

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-528/94-33
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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: Wintersburg, Arizona

Inspection Conducted: October 24-28, 1994

Inspector: L. T. Ricketson, P.E., Senior Radiation Specialist
Facilities Inspection Programs Branch

Approved:

B. Murray
B. Murray, Chief, Facilities Inspection
Programs Branch

11/23/94
Date

Inspection Summary

Areas Inspected (Units 1, 2 and 3): Routine, announced inspection of selected aspects of the licensee's implementation of the revised 10 CFR Part 20, in accordance with Temporary Instruction 2515/123.

Results (Units 1, 2, and 3):

- The radiation worker training, radiation protection technician training, and contract radiation protection technician training properly addressed the hazards, procedural requirements, and worker responsibilities associated with controlling and accessing high and very high radiation areas (Section 1.1.1).
- Comprehensive procedures had been implemented for guidance in controlling access and work in high and very high radiation areas (Section 1.1.2 and 1.1.3).



- The primary implementing procedure dealing with declared pregnant women and embryo/fetus doses was compatible with the revised 10 CFR Part 20. Related records were handled properly (Sections 1.2.2 and 1.2.3).
- Good respiratory protection training was established which addressed the importance of maintaining low total effective dose equivalent (Section 1.3.1).
- Implementing procedures provided proper guidance to radiation protection personnel to enable them to determine if the use of respiratory protection equipment was the proper means to achieve the lowest total effective dose equivalent (Section 1.3.2).
- Good results were achieved in reducing respirator use while maintaining low total dose (Section 1.3.3).
- Good procedures for conducting a planned special exposure were available (Section 1.4).
- Overall, Good implementation of revised 10 CFR Part 20 was noted (Section 1.5).

Attachment:

- Attachment - Persons Contacted and Exit Meeting



1 IMPLEMENTATION OF THE REVISED 10 CFR PART 20 (TI 2515/123)

1.1 High and Very High Radiation Areas

1.1.1 Training

The inspector interviewed training representatives and reviewed training handouts and lesson plans and determined that in Radiation Worker Training, terms were defined, and posting, controls, entry requirements, and worker responsibilities were discussed. A simulated locked high radiation area was used during dressout training. Radiation Protection Technician Continuing Training included discussions of 10 CFR Part 20 revisions and industry events related to high radiation area problems. Radiation Protection Initial Training included an entire section devoted to the responsibilities of controlling access to locked high radiation areas and very high radiation areas.

Additionally, the inspector reviewed selected examples of lesson plans and procedures and determined that licensed reactor operators were provided training with respect to operations which could change radiological conditions within the plant and which may result in the creation of high radiation areas.

1.1.2 Procedures

The primary implementing procedure was Procedure 75RP-90P02, "Control of Locked High Radiation Areas and Very High Radiation Areas," Revision 7. The inspector compared the procedure with the requirements in 10 CFR 20.1601 and 1602 and compared the program to control high and very high radiation areas with the guidance contained in Regulatory Guide 8.38. Other procedures with related guidance included:

- 75PR-ORP01 "Radiation Protection Program," Revision 4
- 75AC-9RP01 "Radiation Exposure and Access Control," Revision 4
- 75RP-9RP16 "Special Dosimetry," Revision 3
- 75RP-9RP02 "Radiation Exposure Permits," Revision 5
- 75RP-ORP02 "Radiological Survey Schedule," Revision 1

Collectively, the procedures addressed the regulatory requirements and provided guidance compatible with that of the regulatory guide.

1.1.3 Implementation

The licensee identified two areas which had the potential to become very high radiation areas: the incore detector chase and the fuel transfer tube bellows during fuel movement. The fuel transfer tube bellows was inaccessible, according to licensee representatives.

The inspector evaluated the licensee's implementation of the program for controlling access to locked high radiation areas and very high radiation areas, in each unit. During this evaluation, the inspector reviewed records of key inventories and key issues. The inspector confirmed that keys were



kept in locked cabinets or wall-mounted boxes, inventoried at the beginning of each shift, and issued to only radiation protection personnel, as required. Very high radiation area keys could be issued only with the permission of a radiation protection manager. Very high radiation area keys were kept at the radiation protection desks at the access control points and in the shift supervisors' areas. The inspector inventoried the keys and accounted for all. The inspector also selected examples from the key issue logs and verified that radiation survey records were available for entries into locked high radiation areas. Surveys were made at the distance required by the revised 10 CFR Part 20. Radiation protection technicians were knowledgeable of requirements for controlling locked high and very high radiation areas. Safety instructions included on the radiation work permits were appropriate. The inspector noted consistency in the implementation of this program among the units.

The inspector toured the radiological controlled area and reviewed the posting and control of locked high radiation areas and determined that both posting and controls were appropriate. The licensee used two locks to secure gates at entries. Through a review of records, the inspector confirmed that inspections were performed during each shift by radiation protection personnel to verify that the areas were posted and controlled as required. Second person verifications were required after exits from the areas to ensure that the gates were locked. These verifications were documented in the key issue logs. Licensee representatives stated that these measures were implemented several years ago as corrective actions following problems related to the control of locked high radiation areas.

To evaluate the licensee's performance in the more recent past, the inspector reviewed Condition Reports/Disposition Requests related to high radiation area problems and identified by the licensee. Two significant items had occurred since the implementation of the revised 10 CFR Part 20. The first event, occurring in March 1994, involved the failure to control a key to a very high radiation area and resulted in Incident Investigation Report 9-4-0182. The inspector noted that the incident investigation and root cause determination was very good. The report concluded that the event was due to lack of procedural guidance for the key inventory process. It was also determined that no entries were made into the very high radiation area (incore detector chase). The inspector verified that the proper actions, including improving procedural guidance, were taken by the licensee.

During the second event, occurring on April 12, 1994, a group of workers were observed working in a posted high radiation area without a radiation dose rate monitoring device, alarming dosimeters, or radiation protection escort (CRDR No. 3-4-0190). This was a violation of Technical Specification 6.12.1, which requires that persons entering high radiation areas be provided with or accompanied by one or more of the listed precautions. A Notice of Violation was issued with NRC Inspection Report No. 50-528/94-14; 50-529/94-14; 50-530; 94-14 because corrective actions taken previously did not prevent recurrence.

During the integrated assessment team inspection (NRC Inspection Report 50-528/94-28; 50-529/94-28 ; 50-530/94-28), the inspector reviewed entries into the radiological controlled areas by the radiation protection



director, managers, and supervisors and noted mixed results. Some toured frequently; some did not.

1.2 Declared Pregnant Women and Embryo/Fetus Doses

1.2.1 Training

The inspector reviewed the licensee's Radiation Worker Training and noted that the effects of radiation on the unborn child were discussed. Dose limits and the option of limiting the woman's radiation dose were also discussed. The training material explained that the declaration was made at the choice of the woman and that it needed to be in writing.

1.2.2 Procedures

The licensee's requirements for this program were included in the following procedures:

Procedure 75RP-ORP01, "Radiation Protection Program," Revision 4 set forth the dose limits and defined what constituted the embryo/fetus dose. It addressed the means for avoiding substantial variation above a uniform monthly exposure rate so as to satisfy the limit.

Procedure 75AC-9RP01, "Radiation Exposure and Access Control," Revision 4, addressed the woman's responsibility of providing a written declaration of pregnancy, if she so decides.

Procedure 75RP-9ME21, "TLD Issue, Exchange, and Termination," Revision 4 addressed the means for determining whether or not individual monitoring of the declared pregnant woman is required to determine the embryo/fetus dose.

1.2.3 Implementation

The inspector examined a sample of records of declared pregnant women and confirmed that declarations of pregnancy were kept with the women's records. Dose records for the embryo/fetus were maintained as appropriate. There has been no need for declared pregnant worker dose assessments involving internal exposures. The licensee has committed to using the guidance of Regulatory Guide 8.36 should the occasion arise.

1.3 Total Effective Dose Equivalent/ALARA and Respiratory Protection

1.3.1 Training

The inspector reviewed study handouts and noted that the licensee's training discussed the concept of total effective dose equivalent and properly conveyed the latest radiation protection philosophy. Acceptance of the total effective dose equivalent concept by the radiation workers has been good, according to licensee representatives.



1.3.2 Procedures

Procedure 75RP-9RP02, "Radiation Exposure Reports," Revision 5, instructed the radiation protection technicians to perform an assessment to determine whether respiratory protection equipment was effective in reducing an individual's total effective dose equivalent. Appendix J of the latest revision provided a logic chart and worksheet to aid the technicians in the assessment.

1.3.3 Implementation

Licensee representatives stated that an effort to reduce the use of respirators began before the implementation of the revised 10 CFR Part 20 requirements. The licensee provided the following information on the number of respirators issued during refueling outages.

Spring 1992 U1R3	Fall 1992 U3R3	Spring 1993 U2R4	Fall 1993 U1R4	Spring 1994 U3R4
5335	411	776	504	127

Radiation protection representatives stated that they had seen an increase in the number of facial contaminations, since the use of respirators was reduced. However, the licensee has not noted a significant increase in internal exposures. Overall, the licensee has had good success in maintaining worker total effective dose equivalent ALARA.

The inspector reviewed respirator issue records and noted the dates and the numbers of the associated radiation exposure permits. The inspector then reviewed the radiation exposure permit packages containing the written evaluations. The inspector noted that evaluations from early in the year indicated problems related to determining when respiratory protection equipment was to be used. For example, one evaluation concluded that respirators were not recommended, but respirators were issued anyway. The licensee identified the problem and revised the procedure to provide better guidance. The recent examples of respiratory protection evaluations were performed appropriately.

1.4 Planned Special Exposures

Procedure 75RP-9RP19, "Planned Special Exposures," Revision 1, included provisions compatible with all requirements of 10 CFR 20.1206. The Executive Vice President, Nuclear was listed as the individual who was responsible for final approval of the implementation of this procedure. No planned special exposures had been conducted.

1.5 Conclusions

The radiation worker training, radiation protection technician training, and contract radiation protection technician training properly addressed the hazards, procedural requirements, and worker responsibilities associated with controlling and accessing high and very high radiation areas. Comprehensive



implementing procedures were used for guidance in controlling access and work in high and very high radiation areas.

The primary implementing procedure dealing with declared pregnant women and embryo/fetus doses was compatible with the revised 10 CFR Part 20 requirements.

Respiratory protection training appropriately addressed the importance of maintaining workers' total effective dose equivalent low. Implementing procedures offered sufficient guidance to radiation protection personnel to enable them to determine if the use of respiratory protection equipment was the proper means to achieve the lowest total effective dose equivalent. The licensee achieved good results in reducing respirator use while maintaining low total dose.

Appropriate guidance was available to conduct a planned special exposure. No such exposures had occurred.

Based on the above findings, the inspector concluded that the licensee's implementation of these provisions of the revised 10 CFR Part 20 were appropriate.



ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

- *K. Akers, Evaluator, Nuclear Assurance
- *S. Bauer, Licensing Supervisor, Regulatory Affairs
- *J. Draper, Site Representative, Southern California Edison
- *T. Gray, Supervisor, Radiological Engineering
- *R. Hazelwood, Engineer, Regulatory Affairs
- *R. Henry, Site Representative, Salt River Project
- *W. Monteour, Senior Representative, Owner Services
- *B. Picchiottino, Supervisor, Training
- *M. Shea, Director, Radiation Protection
- *W. Sneed, Manager, Radiation Protection Operations
- *J. Steward, Manager, Radiation Protection Technical Support

1.2 NRC Personnel

- K. Johnson, Senior Resident Inspector
- *A. MacDougall, Resident Inspector

*Denotes personnel that attended the exit meeting. In addition to the personnel listed, the inspector contacted other personnel during this inspection period.

2 EXIT MEETING

An exit meeting was conducted on October 28, 1994. During this meeting, the inspector reviewed the scope and findings of the report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary, any information provided to, or reviewed by the inspector.

