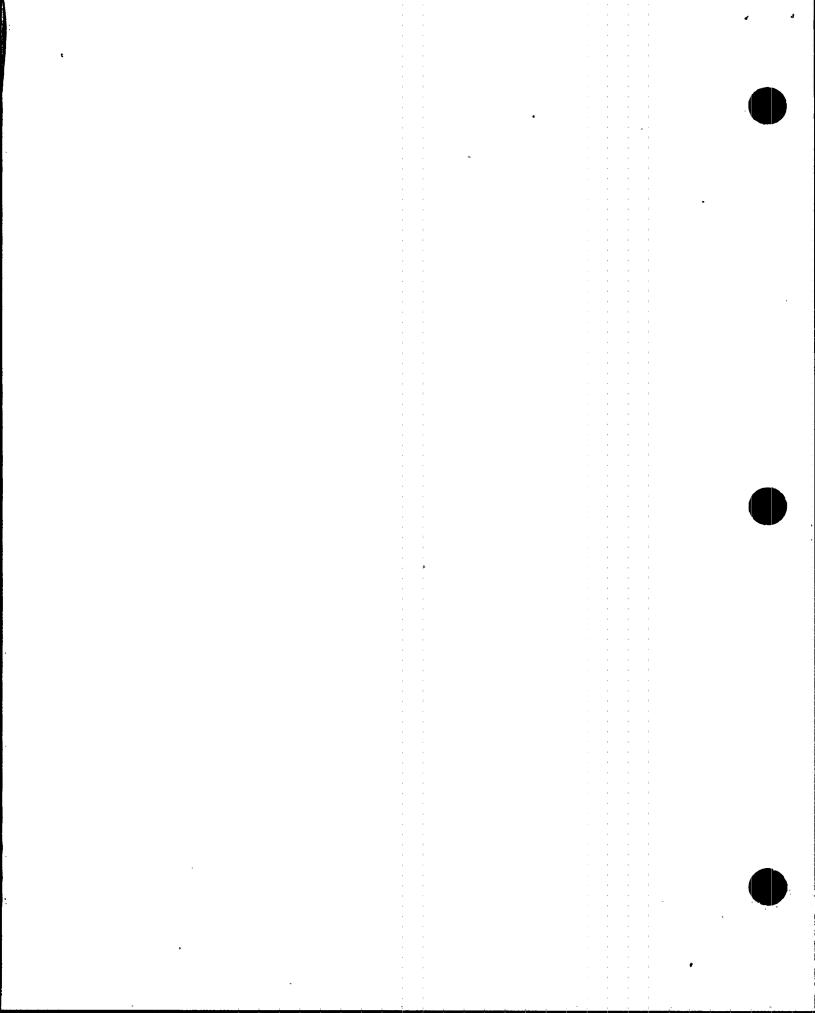
The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

FARZIN BEIGI	Force Bei	8-31-15
Print or Type Name	Signature ()	Date
JOHN Q DIZON, PE Print or Type Name	_ chho. Dim	9/5/95
Print or Type Name	Signature	Date'
Deich an Trac M		
Print or Type Name	Signature	Date
	5-11	



SEL Line No. 9014 Y (N) U Status SCREENING EVALUATION WORK SHEET (SEWS) Sheet 1 of 3 Equip. ID No. <u>O-BDAA-211-0000C</u> Equip. Class <u>03 - Medium Voltage Switchgear</u> Equipment Description 4KV SHDN BD C Location: Bldg. RB Floor El. 621-3" Room, Row/Col R-R13 Manufacturer, Model, Etc. (optional but recommended) <u>GE, Maane-Blast Great Break</u>er model HAH-476-250-10 SEISMIC CAPACITY VS DEMAND Elevation where equipment receives seismic input 621-3" 1. Y (DU. John @ EL 550 Elevation of seismic input below about 40' from grade 2. 3. Equipment has fundamental frequency above about 8 Hz O N U N/A (i) 4. Capacity based on: Existing Documentation DOC Bounding Spectrum BS 1.5 x Bounding Spectrum (ABS) GERS GERS 5. Demand based on: Ground Response Spectrum GRS 1.5 x Ground Response Spectrum AGS Conserv. Des. In-Str. Resp. Spec. CRS Realistic M-Ctr. In-Str. Resp. Spec. (RRS) (9) N U (2) * pes capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.) <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) 1. Equipment is included in earthquake experience () N U N/A (6) equipment class (Y) N U N/A 2. 2.4 KV to 4.16 KV rating Internally mounted potential and/or control power 3. transformers are restrained to prevent damage to or -N U (Y) N/A disconnection of contacts 4. Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together N/A (5) if they contain essential relays 5. Attached weight (excluding conduit) less than  $(\mathfrak{P})$ N U N/A (14).(1) about 100 lbs per cabinet bay N/A (14).(") Ø N Externally attached items rigidly anchored U 6. (Ŷ) N U N/A General configuration similar to ANSI C37.20 Standards 7. Cutouts in lower half of cabinet sheathing 8. less than 30% of width of side panel wide and less than 60% of width of side panel high excluding NGGGG N N N N U U U U N/A bus transfer compartment N/A All doors secured by latch or fastener 9. Anchorage adequate (See checklist below for details) N/A ( ) 10. N/A (15) Relays mounted on equipment evaluated A = 7.011. YN U N/A Have you looked for and found no other adverse concerns? 12. M U N/A Is the intent of all the caveats met for Bounding Spectrum?



# SSEL Line No. <u>9014</u>

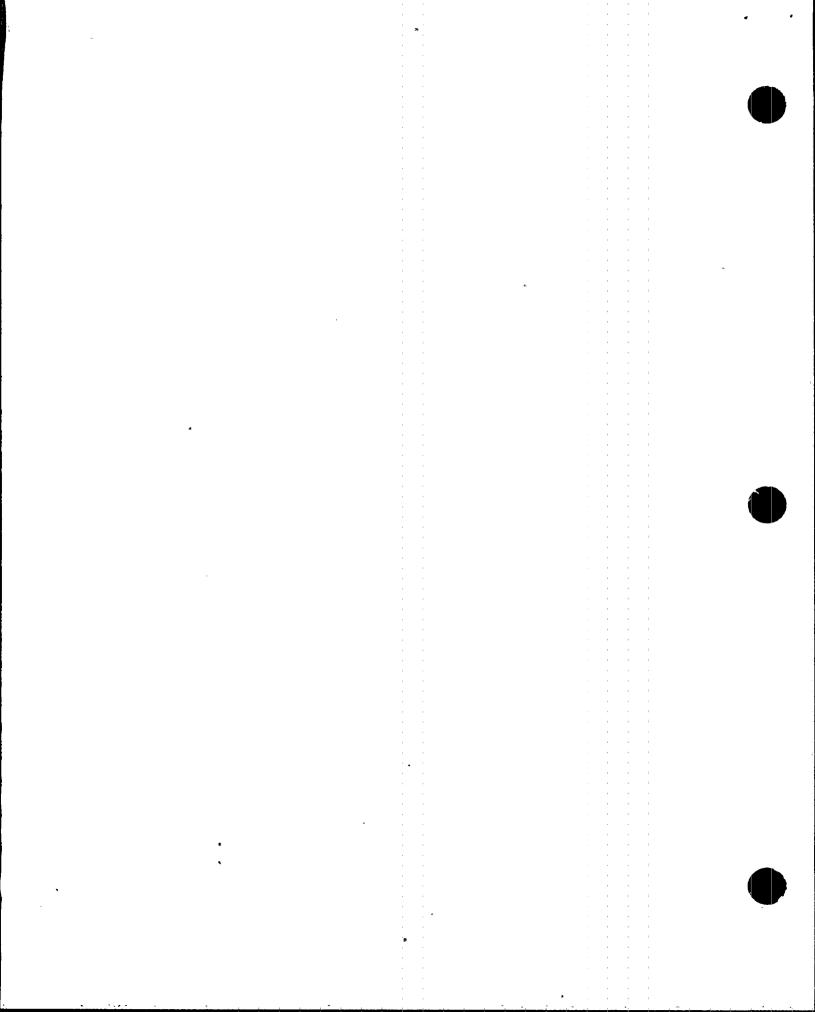
# SCREENING EVALUATION WORK SHEET (SEWS) Sheet 2 of 3

κ.

Equip. ID No. <u>0-BDAA-211-0000C</u> Equip. Class <u>03 - Medium Voltage Switchgear</u>

Equipment Description <u>4KV SHDN BD C</u>

met by	<u>S - GERS</u> (Identify with an asterisk (*) those caveats which intent without meeting the specific wording of the caveat plain the reason for this conclusion in the COMMENTS section Equipment is included in generic seismic testing	rule	)	ı)	
2. 3. 4.	equipment class Meets all Bounding Spectrum caveats Floor-mounted enclosure The switchgear is not a specially-designed type	Y Y Y Y	N N N N	U U U U	N/A N/A N/A
5. 6.	Circuit breakers are truck-mounted type, not jack-up or vertical-lift Maximum weight per vertical section less than	Ŷ	N	U	N/A N/A
7. 8.	5000 lbs Base anchorage adequate (See checklist below for details) Relays used for breaker function are not on	Y Y	N N	U U	N/A N/A
9.	"Low Ruggedness Relays" list Relay evaluations completed for all relays that are	Y	N	U	N/A
10.	essential to other equipment or cause unacceptable lockout For 2.5g level GERS, vertical restraint prevents	Y		U	N/A
11.	circuit breaker uplift For 2.5g level GERS, circuit break arc chutes are restrained horizontally	Y Y	N N	U U	N/A N/A
12.	For 2.5g level GERS, a Beaver Type Z relay is not used in Westinghouse MV switchgear for the "Y" anti-pump relay	Y	N	U	N/A
13.	Separate evaluation of breaker racking mechanism completed; seismic positioner or sufficient side-to-side restraints used	Y	N		N/A
14.	<u>All</u> adjacent cabinets or sections of multi-bay assemblies bolted together intent of all the caveats met for GERS?		N		N/A Y N U N/A
ANCHOR/	<u>\GE</u>				
1. 2.	Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP	Ø	N N	U	N/A (3, 8) N/A
3. 4.	Sizes and locations of anchors determined Anchorage installation adequate, e.g., weld quality and length, nuts and washers, expansion	Ø	N	U	N/A (8)
5.	anchor tightness Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing,	$\mathcal{O}$	N	U	N/A
6.	free-edge distance, concrete strength/condition, and concrete cracking For bolted anchorages, gap under base less than	Y	N	U	N/A
	1/4-inch	Y	N	ប	N/A



SEL Line No. 9014

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SCREENING EVALUATION WORK SHEET (SEWS)

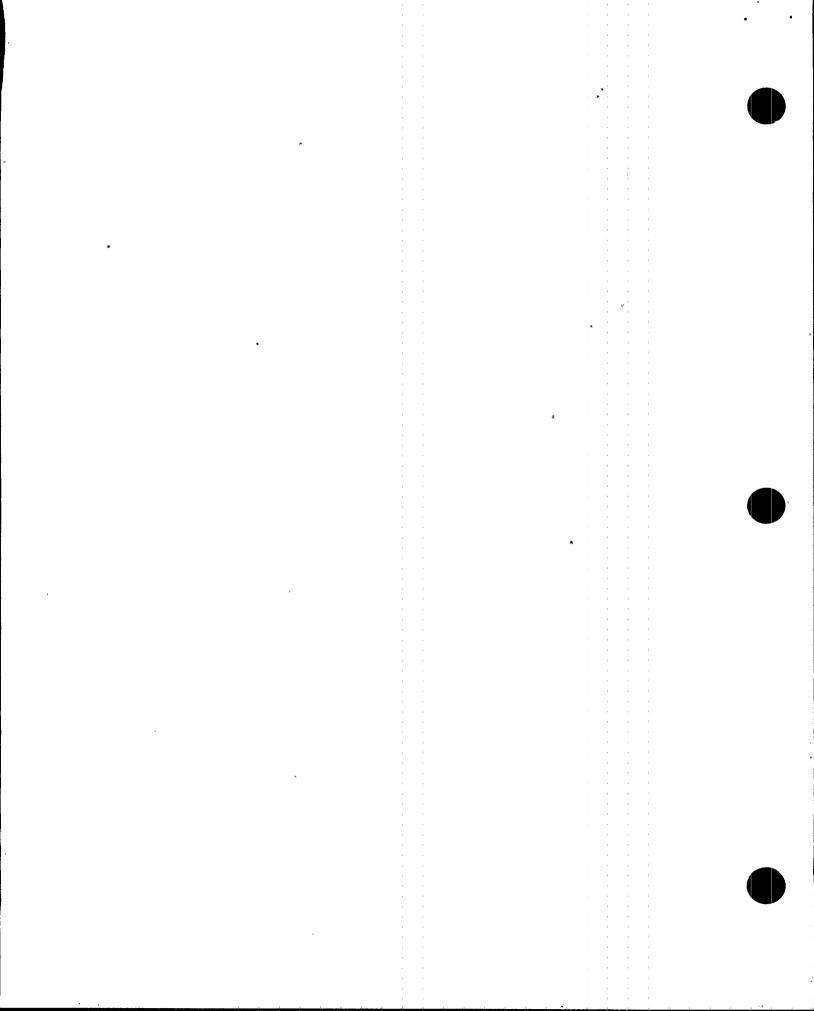
Sheet 3 of 3

1 Nr. 41 A1202-1, RS

Equip. ID No. 0-BDAA-211-0000C Equip. Class 03 - Medium Voltage Switchgear Equipment Description <u>4KV SHDN BD C</u> ANCHORAGE (Cont'd) Factors affecting essential relays considered: gap 7. under base, capacity reduction for expansion anchors (Y) N U N/A Base has adequate stiffness and effect of prying 8. action on anchors considered  $(\mathcal{D})$ N U N/A Strength of equipment base and load path 9. () N .U N/A to CG adequate Embedded steel, grout pad or large concrete 10. (Y) N' U N/A pad adequacy evaluated Are anchorage requirements met? () N U (3) INTERACTION EFFECTS Soft targets free from impact by nearby 1.  $\bigcirc$  N U N/A (12) equipment or structures 2. If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures 3. Attached lines have adequate flexibility Overhead equipment or distribution systems are not likely to collapse (ジ) N U N/A Y (ジ) U N/A (いう) Have you looked for and found no other adverse concerns? 5. Is equipment free of interaction effects? YODU (13) ( bossely attached Y(NU (... breaker wrench to the bay NO.3 - potential ralay chatter concern - <u>outlier</u> 105VS-90 IS EQUIPMENT SEISMICALLY ADEQUATE? Y(N)U (ιз) <u>COMMENTS</u> (05VS-9014) For notes 1-6 \$ 8-15 see SEWS for O-BDAA-211-0000A, (SSEL NO. 9012). These two equipment are similar in every respect except that the back side of this equipment is fillet welded to the entred plate by total of approx. 72" of 1/3" weld (24 baye x 2weld/ x 1.5"/weld) Vs. Doard A which has 192" of weld. However, the archovage evaluation performed in SEWS for Board A (Note #3) considered 32.5" welds in tension, and 120" welds for shear mistance Calculation showed a F.s. > 11. against weld striss allowables. Also, The plug welds provided in the front holes of this S.G. (SSELA gold) do not fully cover the entire slotted hole opening on the bottom of the s.c. born... Valuated by: <u>Force Berg</u> Date: <u>7-12-95</u> <u>color O. Dizm</u> <u>9/18/15</u> This is also accepted in fight of large margin and conservative nature

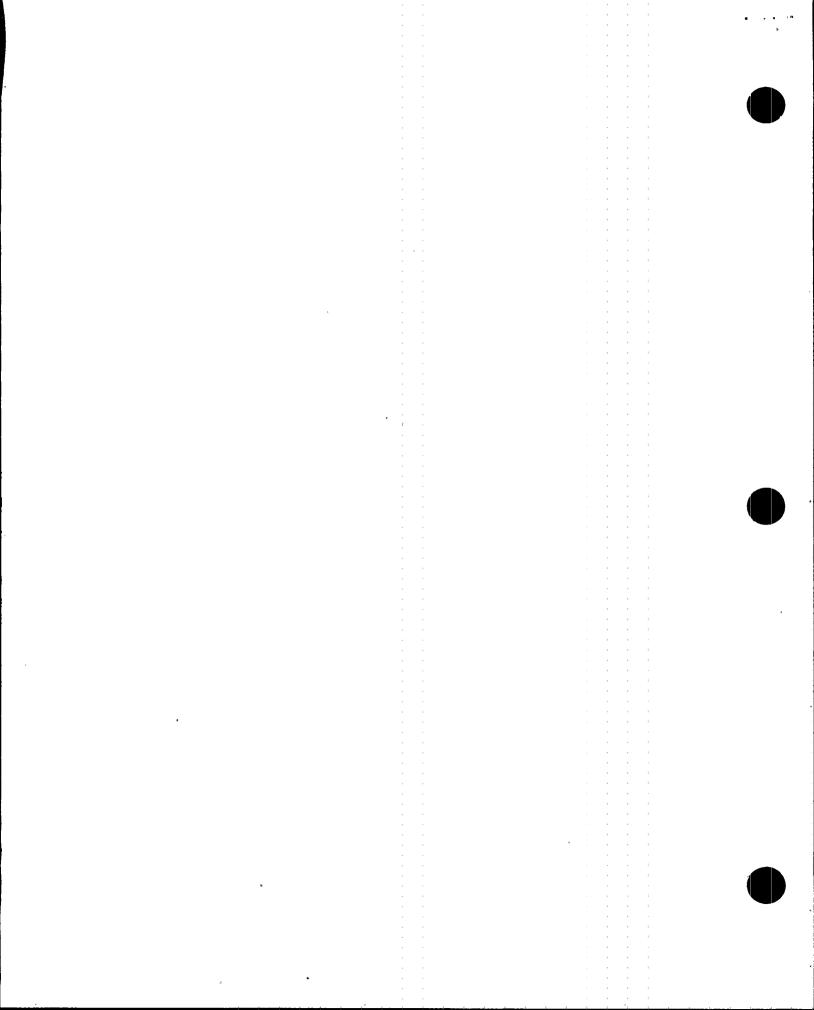
of the anchorage cell. performed as referenced above. all

Block walls in the own are realised por TER TO-IL program. (i



SSEL Line No. <u>9014</u>	Status Y N U	
	Sheet 1 of 1	
IPEEE SUPPLEMENTAL SCREENING I	EVALUATION WORKSHEET	
Equip. ID No. <u>O-BDAA-211-0000C</u> Equip. Class <u>03</u>	- Medium Voltage Switchgear	
Equipment Description <u>4KV SHDN BD C</u>		
RELAY WALKDOWN	•	
<ol> <li>Does spot check of essential relays indicate relays present and properly mounted?</li> </ol>	Y N U N/A	
2. Are essential relays required to function during earthquake screened out?	YNU 🕅	
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.		
3. No other relay concerns?	Y (N) U N/A (')	
Requirements for relays satisfied?	YNU	<b>(</b> 1)
SYSTEM INTERACTION EFFECTS		
1. No potential sources could flood or spill onto cabinet?	(Ŷ) N U N/A	
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSAT sheets if necessary)	TISFACTORY (Use additional	
1) Breaken wrench is attached loosely to In a seismic event this wrench will "bang	the front of the buy NO 3	۶.
course relays in this bay to chatter	- <u>outlier</u> (05V5-9014)	
IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, YES NO	, EXCLUDING RELAY CHATTER?	

IS EQUIPMENT F	REE OF	NEED FOR	FURTHER	RELAY	CHATTER	INVESTIGATION?	YES	_ NO_	(r)
Evaluated by:		For	y <u>i Be</u>	en et interested and the second se	. <u>.</u>	Date: _	7-12-	<u>-9( '</u>	
Evaluated by:		- die	J. Diz	$\mathcal{D}$		Date: _	9/18/9	·	



SSEL	Line No. $9014$ (OSVS - 9014) Sheet 1 of 2
	OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
1.	OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION
	Equipment ID Number <u>D-BDAA-211-0000</u> C Equipment Class <u>03 - MVSG</u>
2	Equipment Location: Bldg. <u>UZ, RB</u> Floor Elevation <u>G21-3</u>
	Room or Row/Column <u>R-R13</u> Base Elevation <u>621-3</u>
	Equipment Description <u>4 KV SHDN BD C</u>
2.	OUTLIER ISSUE DEFINITION
	a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)
	Mechanical and       Tanks and Heat Exchangers         Electrical Equipment       Shell Buckling*         Capacity vs. Demand       Anchor Bolts and Embedment         Caveats       Anchor Bolts and Embedment         Anchorage       Flexibility of Attached Piping*         Other       Other
	Essential Relays Capacity vs. Demand Mounting, Type, LocationCable and Conduit Raceways 
	* Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.
	b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):
	A breaker racking whench is loosely attached
	to hay No. 3 of This switchgear. In a seismic
	event this wrench will interact with the panel
	it is attached to (it will "bang" into it]. This
	impact by the wrench could chatter relays
	in this bag.
	. <b>U</b> .

P

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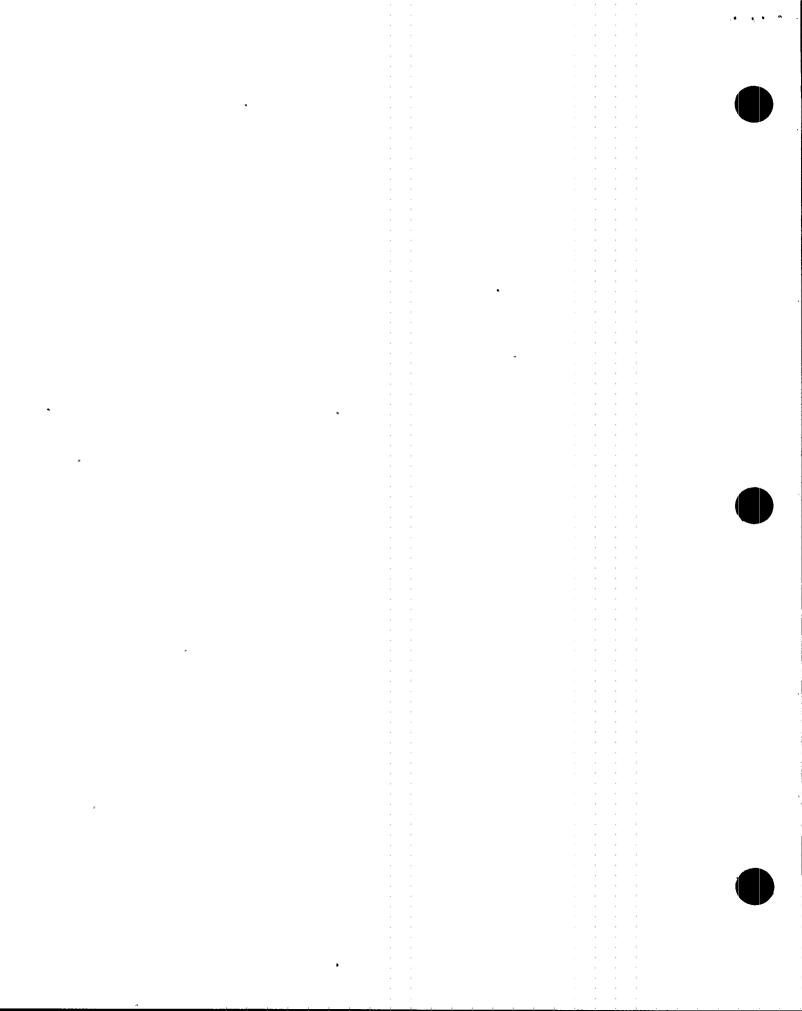
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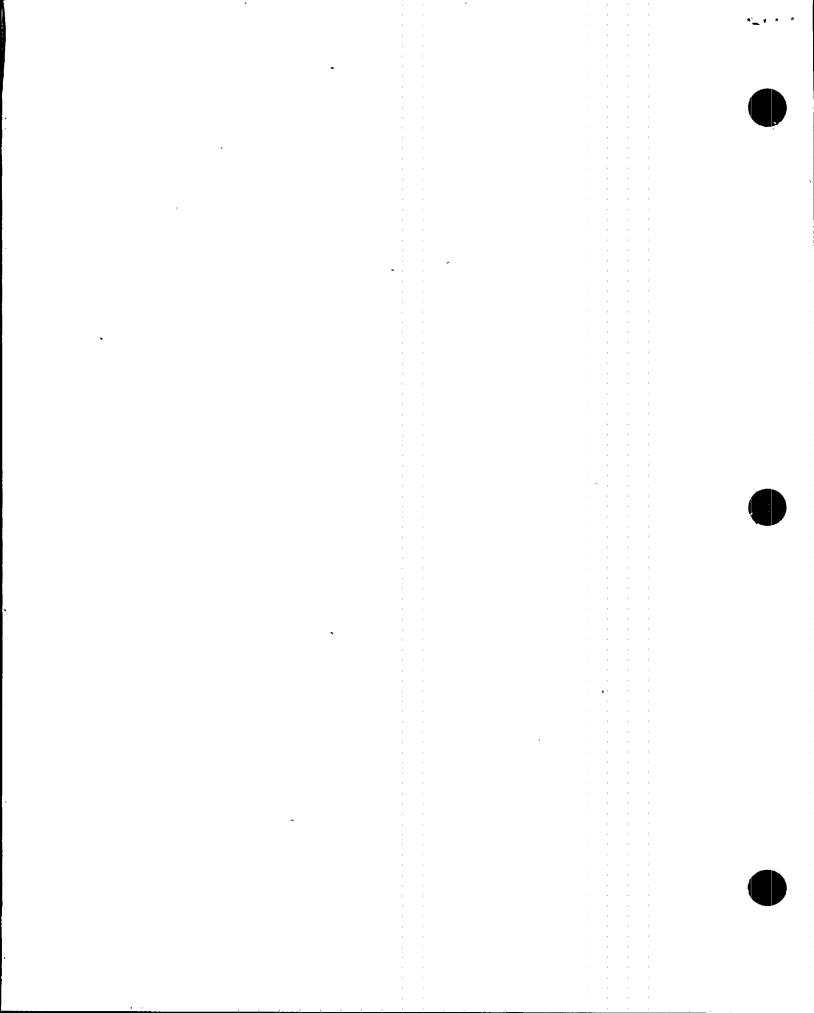
SSEL	Line	No. <u>9014</u> Sheet 2 of 2
		OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
		Equipment ID Number <u>0-BDAA-211-0000C</u>
3.	<u>PROP</u>	OSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)
~	a.	Define proposed method(s) for resolving outlier.
• ·	Ь.	<u>If the relay review identifies this bay to include</u> <u>essential relays</u> . Then the wrench neede to be <u>removed</u> . from the bay or positively attached to <u>it such that any interaction would be precluded</u> . Provide information needed to implement proposed method(s) for bissue resolving outlier (e.g., estimate of fundamental frequency). <u>N/A</u>
,		

4. CERTIFICATION:

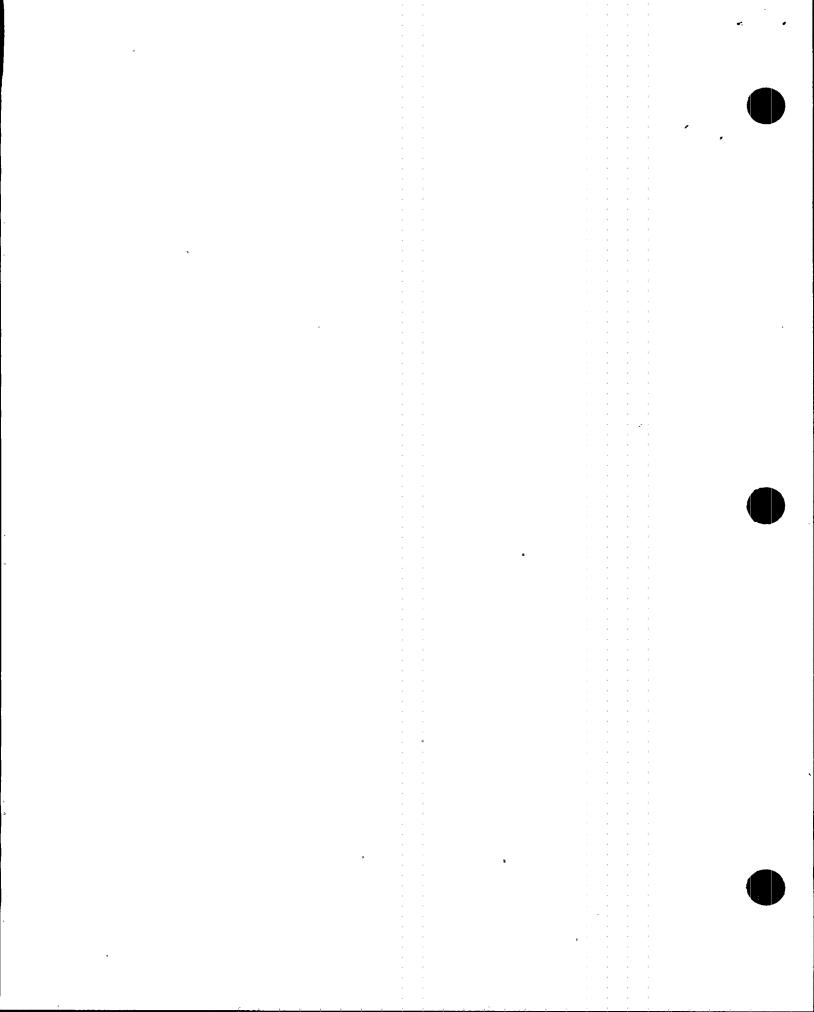
The information on this OSVS is; to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

FARZIN BEIGI	- Farzi Beri	9-12-95
<u>FARZIN REIGI</u> Print or Type Name	Signature	Date
JOHN O. DIZON PE	dan O. Diran	9/12/95
rint or Type Name	Signature	Date
Print or Type Name	Signature	Date



1017205 SSEL Line No. 9012 Y (N) Status U SCREENING EVALUATION WORK SHEET (SEWS) Sheet 1 of 3'qEquip. ID No. 0-BDAA-211-0000A Equip. Class 03 - Medium Voltage Switchgear Equipment Description 4KV SHDN BD A Location: Bldg. RB Floor El. 621-3" Room, Row/Col R-R2 Manufacturer, Model, Etc. (optional but recommended) GE Circuit Breaker Type rease-Blast MAH - 4.76 - 250-15 SEISMIC CAPACITY VS DEMAND 621.3" Elevation where equipment receives seismic input 1. Elevation of seismic input below about 40' from grade YODU 2. 7 raise 3 561' 3. Equipment has fundamental frequency above about 8 Hz (Y) N U N/A(i)Capacity based on: Existing Documentation DOC 4. Bounding Spectrum BS 1.5 x Bounding Spectrum ABS GERS GERS 5. Demand based on: Ground Response Spectrum GRS 1.5 x Ground Response Spectrum AGS Conserv. Des. In-Str. Resp. Spec. CRS Realistic M-Ctr. In-Str. Resp. Spec. (RRS) Does capacity exceed demand? (Indicate at right (*) and in ĵ)n u (:) ☆ <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.) <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) Equipment is included in earthquake experience 1. equipment class N U N/A (~) 2.4 KV to 4.16 KV rating 2. Ν U N/A 3. Internally mounted potential and/or control power transformers are restrained to prevent damage to or (Ŷ) U N/A disconnection of contacts Ν 4. Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together (Y) if they contain essential relays N U N/A (5) 5. Attached weight (excluding conduit) less than N/A(1+),(")  $\oslash$ U Ν about 100 lbs per cabinet bay Ø N/A(14)(11)N U Externally attached items rigidly anchored 6. (Y) N U N/A 7. General configuration similar to ANSI C37.20 Standards Cutouts in lower half of cabinet sheathing less than 30% of width of side panel wide and 8. less than 60% of width of side panel high excluding Ϋ́́Ν U N/A bus transfer compartment Y) N U N/A Y) N U N/A(3) 9. All doors secured by latch or fastener 10. Anchorage adequate (See checklist below for details) WNUN/A(15) Relays mounted on equipment evaluated Ar = 7.011. (Y) N' U N/A 12. Have you looked for and found no other adverse concerns? (Y)N U N/AIs the intent of all the caveats met for Bounding Spectrum?



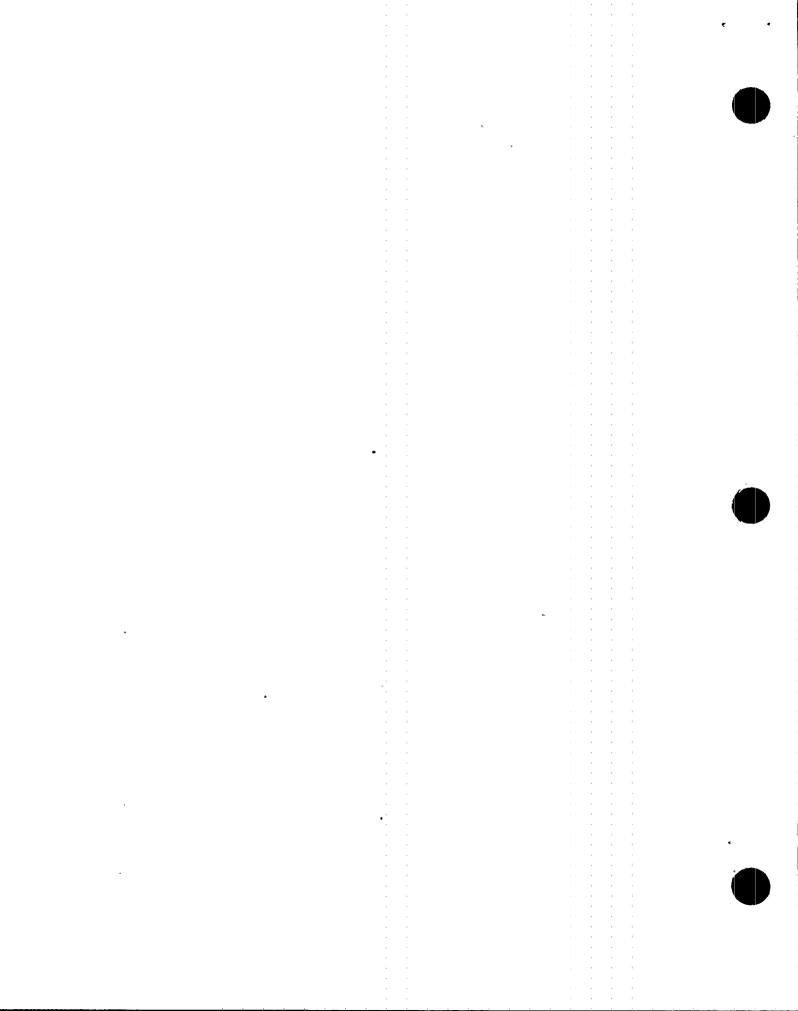
SSEL Line No. <u>9012</u>

## SCREENING EVALUATION WORK SHEET (SEWS) . Sheet 2 of Z q

Equip. ID No. <u>O-BDAA-211-0000A</u> Equip. Class <u>03 - Medium Voltage Switchgear</u>

Equipment Description 4KV SHDN BD A

<u>CAVEATS - GERS</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) Equipment is included in generic seismic testing 1. equipment class Y N U 'N/A` Meets all Bounding Spectrum caveats 2. Y Ν U N/A 3. Floor-mounted enclosure U Y  $\sim N$ N/A 4. The switchgear is not a specially-designed type Y Ν U N/A 5. Circuit breakers are truck-mounted type, not jack-up or vertical-lift Y Ν U N/A 6. Maximum weight per vertical section less than 5000 lbs U N/A Y Ν 7. Base anchorage adequate (See checklist below for details) Y Ν U N/A Relays used for breaker function are not on "Low Ruggedness Relays" list 8. Y Ν U N/A 9. Relay evaluations completed for all relays that are essential to other equipment or cause unacceptable lockout Y N U N/A For 2.5g level GERS, vertical restraint prevents 10. circuit breaker uplift U N/A Y Ν For 2.5g level GERS, circuit break arc chutes are 11. restrained horizontally N U N/A Y 12. For 2.5g level GERS, a Beaver Type Z relay is not used in Westinghouse MV switchgear for the "Y" anti-pump relay Y Ν U N/A 13. Separate evaluation of breaker racking mechanism completed; seismic positioner or sufficient side-to-side restraints used N/A U Y Ν All adjacent cabinets or sections of multi-bay 14. assemblies bolted together Y Ν U Is the intent of all the caveats met for GERS? NU/Ń/A) ANCHORAGE 1. Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP (Plug & Filled we (4)) N U N/A (8,3) 2. N U N/A 3. Sizes and locations of anchors determined Ν U N/A(8) 4. Anchorage installation adequate, e.g., weld quality and length, nuts and washers, expansion (Ÿ) N U anchor tightness N/A 5. Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking Y Ν б. For bolted anchorages, gap under base less than 1/4-inch Ν (N/)



SSEL Line No. 9012

SCREENING EVALUATION WORK SHEET (SEWS)

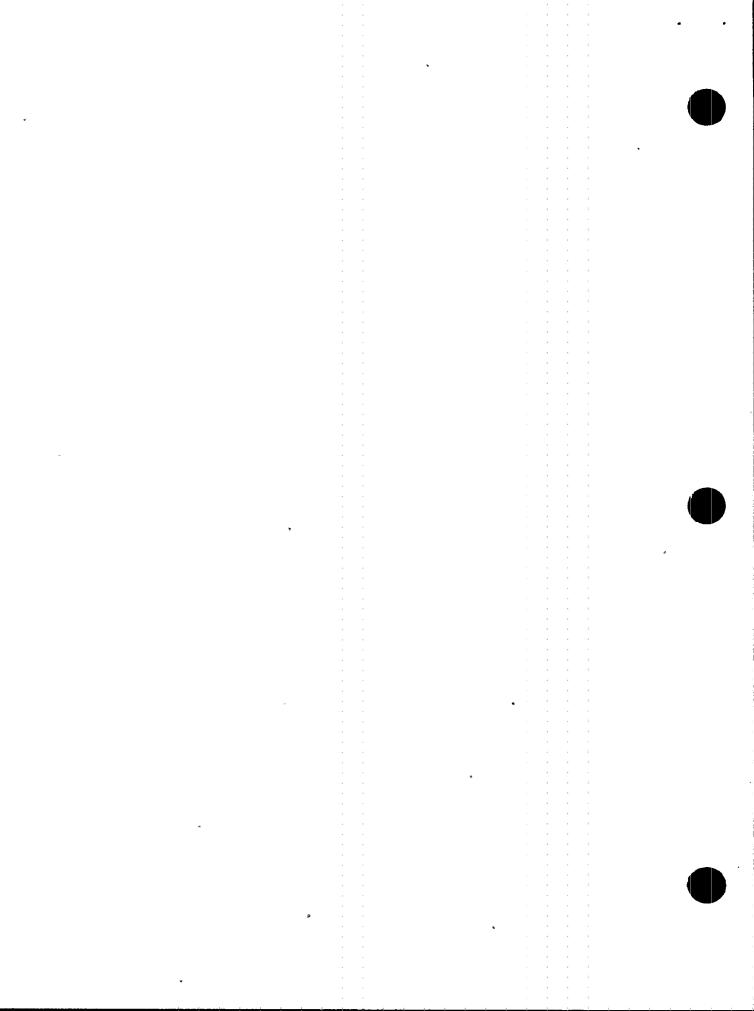
Sheet 3 of  $\mathcal{X}_q$ 

Equip. ID No. <u>0-BDAA-211-0000A</u> Equip. Class <u>03 - Medium Voltage Switchgear</u>				
Equipment Description _4KV_SHDN_BD_A				
ANCHORAGE (Cont'd)				
<ol><li>Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors</li></ol>	() N U	N/A .		
<ol> <li>Base has adequate stiffness and effect of prying action on anchors considered</li> </ol>	(Y) N U	N		
9. Strength of equipment base and load path to CG adequate	(Y) N U			
<ol> <li>Embedded steel, grout pad or large concrete pad adequacy evaluated</li> </ol>	-	-		
Are anchorage requirements met?		N/A () N U (3)		
<ul> <li><u>INTERACTION EFFECTS</u></li> <li>1. Soft targets free from impact by nearby equipment or structures</li> <li>2. If equipment contains sensitive relays, equipment</li> </ul>		N/A (12)		
<pre>free from all impact by nearby equipment or structures . 3. Attached lines have adequate flexibility</pre>	:. У N U О N U	N/A (7) N/A (9)		
<ol> <li>Overhead equipment or distribution systems are not likely to collapse</li> <li>Have you looked for and found no other adverse concerns?</li> <li>Is equipment free of interaction effects?</li> </ol>	ΨΝU ΥŒU	N/A N/A (いる) Y @ U (マ)		
IS EQUIPMENT SEISMICALLY ADEQUATE?		Y @ U (13)		

### COMMENTS

1) The heavy circuit breakers in This med-voltage Switchgen are horizontally tacked and Their weight rests on the floor Mechanical jack science scame the breakers to the rear of the enclosure. The lowest frequency associated with the rigidity of the breakers in racked-in position is estimated to be 22.9 HZ based on a Conservative Calculation (Ref Calc. CD. - Qo211 - 89 0151). Test results of a 2.3 unit sections of switchgean. shared that the side - to-side response is often law than 8 HZ, while the front - to-back response is greater than 8 HZ (Ref. EPRI Report TR-102180, March 1993). However, since all individual sections of this switch gear are bolted together, The side - to- side frequency would at least match that of the front - to-back the side frequency would at least match that the first - to-back the side frequency would at least match that the front - to-back the side frequency would at least match that the front - to-back the side frequency would at least match that the front - to-back the side frequency would at least match that the front - to-back the the side frequency would at least match that the front - to-back the frequency of the switch gear would be a suitch gear would be a suitch frequency would be a suitch gear for the front - to back the frequency of the switch gear would be the frequency is greater than 8 HZ.

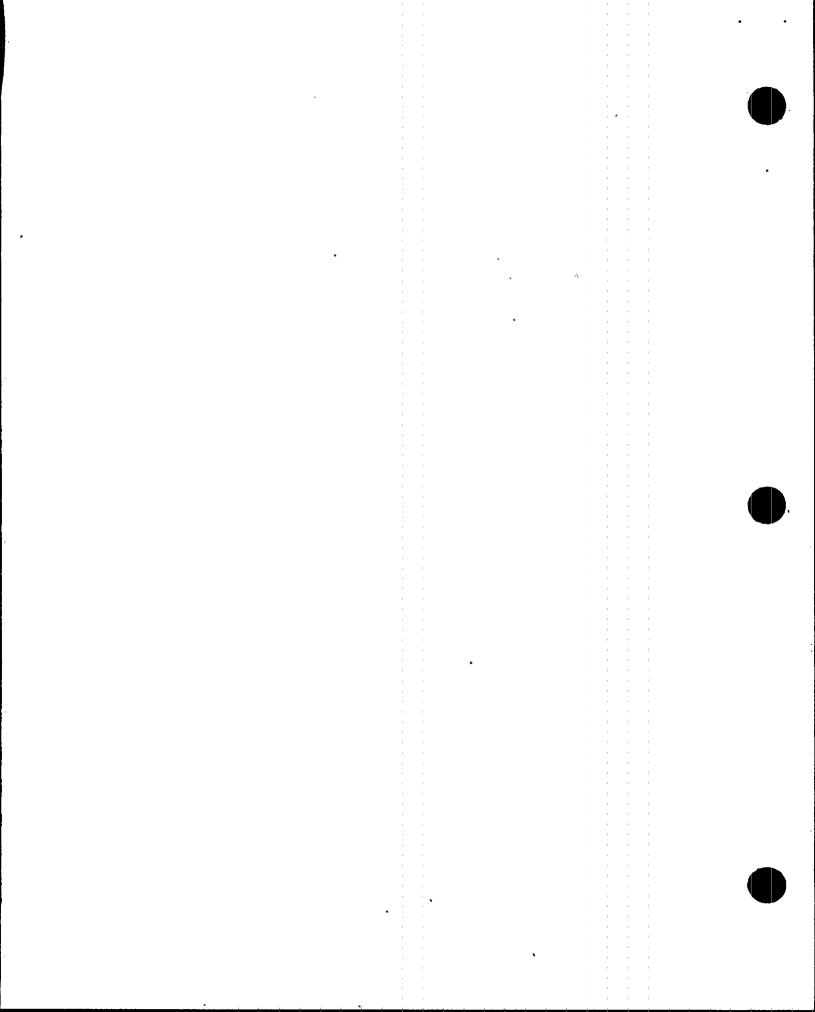
Date: <u>9-12-95</u> toni D galuated by:

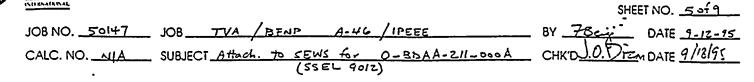


SHEET NO. 4 of 9 JOB NO. 50147 JOB TVA BENP A-46 / IPEEE BY 7 Being DATE 9-12-95 CALC. NO. NIA SUBJECT Attach. to SEWS for 3-BDAA-211-000A CHKD. ADDIZ DATE 1/18/35 (SSEL 9012)

2) Per Calc. CD-Q0000-940339, FIG. B.I, the 1.5 × Bounding spectrum is exceeded by the In-structure spectra at EL. 621 of RB in the frequency range of 5.0 Hz to 7 Hz. Since, the lowest natural frequency of this switchgeer is greater than 7 Hz, the <u>intent</u> of GIP seismic capacity VS. Demand criteria is met

3) Anchorage Evaluation = Wt. = 60 K (Ref. DWG. 45N 326) Front DBE Horiz. Accel. @ f=BHE an = 1.0 g (RB, EL. 621, 5% Damping. DS2) QC.G. (Ref. DWG. 451326) * av= 0.16g (ZPA) PLugweld (Total of 48) 1/8 4 012 cc. Factor to account for Med. ctr. Fh = 60 × 1.25 × 1.0g = 75 K spectr RG ..... z!" Fv = 60 x 1.25 x 0.16g = 12K 73 % - Weld properties Perimeter of Hole = TT (5/8) + (1-5/8) × 2 = 2.71 Long slotted hole @ Case Equivalent well length (for shear) a front = 2.71" x 48 = 130" Equivalent well length (for tension, a front = 120" = 32.5" Knock down feetor for pour workmenship . Der GIP, App. C Equivalent weld length & back = 24 x Z x 4" = 192" (down of govern) - st of t'welds per Bay





Note 3 (cont'd)  
- Weld allowables:  

$$F_{W_{S}} = 30.6^{145i} \times \frac{1}{8} \times 0.707 \times 130^{7} = 352.6^{4}$$

$$F_{W_T} = 30.6^{K_{S}} \times \frac{1}{8}^{n} \times 0.707 \times 32.5^{n} = 87.9^{n}$$

Weld seiemic forces (Moment about A)  

$$OTM = (75 \times 38'') + (12 \times (73 \times -17)) - (60 \times (73 \times -17)) = 138$$
 K-in

$$F_{Y} = \frac{./3 \, 8^{\kappa^{*}}}{73.5-4^{*}} + \frac{.12^{\kappa}}{2} = 8.0^{\kappa}$$

$$F_{X} = \frac{.75^{\kappa}}{2} = 37.5^{\kappa}$$

$$F_{Z_{1}} = F_{X} = 37.5^{\kappa}$$

$$F_{Z_{2}} = \frac{.75^{\kappa}(.73.5-.21)}{.73.5-.4^{\kappa}} = 56.7^{\kappa}$$

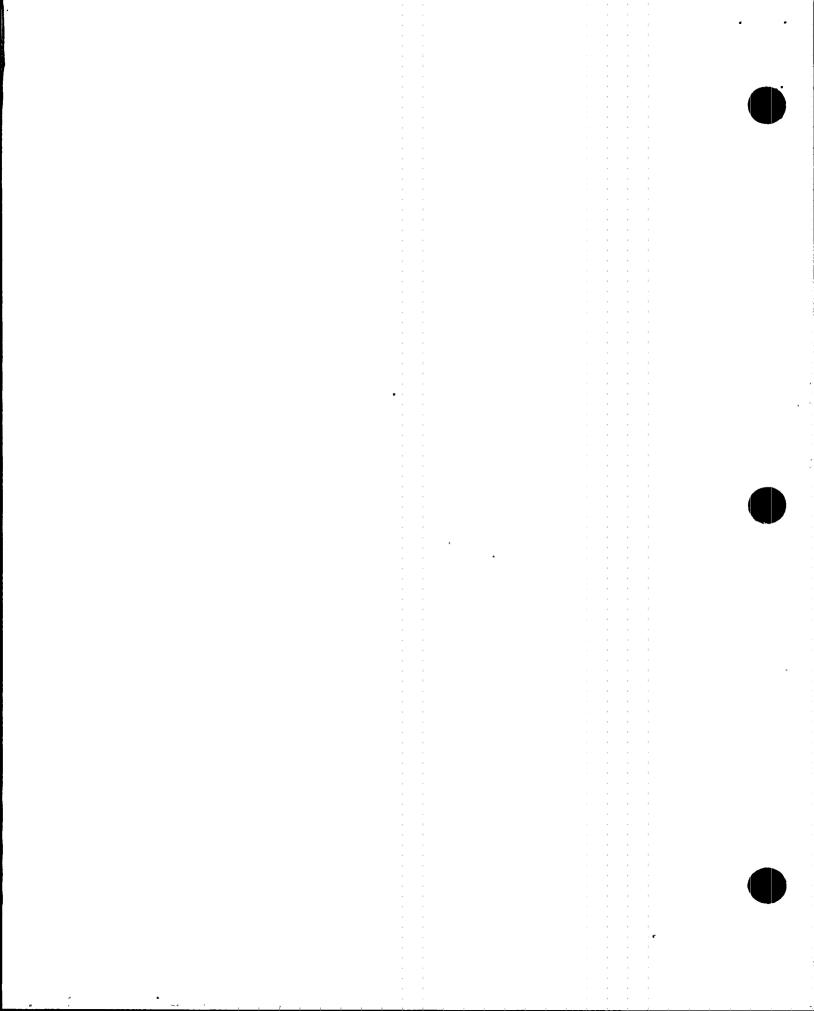
$$F_{Z_{2}} = \frac{.75^{\kappa}(.73.5-.21)}{.73.5-.4^{\kappa}} = 56.7^{\kappa}$$

- Shear-Tension Interaction:

$$\left(\frac{F_{Y}}{F_{W_{T}}}\right)^{2} \left(\frac{\left[F_{x}^{+}+f_{z}^{+}\right]^{y_{z}}}{F_{W_{z}}}\right)^{2} \leq 1.0$$

$$\left(-\frac{8}{87.9^{\mu}}\right)^{2} \left(\frac{101^{\kappa}}{352.6^{\kappa}}\right)^{2} = 0.09 \quad \langle\langle 1.0 \rangle$$

o's Anchorage Adaquate



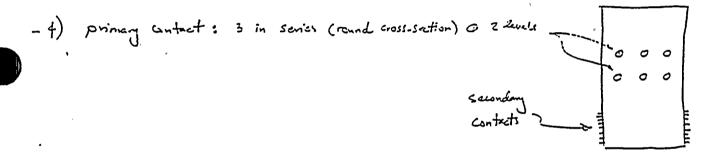
SHEET NO. 6 4 9 JOB NO. 50147 JOB TVA BENE A-46 /IPEEE -Peris DATE _7-12-95 CALC. NO. JIA SUBJECT Attachment to SENS G- D-BDAA-211-0000A CHKD10.1) Zon DATE 4/18/95 (SSEL NO. 9012)

SSEL: 9012

10: 0-BDAA-211-000A

(4 KV Shutdown Bonned)

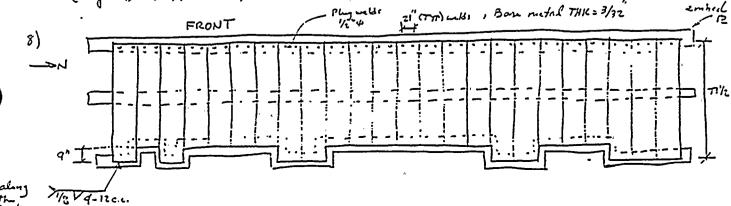
Breaker Type : GE Magne'-blast circuit breaker Type MAH-4.76-250-1D

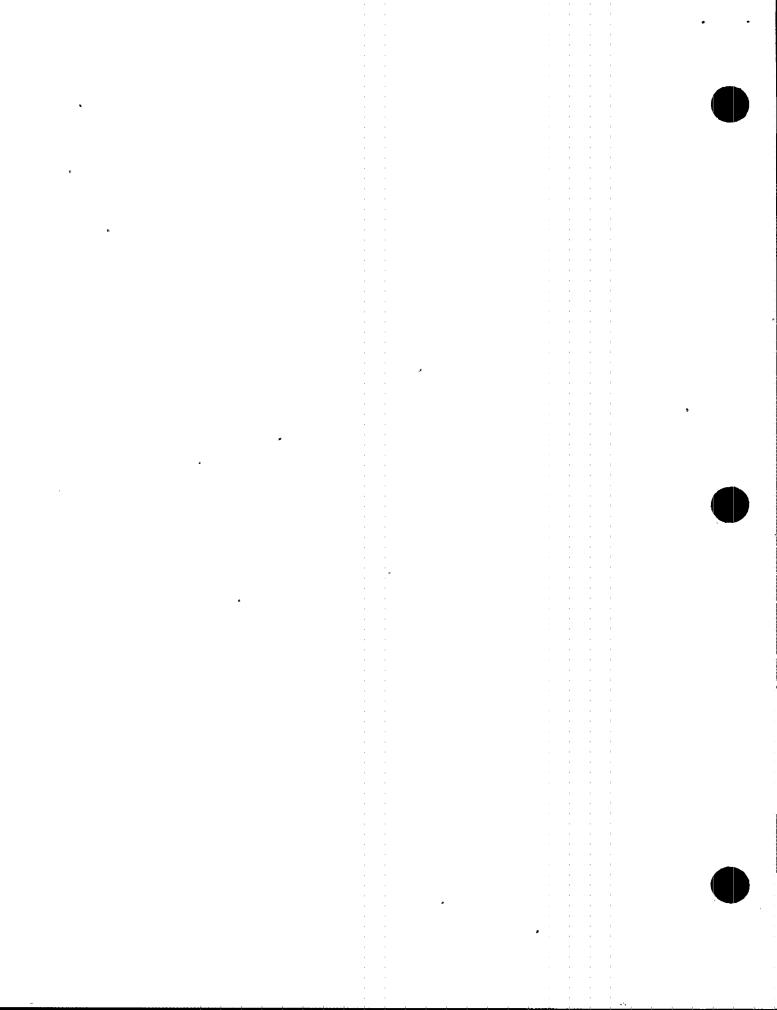


-5) 24 Panele, all bolted together, with 5 rows of 1/4"to 1/2 & along the high of cach panel (~15" spacing). Also each "adjacent panel is bolted to each other @ top by 2" x 3/11' metal strip that are bolted heavily to the panels. -6) Size : 731/2 (D) x 26 (W) x 90 (H) ~@ 9 panels

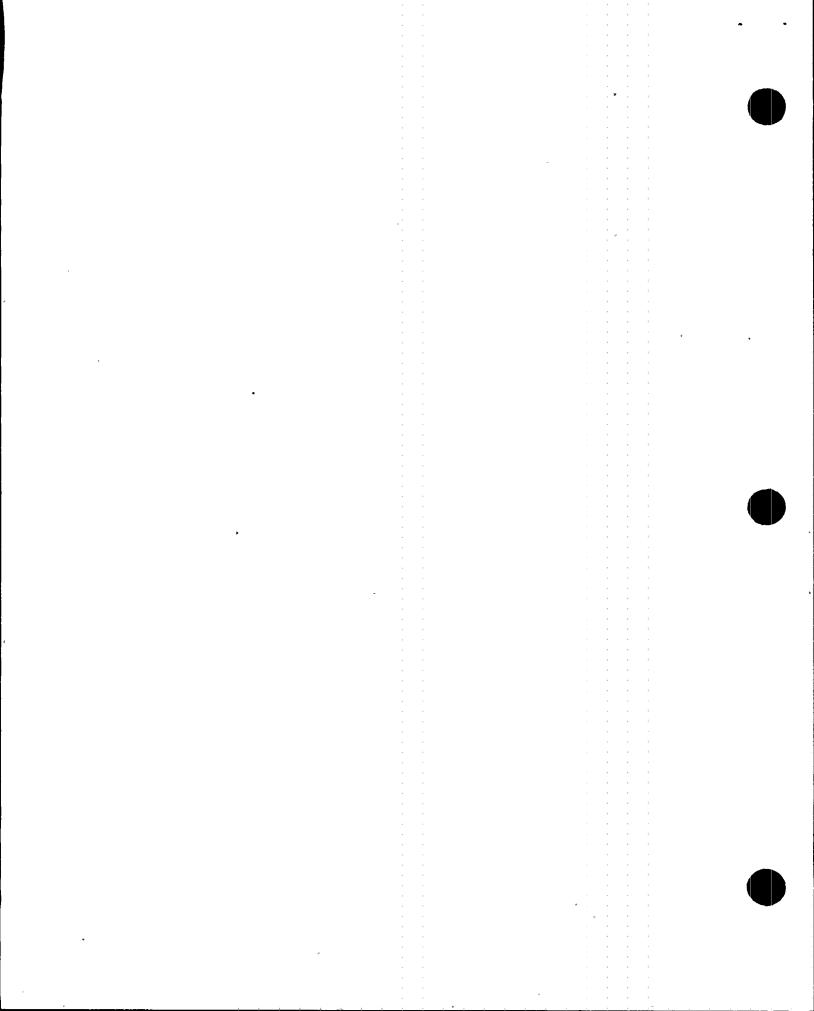
-6) 5120 : 731/2 (D) x 26 (W) x 90 (H) -@9 panels 641/2 (D) x 26 (W) X 90 (H) -@15 panels

-7) Blockwalls in the vicinity of Board qualified per IEB SO-11 program (Ref. DNG. 4INIZOI-1, Wall Nos. 28 and 35)



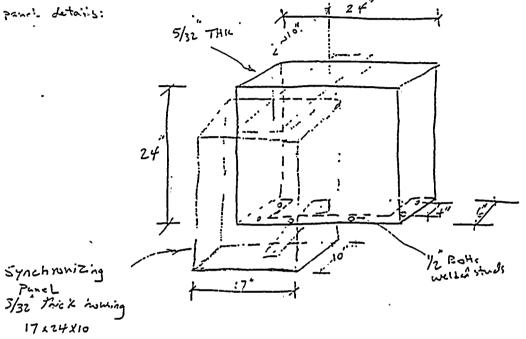


HEET NO. <u>7 of 9</u> A-46 /IPEES 3. JOB NO. _____ JOB ____ BENC DATE 9-12-15 + to SENS G- 0- > DAL-211-0000A CHKD 1.1.1)17-CALC. NO. ____A SUBJECT Attachme (SSEL 9012) 9012 (cont'd) 9) Top entry conduct are rod hung -adequate Theribility 10) Consider 2-3" (p, 1-2" (p, 1-"/2" (p, 1-3/4" ) < condicil u/ 4" span e top of each boy. [ix 12.8 + 1x 5.1 + 1x 3.6 + 1x 1.4] x 4' = 143. " => small er ough to ignore in Anchorage Carc. 11) There is a synchronizing point (24×17×10") @ top of . buy No. 12. See note 14 for its estimated weight and frequency calculation. Load path from the C.G. of this panel to the s.G. is rugged (G. 1/2 d'said) The frequency estimation in Note 14 is based on the determination that the lowest frequency of this panel is attributed to its bare flexibility. 12) FLuorescent Lights overhad are for enough not to cause seismic interaction, since compression type fittings are used. HAC, supports in the proximity are rigid. or (For SEL 9013 and 9015, There are 2 Fluorescent fixtures without compress. Fitting - oke since 13) There is a racking Wrench attriched to bay No. 2 Which Would impact bound and are behind the front of the panel in a Sejunic event. The upper compartment Boards. in this bay has relays and the impact of this wrench to The battom compartment would potentially chatter these relays. -> Outlier (05VS-9012).



SHEET NO. <u>3 of 9</u> JOB NO. <u>Sol47</u> JOB <u>TVA/BEND A-46/IPEEE</u> BY <u>730</u> DATE <u>9-12-55</u> CALC. NO. <u>AIA</u> SUBJECT <u>Attachment to' SENS Son O-BDAA-211-00000</u> CHKD 10. DIZA DATE <u>9/18/95</u> (SSEL 9012)

14) Synchronizing panel details:



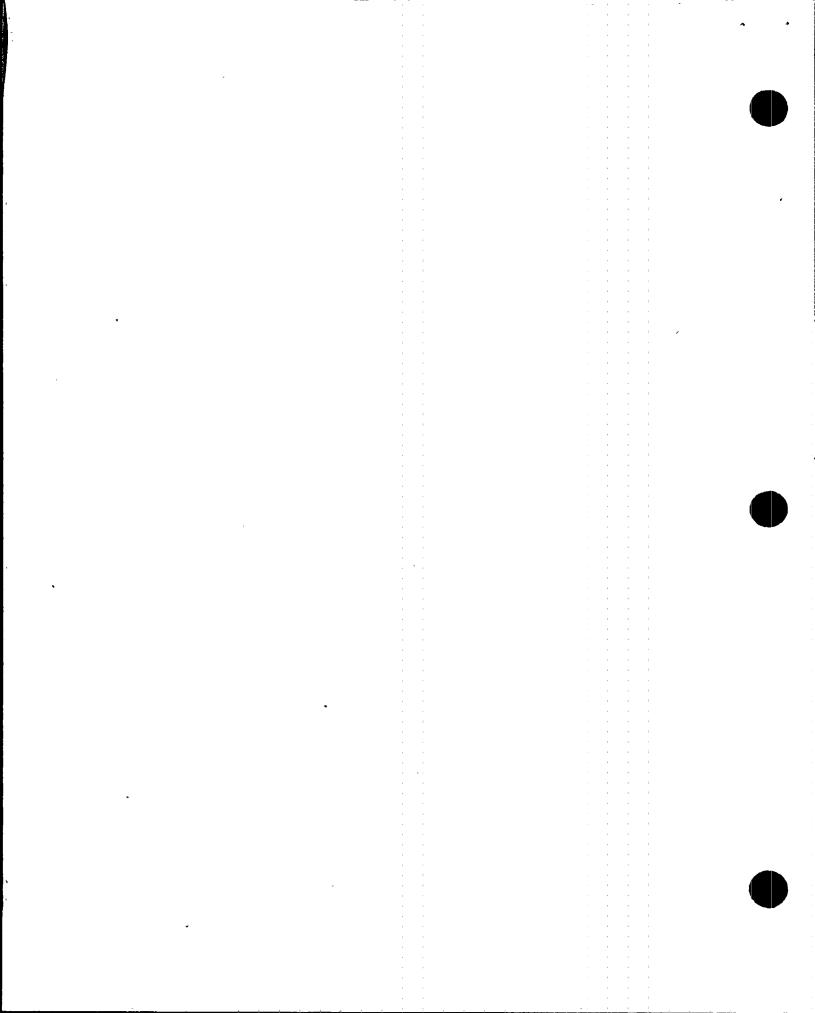
Weight of housing =  $\frac{490}{12^3} \times \frac{3}{32} \times 2 \left[ (17 \times 10) + (17 \times 24) + (10 \times 24) \right] = 43.5 #$ There are total of 5 components (maters) mounted inside thebox. wt. of each component is estimated to be less than10 #.

Total wet of the box = 43.5 + 5 (10#)=93.5#

uct. of the support punch =  $\frac{490}{12^3} \times \frac{5}{32} \times \left[ (24\times6) + 2(6\times24) + (24\times24) \right]$ =  $45^{\#}$ 

$$\frac{2}{12^{3}} \times \frac{5}{32} \times \frac{5}{12^{3}} \times \frac{5}{12^{3}} \times \frac{5}{12^{3}} \times \frac{5}{32} \times \frac{5}{12^{3}} \times \frac{5}{1$$

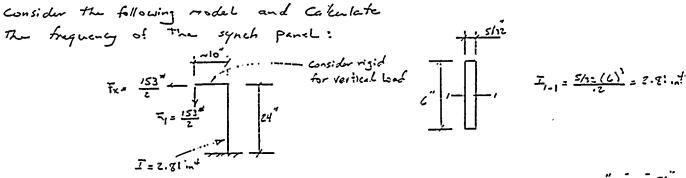
Total ut. d Synchronizing Much = 93.5 + 45 + 14 = 153. = (This with course is normal in anchorage call. since it is very small as compared to the overall s.c. with (153%, 0000 = 0.3%).)

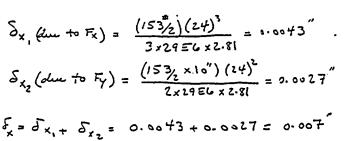


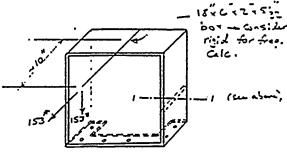


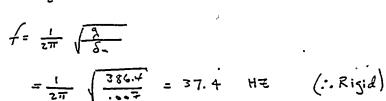
SHEET NO. <u>9079</u> JOB NO. <u>50147</u> JOB <u>TVA/BFNP A-46/IPEEE</u> BY <u>7 Beig</u> DATE <u>9-12-95</u> CALC. NO. <u>AILA</u> SUBJECT <u>Attachment to SENS for 0-RDAA-211-0000</u> ACHKDJ.J.DIZG, DATE <u>9/18/95</u> (SSEL NO 9012)

Note 14 (cont'é)

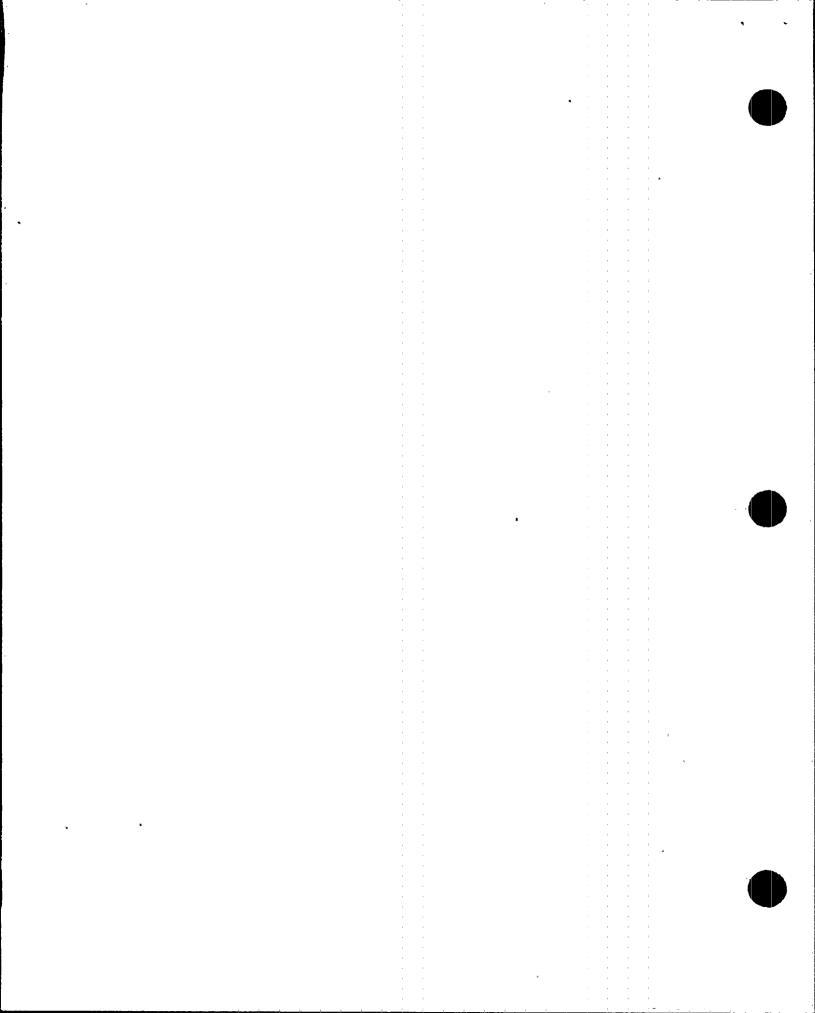








- Note: Fx and Fy above an conservative since the restraint provided by the lower member connecting the box to the supporting panel. is ignored in the frequency calculation.
- 15) The long heavy loaded panel doors are consistently reinforced with stiffering angles - A similar panel door for low voltage switch gear with no reinforcement was shown to have an estimated fundamental frequency of 7.5 HE (see SEWS for SSEL NO 9018). By comparison, the fundamental frequency of The panel doors on this equipment when relays are attached to is greater than 7.5 HE (due to additional stiffeners). A conservative amplification factor of 7.0 is assigned to this switchgear, consistent with that suggested in EPRI Report



SEL Line No. <u>9012</u>	Status Y 🕅 U
	Sheet 1 of 1
IPEEE SUPPLEMENTAL SCREENING EV	ALUATION WORKSHEET
Equip. ID No. <u>O-BDAA-211-0000A</u> Equip. Class <u>03 -</u>	Medium Voltage Switchgear
Equipment Description <u>4KV SHDN BD A</u>	
RELAY WALKDOWN	
<ol> <li>Does spot check of essential relays indicate relays present and properly mounted?</li> </ol>	Ý NUN/A
<ol><li>Are essential relays required to function during earthquake screened out?</li></ol>	Y N U (N/A)
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.	
B. No other relay concerns?	Y (N) U N/A C')
Requirements for relays satisfied?	Y (N) U (·)
SYSTEM INTERACTION EFFECTS	
<ol> <li>No potential sources could flood or spill onto cabinet?</li> </ol>	Y N U N/A
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATI sheets if necessary)	SFACTORY (Use additional
1) Racking Wrench is bossely attached to bay front of this bay of switch gear in a seismic there are essential relays in this bay, the the relays. <u>Outlier</u> osys-9012.	NO. 2 and it would impact the event. IF it is determined that impact could potentially chatter
S EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION, YES $\checkmark$ NO	EXCLUDING RELAY CHATTER?
IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER I	NVESTIGATION? YES NO 📈 (1)

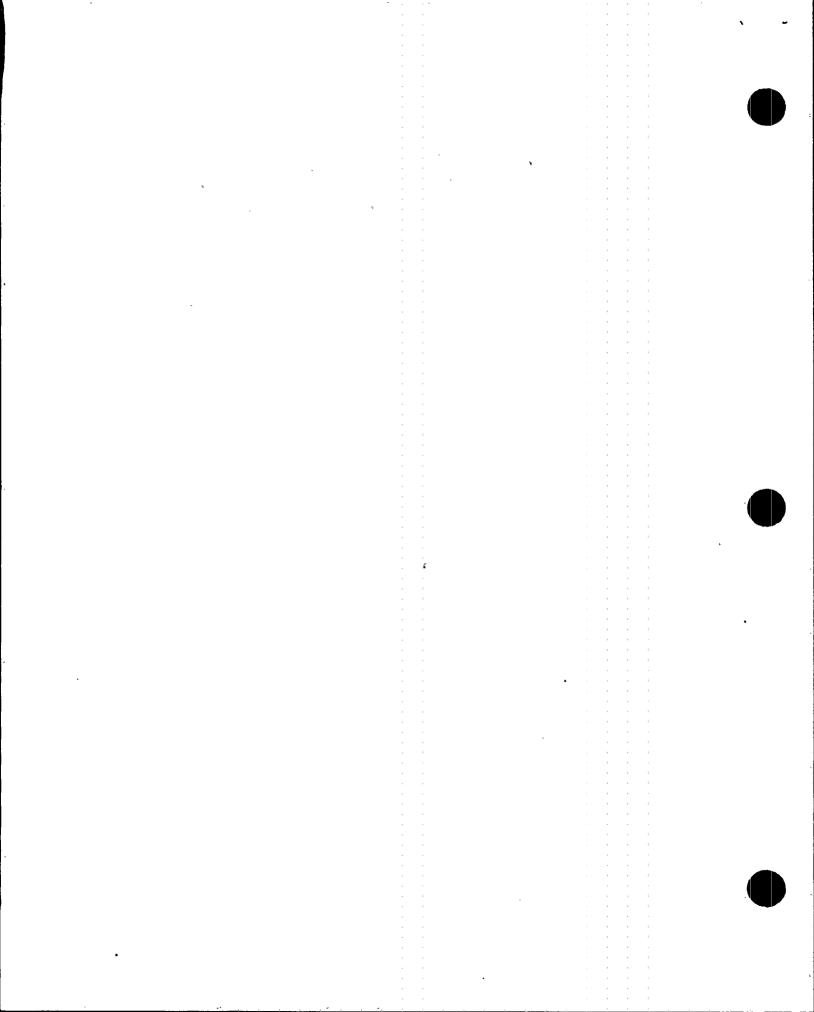
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Evaluated by:	7Ben:	Date:	9-12-55	′
Evaluated by:	den G. Dizon	Date:	9/18/95	′



SSEL	Line No. $9012$ (OSVS-9012) Sheet 1 of 2
	OUTLIER SEISMIC VERIFICATION SHEET (OSVS)
	•
1.	OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION
	Equipment ID Number <u>0-BDAA-211-0000</u> A Equipment Class <u>03-MVSG</u>
z	Equipment Location: Bldg. $RB_{\mu}$ Floor Elevation $C21'-3''$
	Room or Row/Column <u>R-RZ</u> Base Elevation <u>czi-s</u>
	Equipment Description <u>4KV SHON</u> BD A
2.	OUTLIER ISSUE DEFINITION
	a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)
	Mechanical and       Tanks and Heat Exchangers         Capacity vs. Demand       Shell Buckling*         Caveats       Anchor Bolts and Embedment         Anchorage       Anchorage Connections         Seismic Interaction       Flexibility of Attached Piping*         Other       Other
	Essential Relays Capacity vs. Demand Mounting, Type, Location 
	* Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.
	b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):
	A breaker racking Wrench is mosely attached
	to bay No. 2 of this switchgear. In a seismic
	event this wrench will interact with the Panel
8	it is attached to (it will bang into it). This

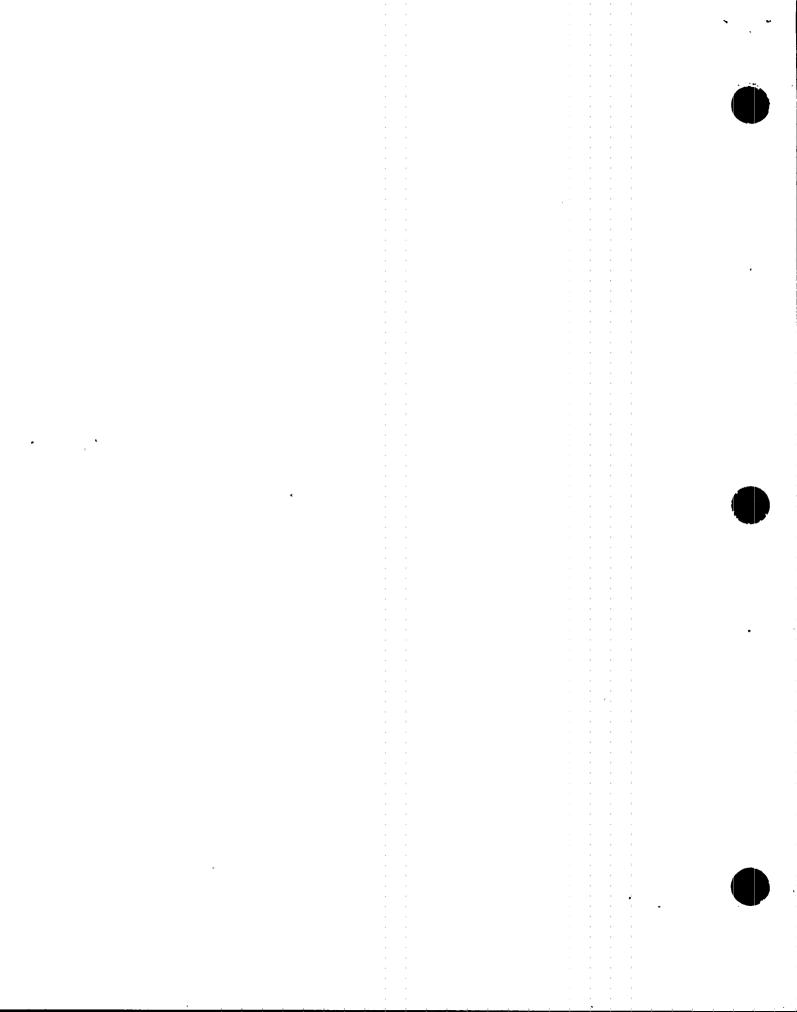
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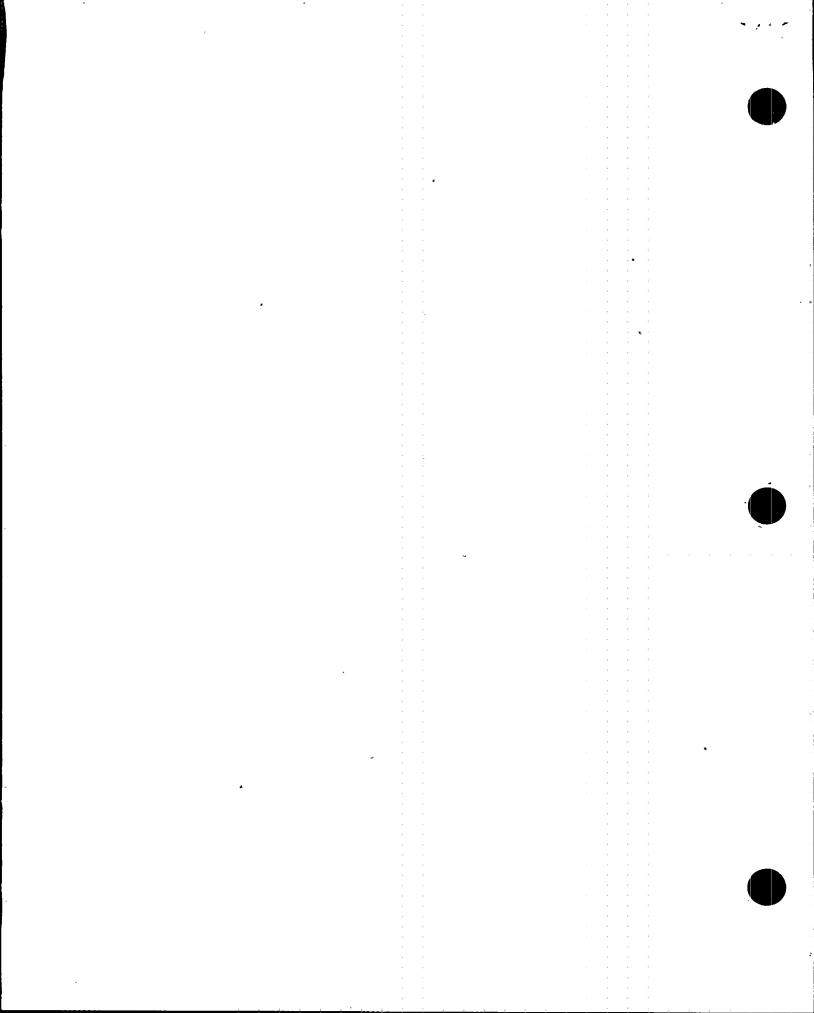
(* SSEL	Line	No. <u>9012</u> (OSVS-9012) OUTLIER SEISMIC VERIFICATION SHEET (OSVS) Equipment ID Number <u>O-BDAA-211-0000</u> A
3.	PROP	OSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)
~	a.	Define proposed method(s) for resolving outlier.
	b.	<u>i) IF the relay review identifies this bay to include</u> <u>essential relays than the wrench neede to be</u> <u>removed from the bay or positively attached to</u> <u>it such that any interaction would be precluded</u> . Provide information needed to implement proposed method(s) for bissue resolving outlier (e.g., estimate of fundamental frequency). <u>NIA</u>
·		

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

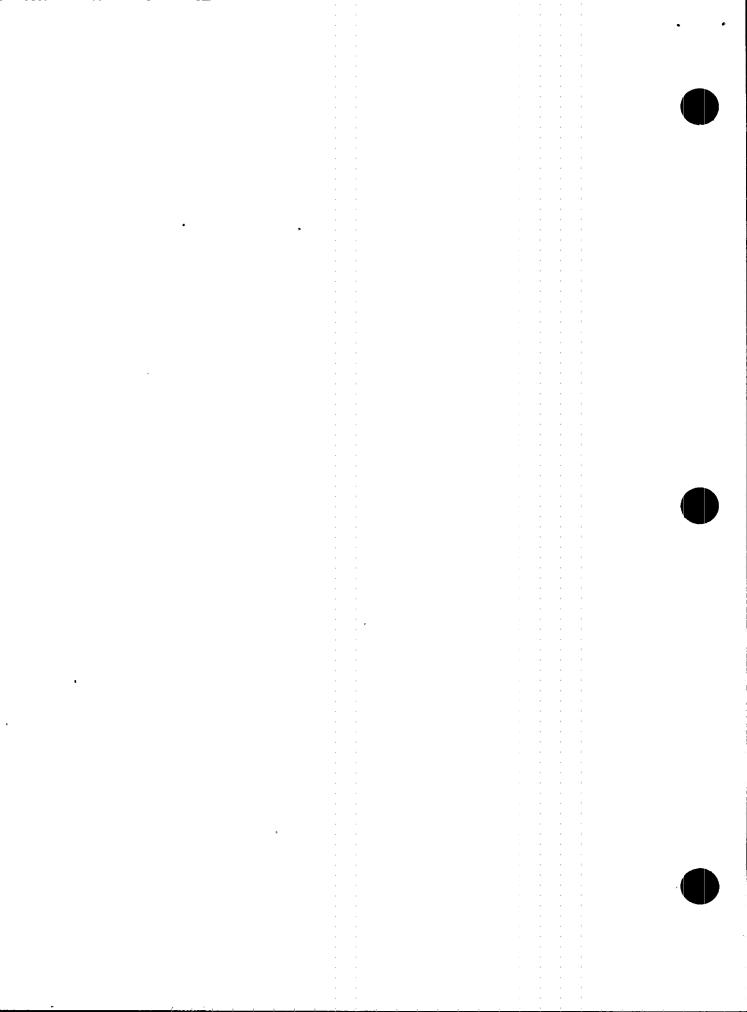
Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

, Print or Type Name	- Fort Bei	9-12-95
, Print or Type Name	Signature	Date
JOHN O. DIZON P.E. Fint or Type Name	John O. Dizan	9/18/95
rint or Type Name	Signature	Date
Print or Type Name	Signature	Date



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: SEL L	ine No. <u>9006</u> S	tatus	Ý	NU	
	SCREENING EVALUATION WORK SHEET (SEWS)	heet 1 d	of A		
Equip.	ID No. 2-XFA-253-0002A1 Equip. Class 04 - Transform	ners			
Equipm	ent Description <u>480V-120/208V XFMR FOR I&amp;C BUS 2A</u>				
Locati	on: Bldg. <u>RB</u> Floor El. <u>621'-3'</u> Room, Ro	_ IoJ\wc	P-R1	3	
Manufa	cturer, Model, Etc. (optional but recommended) <u>SOUARE</u>	ED,	<u>ر</u>	75 KVA , 2 pl	ಜ್ಜುಲ
1. 2. 3. 4. 5.	<u>C CAPACITY VS DEMAND</u> Elevation where equipment receives seismic input Elevation of seismic input below about 40' from grade Equipment has fundamental frequency above about 8 Hz Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. apacity exceed demand? (Indicate at right (*) and in <u>MMENTS</u> if a special exception to enveloping of seismic mand spectrum is invoked per Section 4.2 of the GIP.)		S RS S S S S S S S S S S S S S S	<u>21-2</u> " U N/A (1) U N/A (2)  (Y)N U	(٥١ر3)
are me explai	<u>S - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) the t by intent without meeting the specific wording of the n the reason for this conclusion in the COMMENTS section	caveat	rule	which and	
1. 2. 3.	Equipment is included in earthquake experience equipment class 4.16 KV rating or less	$\langle \Theta \rangle$	N U N U	J N/A J N/A	
4.	For floor-mounted dry- and oil-type unit, transformer coils are positively restrained within cabinet For 750 kVA or larger units, coils are top braced or adequacy shown by evaluation	(V) Y	N U N U		
5. 6.	For 750 kVA or larger units, 2-inch clearance is provided between energized component and cabinet For 750 kVA or larger units, the slack in the	Ŷ			•
7	connection between the high-voltage leads and the first anchor accomodates 3-inch relative displacement For wall-mounted units, transformer coils anchored	Y	NU	J NZA	
8.	to enclosure near enclosure support surface For floor-mounted units, anchorage does not rely on weak-way bending of cabinet structures under	Y	NU		
9.	Adjacent cabinets which are close enough to impact are bolted together if they contain essential relays	Y) Y	N U N U	J NZA	
10. 11. 12.	All doors secured by latch or fastener Anchorage adequate (See checklist below for details)	~(\$)(\$) ~		J N/A J N/A (6) J (N/A.)	
13. Is the	Relays mounted on equipment evaluated on the state of the	? (Y	N L	ANUN YNUN	I/A

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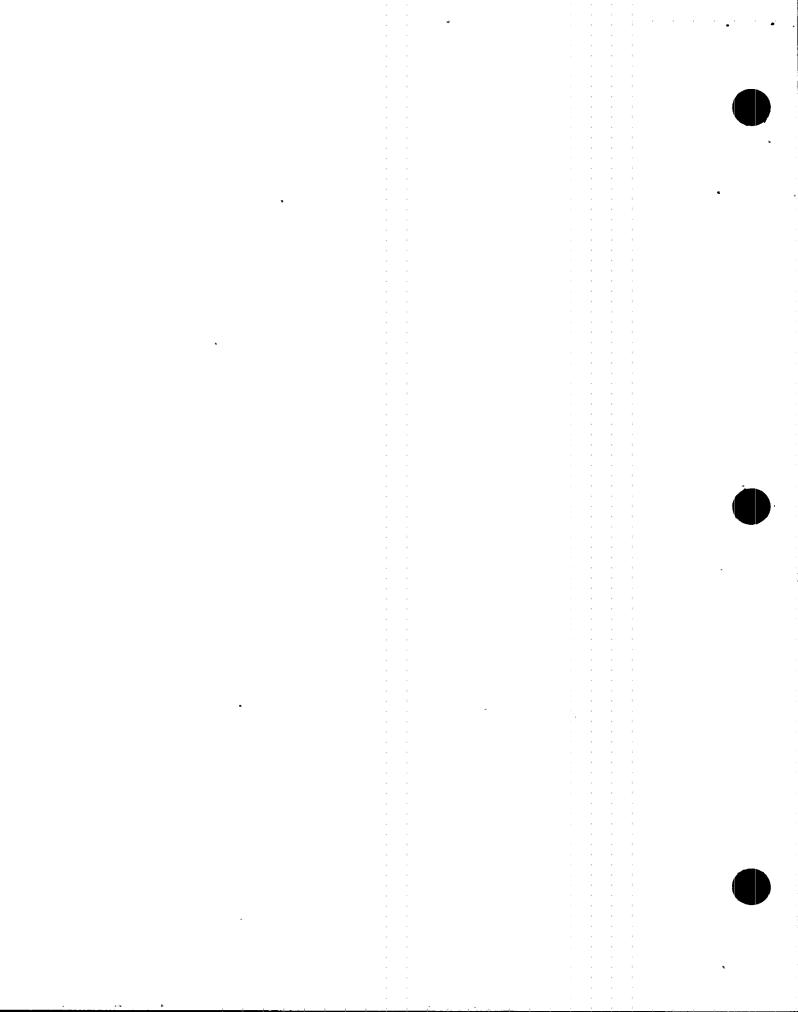
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SSEL Line No. 9006

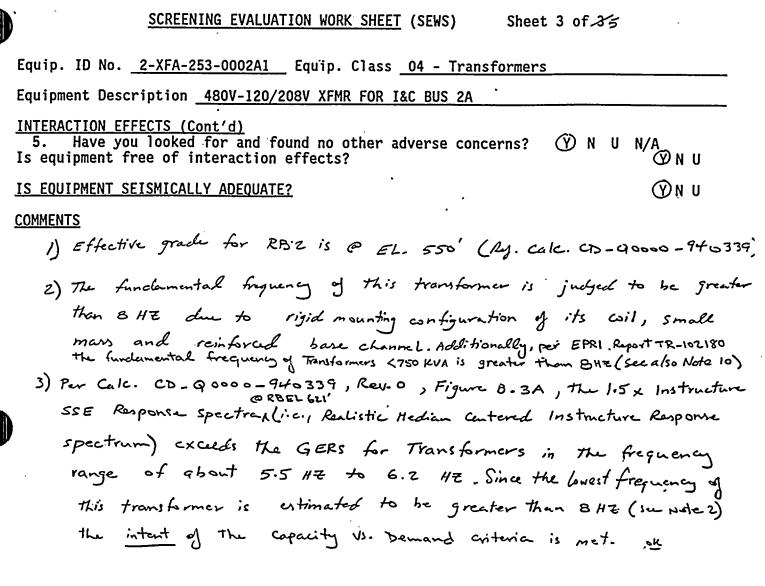
### SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 2 of 35

Equip. ID No. 2-XFA-253-0002A1 Equip. Class 04 - Transformers Equipment Description 480V-120/208V XFMR FOR I&C BUS 2A CAVEATS - GERS 1. Equipment is included in generic seismic testing )000000 :22222 :ccccc equipment class N/A Meets all Bounding Spectrum caveats 2. N/A 3. Dry-type unit (not oil-filled) N/A 4. Wall or floor-mounted NEMA-type enclosure N/A 5. 120 to 480 VAC rating N/A 7.5 to 225 KVA rating 6. N U N/A 7. 180 to 2000 pound weight U N N/A 8. Internal supports provide positive attachment of A) transformer components N IJ N/A There is a minimum clearance of 3/8 inches between 9. bare conductors and enclosure Y) N U N/A 10. All adjacent cabinets or sections of multi-bay assemblies bolted together N/A Y N U Is the intent of all the caveats met for GERS? MN U N/A ANCHORAGE 1. Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP (Exp. Anch.) (Y) N U N/A(4,5)2. U N/A(4,5) N 3. Sizes and locations of anchors determined Ν U N/A 4. Anchorage installation adequate, e.g., weld quality and length, nuts and washers, expansion (V) N anchor tightness U N/A 5. Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking (Y) N U N/A 6. For bolted anchorages, gap under base less than 1/4-inch (Y) N U N/A 7. Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors Y N N/A U 8. Base has adequate stiffness and effect of prying (Y_ action on anchors considered N U N/A (9) Strength of equipment base and load path 9.  $(\mathbf{T})$ to CG adequate N U N/A (9) Embedded steel, grout pad or large concrete 10. Y N U (N/A pad adequacy evaluated (Y) N U(8) Are anchorage requirements met? INTERACTION EFFECTS 1. Soft targets free from impact by nearby (Y) N U N/A (6) equipment or structures 2. If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures U (NZA N 3. Attached lines have adequate flexibility Ϋ́Ν U N/A Overhead equipment or distribution systems are 4. not likely to collapse (Y) N U N/A (.7)



#### SSEL Line No. 9006

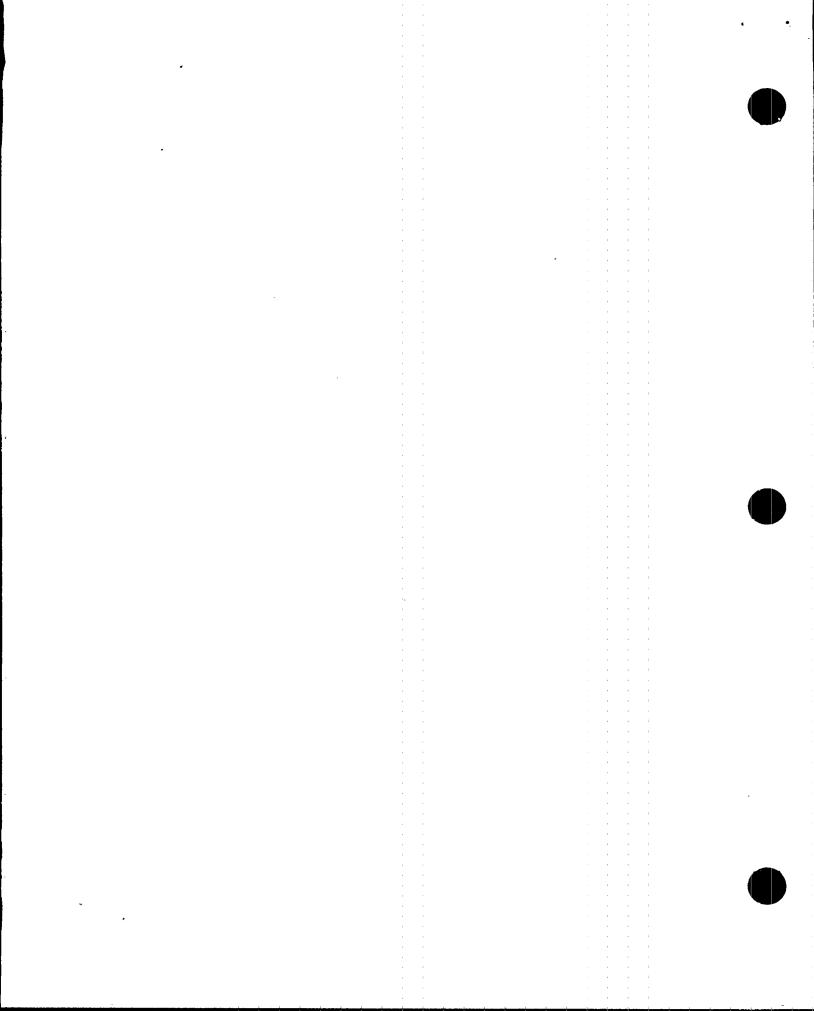


Notes 4 three 9 continued on sheets 4 \$5.

10) Futhermore, the above transformer (75 kvA) is also seismically qualified by Comparison to similar transformer (45 kvA) that was tested per 1555 344-75 requirements. The 75 kvA transformer base mounting bracket and base mounting dimension were increased to lower the resulting stresses and increase the natural frequency? Based on comparable fest results from the 45 kva transformer. (Wyle test Report # 44509-1, 5/14/80) 60 apr B a/211

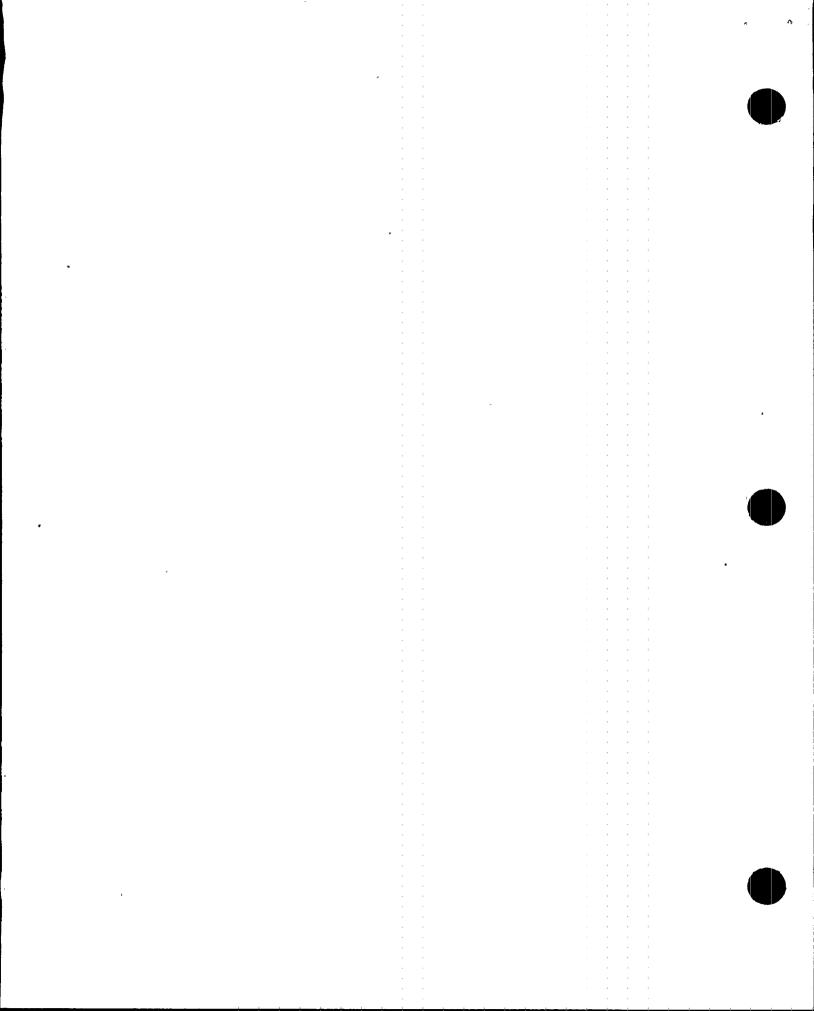
torri Beig Evaluated by: Date: 7-21-95

[*] seismic quelification documented in a letter from B.R. Rich (Square D Co.) to Amita Helton (TVA) dated 1/21/81.



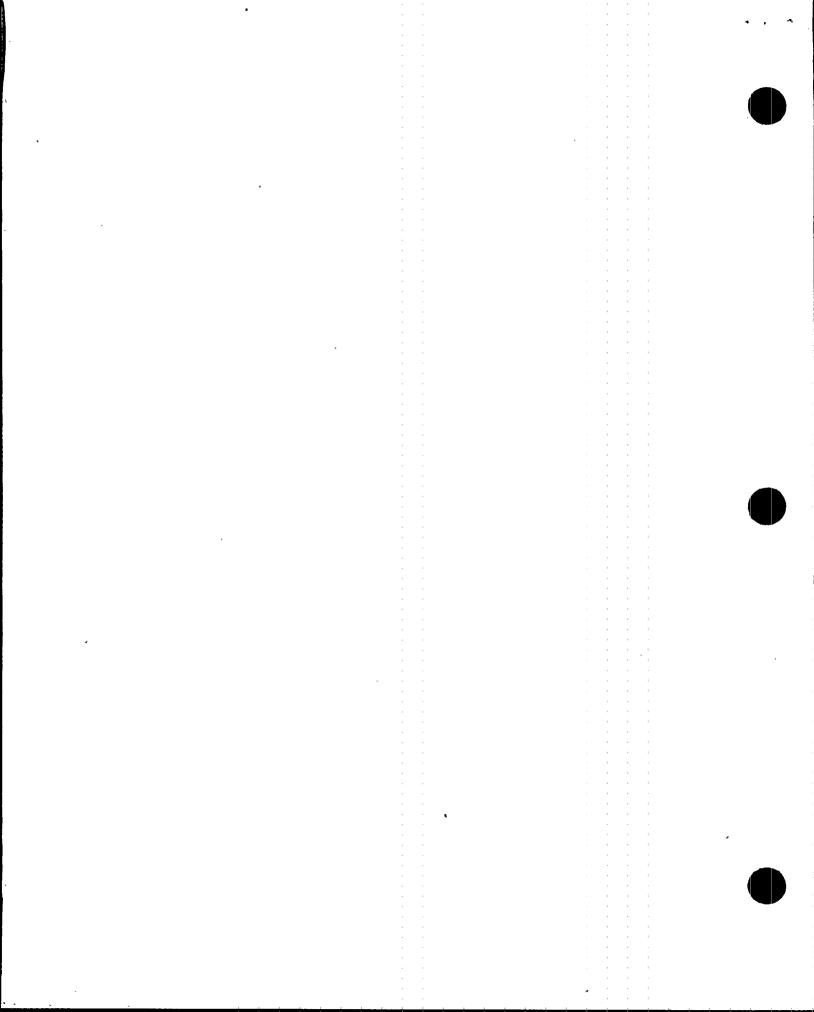
#### EQE INTERNATIONAL

SHEET NO. 4 75 JOB NO. 50147.05 JOB TVA/BAD A-46/1PEEE BY <u>78 en</u> DATE <u>7-21--</u> -XFA-253-000ZA1 (SSEL # 9006) -000ZA1 CALC. NO. MA SUBJECT CHKOLDIZAL DATE 7/25 SSEL NO. 9006, 90.8 ( photos; RI, F 9 \$10) 2-XFA-253-0002A1,2B1 Comp- 13: Manufactumen : SQUARED company · 75 KVA , 3 phone Note 4) - as-built sketch З0″ depth = 2 34 Cis 17 1/2 0 Hach. Bolt W 3'/2" h== 21/2 2.8 d= 31/2 x=3/16 L11/2×1/2×3/1 20″ 5) - C.G. a center of the Transformer (conservative) 10/7 ที่ 6) - Fire Extinguisher near by not supported positively may tall & impact the Transformer. Judged ok since Transfi is enclosed by 3/32 , TOP tto 0 Thick steel of does not have any soft A-A tayets or relays. .F) _ Fluorescent lights about this comp. and patential isteraction hazard but it is insignificant (saw above note)



EQE INTERNATIONAL

SHEET NO. 5 91.5 JOB NO. 50147.05 JOB TVA/BEN A-46/1PEEE BY 7Bei DATE 7-21-9 2-XFA-253-0002A1 (SSEL # 9006) CALC. NO. NA SUBJECT CHKR DALLAZON DATE 7/25/9 SSEL NO. 9006 Equip. ID. 2-XFA-253-0002A1 8) Anchorage Evaluation : (similar to the transformer analy-ad in Calc. CD-Q30+2-930+0 WT ≃ 385 [#] conservatively we peak accelerations @ RB, EL 621-3", 5% Damping, 55 aprox = 2.15 g aprox = 0.66 g (Ry:CEB_ 88-05-C, Rw.1) for median-centers spectra T = Resultant pullout load per 1/2" & EXp. Anchor  $= \left[ \left( \frac{385 \# \times 2.159 \times 205}{28'' \times 2} \right)^{1} + \left( \frac{385 \# \times 2.159 \times 20.5}{17'' \times 2} \right)^{1} + \left( \frac{385 \# 0.669}{4} \right)^{2} \right]^{1/2} \times 1.25$  $-\frac{385^{\#}}{4} = 638^{\#} < \overline{I_{a_{11}}} = 2.29^{\frac{1}{2}} \times \frac{3600}{400} = 2.06^{\frac{1}{2}} (\frac{1}{2} - \frac{1}{2})$ the Red. Factor V = Resultant Shear load per 1/2 & Anchor  $=\sqrt{2} (385^{\#} \times 2.15g \times 1.25)/4 = 366^{\#} < V_{a11} = 2.38^{k}; \frac{\sqrt{2}}{\sqrt{a11}} < 0.3$  $IR = \frac{638}{2060} = 0.31 < 1.0$ 9) - Base channel The stress in the base channel is very small by inspection and due to the fact that the channel flanges are reinforced @ the, anchor points by L11/2×11/2×3/16 members.



SSEL Line No. <u>9006</u>

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Sheet 1 of 1

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# IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>2-XFA-253-0002A1</u> Equip. Class <u>04 - Transformers</u> Equipment Description <u>480V-120/208V</u> XFMR FOR I&C BUS 2A

#### RELAY WALKDOWN

- 1. Does spot check of essential relays indicate Y N relays present and properly mounted?
- 2. Are essential relays required to function during earthquake screened out?

If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.

3. No other relay concerns?

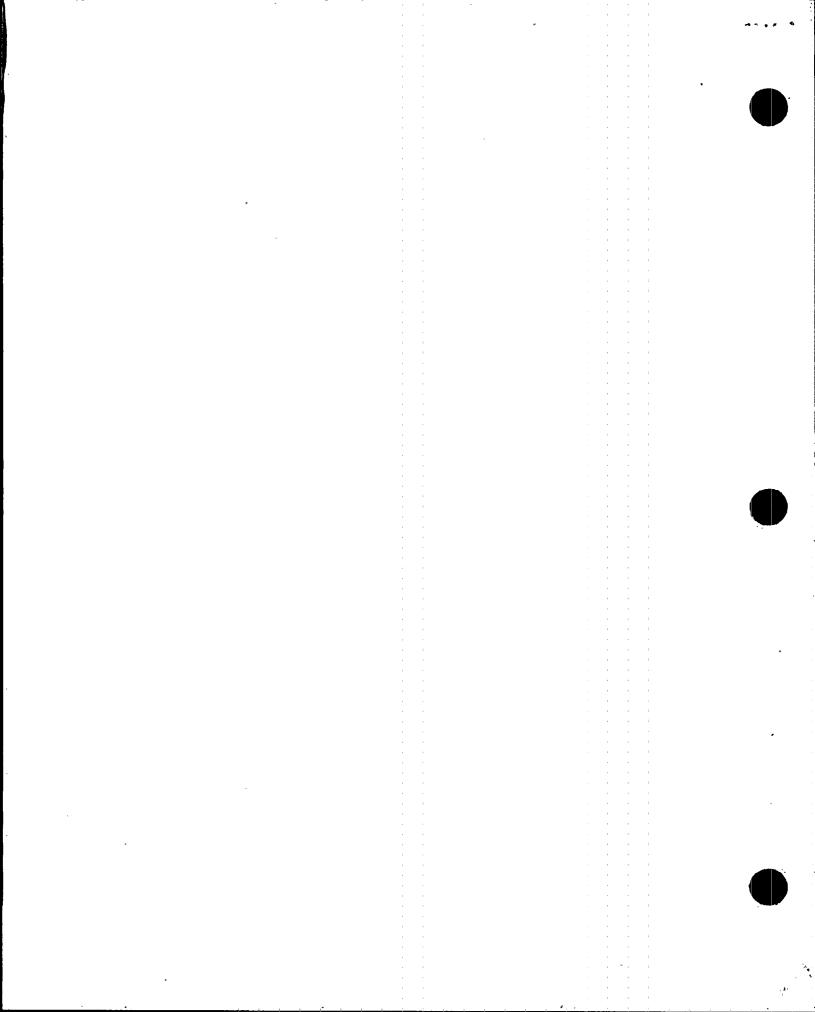
SYSTEM INTERACTION EFFECTS

1. No potential sources could flood or spill onto cabinet?

(Y) N U N/A

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION	ON, EXCLUDING RELAY CHAILER?
IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATT	ER INVESTIGATION? YES 🖌 NO
Evaluated by: <u>Forzi Beini</u>	Date: <u>7-21-95</u> '
Evaluated by: <u>Forze Bein</u> Evaluated by: <u>Stur O. D. Zon</u>	Date: <u>7/25/95</u> ,



14) 354-8100

ELECTRICAL

SQUARE TI COMPANY

B WEST HATIONAL AVE .P.O. BOX 04549

EQUIPMENT

#### CERTIFICATION

The transformers described in the following documentation are nuclear qualified based on previous test data from similar equipment. This similar equipment operated properly before, during and after the Qualification Test Program performed at the Wyle Laboratories and as recorded in Wyle Test Report No. 44509-1. (One copy included for documentation).

State of Wisconsin ) ss County of Milwaukee) Wisconsin Professional Engineer License No. E 10174

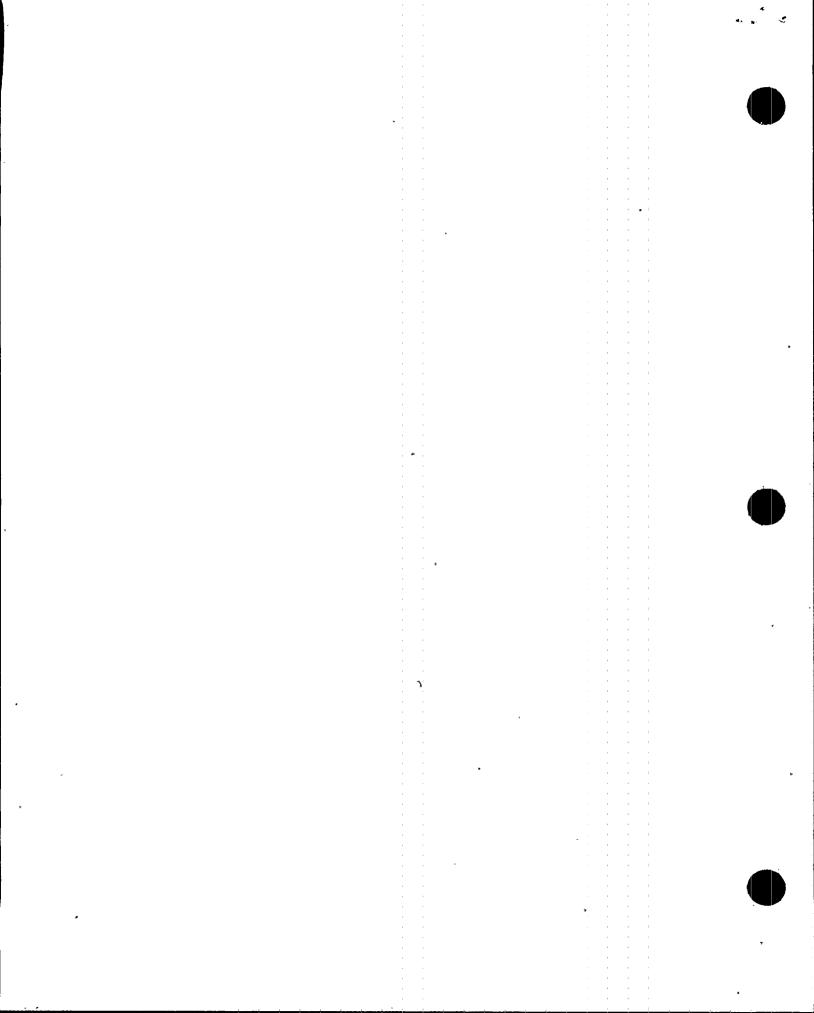
Marvin O. Kanter , being duly sworn, desposes and says: The information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects.

SUBSCRIBED and sworn to before me this <u>36TH</u> day of <u>FIEBRIJART</u>. 19<u>81</u>. <u>Jan Don Dleef</u>

Notary Public for the County of Milwaukee, State of Wisconsin.

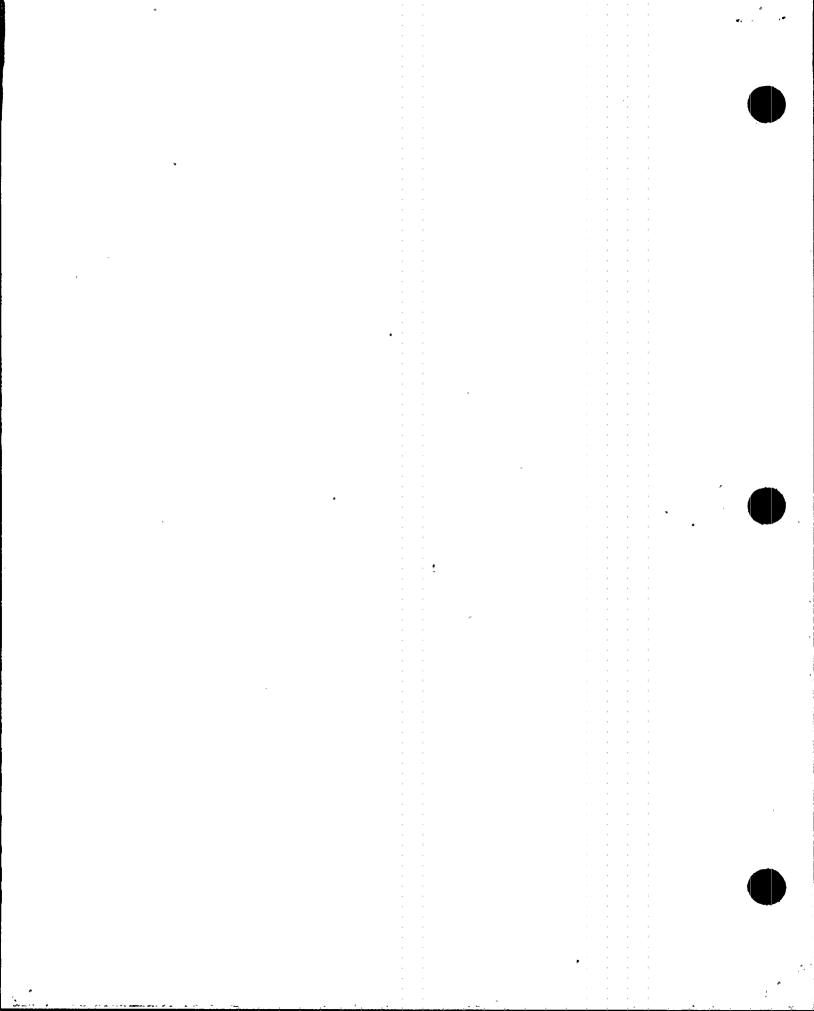
My Commission expires 39th De Furste R. 19 5/ ....

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January 21, 1981

Ms. Anits Helton Tennessee Valley Authority Division of Purchasing 400 Commerce Union Bank Bldg. 633 Chestnut St. • Chattanooga, TN 37401

Subject: TVA Ref. #6-828602

Dear Ms. Helton:

This letter is to confirm our phone conversation wherein I advised you that we would supply additional saterial in the form of a documentations of test results on the 45KVA transformer and the calculations necessary to show how these test results can be applied to the 75KVA transformer to show that it does meet your seismic requirements.

Shipment can be made in order for meterial to arrive at the job site by April 1, if the order is received by January 23, with the following requirements:

- 1. Approval drawings are waived by TVA. Drawings will be for record.
- 2. TVA will accept provious qualification data. No additional testing required.

If you have any questions concerning the documentation of test results and their application to the 75KVA transformer, you may contact Ron Franzen at (414) 384-8100.

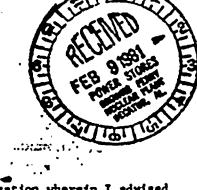
Very truly yours,

SOUARE D COMPANY

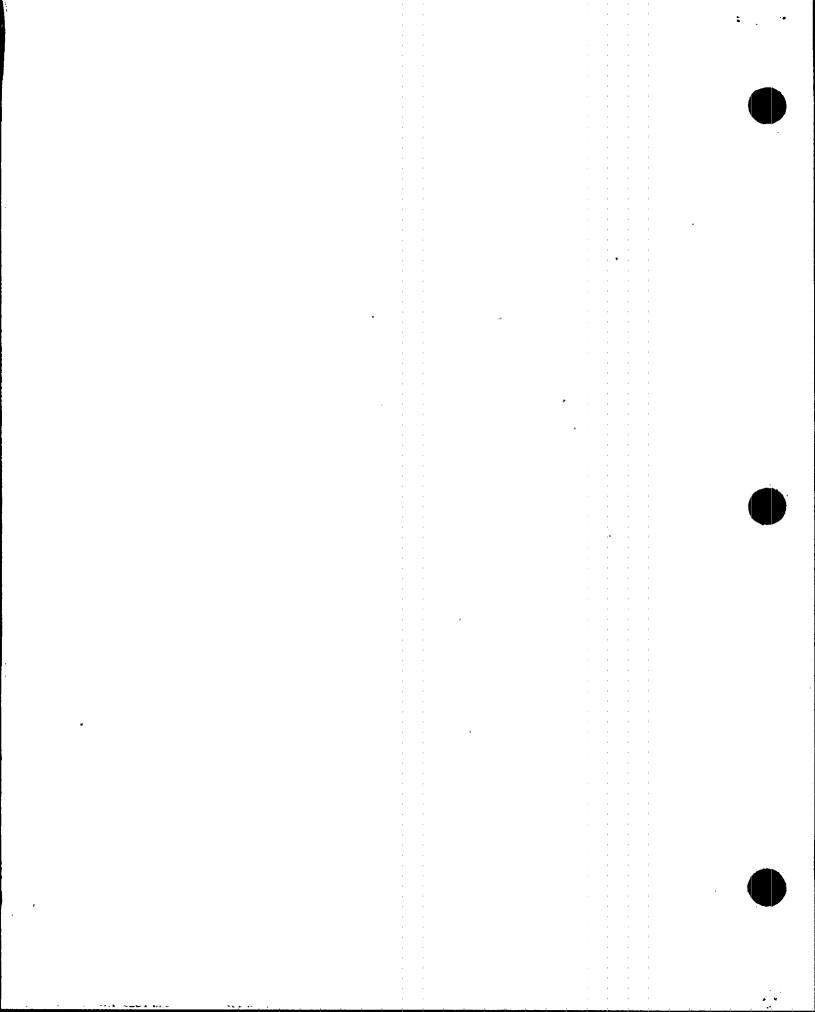
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B. R. Rich Senior Field Representative

BR/mc

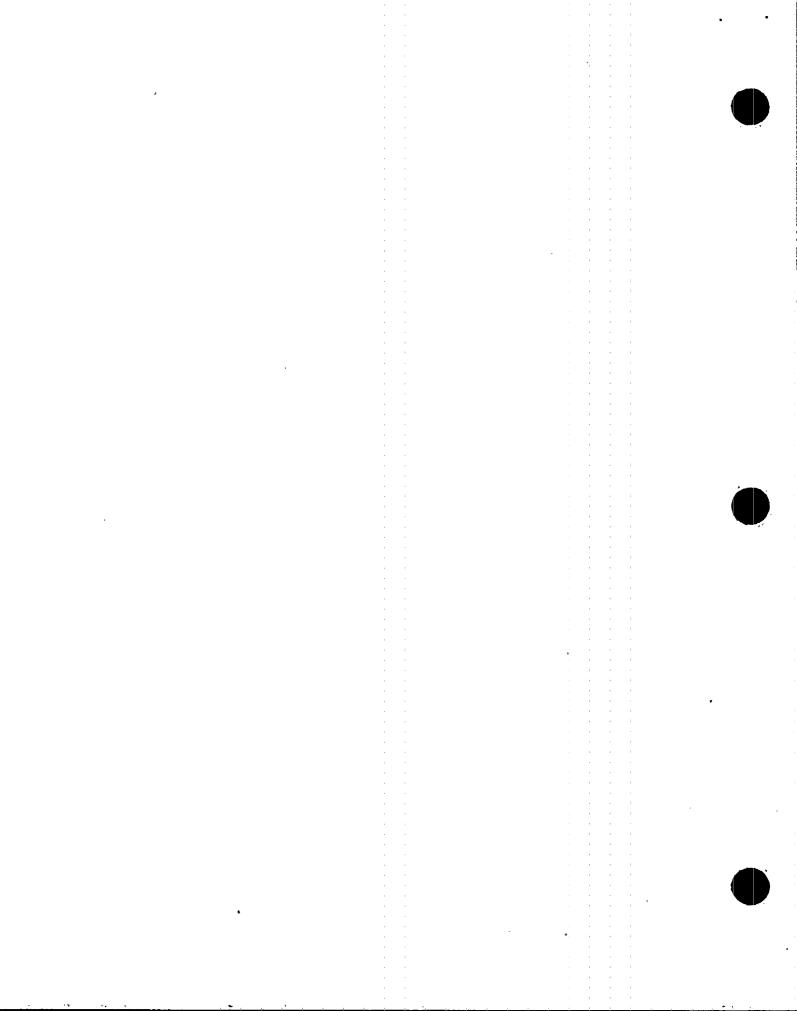


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	SQUARE D COMPANY
••	SORJEL TRANSFORMERS
	(414) 384-8100 B38 WEST HAFIONAL AVE. MILWAUECL. WIS. 53204
•	• • • • • • • • •
	·; .
8 8 -	Nuclear Environmental Qualification of Class lE Transformers
с v	Tennessee Valley Authority 1010 Georgia Ava., Chattanooga, Tennessee
	Tennessee Valley Authority Brown's Ferry Nuclear Plant Near Athens, Alabama
	•
•	Project Identification Contract No. 81P6-828602 Specification No. 6-828602
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DOCUMENTATION

Method of Qualification:

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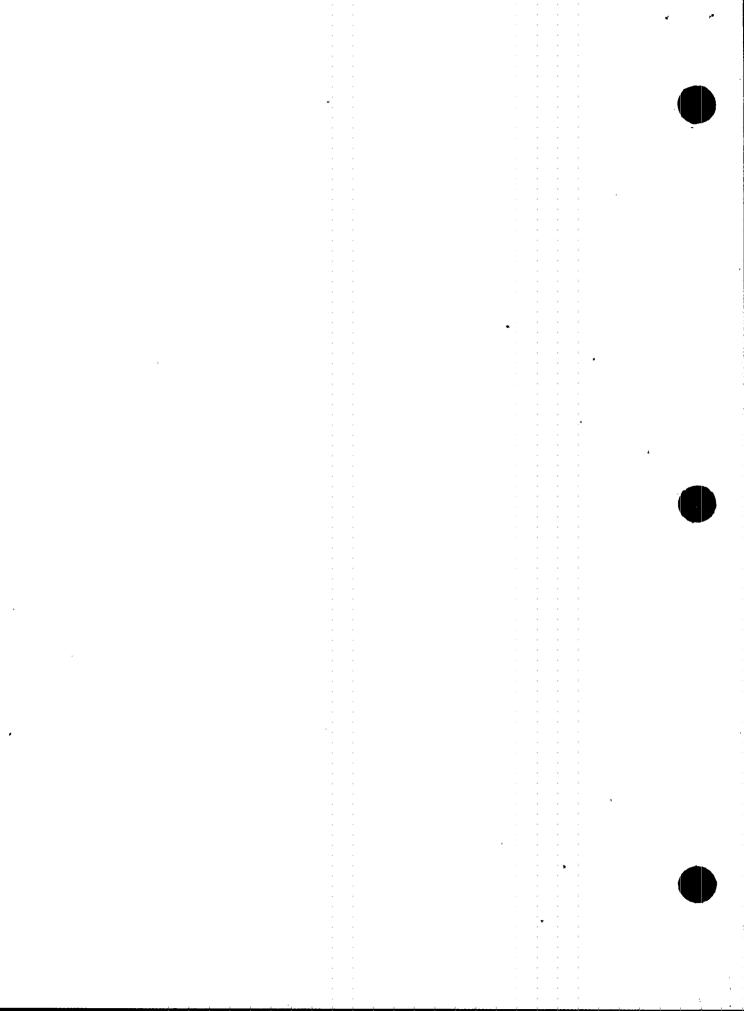
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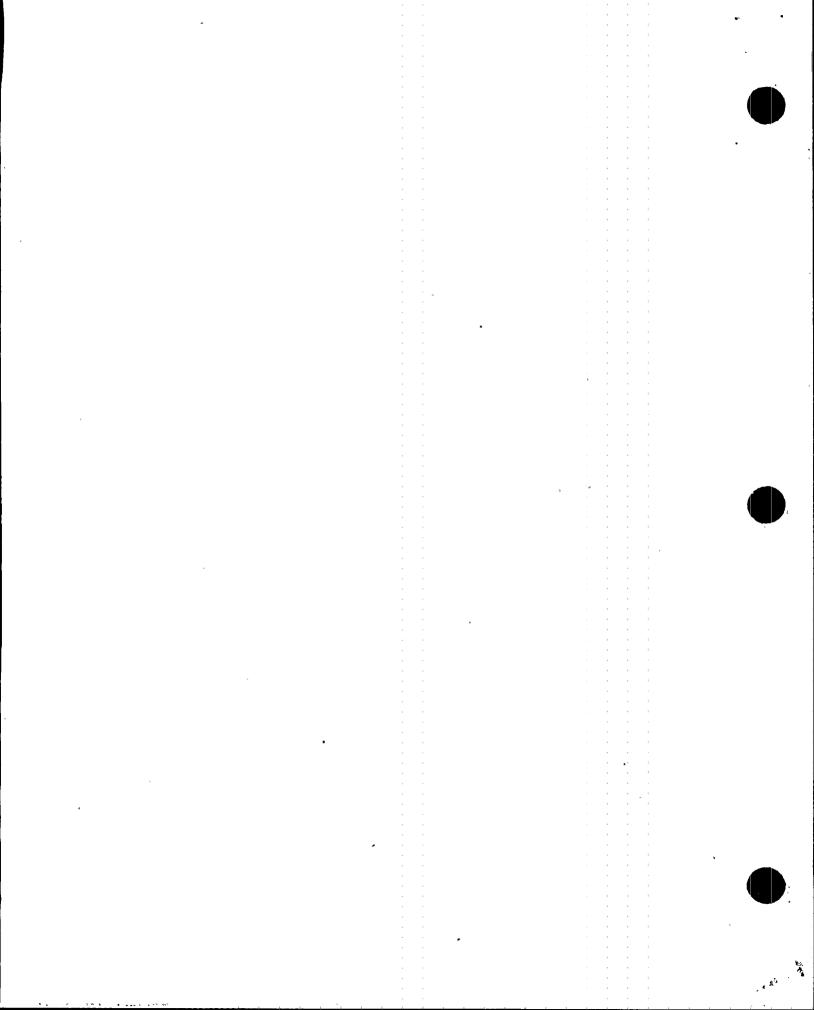
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The equipment required for this contract specification is seismically qualified in accordance with IEEE 344-1975 and meets all environmental requirements of IEEE 323-1974 as described in Test Report No. 44509-1.

- I. Description of both equipment
 - A. Tested equipment is rated 45 KVA, three phase, 60 Hertz, 480 volt delta primary to 208Y/120 volt secondary, 115°C rise transformer. Dimensions and physical description as shown on comparison analysis sheet B-111112 with modification per drawing A-103247.
 - B. Equipment to be supplied on this contract is rated 75 KVA, three phase, 60 Hertz, 480 volt delta primary to 208Y/120 volt secondary, 80°C rise transformer.
 Dimensions and physical description as shown on comparison analysis sheet B-11118 and drawing A-111117 with modification per drawing A-103247. Electrical connections and wiring details as per drawing A-109886.
- II. Test data on original equipment
 - A. Wyle Laboratories nuclear environmental qualification test report No. 44509-1 provides complete test data on the original equipment.
 - B. The environmental limits for temperature, pressure, humidity and radiation are defined in the qualification plan Section II, page 12.



- C. The age-sensitive materials involved are listed on Page 34, Figure 1 of the qualification plan. The qualified life for 80°C rise transformers is 59 years at 100% load. Qualified life at other conditions are listed in Table III, Page 30 of the qualification plan.
- D. Documentation Figure No. 1 is a comparative plot of the horizontal TRS at 3% damping using composite response spectra taken from test report No. 44509-1 Pages IX-56 and IX-66 showing a ZPA of 3.2 g compared with the response acceleration spectra in Appendix A of Spec. 6-828602. The data on this floor spectra was doubled for an equivalent horizontal SSE and shown as the RRS with a ZPA of 0.5 g.
- E. Documentation Figure No. 2 is a comparative plot of the vertical TRS at 3% damping using composite response spectra taken from test report No. 44509-1 Pages IX-57 and IX-67 showing a ZPA of 3.8 g compared with the response acceleration spectra in Appendix A of Spec. 6-828602. The data on this floor spectra was doubled for an equivalent horizontal SSE and then reduced to 2/3 horizontal response for an equivalent vertical SSE and shown as the RRS with a ZPA of 0.33 g.
- III. Detailed description of difference between the two equipments.
 - A. The enclosure housing on both designs is the same part 43005-033-50.
 - B. The same mounting bolts and ESNA type elastic slop nuts are used to fasten the base mounting brackets to the enclosure base.
 - C. The base mounting brackets of the test unit were made from 1/2" x 1-1/2" iron bar. The base mounting brackets of the transformer to be supplied will have base mounting brackets of 1/2" x 2" iron bar.
 - D. The transformer to be supplied will be very similar in electrical design and overall weight to the tested transformer, however, the center of gravity will be one inch higher.



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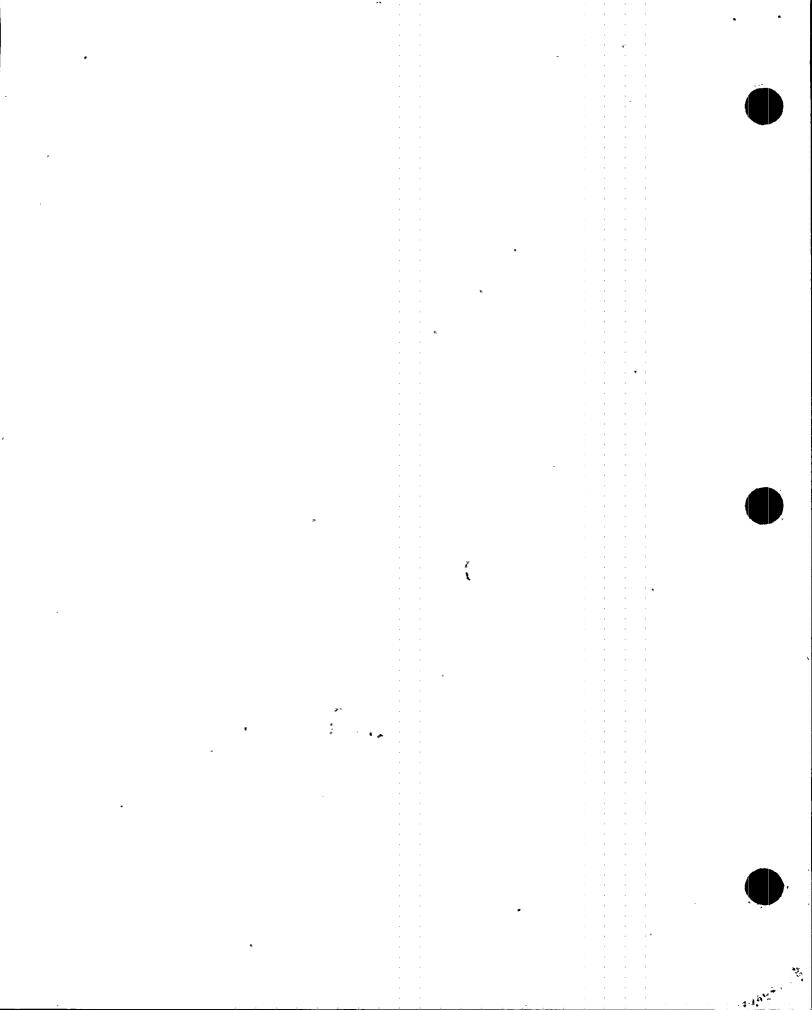
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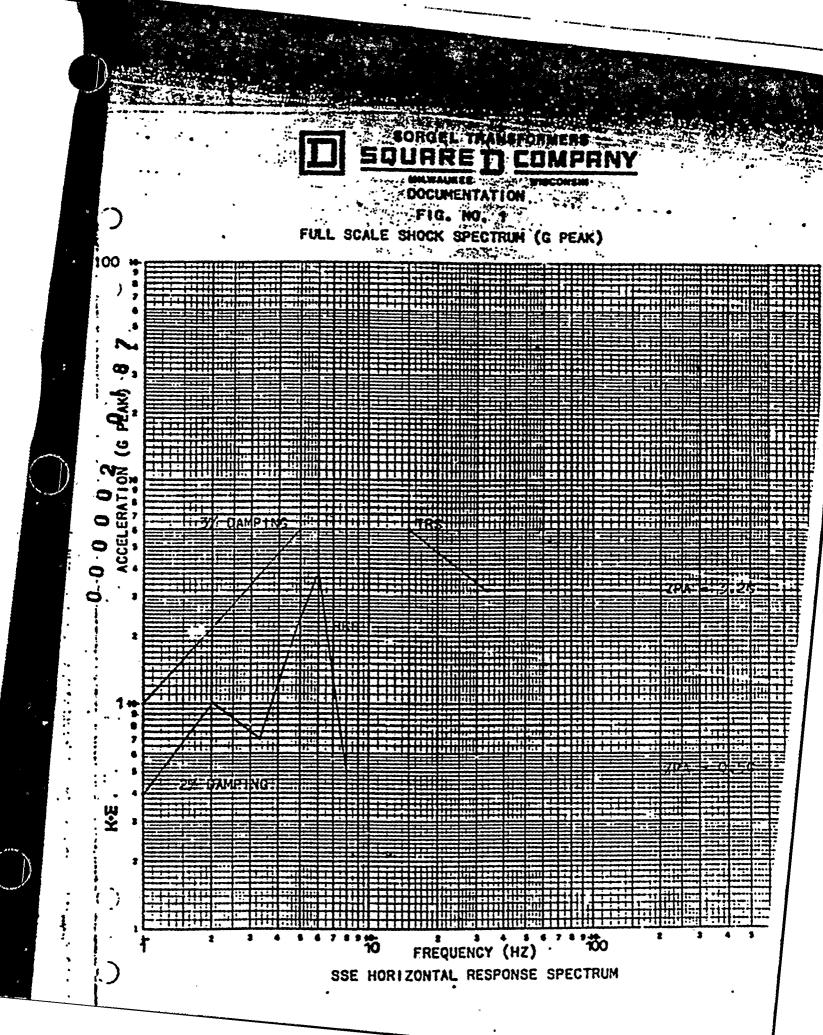
IV. Justification of Data.

A. The nuclear environmental qualification test plan No. 44509-1 is a generic program to qualify a line of transformers. The qualification will satisfy any specification whose environmental conditions fall within the worst-case environments defined in Paragraph 1.0, Section II of the plan. Since the transformer to be furnished incorporates the same age-sensitive materials as the tested transformer, the documentation satisfies the qualification of this unit.

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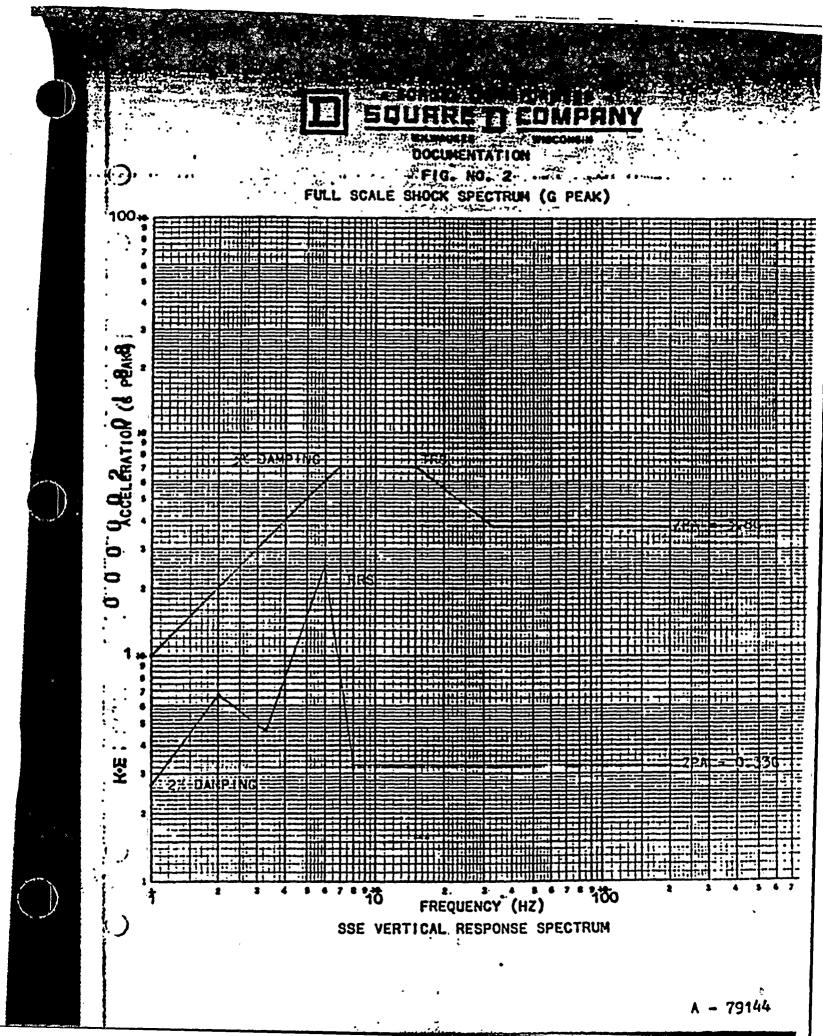
- Β. The seismic acceptability of the transformer to be furnished is covered by comparison analysis with the tested transformer per paragraph 3.1.1, Section I of the plan. The data necessary to make both the static and dynamic comparison of the two transformers is given on drawing B-111118. Since the furnished transformer's center of gravity was found to be higher, the stresses and fundamental frequency were adjusted by increasing the size of the base mounting brackets and by increasing the base mounting dimension (d) by 2 inches. These modifications had the effect of lowering the normalized stresses and increasing the fundamental frequency and thus satisfying the qualification of this unit.
- C. With reference to the Documentation Curves Figures 1 and 2, taking into account that the TRS is plotted at 3% damping and that at 2% damping it would have an even higher g peak level in the flexible frequency range of 1 to 20 Hz and thus envelope the RRS with an even greater margin, this variation in damping can be ignored since the important consideration is the comparison of the Zero Period Acceleration (ZPA) between the two curves.
- D. Comparison of the ZPA levels indicates that the tested transformer passed tests at levels six times greater in the horizontal and eleven times greater in the vertical than those required in Appendix A of Spec. 6-828602. This wide margin or factor of safety in seismic activity should be ample to justify the qualification of the transformers to be supplied on this contract.

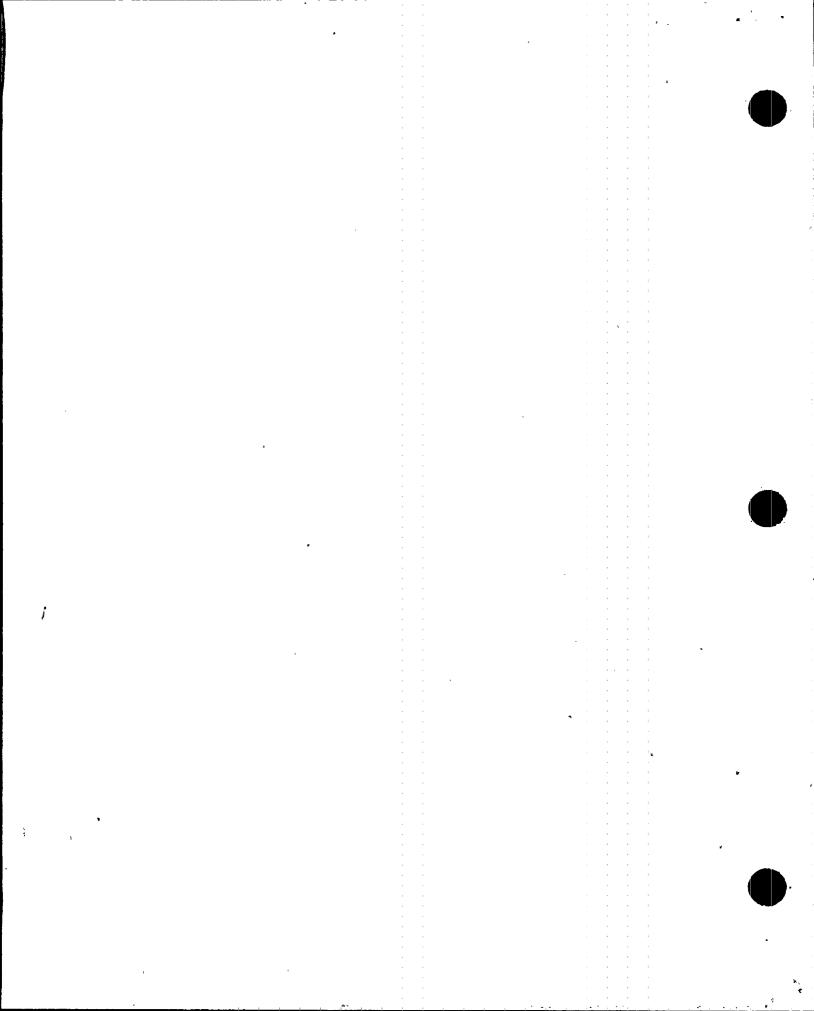




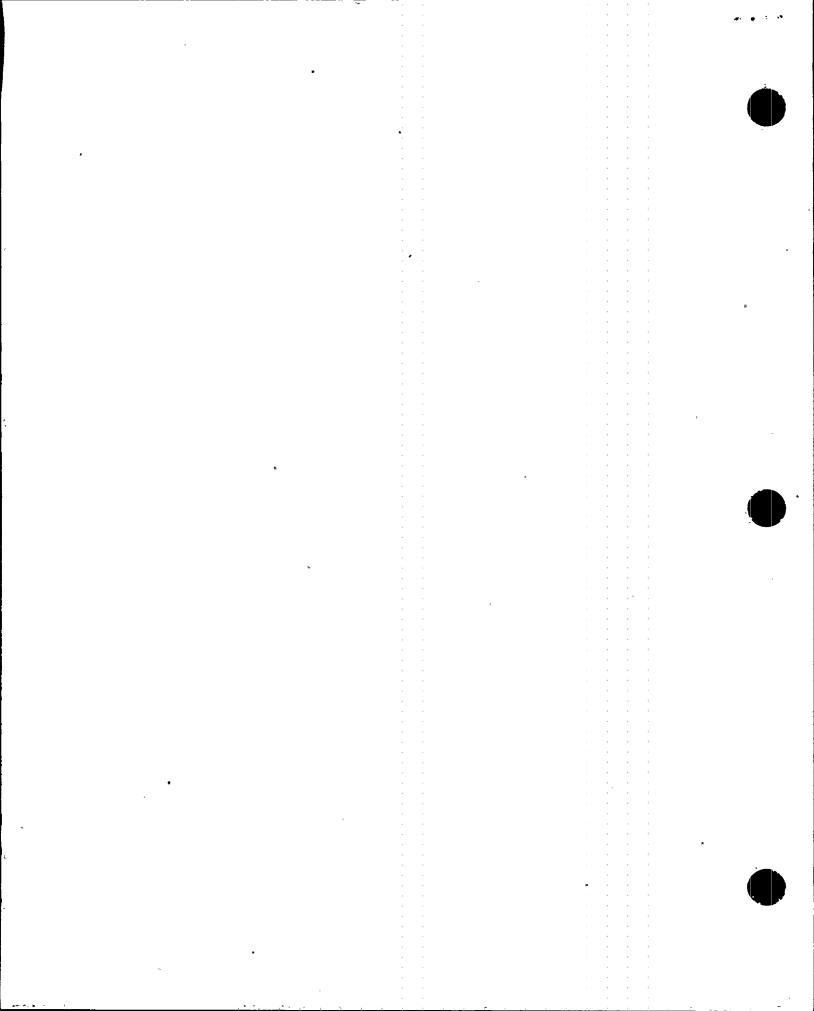


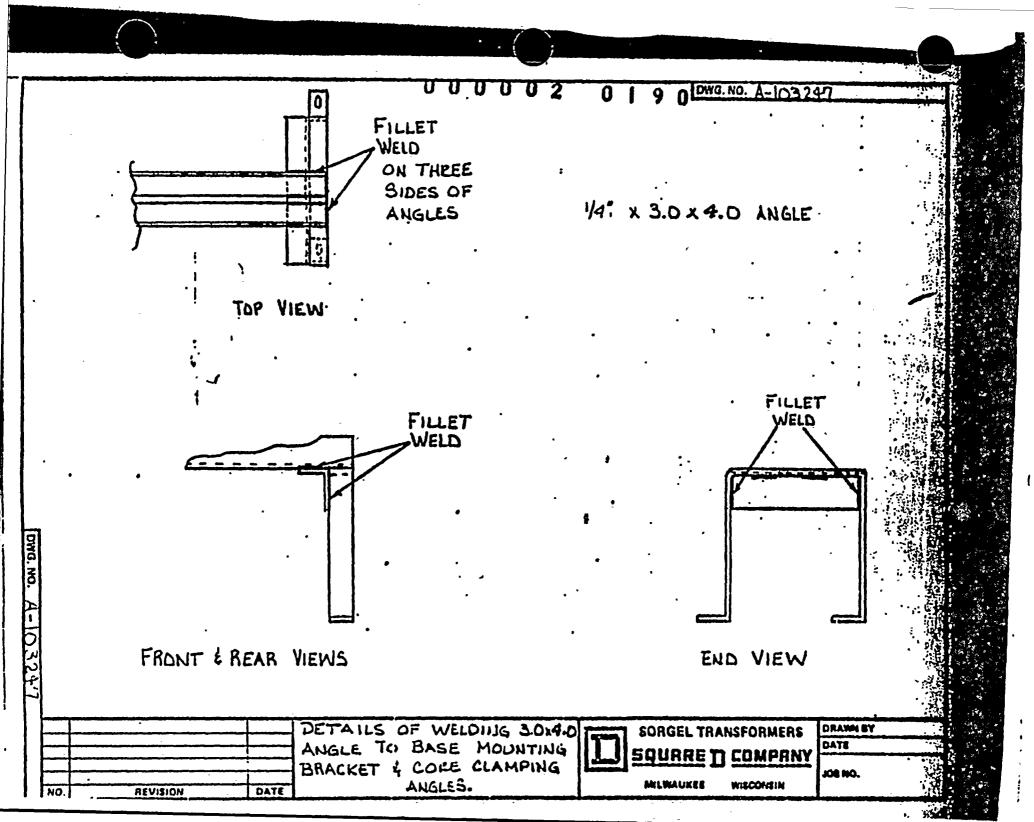


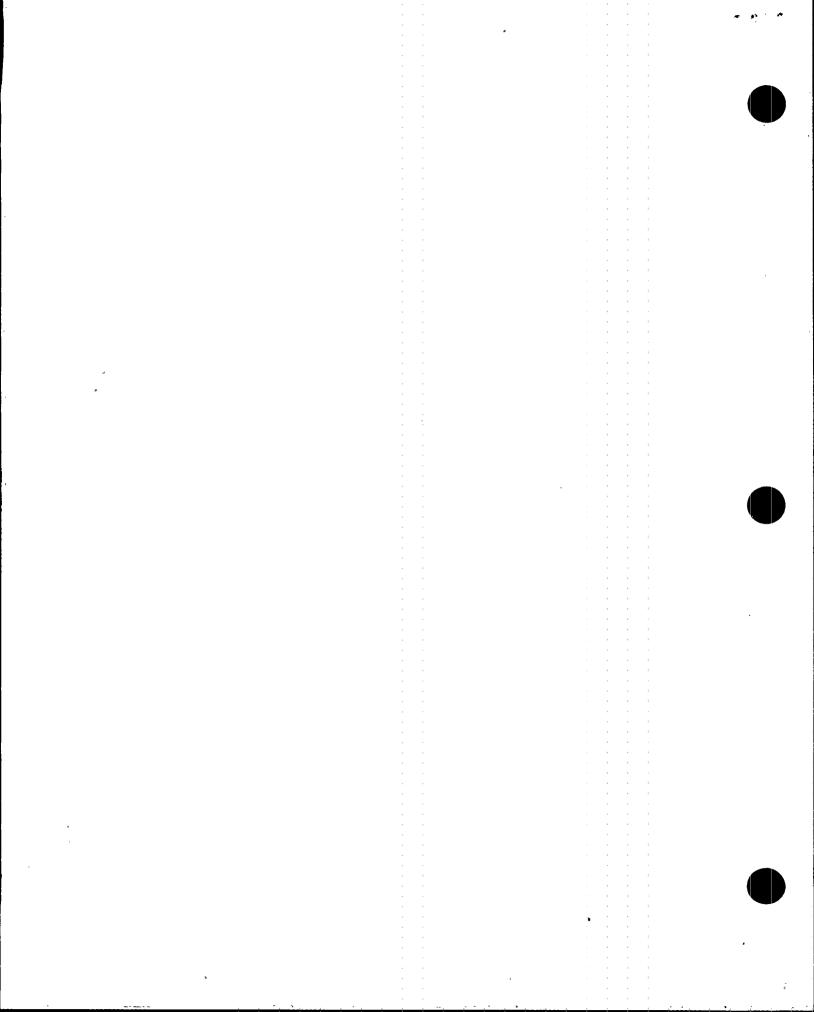


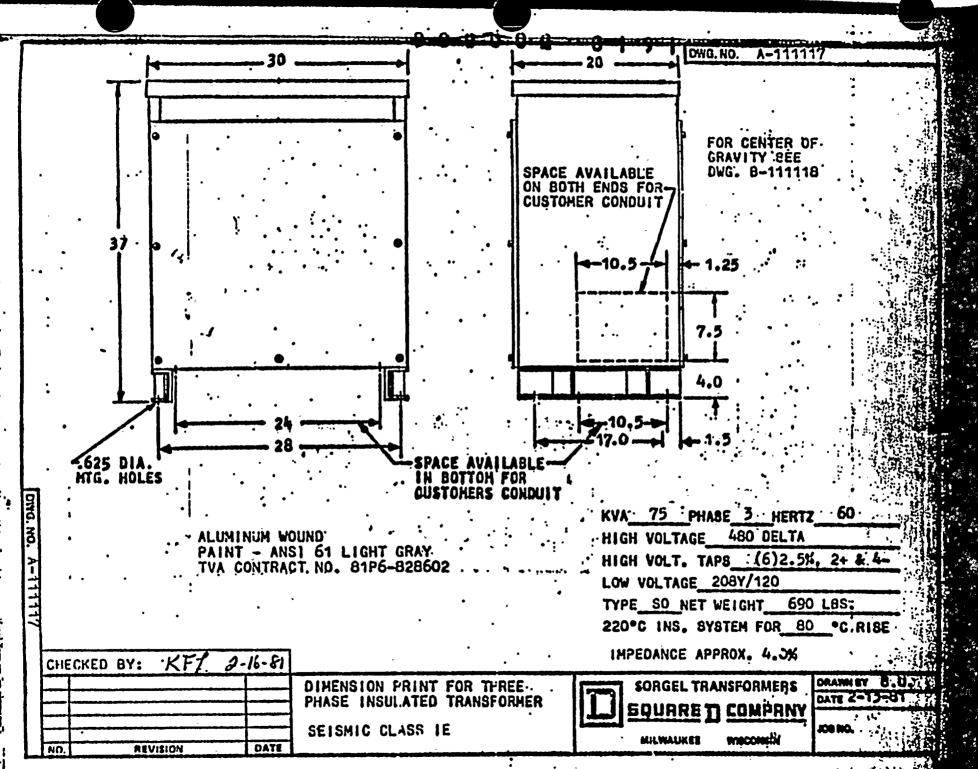


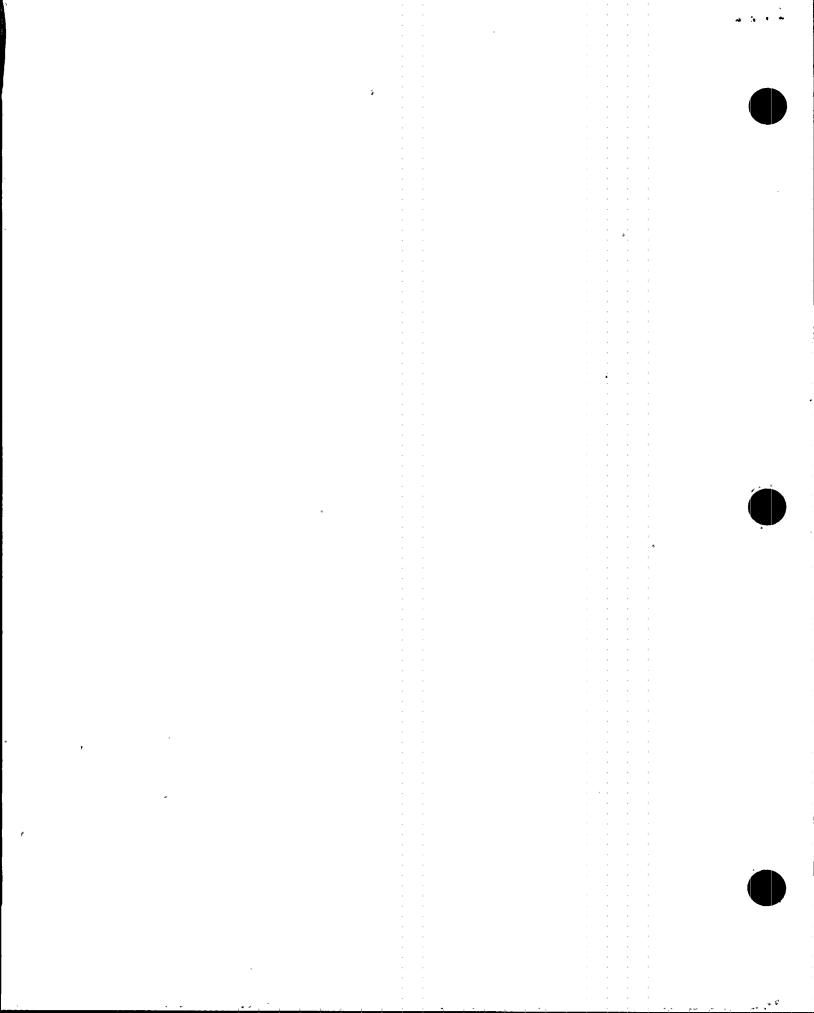
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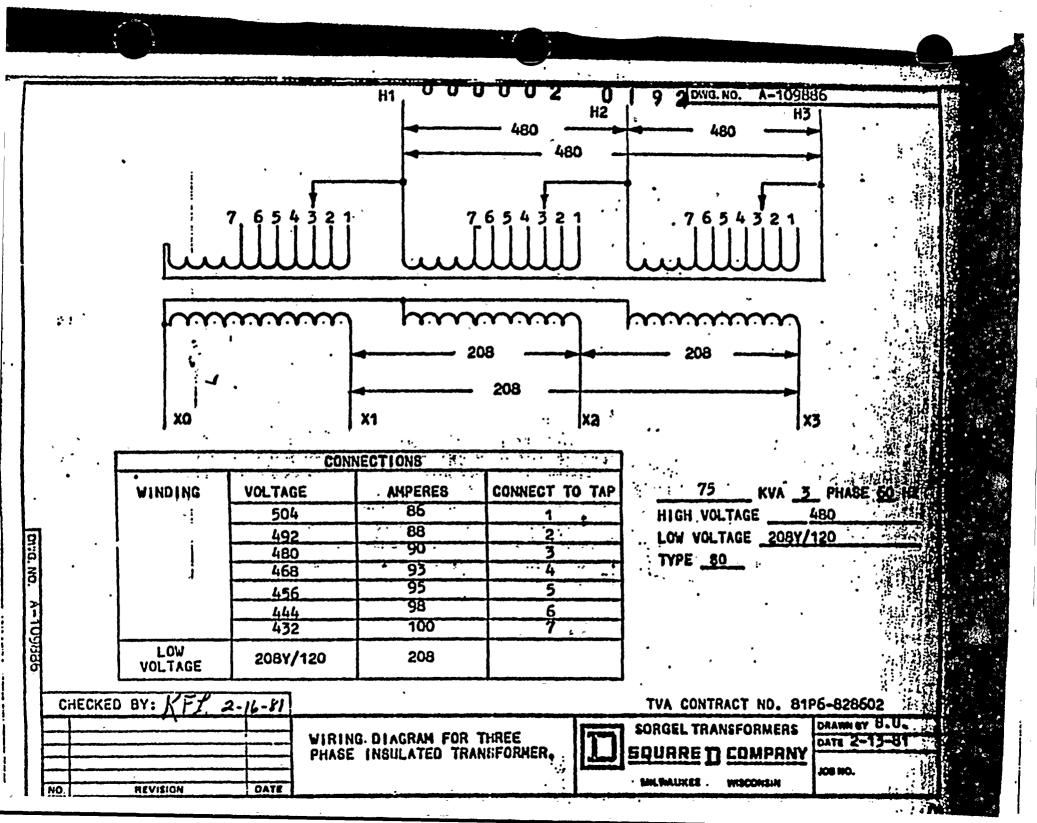
















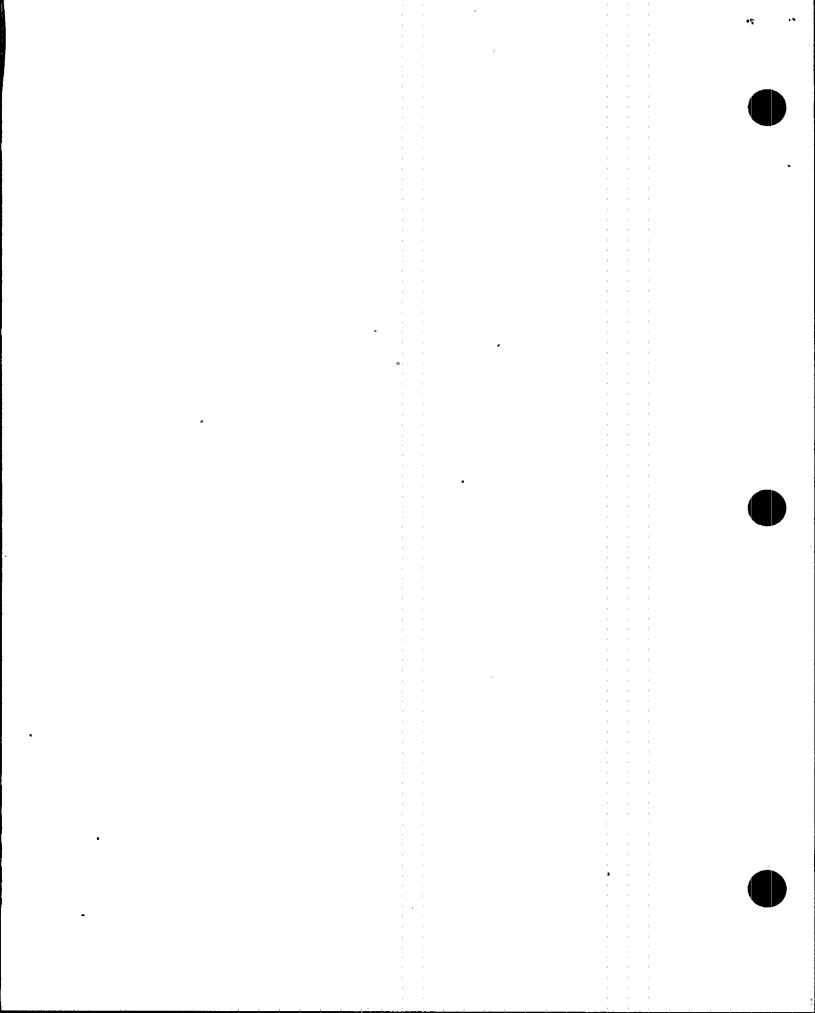
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	55EC Live no. 9285
	A-I Revision 2A Status ØNU
	SCREENING EVALUATION WORK-SHEET (SEWS) Sheet 1 of 3
	Equip. ID No. 2-JBOX-268-5991 Equip. Class 14 - Distribution Panels
	Equipment Description M-G Set 2DA Control Station (2-HS-268-0002DA)
	Location: Bldg. <u>UZ-RB</u> Floor El. <u>639</u> Room, Row/Col <u>U/R14</u>
ł	Manufacturer, Model, Etc. (optional but recommended)
	SEISMIC CAPACITY VS DEMAND1. Elevation where equipment receives seismic input2. Elevation of seismic input below about 40' from grade3. Equipment has fundamental frequency above about 8 Hz4. Capacity based on: Existing DocumentationBounding Spectrum1.5 x Bounding SpectrumGERS
	5. Demand based on: Ground Response Spectrum GRS 1.5 x Ground Response Spectrum AGS Conserv. Des. In-Str. Resp. Spec. CRS Realistic M-Ctr. In-Str. Resp. Spec. RRS Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)
	CAVEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) Equipment is included in earthquake experience equipment class Contains only circuit breakers and switches All latches and fasteners in door secured Adjacent cabinets which are close enough to impact, or sections of multi-bay cabinets, are bolted together if they contain essential relays Wall- or floor-mounted NEMA-type enclosure Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum?
	CAVEATS - GERS (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below). Equipment is included in the generic seismic testing equipment class Meets all Bounding Spectrum caveats Use panelboard GERS unless unit is free-standing and designated as a switchboard by manufacturer W "Quicklag" Type E circuit breakers are not in distribution panel All adjacent cabinets or sections of multi-bay assemblies bolted together Y N U N/A

y.



	SSEL Line no.	9285		
	AT .	SCREENING EVALUATION WORK SHEET (SEWS)	Revision 2A Sheet 2 of 3 :	
		2-JBOX-268-5991 Equip. Class 14.		
	ANCHORAGE	· · · · · · · · · · · · · · · · · · ·		
ļ	(mass, CG, 2. Type of ar 3. Sizes and 4. Anchorage	e equipment characteristics determined natural freq., damping, center of rotati chorage covered by GIP locations of anchors determined installation adequate, e.g., ity and length, nuts and washers, expansion		
1	anchor tic 5. Factors a safety cor free-edge	phiness ffecting anchorage capacity or margin of isidered: embedment length, anchor spacin distance, concrete strength/condition, an	YNUN/A ng, nd	
	1/4-inch	i anchorages, gap under base less than	(Ý) N U N/A (Ý) N Ù N/A	
	under base 8. Base has a	ffecting essential relays considered: gap e, capacity reduction for expansion anchor adequate stiffness and effect of prying anchors considered		
	9. Strength c to CG adec	of equipment base and load path :	Y N U N/A	
•	pad adequa Are anchorage rec	icy evaluated	YNUNA (3) YNU)))
	INTERACTION EFFEC	<u>TS</u> ets free from impact by nearby	_	
	equipment 2. If equipme	or structures ent contains sensitive relays, equipment all impact by nearby equipment or structu	ÎN UN/A	,
	 Attached 1 Overhead e 	ines have adequate flexibility equipment or distribution systems are to collapse	Y N U N/A	
	5. Have you 1	ooked for and found no other adverse conc of interaction effects?	cerns? (PNUN/A NUN/A (PNU	
		MICALLY ADEQUATE?	V N U	
	(1) Component	t is rigidly mounted to the way f > Bhz, by judgment.	le close to the floor	
	elevation	f > 8 hz, by Judgment.	PRE EL (39'	
	(2) Per cale	. CD-Q0000-940339, h-structure of lemand) exceeds the capacity ((1.5 × Boundy' spectrum)	
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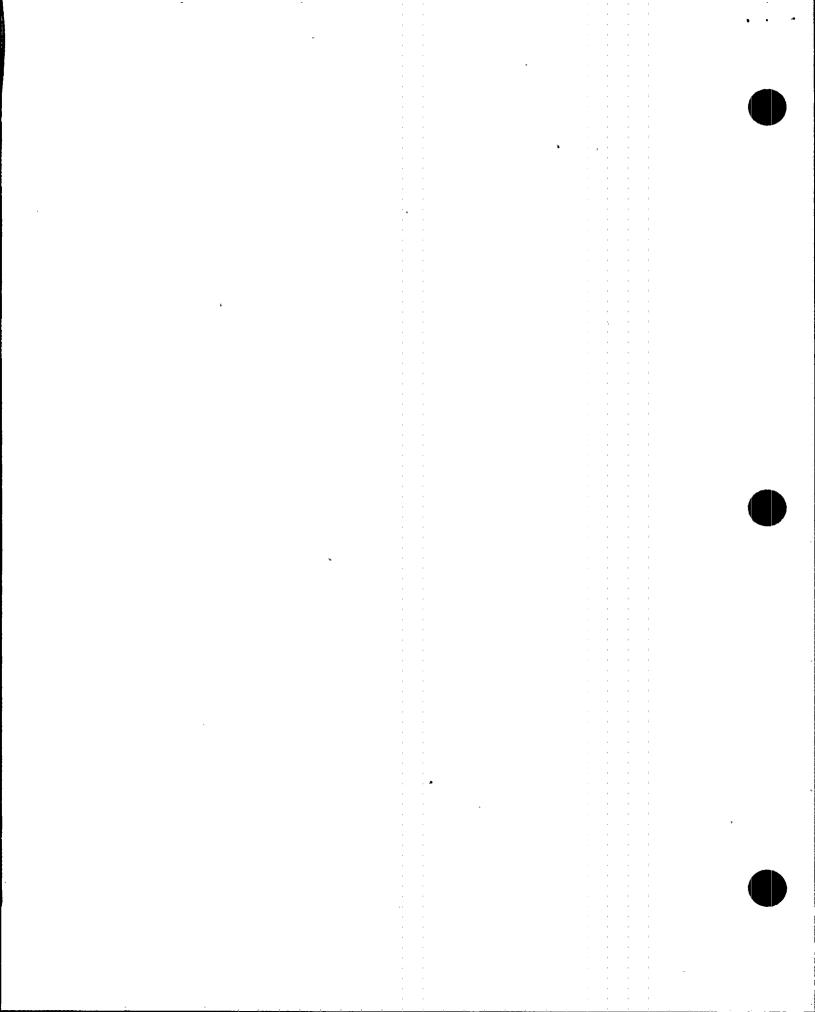
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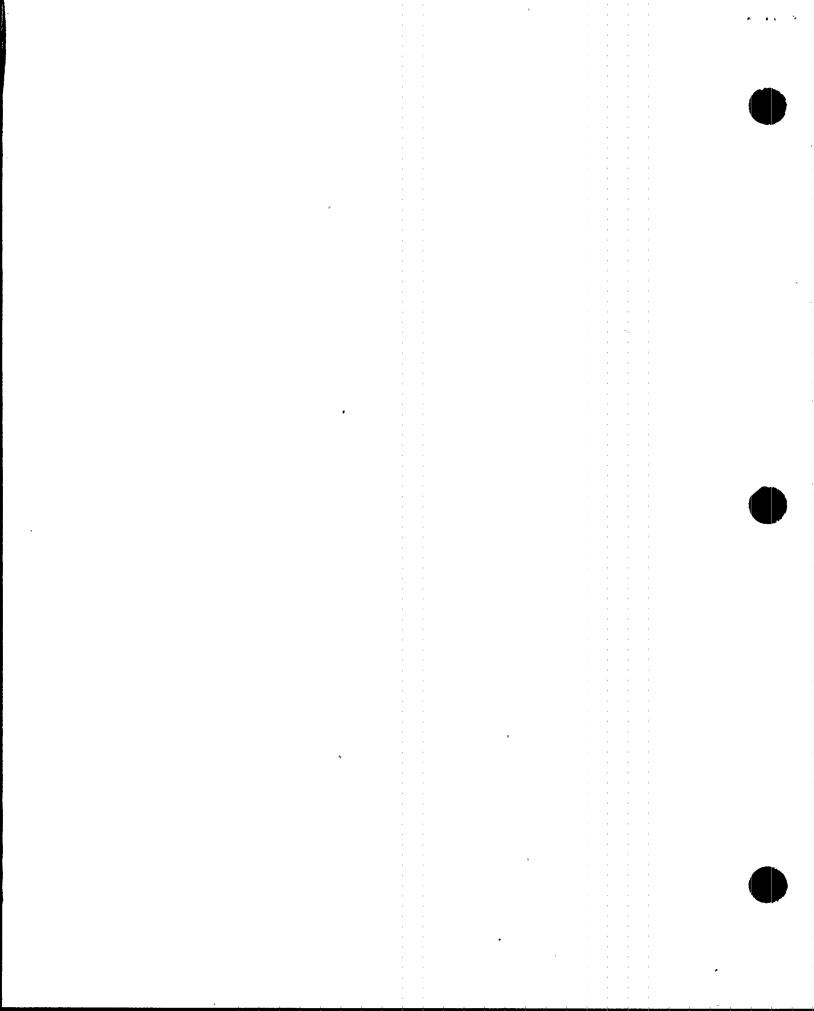


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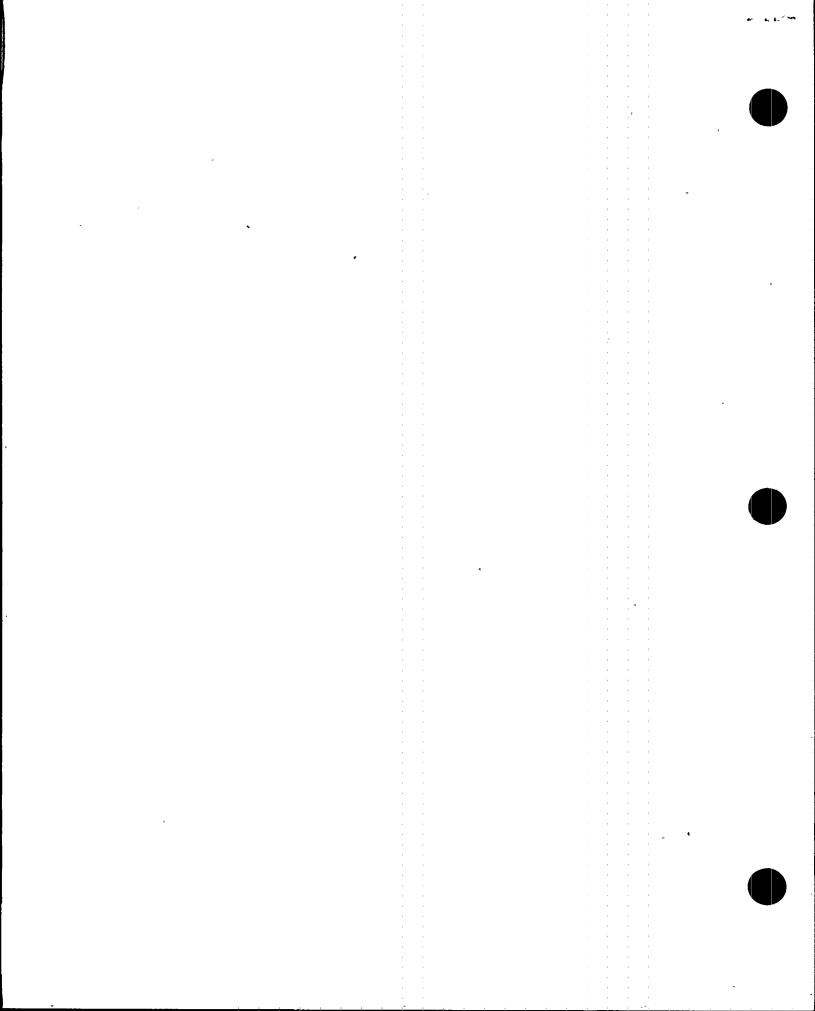
Revision 2A <u>SCREENING EVALUATION WORK SHEET</u> (SEWS) Sheet 3 of 3 Equip. ID No. <u>2-JBOX-268-599</u>/ Equip. Class <u>14 - Distribution Panels</u> Equipment Description <u>MG Set 2DA Control Station (2-1t5-268-0002DA)</u> <u>COMMENTS</u>

(3) Component is small + light weight. Tag test demonstrates adequate anchorage.

Evaluated by:	obh O. E	Diran	Date: _	1/11/96
	Ý.	J.R. Dissor		1/12/96



5551 Line Ha 9285				
SSEL Line No. 9285	~	•	Status (Y) N	U
AI .			Sheet 1 of 1	
	IPEEE SUPPLEMEN	TAL SCREENING	EVALUATION WORKSHEET -	
	-	· - ·		
Equip. ID No. 2-JBox-	268- <u>9991</u> Equ	rip. Class _/	F- Bist, Panets	
Equipment Description	M-G Set 20	A Control S	Fation (2-145-268-0	oozda)
RELAY WALKDOWN		•		
1. Does spot check of relays present and			Y N U NA	
2. Are essential rela during earthquake		function ;	Y N U MA	
If no, attach lis cabinet and genera details of mountin for later analysis	al dimensions, t ng plates that s	hicknesses and		
3. No other relay co	ncerns?		🗇 N U N/A	•
Requirements for rela	ys satisfied?	:		N U
SYSTEM INTERACTION EF	FECTS	•		
<pre>1. No potential sour cabinet?</pre>	ces could flood	or spill onto	Y N U N/A	
cabinet?			ATISFACTORY (Use additiona	1
cabinet? DESCRIBE POTENTIAL PR				1
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cabinet? DESCRIBE POTENTIAL PR				1
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cabinet? DESCRIBE POTENTIAL PR sheets if necessary)	OBLEMS INDICATE) by no or uns		
cabinet? DESCRIBE POTENTIAL PR sheets if necessary) IS EQUIPMENT FREE OF	DBLEMS INDICATED) BY NO OR UNS	ATISFACTORY (Use additiona	
cabinet? DESCRIBE POTENTIAL PR sheets if necessary) IS EQUIPMENT FREE OF YES V NO	DBLEMS INDICATED) BY NO OR UNS	ATISFACTORY (Use additiona	



INIENT 5SEZ NO. <u>9406</u> **Revision 2A** Status Sheet 1 of 2 4 SCREENING EVALUATION WORK SHEET (SEWS) Equip. ID No. Z-CHGD-283-A1-2 Equip. Class 16 - Battery Chargers & Inverters Equipment Description <u>+244 NEUTRON HONITOR BATTERY CHARGERS 41-2</u> Location: Bldg. CB Floor El. 593 Room, Row/Col RATTERY BOARD-ROOM 2 | Manufacturer, Model, Etc. (optional but recommended) <u>GENERAL ELECTRIC $\pm 24V$ </u> SEISMIC CAPACITY VS DEMAND <u>598</u>¹ <u>Y N U N/A</u> Y N U N/A NOTE (Elevation where equipment receives seismic input Elevation of seismic input below about 40' from grade Equipment has fundamental frequency above about 8 Hz DOC Capacity based on: Existing Documentation BS Bounding Spectrum (ABS 1.5 x Bounding Spectrum GERS GERS GRS Demand based on: Ground Response Spectrum AGS 1.5 x Ground Response Spectrum CRS · Conserv. Des. In-Str. Resp. Spec. (RRS` Realistic M-Ctr. In-Str. Resp. Spec. Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic - NOTE (I) demand spectrum is invoked per Section 4.2 of the GIP.) <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) Equipment is included in earthquake experience U N/A equipment class U N/A Solid state type For floor-mounted, transformer positively anchored and mounted near base, or load path is evaluated Base assembly of floor-mounted unit properly Y N U braced or stiffened for lateral forces For wall-mounted units, transformer supports and bracing provide adequate load path to the rear. cabinet wall XMFR secured w/ 4-14" & bolts to internal frame (V) N U N/A NOTE E N U (N/A) ·

Y DU V N/A NOTE D N U N/A NOTE D

Y(N]U N/A

U N/A

(N

6. All latches and fasteners in doors secured

1.

2.' 3.

4.

5.

1.

2.

3.

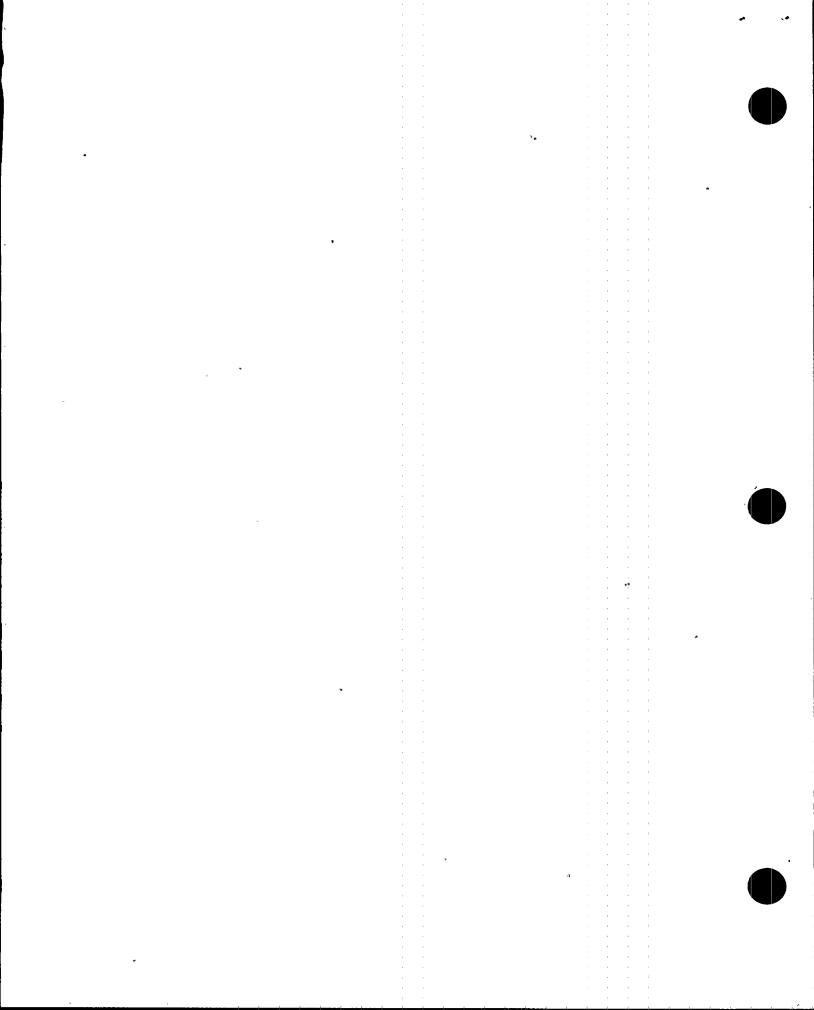
4.

5.

- 7. Anchorage adequate (See checklist below for details)
- Relays mounted on equipment evaluated A = 3.08.
- Have you looked for and found no other adverse concerns? 9. Is the intent of all the caveats met for Bounding Spectrum?

<u>CAVEATS - GERS</u> (Identify with an asterisk (*) those caveats which are met by intent without meeting the specific wording of the caveat rule and explain the reason for this conclusion in the COMMENTS section below) 1. Equipment is included in generic seismic testing U /N/A Y N equipment class Y N U N/A

Meets all Bounding Spectrum caveats 2.



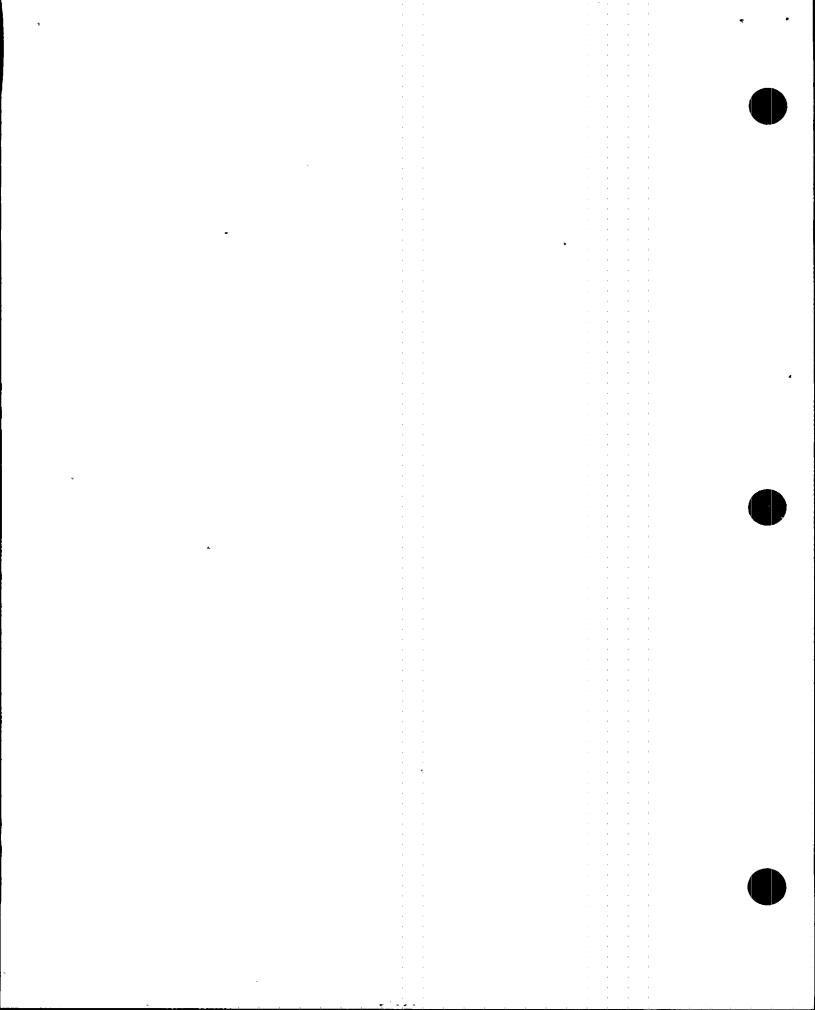
SCREENING EVALUATION WORK SHEET (SEWS)

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Revision 2A Sheet 2 of 3 4

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	•					
	ID No. 2_CHGN-283-A1-2 Equip. Class 16 - Battery Cl					
Equipme	ent Description <u>224 V NEUTRON MONITOR PATTERY CH</u>	ARGE	<u>k</u> ş		<u>4/-2</u>	,
CANEAT	<u>S - GERS (Cont'd)</u>					
<u> </u>	Silicon-Controlled Rectifier (SCR) power controls;				~	
5.	wall- or floor-mounted NEMA-type enclosure	Y	N	u /	N/A	\
4.	Within range of battery charger ratings:	ł	IV.	~	iγA	<u></u>
۰.	24-250 VDC	Y	N	пÌ	N/A	
	120-480 VAC	Ý	N	ŭ	N/A	
	25-600 amps	Ý	N N N	ŭ	N/A	
	150-2850 pounds (floor-mounted)	Ý	Ň	Ŭ	N/A	
	150-600 pounds (wall-mounted)	Ý	N	Ŭ	N/A	
5.	Within range of inverter ratings:			- 1	· ·	
	120 VDC only	Y	Ν	U	N/A	
	120-480 VAC	Y	N	U	N/A	
	0.5-15 KVA	- Y	N	U	N/A	1
	300-2000 pounds	Y	N	υł	N/A	
6.	Heavy components are located in lower half of cabinet					
	and are supported from base or rear panel with no panel					
	cutouts adjacent to attachment	Y	N	U (N/A)	\square
Is the	intent of all the caveats met for GERS?				Ϋ́	N U N/A
N						\bigcirc
NCHOR.	AGE					
1.	Appropriate equipment characteristics determined					
	(mass, CG, natural freq., damping, center of rotation)	Ŷ	N N (ዾ	N/A N/A N/A	
2.	Type of anchorage covered by GIP	Y	N ⁻	W.	N/A	
3.	Sizes and locations of anchors determined	Y	N (U	N/A	• •
4.	Anchorage installation adequate, e.g.,					
•	weld quality and length, nuts and washers, expansion			<u>ھ</u>		
[anchor tightness	Ŷ.	N	ர	N/A	
5.	Factors affecting anchorage capacity or margin of					
	safety considered: embedment length, anchor spacing,		•			
	free-edge distance, concrete strength/condition, and					
	concrete cracking	Ŷ	N	\mathbf{U}	N/A	
б.	For bolted anchorages, gap under base less than	.				
	1/4-inch	Ŭ	N	U	N/A	
7.	Factors affecting essential relays considered: gap		••	••		
	under base, capacity reduction for expansion anchors	\mathbb{O}	N	U	N/A	
8.	Base has adequate stiffness and effect of prying	Ā				
	action on anchors considered	Ŭ	N	U	N/A	
9.	Strength of equipment base and load path	0				
	to CG adequate	. 🕑	N	U	N/A	
10.	Embedded steel, grout pad or large concrete			ß	11/4	
	pad adequacy evaluated	Y	N	ພ	N/A	. <u> </u>
Are an	chorage requirements met?				Y	(m) u
ITERA	CTION EFFECTS					
1.	Soft targets free from impact by nearby	<u>,</u> ,			11 / A	
	equipment or structures	Ŭ	N	U	N/A	
2.	If equipment contains sensitive relays, equipment	5		U	N / A	
	free from all impact by nearby equipment or structures	U	n	U	N/A	
		-				



SCREENING EVALUATION WORK SHEET (SEWS)

Revision 2A Sheet 3 of 3 4

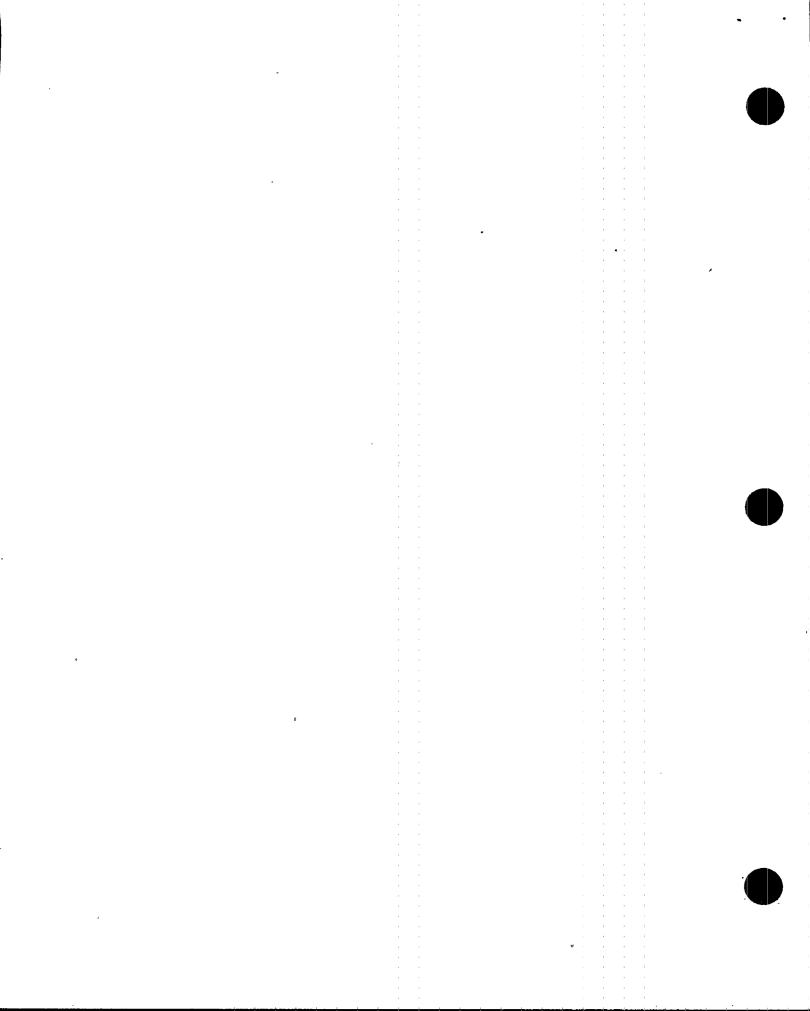
Equip. ID No. 2-CHGD-283-A/-ZEquip. Class 16 - Battery Chargers & Inverters Equipment Description 1241/ NEUTRON MONITOR BATTERY CHARGERS AL-2 INTERACTION EFFECTS (Cont'd) (Y) N U N/A NOTE 4-Attached lines have adequate flexibility 3. Overhead equipment or distribution systems are 4. not likely to collapse U N/A U Have you looked for and found no other adverse concerns? N/A 5. (Y)n u Is equipment free of interaction effects? U(N)Y IS EQUIPMENT SEISMICALLY ADEQUATE? COMMENTS

1. THE BATTERY CIFARGER IS RIGIALY MOUNTED TO THE WALL WITH 4 - 36" & DIAMETER ANCHORS USING WASHERS AS SCALERS TO PROVINE ABOUT 1/2" CLEARANCE FROM THE WALL. TEST REJULTS INDICATE THE NATURAL FREQUENCY OF TYPICAL WALL MOUNTED BATTERY CHARGERS TO BE GREATER THAN 8 HZ (REFER TO EDRI TR-102180). THE SG3' REVALTOR BUILDING ELENATION

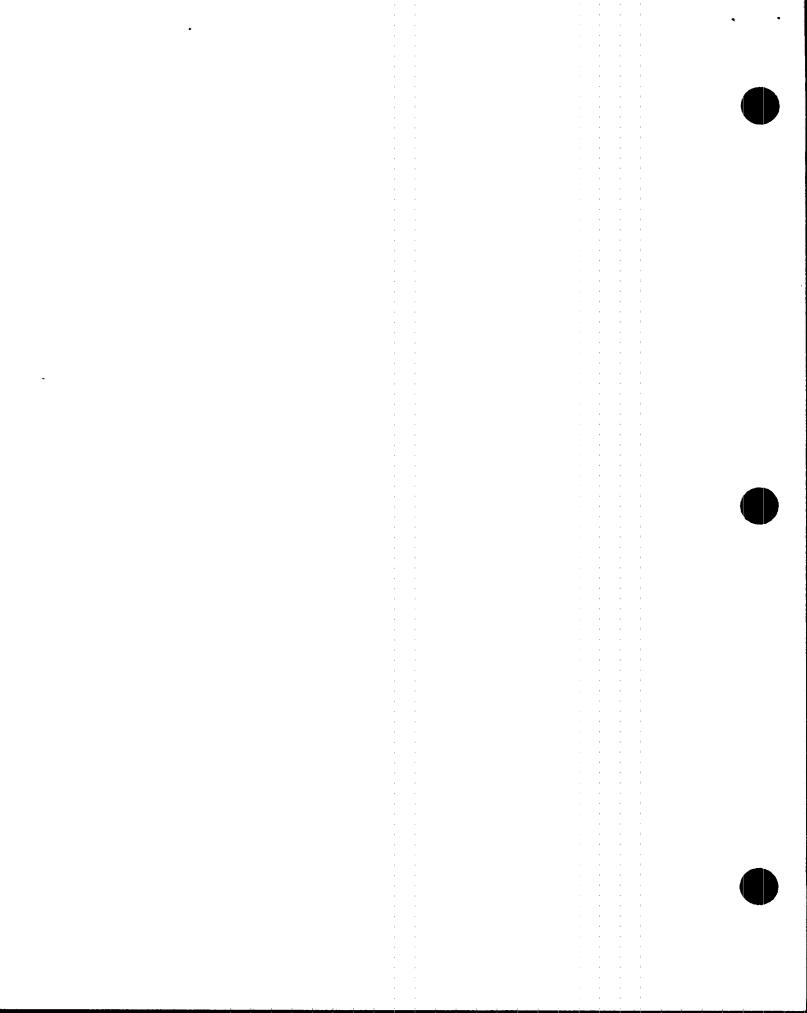
- RRS EXCEETS THE ABS IN THE FREQUENCY RANGE OF 5.5-GIZ HZ. BECAUSE THE NATURAL FREQUENCY OF THE BATTERY CHARGER IS GREATER THAN 8 HZ, THE CAPACITY SACTUM ENVELOPES THE BENGAND SPECTMA AND THE INTENT OF THE CANERT IS MET.
- 2. THE BATTERY CHARGER IS WALL MOUNTED USING 4-316" & ANCHORS. HOWEVER, THE ANCHORS ARE MOUNTED IN A SETSHIC BLOCK WALL AND AUTAICS OF THE ANCHORAGE USED ARE UNAVAILABLE, DUTLIER. SEE OSVS - 9406 . SEE THE ATTACHED SKETCH OF THE BATTERY CHARGER AND VISIBLE ANCHORAGE BETAILS.
 - 3. RELAYS ARE EVALUATED IN A SEPARATE HEOGRAM. IT IS NOT KNOWN IF RELAYS ARE LOCATED IN THE CHARGERS.
 - 4. CONJULT EXITING/ENTERING THE TOD OF THE CHARGER ARE RIGIS. CONJULT EXITTING/ENTERING THE BOTTON OF THE CHARGER ARE FREX CONJULTS. THE ATTACHED CONJULT IS RECEPTINGLE AN THEY ARE ATTACHED TO THE SAME BLOCK WALL THE CHARGER IS HOUNTED ON.

J.R. SISSER Date: _ Evaluated by:

PHOTOS: 4/18/96 BOLL 8-, 13+14 6.16-3'



EQE INTERNATIONAL SHEET NO. 4/4 JOB NO. 50147 JOB 2-CHGA-283-A1-2 CALC. NO. N/A SUBJECT 550 # 9406 CALC. NO. NA SUBJECT The DATE 4/19/96 CHK છિા 24" BATTERY CITARGER -3/11 5 NUTSON STUDS 2/2" æ, -[6" 16" OF WALL FRONT ~ ZXZX / THE. TE (TYP) ł 1 BACK OF WALL



SSEL Line No. _9406 AI

Status	Y (N) U	
Sheet l	of	1

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RELAYS EVALUTES

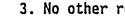
IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. Z-CHGD-283-A1-Z Equip. Class 16-BATTERY CHARCENS Equipment Description 124 V NEUTRON MONITOR BATTERY CHARGERS A1-2

RELAY WALKDOWN

- 1. Does spot check of essential relays indicate relays present and properly mounted?
- 2. Are essential relays required to function during earthquake screened out?

If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.



3. No other relay concerns?

Requirements for relays satisfied?

SYSTEM INTERACTION EFFECTS

1. No potential sources could flood or spill onto cabinet?

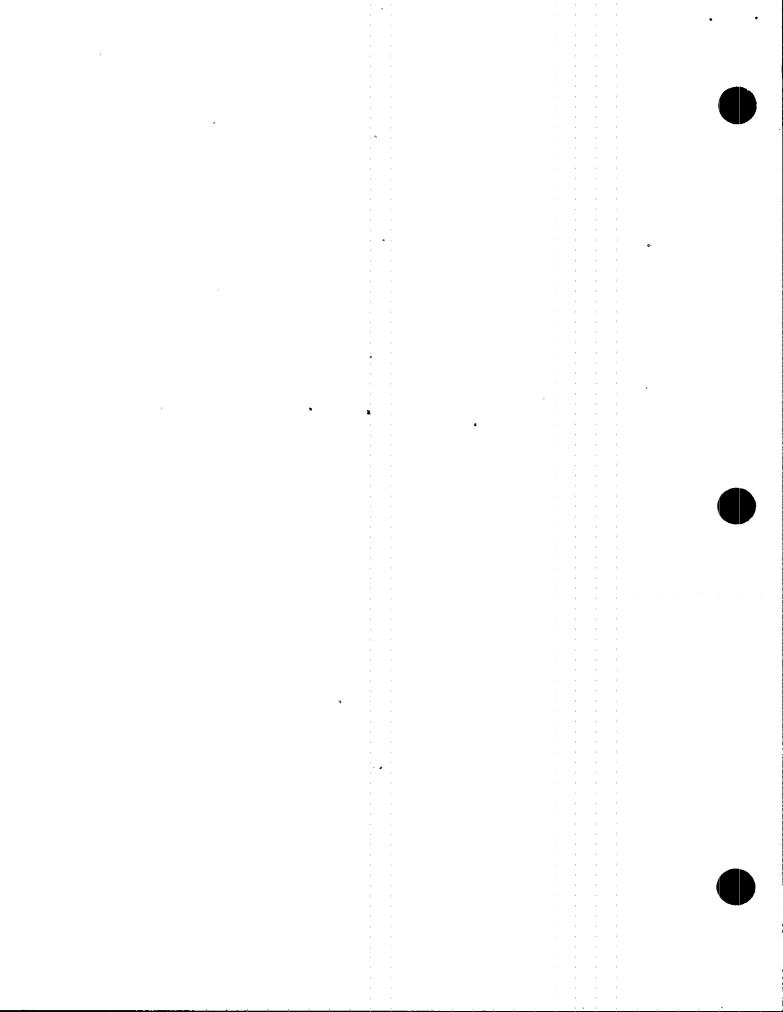
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

ADEQUART OF ANCHERAGE LS INDETERMINATE. SEE OSUS-9406

)	IS	EQUIPMENT	FREE OF XEED	FOR FURTHER	INVESTIGATION,	EXCLUDING REL	AY CHATTER?	
		YES	NO <u> </u>					
	IS	EQUIPMENT	FREE OF NEED	FOR FURTHER	RELAY CHATTER	INVESTIGATION?	YES V NO	
		aluated by		* ·	_ J.R. Diss	CCR Date:	4/12/96	_′
		aluated by:		Dizon		Date:	4/19/96	_′



П ·N/A (Y) N



SSEL	Line No.	9406	OS	US - 940	6	Sheet I of	2	
		OUTLIE	R SEISMIC	VERIFICATI	ON SHEET (OSVS)		
1.	OUTLIER I	DENTIFICATI	ON, DESCRI	PTION, AND	LOCATION		-	
	Equipment	ID Number2	<u>-CHGD-28</u>	<u>33-A/-2</u>	Equipment	Class 18 10	6	
	Equipment	Location:	Bldg	3	Floor El	evation <u>59</u>	3	
	Room or	Row/Column	BATTERY	BOARD RH D	ZBase Ele	vation <u>~598</u>	3	
	Equipment	Description	n <u>=24V</u>	NEUTRON	HON ITOR	BATTERY C	HARLERS	' AI-2_
2.	OUTLIER IS	SSUE DEFINI	TION				·	

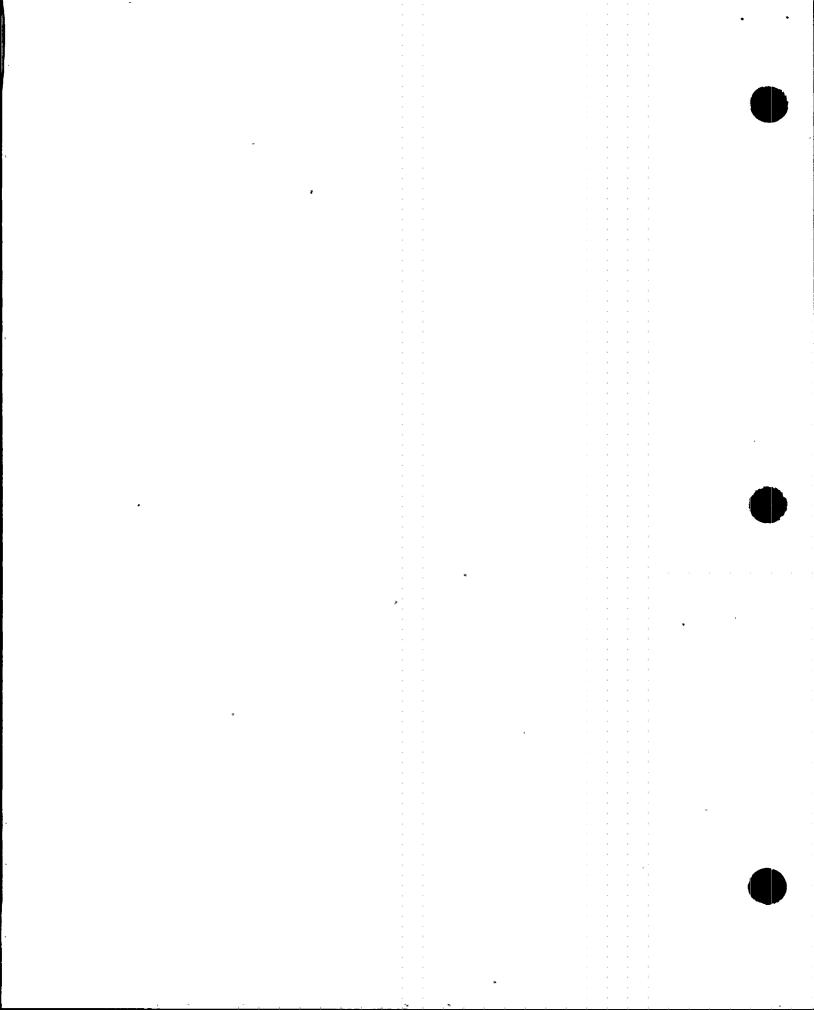
a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)

Mechanical and <u>Electrical Equipment</u> Capacity vs. Demand Caveats Anchorage Seismic Interaction Other	Tanks and Heat Exchangers Shell Buckling* Anchor Bolts and Embedment Anchorage Connections Flexibility of Attached Piping* Other	
<u>Essential Relays</u> Capacity vs. Demand Mounting, Type, Location Other	 <u>Cable and Conduit Raceways</u> Inclusion Rules Other Seismic Performance Concerns Limited Analytical Review Other	

* Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.

b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):

CHARGERS ARE MOUNTED ON A SEISMIC MASONARY BLOCK WALL USING 3/8" ANCHERS (NUTS ON STUDS VISIBLE, 3=1/16" PLATES ON BACK OF WALL VISIBLE). NO DETAILS ARE AVAILABLE TO DETERMINE THE SEISMIC ABEQUART OF THE ANCHERAGE.



SS	EL	Line	No. <u>9406</u> Sheet 2 of 2	,
			OUTLIER SEISMIC VERIFICATION SHEET (OSVS)	
			Equipment ID Number <u>Z-C1-45-283-</u> A1-Z	
3.		PROP	DSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)	
	i	a.	Define proposed method(s) for resolving outlier.	
			LOCATE ANCHORAGE DETAILS AND EVALUATE OR	
			INSTALL THROUGH BOLTS IN BLOCK WALL	
			/	SEE
				ATTACTS
	ł	5.	Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).	52E ATTACATED SHEETS 9/23/96
			SEE SKETCH IN THE SEWS FOR THIS EQUIPMENT.	
				۰
	•			
				• •*

4. CERTIFICATION:

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

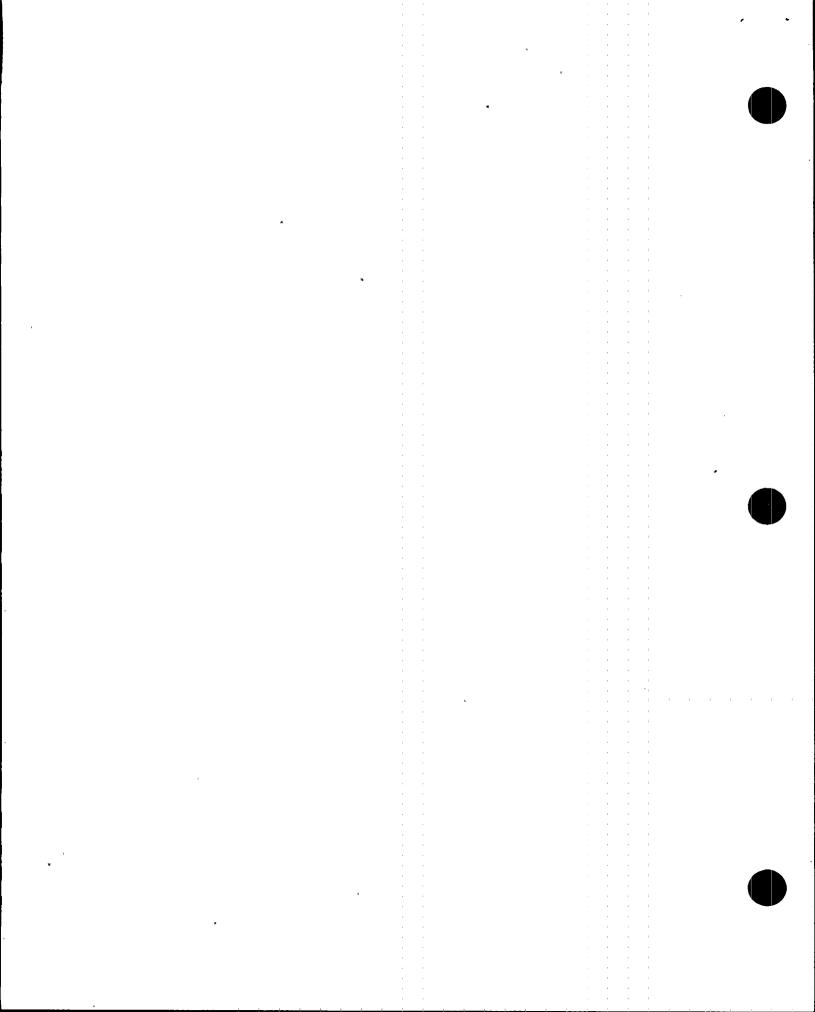
Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

4/19/96 Date 4/19/96 MES R. BISSOR Print or Type Name Signature DIZON 10HW rint or Type Name

Print or Type Name

Signature

Date



24V Neutron Monitoring Battery Chargers AL--2. A2-2. BI-2. & B2-2 SSEL # 9406. 9407. 9408. 9409

The 24V Neutron Monitoring Battery Chargers A1-2, A2-2, B1-2, & B2-2 are located in the Battery Board Room, Unit 2, floor elevation 593. They are mounted on the existing block wall adjacent to the MG-Motor Set room. There is no drawing available which shows the existing anchorage and mounting details to these chargers. It is clear, however, that each of these battery chargers are securely fastened to the block wall via 4 anchor bolts. (appear to be 1/2 inch or greater in diameter). If any plates were used as they were in Unit 3, they were inaccessible at the time of inspection. As was previously calculated for Unit 3, an analytical approach was used to determine an effective load on each of the anchors. That effective load was determined to be 47.6 lbs. To get this load it was assumed the chargers weighed (conservatively), 150 lbs. For the purpose of determining the anchorage inherent strength and ability to withstand seismic forces, a vertical live load (200 lbs +; full weight applied by R. T. Deal), was applied to the chargers. The result was no slip or damage to the chargers or existing anchors. Additionally, an approximate horizontal force of 100 lbs. was placed on the boxes. This also produced no damage, slip, or failures. These applied loads were applied and witnessed by R. T. Deal and J. W. Beason (9.10.96). Both agreed on results, i.e. the charger's anchorage inherent strength would prevent the chargers from falling during or after an SSE. (this of course is contingent upon the masonry block performing its function and remaining in place..

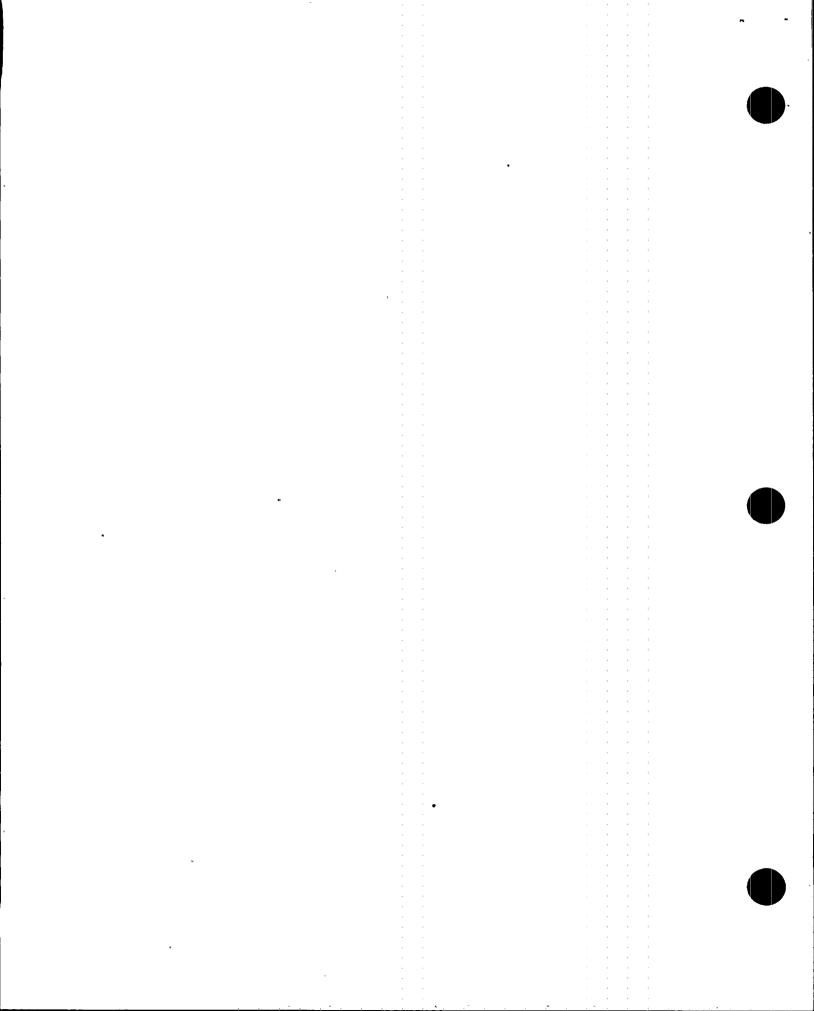
Currently, the EMS shows these chargers as quality-related. Therefore, being in the Reactor Building, they must maintain Class II/I criteria, i.e. not to fall in an SSE.

Based upon the anchorage geometry, rigidity of the chargers, inherent strength, and the added live load with no changes to support/anchorage integrity, it is concluded by engineering judgement that the chargers would remain on the block wall during and after an SSE.

Prepared Checked:

Date:

9-12-96



SHEET OF
COMPUTED SSH DATE 8-6-96
CHECKED RTD DATE 9-10.96

24. V. NEUTRON MONITORING BATTERY CHARGERS AL.3, N2-3, BI-3 & B2-3 ARE LOCATED IN BATTERY BOARD FOOM UNIT-3. THEY ARE MOUNTED ON BLOCK WALL NEXT TO THE STAIR NELL. THERE IS NO DRAWING AVAILABLE TO DEPICT THE DETAIL OF THE ATTACHMENT TO THE BLOCK WALL. WHAT IS CLEARLY VISIBLE, IS THAT THERE ARE FOUR BOLTS ATTACHING FACH OF THE BATTERY CHARGERS TO THE BLOCK WALL. ON THE OTHER SIDE OF THE BLOCK WALL, THERE IS A PLATE VIGX 2"X2" AT THE LOCATION OF EACH ANCHOR. IN THE ABSENCE OF INFORMATION AVAILABLE ON THESE BATTERY CHARGERS AND THEIR SUPPORTS, S.S. HAIDER AND C.N.SIMMS, VISUALLY INSPECTED AND CONSERVATIVELY ESTIMATED WEIGHTS OF EACH CHARGERS AS 150 LBS.

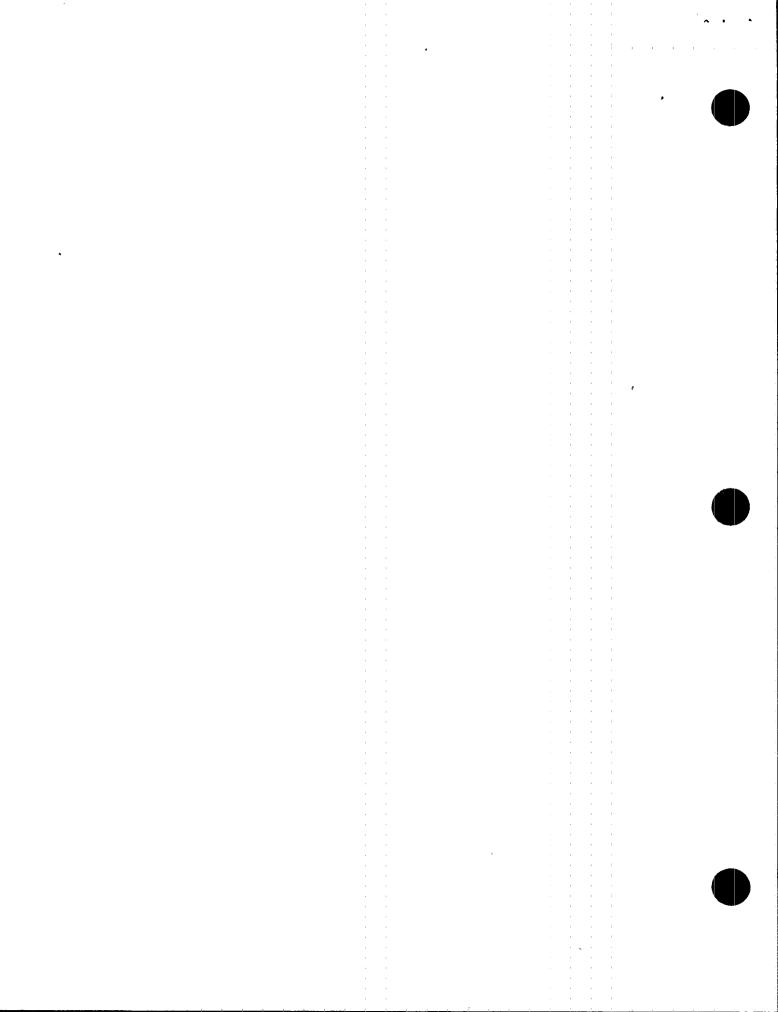
FOLLOWING CALCULATION WILL PEMONBTRATE THAT 47.6 LAS. OF. WEIGHT NEEDS TO BE HUNG FROM THE FRONTS OF THE ' CHARGER'S, TO SIMULATE THE EFFECT OF SSE ON ANCHORS.

IN REALITY A PERSON WEIGHING 125 LSS. HUNG HIMSELF FROM EACH OF THE 4 BATTERY CHARGERS, WITHOUT ANY DETRIMENTAL EFFECT ON THE CHARGERS OR ITS SUTPORTS. THIS REMONSTRATION WAS WITNESSED BY SEVERAL INDIVIDUALS, INCLUDING S.S. HAIDER, JOHNY DUKE (SRO) AND DAVE WHITTEHEAD (MOD). HENCE, IT IS CONCLUDED THAT THE SUPPORTS FOR THE BATTERY CHARGERS ARE ACCEPTABLE AS 15.

* IN 1.10.16 2.T. O DAL ACCOMPANIEN By J.W. BEASON INSPECTED COMPLIANS. R.T. O. APPLIED LOND TO ENCH CAMPLER > 50 ". K

(WM-7-75

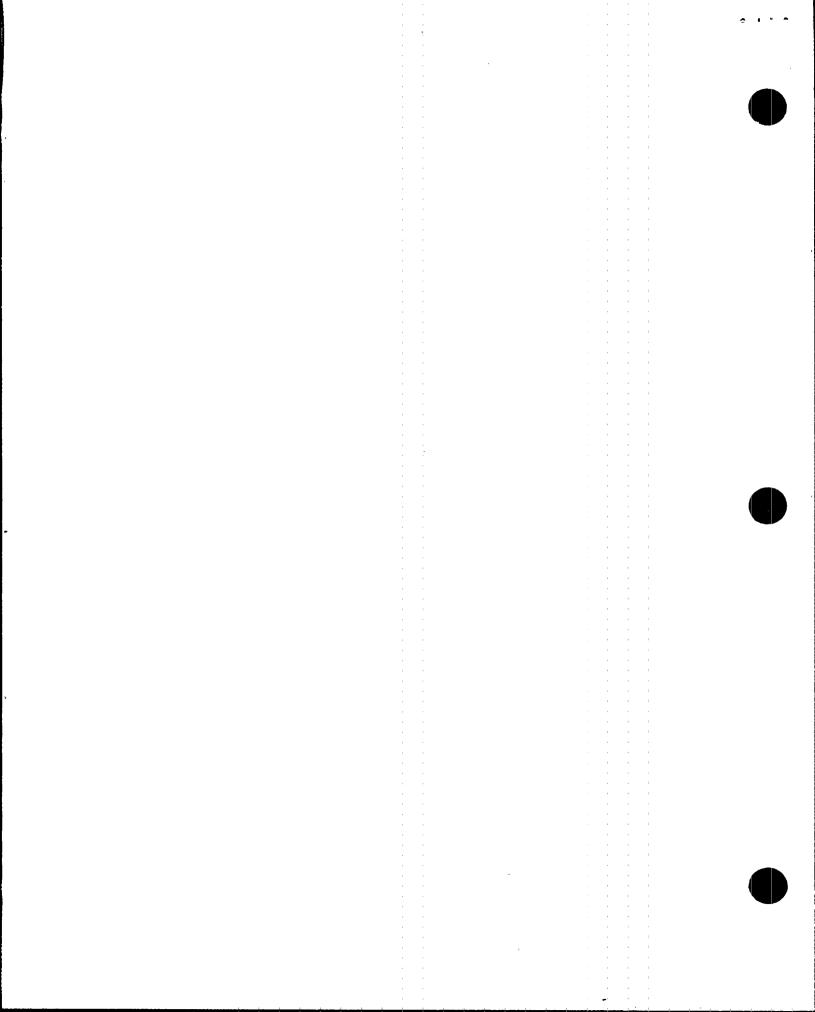
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SALLI COMPUTED SSH DATE 876196 CHECKED RATE 9.10.46

CASED ON THE SIZE AND SHAPE OF THE CHARGERS, AND THE FACT THAT IT IS MOUNTED DIRECTLY ON THE WALL WITH 4 ANTCHORS, IT IS JUDGED TO BE RIGID, AND ZPA IS USED TO. CALCULATE SSE REACTION AT EACH AN CHOR. PER CER REPORT 88-05-4, EL. 621-3": gy = 2x0.19 = 0.38 g gy = 2 x .. 08 = 0,16 g H = 150 × 0.38 = 57 LKS. V = 150× 1.16 = 174 LAS. TENSION/ANCHOR = $\frac{57}{4} + \frac{174 \times 8}{7242} = 49.05 \text{ LSS}.$ TO SIMULATE THE ABOVE EFFECT ELEV. LOOKING AT WALL CALCULATE THE MAGNITUDE OF P : LP $\frac{p(16)}{20 \times 7} + \frac{150 \times 8}{20 \times 2} = 49.05 \text{ LBS.}$ 8 :. P= 47.6 LASS. A_A

VA 11030 (WM-7-75

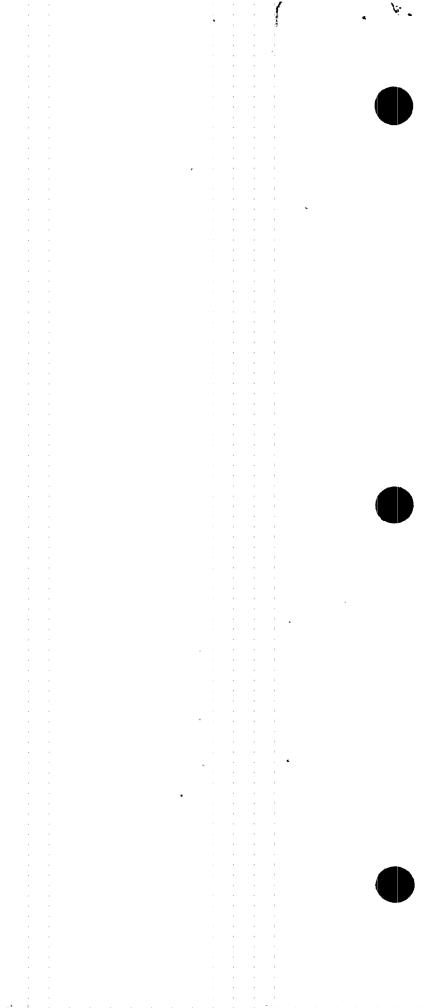


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SSEL Line No. 9305	Revision 2, Corrected, 6/28/91 Status N U
SCREENING_EVALUATION WORK SHEET (SEWS)	Sheet 1 of 3
Equip. ID No. <u>2 - LPNL - 925 - 247A</u> Equip. Class <u>18 -</u>	Instruments on Racks
Equipment Description Local Panel 2-25-247A (CAD)	Drummil & Supes AHANY)
Location: Bldg. <u>RR2</u> Floor El. <u>CZ1-3</u> Room, Row/Col	Q, RII
Manufacturer, Model, Etc. (optional)	
SEISMIC_CAPACITY VS_DEMAND	,
 Elevation where equipment receives seismic input Elevation of seismic input below about 40' from grac Equipment has fundamental frequency above about 8 Hz Capacity based on: Existing Documentation 1.5 x Bounding Spectrum 	$ \frac{626}{Y(N) \cup (37846 @ 550')} $ $ \frac{Y(N) \cup (37846 @ 550')}{V N \cup N/A (1)} $ $ \frac{DOC}{BS} $ $ \frac{626}{BS} (AB3) $
5. Demand based on: Ground Response Spectrum Ground 1.5 x Bounding Spectrum Conserv. Des. In-Str. Resp. Spec Realistic M-Ctr. In-Str. Resp. Spec	GRS ABSAGS CRS
Does capacity exceed demand?	(3)*
VEATS - BOUNDING SPECTRUM (Identify with an asterisk (*) are met by intent without meeting the specific wording of t explain the reason for this conclusion in the COMMENTS sect	the caveat rule and
 Equipment is included in earthquake experience equipment class No computers or programmable controllers Steel frame and sheet metal structurally adequate Adjacent racks which are close enough to impact or 	 𝔅) N U N/A 𝔅) N U N/A 𝔅) N U N/A 𝔅) N U N/A
sections of multi-bay racks are bolted together if they contain essential relays 5. Natural frequency relative to 8 Hz limit considered 6. Attached lines have adequate flexibility 7. Anchorage adequate (See checklist below for details) 8. Relays mounted on equipment evaluated 9. Have you looked for and found no other adverse conce Is the intent of all the caveats met for Bounding Spectrum?	erns? (DNUN/A
 <u>CAVEATS - GERS</u> (Identify with an asterisk (*) those caveats met by intent without meeting the specific wording of the cand explain the reason for this conclusion in the COMMENTS Equipment is included in the generic seismic testing equipment class Meets all Bounding Spectrum caveats Component is a pressure, temperature, level or flow transmitter 	caveat rule section below)

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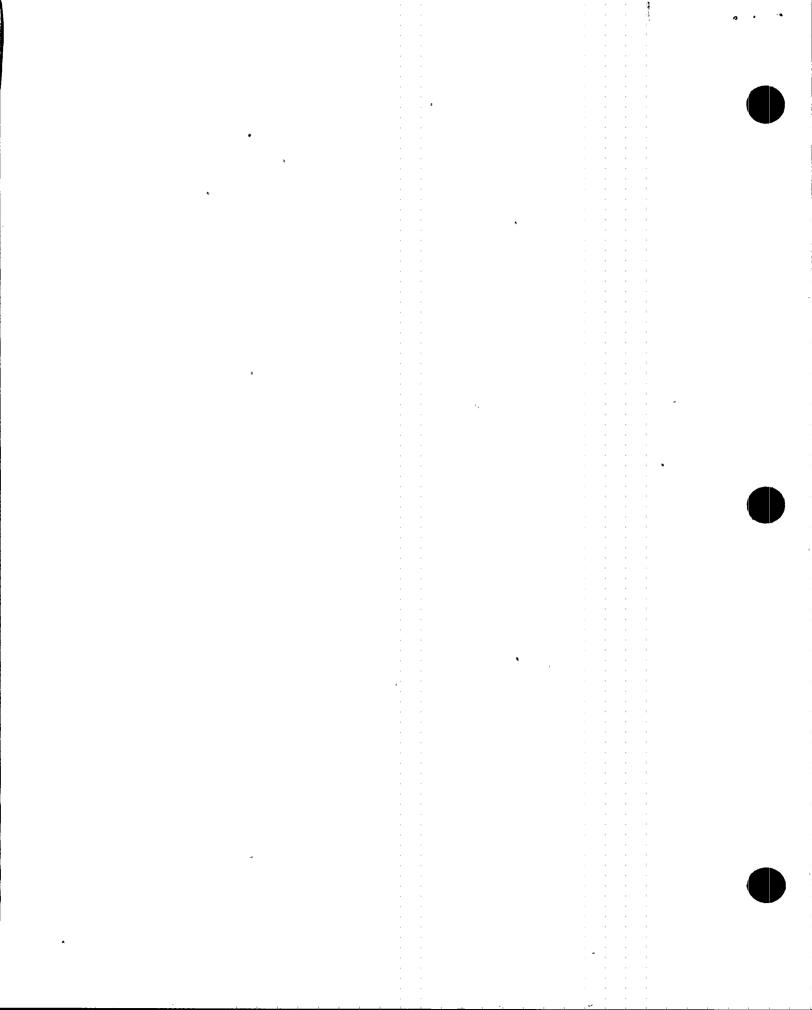
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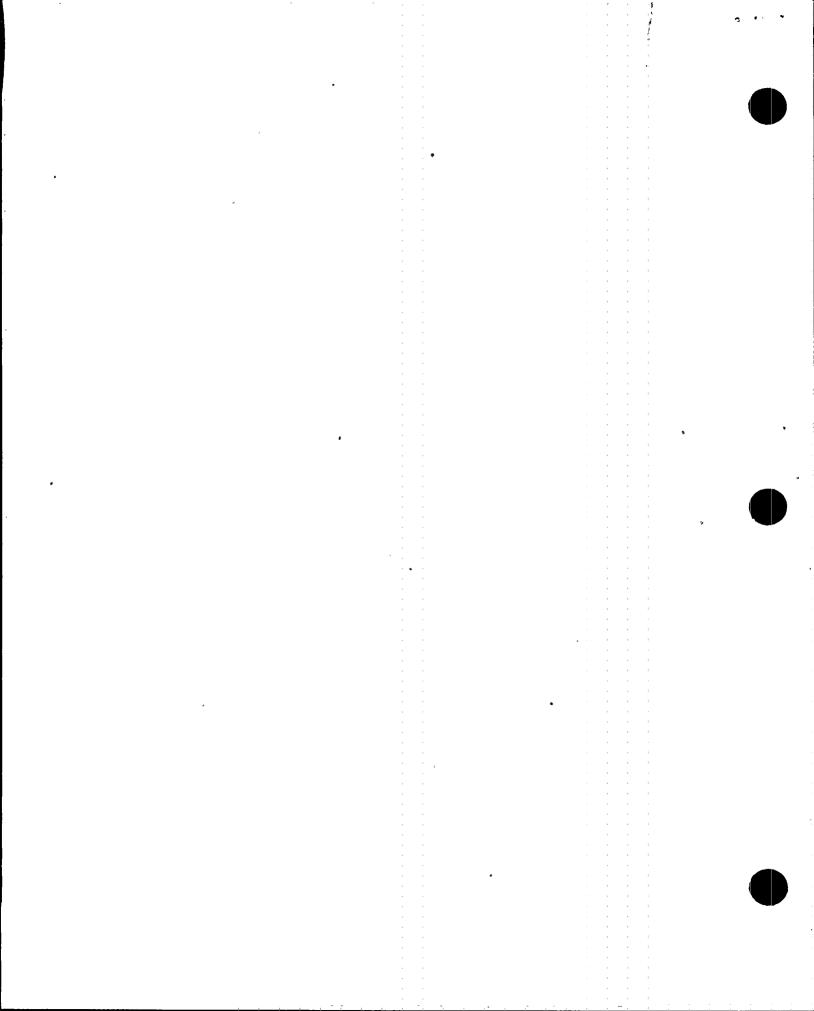


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SSEL Line No. 9305 Revision 2, Corrected, 6/28/91 SCREENING EVALUATION WORK SHEET (SEWS) . Sheet 2 of 3 Equip. ID No. 2-LPNL -925 - 0247A Equip. Class 18 - Instruments on Racks Equipment Description Panel 2-25-247A <u>CAVEATS - GERS (Cont'd)</u> Component is one of the specific makes and models 4. N U N/A tested, as listed in Appendix B Y 5. Necessary function of component not sensitive to seismically induced system perturbations (e.g., Y N U sloshing) Y No vacuum tubes N U 6. U Y N 7. All external mounting bolts in place Demand based on amplified portion of 3% damped 8. floor response spectrum if estimated natural YNU (N/D) frequency of rack less than 33 Hz 9. Rack capable of structurally transferring GERS Y N U (N7A) level seismic loads to anchorage Is the intent of all the caveats met for GERS? YNU (ATA) ANCHORAGE 1. Appropriate equipment characteristics determined () N U N/A () (mass, CG, natural freq., damping, center of rotation) 2. **WNU** N/A Type of anchorage covered by GIP SN U N/A 3. Sizes and locations of anchors determined 4. Adequacy of anchorage installation evaluated (weld quality and length, nuts and washers, expansion CON U N/A anchor tightness, etc.) 5. Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and (Y)N N/A concrete cracking U For bolted anchorages, gap under base less than 6. (Y) N U N/A 1/4-inch 7. Factors affecting essential relays considered: gap U (N7A) Y N under base, capacity reduction for expansion anchors 8. Base has adequate stiffness and effect of prying N/A (Ŷ) N U action on anchors considered 9. Strength of equipment base and load path (C) N U N/A to CG adequate Embedded steel, grout pad or large concrete . 10. pad adequacy evaluated YNU (N/I)(9) N U (~) Are anchorage requirements met? INTERACTION EFFECTS 1. Soft targets free from impact by nearby (Ý) N U equipment or structures N/A 2. If equipment contains sensitive relays, equipment U \$YD free from all impact by nearby equipment or structures N ON U N/A (2) 3. Attached lines have adequate flexibility



SSEL Line 10. 5305 Revision 2, Corrected, 6/28/91 Sheet 3 of 3 SCREENING EVALUATION WORK SHEET (SEWS) Equip. Class <u>18 - Instruments on Racks</u> Equip. ID No. 2-LPNL-925-0247A Equipment Description Pench 2-25-247A INTERACTION EFFECTS (Cont'd) Overhead equipment or distribution systems are 4. ON U N/A . not likely to collapse ON UN/A Have you looked for and found no other adverse concerns? Юn и Is equipment free of interaction effects? (N U IS EQUIPMENT SEISMICALLY ADEQUATE? COMMENTS 3/2 \$ 4 SSD (TYP) 3×3×1/4 Rack (Local Panel) Configuration 1) is shown below. The rack is of. all welded construction. components mounted on this rack are light weight and are rigidly attached. L2x2×3/16 Fundamental frequency of this 26" (77) ruck is greater than 8HZ, by judgment. Mounting Plate 225ida (147) オーレン Attached lines (conduit & Tubing) z) are rigidly supported from the Same wall and are rigidly attached to the components on Wall-mounted Panel the rack . i line Flexibility oh 3) Per Calc. CD-Q0000-940339, The 1.5x B.S. is exceeded by the In-structure spectra @ EL. 621 of RD, in the 5.0 to 7.0 HZ frequency range. Since the lowest natural frequency of this rack is > 8 HZ (some note 1), the intent of the GIP seismic capacity vs. Demande criteria is met. 4) The anchorage of this rack to the wall is judged a dequate due to rack rigidity (low spectral acceloration) and that bad wh on this rack is very small Frazi Ber Date: 3-1-96 Evaluated by: 3-4-910



SEL Line No.	93	ء5
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Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

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(V) N U

Equip. ID No. <u>2-LPNL-925-02474</u> Equip. Class <u>18 - Instruments on Racks</u> Equipment Description <u>Local Panel 2-25-2474</u>

RELAY WALKDOWN.

- Does spot check of essential relays indicate relays present and properly mounted?
- 2. Are essential relays required to function during earthquake screened out?

If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.

3. No other relay concerns?

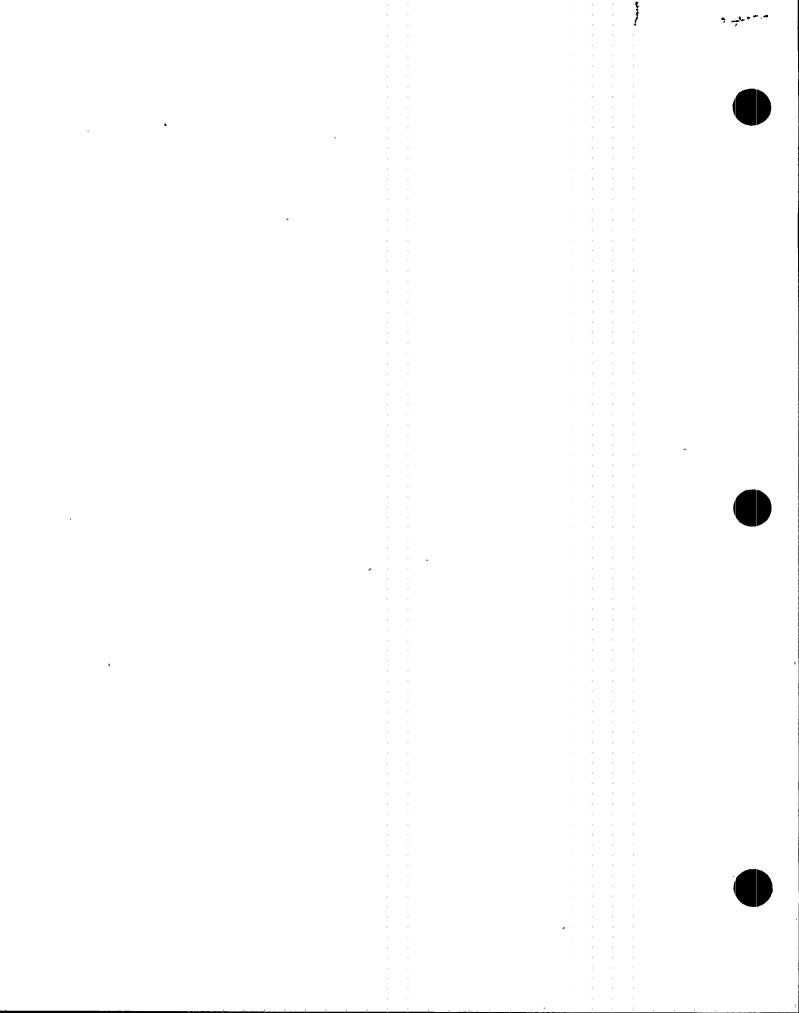
Requirements for relays satisfied?

SYSTEM INTERACTION EFFECTS

1. No potential sources could flood or spill onto (N) N U N/A cabinet?

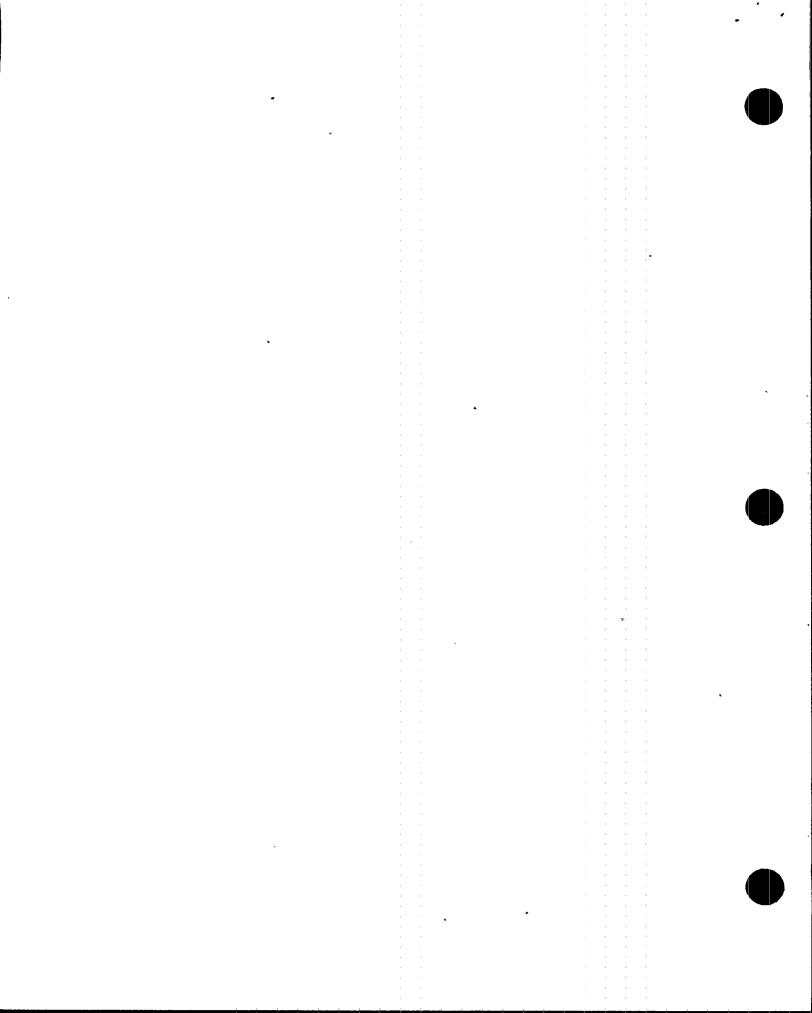
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

ts	EQUIPMENT YES_	FREE NO_		EED FOR	FURTHER	INVEST	FIGATION,	EXCLUDING	RELA	Y CHATTER?	
IS	EQUIPMENT	FREE	OF N	EED FOR	FURTHER	RELAY	CHATTER	INVESTIGAT	EON?	YES 🖌 NO	
Eva	aluated by:		·	Forzi	Ber		<u>-</u>	Dat	te: _	7-1-96	′
Eva	aluated by:		K	1.172/107	1. Juan	ul-		Dat	te: _	3-4-96	′



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SSEL Line No. <u>9040</u> Statu	us Y 🕅 U
SCREENING EVALUATION WORK SHEET (SEWS) Sheet	t 1 of 24
	:
Equip. ID No. <u>2-PNLA-009-0003A</u> Equip. Class <u>20 - Instr. & Cor</u>	ntrol Panels & Cabinets
Equipment Description _ PANEL 9-3A	
Location: Bldg. <u>CB</u> Floor El. <u>617</u> Room, Row/C	Col <u>U2 MCR</u>
Manufacturer, Model, Etc. (optional but recommended) GE	
SEISMIC CAPACITY VS DEMAND 1. Elevation where equipment receives seismic input 2. Elevation of seismic input below about 40' from grade 3. Equipment has fundamental frequency above about 8 Hz 4. Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS 5. Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Comments if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)	C/7 Y (D) U (5~a ch @ 550) W N U N/A (1) DOC BS (ABS) GERS GRS AGS CRS BS W N U (2)**
 <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those are met by intent without meeting the specific wording of the cave explain the reason for this conclusion in the COMMENTS section be Equipment is included in earthquake experience equipment class No computers or programmable controllers No strip chart recorders Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain essential relays Drawers and equipment on slides restrained from falling out Attached lines have adequate flexibility Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated AF=4.5 Have you looked for and found no other adverse concerns? 	veat rule and
 ANCHORAGE Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP Sizes and locations of anchors determined 	

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SEL Line No. <u>9040</u>

SCREENING EVALUATION WORK SHEET (SEWS)

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Sheet 2 of 2'4'

Equip. ID No. <u>2-PNLA-009-0003A</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u> Equipment Description <u>PANEL 9-3A</u>

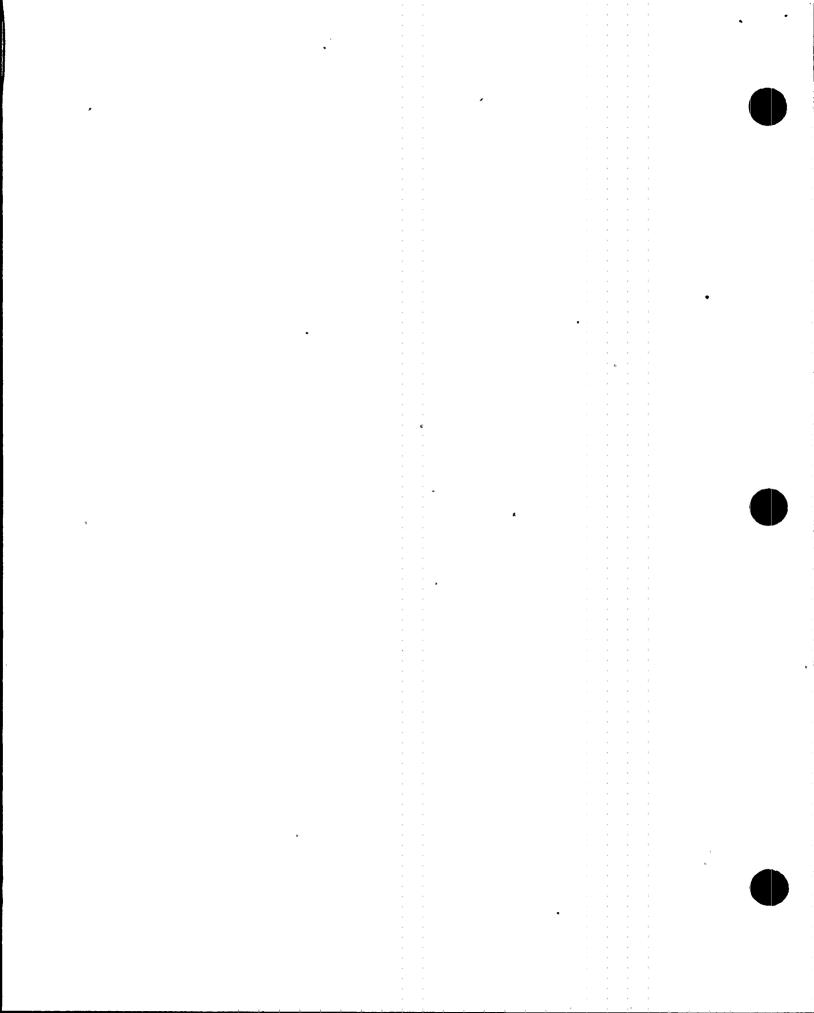
ANCHORAGE (Cont'd)

4.	Anchorage installation adequate; e.g., weld quality and length, nuts and washers, expansion anchor tightness	(Y) N U	, N / A
5.	Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing,		N/ A
•	free-edge distance, concrete strength/condition, and concrete cracking	() N U	N/A
6. -	For bolted anchorages, gap under base less than 1/4-inch	Y N U	
7. 8.	Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors Base has adequate stiffness and effect of prying	() N U	N/A
9.	action on anchors considered Strength of equipment base and load path	(Y) N U	N/A
	to CG adequate Embedded steel, grout pad or large concrete		
re an	pad adequacy evaluated chorage requirements met?	(Y) N U	N/A SONU(')
INTERA	CTION EFFECTS		
1.	Soft targets free from impact by nearby equipment or structures If equipment contains sensitive relays, equipment	W N U	N/A (4)
2.	free from all impact by nearby equipment or structures Attached lines have adequate flexibility	Y (D) U (D) N U	N/A (∓) N/A
4.	Overhead equipment or distribution systems are not likely to collapse	(V) N U (V) N U	
5. [s equ	Have you looked for and found no other adverse concerns? ipment free of interaction effects?		N/A Y@U(7)
<u>IS EQU</u>	IPMENT SEISMICALLY ADEQUATE?		۲ (۲) ۲ (۲) ۲ (۲)

COMMENTS

For notes see pages 3 and 4 of this sews.

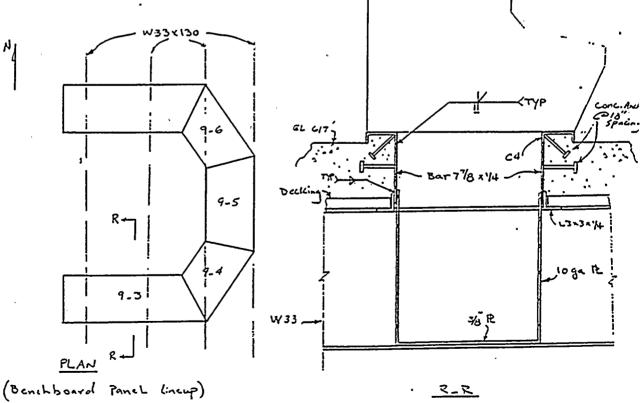
Evaluated by:	Farris Bei	Date:	11-27-95
	John O. Dizm		11/28/95



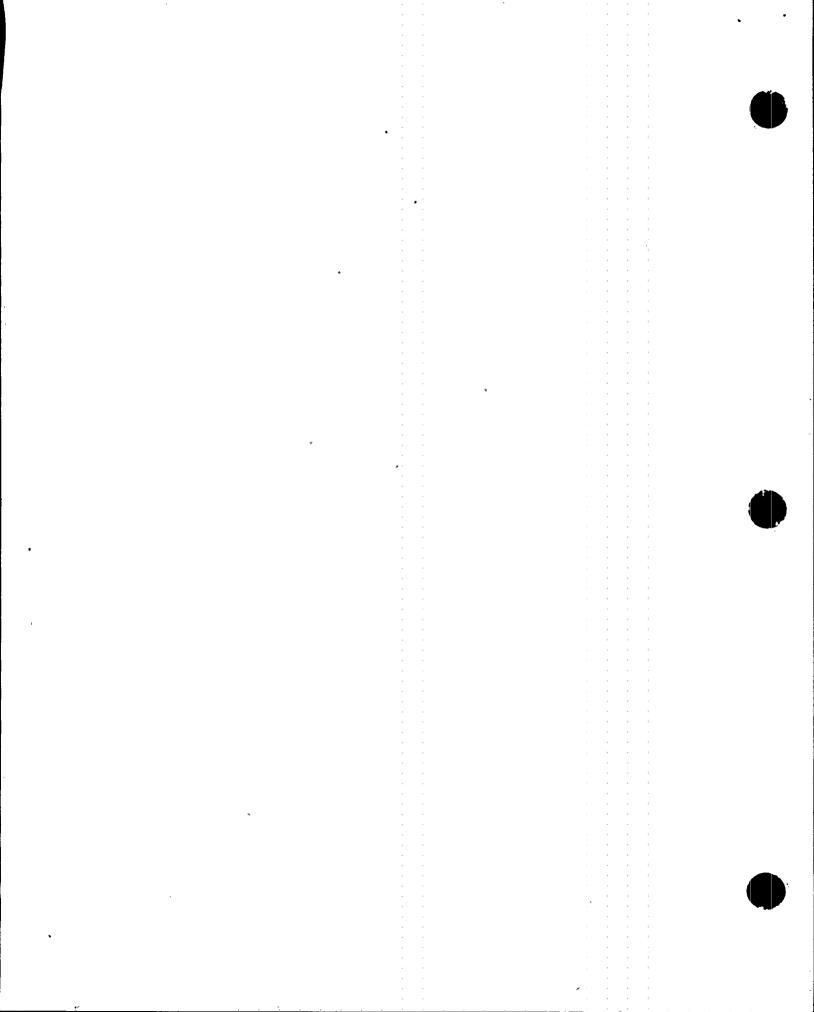


SHEET NO. 344 BY 7 Ben DATE 11-27-55 JOB NO. 50147 JOB TVA /BTNP A-46/IPEEE to SEWS for 2-PALA-009-00-3A CHKD 1.D. Dize DATE 11/28/55 (SSEL 9040) CALC. NO. ______ _ SUBJECT_<u>Attach</u>.

1) Benchboards 2-9-3A, 3B, 4-8, 3-9-3, 4-8 and 1-9-348 are all of the same construction type. This includes panel thickness of 5/32 and reinforced Panel faces (with 1/4"x3" welded plate bars) where the components are mounted. There are also angle irons reinforcing the panel perimeters. These bench boards are heavily welded to their sill channel by closely spaced (front & back of the panels) welded bars (NIH" to 22" max. c.c. spacing). This anchorage configuration is conservatively qualified in calculation CD-Q0009: 871685, Rev.6. DWG. 48N933 and 0-48N934 shows the embedment details (shown below). This type of benchboards have exhibited natural frequency of 11 to 13 HE when shake table tested (see GE Report NEDO-10678, "seismic qualification of Electrical Equipment, "CEB-CQS-82-4.)



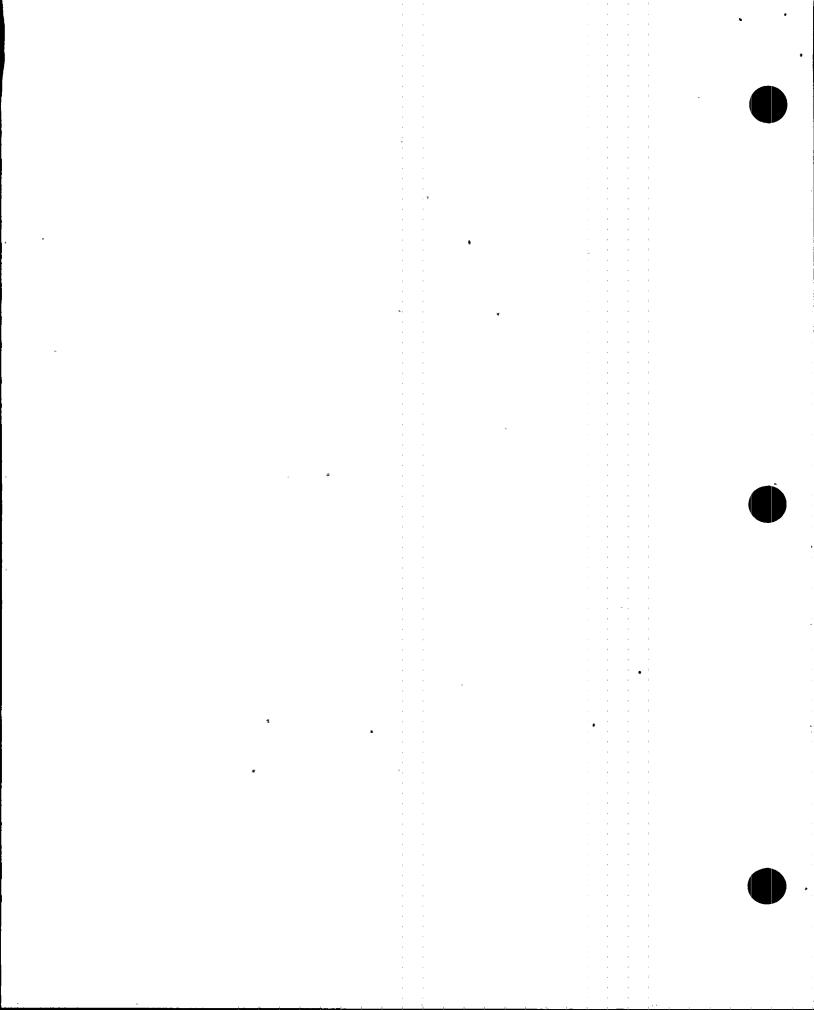
⁽Rel. DWG. 0-484934)



EQE INTERNATIONAL

SHEET NO. <u>444</u> JOB NO. <u>50147</u> JOB <u>474</u> <u>BENP A-46 / IPEEE</u> BY <u>7Bey</u> DATE <u>11-27-15</u> CALC. NO. <u>NIA</u> SUBJECT <u>Attach to SEWS for 2-PNLA-009-0003</u> A CHKD <u>10. Dize</u> DATE <u>11/28/95</u> (SSEL 9040)

- 2) Per calculation CD-Q0000-940339, the in-structure response spectra Q EL. GZI' of RB (seismic Demand) exceeds the 1.5xB.S. (seismic Capacity) in the frequency range of 5 to 7 HZ. Since the lowest natural frequency of these panels is greater than 7 HZ the intent of the GIP seismic Capacity VS. Demand Criteria is met.
- 3) Face of the bench soards are stiffened with welded 1/4"x 3" plate bars.
- 4) Cables running horizontally right under the face of the bench board 9-3A (bay'z) are sagging. It appears that plastic strap ties holding these cables to their supporting Unistrut member are missing. In a seismic event these cables may potentially pullout at their terminal connection points. <u>Outlier</u> <u>OSVS-9040-1</u>
- 5) All doors rattle in closed position due to small gap between door + cab. framing. Since relay in these panels are too far from the doors it is judged that this condition (door rattling) is ok-as-is, as it will not cause any relay chatter in a seismic event, except for isolated cases as noted on the respective SEWS.
- c) Fluorescent lights in The panel are all caged in with a wire mesh howsing <u>ole</u>
- 7) Miscellaneous items, such as; Vacuum on wheels, breathing apparatus boxes and typer covers are located very near the back . . side of this panel (2-9-3A). These items are unanchored and may slide and impact this panel in a seismic event. <u>Outlier</u> 05vs_9040-2
- 8) programable controller in buy 3 has its own rigid independent support and the panel face at this controller is heavily rein-orce i. strip charts and flow control devices on slides are positively restrained.
- 9) A typical in-cabinet amplification factor of 4.5 is reasonable and Conservative for benchboard type panels consistent with the recommendations provided in EPRI Reports NP-7146-5L and NP-7148-SL
- 10) All adjacent hench board panels (shown in the figure on the previous page)



SEL Line No. 9040

Status -YNU

Sheet 1 of 1

Date:

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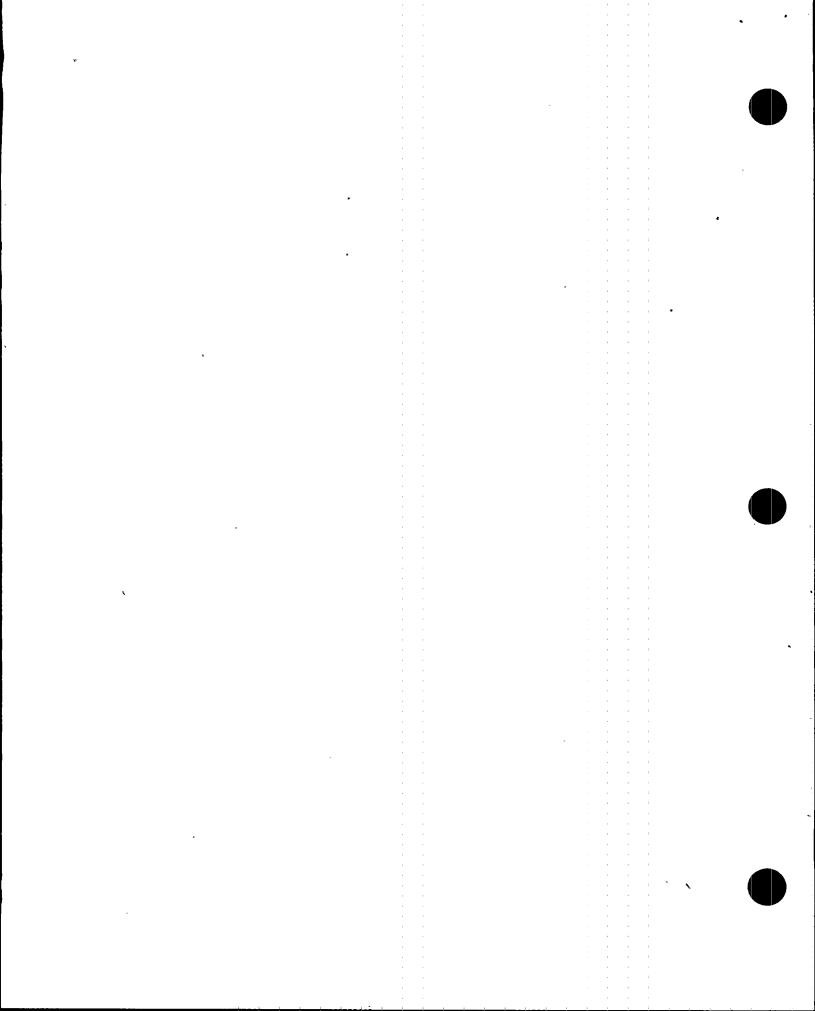
IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. 2-PNLA-009-0003A Equip. Class 20 - Instr. & Control Panels & Cabinets Equipment Description PANEL 9-3A

Evaluated by:

RELAY WALKDOWN	
 Does spot check of essential relays indicate relays present and properly mounted? 	⑦ N U N∕A
2. Are essential relays required to function during earthquake screened out?	YNU. NA
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.	
3. No other relay concerns?	. Y (N) U N/A
Requirements for relays satisfied?	YNU(1)
SYSTEM INTERACTION EFFECTS	
 No potential sources could flood or spill onto cabinet? 	() N U N/A
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSA sheets if necessary)	ATISFACTORY (Use additional
1) See note 7 on SEWS for this equipment (Unanchored equipment/objects near this panel)	t. ~ <u>ontlice</u> 05v5-9040-2
2) see note 4 on sews for this equipment	t outlier osvs-9040-1
(saysing cables / unrestrained cables inside this po	rane ()
IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION YES NO_v_ (see note 2) above	
IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER	R INVESTIGATION? YES NO i/ (see note i)
Evaluated by: <u>Formi Beig</u>	Date: <u>11-27-75</u>

ZIA



Sheet 1 of 2 SSEL Line No. <u>9040</u> 0515-9040-1 OUTLIER SEISMIC VERIFICATION SHEET (OSVS) 1. OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION Equipment ID Number 2-PMA-009-0003A Equipment Class 20-Instr. & Control Panels Equipment Location: Bldg. ____ Floor Elevation 617 Room or Row/Column <u>MCR UZ</u> Base Elevation GIT OUTLIER ISSUE DEFINITION 2. Identify all the screening guidelines which are not met. a. (Check more than one if several guidelines could not be satisfied.) Mechanical and Tanks and Heat Exchangers Electrical Equipment Capacity vs. Demand Shell Buckling* Caveats Anchor Bolts and Embedment Anchorage Anchorage Connections Seismic Interaction Flexibility of Attached Piping* Other Other <u>Cable and Conduit Raceways</u> Essential Relays Inclusion Rules Capacity vs. Demand Other Seismic Performance Concerns

* Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.

Other

Limited Analytical Review

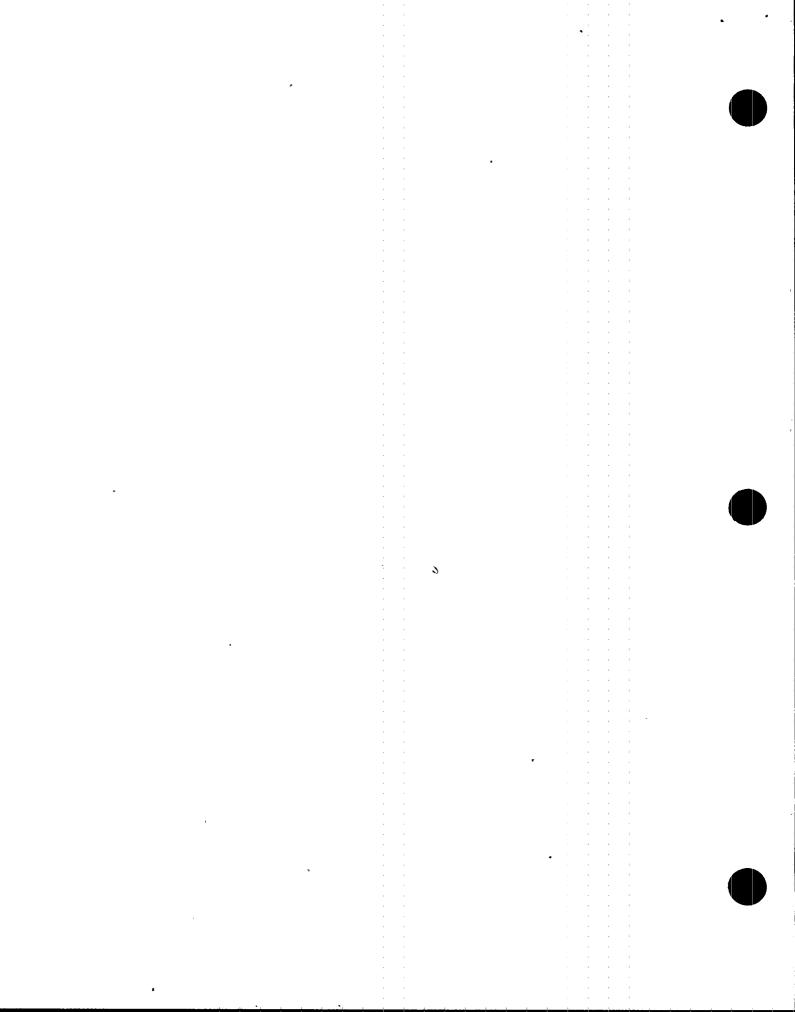
b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):

Mounting, Type,

Location

Other

<u>Cables running horizontally inside the beachboard</u> <u>Panel 9-3A (bay 2) are sarging. It appears that</u> <u>plante strap ties holding these cables to their supporting</u> <u>Unistrut member are missing. In a seismic event these</u> <u>Cables man potentially pull out at their terminal</u> <u>connection points.</u>



Sheet 2 of 2

SSEL Line No. 9040

osvs_۹۰۴۰-۱ OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

Equipment ID Number 2-PNLA-009-0003A

- 3. <u>PROPOSED</u> METHOD OF OUTLIER RESOLUTION (OPTIONAL)
 - a. Define proposed method(s) for resolving outlier.

Provide positive verticist for the sagging cables. (This could be accomplished by plantic straption That wrap around the cables, as a bundle, and the unistruct member supporting the plastic tray containing there explose

b. Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).

WOR	K REQUE	57 (WR)	C165336	15	INITIATE		412 9ats-96
70	RESOLVE	OUTLIER	9040-1				HL q K Hl
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4. CERTIFICATION:

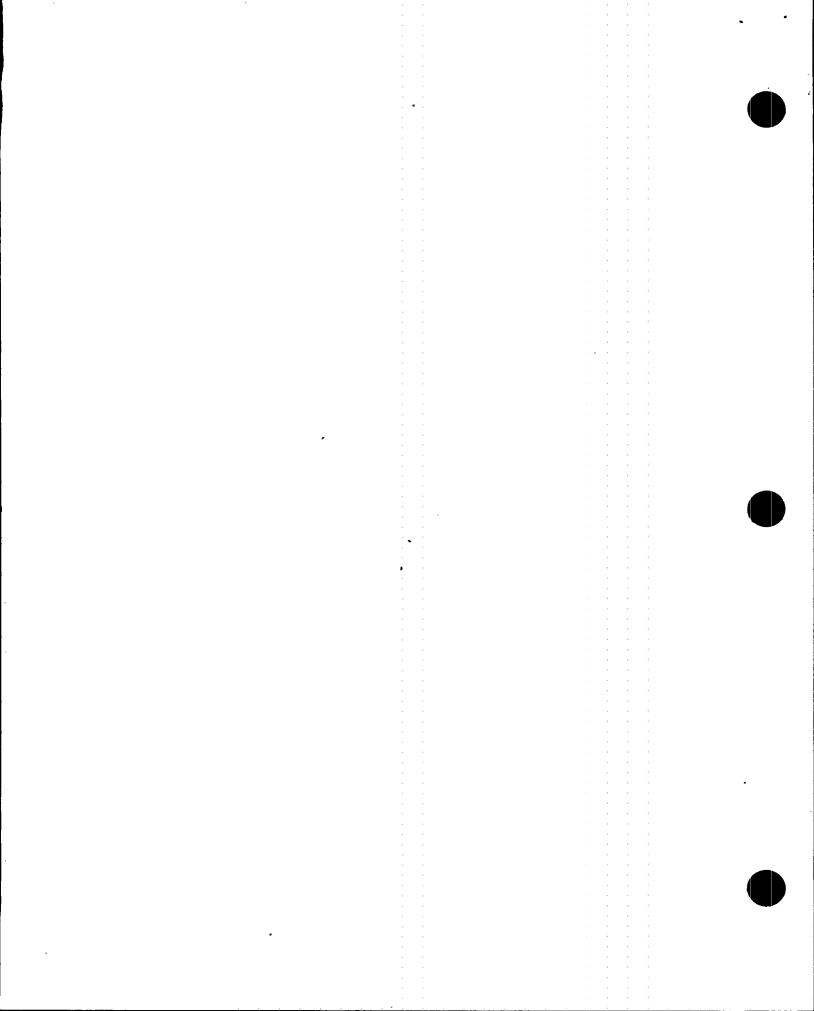
The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

FAREIN R. BEIGI	<u>Fanci R. Bezi</u> Signature ()	<u>11-27-95</u> Date
JOHN O. DIZON, P.E. Print or Type Name	Jano, Dizm Signature	<u>11/28/55</u> Date
Frint of Type Name	Signature	Date

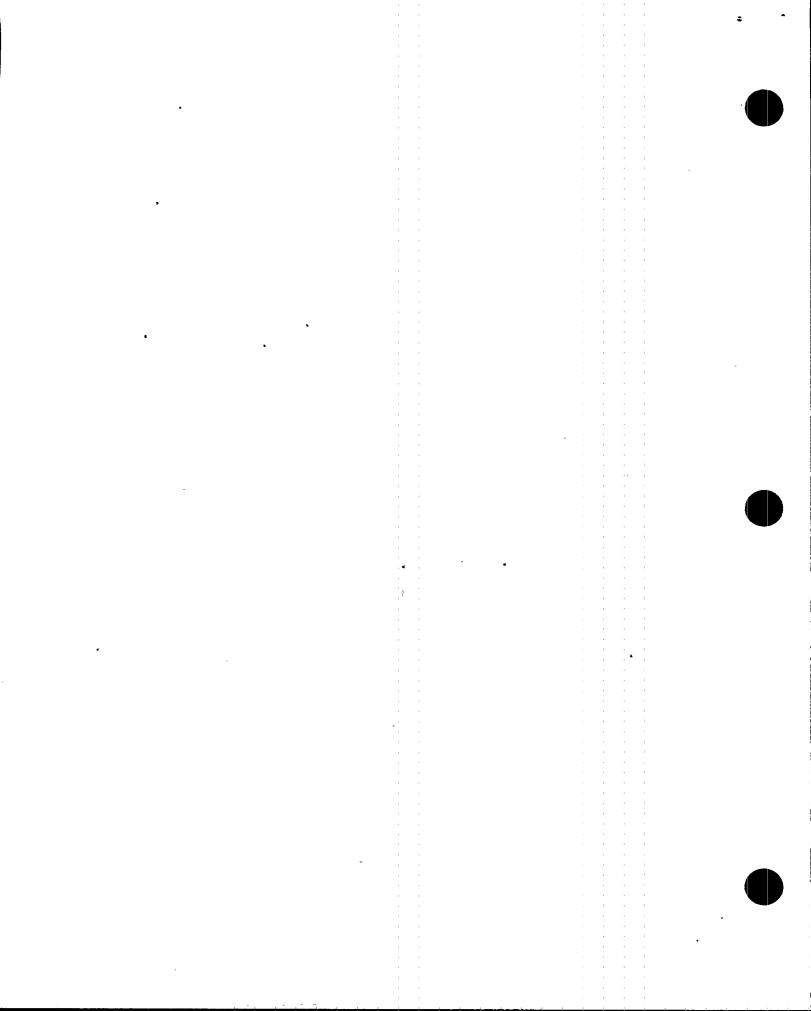
Print or Type Name

Signature



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SSEL	L Line No. <u>9040</u> OSVS <u>9040-2</u> OUTLIER SEISMIC VERIFICATION SHEET (OSVS)	
r.	OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION	
	Equipment ID Number 2-PNLA-009-0003A Equipment Class 20- Instr & Control Pana	داع
	Equipment Location: Bldg. <u>cr</u> Floor Elevation <u>cv</u>	
	Room or Row/Column <u>MCR U2</u> Base Elevation <u>617</u>	
	Equipment Description	
2.	OUTLIER ISSUE DEFINITION .	
	a. Identify all the screening guidelines which are not met. (Check more than one if several guidelines could not be satisfied.)	
	Mechanical and Image: Tanks and Heat Exchangers Capacity vs. Demand Image: Tanks and Heat Exchangers Caveats Image: Shell Buckling* Anchorage Anchorage Connections Seismic Interaction Image: Flexibility of Attached Piping* Other Other	-
, ,	Essential Relays Capacity vs. Demand Mounting, Type, LocationCable and Conduit Raceways Inclusion Rules Other Seismic Performance Concerns Limited Analytical Review OtherOther	•
	* Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.	
	b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):	
_ .	Miscellarcous items, Such as; Vacume on wheels,	
	breathing apparatus baxes and typer cover for	
	electrical cabinets are near the back side of	

This panel These items are unanchored and man slide / tip over and impact This panel in a seismic event causing potential relay chatter.



SSEL	Line	e No. 9040	2 2	
		OUTLIER SEISMIC VERIFICATION SHEET (OSVS)	c ay - 4,	0.
•		Equipment ID Number <u>z-PNLA-009-000</u> 3A	ia l'r and	16-91-6 9-16-96
3.	PROP	POSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)	•ssenhal 1,-3 B, an	200
	a.	Define proposed method(s) for resolving outlier.	10 C3 - 3 A;-	
		1) provide positive restraint for these items;	2-9.	5
		OR 2) relocate these items	There are panels 2- 4	7 (110
•		jor if it is shown that There panels (2-9-34 \$ 3B \$ a	NK g.	: 3
		do not contain essential relayse This outlier can be resolved	AS_IS.	
	b.	Provide information needed to implement proposed method(s) for resolving outlier (e.g., estimate of fundamental frequency).		
		NIA		
		· · · · · · · · · · · · · · · · · · ·	, , *	
		·		•
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4. **CERTIFICATION:**

The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

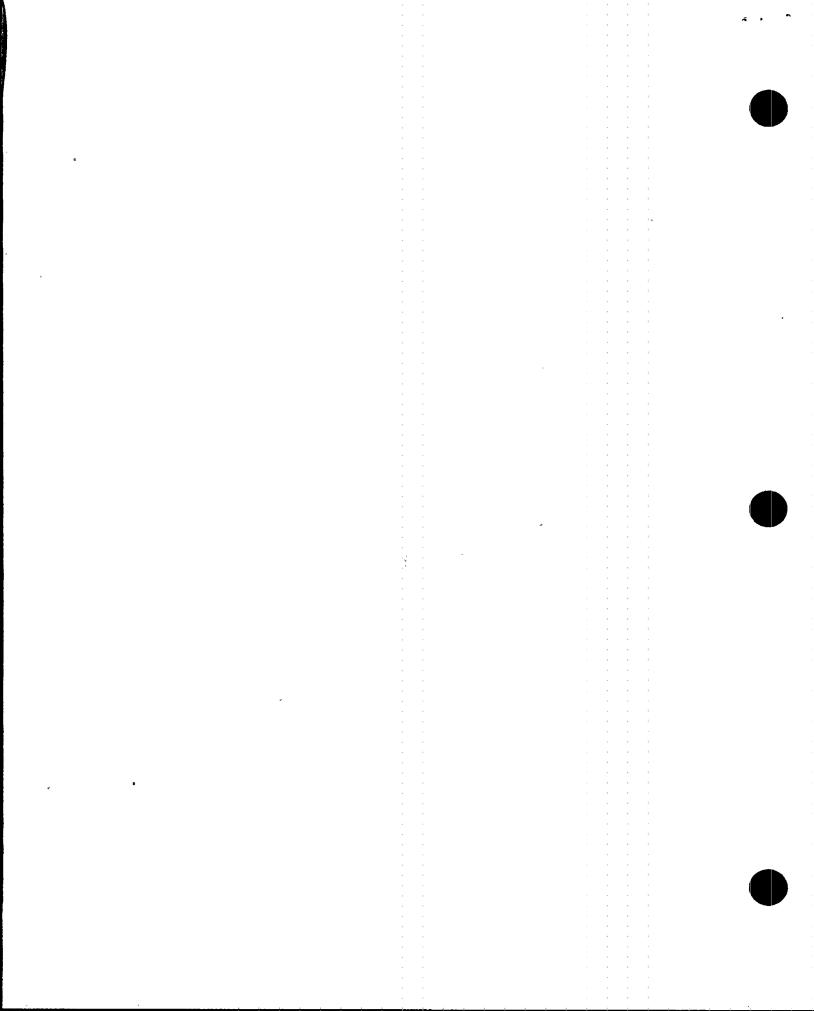
FARZIN R. BEIGI	Farri R. Bei	11-27-95
Print or Type Name	Signature ()	Date
JOHN O. DIZON P.E.	John O. Diran	11/28/95
<u>bhv O. Dizon, PiE.</u> Print or Type Name	Signature	Date

Print or Type Name

Signature

Sheet 2 of 2

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INFORMAL

September 16, 1996

REVIEW FOR ESSENTIAL RELAYS IN PANELS 2-PNLA-009-0003A, 2-PNLA-009-0003B, 2-PNLA-009-0004, 2-PNLA-009-0009, 2-PNLA-009-0020, AND 2-PNLA-009-0021.

Modifications to panels 2-PNLA-009-0003A (SSEL No. 9040), 2-PNLA-009-0003B (SSEL No. 9041), 2-PNLA-009-0004 (SSEL No. 9042), 2-PNLA-009-0009 (SSEL No. 9045), 2-PNLA-009-0020, and 2-PNLA-009-0021 (SSEL No. 9050) were determined to possibly be required under the USI A-46 program, resulting from outliers OSVS-9040-2, OSVS-9045, and OSVS-9050, if these panels contain essential relays. A review of the <u>Browns Ferry Nuclear Plant USI A-46</u> <u>Seismic Evaluation Report</u>, May 1996, Revision 0, Appendix A determined that there are no essential relays installed in these panels. This review resolves outliers OSVS-9040-2, OSVS-9045, and OSVS-9050. Note that modifications may be required resulting from other outliers on these panels.

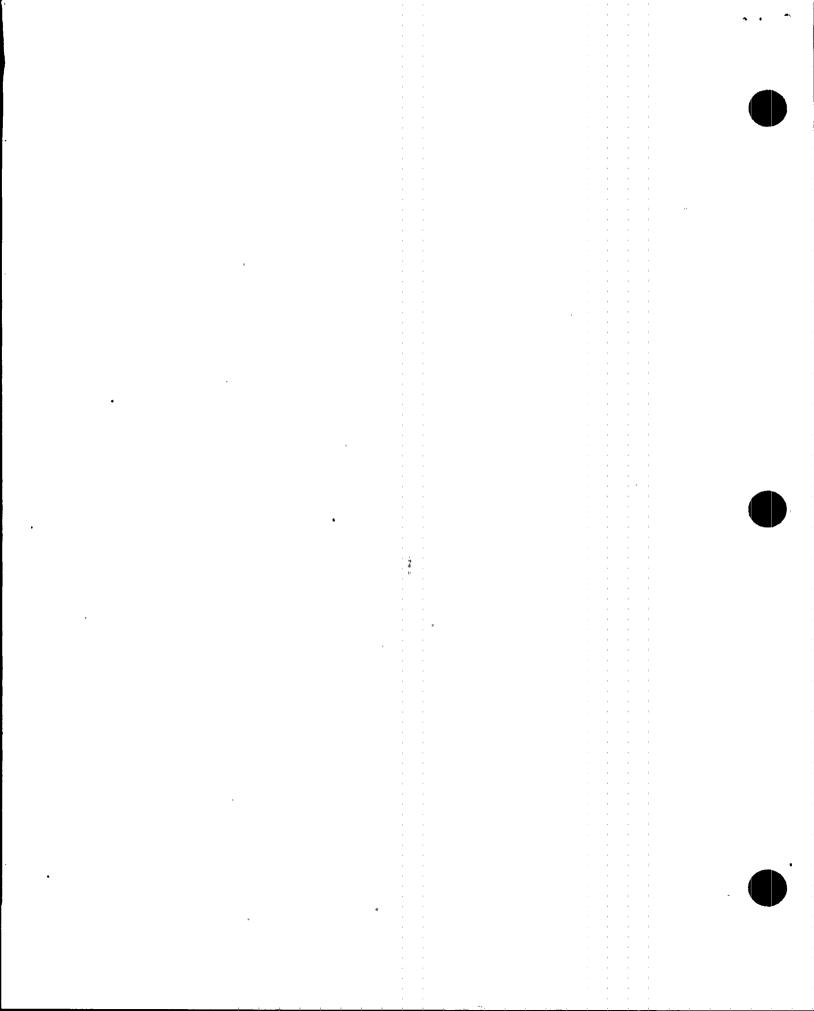
Review performed by

-16-90 date

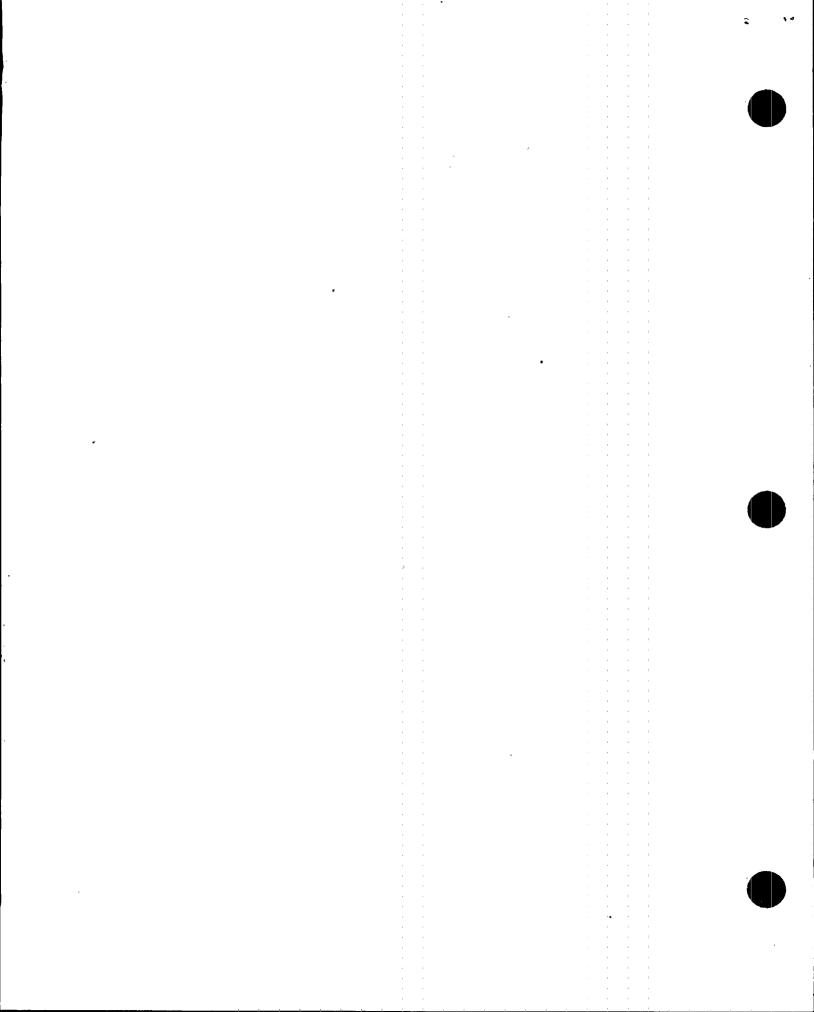
Verified by

Pedroso

-16-96 date



	/ WTENT/
SSEL Line No. <u>39117</u> S	tatus Y 🔿 U
SCREENING EVALUATION WORK SHEET (SEWS)	heet 1 of 2
Equip. ID No. <u>3-PNLA-009-0005</u> Equip. Class <u>20 - Instr. &</u>	Control Panels & Cabinets
Equipment Description <u>REACTOR CONTROL PNL</u>	
Location: Bldg. <u>CB</u> Floor El. <u>621</u> Room, R	ow/Col <u>U3 MCR</u>
Manufacturer, Model, Etc. (optional but recommended)	GE
SEISMIC CAPACITY VS DEMAND 1. Elevation where equipment receives seismic input 2. Elevation of seismic input below about 40' from grade 3. Equipment has fundamental frequency above about 8 Hz 4. Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum 1.5 x Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Comments if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)	$\frac{G \cdot T'}{Y \cdot (N) \cdot U \cdot (S)^{rade} \cdot \mathcal{O} \cdot S(GT')}$ $\frac{(N) \cdot U \cdot (S)^{rade} \cdot \mathcal{O} \cdot S(GT')}{DOC}$ $\frac{(N) \cdot U \cdot N/A \cdot (T)}{DOC}$ $\frac{(ABS)}{GERS}$ $\frac{(ABS)}{GERS}$ GRS AGS CRS CRS CRS (MRS) $(M) \cdot U \cdot (T)^{rad}$
 <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) the are met by intent without meeting the specific wording of the explain the reason for this conclusion in the COMMENTS section 1. Equipment is included in earthquake experience equipment class 2. No computers or programmable controllers 3. No strip chart recorders 4. Steel frame and sheet metal structurally adequate 5. Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain 	caveat rule and
 aners, are borted together in they contain essential relays Drawers and equipment on slides restrained from falling out All doors secured by latch or fastener Attached lines have adequate flexibility Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated AF-45 Have you looked for and found no other adverse concerns Is the intent of all the caveats met for Bounding Spectrum? 	$ \begin{array}{c} (Y) & N & U & N/A (10) \\ (Y) & N & U & N/A (10) \\ Y & (N) & U & N/A (10) \\ (Y) & N & U & N/A (10) \\ (Y) & N & U & N/A (10) \\ (Y) & N & U & N/A (10) \\ (Y) & N & U & N/A (10) \\ (Y) & N & U & N/A (10) \\ (Y) & N & U & N/A (10) \\ (Y) & V & V & V \\ (Y) & V \\ (Y) & V & V \\ (Y) &$
 <u>NCHORAGE</u> Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP Sizes and locations of anchors determined 	



SEL Line No. 39117

SCREENING EVALUATION WORK SHEET (SEWS) Sheet 2 of 2

Equip. ID No. <u>3-PNLA-009-0005</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u>

Equipment Description <u>REACTOR CONTROL PNL</u>

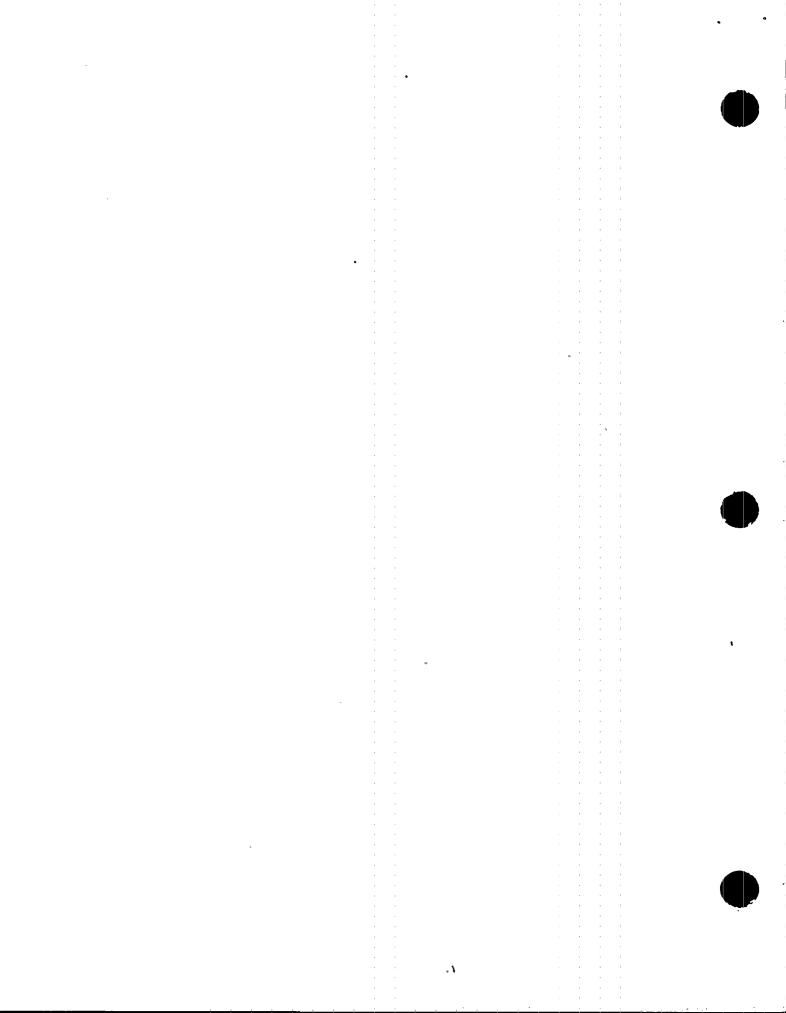
ANCHORAGE (Cont'd)

ANCHUR	KAGE (CONC d)				•
- 4. 5.	Anchorage installation adequate, e.g., weld quality and length, nuts and washers, expansion anchor tightness Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing,	\bigotimes	N	U	N/A
c	free-edge distance, concrete strength/condition, and concrete cracking	Ŷ	N	U	N/A
б.	For bolted anchorages, gap under base less than 1/4-inch	Y	N	U	N/A
7.	Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors	${\mathfrak O}$	N		N/A
8.	Base has adequate stiffness and effect of prying action on anchors considered	\heartsuit	N	U	·N/A
9.	Strength of equipment base and load path to CG adequate	\mathfrak{O}	N	U	N/A
10. Pre ar	Embedded steel, grout pad or large concrete pad adequacy evaluated nchorage requirements met?	Ś	N	U	N/A () N U(1)
INTER	ACTION EFFECTS				
1.	Soft targets free from impact by nearby equipment or structures	\bigotimes	N	U,	N/A (G)
2. 3.	If equipment contains sensitive relays, equipment free from all impact by nearby equipment or structures Attached lines have adequate flexibility	ÐÐ	N N	U U	N/A N/A
4.	Overhead equipment or distribution systems are not likely to collapse				N/A
5. Is equ	Have you looked for and found no other adverse concerns? Jipment free of interaction effects?	Ś	N.	Ŭ	N/A DN U
IS EQU	JIPMENT SEISMICALLY ADEQUATE?				Y (NU (5)
COMMEN	<u>ITS</u>				
	For notes 1-3, 6,8-10 see the constructing notes of	n 55	۲۲		
	for 2-PNLA_009-000 JA (SSEL 9040)				
	The door latch to bag no. 2 of this panel is brok Notes 4+7 not used.		<u>ar</u>	• 112	<u>~</u> 05V5-39117
alua Valua	ated by: Farzi Bezi	Date:		//_ 2	7 - 35

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SEL Line No. _ 39117

S	ta	tu	S	,	Y,	N)	U

Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>3-PNLA-009-0005</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u> Equipment Description <u>REACTOR CONTROL PNL</u>

RELAY WALKDOWN

1. Does spot check of essential relays indicate <u>(</u>Y) N U N/A relays present and properly mounted? 2. Are essential relays required to function Y Ν H during earthquake screened out? If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis. B. No other relay concerns? Y N 11 N/A Y (N) U (v) Requirements for relays satisfied?

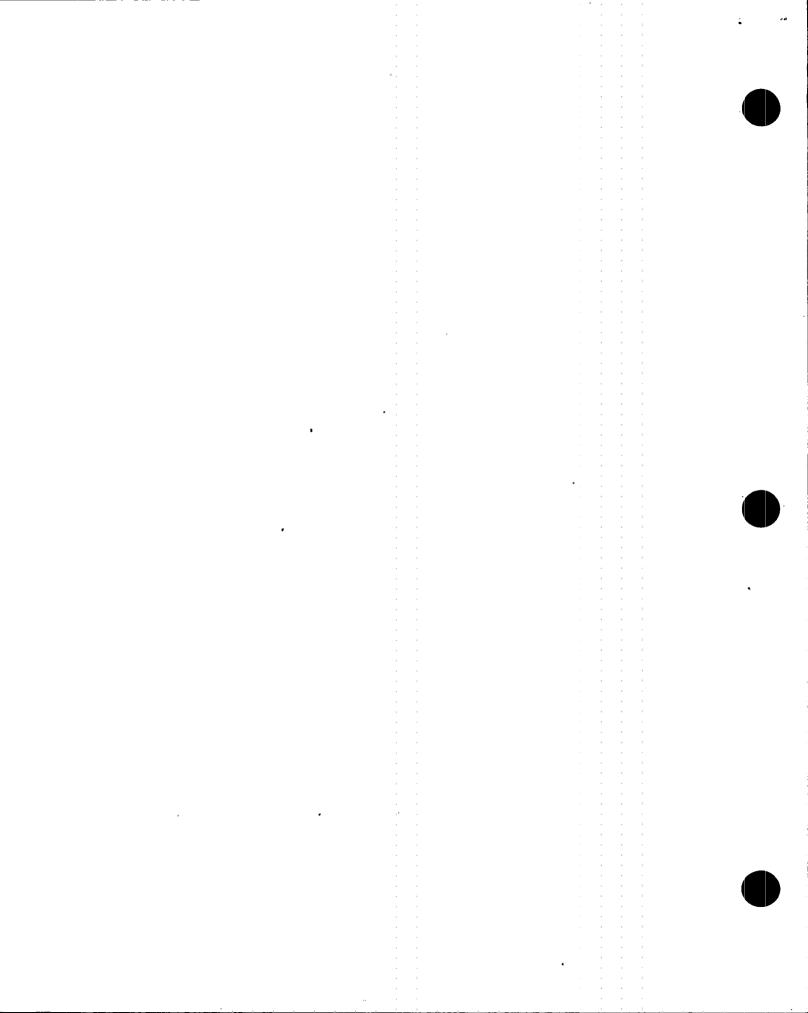
SYSTEM INTERACTION EFFECTS

1. No potential sources could flood or spill onto (Y) N U N/A cabinet?

DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATISFACTORY (Use additional sheets if necessary)

1) Door Latch is broken on bay no. 2. Outlier_OSVS_ 39117

IS EQUIPMENT	FREE OF NEED	FOR FURTHER	INVESTIGATION,	EXCLUDING RELA	Y CHATTER?	
IS EQUIPMENT	FREE OF NEED	FOR FURTHER	RELAY CHATTER	INVESTIGATION?	YES NO 🦯	(sernotal)
Evaluated by:	Fanci	.Be .:		Date: _	11-27-95 1	
Evaluated by:	\(i, j, c)). Dizm		Date: _	11/2.8/95'	



SSEL Line No. <u>39/17</u>

Sheet 1 of 2

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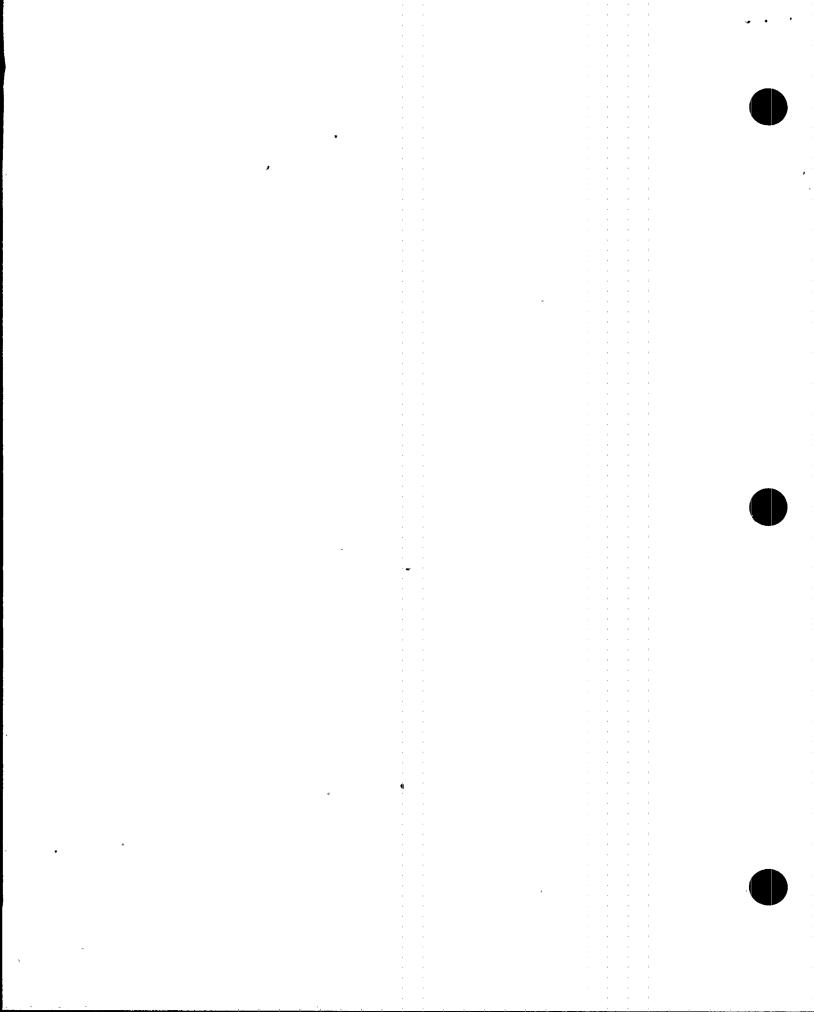
	OUTLIER SEISMIC VERIFICATION SHEET	- (OSVS) -
1.	OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION	N
	Equipment ID Number <u>3-PNLA-009-0</u> 005 Equipmer	t Class 20 - Instr. & Control Panels
	Equipment Location: Bldg. <u>CB</u> Floor	Elevation <u>617</u>
	Room or Row/Column <u>мск из</u> Base B	levation <u> </u>
	Equipment Description Reactor Control Par	
2.	OUTLIER ISSUE DEFINITION	
	 Identify all the screening guidelines which (Check more than one if several guidelines 	
	Other Other Other	* nd Embedment ections Attached Piping*
	Essential Relays Inclusion Rule	s Performance Concerns

0515-39117

* Shell buckling and flexibility of attached piping only apply to large, flat-bottom, vertical tanks.

b. Describe all the reasons for the outlier (i.e., if all the listed outlier issues were resolved, then the signatories would consider this item of equipment to be verified for seismic adequacy):

Th 2 .00 of <u>this panel</u> tch bou broken. The door could impact is 10 th. a seismic event and cause Panel frame in potential relay chatter. ٤ \mathbf{N}



Sheet 2 of 2

RELAN CIST INPICATED

PRVIEW OF ESSENTIAL

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SEL Line No. 39117

OSVS-39/17-OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

Equipment ID Number 3-PNLA-009-0005

- 3. <u>PROPOSED</u> METHOD OF OUTLIER RESOLUTION (OPTIONAL)
 - a. Define proposed method(s) for resolving outlier.

Replace the broken Latch -

Ъ.	Provide information needed to implement proposed resolving outlier (e.g., estimate of fundamental	<pre>method(s) for frequency).</pre>
		··· cqueirej / •

4. CERTIFICATION:

NIA

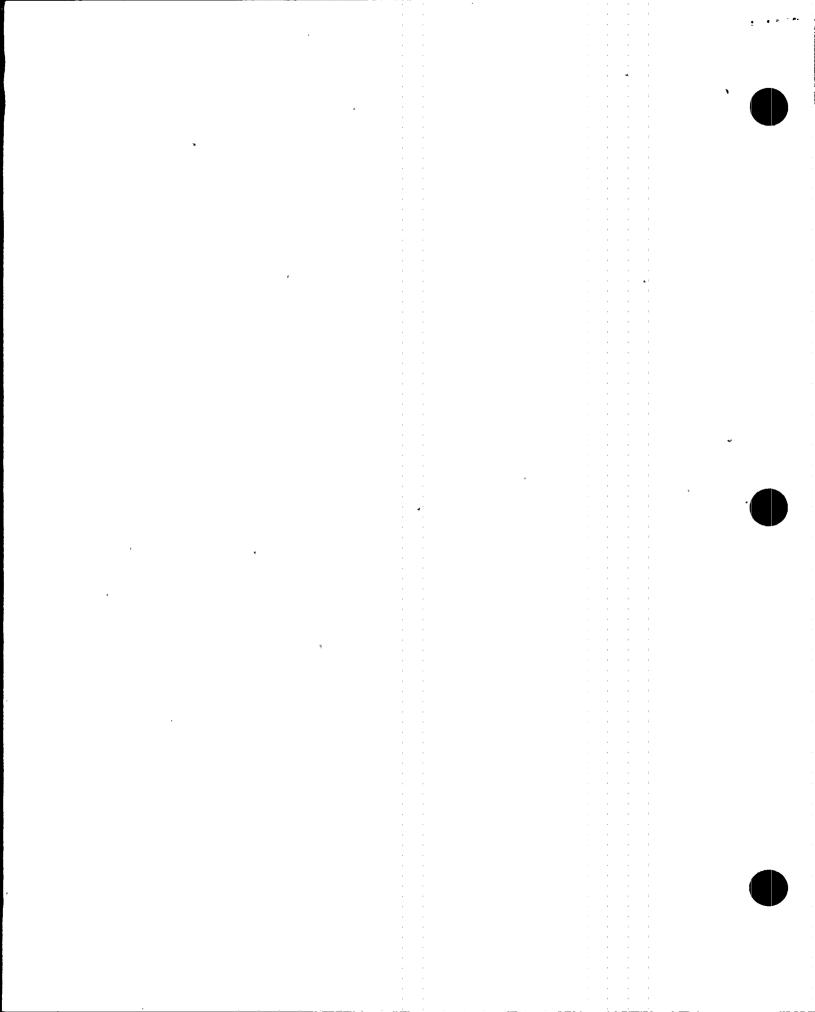
The information on this OSVS is, to the best of our knowledge and belief, correct and accurate, and resolution of the outlier issues listed on the previous page will satisfy the requirements for this item of equipment to be verified for seismic adequacy:

Approved by: (For Equipment Classes #0 - #22, all the Seismic Capability Engineers on the Seismic Review Team (SRT) should sign; there should be at least two on the SRT. One signatory should be a licensed professional engineer. For Relays, the Lead Relay Reviewer should sign.)

FARZIN R. BEIGI Print or Type Name	<u> </u>	Fanji R. Ben?	11-27-95
Print or Type Name		Signature ()	Date
	PIE	John O. Dizan	11/2/95
rint or Type Name		Signature	Date

Print or Type Name

Signature



/INTENT

Revision 2A Status VN U

SCREENING EVALUATION WORK SHEET (SEWS)

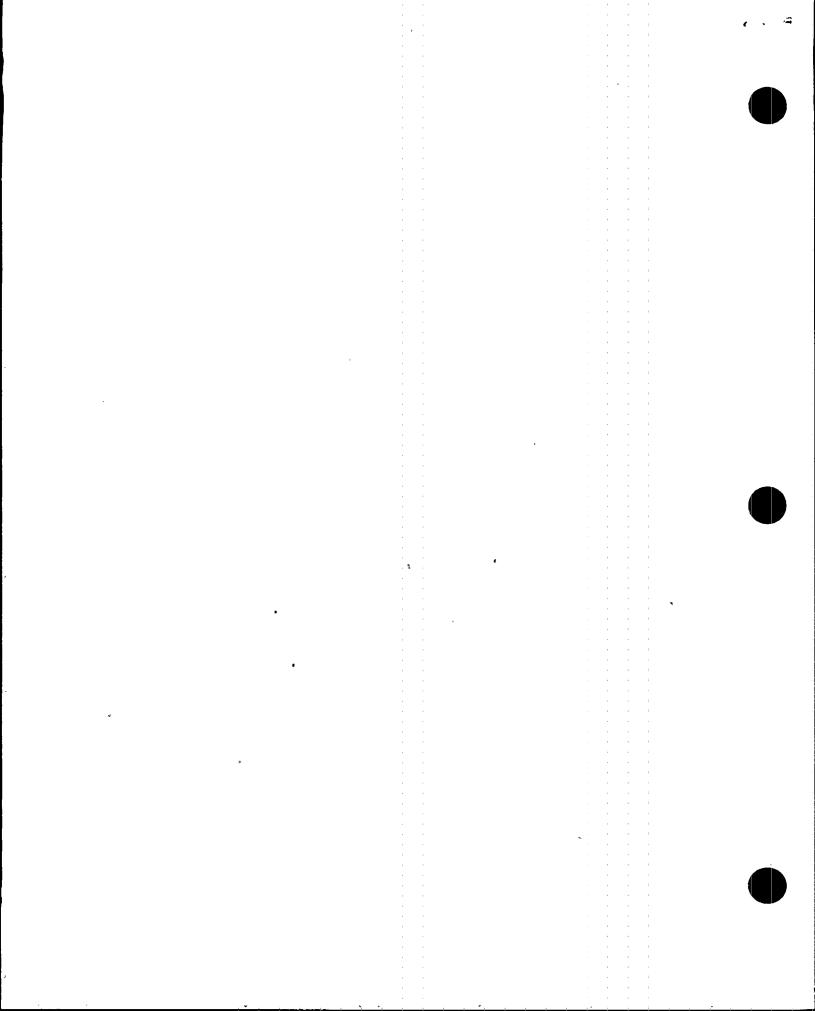
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SSEZ line no, <u>39216</u> AI

Sheet 1 of 2

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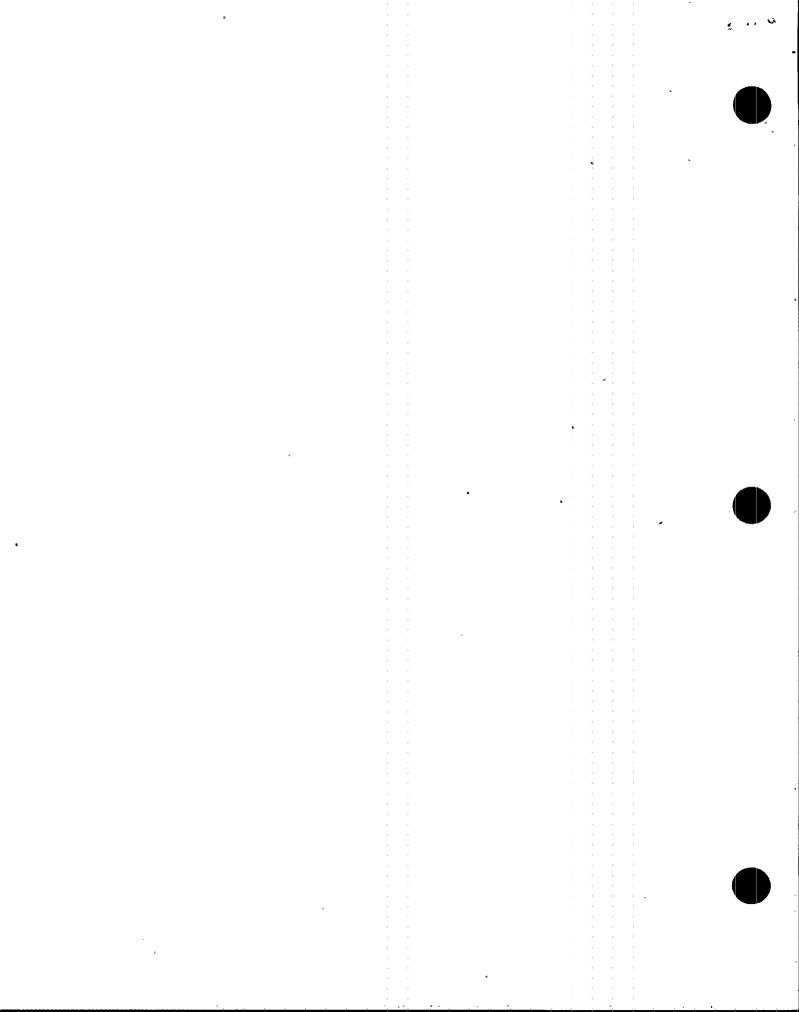
	•		
	Equip. ID No. 3-LANL-925-655 A Equip. Class 20 - Instr. & Cont	rol Panels	& Cabinets
	Equipment Description _ DIV. I Load Shed Logic Anel		
	Location: Bldg. <u>43- RB</u> Floor El. <u>621'-3</u> Room, Row/Col <u>480</u>		
I	Manufacturer, Model, Etc. (optional but recommended)	n Technol	paies
 	SEISMIC CAPACITY VS DEMAND1. Elevation where equipment receives seismic input2. Elevation of seismic input below about 40' from grade3. Equipment has fundamental frequency above about 8 Hz4. Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS		15ff.Grade <u>© E1.563</u> ') N/A
	5. Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Does capacity exceed demand? (Indicate at right (*) and in <u>COMMENTS</u> if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)	GRS AGS CRS RRS	(₹) N U (7) [*]
	 <u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) those are met by intent without meeting the specific wording of the care explain the reason for this conclusion in the COMMENTS section bionates in the commentation of the care equipment class No computers or programmable controllers No strip chart recorders Steel frame and sheet metal structurally adequate Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or panels, are bolted together if they contain essential relays Drawers and equipment on slides restrained from falling out Attached lines have adequate flexibility Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated AF = 4.5 Have you looked for and found no other adverse concerns? Is the intent of all the caveats met for Bounding Spectrum? 	veat rule a elow) QNU	nd N/A N/A N/A (1) (5)
	3. Sizes and locations of anchors determined	U N U	N/A



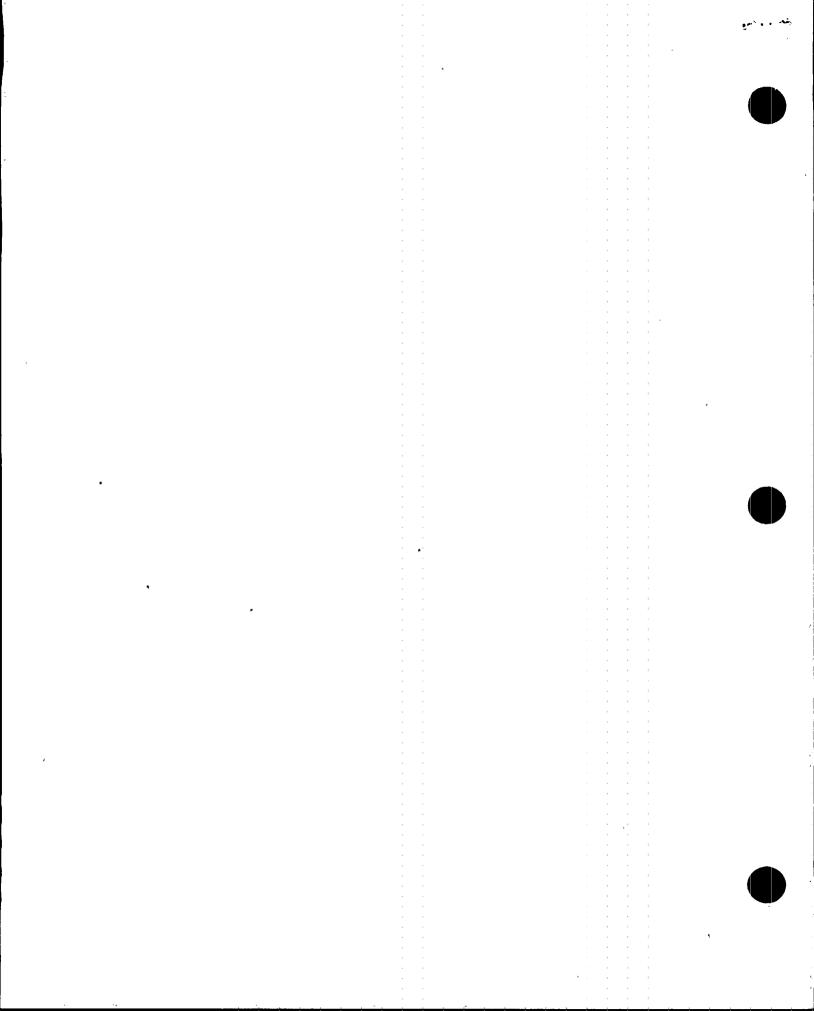
SSEL Line no. 39216 ÆΙ **Revision 2A** SCREENING EVALUATION WORK SHEET (SEWS) Sheet 2 of 2 Equip. ID No. 3-LPNL-925-655A Equip. Class 20 - Instr. & Control Panels & Cabinets Equipment Description DIV. I Load Shed Logic Panel ANCHORAGE (Cont'd) Anchorage installation adequate, e.g., 4. weld quality and length, nuts and washers, expansion U N/A N anchor tightness 5. Factors affecting anchorage capacity or margin of safety considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and N/A concrete cracking For bolted anchorages, gap under base less than 6. U N/A 1/4-inch Factors affecting essential relays considered: gap 7. N U N/A under base, capacity reduction for expansion anchors 8. Base has adequate stiffness and effect of prying N/A action on anchors considered 9. Strength of equipment base and load path U N/A to CG adequate Embedded steel, grout pad or large concrete 10. U (N/ Y N pad adequacy evaluated Are anchorage requirements met? INTERACTION EFFECTS Soft targets free from impact by nearby 1. (N U N/A equipment or structures. If equipment contains sensitive relays, equipment 2. N N บ บ N/A free from all impact by nearby equipment or structures (4) N/A 3. Attached lines have adequate flexibility Overhead equipment or distribution systems are 4. (6) U N/A N not likely to collapse U Have you looked for and found no other adverse concerns? (2) 5. Is equipment free of interaction effects? Y)N U IS EQUIPMENT SEISMICALLY ADEQUATE? COMMENTS See notes on SEWS package for 3-LPNL-925-654A (SSEC#39105) Since both equipment are similar. (panel and anchorage configurations).

Evaluated by:	Alu O. Diza	_ Date: _1/12
	J.R. A Isser	_ <u>,//</u>

G.20-2

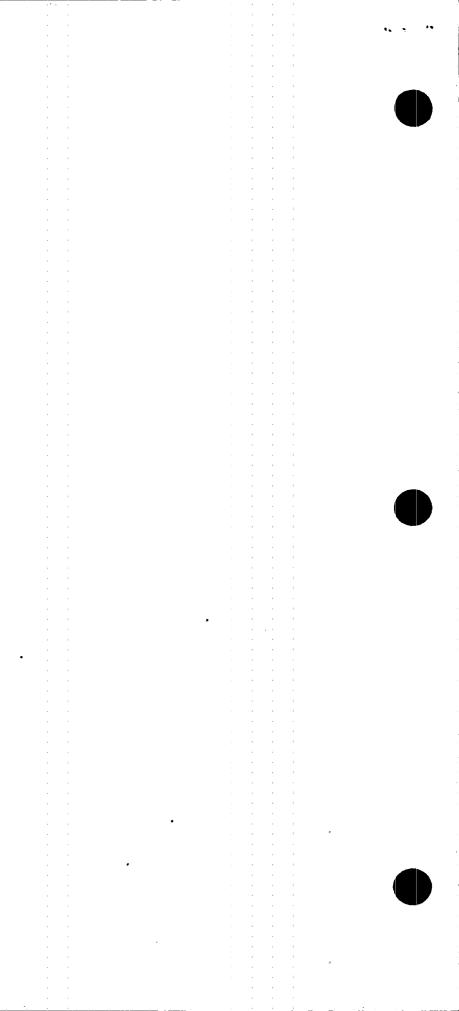


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SSEL Line No. <u>39216</u> AI	•. •.	Status	(Y) N U
		Sheet	1 of 1
IPEEE SUPPLY	EMENTAL SCREENING E	VALUATION WORK	SHEET
		-	
Equip. ID No. 3-LPNL-925-655A			s + Calcinets
Equipment Description <u>Du</u>	Load shed Logi	c Panel	
* RELAY WALKDOWN	. •		
 Does spot check of essential relays present and properly m 	relays indicate ounted?	<i>(</i>) N U	N/A
2. Are essential relays required during earthquake screened ou	to function t?	YNU	(N/A)
If no, attach list of relays cabinet and general dimension details of mounting plates th for later analysis.	s, thicknesses and		
3. No other relay concerns?		<u>(</u> Y) N U	N/A
Requirements for relays satisfied	? .		. (Ŷ N U
SYSTEM INTERACTION EFFECTS	<i>, , , , , , , , , ,</i>	•••	-
1. No potential sources could fl cabinet?	ood or spill onto	YN U	N/A
DESCRIBE POTENTIAL PROBLEMS INDIC .sheets if necessary)	ATED BY NO OR UNSAT	ISFACTORY (Use	additional
•			
۰. ۸	_ `		
IS EQUIPMENT FREE OF NEED FOR FUR	THER INVESTIGATION,	EXCLUDING REL	AY CHATTER?
IS EQUIPMENT FREE OF NEED FOR FUR	THER RELAY CHATTER	INVESTIGATION	YES NO
Evaluated by: John O. Dire	~	Date:	1/12/46
Evaluated by:	- J.R. DISSER	<u>e</u> Date:	1/12/96



	11N FENT
- SEL Line No. <u>39105</u>	Status 🔗 N U
SCREENING EVALUATION WORK SHEET (SEWS)	Sheet 1 of 2 3
Equip. ID No. <u>3-LPNL-925-654A</u> Equip. Class <u>20 - Instr. 8</u>	<u>& Control Panels & Cabinets</u>
Equipment Description <u>DIV I LOAD SHED LOGIC PANEL - DCN W212</u>	284
Location: Bldg. <u>RB</u> Floor El. <u>621'-3"</u> Room, F	Row/Col <u>SD BD RM E</u>
Manufacturer, Model, Etc. (optional but recommended)	ectrum Technologies
SEISMIC CAPACITY VS DEMAND 1. Elevation where equipment receives seismic input 2. Elevation of seismic input below about 40' from grade 3. Equipment has fundamental frequency above about 8 Hz 4. Capacity based on: Existing Documentation Bounding Spectrum 1.5 x Bounding Spectrum GERS 5. Demand based on: Ground Response Spectrum 1.5 x Ground Response Spectrum Conserv. Des. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. Realistic M-Ctr. In-Str. Resp. Spec. MMENTS if a special exception to enveloping of seismic demand spectrum is invoked per Section 4.2 of the GIP.)	Y N U N/A (8) DOC BS ABS GERS GRS AGS CRS
<u>CAVEATS - BOUNDING SPECTRUM</u> (Identify with an asterisk (*) th are met by intent without meeting the specific wording of the explain the reason for this conclusion in the COMMENTS section 1. Equipment is included in earthquake experience	e caveat rule and
equipment class 2. No computers or programmable controllers 3. No strip chart recorders 4. Steel frame and sheet metal structurally adequate 5. Adjacent cabinets or panels which are close enough to impact, or sections of multi-bay cabinets or	 𝔅 N U N/A 𝔅 N U N/A 𝔅 N U N/A 𝔅 N U N/A 𝔅 N U N/A (1, 5)
panels, are bolted together if they contain essential relays	YNU 🕼
 Drawers and equipment on slides restrained from falling out All doors secured by latch or fastener Attached lines have adequate flexibility Anchorage adequate (See checklist below for details) Relays mounted on equipment evaluated AFLYS Have you looked for and found no other adverse concern Is the intent of all the caveats met for Bounding Spectrum? 	Y N U N/A O N U N/A O N U N/A(4) O N U N/A(7) O N U N/A (5) O N U N/A O N U N/A O N U N/A
 NCHORAGE Appropriate equipment characteristics determined (mass, CG, natural freq., damping, center of rotation) Type of anchorage covered by GIP Sizes and locations of anchors determined) (V) N U N/A (V) N U N/A (V) N U N/A (V) N U N/A

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SEL Line No. <u>39105</u>

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SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 2 of $2'_3$

Y) N U N/A(4)

() N ()

N/A (Z)

() N ()

(Y) N U

Equip. ID No. <u>3-LPNL-925-654A</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u>

Equipment Description DIV I LOAD SHED LOGIC PANEL - DCN W21284

ANCHORAGE (Cont'd)

/							
4.							
-	weld quality and length, nuts and washers, expansion	0					
	anchor tightness	Ø	N	U	N/A		
5.	Factors affecting anchorage capacity or margin of						
	safety considered: embedment length, anchor spacing,						
	free-edge distance, concrete strength/condition, and	<i>د</i> م	N	11	N/A		
~	concrete cracking	P	и	U	NZA		
6.	For bolted anchorages, gap under base less than	ത	М	11	N/A		
7	1/4-inch	Û	I	U	NY A		
7.	Factors affecting essential relays considered: gap under base, capacity reduction for expansion anchors	$\langle \nabla \rangle$	N	п	N/A		
0	Base has adequate stiffness and effect of prying	9		v	ių n		
8.	action on anchors considered	(Y)	Ν	н	N/A		
9.	Strength of equipment base and load path			v			
5.	to CG adequate	(Y)	Ν	U	N/A		
10.							
10.	pad adequacy evaluated	Y	Ν	U			
Are an	ichorage requirements met?	-	•••		Ø N	U (7	.)
ALC U					-	•	-
INTERA	CTION EFFECTS						
	Soft targets free from impact by nearby	•			•		
	equipment or structures	\bigotimes	Ν	U	N/A		
2.	If equipment contains sensitive relays, equipment	~					
	free from all impact by nearby equipment or structures	Ŕ	N	U	N/A N/A (4)		
2	Attached lines have adequate flexibility	(7)	N	U	N/A (4)		

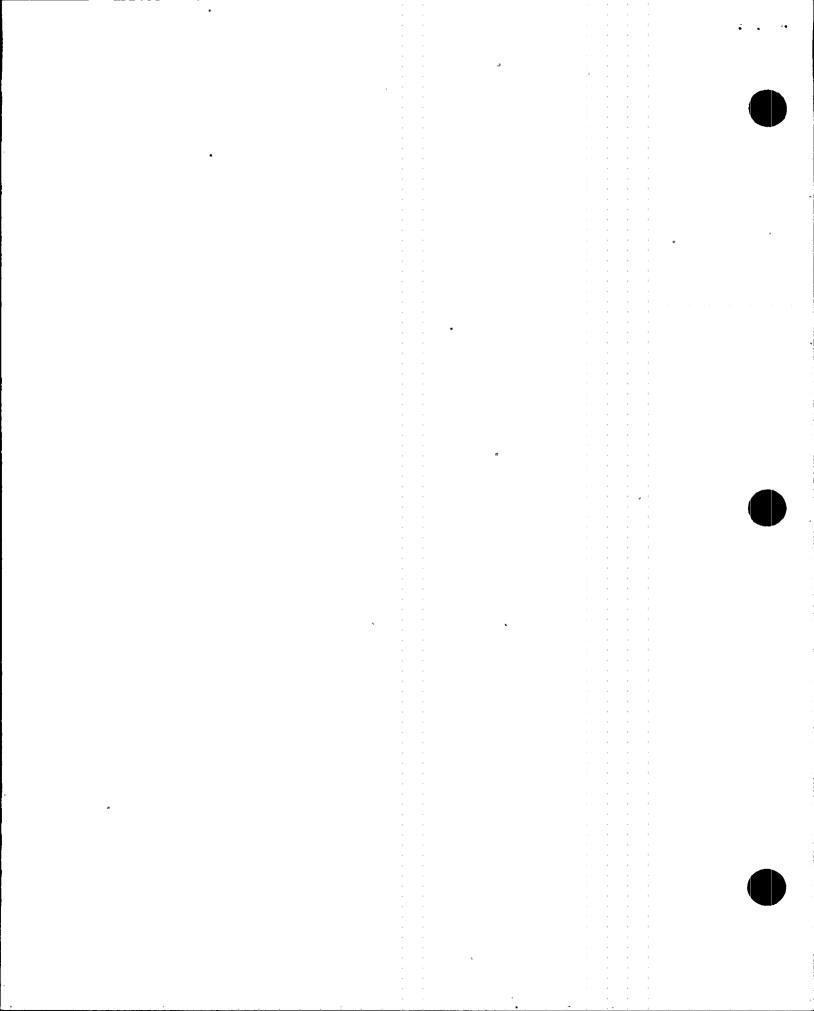
- Attached lines have adequate flexibility
 Overhead equipment or distribution systems are
- not likely to collapse 5. Have you looked for and found no other adverse concerns? Is equipment free of interaction effects?

IS EQUIPMENT SEISMICALLY ADEQUATE?

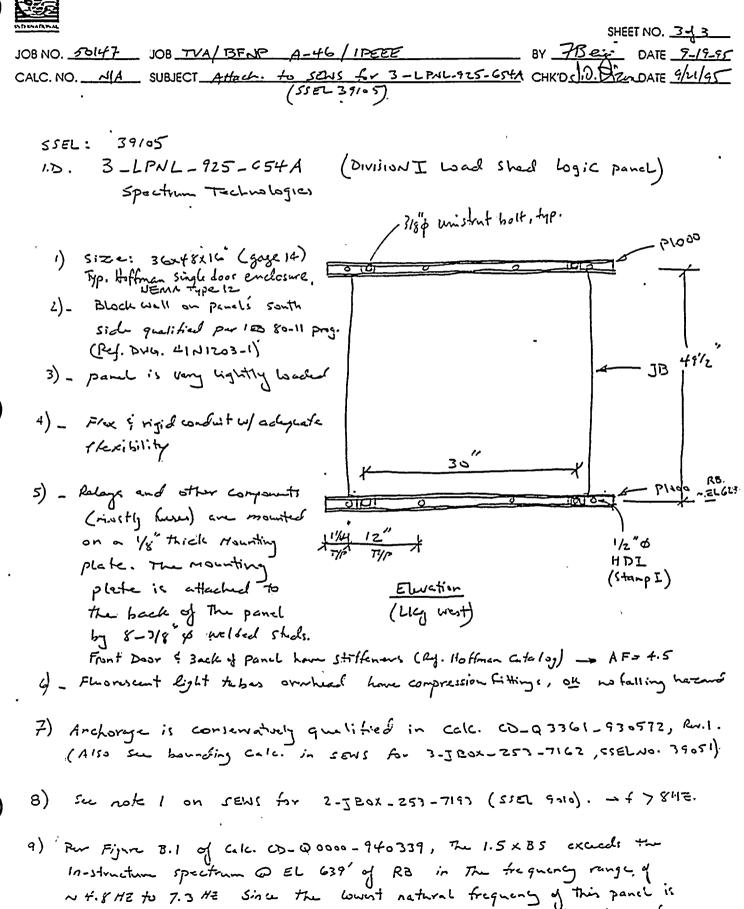
COMMENTS

- see next sheet for notes.

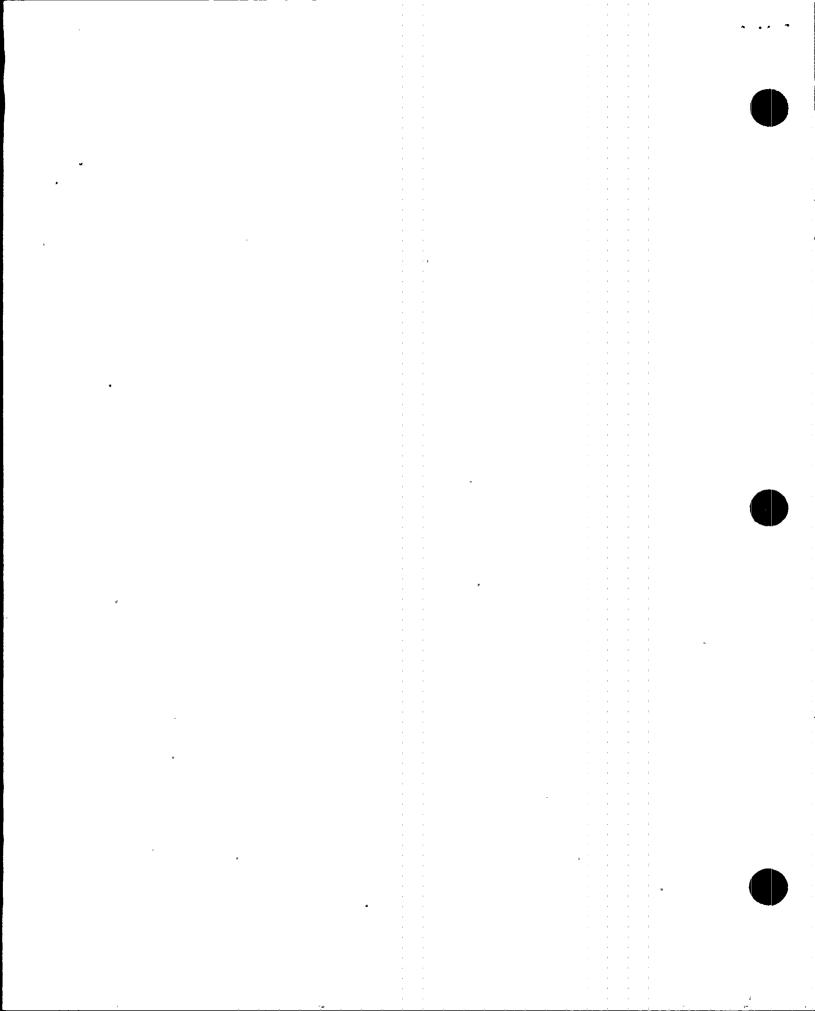
Date: Evaluated by: 9-19-95 То



EQE INTERNATIONAL



greater than 7.3.112 The intent of seismic capacity VS Demand criteria of



SEL Line No. <u>39105</u>

Status	Ø	Ν	U

Sheet 1 of 1

IPEEE SUPPLEMENTAL SCREENING EVALUATION WORKSHEET

Equip. ID No. <u>3-LPNL-925-654A</u> Equip. Class <u>20 - Instr. & Control Panels & Cabinets</u> Equipment Description <u>DIV I LOAD SHED LOGIC PANEL - DCN W21284</u>

RELAY WALKDOWN

 Does spot check of essential relays indicate relays present and properly mounted? 	\heartsuit	N	U	N/A	
2. Are essential relays required to function during earthquake screened out?	Y	N	U	NA	
If no, attach list of relays with locations in cabinet and general dimensions, thicknesses and details of mounting plates that support relays for later analysis.					
3. No other relay concerns?	$\langle \mathbf{y} \rangle$	N	U	N/A	
Requirements for relays satisfied?				()	4 U
SYSTEM INTERACTION EFFECTS					
 No potential sources could flood or spill onto cabinet? 	$\langle \mathbf{y} \rangle$	N	U	N/A	
DESCRIBE POTENTIAL PROBLEMS INDICATED BY NO OR UNSATI sheets if necessary)	SFACTO	RY ((Use	additional	ŀ
•					
IS EQUIPMENT FREE OF NEED FOR FURTHER INVESTIGATION,	EXCLUD	ING	RELA	AY CHATTER?	?

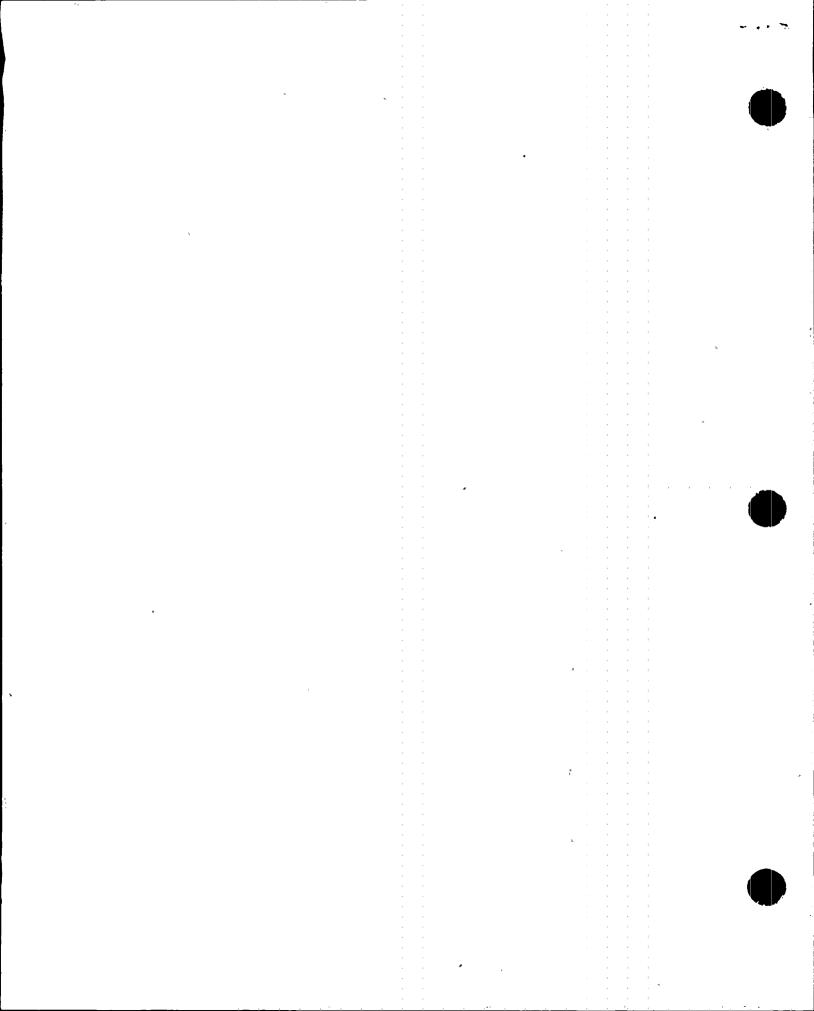
IS EQUIPMENT FREE OF NEED FOR FURTHER RELAY CHATTER INVESTIGATION? YES / NO____

Evaluated by: _

Evaluated by:

Tonic Bey	
An O. Fron	

Date: 9-19-95 , Date: 9/21/95 ,



ATTACHMENT 8-4

