

U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-528/91-17, 50-529/91-17, 50-530/91-17

License No. NPF-41, NPF-51, NPF-74

Licensee: Arizona Public Service Company
P. O. Box 52034
Phoenix, Arizona 85072-2034

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

Inspection at: Wintersburg, Arizona

Inspection Conducted: April 22-23 and April 29-May 3, 1991

Inspected by:

W. K. TenBroek
W. K. TenBroek, Radiation Specialist

24 MAY 1991
Date Signed

H. Resides
H. Resides, Radiation Specialist

24 May 91
Date Signed

Approved by:

G. P. Yuhas
G. P. Yuhas, Chief
Reactor Radiological Protection Branch

5/24/91
Date Signed

Summary:

Areas Inspected: Inspection of personnel internal and external exposure assessment and control with additional review of inspection followup items and licensee reports. Inspection procedures 90712, 92701, 83724 and 83725 were used.

Results: The licensee's programs for assessment and control of internal and external exposure had continued their prior levels of performance. Section 6 discusses a strength in the use of job history trending methods by Unit 2 and weaknesses in the delayed issuance of ALARA Outage Reports and the movement of an in-core instrumentation cable without the specific knowledge of the Unit radiation protection organization. No violations were identified.



DETAILS

1. Persons Contacted

Licensee

- *P. Hughes, General Manager, Radiation Protection (RP)
- *J. Albers, Manager, RP Operations
- *T. Bradish, Manager, Compliance
- *R. Fullmer, Manager, Quality Assurance and Monitoring (QA&M)
W. Sneed, RP Manager, (RPM), Unit 3
- *J. Sills, RP Manager, Unit 1
- *S. Sawtschenko, RP/ALARA Supervisor, Unit 2
- *R. Hazelwood, Supervisor, QA & M
- *M. Lantz, RP Supervisor, Dosimetry
- *R. Rouse, Supervisor, Compliance
J. Steward, Supervisor, RP/ALARA Outage Planning
D. McGee, Supervisor, RP/ALARA Outage Planning
- *D. Kanitz, Engineer, Compliance
D. Wanslee, RP Supervisor, Unit 3
M. Wagner, RP Supervisor, Unit 3

Contractor Personnel

W. Barley, Technical Services Manager, Bartlett Nuclear, Inc.

Nuclear Regulatory Commission

- *D. Coe, Senior Resident Inspector
J. F. Ringwald, Resident Inspector

*Denotes personnel in attendance at the exit interview on May 3, 1991. Discussions were also held with other personnel in the course of the inspection.

2. Followup (92701)

Outstanding Item 50-528/90-55-03 (Closed): This item concerned a weakness in the bioassay program in that procedures did not address Tritium (H-3) sampling of chemistry technicians. Additionally, Quality Assurance (QA) Audit Checklist No. 90-011-016 noted that procedural references did not include Regulatory Guide (RG) 8.32, "Criteria for Establishing a Tritium Bioassay Program." The inspector examined 75RP-9RP03, "Bioassay Analysis," which had been revised to require random sampling of specific "at risk" work groups, including chemistry technicians, and added a detailed H-3 bioassay program consistent with RG 8.32. The inspector had no further questions in this matter.



3. Followup of Violations (92702)

Violation 50-528/90-55-02 (Closed): This item concerned a violation of 10 CFR 20.103(a)(3) for permitting personnel access to containment during power operations without prior sampling for H-3.

In a letter dated February 15, 1991 from Arizona Public Service Company (APS) Executive Vice President William F. Conway to the USNRC, the licensee's proposed corrective actions and completion dates were delineated. A review of relevant documentation and licensee procedures revealed that the corrective actions met or exceeded requirements and that all completion dates were met. The substantiating documents reviewed included the following:

- 75RP-9RP07, "Radiological Surveys," was revised to require H-3 air sampling prior to containment entry during power operations.
- 75RP-9RP21, "Airborne Radioactivity Sampling Methodology, Evaluation, and Exposure Tracking," was revised to include H-3 in the Maximum Permissible Concentration (MPC) calculation. The results of the survey were to be documented on personnel tracking records. The procedure also outlined when airborne H-3 sampling is required.
- 74RM-9EF20, "Gaseous Radioactive Release Permits and Offsite Dose Assessment," was revised to inform the individual unit Radiation Protection (RP) departments of effluent air sample results.
- The first quarterly (1991) RP Lesson Plan incorporated a description of the events surrounding the violation, the regulation violated, the cause of the violation, and review of the aforementioned procedural changes. The lesson plan was to be administered to all site RP personnel as part of their continuous training effort.

The licensee's actions were properly directed to prevent recurrence of this violation. The inspector had no further questions in this matter.

4. Review of Licensee Event Reports (90712)

Report 50-530/91-02-L0 (Closed): This report concerned a March 25, 1991 exposure to a worker's skin from a Co-60 particle. The 13.9 rem exposure exceeded the limit of 10 CFR 20.101 for skin of the whole body. The circumstances of the exposure and the licensee's response were previously examined and documented in Inspection Report No. 50-530/91-13 with respect to Information Notice No. 90-48, "Enforcement Policy for Hot Particle Exposures." The licensee's timely report contained all information required by 10 CFR 20.405. This matter is closed.

5. External Exposure Control (83724)

The inspector reviewed the licensee's measures to assess external exposure. The inspector evaluated the following procedures:

75RP-9AL06, Rev 0, "Exposure Trending"
 75AC-9RP01, Rev 1, "Exposure and Access Control"
 75PR-ORP03, Rev 1, "ALARA Program"
 75RP-9ME21, Rev 1, "TLD Issue, Return and Termination"
 75RP-9ME24, Rev 0, "Dosimetry Processing, Evaluation and Termination"

Based on review of the above procedures, the inspector examined selected exposure trending reports prepared by the dosimetry group during the Unit 3 refueling outage. Reports of collective exposure during the calendar quarter and collective exposure versus radiation exposure permit estimates had been distributed per procedure 75RP-9AL06. In addition, the dosimetry group had prepared frequent individual work group quarterly exposure lists to inform licensee and contractor managers of employee dose status for work control purposes. Reports of remaining available dose were also frequently prepared.

During the review of trending reports, the inspector noted two individuals had incurred more than 1250 millirem (mr) dose equivalent early in the current quarter. The inspector examined the dosimetry files of the two individuals and concluded that administrative dose extensions and NRC Form-4 exposure histories had been properly documented, authorizing the individuals to receive more than 1250 mr pursuant to 10 CFR 20.101(b). An additional statement by each individual verifying the accuracy of their exposure history was included in the file.

The inspector and the dosimetry group discussed the licensee's policy for assigning personnel dosimeters to personnel within the restricted area. Dosimeters were provided to all personnel authorized to enter radiologically controlled areas under the radiation exposure permit system and procedure 75AC-9RP01. Personnel without authorization to enter controlled areas were not typically provided with dosimeters.

In support of the dosimeter issuance policy, the dosimetry supervisor described a study of workers in an office trailer within the restricted area, adjoining the dry active waste processing and storage building, a controlled area. NRC inspectors had previously inquired as to the doses received by non-radiation workers in this vicinity. The study presented the record doses of authorized radiation workers in the trailer compared to their cumulative doses from controlled area entries based on self-indicating dosimeters. The net doses incurred by workers when outside controlled areas were not distinguishable from background.

Based on the data, the inspector concluded that personnel working in the area in question not authorized access to controlled areas were not likely to approach 313 mr per quarter and personnel dosimeters were not likely to be required pursuant to 10 CFR 20.202(a)(1). However, area dosimeter measurements were continuing in this area and a concrete shield wall was under construction to provide non-radiation workers additional protection from stored dry active waste.

10 CFR 20.409 and 19.13(d) requires that a personnel overexposure requiring a report to NRC under 10 CFR 20.405 be reported to the



overexposed individual no later than the report to NRC. The inspector inquired as to the nature of the report to the individual who had received a hot particle exposure discussed in Section 4. The dosimetry group presented the report of individual's exposure, with correspondence directed to the individual dated April 10, 1991, which preceded the licensee's event report 50-530/91-02-L0, dated April 13, 1991. All information required by 10 CFR 19.13(a) was included in the report.

Within the areas inspected, the licensee's external exposure assessments and reports satisfied the requirements of 10 CFR 20 and technical specification 6.11.

6. Internal Exposure Control (83725)

Audits and Appraisals

Licensee audits of the RP program were discussed in NRC Inspection Report No. 50-528/90-55. The inspector reviewed selected Quality Deficiency Reports (QDR) and Quality Monitoring Reports written since prior inspections.

The Monitoring Reports revealed numerous examples of individuals' failures to sign in on Radiation Exposure Permits (REP) as required by 75AC-9RP01, "Radiation Exposure and Access Control," and an increasing number of examples of no post-job ALARA debrief as required by 75RP-9AL05, "ALARA Post Job Review Reports."

Discussion with Unit 3 RP supervision revealed that, in addition to departmental briefings on the subject, the implementation of an interlock system as employed by Units 1 and 2 for Radiologically Controlled Area (RCA) access had eliminated the occurrence of individuals entering the RCA without signing in on a REP. Major evolutions were debriefed and ALARA reviews were conducted upon completion, with the more routine evolutions debriefed as personnel became available. The QA Staff were continuing to monitor these and other areas of the RP program in an objective and aggressive manner.

The inspector concluded that the continued implementation of the QA program in this manner will provide the licensee with an objective assessment of their performance.

Changes

Other than the changes to the bioassay program previously addressed, no significant programmatic or facility changes had occurred since the previous inspection of this area.



Planning and Preparation for Outages

The inspector held discussions with, and reviewed documentation requested from, the Unit ALARA supervisors and the ALARA Outage Planning Group supervisor. The inspector noted that both the Unit ALARA Group and Outage Planning Group reviewed evolutions that had the potential for airborne activity, and thus internal exposure. Evaluation of auxiliary ventilation systems to minimize the need for respiratory protective equipment was demonstrated by both groups. For example, the ALARA Group specifically required use of portable ventilation units during letdown valve replacement. The evaluation of such measures was based on historical records of past performance, the job hazard evaluation system, (as described in 75RP-9RP02, "Radiation Exposure Permits," revised February, 1991) and the review of survey data to determine the possibility of airborne activity. The evaluation conformed to regulatory standards as set forth in 10 CFR 20 and the guidance of RG 8.8. The same process was employed to evaluate the use of respiratory protection for certain high airborne outage evolutions.

The inspector reviewed the Unit ALARA programs to assess their ability to use past performance indicators as a means of improving their control of exposure in future evolutions. The Unit 2 ALARA group had developed a program to compile comprehensive job history reports to be used as a data base for planning future jobs. These histories contained, but were not limited to:

- ° exposure estimates for jobs based on work control procedures, surveys, man-day estimates
- ° copies of the applicable REP(s)
- ° in-progress and post-job radiological surveys
- ° results of tours and suggestions made by the ALARA group for improved control of exposure.
- ° job progress charts and evaluations
- ° exposure records to be used in future MPC and skin dose estimates
- ° post-job work summaries, including lessons learned and ALARA reviews

Feedback was obtained via comment sheets used, in one form or another, by all the units. The history files were being incorporated into the site shared data base. The program has been well-received at Unit 2 and was being adopted by Unit 1. The inspector concluded that the



implementation of the job history report at Unit 1 was an improvement in the consistency of planning, execution, and evaluation of work.

Interviews with licensee representatives concerning outage ALARA report evaluation revealed that outage reports were not returned to the units in a timely manner. These reports permitted evaluation of lessons-learned prior to planning upcoming work.

While the Generic Refueling Outage Guidelines (GROGS) manual provided generic information on major evolutions performed in all the units, many evolutions with lower overall exposure totals were only published in the ALARA Outage Report. However, the last Unit 2 outage concluded in July of 1990, and, as of the date of this inspection, the Unit 2 ALARA group had not received a report, though a copy had recently been forwarded to the Unit 2 radiation protection manager. Factors contributing to the delay in report dissemination included:

- ° a cumbersome report review process
- ° the need to streamline the report review by the ALARA Review Committee
- ° the structuring of the Unit ALARA groups and the ALARA Planning Group under different management hierarchies

To improve report timeliness, RP support services management had directed that the reports be issued within thirty days. Consistent with this directive, the Outage Planning Group was finishing the Unit 1 outage report:

The inspector examined pre-job ALARA review and post-job debriefing practices for jobs whose total exposure was less than 10 man-rem. Procedure 75RP-9AL03 had been revised to state that the Unit RP Group will perform ALARA pre-job reviews for jobs with total exposure greater than 1 man-rem but less than 10 man-rem. The ALARA Outage Planning Group will continue to provide review for outage evolutions with total exposure greater than 10 man-rem and for major evolutions known to generate airborne activity.

The inspector concluded that the licensee's program in this area was improving.

Observation of Work Activities

The inspector examined the licensee's internal exposure control practices during the inspection. General area and grab sampling for airborne activity and respiratory protection measures employed during cavity decontamination were observed. The inspector reviewed selected air sample survey records for this period. Licensee activities and documentation complied with 10 CFR 20.103 and 10 CFR 20.201. Observations of other aspects of work in-progress revealed appropriate dosimeter use, instrumentation within calibration period, and most work practices consistent with the applicable REP's.



On April 30, 1991, at approximately 3 A.M. a section of In-Core Instrumentation (ICI) cable with radiation levels of 10 rem/hr to 8000 rem/hr was discovered by the licensee during surveys and decontamination of the 114 foot cavity level, Unit 3. All cavity and reactor vessel head work was suspended until the ICI cable was safely stowed. A plan was developed during the day to remove the ICI cable to the spent fuel storage pool for disposal. The licensee was investigating the root cause for misplacing the cable in the cavity. This matter will be reviewed during a subsequent inspection. (50-530/91-17-01)

At approximately 5 p.m. on April 30, 1991, the Unit 3 RPM informed the inspector of a delay in removing the ICI cable and transferring it to the spent fuel pool. The RPM stated the work would resume the following morning with the issuance of a specialized REP, and only after an ALARA pre-job briefing.

During a tour of containment that evening, the inspector observed an ALARA supervisor on the 140 foot level of the Unit 3 containment building manipulating the ICI cable into the upender in the refueling cavity using remote handling tools. This action was inconsistent with previous information received by the inspector concerning plans to remove the cable from containment to the spent fuel storage pool for disposal.

The observation was brought to the attention of the shift RP supervisor. Discussion revealed that the RP supervisor had been told no work on the ICI cable would occur on his shift and he was unaware that such work was occurring. The RP supervisor then queried the RP lead containment technician at the access control point. The RP lead had no apparent knowledge of the ICI cable manipulation. The RP lead stated that no one had mentioned manipulation of the cable. The RP supervisor and the inspector examined the REP that the ALARA supervisor had signed. The REP was for movement of filters for survey prior to disposal. Operations was notified by the RP supervisor and their instruction was to stop the work. The message was conveyed to the personnel in containment and they were asked to exit.

Subsequently, discussions were held with the Manager of RP Operations, the Unit 3 RPM, the Technical Services Manager, and the ALARA supervisor to determine why the work proceeded. The discussions revealed the following:

The decision to postpone ICI cable removal until the following day was based on hazards associated with placing the cable into the upender while the upender opening was raised closer to the cavity water surface.

The decision to delay the ICI movement was made without considering that the tools holding the ICI cable were needed for filter movement, the next item on critical path schedule.

The ALARA supervisor from day shift was unaware of the hold and briefed the backshift ALARA supervisor on plans to move the cable. Following



the briefing, the ALARA supervisor planned to put the cable in the upender prior to commencing manipulation of filters, as opposed to lying the cable on the bottom of the cavity where retrieval would be difficult. The ALARA supervisor's plan to place the cable in the upender did not require elevation of the upender, so full water shielding was available.

The backshift RP supervisor was briefed by Operations concerning a hold placed on any ICI cable work. During this briefing, the ALARA supervisor arrived to begin work, stated his intent to move the cable to gain access to the filters to the lead containment technician, and was granted access on the filter REP. The filters possessed dose rates of 4000 rem/hr, similar to the ICI cable, and the filter REP precautions and limitations were similar to those proposed for the ICI cable REP.

The lead containment technician had not yet been briefed on the hold placed on the cable movement and, based on subsequent statements, had not clearly understood the ALARA supervisor's intent to move the cable.

The RP supervisor returned to the access control point to brief his staff after the ALARA supervisor had been processed-in and had begun to move the cable.

By direct observation of the work and further review of documentation, surveys, and controls, the inspector concluded that adequate radiological precautions for the cable movement had been implemented. However, the hold on the cable movement was not conveyed to the oncoming RP shift in a timely and efficient manner, as demonstrated by the lead technician not receiving instructions from his supervisor until almost two hours into the shift. Also, the scope of the ALARA supervisor's plan to move the cable was not clearly understood by the lead containment technician during the pre-job briefing and, as a result, no feedback was provided to the RP supervisor so appropriate action could be taken. The inspection brought these observations to management's attention during the exit meeting, discussed below.

Conclusion

The licensee's program to control internal exposure had maintained its prior level of performance. A strength was noted in the appropriation of Unit 2 ALARA job history trending methods by Unit 1. Weaknesses were observed in the delayed issuance of ALARA Outage Reports and the movement of the ICI cable without the specific knowledge of Unit RP.

7. Exit Meeting

The inspector met with the individuals annotated in Section 1 on May 3, 1991. The scope and findings of the inspection were summarized and the licensee was informed of the inspectors observations concerning the lack of timely and effective communication between shifts, access control personnel and the workforce as a result of the ICI cable movement. Licensee management stated that they would incorporate lessons learned from this matter into the industry experience portion of continuing radiation protection training.

