UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

August 14, 2008

Randall K. Edington,
Executive Vice President, Nuclear
and Chief Nuclear Officer
Mail Station 7602
Arizona Public Service Company
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Phoenix, AZ 85072-2034

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION - NRC INTEGRATED INSPECTION REPORT 05000528/2008003, 05000529/2008003, AND 05000530/2008003

Dear Mr. Edington:

On June 30, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Palo Verde Nuclear Generating Station, Units 1, 2, and 3, facility. The enclosed integrated report documents the inspection findings, which were discussed on July 28, 2008, with you 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 three NRC-identified findings and six self-revealing findings. These findings were evaluated under the risk significance determination process as having very low safety significance (Green). One finding was not suitable for evaluation under the significance determination process; however, it was determined to be of very low safety significance by NRC management review. Seven of these findings were determined to involve violations of NRC requirements. Additionally, two licensee-identified violations, which were determined to be of the very low safety significance are listed in Section 4OA7 of this report. However, because of the very low safety significance of these violations and because they were entered into your corrective action program, the NRC is treating these findings as noncited violations consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest these noncited violations, 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, 612 E. Lamar Boulevard, Suite 400, Arlington, Texas 76011-4125; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; and the NRC Resident Inspector at the Palo Verde Nuclear Generating Station, Units 1, 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 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/

Michael C. Hay, Chief
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Division of Reactor Projects

Docket Nos. 50-528
50-529
50-530

License Nos. NPF-41
NPF-51
NPF-74

Enclosure: NRC Inspection Report 05000528/2008003, 05000529/2008003, and 05000530/2008003

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SUNSI Review Completed: MCH ADAMS: ☑ Yes □ No Initials: MCH
☑ Publicly Available □ Non-Publicly Available □ Sensitive ☑ Non-Sensitive

R:_REACTORS_PV\2008\PV2008-003RP-RIT.doc ML082270708

RIV:RI:DRP/D	RI:DRP/D	RI:DRP/D	SRI:DRP/D	SPE:DRP/D	C:DRS/EB1
JBashore	MCatts	JMelfi	RTreadway	DAllen	RBywater
/RA/ E-DBA for	***/RA/ E DBA for***	***/RA/ E DBA for***	***/RA/ E DBA for***	***/RA/***	***/RA/***
08/14/08	08/13/08	08/12/08	08/14/08	08/14/08	07/31/08
C:DRS/PSB	C:DRS/PSB1	C:DRS/OB	C:DRS/EB2	C:DRP/D	
GWerner	MShannon	RLantz	NO'Keefe	MHay	
/RA/	***/RA/***	***/RA/***	***/RA/***	***/RA/***	
07/31/08	07/31/08	07/30/08	07/30/08	08/14/08	

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Dockets:	50-528, 50-529, 50-530
Licenses:	NPF-41, NPF-51, NPF-74
Report:	05000528/2008003, 05000529/2008003, 05000530/2008003
Licensee:	Arizona Public Service Company
Facility:	Palo Verde Nuclear Generating Station, Units 1, 2, and 3
Location:	5951 S. Wintersburg Road Tonopah, Arizona
Dates:	April 1 through June 30, 2008
Inspectors:	J. Bashore, Resident Inspector M. Catts, Resident Inspector J. Melfi, Resident Inspector R. Treadway, Senior Resident Inspector G. Miller, Senior Project Engineer W. Sifre, Reactor Inspector G. Apger, Operations Engineer L. Ricketson, Senior Health Physicist J. Adams, Reactor Inspector G. George, Reactor Inspector P. Elkmann, Senior Emergency Preparedness Inspector
Accompanied By:	J. Razo, Health Physicist
Approved By:	Michael C. Hay, Chief, Project Branch D Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000528/2008003, 05000529/2008003, 05000530/2008003; 04/01/08 - 06/30/08; Palo Verde Nuclear Generating Station, Units 1, 2, and 3; Integrated Resident and Regional Report; Maint., Effect. Surv. Testing, Identi. & Res. of Prob., Event Flwp.

This report covered a 3-month period of inspection by resident and regional inspectors. The inspection identified nine findings. 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 4, dated December 2006.

A. NRC-Identified and Self-revealing Findings

Cornerstone: Initiating Events

- Green. A self-revealing finding was identified for the failure of operations and maintenance personnel to follow Procedure 01DP-9ZZ01, "Systematic Troubleshooting," and resolve a discrepancy with a work instruction prior to proceeding with troubleshooting. Specifically, maintenance and operations personnel did not resolve an error in Work Order 3174332 when troubleshooting Breaker NBN-S01A that failed to trip, resulting in a loss of the non-vital electrical bus that supplied power to the nuclear cooling water and normal chilled water systems. This issue was entered into the licensee's corrective action program as Palo Verde Action Request 3174647.

  The finding is greater than minor because it is associated with the initiating events cornerstone attribute of configuration control and affects the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown and power operations. Using the Manual Chapter 0609 Appendix G, "Shutdown Operations Significance Determination Process," the finding is determined to have very low safety significance because the finding did not result in a loss of shutdown safety functions. This finding has a crosscutting aspect in the area of human performance associated with work practices because maintenance and operations personnel proceeded in the face of uncertainty or unexpected circumstances [H.4(a)] (Section 1R12.2).

- Green. A self-revealing noncited violation of Technical Specification 5.4.1, "Procedures," was identified for the failure of operations personnel to adequately implement Procedure 40DP-9OP19, "Locked Valve, Breaker, and Component Tracking." Specifically, on May 14, 2008, Valve SIA-V421 was found out of its locked closed position one and one-half turns open resulting in approximately 930 gallons of water being inadvertently transferred from the reactor coolant system to the refueling storage water tank. This issue has been entered into the licensee's corrective action program as Palo Verde Action Request 3174527.

  The failure to ensure the valve was properly closed resulted in an inadvertent reactor vessel level decrease. The finding is more than minor because it is

associated with the configuration control attribute of the initiating events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown operations. A Phase 2 analysis was required because using Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," Attachment 1, the inspectors determined that the finding actually resulted in a loss of reactor coolant system inventory. Using the Phase 2 worksheets in Attachment 2, this was determined to be a loss of level control precursor event. The initiating event likelihood for this finding was determined from Table 1 of the worksheet and the resultant core damage frequency was determined to be 1E-8, therefore the finding screened as having very low safety significance. The finding has a crosscutting aspect in the area of human performance associated with work practices because the licensee failed to use human error prevention techniques such as self-checking [H.4(a)] (Section 1R22).

- Green. A self-revealing finding of Procedure 81DP-0DC13, "Deficiency Work Order," Revision 13, was identified for the failure of engineering personnel to ensure modifications do not inadvertently affect design basis plant conditions. Specifically, between January 23, 2001 and October 6, 2007, engineering personnel failed to ensure material compatibility of the condenser air removal system seal water cooler tube plugs to prevent corrosion. This resulted in sodium ingress into the condenser hotwell and steam generators due to a corroded tube plug that failed in the condenser air removal system D seal water cooler, and consequently a manual reactor scram. This issue was entered into the licensee's corrective action program as Condition Report/Disposition Request 3074272.

  The finding is greater than minor because it is associated with the design control attribute of the initiating events cornerstone and affects the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown and power operations. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding is determined to have very low safety significance because the finding did not result in exceeding the technical specification limit for identified reactor coolant system leakage, did not affect other mitigation systems, did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available; and did not increase the likelihood of a fire or internal/external flood. This finding was evaluated as not having a crosscutting aspect because the performance deficiency is not indicative of current performance (Section 4OA3).

- Green. A self-revealing noncited violation of License NPF-51, Condition 2.C. (6), was identified involving the failure to follow procedures for proper control of ignition sources. Specifically, contract welding personnel failed to deenergize welding equipment and properly secure the welding rod electrodes, resulting in a fire in the Unit 2 pressurizer cubicle inside containment. This issue was entered into the licensee's corrective action program as Condition Report/Disposition Request 3170965.

The finding is greater than minor because it is associated with the external factors attributes of the initiating events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Manual Chapter 0609, "Significance Determination Process," Appendix M, "Significance Determination Process Using Qualitative Criteria," was used since the Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," does not address the potential risk significance of fire protection findings during shutdown conditions. The finding was determined to be of very low safety significance by NRC management review because the finding occurred while the unit was already in a cold shutdown condition and the finding did not affect equipment necessary to maintain safe shutdown. This finding has a crosscutting aspect in the area of human performance associated with work practices because the licensee did not ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported [H.4(c)] (Section 4OA3).

Cornerstone: Mitigating Systems

- Green. The inspectors identified a noncited violation of Technical Specification 5.4.1.a, "Procedures," for the failure to establish and implement adequate maintenance procedures. These inadequate instructions resulted in the failure to install required washers during installation of a constant support spring hanger for a main steam line on May 14, 2008. This issue was entered into the licensee corrective action program as Condition Report/Disposition Request 3177622.

  The finding is greater than minor because it is associated with the procedure quality attribute of the mitigating systems cornerstone and affects the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have a very low safety significance because the finding did not result in a loss of system safety function, an actual loss of safety function of a single train for greater than its Technical Specification allowed outage time, or screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. This finding has a crosscutting aspect in the area of human performance associated with resources because the licensee failed to ensure work packages were complete, accurate and included up-to-date design documentation to assure nuclear safety [H.2(c)] (Section 1R12.1).

- Green. A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," was identified for the failure of engineering personnel to implement adequate corrective actions to preclude recurrence of a significant condition adverse to quality. Specifically, between June 28, 1998 and July 17, 2006, on several occasions, the four-way 'N' valve for an economizer main feedwater isolation valve became lodged in the center blocked position, preventing fast closure of the main feedwater isolation valve upon receipt of a main steam isolation signal. This issue was entered into the licensee's corrective action program as Condition Report/Disposition Request 2915450.

This finding is greater than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the cornerstone objective of ensuring the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. A Phase 2 analysis was required because using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," there was a loss of main feedwater isolation of a single train to Steam Generator 1 for greater than the Technical Specification allowed outage time. Using the Phase 2 worksheets associated with a steam generator tube rupture without steam generator isolation, the finding is determined to have very low safety significance since all remaining mitigation capability was available or recoverable. This finding was evaluated as not having a crosscutting aspect because the performance deficiency is not indicative of current performance (Section 4OA2).

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the failure of operations and maintenance personnel to promptly identify and correct a condition adverse to quality. Specifically, from August 2007 till June 2008, operations and maintenance personnel failed to ensure that work management process procedures were followed for a degraded condition affecting Safety Injection Tank 1A. This issue was entered into the licensee's corrective action program as Condition Report/Disposition Request 3185716.

  The finding is greater than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the cornerstone objective of ensuring the reliability, availability and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have a very low safety significance because the finding did not result in a loss of system safety function, an actual loss of safety function of a single train for greater than its technical specification allowed outage time, or screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. This finding has a crosscutting aspect in the area of human performance associated with work control because the licensee failed to plan work activities to support long-term equipment reliability by limiting operator work-arounds, safety systems unavailability, and reliance on manual actions [H.3 (b)] (Section 40A3).

Cornerstone: Barrier Integrity

- Green. A self-revealing noncited violation of Technical Specification 5.4.1.a, "Procedures," was identified for the failure of maintenance personnel to adequately implement procedural guidance. Specifically, on May 9, 2008, maintenance personnel failed to ensure the permit requirements of Procedure 0DP-9ZZ17, "Control of Doors, Hatches, and Floor Plugs," were complete while accessing the tendon gallery access shaft, resulting in the control room determining that both trains of the pump room exhaust air cleanup system had been inoperable. This issue was entered into the licensee's corrective action program as Palo Verde Action Request 3172712 and as significant Condition Report/Disposition Request 3173930.

The finding is greater than minor because it is associated with the barrier performance attribute associated with maintaining radiological barrier functionality for the auxiliary building and affects the cornerstone objective to provide reasonable assurance that the physical design barriers protect the public from radio nuclide releases caused by accidents or events. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding is determined to have very low safety significance because it only affected the barrier integrity cornerstone and only represented a degradation of the radiological barrier function of the auxiliary building. This finding has a crosscutting aspect in the area of human performance associated with work practices because the licensee did not ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported [H.4(c)] (Section 40A3).

Cornerstone: Emergency Preparedness

- Green. The inspectors identified a noncited violation (NCV) of 10 CFR 50.54(q) and 10 CFR Part 50, Appendix E.IV.F.2.g, for the licensee's failure to correct an identified risk significant planning standard weakness between May 2, 2007 and October 28, 2007. Specifically, the licensee failed to implement adequate corrective actions for identified weaknesses in the ability to correctly make a Site Area Emergency declaration for a steam generator tube rupture event. This issue was entered into the licensee's correction action program as Palo Verde Action Request 3083911.

  The NRC determined that the inability to consistently implement an Emergency Action Level was a performance deficiency within the licensee's control. This finding is more than minor because it was associated with the Emergency Preparedness attribute of emergency response organization performance and affected the cornerstone objective to implement adequate measures to protect the health and safety of the public because the inability to properly recognize and classify an emergency condition affects the licensee's ability to implement adequate protective measures. This finding was preliminarily determined to be of low to moderate safety significance. After consideration of information provided during and after a Regulatory Conference held on March 25, 2008, the NRC has concluded that the knowledge deficiency identified among senior operators would not likely result in an incorrect emergency classification during a steam generator tube rupture event, and the NRC has concluded the significance of the inspection finding is appropriately characterized as Green (i.e., a finding of very low safety significance). This violation is being treated as an NCV, consistent with Section VI of the NRC Enforcement Policy. The cause of this finding has crosscutting aspects associated with the corrective action aspect of the problem identification and resolution area in that the licensee failed to thoroughly evaluate problems such that resolutions ensured correcting problems [P.1.(c)]. The cause of this finding was also related to the safety culture component of accountability in that the licensee failed to demonstrate a proper safety focus and reinforce safety principles [O.1.(c)] (Section 4OA5).

B. Licensee-Identified Violations

Violations of very low safety significance that were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at full power until June 6, 2008, when the unit was shutdown to repair Safety Injection Tank (SIT) 1A. Repairs were made to SIT 1A and the unit returned to full power on June 10, 2008, and remained at full power for the duration of the inspection period.

Unit 2 began the inspection period shutdown for Refueling Outage 2R13. The unit was shutdown on March 29, 2008, to support the refueling outage, was restarted on June 2, 2008, returned to full power on June 9, 2008, and remained there for the duration of the inspection period.

Unit 3 operated at essentially full power for the entire inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

1. Readiness for Seasonal Susceptibilities

The inspectors completed a review of the licensee's readiness of seasonal susceptibilities involving impending high temperatures. 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 four systems listed below to ensure that adverse weather protection features (heat tracing, space heaters, weatherized enclosures, temporary chillers, etc.) were sufficient to support operability, including the ability to perform safe shutdown functions; (3) evaluated operator staffing levels to ensure the licensee could maintain the readiness of essential systems required by plant procedures; and (4) reviewed the corrective action program (CAP) to determine if the licensee identified and corrected problems related to adverse weather conditions.

- June 1, 2008, Unit 3, plant cooling water system
- June 1, 2008, Unit 3, main generator and main transformers
- June 1, 2008, Unit 1, spray pond system, Trains A and B
- June 1, 2008, Unit 1, turbine building cooling water

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

2. Summer Readiness of Offsite and Alternate Alternating Current (AC) Power Systems

The inspectors completed a review of the licensee's readiness of offsite and onsite AC power systems for the high grid loading season. The inspectors reviewed plant procedures, the UFSAR, TSs, transmission system operator (TSO) procedures, and communications protocols between Palo Verde Nuclear Generating Station (PVNGS) and the TSO to verify procedures address: (1) measures to monitor and maintain availability of AC power systems; (2) required communications between the licensee and the TSO when the capability of the transmission system to provide offsite power is challenged; (3) compensatory actions to be performed when offsite power system voltage will not be acceptable to assure continued operation of safety related loads; and (4) required risk assessments for plant maintenance activities which could affect grid reliability or the ability of the transmission system to provide offsite power.

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)

a. Inspection Scope

1. Partial Walkdown

The inspectors: (1) walked down portions of the two below 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 CAP to ensure problems were being identified and corrected.

- April 23 , 2008, Unit 2, low pressure safety injection system, Train A
- June 1, 2008, Unit 3, emergency diesel generator (EDG), Train B

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed two samples.

2. Complete Walkdown

The inspectors: (1) reviewed plant procedures, drawings, the UFSAR, TSs, and vendor manuals to determine the correct alignment of the essential auxiliary feedwater (AFW) system, Train A; (2) reviewed outstanding design issues, operator work-arounds, to determine if open issues affected the functionality of the AFW system; and (3) verified that the licensee was identifying and resolving equipment alignment problems.

- April 23 , 2008, Unit 3, essential AFW system, Train A

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

1. Quarterly Inspection

The inspectors walked down the seven below 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 CAP to determine if the licensee identified and corrected fire protection problems.

- April 9, 2008, Unit 2, containment, 80 foot, 100 foot, 120 foot, and 140 foot elevations
- May 5, 2008, Unit 1, diesel generator building, 100 foot, 115 foot, and 131 foot elevations
- May 7, 2008, Unit 1, auxiliary building, 100 foot, 120 foot, and 140 foot elevations
- May 19, 2008, Unit 2, main steam support structure, 80 foot, 100 foot, 120 foot, and 140 foot elevations
- May 28–29, Unit 2, control building, 74 foot, 100 foot, 120 foot, 140 foot, and 160 foot elevations
- May 28, 2008, Unit 3, auxiliary building, 100 foot, 120 foot, and 140 foot elevations
- May 28, Unit 3, control building, 74 foot, 100 foot, 120 foot, 140 foot, and 160 foot elevations

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed seven samples.

2. Annual Inspection

On April 21, 2008, the inspectors observed a fire brigade drill to evaluate the readiness of the licensee to fight fires, including the following aspects: (1) the number of personnel assigned to the fire brigade; (2) use of protective clothing; (3) use of breathing apparatuses; (4) use of fire procedures and declarations of emergency action levels; (5) command of the fire brigade; (6) implementation of pre-fire strategies and briefs; (7) access routes to the fire and the timeliness of the fire brigade response; (8) establishment of communications; (9) effectiveness of radio communications; (10) placement and use of hoses; (11) entry into the fire area; (12) use of fire fighting equipment; (13) searches for fire victims and fire propagation; (14) smoke removal; (15) use of pre-fire plans; (16) adherence to the drill scenario; (17) performance of the post-drill critique; and (18) restoration from the fire drill.

- April 21, 2008, Unit 3, simulated fire on Main Transformer MANX01A

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed the one below listed heat exchanger to: (1) observe or review reports of tests for problems; (2) verify utilization of the periodic maintenance method outlined in Electric Power Research Institute (EPRI) NP-7552; (3) observe execution of bio-fouling controls; (4) observe heat exchanger inspections for cleanliness; (5) check heat exchanger temperatures, fluid flow, evident leaks, and end bell orientation to verify the heat exchanger can perform its safety related function; and (6) determine if the heat exchanger is correctly categorized and maintained under the maintenance rule.

- April 17, 2008, Unit 2, essential cooling water heat exchanger, Train A, testing during Refueling Outage 2R14

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection Activities (71111.08)

02.01 Nondestructive Examination (NDE) Activities and Welding Activities – Unit 2

a. Inspection Scope

The inspection procedure requires review of two or three types of NDE activities and, if performed, one to three welds on the reactor coolant system pressure boundary. Also the procedure requires review of one or two examinations with recordable indications that have been accepted by the licensee for continued service. Additionally, the procedure directs the inspectors to review the licensee's augmented inservice inspection (ISI) program to ensure it adheres to industry guidance and NRC requirements.

The inspectors directly observed the following NDEs: ultrasonic test (UT) examination of the overlay welds on three pressurizer safety relief valve nozzles plus UT examination of the overlay weld on the pressurizer spray line nozzle. The inspectors also observed both dye-penetrant test (PT) and UT examinations on two steam generator (SG) blowdown line welds, prior to the licensee performing full structural weld overlays on these two welds.

In addition to directly observing the above mentioned NDE activities, the inspectors reviewed the records associated with 10 visual examinations of the main steam line support structures and surface examinations, PTs, on four pressurizer safety, spray, and surge line welds prior to the licensee performing full structural weld overlays on these three welds.

The inspectors performed a record review of the 10-year reactor vessel ISI examination, including review of the recorded visual examination (VT-1 and VT-3) and review of the results from the automated UT examination of the vessel welds. The inspectors also reviewed the governing procedures for these examinations and the NDE technician qualification records.

During the review and observation of each examination, the inspectors verified that activities were performed in accordance with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code requirements, industry guidelines (specifically for the augmented inspection program), NRC requirements, and applicable procedures. The qualifications of all NDE technicians performing the inspections were verified to be current.

The inspectors directly observed the performance of one full structural weld overlay on the hot leg shutdown cooling line, reviewed the performance qualification report and weld performance sheets associated with this weld, and reviewed the welder qualification certification records.

All observed and reviewed welding and NDEs conformed to ASME Code requirements and licensee requirements.

Documents reviewed are listed in the attachment.

The inspectors completed one sample under Section 02.01.

b. Findings

No findings of significance were identified.

02.02 Unit 2 Pressurized Water Reactor (PWR) Vessel Upper Head Penetration Inspection Activities

a. Inspection Scope

The licensee performed NDE of 100 percent of reactor vessel upper head penetrations. The inspectors directly observed the UT/eddy current test data acquisition/analysis of six control element drive mechanism penetrations. The inspectors also observed the PT examination of the vent line penetration. The inspectors reviewed the governing procedures and NDE technician qualification certifications.

The NDE inspections were performed in accordance with the requirements of NRC's Order, dated February 20, 2004, "Issuance of First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors." No defects were detected, and no weld repairs were necessary.

The inspectors completed one sample under Section 02.02.

b. Findings

No findings of significance were identified.

02.03 Unit 2 Boric Acid Corrosion Control Inspection Activities (PWR)

a. Inspection Scope

Inspectors observed a sample of boric acid corrosion control activities and verified that visual inspections emphasized locations where boric acid leaks can cause degradation of safety significant components.

The inspectors reviewed two instances where boric acid deposits were found on reactor coolant system piping components. The inspectors reviewed the boric acid corrosion control procedure and NDE technician qualification certification to verify that plant areas, where boric acid leaks could occur, were inspected by qualified individuals, and that any boric acid leak indications were correctly dispositioned.

The inspectors completed one sample under Section 02.03.

b. Findings

No findings of significance were identified.

02.04 Unit 2 SG Tube Inspection Activities

a. Inspection Scope

This was the second cycle of operation for the new SGs installed at PVNGS, Unit 2. During this refueling outage, 89 tubes in SG 1 and 94 tubes in SG 2 were plugged. These tubes were plugged because of increased vibration wear by vertical supports and batwing tube supports. No tubes were identified that met the requirements for in situ pressure testing, and no in situ pressure testing was performed.

The inspectors compared the recommended test scope to the actual test scope and found that the licensee had accounted for all known areas of previous wear, as documented in the licensee's operational and degradation assessments. In addition, the licensee established a test scope that met the TS requirements, EPRI guidelines, and commitments made to the NRC. The scope of the licensee's eddy current examinations of tubes in both SGs included:

- A full length bobbin examination of 100 percent of inservice tubes
- Plus point, rotating coil examinations for the U-Bend area of tubes
- Plus point, rotating coil examinations of special interest locations

No new degradation mechanisms were identified during the inspection activities, and all areas of potential degradation, as indicated by plant-specific experience, were inspected. No SG tube leakage in excess of three gallons per day was identified prior to entering the refueling outage or during post-shutdown visual inspections. No loose parts or foreign materials were identified prior to the outage.

The SG tube inspection contractor used eddy current probes that were appropriate to find the type of degradation expected. Extensive use of the plus point, rotating probe was employed.

The inspectors reviewed a sample of SG tube inspection data for nine tubes in which indications were present.

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 ISIs documented by the licensee in the CAP for appropriateness of the corrective actions.

The inspector reviewed 10 corrective action reports which dealt with ISI activities. Action requests reviewed are listed in the documents reviewed section. From this review, the inspector concluded that the licensee has an appropriate threshold for entering issues into the CAP and has procedures that direct a root cause evaluation when necessary.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

a. Inspection Scope

Quarterly Inspection

On June 3, 2008, the inspectors observed testing and training of senior reactor operators (SROs) 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 SES-0-07-E-02, "Loss of PKC-M43/Loss of Offsite Power," involved four events including: (1) failure of condensate storage tank level instrument; (2) failure of a steam flow transmitter; (3) loss of class 1E 125 volts direct current (VDC) Bus C; and (4) loss of offsite power.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed the four below 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 SSCs 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.

- April 8, 2008, Unit 2, failure of charging pump suction check Valves PCHAV177 and PCHAV190 as documented in Condition Report/Disposition Request (CRDR) 3158130
- April 8–10, 2008, Unit 1, failure of Radiation Unit (RU) 1 as documented in CRDR 3153625
- May 12, 2008, Unit 2, failure of spring can support hanger for main steam line on SG 2 as documented in CRDR 3177622

- May 14, 2008, Unit 2, failure of Breaker NBN-S01A to open as documented in CRDR 3175456

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed four samples.

b. Findings

1. Inadequate Work Instructions for Reinstallation of Constant Support Hanger

Introduction. The inspectors identified a Green noncited violation (NCV) of TS 5.4.1.a for the failure to establish and implement adequate maintenance procedures. These inadequate instructions resulted in the failure to install required washers during installation of a constant support spring hanger for a main steam line on May 14, 2008.

Description. On March 28, 2008, Unit 2 was shutdown for Refuel Outage 2R13. On March 30, 2008 operations personnel observed that the support welds for constant support spring Hanger 2SG045-H011 had failed. This observation was immediately communicated to Palo Verde management to address the potential impact of this failure. The licensee's corrective actions for the constant support spring hanger failure are described in more detail in Section 4OA2 of this report. During the licensee's extent of condition review, three other similar constant support spring hangers were inspected and repaired or reworked as necessary.

Constant supports are used either; where piping stress is critical and the pipe is subject to movement greater than one-half inch due to thermal expansion, or where it is necessary to avoid any transfer of stress from support to support. These specific constant support spring hangers are designed to keep a constant supporting force for the associated piping throughout the hanger's entire range of motion. Palo Verde completed testing for the hangers and concluded that an increase in friction for the various moving parts of the hanger resulted in a degradation of the hanger's ability to perform its function.

On May 16, 2008, inspectors entered Unit 2 containment to verify the maintenance task to reinstall the hangers was complete prior to plant startup. The inspectors identified that constant support spring Hanger 2SG045-H011 was missing washers associated with the load yoke and the load pivot of the hanger. Vendor Technical Document I207-0013, "ITT Grinnell Installation Instructions & Data Sheets for Constant Support," gives instructions for installation and inspection of these constant support spring hangers and the purpose of these washers in the design of the spring hanger. For these hangers, the washers are designed to ensure the frictional force between the load yoke and load pivot does not exceed the code allowable stresses of the hanger.

During review of the work orders (WOs) the inspectors noted that the instructions for the disassembly and reassembly of the main steam hanger did not contain instructions specific to the installation of these washers, and instead relied upon knowledge and skill of maintenance personnel. Additionally, while the washers were included as parts for the reinstallation of the hanger, they were not installed because maintenance personnel determined that there was not adequate clearance between the load yoke and load pivot to install them.

The licensee documented the inspectors' observation in Palo Verde Action Request (PVAR) 3176182 and installed the washers in the hanger in accordance with WO 3161040.

Analysis. The performance deficiency associated with this finding involved the failure to adequately establish and implement maintenance procedures for replacement of the constant support spring hanger for SG 2. The finding is greater than minor because it is associated with the procedure quality attribute of the mitigating systems cornerstone and affects the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have a very low safety significance because the finding did not result in a loss of system safety function, an actual loss of safety function of a single train for greater than its TS allowed outage time, or screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. This finding has a crosscutting aspect in the area of human performance associated with resources because the licensee failed to ensure work packages were complete, accurate and included up-to-date design documentation to assure nuclear safety [H.2(c)].

Enforcement. Technical Specification 5.4.1.a requires that written procedures be established, implemented, and maintained covering the activities specified in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Regulatory Guide 1.33, Appendix A, Section 9(a), requires that maintenance that can affect the performance of safety-related equipment should be performed in accordance with written procedures. Contrary to the above, on May 14, 2008, the licensee failed to establish and implement adequate maintenance procedures for replacement of the constant support spring hanger for SG 2 resulting in the failure to install required washers. Because the finding is of very low safety significance and was entered into the licensee's CAP as CRDR 3177622, this violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000529/2008003-01, "Inadequate Work Instructions for Reinstallation of Constant Support Spring Hanger."

2. Failure to Resolve Discrepancies Between Installed Equipment and Work Instructions Results in Mispositioning Event

Introduction. A Green self-revealing finding (FIN) of Procedure 01DP-9ZZ01, "Systematic Troubleshooting," was identified for the failure of operations and maintenance personnel to follow procedures and resolve a discrepancy with a work instruction prior to proceeding with troubleshooting. Specifically, maintenance and operations personnel did not resolve an error in WO 3174332 when troubleshooting Breaker NBN-S01A that failed to trip, resulting in a loss of the non-vital electrical bus that supplied power to the nuclear cooling water and normal chilled water systems.

Description. On May 13, 2008, operations personnel identified an equipment deficiency associated with Breaker NBN-S01A that serves as the normal supply breaker for non-vital electrical Bus NBN-S01. Breaker NBN-S01A failed to auto-open upon successful closure of cross-tie Breaker NBN-S01C that supplies power to Bus NBN-S01 from alternate power source Bus NBN-S02 when the normal power supply is removed. Operations personnel were transferring power from the normal to alternate supplies to support a maintenance activity. Once it was identified that the breaker failed to open,

operations personnel manually opened the normal supply breaker using a handswitch in the control room and entered the deficiency into the CAP. A troubleshooting plan was developed and implemented via corrective maintenance WO 3174332.

During the troubleshooting efforts Bus NBN-S01 was powered from Bus NBN-S02, the alternate power supply, via the alternate cross-tie Breaker NBN-S01C. The troubleshooting plan gave instruction to test the normal supply breaker using key interlocks associated with Bus NBN-S01 and a synchronizing (sync) switch. The sync switch has three possible positions, labeled “S01 XFR,” “OFF,” and “S02 XFR.” The S01 XFR position allows power to be supplied from the normal power supply breaker, and the S02 XFR position allows power to be supplied from the alternate power supply, Bus NBN-S02. During execution of the troubleshooting plan, electricians in the field requested control room operators to place the sync switch to the X01 XFR position, in accordance with Step 2.6 of the troubleshooting plan. The control room operator responded that the switch could only be taken to either the S01 XFR or the S02 XFR position. The electricians repeated the request as it was written in the procedure, to go to the X01 XFR position. After a brief discussion with the control room supervisor, the control room operator placed the sync switch to the S02 XFR position. With the alternate power supply breaker closed and the sync switch manually taken to the S02-XFR position, the interlock that prevents the electrical bus from being supplied by two separate power supplies, was enabled causing the alternate power supply breaker to open. When the alternate power supply breaker opened, a loss of both non-class 1E 4160 VAC buses resulted. The loss of both Buses NBN-S01 and NBN-S02 resulted in a loss of nuclear cooling water and normal chilled water.

Operations personnel recognized the cause of the loss of both non-class 4160 VAC power sources was a sync switch manipulation error. Power was restored to the non-class 4160 volt electrical buses in accordance with Procedure 40AO-9ZZ12, "Degraded Electrical Power." Immediately thereafter, operators restored nuclear cooling water in accordance with Procedure 40AO-9ZZ03, "Loss of Cooling Water," and determined that no appreciable effect was observed with the spent fuel pool temperature. The troubleshooting plan was revised to indicate the correct sync switch position and the troubleshooting was completed on May 20, 2008. The event was entered into the CAP as PVAR 3174647 and adverse CRDR 3175456.

Procedure 01DP-9ZZ01, "Systematic Troubleshooting," Step 3.4.6.2 states, in part, that personnel performing troubleshooting should resolve any discrepancy between installed equipment and the documents used for troubleshooting prior to proceeding. Procedure 30DP-9MP01, "Conduct of Maintenance," Section 3.8 states that "work shall be stopped when maintenance team members identify a discrepancy between the work described in the package and the actual configuration in the field." Additionally, Procedure 40DP-9OP02, "Conduct of Operations," Section 4.2, states that "communications be clear, complete, and unambiguous and use accepted standard terminology." Contrary to the above, when the discrepancy between the field work instruction and the switch label in the control room was identified, operations and maintenance personnel proceeded with the troubleshooting efforts prior to resolving the discrepancy.

Analysis. The performance deficiency associated with this finding was the failure of operations and maintenance personnel to follow procedures and resolve a discrepancy with a work instruction prior to proceeding with troubleshooting. The finding is greater

than minor because it is associated with the initiating events cornerstone attribute of human performance and affects the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown and power operations. Using Manual Chapter 0609 Appendix G, "Shutdown Operations Significance Determination Process," the finding is determined to have very low safety significance because the finding did not result in a loss of shutdown safety functions. This finding has a crosscutting aspect in the area of human performance associated with work practices because maintenance and operations personnel proceeded in the face of uncertainty or unexpected circumstances [H.4(a)].

Enforcement. Enforcement action does not apply because the performance deficiency did not involve a violation of regulatory requirements. The finding is of very low safety significance and the issue was entered into the licensee's CAP as PVAR 3174647 and adverse CRDR 3175456: FIN 05000529/2008003-02, "Failure to Resolve Discrepancies Between Installed Equipment and Work Instructions Results in Mispositioning Event."

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

a. Inspection Scope

1. Risk Assessment and Management of Risk

The inspectors reviewed the two below listed assessment activities to verify: (1) performance of risk assessments when required by 10 CFR 50.65 (a)(4) and licensee procedures prior to changes in plant configuration for maintenance activities and plant operations; (2) the accuracy, adequacy, and completeness of the information considered in the risk assessment; (3) that the licensee recognizes, and/or enters as applicable, the appropriate licensee-established risk category according to the risk assessment results and licensee procedures; and (4) the licensee identified and corrected problems related to maintenance risk assessments.

- April 12, 2008, Unit 2, low pressure safety injection system, Train A, and Station Blackout Generator A out of service due to planned maintenance

- April 30, 2008, Unit 1, maintenance on the current transformer for switchyard Breaker AEMANPL 995 resulting in loss of Devers offsite power supply

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed two samples.

2. 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 CAP to determine

if the licensee identified and corrected risk assessment and emergent work control problems.

- April 25, 2008, Unit 1, troubleshooting and repair of 120 VAC Class 1E Inverter 1EPNCN13 for Train C
- May 14, 2008, Unit 2, shutdown risk assessment following the simultaneous loss of non-class electrical Buses NBN-SO1 and NBN-S02
- May 14-16, 2008, Unit 2, inadvertent transfer of water from reactor coolant system (RCS) to refueling water tank (RWT)

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed three 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 night 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.

- April 4, 2008, Unit 2, functional assessment of degraded thermo-lag on the motor-driven AFW pump room Train B cable chase
- April 8, 2008, Units 1 and 3, functional assessment of charging pump suction check Valves PCHA177 and PCHA190
- April 18, 2008, Unit 1, failure of air operated Valve SGA-UV-1133 to close during performance of relay testing
- April 21, 2008, Unit 1, Cycle 14 core design uses fewer new fuel assemblies than assumed in decay heat calculations that support UFSAR Chapters 6 and 15 analyses
- April 22, 2008, Unit 1, cold leg safety injection lines projected end of cycle effective boron concentration diluted below value assumed in transient analysis
- June 5, 2008, Unit 1, degraded nitrogen line nozzle penetration for SIT 1A

- June 2, 2008, Unit 3, EDGs A and B declared inoperable due to defect associated with the fuel injection pumps

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed seven samples.

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

1. Permanent Modifications

On April 15, 2008, the inspectors reviewed a permanent modification to the Unit 2 EDG A speed control governor. The inspectors reviewed key affected parameters associated with materials/replacement components, timing, control signals, equipment protection from hazards, operations, structural, process medium properties, licensing basis, and failure modes for the speed control governor modification. 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 a loss of key safety functions; (2) postmodification 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.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

2. Temporary Modifications

On May 28, 2008, the inspectors reviewed a temporary modification for Unit 2 to install vibration monitoring equipment for the two main steam lines for SGs 1 and 2. The inspectors reviewed the UFSAR, plant drawings, procedure requirements, operator logs, and TSs to ensure that the temporary modification was properly implemented. The inspectors verified that: (1) the modification did not have an effect on system operability/availability; (2) the installation was consistent with modification documents; (3) the post-installation test results were satisfactory and that the impact of the temporary modification on permanently installed SSCs were supported by the test; (4) the licensee evaluated the combined effects of temporary modifications; and (5) there were no temporary modifications installed that have not been evaluated. The inspectors also verified that the licensee identified and implemented any needed corrective actions associated with temporary modifications.

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 six below 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 CAP to determine if the licensee identified and corrected problems related to postmaintenance testing.

- April 8–10, 2008, Units 1, 2, and 3, troubleshoot and repair station blackout gas turbine generator, Train B, frequency and load oscillations
- April 16, 2008, Unit 1, troubleshoot and repair Valve SGA-UV-1133 failure to close during performance of relay testing
- April 19, 2008, Unit 2, troubleshoot and repair EDG A for reversed polarity at connector for speed control governor
- April 25, 2008, Unit 1, troubleshoot and repair 120 VAC Class 1E Inverter 1EPNCN13 for Train C
- May 2, 2008, Unit 2, troubleshoot and repair the containment purge isolation actuation system module control logic, Train B
- June 2, 2008, Unit 3, replace 13 fuel injectors on the EDG, Train A

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

Unit 2 Refueling Outage 2R13

The inspectors reviewed the following risk-significant refueling items or outage activities 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 (GL) 88-17, "Loss of Decay Heat Removal:" (1) the risk control plan; (2) tagging/clearance activities; (3) RCS 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 mid-loop conditions; (11) refueling activities; (12) heatup and cooldown 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 eight below listed surveillance activities demonstrated that the SSCs 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 to demonstrate TS operability; (9) test equipment removal; (10) restoration of plant systems; (11) fulfillment of ASME Code requirements; (12) updating of performance indicator (PI) data; (13) engineering evaluations, root causes, and bases for returning tested SSCs not meeting the test acceptance criteria; (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.

- April 9, 2008, Unit 2, low pressure safety injection (LPSI), containment spray (CS) and RWT outlet check valve inservice test
- April 14-15, 2008, Unit 1, engineered safety feature actuation system (ESFAS), Train A, subgroup relay functional test
- April 18, 2008, Unit 1, ESFAS relay testing for Valve SGA-UV-1133

- April 29, 2008, Unit 2, local leak rate test on Penetration 44
- May 2, 2008, Unit 2, containment purge isolation actuation system module control logic, Train B
- May 12, 2008, Unit 2, EDG A integrated safeguards actuation test
- May 12, 2008, Unit 1, control element assembly operability checks
- May 30, 2008, Unit 1, CS pump and check valve, Train A, inservice test

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed eight samples.

b. Findings

Introduction. A Green self-revealing NCV of TS 5.4.1, "Procedures," was identified for the failure of operations personnel to adequately implement Procedure 40DP-9OP19, "Locked Valve, Breaker, and Component Tracking." Specifically, on May 14, 2008, Valve SIA-V421 was found to be one and one-half turns open resulting in approximately 930 gallons of water being transferred from the RCS to the refueling water storage tank.

Description. On May 13, 2008, Unit 2 was shutdown in Mode 5, with reactor water level near the vessel flange and the core fully loaded. Shutdown cooling, Train B, was in service for decay heat removal. Containment spray Pump A was started for vibration and flow data collection in accordance with plant procedures. During operation of the CS system a decrease in RCS level of approximately four inches and a corresponding increase in RWT level were observed. The CS Pump A was secured and the cause of the level change was investigated. Approximately 450 gallons of water were transferred from the RCS to the RWT. Operations personnel believed that a valve in the system was leaking past its seat and took action to isolate the path. Containment spray Pump A was restarted to continue with vibration and flow data collection. Again, during CS system Train A operation, RCS level was observed to decrease approximately four inches with a corresponding RWT increase. Approximately 480 gallons of water was transferred from the RCS to the RWT on the second occasion.

Subsequent troubleshooting efforts by operations personnel determined that Valve SIA-V421 was found one and one-half turns open. This valve isolates Train A from a common sample point for the RCS and the RWT. The open sample isolation resulted in a discharge path being established from the RCS to the RWT when CS Pump A was started.

During review of this event the inspectors noted that Valve SIA-V421 was required to be closed and locked in accordance with Procedure 40DP-9OP19, "Locked Valve, Breaker, and Component Tracking." The inspectors also noted that Procedure 40AC-0ZZ06, "Locked Valve, Breaker, and Component Control," establishes a method to lock and seal valves governed by Procedure 40DP-9OP19. In addition, Procedure 02DP 0ZZ01, "Verification of Plant Activities," describes the requirements and methods for independent verification. The inspectors determined that while Valve SIA V421 had been signed for being closed, locked, and verified on May 13, 2008, this action was not

completed in accordance with approved procedures to ensure that valve was indeed in the closed position.

Operations personnel returned Valve SIA-V421 to the correct position. The licensee wrote PVAR 3174527 to address this issue.

Analysis. The performance deficiency associated with this finding is the failure of operations personnel to adequately implement Procedure 40DP-9OP19, "Locked Valve, Breaker, and Component Tracking." This resulted in an inadvertent reactor vessel level decrease. The finding is more than minor because it is associated with the configuration control attribute of the initiating events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown operations. A Phase 2 analysis was required because using Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," Attachment 1, the inspectors determined that the finding actually resulted in a loss of RCS inventory. Using the Phase 2 worksheets in Attachment 2, this was determined to be a loss of level control precursor event. The initiating event likelihood for this finding was determined from Table 1 of the worksheet and the resultant core damage frequency was determined to be 1E-8, therefore the finding screened as having very low safety significance (Green). The finding has a crosscutting aspect in the area of human performance associated with work practices because the licensee failed to use human error prevention techniques such as self-checking [H.4(a)].

Enforcement. Technical Specifcation 5.4.1 requires that procedures be established, implemented, and maintained covering the applicable procedures in Regulatory Guide 1.33, Appendix A. Paragraph 1.c of Appendix A requires procedures for equipment control, including locking. Procedure 40DP-9OP19, "Locked Valve, Breaker, and Component Tracking," Section 3.3, valve, breaker, or component restoration, states in part, “to place the valve, breaker, or component in its required locked position and then to install and lock the locking device.” Section 3.3 also states, in part, “that a second individual shall check that the valve, breaker or component is in its required position using local and remote indication and that the locking device is locked.” Contrary to these requirements, on May 13, 2008, operations personnel did not fully close Valve SIA-V421 prior to installing the locking device. This condition was not discovered by the individual conducting the independent verification. Because this finding is of very low safety significance and has been entered into the licensee's CAP as PVAR 3174527, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000529/2008003-03, "Inadvertent Decrease in Reactor Vessel Level Due to Personnel Error."

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

a. Inspection Scope

The inspectors performed an in-office review of Revisions 19 and 20 to Emergency Plan Implementing Procedure (EPIP)-99, "EPIP Standard Appendices," Appendix A, "Emergency Action Levels," and Appendix P, "EAL Technical Bases," submitted March 18, 2008, and Revision 39 to the PVNGS Emergency Plan, submitted April 10, 2008. These revisions added Monitors RU-61, RU-62, and RU-66, to Emergency Action

Level 3-12, replaced Monitor RU-55 with Monitors RU-55a and RU-55b, and added the radiological monitoring technician position to the minimum staffing.

The 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 the criteria of Nuclear Energy Institute (NEI) Report 99-01, "Methodology for Development of Emergency Action Levels," Revision 4, and to the standards in 10 CFR 50.47(b) to determine if the revisions adequately implemented the requirements of 10 CFR 50.54(q). This review was not documented in a safety evaluation report and did not constitute approval of licensee changes to the emergency plan and associated implementing procedures, therefore these revisions are subject to future inspection.

The inspectors completed two samples during the inspection.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

On June 18, 2008, for the emergency response organization exercise scenario Guide 08-D-FSD-06004 simulator-based training evolution, contributing to drill/exercise performance and emergency response organization Performance Indicators (PIs), the inspectors: (1) observed the training evolution to identify any weaknesses and deficiencies in classification, notification, and protective action requirements development activities; (2) compared the identified weaknesses and deficiencies against licensee identified findings to determine whether the licensee is properly identifying failures; and (3) determined whether licensee performance is in accordance with the guidance of the NEI 99-02, "Voluntary Submission of Performance Indicator Data," acceptance criteria.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

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, and worker adherence to these controls. The inspectors 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 inspectors interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspectors 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 radiation, high radiation, or airborne radioactivity areas
- Radiation exposure permits, procedures, engineering controls, and air sampler locations
- Conformity of electronic personal dosimeter alarm setpoints with survey indications and plant policy; workers' knowledge of required actions when their electronic personnel dosimeter noticeably malfunctions or alarms
- Barrier integrity and performance of engineering controls in airborne radioactivity areas
- Physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools
- 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 control during job performance
- Dosimetry placement in high radiation work areas with significant dose rate gradients
- Changes in licensee procedural controls over 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 are listed in the attachment.

The inspector completed 20 samples.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope

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

- Integration of ALARA requirements into work procedure and radiation exposure permit documents
- Use of engineering controls to achieve dose reductions and dose reduction benefits afforded by shielding
- Workers' use of the low dose waiting areas
- Radiation worker and radiation protection technician performance during work activities in radiation areas, airborne radioactivity areas, or high radiation areas

Documents reviewed are listed in the attachment.

The inspector completed four samples.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 PI Verification (71151)

a. Inspection Scope

Cornerstone: Mitigating Systems

The inspectors sampled licensee submittals for the nine PIs listed below for the period from April 1, 2007, to March 31, 2008, for Units 1, 2, and 3. The definitions and guidance of NEI 99-02, "Regulatory Assessment Indicator Guideline," Revision 5, 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 license event reports (LERs), monthly operating reports, and operating logs as part of the assessment. Licensee PI data was also reviewed against the requirements of Pocedures 93DP-0LC09, "Data Collection and Submittal Using Institute of Nuclear Power Operations Consolidated Data Entry System," Revision 7 and 70DP-0PI01, "Performance Indicator Data Mitigating Systems Cornerstone," Revision 3.

- Mitigating System Performance Index - Safety System Functional Failures
- Mitigating System Performance Index - Emergency AC Power Systems
- Mitigating System Performance Index - High Pressure Injection Systems

The inspectors completed nine samples.

Cornerstone: Occupational Radiation Safety

Occupational Exposure Control Effectiveness

The inspectors reviewed licensee documents from September 1, 2007, through March 31, 2008. The review included corrective action documentation that identified occurrences in locked high radiation areas (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 inspectors interviewed licensee personnel that were accountable for collecting and evaluating the performance indicator data. In addition, the inspectors toured plant areas to verify that high radiation, locked high radiation, and very high radiation areas were properly controlled. Performance indicator definitions and guidance contained in NEI 99-02, were used to verify the basis in reporting for each data element.

The inspectors completed one sample in this cornerstone.

Cornerstone: Public Radiation Safety

- Radiological Effluent Technical Specification/Offsite Dose Calculation Manual Radiological Effluent Occurrences

The inspectors reviewed licensee documents from September 1, 2007, through March 31, 2008. Licensee records reviewed included corrective action documentation that identified occurrences for liquid or gaseous effluent releases that exceeded PI thresholds and those reported to the NRC. The inspectors interviewed licensee personnel that were accountable for collecting and evaluating the PI data. Performance indicator definitions and guidance contained in NEI 99-02, were used to verify the basis in reporting for each data element.

The inspectors completed one sample in this cornerstone.

Documents reviewed by the inspectors are listed in the attachment.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Reviews of Identification and Resolution of Problems

The inspectors performed a daily screening of items entered into the licensee's CAP. This assessment was accomplished by reviews of daily summary reports for CRDRs and work mechanisms, 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 followup through other baseline inspection procedures.

.2 Selected Issue Followup Inspection

a. Inspection Scope

In addition to the routine review, the inspectors selected the three below 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.

- April 1, 2008, Units 1, 2, and 3, review of repeat significant failures of economizer line Main Feedwater Isolation Valves (MFIVs) 2JSGAUV174 on June 27, 1998, 1JSGAUV177 on June 18, 1998, and 3JSGAUV177 on July 13, 2006

- April 5, 2008, Unit 2, SIT discharge check Valve SIEV215 failed to open during refueling outage equalization of the SITs with the refueling pool

- May 29, 2008, Unit 2, failure of main steam line constant support Hanger SG033-H011

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed three samples.

b. Findings and Observations

1. Introduction. A Green self-revealing NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," was identified for the failure of engineering personnel to implement adequate corrective actions to preclude recurrence of a significant condition adverse to quality. Specifically, between June 28, 1998 and July 17, 2006, on several occasions the four-way 'N' valve for an economizer MFIV 2JSGAUV0174 became lodged in the center blocked position, preventing fast closure of the MFIV upon receipt of a main steam isolation signal.

Description. On July 27, 2006, operations personnel declared MFIV 2JSGAUV0174 to SG 1 inoperable as a result of the hydraulic accumulator for MFIV 2JSGAUV0174 failing to recharge. This failure occurred when the four-way 'N' valve for MFIV 2JSGAUV0174 became lodged in the center blocked position such that flow to the hydraulic accumulator was blocked. This would have prevented fast closure of the MFIV upon receipt of a main steam isolation signal and had existed since July 13, 2006.

The safety function of this MFIV is to provide containment isolation between the SGs and the feedwater line in the event of a main steam line break, feedwater line break, or loss of reactor coolant accident. The MFIVs isolate main feedwater flow to the secondary side of the SGs following a high energy line break. Closure of the MFIVs terminates flow to both SGs, terminating the event for feedwater line breaks occurring upstream of the MFIVs. The safety function of the MFIV, to provide containment isolation, was not affected since the redundant valve, MFIV 2JSGBUV0132, on the economizer line would have closed. The normal position and the safety position for MFIV 2JSGAUV0174 four-way 'N' valve is in the open position to port accumulator nitrogen to fast close the MFIVs.

Valve 2JSGAUV0174 was declared inoperable on July 27, 2006, and the four-way 'N' valve was replaced. Engineering personnel evaluated the accumulator pressure trends and determined the 'N' valve had been lodged in the blocked position since the last time operations personnel reduced pressure on July 13, 2006. A root cause investigation was conducted and documented in CRDR 2915450. The root cause investigation identified the cause to be the inability to detect the failure of the four-way 'N' valve when using Procedure 40OP-9SG01, "Main Steam." Procedure 40OP-9SG01, Step 4.5, is used to verify the nitrogen precharge of the accumulators by turning the MFIV exercise/accumulator charge test switch to ACC CH TEST, which shuttles the four-way 'N' valve to bleed off accumulator hydraulic fluid. After verifying the nitrogen pre-charge, operations personnel turn the switch back to normal which causes the actuator air operated hydraulic pump to recharge the accumulator. Further, Procedure 40OP-9SG01, Step 4.6.10, is used if pressure becomes too high in the accumulators, and operations personnel reduce pressure by cycling the exercise/accumulator charge test switch to ACC CH TEST, which cycles the four-way 'N' valve to bleed off a slight amount of pressure. This process should automatically return the four-way 'N' valve to its required position. Procedure 40OP-9SG01 did not provide a step to verify the position of the four-way 'N' valve after cycling the valve. The action to prevent recurrence was to revise the procedure to require verification of hydraulic pump start and accumulator pressure increase greater than 100 psi. The ability to increase accumulator pressure indicates the four-way 'N' valve has returned to its proper position to support MFIV operation.

The MFIV failure on July 27, 2006 was similar to four past MFIV failures. On June 18, 1998, operations personnel were attempting to lower MFIV 1JSGAUV0177 accumulator pressure due to seasonal temperature influences. Following the decrease in accumulator pressure, the accumulator pressure failed to increase. Also, on June 27, 1998, the MFIV 3JSGAUV0177 accumulator failed to lower in pressure when operations personnel attempted to lower pressure due to seasonal temperature influences. It was found that the four-way 'N' valves were bound in the blocked position and would have prevented fast closure of these valves on receipt of a main steam isolation signal. These events are documented in CRDR 3-8-0142. The licensee determined that the most probable cause of the failure was due to rougher than optimum

end cap surface roughness of the MFIV 4-way valves. The licensee implemented corrective actions by changing Vendor Technical Document 13-VTD-A391-00010, "Anchor/Darling Instruction Manual for Main Stream Isolation Valves and Feedwater Isolation Valves," to include a surface finish on the inside of the MFIV 4-way valve end caps of 16-32 roughness measurement system. The licensee's corrective actions concentrated on a lack of surface roughness requirements on the end cap of the MFIV. The corrective actions were limited in scope, did not address the procedural changes needed, and were not adequate to preclude repetition. During their review, the inspectors noted that the root cause investigation for the four-way 'N' valve was never determined. Also, the four-way 'N' valve failed and became stuck on MFIV 2JSGAUV0174 on April 4, 2000, and May 13, 2003, when operations personnel attempted to adjust accumulator pressure. The events were documented in CRDRs 117037 and 2604468. The inspectors noted that the most recent occurrence was the third occurrence of the four-way 'N' valve failure since the root cause investigation and the surface roughness requirement corrective actions were completed in 1998.

The licensee classified the MFIV failure on July 17, 2006, and the two failures on June 18 and June 27, 1998, as significant conditions adverse to quality. A significant condition adverse to quality is defined in PVNGS Procedure 01DP-0AP12, "Palo Verde Action Request Processing," in part, as a condition or event that presents a significant or moderate risk to the safe, reliable operation of the plant or personnel safety such that recurrence is unacceptable. Consideration of significance shall also include events that had a strong potential to be more severe if different conditions, that could be reasonably expected, had been present. An assessment of the possible causes, risks, uncertainties, and consequences (potential or actual) should be factored into the significance determination. In addition, Procedure 90DP-0IP10, "Condition Reporting," Step 3.3.2.1, states, in part, that for significant CRDRs, the CRDR owner shall complete a root cause investigation, identify the root cause(s) and implement corrective actions to prevent recurrence. The inspectors noted that the corrective actions from the significant June 1998 failures did not prevent recurrence of the MFIV four-way 'N' valve failures.

Analysis. The performance deficiency associated with this finding involved the failure of engineering personnel to implement adequate corrective actions to preclude recurrence of a significant condition adverse to quality. This finding is greater than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the cornerstone objective of ensuring the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. A Phase 2 analysis was required because using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," determined that there was a loss of main feedwater isolation of a single train to SG '1' for greater than the TS allowed outage time. Using the Phase 2 worksheets associated with a SG tube rupture without SG isolation, the finding is determined to have very low safety significance since all remaining mitigation capability was available or recoverable. This finding was evaluated as not having a crosscutting aspect because the performance deficiency is not indicative of current performance.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," requires, in part, that in the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective actions taken to preclude repetition. Contrary to the above, between June 28, 1998, and July 17, 2006, engineering personnel failed to implement adequate corrective actions to

preclude recurrence of a significant condition adverse to quality. Specifically, for three times in eight years, the four-way 'N' valve for an economizer MFIV became lodged in the center blocked position, preventing fast closure of the MFIV upon receipt of a main steam isolation signal. Because this finding is of very low safety significance and has been entered into the licensee's CAP as CRDR 2915450, this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000529/2008003-04, "Failure to Prevent Recurrence of a Significant Condition Adverse to Quality for the Feedwater Isolation Valves."

2. Detailed Review of Unit 2 Constant Support Hanger Degradations and Failures

The inspectors performed an in-depth review of the failure of Unit 2 main steam line constant support Hanger 2SG033H011 failure. Following this failure, and due to previous failures and degradations of similar support hangers, the licensee investigated to evaluate the cause(s) of the failure and correct the condition. The inspectors considered the following during the review of the licensee's actions: (1) review all previous failures or degradations of all Palo Verde ITT-Grinnell safety-related constant supports; (2) review the extent of condition determination for this issue (current and prior constant support failures) and whether the licensee's actions were comprehensive; (3) review the licensee's evaluation on the effect of the support failure on main steam line stresses for anticipated loads; (4) review and assess the effectiveness of corrective actions for current and past similar failures; and (5) review industry operating experience related to ITT-Grinnell constant supports and ensure the licensee had incorporated the operating experience into the maintenance and testing programs for the constant supports.

Related inspections for the main steam line supports are noted in Sections 1R12, 1R18 and 4OA7 of this report.

Background of Constant Support Failures

A constant support hanger provides a constant supporting force for a piping system throughout its full range of vertical pipe movement. This is accomplished through the use of a spring operating in conjunction with a lever, in such a way that the spring force times the distance to the lever pivot is always equal to the pipe load times its distance from the pivot point. This type of support is thermally invisible, as the supporting force equals the pipe weight throughout the entire thermal cycle. These hangers are attached to systems and at locations where the stresses are considered critical.

The licensee has experienced several failures associated with constant support Hanger 11 associated with Main Steam Lines 33, 36, 42 and 45 over the last three years. These supports are designed to support the weight of the main steam piping plus insulation from the SG nozzle to Hanger 16. These supports were installed to eliminate the main steam line dead weight load on the SG nozzles. These supports have experienced cracking in the attachment welds to the support structure, the load coupler, the load yoke, and dents in the can cover around the spring. These failures are noted in the table below.

DATE	HANGER	Reference Document WO /CRDR	Cracked Welds	Failed Coupler	Failed Yoke	Spring Cover Damage
05/31/2007	1SG042H011	WO 3021090/CRDR 3022731		X		
10//22/2003	2SG033H011	WO 2645526				X
03/31/2008	2SG033H011	WO 3156677/CRDR 3156207	X		X	X
10/22/2003	2SG036H011	WO 2645526				X
04/03/2005	2SG036H011	WO 2789760/CRDR 2786278	X			
10/24/2006	2SG036H011	WO 2912408/CRDR 2935286			X	
03/31/2008	2SG036H011	WO 3156710/CRDR 3153607			X	
10/22/2003	2SG045H011	WO 2645526				X
03/31/2008	2SG045H011	WO 3161040/CRDR 3153607	X		X	
04/03/2006	3SG036H011	WO 2888460/CRDR 2887685		X		

Extent of Condition Review

The failures noted above, with the exception of the most recent failure in March of 2008, were evaluated, and the licensee determined the most likely cause to be from high cycle fatigue. The licensee performed an equipment root cause of failure analysis for significant CRDR 3022731, evaluating the failures that occurred from October 2003 through May 2007. This analysis did not come to any definitive conclusion, but had the following potential causes: (1) "topping out" of the constant support due to insufficient travel margin from the hot position; (2) "popping" of the constant support structural frames may amplify the dynamic responses of the piping system; (3) incorrect hot settings on the constant support may contribute to the available travel margin; (4) steam hammer of the piping leading to load variations on the constant support and associated components; and (5) load coupler manufacturing or design. The evaluation recommended the replacement of the couplers with components that are less susceptible to these issues, and vibration monitoring of the Unit 1 main steam line piping to record actual pipe displacement.

On March 29, 2008, Unit 2 was shutdown for the Refueling Outage 2R13. The licensee entered containment to inspect the main steam line supports, and observed that main steam line Hanger 2SG033H011 had a broken attachment weld. Upon further inspection of the other three supports, the licensee identified a cracked attachment weld on the load coupler for Hanger 2SG045H011. The licensee performed evaluations of these conditions, including independent verification of the piping design and support design; consulted with the constant support vendor; performed additional testing of the constant supports; and installed a temporary modification to monitor piping vibration and pipe stresses during operation (see Section 1R18 of this report).

Effect of Degraded Supports on Main Steam Line Pipe Stresses

The licensee analyzed the effect of degraded supports for the main steam pipe utilizing a computer modeling program. This computer model uses analytical results for various UFSAR design basis conditions and revealed that although design margins were reduced, no pipe stress limits were exceeded.

Previous Operating Experience

During their review, the inspectors noted that other than previous plant specific experience no other industry operating experience related to these support failures were found.

Generic Industry Issues

As part of the corrective actions under CRDR 3153607, the licensee removed Hangers 2SG033H011, 2SG036H011, 2SG042H011, and 2SG045H011, and tested the hangers' load capability in accordance with WOs 3156677, 3156710, 3161039 and 3161040, respectively. During testing the licensee identified that none of the hangers had a substantially uniform supporting force over the supports full travel range. Additionally, the licensee noted that the supporting force for the four hangers tested exceeded the maximum allowed deviation of six percent (noted in ASME Section III, Subsection NF (1974), Article NF-3273.1). The licensee assessed these effects and determined the variability onto the main steam line pipe did not reduce piping design margins, nor did they exceed code allowable stresses. The licensee is currently evaluating this issue for industry operating experience in Condition Report Action Item (CRAI) 3181298. One licensee-identified finding is discussed and documented in Section 4OA7 of this report.

Documents reviewed by the inspectors are listed in the attachment.

.3 Semi-Annual Review to Identify Trends

a. Inspection Scope

The inspectors completed a semi-annual trend review of repetitive or closely related issues that were documented in Palo Verde's corrective action documents and monthly trend reports to identify trends that could indicate the existence of a more significant safety issue. The inspectors also performed a walkdown of equipment important to safety to ensure issues were being properly identified and tracked in the CAP. The review was focused on repetitive equipment problems, human performance issues, and program implementation issues. The results of the trend review by the inspectors were compared with the results of normal baseline inspections. The review included issues documented outside the normal corrective action system, such as in system health reports, nuclear oversight reports, and Palo Verde monthly management reports. The review considered a 6-month period of January through June of 2008.

- A review of an adverse trend that continues within the engineering, maintenance and operations organizations to effectively implement the CAP

- A review of an adverse trend in the number of configuration control events within the operations department

- A review of an adverse trend that identified the trending program is ineffective, does not provide useful information, and needs improvement

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance identified.

.4 Multiple/Repetitive Degraded Cornerstone Column and Crosscutting Issues Follow-up Activities

Quarterly Confirmatory Action Letter Inspection

This inspection was the second in a series of inspections to be performed by the NRC to assess the progress that PVNGS made with respect to the implementation of their Site Integrated Improvement Plan (SIIP) and to verify their progress in addressing the specific actions in the NRC Confirmatory Action Letter (CAL) dated February 15, 2008.

During the IP 95003 Supplemental Inspection, the licensee was still in the process of developing the SIIP and only limited progress had been made in completing SIIP tasks. As of November 1, 2007, the licensee had completed 12 closure packages and only two had been approved for closure by the Closure Review Board (CRB). On December 31, 2007, PVNGS submitted portions of their SIIP to address Action 5 of the original CAL dated June 21, 2007. Action 5 required the licensee to submit the portions of their improvement plan that impacted the reactor safety strategic performance area.

The revised CAL, dated February 15, 2008, superseded the CAL dated June 21, 2007. The revised CAL contains a subset of actions delineated in the SIIP that the NRC determined were necessary to address the performance insights identified by PVNGS assessment activities and the IP 95003 Supplemental Inspection. The key performance areas that PVNGS has committed to address are as follows: Yellow and White findings as documented in NRC Inspection Reports 05000528; 05000529; 05000530/2004014 and 2006012, problem identification and resolution issues, human performance issues, engineering programs, review of current equipment evaluations, safety culture, accountability, change management, emergency preparedness, longstanding equipment deficiencies, and backlog.

The areas to be inspected are identified in the revised CAL. The licensee submitted a list of the specific tasks, including due dates, associated with the action plans and strategies for each of the CAL items on March 31, 2008. The items selected for this quarterly CAL inspection were based on the completion due dates provided by the licensee from their submittal dated, December 31, 2007.

a. Inspection Scope

The inspectors selected the SIIP/CAL tasks listed below for an in-depth review. The inspectors reviewed a total of 65 completed closure packages associated with the licensee's SIIP/CAL tasks. Since some of the tasks are associated with multiple action plans, the inspectors reviewed a total of 83 CAL items, and closed 82 of those 83 CAL items. The inspectors considered the following during the review of the licensee's actions: (1) SIIP task matches the CRAI description; (2) corrective actions address and correct the SIIP task; (3) corrective actions address the action plan problem statement and primary causes; (4) verification of SIIP task completion; (5) timely completion of corrective actions in accordance with the SIIP schedule; (6) review of metrics and measures for improved performance; (7) independent verification of improved performance; and (8) closure of SIIP task in accordance with procedures.

- Task 1.2.E.13 (CAL Item 5 and SIIP Action Plan 5, Strategy 6) (CRAI 3065157) - Provide closure documentation in support of completed action to establish engineering programs management and health reporting procedure

- Task 1.2.E.21 (CAL Item 5 and SIIP Action Plan 5, Strategy 1) (CRAI 3065077) - Engineering evaluate what existing programs need to be immediately assessed or assessed near term (interim measure)

- Task 3.2.1.d (CAL Item 1 and SIIP Action Plan 15, Strategy 2) (CRAI 3047250) - Implement an action request review committee to improve condition statement, risk assessment, and prioritization

- Task 3.2.4 (CAL Item 1 and SIIP Action Plan 15, Strategy 3) (CRAI 3063809) – Evaluate establishment of a condition review group, present results to senior management and incorporate actions as necessary

- Task 3.4.1 (CAL Item 1 and SIIP Action Plan 15, Strategy N/A) (CRAI 3023674) – Provide ability to anonymously initiate a PVAR

- Task 3.6.5 (CAL Item 2 and SIIP Action Plan 14, Strategy 2) (CRAI 3069469) – Revise work scope library 243880 to provide complete instructions for EDG relay maintenance

- Task 3.6.47 (CAL Item 2 and SIIP Action Plan 14, Strategy 2) (CRAI 3105178) – Create work scope library 2960093 to ensure proper contactor setup and DC coil switch cleaning instructions

- Task 3.6.49 (CAL Item 2 and SIIP Action Plan 14, Strategy 1) (CRAI 3104903) – Field straighten K1 actuator relay arms

- Task 3.6.55 (CAL Item 2 and SIIP Action Plan 14, Strategy 5) (CRAI 2967986) – Implement systematic troubleshooting procedure

- Task 3.6.57 (CAL Item 2 and SIIP Action Plan 14, Strategy 3) (CRAI 2968028) – Ensure reliability centered maintenance templates effectively manage single point vulnerabilities on the EDGs

- Task 3.6.59 (CAL Item 2 and SIIP Action Plan 14, Strategy 4) (CRAI 3086661) - Identify/classify components in Class 1E 4.16 kV system designated to have moving parts which break or make contacts and/or physical adjustments which control actuation of device

- Task 3.6.61 (CAL Item 2 and SIIP Action Plan 14, Strategy 4) (CRAI 3086665) - Identify/classify components in the Class 1E 480 V power system designated to have moving parts which break or make contacts and/or physical adjustments which control actuation of device

- Task 3.6.62 (CAL Item 2 and SIIP Action Plan 14, Strategy 4) (CRAI 3086667) - Identify/classify components in Class 1E 125 VDC system designated to have moving parts which break or make contacts and/or physical adjustments which control actuation of device

- Task 3.6.63 (CAL Item 2 and SIIP Action Plan 14, Strategy 4) (CRAI 3086669) - Identify/classify components in the diesel system designated to have moving parts which break or make contacts and/or physical adjustments which control actuation of device

- Task 3.6.65 (CAL Item 2 and SIIP Action Plan 14, Strategy 4) (CRAI 3042099) - Identify/classify components in containment hydrogen control system designated to have moving parts which break or make contacts and/or physical adjustments which control actuation of device

- Task 3.6.72 (CAL Item 2 and SIIP Action Plan 14, Strategy 5) (CRAI 3105370) - Provide training on new troubleshooting/problem solving process

- Task 3.7.2.b (CAL Item 1 and SIIP Action Plan 15, Strategy 4) (CRAI 2785397) – Revise procedure to fill the recirculation actuation signal (RAS) piping lines for Unit 1

- Task 3.7.2.c (CAL Item 1 and SIIP Action Plan 15, Strategy 4) (CRAI 2785415) – Revise procedure to fill RAS lines for Unit 2

- Task 3.7.2.e (CAL Item 1 and SIIP Action Plan 15, Strategy 3) (CRAI 2785293) – Revise procedure to local leak rate test containment sump valves prior to filling line

- Task 3.7.2.f (CAL Item 1 and SIIP Action Plan 15, Strategy N/A) (CRAI 2878457) – Revise Appendices A and B of Procedure 40ST-9SI04, "RAS Line Fill Check," to require that the inner piping exposed by removing the pipe cap after the fill and vent be inspected to determine if water is still actively flowing after 30 seconds

- Task 3.7.2.g (CAL Item 1 and SIIP Action Plan 15, Strategy 5) (CRAI 2981851) – Revise Procedure 40ST-9SI04 to include time criteria for evaluating length of void escaping the vent valve and reordering the venting steps to eliminate one possible path for drawing air into the piping on vent

- Task 3.7.2.h (CAL Item 1 and SIIP Action Plan 15, Strategy N/A) (CRAI 2858706) – Develop a new safety injection venting strategy based on feedback and lessons learned from benchmarking activities

- Task 3.7.2.i (CAL Item 1 and SIIP Action Plan 15, Strategy N/A) (CRAI 2881096) – Revise Procedures 40ST-9SI04 and 40OP-9SI04, "Safety Injection System Venting," to assure the line used to fill the RAS piping is full of water before beginning the RAS fill

- Task 3.7.2.j (CAL Item 1 and SIIP Action Plan 15, Strategy 6) (CRAI 3145720) – Complete Engineering Study 13-MS-A102 to determine venting duration and tolerable void size criteria for surveillance test procedure 40ST-9SI04 that will ensure no adverse impact to pump operation

- Task 3.7.2.k (CAL Item 1 and SIIP Action Plan 15, Strategy 7) (CRAI 3145723) – Revise surveillance test Procedure 40ST-9SI04 to align the procedure acceptance criteria and contingency actions with the results of Engineering Study 13-MS-A102

- Task 3.7.2.m (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 3170748) - Complete design modification WO 2739742 for Unit 3 to add additional venting, draining, and filling connections on the emergency core cooling system suction piping

- Task 3.7.2.n (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 3171169) – Keep RAS sumps full of borated water

- Task 3.7.2.o (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 3171179) – Revise safety injection design basis manual to add requirement to keep RAS suction lines full

- Task 3.7.2.p (CAL Item 1 and SIIP Action Plan 15, Strategy 4) (CRAI 3171184) - Revise Procedure 40ST-9SI04 for Unit 3 after implementation of modification to install fill and vent lines

- Task 3.7.3.d (CAL Item 1 and SIIP Action Plan 15, Strategy 2) (CRAI 2785412) - Implement design WO 2760330 to implement the emergency core cooling system suction piping modification in Unit 2

- Task 3.7.3.l (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 2808185) – Process change to UFSAR and the Technical Requirements Manual to add requirement to verify RAS suction lines full every 31 days

- Task 3.7.4.gg (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 3109807) - Establish/re-establish expectations for a questioning attitude and technical rigor

- Task 3.7.5.a (CAL Item 1 and SIIP Action Plan 15, Strategy 4) (CRAI 2833593) - Track to completion open Combustion Engineering control system independent design review items

- Task 3.7.7.l (CAL Item 1 and SIIP Action Plan 15, Strategy 4) (CRAI 2828875) - Revise the industry operating experience (OE) Program to provide guidance for

ensuring that industry OE reviews broadly consider related conditions that could have similar consequences

- Task 3.7.8.h (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 2825660) - System engineering will develop an appropriate system turnover process to include accomplishment of the necessary technical and administrative material prior to turnover

- Task 3.7.10.a (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 2825662) – Revise audit procedure to verify TS and surveillance requirement acceptance criteria are consistent

- Task 3.7.10.b (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 2853780) –Nuclear Assurance Department (NAD) to use case study of RAS event in pre-audit briefs

- Task 3.7.10.c (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 2825483) – Incorporate OE checklists into audits

- Task 3.7.10.d (CAL Item 1 and SIIP Action Plan 15, Strategy 3) (CRAI 2845862) – Conduct detailed standdown with lead auditors to reinforce expectations

- Task 3.7.10.f (CAL Item 1 and SIIP Action Plan 15, Strategy 3) (CRAI 2951170) – Implement post-audit conference with all first quarter 2007 audit team leads

- Task 3.7.10.g (CAL Item 1 and SIIP Action Plan 15, Strategy 2) (CRAI 2833209) – Develop and implement a process to review for independent safety review opportunities

- Task 3.7.10.h (CAL Item 1 and SIIP Action Plan 15) (CRAI 2833211) – Revise audit procedure to add instructions from the UFSAR for independent safety review

- Task 3.7.10.i (CAL Item 1 and SIIP Action Plan 15, Strategy 2) (CRAI 2832749) – Develop methodology to conduct fewer and more in-depth assessments

- Task 3.7.10.o (CAL Item 1 and SIIP Action Plan) (CRAI 2918738) –NAD to pilot a product review board

- Task 4.1.F.10 (CAL Item 8 and SIIP Action Plan 1, Strategy 12) (CRAI 3105753) – Revise procedures to require an OD or functional assessment on all TS and TS support SSCs

- Task 4.1.F.11 (CAL Item 8 and SIIP Action Plan 1, Strategy 12) (CRAI 3105754) – Add checklist to OD procedure

- Task 4.1.F.12 (CAL Item 8 and SIIP Action Plan 1, Strategy 12) (CRAI 3105755) – Revise OD procedure to have operations make initial extent of condition call

- Task 4.1.F.18 (CAL Item 8 and SIIP Action Plan 1, Strategy 12) (CRAI 3105759) – Revise OD procedure to require documentation of unverified assumptions and require a corrective action to validate assumptions

- Task 4.1.F.19 (CAL Item 1 and SIIP Action Plan 15, Strategy 2) (CRAI 3105760) - Establish dedicated engineering support for the preparation of prompt operability determinations (PODs)

- Task 4.1.F.22 (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 3105762) - As an interim action, establish a daily challenge board for immediate ODs and PODs generated in the previous 24 hours/weekend/holiday

- Task 4.1.F.27 (CAL Item 1 and SIIP Action Plan 15, Strategy 5) (CRAI 3105762) - Establish appropriate metrics to monitor OD performance

- Task 4.1.F.31 (CAL Item 6 and SIIP Action Plan 3, Strategy 8) (CRAI 3132227) – Develop and implement interim guidance that PODs shall not be based on informal information

- Task 4.1.F.32 (CAL Item 6 and SIIP Action Plan 3, Strategy 5) (CRAI 3132236) – Revise prompt OD procedure to include Task 4.1.F.31

- Task 4.4.11 (CAL Item 1 and SIIP Action Plan 15, Strategy 6) (CRAI 3075694) - Create a site-wide awareness/focus on the plant and corresponding safety aspects by setting the expectation to open initial daily meetings with discussions on plant status and correlating safety aspects

- Task 6.1.9 (CAL Item 1 and SIIP Action Plan 15) (CRAI 3030882) – Evaluate decision making error metric

- Task 6.7.1 (CAL Item 1 and SIIP Action Plan 15, Strategy 4) (CRAI 3066101) - Revise Procedure 65DP-0QQ01, "Industry Operating Experience Review," Revision 13, to include conduct of OE elements

- Task 6.7.13 (CAL Item 1 and SIIP Action Plan 15, Strategy 1) (CRAI 2938874) – OE outage books developed and published prior to each refueling outage, outlining internal and external OE and the behaviors to prevent recurrence

- Task 6.7.16 (CAL Item 1 and SIIP Action Plan 15, Strategy 4) (CRAI 3104859) – Develop and implement an OE screening committee

- Task 11.1.2 (CAL Item 1 and SIIP Action Plan 15, Strategy 6) (CRAI 3062207) – Distribute engineering principles and expectations

- Task 11.6.7 (CAL Item 1 and SIIP Action Plan 15, Strategy 4) (CRAI 3062318) – Finalize overall scope of component design basis high risk, low margin components by both qualitative and quantitative probabilistic risk assessment/analysis

- Task 11.8.30 (CAL Item 1 and SIIP Action Plan 15, Strategy 2 and 7) (CRAI 3065735) – Develop a conduct of engineering procedure, including engineering principles and standards

- Task 11.9.A.8 (CAL Item 1 and SIIP Action Plan 15, Strategy 3) (CRAI 3062655) – Issue initial base load work schedules for design, system, and maintenance engineering department

- Task 11.9.A.9 (CAL Item 1 and SIIP Action Plan 15, Strategy 4) (CRAI 3062657) – Establish and conduct periodic engineering work management meetings between engineering leaders and their staff to review work prioritization, resource allocation, and schedule dates for assigned work activities and incorporate results into the engineering schedule

- Task 15.1.2 (CAL Item 3 and SIIP Action Plan 6 Part 2, Strategy 7) (CRAI 3017936) -Transition current station policy for self-assessment to a station procedure and enhance policy

- Task 15.1.7 (CAL Item 3 and SIIP Action Plan 6 Part 2, Strategy 7) (CRAI 3060937) -Develop a process to identify and schedule overall station self-assessments by department

The inspectors considered all of the above tasks closed except Task 3.6.5. For details, refer to Section 1 below.

b. Findings and Observations

1. Task Closure

Each task within the SIIP requires a closure package along with varying levels of management review for closure based on the priority of the corrective action. The inspectors reviewed tasks associated with the licensee's SIIP and the CAL. These tasks were in various stages of the closure process, including some items that were still open. The SIIP task closure packages that were completed were reviewed in accordance with procedure 01DP-0AC06, "SIBP/SIIP Process," to determine if PVNGS personnel were following the closure process. The process has three closure categories:

- Category A – included significant conditions adverse to quality and CAL items

- Category B – included adverse conditions and improvement plan Priority 3 CRAIs

- Category C – included improvement plan Priority 4 CRAIs.

Category A tasks get the most reviews including: the standard CRDR/CRAI closure process; initiative lead concurrence that the action is ready for closure; reviewed and approved by the CRB; and, independent reviews from senior management led boards.

During the review of the SIIP tasks, the inspectors identified numerous quality issues, including closure packages for Tasks 3.6.5, 3.7.10.o, 4.1.F.27, and 6.71., as follows:

- Closure package for Task 3.6.5, "Revise work scope library 243880 to provide complete instructions for EDG relay maintenance," was inappropriately closed with outstanding reviews not completed. To address this issue, PVAR 3192713 was written. Inspectors will review this task during the next CAL inspection.

- Closure package for Task 3.7.10.O, "Nuclear Assurance to pilot a NAD Product Review Board, utilizing independent technical expertise, to ensure desired

improvements are being achieved," did not institutionalize these periodic reviews through procedures. To address this issue, PVAR 3192573 was written.

- Closure package for Task 4.1.F.27, "Establish appropriate metrics to monitor OD performance" did not include the success measure to monitor timely and accurate processing of IODs and PODs, as discussed in Policy Guide 1505-01, "Operability Determination Quality Metric," in a metric. To address this issue, PVAR 3192522 was written..

- Closure package for Task 6.7.1, "Revise 65DP-0QQ01 to include conduct of OE elements," did not include or evaluate all the described OE elements such as guidance to ensure timeliness and effectiveness of actions taken to address lesson learned; or define the required knowledge and skills for personnel reviewing and responding to OE. To address these issues, PVARs 3192771, 3192777, and 3192766 were written.

Task 3.6.62, "identify and classify components in the class 1E 125 VDC system," was not closed during the last CAL inspection due to the licensee inappropriately closing the task with outstanding reviews not completed to ensure operability of the class 1E 125 VDC system. Inspectors reviewed the licensee's corrective actions in PVAR 3144707, and Task 3.6.62 closure package addendum, and consider this task closed.

The inspectors also reviewed the SIIP quality PIs, interviewed numerous personnel, and reviewed several effectiveness reviews related to CAL SIIP actions.

2. Metrics and Measures to Monitor Improvement

During the inspection, the inspectors reviewed the recently implemented SIIP and the CAL PIs. The licensee developed twelve PIs to track the quality and schedule completion of SIIP and CAL tasks. The PIs included schedule adherence burn curves, SIIP original schedule adherence, document quality, 2008 closure packages that are CRB closed, 2007 closure package backlog, 2008 closure package cycle time, and a status of core performance indictors. The inspectors reviewed a sample of these PIs and determined that most of the indicators appeared appropriate and should provide useful information. However, since only four months of data was available for the 2008 PIs, the inspectors determined that not enough time had passed to assess trends or determine the appropriateness of the goals and thresholds.

Overall, the licensee is making progress in closing out the task closure packages. The licensee has closed 109 of the 455 CAL tasks through the CRB. During the inspectors' review of the CAL closure package quality PIs, it appears that overall package quality was improving for packages received by the CRB, but not at the administrative and preliminary reviews before the CRB. The inspectors determined the rejection rate of closure packages during the administrative and preliminary reviews, reviews prior to the CRB, was high. As of the June 26, 2008, for 2008, out of the 455 CAL tasks, 188 packages were closed in Site Work Management System but 150 of those did not meet the standards during the administrative and preliminary reviews and were returned to the responsible owners. Those owners were provided feedback to improve the quality of the closure packages. During the same time period, the CRB rejected only 11 closure packages.

The poor quality of the packages submitted for the administrative review has delayed package closure. For comparison, for April 2008, the average time it takes for a CAL closure package to be closed in Site Work Management System until the time it takes to go through the administrative review process and be submitted to CRB, is 48.1 days. The average number of days for the package to be reviewed and accepted by CRB is only 9.1 days.

The licensee has been and continues to provide training to the task owners on Procedure 01DP-0AC06 closure process, and is also providing coaching to individuals. Packages can be unsatisfactory for many reasons including: improper formatting, missing signatures, incomplete documentation, lack of demonstrated implementation, inadequate corrective actions, and inadequate sustainability requirements. The closure review process was described in Procedure 01DP-0AC06, Appendix L, "SIBP/SIIP Action Closure Flowchart," and contained two quality control steps, administrative and preliminary reviews. Numerous packages that were submitted for closure did not meet the closure review checklist criteria and were sent back to the owners for correction prior to CRB review.

At the end of the inspection, only 42 of 109 CRB approved CAL SIIP items were completely closed since they had received the independent reviews required by Procedure 01DP-0AC06. The inspectors attended several recent CRB meetings and found the CRB packages reviewed to be of higher quality. The licensee is making progress in closing the task closure packages; however, overall package quality needs to be improved.

4OA3 Followup of Events and Notices of Enforcement Discretion (71153)

.1 Event Follow Up

a. Inspection Scope

The inspectors reviewed the three below listed events and degraded conditions for plant status and mitigating actions to: (1) provide input in determining the appropriate agency response in accordance with Management Directive 8.3, "NRC Incident Investigation Program;" (2) evaluate performance of mitigating systems and licensee actions; and (3) confirm that the licensee properly classified the event in accordance with emergency action level procedures and made timely notifications to NRC and state/governments, as required.

- May 6, 2008, Unit 2, fire in the pressurizer cubicle due to a welding machine that was left energized and unattended
- May 9, 2008, Unit 1, tendon gallery Door A-B-06 opened without compensatory measures affecting pump room exhaust air cleanup system (PREACS) operability
- June 5–8, 2008, Unit 1, SIT 1A declared inoperable resulting in a reactor shutdown

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed three samples.

b. Findings

1. Fire in Pressurizer Cubicle due to Poor Work Practices

Introduction. A Green self-revealing NCV of License NPF-51, Condition 2.C.(6), was identified for the failure of maintenance personnel to follow procedures for proper control of ignition sources. Specifically, contract welding personnel failed to deenergize welding equipment and properly secure the welding rod electrodes, resulting in a fire in the Unit 2 pressurizer cubicle inside containment.

Description. On May 6, 2008, maintenance personnel were performing weld repairs on the pressurizer safety valves located in the pressurizer cubicle inside containment. At approximately 11:30 a.m., the welders broke for lunch, ensuring that a fire watch was stationed for at least 30 minutes after hot work was complete in accordance with station procedures. Once the thirty minutes had expired, the fire watch was secured and left the area. Shortly thereafter, a licensee engineer entered the pressurizer cubicle and identified a burning hammer handle and smoldering insulation. The licensee engineer also noted that the welding machine was never deenergized and immediately turned the welding machine off. The licensee engineer then informed other licensee personnel in the area of the fire, who then extinguished the fire with a portable carbon dioxide fire extinguisher.

The licensee conducted a safety standdown for all personnel involved with maintenance and performed an investigation to identify the cause of the fire documented in PVAR 3170965 and CRDR 3171155. The licensee found that no actual welding had occurred in the 30 minutes prior to the contract welders leaving the area. The licensee determined that the contract welding personnel had not deenergized the welding equipment prior to breaking for lunch. The licensee also found that poor housekeeping practices in the area and poor control of the welding rod electrodes contributed to the cause of the fire. The licensee determined that the weld rod was not stored appropriately in the weld rod holder and was lying on the deck in contact with a metal scaffold plate. This caused the weld rod to become hot enough to ignite the insulation and hammer located near the welder.

During the inspectors' review of the fire and licensee investigation, it was noted that several fire protection and safety procedures causing this event were not followed. Specifically, the welding rod electrodes were not placed in an appropriate holder to ensure that no electrical contact with a conducting object would occur. Additionally, the inspectors noted that when arc welding is to be suspended for a substantial period of time, such as break, lunch or overnight, the welding machine is required to be deenergized.

Analysis. The performance deficiency associated with this finding involved the failure of contract welding personnel to follow procedures for proper control of ignition sources. The finding is greater than minor because it is associated with the external factors attributes of the initiating events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Manual Chapter 0609, "Significance Determination Process," Appendix M, "Significance Determination Process

Using Qualitative Criteria," was used since the Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," does not address the potential risk significance of fire protection findings during shutdown conditions. The finding was determined to be of very low safety significance by NRC management review because the finding occurred while the unit was already in a cold shutdown condition and the finding did not affect equipment necessary to maintain safe shutdown. This finding has a crosscutting aspect in the area of human performance associated with work practices because the licensee did not ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported [H.4(c)].

Enforcement. Arizona Public Service Company Operating License NPF 51, Condition 2.C(6), requires, in part, that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the UFSAR, as supplemented and amended, and approved in the Palo Verde Safety Evaluation Report through Supplement 11. The UFSAR, Section 9.5.1.5.3(c) requires that the licensee control ignition sources in areas containing or representing a hazard to safety related areas. Revision 31 to the Palo Verde Safety Manual, Section XIII, Article 1.C.12 states, "when arc welding is to be suspended for any substantial period of time, such as during lunch or overnight, all electrodes shall be removed from the holders carefully located so that accidental contact cannot occur. The machine shall be disconnected from the power source." Contrary to the above, on May 6, 2008, contract welding personnel did not ensure the electrodes for the welding rod were located such that accidental contact could not occur and did not deenergize the welding machine prior to breaking for lunch. Because this violation was determined to be of very low safety significance and has been entered into the licensee's CAP as PVAR 3170965, this violation is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000529/2008003-05, "Fire in Pressurizer Cubicle due to Poor Work Practices."

2. Failure to Adequately Implement Procedural Requirements for Open Doors, Hatches, and Floor Plugs

Introduction. A self-revealing Green NCV of TS 5.4.1.a was identified for the failure of maintenance personnel to adequately implement procedural guidance. Specifically, on May 9, 2008, maintenance personnel failed to ensure the permit requirements of Procedure 40DP-9ZZ17, "Control of Doors, Hatches, and Floor Plugs," were complete while accessing the tendon gallery access shaft, resulting in the control room determining that both trains of the PREACS had been inoperable

Description. On May 9, 2008, at approximately 4:32 p.m., the maintenance fix-it-now team notified the Unit 1 control room that auxiliary building Door A-B-06 was closed. Upon documenting that the door was closed, operations personnel reviewed the control room operator logs, and determined that the control room was never notified that this door had been open. Control room personnel confirmed with security that the door was opened at 3:50 p.m. and closed at 4:32 p.m. During this 42 minute interval, the fix-it-now team did not maintain constant radio communication with the control room as required by plant procedures. Operations personnel instructed the fix-it-now team to postpone work and then contacted the fix-it-now team foreman.

Procedure 40DP-9ZZ17, "Control of Doors, Hatches, and Floor Plugs," identified Door A-B-06 as a heating, ventilation, and air conditioning barrier that is used to meet the requirements of TS LCO 3.7.13. Technical Specification LCO 3.7.13 states that two

PREACS trains shall be operable, and requires an action to place the unit in Mode 3 within 6 hours if this condition is not met. Door A-B-06 provides access to the south tendon gallery from the auxiliary building. When open, this door affects the design function of the PREACS to maintain a negative pressure on the auxiliary building following a safety injection actuation signal (SIAS), thus affecting the operability of PREACS. The door was opened in order to set up work equipment in preparation for maintenance activities in the tendon gallery.

Procedure 40DP-9ZZ17 specified contingencies that must be met in order to prop open Door A-B-06 during maintenance activities. These compensatory measures were also specified in the precautions and limitations section of the work instruction. Compensatory actions required an individual be stationed at the door in constant communication via plant radio with the control room to close the door within 10 minutes of a SIAS. In addition, an Open Door/Hatch/Floor Plug permit was issued that also specified the required compensatory actions. The fix-it-now team personnel attempted to contact the control room prior to opening Door A-B-06 but were unsuccessful. The fix-it-now team supervisor then attempted to contact the augment SRO. The fix-it-now team informed the augment SRO that the permit was posted on the door. Based upon previous discussions with the fix-it-now team regarding complying with the 'Open Door/Hatch/Floor Plug permit,' the augment SRO authorized entry into the tendon gallery. The augment SRO did not discuss the specific procedure or permit requirements with the fix-it-now team at that time. The augment SRO did not call the control room to inform them that the door was open. Believing they had met the procedure requirements, the fix-it-now team proceeded with the work instructions and opened Door A-B-06 without contacting the control room. Consequently, radio contact was not established during the time Door A-B-06 was opened.

Since continuous radio contact had not been established prior to opening Door A-B-06, control room personnel determined that both PREACSs had been rendered inoperable for the 42 minute interval. With both PREACSs inoperable, operations personnel also determined that entry into TS 3.0.3 should have been required. The licensee wrote PVAR 3172712 and significant CRDR 3173930 to address these issues. Subsequent engineering analysis showed that the PREACSs would have been able to maintain the auxiliary building at a negative pressure while Door A-B-06 was opened, and consequently, entry into TS 3.0.3 would not have been required.

Analysis. The performance deficiency associated with this finding was the failure of maintenance personnel to adequately implement permit requirements of Procedure 40DP-9ZZ17, "Control of Doors, Hatches, and Floor Plugs," while accessing the tendon gallery access shaft, resulting in the control room determining that both trains of the PREACS had been inoperable. The finding is greater than minor because it is associated with the barrier performance attribute associated with maintaining radiological barrier functionality for the auxiliary building of the barrier integrity cornerstone and affects the cornerstone objective to provide reasonable assurance that the physical design barriers protect the public from radio nuclide releases caused by accidents or events. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding is determined to have very low safety significance because it only affected the barrier integrity cornerstone and only represented a degradation of the radiological barrier function of the auxiliary building. This finding has a crosscutting aspect in the area of human performance associated with work practices because the licensee did not ensure supervisory and management

oversight of work activities, including contractors, such that nuclear safety is supported [H.4(c)].

Enforcement. Technical Specification 5.4.1.a requires that written procedures be established, implemented, and maintained covering the activities specified in Regulatory Guide 1.33, Appendix A, February 1978. Regulatory Guide 1.33, Appendix A, requires, in part, that procedures for performing maintenance that can affect the performance of safety related equipment be established and implemented. Procedure 40DP-9ZZ17, "Control of Doors, Hatches, and Floor Plugs," Appendix A, identified Door A-B-06 as a controlled barrier. The procedure required that all identified responsible organization(s) shall be contacted for compensatory measures and authorization prior to blocking open or removing the barrier. Note 37 of Appendix A, contained in Procedure 40DP-9ZZ17, specified that an individual shall be stationed at Door A-B-06 in constant communication via plant radio with the control room to close the door within 10 minutes of an SIAS initiation. In addition, work instructions for WO 2911469 and Open Door/Hatch/Floor Plug permit 3164879 also specified these requirements. Contrary to the above, on May 9, 2008, maintenance personnel propped open Door A-B-06 for 42 minutes without informing the control room or implementing the required compensatory actions. Because this finding is of very low safety significance and has been entered into the licensee's CAP as PVAR 3172712 and as significant CRDR 3173930, this violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000528/2008003-06, "Failure to Adequately Implement Procedure Requirements for Open Doors, Hatches, and Floor Plugs."

3. Untimely Corrective Actions for Nitrogen Leak on SIT 1A

Introduction. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the failure of operations and maintenance personnel to promptly identify and correct a condition adverse to quality. Specifically, from August 2007 to June 2008, operations and maintenance personnel failed to ensure that work management process procedures were followed for a degraded condition affecting SIT 1A.

Description. On August 16, 2007, engineering identified a lowering trend in Unit 1 on the SIT 1A nitrogen pressure. The leakage rate was estimated to be approximately five psig per week with pressure in the range of 605 psig to 618 psig. To enter the trend into the CAP, PVAR 3051349 was written. Work order 3051672 was generated to identify leakage source(s) during future containment entries. The scope of the WO was to investigate SIT '1A' for nitrogen leaks. The WO was assigned a 4A priority, which would require the task to be completed within the normal 24-week schedule. The control room review of PVAR 3051349 occurred on August 16, 2007. The control room review comments indicated that operators use alarm response Procedure 40AL-9RK2B and operating Procedure 40OP-9SI03 to maintain SIT pressures within the prescribed band. In addition, the control room review noted that both engineering monitoring and weekly preventive maintenance tasks performed by shift STAs would serve to monitor for any degradation in SIT level and pressure.

The inspectors noted that the control room review described the condition in PVAR 3041349 as a material condition and not a degraded condition. Additionally, the inspectors noted that WO 3051672 was initially planned and ready for performance in September 2007, but was not actually worked until June 4, 2008. The licensee's

inspection performed under WO 3051672 identified a leak at the vent line penetration into the SIT 1A. The structural integrity of the SIT 1A ASME Class 2 boundary was unknown due to the leak location being inside the SIT. Consequently, SIT 1A was declared inoperable. Unit 1 entered TS 3.5.1, Condition B, with an action statement to restore SIT 1A to an operable status within 24 hours, or commence a shutdown. Due to the leak being inside the SIT, Unit 1 commenced a shutdown on June 6, 2008, to perform repairs on the SIT.

Procedure 40DP-9OP26, "Operability Determination and Functional Assessment," defined a degraded condition as a condition in which the qualification of a SSC or its functional capability is reduced. Examples included failures, malfunctions, deficiencies, deviations, and defective material and equipment. Examples of conditions that can reduce the functional capability of an SSC included aging, erosion, corrosion, improper operation, and maintenance. Specific examples of these conditions listed degraded performance parameters such as temperature, flow, pressure, and heat transfer.

Procedure 40DP-9WP01, "Operations Processing of Work Orders," Appendix C, "Prioritization Matrix," indicated that corrective WOs associated with TS components or systems with an LCO action time of 10 days or less, within the power block, be assigned a priority of 1A or 2A. Work characterized as "corrective" included failures and significant degradation. Elective WOs associated with TS components or systems with and LCO action time of 10 days or less, within the power block, were assigned a priority of 3A. Work characterized as "elective" includes degraded and non-significant failures of components. Other WOs associated with TS components or systems with an LCO action time of 10 days or less, within the power block, were assigned a priority of 4A. Characterization as "other" work included inspections. Work assigned as 3A was required to be scheduled and worked at the next available system week within the 12 week matrix, or the next available system window. Work assigned as 4A was required to be scheduled and worked as resources allow within the normal process.

The inspectors observed that engineering personnel identified a degraded performance parameter trend (pressure) on August 17, 2007. The inspectors also observed that the initial control room review characterized this condition as a material condition vice a degraded condition. As a result, WO 3051672 was assigned a priority of 4A vice 3A or higher. Prioritizing the work as 4A vice 3A resulted in the work being scheduled as resources allow within the normal process vice the next available opportunity. The inspectors also observed that at a priority of 4A, the WO should have been completed within a 24 week cycle. The WO was actually worked approximately 10 months after the initial engineering trend was documented. During that 10 month interval, Unit 1 had two short notice outages and multiple containment entries. Each short notice outage and containment entry provided an opportunity for operations personnel to identify the cause of the SIT 1A pressure drop.

Analysis. The performance deficiency associated with this finding is the failure of operations and maintenance personnel to promptly identify and correct a condition adverse to quality for the nitrogen leak on SIT 1A. The finding is greater than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone and affects the cornerstone objective of ensuring the reliability, availability and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have a very

low safety significance because the finding did not result in a loss of system safety function, an actual loss of safety function of a single train for greater than its TS allowed outage time, or screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. This finding has a crosscutting aspect in the area of human performance associated with work control because the licensee failed to plan work activities to support long-term equipment reliability by limiting operator work-arounds, safety systems unavailability, and reliance on manual actions [H.3(b)].

Enforcement. Title10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," states, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Procedure 01DP-0AP10, "Corrective Actions," stated, in part, that conditions adverse to quality shall be completely and accurately identified in a timely manner commensurate with their significance and ease of discovery. Procedure 01DP-0AP10 also stated, in part, that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances shall be promptly corrected. Contrary to the above, between August 2007 and June 2008, operations and maintenance personnel failed to identify and correct the source of a nitrogen leak on SIT 1A. Because this finding is of very low safety significance and has been entered into the licensee's CAP as CRDR 3185716, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000528/2008003-07, "Failure to Take Timely Corrective Actions for a Condition Adverse to Quality Resulting in SIT 1A Being Declared Inoperable."

.2 Event Report Reviews

a. Inspection Scope

The inspectors reviewed the two below listed LERs and related documents to assess: (1) the accuracy of the LER; (2) the appropriateness of corrective actions; (3) violations of requirements; and (4) generic issues.

b. Findings and Observations

1. (Closed) LER 05000529/2006003-01, Unit 2 Variable Overpower Reactor Trip During Main Turbine Control Valve Restoration

This LER is a supplement to LER 05000529/2006003-00, which was closed in NRC Inspection Report 05000528; 05000529; 05000530/2006005, and dispositioned as NCV 05000529/2006005-08. This supplement provided the root cause of the event. The inspectors reviewed the LER and identified no additional concerns. This LER is closed.

2. (Closed) LER 05000529/2007003-00, Manual Reactor Trip Due to Increased Steam Generator Sodium Levels from Failed Heat Exchanger Plug

On October 6, 2007, chemistry personnel notified operations personnel that the Unit 2 main condenser sodium levels were increasing and that SG 1 and 2 sodium levels had increased to above one part per million (ppm), which is the reactor trip criterion. Unit 2 was manually tripped from 100 percent power. The cause of the high sodium levels was sodium ingress into the condenser hotwell and SGs due to a corroded and failed tube

plug in the condenser air removal system Seal Water Cooler D. The failed tube plugs were replaced. The licensee documented this manually initiated reactor trip resulting from secondary system sodium ingress in CRDR 3074272. This LER is closed.

Introduction. A Green self-revealing finding of Procedure 81DP-0DC13, "Deficiency Work Order," August 13, 2007, was identified for the failure of engineering personnel to ensure modifications do not inadvertently affect design basis plant conditions.

Description. On October 6, 2007, chemistry personnel notified operations personnel that the Unit 2 main condenser hotwell sodium levels were increasing and that the sodium levels for SGs '1' and '2' had increased to greater than one ppm. Operations personnel entered Procedure 40AO-9ZZ10, "Condenser Tube Rupture," and manually tripped the reactor in accordance with that procedure. The cause of the high sodium levels was sodium ingress into the condenser hotwell and SGs due to a corroded and failed tube plug in the condenser air removal system Seal Water Cooler D. The condenser air removal units, including the seal water coolers, are cooled by the plant cooling water system, which was the source of the sodium. Once the plant was shutdown, maintenance personnel prepared and executed a WO to replace the failed tube plugs.

The condenser air removal system, classified as non-quality related (NQR), removes air and non-condensable gases from the main condenser to help maintain vacuum in the main condenser. This vacuum maximizes turbine output power and plant efficiency. Four identical condenser air removal units composed of a vacuum pump, moisture separator, seal water recirculation pump, and seal water cooler are provided for the main condenser.

During the inspector's review of the event, it was noted that in January 2001, a leak was identified on the condenser air removal system Seal Water Cooler D. Deficiency Work Order 2350870 identified that the leaking tube was plugged in both ends with a pair of plugs that were made of a Buna 'N' rubber with brass inserts. The inspectors also noted that on April 26, 2005, Seal Water Cooler D had a leak due to corrosion of the previously installed Buna 'N' rubber with brass insert plugs, and the corrective actions were to replace the plugs with the same type of brass insert plugs.

Procedure 81DP-0DC13, "Deficiency Work Order," Step 3.2.2, stated, in part, that a "repair" disposition must have, as a minimum, a Design Input Requirements Checklist. Procedure 81DP-0CC05, "Design and Technical Document Control," August 13, 2007, Appendix B, Step 11, stated "for NQR components, the Design Input Requirements Checklist should be reviewed and analyzed to ensure NQR modifications do not inadvertently effect the design basis or licensing commitments; however, no signature is required on the checklist." The Design Input Requirements Checklist in Appendix I, Step 7, stated, in part, that personnel should evaluate whether material compatibility and corrosion characteristics are compatible with existing plant components. Also, Procedure 81DP-0CC05, Appendix E, stated, in part, that though not mandatory for NQR components, the independent verification requirements should be reviewed and analyzed to ensure NQR modifications do not inadvertently affect the design basis. The independent verification requirements are used to determine whether the specific materials are compatible with each other and to determine the design environment conditions to which the material will be exposed. Deficiency work order 2350870 stated, "The Design Input Requirements Checklist is not required for NQR equipment," however, the inspectors noted that the checklist was reviewed and analyzed to ensure

that the modification would not inadvertently affect the design basis or licensing commitment. The inspectors also noted that the Independent Verification Checklist included in the deficiency work order was blank.

As discussed in CRDR 3074272, the current revision of Procedure 81DP-0DC13, Step 3.3.5, was changed on August 31, 2007 to provide instructions to include all repair dispositions for the Design Input Requirements Checklist and Independent Verification Checklist in accordance with Procedure 81DP-0CC05. Additionally, Procedure 81DP-0CC05, was changed on August 31, 2007, to include a 'peer review' as a detailed design review of design documents for NQR design changes. The peer reviewer verifies the completeness, correctness, and adequacy of the design as reflected on the design documents.

To prevent recurrence, the licensee changed the condenser hotwell setup to prevent sodium ingress to the SGs, and is evaluating in CRAI 3095307 an alternative tube plug type for the condenser air removal system seal water coolers that will not be subject to corrosion or galvanic interaction with the titanium tube sheets and tubes.

Analysis. The performance deficiency associated with this finding was the failure of engineering personnel to ensure modifications do not inadvertently affect design basis plant conditions. The finding is greater than minor because it is associated with the design control attribute of the initiating events cornerstone and affects the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown and power operations. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding is determined to have very low safety significance because the finding did not result in exceeding the TS limit for identified RCS leakage, did not affect other mitigation systems, did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available; and did not increase the likelihood of a fire or internal/external flood. This finding was evaluated as not having a crosscutting aspect because the performance deficiency is not indicative of current performance.

Enforcement. Enforcement action does not apply because the performance deficiency did not involve a violation of regulatory requirements. The finding is of very low safety significance and the issue was entered into the licensee's CAP as CRDR 3074272: FIN 05000529/2008003-08, "Failure to Evaluate Design Changes Leads to a Manual Reactor Trip."

.3 Personnel Performance

a. Inspection Scope

On April 24, 2008, the inspectors reviewed the loss of the 120 VAC Class 1E inverter, Train C and the associated 120 VAC vital instrument bus on Unit 1. The inspectors: (1) reviewed operator logs, plant computer data, and/or strip charts 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 evolution sampled.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

4OA5 Other Activities

.1 (Closed) Apparent Violation 05000528, 05000529, 0500030/2007012-15, Failure to Correct a Risk Significant Planning Standard

The final significance determination for the finding identified in Inspection Report 05000528;529;530/2007012, for failure to correct a risk significant planning standard was communicated to the licensee in Letter dated April 30, 2008, EA-08-003, (ADAMS accession number ML081230561). The NRC concluded the significance to be appropriately characterized as very low safety significance (Green.) Additional details are contained in Section 5.7.b.1 of the above Inspection Report. The Apparent Violation is closed: NCV 05000528;05000529;05000530/2008003-09, “Failure to Correct a Risk Significant Planning Standard.”

.2 (Closed) Temporary Instruction 2515/166, "Pressurized Water Reactor Containment Sump Blockage," PVNGS Unit 2

The inspectors observed the physical installation of the sump strainers, in PVNGS Unit 2, as committed to in the licensee's response to GL 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors."

In addition, the inspectors completed a walkdown of the containment area tags, labels, and coatings. The inspectors also reviewed the licensee's procedures and programs for accounting for and controlling equipment tags, latent debris, unqualified coatings, and chemicals inside containment. Programs to identify the scope of equipment tags, coatings, debris, and chemicals that have the potential to cause screen blockage were adequate, and the licensee has made needed changes to the relevant procedures to control introduction of these items in the future.

At the time of the inspection, chemical and downstream effects testing were complete; however, the final evaluation reports for head loss and downstream effects were not available to the inspectors. The evaluation reports were not available because of a number of issues with vendor resources. Because of revisions to the methodologies for performing the tests, the licensee continued revised testing of the sump strainers. The final response to GL 2004-002 will be submitted before September 30, 2008. At that time, the Office of Nuclear Reactor Regulation (NRR) will review the results of the chemical and downstream effects testing.

The inspection phase of Temporary Instruction 2515/166 for PVNGS Unit 2 is closed. The inspection phase for PVNGS Units 1 and 3 was closed and documented in NRC Inspection Report 05000528; 529; 530/2007005, Section 4OA5.

Listed below are the commitments and actions taken by PVNGS Unit 2.

a. Evaluate the recommendations contained in the Westinghouse downstream effects evaluation for Unit 2 and establish an implementation schedule for appropriate recommendations.

Actions Taken

This commitment was completed on December 31, 2005. The licensee reviewed Westinghouse WCAP-16406-P, "Evaluation of Downstream Sump Debris Effects in Support of GSI-191," dated June 2005. Any deviations from this evaluation were documented in Attachment 1 of the licensee's September 1, 2005, response to GL 2004-02.

b. Perform confirmatory head loss testing of new strainer with plant-specific debris to ensure an adequate design.

Actions Taken

Initial head loss and chemical effects testing, performed by Control Components, Inc. and Sargent and Lundy, Inc., were completed in March 2007. However, the EPRI testing guidelines for downstream and chemical effects were revised in November 2007. Because of the revision, the licensee opted to retest the sump strainer to the new testing requirements. Testing was being performed concurrently with the inspection. Final resolution of the head loss testing is expected to be completed before September 30, 2008. At that time, the Office of NRR will review the results of the chemical and downstream effects testing.

c. Verify that a capture ratio of 97 percent or higher can be achieved in the final design of the new sump screen to ensure that the fuel evaluation contained in the Westinghouse downstream effects evaluation is bounding.

Actions Taken

In the licensee's GL 2004-02 response, it states that a capture ratio of 97 percent must be achieved in order to prevent the creation of a thin bed on the underside of the fuel bottom nozzle following a hot leg break loss of coolant accident. A 97 percent capture ratio would ensure that the fuel evaluation in the Westinghouse downstream effects evaluation is bounding. During the March 2007 chemical and downstream effects testing, results of the tests indicate the strainers would achieve a capture ratio of 90 to 95 percent, which is not bounded by the Westinghouse evaluation. The licensee stated that the capture ratio for the sump strainer is lower than expected because there is a low amount of fiber in containment. In addition, testing has confirmed the capture ratio of the strainers will gradually increase when captured debris performs the "capturing" role through the accident duration. The licensee has contracted with Westinghouse for final resolution of the capture ratio issue of the sump strainers. This evaluation is expected to be complete before September 30, 2008. The results will be reviewed by the Office of NRR.

d. Perform sump strainer structural evaluation to ensure seismic and operational integrity.

Actions Taken

The structural evaluation for the new sump strainers was completed on October 31, 2006. This evaluation is applicable to Units 1, 2, and 3.

e. Validate allocated margins for chemical effects in strainer head loss to ensure an adequate design.

Actions Taken

Validation of the allocated margin for chemical effects was tested in March 2007. However, the EPRI testing guidelines for downstream and chemical effects were revised in November 2007. The licensee opted to retest the sump strainers. The licensee's review of the test data was complete in May 2007. The test review will be submitted as part of the licensee's final response by September 30, 2008, and reviewed by the Office of NRR.

f. Perform a confirmatory containment latent debris walkdown of Units 1 and 3.

Actions Taken

Latent debris walkdowns for Units 1 and 3 were completed by the licensee on June 30, 2006. A walkdown of Units 1 and 3 was completed by the inspectors in May 2007 and December 2007, respectively. The debris and head loss evaluations conservatively use 200 pounds per unit for transportable debris. A walkdown in Unit 2 identified 119 pounds of latent debris using NEI 04-07 sampling methods. Subsequent walkdowns were performed in Units 1 and 3. The walkdowns identified that latent debris was within the bounds of the evaluations.

g. Perform a confirmatory containment unqualified coating walkdown of Units 1 and 3.

Actions Taken

The containment coating walkdown was completed by the licensee before June 30, 2006. A walkdown of Units 1 and 3 was completed by the inspectors in May 2007 and December 2007, respectively. All unqualified coatings are maintained in an "unqualified coatings log" per the licensee's procedure. The licensee's debris generation calculation assumes that all coatings in the zone-of-influence are transported to the sump as fine debris. Unit 2 is bounded by the evaluations of Units 1 and 3.

h. Review the existing programmatic controls for containment coatings identified in the response to GL 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment," for their adequacy.

Actions Taken

The licensee completed the review of programmatic controls for containment coatings and enhanced the procedure before November 30, 2006. The coatings procedure is

applicable to all three units. The inspectors reviewed the procedures. There were no concerns identified.

i. Review the existing programmatic and procedural controls in place to prevent potentially transportable debris in the containment building to ensure that the bounding assumptions in the design of the new strainers will be maintained.

Actions Taken

The licensee completed the review of programmatic controls for containment coatings and enhanced the procedure before November 30, 2006. The coatings procedure is applicable to all three units. The inspectors reviewed the procedures. There were no issues identified.

j. Implement in Unit 1 changes to programs and procedures to ensure and/or enhance the control of transportable debris in containment.

Actions Taken

The licensee has completed changes to programs and procedures to ensure and enhance the control of transportable debris in containment. The inspectors reviewed the procedures. There were no issues identified. The licensee has added restrictions to their procedures for tags, insulation, and additional debris. If an item has been qualified for continuous use in containment, the licensee's procedure requires the item to be included in the debris loading evaluation. In addition, the description and location of potential debris will be posted outside of containment.

k. Implement in Unit 2 changes to programs and procedures to ensure and/or enhance the control of transportable debris in containment.

Actions Taken

The licensee has completed changes to programs and procedures to ensure and enhance the control of transportable debris in containment. The licensee has added restrictions to their procedures for tags, insulation, and additional debris. If an item has been qualified for continuous use in containment, the licensee's procedure requires the item to be included in the debris loading evaluation. In addition, the description and location of potential debris will be posted outside of containment.

l. Implement in Unit 3 changes to programs and procedures to ensure and/or enhance the control of transportable debris in containment.

Actions Taken

The licensee has completed changes to programs and procedures to ensure and enhance the control of transportable debris in containment. The licensee has added restrictions to their procedures for tags, insulation, and additional debris. If an item has been qualified for continuous use in containment, the licensee's procedure requires the item to be included in the debris loading evaluation. In addition, the description and location of potential debris will be posted outside of containment.

m. Install larger sump strainers in Unit 1.

Actions Taken

Larger sump strainers were installed in PVNGS Unit 1 during the May/June 2007 refueling outage.

n. Install larger sump strainers in Unit 2.

Actions Taken

Palo Verde Nuclear Generating Station, Unit 2 was granted an extension to implement the sump modifications after the December 31, 2007, due date. New sump strainers were installed during the April 2008 refueling outage.

o. Install larger sump strainers in Unit 3.

Actions Taken

Larger sump strainers were installed in PVNGS Unit 3 during the October/November 2007 refueling outage.

p. Remove installed Fiberfrax insulation in Units 1, 2, and 3.

Actions Taken

All Fiberrax insulation in PVNGS Units 1, 2, and 3 has been removed.

q. Remove installed Fiberfrax insulation in Unit 2.

Actions Taken

All Fiberrax insulation in PVNGS Unit 2 has been removed.

r. Remove installed Fiberfrax insulation in Unit 3.

Actions Taken

All Fiberrax insulation in PVNGS Unit 3 has been removed.

s. After plant specific strainer testing has been completed and the Westinghouse downstream effects evaluation for PVNGS has been evaluated, Arizona Public Service Company will submit an update to the NRC to report the validation of the allocated margins for chemical effects and identify any recommendations from the Westinghouse evaluation to be implemented.

Actions Taken

This report will be submitted no later than September 30, 2008, and will be reviewed by the Office of NRR.

.3 Temporary Instruction 2515/172, "Reactor Coolant System Dissimilar Metal Butt Welds," PVNGS Unit 2

The inspectors performed the following inspection activities. The specific inspection requirements are listed along with the inspection activities that addressed each specific requirement.

03.01 Licensee's Implementation of the Material Reliability Program (MRP)-139 Baseline Inspections

a. The licensee's inspection program includes inspections of the pressurizer, hot- and cold-leg temperature dissimilar metal butt welds (DMBWs) and the schedules for these baseline inspections are consistent with the requirements stated in MRP-139. If any baseline inspection schedules deviate from MRP-139 guidelines, determine what deviations are planned and what is the general basis for the deviation.

The inspectors verified that the licensee either has or plans to perform all DMBW inspections in accordance with the requirements of MRP-139, with the exception of the pressurizer DMBW, as discussed in Item 03.01.b, below.

b. The licensees (except for the nine plants specified below) have completed their MRP-139 baseline inspections of all pressurizer DMBWs by December 31, 2007. For nine PWR plants (Braidwood, Unit 2; Comanche Peak Steam Electric Station, Unit 2; Diablo Canyon Power Plant, Unit 2; PVNGS, Unit 2; Seabrook; South Texas Project Electric Generating Station, Unit 1; V.C. Summer; Vogtle, Unit 1; and Waterford Steam Electric Station, Unit 3), verify that the baseline pressurizer DMBWs are completed during the spring 2008 outages.

The inspectors verified that the licensee performed full structural weld overlays on all pressurizer DMBWs during the Spring 2008 outage. Following performance of the weld overlays, the licensee performed pre-service volumetric inspections on all overlaid welds, using a qualified UT process.

03.02 Volumetric Examinations.

a. Observe or review at least one examination of a weld (for example, an examination of a weld that is categorized as not being mitigated, an examination of a weld prior to mitigation by either weld overlay or mechanical stress improvement, or an examination of a weld after mitigation by mechanical stress improvement). Verify that the inspection is performed in accordance with the guidelines in MRP-139, Section 5.1

The inspectors verified that the licensee intends to perform full-structural weld overlays on all pressurizer and hot leg DMBWs. Accordingly, there is no requirement for pre-overlay examination of these welds. The inspectors performed a record review of the pre-overlay surface examinations of two hot-leg (blowdown lines) and four pressurizer (surge line, spray line, and safety relief valve) DMBWs and verified that they were performed in accordance with written procedures that meet the intent of the ASME code and by technicians who were qualified and certified to perform these surface examinations.

b. Observe or review at least one weld overlay volumetric examination. Verify that the inspection performed is consistent with the NRC staff relief request authorization for the weld overlay. If the inspection coverage warrants further evaluation, review the licensee's documentation of the basis for achieving the required inspection coverage.

The inspectors directly observed the volumetric examination of three overlaid welds and performed a record review of a fourth examination. The directly observed overlay welds were the pressurizer spray line nozzle and pressurizer safety relief valve nozzles in Lines 0 and 1. The record review was of the Pressurizer Safety Relief Valve Line 2. The licensee performed these examinations using a performance demonstration initiative qualified phased array UT probe. The inspectors verified that the calibration of the probe and conduct of the examination of the welds were performed in accordance with approved procedures that meet the intent of MRP-139 and that the technicians were appropriately qualified to perform the examinations.

c. Verify that the examinations were performed by qualified personnel.

The inspectors reviewed technician qualification certifications and verified that they were qualified to perform the examinations.

d. Verify that any deficiencies identified were appropriately dispositioned and resolved.

There were no deficiencies that were identified during the examinations.

03.03 Weld Overlays.

a. For at least one weld overlay verify that the welding activities were performed consistent with ASME Code requirements as modified by NRC staff relief request authorizations.

The inspectors observed the overlay welding of the SG blowdown nozzle DMBW and verified that it was performed in accordance with ASME Code requirements, as modified by PVNGS Relief Requests 36 and 37.

b. Verify that the licensee has submitted a relief request and obtained NRR staff authorization to install the weld overlays, whether full structural or optimized weld overlays.

The inspectors verified that the licensee had submitted Relief Requests, 36 and 37, addressing relief from the requirements of the ASME code in performing the full structural weld overlays. The inspectors further verified that the NRC had approved these relief requests and that the overlay welding was done in accordance with the code and the approved relief requests.

c. Verify that welding was performed by qualified personnel.

The inspectors reviewed the welder qualification certifications and verified that the welding was performed by personnel qualified to the requirements of the ASME code.

d. Verify that any deficiencies identified were appropriately dispositioned, and resolved.

The inspectors determined that there were no deficiencies in the observed weld.

03.04 Mechanical Stress Improvement.

The inspectors determined that the licensee has not performed any mechanical stress improvements on their DMBWs and have no specific plans to perform any. Accordingly, there were no inspection activities in this area.\

.4 Quarterly Resident Inspectors' Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted the following observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspectors' observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

On April 22, 2008, the inspector conducted a telephonic exit meeting to present the results of the in-office inspection of licensee changes to their emergency action levels and emergency plan to Mr. E. O'Neil, Department Leader, Emergency Preparedness, who acknowledged the presented findings.

On May 27, 2008, the inspector presented the occupational radiation safety inspection results to Mr. R. Bement, Vice President, Nuclear Operations and Mr. D. Mims, Vice President, Regulatory Affairs and Performance Improvement, and other members of the staff, who acknowledged the presented findings.

On June 18, 2008, the inspectors presented the results of the in-service inspection to D. Mims, Vice President, Regulatory Affairs and Performance Improvement, and other members of licensee management, who acknowledged the presented findings.

On July 23, 2008, the resident inspectors presented the inspection results to Mr. R. Edington, Executive Vice President, Nuclear and Chief Nuclear Officer, and other members of the licensee's management staff. The licensee acknowledged the presented findings.

On August 4, 2008, the resident inspectors conducted a telephonic exit with Mr. R. Buzard, Compliance Section Leader, to present changes in our characterization of findings.

The inspectors noted that while proprietary information was reviewed, the material was returned to the licensee and none would be included in this report.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements that meet the criteria of Section VI.A.1 of the NRC Enforcement Policy, NUREG-1600, to be dispositioned as NCVs.

- Title 10 CFR Part 50, Appendix B, Criterion III, states, "measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR Part 50.2 and as specified in the license application, for those SSCs to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions." The licensee identified that the specification for installation of main steam line constant support hangers was not followed and the allowable deviation from vertical was exceeded when the main steam line was at normal operating temperature and pressure. This event has been documented in the licensee's CAP as CRDR 3153607. The finding is of very low safety significance because it did not result in a loss of main steam line operability as defined in NRC Inspection Manual, Part 9900, Technical Guidance, "Operability Determination Process for Operability and Functional Assessment."

- Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," requires that activities affecting quality shall be prescribed by instructions, procedures, or drawings, and shall be accomplished in accordance with those instructions, procedures, or drawings. The licensee identified that operations personnel did not follow procedures to promptly evaluate a degraded condition identified for the SIT 1A nitrogen leak. This issue has been entered into the licensee's CAP as PVAR 3185480, CRDR 3186791 and significant CRDR 3185716. The finding is of very low safety significance because it did not result in a loss of system safety function, an actual loss of safety function of a single train for greater than its TS allowed outage time, or screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

G. Andrews, Director, Performance Improvement
S. Bauer, Department Leader, Regulatory Affairs
J. Bayless, Senior Engineer
R. Bement, Vice President, Nuclear Operations
P. Borchert, Unit 1 Assistant Plant Manager
P. Brandjes, Department Leader, Maintenance
R. Browning, Sr. Engineer
J. Bungard, Radiological Engineer
R. Burge, Sr. Engineer
R. Buzard, Section Leader, Compliance
D. Carnes, Unit 2 Assistant Plant Manager
P. Carpenter, Department Leader, Operations
R. Cavalieri, Director, Outages
K. Chavet, Senior Consultant, Regulatory Affairs
L. Cortopossi, Plant Manager, Nuclear Operations
D. Coxon, Unit Department Leader, Operations
E. Dutton, Acting Director of Nuclear Assurance
R. Edington, Executive Vice President, Nuclear and Chief Nuclear Officer
D. Elkington, Consultant, Regulatory Affairs
T. Engbring, Senior Engineer
E. Fernandez, Sr. Engineer
J. Gaffney, Director, Radiation Protection
T. Gray, Department Leader, Radiation Protection
K. Graham, Department Leader, Fuel Services
M. Grigsby, Unit Department Leader, Operations
D. Hansen, Sr. Consulting Engineer
D. Hautala, Senior Engineer, Regulatory Affairs
R. Henry, Site Representative, SRP
J. Hesser, Vice President, Engineering
G. Hettel, Director, Operations
A. Huttie, Director, Emergency Services
R. Indap, Senior Engineer
M. Karbasian, Director, Design Engineering
W. Lehman, Senior Engineer
J. McDonnell, Department Leader, Radiation Protection
S. McKinney, Department Leader, Operations Support
J. Mellody, Department Leader, PV Communications
D. Mims, Vice President, Regulatory Affairs and Performance Improvement
E. O'Neil, Department Leader, Emergency Preparedness
F. Poteet, Senior ISI Engineer
M. Radspinner, Section Leader, Systems Engineering
T. Radtke, General Manager, Emergency Services and Support
H. Ridenour, Director, Maintenance
F. Riedel, Technical Management Assistant, Nuclear Operations

R. Rogalski, Sr. Engineer
S. Sawtschenko, Department Leader, Emergency Preparedness
J. Scott, Section Leader, Nuclear Assurance
M. Shea, Director, IMPACT
E. Shouse, Representative, El Paso Electric
M. Sontag, Department Leader, Performance Improvement
J. Summy, Director, Plant Engineering
K. Sweeney, Department Leader, Systems Engineering
J. Taylor, Nuclear Project Manager, PNM
J. Taylor, Unit Department Leader, Operations
J. Tollar, Sr. Engineer
D Vogt, Section Leader, Operations Shift Technical Advisor
J. Waid, Director, Nuclear Training
C. Wandell, Sr. Consulting Engineer
T. Weber, Section Leader, Regulatory Affairs
J. Wilson, Engineering Section Leader
J. Wood, Department Leader, Nuclear Training Department
T. Young, Director, Communications

Nuclear Regulatory Commission

M. Runyan, Senior Reactor Analyst, Region IV

LIST OF ITEMS OPENED AND CLOSED

Opened and Closed

05000529/2008003-01	NCV	Inadequate Work Instructions for Reinstallation of Constant Support Hanger (Section 1R12.1)
05000529/2008003-02	FIN	Failure to Resolve Discrepancies Between Installed Equipment and Work Instructions Results in Mispositioning Event (Section 1R12.2)
05000529/2008003-03	NCV	Inadvertent Decrease in Reactor Water Level due to Personnel Error (Section 1R22)
05000529/2008003-04	NCV	Failure to Prevent Recurrence of a Significant Condition Adverse to Quality for the Feedwater Isolation Valves (Section 4OA2)
05000529/2008003-05	NCV	Fire in Pressurizer Cubicle due to Poor Work Practices (Section 4OA3)
05000528/2008003-06	NCV	Failure to Adequately Implement Procedural Requirements for Open Doors, Hatches, and Floor Plugs (Section 4OA3)
05000528/2008003-07	NCV	Failure to Take Timely Corrective Actions for a Condition Adverse to Quality Resulting in SIT 1A being declared Inoperable (Section 4OA3)

05000529/2008003-08	FIN	Failure to Evaluate Design Change Leads to Manual Reactor Trip (Section 4OA3)
05000528;529;530/2008003-09	NCV	Failure to Correct a Risk Significant Planning Standard (Section 4OA5)

Closed

05000529/2007003-00	LER	Manual Reactor Trip Due to Increased Steam Generator Sodium Levels from Failed Heat Exchanger Plug (Section 4OA3)
05000529/2006003-01	LER	Unit 2 Variable Overpower Reactor Trip During Main Turbine Control Valve Restoration (Section 4OA3)
05000528;529;530/2007012-15	AV	Failure to Correct a Risk Significant Planning Standard (Section 4OA5)

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:

51DP-9OM03, Site Scheduling, Revision 21

40AO-9ZZ12, Degraded Electrical Power, Revision 37

40DP-9OP34, Switchyard Administrative Control, Revision 16,

40AO-9ZZ25, ECC Directed Turbine Unloading, Revision 9

70DP-0RA05, Assessment and Management of Risk When Performing Maintenance in Modes 1 and 2, Revision 9

40OP-9ZZ19, Hot Weather Protection, Revision 2

PVTS-01, Palo Verde Transmission System Interchange Scheduling and Congestion Management Procedure, Revision 9

Miscellaneous:

Notification to Palo Verde Unit One Control Room of a Severe Grid Disturbance, 01/23/2007

Notification to Palo Verde Unit One Control Room in the event of a frequency excursion, 01/04/2007

Section 1R04: Equipment Alignment

Procedures:

40ST-9SI13, LPSI and CS System Alignment Verification, Revision 14
40ST-9AF07, Auxiliary Feedwater Pump AFA-P01 Monthly Valve Alignment, Revision 4

Drawings:

02-M-SIP-001, P&I Diagram – Safety Injection and Shutdown Cooling System, Revision 41
02-M-SIP-002, P&I Diagram – Safety Injection and Shutdown Cooling System, Revision 32
01-M-AFP-001, P&I Diagram – Auxiliary Feedwater System, Revision 34
01-M-SGP-001, P&I Diagram – Main Steam System, Revision 58

Miscellaneous:

Unit 2 Outage Control Center Turnover Sheet, April 23, 2008
System Health Report, Auxiliary Feedwater, July 31 – December 31, 2007

Section 1R05: Fire Protection

Procedures:

14DP-0TR02, Fire Department Training Program Administration, Revision 22
14FT-9QF01, Sound Powered Telephone Functional Test, Revision 3
14DP-0FP33, Control of Transient Combustibles, Revision 18

Drawings:

13-P-OOB-003, General Arrangement Plans at El. 100'-0", Revision 13

13-P-OOB-004, General Arrangement Plans Between 120'-0" & El 140'-0", Revision 8

01-M650-505-9, Auxiliary Building Southeast Corridor 100' Level (Protectowire), Revision 5

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PVARs:

3152878

CRDRs:

2933905	2939273	2940250	2959579
2964478	2965172	2966039	2971756
3146069	3153607		

CRAIs:

2942716	2942719	3011311

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PT-08-143, WOL-202, Pressurizer Safety Pre Weld Overlay, Penetrant
PT-08-144, WOL-203, Pressurizer Safety Pre Weld Overlay, Penetrant
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VT-05-521, SG-036-H011, Main Steam Line Support, VT-3
VT-05-530, SG-033-H017, Main Steam Line Support, VT-3
VT-05-536, SG-045-H016, Main Steam Line Support, VT-3
VT-05-578, SG-036-H011, Main Steam Line Support, VT-3
VT-05-579, SG-033-H011, Main Steam Line Support, VT-3
VT-06-965, SG-036-H011, Main Steam Line Support, VT-3
VT-06-967, SG-033-H011, Main Steam Line Support, VT-3
VT-06-969, SG-033-H017, Main Steam Line Support, VT-3
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Miscellaneous:

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Procedures:

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Drawings:

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PVARs:

3015755	3101398	3105304	3146833
3148099	3152727	3157405	3157407

CRDRs:

250201	2889473	3139798	3142436
3147603	3149017	3153625	

CRAIs:

2963635	2963640

Work Orders:

3146836	3148113	3151910	3158589

ACT:

3159552

TSCCR:

3118126	3159587

Miscellaneous:

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PVARs:

3164931 3166856 3174329 3174527
3174647

CRDRs:

3167411 3175390 3175456

CRAIs:

3175457

TSCCRs:

3164974

Work Orders:

3164936 3164946 3164998 3174332
3174531

Miscellaneous:

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3015755	3051349	3053618	3101398
3105304	3105714	3130277	3151267
3154737	3157405	3157407	3159922
3160087			

CRDRs:

97Q622	250201	2889473	2893921
3107448	3130604	3139798	3155456

3160735	3185716	3186791	31607448

CRAIs:

2963635	2963640	3160736

Work Orders:

3051672	3158589	3159927

ACT:

3159552

TSCCR:

3118126	3159587	3185134

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Work Orders:

2935194 3020919

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Drawings:

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13-E054-00108, PVM, Analog Logic, INV 253-1-101, Revision 3

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3161120	3161671	3161671	3162123
3166534			

CRDRs:

3152084	3160735	3165478	3166278

CRAIs

3152085	3160736	3160737

Work Orders:

2932389	2935194	3011655	3020919m
3151738	3152058	3152058 Amendment A	
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Procedures:

40DP-9ZZ17, Control of Doors, Hatches, and Floor Plugs, Revision 40
40OP-9PK01, 125 VDC Class 1E Electrical System, Revision 24

Drawings:

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40AL-9SF01, Local Alarm Panel J-SFN-C01D Responses, Revision 3
40AO-9ZZ11, CEA Malfunctions, Revision 12
40DP-9ZZ01, Containment Entry in Modes 1 thru 4, Revision 28
40EP-9EO01, Standard Post Trip Actions, Revision 16
40EP-9EO02, Reactor Trip, Revision 18
40OO-9ZZ23, Outage GOP, Revision 13
40OP-9SI02, Recovery from Shutdown Cooling Surveillance Checks – All Modes, Revision 81
40OP-9SI03, Safety Injection Tank Operations, Revision 30
40OP-9ZZ02, Initial Reactor Startup Following Refueling, Revision 39
40OP-9ZZ03, Reactor Startup, Revision 46
40OP-9ZZ05, Power Operations, Revision 123
40OP-9ZZ06, Mode 5 Operations, Revision 17
40OP-9ZZ10, Mode 3 to 5 Operations, Revision 56
40ST-9ZZ09, Containment Cleanliness Inspection, Revision 15
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70OP-9FX01, Refueling Machine Operations, Revision 32
72IC-9RX03, Core Reloading, Revision 30
72OP-9RX01, Calculation of Estimated Critical Position, Revision 20
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PVARs:

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3167793	3181192	3181205	3182402
3183835			

CRDRs:

2993354

Permits:

137691	145213	145216	148660
148742	148755	148798	149068
149070	149158	149159	149257
149268	149479	149480	149657
149782	149980	150451	150557
150855	151038	151049	151272
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2979275	2989812	3167794	3183896

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Procedures:

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40ST-9CP03, Containment Purge Isolation Valve Closure Test, Revision 2
40ST-9FS01, CEA Operability Checks, Revision 24
73DP-9XI01, Pump and Valve In-service Testing Program – Component Tables, Revision 22
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3159922

Work Orders:

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2995536	3166535		

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Procedures:

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Procedures:

75PR-9RP10, Conduct of RP Operations, Revision 25
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3166243	3166530	3167451	

CRDRs:

3157122

CRAIs:

3157123

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2-3002 I Reactor Destack and Restack
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Miscellaneous:

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40OP-9SG01, Main Steam, Revision 53

40OP-9SI01, Shutdown Cooling Initiation, Revision 41

40OP-9SI02, Recovery from SDC to Normal Operating Lineup, Revision 64

40OP-9SI02, Recovery from Shutdown Cooling to Normal Operating Lineup, Revision 64

40OP-9ZZ16, RCS Drain Operations, Revision 62

40OP-9ZZ23, Outage GOP, Revision 53

40ST-9SI04, RAS Line Fill Check, Revision 14

40ST-9SI04, RAS Line Fill Check, Revision 21

60DP-0QQ02, Trend Analysis and Coding, Revision 18

60DP-0QQ19, Internal Audits, Revision 19

60DP-0QQ20, Offsite Safety Review Committee, Revision 5

70DP-0AC01, Conduct of Engineering, Revision 2

73DP-0AP05, Engineering Programs Management and Health Reporting, Revision 3

73DP-9XI01, Pump and Valve In-service Testing Program – Component Tables, Revision 22

73ST-9SG01, Main Steam Isolation Valves – In-service Test, Revision 31

73ST-9SI03, Leak Test of Safety Injection / Reactor Coolant System Pressure Isolation Valves, Revision 43

73ST-9XI16, Economizer FWIVs – In-service Test, Revision 27

73ST-9XI25, Safety Injection Tank Isolation and Outlet Check Valves – In-service Test, Revision 9

73ST-9XI43, Containment Recirculation Sump Isolation Valve Leak Testing, Revision 1

81DP-0DC13, Deficiency Work Order, Revision 21

90DP-0IP10, Condition Reporting, Revision 36

90DP-0IP10, Condition Reporting, Revision 38

PG-1301-01, Palo Verde Human Performance Policy Guide, Revision 4

PVARs:

2946680	2972309	3022602	3036970
3046149	3046586	3048198	3048518
3048950	3049261	3050729	3060927
3065816	3094009	3094022	3094044
3101018	3141135	3141756	3141757
3144707	3144707	3147241	3156599
3160951	3161173	3162048	3191901
3192009	3192522	3192734	3192766
3192771	3192777		

CRDRs:

117037	380142	2604468	2726509
2735052	2735329	2814439	2831678
2838314	2859071	2876468	2878457
2881096	2901498	2913790	2915450
2928540	2940659	2947385	2947385
2967761	2974028	2977201	2984713
3011220	3015865	3022621	3023674
3030542	3045719	3047848	3048870
3048872	3050405	3055433	3055914
3055917	3061144	3065077	3065954
3069084	3086433	3102650	3104119
3112220	3112221	3112222	3112459
3112469	3112547	3112902	3112960
3112991	3113113	3114262	3114514
3114560	3114562	3114567	3114570
3114576	3114581	3114587	3114589
3114592	3114610	3114632	3114642
3114735	3135996	3135996	3142777
3145105	3149017	3149149	3149507
3149661	3162435		

Drawings:

02-M-SIP-001, P&I Diagram – Safety Injection and Shutdown Cooling System, Revision 41
02-M-SIP-002, P&I Diagram – Safety Injection and Shutdown Cooling System, Revision 32

Work Orders:

2913678	2977939	2989812	3003904
3006579	3006785	3006800	

CRAIs:

2711770	2777728	2785293	2785397
2785415	2825482	2845862	2847228
2856706	2857505	2858705	2858706
2878457	2886278	2886306	2933706
2938720	2938723	2938874	2951170
2951170	2958708	2968028	2981851
3020641	3022621	3023674	3047250
3062542	3062655	3062657	3063809
3065077	3090779	3104749	3104859
3107133	3114514	3119719	3128480
3129055	3143117	3145720	3145723
3159536	3160895	3161506	3167064
3171169	3171184	3171880	3171880
3171903	3171903	3173776	3177455
3178055	3178610	3184109	3188325
8018587			

Site Integrated Improvement Plan Tasks:

3.6.59	3.7.2.m	3.7.7.l	4.1.F.27	6.7.1	15.1.2	3.6.63	3.7.3.l
3.6.61	3.7.2.p	4.1.F.19	11.8.30	4.4.11	1.2.E.13	3.6.65	3.6.72
3.6.62	3.7.3.d	4.1.F.22	3.7.8.h	15.1.7	3.6.47	3.6.49	3.6.55
1.2.E.21	3.2.1.d	3.2.4	3.4.1	3.7.2.f	3.7.10.a	3.7.10.b	3.7.10.c
3.7.2.g	3.7.2.h	3.7.2.i	3.7.2.j	3.7.2.k	6.1.9	11.1.2	3.6.5
3.7.10.i	3.6.57	3.7.10.d	4.1.F.10	3.7.2.b	3.7.2.c	3.7.2.e	3.7.2.n
4.1.F.11	4.1.F.12	4.1.F.18	4.1.F.31	4.1.F.32	3.7.2.o	3.7.10.o	3.7.10.f
11.9.A.9	3.7.10.h	3.7.4.gg	3.7.5.a	3.7.10.g	6.7.13	6.7.16	11.6.7
11.9.A.8							

NAD Closure Review Checklists:

Task 3.6.62, March 20, 2008
Task 3.7.8.h, June 4, 2008
Task 11.8.30, June 5, 2008

SIBP/SIIP Closure Documents:

Task 4.4.11 Closure Document, November 29, 2007
Task 1.2.E.13 Closure Document, February 27, 2008
Task 1.2.E.21 Closure Document, March 4, 2008
Task 3.6.49 Closure Document, March 5, 2008
Task 15.1.2 Closure Document, March 14, 2008
Task 3.7.7.l Closure Document, March 27, 2008
Task 15.1.7 Closure Document, March 31, 2008
Task 3.6.55 Closure Document, April 3, 2008
Task 4.1.F.10 Closure Document, April 4, 2008
Task 4.1.F.11 Closure Document, April 4, 2008
Task 11.1.2 Closure Document, April 11, 2008
Task 3.7.5.a Closure Document, April 15, 2008
Task 3.7.10.b Closure Document, April 22, 2008
Task 3.6.47 Closure Document, April 24, 2008
Task 4.1.F.18 Closure Document, April 29, 2008
Task 3.7.10.d Closure Document, May 5, 2008
Task 3.7.10.o Closure Document, May 5, 2008
Task 3.7.10.f Closure Document, May 13, 2008
Task 3.7.10.a Closure Document, May 13, 2008
Task 3.7.10.f Closure Document, May 13, 2008
Task 3.6.57 Closure Document, May 15, 2008
Task 3.7.8.h Closure Document, May 15, 2008
Task 11.8.30 Closure Document, May 15, 2008
Task 3.6.5 Closure Document, May 20, 2008
Task 3.4.1 Closure Document, May 23, 2008
Task 3.7.2.m Closure Document, May 23, 2008
Task 3.7.2.g Closure Document, May 27, 2008
Task 3.7.2.k Closure Document, May 27, 2008
Task 6.7.13 Closure Document, May 27, 2008
Task 3.7.3.l Closure Document, May 28, 2008
Task 4.1.F.31 Closure Document, May 28, 2008
Task 3.7.2.b Closure Document, June 2, 2008
Task 3.7.2.c Closure Document, June 2, 2008
Task 3.7.2.e Closure Document, June 2, 2008
Task 6.1.9 Closure Document, June 3, 2008
Task 3.7.2.f Closure Document, June 5, 2008
Task 11.9.A.8 Closure Document, June 5, 2008
Task 3.7.2.p Closure Document, June 6, 2008
Task 3.7.10.c Closure Document, June 6, 2008
Task 11.6.7 Closure Document, June 9, 2008
Task 3.7.2.i Closure Document, June 11, 2008
Task 3.7.2.j Closure Document, June 11, 2008
Task 3.2.1.d Closure Document, June 12, 2008

Task 3.6.61 Closure Document, June 12, 2008
Task 3.6.63 Closure Document, June 12, 2008
Task 3.6.72 Closure Document, June 12, 2008
Task 3.6.59 Closure Document, June 12, 2008
Task 3.7.3.d Closure Document, June 12, 2008
Task 3.2.4 Closure Document, June 13, 2008
Task 3.6.65 Closure Document, June 13, 2008
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Task 3.7.10.h Closure Document, June 13, 2008
Task 3.7.10.i Closure Document, June 13, 2008
Task 4.1.F.27 Closure Document, June 13, 2008
Task 3.7.2.h Closure Document, June 14, 2008
Task 4.1.F.12 Closure Document, June 14, 2008
Task 3.7.2.o Closure Document, June 16, 2008
Task 3.7.4.gg Closure Document, June 16, 2008
Task 4.1.F.32 Closure Document, June 16, 2008
Task 6.7.1 Closure Document, June 16, 2008
Task 4.1.F.19 Closure Document, June 18, 2008
Task 11.9.A.9 Closure Document, June 18, 2008
Task 3.7.2.n Closure Document, June 20, 2008
Task 4.1.F.22 Closure Document, June 20, 2008
Task 6.7.16 Closure Document, June 23, 2008
Task 3.6.62 Closure Document, June 24, 2008
Task 3.6.62 Addendum 1 to Closure Package, June 24, 2008

Miscellaneous:

13-VTD-A391-00010, Anchor/Darling Instruction Manual for Main Steam Isolation Valves and Feedwater Isolation Valves

Licensee Event Report 2006-004-00

System Health Report, Safety Injection and Shutdown Cooling, July 1, 2006 –

Condition Report Trending Report, First Quarter 2008

Effectiveness Review for Key Performance Area – RAS Focus Area 1 – Fill the ECCS Piping, May 2008

Effectiveness Review for Key Performance Area – RAS Focus Areas 2 and 10 – Design and Licensing Bases Documentation Adequacy and Design Bases Project Guidance/Scope Adequacy, May 2008

Offsite Safety Review Committee Charter, Revision 11

Self Assessment 2873084

PI Data Trend – Unit 2 Safety Injection Tank Levels, April 9, 2008, 07:00:00 – 18:00:00

Licensed Operator Continued Training NLR08C020600, February 18, 2008

Technical Specification 3.7.3, Main Feedwater Isolation Valves, Revision 1

Air Operated Valve Program Health Report, July 1, 2007 – December 31, 2007

December 31, 2007

13-VTD-A109-0002-2, Agastat Electromechanical Relays, Switches, Rotary Drives, Revision 0

1PSIEV215, Component Data Sheet, April 9, 2008

Repeat Significant Events Metric, May 2008

Unit 2 Operator Logs, April 5 and 6, 2008

Offsite Safety Review Committee Meeting Minutes #08-004, May 20, 2008

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedures:

01DP-0AP10, Corrective Action Program, Revision 1
01DP-0AP12, Palo Verde Action Request Processing, Revision 2
30DP-9MP01, Conduct of Maintenance, Revision 52
30DP-9WP02, Maintenance Work Order Process and Control, Revision 49
40AO-9ZZ10, Condenser Tube Rupture, Revision 18
40AO-9ZZ13, Loss of Class Instrument or Control Power, Revision 11
40DP-9OP09, System Status Control, Revision 46
40DP-9OP26, Operability Determination and Functional Assessment, Revision 18
40DP-9WP01, Operations Processing of Work Orders, Revision 9
40DP-9ZZ17, Control of Doors, Hatches, and Floor Plugs, Revision 40
40OP-9PN03, 120V AC Class 1E Instrument Channel C, Revision 5
51DP-9OM03, Site Scheduling, Revision 17
72ST-9RX03, DNBR/LHR/AZTILT/ASI with COLSS Out of Service, Revision 16
74DP-9CY04, Systems Chemistry Specifications, Revision 53
81DP-0CC05, Design and Technical Document Control, Revision 34
81DP-0DC13, Deficiency Work Order, Revision 21

PVARs:

3051349	3164931	3172712	

CRDRs:

3-8-0142	3074272	3165478	3166278
3173930	3185716	3186791	

CRAIs:

3176750

Drawings:

02-M-MTP-001, P & I Diagram Main Turbine System, Revision 17

Work Orders:

2337438 2350870 2353648 2911469
3051672

Miscellaneous:

Licensee Event Report 2007-003-00
Open Door/Hatch/Plug Permit 3164879
Personal statements from Safety FIN team members dated 05/09/2008
Prompt Human Performance Evaluation Forms for tendon gallery access door A-B-06 open
Significant CRDR Investigation Charter for CRDR 3185716
Significant Investigation Team Charter for CRDR 3173930
Support Evaluation to CRDR 3173930
Technical Specifications 3.8.7, Inverters-Operating
Technical Specifications 3.8.9, Distribution Systems-Operating

Section 4OA5: Other

Procedures:

40ST-9ZZ09, Containment Cleanliness Inspection, Revision 18

81DP-0EE10, Design Change Process, Revision 14

SI-UT-126, Procedure for the Phased Array Ultrasonic Examination Of Weld Overlaid Similar And Dissimilar Metal Welds, Revision 3

Drawings:

SDOC 13-N001-1106-00033, Strainer, Revision 3

CRDR:

2874685 3014414

Calculations:

FL-201667, Palo Verde NPP Clean Strainer Head Loss, Revision B
13-MC-SI-0017 APS, Safety Injection System Interface Calculation, Revision 6

Miscellaneous:

102-05641-CDM/SAB/RJR, Letter from D. Mauldin (PVNGS) to Document Control Desk (NRC), Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2 and 3 Docket Nos. STN 50-528/529/530 Proposed Alternative for PVNGS, Units 1, 2 and 3: Use of Full–Structural Weld Overlays in the Repair of Dissimilar Metal Welds – Relief Request No. 36 -10 CFR 50.55a(a)(3)(i), and Request to Use a Later Edition and Addenda of the ASME Boiler and Pressure Vessel Code, Section XI, for Repair and Replacement Activities at PVNGS Units 1 and 3 in accordance with 10 CFR 50.55a(g)(4)(iv), dated February 8, 2007

102-05643-RSB/SAB/RJR, Letter from D. Nauldin (APS) to Document Control Desk (NRC) Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3 Docket Nos. STN 50-52815291530 Mitigation of Alloy 600182/182 Pressurizer Butt Welds, dated January 31, 2007

102-05703-DCM-RJR, Letter from D. C. Mims (PVNGS) to Document Control Desk (NRC), Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, 3 Docket No. STN 50-528/529/530 Proposed Alternative to Code Case N-638-1, Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temperbead Technique, Relief Request 37, dated May 16, 2007

81-DP-9RC03, PVNGS Integrated Materials Management Program, Revision 1

900319-001, Dedication Inspection Report: Austenitic Stainless Steel Fasteners

Alloy 600 Management Program Plan, Dated April 4, 2005

AM 06-701, CCI Customer Deviation Record: Welded Parts

EDC 2006-00814, Implement DMWO Rev 1 to replace Emergency Recirculation Sump

ITP 0463 Inspection Plan: ECCS Strainer Including Welding

Letter from T. J. Hiltz (NRC) to R. K. Edington (PVNGS), Palo Verde Nuclear Generating Station, Units 1, 2, AND 3 - Relief Request Nos. 36 AND 37 RE: Alternatives To Weld Overlay Requirements For Inservice Inspection (TAC Nos. MD4272, MD4273, MD4274, MD5579, MD5580, And MD5581), dated June 21, 2007

MRP-139, Materials Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guidelines dated August 2005

NEI 03-08, Guideline for the Management Of Materials Issues, dated May 2003

WDI-PJF-1303408-TR-001, Examination Coverage Assessment for Selected Palo Verde Dissimilar Metal Weld Configurations, Revision 0

LIST OF ACRONYMS USED

AC	alternating current
AFW	auxiliary feedwater
ALARA	as-low-as-is-reasonably-achievable
ASME	American Society of Mechanical Engineers
CAL	Confirmatory Action Letter
CAP	corrective action program
CFR	*Code of Federal Regulations*
CRAI	condition report action item
CRB	closure review board
CRDR	Condition Report/Disposition Request
CS	containment spray
DMBW	dissimilar metal butt welds
EDG	emergency diesel generator

EPIP	emergency plan implementing procedure
EPRI	Electric Power Research Institute
ESFAS	engineered safety feature actuation system
FIN	Finding
GL	Generic Letter
IOP	immediate operability determination
ISI	inservice inspection
LER	Licensee Event Report
LPSI	low pressure safety injection
MFIV	main feedwater isolation valve
MRP	material reliability program
NAD	nuclear assurance department
NCV	noncited violation
NDE	nondestructive examination
NEI	Nuclear Energy Institute
NQR	non-quality related
NRC	U.S. Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
OD	operability determination
OE	operating experience
PI	performance indicator
POD	prompt operability determination
ppm	parts per million
PREACS	pump room exhaust air cleanup system
psig	pounds per square inch gauge
PT	penetrant testing
PVAR	Palo Verde Action Request
PVNGS	Palo Verde Nuclear Generating Station
PWR	pressurized water reactor
RAS	recirculation actuation signal
RCS	reactor coolant system
RU	radiation unit
RWT	refueling water tank
SIAS	safety injection actuation signal
SIIP	site integrated improvement plan
SIT	safety injection tank
SSC	structures, systems, and components
SG	steam generator
SRO	Senior Reactor Operators
sync	synchronizing
TS	Technical Specification
TSO	Transmission System Operator
UFSAR	Updated Final Safety Analysis Report
UT	ultrasonic test
VAC	volts alternating current
VDC	volts direct current
VT	visual examination
WO	work order