

ENCLOSURE
U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

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License Nos.: NPF-41
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Report No.: 50-528/99-22
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Licensee: Arizona Public Service Company

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

Location: 5951 S. Wintersburg Road
Tonopah, Arizona

Dates: November 28, 1999, through January 8, 2000

Inspectors: J. H. Moorman, III, Senior Resident Inspector
D. E. Corporandy, Resident Inspector
N. L. Salgado, Resident Inspector

Approved By: P. Harrell, Chief, Project Branch D

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Palo Verde Nuclear Generating Station, Units 1, 2, and 3
NRC Inspection Report No. 50-528/99-22; 50-529/99-22; 50-530/99-22

Operations

- The licensee was well prepared for the potential adverse events that may have occurred from the rollover to Year 2000. This was demonstrated, in part, by having comprehensive checklists for pre- and post-rollover actions, a person stationed at a similar plant in Korea, and emergency plan staffing and other personnel onsite during the rollover. There was no impact to unit operation or license compliance as a result of the rollover (Section O1.1).
- Operator response to indications of a circulating water tube leak in Condenser Hotwell 1B was good (Section O1.2).
- Self-assessments of operations were critical, as evidenced by the number of issues and recommendations documented in the reports. Also, the scope and depth of the assessments was good. The value of these assessments was demonstrated by management's use of one issue to form a project to address the status control complexity issue (Section O7.1).

Maintenance

- Knowledgeable technicians used approved procedures to perform maintenance activities safely. A nuclear assurance representative was present during implementation of the work packages on the gas turbine generators and identified a number of minor issues, which were corrected prior to completing the work (Section M1.1).
- Knowledgeable technicians used approved procedures to conduct surveillance activities in a safe manner (Section M1.2).
- Material condition of the three units was good (Section M2.1).
- A violation of Technical Specification Surveillance Requirement 3.8.1.13 was identified for failing to perform a test of the emergency diesel output breaker. This event was reported in Licensee Event Report 50-528; -529; -530/99-002-00. This Severity Level IV violation is being treated as a noncited violation consistent with Section VII.B.1.a of the NRC Enforcement Policy. This issue is in the licensee's corrective action program as Condition Report/Disposition Request 97-0078 (Section M8.1).

Engineering

- Reactor engineering promptly identified an approximate 3 percent power distribution deviation in Unit 2 and was actively pursuing a root cause through the corrective action process. Although the core axial shape index was not within predicted values, it was within Technical Specification limits and has not affected plant operation (Section E1.1).

Plant Support

- The radiological protection program was effectively implemented in those areas reviewed (Section R1.1).
- The licensee's program for self-contained breathing apparatus was adequate. However, the licensee identified problems with control of records for related training and testing. The problems were promptly corrected (Section R8.1).

Report Details

Summary of Plant Status

Units 1 and 3 operated at essentially 100 percent power for the duration of this inspection period.

Unit 2 began this inspection period at 100 percent power. On January 6, the unit was shut down to repair a leaking tube in the condenser hotwell. The unit was in Mode 3 at the end of this period.

I. Operations

O1 Conduct of Operations

O1.1 Year 2000 (Y2K) Rollover (Units 1, 2, and 3)

a. Inspection Scope (71707)

On December 31, 1999, the inspectors observed the licensee implement Y2K contingency plan actions to prepare for the rollover from 1999 to 2000.

b. Observations and Findings

On December 31, licensee personnel prepared for the Y2K rollover using a comprehensive list contained in the Y2K contingency plan. The inspectors reviewed the master copy of the list and contacted personnel in the unit control rooms to verify that the actions had been completed.

Personnel were on site to meet the minimum staffing requirements for emergency plan implementation. Other additional personnel, such as security officers, engineers, technicians, licensed operators, and administrative personnel, were onsite. A licensee representative was at the Yongwang plant in Korea to monitor the status of those Combustion Engineering System 80 plants as they went from 1999 to 2000, 16 hours prior to the rollover at Palo Verde.

After the Y2K rollover, the licensee used prepared lists to verify that plant and system status had not been affected. One minor discrepancy was noted in that the automated radiological access control system could not print one report. This report was not needed for regulatory compliance purposes. Access to the radiological controlled area was not affected.

c. Conclusions

The licensee was well prepared for the potential adverse events that may have occurred from the rollover to Y2K. This was demonstrated, in part, by having comprehensive checklists for pre- and post-rollover actions, a person stationed at a similar plant in Korea, and emergency plan staffing and other personnel onsite during the rollover. There was no impact to unit operation or license compliance as a result of the rollover.

O1.2 Manual Reactor Trip Due to High Sodium Concentration In The Condenser Hotwell (Unit 2)

a. Inspection Scope (71707)

The inspectors reviewed operator actions taken in response to high sodium concentration in the Unit 2 condenser hotwell.

b. Observations and Findings

On January 5, 2000, at 10:00 p.m. (MST) control room operators were notified by chemistry personnel of high sodium concentration in Condenser Hotwell 2B. At 10:30 p.m., chemistry notified the control room that sodium levels in the steam generators were 10 ppb and increasing. Based on additional investigation, it was identified that Condenser Hotwell 1B was experiencing a circulating water tube leak. Operations management directed a power reduction and plant shutdown.

At 11:35 p.m., operators commenced a power reduction from approximately 100 to 20 percent power in accordance with Procedure 40OP-9ZZ05, "Power Operations," Revision 35. Reactor engineering had prepared a detailed power reduction plan for the January 6, planned shutdown to repair the extraction steam expansion joints. The operations crew used the plan, in part, to maintain the axial shape index (ASI) within a predetermined band as power was reduced. The reactor was manually tripped at 1:15 a.m. on January 6. Following the trip, the operators performed Procedures 40EP-9EO01, "Standard Post Trip Actions," Revision 2, and 40EP-9EO02, "Reactor Trip," Revision 1, and diagnosed it as an uncomplicated reactor trip. The unit remained in Mode 3 for the remainder of the inspection period.

c. Conclusions

Operator response to indications of a circulating water tube leak in Condenser Hotwell 1B was good.

O7 Quality Assurance in Operations

O7.1 Review of Operations Self-Assessment Reports (Units 1, 2, and 3)

a. Inspection Scope (71707)

The inspectors reviewed the following operations department self-assessments:

- Operations Corrective Actions Assessment
- Assessment for Operator Aids
- Operations Standards Benchmarking Assessment
- Tagging and Clearance Integrated Self-Assessment 1999
- System Status Control Program Assessment

b. Observations and Findings

The purpose of the assessments was clearly stated in each of the reports. The inspectors found the assessments to be critical, as evidenced by the number of issues and recommendations documented in the reports. The inspectors noted that the assessments were performed by management, supervisory, and/or working level personnel from the operations department.

The system status control assessment concluded that the operations department had control of equipment manipulation. However, the ability to provide supporting documentation was not a consistently strong performance area. The knowledge of current system status was dependent upon other complex processes. The assessment recommended the formation of a multi-discipline team of maintenance and operations personnel to address and resolve issues associated with the complexity of the system status control program. On January 4, 2000, Operations 2000 Project was established based, in part, on this recommendation and was expected to be in existence for a minimum of 6-months pending scope expansion and progress.

c. Conclusions

Self-assessments of operations were critical, as evidenced by the number of issues and recommendations documented in the reports. Also, the scope and depth of the assessments was good. The value of these assessments was demonstrated by management's use of one issue to form a project to address the status control complexity issue.

O8 Miscellaneous Operations Issues (92901)

O8.1 Review of Institute of Nuclear Power Operations Assessment Report (Units 1, 2, and 3) (71707)

The inspectors reviewed the results of the most recent Institute of Nuclear Power Operations assessment of the Palo Verde plant. This assessment was conducted during the weeks of August 9 and 16, 1999.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments on Maintenance Activities (Units 1, 2, and 3)

a. Inspection Scope (62707)

The inspectors observed all or portions of the following activities performed per the listed WO:

891570	"Perform Work to Install Remote Air Tubing for Moisture Control" (Gas Turbine Generator #1)
887610	"Install Space Heater, Air Compressor, and Add Heat Tracing in the Enclosure, Heat Trace the Air Receiver, and Power to an Auxiliary Air Compressor at GTG #2" (Gas Turbine Generator #2)
910829	"Identify Condenser Tube Leak in Unit 2 Condenser" (Unit 2)
910151	"Troubleshoot Cause of Dual Indication In Control Room for Damper 3MHFAM01" (Unit 3)

b. Observations and Findings

The inspectors observed that the work was performed with the work package present and in active use. A nuclear assurance inspector was present to observe the work activities on the gas turbine generators. The nuclear assurance inspector identified a number of minor issues involving Unistrut bolting and conduit support spacing, which were corrected prior to completing the work. Work and foreign material exclusion practices observed were good. Technicians were experienced and knowledgeable of their assigned tasks.

c. Conclusions

Knowledgeable technicians used approved procedures to perform maintenance activities safely. A nuclear assurance representative was present during implementation of the work packages on the gas turbine generators and identified a number of minor issues, which were corrected prior to completing the work.

M1.2 General Comments on Surveillance Activities (Units 1, 2, and 3)

a. Inspection Scope (61726)

The inspectors observed all or portions of the following activities performed per the listed surveillance procedures:

- 36ST-9SB02 "PPS Bistable Trip Units Functional Test," Revision 20 (Unit 1)
- 40ST-9ZZM1 "Operations Mode 1 Surveillance Logs," Revision 0 (Unit 2)
- 36ST-9SA05 "FBEVAS, CREFAS, and CRVIAS 18 Month Functional Test," Revision 14 (Unit 3)

b. Observations and Findings

The inspectors found that knowledgeable personnel performed these surveillances satisfactorily, as specified by applicable procedures.

c. Conclusions

Knowledgeable technicians used approved procedures to conduct surveillance activities in a safe manner.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Review of Material Condition During Plant Tours (Units 1, 2, and 3)

a. Inspection Scope (62707)

During this inspection period, routine tours of all units were conducted to evaluate plant material condition.

b. Observations and Findings

Observation of plant material condition during this inspection period identified no major material condition deficiencies. Minor deficiencies brought to the attention of the licensee were documented with work requests.

c. Conclusions

Material condition of all three units was good.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) LER 50-528; -529; -530/99-002-00: Test Mode Trip for Emergency Diesel Generator Output Breakers Not Surveilled

This event was discussed in NRC Inspection Report 50-528; -529; -530/99-16. No new issues were revealed by the LER.

The failure to test the emergency diesel generator output breaker in accordance with TS Surveillance Requirement 3.8.1.13 is a violation of the TS. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as CRDR 97-0078 (50-528; -529; -530/9922-01).

Conclusions

A violation of TS Surveillance Requirement 3.8.1.13 was identified for failing to perform a test of the emergency diesel output breaker. This event was reported in LER 50-528; -529; -530/99-002-00. This Severity Level IV violation is being treated as a noncited violation consistent with Section VII.B.1.a of the NRC Enforcement Policy. This issue is in the licensee's corrective action program as Condition Report/Disposition Request 97-0078.

III. Engineering

E1 Conduct of Engineering

E1.1 Unit 2 Power Distribution Deviation (Unit 2)

a. Inspection Scope (37551, 71707)

The inspectors reviewed CRDR 1-07462, which was initiated to evaluate the Unit 2 Cycle 9 core axial flux behavior that deviated slightly from the predicted performance. The inspectors also interviewed reactor engineering personnel.

b. Observations and Findings

On October 13, 1999, while trending Unit 2 Cycle 9 core performance, reactor engineering personnel identified an ASI trend that was deviating from predicted performance. This type of deviation had been experienced at other nuclear facilities, and was reported in various industry notifications. Measured power in Unit 2 had shifted axially lower than that predicted in calculations by approximately 3 percent. The axial relative power profile also indicated an unusual trend of power suppression in the upper half of the core and increasing power in the lower half of the core. At the end of this inspection period, the licensee was performing a formal root cause evaluation, which will be documented in CRDR 107462. The unit has been operating within the bounds of its safety analyses.

The licensee trained all reactor operators on the Unit 2 power distribution deviation. The deviation has had no impact on operation of the plant. The inspectors independently verified that ASI was within the requirements of TS 3.2.5 by reviewing the computer point associated with ASI, and reviewing several completed copies of Procedure 40ST-9ZZM1, "Operations Mode 1 Surveillance Logs," Revision 0. Procedure 40ST-9ZZM1, in part, satisfied Surveillance Requirement 3.2.5.1, which verifies ASI is within the limits of the Core Operating Limits Report.

c. Conclusions

Reactor engineering promptly identified an approximate 3 percent power distribution deviation in Unit 2 and was actively pursuing a root cause through the corrective action process. Although the core ASI was not within predicted values, it was within TS limits and has not affected plant operation.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 General Comments on Radiological Protection Controls (Units 1, 2, and 3)

a. Inspection Scope (71750)

The inspectors monitored radiological protection activities during routine site tours.

b. Observations and Findings

The inspectors observed radiation protection personnel, including supervisors, routinely touring the radiologically controlled areas. Licensee personnel working in radiologically controlled areas exhibited good radiation work practices.

Contaminated areas and high radiation areas were properly posted. Area surveys posted outside the room were current. The inspectors checked a sample of doors, required to be locked for the purpose of radiation protection, and all were in accordance with requirements.

c. Conclusions

The radiological protection program was effectively implemented in those areas reviewed.

R8 Miscellaneous Radiation Protection Issues

R8.1 Self-Contained Breathing Apparatus (SCBA) Program (Units 1,2, and 3)

a. Inspection Scope (71750)

The inspectors reviewed the licensee's program for control of SCBA. This was accomplished by checking documentation of performance of required functional inspections of SCBA equipment, documentation of training of licensed operators required to use the SCBA equipment, and random checks/interviews of on-shift control room personnel required to wear glasses with their respirators.

b. Observations and Findings

The inspectors checked for the months of October through December 1999, and observed that the SCBA equipment of all three units contained tags indicating that inspections/tests had been successfully accomplished each month in accordance with the licensee's requirements.

The inspectors interviewed several on-shift licensed operators and confirmed that respirator glasses necessary for compliance with medical restrictions on the operator's

license had been met prior to assuming the shift. This was a requirement of Procedure 40DP-9OP33, "Shift Turnover," Revision 6.

The inspectors reviewed CRDR 1-11496, which documented problems with control of licensed operator records for SCBA and FIT training (FIT training verifies the adequacy of fit of SCBA equipment to ensure that operators will be protected as intended). CRDR 1-11496 documented that a check of training and qualification for all licensed operators was conducted in November 1999. These records are supposed to be in the licensee's Site Work Management System (SWMS) data base. The SWMS data base indicated that 4 licensed operators were due for FIT tests and 8 licensed operators were due for SCBA training. Upon further investigation, which involved interviewing the operators and checking their individual files, it was determined that 8 of the 12 operators had completed the training requirements, but that the SWMS data base had not been updated. However, no documentation was available to support satisfactory completion of training requirements for 1 licensed operator for SCBA and 3 licensed operators for FIT; therefore, training requirements were assumed to be incomplete for these operators. The required tests were completed for all 4 operators within their next work day. The licensee also checked and verified that each of the 4 operators was on different shifts and did not jeopardize minimum shift manning requirements.

The individuals interviewed by the inspectors recognized that the entry of data into the SWMS data base was inaccurate and untimely in some cases, in particular with regard to SCBA training and FIT tests. At the end of this inspection period, CRDR 111496 remained open for further evaluation within the licensee's problem evaluation/corrective action program.

c. Conclusions

The licensee's program for self-contained breathing apparatus was adequate. However, the licensee identified problems with control of records for related training and testing. The problems were promptly corrected.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee's staff on January 12, 2000, after the conclusion of the inspection. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Buzzard, Senior Consultant, Nuclear Regulatory Affairs
F. Gowers, Site Representative, El Paso Electric
R. Henry, Site Representative, Salt River Project
D. Marks, Section Leader, Nuclear Regulatory Affairs
D. Mauldin, Vice-President, Engineering and Support
G. Overbeck, Senior Vice President, Nuclear
T. Radke, Director, Maintenance
D. Smith, Director, Operations
M. Sontag, Department Leader, Nuclear Assurance
P. Wiley, Unit 2 Department Leader, Operations
M. Winsor, Director, Nuclear Engineering

INSPECTION PROCEDURES USED

37551	Onsite Engineering
61726	Surveillance Observations
62707	Maintenance Observations
71750	Plant Support Activities
71707	Plant Operations
92901	Plant Operations Follow-up
92902	Maintenance Follow-up

ITEMS OPENED AND CLOSED

Opened

50-528; -529; -530/9922-01	NCV	Failure to Perform TS-Required Test of Diesel Generator Output Breaker (Section M8.1)
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Closed

50-528; -529; -530/9922-01	NCV	Failure to Perform TS-Required Test of Diesel Generator Output Breaker (Section M8.1)
50-528; -529; -530/99-002-00	LER	Missed Surveillance Test for Diesel Output Breaker (Section M8.1)

LIST OF ACRONYMS USED

ASI	axial shape index
CFR	Code of Federal Regulations
CRDR	condition report/disposition request
ECCS	emergency core cooling system
gpm	gallons per minute
LER	Licensee Event Report
NRC	Nuclear Regulatory Commission
PDR	Public Document Room
ppb	parts per billion
SCBA	self-contained breathing apparatus
SWMS	Site Work Management System
TS	Technical Specification
WO	work order
Y2K	Year 2000