



# CALCULATION COVER SHEET

NINE MILE POINT NUCLEAR STATION

Unit (1, 2 or 0=Both): 1

Discipline: STRUCTURAL

Title  
SCREENING EVALUATION WORK SHEETS FOR PUMP 210.1-36

Calculation No.  
S0.0SEWS210.1-36

(Sub)system(s) 210.1	Building TB	Floor Elev. 300	Index No. S0.0
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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	LA	6-23-97	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Superseded Document(s) : NONE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) :  
PMP-210.1-36

Key Words : NMP-1, STRUCTURAL, SQUG, SEWS, SEISMIC VERIFICATION



Nine Mile Point Nuclear Station

Unit: 1

Disposition:     

Originator/Date <u>PA / 6-23-97</u>	Checker/Date <u>M.A 7-7-97</u>	Calculation No. <u>S0.0SEWS210.1-36</u>	Revision <u>00</u>
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Ref.	<p><b>PURPOSE:</b> Document the Screening Evaluation Work Sheets (SEWS) for the CRAC/CHILL Water Pump #12, equipment number 210.1-36.</p> <p>This SEWS has been prepared as part of the commitment to use the SQUG (GIP) methodology to document the seismic adequacy of SSEL components.</p>
2	<p><b>CONCLUSION:</b> The four 5/8" diameter cinch anchors are adequate for a 250 pound load based on engineering judgment, the 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 210.1-36 is resolved.</p>
	<p><b>ATTACHMENTS</b></p> <ul style="list-style-type: none"> <li>A. SEWS for Equipment ID Number 210.1-36</li> <li>B. The Outlier Seismic Verification Sheet (OSVS) for Equipment ID Number 210.1-36</li> </ul>





ATTACHMENT  
PAGE NO  
REVISION  
DATE NO



SSEL Line No. 7327

SCREENING EVALUATION WORK SHEET (SEWS)

Sheet 2 of 2

Equip. ID No. 210.1-36 Equip. Class 05 - Horizontal Pumps

Equipment Description CRAC/CHILL WATER CIRC PUMP #12

ANCHORAGE (Cont'd)

- |                                                                                                                                                                                  |     |   |   |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|---|-------|
| 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 | 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                                                                                                                       | (Y) | N | U | N/A   |
| 10. Embedded steel, grout pad or large concrete pad adequacy evaluated                                                                                                           | (Y) | N | U | N/A   |

Are anchorage requirements met?

Y (N) U  
 NOTE (3)  
 SEE OSVS

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 | (X) | N | U | (N/A) |
| 3. Attached lines have adequate flexibility                                                                 | (Y) | N | U | N/A   |
| 4. Overhead equipment or distribution systems are not likely to collapse                                    | (Y) | N | U | N/A   |
| 5. Have you looked for and found no other adverse concerns?                                                 | (Y) | N | U | N/A   |

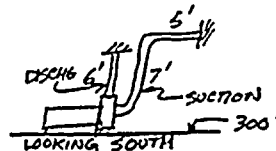
Is equipment free of interaction effects?

(Y) N U

IS EQUIPMENT SEISMICALLY ADEQUATE?

Y (N) U

COMMENTS



(1) DISCHARGE PIPING ANCHORED ~ 6' AWAY, SUBSTION ~ 12' AWAY (7' VERT, 5' HORIZ). PIPE SIZE IS ~ 4" Ø; WT./FT. OF 4" STD PIPE (INCLUDING WATER) IS ~ 16 #/FT. ASSUMING 7' SECTION IS CARRIED BY PUMP SUCTION NOZZLE, LOADS DUE TO MASS (16.3#/ft \* 7' = 114 #) @ 3.5' ABOVE PUMP & ; AND ACCEL. OF 1.38g (N-S), 1.08g (E-W), AND 0.34g (VERT.) [PEAK S.A. FROM SDR-01]: BENDING MOM. = (114 #)(1.08g)(3.5ft)(12 in/ft) = 517 in-lb, TORS. MOMENT = (114 #)(1.38g)(3.5ft)(12 in/ft) = 6607 in-lb, AND SHEAR LOADS & AXIAL LOADS. CHECK BENDING STRESS:  $\frac{517 \text{ in-lb}}{1.25 \text{ in}^3} = 414 \text{ psi}$  & SHEAR DUE TO TORSION:  $\frac{6607 \text{ in-lb}}{2 \text{ in}^3} = 1652 \text{ psi}$ . STRESSES ARE MUCH LESS THAN AISC ALLOWABLES (23.8 ksi BENDING, 14.9 ksi SHEAR) → OK BY INSPECTOR

Evaluated by: [Signature], PE

Date: 6-1-95

[Signature]

6/1/95

- (2) PUMP FREQ. IS ESTIMATED > 20 Hz. TURB. BLDG. 300' IRS EXCEED 1.5 \* BS BETWEEN 9-18 Hz ∴ PUMP FREQ IS OUTSIDE EXCEEDANCE RANGE, AND CAP. > DEMAND.
- (3) PER DWG # C-18952-C, PUMP IS ANCHORED WITH 4, 5/8" Ø CINCH (LEADED) ANCHORS. THIS TYPE OF ANCHORAGE IS NOT COVERED BY THE GIP → OUTLIER. SEE OSVS. ALSO, INSTALLATION ADEQUACY IS UNKNOWN.

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Exhibit 5-1

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

1. OUTLIER IDENTIFICATION, DESCRIPTION, AND LOCATION

Equipment ID Number 210.1-36 Equipment Class 5  
 Equipment Location: Building TB Floor Elevation 300'  
 Room or Row/Column      Base Elevation 300'  
 Equipment Description CRAC/CHILL WATER <sup>CIRC</sup> PUMP #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.)

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

<sup>1</sup> 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):

- (1) EQUIPMENT IS ANCHORED BY LEADED CINCH ANCHORS. LEADED ANCHORS ARE NOT COVERED BY GIP.  
 (2) TIGHTNESS/INSTALLATION QUALITY OF CINCH ANCHORS IS UNKNOWN.



Exhibit 5-1 (Cont'd)

OUTLIER SEISMIC VERIFICATION SHEET (OSVS)

Equipment ID Number 210.1-36

3. PROPOSED METHOD OF OUTLIER RESOLUTION (OPTIONAL)

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

DETERMINE CHINCH ANCHOR TENSILE AND SHEAR CAPACITIES USING SAVANNAH RIVER TEST PROGRAM REPORT, AND CONFIRM TIGHTNESS OF EXISTING ANCHORS. OTHERWISE, MODIFY ANCHORAGE.

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

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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.)

CAROLINE S. SCHLASEMAN  
 Print or Type Name

Caroline S. Schlaseman PE  
 Signature

6-1-95  
 Date

CARMEN R. ACOSTA  
 Print or Type Name

Carmen R. Acosta  
 Signature

6/14/95  
 Date

\_\_\_\_\_  
 Print or Type Name

\_\_\_\_\_  
 Signature

\_\_\_\_\_  
 Date

