

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos.: 50-528/91-11, 50-529/91-11, 50-530/91-11

License: NPF-41, NPF-51 and NPF-74

Licensee: Arizona Public Service Company
P. O. Box 53999 Station 9012
Phoenix, Arizona 85072-3999

Facility Name: Palo Verde Nuclear Generating Sta. (PVNGS), Units 1, 2 & 3

Inspection at: PVNGS Site at Wintersburg, Arizona

Inspection Conducted: March 18-22, 1991

Inspection by: G.P. Yuhas for
H. D. Chaney, Senior Radiation Specialist

4/16/91
Date Signed

L. C. Carson II
L. C. Carson II, Radiation Specialist

4/15/91
Date Signed

Approved by: G.P. Yuhas
G. P. Yuhas, Chief
Reactor Radiological Protection Branch

4/16/91
Date Signed

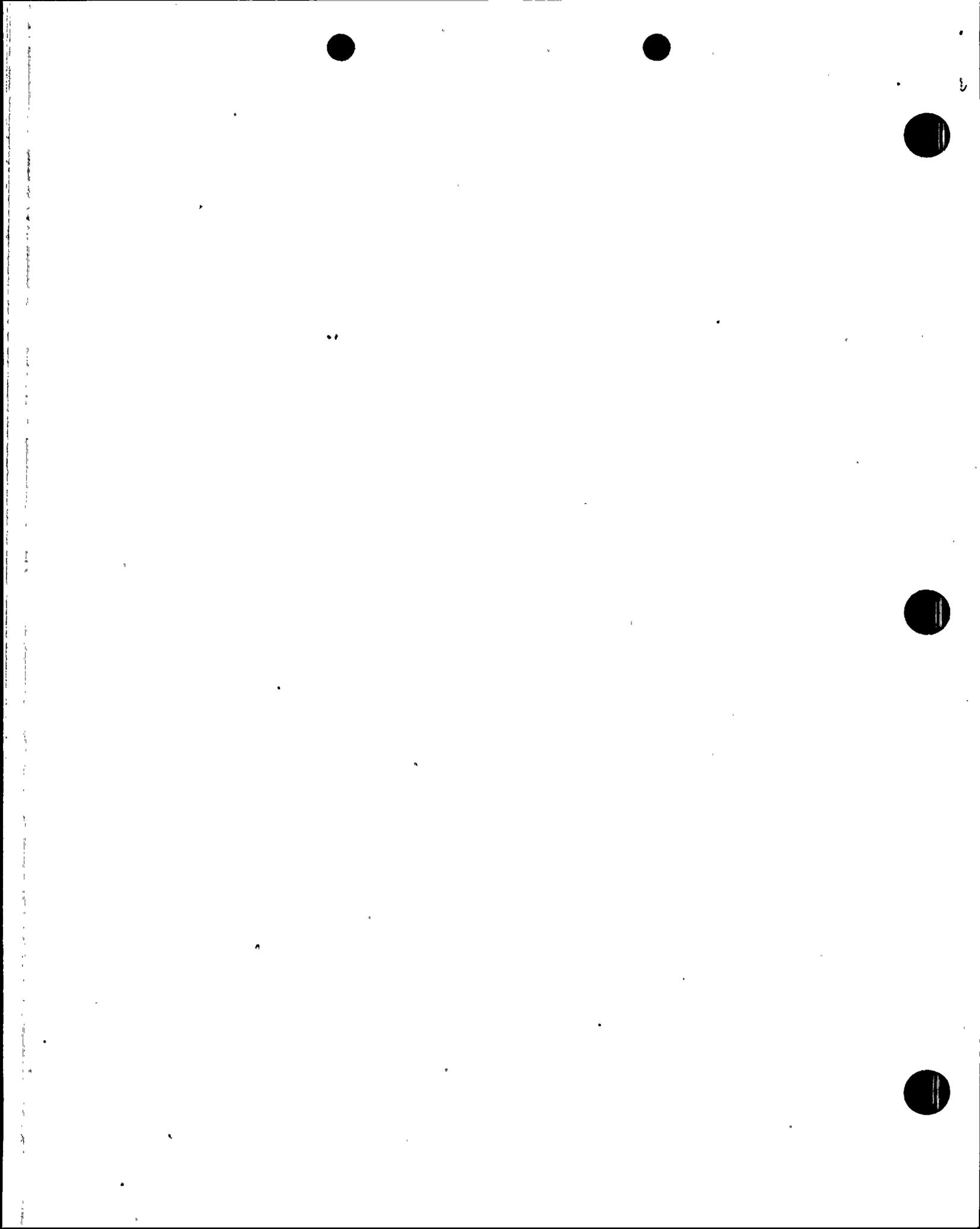
Summary:

Areas Inspected:

Routine unannounced inspection of the licensee's radiation protection program, including occupational exposures and contamination control practices during the Unit-3 refueling outage. Tours of licensee's facilities and follow-up on previous inspection findings were conducted. Inspection procedures 83729, 83750 and 92700 were used.

Results:

No violations or deviations were identified. In the areas inspected, the licensee's program appeared adequate to accomplish their safety objectives. Concerns associated with the licensee's radioactive material contamination control practices, particularly hot particles controls during the Unit-3 refueling outage are discussed in Section 3.



DETAILS

1. Persons Contacted

Licensee

J. Levine, Vice President, Nuclear Production
*P. Hughes, Site General Manager, Radiation Protection
*J. Scott, Site General Manager, Chemistry
*S. Guthrie, Deputy Director, Quality Assurance (QA)
*J. Scott, Assistant Plant Manager, Unit-3
*W. Sneed, Radiation Protection Manager (RPM), Unit-3
*M. Shea, RPM, Unit-2
*W. Barley, Acting RPM, Technical Support
*R. Fullmer, Manager, QA Monitoring & Audits (QAM&A)
*R. Hazelwood, Supervisor, QA Monitoring
*R. Rouse, Supervisor, Compliance
*P. Coffin, Compliance Engineer

Others

*D. Coe, NRC, Senior Resident Inspector
*J. Draper, Southern California Edison, Site Representative
*K. Hall, El Paso Electric, Site Representative
*R. Henry, Salt River Project, Site Representative
*S. Kanter, Owner Services, Site Representative

* Denotes those persons present at the exit interview held on March 22, 1991. In addition the inspectors met and held discussions with other licensee and contractor personnel.

2. Follow-up of Licensee Event Report (LER) (92700)

(Closed) LER 50-529/87-017-L2: This supplemental LER updated the schedule to correct inadequate monitoring of explosive gases in the gaseous radwaste system. The new monitoring system was to be complete by 3/1/91, according to the LER. PVNGS Technical Specification (TS) 3.3.3.8 requires that the licensee use on-line (automatic) oxygen/hydrogen monitors for detecting explosive gas mixtures in the Gaseous Radioactive Waste System (GRWS). The new oxygen monitors were previously addressed in NRC Inspection Reports Nos.: 50-528/90-17, 50-529/90-17 and 50-530/90-17.

The inspector discussed the operation of the new oxygen monitors with the cognizant system engineer and verified that the new system was in service at all three units. No further action is required concerning this LER.

3. Occupational Radiation Exposure During Extended Outages (83729 and 83750)

The licensee's preparations/planning, and goals for the Unit-3 refueling outage were previously discussed in NRC Inspection Reports Nos.: 50-528/91-06, 50-529/91-06, and 50-530/91-06.

a. Audits and Appraisals

The inspectors met with QA monitoring (QAM) personnel to determine the scope of their activities during the Unit 3 refueling outage. The QAM group presented their Unit-3 Outage Action Plan to the inspectors for review. The Action Plan assigned QAM personnel to monitor seven functional areas during the Unit-3 outage, including radiation protection (RP) and chemistry activities. The inspectors examined the licensee's performance involving Reactor Coolant System clean-up (chemical addition), one of the chemistry activities being followed by QAM at the time of this inspection. There were at least three QAM personnel reviewing/assessing RP performance during the Unit-3 outage. The following RP activities were under review:

ALARA
 General work practices
 Hot particle control
 Job coverage
 Radiological surveys
 Locked high radiation area control
 Worker training and qualifications

The inspectors observed QAM personnel reviewing Unit-3 outage activities. The inspectors concluded that the QAM Action Plan and its implementation continues to be a viable tool for assessing the licensee's outage performance.

b. Planning and Preparation

The licensee used a management team concept for the Unit-3 refueling outage. An outage control center was established in the Unit-3 Operation Support Building where personnel were available 24 hours a day to resolve problems. The inspectors attended one such problem resolution session dealing with a spill of potentially radioactive liquid during a local leak rate test (LLRT). All LLRTs were halted until the outage central team (RP, operations, test, and cognizant engineering personnel) could agree on how to more effectively control LLRT boundaries. The outage central team successfully arranged among the parties involved agreements to exercise more precautions during LLRT boundary tagging, fully implement the Unit-1 LLRT lessons learned, and assign two auxiliary operators to inspect LLRT boundaries with RP and engineering prior to release of the system for testing. The inspector concluded that the outage central management team would be an effective tool for promoting ALARA and resolving problems during the Unit-3 outage.

c. Radiation Source and Field Control

The RCS clean-up was ongoing at the time of this inspection. Based on initial results, the total activity removed during RCS clean-up was approximately 1928 Curies of activated debris (crud). The primary constituents were cobalt-58 (Co-58) 61.3%, antimony-122 (Sb-122) 18.7%, and Sb-124 17.3%. Iodine-131 and Co-60 were approximately 1% respectively. A dose to curie relationship



calculation was based on demineralizer dose rates taken before and after commencement of the clean-up program. Significant crud bursts occurred during the RCS cool-down period between operational modes 4 and 5, and also when the licensee made three hydrogen peroxide injections during mode 5 operations. The inspector concluded that the Unit 3 RCS clean-up was showing success and would be a definite attribute in the lessening of radiation exposures to Unit 3 personnel during this outage.

d. ALARA Reviews

The inspectors examined the following jobs for effectiveness of prework ALARA reviews:

- . Reactor Vessel Head Removal
- . Fuel Assembly Upender Limit Switch Adjustment
- . Steam Generator (SG) Nozzle Dam Installation and Removal

The prejob ALARA reviews were considered very good. The licensee is paying particular attention to, and providing mockup training on, SG nozzle dam installation and removal.

e. External Exposure Control

The NRC inspectors verified radiation and high radiation area posting, and observed the issuance and placement of personnel dosimeters (self reading and alarming type) and the conduct of area radiation surveys by radiation protection technicians (RPTs). Posting of radiation and high radiation areas were satisfactory. The NRC inspectors brought to the attention of cognizant RP supervisors that areas had dose rates at or near 100 milliRem per hour and that existing radiological postings were becoming marginally effective in properly identifying the radiological status of the area. A cursory review the exposure expenditures during the fuel assembly upender limit switch replacement showed that the job was accomplished significantly under ALARA staff person-Rem projections.

The inspectors toured Unit-3 facilities (Radwaste Building, Reactor Containment, Auxiliary Building, and Turbine Building), performed confirmatory measurements of surface contamination and radiation dose rates. Licensee controls over locked high radiation areas and high radiation areas were examined. Selected locked high radiation areas and those with flashing lights were inspected for compliance with the Technical Specification (TS) 6.12.2 requirements. The licensee is using flushing and isolation methods for eliminating the need for locked high radiation areas.



f. Internal Exposure Control

The inspectors examined workers' use of respiratory protection equipment. Workers' selection of respirators, respirator inspection, and facial seal verification before entry into airborne radioactivity areas were observed. Radiological posting of airborne areas was also observed. The licensee's use of general area sampling and grab sampling for airborne radioactivity during specific work operations agreed with licensee procedures and industry guidance. The licensee activities observed appeared to comply with 10 CFR Part 20.103 requirements and industry practices.

g. Control of Radioactive Materials and Contamination, Surveys, and Monitoring

The inspectors examined completed radiation, contamination, and airborne radioactivity surveys, and observed the accomplishment of these radiological surveys. The inspectors determined that the licensee required that alpha contamination surveys be obtained whenever surface contamination exceeds a preset level.

The inspectors conducted confirmatory measurements of radiation dose rates and surface contamination levels (beta/gamma) in selected areas of Unit-3, see Section 3.d above. The inspector examined the contamination controls implemented for the breaching and disassembling of secondary steam supply system components (main steam isolation valves-MSIVs, low pressure turbines, etc.,). Confirmatory surface contamination monitoring was performed on MSIVs, combine intercept valve components and the internal surfaces of the low pressure turbines covers and moisture separators' manway covers. Documented licensee surveys were in agreement with the inspectors' finding of no detectable radioactivity (less than 100 counts per minute above background, using a standard GM type pancake probe held within a half inch of the surfaces being monitored).

Packaging, labeling, and control of radioactive materials were conducted according to licensee procedures and 10 CFR Part 20.203(f).

The inspectors reported to RP supervisors, and again at the Exit Meeting on March 22, 1991, the following observations concerning personnel cross contamination and hot particle control practices.

- . Of the observations made during the inspection regarding contamination control practices, RPTs exhibited the poorest practices.
- . During observations of the Unit-3 reactor containment entry/exit protective clothing undressing area (a posted contamination control area, requiring protective clothing) RPTs inside the area were observed handling previously used tape and protective clothing located in disposal bins, and then touching their hoods and handling other normally uncontaminated material (portable radiation monitoring instruments, walls, handrails,



etc.,) within the area and into containment without trying to minimize cross contamination.

During decontamination work on a platform within a hot particle zone (HPZ), an RPT was observed receiving survey swipes across the HPZ barrier wall from decontamination personnel within the HPZ. This type of transfer occurred at least three times during the inspectors' observation and each time the RPT was observed to be constantly adjusting his hood, and walking around the area (outside the HPZ) with the swipes out in the open. The RPT did not use a bag to carry the swipe nor did the RPT change protective clothes after handling the swipes. The inspectors' concerns were brought to the attention of a senior RPT nearby and the inspectors were assured that the RPT's contamination control practices would be corrected.

The inspectors discussed with senior RP staff representatives the possible ineffectiveness of the hot particle buffer zone placed at the normal entry/exit of posted HPZs (per 75RP-9RP06). The inspectors noted to the RP staff that, unless the handling of materials within an HPZ are conducted via the established buffer zone, using multiple bagging techniques and the frequent changing of outer rubber gloves, their hot particle controls might be compromised. The inspectors also noted to the licensee that having buffer zones that only partially encompassed HPZs negates effective hot particle control when activities with a potential for spreading hot particle are conducted at or near the perimeters not encompassed by the buffer zone. This aspect was critical when the HPZ borders a high traffic area, as was the area noted above.

Personnel using the automated half body monitors/friskers at the exit from the Auxiliary Building radiologically controlled area (140 foot elevation) exhibited poor monitoring practices, in that they frequently turned their face away from the detectors, wore large tool belts and portable two-way radios into the monitor. The inspectors also noted that obese persons using the automated whole body friskers may not have their entire torso properly monitored when using these whole body monitors. In the above noted observations the body seems farther away from the detectors than normally expected thus reducing the effectiveness of the units to detect radioactivity on a person's body. Inspectors also determined that personnel frisking practices were not monitored on a continuous basis and critiquing of poor practices was less than adequate.

The inspectors also discussed with RP staff members whether security guards or exiting workers were able to determine whether the walk through personnel contamination monitors at the exit to the protected area (Security Headquarters) were operational prior to use. The licensee confirmed to the inspectors that the monitors would not indicate a nonoperational status if the monitors' lost electrical power.



The licensee representative stated that they will address the observation.

The licensee's contamination control program was satisfactory for the most part; still, improvements in the areas noted above should be considered by the licensee.

The inspectors examined the preparations for the removal of a purification filter (CHN-F36) in the Auxiliary Building. The inspectors examined Radiation Exposure Permit No.: 3-91-1063-A, attended prework briefings, observed radiological control preparations in the work area, posting of the work area, selection and use of respiratory protection equipment, use of high range radiation exposure survey instruments, and the breaching and removal of the filter from the system.

No violations or deviations were identified in the area of the inspection.

4. Exit Meeting

The inspectors met with the licensee representatives identified in Section 1 of this report on March 22, 1991. The inspectors discussed the scope and findings of the inspection. The inspectors' concerns were acknowledged.

