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 AUTH. NAME AUTHOR AFFILIATION
 DIETCH, R. Southern California Edison Co.
 RECIP. NAME RECIPIENT AFFILIATION
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Southern California Edison Company



P. O. BOX 800

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ROBERT DIETCH

VICE PRESIDENT

March 8, 1982

TELEPHONE

213-572-4144

Director, Office of Nuclear Reactor Regulation
Attention: Mr. Darrell G. Eisenhut,
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555



Gentlemen:

Subject: Docket 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

Enclosed are sixty-three copies, each, of "F" series Potential Finding Reports issued by General Atomic Company, as follows:

PFRs F001	PFRs F014	PFRs F032	PFRs F070
F002	F019	F039	F074
F003	F020	F047	F075
F004	F021	F057	F076
F005	F022	F063	F087
F008	F024	F064	F088
F009	F027	F065	F089
F010	F028	F066	F090
F011	F029	F067	
F012	F031	F068	

These reports reflect the reviewer's initial opinion and have not necessarily been verified for validity and accuracy by the original design organization. When they are fully processed and classified, we will resubmit them to you in their final disposition.

If you have any questions regarding this matter, please call me.

Very truly yours,

Robert Dietch

Boo!
1/60

cc: NRC Region V, R. H. Engelken (w encl)
H. Rood, Licensing Branch #3 (w encl - 10)
H. R. Fleck, ETECH, (w encl)

8203100279 820308
PDR ADDCK 05000361
PDR

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. / 2408-PFR-F001

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Safety Injection Line to Reactor Coolant Loop 1A
Piping Stress Analysis Package PSG-74

REQUIREMENT REFERENCE DOCUMENTS:

< Pipe Support Description List Sheets

BASIC REQUIREMENT: The design load should be an absolute summation of the seismic inertia loads and the seismic anchor movement loads combined with an algebraic summation with the dead weight and thermal loads, with the exception of the special case where ZPAs occur, this uses $(DBE + ZPA)^{1/2}$

DESCRIPTION OF POTENTIAL FINDING:

The above summation of weight, thermal, seismic inertia and seismic anchor movement loads exceeds the design load of five of the twenty-two supports that have been considered in PSG-74. These supports are PS-12, PS-14, PS-16, PS-17 and PS-22.

PREPARED BY: Alan C. Lewis

DATE: 25 Feb 1982

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY [Signature]

DATE 2/25/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

The correct method for combining pipe support design loads is given in Section 27.6.8 of the SONGS 2 & 3 Pipe Support Group Design Manual. See attached sheets 27, 28 and 29 from this manual. Sheet 27 shows that the procedure for combining seismic inertia and seismic anchor movement loads is by the SRSS method. This method is considered conservative due to the extremely low probability of a maximum seismic inertia load occurring at the same instant in time as the maximum load due to seismic anchor movements.

☐ AGREE PFR IS VALID

This combined seismic load is then added algebraically with weight and thermal loads.

☒ DISAGREEBY: Paul M. M...DATE: 3/1/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

The following combination shall be used for NB-3652 equation (9) faulted condition.

$$B_1 \frac{PD_o}{2t} + B_2 \frac{D_o}{2I} M_1 \leq 3S_m$$

where

$$M_1 = \sqrt{M_x^2 + M_y^2 + M_z^2}$$

For faulted condition, the moments in each individual direction shall be combined as follows:

$$M_j = M_{jw} + \sqrt{M_j^2 \frac{DBE}{INERTIA} + (|M_j| \frac{JI}{DISP} + |M_j| \frac{LOCA}{DISP})^2}$$

where

$$j = x, y, z$$

27.6.7 PIPE BREAK EFFECTS

Stress summaries will be provided to Mechanical Group and the nozzle loads are furnished to CE. Jet impingement loads are described in Section 27.6.6.

27.6.8 PIPE SUPPORT DESIGN LOADS

Definition of Terms

TH	=	Loads from Thermal Analysis
DW	=	Dead Weight Loads
EQ	=	Load Associated with DBE earthquake,
	=	$\sqrt{SI^2 + SAM^2}$

where

SI	=	Loads from seismic inertia analysis, DBE
SAM	=	Loads from Seismic Anchor Movement Analysis, DBE
HYDRO WT.	=	Dead Weight Loads Associated with Hydro Test Loads

PLANT DESIGN



NUMBER Sec. 27.0

SHEET 27 OF 31

DATE 12-10-80

ED-22 (3-74)

- FV = Loads from Fast Valve Closure
- RVC = Loads from Relief Valve Opening - Closed System (Transient)
- RVO = Loads from Relief Valve Opening - Open System (Sustained)
- PD = Loads from Untied Expansion Joint at Design Pressure
- LOCA = Loads Associated with LOCA Event
- $$= (JI + DISP)$$

where

JI = Loads from Jet Impingement

DISP = Loads Associated with NSSS Vessel During LOCA Condition

- DF = Dynamic Events Associated with LOCA (Piping Must Remain Intact)
- DU = Dynamic Events Associated with Upset Plant Condition
- DE = Dynamic Events Associated With Emergency Plant Condition

ASME Class 2 and 3 Piping Systems

Using the load combinations shown the pipe support design loads are the load combination which gives the largest algebraic value in each direction.

DW. + EQ. + PD
 TH + DW + EQ + RVO + PD
 HYDRO WT. + PD
 TH + DW + DF + PD
 TH + DW + FV + PD
 TH + DW + RVC + PD
 TH + DW + DU + PD
 TH + DW + DE + PD

For most ASME Class 2 and 3 piping the governing load combinations are:

- 1) HYDRO WT.
- 2) WT + EQ
- 3) TH + WT + EQ

PLANT DESIGN



NUMBER Sec. 27.0

SHEET 28 OF 31

DATE 12-10-80

ED-22 (3-74)

B31.1 Power Piping Systems, Seismic Category II

Load combinations sets used to obtain maximum pipe support design loads in each direction that the support acts

$$\begin{cases} \text{HYDRO} + \text{PD} \\ \text{TH} + \text{DW} + \text{FV} + \text{PD} \\ \text{TH} + \text{DW} + \text{RVC} + \text{PD} \\ \text{DW} + \text{Static Seismic} + \text{PD} \\ \text{TH} + \text{DW} + \text{Static Seismic} + \text{RVO} + \text{PD} \end{cases}$$

Static seismic per Appendix 4G or upgrade criteria. SAMs are not included in static seismic analysis.

$$\text{State Seismic} = \frac{N - S}{\text{STATIC}}^2 + \frac{\text{VERT.}}{\text{STATIC}}^2 + \frac{E - W}{\text{STATIC}}^2$$

B31.1 Power Piping Systems, Seismic Category I

Load Combinations

$$\begin{cases} \text{HYDRO} + \text{PD} \\ \text{TH} + \text{DW} + \text{PV} + \text{PD} \\ \text{TH} + \text{DW} + \text{RVC} + \text{PD} \\ \text{DW} + \text{EQ} + \text{PD} \\ \text{TH} + \text{DW} + \text{EQ} + \text{PD} + \text{RVO} \end{cases}$$

ASME Class 1 Piping Systems

Loads combinations are the same as for ASME Class 2 and 3 piping systems with the addition of the following LOCA condition:

$$\begin{aligned} & \text{TH} + \text{WT} + \sqrt{\text{EQ}^2 + \text{LOCA}^2} \\ & = \text{TH} + \text{WT} + \sqrt{\text{DBE SI}^2 + \text{DBE SAM}^2 + \text{JI} + \text{DISP}^2} \end{aligned}$$

The above load combination is the governing criteria for design loads on Class 1 pipe supports.

27.6.9 STRESS INTENSIFICATION FACTORS (SIF)

- SIF for elbows, tees, reinforced, and unreinforced branch connections shall be per the Code.
- SIF for Sweepolets shall be the larger of the SIF for a welding tee or the SIF as specified by the vendor.
- SIF for weldolets shall be the larger of the SIF for an unreinforced branch connection or the SIF as specified in the vendor catalog. Deviation from this requires EGS approval.

PLANT DESIGN



NUMBER Sec. 27.0

SHEET 29 OF 31

DATE 12-10-80

ED-22 (3-74)

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POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-F002

REVISION _____

PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Safety Injection Line to Reactor Coolant Loop 1A
Piping Stress Analysis Package PSG-74

REQUIREMENT REFERENCE DOCUMENTS:

Anchor Load Sheets

BASIC REQUIREMENT: The total net design load should be an absolute summation of the seismic inertia loads and the seismic anchor movement loads combined by an algebraic summation with the dead weight and thermal loads.

DESCRIPTION OF POTENTIAL FINDING:

The above summation of weight, thermal, seismic loads, inertia and seismic anchor movement loads from both sides of the anchor using the latest seismic computer run exceeds the total load of both of the anchors.

PREPARED BY: A. Lewis

DATE: 25 Feb, 1982

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY F. J. [Signature]

DATE 2/25/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

The correct method for combining pipe support design loads is given in Section 27.6.8 of the SONGS 2 & 3 Pipe Support Group Design Manual. See attached sheets 27, 28 and 29 from this manual. Sheet 27 shows that the procedure for combining seismic inertia and seismic anchor movement loads is by the SRSS method. This method is considered conservative due to the extremely low probability of a maximum seismic inertia load occurring at the same instant in time as the maximum load due to seismic anchor movements.

☐ AGREE PFR IS VALID

This combined seismic load is then added algebraically with weight and thermal loads.

☒ DISAGREEBY: David R. MarshallDATE: 3/1/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

The following combination shall be used for NB-3652 equation (9) faulted condition.

$$B_1 \frac{PD_o}{2t} + B_2 \frac{D_o}{2I} M_1 \leq 3S_m$$

where

$$M_1 = \sqrt{M_x^2 + M_y^2 + M_z^2}$$

For faulted condition, the moments in each individual direction shall be combined as follows:

$$M_j = M_{jvt} + \sqrt{M_j^2 \text{ DBE} + \left(\frac{M_j}{\text{INERTIA}} + \frac{M_j \text{ LOCA}}{\text{JI DISP}} \right)^2}$$

where

$$j = x, y, z$$

27.6.7 PIPE BREAK EFFECTS

Stress summaries will be provided to Mechanical Group and the nozzle loads are furnished to CE. Jet impingement loads are described in Section 27.6.6.

27.6.8 PIPE SUPPORT DESIGN LOADS

Definition of Terms

TH	=	Loads from Thermal Analysis
DW	=	Dead Weight Loads
EQ	=	Load Associated with DBE earthquake,
	=	$\sqrt{SI^2 + SAM^2}$

where

SI = Loads from seismic inertia analysis, DBE

SAM = Loads from Seismic Anchor Movement Analysis, DBE

HYDRO WT. = Dead Weight Loads Associated with Hydro Test Loads

PLANT DESIGN



NUMBER Sec. 27.0

SHEET 27 OF 31

DATE 12-10-80

ED-22 (3-74)

FV = Loads from Fast Valve Closure
 RVC = Loads from Relief Valve Opening - Closed System (Transient)
 RVO = Loads from Relief Valve Opening - Open System (Sustained)
 PD = Loads from Untied Expansion Joint at Design Pressure
 LOCA = Loads Associated with LOCA Event
 = (JI + DISP)

where

JI = Loads from Jet Impingement

DISP = Loads Associated with NSSS Vessel During LOCA Condition

DF = Dynamic Events Associated with LOCA (Piping Must Remain Intact)

DU = Dynamic Events Associated with Upset Plant Condition

DE = Dynamic Events Associated With Emergency Plant Condition

ASME Class 2 and 3 Piping Systems

Using the load combinations shown the pipe support design loads are the load combination which gives the largest algebraic value in each direction.

DW + EQ + PD
 TH + DW + EQ + RVO + PD
 HYDRO WT. + PD
 TH + DW + DF + PD
 TH + DW + FV + PD
 TH + DW + RVC + PD
 TH + DW + DU + PD
 TH + DW + DE + PD

For most ASME Class 2 and 3 piping the governing load combinations are:

- 1) HYDRO WT.
- 2) WT + EQ
- 3) TH + WT + EQ

PLANT DESIGN



NUMBER Sec. 27.0

SHEET 28 OF 31

DATE 12-10-80

ED-22 (3-74)

B31.1 Power Piping Systems, Seismic Category II

Load combinations sets used to obtain maximum pipe support design loads in each direction that the support acts

$$\left\{ \begin{array}{l} \text{HYDRO} + \text{PD} \\ \text{TH} + \text{DW} + \text{FV} + \text{PD} \\ \text{TH} + \text{DW} + \text{RVC} + \text{PD} \\ \text{DW} + \text{Static Seismic} + \text{PD} \\ \text{TH} + \text{DW} + \text{Static Seismic} \\ + \text{RVO} + \text{PD} \end{array} \right.$$

Static seismic per Appendix 4G or upgrade criteria. SAMs are not included in static seismic analysis.

$$\text{State Seismic} = \frac{N - S}{\text{STATIC}}^2 + \frac{\text{VERT.}}{\text{STATIC}}^2 + \frac{E - W}{\text{STATIC}}^2$$

B31.1 Power Piping Systems, Seismic Category I

Load Combinations

$$\left\{ \begin{array}{l} \text{HYDRO} + \text{PD} \\ \text{TH} + \text{DW} + \text{FV} + \text{PD} \\ \text{TH} + \text{DW} + \text{RVC} + \text{PD} \\ \text{DW} + \text{EQ} + \text{PD} \\ \text{TH} + \text{DW} + \text{EQ} + \text{PD} + \text{RVO} \end{array} \right.$$

ASME Class 1 Piping Systems

Loads combinations are the same as for ASME Class 2 and 3 piping systems with the addition of the following LOCA condition:

$$\text{TH} + \text{WT} + \sqrt{\text{EQ}^2 + \text{LOCA}^2}$$

$$= \text{TH} + \text{WT} + \sqrt{\text{DBE SI}^2 + \text{DBE SAM}^2 + \text{JI} + \text{DISP}^2}$$

The above load combination is the governing criteria for design loads on Class 1 pipe supports.

27.6.9 STRESS INTENSIFICATION FACTORS (SIF)

- A. SIF for elbows, tees, reinforced, and unreinforced branch connections shall be per the Code.
- B. SIF for Sweepolets shall be the larger of the SIF for a welding tee or the SIF as specified by the vendor.
- C. SIF for weldolets shall be the larger of the SIF for an unreinforced branch connection or the SIF as specified in the vendor catalog. Deviation from this requires EGS approval.

PLANT DESIGN



NUMBER Sec. 27.0

SHEET 29 OF 31

DATE 12-10-80

ED-22 (3-74)

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POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-F003

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: The Seismic Category I Motor Control Centers (MCC)

REQUIREMENT REFERENCE DOCUMENTS: Bechtel Power Corporation Spec. No. S023-302-4 and 8 Addendum. "Quality Class II & III Spec for Motor Control Centers for San Onofre Nuclear Generating Station Units 2 & 3.

BASIC REQUIREMENT: Section 4.11.3 Mounting Base: States that the MCC base will be tack welded to steel channels embedded in the concrete floor, and that the vendor shall determine the location of the welds to satisfy seismic requirements per 4.92 (i.e., Appx 4F).

DESCRIPTION OF POTENTIAL FINDING:

1. The spec is written for fabrication and test of many individual MCC units. No direction is given on seismic performance of the individual units when mounted in an array.
2. There is no specification of the flexibility of the steel rail support foundation that the vendor must simulate during MCC seismic qualification.
3. There is no requirement in the specification to send rail loads measured during seismic testing back to Bechtel so that Bechtel can check the structural integrity of the rail design.

PREPARED BY: A. Middleton DATE: 1-23-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PFR IS VALID

BY [Signature]

DATE 1/25/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

See attached sheet.

☐ AGREE PF IS VALID☒ DISAGREEBY: SAFDATE: 1/29/84**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

3D CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

3D CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDING

CLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

1. The minimum number of sections used for MCC's for San Onofre Nuclear Generating Station Units 2 and 3 is six. The qualification tests are performed on arrangements that are less than six sections and this is a conservative approach for testing. As discussed on the seismic qualification report, data obtained in a test of single section MCC's indicates that this is the worst case situation where the highest amplification factors and lowest equipment damping are obtained compared to MCC units tested in arrays. Multiple section MCC configurations will tend to be stiffer resulting into lesser response amplification. Thus, arrangements used for testing that include equal or less number of sections, simulate adequately the actual in-service configuration of the MCC units.
2. The test report for specification no. S023-302-4 indicates that the specimen mountings simulate as closely as practical the actual in-service mountings. The actual mounting details consist of embedded channels in concrete and are for practical purposes fixed. The details are shown on drawing 25125. Thus, the flexibility of support channels are not required for seismic qualification of the MCC units.
3. Specification S023-302-4, Appendix 4F, requires the vendor to submit maximum vertical and horizontal seismic forces and hold down bolts or hold down requirements (Appendix 4F, Section D.1). This information supplied by the vendor is used by Bechtel engineering in the design of the mountings.

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Design Control Training

REQUIREMENT REFERENCE DOCUMENTS:

Attachment 3, PSAR, Section II, Paragraph 10

BASIC REQUIREMENT:

"The responsibility for assuring that the personnel performing the activities affecting quality are suitably trained rests with the organization performing that activity"

DESCRIPTION OF POTENTIAL FINDING:

CE Instrumentation Control and Electrical Section Procedure ICE-11 did not address training of engineers in implementation of the design control procedures.

PREPARED BY: Gregory ChandlerDATE: 1/25/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALIDBY J. BurrellDATE 1/25/82☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

Procedure ICE-13, which was issued in March 1971, did not include training since there was no requirement that this be included in departmental procedures. When MPI-18, Rev. 3, was issued in May 1974 to be responsive to Gray Book requirements, training to departmental procedures was required. Subsequently, ICE-13 was superseded by ICE-100 in May 1975 with training included in the procedure.

☐ AGREE PFR IS VALID☒ DISAGREE

BY:

V C Hall

DATE:

1/29/82D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. FO05

REVISION A

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: CEN-99(S), "Seismic Program for Qualification of NSSS-Supplied Instrumentation Equipment."

REQUIREMENT REFERENCE DOCUMENTS:

QADP 5.8, Rev. 0, "Other Design Documents."

BASIC REQUIREMENT:

Design documents must be reviewed, approved, issued and revisions controlled.

DESCRIPTION OF POTENTIAL FINDING:

CEN-99(S) appears to exist only as a marked-up draft copy. Combustion Engineering furnished this marked-up draft to GA as the only version available. A copy of the Title page is attached as an illustration of the condition of the document. Also attached is a section from the FEAR that references CEN-99(S).

PREPARED BY: W. Chen

DATE: 2/24/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY S. Burre

DATE 2/24/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

3102
PFIC 005
Rahowski's Copy
SAN ONOFRE UNITS 2 AND 3

DOCKETS: 50-361 AND 362

Program for
Seismic ENVIRONMENTAL QUALIFICATION DATA FOR OF
NSSS-SUPPLIED INSTRUMENTATION EQUIPMENT

99
CEN-95(S)

August
JULY 1973

COMBUSTION ENGINEERING, INC.
POWER ENGINEERING
WINDSOR, CONNECTICUT

1347-946

3.10 SEISMIC QUALIFICATION OF SEISMIC CATEGORY I INSTRUMENTATION AND ELECTRICAL EQUIPMENT

3.10.1 SEISMIC QUALIFICATION CRITERIA

The seismic qualification of Category I instrumentation and electrical equipment demonstrates an equipment's ability to perform its required function during and after the postulated design basis earthquake. The demonstration has been accomplished by either of the following two methods (or combinations thereof):

A. Analysis

The equipment performance is predicted by mathematical analysis techniques and accompanied by sufficient followup testing of the equipment to verify the mathematical predictions of the natural frequency and damping.

B. Testing

The equipment performance is determined by testing under simulated seismic conditions as given herein and accompanied by sufficient mathematical analysis to extract the needed information from the test results.

The choice of method was based on the practicality of the method for the type, size, shape, and complexity of the equipment and the reliability of the conclusions.

The Design Basis Earthquake (DBE) and the Operating Basis Earthquake (OBE) horizontal and vertical floor response spectra, reflecting in-structure floor accelerations, were provided to the vendor for a given instrumentation or electrical equipment location. The vendor then determined the appropriate acceleration levels for qualification from these spectra.

In designing the equipment, the vendor combined the effects of gravity loads, normal operating loads, operating temperature loads, other loads that may be included in the specification, and the appropriate DBE and OBE seismic loads.

3.10.1.1 Vendor Documentation

The adequacy of the seismic qualification program is demonstrated in documentation requirements that the vendor fulfills for each equipment type. The documentation demonstrates that the equipment meets its performance requirements when subjected to the loads for which it was qualified. Documentation was required from vendors as described in (reference 1) for NSSS equipment and appendix 3.10A for other equipment.

none given, see page 3.10-12

SEISMIC QUALIFICATION OF SEISMIC CATEGORY I
INSTRUMENTATION AND ELECTRICAL EQUIPMENT3.10.1.2 Analysis Method Requirements

- 13 When the analysis method was used, vendors met the requirements of CEN-99(S)(4) for NSSS equipment and appendix 3.10A for other equipment.

3.10.1.3 Test Method Requirements

- 13 When the test method was used, vendors met the requirements of CEN-99(S)(4) for NSSS equipment and appendix 3.10A for other equipment.

All test data submitted by the vendor to satisfy these requirements was obtained from these test programs which show evidence of performance, supervision, and witnessing of all testing by qualified personnel.

3.10.1.4 Acceptance Evaluation

Upon receiving the equipment supplied by the vendor, selective tests were performed to determine equipment adequacy to meet the specified seismic requirements. The following tests and analyses have been used:

- A. Determination of natural frequencies by field testing.
- B. Formulation and analysis of a mathematical model.
- C. Testing to the stress levels indicated by the analysis of the mathematical model.

- 13 A list of all Seismic Category I instrumentation, electrical equipment, and supports can be found in table 3.10-1 and CEN-94(S)(3).

For further information refer to appendix 3.10A Criteria for Seismic Qualification of Seismic Category I Equipment, which incorporates the information found in IEEE Standard 344-1971. Appendix 3.10A is the specification provided to vendors, which presents the criteria for seismic qualification of Seismic Category I equipment for San Onofre Units 2 and 3. The criteria used for NSSS equipment is contained in CEN-99(S)(4).

3.10.1.5 Overall Seismic Criteria and Implementation Program

The program for overall seismic adequacy is addressed in San Onofre Nuclear Generating Station, Units 2 and 3 Seismic Category I Criteria and Implementation Program⁽²⁾. This document describes the scope of the Seismic Category I design program and includes sufficient detail to provide the technical basis for design criteria, analysis methods, and design control implementation.

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION --

A. PREPARATION BY GA INITIATOR**AFFECTED ITEMS:**

Bechtel Site Audit No. FQA 080, conducted 6/30/75

REQUIREMENT REFERENCE DOCUMENTS:

- 1) ANSI N45.2-1971
- 2) Bechtel Q.A. Standard No. 12, Rev. 14, issued 8/16/72, "Quality Assurance Project Quality Audits"
- 3) Bechtel Site Procedure QP/P015, Sections 3.3.1 and 3.3.2 as of 6/30/75.

BASIC REQUIREMENT:

SEE ATTACHMENT I

DESCRIPTION OF POTENTIAL FINDING:

SEE ATTACHMENT I

PREPARED BY: Robert A. SweetDATE: 2/8/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER**COMMENTS**☒ AGREE PF IS VALIDBY J. BreuerDATE 2/11/82☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

See attached sheet per Attachment I and II.

☐ AGREE PF IS VALID

☒ DISAGREE

BY: J. W. Hunt

DATE: 2/22/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE

☐ INADEQUATE

VALIDITY:

☐ VALID

☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE

☐ APPLICABLE

10 CRF 50.55(e):

☐ NOT APPLICABLE

☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____ DATE: _____

ATTACHMENT I

BASIC REQUIREMENT:

- 1) 19 Audits
... "Responsible management shall take necessary action to correct the deficiencies revealed by the audit."...
- 2) 4.1 Audit Team Leader
4.1.11b. "Assure corrective action is identified, acceptable,"...
- 3) WP/P-15, as of 5/30/1975
3.3.1 "FGDs (Field Generated Drawings) with Quality (Q) Class III and IV assignment shall have as a minimum the initials and date of the originator and checker."
3.3.2 "FGDs with Quality (Q) Class I, II, and ASME code assignment shall have as a minimum the initials and date of the originator, checker and the assigned LDFE." (Lead Design Field Engineer?)

DESCRIPTION OF POTENTIAL FINDING:

The potential finding is that the corrective action accepted was inappropriate, hence the system deficiency was not corrected.

The concern is that FGDs of quality class I-IV and ASME code piping items or systems could be issued by an originator without reference to the controlling design drawing or "Q" class and ASME code assignments.

This audit found field generated piping item or system drawings, on form A3920, without reference to controlling design drawings, and without Quality Class or ASME code assignments, contrary to reference (3) requirements.

The cause reported for this deficiency was that for all but one of the nonconforming drawings that they "are drawings of temporary items or systems. Quality class designations are not applicable for these drawings."

The stated corrective action was the following:

"All field generated drawings of temporary systems that have the reference design block shall be identified as "NA", Not Applicable. Future drawings and revisions to existing drawings shall have the "NA" designation for reference design drawings, and for Q-Class also. Temporary FGDs may be drawn on Form A3920."

The stated corrective action does not correct the system deficiency in drawing identification and control. FGDs could still be issued without proper references. When NA was used in the reference blocks, at least the initials and dates by originator and checker should be on the drawing.

Some verified method of identifying, controlling and separating the drawings of permanent piping items and systems from those of temporary items and systems should have been provided to correct the deficiency found.

SUBJECT:

BPC Response to Potential Finding Report No. F008 documenting a concern that the Corrective Action statement on BPC Quality Audit Report FQA-080 did not correct a system deficiency in drawing identification and control.

RESPONSE: The acceptance of the corrective action on Quality Audit Report FQA-080 was appropriate.

Adequate controls for Field Generated Drawings (FGD's) exist in Work Plan Procedure/Quality Control Instruction (WPP/QCI)-015 "Field Generated Drawings".

Specific concerns expressed in PFT-F008 are addressed as follows:

A. Concern "The concern is that FGD's of quality class I-IV and ASME code piping items or systems could be issued by an originator without reference to the controlling design drawing or "Q" class and ASME code assignments".

Response Paragraph 4.4 of WPP/QCI-015, Rev. 8 specifies: "FGD's shall reflect the design drawing number and Quality Class when applicable".

Paragraph 4.6 specifies: "FGD's with Quality Class I and II and or ASME Code Assignment, shall have as a minimum, the initials and date of the originator, checker and the IDFE or ALDFE".

Paragraphs 4.4 and 4.6 provide adequate control for the above concern.

B. Concern "The stated corrective action does not correct the system deficiency in drawing identification and control. FGD's could still be issued without proper references. When NA was used in the reference blocks, at least the initials and dates by originator and checker should be on the drawing."

Response Paragraph 4.4 of WPP/QCI-015 (quoted above) only requires a design drawing and Quality Class reference on an "as required" basis, i.e., No Quality Class or Design Drawing exists for temporary systems. In addition, temporary systems are not within the scope of the Safety Analysis Report which establishes Quality Class.

Paragraphs 4.6 and 4.7 of WPP/QCI-015, require initials and dates for the originator and checker of Quality Class I, II, III and IV drawings only.

This is not a requirement for FGD's of temporary systems. A review of BPC Quality Audit Report FQA-080 revealed no finding in regard to a lack of initials and dates on the FGD's reviewed. In addition, the referenced FGD's were re-reviewed and found to be initialed by the originator and checker and dated.

- C. Concern "Some verified method of identifying, controlling and separating the drawings of permanent piping items and systems from those of temporary items and systems should have been provided to correct the deficiency found."

Response WPP/QCI-015 requires that FGD's for temporary as well as permanent systems be identified and controlled. The only requirement of WPP/QCI-015 that is not applied to FGD's for temporary systems is the requirement that a Quality Class and a reference drawing be noted on the FGD.

CONCLUSION:

No system deficiency exists in WPP/QCI-015. Paragraph 4.4 of WPP/QCI-015 requires the recording of Quality Class on FGD's on an "as required" basis. Temporary systems do not have a quality class because they are not within the scope of the Safety Analysis Report, which establishes the Quality classes.

NOTE: The following is a list of the numbers and titles of the FGD's listed in BPC Quality Audit Report FQA-080:

<u>Number</u>	<u>Title</u>
FGD-P-001-1	Plumbing, temporary facility, Japanese Mesa Fabrication Area
FGD-P-003-0	Temporary facilities-Japanese Mesa - Profile - Sanitary Sewer
FGD-P-004-0	Temporary facilities-Japanese Mesa - Hot water & Cold water supply - Fab Shop Rest Rooms
FGD-P-005-1	Temporary facilities-Japanese Mesa - Hot water & Cold water supply - Warehouse Rest Rooms
FGD-P-006-0	Domestic Water Header from 6" supply header to building line (Japanese Mesa)
FGD-P-007-2	Temporary facilities-Japanese Mesa - Fire Water Header
FGD-P-008-2	Fire System Pumphouse - temporary facilities-Japanese Mesa
FGD-P-045-0	Curing Room Piping, Batch Plant
FGD-P-046-0	Temporary Water Surge Tank
FGD-P-047-0	Temporary Water Surge Tank Piping
FGD-P-048-0	Hanger Parts Bin location
FGD-P-049-0	Temporary Air Manifold
FGD-P-051-0	Circulating Water Thimble Support Steel Location Turbine Mat
FGD-P-052-0	Circulating Water Thimble Location

The Japanese Mesa Fabrication Shop and Warehouse are located on a site approximately two (2) miles from the jobsite.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. F009

REVISION --

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Bechtel Site Audit No. 601, conducted 5/2/77.

REQUIREMENT REFERENCE DOCUMENTS:

- 1) ANSI N45.2-1971
- 2) Bechtel QA Standard No. 5.1 Rev. 10, issued 4/1/77, "Project QA Audits."
- 3) Bechtel Site Procedure WPP-QCI-701, Rev. 1, para. 5.1, as of 4/29/1977.

BASIC REQUIREMENT:

SEE ATTACHMENT II

DESCRIPTION OF POTENTIAL FINDING:

SEE ATTACHMENT I

PREPARED BY: Robert A. Sweg DATE: 2/19/82
REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____
REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID BY J. Burrell DATE 2/17/82
☐ REQUEST RE-REVIEW BY _____ DATE _____
☐ DISAGREE BY _____ DATE _____
☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

See attached sheet per Attachment I and II.

☐ AGREE PF IS VALID

☒ DISAGREE

BY: L. W. Hurst

DATE: 2/22/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE

☐ INADEQUATE

VALIDITY:

☐ VALID

☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE

☐ APPLICABLE

10 CRF 50.55(e):

☐ NOT APPLICABLE

☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____

DATE: _____

ATTACHMENT I

BASIC REQUIREMENT:

- 1) 19 Audits
..."Responsible management shall take necessary action to correct the deficiencies revealed by the audit."...
- 2) 4.2 Quality Assurance Engineers (Auditors) para. 10. "Perform follow-up of open items to assure..., acceptable corrective action is defined, ...and verify that corrective action is implemented. Verification actions will be documented..."
- 3) "Prior to the commencement of the Bench Check and/or any instrumentation installation activity, the responsible CFE shall initiate an ICC." (Instrument Control Card = ICC, Construction Field Engineer = CFE.)

DESCRIPTION OF POTENTIAL FINDING:

The potential finding is that the corrective action accepted was inappropriate, hence the system deficiency was not corrected.

The concern is that instruments could receive inappropriate bench check and/or installation and/or inspection and acceptance where the Quality and Seismic classes are not added to the ICCs prior to the commencement of such activity.

This audit found 17 of 23 ICCs without Quality or Seismic classes indicated on the form, contrary to reference (3) requirements.

No cause was reported. The stated corrective action was as follows: "Q class is being input on ICCs as time allows."

The stated corrective action does not assure that the "Q" class will be entered on ICCs and doesn't even address the absence of Seismic class on ICCs. Therefore, it is inappropriate since it does not assure compliance with reference (3) requirements.

SUBJECT:

BPC response to Potential Finding Report No. F-009 documenting a concern that the Corrective Action Statement on BPC Quality Audit Report SOF-J-2 did not correct a system deficiency on Instrument Control Cards (ICC's).

RESPONSE:

The acceptance of the Corrective Action on Quality Audit Report SOF-J-2 was appropriate. The requirements for Quality Class entries on ICC's is specifically addressed in WPP/QCI-701. Specific concerns expressed in PFR F-009 are addressed as follows:

- A. Concern "The potential finding is that the corrective action accepted was inappropriate, hence the system deficiency was not corrected."

Response Subsequent audits (1178, 1546, 1802, 1939) revealed no discrepancies concerning Quality Class designations on the ICC's. The items listed in Audit 601 have been properly entered into the Quality Tracking System which identifies the project classification of the applicable instrument. The "file record" copy of the instruments have the Quality Class entered on the ICC. WPP/QCI-701, paragraph 4.4.3.1 requires only Quality Class not Project Classification.

- B. Concern "The concern is that instruments could receive inappropriate bench check and/or installation and/or inspection and acceptance where the Quality and Seismic classes are not added to the ICC's prior to the commencement of such activity."

Response All instruments, regardless of Quality Class are bench checked the same way. Any potential installation/inspection problems would be identified at the time of the transmittal of the permanent record ICC as Quality Class is verified against the appropriate documents (QTS, Matrix Drawing 56288). A cross check is performed by CSQCC to assure all quality

items are inspected by Quality Control personnel.

- C. Concern "This audit found 17 of 23 ICC's without Quality or Seismic classes indicated on the form, contrary to reference (3) requirements."

Response As per WPP/QCI-701, paragraph 4.4.3.1, only the Quality Class is required to be entered on the ICC.

- D. Concern "No cause was reported. The stated corrective action was as follows: "Q Class is being input on ICC's as time allows".

Response At the time of Audit 601, approximately 20,000 ICC's were in the process of having the Quality Class entered on the ICC. This task was completed in about four (4) months. Subsequently, a review of the QTS on 2/17/82 and 2/18/82 revealed that all instruments including Class III and IV have the proper Project Classification including those specified on Audit 601.

- E. Concern "The stated corrective action does not assure that the "Q" class will be entered on ICC's and doesn't even address the absence of Seismic class on ICC's. Therefore, it is inappropriate since it does not assure compliance with reference (3) requirements".

Response The Quality Class is required to be entered on the ICC by the Instrumentation Warehouse Field Engineer (IWFE) per WPP/QCI-701. A review of Audits 1178, 1546, 1802 and 1939 performed subsequent to Audit 601 reveal no findings related to the problem of not entering the Quality Class on the ICC. The Project Classification which includes both Quality and Seismic information has been entered on the Quality Tracking System for all instruments regardless of Quality Class including those referenced in Audit 601.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. - F010

REVISION -

PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Ultimate Heat Sink Auxiliary Intake Structure Specification #41-2055.

REQUIREMENT REFERENCE DOCUMENTS:

Engineering & Construction Dept. QA Procedure 39-20-3 (Section B, Action I)
"Preparation, Review, Approval, Verification, and Release of Specifications and Addenda Developed by SCE for SONGS 1,2&3".

BASIC REQUIREMENT: The responsible Group Leader prepares form E4-611 "Project Requirements" which identifies for each specification the appropriate project and SCE standards, QA requirements, supplier documentation requirements, quality class, safety class, seismic category, etc. The Responsible Engineer (spec preparer) reviews the E4-611 and other established design input considerations, and prepares form E4-608 "Input Data Requirements".

DESCRIPTION OF POTENTIAL FINDING:

No evidence could be located that the design input requirements for specification #41-2055 were established or implemented in accordance with the stated requirement. No copies of forms E4-611 and E4-608, or equivalent data sheets, could be located for this specification in the Corporate Documentation Services master files or microfiche.

PREPARED BY: B. L. Feldman DATE: 1/29/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY J. Brunel

DATE 1/29/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**☒ AGREE PF IS VALID Comments attached☐ DISAGREEBY: By RAS J.L. Hutter DATE: 2/4/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**DEFINITION ADEQUACY: ☐ ADEQUATE ☐ INADEQUATEVALIDITY: ☐ VALID ☐ INVALIDCLASSIFICATION: ☐ OBSERVATION ☐ FINDING**JUSTIFICATION:**

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

PFR NO. F010

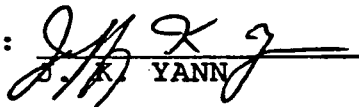
The design of the auxiliary intake structure (A.I.S.) and the preparation of the construction specification #41-2055 was initiated by Edison Civil Engineering and integrated into the ongoing construction schedule for the Offshore Circulating Water System (OCWS). The A.I.S. specification was prepared with the foreknowledge that the OCWS contractor would also be performing the A.I.S. work. Therefore, the technical specification for the A.I.S. used much of the technical information contained in the OCWS specification as input.

Design input sheets (E4-611 and E4-608) were not prepared for specification #41-2055 in accordance with QA procedure 39-20-3, and this is acknowledged as a design oversight. However, the design of the A.I.S. and the preparation of the specification were performed by the same registered engineer with the direct involvement of the Project Group Leader. Calculations and the specification were prepared concurrently with direct correlation to ensure that appropriate project design criteria and inputs were incorporated in the specification.


The A.I.S. involved concrete construction for which straightforward technical specifications were already cited in the OCWS specification. Further, because the design was clearly a single-discipline effort (Civil Engineering), design inputs from other disciplines were not warranted.

The impact of this deviation from procedures on the integrity or performance of the A.I.S. is inconsequential.

Prepared By:


J. K. YANN

Approved By:


H. L. RICHTER

POTENTIAL FINDING REPORT SONGS 2&3 SEISMIC DESIGN VERIFICATION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Ultimate Heat Sink Auxiliary Intake Structure Specification #41-2055 and Drawing 5161684-1.

REQUIREMENT REFERENCE DOCUMENTS:

- a) Engineering & Construction Dept. QA Procedure 39-20-3, "Preparation, Review, Approval, Verification and Release of Specifications and Addenda Developed by SCE for SONGS 1,2&3.
- b) E&C 24-8-7, "Drawings and Drawing Revisions Developed by SCE for SONGS 1,2&3."
- c) E&C 24-7-14, "Configuration Changes (CCs) Developed by SCE for SONGS 1,2&3".

BASIC REQUIREMENT:

Reference Document (a) above states that the Responsible Engineer resolves all comments with each reviewer during the document review cycle and that "all resolutions to comments must be documented in writing. Oral resolutions are not acceptable." Reference (b) states that "all resolutions to comments must be documented in writing on the EO-165". Reference (c) states that the Responsible Engineer "resolves all comments with each reviewer, and documents the resolution on an EO-165."

DESCRIPTION OF POTENTIAL FINDING:

Reviewer comments on forms EO-165 "Document Transmittal", for Spec. 41-2055, the ten (10) Configuration Changes to Spec. 41-2055, and the Configuration Change to drawing 5161684-1 are not resolved in writing on each form EO-165.

PREPARED BY: B. S. Galaman

DATE: 1/29/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☐ AGREE PF IS VALID

BY S. Burrell

DATE 1/29/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

☒ AGREE PF IS VALID Comments attached
☐ DISAGREE

BY: RA. L. Richter DATE: 2/4/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY: ☐ ADEQUATE ☐ INADEQUATE
VALIDITY: ☐ VALID ☐ INVALID
CLASSIFICATION: ☐ OBSERVATION ☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. GA PROJECT MANAGER

☐ ACCEPT
☐ REJECT

BY: _____ DATE: _____

PFR No. F011

At the time of the preparation of Spec. 41-2055 the primary form for review of documents was the Design Review Checklist, form E2-025 although the EO-165 could also be used. Procedures in existence at this time required resolution of comments in writing but documentation on either the EO-165 or E2-025 was not required. The practice in use in Civil Engineering at that time was to provide written documentation only for comments which were not incorporated. This documentation was in the form of a written memorandum. Comments which were incorporated were documented in writing by their appearance in the final issued draft of the document.

1) Specification #41-2055, Configuration Changes 1 through 10

The original Specification 41-2055 was issued as Revision 0 for comment. Comments were received only from QA and their resolution is documented independently.


SCE review of available documentation on Configuration Changes (CC's) 1 through 10 to Specification #41-2055 has concluded that CC's #1, 2, 3, 9, and 10 had no reviewer comments to resolve, as indicated on the review request form EO-165. On CC's 4, 5, and 6, comments were received and in nearly every case incorporated verbatim in the CC as issued. However, the nature of some comments did not always warrant a resolution in writing (e.g., some comments were merely rhetorical questions, not requests for revision to the proposed CC). Also, some comments conveyed no technical content but merely addressed such items as assignment of the proper CC number for retrieval from the Document Control Center (CDM).

CC's 7 through 10 were developed in 1980 as a procedure for casting a series of test beams to test underwater repair methodologies. While not truly a specification, it was issued as a CC to Specification 41-2055 for record purposes. Although most comments to this and subsequent CC's pertaining to these tests were incorporated in the documents, a review of our records demonstrated that, as stated in this PFR, not all were resolved in writing per existing QA procedures. This does not affect the quality of the AIS, however, since no work was performed on the structure itself using this procedure.

2) Drawing 5161684-0, Configuration Change #1

SCE review has not substantiated the finding that reviewer comments on CC #1 to Drawing 516184-0 were not resolved in writing on Form EO-165. To the contrary, evidence shows that there were no reviewer comments made to either the original issue of the drawing or to CC #1.

Prepared By:


J. E. YANN

Approved By:


H. L. RICHTER

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATIONREVISION **A. PREPARATION BY GA INITIATOR**

AFFECTED ITEMS: Ultimate Heat Sink Auxiliary Intake Structure Specification #41-2055 and Calculation #DC-339.

REQUIREMENT REFERENCE DOCUMENTS:

Engineering & Construction Dept. QA Procedure 39-20-3, "Preparation, Review, Approval, Verification and Release of Specifications and Addenda Developed by SCE for SONGS 1, 2&3"; and 24-7-15, "Performing Design Analysis for SONGS 1,2&3"

BASIC REQUIREMENT:

Responsible Engineer is to stamp the Registered Professional Engineer's Seal on the cover page of Civil/Structural specifications and on the table of contents sheet for Civil/Structural calculations.

DESCRIPTION OF POTENTIAL FINDING:

The cover pages of specification 41-2055, Rev. 1 and Rev. 2, do not have the Registered P.E.'s Seal (Rev. 2 is the current issue) nor does the latest revision (5/81) of calculation DC-339.

PREPARED BY: B. L. ColemanDATE: 1/29/82REJECTION OF GA TASK LEADER COMMENTS BY: DATE: REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: DATE: **B. REVIEW BY GA TASK LEADER****COMMENTS**☒ AGREE PFR IS VALIDBY J. BurrillDATE 1/29/82☐ REQUEST RE-REVIEWBY DATE ☐ DISAGREEBY DATE ☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: DATE:

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**☒ AGREE PF IS VALID

Comments attached

☐ DISAGREE225 BY: E. R. L. Richter DATE: 2/4/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

PFR No. F012

The potential finding is correct. The initial issue of specification 41-2055 was prepared and stamped by D. B. Schone, Licensed Civil Engineer. It was issued in draft form for comments and for preliminary use by Guy F. Atkinson Co. for preparation of bids and construction planning to add construction of the Auxiliary Intake Structure to their existing scope of work. The formal issue of this specification for construction was revision 1 which was dated March 31, 1978. At this point, a new cover sheet was prepared and the P.E. stamp was omitted. Since the specification was prepared by a licensed Civil Engineer under the direction of other registered engineers, failure to affix this seal, although required by procedures, does not affect the quality of this document.

Revision 2 of this specification was prepared to incorporate Configuration Changes which had been previously reviewed and approved. It was prepared in a manner similar to that used to incorporate existing CC's into drawing revisions and the cover sheet was not stamped. The use of a P.E. stamp in this case would be technically superfluous and its omission does not affect the quality of this document.

The 5/81 revision of DC 339 does not form any part of the design basis for the AIS and are retained in this file for record purposes only.

Prepared By:


J. K. YANN

Approved By:


H. L. RICHTER

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION _____

A. PREPARATION BY GA INITIATOR**AFFECTED ITEMS:**

Ultimate Heat Sink Auxiliary Intake Structure Calculation #DC-339.

REQUIREMENT REFERENCE DOCUMENTS:

Engineering & Construction Dept. QA Procedure 24-7-15, "Performing Design Analyses for SONGS 1, 2&3".

BASIC REQUIREMENT:

Calculations are checked by an independent review engineer, reviewed and approved by the Project Group Leader and Discipline Supervising Engineer, and stamped by a Registered Professional Engineer. Calculation changes are subjected to the same reviews and approvals as the original.

DESCRIPTION OF POTENTIAL FINDING: The original of calculation DC-339 was reviewed, approved, and stamped on 5/30/78. Subsequent to this date (e.g., 11/28/78) additional calculations were performed and added to DC-339, including insertion of these new calculations on the DC-339 Table of Contents. Dated 5/30/78, which contained the previous approval signatures. DC-339 was not reviewed according to procedures, nor is there evidence that the Group Leader, Supervising Engineer or Registered P.E. reviewed the additional calculations that were inserted over their signatures/stamp.

PREPARED BY: S. Coleman DATE: 1/29/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER**COMMENTS**☒ AGREE PF IS VALIDBY S. BrunelDATE 1/29/82☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**☒ AGREE PF IS VALID Comments attached☐ DISAGREEBY: *R. L. L. Hunter* DATE: 2/4/82 **D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:CLASSIFICATION CRITERION NO. RESULTING IN "FINDING"

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: DATE: **E. GA PROJECT MANAGER**☐ ACCEPT☐ REJECTBY: DATE:

PFR No. 014

With the exception of 2 calculation sheets (E16 and E17), the calculations which formed the original construction basis for this structure were contained within the 5/30/78 issue of the calculations. Sheets E16 and E17 were performed to evaluate a field request to provide a construction joint in this structure. While the specific review was not documented in the table of contents, the calculations were checked by an Independent Review Engineer and the resultant CC was stamped by the responsible engineer and approved by the Group Leader in accordance with QA Procedures in existence at that time.

Following formal issuance of the calculations, several brief calculations were performed to generate data to respond to NRC inquiries or perform independent design comparisons. These calculations were checked and filed with the original calculations but, since they did not affect information contained on design disclosure documents for this structure, approval which was performed for these revisions was not done in strict accordance with procedures.

Sections G and pages H1 through H10, which were added later to provide the design basis for a repair of a crack in the Unit 2 AIS velocity cap, were approved at the time of drawing issuance in accordance with appropriate procedures.

Prepared By:


J. E. YANN

Approved By:


H. L. RICHTER

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. - F019

REVISION --

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Containment Structure Seismic Analysis by Bechtel

REQUIREMENT REFERENCE DOCUMENTS:

Calcs: C-257-1.03, Rev. 1; C-257-1.04 (Attach. A,B) and other calcs
EDP-4.36, Rev. 0, Section 4.3, 6.0 (Attach. C)
Standard Computer Program List, Rev. 8, P.13 (Attach. D)
ASHSD (CE803) User's Manual, P.VI, P.i (Attach. F)

BASIC REQUIREMENT:

Computer programs used in calculations shall be validated against benchmark solutions before the calculational results are used or referenced (Attach. C)

DESCRIPTION OF POTENTIAL FINDING:

1. Rev. 0 of the User's Manual (Attach. E) was issued in 1976 but the calcs (A,B) used it in 1973 and early 1976. No reference to early (1969-76) User's Manuals could be found.
2. Attachment D P.13 lists two ASHSD Verification Reports (1979, 1977). No reference to Verification Reports for 1969-76 could be found.

PREPARED BY: S. Taylor

DATE: Jan 30, 1982

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY S. Burned

DATE 2/1/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

☐ AGREE PF IS VALID☐ DISAGREE

BY: _____ DATE: _____

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____



CALCULATION TITLE SHEET

PROJECT SONGS 2 & 3 JOB NO. 1304-803 SHEET 1 OF 149
CONTAINMENT SHELL ANALYSIS DISCIPLINE C/S
- SEISMIC ANALYSIS - FILE NO. C-257
CALC. NO. C-257-1.03
① ORIGINATOR SIG. [Signature] DATE 6-15-73 QUALITY CLASSIF. II
② CHECKER SIG. R.E. [Signature] DATE 10-1-73 NO. LAST PAGE 147
LEVEL OF REVIEW (1) (2) (3) (4) (5) (6) CHECK AS REQUIRED

P.E. STAMP IF REQ'D

ORIGINAL ISSUE

	NAME	DATE	SIGNATURE
③ GROUP LEADER	<u>K.M. SCHECHTER</u>	<u>10/12/76</u>	<u>KMS</u>
④ EGS	<u>L. HERSH</u>	<u>10/19/76</u>	<u>L.H.</u>
⑤ SPECIALIST			
⑥ CHIEF	<u>W. BRANDES</u>	<u>10/21/76</u>	<u>[Signature]</u>
OTHER			

RECORD OF REVISIONS

NO.	REVISION	DATE	ENG.	CKR	EGL	EGS	SPEC.	CHIEF
1	SEE NOTE 1 BELOW FOR REVISION DESCRIPTION	4/13/79	RK	RL	A.J.	A.L.	—	—
2								
3								
4								
5								

Original Calc includes pages 49A & 121A.

NOTE 1: REVISION ① IS AN ADMINISTRATIVE REVISION, ONLY. ADDED TITLE BLOCK WITH SIGNATURES & NUMBERING TO SHEETS NOS 7, 12, 49A, 53, 72, 73, 74, 75, 79 THRU 90, 95 THRU 106 AND 111 THRU 121A.

COPY

AC-1347-9206
(previously logged in)



ATTACHMENT A-2 CALCULATION SHEET

F019
CALC. NO. C-257-1.03

SIGNATURE ST. Antefackan DATE 10-1-73
 PROJECT SONGS 2 & 3
 SUBJECT CONTAINMENT SHELL ANALYSIS
- SEISMIC ANALYSIS -

CHECKED 1. B. DATE 10-1-73
 JOB NO. 1304-803
 SHEET 3 OF 147 SHEETS

1.0 INTRODUCTION & CRITERIA

THE BASIC CRITERIA AND METHODS OF ANALYSIS USED FOR ANALYZING THE SONGS 2 & 3 CONTAINMENT STRUCTURE ARE PRESENTED IN CALCULATION PACKAGE C-257-1.01. THE ASSUED MODEL HAS BEEN DESCRIBED IN THAT PACKAGE. THIS

CALCULATION PACKAGE CONTAINS CALCULATIONS FOR DETERMINING THE 'DYNAMIC SOIL MODULUS' TO BE USED IN THE SEISMIC ANALYSIS USING THE ASSUED 'SMALL GRID' COMPUTER MODEL.

THE COMPUTER MODEL HAS BEEN DESCRIBED IN C-257-1.01, SECTION 3.5. THE ANALYSIS WAS DONE USING THE ASSUED CODE'S 'DYNAMIC RESPONSE ANALYSIS' CAPABILITY. THE ANALYSIS GIVES THE MAXIMUM STRUCTURAL RESPONSE DUE TO HORIZONTAL AND VERTICAL EXCITATIONS.

TO DETERMINE THE STRESSES IN THE STRUCTURE, THE NODES WERE ANALYZED FOR MOMENTS DUE TO HORIZONTAL & VERTICAL EXCITATIONS. THIS PROCEDURE RESULTS IN UPPER BOUND MOMENTS. SINCE THE VALUES OBTAINED DO NOT HAVE A POSITIVE OR NEGATIVE SIGN, SIGNS WERE ASSIGNED TO THESE FIXED END MOMENTS TAKING INTO CONSIDERATION THE MODE ASSOCIATED WITH THE FIRST MODE RESPONSE DUE TO HORIZONTAL EXCITATION. (THE STRESS RESPONSE UNDER HORIZONTAL SEISMIC EXCITATION IS GREATER THAN THAT OF THE VERTICAL SEISMIC EXCITATION. ALSO, THE PARTICIPATION FACTOR OF THE FIRST MODE IS SIGNIFICANTLY GREATER THAN THE HIGHER MODES. THEREFORE, USING SIGNS ASSOCIATED WITH FIRST MODE RESPONSE UNDER HORIZONTAL EXCITATION PROVIDES A REASONABLE APPROXIMATION).

COMPUTER CODE USED IN CALCULATIONS:

DOE HORIZ. F5742UGS ($E_s = 79.5 \text{ KSE}$)
 " VERT. F694BEG ($E_s = 627 \text{ KSE}$)
 DOE HORIZ. F958B6N ($E_s = 1092 \text{ KSE}$)
 " VERT. F964EX ($E_s = 896 \text{ KSE}$)

DATE PREPARED: April 14, 1972

Project: SONGS 2 & 3

SUBJECT: CONTAINMENT DRILL ANALYSIS - SEISMIC ANALYSIS - CHECKED: RDT
DATE: 10-1-73

ATTACH. A-3

SONGS UNITS #2 & #3
150' DIAMETER CONTAINMENT

DYNAMIC SOIL MODULI

The dynamic soil moduli (Modulus of Elasticity and Shear Modulus) are dependent on the soil strain resulting from seismic forces and on the confining-pressure (σ_3) due to the overburden plus the weight of the structure at a depth below

the foundation of 30 feet (this depth was recommended by the soil consultant). The dynamic soil moduli are determined by an iterative process. The soil strain is first estimated, giving soil moduli to use in a seismic analysis by either the ASHSD model or the SMIS stick model. This results in a soil strain which is then checked with the original estimate and the process is repeated as needed. It was felt that the ASHSD model provided the best soil strain value and this resulted in a Modulus of Elasticity of 8200 KSF. This value was used in the latest SMIS stick model analysis for Combustion Engineering. But with the earlier ASHSD models having a small soil grid, a pseudo Modulus of Elasticity had to be used, resulting in pseudo soil strains. These values then had to be scaled to find the true soil strains. This problem of scaling the soil strains has been eliminated by a new ASHSD model with an expanded soil grid set up by Ricardo Guzman. This grid has a radius of 709 feet and a depth of 641.5 feet, and used a value of 8200 KSF for the soil Modulus of Elasticity and a value of 0.35 for the Poisson ratio.

Therefore the Modulus of Elasticity value of 8200 KSF used in the SMIS stick model will be backchecked by using the expanded soil grid ASHSD model.



ATTACH. B-1
CALCULATION TITLE SHEET

SHEET 1 OF 1
DISCIPLINE SE
FILE NO SE
CALC NO C-257-1.04
QUALITY CLASSIF II
NO LAST PAGE 1

PROJECT SAFETY ANALYSIS JOB NO 32-202
SUBJECT CONTAINMENT SHELL ANALYSIS
FINAL COMPUTER ANALYSIS
① ORIGINATOR SIG J. J. L. L. DATE JAN 15-76
② CHECKER SIG J. J. L. L. DATE JAN 15-76

LEVEL OF REVIEW 3 CHECK AS REQUIRED

PE STAMP IF REQ'D

ORIGINAL ISSUE

	NAME	DATE	SIGNATURE
③ GROUP LEADER	<u>S. AMEAGADIA</u>	<u>8-3-76</u>	<u>S. Amegadiah</u>
④ EGS	<u>L. HERSH</u>	<u>8-6-76</u>	<u>L. Hersh</u>
⑤ SPECIALIST			
⑥ CHIEF	<u>W. BRANDES</u>	<u>8-10-76</u>	<u>W. Brandes</u>
OTHER			

RECORD OF REVISIONS

NO	REVISION	DATE	ENG	CKR	EGJ	EGS	SPEC	CHIEF
△								
△								
△								
△								
△								
△								

NOTE: 1) CALCULATIONS OF THIS PACKAGE ARE CONTAINED IN THE REPORT TITLED "FINAL ANALYSIS OF CONTAINMENT STRUCTURE FOR SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 & 3", DATED MARCH 1976.

2) MICROFILMS OF COMPUTER PRINTOUTS ARE IN THE MICROFILM FILE

#156

1342-9484

ATTACHMENT B-2

FINAL ANALYSIS OF CONTAINMENT
STRUCTURE FOR SAN ONOFRE NUCLEAR
GENERATING STATION
UNITS 2&3

MARCH 1976

Prepared and Checked By:

O. GURBUZ
O. GURBUZJ. M. LOVEKAMP
J. M. LOVEKAMPR. S. CHU
R. S. CHU

Reviewed By:

K. M. SCHECHTER
K. M. SCHECHTERT. D. KOHLI
T. D. KOHLIL. G. HERSH
L. G. HERSH

THIS REPORT CONSTITUTES CALCULATION PACKAGE NUMBER C-257-1.04 AND HAS BEEN
PREPARED, CHECKED, AND REVIEWED IN ACCORDANCE WITH SONGS 2 AND 3 PROJECT
INTERNAL PROCEDURES MANUAL.

ATTACH. B-3

3. METHOD OF SOLUTION

3.1 COMPUTER PROGRAMS

The computer program used in the final analysis of the containment is a two-dimensional finite element (FINEL) code.⁽¹⁾ Its capabilities include thermal analysis under any temperature distribution and nonlinear analysis incorporating bilinear material properties. Both of these features were extensively used in the final analysis.

The FINEL program is for analysis of plane and axisymmetric structures. In the latter case, only axisymmetric loading is permitted. On the other hand, seismic effects, which are asymmetric, must be considered in the loading combinations in accordance with the SONGS 2 and 3 PSAR. Seismic analysis of the containment has already been conducted using an Axisymmetric Shell and Solid (ASHSD) program,⁽²⁾ which is based on linear elastic response. The results of the independent analyses⁽³⁾ were incorporated in this report by simple superposition in appropriate loading combination. (Refer to chapter 4)

Another program was used in the final containment analysis. This program (CE-639-2) computes forces and pressures acting on a dome subjected to prestressing.⁽⁴⁾ The results of this analysis were used as input data in the FINEL analysis.


3.2 COMPUTER MODELS

As previously mentioned, the containment is idealized as an axisymmetric structure in the FINEL analysis. The computer model is shown in appendix A. General guidelines for modeling are discussed in the following paragraphs.

The computer model consists of quadrilateral or triangular elements of the following materials: concrete, liner plate, reinforcing steel, and soil. Two or more elements may occupy the same location in space; in this way reinforcement can be represented in its actual location. Prestressing tendons were not represented in the model since changes in tendon forces will be minimal under most loading conditions.

Aspect ratios of the elements should be within 3:1 where possible, in order to obtain accurate stress distribution. This rule was maintained for

THERMAL POWER ORGANIZATION



BECHTEL POWER CORPORATION

ENGINEERING DEPARTMENT PROCEDURE

SUBJECT: *ATTACH. C-1*

STANDARD COMPUTER PROGRAMS

EDP-4.36 REV. 0

PAGE 1 OF 7

ISSUED May 13, 1977

SUPERSEDES

PREPARED BY	DATE	APPROVED BY	OFFICE	DATE	APPROVED BY	OFFICE	DATE
S.A. Bernsen	9/3/76	<i>[Signature]</i>	TPM	2-8-77	<i>[Signature]</i>	HAO	2/8/77
		<i>[Signature]</i>	SFPD	2-8-77	<i>[Signature]</i>	GPD	2/8/77
		<i>[Signature]</i>	LAPD	2-23-77	<i>[Signature]</i>	AAC	2/23/77
		<i>J.E. Beshore LAPD 3-5-78 J.B. White TPC 3-5-78</i>					

1.0 PURPOSE

The purpose of this procedure is to define the quality related requirements for documentation, verification, control and use of Standard Computer Programs used by engineering for design calculations. Standard Computer Programs are controlled and verified programs that may be used in individual design calculations without specific, detailed description and verification of the program in the calculation documentation package. The term "Standard Computer Programs" (SCP) is used consistently in this EDP and in EDP-4.37 "Design Calculations."

SCOPE

2.1 General

This procedure shall apply to all computer programs, whether owned by Bechtel or by others, that are used in engineering design calculations without detailed verification of the calculation theory, method, and results in each calculation package (or set of calculations) on each project. This procedure covers only quality related requirements for control and use of Standard Computer Programs. This procedure does not cover administrative procedures for development, control and use of all computer programs.

2.2 Bechtel and Non-Bechtel Programs

SCP'S may be developed and/or owned by Bechtel or by others. Sections 3 through 8 apply to Bechtel developed and/or owned Programs. Section 9 outlines basic requirements for programs controlled by others.

3.0 RESPONSIBILITIES

3.1 Program Sponsor


The program sponsor, selected by engineering management is responsible for overall direction of program activities. He

COPY

Proprietary Note:

These procedures are the property of Bechtel Power Corporation and are to be used only for the purposes for which they were developed. They will not be used in whole or in part except as authorized by Bechtel Power Corporation. They will replicate the required design of proprietary.

14.10 9176

 TECHTEL POWER CORPORATION	SUBJECT: ATTACH. C-2 STANDARD COMPUTER PROGRAMS	EDP-4.36
		REV. NO. 0
		PAGE 3 OF 7

- b. Complete description of assumptions, capabilities and limitations.
- c. Instructions for preparing problem data deck.
- d. Instructions for preparing job control cards for problem execution.
- e. List (and explanation) of program error messages.
- f. Description of deficiencies or uncorrected errors.
- g. Description of output options and interpretations.
- h. Sample problem(s), illustrating all input and output options and associated job control cards (These problems should preferably be verification problems.)
- i. Machine hardware and software requirements.
- j. Reference to ancillary programs.
- k. Restart and recovery procedures.

The User's Manual should be signed by the preparer and the Technical Specialist and shall be approved by the Program Sponsor.

4.2 Theoretical Manual

The Theoretical Manual shall present the theoretical basis for the program, detailed description of the mathematical model, empirical data (if any), assumptions used and technical references. The Theoretical Manual shall receive an independent review and be signed by the preparer, reviewer and Technical Specialist, and approved by the Program Sponsor.

4.3 Verification Report

The Verification Report shall describe the verification methods and how they cover all the permitted options and uses of the program. The report shall include the following:

- a. Description of the program option(s) validated, and the methods used to accomplish this.
- b. Detailed description of test problems, including boundary conditions, mathematical model, and all key parameters.
- c. Listing of test problem input data checks and reprint of program input and output, or reference to location where this is stored.

SUBJECT:

ATTACH. C-3

STANDARD COMPUTER PROGRAMS

EDP-4.36

REV.
NO. 0

PAGE 4 OF 7

- d. Results from benchmark solutions, citing references used.
- e. Comparison of solutions, evaluation of program validity and error analysis.

The Verification Report shall receive an independent review for scope and adequacy. The Verification Report shall be signed by the preparer, reviewer and Technical Specialist and approved by the Program Sponsor.

4.4 Revisions

Whenever the program is modified the documentation shall be reviewed and necessary revisions prepared. Each modification shall be identified with a discreet number and revised documentation shall be issued bearing the same modification number. All revisions shall be approved by the program sponsor.

5.0 SOURCE ADEQUACY

Source coding for Bechtel prepared programs shall be independently reviewed by personnel competent in the program language used. The review shall be sufficient to assure that the source coding executes the engineering and mathematical formulation in an appropriate manner. The review need not consist of a detailed step-by-step check for portions of programs that use previously proven coding. Evidence of this review shall be included in the Verification Report (See 4.3).

6.0 VERIFICATION

Programs shall be verified by demonstration of the program capability to produce results closely matching benchmark solutions for a series of test problems encompassing the full range of permitted capabilities and usage of the program. Acceptable benchmark solutions include hand calculations, analysis by comparable public domain programs, empirical data, and information from the technical literature. Verification shall be documented in the Verification Report (Sec. 4.3). Whenever the program is modified, sufficient verification shall be repeated to check any existing capabilities affected and additional verification cases developed to check new capabilities.

Bechtel Power Corporation

ATTACH. D-1

Interoffice Memorandum

To Distribution

Subject Standard Computer Program List
Revision 8

File No.

Date July 24, 1981

From A. L. Cahn

Or Bechtel Power Management

At 50/11/B3 Ext. 7989

Copies to

Attached is the list of Standard Computer Programs, Revision 8. All sponsors are requested to review their programs for completeness and accuracy, and to verify that the information shown on this listing is correct.

All SCP programs now have proper alpha-numeric identification, and the programs which formerly had acronym identification only are relocated within the listing. In the future all programs should be registered with the DP Library prior to addition to the list.

The version dates for some programs show the letter R for revision. The letter was added for cases where the change in date exceeded a month from the date shown on Rev. 7. The version date corresponds with the date the program formally became available to the users. Superseded dates corresponded with such dates as registration, user manual approval, maintenance, etc.

We continue to encounter situations where there is lack of correspondence between programs revisions and verification report updates so that users can't readily determine if the verification reports are still valid for the revised programs. It is recommended that all verification reports contain a Record of Revisions page which shows the historical relationship between program versions and verification report revisions.

The major changes to this issue are:

Programs with Classification
Code Changes

EE 580, Code 2 to 1
NE 003, Code 2 to 3
NE 810, Code 2 to 1
TE 604, Code 2 to 1
TE 605, Code 2 to 1
TE 630, Code 2 to 1
UE 558, Code 2 to 3

Programs Added

CE 111, vers 1, Code 1
TE 801, vers 2, Code 3
UE 160, vers 1, Code 2

COPY

Copy of
Part of

1347-9025

ATTACH. D-2

July 24, 1981
Page Two

This list supersedes all other lists showing Standard Computer Programs.

Further distribution of this report within each organization should be handled by the addressees. Should you have any questions or should any corrections come to your attention, please contact me or John Flaherty on Extension 7532.



A. L. Cahn

ALC/sm

Attachment

BECHTEL POWER CORPORATION

BECHTEL POWER MANAGEMENT

STANDARD COMPUTER PROGRAMS AND OTHER ENGINEERING DESIGN AND ANALYSIS PROGRAMS

PURPOSE: This list defines versions of engineering programs which fall into one of the following code categories:

1. Standard Computer Program conforming to EDP 4.36
2. Proposed SCP; EDP 4.36 verification incomplete but scheduled within next 12 months
3. Programs not used to support final design or submittals to regulatory agencies. Also, programs used to reformat input or output without mathematical manipulation.

Programs which are not standard computer programs must be verified by a user/project in accordance with EDP 4.37. It is the program user's responsibility to assure the the option(s) used has been verified.

Legend:

<u>Category Codes</u>	<u>Location Codes</u>	<u>Other</u>
1 - Current standard program	SF/DP - San Francisco Corporate DP Library	SCP - Standard Computer Program
2 - Proposed standard program	SFPD - San Francisco Power Division	EDP - Engineering Department Procedure
3 - Used for preliminary calculations or reformat	LAPD - Los Angeles Power Division	Arc - Archived by DP
	GPD - Gaithersburg Power Division	DP - Data Processing
	AAPD - Ann Arbor Power Division	Prod - Meets DP Library Production Standard
<u>System Codes</u>	HAO - Houston Area Office	ACT - Active, not on DP Appl. List
CDC - Control Data Corporation	R&C - Refinery & Chemical	ETC - Estimated Time of Completion
UNI - Bechtel Univac	R&E - Research & Engineering	NR - Not Required
UCC - University Computing Company	H&CF - Hydro & Community Facilities	N/R - Not Reviewed
HYW - Honeywell	M&M - Mining & Metals	DEV - Developmental Status
TI - Texas Instruments	EDS - Engineering Data Services	ODAC - Outside Developed & Controlled
		R - Revised date

NOTES: (1) Programs noted "Restricted Access" require guidance from program sponsor before use.

(2) Version dates are dates on which that version of the program became available to the users; e.g., the load date on the computer. It may not be the same date it became an SCP. Reference: DP Library form 0306.

ATTACH D-3

F019

PROGRAM

DOCUMENTATION STATUS/LOCATION

CODE	No.	Acronym	Description	System	Location Sponsor	Version Date	Libr Stat	Users Manual	Verification Report	Theory Manual	Remarks
1	CE802	SPECTRA		CDC		D3 01/03/79	Prod	Complete SF/DP	Complete SF/DP	Complete HAO	
				UCC		D1 01/05/78	Prod	Complete SF/DP	Complete SF/DP	Complete HAO	
				UNI		C3.0 01/31/77	Prod	Complete SF/DP	Complete SF/DP	Complete HAO	
1	CE803	ASHSD	Axisym. struc. under non-axisym. loads	CDC	GPD UCC Arnold	C09 02/11/79	Prod	Complete SF/DP	Complete SF/DP	Complete User Manual	
						C08 09/27/77	Prod	Complete SF/DP	Complete SF/DP	Complete User Manual	Version C08 was never available at UCC.
2	CE823	ASHPOST/ ASHCOMB	Post processor for CE803	CDC	GPD Arnold	C09	Prod	ETC 7/81	ETC 7/81	ETC 7/81	Planned to meet EDP 4.36 in 7/81.
1	CE899	-	Compartment depressurization	UNI	LAPD Kosiba	A3 07/15/76	Prod	Complete SF/DP	Complete SF/DP	Complete User Manual	Verification valid for all versions.
1	CE901	STRU DL	Design & static analysis beams and frames AISC	UNI	GPD Anas	1 11/19/80	Prod	Complete SF/DP	Complete SF/DP	Complete SF/DP	ICES version 2.8. Limited verification of dynamic & finite element options. ACI options not verified. See STRU DL NEWS & Limitation section of user manual.
						F7 06/15/79	Prod	Complete SF/DP	Complete SF/DP	Complete SF/DP	

ATTACH. D-4

1347-9025

F019

Item 5

272:
FOT9

ATTACH. E-1

ASHSD

AXISYMMETRIC SHELL AND SOLID

CONFIDENTIAL
&
PROPRIETARY

USER'S
MANUAL

PREPARED BY

Robert E. Dora

REVIEWED BY

Thomas A. Ballard

APPROVED BY

G. P. [Signature]

#16

CE 303



BECHTEL POWER CORPORATION

ATTACH. E-2

ASHSD MANUAL REVISION RECORD

<u>REVISION NUMBER</u>	<u>DATE ISSUED</u>	<u>DESCRIPTION</u>
0	11/1/76	Original Printing
1	6/1/77	<ul style="list-style-type: none">- Corrects numerous typographical and other errors in the original printing.- Adds more detailed explanations for several sections.- Adds capability to use concentrated nodal masses.- Updates Appendix B for use of PLOT2D.
2	11/1/77	<ul style="list-style-type: none">- Updates Appendix C for use of SECTION.- Corrects several typographical errors.- Adds section on FILE cards.
3	12/15/77	<ul style="list-style-type: none">- Corrects typographical errors.- Updates Appendix B for use of PREPLOT option.- Adds information to existing notes.
4	9/1/78	<ul style="list-style-type: none">- Corrects typographical errors.- Adds Appendix G for use of tape output.

ACKNOWLEDGEMENTS

The original Axisymmetric Shell and Solid Program (ASHSD) was developed in 1969 by E. L. Wilson and S. Ghosh at the University of California, Berkeley. The shell element employed by Wilson and Ghosh was later replaced by an isoparametric shell element with interaction stiffness developed by Ralph McChesney of the Los Angeles office. T. D. Kolhi, also of the Los Angeles office was the author of the ASHSD User's Manual released in November 1971.

The ASHCOMB program was written in 1975 by T. A. Ballard of the Gaithersburg office for the SNUPPS project of the Gaithersburg Power Division. The PLOT2D and SECTION programs were written by J. J. Sturkey using the FPLOT program as a basis. His notes were used to write Appendices B and C.

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

attached sheet.

☐ AGREE PF IS VALID☒ DISAGREEBY: DATE: **D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. TPI PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

1. The User's Manual for ASHSD (CE803) was authored by T. D. Kohli and was released in November, 1971. This version of the Manual was used to perform the subject computer runs. The later version of the User's Manual mainly incorporated updated versions of Appendices B and C, and removed numerous typographical errors. A copy of the 1971 version of the ASHSD User's Manual is available in the BPC's data processing library.
2. The official verification manual for ASHSD program was issued in August, 1974. However, the program had been verified much earlier than 1974. In fact, sample problems used for verification were initiated in 1973. A copy of the 1974 verification manual is available in the BPC's data processing library. In general, any program used by engineering is independently verified by the users before applying it to large size structural analysis problems. It is not required to list each phase of documentation since it is maintained in our libraries.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATIONREVISION —**A. PREPARATION BY GA INITIATOR****AFFECTED ITEMS:**

Piping Analysis for Segment 78

REQUIREMENT REFERENCE DOCUMENTS:Bechtel's PIPM Section 14.5.2 Required Approvals - Computer Program
(Rev. 10 date 3-9-81)**BASIC REQUIREMENT:**

ASME nuclear Class 1 design requires check by Chief Engineer or designee. Professional Engineer stamp required on specific pipe stress calculation (per State of California)

DESCRIPTION OF POTENTIAL FINDING:

Segment 78 calc. not signed by Chief Engineer and no P.E. stamp. Later Bechtel personnel produced Calc. No. M-DSC-50 with P.E. stamp on a related stress calc. Calc. No. M-DSC-50 was not included in PSG #78 package or identified in this package.

Problem: Calc. No. M-DSC-50 with approval and P.E. stamp not traceable from PSG #78 package.

PREPARED BY: W. J. Hopkins DATE: 2-1-82 (Task B Procedural Review)

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER**COMMENTS**☒ AGREE PF IS VALIDBY J. BurrellDATE 2/1/82☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

See attached sheet.

☐ AGREE PF IS VALID☒ DISAGREE *WCE*BY: *JEM*
*Phogun*DATE: *2/12/82***D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

PSG #78 is not a calculation for the Nuclear Class 1 portion of the subject piping system. It was developed mainly to:

1. Provide an analysis for the Nuclear Class 2 portion of the piping system.
2. Provide a listing (PSDL) of loads for pipe supports design.
3. Provide nozzle loading information.

Therefore, PSG #78 need not be approved and stamped by the Chief Engineer.

The applicable calculation for the Nuclear Class 1 portion of the piping system is M-DSC-050 which has been stamped and approved by the Chief Engineer.

It is not required to identify calculation M-DSC-050 in PSG #78 since M-DSC-050 is a separate calculation that stands on its own. Some of the computer analyses referenced in M-DSC-050 are also required for calculations in PSG #78.

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION **A. PREPARATION BY GA INITIATOR****AFFECTED ITEMS:**

Piping Analysis for Segments 82, 57, 74, 117

REQUIREMENT REFERENCE DOCUMENTS:

Bechtel's PIPM Section 14.4.4 Calculation Page Numbering (Rev. 10 date 3-9-81)

BASIC REQUIREMENT:

"Pages from other documents must be numbered, dated, identified with a title and calc. number, and initialed by the responsible engineer."

DESCRIPTION OF POTENTIAL FINDING: The required information is missing:

PS	No date	No title	No RE Initials
82	6	0	6
57	26	27	26
74	8	8	8
117	9	1	11

PREPARED BY: N. G. H. [Signature] DATE: 2-1-82 (Task & Procedural Review)REJECTION OF GA TASK LEADER COMMENTS BY: DATE: REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: DATE: **B. REVIEW BY GA TASK LEADER****COMMENTS**☒ AGREE PF IS VALIDBY J. BreuerDATE 2/1/82☐ REQUEST RE-REVIEWBY DATE ☐ DISAGREEBY DATE ☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: DATE:

REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

See attached sheet.

☐ AGREE PF IS VALID☒ DISAGREESNR *ME*BY: *F. B. Marshall*DATE: *2/22/82*D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

The potential finding description does not identify the particular sheets which were missing the date, title and RE initials. From our review of the cited documents we have assumed that the PFR was written against the spectra curves and the "Reference Only" sheets included in the calculation.

The response spectra curves are initialed and dated when originally prepared by staff. The "Reference Only" sheets are typically vendor information which have been approved by the supplier and given a "status" approval by Bechtel. The signatures and date shown on the title sheet of the calculation indicates that all material contained therein has been reviewed for its validity and application at the time the calculation is approved and released.

To prevent further questions of this nature in the future the Calculation Procedure in the PIPM will be changed to clarify that the use of spectra curves and "Reference Only" material do not require the signing and dating of each sheet in a prescribed fashion as long as they have been previously approved or statused.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Piping Analysis for Segment 78

REQUIREMENT REFERENCE DOCUMENTS:

Bechtel's PIPM Section 14.5.1 Required Approvals - Design Approval
(Rev. 10 date 3-9-81)

BASIC REQUIREMENT:

Level of Approvals on Title Sheet required Chief Engineer signature.

DESCRIPTION OF POTENTIAL FINDING:

Chief Engineer did not sign original or initial as built check.

PREPARED BY: H. J. Burrell DATE: 2-1-82 (Task B Procedural Review)

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY

J. Burrell

DATE

2/1/82☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

CALCULATION TITLE SHEET

F022

PSG# 795
SHEET 1 OF 1

SUBJECT San Onofre Units 2 & 3

JOB NO. 10079-003

DISCIPLINE MECH / STRESS

PROJECT SAFETY INJECTION FROM PEN'S 3 & 4 TO LOOP 1A

FILE NO. 251 A

P00349

CALC. NO. M-120-043-2A

① ORIGINATOR SIG. [Signature]

DATE 4-1-77

QUALITY CLASSIF. 111A

② CHECKER SIG. [Signature]

DATE 10-8-79

NO. LAST PAGE 91

LEVEL OF REVIEW

① ② ③ ④ ⑤ ⑥

CHECK AS REQUIRED

P.E. STAMP IF REC'D

Complete Review 12/22/81

ORIGINAL ISSUE

	NAME	DATE	SIGNATURE
② GROUP LEADER	<u>R. HERMANN</u>	<u>3/16/81</u>	<u>[Signature]</u>
② EGS	<u>S. MOHAMMED</u>	<u>3/24/81</u>	<u>[Signature]</u>
③ SPECIALIST			
④ CHIEF			
OTHER			

RECORD OF REVISIONS

NO.	REVISION	DATE	ENG.	CKR	EGL	EGS	SPEC.	CHIEF

This calc. includes sheets 1AA, 1A, 1B, 1C
150 lbs nozzle 043-1
043-2
055-1

FINAL VERIFICATION	UNIT 2	UNIT 3
AS BUILT PIPE SUPPORTS	WISC <u>75</u>	WISC <u>N/A</u>
NOZZLE LOADS	WISC <u>76</u>	WISC <u>N/A</u>

N/A = not applicable

See Stress Calc
Calc No. M-DSC-050

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

Inclusion of check mark on level 6 was not required and should not have been so indicated. Calculation M-1204-043-2 (Segment 78) is the source of mechanical loads for Nuclear Class 1 Stress Report M-DSC-050 and is referenced in this report which is approved and stamped by the Chief Engineer.

☒ AGREE PFR IS VALID - This has no affect on the use of PSG-78

MC
☐ DISAGREE

SNR
BY: *Fred B. Marshall* DATE: *2/8/82*

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:	<input type="checkbox"/> ADEQUATE	<input type="checkbox"/> INADEQUATE
VALIDITY:	<input type="checkbox"/> VALID	<input type="checkbox"/> INVALID
10 CFR 21:	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
10 CFR 50.55(e):	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
CLASSIFICATION:	<input type="checkbox"/> OBSERVATION	<input type="checkbox"/> FINDING

CLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION --

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Piping Analysis for Segments 82, 78

REQUIREMENT REFERENCE DOCUMENTS:

Bechtel's PIPM Section 14.8, Filing, (Rev. 10 date 3-9-81)

BASIC REQUIREMENT:

The original of completed calculations will be retained in the Project Calculation file.

DESCRIPTION OF POTENTIAL FINDING:

The original of 78 and 82 were not in the files.

PREPARED BY: H. Hooker DATE: 2-1-82 (Task & Procedural Review)

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALIDBY J. Bomer DATE 2/1/82☐ REQUEST RE-REVIEW

BY _____ DATE _____

☐ DISAGREE

BY _____ DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

PSG-78 and PSG-82 originals were in the hands of the responsible engineer who had the circulation under revision. A copy was being maintained in the project central file along with an out card showing the responsible engineer.

☐ AGREE PF IS VALID☒ DISAGREE

SHF

BY: SubramaniamDATE: 2/8/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CRF 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGCLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Piping Analysis for Segments 82, 78

REQUIREMENT REFERENCE DOCUMENTS:

Bechtel's PIPM Section 14.8, Filing, (Rev. 10 date 3-9-81)

A - SONGS FSAR 14.2.1 Prerequisite (to startup testing)

BASIC REQUIREMENT:

The original of completed calculations will be retained in the Project Calculation file.

A - Systems shall be complete and verified prior to startup testing.

DESCRIPTION OF POTENTIAL FINDING:

The original of 78 and 82 were not in the files.

A - Bechtel's comment, C, states that PSG 78 and PSG 82 calculations are under revision by responsible engineer. The calculations do not meet the basic requirement.

PREPARED BY: W C Hopkins DATE: 2-19-82 (Task B Procedural Review)

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY J. B. Bernal

DATE 2/24/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION _____

A. PREPARATION BY GA INITIATOR**AFFECTED ITEMS:**

Piping Analysis for Segments 78, 57, 74, 117

REQUIREMENT REFERENCE DOCUMENTS:Bechtel's PIPM Section 14.4.4 Calculation page numbering
(Rev 10 date 3-9-81)

BASIC REQUIREMENT: 1) Pages are numbered to maintain order and prevent loss; 2) added pages are identified in numbering system; 3) approval of a section must be initiated no later than 60 days after completion of first calculation; 4) additions are revisions; 5) required page count; 6) page adding as part of revision shown title page.

DESCRIPTION OF POTENTIAL FINDING:

The form and intent of the page numbering requirement have not been followed (see attached table) and this makes review difficult.

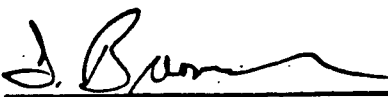
PREPARED BY: _____ DATE: 2-1-82 (Task B Procedural Review)

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER**COMMENTS**☒ AGREE PF IS VALID

BY



DATE

4/1/82

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

2408 PFR No. F027

ATTACHMENT I

Page Numbering Discrepancies

<u>Piping Analysis Segment</u>	<u>Page Numbering- Yrs. after Start</u>	<u>Additions Not Identified</u>	<u>Revision does not show Pages added</u> ?	<u>wrong page count</u>	<u>page count given but not at bottom</u>
78	5	X	no revision		No revision
57	3	X	X		X
74	2	X	X		X
117	4	X	X	X	X

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

e attached sheet.

☐ AGREE PFR IS VALID☒ DISAGREEBY: Dr. RosenDATE: 7/17/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDING☐ CLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

Bechtel's review of the calculations cited did not disclose any procedural violations. The potential findings, as listed, appear to result from a misunderstanding of the procedures as stated in the auditing check list. For example, Bechtel has no procedural requirements for individual sheets, spectra curves and references to be dated the same date as the title page. The sheets are developed over a period of time and collected, numbered and released under a title sheet dated at the time of completion.

The forms shown in the procedure are typical, not mandatory, therefore, the location of the page count is not significant only that they are correctly numbered. Likewise, the use of spectra curves in the form in which they are developed is also permissible.

The page number was checked and found to be correct for calculation 117.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-FO28

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Safety injection line to reactor coolant loop 1A, pipe support at node 116, calculation TAG:S2-S1-043-H-020.

REQUIREMENT REFERENCE DOCUMENTS:

Piping stress analysis package PSG-78, M1204-043-2B.

BASIC REQUIREMENT:

Calculation should reflect the effects of all field change requests /DCN/SCN.

DESCRIPTION OF POTENTIAL FINDINGS:

Changes shown in DCN Sub No. 07 and 08, S-7295 and S-7450 dated 1/23/81 and 2/5/81 are not included in calculation report: TAG:S2-S1-043-H-020, P450-150-169 dated 4-10-80. This change modified the support to interface with jet impingement bracing. There is no indication that loads imposed by jet impingement bracing have been evaluated or compared with loads used in original calculations.

(in connection with seismic loads and)

PREPARED BY: R. Salavattcioglu *R. Salavatt* DATE: 2-4-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

DESIGN REVIEW BY ORIGINAL ORGANIZATION FOR
VALIDITY AND ACCURACY

as ☒ AGREE PF IS VALID

BY *[Signature]*

DATE 2/18/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

The calculation report for tag S2-SI-043-H-020 (P450-1.50-169) was provided to TPT without a check of the as-built calculation file which contains calculation (P450-1.190-9.79 - attached) that addresses the addition of the jet impingement bracing. FCR number S-7295 is included in the attached calculation. FCR number S-7450 was dispositioned as not requiring a calculation as shown in the as-built calculation log for startup system BBB.

☐ AGREE PFR IS VALID☒ DISAGREEBY: ME
Frank MarchDATE: 3/1/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

SIGNATURE Ramon Lora DATE 12-22-80 CHECKED WD DATE 1-9-81
 PROJECT SONGS UNITS 2 & 3 JOB NO. 10079-003
 SUBJECT PIPE SUPPORTS SHEET 1 OF 8 SHEETS

DESIGN VERIFICATION

- ☐ DESIGNED BY ENGINEERING JUDGEMENT
☒ DESIGNED BY CALCULATION REF. Below

SUS 2 BBS
 FCR-5-7295

REFERENCE DESIGN DATA

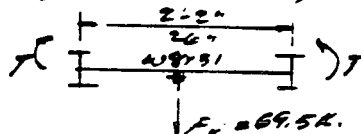
STRESS PROBLEM NO. 5 78 REV. PR. NO. 117

STRESS ISO NO. REV. NO.

ADDITIONAL CALC. (Due to addition of
WHP RESTRAINT ON
DWG. 23257)

1) CHECK MEMBER A @ J. #1:

a) $M_y = 169.11 \text{ K-in}$
 $F_A = 20.23 \text{ K, Tension}$
 $F_S = 8.40 \text{ K, WHP}$



$F_A = 69.5 \text{ K}$

$\Delta_1 = \frac{F_A L^3}{48 E I} = \frac{(69.5)(26)^3}{48 E (140)} = 0.00798 \text{ in}$

$\Delta_1 = \theta L$

$\theta = \frac{\Delta_1}{L} = \frac{0.00798 \text{ in}}{26 \text{ in}} = 0.0006138 \text{ Rad.}$

$\theta = \frac{T L}{E I} ; T = \frac{\theta E I}{L} = \frac{(0.0006138)(E)(140)}{44} = 0.089 \text{ K-in}$

$T = 0.089 \text{ K-in} \rightarrow \text{Very Small}$

$f_b = \frac{169.11}{27.4} + \frac{20.23}{9.12} = 8.4 \text{ K-in}$

$f_s = \frac{8.40}{9.12} = 0.92 \text{ K-in}$

$\frac{8.4}{19.14} + \frac{0.92}{12.95} = 0.51 < 1.0 \text{ O.K. 2 Mem. Subjected to Tension}$

b) $M_y = 133 \text{ K-in}$

$F_A = -51.6 \text{ K}$

$F_S = 9.43 \text{ K}$

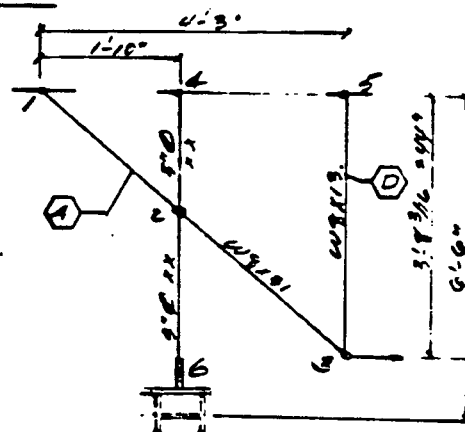
$f_b = \frac{133}{27.4} = 4.9 \text{ K-in}$

$f_A = \frac{51.6}{9.12} = 5.66 \text{ K-in}$

$f_s = \frac{9.43}{9.12} = 1.04$

$\frac{4.9}{9.14} + \frac{5.66}{11.5} + \frac{1.04}{12.95} = 0.94 < 1.0 \text{ O.K.}$

MEMBER SUBJECT TO COMPRESSION

TAG NO. 42-51-043-H-020

PLAN NORTH
 WHP: A = 9.12
 $I_x = 110, I_y = 214$
 $I_y = 37, I_x = 9.24$
 $r = 2.01$

$\frac{F_A}{r} = \frac{(51.6)(\sqrt{51.6^2 + 19.98^2})}{2.01} = 30.4$

$F_A = 20 \left(\frac{31.6}{9.12} \right) = 17.5 \text{ K-in}$

SIGNATURE Ramon Lora DATE 12-22-80CHECKED WD DATE 1-3-81PROJECT Song 2 & 3JOB NO. 10079-003SUBJECT PIPE SUPPORT 92-91-048-H-020SHEET 2 OF 8 SHEETS

2) Check Base Pl & Props 2 & #1:

a) Check 1 3/8" Rock Props:

$$P_y = \frac{169.11}{14} + \frac{6.86}{2} = 15.5 \text{ K/in.}$$

$$\text{Pull-out per Prop} = \frac{15.5}{2} = 7.75 \text{ K.} < 85 \text{ K}$$

$$\text{Shear per Prop} = \frac{20.9}{4} = 5.2 \text{ K.} < 48 \text{ K}$$

b)

$$R_{\text{thick}} = \left[\frac{6(169.11)(1.75^3)}{75(31.6)(18)} \right]^{1/2} = 2.04" > 1 1/4" \text{ O.K.}$$

N.G.
ADD STIFF. AS SHOWN

W STIFF. PL 1/2" (Two on Side)

$$P_y = \frac{169.11}{20} + \frac{6.86}{2} = 11.9$$

$$R_{\text{thick}} = \left[\frac{6(11.9)(1^3)}{75(31.6)(18)} \right]^{1/2} = 0.41" < 1 1/4" \text{ O.K.}$$

c) Weld Size of Stiff. is O.K. Adequate.

3)

Check Base Pl & 1" Rock Props:

$$a) P_y = \frac{130.01}{9.875} = 13.17$$

Comb. #1:

$$\text{Pull-out per 1" Prop} = \frac{13.17}{2} = 6.6 \text{ K.} < 25 \text{ K}$$

$$\text{Shear per Prop} = \frac{5.22}{4} = 1.30 \text{ K.} < 8 \text{ K}$$

Comb. #2:

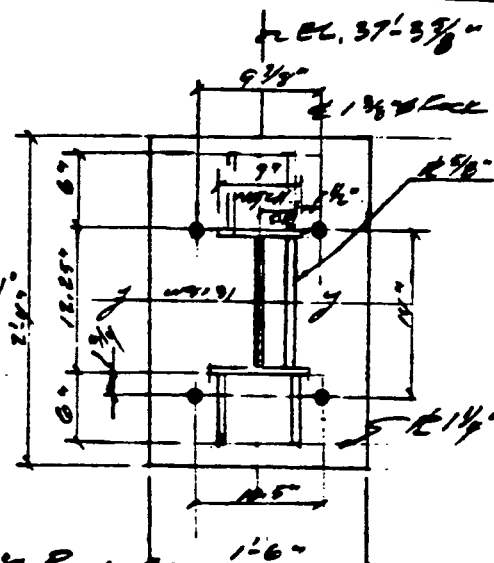
$$\text{Pull-out per Prop} = \frac{70}{(9.875)^2} + \frac{23.32}{4} = 10.2 \text{ K.} < 25 \text{ K}$$

$$\text{Shear per Prop} = \frac{1.87}{4} = \text{Very Small} < 8 \text{ K}$$

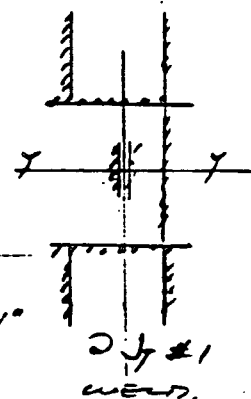
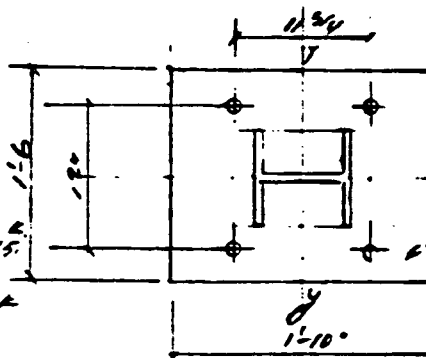
$$P_y = \frac{70}{9.875} + \frac{23.32}{2} = 19.76$$

$$R_{\text{thick}} = \left[\frac{6(19.76)(1.875^3)}{75(31.6)(22)} \right]^{1/2} = 0.65" < 1" \text{ O.K.}$$

$$\text{Weld Size} = \left[\frac{130}{72.3} + \frac{23.32}{26} \right]^2 + \left(\frac{5.22}{26} \right)^2 \left(\frac{1}{2} \right) = \frac{2.7}{9.5} = 0.28 < 7/16" \text{ O.K.}$$



1 3/8 Rock:
 Allow. pull-out = $80 \left(\frac{9 3/4}{14} \right) = 55 \text{ K}$
 Allow. shear = $16 \text{ K} \left(\frac{9 3/4}{14} \right) = 11.3 \text{ K}$
 Concluding.



2" #1
 WELD.

Aw = 20
 $\text{Weld} = 5/16" + \frac{1}{2}"$
 $\text{Weld} = 7/8"$



CALCULATION SHEET

F028

P450-1-105-9.79
CALC. NO.SIGNATURE Ramon Lora DATE 12-22-86CHECKED WD DATE 1-8-91PROJECT CONCRETEJOB NO. 10074-003SUBJECT PIPE SUPPORT 52.91-043-H-020SHEET 3 OF 8 SHEETS

GENERAL FRAME ANALYSIS

BMC. 23259 ON S2-S1-043-H-020 @ PLAN EL. 57'-2 3/4"

JOINT COORDINATES

JOINT	X	Y
1	0	0
2	22	-16.96
3	51	-44
4	22	0
5	51	0
6	22	-76

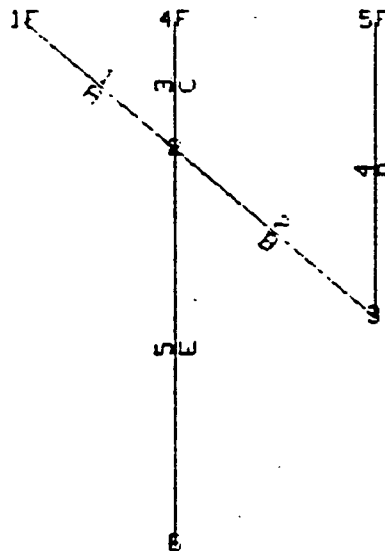
JOINT RESTRAINTS

- 1 FIXED
- 4 FIXED
- 5 FIXED

OF EQUATIONS = 9

MEMBER IDENTIFICATION

MEMBER	JT.	JT.	TYPE	LENGTH	L(X)	L(Y)
1	1	2	A	25.06	22.00	-16.96
2	2	3	B	36.30	29.00	-25.02
3	2	4	C	16.98	0.00	+16.96
4	3	5	D	44.00	0.00	+44.00
5	6	2	E	59.62	0.00	+59.62





CALCULATION SHEET

FD 28

P450-1.109-9.79
CALC. NO.SIGNATURE Ramon Lora DATE 12-22-80CHECKED WD DATE 1-8-81PROJECT COAL 2 & 3JOB NO. 10079-003SUBJECT PIPE SUPPORT 42.51-043-H-020SHEET 4 OF 8 SHEETS

MEMBER PROPERTIES AND LOADS

CONSISTENT UNITS USED

E = 29000

SECTION NO.	I	A
1	110	9.12
2	33	11.34

MEMBER TYPE A

LENGTH = 25.02 L(X) = 25 L(Y) = 16.96

SECTION NO. 1 I = 110 A = 9.12

MEMBER TYPE B

LENGTH = 36.3 L(X) = 29 L(Y) = 25.02

SECTION NO. 1 I = 110 A = 9.12

MEMBER TYPE C

LENGTH = 18.96 L(X) = 0 L(Y) = 18.96

SECTION NO. 2 I = 33 A = 11.34

MEMBER TYPE D

LENGTH = 44 L(X) = 0 L(Y) = 44

SECTION NO. 1 I = 110 A = 9.12

MEMBER TYPE E

LENGTH = 59.02 L(X) = 0 L(Y) = 59.02

SECTION NO. 2 I = 33 A = 11.34

LOADINGS

LOAD COMBINATION	1	2
DEAD LOAD FACTOR	1.000	1.000
LIVE LOAD FACTOR	1.000	1.000

JOINT	P(X)	P(Y)	MOMENT	LOAD COMBINATION 1
3	34.75	0.00	0.00	
6	0.00	-154.02	0.00	



CALCULATION SHEET

FD28

P450-1.109-9.77
CALC. NO.SIGNATURE Edmond LoraDATE 12-22-76CHECKED WDDATE 1-8-81

PROJECT

SONG 2 #3

JOB NO.

10079-003

SUBJECT

PIPE SUPPORT 52-51-043-H-020

SHEET

5

OF

8

SHEETS

JOINT	P(X)	P(Y)	MOMENT	LOAD COMBINATION 2
3	-34.75	0.02	0.00	
6	0.00	-154.00	0.00	

DISPLACEMENTS

JOINT	X (---)	Y (DOWN)	ROT. (CW)	LOAD COMBINATION 1
1	0.0000E+00	0.0000E+00	0.0000E+00	
2	9.2710E-03	-7.3445E-03	-4.2933E-04	
3	1.6234E-02	-5.5903E-03	-2.1020E-04	
4	0.0000E+00	0.0000E+00	0.0000E+00	
5	0.0000E+00	0.0000E+00	0.0000E+00	
6	3.4611E-02	-3.4983E-02	-4.2933E-04	

JOINT	X (---)	Y (DOWN)	ROT. (CW)	LOAD COMBINATION 2
1	0.0000E+00	0.0000E+00	0.0000E+00	
2	-6.0064E-04	-7.8773E-03	3.6294E-05	
3	-1.0595E-02	3.6600E-03	7.1660E-04	
4	0.0000E+00	0.0000E+00	0.0000E+00	
5	0.0000E+00	0.0000E+00	0.0000E+00	
6	-2.8309E-03	-3.5515E-02	3.6294E-05	

MEMBER FORCES

MEMBER	LD. COMB.	JOINT	AXIAL	SHEAR	MOMENT
TYPE A					
1	1	1	20.23	-8.40	169.11
1	2	2	20.23	-8.40	74.84
1	2	1	-51.59	-9.43	132.99
1	2	2	-51.59	-9.43	140.96
TYPE B					
2	1	2	44.31	6.15	-136.04
2	3	3	44.31	6.15	-99.54
2	2	2	-40.58	4.21	-137.30
2	3	3	-40.58	4.21	-23.96
TYPE C					
3	1	2	-127.26	-8.73	61.20
3	4	4	-127.26	-8.73	104.49
3	2	2	-136.49	.50	-2.66
3	4	4	-136.49	.50	-7.32
TYPE D					
4	1	3	-33.60	-5.22	99.54
4	5	5	-33.60	-5.22	130.01
4	2	3	23.32	1.27	23.98
4	5	5	23.32	1.27	-79.93
TYPE E					
5	1	6	-154.00	0.00	.00
5	2	2	-154.00	0.00	-.00
5	6	6	-154.00	-.00	.00
5	2	2	-154.00	-.00	-.00

REACTIONS

JOINT	X (---)	Y (UP)	MOM. (+CCW)	LOAD COMBINATION 1
1	20.00	6.00	-169.11	
4	8.73	-127.26	-104.49	
5	5.22	-33.60	-130.01	

JOINT	X (---)	Y (UP)	MOM. (+CCW)	LOAD COMBINATION 2
1	-32.90	-40.04	-132.99	
4	-0.56	-136.49	7.32	
5	-1.27	23.32	79.93	



CALCULATION SHEET

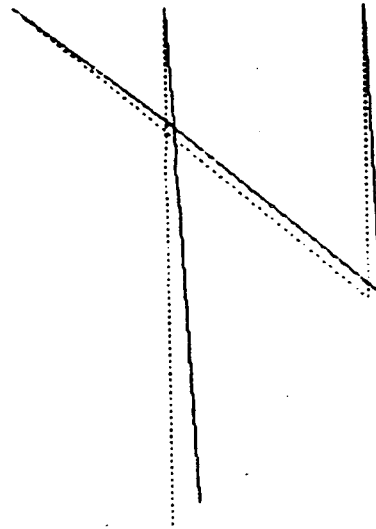
FD 28

P450-1-109-9.79

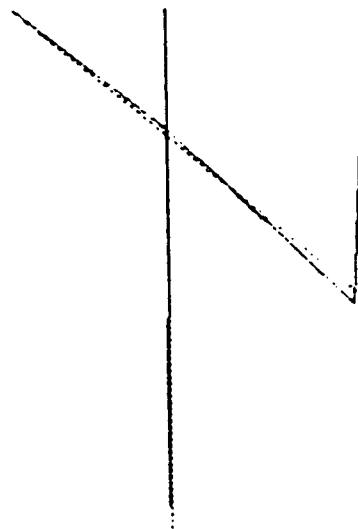
CALC. NO.

SIGNATURE CAROL Lora DATE 12-22-76CHECKED UD DATE 1-8-81PROJECT Stages 2 & 3JOB NO. 18079-003SUBJECT Pipe Support 52-91-043-H-020SHEET 6 OF 8 SHEETS

1
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LOAD COMB. 1 MAX. DISPL. = 3.4863E-02



LOAD COMB. 2 MAX. DISPL. = 3.5515E-02

**SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3
FIELD CHANGE REQUEST/DCN/SCN**

FIELD CHANGE REQUEST/DCN/SCN

IC

1. FCR NO. S-7295
DATE 1/7/81
2. PAGE 1 OF 2
3. UNIT NO. 2

12A. QUALITY CLASS
I
12B. SPEC ADDEND NO.

12C. DCN SUB NO. _____
12D. DATE _____
12E. SCN NO. _____

F
028

A(QCI) JOB NO. 10079 2009.3

DWG. OR SPEC.	SHEET NO.	REV.	S. TITLE
SI. 043-H-020		1	

PIPE SUPPORT ASSEMBLY

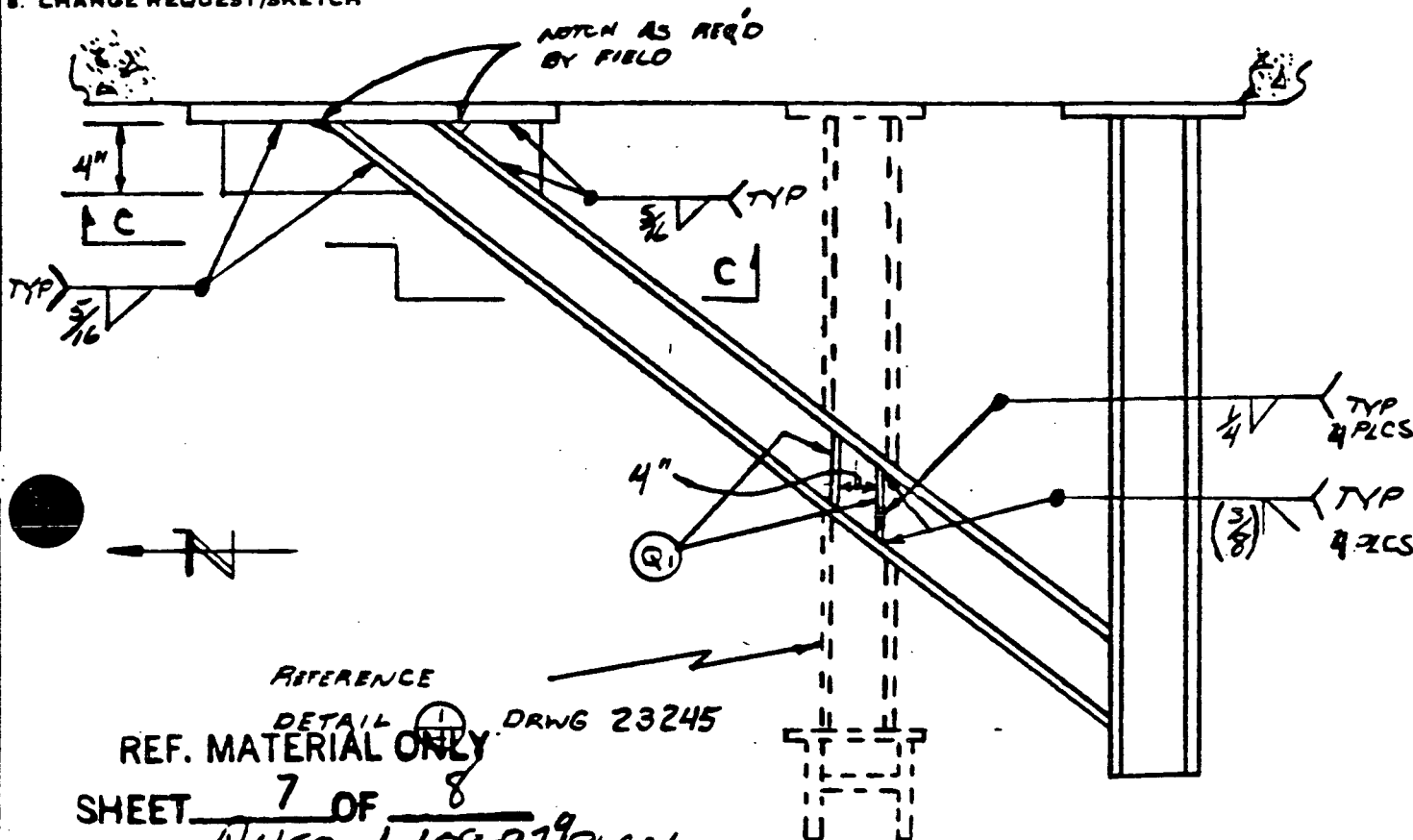
6. DESIGN ORIGIN: ENGRG ☒ VENDOR ☐ (IDENTIFY)

7. EXISTING CONDITION:

NEED TO REVISE SUPPORT DUE TO JET
BRACING REQUIRED BY CIVIL.

525 # 2BBB

8. CHANGE REQUEST/SKETCH



REFERENCE

DETAIL DRWG 23245

REF. MATERIAL ONLY

SHEET 7 OF 8

CALC # P450-1.109-9.17 PLAN

PROJECT ENGINEERING APPROVAL PER (PARTIAL)

PL# 627E

19.	REVIEWED BY	DATE	<i>J. J. [Signature]</i>	<i>1/8/81</i>
	CIVIL _____	_____	PIPE _____	_____
	ELEC _____	_____	INSTR _____	_____
	MECH _____	_____	NUC _____	_____
	WELD _____	_____	QAE _____	_____

9. GREGORY A. GILBERT RF
PREPARED BY
11. APPROVAL OF FLD DISPOSITION *mtc*
PROJECT FIELD ENGINEER
DATE

12. PROJECT ENGRG APPROVAL: YES ☒ NO ☐ EGS

P.E: R.L. Royen / update DATE 1-8-81

REMARKS: CONVERT TO DCN

13. QUALITY ASSURANCE ENGINEER (FIELD): _____ DATE _____

11. **ENGINEERING APPROVAL** _____ **P.E.** _____ **DATE** _____

18. BECHTEL QUALITY ENGINEER/QUALITY ASSURANCE _____ DATE _____

16. ADDITIONAL DISTRIBUTION



SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

FIELD CHANGE REQUEST/DCN/SCN

SUPPLEMENTAL PAGE I.C.

1. FCR NO

5-7295

DATE 1/7/81

2. PAGE 2 OF 2

3. UNIT NO 2

12A. QUALITY
CLASS

I

12B. SPEC ADDEND
NO.

12C. DCN SUB NO.

12D. DATE

12E. SCN NO.

F
028

JOB NO. 10079

2009-3

DWG. OR SPEC.

SHEET NO.

REV.

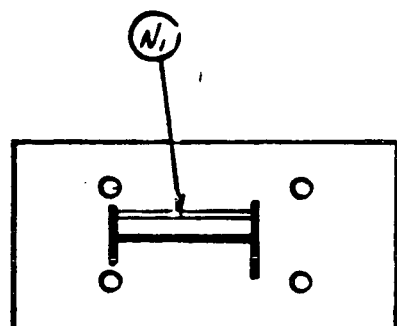
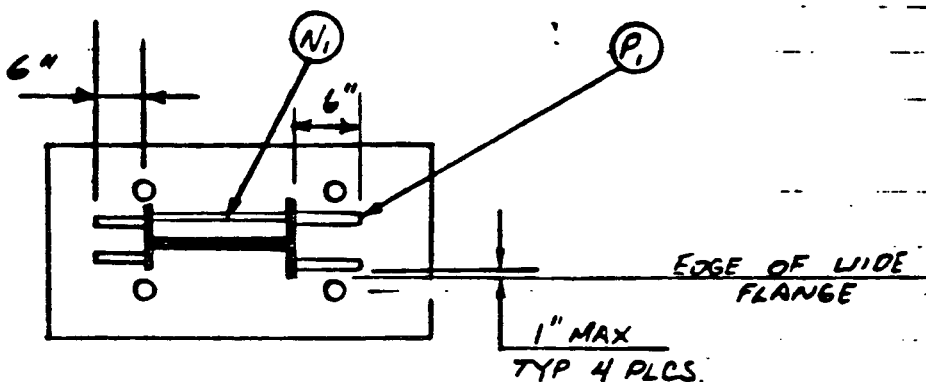
5. TITLE

ST-043-H-020

1

PIPE SUPPORT ASSEMBLY

CHANGE REQUEST/SKETCH (CONTINUED)



REF. MATERIAL ONLY

SHEET 8 OF 8
CALC # P450-1.109-979

SECTION CC
(PARTIAL)

ADD ON B/M:

ITEM P, 4 REQ $\frac{1}{2}$ " STIFF PL } "BY FIELD"
ITEM Q, 4 REQ $\frac{1}{2}$ " STIFF PL }

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. F029

REVISION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Cable Tray Hanger Drawing #37185, Rev. 2

REQUIREMENT REFERENCE DOCUMENTS:

Bechtel Project Internal Procedures Manual, Section 8, Paragraph 8.4,
Rev. 24, 10-27-81.

BASIC REQUIREMENT:

Checker must verify that the drawing is complete, accurate and conforms to the drafting standards. Checking of engineering drawings prior to use is mandatory and must not be waived.

DESCRIPTION OF POTENTIAL FINDING:

Drawing #37185, Rev. 2, (Attached) is an unauthorized revision signed by the draftman only, with no issue date, thereby indicating a drawing control violation. The drawing control log shows the last revision of this drawing to be Rev. 1.

PREPARED BY: M. J. Dwyer

DATE: 2-2-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PFR IS VALID

BY J. Burrell

DATE 2/2/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

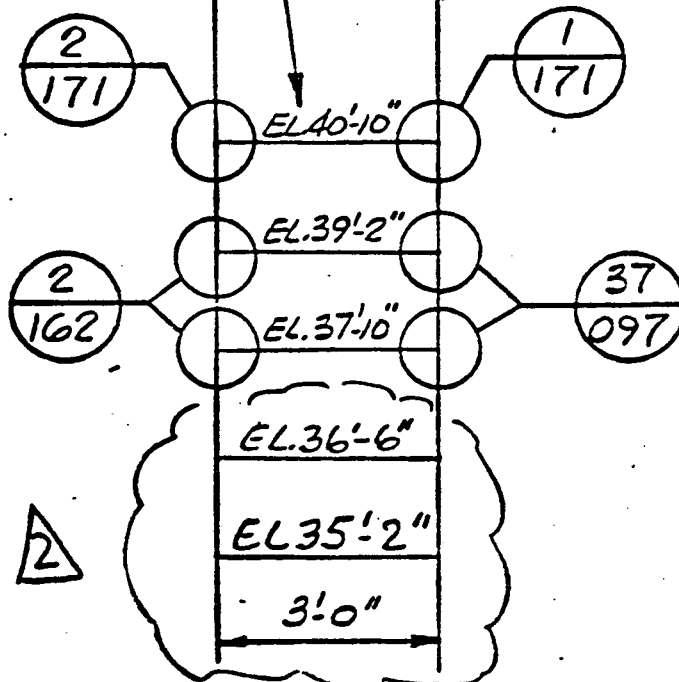
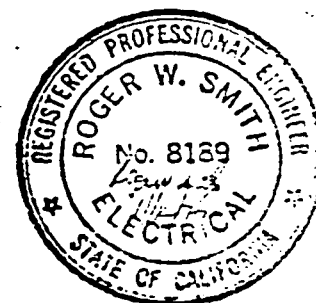
☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

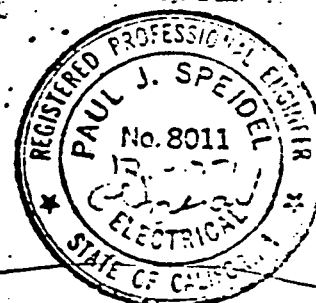
DATE: _____

G-5812A
(TYP)G-5812A
(7'-2" LG.)35102 - 1 REQ'D
35662 - 1 REQ'DNOTE: FOR LEGEND AND GENERAL
NOTES SEE DWG. #37000How come we
HAVE THIS? IT HAS
NOT BEEN RELEASED
MD
G

SEE SH1 FOR ASSEMBLY

NUCLEAR SAFETY RELATED

C/S CALC. SH # 360-365 (C-270-01-02)



2	ADDED SUPPORTS (2) EL. 36'-6" (35'-2")	MD
1	REVISED NOTE - QUALITY CLASS	MD
0	ISSUED FOR CONSTRUCTION	MD
NO.	REVISIONS	DATE DR. CHK. E.C.S. OFF. E. PE
BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		J.O. NO.
JOB NO. 10079-003		FILE
DATE		SAN ONOFRE NUCLEAR GENERATING STATION
APPROVED		TRAY HANGER DWG - 37155-2
		SOUTHERN CALIFORNIA EDISON COMPANY
		SCALE NONE
		LOS ANGELES, CALIF.

A

Sheet 5 of 5 37155-2

REVISION _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

A review of the drawing and a walkdown at the jobsite demonstrated that the cited Division 2 to 37185 was never issued nor implemented at the jobsite.

The drawing was inadvertently included in the package sent to you in the incomplete state. This condition has now been corrected.

☒ AGREE PFR IS VALID☐ DISAGREEBY: PLR/gmDATE: 7/12/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CRF 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGCLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. F 031

REVISION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Cable Tray Hanger Dwg. #37413, Rev. 4

REQUIREMENT REFERENCE DOCUMENTS:

Bechtel - Project Internal Procedures Manual, Section 14,
Paragraph 14.6, Rev. 10, 3/9/81

BASIC REQUIREMENT:

Design Calculations are checked before the associated design drawings are
issued for construction.

DESCRIPTION OF POTENTIAL FINDING:

Drawing issued for construction on 4/20/76. Calculation C270-01-02,
Sht. 937 - 945 were checked on 11/23/76, Sht. 946 checked on 9/1/76.

PREPARED BY: H. H. H. H.

DATE: 2-15-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY P. Brunel

DATE 2/15/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

is a correct observation that the drawing was issued for construction prior to completion of checking of the corresponding calculation. However, upon completion of the calculation check, no changes to the calculation were required.

☒ AGREE PF IS VALID However, no impact on design.

☐ DISAGREE

BY: DeB Marshall DATE: 3/1/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:	<input type="checkbox"/> ADEQUATE	<input type="checkbox"/> INADEQUATE
VALIDITY:	<input type="checkbox"/> VALID	<input type="checkbox"/> INVALID
10 CFR 21:	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
10 CFR 50.55(e):	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
CLASSIFICATION:	<input type="checkbox"/> OBSERVATION	<input type="checkbox"/> FINDING

CLASSIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-F032

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Seismic Class I Cable Tray Support No. 37202

REQUIREMENT REFERENCE DOCUMENTS:

1. SONGS FSAR 3.8.3.3
2. Design Criteria for Seismic Class I Cable Tray Supports
Page 7 of Bechtel Cal C270-01-02.

BASIC REQUIREMENT:

Loads and load combinations of abnormal/extreme environmental condition for the cable tray hanger design should be $D + L + E'$

DESCRIPTION OF POTENTIAL FINDING:

Only E' was considered for the vertical loads on p. 427 of Bechtel Cal C270-01-02. Loads of $D + L$ were neglected in the calculation. Please see Attachment No. 1 (Bechtel Cal C270-01-02 Sheets: 427e-427f) for details. On page 427f the equation for f_{bx} contains the factor of 1.5 which represents only the seismic load E' as shown on page 427e for the value of S_v . The correct value should be 2.5 to account for $D+L+E'$.

PREPARED BY: T. Smith DATE: 2/1/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY [Signature]

DATE 2/4/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

The dead loads were not considered in the calculations performed for the cable tray support beam, shown on sheets 427e and 427f, C-270-01-02. Inclusion of this load will increase the interaction factor but its value is less than 1.0 indicating a satisfactory design condition.

This calculation will be revised to document the inclusion of dead loads.

☒ AGREE PFR IS VALID

☐ DISAGREE

HAN
BY: Justin M. Marshall

DATE: 2/22/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY: ☐ ADEQUATE ☐ INADEQUATE

VALIDITY: ☐ VALID ☐ INVALID

CLASSIFICATION: ☐ OBSERVATION ☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. GA PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____ DATE: _____



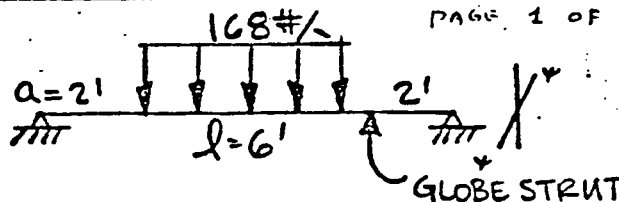
SIGNATURE Steven Groom DATE 10-25-76 CHECKED W. B. B. B. DATE 12-26-76
 SUBJECT SONGS 2+3 JOB NO. 10079-003
 SUBJECT SEISMIC CLASS I CABLE TRAY SUPPORTS SHEET 427e OF 574 SHEETS

VERTICAL SEISMIC ANALYSIS

PFR NO. 2408-BFR-F032

ATTACHMENT NO. 1

PAGE 1 OF 2



$$W_v = (56\#/')(6'/2) = 168\#$$

$$\Delta_v = \frac{W_v(l^2 - 4a^2)}{384EI_x} (5l^2 - 4a^2)$$

$$M_x = \frac{168(2)(6+4)(12)}{8} = 5,040\#-in$$

$$\Delta_v = \frac{168(12^3)(36-16)(5 \times 36 - 4 \times 4)}{384(2.95 \times 10^7) I_x} = 0.084/I_x$$

FOR 58HD12A WITHIN SAFETY EQUIP. BLDG. :

$$\Delta_v = 0.084/7.43 = 0.011"$$

$$T_s = 2\pi(0.011/386.4)^{1/2} = 0.034 \text{ sec}$$

$$T_T = 1/30.3 = 0.033 \text{ sec (24" TRAY)}$$

$$T = (0.034^2 + 0.033^2)^{1/2} = 0.047 \text{ sec}$$

$$S_v = 1.5g \text{ (SK\#S023-SK-S-938)}$$

FOR 45812E OUTSIDE SAFETY EQUIP. BLDG. :

$$\Delta_v = 0.084/3.06 = 0.027"$$

$$T_s = 2\pi(0.027/386.4)^{1/2} = 0.053 \text{ sec} \quad \left\{ \begin{array}{l} T = (0.053^2 + 0.033^2)^{1/2} = 0.062 \text{ sec} \\ T_t = 0.033 \text{ sec} \end{array} \right.$$

$S_v = 1.12g$ @ $T = 0.062 \text{ sec}$, 5% DAMPING $\left\{ \begin{array}{l} \text{REF DBE VERT. ACC. RESP.} \\ \text{SPECTRA AT NODE 12A, EL. 95'0} \\ \text{OF CENT. CONT. AREA, AUX. BLDG.} \end{array} \right.$
 $< 1.5g$

USE 1.5g OUTSIDE OF SAFETY EQUIP. BLDG.

CALCULATION SHEET

2

FD32

CALC. NO. C-270-01-0

SIGNATURE Steven Groom DATE 10-25-76 CHECKED W. B. B. DATE 10-26-76
 SUBJECT SONGS 2+3 JOB NO. 10079-003
 SUBJECT SEISMIC CLASS I CABLE TRAY SUPPORTS SHEET 427 OF 574 SHEETS

PER NO. 2408-PER-FD32
 ATTACHMENT NO. 1 PAGE 2 OF 2

CHECK SUPPORT WITHIN THE SAFETY EQUIP. BLDG.

58HD12A:

$$S_x = 2.38 \text{ in}^3$$

$$S_y = 1.46 \text{ in}^3$$

COMBINED BENDING:

$$f_{bx} = \frac{(5040 \# \cdot \text{in})(1.5) \rightarrow 2.5}{2.38} = 3,177 \text{ psi}$$

$$f_{by} = 4,143 \text{ psi (P. 427d)}$$

$$f_{bx}/F_b + f_{by}/F_b = 3,177/29,700 + 4,143/29,700 = 0.25 < 1.0 \text{ O.K.}$$

USE 58HD12A @ 6'-0" max SPAN WITHIN SAFETY EQUIP. BLDG.

G5B12E:

$$S_x = 1.26 \text{ in}^3, S_y = 0.787 \text{ in}^3$$

$$f_{bx} = \frac{1.5(5040) \leftarrow \text{P. 427e}}{1.26} = 6,000 \text{ psi}$$

$$f_{by} = 6048(1/0.787) = 7,685 \text{ psi}$$

$$f_{bx}/F_b + f_{by}/F_b = 6,000/29,700 + 7,685/29,700 = 0.46 < 1.0 \text{ O.K.}$$

USE G5B12E @ 6'-0" max. SPAN OUTSIDE SAFETY EQUIP. BLDG.

BEAM CONNECTIONS ARE O.K. W/ REFERENCE TO PP. 426-427.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-F039

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Suction System for the Low Pressure Safety Injection Pump from the Refueling Water Storage Tank T-006 to the inlet of the LPSI Pump P-016.

REQUIREMENT REFERENCE DOCUMENTS:

1. FSAR Secs. 6.3.1.4 and 3.9.3
2. CE General Engineering Specification for Safeguard Pumps No. 00000-PE-410
3. CE Project Specification for Safeguard Pumps No. 1370-PE-410, Rev. 07.
4. Safeguard Pumps NPSH with Suction from Refueling Water Tank BPC Calc. File No. S023-451A

BASIC REQUIREMENT:

The minimum available NPSH shall not be less than 20 feet under any operating conditions including a design basis earthquake.

DESCRIPTION OF POTENTIAL FINDING:

The referenced calculation (4) does not consider the effect of seismic excitations on the available pump NPSH. Design basis earthquake excitations may reduce the available NPSH below the minimum 20 foot requirement for reasons given on the attached sheet.

PREPARED BY: L. Penzes

DATE: Feb 29, 1982

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY [Signature]

DATE 2/24/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

Attachment to PFR 2408-PFR-F039

1. The hydrostatic head is significantly reduced by vertical acceleration.
As an illustration, a vertical acceleration of $1g$ in the downward direction would negate the hydrostatic head due to elevation ~~of~~ difference. The accelerations to be considered are the ZPA multiplied by the spectral magnification factor .
2. The refueling water tank and suction pipeline with fluid have natural frequencies which produce spectral magnification greater than 1.
3. The response of the tank to vertical accelerations may result in less than atmospheric pressure at the tank outlet to the suction line.
4. Horizontal accelerations reduce the pressure in horizontal portions of the suction line in the same manner that vertical accelerations reduce the head in vertical segments.
5. The effects of horizontal and vertical accelerations must be combined.

3/2/82

Bechtel Response to
2408-PFR-F039

There is no statement in the "Requirement Reference Documents" specifying that the NPSH must be greater than 20 feet during a design basis earthquake. Reference documents 1, 2 and 3 address only system physical integrity during a design basis earthquake, not system performance during said event; reference document 4 is the actual low pressure safety injection pump NPSH calculation.

NPSH variation resulting from the response of the flowing fluid to seismic acceleration is considered a secondary effect, and is not normally included in NPSH calculations, since:

1. The theoretical momentary reduction in NPSH would merely result in a momentary reduction in system flow. The duration of the flow reduction would be negligible with respect to the RCS heat-up rate; and, due to the nature of seismic motion, would be countered by a similar, if not equal, increase in flow due to the increase in suction head which results from the reversal in direction of the seismic acceleration.
2. Any flashing which might occur at the pump impeller due to a seismically induced momentary reduction in NPSH would be of too short a duration to damage the pump.

JBH

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. F047

REVISION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Bechtel Site audit No. 934, conducted 10/20/77.

REQUIREMENT REFERENCE DOCUMENTS:

- 1) ANSI N45.2-1971
- 2) Bechtel QA Standard No. 5.1, Rev. 11, issued 10/17/77, "Project QA Audits".
- 3) 10CFR50.71(e), Revised 1/1/81, "Maintenance of Records, Making of Reports".

BASIC REQUIREMENT:

SEE ATTACHMENT I

DESCRIPTION OF POTENTIAL FINDING:

SEE ATTACHMENT I

PREPARED BY: Robert Sweet

DATE: 2/15/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

AGREE PF IS VALID

BY J. Burne

DATE 2/22/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

1. The requirements of 10CFR50.71(e) do not apply to the construction phase but are a requirement for operating nuclear plants.
2. Each deviation to a statement in the FSAR does not require an FSAR change. The function of Non-Conformance Reports (NCR's) is to technically disposition deviations from design criteria. Only when the required changes were to be used consistently in the design or construction process were FSAR changes implemented.

☐ AGREE PFR IS VALID☒ DISAGREEBY: *Frederick M. Marshall*DATE: 3/2/82D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

ATTACHMENT I

BASIC REQUIREMENT:

- 1) 19 Audits
..."Responsible management shall take necessary action to correct the deficiencies revealed by the audit."...
- 2) 4.2 Quality Assurance Engineers (Auditors) para. 11. "Perform follow-up of open items to assure..., acceptable corrective action is defined, ...and verify that corrective action is implemented. Verification actions will be documented..."
- 3) (e) Each person licensed...shall update periodically...the (FSAR) originally submitted...to assure that...the FSAR contains the latest material developed...The updated FSAR shall be revised to include the effects of: all changes made in the facility or procedures as described in the FSAR;...

DESCRIPTION OF POTENTIAL FINDING:

The potential finding is that the corrective action accepted was incomplete. Bechtel Engineering basing their decision to update the FSAR for facility or procedure changes on whether or not they consider such a change necessary, does not comply with 10CFR50.71(e) FSAR update requirements, stated above. If the concrete placement temperature was important enough for inclusion in the FSAR, then a change to that temperature must be updated in the FSAR per 10CFR50.71(e).

This audit found concrete placement for the containment #3 dome with field temperatures averaging approximately 61.3°F and a range from 56°F to 67°F. This is in contrast to the requirement "FSAR 3.8.1.6.1.8(F)...as close to 50°F as possible and not to exceed 55°F."

The recommended corrective action was as follows:

- "1. Follow requirements for temperature control per Spec. Cs-C2 and FCR 1099-C.
2. Investigate records for temperature on previous placements of Containment 2 & 3 and write NCRs as required.
3. Project Engineer to evaluate lack of temperature control on an engineering basis, (and)
4. Evaluate Quality Program deficiency (FSAR) as per QPAM 15.1
5. If evaluation required a program (FSAR) change, initiate change notice as per P.I.P.M., etc."

The stated corrective action taken was the following:

- "1. FCR No. 8571C has been written allowing the use of 70°F concrete in the Buttresses of the containment bldgs.
2. An NCR will be written for all concrete placements placed prior to the issuance of FCR No. 8571C concerning the exterior wall of containment bldgs. 2 & 3.
3. Engineering has evaluated temperature conditions on subject pours (see NCR C-1642).
4. This item has been evaluated by Engineering and is not considered to be significant in the context of PQAM 15.1.
5. An FSAR change is not considered necessary."

DEC 29 1977

SAN ONOFRE NUCLEAR GENERATING STATION



NONCONFORMANCE REPORT

NO C-1642

PAGE 1 OF 3

UNIT #3	2. MO DAY YR 11 16 77	3. DRAWING/PART NO. 23000	REV. 5	4. ITEM DESCRIPTION CONCRETE PLACEMENT	5. ITEM LOCATION UNIT #2 & 3
6. CLASS II	7. STARTUP SYSTEM NO. N/A	8. SERIAL NO. N/A	9. CONTRACTOR SUPPLIER BECHTEL	10. P.O. OR SPEC NO. N/A	11. REPLACEMENT PART CONTAINMENT - EXTERIOR WALL
INSPECTION CRITERIA/PLAN NO. CS-C2			12. DISCOVERED DURING REG <input checked="" type="checkbox"/> CONST <input type="checkbox"/> TEST <input type="checkbox"/>	13. ASME AUTHORIZED INSPECTION REQ'D. YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	14. SKETCH ATTACHED YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
15. DWG <input type="checkbox"/> SPEC <input checked="" type="checkbox"/> OTHER <input type="checkbox"/>			16. EQUIP. FURNISHED BY CLIENT <input type="checkbox"/> ENG <input checked="" type="checkbox"/> FLD <input type="checkbox"/>		

17. DESCRIPTION LIST IN ORDER: NO. PCS., DWG/SPEC REQ'D., PRESENT CONDITION	22. FIELD ENGR DECISION	23. DISPOSITION COMMENTS
SPEC STATES THAT THE TARGET TEMP. OF CONCRETE SHALL BE LESS THAN 55°F FOR PLACEMENTS WHICH EXCEED 6 FEET IN THICKNESS; THE LEAST DIMENSION IN ANY DIRECTION. SEVERAL CONCRETE PLACEMENTS ON THE EXTERIOR OF UNIT #2 & 3 CONTAINMENTS HAVE BEEN PLACED	USE AS IS	TYPICALLY THE THICKNESS OF ALL BUT A VERY SMALL PORTION OF THE PLACEMENT [I.E. THE BUTTRESSES] IS 4'-4". THE AMOUNT OF ^{NOT} CONCRETE GREATER THAN 6 FEET THICK THAT WAS PLACED AT A TEMPERATURE GREATER THAN 55°F IS NEGLIGIBLE AND
		QC DISCIPLINES AFFECTED CIVIL <input checked="" type="checkbox"/> ELECT <input type="checkbox"/> INSTR <input type="checkbox"/> MECH <input type="checkbox"/> WELDING <input type="checkbox"/>

REPORTED BY Kim J. Sullivan	24. INSPECTION/VALIDATION/REVIEW DATE 11/16/77	25. PROJ. FIELD ENGR REVIEW W.S.C. for R. H. CUTLER 12/22/77	26. TWA/CLERK APPROVAL FOR REPAIR/REWORK EGS. PL. ENR L. MOON 12-29-77
APPARENT CAUSE OF DISCREPANCY C.F.E & Q.C.E. OVERSIGHT		27. DISPOSITION APPROVALS W.S.C. for R. H. CUTLER 12/22/77	28. ACCEPTANCE OF NEW WORK/REWORK/REPAIRS DATE 12/20/77

INATURE Kim J. Sullivan	TITLE Q.C.E.	DATE 11/16/77	AUTHORIZED INSPECTOR W.S.C. for R. H. CUTLER 12/22/77	QA ENGR. DATE
RECOMMENDATION TO PREVENT RECURRENCE CONFINANT PERSONNEL HAVE BEEN MADE AWARE OF THIS NCR AND HAVE BEEN ADVISED TO OBTAIN PROPER CLARIFICATION ON ANY UNCLEAR DETAILS.			29. GAE FINAL REVIEW DATE	
INATURE Kim J. Sullivan			TITLE Q.C.E.	DATE 21 DEC 77

F047

NO. C-1642

PAGE _____

INIT	2. MO DAY YR	3. DRAWING/PART NO
------	--------------	--------------------

REV

4 ITEM DESCRIPTION

B. ITEM LOCATION	
1	100-443888-1000
2	100-443888-1000
3	100-443888-1000
4	100-443888-1000
5	100-443888-1000
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7	100-443888-1000
8	100-443888-1000
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100	100-443888-1000

Cher "253"

13

2. MO DAY YR		
11	16	77

23000

5

CONCRETE PLACEMENT

CONTAMINANT - External Noise

17. DESCRIPTION

LIST IN

ORDER: NO. PCB, DWG/SPEC REQMT., PRESENT CONDITION

22. FIELD ENGR DECISION

23. DISPOSITION/COMMENTS

Q.E.

Q.E.D.

WHERE THE WIDTH OF THE BUTTRESS SECTIONS EXCEEDS 6 FEET AND "55° CONCRETE"

WILL NOT AFFECT THE INTEGRITY
OF THE STRUCTURE. W/

WAS NOT USED. SEE ATTACHED
SHEET FOR LIFT NUMBERS AND
AVERAGE OF CONCRETE TEMPERATURES
TAKEN.

~~This memorandum also derived~~ ^{ad. reference}
~~from FSAR 3.0.1.6.10(F).~~

~~Book 100-100000~~
100-100000

747

UNIT #2

UNIT #3

DATE OF PLACEMENT	LIFT NUMBER	AVERAGE CONC. TEMP.	DATE OF PLACEMENT	LIFT NUMBER	AVERAGE CONC. TEMP.
12-15-75	23-301-A	51°	9-2-76	23-311-A	67°
1-16-76	23-302-A	54°	9-23-76	23-312-A	62°
2-4-76	23-303-A	63°	10-7-76	23-313-A	65°
2-23-76	23-304-A	58°	10-28-76	23-314-A	60°
3-5-76	23-305-A	57°	11-10-76	23-315-A	64°
3-19-76	23-306-A	54°	12-1-76	23-316-A	57°
4-1-76	23-307-A	64°	12-13-76	23-317-A	63°
4-14-76	23-308-A	65°	12-22-76	23-318-A	61°
4-28-76	23-309-A	68°	1-5-77	23-319-A	59°
12-28-76	23-416-A	60°	8-19-77	23-426-A	63°
1-11-77	23-417-A	60°	9-2-77	23-427-A	63°
1-25-77	23-418-A	61°	9-16-77	23-428-A	58°
2-9-77	23-419-A	61°	9-29-77	23-429-A	59°
3-2-77	23-420-A	53°	10-12-77	23-430-A	60°
3-21-77	23-421-A	52°			
4-6-77	23-422-A	55°			
4-20-77	23-423-A	57°			
5-13-77	23-424-A	54°			

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FIELD CHANGE REQUEST SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 & 3		1. PAGE <u>1</u> OF <u>1</u>		2. No. <u>B571-C</u>	
NOV 07 1977 NO. <u>10079</u>		UNIT NO. <u>9</u>		3. DATE <u>10/25/77</u> MO DAY YR	
REF. DWG. OR SPEC. <u>3031</u>		REV. <u>3</u>		5. TITLE <u>CONTAINMENT DOME</u>	
DESIGN ORIGIN: ENGRG <input checked="" type="checkbox"/>		VENDOR <input type="checkbox"/> (IDENTIFY)		NAME	
7. EXISTING CONDITION: <u>CS-C2 PARA 9.7.1 REQUIRES 50°F CONCRETE</u> <u>FOR PLACEMENTS WHICH EXCEED 6' IN THE LEAST DIMENSION.</u> <u>THE CONTAINMENT SHELL PLACEMENTS EXCEED THE 6'</u> <u>LIMIT TYPICALLY IN 3 PLACES, AT THE BUTTRESSES.</u>					
8. CHANGE REQUEST / SKETCH <p>THE THICKNESS OF ALL BUT A VERY SMALL PORTION OF THE WALL (IE. THE BUTTRESSES) IS ~ 4'. THIS MAY BE TAKEN AS THE NOMINAL PLACEMENT THICKNESS AND THE PLACEMENTS MAY BE MADE WITH 70°F CONCRETE.</p> <p>PLACEMENTS 23-431, 432, 433, 434, & 435</p>					
PROJECT ENGINEERING APPROVAL PER TELECON WITH L. MOON LMF SUBJECT TO GARE # 934 <i>[Signature]</i> <u>10/25/77</u>					
10. REVIEWED BY CIVIL <u>[Signature]</u> <u>11-25-77</u> ELEC _____ MECH _____ PIPE _____ INSTR _____ NUC <u>[Signature]</u> <u>10/25/77</u> O&E <u>[Signature]</u> <u>10/25/77</u>			9. LMF SHER. <u>[Signature]</u> PREPARED BY 11. APPROVAL OF ELD DISPOSITION <u>[Signature]</u> <u>10/25/77</u> Project Field Engineer Date <u>10/25/77</u>		
12. PROJECT ENGRG APPROVAL: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> PROJ ENGR: <u>[Signature]</u> Date <u>11/9/77</u> REMARKS: <u>He remains will be made to chg 23.3.12.3</u> <u>11-9-77</u>					
13. QUALITY ASSURANCE ENGINEER (FIELD): _____ Date _____					

10079

FIELD CHANGE REQUEST
SAN ONOFRE NUCLEAR GENERATING STATION
UNITS 2 & 3

NO. 10079

PAGE 1 OF 1

No. 1099-C

UNIT NO. 2 & 3

DATE

MO DAY YR
11 18 75

1. F. DWG. OR SPEC.

CS-C2

REV.

2

5. TITLE

CONSTRUCTION SPECIFICATION -
CONCRETE PLACEMENT TEMPERATURE

6. DESIGN ORIGIN:

ENGRG ☒

VENDOR ☐ (IDENTIFY)

NAME

7. EXISTING CONDITION

PAR. 2.9.7 - THE TARGET TEMPERATURE OF CONCRETE SHALL BE
LESS THAN 50°F FOR PLACEMENTS WHICH EXCEED 6 FEET
IN THICKNESS, I.E., THE LEAST DIMENSION IN ANY DIRECTION.

8. CHANGE REQUEST / SKETCH

THIS CHANGE REQUEST APPLIES TO SPECIFICATION CS-C2
AND ALL RELATED DOCUMENTS.

CHANGE PARAGRAPH 2.9.7 TO READ

THE TARGET TEMPERATURE OF CONCRETE FOR:

- A. PLACEMENTS WHICH EXCEED 6 FEET IN THE LEAST
DIMENSION.
- B. CONSECUTIVE PLACEMENTS WHICH EXCEED A TOTAL
OF 6 FEET IN THICKNESS AND FOR WHICH THE
ELAPSED TIME BETWEEN PLACEMENTS IS LESS THAN
14 DAYS.

SHALL BE AS CLOSE TO 50°F AS POSSIBLE.

AS MUCH ICE AS POSSIBLE SHALL BE USED TO MAINTAIN
A CONCRETE TEMPERATURE AS CLOSE TO 50°F AS POSSIBLE
BUT NOT EXCEEDING 55°F.

10. REVIEWED BY:

CIVIL

ELECT.

ENGINEERING

DATE

Date

11-19-75

9. PREPARED BY:

D. P. GALLAGHER

11. APPROVAL OF FIELD DISPOSITION:

Project Field Engineer

Date

11-19-75

PROJECT ENGRG APPROVAL: YES ☒ NO ☐

PROJ ENGR:

J. H. Smith

Date

12-14-75

REMARKS: EUCON APPROVAL PER J. H. SMITH 11/18/75

Document will be revised accordingly.

P. H. Smith

12/3/75

3.8.1.6.1.8

DESIGN OF CATEGORY I STRUCTURES

B. Clean-Up Preparation

Before depositing concrete, all equipment is cleaned. Debris is removed from spaces to receive concrete. Reinforcement and other metal to be embedded is thoroughly cleaned of all loose rust, scale, and/or coatings that might impair the bond. All compacted soil, rock, or concrete surfaces to receive concrete are thoroughly wetted before placement.

C. Construction Joint Placement

To the maximum extent possible, concrete is deposited continuously to provide monolithic units in the construction as shown on the approved engineering design drawings. Construction joints are provided in accordance with details as shown on the approved engineering design drawings where the size of large slabs or lengths of continuous strips so dictate. Adjacent vertical placements have a minimum curing time of 3 days. In all cases, concrete is deposited in such a way as to prevent water from collecting at the ends and corners of forms and along form faces during placement.

All contiguous vertical concrete construction joints to receive additional lifts of concrete are moist cured. Newly placed concrete is moist cured by continuous application of water for the first 7 days after the concrete has been placed. As soon as unformed surfaces of concrete have hardened sufficiently to prevent surface damage through application of curing procedures, an intermittent fine spray of water is applied as necessary to keep such surfaces continually moist for not less than 7 days.

D. Placement Limitations

Concrete is deposited in horizontal layers between 12 to 24 inches, and is not allowed to flow a distance of more than 5 feet from point of deposition.

E. Segregation

Concrete is not dropped through dense reinforcing steel, which might cause segregation of the coarse aggregate. Concrete is not dropped free from a height of more than 6 feet.

F. Concrete Temperature Control

The target temperature of concrete shall be less than 50F for placements that exceed 6 feet in thickness; i.e., the least dimension in any direction

DESIGN OF CATEGORY I STRUCTURES

The target temperature for placements greater than 3 feet in the least dimension and less than or equal to 6 feet in the least dimension shall be 70°F. The target temperature for placements less than or equal to 3 feet in the least dimension shall be 85°F and the maximum temperature for placement shall not exceed 90°F.

19

26

The total thickness for consecutive placements shall be determined by adding all placements made within a lapsed time of 14 days. This total thickness in the least dimension shall be used in determining the target temperature as indicated in the above paragraph.

19

G. Weather Precautions


During cold weather, if the air temperature drops below freezing at night, or if the mean daily temperature falls below 40°F for more than 1 day during the period when concrete is being placed, concrete is placed in accordance with the Recommended Practice for Cold Weather Concreting, ACI 306. The concrete shall be maintained at a temperature no lower than 50°F for at least 72 hours after it is placed. No additional protection from freezing will be required if that temperature is maintained for that length of time by means of insulation in contact with the form or concrete surfaces. Foundation forms can be stripped 24 hours after concrete is placed.

Concrete, when deposited in the forms during cold weather, is required to have a temperature of not less than the following:

Air Temperature (°F)	Less than 2-1/2 feet in Least Dimension (°F)	Mass Concrete In excess of 2-1/2 feet Least Dimension (°F)
30 to 45	60	50
0 to 30	65	55

During hot weather, when the ambient temperature is greater than 80°F, concrete is placed in accordance with ACI 305, Recommended Practice for Hot Weather Concreting.

Before depositing concrete in any form or on any surface, cool water is sprinkled on all surfaces and reinforcement steel. Wind breakers are used to prevent wind from blowing over the concrete surface prior to the initiation of curing.

	SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 & 3		PROCEDURE	
	TITLE FIELD CONTROL OF NONCONFORMING ITEMS		NO 15.0	REV 11
			PAGE 1	OF 5
			ISSUED 10-11-74	
			REVISED 10-7-80	
QUALITY ASSURANCE MANAGER <i>[Signature]</i>		PROJECT MANAGER <i>[Signature]</i>		

QUALITY PROGRAM

1.0 PURPOSE

To describe the procedure for the identification, control and dispositioning of items or services that do not conform to the requirements of the purchase order, specifications, drawings and applicable regulatory requirements.

2.0 GENERAL

2.1 This procedure applies to all Quality Class I and II and ASME Code nonconformances discovered in receiving, storage, construction, fabrication, installation and test. These nonconformances shall be identified, segregated from acceptable material (if practical), documented on a Nonconformance Report (NCR), shown as Exhibit 15.0-1, and dispositioned as outlined in this procedure.

- NCRs may be initiated by Project Field Quality Control, Project Field Engineering, Project Field Quality Assurance and Startup.
- Quality Class I, II and ASME Code nonconformances are generally reported by Project Field Quality Control.
- Nonconformances may be procedural (document deficiencies) as well as physical (dimensional deficiencies).
- NCRs shall be initiated when Items are received with a Supplier Deviation Disposition Request (SDDR) that contains any deviations that are open after delivery.
- Dispositions affecting ASME Code items will require concurrence by the Authorized Nuclear Inspector (ANI).
- Nonconformances that affect the Client's scope of responsibilities shall be processed in accordance with the Client's Quality Assurance Program.
- Nonconformances may be dispositioned by the Project Field Engineer (PFE) as "rework" or "reject" (return to Supplier or scrap) or by an Engineering review as "repair", "use as is". Nonconforming items may be "conditionally released" under certain conditions as specified in WPP/QC1-006.

Proprietary Note

This document is the property of Bechtel Power Corporation and is to be returned upon request. Where released it is on the express agreement that it will not be used in whole or in part except for the limited purpose for which it was released by the Corporation. The Quality Assurance Manager will stipulate the required degree of proprietary control and will obtain acknowledgment from recipients as a condition of release.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-F057

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Control Room Relay Panels 2L-71 and 3L-71

REQUIREMENT REFERENCE DOCUMENTS: Quality Class II Specification for Quality Class II Panels, Relays and Devices for the Southern California Edison Company San Onofre Nuclear Generating Station, Units 2 and 3, San Onofre, California. Specification Number S023-306-1, SCE Number 3274, July 31, 1975.

BASIC REQUIREMENT: Section 3.10A in Appendix 3.10A of the FSAR requires that the actual service mounting condition of equipment be accounted for in seismic qualification by test or analysis.

DESCRIPTION OF POTENTIAL FINDING

Although paragraph 4.6.3.3 of this specification states that flexibility of the foundation anchorage detail must be considered in the calculation of the system natural frequencies, there is no information provided in the specification from which the anchorage flexibility could be included in the analysis or test.

PREPARED BY: J. Rakowski

DATE: 2/25/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY

DATE

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

REVIEW BY ORIGINAL DESIGN ORGANIZATIONCOMMENTS

See attached sheet.

☐ AGREE PF IS VALID

☒ DISAGREE

BY: Ed R Marshall

DATE: 3/2/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE

☐ INADEQUATE

VALIDITY:

☐ VALID

☐ INVALID

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. GA PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____

DATE: _____

The provisions of Paragraph 4.6.3.3 of the Specification, pertaining to the flexibility of the foundation anchorage detail, were introduced to account for the composite flexibility of the base frame of the panel and its connection to the rigid mounting surface provided on the building floor. The mounted surface is designed generically by Bechtel to afford a rigid interface consisting of structural steel embedments anchored in the concrete floor. The potential flexibility under consideration develops above the rigid mounting interface, within the base frame and connection detail designed by the equipment supplier. Therefore incorporation into the specification of the characteristics of the embedded rigid mounting interface is not essential for the evaluation of the equipment base flexibility by the supplier.

The embedded steel anchorage is detailed in drawings 25131 and 25132, and it consists of C6 X 10.5 (rolled steel channels) with 5/8"Ø anchor studs at 16 inch spacing. The base frame of the panel is detailed in Vendor drawings S023-306-1-7 and -31, and it consists of C3 X 4.1 framing with 3/16 inch fillet weld on 6 inch lengths at 12 1/2 inch spacing.

The integrated mounting detail as defined by the above drawings is obviously rigid for the light weight panels under consideration. Therefore, for the seismic qualification of the panel by analysis it is appropriate to consider a fixed boundary condition at the base, and it is not essential to incorporate any refinement to account for the flexibility of the rigid structural steel interface embedded in the concrete floor.

~~7/8/82~~
3/2/82

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

A. PREPARATION BY GA INITIATOR**AFFECTED ITEMS:**

Generic Problem inherent to system.

REQUIREMENT REFERENCE DOCUMENTS:

- a) Bechtel Power Corp. Project Internal Procedures Manual (PIPM) 14.4.3
- b) Calculations: E4C-027, C-257-7.04.01, C-259-2.03.14, C-259-5.02.02, C-170-01-02
- c) Drawings: 38055-0, 38057-1, 37342-2, 37925-1.

BASIC REQUIREMENT:

PIPM 14.4.3 states when a calculation is used to support a specification, the calculation number must be entered directly above the date in the calc. sheet, and the specification number must be entered directly below the subject title.

DESCRIPTION OF POTENTIAL FINDING:

The above listed calculations, ref. b, do not identify the applicable specifications as required by ref. a, nor the drawing number.

There is no established system which cross references calculations, specifications and drawings.

PREPARED BY: Michael D. P. Lafferty

DATE: 2/22/82

REJECTION OF GA TASK LEADER COMMENTS BY:

DATE:

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY:

DATE:

B. REVIEW BY GA TASK LEADER**COMMENTS**

☒ AGREE PFR IS VALID

BY J. Brunel

DATE 2/23/82

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY:

DATE:

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

The objective of calculation E4C-027 is to provide an electrical auxiliary system ground fault protection design which includes the 4600 V buses. This calculation is developed after the equipment has been procured and when the actual parameters of the electrical components (current transformers, circuit breakers, relays, etc.) are available. The intent of the calculation is to support a system design rather than to support a specification used for equipment procurement.

☐ AGREE PF IS VALID☒ DISAGREEBY: Frank Marshall DATE: 3/1/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:	<input type="checkbox"/> ADEQUATE	<input type="checkbox"/> INADEQUATE
VALIDITY:	<input type="checkbox"/> VALID	<input type="checkbox"/> INVALID
10 CFR 21:	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
10 CFR 50.55(e):	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
CLASSIFICATION:	<input type="checkbox"/> OBSERVATION	<input type="checkbox"/> FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408PFR NO. E064

REVISION ---

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

4160V. Switchgear. Specification S023-302-2

REQUIREMENT REFERENCE DOCUMENTS:

- a) Bechtel Power Corporation, Project Internal Procedures Manual (PIMP)
- b) Calculation E4C-027
- c) Drawing 30108, Rev. 2

BASIC REQUIREMENT:

Design calculations are "checked" before the associated design drawings are issued for construction or before the associated specification is issued for bid.

DESCRIPTION OF POTENTIAL FINDING

Calculation E4C-027 was issued 10/7/75. The specification was issued 9/5/73 and drawing 30108-2 was issued on 8/5/74. Both the spec and the drawing were issued prior to the calculation.

PREPARED BY: [Signature]

DATE: 9/15/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY J. Burrell

DATE 2/17/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

The objective of calculation E4C-027 was to fine tune the electrical auxiliary system ground fault protection scheme including the 4160 V buses. It is usually done after the equipment (switchgear, motors, etc.) has been procured or data available, because it is necessary to know the electrical characteristics such as current transformer rating, accuracy range, circuit breaker clearing time and trip setting, motor data, etc. This calculation was not required to support the switchgear specification S023-302-2 when it was issued for bid nor the switchgear one line drawing 30108 prior to the final revision. The short circuit calculation E4C-008 (used to determine the short circuit available at the switchgear) is required and was completed prior to specification issued for bid.

☐ AGREE PF IS VALID☒ DISAGREE

BY: Jeff Marsh DATE: 3/1/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:	<input type="checkbox"/> ADEQUATE	<input type="checkbox"/> INADEQUATE
VALIDITY:	<input type="checkbox"/> VALID	<input type="checkbox"/> INVALID
10 CFR 21:	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
10 CFR 50.55(e):	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
CLASSIFICATION:	<input type="checkbox"/> OBSERVATION	<input type="checkbox"/> FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-FO65

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Safety injection line to reactor coolant loop 1A, Piping Stress Analysis Package, PSG-78, calculation sheets for Node 167, Tag No. S2-S1-059-H008

REQUIREMENT REFERENCE DOCUMENTS:

N/A

BASIC REQUIREMENT: Shear deformation effects should be included in the calculation.

~~N/A~~
PCR

DESCRIPTION OF POTENTIAL FINDING:

See attached sheet

PREPARED BY: F. Rebusen

DATE: 2/16/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY [Signature]

DATE 2/19/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

FOL 5

INTERNAL CORRESPONDENCE
GA-1076

FROM: P. Rasmussen

IN REPLY
REFER TO:

TO: Potential Findings Committee

DATE: 2/16/82

SUBJECT: 2408-PFR-FO65

This potential finding concerns the applicability of the computer code used to analyze the pipe support for Node 167 of the Safety Injection Line to Reactor Coolant Loop 1A, Piping Stress Analysis Package PSG-78.

The new calculation received from Bechtel Power Corporation as a result of PFR-25 uses the computer code, general frame analysis, to compute member forces. At Node 167, the vertical frame members are connected near the base plate by a cross member whose centerline is 4" above the base plate. Therefore, the member below the cross piece is 6.38" deep by 4" long and the normal assumption of long slender beams does not apply. The fact that the code input does not include the shear modulus, Poisson's ratio, shear area or any other information necessary to compute shear stiffness would indicate that the code assumes long slender beams. The deflection calculations on p. 1 of Attachment 1 indicates that the computer deflection is much closer to the deflection of a cantilever beam than to the shear deflection of a short beam. The shear deformation will change both the stiffness and transfer matrices that are used to calculate forces and displacements, and therefore the resulting forces, moments and deflections will be changed.

CALCULATIONS FOR

EQUIP. NO.

PROJ. NO.

CALC. NO.

PAGE | OF

PREPARED BY P. RASMUSSEN

DATE 2/5/82

REF. DOCUMENTS:

REVIEWED BY

DATE

APPROVED BY

DATE

ATTACHMENT 1

SHEAR DEFORMATION

REF - DESIGN OF WELDED STRUCTURES

LINCOLN ARC WELDING FDN

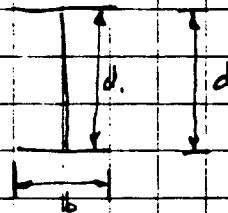
PP 2.6-1 2.6-3

$$\Delta_s = \frac{PL\alpha}{AG}$$

$$\alpha = \frac{A}{8It} (bd^2 - bd_1^2 + td_1^2)$$

FOR A NGX25

$$\alpha = \frac{7.34}{8(53.4)(0.32)} (6.08(6.38)^2 - 6.08(5.41)^2 + 2.32(4.1)^2)$$



$$\alpha = 4.03$$

SHEAR FORCE AT JOINT 2 FROM
COMPUTER LOAD CASE 1

$$= 18.28 + 3.82 = 22.1 \text{ k}$$

$$\Delta_{\text{CONTROL}} @ JT 2 = 7.9 (10^{-4})''$$

$$\Delta_{\text{SHEAR}} = \frac{22.1 (4.07)(4.03)}{7.34 (12,000)} = 4.1 (10^{-3})''$$

& DIMENSIONS
ARE USED
FOR L

$$\Delta_{\text{FLANGE}} = \frac{PL^3}{3EI} = \frac{22.1 (4.07)^3}{3(29,000)(53.4)} = 3.2 (10^{-4})''$$

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

See attached sheet.

☐ AGREE PF IS VALID☐ DISAGREEBY: Zed Marsh DATE: 3/1/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE☐ APPLICABLE

10 CRF 50.55(e):

☐ NOT APPLICABLE☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

The effects of shear stiffness in the analysis of the subject support are considered insignificant.

However, the subject support has been reanalyzed for the purpose of taking into consideration the effects of shear deformation. Results are as follows:

Deflections

The resulting deflection is still well below the allowable. The maximum deflection is 0.016 in. which is much less than the allowable of 0.0625 in.

Normally, actual shear stresses in support members are calculated and checked against allowables. This check limits the deflection due to shear to a negligible level.

Reactions

The reanalysis indicates a redistribution of load such that shear reactions have been reduced but some forces and moments have increased. Increases in the controlling moment reactions are not significant - less than ten percent and resulting stresses remain below allowables.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. F066

REVISION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Pipe Support: 167, 203, 826, 116, 178, 93, 77, 466, 146, 52, 200, 152, (GA Item #23, 30, 32, 21, 28, 26, 25, 31, 22, 24, 29, 27)

REQUIREMENT REFERENCE DOCUMENTS: PIPM Section 14.4.4 Rev. 10 dated 3-9-81

BASIC REQUIREMENT: Attachments must be numbered, dated, identified with a title and the calculation number, and initiated by the responsible engineer to indicate approval of the contents.

DESCRIPTION OF POTENTIAL FINDING: Attachments to the calculations as follows: Drawings and change notices/requests were not initialed by the R.E. nor dated. See attached Table.

PREPARED BY: John L. Shumaker DATE: FEB 16, 1982

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY

J. Burd

DATE

2/17/82

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

REVIEW BY ORIGINAL DESIGN ORGANIZATIONCOMMENTS

The reference material does not contain any portion of the calculation. These sheets were included in the calculation package for reference convenience only as indicated by the "Reference Material Only" stamp on the face of the page. These pages serve to aid in latter review of the calculation, however, they are not required to complete the calculation. The calculation cover sheet does indicate these attached reference sheets by FCR or DCN number.

☐ AGREE PF IS VALID☒ DISAGREEBY: *Frederick Marshall*DATE: 3/2/82D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____

DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____

DATE: _____

Attachment 1

Description of Potential FindingATTACHMENTS TO CALCULATIONS NOT TABLED
PER PIPM SECTION 14.4.4

<u>GA ITEM</u>	<u>PIPE SUPPORT NUMBER</u>	<u>SUPPORT TAG NO.</u>	<u>CALC. NO.</u>	<u>PAGES LACKING R.E. INITIALS & DATE</u>
23	167	S2-S1-059-H-008	P 450-1.44-570	4
30	203	S2-S1-033-H-007	P 450-1.44-415	3
		S2-S1-033-H-002	P 450-1.44-413	3
32	826	S2-S1-002-H-029	P 450-1.44-180	2
21	116	S2-S1-043-H-020	P 450-1.50-169	12
28	178	S2-S1-031-H-003	P 450-1.44-410	4
26	93	S2-S1-004-H-013	P 450-1.44-211	6
25	77	S2-S1-002-H-020	P 450-1.44-171	6
31	466	S2-S1-038-H-031	P 450-1.44-458	5
22	146	S2-S1-059-H-009	P 450-1.50-211	6
24	52	S2-S1-109-H-005	P 450-1.44-654	7
		S2-S1-109-H-003	P 450-1.44-653	8
29	200	S2-S1-063-H-005	P 450-1.50-222	3
27	152	S2-S1-067-H-002	P 450-1.44-580	4

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408

PFR NO.

F067

REVISION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Pipe Support 167, 203, 826 (GA Item #23, 30, 32)

REQUIREMENT REFERENCE DOCUMENTS: PIPM Rev. 10 date 3-9-81 Section 14.4.3

BASIC REQUIREMENT:

Calculation must be performed on sheets, Form DAO 0513 or Form 0514, except Title Page.

DESCRIPTION OF POTENTIAL FINDING:

See Attachment 1

PREPARED BY: John P. Steward

DATE: FEB 16, 1984

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY J. Burne

DATE 2/17/84

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

Description of Potential Finding

Calculation not on required forms. See Table

Calculations not on Required Form
0513 or 0514

GA Item	Pipe Support Point	Support Tag No.	Calculation No.	Sheets not on Form 0513 or 0514
23	167	S2-S1-059-H-008	P-450-1.44-570	1
30	203	S2-S1-033-H-007	P-450-1.44-415	1
		S2-S1-033-H-002	P-450-1.44-413	1
32	826	S2-S1-002-H-029	P-450-1.44-180	1
		S2-S1-002-H-028	P-450-1.44-179	1
27	152	S2-S1-067-H-002	P-450-1.44-580	1
		S2-S1-067-H-001	P-450-1.44-579	1
29	200	S2-S1-063-H-005	P-450-1.50-222	1
24	52	S2-S1-109-H-003	P-450-1.44-653	2
		S2-S1-109-4-005	P-450-1.44-654	1
21	116	S2-S1-043-H-020	P-450-1.50-169	None
28	178	S2-S1-031-H-003	P-450-1.44-410	None
26	93	S2-S1-004-H-013	P-450-1.44-211	2
25	77	S2-S1-002-H-020	P-450-1.44-171	1
31	466	S2-S1-038-H-031	P-450-1.44-458	None
22	146	S2-S1-059-H-009	P-450-1.50-211	2
		S2-S1-059-H-009	P-450-1.109.9.100	1

REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

The requirement reference document (PIPM, Rev. 10, dated 3/9/81, Section 14.4.3) states, "Calculations must be performed on suitable Calculation Sheets (see Form LAO 0513, (8-1/2 X 11), or Form LAO 0514 (11 X 17) for typical examples)." The PIPM does not state that LAO 0513 or LAO 0514 are the only calculation sheets that may be used. It merely states that they are examples of suitable sheets.

☐ AGREE PFR IS VALID☒ DISAGREEBY: Joe B. MarshDATE: 3/1/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**DEFINITION ADEQUACY: ☐ ADEQUATE ☐ INADEQUATEVALIDITY: ☐ VALID ☐ INVALID10 CFR 21: ☐ NOT APPLICABLE ☐ APPLICABLE10 CFR 50.55(e): ☐ NOT APPLICABLE ☐ APPLICABLECLASSIFICATION: ☐ OBSERVATION ☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. F 068

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Pipe Support 167, 203, 826, 152, 200, 52, 116, 178, 93, 77, 466, 146
(GA Item 23, 30, 32, 27, 29, 24, 21, 28, 26, 25, 31, 22.)

REQUIREMENT REFERENCE DOCUMENTS:

PIPM Section 14.7, Rev. 10 (dated 3/9/81)

BASIC REQUIREMENT:

Revisions must be recorded in the control logs within 15 working days.

DESCRIPTION OF POTENTIAL FINDING:

A check of the Project files showed that the calculations for the above were being revised (Revision 2) and the documentation was not complete. The title sheet for Calc No. P 450-1.44 was not approved for Rev. 2. Also Calc No. P 450-1.50. These calculations include all of the above affected items. Attached are title sheets for -1.44 and -1.50.

PREPARED BY: W. C. B. Jones DATE: 2-16-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY

J. Breuer

DATE

2/19/82

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

Calculations P-450-1.44 and P-450-1.50 are currently under revision. Upon completion of the revision process Rev. 2 will be recorded in the control logs within 15 working days.

☐ AGREE PF IS VALID

☒ DISAGREE

BY: Frederick B. Marshall DATE: 3/1/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE

☐ INADEQUATE

VALIDITY:

☐ VALID

☐ INVALID

10 CFR 21:

☐ NOT APPLICABLE

☐ APPLICABLE

10 CFR 50.55(e):

☐ NOT APPLICABLE

☐ APPLICABLE

CLASSIFICATION:

☐ OBSERVATION

☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____ DATE: _____

CALCULATION TITLE SHEET

SHEET 1 OF 4800

DISCIPLINE PL

FILE NO. P-450

CALC. NO. P-450-1.44

QUALITY CLASSIF. I Δ

NO. LAST PAGE 11

① ORIGINATOR SIG. [Signature]

DATE 4/3/80

② CHECKER SIG. [Signature]

DATE 7-3-80

LEVEL OF REVIEW

CHECK AS REQUIRED

P.E. STAMP IF REQ'D

ORIGINAL ISSUE

	NAME	DATE	SIGNATURE
③ GROUP LEADER	RUSSELL DAILY	7/3/80	[Signature]
④ EGS	Salah Mohamed	7-3-80	[Signature]
⑤ SPECIALIST			
⑥ CHIEF			
OTHER			

RECORD OF REVISIONS

NO	REVISION	DATE	ENG.	CHK	EGL	EGS	SPEC.	CHIEF
1	CORRECTED QUALITY CLASSIF.	5-15-81	SR	[Signature]	[Signature]	SAM		
2	CONFORMED CALC TO PSDL							

FOR CRITERIA & PROCEDURES SEE CALC NO P450-010
 THIS CALCULATION INCLUDES CALC P450-1.44-1 Thru
 P-450-1.44-771

Rev Δ includes adding supplements 772 & 773
 pipe support design loading

FOR CIVIL/STRUCTURAL
 VERIFICATION OF THE
 AS-BUILT CONDITION,
 SEE CALC. NO. P-450-1

109

CALCULATION TITLE

THIS PACKAGE WAS PICKED UP
FROM BECHTEL ON 2/8/1982
IT IS APPLICABLE TO
ITEM 21 & 22 SHEET 1 OF 1770 PFRF068 F068

SUBJECT SONGS UNIT 282 JOB NO. 10079-00 DISCIPLINE VD
PIPE SUPPORTS C/S CALCS SUS 2B3B FILE NO. P-450
CALC. NO. P-450-1.50
① ORIGINATOR SIG. [Signature] DATE 3/2/80 QUALITY CLASSIF. IA
② CHECKER SIG. [Signature] DATE 7/3/80 NO. LAST PAGE 4
LEVEL OF REVIEW [X] [X] [X] [X] [X] [X] CHECK AS REQUIRED 1 of

P.E. STAMP IF REQ'D

ORIGINAL ISSUE

	NAME	DATE	SIGNATURE
③ GROUP LEADER	<u>Russell Daily</u>	<u>7/3/80</u>	<u>[Signature]</u>
④ EGS	<u>Salah mohamed</u>	<u>7-3-80</u>	<u>[Signature]</u>
⑤ SPECIALIST			
⑥ CHIEF			
OTHER			

RECORD OF REVISIONS

NO	REVISION	DATE	ENG.	CKRN	EGL	EGS	SPEC.	CHIEF
1	CORRECTED QUALITY CLASSIF. CONFIRMED CALCS TO PSDL	5-15-81	SE	[Signature]	[Signature]	SAM		
2								
3								
4								
5								

FOR CRITERIA E PROCEDURES SEE CALL P450-010
THIS CALCULATION INCLUDES CALL P450-1.50-1 THRU
P-450-1.50-335.

Rev. A includes re-calc for supplement(s) 7

FOR CIVIL/STRUCTURAL
VERIFICATION OF THE
AS-BUILT CONDITION,
SEE C.I.C. NO. P450-1

109

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-F070

REVISION _____

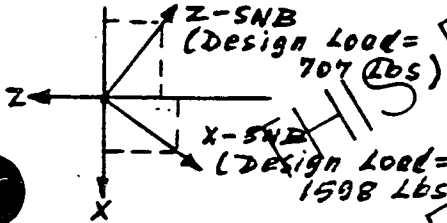
A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Low Pressure Safety Injection System
Piping Stress Analysis Package PSG-117

REQUIREMENT REFERENCE DOCUMENTS:

BASIC REQUIREMENT: Consistency between Isometric Sketch, Computer Model, Pipe Support Description List, and Snubber Installation Drawing.

DESCRIPTION OF POTENTIAL FINDING: Horizontal snubbers at D.P. 179 are shown oriented in the (-x) and (-z) directions on ISO Dwg. No. 1204-149-1. However, the Computer Data Input and Pipe Support Description List indicate a rotated orientation as follows (see sketch):



Global components		
x - SNB	0.61	0.0
z - SNB	-0.79	0.0

PREPARED BY: P. Koefoed *P. Koefoed* DATE: 2-17-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY *FS7/ue*

DATE *2/19/82*

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

REVIEW BY ORIGINAL DESIGN ORGANIZATION

COMMENTS

The snubber orientation as shown on Isometric 1204-149-1 is not consistent with that in the Computer Model, Pipe Support Description List (PSDL) and Snubber Installation Drawing S2-SI-149-H-015. However, the isometric sketch is not a controlled document. The requirement is that there be consistency between the piping stress calculation (which includes the Computer Model and the PSDL), the snubber installation drawing, both of which are controlled documents, and the as-built configuration.

☐ AGREE PFR IS VALID☒ DISAGREEBY: De
Frederick MarshallDATE: 3/1/82D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY:

☐ ADEQUATE☐ INADEQUATE

VALIDITY:

☐ VALID☐ INVALID

CLASSIFICATION:

☐ OBSERVATION☐ FINDINGJUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. GA PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

PFR NO. 2408-PFR-F074

REVISION _____

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Low Pressure Safety Injection System
Piping Stress Analysis Package PSG 117

REQUIREMENT REFERENCE DOCUMENTS:

BASIC REQUIREMENT: Weight calculations should be based on correct pipe schedule, and all component weights included.

DESCRIPTION OF POTENTIAL FINDING: Seismic anchor load calculation for D.P. 235 (Sheet 17 of 67 in Calc. No. PSG 117) should be based on Sch 140 pipe over approximately 7 ft. The weight of flanges 2FO 9x10 should also be included. An adjusted calculation gives the following results: $Wt = (7)(91.78) + 1000 + 152 + (3.5)(48.81) = 1965 \text{ lbs.}$
 $[Pa_1^2 + Pa_2^2]^{1/2} = [1538^2 + 1965^2]^{1/2} = 2493 \text{ lbs (instead of 2114 lbs listed).}$

PREPARED BY: P. Koefoed DATE: 2-19-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PFR IS VALID

BY [Signature]

DATE 2/22/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

Rechtel concurs that a revised load of 2495 lbs. instead of 2114 lbs. is appropriate. Using this revised load in the load combination for the penetration makes a minor difference (less than 4%) in the final load which is still well below the penetration allowables.

☒ AGREE PFR IS VALID However, impact is not significant.

☐ DISAGREE *Me*

BY: *Frederick Marsh* DATE: 3/1/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY: ☐ ADEQUATE ☐ INADEQUATE

VALIDITY: ☐ VALID ☐ INVALID

10 CFR 21: ☐ NOT APPLICABLE ☐ APPLICABLE

10 CFR 50.55(e): ☐ NOT APPLICABLE ☐ APPLICABLE

CLASSIFICATION: ☐ OBSERVATION ☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. F075

REVISION --

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Emergency Evacuation Alarm Specification #S023-307-14

REQUIREMENT REFERENCE DOCUMENTS:

- Project Internal Procedures Manual, Section 11.8, "Changes to Purchase Specifications."
- Project Internal Procedures Manual, Section 33, "Supplier Deviation Disposition Requests."

BASIC REQUIREMENT: Vendors of safety-related equipment who seek approval from Bechtel to allow the vendor to deviate from a purchase specification must submit a Supplier Deviation Disposition Request to Bechtel. If the request is approved, and a change to the specification is required, Bechtel must change the specification within 120 days of the SDDR approval. The specification addendum which incorporates the change must reference the SDDR.

DESCRIPTION OF POTENTIAL FINDING:

SEE ATTACHMENT I

PREPARED BY: B. L. Paleman DATE: 2/19/82
REJECTION OF GA TASK LEADER COMMENTS BY: _____ DATE: _____
REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____ DATE: _____

B. REVIEW BY GA TASK LEADER COMMENTS

☒ AGREE PF IS VALID BY J. Burne DATE 2/22/82
☐ REQUEST RE-REVIEW BY _____ DATE _____
☐ DISAGREE BY _____ DATE _____
☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____ DATE: _____

ATTACHMENT I

DESCRIPTION OF POTENTIAL FINDING:

- a) Emergency Evacuation Alarm specification #S023-307-14 requires the sirens to be seismically tested with the Type CC adapter plate. The vendor performed the seismic testing without the adapter plate and subsequently submitted SDDR #1694 to Bechtel on 2/15/79 to request a waiver on the adapter plate testing or a decision on whether or not seismic testing would be required with the Type CC adapter plate. Bechtel Engineering approved the waiver request; however, the specification has never been revised to delete the requirement for the Type CC adapter plate, nor to identify its replacement part, if any.
- b) SDDRs #1215 and #1784 were incorporated into Addendum 2 and 3, respectively, of specification #S023-307-14; however, neither SDDR is referenced in the addenda. (Ref: PIPM Section 11.8.2.1)
- c) SDDR #1784 was approved by Bechtel on 5/7/79, but was not incorporated into Addendum 3 of the specification until 9/21/81.

C. REVIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

See attached sheet.

☒ AGREE PFR IS VALID But there is no impact on design.

☐ DISAGREE

BY: Frank B. Marsh DATE: 3/1/82

D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE

DEFINITION ADEQUACY: ☐ ADEQUATE ☐ INADEQUATE

VALIDITY: ☐ VALID ☐ INVALID

10 CFR 21: ☐ NOT APPLICABLE ☐ APPLICABLE

10 CFR 50.55(e): ☐ NOT APPLICABLE ☐ APPLICABLE

CLASSIFICATION: ☐ OBSERVATION ☐ FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER

☐ ACCEPT

☐ REJECT

BY: _____ DATE: _____

1. The design engineer concurred with the vendor that type "CC" adaptors were not required for mounting Seismic I sirens and the seismic testing was accomplished in this manner. Since the disposition of the SDDR provided immediate direction to the vendor and the existing equipment installation matches the design, there is no identifiable impact associated with late revision of the specification. An addendum to specification S023-307-17 will be issued to delete "CC" adaptor plates.
2. The specification was changed to incorporate SDDR's 1215 and 1784. There is no identifiable impact on not referring to the SDDR's in the addenda.
3. SDDR 1784 was incorporated into the specification on dates greater than 120 days. Since the SDDR disposition provided immediate direction to the vendor, the existing needs were satisfied with no identifiable impact associated with late revision of the specification.

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

2408 PFR NO. F076

REVISION --

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS: Refueling Water Storage Tank Support Structure Calculation

REQUIREMENT REFERENCE DOCUMENTS:

- a) EDP 4.36 Computer Program List
- b) Calculation C-259-5-02.02

BASIC REQUIREMENT:

Reference (a) states that computer programs used in design calculations appear on the Bechtel "Standard Computer Program List" as Code 1.

DESCRIPTION OF POTENTIAL FINDING:

Reference (b) states that a computer program titled "OPTCON" was used in the Computation of Structural Loading and Design Base Earthquake analysis. The computer code "OPTCON" cannot be found on the "Standard Computer Program List".

PREPARED BY: M. B. B. B.

DATE: 1/2/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY J. B. B. B.

DATE 2/21/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

C. VIEW BY ORIGINAL DESIGN ORGANIZATION**COMMENTS**

OPTCON is a computer program incorporated as part of BSAP-POST (CE 201), which is listed in the "Standard Computer Program List". The program is a reinforced concrete design module that accepts input either directly from BSAP or from an independent structural analysis via punch cards.

☐ AGREE PF IS VALID☒ DISAGREEBY: Frederick B. March DATE: 3/1/82**D. RECOMMENDATION BY FINDINGS REVIEW COMMITTEE**

DEFINITION ADEQUACY:	<input type="checkbox"/> ADEQUATE	<input type="checkbox"/> INADEQUATE
VALIDITY:	<input type="checkbox"/> VALID	<input type="checkbox"/> INVALID
10 CFR 21:	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
10 CFR 50.55(e):	<input type="checkbox"/> NOT APPLICABLE	<input type="checkbox"/> APPLICABLE
CLASSIFICATION:	<input type="checkbox"/> OBSERVATION	<input type="checkbox"/> FINDING

JUSTIFICATION:

CLASSIFICATION CRITERION NO. RESULTING IN "FINDING" _____

COMMENT ON "OBSERVATION" CLASSIFICATION

BY: _____ DATE: _____

E. TPT PROJECT MANAGER☐ ACCEPT☐ REJECT

BY: _____ DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION —

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Reactor Vessel Support Specification (CE)

REQUIREMENT REFERENCE DOCUMENTS:

Quality Assurance Design Manual, QADP 5.6.3.5 & .6

BASIC REQUIREMENT:

Specification should be properly formatted and contain all pages.

DESCRIPTION OF POTENTIAL FINDING:

CE Specification 01370-PE-110, Rev. 4, Quality Record copy has page 6 of the Specification missing.

PREPARED BY: J. P. BernalDATE: 3-2-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALIDBY J. P. BernalDATE 3/2/82☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

CE Quality Record; Document Distribution/Approval Form

REQUIREMENT REFERENCE DOCUMENTS:

Quality Assurance Design Manual, QADP 5.3-2.2

BASIC REQUIREMENT:

Upon completion of routing of document (design), Document Distribution/Approval Form will be made a quality record.

DESCRIPTION OF POTENTIAL FINDING

The Cog. Engineers maintain Document Distribution/Approval forms in their working files rather than forwarding form to Quality Records.

PREPARED BY: _____

DATE: 3-2-82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY J. B. Bavel

DATE 3/1/82

☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____

POTENTIAL FINDING REPORT
SONGS 2&3 SEISMIC DESIGN VERIFICATION

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

CE Specification S-PEC-111 Rev. 2, Method of Verification
(Boric Acid Make-up Tank)

REQUIREMENT REFERENCE DOCUMENTS:

Quality Assurance Design Manual, QADP 5.2-2.2

BASIC REQUIREMENT:

The method of verification is clearly annotated on the front page of the specification.

DESCRIPTION OF POTENTIAL FINDING:

The method of verification block is not filled in.

PREPARED BY:

DATE: 3-2-82

REJECTION OF GA TASK LEADER COMMENTS BY:

DATE:

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY:

DATE:

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PF IS VALID

BY J. Bussell

DATE 3/2/82

☐ REQUEST RE-REVIEW

BY

DATE

☐ DISAGREE

BY

DATE

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY:

DATE:

POTENTIAL FINDING REPORT

SONGS 2&3 SEISMIC DESIGN VERIFICATION

REVISION --

A. PREPARATION BY GA INITIATOR

AFFECTED ITEMS:

Reactor Coolant Pump Snubbers - Stress Report (Combustion Engineering)

REQUIREMENT REFERENCE DOCUMENTS:

ASME Code, 1977 Edition, Section III, Subarticle NA-3356

BASIC REQUIREMENT:

"The Stress Report shall be certified by one or more Registered Professional Engineers, competent in the applicable field of design."

DESCRIPTION OF POTENTIAL FINDING:

The copy of the Stress Report furnished to GA, Abex Corp. Report A690812 Rev. 0 dated 1/28/78, contained no PE certification. There was a block on the approval sheet for the PE certification, but this block was not filled in.

PREPARED BY: George ChandlerDATE: 3/2/82

REJECTION OF GA TASK LEADER COMMENTS BY: _____

DATE: _____

REJECTION OF ORIGINAL DESIGN ORG. COMMENTS BY: _____

DATE: _____

B. REVIEW BY GA TASK LEADER

COMMENTS

☒ AGREE PFR IS VALIDBY J. BurdDATE 3/2/82☐ REQUEST RE-REVIEW

BY _____

DATE _____

☐ DISAGREE

BY _____

DATE _____

☐ REVIEW OF ORIGINAL DESIGN ORGS. COMMENTS BY: _____

DATE: _____