

APPENDIX A

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-528/94-17
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Licenses: NPF-41
NPF-51
NPF-74

Licensee: Arizona Public Service Company
P.O. Box 53999
Phoenix, Arizona

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

Inspection At: Wintersberg, Arizona

Inspection Conducted: May 3-6 and 16-20, 1994

Inspectors: Philip Morrill, Chief Examiner, Operations Branch
Division of Reactor Safety

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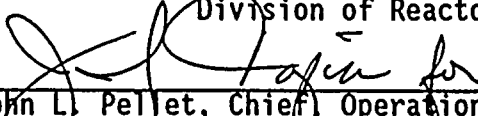
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Approved:


John L. Pellet, Chief, Operations Branch
Division of Reactor Safety

6-20-94
Date

Inspection Summary

Areas Inspected (Units 1, 2, and 3): Routine, announced inspection of the
qualification of licensed operators and evaluation of their requalification

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training program. The examiners also observed the performance of on-shift operators and plant conditions incident to the conduct of the examinee evaluations. The examiners used the guidance provided in NUREG-1021, "Operator Licensing Examiner Standards," Revision 7, Sections 601 through 605.

Results (Units 1, 2, and 3):

- The Palo Verde Nuclear Generating Station licensed operator requalification training program was evaluated as satisfactory in accordance with NUREG-1021 (Section 1.2).
- All crews and ten of thirteen individuals examined were evaluated as satisfactory by the NRC and the facility evaluators on all portions of the coadministered examinations (Section 1.2).
- Licensed operator performance had improved since the last program evaluation. The improvements in controlling plant parameters, command and control, and communications were noteworthy (Section 1.2).
- The examination material substantially improved from the last program evaluation. Simulator scenarios and job performance measures (JPMs) required only minor changes; some multiple choice written questions required more credible distractors (Section 1.1).
- Several individual performance errors and one JPM failure were attributed to a lack of effective self-checking by the examinees (Section 1.2).
- Major deficiencies identified in the previous requalification inspection report OL 93-01, dated May 13, 1993, have been corrected (Sections 1.1 and 1.6).

Summary of Inspection Findings:

- There were no findings that were assigned a tracking number identified during the course of this inspection.

Attachments:

- Attachment 1 - Persons Contacted and Exit Meeting
- Attachment 2 - Simulation Facility Report



DETAILS

I LICENSED OPERATOR EXAMINEE QUALIFICATION EVALUATION (NUREG-1021)

During the inspection, the examiners evaluated the qualifications of 18 licensed operators, the performance of 3 crews, and the adequacy of the licensed operator requalification training program. Licensed operators were evaluated based on examination results. The program was evaluated based on review of the facility's examination material, observation of the facility evaluators during the coadministered examinations, and by analysis of the results. The examiners performed the evaluations in accordance with 10 CFR Part 55 and NUREG-1021, "Operator License Examiner Standards," Revision 7, Sections 601-605. The inspection included an evaluation of facility materials, procedures, and simulation capability used to develop and administer the examinations. These areas were evaluated using the guidance provided in the sections of NUREG-1021 stated above.

In March 1993, an NRC program evaluation had concluded that the facility requalification program was marginally satisfactory. At that time, the NRC observed that operator performance during NRC requalification examinations had declined during three consecutive examinations. Three major problems were identified by the NRC following the March 1993 requalification testing: (1) the examination material was marginally adequate and was not consistent with NUREG-1021, (2) operators exhibited poor plant control and crew communications in the simulator, and (3) operators had unexpected difficulty completing job performance measures. This inspection was therefore scheduled to evaluate the licensee's corrective actions and to verify that operator performance had not continued to decline.

Five of the eighteen license operators evaluated were retested following a previous failure. In accordance with NUREG-1021, ES-601, the evaluation of these five individuals was not used for program evaluation.

Performance results for individual examinees are not included in this report because inspection reports are placed in the NRC Public Document Room as a matter of course. Individual performance results are not subject to public disclosure.

1.1 Facility Materials Submitted for Examination Development

The chief examiner reviewed the licensee's materials provided for development of the examination, which included the station administrative and operating procedures, job task list, cycle training plan, test sample plans, question banks, simulator scenarios, lesson plans, and job performance measures (JPMs).

The procedures, lesson plans, and question banks were current and adequate to support the examination development. The facility had revised all the simulator scenarios and JPMs, as well as over 95 percent of the written



questions in 1993. Twenty to fifty percent of the material examined had been deleted or completely rewritten in 1993. The examination bank weaknesses noted following the March 1993 requalification were properly corrected. The chief examiner observed that many analysis and comprehension questions had replaced memory-recall questions, that critical steps and examiner cues of the JPMs were greatly improved, and that the simulator scenario critical tasks had clear acceptance criteria. The written questions, JPMs, and scenarios were consistent with NUREG-1021 and greatly improved.

The cycle training plan and sample plan were consistent with each other and were based on the job task list. The chief examiner observed that the planning for two year cycle training and the testing sample plans were comprehensive and implemented the systems approach to training process.

The examiners also reviewed the draft written examinations and operating tests proposed by the facility. The draft examinations were used as proposed with the following minor exceptions.

- One JPM to reset the control room emergency safeguards feature actuation system with only one critical step was modified to add an extra critical step.
- One scenario was modified to change a crew critical task from managing a security threat to scrambling the plant after an anticipated transient without scram (ATWS).
- Several distractors for written test items were changed by the examination team to make them more plausible.

The facility personnel agreed that some written question distractors could be made more plausible and stated they would incorporate that approach as they revised the examination bank. Facility personnel agreed that the other two changes were appropriate. They stated that the simulator scenario that used a security threat critical task was constructed to provide a mechanism for multiple plant failures.

The draft examinations adequately met the scope and content guidelines in NUREG-1021. The changes described above were made to enhance the examinations and constitute a minor fraction of the large amount of material used to construct the examinations.

The chief examiner also observed that the prior requalification examination report, OL 93-01, dated May 13, 1993, noted significant weaknesses in the facility's testing material. That report documented that the material proposed to the NRC by the facility had required extensive revision and would not have been adequate for testing. In addition to reviewing the material presented for the current requalification examination, the chief examiner reviewed a sample of the facility's entire dynamic simulator scenario, JPM, and written question banks to evaluate the examination bank adequacy. Dynamic



simulator scenarios contained clear and objective crew critical tasks. JPMs for similar actions were consistent and critical steps met the requirements of NUREG-1021. The written examination questions used the correct format and had only one correct answer. The chief examiner concluded that the facility testing material currently met NUREG-1021.

1.2 Operator Performance

The examiners evaluated the performance of a total of 18 licensed operators, including 3 crews of 5 individuals. Five of the operators were being retested after previous failures in March 1993 and were not included in the program evaluation. Nine of the thirteen operators observed for program evaluation purposes were administered full NRC examinations by co-administering dynamic simulator, written, and plant walk-through portions of the examinations. The remaining four licensed operators were evaluated by NRC only as part of the operating crews during the dynamic simulator examinations.

All crews and ten individuals were evaluated as satisfactory by the NRC and facility evaluators on all portions of the coadministered examinations. The five individuals retaking requalification examinations passed. Two individuals failed the coadministered written examination. The average grade on the written examination was 91.2 percent. Three individuals incorrectly performed one (DG003) of five JPMs. One individual incorrectly performed two of five JPMs and therefore failed the coadministered operating portion of the examination. All other examinees performed all JPMs acceptably. Crew and individual simulator performance was satisfactory overall with respect to all critical tasks. The facility staff identified several areas for additional training for selected individuals who performed adequately overall and passed the examination.

Based on the individual and crew results above, the Palo Verde Nuclear Generating Station licensed operator requalification training program was evaluated as satisfactory in accordance with NUREG-1021, with the following observations:

- Individual and crew performance and teamwork were notable strengths. Control of steam generator level, steam generator pressure, and reactor coolant system subcooling was greatly improved from previous examinations.
- Supervisory command and control and overall communications had improved significantly from prior requalification examinations.
- One emergency plan classification was made at the site area emergency level rather than at the general emergency level. This was an isolated error since all other classifications were correct.



- Two out of three crews made dynamic simulator errors and/or omissions which were later corrected by the crew or individual operators. Event mitigation or event response was not significantly affected. The facility identified the root cause as the individual operators' failure to properly self-verify. One additional operator also appeared to have some difficulty self-verifying. These errors or omissions included:
 - During a loss of high pressure injection simulator scenario, an operator attempted to start the only remaining high pressure centrifugal charging pump (the "E" Pump), and incorrectly verified the pump running based solely on breaker indication although its associated power supply was de-energized
 - During a total loss of all AC (blackout) simulator scenario, the crew properly started the gas turbine generator but could not initially re-energize the emergency bus due to breaker misalignment.
 - During a JPM to "Place BOP ESFAS in Auto Test," the operator pressed the "Start/Stop" switch instead of the "Auto/Manual" switch and did not adequately recheck his actions with the procedure.
- Three operators incorrectly performed one in-plant JPM, "Diesel Generator B Sequencing, Shutdown Outside Control Room, Fire/Smoke." This JPM required local actions to shed the load on the emergency bus, manually start the diesel generator, and re-energize selected loads. The procedure appeared difficult to use and may have contributed to the operators' failure to remove all loads from the emergency bus before starting the diesel generator.
- There were five questions missed on the written examination by three or more operators. Potential knowledge weaknesses were identified in the following five areas:
 - Determination of minimum acceptable indicated HPSI flow to the cold leg with the flow instrument at its' operating limit,
 - Detecting excessive leakage in the nozzle dam air supply system,
 - Completing reactor coolant leakage rate calculations by hand,
 - Using the Pre-fire Strategies Manual to determine team or control room actions, and
 - Determining steam generator isolation status with a combination of a trip signal and a failed component.



1.3 Licensee's Requalification Examination Participants

During these examinations, facility staff from the training and operations departments participated in the development and validation of the examinations. As described above, the draft examinations prepared by the facility were of high quality and were used with only minor revisions. The facility staff supported the validation of the draft examinations in a professional and competent manner.

During the coadministered examinations, the facility evaluators identified the same or similar performance observations as the NRC examiners, with occasional differences in assigning weaknesses to specific competencies. The NRC concurred in the overall pass/fail judgement for all coadministered examinations. In all cases, facility evaluators used thorough and effective examination techniques to accurately measure the operators' knowledge and/or ability.

Facility operations management was also present during the dynamic simulator scenarios.

1.4 Post Examination Review

Due to the relatively high proportion (2/9) of operators that failed the coadministered written examination and the fact that no one had failed the facility's written tests for the other weeks of the annual examinations, the chief examiner requested that the facility submit the written examinations and results from the previous five weeks for NRC review. The chief examiner also requested the facility to evaluate why these written failures had occurred and requested that plans for remedial training be submitted. Following the examinations, the facility concluded that the major causes for the two written failures were lack of time management and lack of self-study.

The chief examiner reviewed the facility written examinations to evaluate the examination difficulty level and to determine if there were any additional licensee knowledge deficiencies. The chief examiner also reviewed the facility's tabulation of operator weakness, the lesson plan for the 1994 requalification examination review, the written examination question validation data, the examination summaries for all six weeks of examinations, and JPM performance statistics.

The average score for the facility administered written examinations was 90 percent while the average score for the NRC written examinations was 91.2 percent. The facility examinations did not appear significantly harder or easier than the NRC coadministered examinations. The chief examiner concluded that the facility operating and written examinations were of comparable difficulty and that the two written failures did not appear indicative of the entire facility. The chief examiner also concluded that the facility had identified appropriate follow-up training.



1.5 Simulation Facility

During the preparation and conduct of the operating examinations, the examiners observed no simulation facility infidelity that had any impact on administration of the examinations. The simulator did suffer a software fault (full memory) which delayed the start of the dynamic simulator scenarios for about two hours on Tuesday, May 17th. Otherwise, the simulator performed properly.

1.6 Conclusions

The examiners concluded that the performance of ten of thirteen licensed operators examined was acceptable. Further, the three crews examined in the simulator were found acceptable. The examiners concluded, based on the individual results, the examination material submitted, and observations during the coadministered examinations, that the licensed operator requalification training program was effectively maintaining proficiency of licensed operators.

The chief examiner also reviewed the most recent requalification examination report OL 93-01, dated May 13, 1993, for previous findings. That report documented broad weaknesses in post-accident steam generator pressure and level control, post-accident reactor coolant system temperature control, lack of knowledge of instrument and component power supplies, poor performance of JPMs, as well as poor teamwork and communications within some crews. During these examinations, the operators performed better in all of these areas. The chief examiner also reviewed facility examination material (Section 1.1) to determine if corrective actions had been taken to correct previous deficiencies. The current examination material was found to be satisfactory.



ATTACHMENT 1

1 PERSONS CONTACTED

1.1 Licensee Personnel

- *W. Conway, Executive Vice President
- *W. Stewart, Executive Vice President
- *J. Levine, Vice President Nuclear Production
- *R. Adney, Plant Manager, Unit 3
- *J. Scott, Assistant Plant Manager, Unit 3
- *R. Flood, Plant Manager, Unit 2
- *L. Speight, Shift Supervisor, Unit 2
- *R. McKinney, Operation Supervisor, Unit 1
- *J. Velotta, Director, Training
- *J. Dennis, Manager, Operations Standards
- *R. Nunez, Manager, Nuclear Operator Training
- *M. Baughman, Supervisor, Licensed Operator Continuing Training
- *B. Picchiottino, Supervisor, Simulator Support
- *D. Brown, Manager, Nuclear Training Simulator
- *E. Shouse, Senior Simulator Tester
- *P. Coffin, Engineer, Nuclear Regulatory Affairs
- *M. Weloszyj, Supervisor, QA&M
- *R. Fountain, Supervisor, QA&M

1.2 Other Personnel

- *J. Draper, Site Representative, Southern California Edison
- *R. Henery, Site Representative, Salt River Project
- *F. Gowers, Site Representative, El Paso Electric Company

In addition to the personnel listed above, the examiners contacted other personnel during this inspection period.

- * Denotes personnel that attended the exit meeting.

2 EXIT MEETING

An exit meeting was conducted on May 20, 1994. During this meeting, the examiners reviewed the scope and findings of the requalification examination evaluation. The examiners provided preliminary results of licensed individual and program evaluations. The NRC and facility evaluators agreed on all of the pass/fail results, as well as, the identified programmatic strengths and weaknesses. The facility indicated that a more detailed analysis and review of the examination results, including a summary of necessary remediation and program enhancements, would be completed during the week of May 23, 1994, and forwarded to the NRC Walnut Creek Field Office. The licensee did not identify as proprietary any information provided to, or reviewed by, the examiners.



ATTACHMENT 2

SIMULATION FACILITY REPORT

Inspection Report: 50-528/94-17
50-529/94-17
50-530/94-17

Licensee: Arizona Public Service Company

Facility Name: Palo Verde Nuclear Generating Station

Inspection At: Wintersburg, Arizona

Operating Tests Administered on: May 16-20, 1994

This form is to be used only to report observations. These observations do not constitute audit or inspection findings and are not, without further verification and review, indicative of noncompliance with 10 CFR 55.45(b). These observations do not affect NRC certification or approval of the simulation facility other than to provide information that may be used in future evaluations. No licensee action is required in response to these observations.

While conducting the simulator portion of the operating tests, no simulator infidelities were observed.

