



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

December 3, 2004

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

**SUBJECT: NRC REQUALIFICATION INSPECTION REPORT 05000528/2004-015;  
05000529/2004-015, 05000530/2004-015**

Dear Mr. Overbeck:

On September 3, 2004, the NRC completed an inspection at your Palo Verde Nuclear Generating Station, Units 1, 2, and 3. The enclosed report documents the inspection findings, which were discussed on October 14, and November 29, 2004, with Mr. Fred Riedel, Director Nuclear Training, and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The engineers reviewed selected procedures and records, observed activities, and interviewed training department personnel and licensed operators.

Based on the results of this inspection, the NRC has determined that one violation of NRC requirements occurred associated with the use of a non-plant referenced simulator for operating tests without prior Commission approval. Although this issue should be corrected, it constituted a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the Enforcement Policy. If you contest the violation or its significance, 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; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Palo Verde Nuclear Generating Station, Units 1, 2, and 3.

In accordance with 10 CFR 2.390 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/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/ TFS for

Anthony T. Gody, Chief  
Operations Branch  
Division of Reactor Safety

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

Enclosures:  
Inspection Report 05000528/2004-15; 05000529/2004-15; 05000530/2004-15  
w/Attachment Supplemental Information

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Dockets: 50-528; 50-529; 50-530  
Licenses: NPF-41; NPF-51; NPF-74  
Report No.: 05000528/2004-015; 05000529/2004-015; 05000530/2004-015  
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 30-September 2, October 15, and November 29, 2004  
Inspectors: Michael E. Murphy, Sr. Operations Engineer  
James F. Drake, Operations Engineer  
Peter Presby, Operations Engineer  
Approved By: Anthony T. Gody, Chief  
Operations Branch  
Division of Reactor Safety

## SUMMARY OF FINDINGS

IR 05000528/2004-015; 05000-529/2004-015; 05000-529/2004-015; August 30 - September 2, 2004; Palo Verde Nuclear Generating Station, Units 1, 2, and 3: Licensed Operator Requalification Program.

The report covered a one week period of inspection by three inspectors. One minor violation was identified. The significance of most findings is indicated by its color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process." Findings for which the Significance Determination Process does not apply may be green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

### NRC-Identified

None

## REPORT DETAILS

### 1 REACTOR SAFETY

#### 1R11 Licensed Operator Requalification

##### a. Inspection Scope

The inspectors (1) evaluated examination security measures and procedures for compliance with 10 CFR 55.49; (2) evaluated the licensee's sample plan for the written examinations for compliance with 10 CFR 55.59 and NUREG-1021, as referenced in the facility requalification program procedures; and (3) evaluated maintenance of license conditions for compliance with 10 CFR 55.53 by review of facility records (medical and administrative), procedures, and tracking systems for licensed operator training, qualification, and watch standing. In addition, the inspectors reviewed remedial training for examination failures for compliance with facility procedures and responsiveness to address areas failed.

Furthermore, the inspectors interviewed 14 personnel (6 operators, 4 instructors/evaluators, and 4 training supervisors) regarding the policies and practices for administering examinations. The inspectors also observed the administration of four dynamic simulator scenarios to 2 requalification crews by facility evaluators. Job performance measures were observed for conformance to facility administration practices.

The inspectors also reviewed the remediation process for individuals, who had examination failures. The results of the examinations were assessed to determine the licensee's appraisal of operator performance and the feedback of performance analysis to the requalification training program.

The inspectors interviewed members of the training department, training department managers, and selected members of an operating crew to assess the responsiveness of the licensed operator requalification program. Inspectors also observed the examination security maintenance for the operating tests during the examination week.

Additionally, the inspectors assessed the Palo Verde Nuclear Generating Station plant-referenced simulators for compliance with 10 CFR 55.46 using Baseline Inspection Procedure IP-71111.11B (Section 03.11). The inspectors assessed the adequacy of the facility licensee's simulation facility (simulator) for use in operator licensing examinations. The facility does not, at this time, conform to the requirements of 10 CFR 55.46c)(1), "Simulation Facilities."

The inspectors reviewed a sample of simulator performance test records (i.e., transient tests, surveillance tests, malfunction tests, and normal operations tests), simulator discrepancy reports, and processes for ensuring simulator fidelity commensurate with 10 CFR 55.46. The inspectors also interviewed personnel involved in the licensee's simulator configuration control program as part of this review.

b. Findings

Introduction

The Palo Verde facility had two simulators in service during the period. The inspectors identified two issues associated with the use of those simulators.

The first issue involved the licensee's practice of conducting operating tests (both for requalification and initial examination purposes) on a simulator configured differently from the plant referenced simulator. While this practice was not of significant technical concern, it did not comply with the 10 CFR 55.45(b) requirements for implementing operating tests on a plant referenced simulator.

The second issue involved the licensee's practice of only conducting 50% of the malfunction tests required by ANSI/ANS-3.5 1985 on each simulator. The licensee was committed to implementing ANSI/ANS-3.5 1985. Parts of the ANSI/ANS-3.5 testing are used to meet the requirements of 10 CFR 55.46(d)(1). Performance testing required by 10 CFR 55.46(d)(1) ensures that a plant referenced simulator of sufficient scope and fidelity exists to allow the conduct of evolutions listed in 10 CFR 55.45(a)(1) through (13) and 10 CFR 55.59(c)(3)(i)(A) through (AA) on operating tests. The inspector's assessment of the simulator performance testing indicated that this issue was not significant because no specific scope or fidelity issues were identified that affected the requirements of 10 CFR 55.45 or 10 CFR 55.59. Nevertheless, the performance testing did not meet the licensee's commitments to implement performance testing in accordance with ANSI/ANS-3.5 1985.

Description

Use of a non-plant referenced simulator during operating tests. As discussed above, 10 CFR 55.45(b) requires licensees, in part, to conduct operating tests on either (1) a Commission approved simulation facility, or (2) a plant-referenced simulator, or (3) the actual plant. In addition, 10 CFR 55.46(c)(1)(i) requires, in part, that a plant referenced simulator be of sufficient scope and fidelity to allow the conduct of evolutions contained in 10 CFR 55.45(a)(1) through (13) and 10 CFR 55.59(c)(3)(i)(A) through (AA) on operating tests. The licensee selected the Palo Verde Nuclear Generating Station simulators to be referenced to Unit 1. In an effort to satisfy the systems approach to training implemented by the licensee in accordance with 10 CFR 55.59(c), the facility developed alternate simulator software models to replicate unit differences. For example, extensive training was implemented on the Unit 2 differences from the reference plant because the unit had undergone a 3 percent power uprate concurrent with steam generator replacement, turbine changes, and control and protection setpoint changes. The inspectors noted that approximately 25 percent of the annual requalification scenarios used this Unit 2 configuration.

The inspectors reviewed the licensee's performance testing of the simulators when configured to model Unit 2 and found that it adequately validated the fidelity of the simulator to Unit 2.



The licensee's practice appeared to provide high quality training and evaluations by ensuring licensed operators trained and tested in environments that accurately mimic each of the 3 units. The inspectors found that this practice did not complicate procedure usage because all 3 units used the same procedures. When operating the Unit 1 simulator in a Unit 2 configuration an operator used the same procedures except that he or she applied the "Unit 2 only" steps within the procedure, rather than the "Unit 1 only" or "Unit 3 only" steps. The inspectors found that this practice did not result in any confusion to the operators. The inspectors also noted that running scenarios on other units did not confuse operator board recognition because all control board labels were generic to all 3 units. No confusion arose through reference to components because unit designators are not used. The inspectors found that no confusion existed with respect to communications because external watchstanders were referenced by watch station, without unit designation.

The inspectors assessed the licensee's use of non-plant referenced simulator configurations and found that it was proactive in ensuring that all licensed operators were adequately trained to safely operate each of the 3 units they were licensed to operate.

In addition, the inspectors assessed just-in-time training for plant modifications and found that the licensee's practice of modifying the simulator in advance of the plant modifications allowed for early and appropriate training of operators on new plant modifications.

Simulator Performance Testing. The inspectors found that the licensee conducted 50% of the ANSI/ANS-3.5 malfunction tests on each of the two simulators. Combined, the two simulators receive 100% of the required malfunction testing. Both simulators were nearly identical and had ostensibly Unit 1 as their designated reference unit. The licensee maintained only one copy of model source code for both simulators. When the code was recompiled, the new executable programs were copied to both simulators. The inspectors noted that subtle differences, like the fact that the newer core protection calculator operator display module is only installed on Simulator 'B', exist and were modeled by placing flags in the computer code. The licensee had developed different subroutines which could be used depending on which simulator was running the program and which unit was being trained or tested on. The inspectors noted that the test platform was alternated year to year. For example, in the first year of a 4-year test cycle, the annual tests and 25 percent of the malfunction tests were performed on one of the simulators. In the second year of a 4-year test cycle, annual tests and the next 25 percent of malfunction tests were performed on the other simulator. Under this system, 50 percent of the malfunction tests were potentially never run on a specific physical simulator. The inspectors found that the combined testing of the model was complete even though split between the two simulators. This test scheme, while not typical for implementing the ANSI/ANS-3.5 requirements would be acceptable as long as the licensee certified that the hardware configurations did not differ significantly between the simulators.

## Analysis

Use of a non-plant referenced simulator during operating tests. The licensee's failure to obtain Commission approval for using non-plant referenced simulator configurations for conducting operating tests was a performance deficiency. The requirement contained in 10 CFR 55.45(b) specifies that the licensee, either use a simulation facility approved by the Commission, use a plant-referenced simulator, or use the plant when implementing operating tests. The inspectors concluded that, in this case, the licensee's failure to request Commission approval prior to conducting operating tests did not have the potential for impeding the regulatory process because operating tests conducted for initial operator license examinations and biennial requalification programs were reviewed by the inspectors. Nevertheless, the inspectors did conclude that the licensee was required to obtain Commission approval prior to implementing the operating tests using non-plant reference simulator modeling and that they had not. The inspectors concluded that the finding was minor because it could not be reasonably viewed as a precursor to a significant event, that if left uncorrected it would not become a more significant concern, that it did not relate to a performance indicator, and while the finding was related to the reactor safety cornerstone attribute associated with operator requalification, when Unit 2 modeling was used in the simulator, the inspectors identified no instance where negative training occurred or a simulation fidelity concern existed. Therefore, the inspectors concluded that the performance deficiency was a minor violation of 10 CFR 55.45(b).

Simulator Performance Testing. The licensee's practice of only conducting 50% of the malfunction tests required by ANSI/ANS-3.5 1985 on each simulator was a performance deficiency. The licensee was committed to implementing ANSI/ANS-3.5 1985. Parts of the ANSI/ANS-3.5 testing are used to meet the requirements of 10 CFR 55.46(d)(1). Performance testing required by 10 CFR 55.46(d)(1) ensures that a plant referenced simulator of sufficient scope and fidelity exists to allow the conduct of evolutions listed in 10 CFR 55.45(a)(1) through (13) and 10 CFR 55.59(c)(3)(i)(A) through (AA) on operating tests. The inspectors concluded that the finding was minor because it could not be reasonably viewed as a precursor to a significant event, that if left uncorrected it would not become a more significant concern, that it did not relate to a performance indicator, and while the finding was related to the reactor safety cornerstone attribute associated with operator requalification, it did not affect the associated cornerstone objective because no actual scope or fidelity issues were identified that affected the requirements of 10 CFR 55.45 or 10 CFR 55.59

## Enforcement

Use of a non-plant referenced simulator during operating tests. The licensee's failure to obtain Commission approval for using non-plant referenced simulator configurations for conducting operating tests was a violation of 10 CFR 55.45(b). The requirement contained in 10 CFR 55.45(b) specifies that licensees, either use a simulation facility approved by the Commission, use a plant-referenced simulator, or use the plant when implementing operating tests. Contrary to this, the licensee conducted operating tests on non-plant reference simulator configurations during the biennial requalification operating tests conducted between August 30, 2004 and September 2, 2004. Although

this issue should be corrected, it constituted a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the Enforcement Policy.

Simulator Performance Testing. The simulator performance testing issue did not constitute a violation of NRC requirements.

4OA6 Meetings, Including Exit

On October 14, and November 29, 2004, the inspectors presented, by telephone, the inspection results to Mr. Fred Riedel and other members of his staff who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during this inspection

ATTACHMENT: SUPPLEMENTAL INFORMATION

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

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J. Hunter, Senior Operator  
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M. Murphy, Sr. Operations Engineer  
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LIST OF DOCUMENTS REVIEWED

Procedures

License Operator Continuing Training, Training Program Description, Revision 20  
15DP-0TR70, Simulator Configuration, Revision 2  
15TD-0CC02, Simulator Operator Feedback, Revision4  
15TD-0CC02, Simulator Design Control, Revision 4  
15TD-0CC03, Simulator Load Control, Revision 3  
15TD-0CC04, Simulator Performance testing, Revision 3  
15TD-0CC05, Simulator Instructor Guide and Reporting, Revision 2

### Miscellaneous

Licensed Operator Continuing Training (LOCT) 2-Year Schedule for 2003-2004  
Training Cycle Feedback Report for LOCT Cycle 2003-2004 up to 31 August 2004  
Plan and Industry Operating Experience 2003-2004 LOCT Schedule  
Requalification Records for 2003-2004 to 24 August 2004  
Health Records for various Licensed Operators  
Written exam RO week 1 - NUA04C00104  
Written exam RO week 2 - NUA04C00304  
Written exam SRO week 1 - NUA04C00204  
Written exam SRO week 2 - NUA04C00404  
Scenario SES-0-03-T-00  
Scenario SES-0-09-AG-00  
Scenario SES-0-06-E-00  
Scenario SES-0-09-AH-00  
JPM AO 021-PL-000  
JPM SA 0020-CR-000  
JPM AO 017-PL-001  
JPM SF 001-PL-001  
List of Working Status CRDR for simulator  
List of Open Simulator Drs  
List of Closed Simulator Corrective Actions (2002-2004)  
List of Closed Simulator CRDRs (2002-2004)  
Lists of Closed Drs (2002-2004)  
Operator Feedback From Simulator Critiques  
CRDR 2734338, Lack of Best Estimate Data for Transient Test Evaluation  
Simulator Load Report 2004-03  
CRDR 2623273  
CRDR 2623273  
CRDR 2627586  
CRDR 2654236  
CRDR 2717298

### Simulator Tests

Annual Steady State Test SST-001, Simulator Heat Balance at 100 percent Power (2003)  
Annual Steady State Test SST-002, Simulator Heat Balance at 50 percent Power (2003)  
Annual Steady State Test SST-003, Simulator Heat Balance at 30 percent Power (2003)  
Annual Steady State Test SST-004, Simulator Stability for 60 Minutes at 100 percent Power (2003)  
Annual Transient Test TTP-001, Manual Reactor Trip (2003)  
Annual Transient Test TTP-002, Simultaneous Trip of All Feedwater Pumps (2003)

Annual Transient Test TTP-005, Trip of Two Reactor Coolant Pumps (2003)

Quadrennial Malfunction Test RXM02, RCS T-Hot Transmitter Failure (2003)

Quadrennial Malfunction Test MSM07, Steam Line Rupture on Common Header (2003)

Quadrennial Surveillance Test OST-006 (40ST-9RC02), Comp.Calc.of RCS Water Inventory (2003)

Quadrennial Core Physics Test NET- 009, Core Physics Test (2003)

Selected Closed Simulator Discrepancy Reports (99-68, 00-71, 00-284, 01-697, 02-896, 02-1090, 03-1338, 03-1362, 03-1318, 04-1514)

Replacement Steam Generator Tests:

-SST-001, 100 percent Steady State Heat Balance (2004aa-MOC)

-SST-004, 100 percent Steady State Heat Balance (2004-MOC)

-MTI-002, Real Time Test (2004)