Southern California Edison Company

P. O. BOX 800
2244 WALNUT GROVE AVENUE
ROSEMEAD, CALIFORNIA 91770

M.O. MEDFORD
MANAGER, NUCLEAR LICENSING

TELEPHONE
(213) 572-1749

November 21, 1983

Director, Office of Nuclear Reactor Regulation
Attention: D. M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket No. 50-206
SEP Topic III-6
Seismic Design Considerations
San Onofre Nuclear Generating Station
Unit 1

By letter dated May 23, 1983, we provided responses to a number of open issues which were identified in an NRC memorandum from William T. Russell to Frank J. Miraglia, dated December 29, 1982. We also provided revised criteria for the Balance of Plant Mechanical Equipment and Piping (BOPMEP) Seismic Reevaluation Program. The purpose of this letter is to provide responses to the remaining items from Mr. Russell's memorandum and to clarify several items from our May 23 letter based on subsequent discussions with the NRC staff.

Enclosure 1 provides: (1) responses to Items 4 and 14 from Mr. Russell's memorandum; and (2) additional information for Issue 2 and Items 5, 6, 13 and 20 from Mr. Russell's memorandum. Enclosure 2 provides clarification to three areas of the BOPMEP criteria based on discussions with the NRC staff. Enclosure 3 provides responses to the three additional items identified in our May 23 letter.

If you have any questions regarding any of this information, please let us know.

Very truly yours,

M. O. Medford

Enclosure

A028
1/1

ENCLOSURE 1

RESPONSES TO OPEN ITEMS

SEISMIC REEVALUATION PROGRAM

SAN ONOFRE NUCLEAR GENERATING STATION

UNIT 1

4. Effects of the Flexibility of Intermediate Structures on the Stiffness of Pipe Supports

"Some pipe supports are installed on flexible intermediate structures (e.g., pipe rack inside containment, structural steel members, etc.). The use of floor response spectra at the nearest point where spectra are generated is questionable for calculating the piping stresses and pipe support loads. The licensee must demonstrate that the effects of flexibility of intermediate structures on the piping systems and their supports analyses are either negligible or have been included in the analysis."

Response:

The flexibility effects of intermediate structural elements are accounted for by the inclusion of appropriate stiffness values in the pipe stress analysis. The Plant Design Group is responsible for the design of pipe supports, their supplementary steel and for pipe racks. Support stiffness is checked for minimum values based on the line size of the analyzed piping as part of the support design calculation. The inclusion of appropriate stiffness values in the pipe stress analysis provides a proper link between the structural points where spectra are generated and the piping systems being excited by these spectra.

The Civil/Structural Group is responsible for the evaluation of intermediate structures for conformance to the assumed stiffness used in the pipe stress analysis. This work will be performed as part of the evaluation of the effects of pipe support loads on structures and is limited to the evaluation of large bore pipe supports and pipe racks (regardless of pipe size). The reconciliation of stiffnesses will be performed using calculations and engineering judgment. Reanalysis of the piping using actual stiffnesses and/or stiffening of members will result when the actual stiffnesses do not reconcile with those used in the piping stress analysis. Small bore piping and tubing are not sensitive to increased flexibilities of intermediate structures.

14. Allowable Concrete Strength (f'c)

"In its February 23, 1981 submittal, the licensee had specified the allowable concrete strength. However, in the later submittals (December 8, 1981 and February 9, 1982), an increase of 25% - 50% in allowable strength was used for analysis. Insufficient justification for increases has been provided and further justification is necessary."

Response:

The acceptance criteria for the evaluation of structural concrete members included an increase of up to 50% in the allowable compressive concrete strength over the original specified 28 day compressive strength. The factors which contribute to the justification for this increased allowable and an explanation of each are as follows:

A. Aging

A survey of published test data indicates that the compressive strength of concrete increases with age (References 1, 2, 3, 4). In Reference 2, for example, based on test results, it is suggested that the relationship between strength and age or maturity can be represented by the rectangular parabola

$$D/q = m D + C$$

where q is the strength at age D, and m and C are constants. It is found that such a relationship fits the available test results. For example, they show that based on a series of tests reported in Reference 3, assuming an age factor of unity for the strength at 28 days, the age factor at one year is about 1.24. In addition, a review of References 3 and 4 indicates a general increase in strength of concrete with time. In some cases, the compressive strength more than doubled. Considering that the concrete for the BOP structures (Table 1) is about 17 to 18 years old, an increase of at least 50 percent is not unreasonable.

B. Results of the In-Situ Tests Performed at the Jobsite

Tests have also been conducted at SONGS 1. These tests indicate that the existing compressive strength is greater than the specified minimum. Two series of in-situ tests were performed in early 1977 on the Reactor Building concrete structure at San Onofre Unit 1. The first series of five tests using the Windsor Probe showed an average compressive strength of 6,440 psi and seven tests in the second series using the Schmidt Hammer averaged 7,290 psi. The original specification for the concrete in these cases was f'c = 3,000 psi. These test results are both based on the manufacturer's calibration curves supplied with the instruments. Since no direct calibration of the test instrument against compressive strength specimens is available, these results can only be considered as indicative of the strength of the existing concrete.

C. Mix Design

The specified compressive strength of concrete is the minimum strength required. Experience with placement of large volumes of concrete in the strength range specified shows that actual test results at 28 days are generally in excess of the required minimum. This is due to conservatism in the concrete mix design in terms of the cement content, the aggregate strength and gradation, water/cement ratio and admixtures which assure that the specified minimum strength is always met. In addition, the cement specified for all the concrete design mixes at SONGS 1 has been Type II Portland cement. Past experience, as discussed in Reference 3, has shown that this cement would be expected to provide a better-than-average strength gain after 28 days.

A thorough search of the project, construction, and station files was initiated to evaluate the original concrete pour compressive strength tests of various structures. Table 1 shows the minimum required compressive strength, the number of samples, the mean 28 day strength, the compressive strength used in the seismic reevaluation of BOP structures, and the effective percentage increase required to take credit for the aging effects in concrete. It should be emphasized that the data was based only on the number of samples which were found in the file search.

As shown in Table 1, except for the Turbine Pedestal structure, the percent increase required to take credit for strength increases in concrete due to aging is less than 20 percent. The increase for the Turbine Pedestal evaluation is about 28 percent. The response to Item 8, (Reference 5) demonstrated that the evaluation of the Turbine Pedestal walls are adequate based on their reserve capacities in bending and shear without taking credit for any aging effects in concrete. In the evaluation of the deck framing beams, no credit was taken for increases in the minimum specified concrete strength due to aging.

Considering all of the above, it is concluded that the allowable values of compressive strength which were used for the reevaluation of concrete members are appropriate.

References:

1. Lkieger, Paul, "Long-Time Study of Cement Performance in Concrete", ACI Journal, December, 1957.

2. Kee, Chin Jung, "Relation Between Strength and Maturity of Concrete", ACI Journal, March, 1971.

3. Gonnerman, H. F., and Lerch, William, "Changes in Characteristics of Portland Cement as Exhibited by Laboratory Tests Over the Period 1904 to 1950," Portland Cement Association Research Department Bulletin 39.

4. Washa, George W., and Wendt, Durt F., "Fifty Year Properties of Concrete," ACI Journal, January, 1975.

5. Enclosure to letter from K. P. Baskin to D. M. Crutchfield, dated May 23, 1983.

TABLE 1 - COMPARISON OF COMPRESSIVE STRENGTHS

Structure	Specified Minimum Required Comp. Strength (psi)	Number of Available Cylinder Test Results	Mean 28 Day Strength of Cylinder Tests (psi)	Values Used in BOP Structures Reevaluation (psi)	Percent Increase Due to Aging(1)
	1	2	3	4	5
Control Building	3000	28	4375	4500	3
Fuel Storage Bldg.	3000	36	4205	4500	7
Circulating Water Intake Structure	3000	68	3817	4500	18
Reactor Auxiliary Building	3000	18	4133	3000 4500(2)	– 9
Turbine Pedestal and Deck	4000	54	4689	6000 5000(3)	28 7
Turbine Floor Slab	2500	8	3831	3750	–
Turbine Pedestal Mat and Anchor-Blocks	3000	15	3336	(4)	–

NOTES:

(1) Percent Increase = $\frac{\text{Column 3} - \text{Column 4}}{\text{Column 3}} \times 100$

(2) For the evaluation of shear capacity, 4500 psi was used.

(3) For the evaluation of columns, 5000 psi was used in limited areas.

(4) Due to the massive nature of these structures, it was judged that the reevaluation stresses will be significantly less than their design values.

Issue 2

"Procedures to ensure proper interfacing among various engineering groups have not been defined. Interfaces between support, structural and piping analysis were discussed for the Bechtel reanalysis effort. Information on Westinghouse and other contractors interface procedures were not discussed."

Response:

In response to this issue, Bechtel has prepared for use on the San Onofre Unit 1 project a specific description of the division of responsibility and interface between the Bechtel disciplines involved in the seismic reevaluation of San Onofre Unit 1. This description is reproduced here for your information.

DIVISION OF RESPONSIBILITY AND INTERFACE REQUIREMENT - SAN ONOFRE UNIT 1 SEISMIC REEVALUATION PROGRAM

PURPOSE

The purpose of this document is to describe the division of responsibility and the interface between the Civil/Structural, Plant Design, and Mechanical Engineering Groups in the seismic reevaluation program for San Onofre Unit 1.

DIVISION OF RESPONSIBILITY

The division of responsibility between discipline groups is determined by the Division Chief Engineers. The Project Engineer ensures that each discipline group has a clear understanding of its responsibilities. Responsibility for pipe support design and structural load evaluation is divided between the Plant Design Group and the Civil/Structural Group. The following describes the division of responsibility for the design of pipe supports, the evaluation and design of structures for the effects of pipe support loadings, the evaluation of equipment nozzle loading, and the evaluation of valve accelerations.

Plant Design:

The Plant Design Group performs pipe stress analysis and designs pipe supports to ensure that the piping systems and associated components are maintained within acceptable limits for design basis event loadings. The design of pipe supports includes the attachment or anchorage of the support to the supporting structure. Additionally, the Plant Design Group is responsible for the routing of new piping and modification of existing piping.

Civil Structural:

The Civil/Structural Group is responsible for the evaluation and design of structures for all applied loadings, including pipe reactions and equipment loads. In addition, the Civil/Structural Group evaluates the stiffness of intermediate structures for conformance to assumed stiffnesses in the pipe stress analysis.

Mechanical

The Mechanical Group is responsible for the definition of the scope of the reevaluation as it relates to the systems and equipment, including the definition of any new requirements for valves or equipment. The Mechanical Group also interfaces with equipment vendors to assure that vendor designs meet the Project Criteria. Additionally, the Mechanical Group evaluates valve accelerations and nozzle loadings received from the Plant Design Group and determines the acceptability of these loadings.

DISCIPLINE INTERFACING

Plant Design:

The Plant Design Group identifies and locates all pipe supports. Each pipe support is uniquely identified by a tag number including a prefix that represents the area of the plant in which the support is located.

Piping support loads on equipment and structures including associated stiffness requirements, are provided to the Mechanical and Civil/Structural Groups, respectively, for the evaluation of the mechanical equipment and structural members. Depending upon the results of these evaluations further interactions on the location and type of piping supports may be necessary. For the most part the routing of the piping is not modified, since the piping routing is dictated by existing space and interference limitations in the plant.

The Plant Design Group utilizes a variety of tracking and statusing tools to control interface information and to provide easy and timely access to updated information from the stress analysis. These tools are used to transmit information to the Civil/Structural and Mechanical Groups. The following paragraphs describe these tracking and statusing tools.

The Hanger Tracking System report identifies all pipe support requirements as delineated by the pipe stress analysis. It indicates drawings issued, supports installed, and the Q.C. buy-off status. It is maintained and updated as new drawings are issued or as revised/new pipe stress analysis is issued. This tracking system can sort pipe supports by area. The Civil/Structural (C/S) Group uses this tracking system to ensure that each structure is evaluated for all seismic support loading resulting from the reevaluation program. Additionally, the Pipe Support Description List (PSDL) which controls the design of pipe supports is transmitted to the C/S group. The Plant Design Group maintains all master PSDLs and a calculation control log which indicates the current revision of each PSDL. The calculation control log is updated as required to reflect the current status. Also, all individual pipe support drawings are transmitted to the C/S group as they are issued for construction.

Similarly, data books are maintained by the Plant Design Group for containment penetration loading and equipment nozzle loading. This information and subsequent revisions are transmitted to the C/S Group and the Mechanical Group, respectively. Indexes are published by the Plant Design Group which give the current revision of this information.

Civil/Structural

The Civil Structural Group generates and issues instructure seismic response spectra curves which are used by both the Plant Design and Mechanical groups. A listing which defines all seismic spectra sketches by Sketch No., revision and title is in the Reevaluation Criteria Seismic Reevaluation and Upgrade Program Document which is controlled by the Project Document Processing Group.

The Civil Structural Group generates the seismic displacement of structures and transmits those data to Plant Design for use in pipe stress analysis. This information is transmitted to Plant Design by interoffice memorandum. This transmittal is followed up by the Civil Structural Group to ensure that the information has been received and understood. To date, 10 memoranda containing structural displacements have been transmitted to Plant Design, including one that has been superceded by later information.

In addition, the Civil Structural Group provides the Plant Design Group via interoffice memorandum with the results of flexibility evaluations of intermediate structures for evaluation of pipe stress analysis assumptions. The results of this evaluation are incorporated into the next revision of the pipe stress analysis.

Mechanical

The Mechanical Group generates and issues, through the Project Document Control Group, the scoping P&IDs which are used by Plant Design in establishing the extent of piping within the seismic reevaluation scope. The Mechanical Group evaluates the calculated valve accelerations and equipment nozzle loads provided to them by the Plant Design Group. The accelerations/load sheets are stamped as approved and returned to Plant Design for documentation. If the accelerations/loads are found unacceptable, the Plant Design and Mechanical Groups jointly work out a solution (e.g., more supports and reanalysis of the piping or modification of existing equipment). The Mechanical Group also provides all system pressure and temperature information to the Plant Design Group. This is accomplished through the project Line Designation List which is issued through the Project Document Control Group.

WESTINGHOUSE INTERFACE

Westinghouse performs pipe stress analysis and pipe support design as a subcontractor reporting to Bechtel. Westinghouse work is controlled and monitored by the Plant Design Group and all Westinghouse load data is provided by letter transmittal to the Bechtel Plant Design Group. The Bechtel Plant Design Group processes the Westinghouse information using the hanger tracking system and the load data books and statusing indexes described above. Additionally, Westinghouse Pipe Supports are processed and evaluated per the procedures described in the Plant Design and Civil/Structural interfaces.

PROJECT ENGINEERING GROUP

Through the use of these various documents, and in accordance with the engineering department and project procedures, the discipline interface responsibilities are defined and monitored by the Project Engineer responsible for design control.

5. Effects of Degradation of Existing Piping and Equipment Supports

During the tour of the facility, the NRC staff found that degradation of equipment supports due to environmental effects exists in the facility. For example, the web of a partially embedded I-beam supporting the Component Cooling Water Heat Exchanger has been corroded through the web thickness. The licensee was requested to take remedial action and to inspect other possible areas to ensure that similar conditions do not exist."

Response:

As part of the seismic reevaluation program the existing condition of safety-related piping and equipment supports are examined in the field under the supervision of the Quality Control Group. These examinations are either carried out by a qualified AWS D-1.1 inspector or engineers loaned to and directed by the Quality Control Group. All supports are visually examined, including those for which no modifications are required. Procedures have been developed to provide guidelines for the performance of this examination.

For mechanical equipment the results of the examination are documented in the respective equipment analyses. If significant corrosion is observed, the corroded member is evaluated. If required, the corroded member is either replaced or repaired. Appropriate measures are taken to prevent further corrosion. In the case of the component cooling water heat exchanger, the member in question primarily supports the vertical loads of the lower exchanger shell. This support has been repaired.

For piping supports, when significant corrosion is found, the corroded member is either replaced or repaired. This determination is made by the Plant Design Engineering Group.

The examination procedures are enclosed. They have been revised to reflect NRC comments from the May 2, 1983 meeting.

June 10, 1983
Rev. 1

Attachment 1

NO CHANGE HANGER ISSUED REV. 0
BEFORE VERIFICATION (MARKED "N")

Rev. 0 Issued - Design
(After initial walkdown and tagging)

Verify and Comment - Design
(per GP-3-1 Form)

Engineering Review

With Repairs

Engineering to issue DCN to indicate portion that is to be reworked to desired design/configuration

Rework/Repair - Const/QA/QC

Const. Turnover - Const/QA/QC

Without Repairs

Sign, date and file WDCL with design folder. Incorporate "as-built" information on Rev. 1 at a later date.

June 10, 1983
Rev. 1

Attachment 2

NO CHANGE HANGER

Initial Walkdown and Tagging - Design

↓

Issue Rev. A - Design

↓

Verify and Comment - QCE (GP-3-1 form)

↓

Engineering Review - PSE

With Repairs

↓

Issue Rev. 0 "R" Dwg. - Design
Indicating required rework to
conform to design intent

↓

Repair - Construction/QA/QC

↓

Construction Turnover

Without Repairs

↓

Issue Rev. 0 "N" Dwg. - Design

June 10, 1983
Rev. 1

Attachment 3

MODIFICATION OF EXISTING HANGER

Modification Work Completed Rev. 0

Note: For tag number drawing superseding a M-number, Engineering will issue a DCN indicating conditions as found under the M-number, i.e. in the Bill of Materials under Remarks, superseded tag number shows "Existing" and M-number shows "By field".

Q.C.E. to verify existing unmodified portion per form GP-3-1

Engineering to review form

Acceptable

Engineering to issue a DCN to cover any acceptable deviations as required

Not Acceptable

Engineering to issue DCN indicate portion of as-built that is satisfactory and portion that is to be reworked to desired/configuration

Construction to rework

Q.C. to inspect reworked portion

Turn-over through normal process

New Issue

Engineering issue Rev. A

Q.C. to verify existing

Q.C. to note on Rev. A any variations

Engineering to review and incorporate Q.C. findings into Rev. 0 as appropriate. (If Rev. 0 is issued inadvertently prior to receiving Q.C. comments on Rev. A, then Engineering to issue a DCN for additional work portion.)

Work - Construction

Q.C. inspection per latest drawing

Turnover

June 10, 1983
Rev. 1

SAN ONOFRE NUCLEAR GENERATING STATION

UNIT 1

SAFETY RELATED
VERIFICATION OF EXISTING PIPE SUPPORTS
COVERED BY JOB NUMBERS 14000-300, 339, 360, 383 AND 395

PLANT DESIGN GENERAL PROCEDURE GP-(3)

1.0 INTRODUCTION

1.1 This procedure establishes the design verification of existing pipe supports for the following 2 conditions:

Unmodified pipe supports (i.e. no physical change to existing support)

or

The unmodified portions of pipe supports for which portions were modified as a result of pipe stress analysis performed under the Seismic Reevaluation and Upgrade Program.

1.2 This document establishes the procedures to be followed for design verification of the structural steel portions as well as standard (catalog) components and pipe attachments.

2.0 ABBREVIATIONS

GP	General Procedure
NA	Not Applicable
PSE	Pipe Support Engineer (Design)
WDCL	Walk-Down Checklist
QCE	Quality Control Engineer
N/C	No Change

3.0 REFERENCED DOCUMENTS

Field Construction And Quality Control Manual

4.0 SCOPE

4.1 This work plan pertains to those existing supports classified as N/C and unmodified portions of modified pipe supports for all safety-related piping systems and non-safety related piping systems which are included within the scope of the Balance of Plant Seismic Reevaluation and Upgrade Program for piping and pipe supports.

4.2 This work plan delineates the design verification of the following pipe support configurations.

4.2.1 Existing Unmodified Pipe Supports - The entire pipe support shall be evaluated in accordance with this GP.

4.2.2 Modified Pipe Supports - Only those portions of the pipe support design which existed before the modification and remain unchanged shall be examined in accordance with this GP. Any pipe support assembly components, steel welds or pipe attachments which are added or revised as a consequence of the pipe stress analysis performed under the Seismic Reevaluation and Upgrade Program shall be evaluated in accordance with field QC procedures.

4.3 Attachments 1, 2 and 3 indicate the responsibilities for the various groups involved in this verification program. Final determination of acceptance or rework, based on results of this verification program, is the responsibility of the Plant Design Engineering Group Supervisor, or his designee.

5.0 GENERAL

5.1 Those pipe supports that are within the jurisdiction of this GP will be verified in accordance with the engineering drawings.

6.0 VERIFICATION PROCEDURE

6.1 The person performing the verification shall be a qualified AWS D-1.1 inspector or persons from engineering loaned to and directed by the Qualify Control Group.

6.2 The person performing the verification shall initiate on the PIPE SUPPORT WDCL (Exhibit GP-(3)-1), to document, conformance of installation of various portions of the pipe support; all structural steel items, standard (catalog) components, and any pressure boundary attachments associated with the pipe support.

6.3 The person performing the final verification shall indicate conformance of the various portions of the pipe support installation by signing or stamping and dating the applicable WDCL. (See 7.1 of this procedure for instructions on the use of WDCL.) When performing the verification on the existing portions of a modified pipe support, only the applicable portions of the WDCL shall be used.

6.4 Should portions of the existing pipe support not be in conformance with the drawing, the person performing the verification shall indicate the difference on a copy of the drawing and return it to the PSE, with the WDCL, for engineering evaluation. Determination will be made by Plant Design Engineering if rework is required or incorporation of the noted differences into the drawing is acceptable (i.e. the drawing remains an N/C support but is up-dated to reflect the actual installed configuration).

7.0 DOCUMENTATION

7.1 Preparation of the PIPE WDCL

7.1.1 The WDCL is used to document the design verification for the following:

- Existing, unmodified portion of a revised pipe support design
- Existing, unmodified pipe support (i.e. N/C supports)

The WDCL is to be retained by the responsible PSE until all items on the WDCL have been verified. Each applicable item on the PIPE SUPPORT WDCL shall be checked by the verifier in accordance with 7.1.2.

7.1.2 Specific Preparation Instructions for the PIPE SUPPORT WDCL. The circled numbers used below (1, 2, etc.) correspond to the circled number shown on EXHIBIT GP-(3)-1, while the term "Item No.", refers to the pre-printed Item Numbers on the WDCL FORM.

7.1.2.1 The person doing the verification shall initiate the PIPE SUPPORT WDCL by filling in the indicated blanks, in ink, as follows:

Block No.	Action
1	Enter the Pipe Support Number (Drawing/Plant Tag Number and Revision).
2	Enter any outstanding DCNs against the Pipe Support drawing which cover revisions to structural steel, components, or integral attachments.
3	Enter the line number of the pipe to which the Pipe Support is attached.

7.1.2.2 All required verification items shall be completed in accordance with the guidelines given in 7.1.2.5, then initial and date the form. NA is to be entered for non-applicable items.

7.1.2.3 One form shall be used for each Pipe Support.

7.1.2.4 All applicable items on the PIPE SUPPORT WDCL are to be completed.

7.1.2.5 This verification of Pipe Supports includes standard (catalog) components, pipe integral attachments, anchors, and supplementary structural steel. The verification shall be performed by the designated party as defined in Section 4.2. The verification shall cover items in Exhibit GP-(3)-1, as defined below:

Item 1. Pipe Support Location

Item 2. Support Type

- Is the type and function as indicated on the drawing, e.g., rod hanger, structural restraint, spring support, snubber, etc. If support type is not as shown, indicate actual type and orientation of back of drawing and show item 3 through 8 as NA.

Item 3. Orientation

- Does the support orientation agree with that indicated on the drawing.
- Verify orientation of snubber rear bracket.

Item 4. Pipe Attachment

- Is the pipe attachment type as shown on the drawing, e.g., pipe clamp, welding lug, shear lug, etc.
- Is the attachment size as shown on the drawing
- Do the attachment welds conform to the drawing, e.g., size, location.

Item 5. Structural Configuration and Attachments

- Are structural member shapes and sizes as shown on the drawing
- Is the pipe support attachment to the structure as indicated on the drawing, e.g., clevis or beam attachment orientation, welded embed plate, bolted anchor plate, etc.
- Are steel members located on the embed, or anchor plate as indicated on the drawing
- Is grout present where called for under plates
- Check structural integrity of embed plate with structure, and full thread engagement of anchor bolts
- Clearances between pipe and restraint structures are as indicated on the drawing. In the restrained direction total clearances which appear greater than 1/8" shall be noted on the Walk Down Checklist.

Item 6. Component Size

- Are standard (catalog) component sizes as specified on the drawing.

Item 7. Welds

- Are weld types (fillet, contoured, continuous, etc.) and locations consistent with drawing
- Are weld sizes and lengths as indicated on the drawing
- Any cracked welds observed during the evaluation should be indicated on the Walk Down checklist.

Item 8. Standard (Catalog) Component Characteristics

- Is the available snubber stroke (full range) consistent with the drawing
- Is the pin-to-pin dimension on struts as specified
- If snubbers or spring supports have hot and cold setting indicators, are the values as specified
- Are all bolts tight

Item 9. Corrosion Control of Structural Steel and Attachments

- That corrosion on structural steel is superficial
- That rust scale on attachments is only superficial
- Any other condition shall be flagged to the PSE on the Walkdown Check List

8.0 DESIGN REVIEW

8.1 The responsibile PSE shall review the completed WDCL for compliance with the Rev. A, or Rev. 0 drawing and with the design criteria to determine if any rework is required. After the review the PSE shall sign off the WDCL and indicate what action needs to be taken. The WDCL shall be retained with the design folder.

June 10, 1983
Rev. 1

SAN ONOFRE NUCLEAR GENERATING STATION UNIT 1
WALK-DOWN CHECKLIST FOR
NO CHANGE, UNMODIFIED PIPE SUPPORTS
JOB NO. 14000

Pipe Support Drawing No. ___①___ Rev. _①_

Outstanding DCNs ___②___

Pipe Line No. ___③___

	Agreement With Inspection Document		
	Yes	No(b)	N/A
1. PIPE SUPPORT LOCATION			
2. SUPPORT TYPE			
3. ORIENTATION ($\pm 5°$ visual)	---	---	---
Does the support orientation agree with drawing			
Does orientation of snubber agree with drawing			
4. PIPE ATTACHMENT			
Is the pipe attachment type as shown on the drawing, e.g., pipe clamp, welding lug, shear lug, etc.			
Is the attachment size as shown on the drawing			
Do the attachment welds conform to the drawing, e.g., size, location			
5. STRUCTURAL CONFIGURATION AND ATTACHMENTS	---	---	---
Are structural member shapes and sizes as shown on the drawing			
Is the pipe support attachment to the structure as indicated on the drawing, e.g., clevis or beam attachment orientation, welded embed plate, bolted anchor plate, etc.			

	Agreement With Inspection Document		
	Yes	No(b)	N/A
Are steel members located on the embed, or anchor plate as indicated on the drawing			
Is grout present where called for under plates			
Check structural integrity of embed plate with structure, and full thread engagement of anchor bolts			
Clearances between pipe and restraint structures are as indicated on the drawing. In the restrained direction total clearances which appear greater than 1/8" shall be noted on the drawing			
6. COMPONENT SIZE			
Are standard (catalog) component sizes as specified on the drawing.			
7. WELDS (a)	---	---	---
Are weld types (fillet, contoured, continous, etc.) and locations consistent with drawing			
Are weld sizes and lengths as indicated on the drawing--if not, indicate actual size and length on drawing.			
Any cracked welds observed during the evaluation should be indicated on the drawing			
8. STANDARD (CATALOG) COMPONENT CHARACTERISTICS	---	---	---
Is the available snubber stroke (full range) consistent with the drawing			
Is the pin-to-pin dimension on struts as specified			
If snubbers or spring supports have hot and cold setting indicators, are the values as specified			

	Agreement With Inspection Document		
	Yes	No(b)	N/A
9. CORROSION CONTROL OF STRUCTURAL STEEL AND ATTACHMENT	---	---	---
Does structural steel have corrosion that is more than superficial			
Is rust scale (if present) on attachments only superficial			

(a) Paint need not be removed from weld surface for evaluation.

(b) All variance from pipe supports shall be indicated on a copy of the drawing and returned to the PSE for disposition.

VERIFIER: ______________________ DATE ______________

PSE REVIEW ______________________ DATE ______________

COMMENTS:

SAN ONOFRE NUCLEAR GENERATING STATION
UNIT 1

VERIFICATION OF EXISTING MECHANICAL EQUIPMENT
SAFETY RELATED
SUB JOB 1400-384

1.0 SCOPE

This procedure establishes the design verification of existing mechanical equipment included as part of the Seismic Reevaluation and Upgrade Program.

2.0 VERIFICATION METHODOLOGY

An Equipment Verification Checklist (EVCL) shall be used to document conformance of installation of equipment, equipment supports and related components. One checklist will be used for each piece of equipment. In all areas where the checklist indicates non-conformance, the checker shall provide a written description (sketch or marked up vendor print) to the lead engineer for adjustment to equipment evaluation calculation. The checklist shall be signed and dated by the checker and maintained in the Mechanical descipline files.

3.0 EQUIPMENT VERIFICATION AND DOCUMENTATION

The verification and documentation shall cover the following items:

A. Name and Type of Equipment/System

1) Heat Exchanger, Pump, Filter, Tank etc.

B. Equipment location

1) Area in plant
2) Line connections by P&ID

C. Orientation

Does the equipment orientation agree with that indicated on area drawing?

D. Component Attachment Integrity

1) Are all connected piping, equipment supports and related components (motors, couplings etc.) installed (include nuts and bolts)?
2) Are all components firmly attached (hand check)?
3) Do types of existing connections (flange, weld, screwed) match manufacturer drawing and/or equipment data sheet?

E. Component Size

Are component sizes as specified on the manufacturer drawing or equipment data sheet.

F. Welds

1) Are weld types (fillet, contoured, continuous, etc.,) and locations consistent with manufacturer drawing?

2) Are there any cracked welds?

G. Corrosion Control of Equipment, Equipment Supports and Related Components

1) Is rust scale only superficial?

SAN ONOFRE NUCLEAR GENERATING STATION
UNIT 1

EQUIPMENT VERIFICATION CHECKLIST
SUB JOB 14000-384

1. NAME AND TYPE OF EQUIPMENT:

2. EQUIPMENT LOCATION:

   a. Area ____________________

   b. Connecting Lines:

   ____

3. ORIENTATION

   Does the equipment orientation agree with that indicated on area drawing? Yes___ No___ N/A___

4. COMPONENT ATTACHMENT INTEGRITY

   A. Are all connected piping, equipment supports and related components installed Yes___ No___ N/A___

   B. Are all components firmly attached? Yes___ No___ N/A___

   C. Do existing connections (flanges, weld screwed) match manufacturer drawing of equipment data sheet? Yes___ No___ N/A___

5. COMPONENT SIZE

   Do component sizes match manufacturer data sheet? Yes___ No___ N/A___

6. WELDS

   A. Are weld types and location of welds consistent with manufacturer drawing? Yes___ No___ N/A___

   B. Are there any cracked welds? Yes___ No___ N/A___

7. CORROSION CONTROL OF EQUIPMENT, EQUIPMENT SUPPORTS AND RELATED COMPONENTS

   A. Is rust scale only superficial? Yes___ No___ N/A___

CHECKER SIGNATURE: ____________________ DATE: ____________

6. Effects of Large Line Inertia on Branch Line Piping Analysis

"The licensee's criteria for decoupling small lines from large lines is based upon the ratio of moments of inertia. The connection at the large line is considered as an anchor point for the small line if the ratio of the moments of inertia is 10 or greater. This is acceptable if the point of connection is close enough to a relatively "rigid" support such that the inertial input to the small line is negligible. Otherwise, if this cannot be demonstrated, the effects of large line inertia loading on the branch line must be considered in the branch line analysis."

Response:

While the specific approaches used by Bechtel and Westinghouse differ, they both provide assurance that the effect of large line inertial responses are considered in the evaluation and analysis of branch line piping. With the exception of the main steam line inside containment which uses the overlap technique, the Bechtel and Westinghouse analyses interface points are at piping anchors or the containment sphere penetrations.

A. Bechtel Performed Pipe Stress Analysis

The effect of run piping seismic inertia response on branch piping is addressed per the methods below, as dictated by the ratio of the respective moments of inertia of the run and branch pipes and the seismic inertia displacement of the run pipe at the branch intersection point.

1. If the moment of inertia of the branch pipe is greater than 1/10 the moment of inertia of the run pipe, the branch line is analyzed (coupled) with the larger (run) pipe for all load cases.

2. If the moment of inertia of the branch pipe is less than, or equal to, 1/10 of the moment of inertia of the run pipe the branch pipe can be run separate (decoupled) from the run pipe analysis. The intersection point (i.e., branch connection) is considered to be an anchor point in the branch analysis and is analyzed as such for all load cases. Appropriate stress intensification factors (SIF) are applied at the branch connection point in both run pipe analyses and the separately analyzed branch pipe analyses. In addition the following is considered, based on the inertial displacements of the run pipe at the branch connection point.

   a) If the run pipe inertial displacements are less than, or equal to, 1/16 inch at the branch connection point, no additional consideration is required. These small inertial displacements demonstrate that the branch connection is adjacent to rigid supports and therefore no significant amplification of the floor response spectra exists on the small branch piping due to the inertial response of the larger run pipe. There are 35 decoupled pipe stress problems in this category.

b) If the run pipe inertial movements are greater than 1/16 inch but less than 1/4 inch at the branch connection point, static analysis is performed wherein the inertial movements due to the SSE response of the run pipe, at the branch connection point, are input in the branch pipe (decoupled) analysis. The resulting stresses in the branch pipe are combined by absolute sum with the dead weight stress, SSE seismic inertial stress and longitudinal pressure stress (in the branch pipe) to satisfy the equation 9 stress limit. Additionally, a sample consisting of 5 decoupled branch line pipe stress problems in the group will be evaluated with their respective run pipe analysis by modeling a portion of the branch line (approximately 15 feet including at least two supports in each direction) with the run pipe model and performing a dynamic analysis. The results of this analysis will be evaluated against the static displacement analysis of the branch line to ensure that no significant amplification of the floor response spectra exists on the small branch piping due to the inertial response of the large run piping. The size of the sample will be increased if any significant amplification is noted. There are 16 pipe stress problems in this category.

c) If the run pipe inertial movements are greater than 1/4 inch at the branch connection point, a portion of the branch line (approximately 15 feet including at least two supports in each direction) will be modeled and analyzed dynamically with the run pipe. There are 6 pipe stress problems in this category.

B. Westinghouse Performed Pipe Stress Analysis

The criteria for decoupling small lines from large lines which was used by Westinghouse in performing the piping analyses was based on the relative section moduli of the piping, as discussed below.

1. The branch line need not be included in the run model if its section modulus is 15 percent or less of the run section modulus.

2. For branch lines which have section moduli greater than 15 percent of the run section modulus, the branch line will be modeled initially for a distance of approximately 15 feet. If it is later determined by the piping analyst that additional modeling information is required, it will be provided and included within the analysis model.

3. In the run analysis where the branch line has not been evaluated, the branch line allowable bending moments will be considered. Using Sections NB-3650 or NB-3600, equation 9, the branch line allowable moment will be determined considering the proper allowables.

4. For branch lines which are not included in the model, supports within 10 feet of the run are noted and considered since a support near the run pipe could affect the run pipe flexibility.

Based on subsequent discussions with the NRC, the Westinghouse analyses were reviewed to determine the extent to which the actual analyses conformed to the following more conservative criteria:

1. $Z_{branch}/Z_{run} \leq 1/16$, or

2. $I_{branch}/I_{run} \leq 1/64$, or

3. $r_{branch}/r_{run} \leq 1/4$.

Based on a review of all nineteen of the Westinghouse calculations which pertain to decoupling of branch lines, only two cases did not conform to these criteria. These two cases are addressed in the following paragraphs.

1. Decoupled lines: 2020-2"-2501R and 3/4" instrument line to PIC-1116C

   This line pair meets the decoupling criteria used for the analysis, but falls short of the more conservative criteria with a Z_{branch}/Z_{run} ratio of approximately 1/10. The connection point of the 3/4 inch line is along a short flanged spool piece which is directly attached to the RCP nozzle. The additional line weight by considering the instrument line would be approximately 10 percent with this weight concentrated near the RCP nozzle. The total seismic load on the nozzle is only 30 percent of the total load, with the major contribution coming from thermal loading which is unaffected by the presence or absence of the instrument line. Therefore, the decoupling of the two lines does not have a significant effect on the analysis of line 2020-2"-2501R.

2. Decoupled lines: 5037-2"-HP and 5037-1/2"-HP

   These two lines are non-safety related lines which are not within the scope of the seismic reevaluation program. The inclusion of the 2 inch piping was only for its affect on the safety related piping and it was judged unnecessary to include the 1/2 inch diameter piping due to its distance from the safety related piping actually being analyzed.

Therefore, even though these two cases do not meet the more conservative criteria identified above, it is concluded that this is not significant with respect to the run pipe analyses.

The effect of run piping seismic response on branch piping was addressed in one of two ways depending on whether the branch line was analyzed by spacing tables or dynamic analysis.

1. Spacing Table Analysis: The run and branch lines were considered decoupled. Thermal and seismic displacements associated with the run pipe were applied to the branch line at the connection point of the run pipe and static analyses performed. The resulting stresses in the branch pipe were combined with the other branch pipe stresses in accordance with the established criteria. A total of 13 lines were analyzed in this manner.

2. Dynamic Analysis: The run and branch lines were coupled. If the model was too large to include the total run and branch lines in one model, the branch lines were modeled completely with a portion of the run pipe along with the reactor coolant loop model. The portion of the run pipe included in the model was extended sufficiently beyond the branch line to assure that the run pipe dynamic and load transfer characteristics were maintained. A total of 3 lines were analyzed using this overlapping approach.

   Four small lines (3/4" size) connected to the pressurizer were decoupled from the pressurizer during the analysis. The effect of the pressurizer response was considered by applying the thermal and seismic pressurizer displacements to these lines and performing static analyses. The resulting stresses were combined with the other stresses associated with these lines in accordance with the established criteria.

13. Field Erected Tanks and Buried Piping

"The licensee agreed to provide the soil-structure interaction analysis and acceptance criteria being used for their evaluation and design of the field erected tanks. Similar information was requested for their evaluation of buried conduits and any remaining buried piping."

Response:

It is our intention to provide a new auxiliary feedwater tank as a result of the seismic reevaluation. In addition, it is currently intended to either provide a new refueling water storage tank or to perform alternative seismic analyses of the tank. The new tanks will be designed and constructed in accordance with ASME Section III, 1977 edition through Summer 1978 addenda. Code Case N-284 is being used for buckling consideration. Soil structure interaction analysis is considered using a lumped parameter model which includes the tank shell flexibilities and the fluid interaction effects, with lumped soil structure interaction springs. The methodology and procedures for this type of analysis are described in BC-TOP-4A. In addition, in the design calculations, the tank flexibility is considered using References a, b and c.

All safety-related buried piping will be replaced as part of the seismic reevaluation program.

References

a) Veletsos, A. S. and Yang, J. Y., "Dynamics of Fixed-Based Liquid-Storage Tank", Proceeding U.S. - Japan Seminar on Earthquake Engineering Research with Emphasis on Lifeline Systems, Japan Society for Promotion of Earthquake Engineering, Tokyo, Japan, Nov. 1976. pp. 317-341.

b) Housner, G. W. and Haroun, M. A., "Earthquake Response of Deformable Liquid Storage Tanks", Pressure Vessels and Piping Conference, ASME, San Francisco, California, Aug. 12-15, 1980.

c) Haroun, M. A., "Vibration Studies and Tests of Liquid Storage Tanks," Earthquake Engineering and Structural Dynamics, Volume II, 1983, pp. 179-206.

20.. Trunions

"The licensee indicated that all trunions were being removed where the trunion was less than 1/2 the diameter of the supported pipe. Those remaining trunions were analyzed assuming stress intensification factors based on "stubins" with the elbow analyzed as a 90° bend."

Response

All lugs (rectangular attachments) have been removed from the elbows of piping in the scope of the seismic reevaluation program. In addition, all trunions (hollow circular attachments) whose diameters are less than 1/2 the diameter of the supported pipe diameter (process pipe) have been removed from the elbows of piping in the scope of the seismic reevaluation program.

The remaining trunion configurations were modeled in the piping stress analysis. The elbows were modeled as square corners (i.e., no flexibility with the trunion connection to the elbow modeled as an unreinforced branch connection and the stress intensification factor (SIF) for the unreinforced branch connection was applied to the trunion/elbow interface point. The size, length, and the structural attachment point of the trunion were modeled to reflect the "as-built" conditions.

The welding of a trunion to an elbow will decrease the elbow's flexibility, but does not eliminate it altogether. For the analysis of this condition the elbow was conservatively treated as a rigid joint, thus resulting in conservatively predicted stresses in the elbow, since no credit was taken for the elbow's flexibility. The SIF used represents a conservative approximation of the SIF value appropriate for the evaluation of this configuration. This configuration differs from one in which a process connection is made to an elbow. In this case the SIF would be the product of the SIF for the branch and the elbow. However, since no material has been removed (i.e., no hole in the heel of the elbow) and since the trunions are attached by fillet welds to the elbow the use of an SIF derived from the product of the elbow and branch SIF is not considered appropriate.

However, as a result of the May 2-4, 1983 NRC meeting, the following SIF will be used to evaluate an elbow/trunion interface point:

SIF (Trunion/Elbow) = 1/2 [SIF(Branch) + (SIF(Branch) X SIF(Elbow))]

The SIF used for the trunion/elbow interface (defined above) is approximately 2.5 to 4.0 times the SIF of an elbow without a trunion attached to it. There are 12 safety related piping locations within the Seismic Reevaluation Scope that elbow/trunion configurations were evaluated using the SIF defined above. This evaluation resulted in the removal of one trunion. One trunion within the Westinghouse scope is still under evaluation. The 10 remaining configurations had acceptable intensified stresses when evaluated to the higher SIF defined above.

ENCLOSURE 2

CLARIFICATION TO
BOPMEP SEISMIC REEVALUATION CRITERIA
SAN ONOFRE NUCLEAR GENERATING STATION
UNIT 1

Section 3.1(b)(3) of the BOPMEP Criteria

The NRC review of the BOPMEP Criteria dated May 20, 1983 resulted in their questioning the meaning of "sufficient length" as the description of NSR piping to be included with SR piping where no interface anchor exists.

The wording will be changed to the following:

> For NSR piping which does not terminate at a collapse moment anchor or an equivalent nozzle, an overlapping technique will be employed based on the plant specific configuration. The portion of NSR piping included with the SR piping shall be of sufficient length (as a minimum two restraints in each direction) as to preclude any detrimental stress effects on the SR piping. Supports in the SR/NSR overlap area shall be designed to withstand the load generated by the peak acceleration values of the appropriate response spectrum curves.

Table 3 of the BOPMEP Criteria

The NRC review of the BOPMEP Criteria dated May 20, 1983 resulted in their questioning the stress limits for bolts shown in Table 3 and a code reference quoted in Note 3 of Table 3.

A) The limits shown omitted the check against $0.70S_u$ for tensile stress and $0.42S_u$ for shear stress.

Table 3 will be revised as follows:

Component	Stress Limit for Faulted Condition	
	Class 2&3 and Class 1	
Bolts	Tensile Stress	Lessor of S_y or $0.7S_u$
	Shear Stress	Lessor of $.6S_y$ or $0.42S_u$

B) Note 3 of Table 3 will be revised to correct a typographical error which caused a wrong code reference to be quoted. The revised note will be as follows:

3. Valves are evaluated in accordance with NC-3521 of the Code. Valves were purchased to ASA B16.5 standards (Reference 12). Minimum specified wall thicknesses from B16.5 are used for evaluation of the valves under the provisions of NC-3521(a)(1) and (2) of the Code. Valve extended structures are evaluated by equivalent static analysis in accordance with NC-3521(c) of the Code.

ENCLOSURE 3

RESPONSES TO ADDITIONAL ITEMS

SEISMIC REEVALUATION PROGRAM

SAN ONOFRE NUCLEAR GENERATING STATION

UNIT 1

Item

The structural integrity of the spent fuel pool should be addressed considering the availability of the spent fuel pool cooling system following an earthquake.

Response

The spent fuel pool cooling system is not included in the scope of the seismic reevaluation program. Based on the considerations discussed below, it is concluded that there is sufficient time to provide makeup to the pool in the event that the cooling system is unavailable following an earthquake.

Calculations have been performed to determine the temperature in the pool in the event of loss of cooling. With the current loading in the pool, it has been determined that the temperature will not exceed 140°F with no cooling and with no credit for cooling associated with any makeup water. The required makeup rate to replenish evaporation losses is less than 5 gpm.

Following the next refueling when the next batch is placed in the pool, the temperature which could be reached in the pool is dependent on how soon after shutdown the fuel is placed in the pool and cooling is lost. If refueling is completed two weeks after the reactor is shutdown and cooling is immediately lost, it is conservatively calculated that the pool will heat up to 212°F in about 5 or 6 days and remain at this temperature for only about 8 days. If cooling is not lost until 21 days after the reactor is shutdown, the pool will not boil.

In addition, the effect of temperatures in the range of 212°F on the concrete in the fuel pool walls has been reviewed and found to have no significant impact. At San Onofre, siliceous aggregates were used in the concrete. The use of this type of aggregate has been shown by tests to limit strength losses. At 212°F, concrete may experience a strength loss of about six percent. However, the concrete has additional strength over the original specified (3000 psi) due to the fact that the as-placed strength as determined from cylinder tests was about 4200 psi and due to the fact that the concrete is about 19 years old which provides additional strength due to aging. Volume changes due to temperature effects were found to induce stresses below the ultimate crushing strength of the concrete considering strength losses and gains as appropriate. Because of this, cracking or spalling is not likely to occur.

ITEM

Identify how the seismic reevaluation of safety related pipe supports will account for non-safety related piping which is on the same supports as safety related piping.

RESPONSE

To date the reevaluation of pipe racks has accounted for the seismic load of non-safety related (NSR) piping based on an inertial loading of 0.2g. The design load combination used for all pipe racks was the absolute sum, in each load direction, of the individual pipe support design loads. The following approach, however, will be used for the reevaluation of pipe racks prior to the completion of the seismic reevaluation program.

There are a total of 550 pipe support assemblies which support 2 or more pipes. Approximately 100 of these assemblies (pipe racks) which support safety related (SR) piping also have NSR piping supported from them.

To account for the Service Level D loading (i.e., DBE earthquake loading) from NSR piping, the following procedure will be utilized to evaluate all pipe racks with NSR pipe and SR pipe supported by the same rack.

1. Estimate the DBE seismic inertia load in each supported direction for each NSR pipe. This load will be calculated by simplified dynamic analysis techniques such as the Modified Spectrum Method delineated in Reference 1.

2. Estimate the dead weight load for each NSR pipe using simplified analysis techniques.

3. Estimate the DBE seismic anchor movement (SAM) load (when applicable) and thermal load in each supported direction for each NSR pipe. This load will be calculated by simplified methods such as the "Guided Cantilever Method".

4. The total seismic loading on the rack will be calculated by the SRSS of the individual support loads due to a seismic event for each supported direction.

$$P_{i\,\text{Total Seismic}} = \sqrt{\sum \left(\left| P_{i\,\text{seismic inertia}} \right| + \left| P_{i\,\text{SAM}} \right| \right)^2}$$

The total seismic loading will then be combined with the resultant dead weight and thermal loads (considering their sign) for each supported direction.

Pipe Rack Design Load i^{th} direction $= \begin{cases} \text{LARGER OF} \\ \sum P_{i\,TH} + \sum P_{i\,DW} \pm P_{i\,\text{Total Seismic}} \\ \text{OR} \\ \sum P_{i\,DW} \pm P_{i\,\text{Total Seismic}} \end{cases}$

5. The individual support calculations shall be evaluated to the design loads listed on the Pipe Support Description List or to the sum of the estimated loads combined per Table 4 of the BOPMEP Seismic Reevaluation Criteria for NSR piping.

6. Stresses in the rack will be limited to the allowables listed in Table 4 of the BOPMEP Seismic Reevaluation Criteria.

References:

1. BP-TOP-1, Revision 3, Seismic Analysis of Piping Systems, Bechtel Power Corporation, January 1976

Item

The issue of seismic adequacy of electrical equipment should be included in the scope of SEP Topic III-6, "Seismic Design Considerations".

Response

The adequacy of the anchorage of all electrical cabinets and panels has been evaluated and, where required, appropriate modifications have been implemented. This was documented in letters to the NRC dated March 25, 1981; May 29, 1981; June 28, 1982; and November 22, 1982. As discussed with the NRC in a meeting on November 10, 1982, it is concluded that no further action is required prior to restart of the plant.

However, as part of the overall scope of the seismic reevaluation program, SCE will perform additional evaluations of those items. The anticipated scope of these evaluations is as follows:

1. The structural integrity of electrical cabinets and panels will be evaluated on a sampling basis. The cabinets and panels will be grouped based on similarity of design and location. One cabinet or panel from each group will be evaluated to ensure the capability to withstand 0.67g ground motions. Additional cabinets in a group will be evaluated if there is an integrity problem with the cabinet evaluated.

2. To ensure that internally mounted electrical items are properly attached to the cabinets and panels, an inspection will be performed. The purpose of this inspection will be to identify missing supports, bolts, etc. Questionable items will be identified for further evaluation and/or modification.

The schedule for completion of the additional evaluations will be determined at a later date in accordance with the San Onofre Unit 1 Integrated Living Schedule.