



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

July 21, 2003

Greg R. Overbeck, Senior Vice  
President, Nuclear  
Arizona Public Service Company  
P. O. Box 52034  
Phoenix, Arizona 85072-2034

**SUBJECT: PALO VERDE NUCLEAR GENERATING STATION - NRC INTEGRATED  
INSPECTION REPORT 05000528/2003003, 05000529/2003003,  
AND 05000530/2003003**

Dear Mr. Overbeck:

On June 21, 2003, the U.S. Nuclear Regulatory Commission (NRC) completed an 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 June 20, 2003, 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.

Based on the results of this inspection, no findings of significance were identified. One licensee-identified violation, which was determined to be of very low safety significance, is listed in Section 4OA7 of this report. If you contest this noncited violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-4005; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Palo Verde Nuclear Generating Station Units 1, 2, and 3, facility.

Since the terrorist attacks on September 11, 2001, NRC has issued five Orders and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance controls over access authorization. The NRC issued Temporary Instruction 2515/148 on August 28, 2002, that provided guidance to inspectors to audit and inspect licensee implementation of the interim compensatory measures (ICMs) required by the Order. Phase 1 of TI 2515/148 was completed at all commercial nuclear power plants during Calendar Year 2002, and the remaining inspection activities at Palo Verde Nuclear Generating Station were completed on January 17, 2003. The NRC will continue to monitor overall safeguards and security controls at Palo Verde Nuclear Generating Station.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Linda Joy Smith, Chief  
Project Branch D  
Division of Reactor Projects

Dockets: 50-528, 50-529, 50-530  
Licenses: NPF-41, NPF-51, NPF-74

Enclosure: Inspection Report 05000528/2003003, 05000529/2003003,  
and 05000530/2003-03  
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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 : 05000528/2003003, 05000529/2003003, and 05000530/2003003

Licensee: Arizona Public Service Company

Facility: Palo Verde Nuclear Generating Station, Units 1, 2, and 3

Location: 5951 S. Wintersburg  
Tonopah, Arizona

Dates: March 23 through June 21, 2003

Inspectors: N. Salgado, Senior Resident Inspector, Project Branch D  
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Accompanying  
Personnel: J. Arroyo, General Engineer (Intern), Project Branch D

Approved By: Linda Joy Smith, Chief, Projects Branch D  
Division of Reactor Projects

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## **SUMMARY OF FINDINGS**

IR 05000528/2003003, 05000529/2003003, 05000530/2003003-3/23/03 - 6/21/03; Palo Verde Nuclear Generating Station, Units, 1, 2 and 3; Integrated Resident and Regional Report.

The report covered a 3-month period of inspection by resident inspector, and regional reactor and physical security inspectors. No findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

No findings of significant were identified.

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## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at essentially full power until March 27, 2003, when the reactor was manually shutdown because of a failed condenser tube. The unit was returned to essentially full power on April 2, and remained there for the duration of the inspection period.

Unit 2 operated at essentially full power for the duration of this inspection period.

Unit 3 operated at essentially full power until March 29, 2003, when the reactor was shut down for the tenth refueling outage. The outage was completed on April 30 and the unit was returned to essentially full power on May 4. The unit remained at that power level until June 13 when power was reduced to 40 percent to identify and repair a condenser tube leak. On June 17 power was reduced to 11 percent to facilitate leak identification and the unit was shut down on June 18 to enable leak repairs. The unit was at 90 percent power and in the process of returning to full power at the end of this inspection period.

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity [REACTOR-R]

#### 1R01 Adverse Weather Protection (71111.01)

##### a. Inspection Scope

The inspectors reviewed sections of the Updated Final Safety Analysis Report, the Design Basis Manual, and other plant documents to assess the preparations made and site readiness for implementing contingencies associated with adverse weather, particularly hot weather conditions. The documents reviewed are listed at the end of this report.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment

##### .1 Partial Walkdown (71111.04)

The inspectors completed a partial walkdown of the systems listed below to verify proper equipment alignment. This inspection included a review of the applicable plant procedures, plant drawings, outstanding modifications, work orders (WOs), and condition report/disposition requests (CRDR). The inspectors verified the following: all valves were properly aligned; there was no leakage that could affect operability;

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electrical power was available as required; major system components were properly labeled, lubricated, and cooled; and hangers and supports were correctly installed and functional.

- April 10, 2003, shutdown cooling system Train A (Unit 3)
- April 15, 2003, emergency diesel generator Train B (Unit 3)

b. Findings

No findings of significance were identified

1R05 Fire Protection (71111.05Q)

a. Inspection Scope

The inspectors conducted tours of the areas listed below that are important to reactor safety and referenced in the Pre-fire Strategies Manual to evaluate conditions related to licensee control of transient combustibles and ignition sources; the material condition, operational status, and operational lineup of fire protection systems, equipment and features; and the fire barriers used to prevent fire damage from propagation of potential fires.

- April 9, 2003, containment building - all accessible elevations (Unit 3)
- April 18, 2003, control building - 74-foot, 100-foot, 120-foot, and 160-foot elevations (Unit 3)
- April 25, 2003, control building - 74-foot, 100-foot, 120-foot, and 160-foot elevations (Unit 1)
- May 12, 2003, auxiliary building - 100-foot, 120-foot, and 140-foot elevations (Unit 2)
- May 14, 2003, auxiliary building - 100-foot, 120-foot, and 140-foot elevations (Unit 1)
- June 3, 2003, diesel generator building - all accessible elevations (Unit 2)
- June 13, 2003, main steam support structure - 80-foot, 100-foot, 120-foot, and 140-foot elevations (Unit 3)

b. Findings

No findings of significance were identified.



1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors reviewed the Updated Final Safety Analysis Report, the Design Basis Manual, and other licensee documents to verify that the internal flood mitigation plans and equipment were consistent with the plants' design requirements and risk analysis assumptions. The inspectors also conducted walkdowns in Units 1, 2, and 3 of the rooms containing redundant engineered safety features (ESF) equipment, and the associated radioactive waste drain system components for these areas. The inspectors verified, through direct observation and/or review of preventive maintenance records, the status of the floor drain check valves, detection equipment and associated alarm circuitry for ESF equipment rooms and ESF sumps, ESF sump pumps, and the integrity of walls, ceilings, and piping penetration seals.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07A)

a. Inspection Scope

During the Unit 3 outage in 2003, licensee personnel conducted an inspection of the Train A essential cooling water heat exchanger. The inspectors viewed the interior of the heat exchanger tube side to assess material condition. The inspectors also reviewed test and analysis results for the Train A essential cooling water heat exchanger. Heat exchanger data was collected on April 3, 2003, as directed by Procedure 70TI-9EW01, "Thermal Performance Testing of Essential Cooling Water Heat Exchangers," Revision 4. The data was analyzed using Procedure 73DP-9ZZ10, "Guidelines for Heat Exchanger Thermal Performance Analysis," Revision 4. Final review of the analysis was completed on April 17, 2003. The inspectors' review was conducted to determine if the test acceptance criteria and results appropriately considered the differences between testing and design conditions and if the results were appropriately measured against pre-established acceptance criteria and were acceptable.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection Activities (71111.08)

a. Inspection Scope

Performance of Nondestructive Examination (NDE) Activities Other than Steam Generator Tube Inspections

The inspectors observed licensee and contractor NDE personnel perform the American Society of Mechanical Engineers (ASME) Code Section XI examinations listed below:

<u>System</u>	<u>Component/Weld Identification</u>	<u>Examination Method</u>
Steam Generator	Support Zone 65 SG-48-H26	Magnetic Particle Examination
Reactor Coolant	Pipe to Safety Injection Nozzle Zone 6 Weld 13-8	Magnetic Particle Examination
Reactor Coolant	Outlet Nozzle to Extension Piece Weld Zone 6 Weld 16-1	Ultrasonic Examination
Reactor Coolant	Nozzle Inner Radius Weld Zone 5 Weld 5-10	Ultrasonic Examination
Steam Generator	Feedwater Downcomer Elbow to Steam Generator Nozzle, Zone 59, weld 59-1	Radiographic Examination
Steam Generator	Feedwater Economizer Line Replacement	Radiographic Examination
Steam Generator	0-180°, Girth Weld, Zone 42, Weld 42-1	Ultrasonic Examination

During the performance of each examination, the inspectors verified that the licensee used the correct NDE procedure, met the requirements specified in the procedure, and used properly calibrated test instrumentation or equipment. Where previous examination results existed, the inspectors compared indications revealed by the examinations against the previous outage examination reports.

The inspectors found there were no welding repairs performed under Section III of the ASME Code for Classes 1 and 2 components since the last outage.

The inspectors reviewed two ASME Code Section XI valve repair/replacement activities (WOs 2486603 and 2541396) on replacement of piping on the steam generator. The

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licensee performed welding on the piping replacement only. The inspectors verified that the replacements met ASME Code requirements.

#### Steam Generator Tube Inspection Activities

The inspectors observed the licensee's activities on the one tube subjected to in-situ pressure testing. This tube was the only tube that was screened by the licensee for testing, and the screening met the Electric Power Research Institute's guidelines. The in-situ test was for a 360° circumferential crack found in the tube sheet. The test did not show any leakage.

The inspectors verified that the operational assessment predictions of tube plugging appeared to be the same as experienced in the past. The inspectors also verified that the licensee's eddy current examination scope and expansion criteria met Technical Specifications, industry guidelines, and commitments to the NRC.

The inspectors reviewed the areas of potential degradation (based on site-specific and industry experience) to verify that such areas were being inspected. The inspectors also reviewed the leakage history for the steam generators to verify that the leakage was less than 3 gallons per day during operations. The eddy current probes and equipment were reviewed to ascertain if they were properly qualified for the expected types of tube degradation. The licensee performed plugging during the inspection and the number of plugs installed was less than previous outages. The inspectors observed the collection and analysis of eddy current data by licensee personnel.

#### Inspection of Welding and Welding Process Controls

The inspectors toured the areas where weld rods were kept and segregated to assure that the weld rod issuance was appropriately controlled.

#### Identification and Resolution of Problems

The inspectors selected CRDRs issued during the past year on inservice inspection and steam generator eddy current inspection activities. The inspectors verified that the licensee identified, evaluated, corrected, and trended problems.

#### b. Findings

No findings of significance were identified.

### 1R11 Licensed Operator Regualification Program (71111.11Q)

#### a. Inspection Scope

- On May 15, 2003, the inspectors observed operations crew performance during evaluated simulator Scenario SES-0-02-C-00, "DFWCS Malfunction/Condenser

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Tube Rupture/Security Threat/Reactor Trip w/Contingencies,” dated May 7, 2003. The inspectors evaluated the simulator scenario, the crew performance, and the evaluator critique sessions conducted following the completion of the simulator scenario. Additionally, the inspectors compared simulator board configurations with actual control room board configuration for consistency.

- On May 22, 2003, the inspectors observed crew performance during evaluated simulator Scenario SES-0-02-D-00, “RU145 Fails/Slipped CEA/Security Threat/Reactor Trip w/Contingencies,” dated May 8, 2003. The inspectors evaluated the simulator scenario, the crew performance, and the evaluator critique sessions conducted following the completion of the simulator scenario. The inspectors verified that the examinations were in conformance with NUREG 1021, “Operator Licensing Examiner Standards”; NUREG ES-604, “Dynamic Simulator Requalification Examination”; and management expectations.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation (71111.12Q)

.1 Routine Maintenance Effectiveness Inspection

The inspectors verified the licensee's appropriate handling of structure, system, and component performance or condition problems during review of the following equipment failures. Additionally, the inspectors evaluated the following equipment failures to verify that licensee personnel properly implemented the requirements of 10 CFR 50.65, “Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants”:

- On March 14, 2003, failure of a jacket water circulating pump breaker reported in CRDR 2591645 (Unit 3)
- On March 31, 2003, a chemical and volume control system letdown transient that resulted in lifting chemical and volume control system letdown relief Valve CHN-PSV-0345 and the ensuing long term effects on system performance, reported in CRDR 259473 (Unit 1)
- April 18, 2003, B-D PK battery Charger 1EPKBH16 unable to supply required bus voltage, reported in CRDR 2576763 (Unit 1)

b. Findings

No findings of significance were identified.

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.2 Periodic Evaluation Reviews

a. Inspection Scope

The inspectors reviewed the Palo Verde Nuclear Generating Station report documenting the performance of the last maintenance rule periodic effectiveness assessment. This periodic evaluation covered the period from January 2001 through June 2002.

The inspectors reviewed the program for monitoring risk-significant functions associated with structures, systems, and components using reliability and unavailability. The performance monitoring of nonrisk-significant functions using plant level criteria was also reviewed.

The inspectors evaluated whether the report contained adequate assessment of the performance of the Maintenance Rule Program as well as conformance with applicable programmatic and regulatory requirements. To accomplish this, the inspectors verified that the licensee appropriately and correctly addressed the following attributes in the assessment reports:

- Program treatment of nonrisk-significant structure, system, and component functions monitored against plant level performance criteria
- Program adjustments made in response to unbalanced reliability and availability
- Application of industry operating experience
- Performance criteria for Category (a)(2) components and systems
- Goal setting and performance review of Category (a)(1) components and systems
- Evaluation of the bases for system category status change (e.g., Category (a)(1) to Category (a)(2) or Category (a)(2) to Category (a)(1))
- Effectiveness of performance and condition monitoring at component, train, system, and plant levels
- Expert panel activities associated with key safety function ranking and performance criteria development
- Review and adjustment of definitions of functional failures

The inspectors also verified that the issuance of the most recent assessment met the regulatory timeliness requirements.

The inspectors reviewed procedures, condition reports, and Category (a)(1) recovery plans associated with the above activities for the following systems:

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- instrument air
- 13.8kV power
- reactor coolant system-pressurizer safety relief valves
- excore nuclear instrumentation
- shutdown cooling.

b. Findings

No findings of significance were identified.

.3 Identification and Resolution of Problems

a. Inspection Scope

The inspectors evaluated the use of the corrective action system within the maintenance rule program for issues associated with risk significant systems. The inspectors examined a sample of corrective action documents associated with systems which were or had been in Maintenance Rule Category (a)(1), including recovery plans for improving the system performance. The inspectors performed this review to establish that the corrective action program was entered at the appropriate threshold for the purpose of:

- Implementing the corrective action process when a performance criterion was exceeded
- Correcting performance related issues or conditions identified during the periodic evaluation
- Correcting generic issues or conditions identified during programmatic assessments, audits, or surveillances

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

Throughout this inspection period, the inspectors reviewed daily and weekly work schedules to determine when risk significant activities were scheduled. The inspectors reviewed risk evaluations and overall plant configuration control for selected activities to verify compliance with Procedure 30DP-9MT03, "Assessment and Management of Risk When Performing Maintenance in Modes 1 - 4," Revision 8. The inspectors discussed emergent work issues with work control personnel and reviewed the potential risk impact

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of these activities to verify that the work was adequately planned, controlled, and executed. The specific activities reviewed were associated with planned and emergent maintenance on:

- March 27, 2003, troubleshooting and repair of dual indication on main steam isolation Valve 2JSGE-UV-181 Train B per WO 2592595 (Unit 2)
- April 11, 2003, declaration of Valve SGA-UV-138 inoperable when it failed to close completely while performing a stroke of Valve SGA-UV-138A as described in CRDR 2597124 (Unit 2)
- April 29, 2003, troubleshoot and repair anomalies with auxiliary feedwater Pump 3MAFAP01 governor linkage identified during full-flow testing documented in CRDR 2600640 (Unit 3)
- May 1, 2003, scheduled high pressure safety injection system online outage (Unit 1)
- May 13, 2003, troubleshooting and repair of the feedwater isolation Valve 2JSGA-UV-0174 4-way Valve N per WO 2604451 (Unit 2)

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions (71111.14, 71153)

a. Inspection Scope

The inspectors observed the following nonroutine evolutions to verify that they were conducted in accordance with licensee procedures and Technical Specification requirements:

- On March 27, 2003, the inspectors reviewed and observed performance and response during portions of a manual reactor trip on Unit 1 due to circulating water leakage into the condenser. The licensee determined the cause of the circulating water leakage was a degraded tube plug. Licensee Event Report (LER) 05000528/2003002 is closed in Section 4OA3 of this report (Unit 1).
- On March 31, 2003, the inspectors observed performance and response during the Unit 1 reactor startup following a reactor trip on Unit 1. These activities were conducted in accordance with Procedure 40OP-9ZZ03, "Reactor Startup," Revision 31 (Unit 1).
- On April 10, 2003, the inspectors reviewed the licensee's response to increase leakage from a hard pipe drain in the west mechanical penetration room that was

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potentially beyond Technical Requirements Manual limits. The licensee identified that high pressure safety injection Drain Valve 2PSIB-V040 on Header B was the source of the leakage. The valve was closed an additional 1/4 turn, and the leakrate was reduced to well below the Technical Requirements Manual limits. The reportability review in CRDR 2597022 concluded that the projected dose from this leakage would be less than 10 CFR Part 100 limits (Unit 2).

- On May 8, 2003, the inspectors observed performance and response following failure of the outboard cask loading pit gate seal. These activities were conducted in accordance with Procedure 40AO-9ZZ23, "Loss of Spent Fuel Pool Level or Cooling," Revision 8 (Unit 2).
- On June 17-18, 2003, the inspectors observed performance of a downpower to 12 percent to remove the turbine from service and a plant shutdown for condenser tube leak repairs (Unit 3).

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors evaluated the operability determinations listed below for technical adequacy and assessed the impact of the condition on continued plant operation. Additionally, the inspectors reviewed Technical Specification entries, CRDRs, and equipment issues to verify that operability of plant structures, systems, and components was maintained or that Technical Specification actions were properly entered.

- April 11, 2003, leaving a foreign material exclusion cover in Steam Generator 1, and possible long-term effects as described in CRDR 2597211 (Unit 3)
- April 3, 2003, review of possible damage to the refueling liner and the upper guide structure after the upper guide structure bumped into the refueling liner as described in CRDR 2595961 (Unit 3)
- April 20, 2003, mode change from defueled to Mode 6 and the associated requirements for boron injection flowpath as described in CRDR 2599161 (Unit 3)
- May 1, 2003, wiring for resistance temperature Detector TE-122CC found brittle and damaged where the conduit was routed over the top of reactor coolant system cold leg insulation described in CRDR 2600432 (Unit 3)

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- May 5, 2003, assessment of the size of the containment pressure transmitter instrumentation lines and if the lines met the requirements of Regulatory Guide 1.11 as described in CRDR 2601615 (Units 1, 2, and 3)
- May 13, 2003, inability to reduce feedwater isolation Valve 2JSGAUV0174 accumulator pressure due to failure of 4-way Valve N and impact of excessive accumulator pressure on actuator and 4-way Valve M described in CRDR 2604468 (Unit 2)
- Operability Determination 260 describes that the voltage converters in total feedwater flow Loops SNG-F-1189 and SGN-F-1190 have not been calibrated within periodicity (Units 1, 2, and 3)

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors observed and/or evaluated the results from the following postmaintenance tests to determine whether the test adequately confirmed equipment operability. The inspectors also verified that postmaintenance tests satisfied the requirements of Procedure 30DP-9WP04, "Postmaintenance Testing Development," Revision 13.

- April 23, 2003, performance of Procedure 73ST9XI01, "SG #1 Containment Isolation Valve - Inservice Test," Revision 26, per WO 02455861 (Unit 3)
- April 23, 2003, performance of Procedure 73ST9XI02, "SG #2 Containment Isolation Valve - Inservice Test," Revision 27, per WO 02511987 (Unit 3)
- April 23, 2003, rework of excore cable repair per WO 2444235 (Unit 3)
- May 1, 2003, performance of Procedure 73ST-9SI10, "HPSI Pumps Miniflow - Inservice Test," Revision 25, following high pressure safety injection Pump B on-line outage (Unit 1)
- May 9, 2003, retests for resistance temperature detector nozzle modifications for reactor coolant system Hot Legs 1 and 2 per WOs 2455749 and 2455750 (Unit 3)

b. Findings

No findings of significance were identified.

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1R20 Refueling and Outage Activities (71111.20)

.1 Review of the Unit 3 Outage Plan

a. Inspection Scope

The inspectors reviewed the licensee's Unit 3 Tenth Refueling Outage Shutdown Risk Assessment to verify that the licensee appropriately considered risk in planning and scheduling the outage activities.

The inspectors primarily focused on the following activities:

- Midloop/Reduced Inventory
- Spent Fuel Pool Cooling During Fuel Off-load/Reload and Core Off-loaded
- Steam Generator High Temperature Chemical Cleaning

b. Findings

No findings of significance were identified.

.2 Monitoring of Shutdown Activities

a. Inspection Scope

The inspectors reviewed plant data records, control room logs, and unit logs and conducted interviews with licensed operators to assess the licensee's compliance with Technical Specifications plant cooldown limits during the Unit 3 plant cooldown.

b. Findings

No findings of significance were identified.

.3 Control of Outage Activities

a. Inspection Scope

The inspectors reviewed plant conditions and observed selected refueling outage activities throughout the outage to verify that the licensee maintained the plant in a configuration consistent with the requirements of Technical Specification and with the assumptions of the outage risk assessment. The inspectors verified that emergent issues were properly assessed for their impact on plant risk.

Electrical power availability was periodically verified to meet Technical Specifications requirements and outage risk assessment recommendations. Control room operators were interviewed to determine if they were cognizant of plant conditions. The inspectors

reviewed equipment clearance activities, controls for reactivity management, and reactor coolant system inventory.

b. Findings

No findings of significance were identified.

.4 Clearance Activities

a. Inspection Scope

The inspectors reviewed the following equipment clearances:

- Clearance 92649, "3PDSNV388 would not close after spray ponds side of EWA Heat-X was Filled"
- Clearance 78897, "Permit required to prevent inadvertent RCS boration or dilution"
- Clearance 87210, "1620 U3 PCNV-118 Status Control Permit"

b. Findings

No findings of significance were identified.

.5 Reduced Inventory and Midloop

a. Inspection Scope

On April 1, 2003, the inspectors observed, in part, Unit 3 midloop activities to verify that the licensee had appropriately considered the risk associated with this activity. The inspectors reviewed the licensee's response to Generic Letter 88-17, "Loss of Decay Heat Removal (10 CFR 50.54)," and verified that licensee commitments had been properly translated into procedures. The inspectors also verified that multiple sources of electrical power, multiple reactor vessel level indications, and multiple reactor coolant system temperature indications were available. The inspectors observed licensee compliance with the following procedures:

- Procedure 40OP-9ZZ16, "RCS Drain Operations," Revision 32
- Procedure 40OP-9ZZ20, "Reduced Inventory Operations," Revision 4

b. Findings

No findings of significance were identified.

.6 Refueling Activities

a. Inspection Scope

The inspectors observed portions of core off-load and core reload activities to determine if these activities were conducted in accordance with the Technical Specification and administrative procedures. Refueling was conducted using Procedure 72IC-9RX03, "Core Reloading," Revision 19.

b. Findings

No findings of significance were identified.

.7 Monitoring of Heatup and Startup Activities

a. Inspection Scope

The inspectors reviewed control room and unit logs to verify that the Unit 3 startup was conducted in compliance with Technical Specification and administrative requirements. The inspectors accompanied licensee personnel during the performance of Procedure 40ST-9ZZ09, "Containment Cleanliness Inspection," Revision 6, to assess containment cleanliness and materiel condition of components. The inspectors reviewed Procedure 72PY-9RX04, "Low Power Physics Testing using RMAS," Revision 4, to verify that core operating limit parameters were consistent with the design.

b. Findings

No findings of significance were identified.

.8 Identification and Resolution of Problems

a. Inspection Scope

The inspectors screened CRDRs that documented problems identified during the Unit 3 outage to verify that problems were identified at an appropriate threshold.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed the performance of and/or reviewed documentation for the following surveillance tests. Applicable test data was reviewed to verify whether they met Technical Specification, Updated Final Safety Analysis Report, and licensee procedure requirements. Also, the inspectors verified that the testing effectively demonstrated that the systems were operationally ready and capable of performing their intended safety functions and that identified problems were entered into the corrective action program for resolution.

- April 21, 2003, Procedure 73ST-9CL07, "Containment Ventilation Purge Isolation Valves (8") - Penetrations 78 and 79," Revision 9, Section 7.2, per WO 2511776 (Unit 3)
- April 22, 2003, Procedure 73ST-9DG01, "Class 1E Diesel Generator and Integrated Safeguards Test - Train A," Revision 6, Section 8.9 (Unit 3)
- April 19, 2003, Procedure 40ST-9DG01-3, "Diesel Generator A Test," Revision 19 (Unit 3)
- March 31 and April 9, 2003, Procedure 73ST-9DG02, "Class 1E Diesel Generator and Integrated Safeguards Test - Train B," Revision 6, Sections 8.4 and 8.5 (Unit 3)
- May 5, 2003, Procedure 36ST-9SB28, "PPS Input Loop Calibrations for Parameter 13 (Hi CNT Press) and Parameter 17, (H H CNT Press)," Revision 10 (Unit 1)
- May 6, 2003, Procedure 36ST-9SB04, "PPS Functional Test - RPS/ESFAS Logic," Revision 16 (Unit 2)

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors evaluated the following temporary modifications (T-Mod) and associated 10 CFR 50.59 screening. The inspectors reviewed these against the system design basis documentation and verified that the modification did not adversely affect system operability or availability. Additionally, the inspectors verified that the installation was consistent with applicable modification documents and conducted with adequate

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configuration control. The inspectors observed the installation of and/or reviewed documentation for the following T-Mods:

- T-Mod 2557245, removed one shorted heater element from the circuit in a bank of pressurizer heaters, allowing the other two heater elements to work (Unit 3).
- Repair of pressure boundary leakage from the pressurizer heater sleeves using mechanical nozzle seal assembly per Deficiency Work Order 2594958 (Unit 3)
- T-Mod 2605084, disabled the converter's automatic cable resistance compensation circuit and forced the converter to compensate for actual cable resistance. Temperature Loop 1JRCATT0122H1 was indicating approximately 13° lower than other loop temperatures. Troubleshooting performed under WO 2599558 determined that the resistance of Cable Lead E was approximately 3.9 ohms higher than Leads D or F. This increased resistance was causing the converter's automatic cable lead compensation Circuit 2AI-P2V, to compensate for a higher lead resistance than actually existed, thus leading to the temperature difference.

b. Findings

No findings of significance were identified.

3. SAFEGUARDS

3PP4 Security Plan Changes (71130.04)

a. Inspection Scope

The inspectors reviewed the following Physical Security Plan changes to determine whether the addition of the independent spent fuel storage installation security program commitments into the existing Palo Verde Physical Security Plan reduced the effectiveness of the Palo Verde Physical Security Plan. The licensee submitted these changes in accordance with the requirements of 10 CFR 50.54(p):

- Physical Security Plan, Amendment 45, dated July 19, 2002
- Physical Security Plan, Amendment 47, dated February 12, 2003

The inspectors noted that both changes incorporated the independent spent fuel storage installation security commitments as part of the overall Palo Verde Physical Security Plan and physical protection program.

Since the independent spent fuel storage installation security protected area was a new program at Palo Verde, the staff reviewed the proposed changes in Amendment 45 and provided comments to the licensee. Subsequently, the licensee submitted

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Amendment 47 to the Physical Security Plan that appropriately incorporated the necessary revisions.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES [OA]

4OA1 Performance Indicator Verification

.1 Emergency ac Power System Unavailability (Units 1, 2, and 3)

a. Inspection Scope

The inspectors reviewed unit logs, maintenance rule unavailability tracking database, and Technical Specification component condition records from June 2002 through March 2003 to verify the accuracy and completeness of the unavailability data used to calculate the emergency ac power system unavailability for all three units.

b. Findings

No findings of significance were identified.

.2 High Pressure Safety Injection System Unavailability (Units 1, 2, and 3)

a. Inspection Scope

The inspectors reviewed unit logs, the maintenance rule unavailability tracking database, and Technical Specification component condition records from January 2002 through March 2003 to verify the accuracy and completeness of the unavailability data used to calculate the high pressure safety injection system unavailability for all three units.

b. Findings

No findings of significance were identified.

.3 Residual Heat Removal System Unavailability (Units 1, 2, and 3)

a. Inspection Scope

The inspectors reviewed unit logs, the maintenance rule unavailability tracking database, and Technical Specification component condition records from June 2002 through March 2003 to verify the accuracy and completeness of the unavailability data used to calculate the residual heat removal system unavailability for all three units.

b. Findings

No findings of significance were identified.

.1 (Closed) LER 05000528/2002001-00: Reactor Trip Due to Core Protection Calculators Generating a Control Element Assembly (CEA) Deviation Trip Signal

On November 10, 2002, Unit 1 experienced an automatic reactor trip from approximately 64 percent power during a planned shutdown from 69 percent power. Following the reactor trip, the unit was stabilized in Mode 3, no ESF actuation occurred, and the event was classified by the licensee as an uncomplicated reactor trip. The licensee's investigation determined that the event occurred due to the misalignment of a CEA from its subgroup. Due to the CEA deviation, the core protection calculators generated an automatic reactor trip signal on low departure from nucleate boiling ratio. The CEA misalignment was due to a failed optical isolation card in the CEA control system. The reactor trip was a single initiating event and was tabulated as an unplanned scram in the performance indicator cornerstone of initiating events. The inspectors reviewed the LER and no findings of significance were identified. This issue was entered into the licensee's corrective action program and documented on CRDR 2566870. This LER is closed.

.2 (Closed) LER 05000528/2003002-00: Manual Reactor Trip Due to Degraded Main Condenser Tube Plug

On March 27, 2003, Unit 1 was in Mode 1, 97 percent power. At 9:27 a.m., licensee chemists noticed that the condensate sodium concentration in Hotwell 1A was increasing substantially and notified control room personnel. Operators started using abnormal operating Procedure 40AO-9ZZ10, "Condenser Tube Rupture," and at 9:43 a.m. in accordance with this procedure, tripped the reactor. All rods inserted and no other safety systems actuated or were required to actuate. Some problems were noted with letdown flow, but operators were able to maintain pressurizer level. Operators cooled down the plant to Mode 5 to clean up steam generator chemistry and repair the cause for the sodium intrusion into the hotwell. The licensee found a degraded tube plug previously installed to isolate a leaking condenser tube. This LER was reviewed by the inspectors and no findings of significance were identified. The licensee initiated CRDR 2594001 on this event. This LER is closed.

4OA5 Other Activities

.1 Reactor Pressure Vessel (RPV) Head and Vessel Head Penetration Nozzles (TI 2515/150)

Susceptibility Ranking Calculation

a. Inspection Scope



On March 31 through April 14, 2003, the inspectors performed NRC Inspection Manual Temporary Instruction 2515/150 for Unit 3 during the Cycle 10 Refueling Outage 3R10. They reviewed the licensee's inspection plan in response to NRC Order EA-03-009 (Order) which established interim inspection requirements for RPV heads.

The inspectors reviewed the susceptibility ranking calculation to verify that appropriate plant-specific information was used as input. The calculation determines the effective degradation years which is the effective full power years, normalized to 600°. Two periods were used to determine RPV head temperature and corresponded to the periods before and after implementation of T-hot reduction, which reduced T-hot from 621° to approximately 612° to minimize steam generator tube degradation. The head temperature for each period was based on using a combination of an evaluation to calculate fluid temperature in the upper head based on mixing of bypass flow through different paths and heated junction thermocouple data. The more conservative of the two temperatures was used for each period.

The inspectors noted that Unit 3 was in the moderately susceptible category since the effective degradation years were determined to be 11.1 and the plant had no previous inspection findings requiring classification as high susceptibility. Required inspections for Refueling Outage 3R10 were bare metal visual examination of 100 percent of the RPV head surface (Order Section IV.C.(2)(a)), ultrasonic testing of each RPV head penetration nozzle from 2 inches above the J-groove weld to the bottom of the nozzle (Order Section IV.C.(2)(b)(i)), or eddy current testing of the wetted surface of each J-groove weld and RPV head penetration nozzle base material to at least 2 inches above the J-groove weld (Order Section IV.C.(2)(b)(ii)). Because of hardships, the licensee had, with the ability to perform inspections in strict compliance with the Order, two relaxation requests submitted to the NRC and approved based on the demonstration of good cause for the proposed relaxations. The first proposed alternative examination was to perform a bare metal visual examination of the one RPV head vent line nozzle in accordance with Order Section IV.C.(2)(a), since internal volumetric or surface examination would be difficult and would require the removal of the welded orifice and testing the remaining control element drive mechanism nozzles per Order Section IV.C.(2)(b). The second proposed alternative examination was to perform ultrasonic testing of each nozzle from 2 inches above the J-groove weld to approximately 0.6 inches above the top of the nozzle's chamfer face control element drive mechanism since ultrasonic scans in the area below 0.6 inches to the bottom of the nozzle do not yield useful data because of the geometry of the nozzle and funnel.

b. Findings

No findings of significance were identified.

Volumetric and Surface Examinations

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a. Inspection Scope

The inspectors verified that the licensee's volumetric inspection plan and critical performance objectives were incorporated into site procedures. They also interviewed plant inspection personnel, and contractors performing the inspections, to determine their understanding of inspection standards and acceptance criteria required during data gathering and analysis. The inspectors reviewed the Westinghouse Field Service Procedures which governed the instrument calibration, data gathering, and data analysis requirements for ultrasonic and eddy current testing. Nuclear Reactor Regulation personnel, in conjunction with the inspectors, reviewed the qualification of these methods and their ability to determine flaws in J-groove welds and base metals associated with primary water stress corrosion cracking. The inspectors reviewed licensee and contractor qualifications and certification records which were obtained through a combination of written and practical examinations. The inspectors conducted interviews with plant engineers and Westinghouse contractors to determine their training, background, the basis used for certifications, and expertise in conducting and analyzing these examinations. The inspectors also observed equipment operation during data gathering and data analysis for a sample of head penetration nozzles to assess procedural adherence.

b. Findings

No findings of significance were identified.

Bare Metal Visual Examinations

a. Inspection Scope

The inspectors observed the video acquired during visual inspection of the RPV head vent line nozzle and noted that the camera and remote monitoring equipment used during the examination process provided adequate visual clarity. The inspectors reviewed certification records and discussed the qualifications and experience of the examiners. The inspectors verified that a clear 360° observation of the nozzle was completed and that no evidence of cracking or boric acid crystals were present.

b. Findings

No findings of significance were identified.

.2 Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures (IP 2515/148)

a. Inspection Scope

The inspectors evaluated a licensee review of an incident that involved the owner-controlled area mobile patrols. The inspectors reviewed the following documents:

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- Procedure 20DP-0SK25, "Security Patrols," Revision 17
- NRC Order for Interim Safeguards and Security Compensatory Measures, dated February 25, 2002

b. Findings

In response to an NRC question related to performance of collateral duties by Mobile 7 on March 8, 2003, the licensee had initiated an investigation. The licensee interviewed alarm station operators and officers who had performed the Mobile 7 patrol on March 8, 2003. The alarm station operators did not recall directing Mobile 7 to perform any activities at the independent spent fuel storage installation; however, the alarm station officers indicated that they may have directed the activities. Two officers indicated that they had been directed to perform the specific collateral duties at the independent spent fuel storage installation. One officer did not question the activity; however, the second officer indicated that, although she had complied, she had wondered whether the activity constituted a collateral duty. The licensee determined that the performance of the collateral duties did not comply with the requirements of Item B.4.e of the NRC Order.

Although the activities represented collateral duties, the licensee indicated that the independent spent fuel storage installation was part of the Mobile 7 patrol route and that the activities performed took approximately 3 minutes. Nevertheless, the licensee re-emphasized to security officers, section leaders, and alarm station operators that the Mobile 6 and 7 patrols were to have no collateral duties.

The inspectors determined that Procedure 20DP-0SK25, step 3.2.3, specified that Mobile 6 and 7 patrols shall have no collateral duties as described in Item B.4.e of the NRC Order dated February 25, 2002. The inspectors determined that the failure to comply with the requirements of Item B.4.e of the Order and Procedure 20DP-0SK25 was an unresolved item pending review by the Office of Nuclear Security and Incident Response (unresolved item (URI) 05000528/2003003-01; 05000529/2003003-01; 05000530/2003003-01).

4OA6 Meetings, Including Exit

The inspectors presented the inspection results to Mr. Rusty Stroud, Senior Consultant Regulatory Affairs, during a telephone exit on March 25, 2003.

The inspectors presented the in-service inspection results to Mr. G. Overbeck, Senior Vice President, Nuclear, and other members of licensee management during an exit interview conducted on April 29, 2003.

The inspector presented the results of this maintenance effectiveness inspection to Mr. Gregg Overbeck, Senior Vice President, and other members of licensee management at the conclusion of the inspection on May 2, 2003.

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Division of Nuclear Security staff supported a meeting with the licensee at headquarters on May 2, 2002, in which the licensee security staff provided the status of its plans for spent fuel dry cask storage located at a separate protected area in the owner controlled area. This meeting led to the eventual submittal of Amendment 45 to the Palo Verde Physical Security Plan.

The inspector presented the inspection results to Mr. D. Marks, Compliance Section Leader, during a telephonic exit conference call on May 15, 2003.

The inspectors presented the inspection results to Mr. D. Marks, Section Leader Compliance, during a telephonic exit on May 27, 2003.

The resident inspectors presented inspection results to Mr. G. Overbeck, Senior Vice President, Nuclear, and other members of licensee management on June 20, 2003.

The inspectors noted that, while proprietary information was reviewed, none would be included in this report.

#### 40A7 Licensee-Identified Violations

The following violation of very low significance (Green) was identified by the licensee and is a violation of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a noncited violation.

10 CFR 73.55(b)(4)(ii) requires, in part, that each licensee shall follow an NRC approved training and qualifications plan. The Palo Verde Nuclear Generating Station Security Training and Qualification Plan, Revision 14, Part 4.0, "Weapons Training and Qualification," Section 4.1.1, specified that "Armed Members of the Security Force are trained and qualified in accordance with procedures." Procedure 20DP-0SK20, "General Security Instructions," Revision 14, Section 3.2.11, required, in part, that security personnel "Maintain control of assigned weapons." On April 9, 2003, a security officer unintentionally left his assigned loaded handgun in the men's restroom of the Unit 3 operations control building, 130-foot level. Approximately 10 minutes later, the handgun was found by an auxiliary operator. Security supervision responded and took control of the weapon. The licensee entered this event into their corrective action program as CRDR 2596895. This violation was only of very low safety significance because there were not greater than two similar findings in a four-quarter period.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee Personnel

S. Bauer, Department Leader, Regulatory Affairs  
L. Bullington, Maintenance Rule Expert Panel Chairperson  
R. Buzzard, Regulatory Affairs  
D. Carnes, Department Leader, Operations  
J. Gonzales, Site Representative, Public Service of New Mexico  
F. Gower, Site Representative, El Paso Electric  
R. Henry, Site Representative, Salt River Project  
A. Kranik, Director, Emergency Services Division  
D. Leech, Department Leader, Nuclear Assurance Department  
D. Marks, Section Leader, Regulatory Affairs  
D. Mauldin, Vice President, Engineering and Support  
G. Overbeck, Senior Vice President  
S. Peace, Consultant, Communications  
T. Radtke, Director, Maintenance  
G. Reeves, Maintenance Rule Coordinator  
D. Smith, Director, Operations

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### Opened

05000528, 529, 530/2003003-01	URI	Inappropriate patrol duties performed (Section 4OA5).
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#### Closed

05000528, 529, 530/1998003-02	LER	MSSV As-Found Lift Pressures Outside of Technical Specification Limits (Section 4OA3.1)
05000528/2002001-00	LER	Reactor Trip due to Core Protection Calculators generating a CEA deviation trip signal (Section 4OA3.2)
05000528/2003002-00	LER	Manual Reactor Trip Due to Degraded Main Condenser Tube Plug (Section 4OA3.3)

#### Discussed

None

## LIST OF DOCUMENTS REVIEWED

In addition to the documents noted 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:

### Condition Reports/Disposition Requests

2411580	2441118	2514051
2516137	2547449	2557006
2599646	2557486	2559098
2564721	2565648	2584962
2589790	280170	2566870
2530281	2557032	2600042
2530320	2546026	2603718
2599101		

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
70DP-OMR01	Maintenance Rule	8
30DP-9MT03	Assessment and Management of Risk When Performing Maintenance in Modes 1-4	8
81DP-0ZZ01	Civil System, Structure, and Component Monitoring Program	9
65DP-0QQ01	Industry Operating Experience Review	5
70DP-0EE01	Equipment Root Cause of Failure Analysis	12
90DP-0IP10	Condition Reporting	15
WDI-UT-010	IntraSpect Ultrasonic Procedure for Inspection of Reactor Vessel Head Penetrations, Time of Flight Ultrasonic, Longitudinal Wave, and Shear Wave	4
WDI-UT-013	CRDM/ICI UT Analysis Guidelines	2

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
WDI-ET-002	IntraSpect Eddy Current Inspection of J-Groove Welds in Vessel Head Penetrations	2
WDI-ET-003	IntraSpect Eddy Current Imaging Procedure for Inspection of Reactor Vessel Head Penetrations	4
WDI-ET-004	IntraSpect Eddy Current Analysis Guidelines for Inspection of Reactor Vessel Head Penetrations	2
WDI-ET-008	IntraSpect Eddy Current Imaging Procedure for Inspection of Reactor Vessel Head Penetrations with Gap Scanner	1
40DP-9OP26	Operability Determination	10 and 12
73DP-0EE16	Qualification and Certification of NDE Personnel	4
73DP-9XI03	ASME Section XI Inservice Inspection	5
73TI-0EE01	Ultrasonic Instrument Calibration	3
73TI-0ZZ13	Radiographic Examination	8
73TI-9RC01	Steam Generator Eddy Current Examinations	22
40AL-9DG01	Diesel Generator A Alarm Panel Responses	13
40AL-9DG02	Diesel Generator B Alarm Panel Responses	12
73TI-9ZZ 80	ASME Section XI Appendix VII Ultrasonic Examination of Austenitic Piping	3
73TI-9ZZ05	Dry Magnetic Particle Examination	10
73TI-9ZZ07	Liquid Penetrant Examination	9
73TI-9ZZ09	Ultrasonic Examination of Pipe Welds	11

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
81CP-9RC29	In Situ [sic] Pressure Test Using the Computerized Data Acquisition System	2
81DP-9RC01	PVNGS Steam Generator Degradation Management Program	15
40ST-9ZZ15	Weekly Borated Water Surveillance Checks	5
43ST-3CH02	Boron Injection Flowpaths - Shutdown	4

### Work Orders

2510615	252557	259761
2484213	252563	278029
2510746	259760	287551
2483876	260324	287552
2590102	260326	278031
2482316		

### Root Cause Investigation Reports

"Repeat Maintenance Rules Functional Failure of Unit 3 Nuclear Instrument System Source Range Monitor Channel 2," Revision 0

"Unit 1 Train A Shutdown Cooling Isolation Valve 1JSIAV651," Revision 0

### Assessment

"Periodic Assessment of Maintenance Rules Program," dated January 2001 through June 2002

### Test Reports

#### Ultrasonic Examinations

UT-03-003	UT-03-004	UT-03-006
UT-03-007	UT-03-008	UT-03-009
UT-03-010	UT-03-011	UT-03-012



UT-03-013

UT-03-030

Miscellaneous

10 CFR 50.59 Screening S-03-0110

10 CFR 50.59 Screening S-02-0212

NEI 97-06, "Steam Generator Program Guidelines," Revision 1

Relief Request 17, "Request for Code Alternative for the Use of Mechanical Nozzle Seal Assemblies"

Regulatory Guide 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants," Revision 2

Drawing 02-M-RDP-002, "Radioactive Waste Drain System," Revision 15

Drawing 02-M-RDP-003, "Radioactive Waste Drain System (Aux Bldg)," Revision 6

**LIST OF ACRONYMS**

ASME	American Society of Mechanical Engineers
CEA	control element assembly
CFR	<i>Code of Federal Regulation</i>
CRDR	condition report/disposition requests
ESF	engineered safety features
LER	licensee event report
MSSV	main steam safety valve
NDE	nondestructive examination
NRC	Nuclear Regulatory Commission
Order	NRC Order EA-03-009
RPV	reactor pressure vessel
T-Mod	temporary modifications
URI	unresolved item
WO	work order