UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

October 26, 2000

Gregg 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 INSPECTION REPORT 50-528/00-09; 50-529/00-09; 50-530/00-09

Dear Mr. Overbeck:

On October 7, 2000, the NRC completed an inspection at your Palo Verde Units 1, 2, and 3. The enclosed report documents the inspection findings which were discussed on September 1 and October 4, 2000, with you and other members of your staff.

This inspection was an examination of 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.

No findings of significance were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure 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/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

P. H. Harrell, Chief
Project Branch D
Division of Reactor Projects

Docket Nos.: 50-528
50-529
50-530
License Nos.: NPF-41
NPF-51
NPF-74

Enclosure:
NRC Inspection Report No.
50-528/00-09; 50-529/00-09; 50-530/00-09

cc w/enclosure:
Steve Olea
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, Arizona 85007

Douglas K. Porter, Senior Counsel
Southern California Edison Company
Law Department, Generation Resources
P.O. Box 800
Rosemead, California 91770

Chairman
Maricopa County Board of Supervisors
301 W. Jefferson, 10th Floor
Phoenix, Arizona 85003

Aubrey V. Godwin, Director
Arizona Radiation Regulatory Agency
4814 South 40 Street
Phoenix, Arizona 85040

Angela K. Krainik, Director
Regulatory Affairs
Arizona Public Service Company
P.O. Box 52034
Phoenix, Arizona 85072-2034

John C. Horne, Vice President,
Power Generation
El Paso Electric Company
2702 N. Third Street, Suite 3040
Phoenix, Arizona 85004

Terry Bassham, Esq.
General Counsel
El Paso Electric Company
123 W. Mills
El Paso, Texas 79901

John W. Schumann
Los Angeles Department of Water & Power
Southern California Public Power Authority
P.O. Box 51111, Room 1255-C
Los Angeles, California 90051-0100

David Summers
Public Service Company of New Mexico
414 Silver SW, #1206
Albuquerque, New Mexico 87102

Jarlath Curran
Southern California Edison Company
5000 Pacific Coast Hwy. Bldg. DIN
San Clemente, California 92672

Robert Henry
Salt River Project
6504 East Thomas Road
Scottsdale, Arizona 85251

Electronic distribution from ADAMS by RIV:
Regional Administrator **(EWM)**
DRP Director **(KEB)**
DRS Director **(ATH)**
Senior Resident Inspector **(JHM2)**
Branch Chief, DRP/D **(PHH)**
Senior Project Engineer, DRP/D **(KMK)**
Branch Chief, DRP/TSS **(LAY)**
RITS Coordinator **(NBH)**

Only inspection reports to the following:
David Diec **(DTD)**
NRR Event Tracking System **(IPAS)**
PV Site Secretary **(TLB4)**
Dale Thatcher **(DFT)**

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	50-528 50-529 50-530
License Nos.:	NPF-41 NPF-51 NPF-74
Report No.:	50-528/00-09 50-529/00-09 50-530/00-09
Licensee:	Arizona Public Service Company
Facility:	Palo Verde Nuclear Generating Station, Units 1, 2, and 3
Location:	5951 S. Wintersburg Road Tonopah, Arizona
Dates:	August 27 through October 7, 2000
Inspectors:	J. H. Moorman, III, Senior Resident Inspector N. L. Salgado, Resident Inspector C. E. Johnson, Senior Reactor Inspector P. A. Goldberg, Reactor Inspector
Approved By:	P. H. Harrell, Chief, Project Branch D, Division of Reactor Projects

Attachment 1: Supplemental Information

Attachment 2: NRC's Revised Reactor Oversight Process

SUMMARY OF FINDINGS

Palo Verde Nuclear Power Station
NRC Inspection Report 50-528/00-09; 50-529/00-09; 50-530/00-09

IR 05000-528-00-09, IR 05000-529-00-09, IR 05000-530-00-09, on 08/27-10/07/00; Palo Verde Nuclear Generating Station; Units 1, 2, and 3. Integrated Resident & Regional Report. No findings identified.

The report covers a 6-week period of resident inspection and an announced inspection by two regional engineering inspectors. In the Reactor Safety area, the cornerstones inspected included Initiating Events, Mitigating Systems, and Barrier Integrity.

There were no inspection findings identified in these areas.

Report Details

Summary of Plant Status

Unit 1 operated at essentially 100 percent power for the duration of this inspection period.

On August 26, 2000, Unit 2 experienced an automatic reactor trip on high pressurizer pressure resulting from closure of main steam isolation valves which was caused by loss of logic power supply in the Train A logic cabinet. Power was returned to 100 percent on August 30. The unit operated at 100 percent power until September 16, at which time the operators began reducing power for the planned ninth refueling outage. The unit was shutdown on October 4 and was in Mode 6 at the end of this inspection period.

Unit 3 operated at 100 percent power until September 27, 2000, when operators shut down the unit to repair a steam generator downcomer sample line leak. The unit was returned to 100 percent power on October 4.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment - Routine Inspection

.1 Partial Walkdown Inspections

a. Inspection Scope

The inspectors performed equipment alignment verifications for portions of the following systems:

- Containment Spray Train B (Unit 1)
- Low Pressure Safety Injection Train A (Unit 3)
- Containment Spray Train A (Unit 3)
- Diesel Generator Train A (Unit 3)
- Essential Spray Pond Train A (Unit 3)
- Essential Cooling Water Train A (Unit 3)
- Essential Chilled Water Train A (Unit 3)

b. Issues and Findings

No findings of significance were identified.

1R05 Fire Protection - Monthly Routine Inspection

a. Inspection Scope

The inspectors performed fire protection walkdowns to assess the material condition of plant fire protection equipment and proper control of transient combustibles. The following risk significant areas were inspected:

- Low Pressure Safety Injection Pump Rooms (Trains A and B) (Unit 2)
- Control Building 140-foot elevation (Unit 2)
- Control Buillding 140-foot elevation (Unit 3)

b. Issues and Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On September 6, the inspectors observed licensed operators perform job performance measures during the conduct of licensed operator requalification training. The inspectors evaluated the training and assessed the performance of the operators and the adequacy of the licensee evaluator critiques.

b. Issues and Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed two 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.” Specifically, the inspectors evaluated the failure of Unit 3 Instrument Air Compressor 3MIANC01A to start on demand and the abnormal operation of Unit 1 Instrument Air Compressor 1MIANC01C. The inspectors used the maintenance rule field flow chart to determine if the licensee properly dispositioned the failures.

b. Issues and Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessment and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed daily and weekly work schedules to determine when risk significant activities were scheduled. The inspectors reviewed selected activities regarding risk evaluations and overall plant configuration control. The inspectors discussed emergent work issues with work control personnel and reviewed the potential risk impact of these activities to verify that the work was adequately planned, controlled, and executed. The inspection included the following maintenance activities:

- Troubleshooting failure of the Core Protection Calculator A (Unit 1)
- High Pressure Safety Injection Train B (Unit 2)
- Containment Spray Train B breaker replacement (Unit 3)
- Diesel Generator Train A, Essential Spray Pond Train A, Essential Cooling Water Train A, and Essential Chilled Water Train A outage (Unit 3)

b. Issues and Findings

No findings of significance were identified.

1R14 Nonroutine Plant Evolutions

.1 Reactor Trip Due to Closure of All Main Steam Isolation Valves (Unit 2)

a. Inspection Scope

On August 26, at 3:39 p.m., Unit 2 experienced an automatic reactor trip on a valid high pressurizer pressure signal that resulted when all main steam isolation valves shut. The main steam isolation valves shut due to the failure of a 15-volt power supply in the main steam isolation valve closure logic. The inspectors reviewed data from the trip and interviewed operators to determine if operator response to the trip was appropriate.

b. Issues and Findings

No findings of significance were identified.

.2 Reactor Shutdown Due to Leaking Sample Line on Steam Generator 2 (Unit 3)

a. Inspection Scope

The inspectors assessed operator performance and plant response following an unplanned shutdown of Unit 3 on September 27. Operators shut down the reactor following identification of an approximately 1 liter per minute leak from the secondary system. The leak was from a Steam Generator 2 downcomer blowdown sample line fitting seal weld.

After repairs were completed, the inspectors observed operator performance during the restart of the plant.

b. Issues and Findings

No findings of significance were identified.

1R15 Operability Evaluations

a Inspection Scope

The licensee identified that a plastic coupling insert between the engine-driven jacket water pump and engine-driven fuel oil booster pump for the Unit 2 Train A emergency diesel generator was missing. The licensee initiated Operability Determination 2317708 to evaluate the impact of this condition on the operability of the diesel generator. The inspectors evaluated the operability determination for technical adequacy and assessed the impact of the condition on continued plant operation.

Issues and Findings

No findings of significance were identified.

1R16 Operator Workarounds

.1 Review of the Cumulative Effects of Operator Workarounds

a. Inspection Scope

The inspectors interviewed operators and reviewed the Control Room Deficiency Log in Units 1, 2, and 3 to assess the cumulative effect of operator workarounds on plant operations.

b. Issues and Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed procedures governing plant modifications to evaluate the effectiveness of the licensee's programs for implementing modifications to risk-significant systems, structures, and components, such that these changes did not adversely affect the design and licensing basis of the facility. The inspectors also reviewed 20 permanent plant modification packages (8 major modifications and 12 minor modifications) to verify that they were performed in accordance with plant procedures. Procedures and permanent plant modifications reviewed are listed in Attachment 1.

The inspectors conducted field walkdowns of several permanent plant modifications (i.e., snubber reduction and diesel air start dryer replacement), identified in Attachment 1. The cognizant design and/or system engineers for the identified modifications were interviewed to determine their understanding of the modification packages.

The inspectors also evaluated the effectiveness of the licensee's corrective action process to identify and correct problems concerning the performance of permanent plant modifications. In this effort, the inspectors reviewed condition reports and the

subsequent corrective actions pertaining to licensee-identified problems and errors in the performance of permanent plant modifications. The condition reports/disposition requests reviewed are listed in Attachment 1.

b. Issues and Findings

b.1 Design Modification Work Order (DMWO) 00693298, plant modification to change setpoints of the Unit 2 pressurizer safety valves, March 27, 1995.

The inspectors noted that DMWO 00693298 was prepared to revise the set pressure of the pressurizer safety valves from 2,500 to 2,475 psia. The safety valve set pressure was lowered in order to ensure that the reactor coolant system remained within its design basis during accident conditions. Although DMWO 00693298 was prepared for the Unit 2 safety valves, similar modifications were prepared for Units 1 and 3 pressurizer safety valves. The licensee stated that the two bounding accident analyses for this change were: (1) loss of condenser vacuum, and (2) main feedwater line break with loss of offsite power. The number of steam generator tubes plugged for Unit 2 had increased since the original accident analysis was performed. In 1994, a Technical Specification amendment was submitted by the licensee for the pressurizer safety valve set pressure reduction. The accident analysis was revised to change the number of steam generator tubes plugged from 1,100 to 1,500 per generator. From the most recent outage, the number of tubes plugged in Steam Generator 22 increased to 1,663, and in Steam Generator 21, 821 tubes have been plugged. The licensee stated that the number of plugged tubes could be asymmetrical, such that there could be 2,000 tubes plugged in one generator and 1,000 in the other generator and still meet the accident analysis.

The inspectors questioned the licensee as to whether all accident analyses had been reviewed to ensure that the design basis was met with the additional tubes plugged. The licensee reviewed the accident analyses and identified that the feedwater line break, plus long-term cooling accident, had only been run with plugged steam generator tubes for the first portion of the accident analysis. For the long-term cooling portion of the accident analysis, no tube plugging was assumed. The initial portion of the accident was run with up to 3000 total tubes plugged. The licensee initiated Condition Reports/Disposition Request 2316982, which stated that the Updated Final Safety Analysis Report, Chapter 15.2.8.3 event, long-term heat removal for feedwater line break, did not appear to have been reanalyzed for the steam generator tube plugging, 2 percent power uprate, and T_{hot} reduction. The licensee further stated that no analyses or justification for omission was found in the corresponding licensing basis documents. The licensee stated that they thought that the long-term cooling portion of the accident was bounded by the pressurizer pressure spike at the beginning of the main feedwater line break accident analysis. However, the licensee stated that they would analyze for the long-term cooling portion of the accident with a total of 3,000 steam generator tubes plugged. This item was identified as an unresolved item pending review of the long-term cooling portion of the accident analysis (50-529/00-09-01).

1R19 Postmaintenance Testing

a. Inspection Scope

The inspectors observed or evaluated the following postmaintenance tests to determine whether the test adequately confirmed equipment operability:

- 32ST-9ZZ34 “Battery Charger Surveillance Test,” Revision 6 (Unit 2)
- 32MT-9ZZ34 "Maintenance of Medium Voltage Circuit Breakers Type AM-4.16-250," Revision 13 (Unit 3)

b. Issues and Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed and reviewed the following test:

- 73ST-9AF02 “AFA-P01 - Inservice Test” Revision 15 (Unit 3)

b. Issues and Findings

No findings of significance were identified.

1R23 Temporary Modifications

a. Inspection Scope

The inspectors observed the installation of, and reviewed documentation associated with the following temporary modification:

- 01-RC-2000-002 Pressurizer Head Vent Alarm (Setpoint for JRCNPSH0138 was changed to alarm on 1,800 psi decreasing pressure from 2,000 psi increasing) (Unit 1)

b. Issues and Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Initiating Events Cornerstone

a. Inspection Scope

The inspectors reviewed unit logs and a maintenance rule database from January through August 2000 to verify the accuracy and completeness of the reported unavailablity data for the auxiliary feedwater system and emergency AC power system on all three units.

b. Issues and Findings

No findings of significance were identified. The performance indicators all remained in the licensee response band (Green).

4OA5 Exit Meeting Summary

The engineering inspectors presented the results of the permanent plant modifications inspection to Mr. G. Overbeck, Senior Vice President, Nuclear, and other members of the licensee staff at the conclusion of the inspection on September 1, 2000.

The resident inspectors presented the inspection results to Mr. G. Overbeck, Senior Vice President, Nuclear, and other members of licensee management on October 4, 2000.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. Proprietary information identified by the licensee was not included in this report.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

S. Bauer, Section Leader, Regulatory Affairs
R. Buzard, Senior Consultant, Nuclear Regulatory Affairs
D. Carnes, Department Leader, Unit 1 Operations
D. Fan, Department Lead, Design Engineering
R. Henry, Site Representative, Salt River Project
W. Ide, Vice President, Nuclear Production
D. Kanitz, Senior Engineer, Regulatory Affairs
A. Krainik, Director, Nuclear Regulatory Affairs
D. Lamontagne, Section Leader, Nuclear Assurance Engineering
D. Marks, Section Leader, Nuclear Regulatory Affairs
C. Mauldin, Vice President, Engineering and Support
G. Overbeck, Senior Vice President, Nuclear
K. Parrish, Section Lead, Nuclear Fuels Management
T. Radtke, Director, Maintenance
R. Rios, Senior Engineer, Valve Design
E. Sterling, Department Leader, Nuclear Assurance
S. Waters, Section Leader, Design Services
M. Winsor, Director, Nuclear Engineering

LIST OF DOCUMENTS REVIEWED

Procedures

32MT-9ZZ56, "Motor Operator Testing Using Movats 3500 System," Revision 18
40OP-9GA01, "Service Gases (GA) Nitrogen (n2)," Revision 6
73ST-9XI04, "SI Train B Valves Inservice Test," Revision 9
73ST-9XI13, "Train A HPSI Injection and Miscellaneous SI Valves Inservice Test," Revision 11
40AC-0ZZ06, "Locked Valve, Breaker, and Component Control," Revision 12
81DP-0EE10, "Plant Modifications," Revision 5
81DP-0DC16, "Engineering Document Change," Revision 10

Design Master Work Order (DMWO)

Major Modifications

DMWO 00693298, Change PSV-200, 201, 202, and 203 setpoints from 2500 lbs. to 2475 lbs.

DMWO 00706505, Snubber Reduction For ESF Pump Suction Train B

DMWO 00705815, Modify existing valve from a rising, rotating stem to a “rising, non-rotating stem valve, and replace operator with a SMSB-00-10

DMWO 00714670, Prevent “Pressure Locking"

DMWO 00746141, Replace mechanical seals on all four RCPs with seals manufactured by Sulzer Bingham Pumps, Inc. Unit 1

DMWO 00782827, Valve not regulating pressure

DMWO 00784539, Replace carbon steel piping/fittings with stainless due to erosion corrosion considerations

DMWO 00910843, Replacement of DG starting air dryer

Minor Modifications

DMWO 00691739, Install QSS (Teledyne gauges) on the stem of valves in DMWO

DMWO 00697417, Install live load packing on all four FWIVs and MSIVSAT Units 1, 2, and 3 JSGEUV0171 at Unit 3 using the same system under 3SM-SG-024

DMWO 00756063, Gear change for 1, 2, and 3 AF-54

DMWO 00768502, Delete vibration trip switches from the emergency diesel generators

DMWO 00768977, Modify valves to address pressure locking/thermal binding problems for MOVS 13SIAHV685/688

DMWO 00769986, Replace worm shaft and motor pinion gears to increase overall gear ratio to 95.53

DMWO 00773966, Remove the supply air pressure regulator to the valve actuator

DMWO 00800840, Install live load packing on valves listed in the multi-equipment attachment

DMWO 00818018, Modify existing local indicator to provide accurate local valve position indication

DMWO 00854597, Install the permanent test fittings on valve actuator

DMWO 00866190, Replace DG start air dryer

DMWO 00884302, Remove all EPRI connections to the SG and weld a cap over the hole to remove potential leak path

Calculations

13-MC-SI-229, PRV sizing calculation for SI system valve bonnets, June 6, 1999

13-PM-221C, Technical requirements for nuclear service valves, 3 inch and smaller, Revision 5

APVFE0057, Evaluation of asymmetrical steam generator tube plugging of PVNGS, Revision 1

A-PVZ-FE-0119, Feedwater line break analysis for 3876 Mwt and 1500 plugged tubes, Revision 00

13-MS-A90, Engineering assessment for a 10 degree F reduction in reactor coolant temperature, Revision 00

V-PENG-ER-001, Effect of a 20 degrees F operating temperature reduction on the reactor coolant system for Palo Verde Units 1, 2, and 3, July 1994

SABD 3.2.4, SABD feedwater line break event, Revision 5

Other Documents

102-03197-WLS/SAB/RKR, Proposed amendment to Technical Specification Section 3/4.4.2, November 30, 1994

102-03235-WLS/SAB/RKR, Amendment to Technical Specification Section 3/4.4.2, January 27, 1995

NRC Letter, Issuance of amendment for the Palo Verde Nuclear Generating Station, Unit 2

Condition Report Packages: CRDR 97-0152,CRDR 88-452,CRDR 80-387,CRDR 92-316, CRDR 94-0449, CRDR EER 90-CH-001, CRDR 117385, CRDR 95-0607, CRDR 2306055, CRDR 2312784 and CRDR 2316982.

Work Orders: 00717992, 00788801, 00817539, 00817553, 00817865, 00817867, 00817868, 00819158, 00819159, 2311636, and 00861171.

ITEMS OPENED

Opened

50-529/00-09-01	URI	Long-term cooling portion of feedwater line break accident analysis did not consider plugged steam generator tubes (Section 1R17).

LIST OF ACRONYMS AND INITIALISMS USED

CFR	Code of Federal Regulations
DMWO	Design Modification Work Order
URI	Unresolved Item

ATTACHMENT 2

NRC'S REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	**Radiation Safety**	**Safeguards**
•Initiating Events	•Occupational	•Physical Protection
•Mitigating Systems	•Public	
•Barrier Integrity		
•Emergency Preparedness		

To monitor these seven cornerstones of safety, the NRC used two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http:\\www.nrc.gov\NRR\OVERSIGHT\index.html.