

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-528/90-55, 50-529/90-55 and 50-530/90-55

License Nos. NPF-41, NPF-51 and NPF-74

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

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

Inspection at: Wintersburg, Arizona

Inspection conducted: December 17 through 21, 1990

Inspection by: G.P. Yuhas for 1/16/91  
Louis C. Carson II, Radiation Specialist Date Signed

Approved by: GP Yuhas 1/16/91  
Gregory P. Yuhas, Chief Date Signed  
Reactor Radiological Protection Branch

Summary:

Areas Inspected:

Routine unannounced inspection covering occupational exposure during extended outages and facility tours. Inspection procedures 83729 and 30703 were addressed.

Results:

Radiation protection (RP) planning and preparations for controlling work during Unit-1 surveillance test outage were adequate. Two violations were identified, one of which was considered a non-cited violation (NCV). The NCV was for authorizing a worker to exceed the NRC quarterly limit of 1.25 rem without certifying his occupational exposure as required by 10 CFR 20.102(b)(1), (see Section 2.c). The other violation was for allowing workers into the reactor containment during power operations without performing tritium (H-3) air sampling as required by 10 CFR 20.103(a)(3), (see Section 2d). A weakness was identified in the bioassay program in that procedures do not address H-3 sampling for chemistry technicians in the random sampling program. The ALARA Outage Reports (Units 1 and 2) and the Corporate Annual ALARA Report have not been completed as recommended by licensee procedures.

## DETAILS

### 1. Persons Contacted

#### a. Licensee Personnel

- \* P. W. Hughes, General Manager, Site Radiation Protection
- \* K. R. Oberdorf, Manager, Radiation Protection Unit-1
- \* G. R. Overbeck, Director, Site Technical Support
- \* T. R. Bradish, Manager, Compliance
- \* R. J. Adney, Plant Manager, Unit-3
- \* W. H. Barley, Acting Manager, Technical Services
- \* W. E. Sneed, Manager, Radiation Protection Unit-3
- \* M. D. Shea, Manager, Radiation Protection Unit-2
- \* R. J. Hazelwood, Supervisor, Quality Assurance (QA)
- \* T. E. Trieckel, Supervisor, Unit-3 Outage
- \* S. J. Grier, Manager, Procurement Engineering
- \* D. L. Kanitz, Compliance Engineer
- \* M. W. Lantz, Supervisor, Dosimetry
- \* R. F. Schaller, Assistant Plant Manager, Unit-1
- \* K. M. Coon, Supervisor, Unit ALARA/RP Work Control
- \* M. S. Sexton, Training Coordinator, RP/RW
- \* D. R. Larkin, Compliance Engineer

#### b. NRC

D. Coe, Sr. Resident Inspector  
J. Sloan, Resident Inspector

- \* Denotes those personnel in attendance at the exit interview held on December 21, 1990.

In addition the inspector met and held discussions with other licensee personnel.

### 2. Occupational Exposure During Extended Outages (MC 83729)

#### a. Audits

The inspector reviewed PVNGS QA audits and other self-appraisals that assessed the quality of the ALARA program, outage planning and work control activities. The inspector selected the following reports for review:

- . QA Audit Report No. 90-005, "Refueling Operations", 10/23/90
- . QA Audit Report No. 90-011, "Radiation Protection & RP Training, 8/20/90
- . Radiological Trending Report for October 1990
- . Quality Deficiency Report (QDR) No. 90-0379, 10/1/90
- . QDR No. 90-0276, 7/19/90
- . ALARA Problem Report No. 90-011, 7/19/90

licensee identified findings, corrective actions and auditing methods were discussed with QA, radiological engineering, outage planning, ALARA/RP work control and RP management. QA plans to conduct 26 radiation protection audit activities during the first quarter of 1991. There was one inspector observation related to the depth of QA Audit Checklist No. 90-011-016. Based on the QA Audit Checklist 90-11-016, only the procedure 75RP-9RP03, "Bioassay Analysis" and Regulatory Guide 8.9, "Acceptable Concepts, Models, Equations and Assumptions for a Bioassay Program", were used to determine program adequacy. This audit did not reference Regulatory Guide 8.32, "Criteria for Establishing a Tritium Bioassay Program" and did not discover the deficiencies involving tritium (H-3) analysis discussed in Section d of this report.

A previous PVNGS QA audit program finding did address several inspector observations noted during this inspection. QDR No. 90-0379 expressed that a number of unit RP ALARA reviews were not conducted and were not timely in taking corrective actions to reduce exposures. The inspector had commented to RP management that routine job REPs appeared to account for as much 50% of the total unit personnel exposure. Based on reviews of routine REP work conducted in 1990, the inspector concluded that those REPs did not have the equivalent ALARA pre-job and post-job reviews that non-routine 10 man-rem jobs receive. Licensee RP management stated that corrective actions on this observation had been taken. The inspector reviewed the corrective actions listed in QDR No. 90-0379. The QDR identified the cause of deficiencies with routine REPs implementing effective dose reduction processes. QA concluded that the site lacked a standard method of review and documentation. Procedure 75RP-9Z744, now 75RP-9RP02 "Radiation Exposure Permit", was scheduled to have the changes in the one man-rem routine REP dose reduction process incorporated by 1/1/91.

The licensee's audits and self-appraisals examined by the inspector satisfactorily provides PVNGS management with a capable tool for measuring the quality and performance of the RP outage and ALARA activities conducted by licensee personnel. No violations or deviations were identified.

b. Planning and Preparation for the Unit-1 Surveillance Test Outage

RP Task Team Plan

The inspector reviewed the licensee's plans and preparations for the Unit-1 surveillance test outage scheduled for 1/14/90. Discussions of outage related activities were held with licensee staff which included, the Unit-1 ALARA/RP work control supervisor, ALARA/RP outage planning & radiological engineering, RP/RW (radwaste) training coordinator, RP project/budget coordinator and dosimetry supervision. Overall, the number of actual planned activities were still undetermined by the site outage planning management (SOPM) at the conclusion of this inspection. This appears to be one of the reasons that ALARA/outage planning has not set a firm outage man-rem goal. However, the RP Unit-1 ALARA/RP work control (ARPWC) group

and ALARA outage planning group appears to be prepared and flexible for any contingency that SOPM may present. A preliminary man-rem goal of 120 was based on whether the licensee had to perform eddy current testing on the Unit-1 steam generators (SG-ECT). This estimate could be cut in half if the SG-ECT is not performed. Some 130 local leak rate test (LLRT) are expected to expend 5 man-rem. According to ARPWC, a previous weakness in the program was that each planned activity by SOPM was thought to require a radiation protection technician (RPT) whenever a REP was assigned. This in turn created an inefficient use of RP resources and subsequently caused the cancellation of outage activities due to inadequate RP coverage. In preparation for outages, ARPWC now approaches SOPM task coordinator for list of proposed outage activities. Unit-1 ARPWC designed a program that sorts the outage activities by actual facility location, room and equipment number. The Unit-1 ARPWC explained that this program now has the following capabilities:

- . RP can determine REP needs prior to the start of the outage and assign REPs to work orders based on advanced notice.
- . RP can more accurately determine man-rem estimates because the total manhours in an area per job can be derived ahead of time.
- . The coordination between ARPWC and SOPM assigning work by location instead of by system has increased the outage efficiency and will reduce exposure and radwaste.

The current ARPWC plan for providing the RPT support includes the utilization of a team concept. RP crews will be assigned to a task group as part of a team. For example, the LLRT team will have a work package with specific task information on all planned LLRTs and locations. RP management feels that this team concept will lead to increased cooperation and morale.

#### Outage Personnel

The inspector reviewed the contract RPT requirements and qualifications as spelled out in Contract No. PV90-21182. Ninety-one radiological contract personnel are currently scheduled to support the Unit-1 Outage; 38 Sr. RPTs, 22 Jr. RPTs, 16 decontamination technicians, 5 Sr. RWTs, 8 RW helpers and 2 dosimetry technicians. According to the RW/RP training coordinator and the dosimetry scheduler, all radiological contractors are expected to be on-site by 1/7/91. Additionally, there will be 20 QA/QC contractors and 300 craft personnel to support the Unit-1 Outage. Eventually, these workers will be part of a 1000 person Unit-3 Refueling Outage in March 1991. The dosimetry scheduler was setting up dosimetry, site access training, security badging, respirator training, RP/general employee training and medical/psychological examinations for all PVNGS personnel. The inspector concluded that contract outage support plans and readiness are adequate.

### Training Contract RPTs

The licensee required that the contractors meet the ANSI. N 3.1-1978 qualifications at minimum to be considered for a Sr. RPT outage position. Discussions were held with the RP/RW training coordinator and an examination of the "Radiation Protection Technician Qualification Requirements & Training Program Description", Procedure 15DP-OTR45 was conducted. Section 3.4 of Procedure 15DP-OTR45 entitled, "Contractor Training Requirements" establishes the minimum contractor outage training criteria that will allow that contract RPT to work independently as a Sr. RPT. NRC Region V Report No. 50-529/90-13 previously addressed concerns that Jr. RPTs were allowed to perform Sr. RPTs work for on-the-job training (OJT). Licensee RP management assured the inspector that under the contractor training program Sr. RPTs shall take:

- . a contractor pre-hire examination
- . PVNGS RP instrument training
- . radiological surveillance training
- . radiological incident training

Only after the contract RPT passes all the examinations, including the 40 hours of specific training listed above will that individual be considered a Sr. RPT. The licensee representative expects that 28 contract Sr. RPTs will be ready for outage support activities by 1/7/91. The requirements for training contract Jr. RPTs were not complete at the time of this inspection. However, the plan will provide Jr. RPTs with at least 16 hours of training in some of the areas that the Sr. RPTs require. The Jr. RPT training will be directed towards two task groups, dosimetry and survey/access control. The contract Jr. RPT program is being planned for incorporation into procedure 15DP-OTR45. According to the training coordinator, a Jr. RPT can perform OJT activities under Sr. RPT supervision if and only if RP management specifically chooses that person to train under a selected RP task.

No violations or deviations identified.

#### c. External Exposure Controls

##### Dosimetry

The dosimetry supervisor and dosimetry staff specialist provided records and data of performance evaluations on the personnel monitoring program. Discussions held with the dosimetry personnel revealed that they were knowledgeable on the requirements of their program. The inspector determined if the dosimetry group was in compliance with 10 CFR 20.202, "Personnel Monitoring", by establishing the extent to which they followed these procedures:

- . 75PR-ORP01, "Radiation Protection Program"
- . 75RP-9ME24, "Dosimetry Processing, Evaluation & Documentation"
- . 75RP-9ME26, "Dosimetry Performance Testing"

- . 75RP-9ZZ11, "Special Dosimetry"
- . 75RP-9ZZ12, "Lost/Damaged Dosimetry Reports"

The inspector found no problems in the administration of personnel monitoring and dosimetry program quality controls. The dosimetry personnel indicated that they are pursuing a stronger self-auditing program. Dosimetry representatives stated that they were attempting to improve the quality of the radiological records. The inspector verified that the National Voluntary Laboratory Accreditation Program (NVLAP) certificate was current to 10/1/91.

The inspector examined data from procedure 75RP-9ZZ14, "TLD Area Monitoring" to determine if radiation levels outside the radiation control areas (RCAs) and within the owner controlled areas had a net exposure rate of less than 0.6 mR/hr. The TLD Area Monitoring procedure had a dosimetry supervisor action limit of 300 microRoentgen/hour ( $\mu$ R/hr). This is equivalent to 0.3mR/hr. The dosimetry supervisor explained that the TLDs located in several locations at the Dry Active Waste Processing and Storage (DAWPS) area required investigation to bring the radiation levels below the August and September 1990 bi-monthly reading of 232.1 mrem.

There were no violations or deviations identified.

#### Exposure Reports

The inspector reviewed these exposure reports:

- . PVNGS Third Quarter 1990 Personnel Monitoring Report 11/29/90
- . RRACS Statistical Summary Report (SSR)1990 as of 12/18/90
- . RRACS NRC Regulatory Guide (R.G.) 1.16 Report as of 12/19/90
- . Radiological Trending Summary Report for 10/90
- . SID Trending Report 12/16/90

The SSR indicated that 42.9% of the individuals in 1990 had received measurable whole body exposures as compared with 52.2% in 1989 and 56.7% in 1988. 1 individual had an accumulated exposure of 2 rem in 1990 as compared to 6 in 1989 and 43 in 1988. The Radiological Trending report was critical of Unit-1 exposures and contaminations. The report pointed out that a thermoluminescent dosimeter(TLD) study of radiological control areas in all three units was underway. Also, a radiation exposure comparison study was ongoing during this inspection. The licensee's RP program was beginning to analyze radiological data and trending data to develop additional exposure reduction techniques in order to benefit Units 1, 2 and 3.

#### Exposure Records

The licensee's Special Dosimetry Log for 1990 to date was reviewed. This log contained the results of multiple dosimeters assigned to workers for particular tasks. The data included each individual's identity, the REP number, self indicating dosimeter results, TLD results and assigned dose for entry on their NRC Form 5 equivalent.

From this review, the records of the workers were checked to verify compliance with 10 CFR 20.101, .102, .103, .401 and .408.

One observation was brought to the new dosimetry supervisor's attention. 10 CFR 20.101(b) states that a licensee may permit an individual to receive a whole body dose greater than 1.25 rem provided three specific conditions are met. One condition (10 CFR 20.101(b)(3)) is that the licensee has determined the worker's accumulated occupational dose to the whole body on a Form NRC-4 or equivalent in accordance with 10 CFR 20.102.

In the case of one worker, a Form NRC-4 was signed on 12/14/83. The individual has continued his employment with the licensee and was authorized to receive more than 1.25 rem during the second calendar quarter of 1990. The licensee's procedure 75AC-9RPC1, "Radiation Exposure and Access Control" sets out in Section 3.10 how requests to exceed the exposure limits are to be processed. The procedure does not specifically require that the worker be contacted to provide each period of employment in which they received occupational radiation exposure prior to exceeding the dose limit. 10 CFR 20.102(b)(1) specifically requires this information and that the individual sign the statement. In the case of this worker, the licensee assumed that since the individual had been employed by PVNGS since 1983, and since procedure 75AC-9RPC1 makes it a responsibility of each individual to inform dosimetry of any occupational exposure received at any offsite facility, that it was not necessary to complete the NRC Form 4 process again.

When this weakness was brought to the licensee's attention they contacted the worker and confirmed that he had not received any occupational radiation exposure other than at the licensee's facility since 1983. The inspector contacted the worker to determine if the licensee had asked him about any other occupational exposure he might have received since 1983 prior to exceeding 1.25 rem. The worker stated that he could not recall if anyone had asked him that question prior to receiving his second quarter dose. The licensee stated that they had initiated action to revise their procedure to assure that each individual will sign the "Request for Exceeding Administrative Exposure Limits" to indicate that all periods of occupational radiation exposure are accounted for in the determination of accumulated occupational dose.

Failure to determine an individual's accumulated occupational exposure consistent with 10 CFR 20.102(b)(1) prior to exceeding 1.25 rem during the second calendar quarter of 1990 represents an apparent violation. The violation is not being cited because the criteria specified in Section V.A. of the Enforcement Policy were satisfied (50-528/90-55-01).

### ALARA & External Exposure

The licensee disclosed that in early October 1990 PVNGS management decided that selected surveillance tests (ST) would be conducted before the planned Unit-1 ST Outage scheduled for 1/14/91. According to the radiation protection group (RP), PVNGS management regarded containment entries during power operations to conduct routine work activities as standard industry practice. Therefore, the licensee concluded that STs inside containment at power could be performed in order to minimize outage time.

Between 10/21/90 and 12/17/90 the radiological records access control system (RRACS) Look/Log Report identified that 49 individuals made containment entries during power operations. The inspector examined the extent of radiological controls and planning associated with the ST containment entries. The inspector discussed the RP details of ST work with the Unit-1 RP manager (RPM) and the Supervisor, Unit-1 ALARA/RP Work Control (ARPWC). By the middle of October 1990 a list of proposed containment STs to be performed during power operations was submitted to ARPWC. The list was also submitted to the instrument & controls (I&C) supervisor who was responsible for providing ARPWC the estimated man-hours, specific containment locations of equipment and estimated time of specific ST activities. ARPWC calculated an estimated man-rem value from the I&C ST information, Unit-1 radiological start-up data, and real time radiological survey data by 10/22/90. The ARPWC projected external radiation exposure for some 56 containment STs was 0.920 man-rem. The ST work started 11/28/90 and as of 12/19/90 the total exposure attributed to the ST work under REP 1-90-2522A was 0.135 man-rem. The projected time to complete the containment STs was 150 man-hours. They had used 141 man-hours to date. The percent completion of the ST work was not determined at the time of this inspection. Nevertheless, the ALARA planning aspects of external radiation exposure appeared to be adequate.

#### d. Internal Exposure Control

##### ALARA & Internal Exposure

The inspector examined the licensee's program for implementing airborne radioactive material controls. Particularly of interest were the licensee's air sampling measurement and evaluations associated with containment entries during power operations. The inspector examined radiological controls specified on two of the REPs associated with containment entry activities at power. REP 1-90-0073, "Containment: RP pre-job surveys all modes" and REP 1-90-2522A, "Perform I&C STs in containment outside biowall" were examined. On 12/13/90, three entries were made into containment under REP 1-90-0073. The inspector asked the radiation protection technician (RPT) the reason for this entry into containment at that time. The reply was to perform radiation surveys and to search for a water leak associated with an iodine-131 activity build-up. According to Unit-1 RP, air sample data from inside containment at the I&C ST area and the RU-1 grab sample for containment atmosphere



on 12/13/90, showed I-131 activities were 5.62% and 3.62% of 1 maximum permissible concentration (MPC) in air ( $9.0E-9$  uCi/cc). The inspector compared those I-131 activities to a chemistry effluent release permit data from 12/3/90 and another RP RU-1 grab air sample on 12/16/90. Those I-131 activities were 11.0% and 8.56% of 1 MPC I-131. The inspector compared the I-131 results from 12/16/90 (11:40pm) 8.56% MPC I-131 to the RU-1 containment chemistry effluent permit from 12/15/90 (11:00 pm) 0.46%.

REP 1-90-2522A recorded 38 containment entries at power associated with I&C STs from 11/28/90 to 12/17/90. Further examination of both REPs revealed that there were no requirements for determining gross airborne activity under radiological conditions section of the REP. The MPCs for noble gases, particulates and iodine were to be determined during containment entry for both REPs. REP 1-90-0073 specifically requested that RP air samples be taken from the RU-1 grab sample. The inspector examined five RP containment air samples taken between 12/12/90 and 12/16/90. The samples were evaluated for noble gases, particulates and iodines in accordance with procedure 75RP-9RP021, "Airborne Radioactivity Sampling Methodology, Evaluation and Exposure Tracking."

None of the Unit-1 RP air samples examined were taken to measure for tritium (H-3) concentrations in containment air. This was significant because the inspector's examination of chemistry effluent Release Permit No. 901248 (12/15/90) for a non-standard containment purge revealed a H-3 concentration of  $4.99E-6$  uCi/cc (99.8% MPC). According to 10 CFR 20, Appendix B, Table I, one MPC H-3 is  $5.0E-6$  uCi/cc in air. The inspector reviewed Unit-1 chemistry's Airborne H-3 Calculation Sheet dated 12/15/90, Liquid Scintillator H-3 Activity Determination Sheets (12/13/90 - 12/20/90) and the Miscellaneous Effluents Log (10/11/90 - 12/19/90). It was apparent that chemistry supervision could have notified RP supervision by 2:00 pm 12/15/90 that the H-3 concentration inside of containment was in excess of 25% MPC. The inspector discussed the 12/15/90 H-3 findings with Unit-1 chemistry and the lead RPT on duty the night of 12/18/90 to determine what mechanism existed for both groups to communicate radiological information to one another. The inspector reviewed the following:

- . Gamma Isotopic Request Forms 6/20/90 - 12/19/90
- . Radiation Protection Log 10/27/90 - 12/20/90
- . RP Turnover Checklist 12/19/90
- . Mode 1 & 2 Containment Entry Authorizations 9/27/90 - 12/11/90

Only the RP Turnover Checklist entry on 12/19/90 had a comment from chemistry on the containment H-3 air sample results of 12/15/90 being  $4.99E-6$  uCi/cc. Additionally, the inspector found six chemistry log entries indicating measurable amounts of H-3 in containment between 10/27/90 and 12/15/90; ranging from 17.2% MPC ( $8.59E-7$  uCi/cc) to 558% MPC ( $2.79E-5$  uCi/cc). The inspector did not find nor did the licensee provide any information to support that the Unit-1 RP group initiated sampling under procedure 75RP-9RP21, Section 6.4, "Tritium Sampling".

On 12/17/90 the licensee allowed three individuals under REP 1-90-2522A to work on I&C STs inside of the Unit-1 Containment Building during full power operations. There were no measurements or evaluations for H-3 taken in the containment atmosphere and no assessments of the worker's exposure recorded. This was an apparent violation of 10 CFR 20.103(a)(3), (50-528/90-55-02).

The inspector probed further into the licensee's administrative and procedural mechanisms that were supposed to provide Unit-1 RP with the direction to perform H-3 measurements. The following observations were noted:

- Procedure 75RP-9RP21, Section 6.4, only gave directions on how to perform H-3 sampling, not when it was required to perform H-3 sampling.
- Section 6.4 noted that when sampling from the RU-1 grab sample, refer to procedure 75RP-9ZZ64, "RMS Radioactive Sample Collections". This procedure was a chemistry procedure, not an RP procedure because RU-1 is part of the radiat system under the cognizance of chemistry.
- Section 6.4 instructed RP to deliver the H-3 sample to chemistry for analysis and inform chemistry. According to chemistry personnel all H-3 analysis had to be run on their liquid scintillator and this required that RP complete a request form. The inspector's review of six months of chemistry request records did not turn up any request forms from RP.
- Procedure 75RP-9ZZ64 provided the chemistry group with instructions for performing H-3 from the RU-1 grab sample. However, there were no formal processes requiring chemistry to transfer pertinent radiological data to RP.
- Procedure 75RP-9RP21, Section 6.5, "MPC Calculations" provided RP with instructions for determining the MPCs of sampled airborne radioactivity based solely on gamma isotopic analysis, not by any other means such as liquid scintillation.
- Procedure 75RP-9RP21, Section 6.6, "Tracking of MPC-Hours" did not provide a means to add H-3 MPCs into the MPC total exposure. Additionally, the Appendix C, "Exposure Tracking Record" which the dosimetry group used for documentation did not have a section for recording H-3 exposures.

The inspector discussed these findings with the General Manager, Site RP and other RP management. The licensee agreed with the inspector's findings and promptly initiated the appropriate procedure changes. The inspector explained to the licensee that the violation against 10 CFR 20.103(a)(3) potentially could have been against the Technical Specifications (i.e., TS 6.11.1 or TS 6.8.1(a)). However, collectively these procedural weaknesses contributed to the actual oversight resulting in a failure to measure H-3.

### H-3 and the Bioassay Program

The inspector examined the licensee's bioassay program which is implemented by procedure 75RP-9RP03, "Bioassay Analysis." The inspector did not find an investigatory or action level for H-3 in Appendix D of the bioassay procedure and the parameters for calculating the internal dose to the whole body were not included. The bioassay procedure Appendix B appeared to include the appropriate radionuclides and specific organ intake/uptake constants for performing internal dose estimates, except H-3. The only reference to H-3 in the procedure was a note to add nitric acid to all bioassay samples, except H-3 bioassay samples. The inspector asked the licensee's RP technical services group why the bioassay program did not specifically address H-3 and if this had any connection with the absence of H-3 on the MPC Tracking Form in procedure 75RP-9RP21. The licensee responded that a study conducted in August 1988 resulted in PVNGS not committing to a H-3 bioassay program. The inspector reviewed PVNGS File No. 88-034-419 which had letters and data that formed the basis for the licensee not committing to Regulatory Guide 8.32, "Criteria for Establishing a Tritium Bioassay Program." The study data indicated by a letter dated 8/29/88 that the spent fuel pool (SFP) and reactor coolant system (RCS) activity concentrations ( $7.8E-5$  Ci/Kg (Curies/Kilogram) &  $5.2E-4$  Ci/Kg respectively) were 1000s of times less than the R.G. 8.32 action levels in Table 1:

- . 0.01 Ci/Kg Large open rooms or vessels (i.e. SFP)
- . 0.1 Ci/Kg In hooded process areas (RCS sampling equipment)

The inspector made several observations from the file information provided by RP technical services and dosimetry. According to a letter dated 9/13/88, the then equivalent RP technical services manager recommended that an investigation level of 5  $\mu$ Ci/l (microCi/liter) and an action level 50  $\mu$ Ci/l in bioassay samples be established based on R.G. 8.32 guidance. It was the intent of the 8/29/88 letter to incorporate the action and investigation levels into the then bioassay procedure 75RP-9ZZ13. These R.G. 8.32 concentration levels were being established for diving operations and randomly selected workers. However, the recommended action and investigation levels were not part of the present bioassay analysis procedure 75RP-9RP03. Additionally, a RP Procedure Problem Form dated, 10/12/88 requested that Sections 6.4.1 to 6.4.16 of Procedure 75RP-9ZZ13, delete random bioassays as a requirement. The RP form requested that the H-3 bioassay program be released based on actual RCS and SFP H-3 concentrations identified in the data from PVNGS File 88-034-419.

The inspector examined the following H-3 bioassay results from four groups of workers:

- . the final urinalysis results of three worker samples from 5/9/88
- . four samples from 11/13/88
- . eight samples from 1/9/90
- . three samples from 5/25/90

The highest H-3 concentration analyzed was 0.3 uCi/l in the 11/13/88 group. All of the 1990 H-3 bioassay samples reviewed were reported as being less than 0.002 uCi/l. The inspector tried to determine from dosimetry records if any of the urinalysis samples analyzed in 1990 were obtained from RP technicians (RPTs) or chemistry technicians (CTs). From further discussions with dosimetry, RP and chemistry the inspector concluded that no random bioassay urinalysis were being performed on laboratory type personnel. This was significant because R.G. 8.32, Position 1.3, "Conditions Under Which Bioassay is Necessary" recommends in part that:

"Bioassays should also be performed when an employee can come into skin contact with, ingest, absorb into the body through cuts abrasions, or accidental (hypodermic) injection, water or any other substance with concentrations of tritium greater than or equal to 0.01 milliCi/Kg (0.01 uCi/cc) such as may be common in laboratory practices."

The Unit-1 chemistry technicians perform radiochemistry and cold chemistry applications on the following samples:

. RCS	0.712 uCi/cc	12/20/90
. CVCS Hold-up Tank (Chemical & Volume Control System)	0.149 uCi/cc	12/20/90
. SFP	0.026 uCi/cc	12/7/90

A review of Unit-1 RP Log entries from 10/26/90 and 10/28/90 indicated that the chemistry hot lab sample sink had dose rates in excess of 100 mrad/hour Beta contamination after decontamination efforts. Another entry indicated that the RCS sample sink hood fan was inoperable and gas problems were expected. These inspection observations suggest that RPTs and CTs represent a group of workers who fall into the recommendations of R.G. 8.32, Position 1.3. It is noteworthy to recall that 10 CFR 20, Appendix B, Table I, Column 2, has an occupational water MPC for H-3 of 0.1 uCi/cc.

The inspector discussed these findings initially with the RP technical services group. Their initial impression was that R.G. 8.32 positions 1.1 and 1.2 applied to all nuclear reactor workers and therefore 1.3 did not apply to PVNGS workers. The RP site general manager and the RP technical services manager did agree that this was a weakness in their bioassay program and they were re-evaluating their study. The inspector will follow-up on this item during a subsequent inspection (50-528/90-55-03).

e. ALARA

The inspector's ALARA findings are based the license's adherence to the following procedures:

. 75PR-ORP03, "ALARA Program"

- . 75RP-9RP11, "ALARA Committee"
- . 75RP-9RP12, "ALARA Reports"
- . 75RP-9RP13, "Temporary Shielding"
- . 75RP-9AL03, "ALARA Pre-Job Review/Briefing"
- . 75RP-9AL05, "ALARA Post-Job Reviews"

Procedure 75RP-9RP12 states that ALARA Outage Reports should be submitted within one month of power ascension. Procedure 75RP-9RP11 states that the ALARA committee shall review ALARA Outage Reports. The ALARA Outage Reports for Unit-2 and Unit-1 had not been reviewed or approved to allow for timely incorporation of lessons learned into the Unit-1 outage preparation. Procedure 75RP-9AL05 states that ALARA post-job reviews should be completed within 30 days of job completions. The ALARA post-job reviews for the Unit-2 reactor destack/restack and the Unit 2 cavity decontamination work were not approved by the ALARA committee. The PVNGS Corporate Annual ALARA Report for 1989 was incomplete at the time of this inspection. In QA Audit 90-11, Section 4.2, "Status of the 1989 ALARA Management Evaluation" the inspector noted that Corrective Action Report No. 89-0019 identified that PVNGS was not performing an annual ALARA evaluation as required by FSAR Chapter 12. The inspector noted that NRC Region V Inspection Report No. 50-528/88-27, 50-529/88-26 and 50-530/88-25 addressed significant deficiencies in the ALARA program. One of the NRC report's ALARA findings had the following statement:

"Failure of the ALARA program to function in accordance with ALARA implementing procedures."

As indicated in section c., "Exposure Reports" of this inspection report the overall annual personnel exposures for the site are declining. However, the inspector expressed his concern that procedural adherence is a negative indication of ALARA performance.

Overall, the licensee's program is adequate to accomplish its safety objectives.

### 3. Facility Tours

A tour of the Unit-1 facility was taken that included the Radwaste, Auxiliary, Fuel Handling and Turbine Buildings; also toured was the PVNGS yard. Independent measurements were taken using NRC survey instruments models RO-2, serial no. 9154, calibration due date 2/26/91 and PRM-7, serial no. 8596, calibration due date 4/19/91. The following observations were made:

- . The Unit-1 spent fuel pool (SFP) leak detection drain lines had a build-up of boric acid crystals on several lines. This appeared to indicate a possible SFP lining leak. The inspector found that the SFP system engineer and the resident inspectors addressed this subject of SFP leakage in November 1989. The inspector reviewed the licensee's findings and concluded that Unit-1 SFP leakage has been appropriately documented.

The Unit-1 anti-foam tank T-107 was leaking through level indicator LI-0072 onto pump LRM-P07. The anti-foam material was dissolving the paint off the pump. The anti-foam agent was not identified as a corrosive hazardous material. According to the safety department, the anti-foam agent (TURCO) was not classified by the Occupational Safety & Health Administration (OSHA) as a corrosive agent. Therefore, TURCO was not required to be readily identified. However, safety and operations did report that the area was subsequently roped off and work request no. 781756 was initiated to make repairs.

A charcoal absorber vessel was connected to liquid radwaste system (LRS) valves (LRN-W0924, 926, 927 & 949) to provide inlet and outlet recirculation in order to remove total organic carbons from the LRS evaporators. The connection and vessel appeared to be an unidentified temporary modification to the LRS. The LRS system engineer assured the inspector that this LRS configuration was part of an approved site modification.

The pump motor to radiation monitor RU-9 Unit-1 was vibrating. This was reported to operations.

Radiation monitoring equipment observed were in current calibration

Areas with potential contamination were appropriately identified and marked off. Radioactive materials appeared to be controlled as further indicated by the level of facility cleanliness.

Postings and labeling appeared to be consistent with 10 CFR Parts 19.11 and 20.203.

No violations or deviations were identified.

The licensee's program was adequate to accomplish its safety objectives.

#### 4. Exit Interview (MC 30703)

The inspector met with the individuals noted in section 1 at the conclusion of the inspection on December 21, 1996. The scope and findings of the inspection were summarized.

The inspector presented the two apparent violations. A bioassay program weakness was identified in regards to the absence of H-3 analysis procedures consistent with the guidance of Regulatory Guide 8.32. The inspector expressed concerns about the routine practice of containment entries at power. The licensee acknowledged the inspector's findings by assuring that the appropriate actions were being taken in all areas of concern.