

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-528/84-34

Docket No. 50-528

License No. CPPR-141

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

Facility Name: Palo Verde Nuclear Generating Station - Unit 1

Inspection at: Palo Verde Site - Wintersburg, Arizona

Inspection conducted: August 20-24, 1984 and telephone conversations  
on August 27-28, 1984

Inspectors: Conrad S. Sherman  
C. Sherman, Radiation Specialist

Sept 5, 1984  
Date Signed

Approved By: G. P. Yonas  
G. P. Yonas, Chief  
Reactor Radiation Protection Section

9/5/84  
Date Signed

Summary:

Inspection during the period of August 20-24, 1984 and telephone conversations on August 27-28, 1984 (Report No. 50-528/84-34)

Areas Inspected: Routine unannounced inspection of preoperational test of the Radiation Monitoring System and NUREG-0737 Items II.B.3 and II.F.1, follow-up on inspector identified items including item of deviation.

Results: Of the areas inspected, no items of noncompliance or deviations were identified.

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DETAILS

1. Persons Contacted - APS

- \*J. Allen, Operations Manager
- \*L. Brown, Radiation Protection and Chemistry Manager
- +\*B. Cederquist, Chemical Services Manager
  - K. Gross, Compliance Supervisor
  - L. Icard, Nuclear Engineering
  - M. Lantz, Radiation Protection Support Supervisor
- \*J. Mann, Corporate Health Physicist
- \*G. Perkins, Manager, Radiological Services
- \*C. Crackel, Compliance Engineer
- \*C. Russo, Manager, Audits and Monitoring
- \*W. Craig, Manager, Administrative/Technical Support
- \*A. Ramey, Quality Svstems Supervisor
- \*W. Ide, Director, Corporate Quality Assurance/Quality Control
- \*J. Rowland, I&C Supervisor
- \*R. Kimmel, Transition Group
- \*T. Bloom, Licensing Engineer
- \*D. Karner, Assistant Vice President, Nuclear Production
- \*D. Yows, Emergency Planning
- \*C. Emmett, Compliance Engineer
- \*P. Caffin, Quality Assurance Specialist
- \*T. Bloom, Licensing Engineer
  - J. Ong, Radiation Protection Engineer
  - R. Selman, ALARA Supervisor

Contractor Personnel

- D. Brown, Radiological Engineer
- M. Moon, Radiologica'l Engineer
- J. Balash, Engineer, Cal Test
- S. Schultz, Engineer

\*Denotes those individuals attending the exit interview on August 24, 1984.

+Denotes indiuidal participating in telephone conversations on August 27-28, 1984.

2. Action on Previous Inspection Findings

(Closed) (83-12-11): Inspector identified items regarding completion of startup test procedures for RMS. The inspector examined the following completed generic prerequisite test packages.

<u>DTS No.</u>	<u>Procedure</u>	<u>Instrument</u>
1SQ70-K011	92GU-OZZ63	1KSQNRE0142HG
1SQ70-K013	92GU-OZZ63	1KSQNRE0143G
1SQ70-K010	92GT-OZZ15	1KSQNRE0141

These procedures were examined in NRC Inspection Report Number 50-528/83-41. The procedures examined appeared completed as required. The licensee's program consists of the following prerequisite tests.

<u>Procedure</u>	<u>Title</u>
92GS-OZZ91	Model FU Beta Det Calibration
92GT-OZZ15	Process Monitor Leak Rate Test
92GU-OZZ33	Hygrometer Calibration
92GU-OZZ35	Wallace and Tiernan Flow Switches
92GU-OZZ42	Indicating Control Units
92GU-OZZ52	L.V. Power Supply and Battery Test
*92GU-OZZ58	NMC Gross Gamma Monitor Calibration
*92GU-OZZ59	NMC Spectrometer Calibration
92GU-OZZ60	Hasting Mass Flowmeter Calibration
92GU-OZZ61	Model FU Area Monitor Calibration
92GU-OZZ62	Model FU Gamma Det Calibration
92GU-OZZ63	FRN Beta Det Calibration
92GU-OZZ64	SCAM Monitor Calibration
92GU-OZZ70	HRN Gamma Det Calibration
92GU-OZZ73	HRH Monitor Calibration
92GU-OZZ99	MCAM Monitor Calibration

With the exception of those asterisked items, these tests are complete. The NMC monitor tests identified for retest regard the process letdown radiation monitor and are not a Technical Specification required monitor. In addition to the above tests, five preoperational tests are performed to meet the FSAR commitment of Chapter 14, test 14.B.26. Also described in NRC Inspection Report 50-528/83-41, these are identified as follows:

<u>Procedure</u>	<u>Title</u>
92PE-1SQ01	Minicomputer communications
92PE-1SQ02	Post Accident Monitoring Unit
92PE-1SQ03	Digital Radiation Monitors
92PE-1SQ04	Safety-Related Monitors
92PE-1SQ05	Portable, TSC, and EOF Monitors

The inspector examined selected portions of these tests in order to determine if they were conducted in accordance with the licensee's procedure governing test conduct, 90AC-OZZ02. This examination indicated that TCN's were properly authorized and approved, test procedures were properly issued, prerequisite tests were completed and test exceptions were properly logged.

The inspector also discussed status of these tests with the cognizant engineer. These test procedures were examined previously as described in NRC Inspection Report 50-528/83-41 for acceptability. Completion status of the test program is as described below:

Test Procedure 92PE-1SQ02, Post Accident Monitoring Unit Preoperational Test Procedure (PTP).

Eight test exceptions (TER) were generated that require spare parts to resolve, the licensee expects this test to be completed shortly after receipt of these parts.

Test Procedure 92PE-1SQ-03, Digital Radiation Monitoring System (PTP).

Two TERs generated involving sample flow control which are being resolved by a vendor modification.

Test Procedure 92PE-1SQ-04, Safety-Related Radiation Monitor PTP.

Several problems have prevented performance of this test including a mineral insulated cable failure on one of the high range in containment monitors. An environmental qualification problem with these devices is discussed in this paragraph under item 83-12-18.

Test Procedure 92PE-1SQ-05, Portable and PCA Radiation Monitors PTP.

Problems have been identified with the control and display units in the TSC and EOF.

Final approval of the system will require completion of the four specified tests and 92PE-1SQ01 which is an overall test to verify ability of the master computer to communicate with and control the local devices, completion and acceptance of test results for 92PE-1SQ02-05 are prerequisites for performance of 92PE-1SQ01. Based on review of test procedures, examination of completed generic tests, examination of preoperational tests in progress, conformance to test program requirements and review of outstanding test exceptions, this matter is considered closed. Satisfactory completion of the RMS and acceptance of test results will continue to be tracked by the inspector as part of the routine inspection program (Closed)(83-12-11).

The following inspector identified items from NRC emergency preparedness Inspection Report 50-528/83-14 have been examined and are considered closed based on coverage under the routine reactor radiation protection inspection program or are covered under another open item identified below.

(Closed)(83-14-11) Inspector identified item regarding a training course for chemistry personnel in the PASS. Based on examination of the 130 page training handout, completion of classroom training for nine individuals and preparation of training materials, this matter is considered closed. See also item 83-12-19.

(Closed)(83-14-15) Inspector identified item regarding installation and operation of PASS and status of backup capability for the PASS. This matter is covered under open items 50-528/83-12-19 and 20.

(Closed) (83-14-16) Inspector identified item regarding installation functional check and calibration of RMS. Installation and functional tests are considered complete as discussed above (83-12-11). Final completion of this system will be tracked under the routine inspection program and open item 50-528/83-12-12 regarding calibration.

(Closed) (83-12-09) (Open) (83-12-12) Open items regarding acceptability of transfer calibration data packages provided by the vendor. The licensee has obtained and reviewed the data. Contract personnel assigned to the radiation protection RMS task force have identified discrepancies in the data packages. By letters dated May 25, 1984 and July 31, 1984, the station manager has requested quality assurance assistance in resolving the data.

The inspector reviewed the calibration data for selected monitors and concluded that satisfactory information had been provided to assure a suitable transfer calibration provided the NBS traceability could be confirmed. This item will remain open until a licensee audit verifies acceptability of the calibration traceability records. The need for the licensee to insure veracity of data provided by the vendor was discussed at the exit interview.

(Closed) (83-12-13) (83-30-02) Inspector identified items regarding type of radiation detector used in effluent monitors and energy response of high range noble gas detector channels. FSAR amendment 12 dated February 1984 provided the correct description. The inspector examined DCP ISNSQ030 and SWA 18754 which provided the modification committed to by the licensee regarding these detectors. This work was completed May 31, 1984. The inspector had no further questions on this matter.

(Open) (83-12-14) An inspector identified item regarding the need to review vendor calibration data in light of the requirements to relate monitor readings to equivalent Xe-133 concentration or uCi/cc actual noble gas. The licensee has addressed this issue using a 20 minute shutdown mixture but has not yet completed preparation of emergency procedures providing correction factors for a continuously variable mixture. This item will be examined in a subsequent inspection.

(Open) (83-12-15) Inspector identified item regarding main steam line radiation monitor shield, shielding analysis and correction factors for low energy photons. The inspector examined vendor drawing number 400539 (N997-200-3) which provides the shield design, in addition Bechtel calculation 13-NC-ZY-236 sheets 1-38, approved September 3, 1982 was examined. These calculations appeared to meet the LLIR commitment. The results indicate a range of dose rate varying with time of 60,000 to 1 for a noble gas release and 2600 to 1 for noble gas and iodine. The licensee provides for correction of the main steam line monitor reading in EPIP-14. The present EPIP provides different correction factors than those described above. The correction factors provided were based on calculations performed by Stone and Webster. The inspector has previously raised questions regarding these correction factors. The Bechtel data and Stone and Webster calculations are in direct conflict and appear to confirm the inspectors observations that the correction factors included in EPIP-14 are in error.

At the exit interview, the licensee was informed that these correction factors were an integral part of the main steam line monitor requirements. This item will be examined during a subsequent inspection.

(Open)(83-12-16) Inspector identified item consisting of four parts regarding NUREG-0737 item II.F.1 attachment 2.

(Item 1) - Procedure for handling of post-accident samples were not complete.

(Item 2) - Methods for onsite analysis and evaluation had not be developed.

(Item 3) - Radiation exposures from the plant vent had not been considered in evaluating exposure from retrieval of samples.

(Item 4) - Regarding provisions for automatic sequencing of particulate and iodine filter assemblies, based on radiation levels. The licensee has not finalized appropriate initiating radiation levels for sequencing filters.

The licensee has written procedures for items 1 and 2, however, the licensee considers these inadequate and is revising these procedures. Regarding item 3, the inspector examined a draft document providing a summary of calculations performed by Bechtel which gave projected radiation dose rates in the area of the plant vent ventilation exhaust monitor. The primary source will be from containment with a small contribution from the plant vent. With mini purge secured, the projected dose rate is 2.7 R/hour. If the mini purge is opened by operator action, the dose rate could increase to 20 R/hr. This maximum dose rate with mini purge operating following a LOCA is considered acceptable to meet GDC19 for retrieval of samples.

The setpoint for filter cartridge switch over has been established at 9R/hr. Vendor analysis of exposure for retrieving one filter cartridge in KAMAN Instrumentation Document 82-25U(R) indicates a total dose of 19 mR from the source within the monitor. This area will remain open pending satisfactory completion of items one and two.

(Closed)(83-12-17) Inspector identified item consisting of seven parts involving isokinetic sampling

(Item 1) Flow control and measurement for isokinetic sampling. The licensee has committed to NRR to install flow sensors in effluent release ducts. The licensee indicated that DCP ISNSQ032, 033, 034 will install full range ventilation flow monitoring on the Fuel Building, plant vent and main condenser gland seal exhaust ventilation systems, respectively. This modification will provide flow information to the RMS and CRACS. The RMS will use the information for automatic sample flow control and for updating the integrated radiation release rates display for each effluent point. The timeliness of this installation will be established by an NRR requirement. The inspector had no further questions on this matter.

(Item 2) The licensee plans are to perform a plateout test on the sample lines for the Plant Vent and Containment Atmosphere Radiation Monitors. The licensee plans to use the results of this test to modify Bechtel calculations that determined plateout correction factors. The licensee

plans to test the plant vent and containment atmosphere sample lines only. This matter is closed based on licensee's commitment as discussed in paragraph 3 of this report.

(Item 3) Location of the plant vent sample point. The licensee position is as follows:

The Plant Vent Radiation Monitor is currently located on the highest easily accessible level in the Turbine Building. The sample line is as short as possible, less than 10 feet. The plant vent is a rectangular, not circular duct. This has required a sample assembly that has multiple orifices on multiple probes. In fact, there are three probes with a total of 18 orifices. All probes combine to a single sample line.

The plant vent duct work uses flow straightening vanes at the last bend prior to the sample probe to assist in stabilizing the flow. As shown in drawing 13-P-ZTC-405, the sample is 3 duct diameters downstream of the last bend.

This difference in actual to recommended location is believed by the licensee to be acceptable because it is a compromise between monitor accessibility, sample line length and probe location.

Based on examination and concurrence with of the licensee's position and the commitment to perform sample system plateout tests, this matter is considered closed.

(Item 4) Heat tracing of sample lines. The licensee will review the need to install heat tracing based on the results of plateout tests. Regarding the condenser vacuum/gland seal exhaust monitor, a modification has been initiated which includes the replacement of the carbon steel sample line with stainless steel, replacement of the inlet sample isolation globe valve with a gate valve and pipe routing using only 5 diameter radius bends.

(Item 5) Plateout testing and evaluation of flow conditions. The licensee discussed this matter with the inspector by telephone on May 24, 1984, and agreed to provide plans for plateout testing to the inspector prior to performance of the tests. At present, the licensee has selected a vendor to perform the tests but has not finalized the scope and details of the test program. This matter is considered closed based on licensee commitments in response to a notice of deviation. See also paragraph 3.

(Item 6) The licensee is installing grab sample points and has built grab sample carts. In addition, a procedure has been prepared for this area.

(Item 7) Regarding possible leakage of the air filter and cartridge, the licensee has examined and resolved this area. The inspector had no further questions regarding this matter.

(Open)(83-12-18) Inspector identified item regarding environmental qualification of the in-containment high range monitor. The licensee

indicated that the seal between the cable and the monitor connector has failed environmental qualification tests and that satisfactory resolution would likely be a long lead time item. The licensee has proposed an interim compensatory measure using radiation monitors outside containment and a calculational procedure to relate the reading outside containment to that inside. The inspector informed the licensee that this matter should be referred to NRR. This matter will also be referred to NRR by RV for their consideration prior to issuance of an operating license.

(Open)(83-12-19) Post-Accident Sampling System (PASS). The licensee provided information regarding PASS status to the inspector. PASS status is as follows.

- ° Vendor has completed the initial onsite demonstration test. Based on these test results problems were identified in pressure and temperature reduction components and in some solenoid valves. The test demonstrated ability of the system to provide proper flows to the various sample and analytical modules.
- ° The licensee plans a second vendor demonstration prior to acceptance of the system. This test is presently scheduled for performance prior to issuance of the operating license.
- ° The licensee has prepared draft procedures for testing the system and demonstrating operational availability. The inspector examined a draft of the PASS operational performance test 74HF-1SS03 Rev. 0, which will be conducted in accordance with 70ACOZZ18, Operations Test Conduct. This PASS test provides for testing of all PASS functions and contains analytical acceptance criteria considered satisfactory by the inspector.
- ° The licensee has completed classroom training for nine persons and will complete on job training during the operational availability demonstration.
- ° The PASS program is being developed.

Regarding PASS analytical capabilities, the licensee provides analytical capabilities essentially as described in the LLIR. For dissolved gases in the RCS the following capabilities are provided with in line analytical instrumentation.

- ° Dissolved Oxygen, range 0-20 ppm
- ° Total Gas, range 0-2000 cc/kg

The system does not presently have the capability to take pressurized grab samples so that backup gas capabilities are retained.

In the PVNGS Lesson Learned Implementation Report (LLIR) item II.B.3, Amendment 2, page 8 states, "Grab samples are available from the hot lab in either a depressurized, diluted, or pressurized sample device." The NRC SER page 22-13 states, "In-line analysis will be backed up by grab sample capability in either a depressurized, diluted, or pressurized sample device. "



NUREG-0737 item II.B.3, clarification 8 presents criteria for backup sample capability when in line analytical capabilities are used. Based on inspection findings and subsequent telephone conversation on August 27 and 28, the licensee confirmed that backup capability to perform the total gas and dissolved oxygen analysis do not presently exist. The need to provide this capability, either preferably as a pressurized grab sample or as a grab sample of evolved gas from RCS liquid was discussed with the cognizant licensee representative. This matter will be referred to NRR for their consideration prior to issuance of the operating license. This item will be examined further during a subsequent inspection.

(Open)(83-12-20) Inspector identified item regarding availability of backup capability for the PASS in line instrumentation. NUREG-0737 item II.B.3, clarification 8 specifies the requirement for backup capability. At the time of this inspection, the licensee planned to utilize the Unit 2 chemistry laboratory to provide this capability. At the exit interview, the inspector indicated that this facility will need to be incorporated into the Unit 1 operating license and the inspector reiterated concerns expressed in previous NRC Inspection Report 50-528/84-31 regarding ventilation, shielding, effluent sampling or monitoring and waste handling.

### 3. Licensee Action on Items of Deviation

(Closed)(83-41-02) Item of deviation regarding failure to perform tests of sample system plateout. By letter dated March 23, 1984, the licensee stated their commitment to perform plateout tests to verify calculations of plateout factors. At the time of the inspection, the licensee had selected a vendor to perform the tests and was in the final stages of defining the test program. The inspector examined a memorandum, G. Perkins to J. Rowland, Subject; Guidelines for Particulate Deposition and Plateout Studies in RMS sample lines, dated August 8, 1984. This document sets forth an approach satisfactory to the inspector for responding to questions raised in previous NRC Inspection Reports 50-528/83-12, 28, 30 and 41. The licensee agreed to provide the inspector a copy of the finalized test program. Based on the licensee's response to date, the inspector had no further questions on this matter.

(Closed)(83-41-01) Item of deviation regarding failure to sample the Fuel Building ventilation exhaust system isokinetically. By letter dated April 30, 1984, the licensee stated their commitment to alter the Fuel Building Exhaust sample system by providing for isokinetic sampling and relocating the sample probe. The licensee has completed design and begun construction on two DCPs ISN-SQ-036 and ISN-SQ-034. The inspector had no further questions on this matter.

### 4. Radiation Monitoring System

Status of the RMS test program was described previously in this report.

The PVNGS FSAR Section 11.5.11.2 states that continuous recording of gaseous radioactivity levels will be provided, further the PVNGS LLIR states that hard copy readouts are available from dedicated printers in

the HP office and control room. The inspector discussed with several licensee representatives the provisions for obtaining records of effluent radioactivity levels from the RMS. This capability is only provided by the Chemical and Radiological Analysis Computer System (CRACS). As indicated in NRC Inspection Report 84-31, alternate capabilities have been provided for CRACS functions, however, no alternate capability exists for recording effluent radioactivity levels.

10 CFR 20.106 defines the requirement for limiting releases of radioactive material to unrestricted areas. 10 CFR 20.201(b) specifies the requirement to measure releases of radioactive materials ("surveys as...necessary...to comply") and §20.401b requires that each licensee shall maintain records in the same units used in this part, showing the results of surveys required by §20.201(b) and §20.401(c)(2) provides the record maintenance period. As previously stated, the licensee's present ability to produce these records in other than a manual fashion depends wholly on the operation of CRACS.

In addition to the Part 20 requirements, 10 CFR 50.72 requires reports to the NRC based on effluent levels averaged over one hour and Standard Radiological Effluent Technical Specifications (RETS) generally place an instantaneous limit on release rate on gaseous effluents. Part 50, Appendix E, IV, D.3 requires a 15 minute notification after declaration of an emergency.

In order for the licensee to demonstrate compliance with commission regulations and to meet the recordkeeping requirement of 10 CFR 20, the licensee must produce permanent records of effluent releases. The licensee RMS does not record continuous effluent radioactivity levels but rather averages of 10 minute, 1 hour and 1 day effluent concentrations are recorded. In the inspectors judgement, satisfactory demonstration of compliance appears to require permanent records be maintained of at minimum, the 10 minute average release levels for each release point. The inspector indicated at the exit interview that this capability would be expected to be provided and if not resolved favorably, that the matter would be referred to NRR for their consideration in issuance of an operating license.

The inspector examined procedures which provide Technical Specification required surveillances on the RMS channels. This area was satisfactory.

The inspector also examined the final report of a consultant to the RMS task force. This report identified several new concerns not previously raised by the licensee or the vendor. Engineering Evaluation Request (EERs) have been initiated for most of these. The remaining items are being resolved by other means including response to the NRC. Based on the inspectors review and discussions, the operational radiation protection group appears to be adequately involved in review, test and operation of the Radiation Monitoring System at this time.

No violations or deviations were identified.

5. Exit Interview

The scope and findings of the inspection were discussed on August 24, 1984 with the individuals denoted in paragraph 1.

Items to be satisfactorily resolved prior to operating license issuance were identified and discussed including:

- ° Completion of RMS Preoperational Test
- ° Resolving Deficiencies in Transfer Calibration Data
- ° Resolution of Main Steam Line Monitor Correction Factors
- ° Environmental Qualification of High Range In-Containment Monitor
- ° Radiation Monitoring System Data Recording.