ATTACHMENT G

NIAGARA MOHAWK NUCLEAR ENGINEERING	CALCULATION COVER SHEET	Page 1 (Next 2) Total 16 Last B2

NINE MILE POINT NUCLEAR STATION Unit (1, 2 or 0=Both) : 1 Discipline : STRUCTURAL

Title	Calculation No.			
SCREENING EVALUATION WORK SHEETS FOR TRANSFORMER 167A	S0.0SEWS167A			
	(Sub)system(s)	Building	Floor Elev.	Index No.
	NA	RB	281	S0.0

Originator(s)
CARMEN R. AGOSTA

Checker(s) / Approver(s)
MOHAMMED ALVI

Rev	Description	Design Change No.	By	Date	Chk	Date	App	Date
00	INITIAL ISSUE	NA	CA	7-1-97	M.A	7-7-97	M.A	7-7-97

Computer Output/Microfilm Filed Separately (Yes / No / NA): NA Safety Class (SR / NSR / Qxx) : SR

Superseded Document(s) : NONE

Document Cross Reference(s) - For additional references see page(s) : NA

Ref No	Document No.	Doc Type	Index	Sheet	Rev
1	NER-1S-012	NER	---	---	00
2	S0.0SQUGANCHOR	CALC	S0.0	---	00

General Reference(s) :
3. GENERIC IMPLIMENTATION PROCEDURE (GIP)
4. NMPC Letter to NRC, File Code NMP1L 1044, dated March 11, 1996

Remarks :
NONE

Confirmation Required (Yes / No) : No See Page(s) :	Final Issue Status (APP / FIO / VOI) : APP	File Location (Calc / Hold) : Calc	Operations Acceptance Required (Yes / No) : No

Evaluation Number(s) / Revision : NR Copy of Applicability Review Attached (Yes / N/R)?N/R	Component ID(s) / EPN(s) / Line Number(s) : NA
Key Words : NMP-1, STRUCTURAL, SQUG, SEWS, SEISMIC VERIFICATION	

FORMAT # NEP-DES-08-F01-00

Nine Mile Point Nuclear Station Unit: 1 Disposition: —

Originator/Date	Checker/Date	Calculation No.	Revision
A / 7-1-97	M.A 7-7-97	S0.0SEWS~~72-03~~ 167A	00

Ref.

PURPOSE: Document the Screening Evaluation Work Sheets (SEWS) for the AP/600 TO 120/208 V TRANSFORMER, equipment number 167A.

This SEWS has been prepared as part of the commitment to use the SQUG (GIP) methodology to document the seismic adequacy of SSEL components.

CONCLUSION: The four welds and the four 5/8" diameter cinch anchors are adequate based on the anchor analysis in Attachment A, the cinch anchor capacities given in Calculation S0.0SQUGANCHOR (Ref. 2) and the anchor bolt tightness check results confirming these anchors are tight.
Therefore, the SQUG outlier for 167A is resolved.

#2

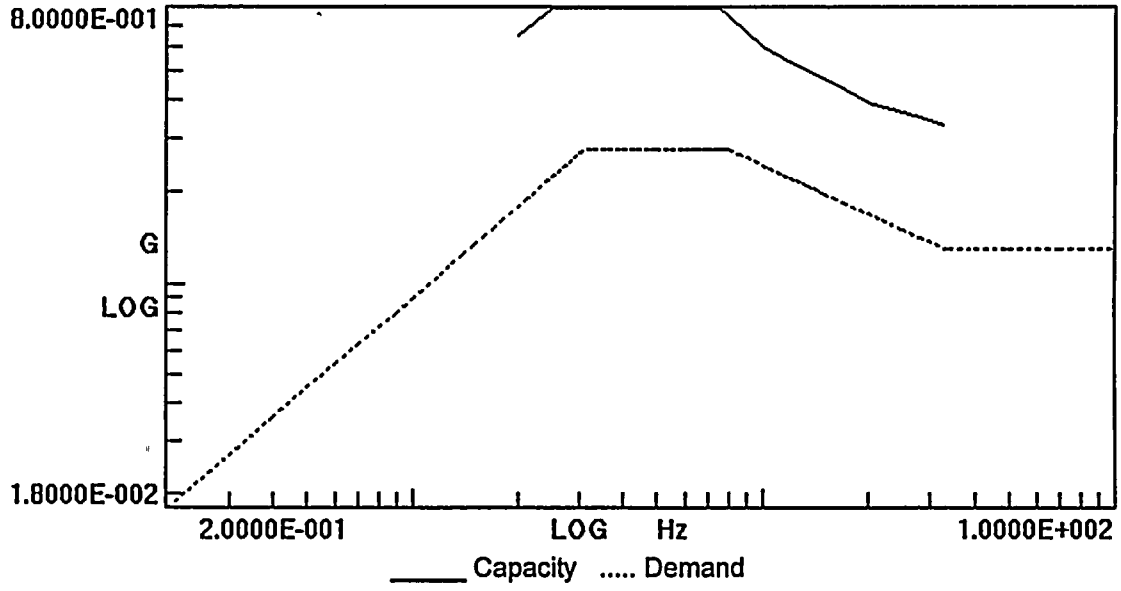
ATTACHMENTS

A. SEWS for Equipment ID Number 167A
B. The Outlier Seismic Verification Sheet (OSVS) for Equipment ID Number 167A

Niagara Mohawk Power Corporation - Nine Mile Point 1 SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 1 of 8
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input	281.00
2.	Elevation of seismic input below about 40' from grade (grade = 243.00)	Yes
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)	SRT
4.	Capacity based on: 1.00 * Bounding Spectrum	
5.	Demand based on: 1.00 * Design Basis Ground Response Spectrum	



	File	Record
Capacity	F:\GIP\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	F:\GIP\PROJ003F\spectra.des	UNIT:|PLANT|BLDG:|BUILDING|E/Q:|SSE|ELEV:|ELEVATION|ROW/COL:|ALL|DIR:|DIR|NODE:|1
Demand 2	F:\GIP\PROJ003F\spectra.des	UNIT:|PLANT|BLDG:|BUILDING|E/Q:|SSE|ELEV:|ELEVATION|ROW/COL:|ALL|DIR:|DIR|NODE:|1

Does capacity exceed demand? Yes

Niagara Mohawk Power Corporation - Nine Mile Point 1 SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 2 of 8
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

TRN/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
TRN/BS Caveat 2 - Rating of 4.16 KV or Less.	Yes
TRN/BS Caveat 3 - Transformer Coils Postively Restrained Within Cabinet.	Yes
TRN/BS Caveat 4 - Coils Top Braced or Analyzed for Large Transformers.	Yes
TRN/BS Caveat 5 - Clearance Between Energized Component and Cabinet.	Yes
TRN/BS Caveat 6 - Adequate Slack in High Voltage Leads.	Yes
TRN/BS Caveat 7 - Wall-Mounted Units Anchored Close to Enclosure Structure.	Yes
TRN/BS Caveat 8 - Weak-Way Bending of Thin Webs Evaluated.	Yes
TRN/BS Caveat 9 - Adjacent Cabinets Bolted Together.	N/A
TRN/BS Caveat 10 - Doors Secured.	N/A
TRN/BS Caveat 11 - Adequate Anchorage.	No*
TRN/BS Caveat 12 - Potential Chatter of Essential Relays Evaluated.	Yes
TRN/BS Caveat 13 - No Other Concerns.	Yes

Is the intent of all the caveats met for Bounding Spectrum? No

ANCHORAGE

1. The sizes and locations of anchors have been determined.	N/A
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	No
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	N/A
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	Yes
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? No

Niagara Mohawk Power Corporation - Nine Mile Point 1 SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 3 of 8
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? **No**

COMMENTS

OUTLIER

IMPORTANT NOTE: This SEWS is a composite of the original SQUG pilot plant walkdown conducted in January and February of 1988 by D. Moore, A. Ordonez, W Djordjevic, RF Oleck, J Valente, D Aelbrecht, J. Reddington, T. Hester, D. Tahiliani, J. Raby, and F. Feng using the GIP, Revision 1; a supplementary walkdown conducted by RF Starck, F Feng and W Djordjevic in April 1989 still using Revision 1 of the GIP, and the final walkdown conducted in April 1993 by W Djordjevic and C Agosta to update the SEWS to Revision 2 GIP requirements as required by USNRC in SSER-2.

Anchorage: Transformer is anchored by four 1" welds 1/8" thick.

Evaluated by: Date:

1/12/94

6/3/95

Attachment: Pictures
Attachment: ANCHOR Report

Niagara Mohawk Power Corporation - Nine Mile Point 1 SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 4 of 8
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8
Manufacturer, Model, Etc. :		

PICTURES

Panel 167A Transformer

Niagara Mohawk Power Corporation - Nine Mile Point 1 SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 5 of 8
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8
Manufacturer, Model, Etc. :		

ANCHOR Report

Earthquake :

Response Spectrum : SSE

Frequency : GIP - Flexible

Damping : GIP - 5.00

Spectral Values :

Direction	Acceleration (g's)
North - South	0.52
East - West	0.52
Vertical	0.16

Angle : 0.00

Combination Criteria : SRSS

Weights :

Number of Weights : 1

No	Weight	X	Y	Z
1	9.75E+002	2.00E+001	1.20E+001	2.00E+001

Forces :

Number of Forces : 0

Moments :

Number of Moments : 0

Allowables :

Anchor :

Number of Anchor types : 1

						Tension	Shear	
				Ultimate	Ultimate	Inter	Inter	Saf
No.	Dia	Manufact	Product	Tension	Shear	Coeff	Coeff	Fact

Niagara Mohawk Power Corporation - Nine Mile Point 1 SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 6 of 8
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8
Manufacturer, Model, Etc. :		

1	3/8	Other	Unknown Expansion Anchor	1460.00	1420.00	1.00	0.30	1.00

Concrete :

Ultimate Stress : 4000.00 psi.

Reduction Factor : 0.85

Weld :

Allowable Stress : 30600 psi.

Surfaces :

Number of Surfaces : 1

	Direction Comp	Direction Comp	Direction Comp
No	Nx	Ny	Nz
1	0.00E+000	0.00E+000	1.00E+000

Anchor Pattern for Surface # 1

Legend for Anchor Patterns

Niagara Mohawk Power Corporation - Nine Mile Point 1 SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 7 of 8
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8
Manufacturer, Model, Etc. :		

Anchors : [redacted]

Concrete Lines : [redacted]

Concrete Points : [redacted]

Weld Lines : [redacted]

Geometry :

Anchor :

Number of Anchors : 0

Concrete Lines :

# of elements per line : 1

Number of Concrete Lines : 4

No	Start X-Coord	Start Y-Coord	Start Z-Coord	End X-Coord	End Y-Coord	End Z-Coord	Sf Id	Line Width
1	0.00E+000	1.00E+000	0.00E+000	4.00E+001	1.00E+000	0.00E+000	1	2.00E+000
2	3.90E+001	0.00E+000	0.00E+000	3.90E+001	2.40E+001	0.00E+000	1	2.00E+000
3	4.00E+001	2.30E+001	0.00E+000	0.00E+000	2.30E+001	0.00E+000	1	2.00E+000
4	1.00E+000	2.40E+001	0.00E+000	1.00E+000	0.00E+000	0.00E+000	1	2.00E+000

Concrete Points :

Number of Concrete Points : 0

Weld Lines :

# of elements per line : 1

Number of Weld Lines : 4

No	Start X-Coord	Start Y-Coord	Start Z-Coord	End X-Coord	End Y-Coord	End Z-Coord	Sf Id	Line Width
1	1.00E+000	0.00E+000	1.00E+000	1.00E+000	1.00E+000	1.00E+000	1	1.25E-001
2	3.90E+001	0.00E+000	1.00E+000	3.90E+001	1.00E+000	1.00E+000	1	1.25E-001
3	1.00E+000	2.30E+001	1.00E+000	1.00E+000	2.40E+001	1.00E+000	1	1.25E-001
4	3.90E+001	2.30E+001	1.00E+000	3.90E+001	2.40E+001	1.00E+000	1	1.25E-001

Niagara Mohawk Power Corporation - Nine Mile Point 1 SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 8 of 8
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8
Manufacturer, Model, Etc. :		

Reduction Factors :

Reduction Factors Data Current : Yes

Analysis Results :

Analysis Performed : Yes

Type of Analysis : Regular

	Spectral Accelerations (G's)			Allowable
No	N-S	E-W	Vertical	Load Factor
1	5.17E-001	2.07E-001	6.50E-002	12.824
2	-5.17E-001	-2.07E-001	-6.50E-002	13.885
3	-5.17E-001	2.07E-001	6.50E-002	12.824
4	5.17E-001	-2.07E-001	-6.50E-002	13.885
5	5.17E-001	-2.07E-001	6.50E-002	12.824
6	-5.17E-001	2.07E-001	-6.50E-002	13.885
7	5.17E-001	2.07E-001	-6.50E-002	13.885
8	-5.17E-001	-2.07E-001	6.50E-002	12.824
9	2.07E-001	5.17E-001	6.50E-002	11.125
10	-2.07E-001	-5.17E-001	-6.50E-002	12.130
11	2.07E-001	-5.17E-001	6.50E-002	11.125
12	-2.07E-001	5.17E-001	-6.50E-002	12.130
13	-2.07E-001	5.17E-001	6.50E-002	11.125
14	2.07E-001	-5.17E-001	-6.50E-002	12.130
15	2.07E-001	5.17E-001	-6.50E-002	12.130
16	-2.07E-001	-5.17E-001	6.50E-002	11.125
17	2.07E-001	2.07E-001	1.63E-001	19.044
18	-2.07E-001	-2.07E-001	-1.63E-001	28.093
19	2.07E-001	2.07E-001	-1.63E-001	28.093
20	-2.07E-001	-2.07E-001	1.63E-001	19.044
21	-2.07E-001	2.07E-001	1.63E-001	19.044
22	2.07E-001	-2.07E-001	-1.63E-001	28.093
23	2.07E-001	-2.07E-001	1.63E-001	19.044
24	-2.07E-001	2.07E-001	-1.63E-001	28.093

Minimum Allowable Load Factor : 1.11E+001

Earthquake :
Response Spectrum : User
Frequency : User - 0.00
Percent Damping : User - 0.00

Spectral Values :

Direction	Acceleration (g's)
North - South	1.100
East - West	1.050
Vertical	0.170

Angle (N-S Direction makes with the X Axis) : 0.00
Combination Criteria : SRSS

Weights :
Number of Weights : 1

No	Weight	X	Y	Z
1	975.00	15.500	18.000	18.750

Forces :
Number of External Forces : 0

Moments :
Number of External Moments : 0

Allowables :
Anchor :
Number of Anchor types : 1

						Tension	Shear	
				Ultimate	Ultimate	Inter	Inter	Saf
No.	Dia	Manufact	Product	Tension	Shear	Coeff	Coeff	Fact
1	5/8	Other	Unknown Expansion Anchor	970.00	1400.00	1.00	0.30	1.00

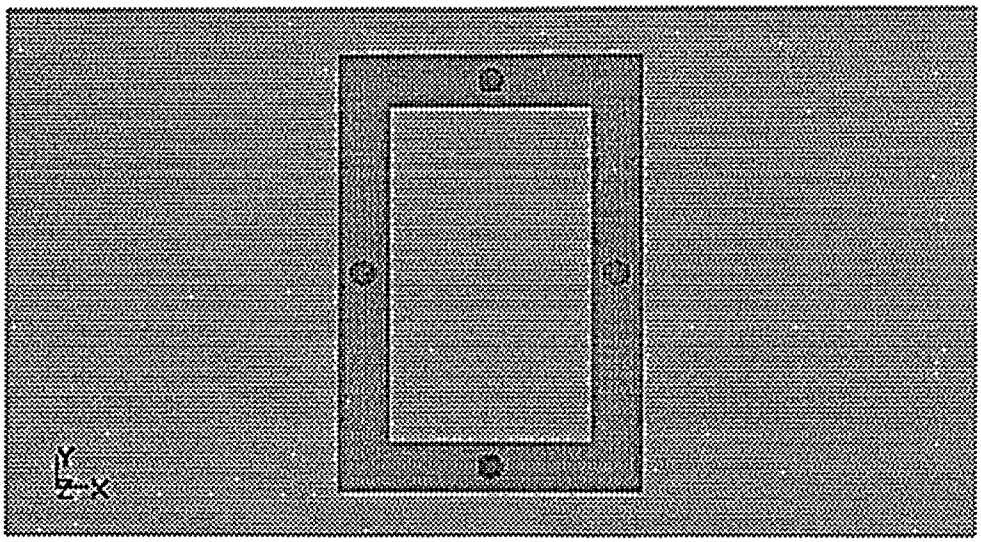
Concrete :
Ultimate Stress : 3500.00 psi.
Reduction Factor : 0.85

Weld :
Allowable Stress : 30600 psi.

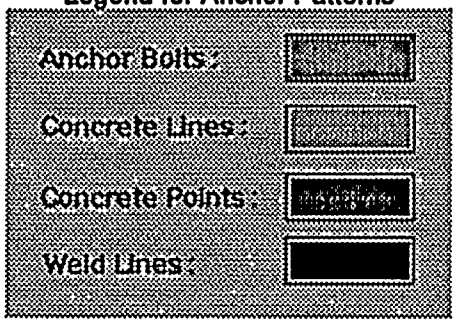
Surfaces :
Number of Surfaces : 1
Surface Orientation

	Direction	Direction	Direction
	Comp	Comp	Comp
No	Nx	Ny	Nz
1	0.000	0.000	1.000

Anchor Pattern for Surface # 1



Legend for Anchor Patterns



Geometry :

Anchor :

Number of Anchors : 4

No.	Anch Id	X Coord	Y Coord	Z Coord	Surf Id
1	1	12.000	2.000	0.000	1
2	1	22.000	17.500	0.000	1
3	1	12.000	33.000	0.000	1
4	1	2.000	17.500	0.000	1

Concrete Lines :

# of elements per line : 4

Number of Concrete Lines : 4

No	Start X-Coord	Start Y-Coord	Start Z-Coord	End X-Coord	End Y-Coord	End Z-Coord	Sf Id	Line Width
1	0.000	2.000	0.000	24.000	2.000	0.000	1	4.000
2	22.000	0.000	0.000	22.000	35.000	0.000	1	4.000
3	24.000	33.000	0.000	0.000	33.000	0.000	1	4.000
4	2.000	35.000	0.000	2.000	0.000	0.000	1	4.000

Concrete Points :
Number of Concrete Points : 0

Weld Lines :
# of elements per line : 4
Number of Weld Lines : 0

Determination of Reduction Factors :
Reduction Factor Input for Anchor # 1

No Input - Reduction factors needing user input are not used.

Reduction Factor Input for Anchor # 2

No Input - Reduction factors needing user input are not used.

Reduction Factor Input for Anchor # 3

No Input - Reduction factors needing user input are not used.

Reduction Factor Input for Anchor # 4

No Input - Reduction factors needing user input are not used.

Reduction Factors Data Current : Yes

No	Anc Id	Pall/ Vall	Pallr/ Vallr	RT	RN	RL	RG	RS	RE	RF	RC	RR	RP	RB	RM
1	1	970.00	N/A	X	X	X	X	X	X	X	X	X	X	X	X
		1400.00	N/A	X	X	X	X	X	X	X	X	X	X	X	X
2	1	970.00	N/A	X	X	X	X	X	X	X	X	X	X	X	X
		1400.00	N/A	X	X	X	X	X	X	X	X	X	X	X	X
3	1	970.00	N/A	X	X	X	X	X	X	X	X	X	X	X	X
		1400.00	N/A	X	X	X	X	X	X	X	X	X	X	X	X
4	1	970.00	N/A	X	X	X	X	X	X	X	X	X	X	X	X
		1400.00	N/A	X	X	X	X	X	X	X	X	X	X	X	X

Legend :

N/A	= Not Applicable
Pall	= Allowable Pull without Reduced Inspection
Vall	= Allowable Shear without Reduced Inspection
Pallr	= Allowable Pull with Reduced Inspection
Vallr	= Allowable Shear with Reduced Inspection
*	= Outlier
X	= Reduction Factor Not Used
RT	= Reduction Factor for Type of Anchorage
RN	= Reduction Factor for Installation Adequacy
RL	= Reduction Factor for Embedment

RG	= Reduction Factor for Gap at Anchors
RS	= Reduction Factor for Spacing
RE	= Reduction Factor for Edge Distance
RF	= Reduction Factor for Concrete Strength
RC	= Reduction Factor for Concrete Cracks
RR	= Reduction Factor for Essential Relays
RP	= Reduction Factor for Base Stiffness and Prying Action
RB	= Reduction Factor for Base Strength and Load Path
RM	= Reduction Factor for Embed. Steel and Pads

Analysis Results :
Analysis Performed : Yes

Type of Analysis : Regular

	Spectral Accelerations (G's)			
No	N-S	E-W	Vertical	Safety Factor
1	1.100	0.420	0.068	2.177
2	-1.100	-0.420	-0.068	2.485
3	-1.100	0.420	0.068	2.351
4	1.100	-0.420	-0.068	2.235
5	1.100	-0.420	0.068	2.177
6	-1.100	0.420	-0.068	2.485
7	1.100	0.420	-0.068	2.235
8	-1.100	-0.420	0.068	2.351
9	0.440	1.050	0.068	2.992
10	-0.440	-1.050	-0.068	3.187
11	0.440	-1.050	0.068	3.013
12	-0.440	1.050	-0.068	3.155
13	-0.440	1.050	0.068	2.992
14	0.440	-1.050	-0.068	3.179
15	0.440	1.050	-0.068	3.155
16	-0.440	-1.050	0.068	3.013
17	0.440	0.420	0.170	4.750
18	-0.440	-0.420	-0.170	6.439
19	0.440	0.420	-0.170	5.544
20	-0.440	-0.420	0.170	4.677
21	-0.440	0.420	0.170	4.627
22	0.440	-0.420	-0.170	5.544
23	0.440	-0.420	0.170	4.750
24	-0.440	0.420	-0.170	6.352

Minimum Safety Factor : 2.177

The anchorage can withstand 2.177 times greater seismic demand

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)		GIP Rev Sheet 1 of 2
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8

1. OUTLIER ISSUE DEFINITION - Mechanical and Electrical Equipment

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

Capacity vs. Demand	
Caveats	
Anchorage	X
Seismic Interaction	
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 of equipment to be verified for seismic adequacy).

Cast-in-place (embedded) channels are anchored by Cinch (leaded) type expansion anchors. The GIP does not cover this anchor type; specifically, it provides no known capacity for this anchor type.

2. PROPOSED METHOD OF OUTLIER RESOLUTION (Optional)

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

Establish an allowable capacity for this anchor type by reviewing appropriate documentation and compare this capacity to the seismic demand, and/or retrofit the anchorage.

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

3. COMMENTS

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 requirments for this item of equipment to be verified for seismic adequacy:

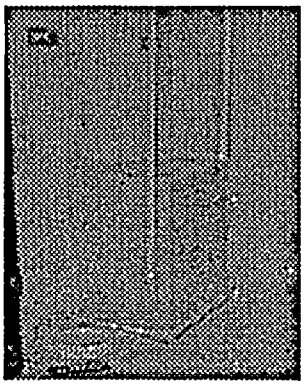
Approved by: _____ Date: 1/11/94

_____ 6/3/95

Attachment: Pictures

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)		GIP Rev Sheet 2 of 2
ID : TRANS 167A* (Rev. 0)	Class : 4. Transformers	
Description : AP/600 TO 120/208 V TRANSFORMER		
Building : RB	Floor El. : 281.00	Room, Row/Col : Q7,8

PICTURES



Panel 167A Transformer