UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

April 28, 2006

Richard M. Rosenblum
Senior Vice President and
Chief Nuclear Officer
Southern California Edison Company
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128

SUBJECT: SAN ONOFRE NUCLEAR GENERATING STATION - NRC INTEGRATED INSPECTION REPORT 05000361/2006002; 05000362/2006002

Dear Mr. Rosenblum:

On March 25, 2006, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your San Onofre Nuclear Generating Station, Units 2 and 3 facility. The enclosed integrated report documents the inspection findings, which were discussed on January 19, February 17, and March 24, 2006, with Dr. R. Waldo and other members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents two self-revealing findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements; however, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these findings as noncited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. If you contest these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-4005; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; and the NRC Resident Inspector at San Onofre Generating Station, Units 2 and 3, facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Troy W. Pruett, Chief
Project Branch D
Division of Reactor Projects

Dockets: 50-361
50-362
Licenses: NPF-10
NPF-15

Enclosure:
NRC Inspection Report 05000361/2006002; 05000362/2006002
w/Attachment: Supplemental Information

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SUNSI Review Completed: _TWP ADAMS: / Yes ☐ No Initials: _TWP_____
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RIV:RI:DRP/D	SRI:DRP/D	SPE:DRP/D	C:DRS/PSB	C:DRS/OB
MASitek	CCOsterholtz	GEWerner	MPShannon	ATGody
T-TWP	***T-TWP***	***NA***	***/RA/***	***/RA/***
04/12/06	04/12/06	04/ /06	04/25/06	04/25/06

C:DRS/EB	C:DRS/PEB	SAC:ACES	C:DRP/D	
JAClark	LJSmith	HAFreeman	TWPruett	
/RA/	***JMMateychick for***	***/RA/***	***/RA/***	
04/2406	04/25/06	04/26/06	04/28/06	

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Dockets:	50-361, 50-362
Licenses:	NPF-10, NPF-15
Report No.:	05000361/2006002 and 5000362/2006002
Licensee:	Southern California Edison Co. (SCE)
Facility:	San Onofre Nuclear Generating Station, Units 2 and 3
Location:	5000 S. Pacific Coast Hwy. San Clemente, California
Dates:	January 1 through March 25, 2006
Inspectors:	C. C. Osterholtz, Senior Resident Inspector, Project Branch D, DRP M. A. Sitek, Resident Inspector, Project Branch D, DRP J. P. Adams, Reactor Inspector, Engineering Branch 1, DRS H. T. Crouch, Reactor Engineer, Technical Support Branch, DRP J. S. Dodson, Regional Operations Officer P. J. Elkmann, Emergency Preparedness Inspector, DRS L. E. Ellershaw, PE, Consultant G. L. Guerra, Health Physicist, DRS B. W. Henderson, Reactor Inspector, DRS T. A. McConnell, Resident Inspector, Project Branch B, DRP M. E. Murphy, Senior Operations Engineer, DRS J. H. Nadel, Reactor Inspector, DRS M. K. Rock Zuccato, General Engineer, Project Branch D, DRP C. H. Young, Project Engineer, Project Branch D, DRP
Approved By:	Troy W. Pruett, Chief Project Branch D Division of Reactor Projects

SUMMARY OF FINDINGS

IR05000361/2006002, 05000362/2006002; 01/01/06 - 03/25/06; San Onofre Nuclear Generating Station, Units 2 & 3; Integrated Resident and Regional Report; Surveillance Testing; and Identification and Resolution of Problems

This report covered a 3-month period of inspection by resident inspectors and Regional office inspectors. The inspection identified two Green findings, both of which were noncited violations. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management's review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. A self-revealing noncited violation of Technical Specification 5.5.1.1 was identified for the failure of electrical test technicians to develop adequate procedures during work to replace and calibrate an exciter field current transducer on the Unit 2 Train A emergency diesel Generator 2G002 on December 16, 2005. This failure resulted in the loss of the exciter field voltage circuit and rendered EDG 2G002 inoperable. This issue was entered into the licensee's corrective action program as Action Request 051200922.

  The finding was determined to be more than minor because it was associated with the procedure quality attribute of the mitigating systems cornerstone and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process" Phase 1 worksheet, the finding is determined to have very low safety significance because the finding did not represent an actual loss of the Unit 2 Train A emergency diesel generator for greater than its Technical Specification allowed outage time of 14 days. The finding had crosscutting aspects in the area of human performance because the failure of the test technicians and their supervisor to communicate changes to maintenance activities directly contributed to the cause of the finding (Section 1R22).

- Green. A self revealing noncited violation of Technical Specification 3.4.9.B was identified for the failure of maintenance engineering personnel to take appropriate corrective actions in response to a failure of the Unit 2 pressurizer backup heater Breaker 2B0602. This failure resulted in pressurizer backup heater Bank 2E129 being inoperable for greater than the allowed Technical Specification outage time of 72 hours. This issue has been entered into the licensee's corrective action program as Action Request 051200151.

The finding is determined to be more than minor because it is associated with the mitigating systems attribute of equipment performance and affects the associated cornerstone objective to ensure the availability of the pressurizer backup heaters to respond to initiating events to prevent undesirable consequences. The Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," were used to conclude that a Phase 2 analysis was required because the finding represented an actual loss of safety function of a single train for greater than its Technical Specification allowed outage time. Because of the very low safety significance of the pressurizer heaters, they are not listed in Table 3.7 of the site specific worksheets or the licensee's probabilistic risk assessment model. Therefore, a Phase 2 analysis could not be performed. Based on NRC management review, the finding was determined to be of very low safety significance. The finding had crosscutting aspects in the area of problem identification and resolution because the failure of maintenance engineering personnel to identify and correct the cause of the failure of pressurizer heater Breaker 0609 directly contributed to the cause of the finding (Section 4OA2).

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Status

Unit 2 began the inspection period in coastdown at approximately 89 percent reactor power. On January 3, 2006, the reactor was shutdown for the Cycle 14 refueling outage. The plant was cooled down and entered Mode 6 (refueling operations) on January 12, 2006. Unit 2 ended the inspection period in Mode 4.

Unit 3 began the inspection period at approximately 100 percent reactor power and remained there through the end of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

Readiness For Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors completed a review of the licensee's readiness for impending adverse weather involving the effects of a tsunami that may be generated by an offshore earthquake. The inspectors: (1) reviewed plant procedures, the Updated Final Safety Analysis Report (UFSAR), and Technical Specifications (TSs) to ensure that operator actions defined in adverse weather procedures maintained the readiness of essential systems; (2) walked down portions of the listed systems to ensure that adverse weather protection features (heat tracing, space heaters, weatherized enclosures, temporary chillers) were sufficient to support operability, including the ability to perform safe shutdown functions; (3) reviewed maintenance records to determine that applicable surveillance requirements were current if an anticipated tsunami developed; and (4) reviewed plant modifications, procedure revisions, and operator workarounds to determine if recent facility changes challenged plant operation.

C January 31, 2006, Units 2 and 3 saltwater cooling (SWC) system and intake structures

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial System Walkdowns

a. Inspection Scope

The inspectors: (1) walked down portions of the two listed risk important systems and reviewed plant procedures and documents to verify that critical portions of the selected systems were correctly aligned; and (2) compared deficiencies identified during the walk down to the licensee's UFSAR and corrective action program (CAP) to ensure problems were being identified and corrected.

- January 5, 2006, Unit 3 Train A SWC system while Train B was inoperable during the dewatering of the Unit 2 intake structure

- January 18, 2006, Unit 2 safety injection system during shutdown cooling operations

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed two samples.

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors: (1) reviewed plant procedures, drawings, the UFSAR, TSs, and vendor manuals to determine the correct alignment of the SWC system; (2) reviewed outstanding design issues, operator workarounds, and UFSAR documents to determine if open issues affected the functionality of the SWC cooling system; and (3) verified that the licensee was identifying and resolving equipment alignment problems. Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

Quarterly Inspection

The inspectors walked down the six listed plant areas to assess the material condition of active and passive fire protection features and their operational lineup and readiness. The inspectors: (1) verified that transient combustibles and hot work activities were controlled in accordance with plant procedures; (2) observed the condition of fire detection devices to verify they remained functional; (3) observed fire suppression systems to verify they remained functional and that access to manual actuators was unobstructed; (4) verified that fire extinguishers and hose stations were provided at their designated locations and that they were in a satisfactory condition; (5) verified that passive fire protection features (electrical raceway barriers, fire doors, fire dampers, steel fire proofing, penetration seals, and oil collection systems) were in a satisfactory material condition; (6) verified that adequate compensatory measures were established for degraded or inoperable fire protection features and that the compensatory measures were commensurate with the significance of the deficiency; and (7) reviewed the UFSAR to determine if the licensee identified and corrected fire protection problems.

- February 27, 2006, Unit 2 containment, all accessible levels
- March 2, 2006, Unit 3 Train A engineering safety feature pump room
- March 2, 2006, Unit 3 Train B engineering safety feature pump room
- March 2, 2006, Unit 3 high pressure safety injection Pump 3P018 room
- March 15, 2006, Unit 2 SWC pump room
- March 16, 2006, Unit 3 SWC pump room

Documents reviewed by the inspectors included:

- Updated Fire Hazards Analysis, San Onofre Nuclear Generating Station Units 1, 2, and 3, Revision 15
- Sprinkler Drawing SO23-403-24-211, "Intake Structure and Tunnel," Revision 4
- Calculation 90035AL, "Fire Suppression, Detection and Separation Analysis," Revision 4
- Action Request (AR) 060201653

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

.1 Annual External Flooding

a. Inspection Scope

The inspectors: (1) reviewed the UFSAR, the flooding analysis, and plant procedures to assess seasonal susceptibilities involving external flooding; (2) reviewed the UFSAR and CAP to determine if the licensee identified and corrected flooding problems; (3) inspected underground bunkers/manholes to verify the adequacy of (a) sump pumps, (b) level alarm circuits, (c) cable splices subject to submergence, and (d) drainage for bunkers/manholes; (4) verified that operator actions for coping with flooding can reasonably achieve the desired outcomes; and (5) walked down the two below listed areas to verify the adequacy of: (a) equipment seals located below the floodline, (b) floor and wall penetration seals, (c) watertight door seals, (d) common drain lines and sumps, (e) sump pumps, level alarms, and control circuits, and (f) temporary or removable flood barriers.

- January 24, 2006, Unit 2 and 3 intake structure

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

.2 Semi-annual Internal Flooding

a. Inspection Scope

The inspectors: (1) reviewed the UFSAR, the flooding analysis, and plant procedures to assess seasonal susceptibilities involving internal flooding; (2) reviewed the UFSAR and CAP to determine if the licensee identified and corrected flooding problems; (3) inspected underground bunkers/manholes to verify the adequacy of (a) sump pumps, (b) level alarm circuits, (c) cable splices subject to submergence, and (d) drainage for bunkers/manholes; (4) verified that operator actions for coping with flooding can reasonably achieve the desired outcomes; and (5) walked down the below listed area to verify the adequacy of: (a) equipment seals located below the floodline, (b) floor and wall penetration seals, (c) watertight door seals, (d) common drain lines and sumps, (e) sump pumps, level alarms, and control circuits, and (f) temporary or removable flood barriers.

- January 31, 2006, Unit 2 and 3 SWC pump rooms

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07A)

a. Inspection Scope

The inspectors reviewed licensee programs, verified performance against industry standards, and reviewed critical operating parameters and maintenance records for the Unit 2 Train A component cooling water heat Exchanger S21203ME001. The inspectors verified that: (1) performance tests were satisfactorily conducted for heat exchangers/heat sinks and reviewed for problems or errors; (2) the licensee utilized the periodic maintenance method outlined in EPRI NP-7552, "Heat Exchanger Performance Monitoring Guidelines;" (3) the licensee properly utilized biofouling controls; (4) the licensee’s heat exchanger inspections adequately assessed the state of cleanliness of their tubes, and (5) the heat exchanger was correctly categorized under the Maintenance Rule. Documents reviewed by the inspectors included:

- Procedure SO23-5-1.1, "Heat Treating the Circulating Water System," Revision 18

- Procedure SO23-I-8.94, "Component Cooling Water Heat Exchanger Cleaning and Inspection," Revision 8

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection Activities (71111.08)

Inspection Procedure 71111.08 requires four samples, as identified in Sections 02.01, 02.02, 02.03, and 02.04.

02.01 Performance of Nondestructive Examination Activities Other Than Steam Generator Tube Inspections, Pressurized Water Reactor Vessel Upper Head Penetration Inspections, Boric Acid Corrosion Control

a. Inspection Scope

The inspection procedure requires the review of nondestructive examination activities consisting of two or three different types (i.e., volumetric, surface, or visual). The inspectors observed the performance of ultrasonic examinations (volumetric) on three pressurizer welds, three reactor pressure vessel upper head penetration nozzles, and one shut down cooling line weld, and reviewed radiographic examinations (volumetric) on a repaired pressurizer lower level nozzle assembly. The inspectors also observed the performance of eddy current examinations (combination volumetric and surface) on three reactor vessel upper head penetration nozzles. In addition, the inspectors observed two liquid penetrant examinations (surface) performed on safety injection line component welds, one magnetic particle examination (surface) on a safety injection line component weld, and three visual (VT-3) examinations (visual) performed on safety injection line components. The table below identifies the above examinations, which were conducted using four methods and three different examination types.

System/ Component	Identity	Examination Type	Examination Method
Pressurizer	Surge Nozzle to Safe End Weld, ISI No. 02-005-03	Volumetric	Ultrasonic
Pressurizer	12" Schedule 160 Nozzle to Pipe, ISI No. 02-016-001	Volumetric	Ultrasonic
Pressurizer	Surge Nozzle to Bottom Head Weld, ISI No. 02-005-009	Volumetric	Ultrasonic
Shut Down Cooling System	Weld ISI No. 02-073-115	Volumetric	Ultrasonic
Reactor Vessel Upper Head	Control Element Drive Mechanism Nozzle 31 and In-core Instrumentation Nozzles 92 and 98	Volumetric Combination volumetric and surface	Ultrasonic Eddy Current
Pressurizer	Lower Head Nozzle Assembly on MWO 03121457001	Volumetric	Radiography
Safety Injection System	Cold leg SI injection line guide with integral welded lugs ISI No. 02-020-087	Surface	Liquid Penetrant
Safety Injection System	Safety Injection Tank outlet valve body to lower section weld ISI No. 02-019-010	Surface	Liquid Penetrant
Safety Injection System	Cold leg SI injection line Y-stop: ISI No. 02-020-088	Surface	Magnetic Particle
Safety Injection System	Cold Leg SI injection line guide and Y-Stop: ISI No. 02-020-084	Visual	Visual (VT-3)
Safety Injection System	Cold Leg SI injection line strut: ISI No. 02-020-085	Visual	Visual (VT-3)

System/ Component	Identity	Examination Type	Examination Method
Safety Injection System	Cold Leg SI injection line Y-stop: ISI No. 02-020-088	Visual	Visual (VT-3)

For each of the observed nondestructive examination activities, the inspectors verified that the examinations were performed in accordance with the specific site procedures and the applicable American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) requirements.

During review of each examination, the inspectors verified that appropriate nondestructive examination procedures were used, examinations and conditions were as specified in the procedure, and test instrumentation or equipment was properly calibrated and within the allowable calibration period. The inspectors also verified the nondestructive examination certifications of the personnel who performed the above volumetric and surface examinations. Finally, the inspectors observed that indications identified during the ultrasonic, liquid penetrant, magnetic particle, and visual examinations were dispositioned in accordance with the ASME qualified nondestructive examination procedures used to perform the examinations.

The inspection procedure requires review of one or two examinations with recordable indications that were accepted for continued service to ensure that the disposition was made in accordance with the ASME Code. The inspectors were informed that no indications exceeding ASME Code allowables were known to be in service.

The inspection procedure further requires verification of one to three welds on Class 1 or 2 pressure boundary piping to ensure that the welding process and welding examinations were performed in accordance with the ASME Code. The inspectors verified through record review that welding and subsequent examinations performed on a Unit 3 pressurizer lower level half nozzle assembly (MWO 03121457001) was performed in accordance with Sections IX and XI of the 1995 Edition of the ASME Code. This included review of welding material issue slips to establish that the appropriate welding materials had been used, verification of welder qualifications, verification that the welding procedure specification (WPS-43-8-GT-1, Revision 1) had been properly qualified, and verification that the applicable nondestructive examination procedures used to perform the examinations had been qualified.

The inspectors completed one sample under Section 02.01.

b. Findings

No findings of significance were identified.

02.02 Reactor Vessel Upper Head Penetration Inspection Activities

The inspection requirements for this section parallel the inspection requirement steps in Section 02.01. The inspectors observed the nondestructive examinations on the three reactor vessel upper head penetrations identified in the table.

Additionally, the nondestructive examination procedures used to perform the above examinations were reviewed to assure that they were consistent with ASME Code requirements, and the equipment and calibration requirements were appropriately identified and demonstrated. The inspectors also observed and reviewed the eddy current data analyses process used on reactor vessel upper head penetration nozzles 82, 87, and 91. The nondestructive examination records were also reviewed to verify that 100 percent of the required inspection coverage was achieved on the observed penetration nozzles.

The inspectors also observed the bare metal visual inspection of approximately 25 percent of the penetration nozzles, performed in accordance with NRC Order EA-03-009, “Issuance of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors,” and reviewed the licensee's procedure and inspection report.

The inspectors verified that the nondestructive activities were performed in accordance with the requirements of NRC Order EA-03-009.

The nondestructive examinations performed during the NRC inspection did not reveal any defects. Indications were dispositioned in accordance with the licensee’s qualified procedures and in accordance with ASME Code acceptance criteria parameters.

The inspectors determined through discussions with licensee personnel, that welding repairs have not been performed on upper head penetrations.

The inspectors completed one sample under Section 02.02.

b. Findings

No findings of significance were identified.

02.03 Boric Acid Corrosion Control Inspection Activities (Pressurized Water Reactors)

a. Inspection Scope

The inspectors evaluated the implementation of the licensee’s boric acid corrosion control program for monitoring degradation of those systems that could be deleteriously affected by boric acid corrosion.

The inspection procedure requires review of a sample of boric acid corrosion control walkdown visual examination activities through either direct observation or record review. The inspectors reviewed the documentation associated with the licensee's boric acid corrosion control walkdown as specified in Procedure S023-V-8.15, "Boric Acid Leak Inspection," Revision 1. Samples of documented visual inspection records of inspection walk-downs performed on components and equipment during December 2005 and January 2006 were also reviewed by the inspectors.

Additionally, the inspectors performed independent observations of piping containing boric acid during walkdowns of the containment building and the auxiliary building.

The inspection procedure requires verification that visual inspections emphasize locations where boric acid leaks can cause degradation of safety significant components. The inspectors verified through direct observation and program/record review that the licensee's boric acid corrosion control inspection efforts are directed towards locations where boric acid leaks can cause degradation of safety-related components.

The inspection procedure requires both a review of one to three engineering evaluations performed for boric acid leaks found on reactor coolant system piping and components, and one to three corrective actions performed for identified boric acid leaks. There were no applicable ARs generated since the last inspection period that required formal engineering evaluations, (e.g. that resulted in a separate design or structural engineering analysis to determine continued operability). The inspectors reviewed ARs 050200951, 051200454, 051200458, 051200467, and 051200465, documenting minor boric acid leaks on a body-to-bonnet bolted connection on a valve in the safety injection system and valve packing leaks on valves in the reactor coolant system and the safety injection system. The planned corrective actions were adequate in each case.

The inspectors completed one sample under Section 02.03.

b. Findings

No findings of significance were identified.

02.04 Steam Generator Tube Inspection Activities

a. Inspection Scope

The inspection procedure specified performance of an assessment of in-situ screening criteria to assure consistency between assumed nondestructive examination flaw sizing accuracy and data from the Electric Power Research Institute (EPRI) examination technique specification sheets. It further specified assessment of appropriateness of tubes selected for in-situ pressure testing, observation of in-situ pressure testing, and review of in-situ pressure test results.

At the time of this inspection, no conditions had been identified that warranted in-situ pressure testing. The inspectors did, however, review the licensee's report for Units 2 and 3, "Steam Generator Degradation Assessment for the Cycle 14 Refueling Outages in 2006," Revision 0, and compared the in-situ test screening parameters to the guidelines contained in the EPRI Document, "In Situ Pressure Test Guidelines," Revision 2, and the Combustion Engineering Owners Group screening criteria. This review determined that the remaining screening parameters were consistent with the EPRI and Combustion Engineering Owners Group guidelines.

In addition, the inspectors reviewed both the licensee site-validated and qualified acquisition and analysis technique sheets used during this refueling outage and the qualifying EPRI examination technique specification sheets to verify that the essential variables regarding flaw sizing accuracy, tubing, equipment, technique, and analysis had been identified and qualified through demonstration. The inspector-reviewed acquisition technique and analysis technique sheets are identified in the attachment.

The inspection procedure specified comparing the estimated size and number of tube flaws detected during the current outage against the previous outage operational assessment predictions to assess the licensee's prediction capability. The inspectors compared the previous outage operational assessment predictions contained in Report R-3671-00-1, "Tube Degradation Predictions for the San Onofre Nuclear Generating Station Unit 2 Steam Generators - 2004 Update," with the flaws identified, thus far, during the current steam generator tube inspection effort. Compared to the projected damage mechanisms identified by the licensee, the number of identified indications fell within the range of prediction and were quite consistent with predictions. No new damage mechanisms had been identified during this inspection.

The inspection procedure specified confirmation that the steam generator tube eddy current test scope and expansion criteria meet TS requirements, EPRI guidelines, and commitments made to the NRC. The inspectors evaluated the recommended steam generator tube eddy current test scope established by TS requirements and the San Onofre Nuclear Generating Station degradation assessment report. The inspectors compared the recommended test scope to the actual test scope and found that the licensee had accounted for all known flaws and had, as a minimum, established a test scope that met TS requirements, EPRI guidelines, and commitments made to the NRC. The scope of the licensee's eddy current examinations of tubes in both steam generators included:

- A full length bobbin examination of 100 percent of inservice tubes

- Rotating pancake coil exams (+Point) of 100 percent of hot leg top-of-tubesheet locations (+4", - 13")

- Rotating pancake coil exams (+Point) of 20 percent of cold leg top-of-tubesheet locations (+4", -13")

- Rotating pancake coil exams (+Point) of 100 percent of Rows 1-4 U-bend locations

- Rotating pancake coil exams (+Point) of 20 percent of Rows 5-10 U-bend locations

- Rotating pancake coil exams (+Point) of 100 percent installed sleeves for full length

- Rotating pancake coil exams (+Point) of 20 percent of hot leg scallop bar supports, and

- Rotating pancake coil exams (+Point) of approximately 8869 special interest locations

The inspection procedure specified, if new degradation mechanisms were identified, verification that the licensee fully enveloped the problem in its analysis of extended conditions including operating concerns and had taken appropriate corrective actions before plant startup. To date, the eddy current test results had not identified any new degradation mechanisms.

The inspection procedure requires confirmation that the licensee inspected all areas of potential degradation, especially areas that were known to represent potential eddy current test challenges (e.g., top-of-tubesheet, tube support plates, and U-bends). The inspectors confirmed that all known areas of potential degradation were included in the scope of inspection and were being inspected.

The inspection procedure further requires verification that repair processes being used were approved in the TSs. At the time of this inspection, it was estimated that a total of approximately 202 tubes in steam Generator 88 would be plugged and approximately 111 tubes in steam Generator 89 would be plugged. The inspectors verified that the mechanical expansion plugging process to be used was an NRC-approved repair process.

The inspection procedure also requires confirmation of adherence to the TS plugging limit, unless alternate repair criteria have been approved. The inspection procedure further requires determination whether depth sizing repair criteria were being applied for indications other than wear or axial primary water stress corrosion cracking in dented tube support plate intersections. The inspectors determined that the TS plugging limits were being adhered to (i.e., 40 percent maximum through-wall indication).

If steam generator leakage greater than 3 gallons per day was identified during operations or during post shutdown visual inspections of the tubesheet face, the inspection procedure requires verification that the licensee had identified a reasonable cause based on inspection results and that corrective actions were taken or planned to address the cause for the leakage. The inspectors did not conduct any assessments because this condition did not exist.

The inspection procedure requires confirmation that the eddy current test probes and equipment were qualified for the expected types of tube degradation and an assessment of the site-specific qualification of one or more techniques. The inspectors observed portions of eddy current tests performed on the tubes in steam Generators 88 and 89. During these examinations, the inspectors verified that: (1) the probes appropriate for identifying the expected types of indications were being used, (2) probe position location verification was performed, (3) calibration requirements were adhered, and (4) probe travel speed was in accordance with procedural requirements. The inspectors performed a review of site-specific qualifications of the techniques being used. These are identified in the attachment.

If loose parts or foreign material on the secondary side were identified, the inspection procedure specified confirmation that the licensee had taken or planned appropriate repairs of affected steam generator tubes and that they inspected the secondary side to either remove the accessible foreign objects or perform an evaluation of the potential effects of inaccessible object migration and tube fretting damage. During licensee-performed foreign object search and retrieval inspections, one small thin strip of magnetic material approximately 2.25" long X 0.03" thick X a tapering width ranging from 0.25" to 0.75" was identified in steam Generator 88 in the hot leg top-of-tubesheet peripheral annulus. This was removed and eddy current examination of tubes in the area of the loose part did not identify any tube damage.

Finally, the inspection procedure specified review of one to five samples of eddy current test data if questions arose regarding the adequacy of eddy current test data analyses. The inspectors did not identify any results where eddy current test data analyses adequacy was questionable.

The inspectors completed one sample under Section 02.04.

b. Findings

No findings of significance were identified.

02.05 Identification and Resolution of Problems

a. Inspection Scope.

The inspection procedure requires review of a sample of problems associated with inservice inspections documented by the licensee in the corrective action program for appropriateness of the corrective actions.

The inspectors reviewed 14 ARs which dealt with inservice inspection activities and found that the corrective actions were appropriate. From this review the inspectors concluded that the licensee had an appropriate threshold for entering issues into the corrective action program and has procedures that direct a root cause evaluation when necessary. The licensee also had an effective program for applying industry operating experience.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope

The inspectors observed testing and training of senior reactor operators and reactor operators to identify deficiencies and discrepancies in the training, to assess operator performance, and to assess the evaluator's critique. The training scenario involved use of a new digital feedwater and turbine control system to respond to plant transients.

Documents reviewed by the inspectors included:

- Procedure SO23-10-1, "Turbine Startup and Normal Operation," Revision 23
- Procedure SO23-9-6, "Feedwater Control System Operation," Revision 13
- 2006 Week 1 Simulator Summary, Revision 3

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

Maintenance Effectiveness Baseline Review

a. Inspection Scope

The inspectors reviewed the two listed maintenance activities to: (1) verify the appropriate handling of structure, system, and component (SSC) performance or condition problems; (2) verify the appropriate handling of degraded SSC functional performance; (3) evaluate the role of work practices and common cause problems; and (4) evaluate the handling of SSC issues reviewed under the requirements of the maintenance rule, 10 CFR Part 50 Appendix B, and the TSs.

- January 3 - March 2, 2006, Units 2 and 3, long term plan for inspecting and staking taper pins associated with Fisher butterfly valves
- January 3 - March 17, 2006, Unit 2, pressurizer heater sleeve half sleeve repairs

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed two samples.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

Emergent Work Control

The inspectors: (1) verified that the licensee performed actions to minimize the probability of initiating events and maintained the functional capability of mitigating systems and barrier integrity systems; (2) verified that emergent work-related activities such as troubleshooting, work planning/scheduling, establishing plant conditions, aligning equipment, tagging, temporary modifications, and equipment restoration did not place the plant in an unacceptable configuration; and (3) reviewed the UFSAR to determine if the licensee identified and corrected risk assessment and emergent work control problems.

- January 5, 2006, Unit 2 polar crane failure (AR 060100243)
- January 15, 2006, Unit 2 SWC system leak into the Unit 2 intake structure (AR 060100847)
- January 19, 2006, Unit 2 refueling load cell failure (AR 060100863)
- January 26, 2006, Unit 2 refueling bridge drive gear failure (AR 060101390)
- January 29, 2006, Unit 2 reactor cavity draining too slowly (AR 060101369)
- March 1, 2006, Unit 2 steam Generator E089 main steam line seismic snubber replacement (AR 060101354)

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

1R14 Operator Performance During Non-Routine Evolutions and Events (71111.14)

a. Inspection Scope

The inspectors: (1) reviewed operator logs, plant computer data, and/or strip charts for the below listed evolutions to evaluate operator performance in coping with non-routine events and transients; (2) verified that operator actions were in accordance with the response required by plant procedures and training; and (3) verified that the licensee has identified and implemented appropriate corrective actions associated with personnel performance problems that occurred during the non-routine evolutions sampled.

- January 9, 2006, Unit 2, control room operator response to shutdown cooling low flow alarm

- February 3, 2006, Units 2 and 3, control room operator response to all offsite power being declared inoperable

- February 15, 2006, Unit 3, control room operator response to inadvertent filling of a steam generator from an auxiliary feedwater pump

- March 19, 2006, Unit 2, control room operator response to a loss of inventory from the reactor coolant system with the unit in cold shutdown

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed four samples.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors: (1) reviewed plant status documents such as operator shift logs, emergent work documentation, deferred modifications, and standing orders to determine if an operability evaluation was warranted for degraded components; (2) referred to the UFSAR and design basis documents to review the technical adequacy of licensee operability evaluations; (3) evaluated compensatory measures associated with operability evaluations; (4) determined degraded component impact on any TSs; (5) used the Significance Determination Process to evaluate the risk significance of degraded or inoperable equipment; and (6) verified that the licensee has identified and implemented appropriate corrective actions associated with degraded components.

The inspectors: (1) reviewed reactor coolant system chemistry analysis results, steam generator chemistry analysis results, quality assurance audits and surveillances; (2) reviewed procedures for laboratory instrumentation quality assurance, operation, calibration and maintenance, sampling and analysis; **(3) observed surveillance sampling and analysis, instrumentation calibration and quality control checks in the reactor and turbine laboratories, in order to evaluate the technical adequacy of the operation, calibration and maintenance methods; and (4) evaluated compensatory measures associated with chemistry surveillance test action levels, and verified that the licensee identified and implemented appropriate corrective actions associated with conditions adverse to quality.**

- January 8, 2006, AR 060100463 - Unit 2 shutdown cooling drain valve leak

- January 9, 2006, AR 060100452 - Unit 2 Train A component cooling water noncritical loop isolation valve equalizing valve found open

- January 20, 2006, AR 060101006 - Unit 2 engineered safety features Cabinet L035 ground

- February 3, 2006, AR 060200232 - Units 2 and 3 offsite power sources declared inoperable

- February 11, 2006, AR 060200377 - Unit 3 potential for dust contamination in the main control room control boards

- February 23, 2006, AR 060102099 - Unit 3 Part 21 report on increased failure rates of digital reference units in emergency diesel generators

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed seven samples.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications (71111.17)

a. Inspection Scope

Annual Review

The inspectors reviewed key affected parameters associated with energy needs, materials/replacement components, timing, heat removal, control signals, equipment protection from hazards, operations, flowpaths, pressure boundary, ventilation boundary, structural, process medium properties, licensing basis, and failure modes for the modification listed below. The inspectors verified that: (1) modification preparation, staging, and implementation did not impair emergency/abnormal operating procedure actions, key safety functions, or operator response to loss of key safety functions; (2) post-modification testing maintained the plant in a safe configuration during testing by verifying that unintended system interactions will not occur, SSC performance characteristics still meet the design basis, the appropriateness of modification design assumptions, and the modification test acceptance criteria has been met; and (3) the licensee has identified and implemented appropriate corrective actions associated with permanent plant modifications.

- Unit 2 digital feedwater and turbine control systems upgrades

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors selected the five listed postmaintenance test activities of risk significant systems or components. For each item, the inspectors: (1) reviewed the applicable licensing basis and/or design-basis documents to determine the safety functions; (2) evaluated the safety functions that may have been affected by the maintenance activity; and (3) reviewed the test procedure to ensure it adequately tested the safety function that may have been affected. The inspectors either witnessed or reviewed test data to verify that acceptance criteria were met, plant impacts were evaluated, test equipment was calibrated, procedures were followed, jumpers were properly controlled, the test data results were complete and accurate, the test equipment was removed, the system was properly re-aligned, and deficiencies during testing were documented. The inspectors also reviewed the UFSAR to determine if the licensee identified and corrected problems related to postmaintenance testing.

- February 2, 2006, Unit 2, component cooling water heat exchanger Train A postmaintenance test following planned cleaning

- February 12, 2006, Unit 2, component cooling water Valve 2HV6212 postmaintenance test following planned maintenance

- February 14, 2006, Unit 2 atmospheric dump Valve 2HV8419 postmaintenance test following planned maintenance

- February 27, 2006, Unit 2, component cooling water Valve 2HV6218 postmaintenance test following planned maintenance

- March 8, 2006, Unit 2 steam Generator E089 mechanical Snubber S2ST002H002 postmaintenance test following its replacement

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed five samples.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities (71111.20)

a. Inspection Scope

The inspectors reviewed the following risk significant items or activities during the Unit 2 Cycle 14 refueling outage to verify defense in depth commensurate with the outage risk control plan, compliance with the TSs, and adherence to commitments in response to Generic Letter 88-17, "Loss of Decay Heat Removal:" (1) the risk control plan; (2) tagging/clearance activities; (3) reactor coolant system instrumentation; (4) electrical power; (5) decay heat removal; (6) spent fuel pool cooling; (7) inventory control; (8) reactivity control; (9) containment closure; (10) reduced inventory or midloop conditions; (11) refueling activities; (12) heatup and coldown activities; (13) restart activities; and (14) licensee identification and implementation of appropriate corrective actions associated with refueling and outage activities. The inspectors' containment inspections included observations of the containment sump for damage and debris; and supports, braces, and snubbers for evidence of excessive stress, water hammer, or aging. Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the UFSAR, procedure requirements, and TSs to ensure that the seven listed surveillance activities demonstrated that the SSC's tested were capable of performing their intended safety functions. The inspectors either witnessed or reviewed test data to verify that the following significant surveillance test attributes were adequate: (1) preconditioning; (2) evaluation of testing impact on the plant; (3) acceptance criteria; (4) test equipment; (5) procedures; (6) jumper/lifted lead controls; (7) test data; (8) testing frequency and method demonstrated TS operability; (9) test equipment removal; (10) restoration of plant systems; (11) fulfillment of ASME Code requirements; (12) updating of performance indicator data; (13) engineering evaluations, root causes, and bases for returning tested SSC's not meeting the test acceptance criteria were correct; (14) reference setting data; and (15) annunciators and alarms setpoints. The inspectors also verified that the licensee identified and implemented any needed corrective actions associated with the surveillance testing.

- December 16, 2005, Unit 2 Train A emergency diesel Generator 2G002 exciter field current transducer calibration

- January 4, 2006, Unit 3 turbine driven auxiliary feedwater Pump 3P140 inservice test

- February 1, 2006, Unit 3 motor driven auxiliary feedwater Pump 3P141 inservice test

- February 10, 2006, Unit 2 contact resistance and dust inspections for control room hand switches associated with Valves 2HV0396, 2HV9350, and 2HV9360

- February 15, 2006, Unit 3, engineered safety features relays semiannual surveillance

- February 28, 2006, Unit 2, component cooling water Valve 2HV6213 inservice test

- March 3, 2006, Unit 2 pressurizer auxiliary spray line check Valve 2MU129 local leak rate test

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed seven samples**.**

b. Findings

Introduction. A Green self-revealing noncited (NCV) of TS 5.5.1.1 was identified for the failure of electrical test technicians to develop adequate procedures during work to replace and calibrate an exciter field current transducer on the Unit 2 Train A EDG 2G002. This failure resulted in the loss of the exciter field voltage circuit and rendered EDG 2G002 inoperable.

Description. On December 16, 2005, two electrical test technicians were to perform work in accordance with Maintenance Order (MO) 05080093 in order to remove, replace, and calibrate the exciter field current transducer for the Unit 2 Train A EDG 2G002.

Following a pre-job brief between the two technicians and their supervisor, it was discovered that the replacement transducer was not an in-kind replacement and that a new one was needed from the warehouse before it could be replaced. While waiting for the new transducer, the supervisor directed the technicians to calibrate the old transducer that was still in-place. The supervisor indicated that he directed the technicians to follow MO 05080093 through Step 7. Completion of these steps would have ensured that the old transducer would have been in-place without any leads connected and the calibration would not affect the rest of the EDG 2G002 exciter circuit.

The technicians indicated that they believed that they were to use the generic calibration Procedure SO123-II-11.151, "Electrical Metering Calibration," Revision 2, and their skill of the craft in order to perform the calibration. As a result, MO 05080093 was not performed and the transducer leads remained connected to the exciter circuit as the test technicians began the calibration. In order to complete the calibration, the technicians had to input a calibration signal into the transducer circuit which required the lifting of a lead at a meter shunt. The technicians failed to recognize that the shunt was not installed in the conventional configuration and did not trace the shunt circuit to identify the correct lead to lift. The technicians lifted the lead to the shunt meter based on the conventional wiring configuration. The lead that was lifted caused the EDG 2G002 exciter field voltage circuit to be lost and rendered EDG 2G002 inoperable. The technicians recognized their mistake when they were not able to calibrate the transducer. The technicians reconnected the lead after approximately fifteen minutes which allowed EDG 2G002 to be available for an emergency start. The technicians informed their supervisor that the wrong lead had been lifted and indicated that they believed that they had rendered EDG 2G002 inoperable. Instead of immediately informing the Unit 2 control room of the suspected inoperability of EDG 2G002, the supervisor first reviewed the electrical drawings to validate the technicians' belief that EDG 2G002 was inoperable. The supervisor notified operations personnel approximately two hours after EDG 2G002 had been suspected to have become inoperable. The inspectors concluded that poor interdepartmental communications were exhibited between maintenance and operations personnel. Operations personnel should have been notified immediately after the test technicians suspected that EDG 2G002 was inoperable so that they could perform a more timely operability assessment of EDG 2G002.

The exciter field current transducer was successfully replaced and wired in the conventional configuration. The Unit 2 Train A EDG was inoperable for approximately 24 hours.

The inspectors reviewed Procedure SO123-I-1.3, "Work Activity Guidelines," Revision 12, and noted that Section 6.2.7 requires the supervisor or planner to make changes to an MO when it will be performed differently then what is directed by the work plan. In this case, the supervisor failed to change MO 05080093 to reflect his direction to calibrate the installed transducer. Furthermore, the supervisor and technicians did not adequately communicate the changes to the maintenance activity.

Analysis. The failure of the test technicians to develop an adequate MO was determined to be a performance deficiency. The finding was determined to be more than minor because it was associated with the procedure quality attribute of the mitigating systems cornerstone and affects the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process" Phase 1 worksheet, the finding is determined to have very low safety significance because the finding did not represent an actual loss of the Unit 2 Train A EDG for greater than its TS allowed outage time of 14 days. The finding had crosscutting aspects in the area of human performance because the failure of the test technicians and their supervisor to communicate changes to the maintenance activity directly contributed to the cause of the finding.

Enforcement. TS 5.5.1.1 requires, in part, that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Appendix A, Section 9, requires that maintenance that can affect the performance of safety related equipment be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Contrary to this, on December 16, 2005, electrical test technicians failed to ensure that maintenance that can affect the performance of safety-related equipment was properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Specifically, test technicians attempted to calibrate the Unit 2 Train A EDG exciter field current transducer without an approved MO. Because the finding is of very low safety significance and has been entered into the licensee's CAP as AR 051200922, this violation is being treated as an NCV consistent with Section VI.A of the Enforcement Policy: NCV 05000361/2006002-01, "Implementation of Improper Procedure Renders Unit 2 Train A Emergency Diesel Generator Inoperable."

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed the UFSAR, plant drawings, procedure requirements, and TSs to ensure that the below listed temporary modification was properly implemented. The inspectors: (1) verified that the modification did not have an affect on system operability/availability; (2) verified that the installation was consistent with modification documents; (3) ensured that the post-installation test results were satisfactory and that the impact of the temporary modification on permanently installed SSC's were supported by the test; (4) verified that the modification was identified on control room drawings and that appropriate identification tags were placed on the affected drawings; and (5) verified that appropriate safety evaluations were completed. The inspectors verified that the licensee identified and implemented any needed corrective actions associated with temporary modifications.

- January 26, 2006, temporary connection between the Unit 3 screen wash system and the Unit 2 SWC system as a means to provide backup spent fuel pool cooling during the Train A SWC outage work window

Documents reviewed by the inspectors included:

- Engineering Change Package 060101648-10
- Procedure SO123-XXIV-10.1, "Preparation, Review, Approval, Issuance, Implementation, and Closure of Engineering Change Packages (ECPs) and Engineering Change Notices (ECNs)," Revision 12
- Calculation M-1413-003-AA, "Saltwater Intake Train B Unit 2," Revision 7

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

The inspector performed in-office reviews of Revision 24 to San Onofre Nuclear Generating Station Emergency Plan Implementing Procedure SO123-VIII-I, "Recognition and Classification of Emergencies," submitted September 30, 2005, and Revision 20 to the San Onofre Nuclear Generating Station Emergency Plan submitted February 2006. These revisions:

- Revised downward emergency action level indications for plant sump radiation monitors in Emergency Action Level A1-2
- Revised upward emergency action level indications for plant sump radiation monitors in Emergency Action Level A2-2
- Defined a single steam generator as the location of leakage in Emergency Action Levels A2-6 and A3-2
- Revised Security-related emergency action levels according to NRC Bulletin 2005-002, "Emergency Preparedness and Response Actions for Security-Based Events"
- Revised process and area radiation monitor emergency action indicators

The inspector reviewed licensee 10 CFR 50.59 and 10 CFR 50.54(q) reviews for Revision 24, OSM-1, "Operations Dictionary," licensee General Employee Training materials, Lesson Plan 2RP479, Revision 0, "Classification for Shift Managers," and Lesson Plan 3DECMGT, "Classification for ERO Members (TSC, EOF Managers)." These revisions were compared to their previous revisions, to the criteria of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, to NRC Bulletin 2005-002, and to the requirements of 10 CFR 50.47(b) and 50.54(q), to determine if the licensee adequately implemented 10 CFR 50.54(q).

The inspector completed two samples during this inspection.

b. Findings

No findings of significance were identified.

Cornerstone: Occupational Radiation Safety

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control To Radiologically Significant Areas (71121.01)

a. Inspection Scope

This area was inspected to assess the licensee's performance in implementing physical and administrative controls for airborne radioactivity areas, radiation areas, high radiation areas (HRAs), and worker adherence to these controls. The inspector used the requirements in 10 CFR Part 20, the TSs, and the licensee's procedures required by TSs as criteria for determining compliance. During the inspection, the inspector interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspector performed independent radiation dose rate measurements and reviewed the following items:

- Performance indicator events and associated documentation packages reported by the licensee in the Occupational Radiation Safety Cornerstone
- Controls (surveys, posting, and barricades) of three radiation, high radiation, or airborne radioactivity areas
- Radiation exposure permits, procedures, engineering controls, and air sampler locations
- Conformity of electronic personal dosimeter alarm set points with survey indications and plant policy; workers' knowledge of required actions when their electronic personal dosimeter noticeably malfunctions or alarms.
- Self-assessments, audits, licensee event reports, and special reports related to the access control program since the last inspection
- Corrective action documents related to access controls
- Licensee actions in cases of repetitive deficiencies or significant individual deficiencies
- Radiation exposure permit briefings and worker instructions
- Adequacy of radiological controls such as, required surveys, radiation protection job coverage, and contamination controls during job performance
- Dosimetry placement in high radiation work areas with significant dose rate gradients
- Changes in licensee procedural controls of high dose rate - high radiation areas and very high radiation areas
- Controls for special areas that have the potential to become very high radiation areas during certain plant operations
- Posting and locking of entrances to all accessible high dose rate - high radiation areas and very high radiation areas

- Radiation worker and radiation protection technician performance with respect to radiation protection work requirements

Documents reviewed by the inspectors are listed in the attachment.

The inspector completed 18 of the required 21 samples.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope

The inspector assessed licensee performance with respect to maintaining individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspector used the requirements in 10 CFR Part 20 and the licensee's procedures required by TSs as criteria for determining compliance. The inspector interviewed licensee personnel and reviewed:

- Three work activities of highest exposure significance during the outage
- ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements
- Use of engineering controls to achieve dose reductions and dose reduction benefits afforded by shielding
- Workers use of the low dose waiting areas
- First-line job supervisors' contribution to ensuring work activities are conducted in a dose efficient manner
- Radiation worker and radiation protection technician performance during work activities in radiation areas, airborne radioactivity areas, or HRAs

Documents reviewed by the inspectors are listed in the attachment.

The inspector completed 6 of the required 29 samples.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification (71151)

a. Inspection Scope

Cornerstone: Initiating Events

The inspectors sampled licensee submittals for the three performance indicators listed below for the period January 2004 through December 2005, for Units 2 and 3. The definitions and guidance of Nuclear Energy Institute 99-02, "Regulatory Assessment Indicator Guideline," Revision 3, were used to verify the licensee's basis for reporting each data element in order to verify the accuracy of PI data reported during the assessment period. The inspectors reviewed licensee event reports, monthly operating reports, and operating logs as part of the assessment. Licensee performance indicator data were also reviewed against the requirements of "Operations 2/3 NEI-PI 99-02 Desktop Guide for Regulatory Assessment Performance Indicators;" Procedure SO23-XV-24, "Quarterly NRC Performance Indicator (PI) Process," Revision 4; and Procedure SO23-NI-1, "NRC Performance Indicator (PI) Program," Revision 4.

- Unplanned Scrams Per 7,000 Critical Hours (IE1)
- Unplanned Scrams With Loss Of Normal Heat Removal (IE2)
- Unplanned Power Changes Per 7,000 Critical Hours (IE3)

The inspectors completed three samples.

Cornerstone: Occupational Radiation Safety

- Occupational Exposure Control Effectiveness

The inspector reviewed licensee documents from March 2005 through February 2006. The review included corrective action documentation that identified occurrences in locked HRAs (as defined in the licensee's TSs), very high radiation areas (as defined in 10 CFR 20.1003), and unplanned personnel exposures (as defined in NEI 99-02). Additional records reviewed included ALARA records and whole body counts of selected individual exposures. The inspector interviewed licensee personnel that were accountable for collecting and evaluating the PI data. In addition, the inspector toured plant areas to verify that high radiation, locked high radiation, and very high radiation areas were properly controlled. PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Indicator Guideline," Revision 3, were used to verify the basis in reporting for each data element.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a daily screening of items entered into the licensee's CAP. This assessment was accomplished by reviewing MOs, ARs, the management focus list, and attending corrective action review and work control meetings. The inspectors: (1) verified that equipment, human performance, and program issues were being identified by the licensee at an appropriate threshold and that the issues were entered into the CAP; (2) verified that corrective actions were commensurate with the significance of the issue; and (3) identified conditions that might warrant additional follow-up through other baseline inspection procedures.

b. Findings

No findings of significance were identified.

.2 Selected Issue Follow-up Inspection

a. Inspection Scope

In addition to the routine review, the inspectors selected the two listed issues for a more in-depth review. The inspectors considered the following during the review of the licensee's actions: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of corrective actions; and (7) completion of corrective actions in a timely manner.

- March 7-9, 2006, Units 2 and 3, AR 041101743 - designated safe load paths violated during the movement of boom lifts onto the Units 2 and 3 SWC pump house roofs

- December 9, 2005, Unit 2 AR 0603001461 - pressurizer heater breaker inoperable for greater than TS allowed outage time

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed two samples.

b. Findings and Observations

.1 On November 10, 2004, a telescopic boom lift was placed on the Unit 2 SWC pump house roof in violation of Procedures SO123-I-1.13, "NUREG 0612 Cranes, Rigging and Lifting Controls," Revision 11, and SO2-I-7.101, "Turbine Gantry Crane Checkout and Operation," Revision 2. The licensee identified the procedural violations, but failed to enter the issue into their CAP. As a result, Procedures SO123-I-1.13 and SO2-I-7.101 were violated again on November 24, 2004, when the boom lift was moved from the

Unit 2 SWC pump house roof to the Unit 3 SWC pump house roof. The licensee identified these issues and addressed them in apparent cause Evaluation 041101743-01. These violations of procedural requirements were determined to be of minor significance because the boom lift was not dropped and there was not any damage to plant structures. In addition, the weight of the boom lift was bounded by equipment that had already been evaluated and approved for movement over the SWC pump house roofs. Finally, the boom lift was not lifted directly over any of the SWC pumps.

The regulations in 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," require, in part, that activities affecting quality shall be accomplished in accordance with appropriate procedures. Procedures SO123-I-1.13 and SO2-I-7.101 are quality affecting. The failure to comply with Procedures SO123-I-1.13 and SO2-I-7.101 on November 10 and 24, 2004, constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's enforcement policy.

.2 Introduction. The inspectors identified a Green self-revealing finding for the failure of maintenance engineering personnel to take appropriate corrective actions in response to a failure of the Unit 2 pressurizer backup heater Breaker 2B0602. This failure resulted in pressurizer backup heater Bank 2E129 being inoperable for greater than its TS allowed outage time of 72 hours.

Description. On December 3, 2005, operations personnel were preparing to perform an engineered safety features subgroup relay test in accordance with Procedure SO23-3-3.43.32, "ESF Subgroup Relays K-113B and K-310B Semiannual Test," Revision 3. This required closure of the Unit 2 pressurizer backup heater Bank 2E129 Breaker 2B0602 from the control room. Breaker 2B0602 did not close as expected, and operations personnel entered a 72 hour shutdown action statement for the inoperability of pressurizer backup heater Bank 2E129 in accordance with TS 3.4.9.B.

Maintenance personnel removed the breaker from its cubicle and performed troubleshooting activities on Breaker 2B0602. Maintenance personnel could not immediately identify any problems with the removed breaker, and installed a replacement breaker in the Breaker 2B0602 cubicle. A surveillance test in accordance with Procedure SO23-3-1.10, "Pressurizer Pressure and Level Control," Revision 13, was performed successfully on Breaker 2B0602 and Breaker 2B0602 was declared operable.

On December 7, 2005, on the first attempt to close Breaker 2B0602 since the December 3 surveillance, Breaker 2B0602 again failed to close from the control room. Operations personnel declared pressurizer heater Bank 2E129 inoperable and entered the 72 hour shutdown action statement in accordance with TS 3.4.9.B.

Maintenance personnel performed a more extensive investigation of the Breaker 2B0602 failure and discovered two mechanisms that could have contributed to the failure. While installing the breaker in the cubicle, the breaker contact support plates were observed interfering with bolts in the rear of the cubicle that hold the secondary carrier to the cubicle. The interference contributed to reducing contact pressure between the secondary contacts. Also, the breaker cradle in the cubicle was slightly misaligned. The breaker cubicle for Breaker 2B0602 was originally designed to accommodate a 1600 ampere breaker. However, the rails in the cubicle were inset to accommodate the 600 ampere Breaker 2B0602.

Maintenance engineering personnel realigned the breaker cradle and modified the original breaker that was removed from the cubicle on December 3 to eliminate the possibility of interference. The cubicle contacts were cleaned and the breaker was reinstalled in the Breaker 2B0602 cubicle. Surveillance Procedure SO23 3-1.10 was performed successfully on Breaker 2B0602 and Breaker 2B0602 was declared operable on December 9, 2005.

The inspectors determined that pressurizer backup heater Bank 2E129 had been inoperable from December 3 - 9, 2005, and had exceeded its TS allowed outage time. The inspectors also noted that there were three other identical configurations on site of a 600 ampere breaker installed in a 1600 ampere cubicle, all associated with pressurizer backup heater breakers. The inspectors had to prompt maintenance engineering personnel to schedule expedited inspections on these breakers to ensure their operability. Unit 2 inspections were completed satisfactorily, and the licensee was still evaluating when inspections on the two breakers in Unit 3 would occur at the end of the inspection period.

The inspectors also identified two similar circumstances where operability and cause assessments were not performed or scheduled until the inspectors raised concerns. First, a Unit 2 control room switch was found to be inoperable due to the accumulation of excessive dust (AR 060200377). An extent of condition review for operability was not performed on switches located in Unit 3 until prompted by the inspectors. Second, an apparent cause assessment was not assigned to an equipment failure event during testing that resulted in the inadvertent feeding of a steam generator from an auxiliary feedwater pump (AR 060300863). The licensee recognized that some corrective action requirements were too vague, and that new guidance would be incorporated into their CAP. This issue was placed in the licensee's CAP as AR 0603001461.

Analysis. The performance deficiency associated with this finding was the failure of maintenance engineering personnel to identify and correct an equipment problem. The finding is more than minor because it is associated with the mitigating systems attribute of equipment performance and affects the associated cornerstone objective to ensure the availability of the pressurizer backup heaters to respond to initiating events to prevent undesirable consequences. The Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," were used to conclude that a Phase 2 analysis was required because the finding represented an actual loss of safety function of a single train for greater than its TS allowed outage time. Because of the very low safety significance of the pressurizer heaters, they are not listed in Table 3.7 of the site specific worksheets and the licensee's probabilistic risk assessment model. Therefore, a Phase 2 analysis could not be performed. Based on NRC management review, the finding was determined to be of very low safety significance. The finding had crosscutting aspects in the area of problem identification and resolution because the failure of maintenance engineering personnel to identify and correct the cause of the failure of pressurizer heater Breaker 2B0609 directly contributed to the cause of the finding.

Enforcement. TS 3.4.9.B requires that, with one required group of pressurizer heaters inoperable, that the required group be restored to operable status within 72 hours, or be in Mode 3 within 6 hours. Contrary to this, Unit 2 pressurizer heater Bank 2E129 was inoperable for 144 hours from December 3 - 9, 2005, while Unit 2 remained in Mode 1. Because this finding is of very low safety significance and has been entered into the licensee's CAP as AR 051200151, this violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 0500361/2006002-02, "Pressurizer Backup Heater Bank Inoperable for Greater than its Technical Specification Allowed Outage Time."

.3 Occupational Radiation Safety

Section 2OS1 evaluated the effectiveness of the licensee's problem identification and resolution processes regarding access controls to radiologically significant areas and radiation worker practices. The inspector reviewed corrective action documents for root cause/apparent cause analysis against the licensee's problem identification and resolution process. No findings of significance were identified.

4OA3 Event Follow-up (71153)

(Closed) Licensee Event Report 05000361/2005-005-00, "Inoperable Class 1E Supply Breaker Causes Pressurizer Heater to be Inoperable for Longer Than Allowed by Technical Specifications"

This issue was determined to be a NCV and is documented in Section 4OA2.2.2 of this report as NCV 0500361/2006002-02, "Pressurizer Backup Heater Bank Inoperable for Greater than its Technical Specification Allowed Outage Time." This Licensee Event Report is closed.

4OA5 Other Activities

.1 Temporary Instruction (TI) 2515/150, Revision 3: Reactor Pressure Vessel Head and Vessel Head Penetration Nozzles (NRC Order EA-03-009)

a. Inspection Scope

The inspectors observed and reviewed licensee activities associated with the reactor pressure vessel head and vessel head penetration nozzle inspections that were implemented in accordance with the requirements of Order EA-03-009.

The licensee performed a visual inspection of the bare metal surfaces of the Unit 2 reactor pressure vessel head and vessel head penetration nozzles during the Cycle 14 refueling outage that occurred during this inspection period. The inspectors performed an independent visual inspection of the reactor vessel head and head penetration nozzles through both direct physical inspection and video recordings. The inspectors noted that the video camera equipment provided sufficient clarity and resolution to identify the presence of small boron deposits (less than one cubic inch), as described in NRC Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles." The inspectors verified that the entire circumference of each head penetration was examined and that no evidence of boron crystals or cracking were present. The inspectors also verified that qualified licensee personnel conducted the inspection and that their training was current.

The licensee also performed nondestructive examinations of the reactor pressure vessel head penetration nozzles. Section 1R08 of this report documents the scope and findings of the NRC inspection activities in that area.

This inspection is the second occurrence of TI 2515/150 for Unit 2 and completes the inspection requirements of the TI. The first inspection occurrence of TI 2515/150 was documented in San Onofre Nuclear Generating Station - NRC Integrated Inspection Report 05000361/2004002; 05000362/2004002.

The inspection requirements of TI 2515/150 have also been completed for Unit 3. The first inspection occurrence was documented in San Onofre Nuclear Generating Station - NRC Integrated Inspection Report 05000361/2003002; 05000362/2003002 and the second inspection occurrence was documented in San Onofre Nuclear Generating Station - NRC Integrated Inspection Report 05000361/2004005; 05000362/2004005.

b. Findings

No findings of significance were identified.

.2 TI 2515/160: Pressurizer Penetration Nozzles and Steam Space Piping Connections in U.S. Pressurized Water Reactors (NRC Bulletin 2004-01)

a. Inspection Scope

The inspectors observed and reviewed licensee activities associated with the Unit 2 pressurizer penetration nozzles and steam space piping connections inspections that were implemented in accordance with the licensee's response to Bulletin 2004-01.

The licensee performed a visual inspection of the bare metal surfaces of the Unit 2 pressurizer and pressurizer penetrations during the Cycle 14 refueling outage that occurred during this inspection period. The inspections were completed before the licensee replaced and/or overlaid all of the Alloy 82/182/600 pressurizer penetrations and connections referenced in Bulletin 2004-01 with Alloy 52/690.

The inspectors performed an independent visual inspection of the pressurizer prior to the Alloy 52/690 modifications. The inspectors verified that the entire circumference of each pressurizer penetration was examined and that no evidence of boron crystals or cracking were present. The inspectors also verified that qualified licensee personnel conducted the inspection and that their training was current.

The licensee also performed nondestructive examinations of the pressurizer safety valve header and spray line. Section 1R08 of this report documents the scope and findings of the NRC inspection activities in that area.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors have completed TI 2515/160 for Unit 2.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

On January 19, February 17, and March 24, 2006, the inspectors presented the inspection results to Dr. R. Waldo and others who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

B. Ashbrook, Manager, Emergency Planning
D. Axline, Engineer, Nuclear Regulatory Affairs
J. Barrow, Health Physics
D. Breig, Station Manager
G. Broussuad, Manager, Security
R. Coe, Steam Generator Tube Integrity Engineer
B. Cortbett, Manager, Health Physics
M. Farmer, Supervisor, Health Physics
J. Fee, Manager, Emergency Preparedness
O. Flores, Manager, Chemical Engineering
J. Heflin, Supervisor, Chemistry
R. Holmes, Welding Engineer
B. Katz, Vice President, Nuclear Oversight and Regulatory Affairs
L. Kelly, Engineer, Nuclear Regulatory Affairs
M. Love, Manager, Maintenance
A. Mahindrakar, ISI Engineer
A. Martinez, Manager, Health Physics Operational Support
A. Matheny, Steam Generator System Engineer and Eddy Current Level III-QDA
A. Meichler, Supervisor, Codes and Welding
C. McAndrews, Manager, Nuclear Oversight and Assessment
M. McBrearty, Technical Specialist, Nuclear Regulatory Affairs
N. Quigley, Manager, Mechanical/Nuclear Maintenance Engineering
D. Richards, Project Manager, Emergency Planning
J. Reilly, Vice President Engineering & Technical Services
A. Scherer, Manager, Nuclear Regulatory Affairs
R. Schofield, Health Physics
J. Scott, Nuclear Regulatory Assurance
M. Short, Manager, Systems Engineering
T. Vogt, Manager, Operations
R. Waldo, Vice President, Nuclear Generation
D. Wilcockson, Manager, Plant Operations
C. Williams, Manager, Compliance
R. Waldo, Vice President, Nuclear Generation
T. Yackle, Manager, Design Engineering

Others

L. Davis, NDE Level III Examiner, Lambert MacGill Thomas, Inc.

NRC personnel

M. Shannon, Branch Chief, Plant Support Branch

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000361/2006002-01	NCV	Implementation of Improper Procedure Renders Unit 2 Train A Emergency Diesel Generator Inoperable (Section 1R22)
0500361/2006002-02	NCV	Pressurizer Backup Heater Bank Inoperable for Greater than its Technical Specification Allowed Outage Time (Section 4OA2.2.2)

Closed

05000361/2005-005-00	LER	Inoperable Class 1E Supply Breaker Causes Pressurizer Heater to be Inoperable for Longer Than Allowed by Technical Specifications (Section 4OA3)

Discussed

None

LIST OF DOCUMENTS REVIEWED

In addition to the documents called out in the inspection report, the following documents were selected and reviewed by the inspectors to accomplish the objectives and scope of the inspection and to support any findings:

Section 1R01: Adverse Weather Protection

Procedures

SO23-13-3, "Earthquake," Revision 8
SO23-13.8, "Severe Weather," Revision 5

Action Requests (ARs)

050701282, 060101555, 040600324

Section 1R04: Equipment Alignment

Procedures

SO23-3-2.6, "Shutdown Cooling System Operation," Revision 22

SO23-3-2.6.3, "RCS and SFP Combined Cooling - Core Not Offloaded," Revision 0

SO23-3-3.1, "Boric Acid Flow Path Testing," Revision 14

SO23-2-8.1, "Saltwater Cooling System Alignments and Infrequent/Outage Operations," Revision 3

Drawings

Process Key Plan 40126X, "Unit 2 Component Cooling Water System (Salt Water Pumps) System No. 1203," Revision 3

Process Key Plan 40126XSO3, "Unit 3 Component Cooling Water System (Salt Water Pumps) System No. 1203," Revision 2

Piping and Instrument Diagram 40126B, "Unit 2 Component Cooling Water System (Salt Water Pumps) System No. 1203," Revision 27

Piping and Instrument Diagram 40126BSO3, "Unit 3 Component Cooling Water System (Salt Water Pumps) System No. 1203," Revision 25

Piping and Instrument Diagram 40126A, "Unit 2 Component Cooling Water System (Salt Water Pumps) System No. 1203," Revision 26

Piping and Instrument Diagram 40126ASO3, "Unit 3 Component Cooling Water System (Salt Water Pumps) System No. 1203," Revision 19

Diagram 41106, "Saltwater Cooling Pump 33WX-I Stage Vertical Circulator Discharge Head," Revision 4

ARs

041200275, 050200691, 050300210, 050301741, 050500782, 050501107, 050501664, 050600625, 050700249, 050700282, 050701623, 050800205, 051000563, 051000366, 051100724, 051200013, 051201082, 051201181, 051201527, 060101394, 060200713

Miscellaneous

2005 4th Quarter System Health Report

1R08 Inservice Inspection Activities

Procedures

PQS-T4EN51,"Boric Acid Leakage and/or Inconel 600 Inspections," Revision 0

QA-37, "Qualification of Nondestructive Examination Personnel for Ultrasonic Examination," Revision 7

QA-41,"Qualification and Certification of NDE and Visual Examination Personnel per ASNT CP-189," Revision 3

SO123-V-7.3, "Administrative Controls of Welding, Brazing and Soldering Performance Qualifications," Revision 4

SO123-V-7.20.1, "ASME General Welding Standard," Revision 5

SO123-V-7.20.3, "ASME Welder Performance Qualification," Revision 3

SO123-V-7.20.9, "Visual Examination of ANSI/ASME Welds," Revision 5

SO123-V-7.40.6, "Visual Examination of ANSI/AWS D1.1 Structural Welds," Revision 2

SO23-V-8.15, "Boric Acid Leak Inspection," Revision 1

SO23-V-8.4, "Leak Management Program," Revision 0

SO123-XII-9.201, "Magnetic Particle Examination," Revision 3

SO23-XVII-3.1, "Inservice Inspection of Class I Components and Their Supports," Revision 6

SO23-XVII-3.2, "Inservice Inspection of Class II Components and Their Supports," Revision 3

SO23-XXVII-3.51.4, "Intraspect Ultrasonic Procedure for Inspection of Reactor Vessel Head Penetrations, Time of Flight Ultrasonic, Longitudinal Wave and Shear Wave," Revision 3

SO23-XXVII-4.120, "IntraSpect Ultrasonic Procedure for Inspection of CE ICI Reactor Vessel Head Penetrations," Revision 1

SO23-XXVII-4.122, "Data Compliance Tracking for SONGS 3R13," Revision 1

SO23-XXVII-20.48, "Liquid Penetrant Examination (PT-10)," Revision 1

SO23-XXVII-20.49, "Visual Examination Procedure to Determine the Condition of Nuclear Parts, Components or Surfaces (VT-1)," Revision 2

SO23-XXVII-20.52, "Ultrasonic Testing of Nozzle Inner Radius Areas," Revision 2

SO23-XXVII-23.1, "Multi-Frequence Eddy Current Examination of Steam Generator Tubing For San Onofre, Units 2 and 3," Revision 18

SO23-XXVII-30.9, "Ultrasonic Examination of Dissimilar Metal Piping Welds," Revision 1

SO23-XXXIII-8.16, "Reactor Coolant System Alloy 600 Inspection," Revision 4

WDI-ET-004, "IntraSpect Eddy Current Analysis Guidelines," Revision 9

WDI-STED-101, "RVHI Vent Tube J-Weld Eddy Current Examination," Revision 5

WDI-STD-148, "IntraSpect Ultrasonic Procedure for Inspection of CE ICI Reactor Vessel Head Penetrations," Revision 2

WDI-UT-013, "IntraSpect UT Analysis Guidelines," Revision 9

WDP-9.2, "Qualification and Certification of Personnel in NonDestructive Examination," Revision 7

Examination Technique Specification Sheets (ETSS)

San Onofre Nuclear Generating Station ETSS	Qualifying EPRI ETSSs
ETSS #1	96004.1, 96005.2, 96008.1, 96012.1, 24013.1, 20511.1
ETSS #2	20510.1
ETSS #3	20510.1, 20511.1, 21409.1, 21410.1, 21998.1, 22401.1, 22842.1, .2, .3, 96703.1
ETSS #4	20510.1, 20511.1, 21409.1, 21410.1, 21998.1, 22401.1, 22842.1, .2, .3, 96703.1
ETSS #5	96008.1, 96511.2
ETSS #6	96511.2, 99997.1

Action Requests

040302409, 040400324, 040600161, 040901737, 050101191, 050200951, 051000657, 051200454, 051200458, 051200465, 051200467, 060100463, 060100750, 060100738, 060100998

Work Orders

MWO 02031691001
MWO 03121457001

Welding Procedure Specifications (WPS) and Supporting Procedure Qualification Records (PQR)

WPS 43-8-GT-1 R 1, PQRs 25 and 34
WPS 03-43-T-801 R 1, PQRs 03-03-T-801 and A43256-52

WPS 43-43-T-001 R 1, PQRs 1001and A43256-52

WPS 03-43T-802 R2, PQR 03-43-T-803

WPS 43-43T-001 R2, PQRs 1001 and A43256-52

Miscellaneous

WSI Work Instruction 101144-002-W1. Sleeve Installation, Revision 0

Certified Material Test Reports for Welding Materials used on Half Sleeve Nozzle Repairs

Training and testing qualification/certification packages for NDE personnel

“SCE Currently Qualified ASME III Fabrication Welders,” dated December 29, 2005

Inservice Inspection Program Plan, “San Onofre Nuclear Generating Station, Unit 2 Third 10-Year Inservice Inspection Program Plan Document 90073,” Revision 0

EPRI Technical Report 1007904, “Steam Generator In Situ Pressure Test Guidelines,” Revision 2

TS 5.5.9

Weld Record WR3-03-231, Revision 1

Radiography Report and associated film 3RT-076-04 dated December 4, 2004

Liquid Penetrant Report 3PT-114-04 dated December 7, 2004

Letter from A. Edward Scherer, Mgr. Nuclear Regulatory Affairs (SONGS) to USNRC, “Docket Nos. 50-361 and 50-362: Third ten-year Inservice Inspection (ISI) Interval Relief Requests ISI-3-16 and ISI-3-17 to Support Pressurizer Lower Level Instrument Nozzle Repairs. San Onofre Nuclear Generating Station, Units 2 and 3,” December 23, 2005

Gary Buxton, “Unit 2 Mode 1 Boric Acid Walkdown Results 12/8/05"

Gary Buxton, “Unit 2 Mode 3 Boric Acid Walkdown Results 1/3/06"

Letter from A. Edward Scherer, Mgr. Nuclear Regulatory Affairs (SONGS) to USNRC, “Docket Nos. 50-361 and 50-362: Response to First Revised NRC Order (EA-03-009) Issued February 20, 2004 and Additional Information Regarding Relaxation Requests 1 and 2 for Reactor Pressure Vessel Head Penetration Inspection Requirements for San Onofre Nuclear Generation Station (SONGS) Units 2 and 3 (TAC Nos. MC1540, MC1541, MC1542, and MC1543,” February 28, 2004

ASME Code Case –513-1, “Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1,

“Safety Evaluation by the Office of Nuclear Reactor Regulation Order (EA-03-009) Relaxation Request, Alternative Examination Coverage for Reactor Pressure Vessel Head Penetration Nozzles San Onofre Nuclear Generating Station Units 2 and 3 Southern California Edison Docket Nos. 50-361, 50-362", March 19, 2004

Letter from A. Edward Scherer, Mgr. Nuclear Regulatory Affairs (SONGS) to USNRC, “Docket Nos. 50-361 and 50-362: Relaxation Request 3 for Reactor Pressure Vessel Head Penetration Inspection Requirements for San Onofre Nuclear Generating Station (SONGS) Units 2 and 3,” January 3, 2005

Letter from Dwight E. Nunn, Vice President (SONGS) to USNRC, “Docket Nos 50-361 and 50-362 60-day Response to NRC Bulletin 2004-01: Inspection of Alloy 82/182/600 Materials Used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors San Onofre Nuclear Generating Station, Units 2 and 3,” July 23, 2004

Letter from Brian Katz, Vice President (SONGS), “Docket No 50-362 60-day Post Refueling Outage Inspection Report for NRC Bulletin 2004-01 San Onofre Nuclear Generating Station, Unit 3,” February 25, 2005

Letter from A. Edward Scherer (Manager of Nuclear Regulatory Affairs) to USNRC, “Docket Nos. 50-361 and 50-362 Additional Information in Support of Inservice Inspection Relief Request ISI-3-14, Request use of Subsequent ASME Code Edition and Addenda for Pressure Testing of Welded Repair/Replacements in Third Inspection Interval San Onofre Nuclear Generating Station Units w and 3,” September 2, 2005

Document 90022, “Susceptibility of Reactor Coolant System Alloy 600 Nozzles to Primary Water Stress Corrosion Cracking and Replacement Plan,” Revision 4

NDE Personnel Qualifications

UT: 2 Level II
2 Level III

ET: 2 Level II
2 Level III

PT: 1 Level II
2 Level III

MT: 1 Level II
2 Level III

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Drawings

S2-1301-ML-002, “Isometric Drawing Steam —1301-002 Generator #1," Sheet 3, Revision 14

Calculations

M-1301-002-AA, "ME101 Piping Stress Calculations for Heatup, Cooldown, and Jacking for Snubber Removal," dated January 25, 2006

Nondestructive Examination Reports

2MT-026-06, NDE Report Magnetic Particle, dated January 31, 2006
2MT-027-06, NDE Report Magnetic Particle, dated February 8, 2006
2MT-035-06, NDE Report Magnetic Particle, dated February 8, 2006

Procedures

SO123-I-6.6, "Functional Testing of Snubbers Using Pacific Scientific Validator," Revision 6
SO123-V-5.17, "Snubber Service Life Monitoring," Revision 3

Section 1R12: Maintenance Effectiveness

Miscellaneous

R2C14 Taper Pin Evaluation

Document No. 2346, "Technical Support for the Loss of Taper Pins in Fisher 9200 Butterfly Valves at SONGS"

SONGS Unit 2 Butterfly Valve Leak Test Status

SONGS Unit 3 Butterfly Valve Leak Test Status

SONGS Unit 2 Butterfly Valve Taper Pin Staking Status

SONGS Unit 3 Butterfly Valve Taper Pin Staking Status

ARs

040401649, 060100738, 050900246, 031100614, 060200207

Section 1R14: Personnel Performance During Nonroutine Plant Evolutions

Procedures

SO23-3-1.8, "Draining the Reactor Coolant System," Revision 23
SO23-3-2.6, "Shutdown Cooling System Operation," Revision 22
SO23-13-19, "Loss of NON-1E Instrument Buses," Revision 6

ARs

060100824, 060200232, 060200863, 060301125

Section 1R15: Operability Evaluations

Procedures

SO23-3-3.12, "Integrated ESF System Refueling Test," Revision 21
SO23-V-3.5, "Inservice Testing of Valves Program," Revision 27
SO23-3-3.30, "Inservice Valve Testing Program," Revision 17

SO123-III-0.7, "Effluent Quality Assurance and Chemistry Quality Control Programs," Revision 21

SO123-III-0.7, "Effluent Quality Assurance and Chemistry Quality Control Programs," Revision 22

SO123-III-0.7, "Effluent Quality Assurance and Chemistry Quality Control Programs," Revision 24

SO123-III-0.7, "Effluent Quality Assurance and Chemistry Quality Control Programs," Revision 25

SO123-III-0.7, "Effluent Quality Assurance and Chemistry Quality Control Programs," Revision 26

SO123-III-1.1.23, "Units 2/3 Chemical Control of Primary Plant and Related Systems," Revision 44

SO123-III-2.1.23, "Units 2/3 Steam Generator and Condensate/Feedwater Chemistry Control and Sampling Frequencies," Revision 34

SO123-III-4.40, "Turbine Lab Dionex DX500 Ion Chromatograph Operation, Calibration, and Maintenance," Revision 5

SO123-III-4.50, "Reactor Lab Dionex DX500 Ion Chromatograph Operation, Calibration, and Maintenance," Revision 2

ARs

020500165, 020901510, 021200982, 021200414, 030100126, 030200357, 060102099, 0205000734, 060200377, 060200442, 060201634, 001000426

MOs

00100467000, 06020615000, 06020608000, 06020614000, 06020607000, 06020605000

Quality Assurance Surveillance Reports

SOS-065-02
SOS-012-04
SOS-020-04

Quality Assurance Audit Reports

SCES-007-03
SCES-011-05

Miscellaneous

Unit 2 RCS Chemistry (Chloride, Flouride, and Sulfate) analysis results 11/17/2000 through 10/31/2005

Unit 3 RCS Chemistry (Chloride, Flouride, and Sulfate) analysis results 05/31/2001 through 10/27/2005

Unit 2 Steam Generator 2E088 Blowdown (Chloride, Sodium, and Sulfate) analysis results 01/01/2002 through 10/31/2005

Unit 2 Steam Generator 2E089 Blowdown (Chloride, Sodium, and Sulfate) analysis results 01/01/2002 through 10/31/2005

Unit 3 Steam Generator 3E088 Blowdown (Chloride, Sodium, and Sulfate) analysis results 01/01/2002 through 10/31/2005

Unit 3 Steam Generator 3E089 Blowdown (Chloride, Sodium, and Sulfate) analysis results 01/01/2002 through 10/31/2005

Lab Stats Turbine Lab data base reports for chlorides and sulfates for 09/15/2002, 10/20/2002 and 10/24/2002

San Onofre Chemistry Laboratory Quality Control Review, November 2002, by M.R. Miller, NWT Corporation

Letter from Engine Systems, Inc. dated January 23, 2006, to NRC discussing Woodward DRU Controls

Section 1R17: Permanent Plant Modifications

Procedure

SO2-XXVI-9.2005.7011.7-2.1, "Unit 2 Digital Feedwater and Turbine Control Systems Power Ascension Test," Revision 0

Drawing

Drawing 2DCS, "Loop Diagram Distributed Control System (DCS) Controller Drops Data," Revision 0

Engineering Change Packages

021100280-4, 020401107-2, 050400232-37. 050400232-68, 020401107-23, 020401107-21

Section 1R19: Postmaintenance Testing

Procedures

SO23-I-6.300, "Air Operated Valve Diagnostic Testing," Revision 7

SO123-I-9.31, "Installation of Stem and Yoke Mounted Strain Gauges," Revision 1

SO123-I-6.6, "Functional Testing of Snubbers Using Pacific Scientific Validator," Revision 6

SO123-I-6.11, "Mechanical Snubbers, Strut, and Limit Stop Inspection," Revision 5

SO23-I-2.39, "Refueling Interval Functional Test of Mechanical Snubbers Surveillance," Revision14

SO123-I-1.43, "Maintenance Human Performance Application," Revision 3

SO23-3-31.3, "Component Cooling Water System Valve Test," Revision 10

SO23-I-8.94, "Component Cooling Water Heat Exchanger Cleaning and Inspection," Revision 8

ARs

060200851, 031000886, 060200599, 060101354, 060200768

MOs

04121128, 06020759, 06011538

Section 1R20: Refueling and Outage Activities

Procedures

SO23-5-1.4, "Plant Shutdown to Hot Standby," Revision 12
SO23-5-1.5, "Plant Shutdown from Hot Standby to Cold Shutdown," Revision 25
SO23-3-1.8, "Draining the Reactor Coolant System," Revision 23
SO23-5-1.8, "Shutdown Operations (Mode 5 and 6)," Revision 16
SO23-I-3.5, "Refueling Sequence," Revision 10
SO123-V-8.15, "Boric Acid Leak Inspection," Revision 1
SO23-5-1.3, "Plant Startup from Cold Shutdown to Hot Standby," Revision 29
SO23-5-1.3.1, "Plant Startup from Hot Standby to Minimum Load," Revision 24

Section 1R22: Surveillance Testing

Procedures

SO23-3-3.51.6, "Containment Penetration Leak Rate Testing - Charging and Hot Leg Injection Penetrations," Revision 8

SO23-V-3.5, "Inservice Testing of Valves Program," Revision 27

SO23-2-4, "Auxiliary Feedwater System Operation," Revision 20

SO23-3-3.60.6, "Auxiliary Feedwater Pump and Valve Testing," Revision 11

SO123-II-15.3, "Temporary System Alteration and Restoration Form," Revision 8

SO23-3-3.43, "ESF Subgroup Relays K-402B, K-624B, and K-724B Semiannual Test," Revision 4

SO123-I-1.3, "Work Activity Guidelines," Revision 12

SO123-II-11.151, "Electrical Metering Calibration," Revision 2

SO23-3-31.3, "Component Cooling Water System Valve Test," Revision 10

ARs

060100183, 060200377, 051200922, 060201584

MOs

06020605, 06020607, 05080093

Section 2OS1 and 2OS2: Occupational Radiation Safety

ARs

030202256, 031000594, 040200416, 040200868, 040201339, 040300701, 040300727, 040302110, 040302411, 040400564, 040400849, 040500094, 040600651, 040900694, 040901781, 040901896, 041100840, 041001666, 041001746, 041001874, 041002167, 041002471, 041002473, 050100096, 050600837, 050701361, 050800927, 050900253, 060200922

Audits and Self-Assessments

Audit Report SCES-005-05, Radiation Protection
Surveillance Report SOS-009-04, U2C13 ALARA In-Progress Reviews
Surveillance Report SOS-009-05, Access Control to Radiologically Significant Areas
Observation Report LOP04084301, 63' Containment Control Point
Observation Report LOP04084697, Entry and Exit From Containment
Observation Report LOP04084946, HP Brief U3C13
Observation Report LOP04085412, Radiological Controls U3C13
Observation Report LOP05091262, 70' Control Point Activities

Radiation Exposure Permits

200173 U2C14 Manways/Nozzle Dams
200250 U2C14 Pressurizer Heater Half Nozzle Repair

Procedures

SO123-VII-20, "Health Physics Program," Revision 11
SO123-VII-20.9, "Radiological Surveys," Revision 6
SO123-VII-20.10, "Radiological Work Planning and Controls," Revision 10
SO123-VII-20.10.3, "Health Physics Work Control Plans," Revision 3
SO123-VII-20.11, "Access Control Program," Revision 9
SO123-VII-20.11.1, "Radiological Posting," Revision 8

Shielding Requests

ALARA Temporary Shielding Authorization 06-26/2

Other

Letter of February 9, 1990, Subject: Amendment Application Nos. 83 and 68
TEDE ALARA Evaluation, REP 200173
ALARA Post Job Review, U3C13 Pressurizer Heater Half Sleeve Repair
Health Physics Standard HP-I-4, Performance Indicator Reporting, Revision 2
WCP# 06-003, U2C14 ICI Thimble Replacement Project, Revision 4
Installation of New ICI Thimble Pre-job Brief Package

ALARA In Progress Review 594, U2C14 ICI Thimble Replacement
ALARA In Progress Review 610, U2C14 Refueling Maintenance
ALARA In Progress Review 624, U2C14 Pressurizer Heater Half Nozzle Repair
ALARA In Progress Review 633, U2C14 Thermowell Replacement
Area Survey #060213-009
Area Survey #060128-027
Area Survey #060105-022

Section 4OA2: Identification and Resolution of Problems

Procedures

SO123-I-1.13, "NUREG 0612 Cranes, Rigging and Lifting Controls," Revision 11
SO2-I-7.101, "Turbine Gantry Crane Checkout and Operation," Revision 2
SO123-I-7.24, "Rigging Manual," Revision 16
SO123-I-1.43, "Maintenance Human Performance Application," Revision 3

Drawings

71634, "Gantry Crane Safe Lifting Load Travel Path," Revision 1

Section 4OA5: Other

Procedures

SO23-XXXIII-8.16, "Reactor Coolant System Alloy 600 Inspection," Revision 4

Miscellaneous

Southern California Edison response to Bulletin 2004-01 dated July 23, 2004

Video recording of Unit 2 Cycle 14 reactor vessel head inspection

Personnel Qualification Standard T4EN51, "Boric Acid Leakage and/or Inconel 600 Inspections," Revision 0

LIST OF ACRONYMS

AR	action request
ASME	American Society of Mechanical Engineers
CAP	corrective action program
EPRI	Electric Power Research Institute
HRA	high radiation area
MO	maintenance order
NCV	noncited violation
PI	performance indicator
SSC	structure, system, component
SWC	saltwater cooling
TI	temporary instruction
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report