

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-528/87-40, 50-529/87-39, 50-530/87-41

Docket Nos. 50-528, 50-529, 50-530

License Nos. NPF-41, NPF-51, NPF-65

Licensee: Arizona Public Service Company  
P. O. Box 21666  
Phoenix, Arizona 85836

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

Inspection at: Wintersburg, Arizona

Inspection Conducted: November 16-20, 1987

Inspected by: GP Kuhas Per 12/31/87  
H. S. North, Senior Radiation Specialist Date Signed

[Signature] 12/31/87  
G. R. Cicotte, Radiation Specialist Date Signed

Approved by: GP Kuhas 12/31/87  
G. P. Kuhas, Chief Date Signed  
Facilities Radiological Protection Section

Summary:

Inspection during the period of November 16-20, 1987 (Report No. 50-528/87-40, 50-529/87-39 and 50-530/87-41)

Areas Inspected: Routine unannounced inspection of licensee action on previous inspection findings, low level radioactive waste storage facilities, NUREG-0737 items II.B.3 (PASS Units 1, 2 and 3) and II.F.1 (Additional Accident-Monitoring Instrumentation, Attachments 1, 2 and 3, Unit 2), allegation followup and facility tours.

Inspection procedures 30703, 65051, 83726, 90713 and 92701 were addressed.

Results: In the five areas addressed, no apparent violations were identified in four areas. In one area, one apparent violation of 10 CFR 20.203 and one apparent violation of Technical Specification 6.12 were identified related to radiological posting (Report section 5).

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## DETAILS

### 1. Persons Contacted

#### Licensee

- \*J. M. Allen, Unit 1 Plant Manager
- \*R. M. Butler, Director, Standards and Technical Support
- \*L. A. Souza, Quality Audits and Monitoring
- \*L. E. Brown, Radiation Protection and Chemistry Manager
- \*K. R. Oberdorf, Radiation Protection Manager, Unit 1
- \*W. E. Sneed, Radiation Protection Manager, Unit 3
- \*J. R. Mann, Radiation Protection Standards Supervisor
- \*R. R. Baron, Compliance Lead
- \*R. J. Rouse, Compliance Senior Engineer

\*Denotes individuals present at the exit interview on November 20, 1987.

In addition to those individuals identified above, the inspectors met and held discussions with other members of the licensee's staff and contractor personnel.

### 2. Low Level Radioactive Waste Storage Facilities

The licensee's new facility appeared to be in full operation, with all major equipment in use and administrative controls appropriate to work being performed. Personnel working in the facility appeared to be knowledgeable of their assigned functions. Training of radioactive waste technicians is conducted in accordance with the licensee's established program.

No violations or deviations were identified.

### 3. Followup

The following open items were examined:

#### A. Information Notices

IN-87-31, IN-87-32, IN-87-39 (Closed) - The inspectors verified that the licensee had received and was evaluating/had evaluated the following Information Notices:

<u>IN No.</u>	<u>Title</u>
IN-87-31	Blocking, Bracing, and Securing of Radioactive Material Packages in Transportation
IN-87-32	Deficiencies in the Testing of Nuclear Grade Activated Charcoal
IN-87-39	Control of Hot Particle Contamination at Nuclear Power Plants

These matters are closed.

- B. 50-530/87-17-01 (Closed) - This item related to continuance of Inspection Procedure 65051, "Low Level Radioactive Waste Storage Facilities" (LLRWSF). The licensee's LLRWSF was complete and functioning. The protected area boundary had been modified to include the facility (see paragraph 2). This matter is closed.

50-528/86-28-02 (Open) - This item related to implementation of the Radiological Records and Access Control System (RRACS). The licensee stated that acceptance criteria for RRACS were currently being resolved prior to physical delivery of the system. The licensee expected the system to be on site but not fully operational in time for the Unit 2 refueling outage scheduled for February 1988. The licensee stated that completion of the effluent tracking portion of the system would take approximately one year from the date of the inspection. This matter will remain open.

50-528/87-18-01 (Open) - This item related to actions by the licensee's hot particle committee. Licensee committee members stated that emphasis had been shifted to maintenance of the developed program. Implementation of hot particle control is discussed in a previous inspection (see Inspection Report 50-528/87-38). This item will remain open.

50-528/86-08-03 (Open) - This item related to operability of the hydrogen/oxygen system monitors. The licensee was evaluating modifications in order to address problems with system operability:

- ° Deletion of hydrogen sampling. The licensee staff stated that only oxygen required monitoring to preclude an explosive mixture, and that a proposed Technical Specification change was being evaluated by the licensee's licensing department.
- ° Use of manual sample selection rather than reliance on the sequential cam timer.

Licensee staff stated that numerous small problems were being resolved, and also stated that responsibility for the system had been shifted to Mechanical Engineering. This matter will remain open.

50-528/86-36-01 (Closed) - This item related to validation and verification (V&V) of Erasable Programmable Read-Only Memory (EPROM) software used in the radiation monitoring system (RMS) in Unit 1. The licensee staff stated that V&V was being performed at the time of the inspection, by a contractor software consulting firm, according to guidance provided by ANSI/IEEE Std 730-1984, "IEEE Standard for Software Quality Assurance Plans." RMS EPROM reprogramming was complete, and other process control program EPROMs were expected to be completed by the end of the first quarter of 1988. The program to accomplish this was in place. This matter is closed.

50-530/87-04-02 (Closed) - This item related to operational status of the RMS in Unit 3. The licensee had completed installation, testing and V&V (see item 50-528/86-36-01 above) at the time of the inspection. This matter is closed.

50-530/87-04-01 (Closed) - This item referred to preoperational testing of the Unit 3 RMS, which had been completed at the time of the inspection. The results were reviewed by the inspectors. This matter is closed.

50-528/86-28-01 (Closed) - This item referred to enforcement action and followup of licensee corrective actions on RU-1 in Unit 1 (see Inspection Report 50-528/86-28). The licensee had committed to verify operability of RU-1 with surveillance testing, develop a verification program for software (see item 50-528/86-36-01 above) and provide configuration control of RMS software. At the time of the inspection, the licensee had completed these actions. This matter is closed.

50-529/87-19-01 (Open) - This item refers to the Unit 2 hydrogen-oxygen monitor. See item 50-528/86-08-03 above for discussion of similar status. This matter will remain open.

50-530/87-20-01 (Open) - This item refers to the Unit 3 hydrogen-oxygen monitor. See item 50-528/86-08-03 above for discussion of similar status. This matter will remain open.

4. Post Accident Sampling Systems, Units 1, 2, and 3

Licensee procedures examined included:

<u>Unit</u>	<u>Procedure</u>
1	74ST-1SS03, Rev. 2, <u>Backup Post Accident Sampling System Surveillance</u>
1	74ST-1SS04, Rev. 0, <u>Backup PASS Functional Test</u>
2	74ST-2SS03, Rev. 1, <u>Post Accident Sampling System Surveillance</u>
2	74ST-2SS04, Rev. 1, <u>PASS Functional Test</u>
3	74ST-3SS03, Rev. 0, <u>Post Accident Sampling System Surveillance</u>
3	74ST-3SS04, Rev. 1, <u>PASS Functional Test</u>

The PASS surveillance tests in the 74ST-(Unit Designator)SS03 series are required at 18 month intervals and require the timed collection and analysis of PASS samples. The results of analyses are compared with results obtained through routine sampling and analysis.

The results of this series of surveillance tests were examined for all three units (e.g. Unit 1, March 5-6, 1987; Unit 2, March 5-8, 1987 and Unit 3, October 20-22, 1987). In all cases, except two at Unit 1, the

samples were collected and analyzed within the three hour time frame. In the case of the two exceptions, on one occasion a backup of samples for multichannel analysis delayed the analysis and in the second case the gas chromatograph had been turned off and required recalibration before the sample could be completed. In all cases routine analytical results were incorporated, standard deviations determined and compared with procedure specified acceptance criteria.

The 74ST-(Unit Designator)SS04 series of procedures require collection and analysis of PASS samples at 31 day intervals, and the comparison with routinely collected samples. The maximum deviations are determined for a more limited number of analyses and compared with procedure specified acceptance criteria. Not all analyses required by the 74ST-( )SS03 are required by the 74ST-( )SS04 procedure, nor are the sampling and analysis times a portion of the 31 day surveillance procedure. The results of completion of the 74ST-( )SS04 procedure were examined for Unit 1, June 8 and July 29 - August 3, 1987; and Unit 2, February 24, 1987.

On the basis of the examination of surveillance test data it appeared that the PASS systems in all three units were capable of meeting the requirements regarding sampling, analysis and accuracy (50-530/87-04-03 closed).

No violations or deviations were identified.

##### 5. Facility Tour

The inspectors conducted a tour of the facility and made independent radiation measurements using an ion chamber survey instrument R02, Serial No. 009154, calibrated September 28, 1987, due for calibration December 28, 1987. Except as noted below, the licensee's posting and labeling practices appeared to be consistent with 10 CFR 19.11, "Posting of Notices to Workers," and 10 CFR 20, "Standards for Protection Against Radiation."

In general, housekeeping was good. Unit 3, in particular, appeared good, especially in consideration of the final construction/startup status. Survey and sampling equipment appeared to be in good repair and within calibration. The condition of the Fuel Building (FB) in Unit 1 was much improved over the last inspection.

The inspectors observed compaction of low level solid radioactive waste in the Unit 1 Radwaste Building. Compaction was being carried out without respiratory protection, but with a breathing zone air sample near the side of the compactor machine, as allowed by the Radiation Exposure Permit (REP). Upon receiving an indication of filter failure on the differential pressure gauge for negative pressure in the compactor, radwaste personnel performing the compaction opened the housing inside the compactor to brush away loose debris and reseal the roughing filter. The individuals stated to the inspectors that loosening and unseating of the filter was a normal occurrence. The inspectors noted the following concerning this evolution:



- The individuals wore neither respiratory protection nor beta eye protection. The REP required concurrence of Radiation Protection (RP) to delete either or both.
- No RP technician was present to observe or monitor the evolution, and no Radiation Protection Technician (RPT) was informed that the filter had failed and/or was going to be repaired. The REP did not appear to address the filter repair, either to allow or prohibit maintenance in conjunction with operation of the compactor. A Radwaste Technician (RWT) was present, but did not perform any surveys, even though a calibrated ion chamber beta-gamma survey instrument was present.
- When the situation was discussed with the RP lead technician, he stated that a survey would have been required, but that RP had not been informed that filter repair was required, and in fact had not been informed that compaction was occurring. Licensee RP staff later stated that an individual RPT assigned to Radwaste had been informed of compaction at the beginning of the shift, and the RPT stated he had allowed relaxation of respiratory protection, in accordance with the REP.

A survey conducted by Licensee RP staff later that day revealed maximum contamination levels on the compactor of 3000 dpm/100 cm<sup>2</sup>. Previous surveys of the compactor were consistent with the results.

The inspectors brought the above observations to the attention of the RP lead technician. Licensee RP staff stated that in the future, the appropriate RP lead would be required to be informed if compaction or filter maintenance was to occur, so that appropriate surveys and work monitoring could be accomplished, and that beta eye protection would be stressed.

Inspection Reports 50-528/87-24 and 50-528/87-38 discussed problems associated with adherence to or knowledge of action levels for radiological posting, REP requirements, and personnel monitoring requirements. The licensee was informed of the concerns addressed in the above reports at the exit interviews, held on July 17, 1987 for 50-528/87-24 and on October 30, 1987 for 50-528/87-38, and in the letter transmitting report no. 50-528/87-38, dated December 4, 1987.

On November 17, 1987, at 9:30 a.m., during a tour of the Unit 1 Auxiliary Building, the radiation area and high radiation area/contaminated area barriers and postings for the 77' elevation West Mechanical Penetration Access Room were observed to have been removed on one side such that the signs could not be read and no barrier impeded entry. Additionally, the high radiation area/contaminated area posting sign was covered by hoses and tubing hanging from the wall, making the sign even harder to observe upon entry to the room. A survey by the inspectors inside the room revealed general area dose rates in major portions of the room above 5 mr/hr, maximum general area dose rates of 200 mr/hr by a valve labeled "SLV-645," on the 77' elevation (E1.) and 150 mr/hr in a brief survey near Penetration 27 on the 87' E1. which is accessed by entry to the 77'

E1. Discussion with RP staff at 10:00 a.m. on November 17, 1987, revealed the following:

- On November 16, 1987, at 8:55 a.m., a survey was performed for REP 1-87-0325 work on a valve (labeled "LPSIAV876") on the 87' elevation near Penetration 27, showing contact readings on the Low Pressure Safety Injection (LPSI) suction pipe of between 100 mr/hr and 700 mr/hr, and general area dose rates of 60 mr/hr to 340 mr/hr.
- On November 16, 1987, at 11:30 a.m., a survey was performed for REP 1-87-0325 work on insulation on the LPSI suction pipe from Penetration 27, with contact readings of 50 mr/hr and 5000 mr/hr, and readings at 18" from the pipe of 20 mr/hr and 2000 mr/hr, and general area readings in the vicinity of the pipe of 20 mr/hr. As of 10:00 a.m. on November 17, 1987, the survey had not been reviewed and no RP staff except the RPT who had performed the survey were apparently aware of the results of the survey.
- Numerous personnel had signed onto REP 1-87-0325 on November 16 and 17, 1987. No personnel on REP 1-87-0325 appeared to have exceptionally high exposure, by self indicating pocket dosimeters.
- As a result of the observations by the inspectors, the RPT who had discovered the 2000 mr/hr reading at 18" and another RPT re-surveyed the area near Penetration 27 on November 17, 1987. The licensee RP staff stated that they discovered that the 2000 mr/hr reading was in error, that 18" readings were actually 800 mr/hr, and thus under the TS action level of 1000 mr/hr for locking of high radiation areas, and that the survey of 11:30 a.m. on November 16, 1987, had been corrected by the RPT who had performed the survey.

On November 19, 1987, at 9:20 a.m., the inspectors re-entered the 77' West Mechanical Penetration Access Room to perform a more detailed survey to verify licensee readings of November 17, 1987. The high radiation area sign and barrier had been removed from one side such that they were again partially obscured by hoses and plastic hanging from the wall. When the inspectors obtained contact dose rate readings on the pipe at Penetration 27, they obtained a maximum reading of 5000 mr/hr (the highest range of the instrument) at 1" from the bottom of the pipe. Nearby, direct contact readings ranged from 500 mr/hr to 5000 mr/hr, and 18" from the pipe (floor level) read 800 mr/hr. Doserates of 350 mr/hr to 5000 mr/hr (1" from pipe) were observed in an area under the horizontal pipe of approximately 60" wide by 18" high. The inspectors informed the Unit 1 Radiation Protection Manager (RPM) of the situation and an RPT was sent to restore the barrier and posting.

The Unit 1 RPM stated that, as a result of the occurrence noted above, he had attempted to discern the extent of RPT awareness of the 1000 mr/hr action level, and had determined that of 12 RPTs he questioned, all were aware that 1000 mr/hr was important, but most were not sure why.

An in-office review revealed that licensee procedure 75RP-9ZZ47, "RADIATION SURVEY PROCEDURE," does not direct the individual performing a





survey to ensure postings are in accordance with 75RP-0ZZ01, "RADIOLOGICAL POSTING". 75RP-9ZZ47 does state, in part:

- "6.1.5 All unusual radiation conditions found in the area shall be described in the Radiation Protection Log Book and on the survey map. The Supervising Radiation Physicist shall be notified of any unusual radiation levels.
- 6.1.6 Complete the survey map and return the completed map to the Radiation Protection Office."

At 10:00 am on November 17, 1987, the inspectors read the Radiation Protection Log Book pages for November 16 and 17, 1987. No entries were observed concerning dose rates greater than 1000 mr/hr at 18" in an area not roped off and marked with flashing lights in accordance with the TS.

10 CFR 20.203, "Caution signs, labels, signals and controls," states, in part:

"(b) Radiation areas. Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

"Caution<sup>1</sup>  
"Radiation Area

"(c) High radiation areas. (1) Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

"Caution<sup>1</sup>  
"High Radiation Area..."

"...<sup>1</sup> Or 'Danger.'"

Licensee Technical Specification (TS) 6.12, "High Radiation Areas," states, in part:

- "6.12.1 In lieu of the "control device" or "alarm signal" required by paragraph 20.203(c)(2) of 10 CFR Part 20, each high radiation area in which the intensity of radiation is greater than 100 mrem/hr but less than 1000 mrem/hr shall be barricaded and conspicuously posted as a high radiation area....
- "6.12.2 In addition to the requirements of Specification 6.12.1, areas accessible to personnel with radiation levels such that a major portion of the body could receive in 1 hour a dose greater than 1000 mrem shall be provided with locked doors to prevent unauthorized entry, .... For individual areas accessible to personnel with radiation levels such that a major portion of the body could receive in 1 hour a dose in excess of 1000 mrems\*, that are located within large areas, such as PWR containment, where no enclosure exists for purposes of locking,

and no enclosure can be reasonably constructed around the individual areas, then that area shall be roped off, conspicuously posted and a flashing light shall be activated as a warning device...."

These findings establish that radiation and high radiation area postings were not maintained consistent with regulatory requirements. Further, the root cause appears to be that procedures and technician training were not adequate to assure that prompt corrective action, in the form of barriers, postings and signals, is taken when unexpectedly high radiation levels are encountered during surveys.

Failure to conspicuously post the West Mechanical Penetration Access Room as a radiation area is an apparent violation of 10 CFR 20.203 (50-528/87-40-01). The licensee was informed at the exit interview that failure to barricade and conspicuously post the 77' and 87' elevation of the West Mechanical Penetration Access Room in the Unit 1 Auxiliary Building as a high radiation area was an apparent violation of TS 6.12 (50-528/87-40-02).

6. Allegation RV-87-A-0069

This allegation related to an individual working in a controlled area. The allegor expressed the following concerns:

1. Allegor not told his exposure resulting from his work

The inspector verified that the allegor's cumulative exposure was readily available for review in an exposure summary report distributed twice daily during the outage by the licensee's Dosimetry Department, and that this availability had been conveyed to the allegor during initial training.

2. Allegor concerned as to why co-workers would encourage getting a "whole body count"

The inspector determined, from observation of the work location and the results of surveys performed, that fixed contamination levels were typically 1000 dpm per 100 cm<sup>2</sup>. The licensee's staff stated that individuals having concerns about suspected inhalation or ingestion of airborne radioactivity were free to request whole body counting.

3. Allegor informed by a Radiation Protection Technician (RPT) that protective clothing requirements were optional

RPTs assigned in the work area stated that the Radiation Exposure Permit (REP) for the work had been changed to eliminate a reference allowing RPTs to determine protective clothing requirements on a case-by-case basis. Licensee staff further stated that this was done to eliminate confusion among workers, a number of whom had expressed concern to RP staff personnel as to apparent inconsistencies. The inspectors verified the current status of the REP and compliance therewith by personnel in the work area.

4. Alleger informed by co-workers that he would probably be fired or laid off early for informing the NRC of his concerns

The resident NRC inspector informed the alleger how violations of 10 CFR 50.7, "Employee Protection," would be addressed. The inspectors verified that current copies of forms NRC-3, "Notice to Employees", were displayed as required by 10 CFR 19.11(c) and (d). The licensee maintains a "Quality Assurance Hotline" to address concerns by workers. The alleger indicated to the resident inspector that the "Hotline" had not been contacted in this instance.

No violations or deviations were identified.

This matter is closed (RV-87-A-0069).

7. Exit Interview

The scope and findings of the inspection were discussed with the licensee's representatives (denoted in paragraph 1). The licensee acknowledged the apparent violation in paragraph 5, above and posting of both radiation and high radiation areas was discussed. The licensee stated that effort was being expended by RP staff to improve postings to prevent recurrence.

