UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W.
ATLANTA, GEORGIA 30323

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Report Nos.: 50-280/89-02 and 50-281/89-02

Licensee: Virginia Electric and Power Company
Glen Allen, VA 23060

Docket Nos.: 50-280 and 50-281 License Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: January 23-27, 1989

Inspector: C H Bassett 2/22/89
C. H. Bassett Date Signed

Approved by: J. Potter 2/22/89
J. Potter, Chief Date Signed
Facilities Radiation Protection Section
Emergency Preparedness and Radiological
Protection Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope: This routine, unannounced inspection of the licensee's radiation protection program consisted of a review in the areas of: organization and management controls; training and qualifications; external and internal exposure control; control of radioactive material and contamination, survey, and monitoring; the solid radioactive waste program; and transportation. The inspection also included a review of licensee actions concerning previous enforcement and inspector followup items.

Results: The licensee has continued to make changes in the health physics organization in order to improve the radiation protection program and upgrade the newly formed radiological engineering section. Management support of the radiation protection program is evident and appears to be adequate. The licensee's program for self-identification of problems has been changed to require more frequent use of Station Deviation Reports. During the inspection, weaknesses were again noted by the inspector, in the areas of procedural compliance, compliance with Technical Specification requirements, and inadequate evaluation of the radiological hazards present.

Within the scope of the inspection, one violation, one unresolved item (URI) and three licensee identified violations (LIVs) were identified as follows:

- URI for failure to adequately evaluate the radiation hazards present prior and incident to welding work in the Unit 1 conoseal area which

then led to failure to adequately determine the need for extremity dosimetry and exceeding established administrative dose limits.

- LIV concerning allowing an individual to exceed the established dose limit without obtaining the required management approval.

- LIV for failure to maintain the entrance to a high radiation area locked as required.

- LIV for failure to ensure that an individual had been properly trained to use a respirator.

- Violation - Failure to perform the required calibration verifications and complete the verification forms following repair or replacement of contamination monitor detectors.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

M. Beckham, Assistant Supervisor, Radwaste and Shipping, Health Physics
*R. Bilyeu, Licensing Engineer, Corporate
W. Cook, Supervisor, Operations, Health Physics
D. Densmore, Assistant Supervisor, Dose Control and Bioassay, Health Physics
*D. Erickson, Superintendent, Health Physics
J. Fisher, Supervisor, Procedure Writing Group, Operations and Maintenance
A. Friedman, Superintendent, Nuclear Training
*B. Garber, Supervisor, Technical Services, Health Physics
*E. Grecheck, Assistant Station Manager, Nuclear Safety and Licensing
*B. Hall, Senior Quality Specialist, Quality Control
M. Kansler, Station Manager
*G. Miller, Licensing Coordinator
H. Miller, Assistant Station Manager, Operations and Maintenance
L. Morris, Supervisor, Radwaste and Decontamination, Health Physics
A. Royal, Supervisor, Nuclear Training
*W. Thornton, Director, Health Physics and Chemistry, Corporate
*F. Wolking, Senior Staff Health Physicist, Corporate

Other licensee employees contacted during this inspection included engineers, security force personnel, technicians, and administrative personnel.

Nuclear Regulatory Commission

W. Holland, Senior Resident Inspector
*L. Nicholson, Resident Inpsector
*J. York, Resident Inspector

*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Occupational Exposure, Shipping, and Transportation - Organization and Management Controls (83750)

a. Organization

The licensee is required by Technical Specification (TS) 6.1 to implement the plant organization specified in TS Figures 6.1-2. The responsibilities, authority and other management controls are further outlined in Chapters 12 and 13 of the Final Safety Analysis Report (FSAR). TS 6.1 also specifies the members of the Station Nuclear

Safety and Operating Committee (SNSOC) and outlines its function and authority. Regulatory Guide 8.8 specifies certain functions and responsibilities to be assigned to the Radiation Protection Manager (RPM) and radiation protection responsibilities to be assigned to line management.

The inspector reviewed the licensee's station organization, as well as the responsibilities, authority, and control given to management as they relate to the site radiation protection program. Recent changes in station organization were reviewed and the inspector verified that no organizational changes had been made which would adversely affect the ability of the licensee to implement the critical elements of the program. There appeared to be sufficient management support to implement improvements of the program as necessary.

The inspector also reviewed changes that had been made by the RPM in the recently reorganized health physics (HP) organization. The previous HP organization had had two major work sections, technical services and operations. As a result of the reorganization, two new sections were created, a radiological engineering section and a radwaste/decon section. The radiological engineering section had been supervised temporarily by a licensed operator from the operations staff. The licensee subsequently had contracted with a vendor to bring in a person to fill the position of supervisor for the radiological engineering section. The inspector reviewed the qualifications of the contractor who was hired to help build the radiological engineering group and give it depth of experience. The individual's experience and qualifications appeared to be adequate and appropriate for the position.

Prior to the Unit 2 refueling outage which began in September 1988, the licensee had hired an individual to fill the position of radiological assessor. The individual was assigned to the site from the corporate office to assist in identifying problem areas in radiation protection and safety. Two contractor assessors also had been hired to assist in this project. The contract assessors had performed that function for three months and finished their job during December 1988. At the time of the inspection, the corporate radiological assessor was still on site and was providing daily support in assessing the HP program. The RPM had assigned the assessment function as part of the duties of the HP supervisors and shift foremen as well.

b. Staffing

TS 6.1 also specifies the minimum staffing for the plant. FSAR Chapters 12 and 13 outline further details on staffing as well.

The inspector reviewed the staffing level of the station HP sections and discussed the current level with licensee representatives. At

the time of the inspection, of the 58 HP positions authorized for the site (including shift supervisors, specialists, and technicians), all but five were filled. The shortages were in the specialist and shift supervisor positions. All the 38 authorized technician positions at the station were filled with personnel who were qualified to the requirements outlined by the American National Standards Institute (ANSI) Standard N18.1-1971 and they were being assisted by 25 junior technicians. Due to the continuing outage in progress, the licensee also had retained the help of 66 contractor HP technicians and approximately 50 personnel who were assisting in decontamination efforts and onsite laundry facility operation.

c. Root Cause Evaluation Program

Following an evaluation by a company specializing in assessing management processes and organizational features, the licensee determined that improvement was needed in the program for self-identification of problems and the causes thereof. The licensee had such a program in place prior to the assessment but took steps to revise it and implement needed changes. Increased emphasis was placed on identifying problems and determining the root cause by means of the Station Deviation Report (SDR). A deviation report was not only written to outline the details of an incident but also contained a section which required a response to station management documenting the steps taken to correct the problem. Prior to the assessment, there had been a few hundred deviation reports written annually to describe problems and develop corrective actions. Following the assessment, the licensee indicated that the number of deviation reports increased by a factor of approximately ten. The inspector reviewed selected deviation reports concerning problems noted in the area of radiation protection. The reports appeared to describe adequately the problems found and the corrective actions appeared to be appropriate. These deviation reports are discussed in further detail in Paragraphs 4.a, 4.b, 4.c, 5.b, and 6.b.

No violations or deviations were identified.

3. Occupational Exposure, Shipping, and Transportation - Training and Qualifications (83750)

a. General Employee Training (GET)

The licensee is required by 10 CFR 19.12 to provide radiation protection training to workers. Regulatory Guides 8.13, 8.27, and 8.29 outline topics that should be included in such training.

The inspector verified, through selective review of training records of personnel allowed access to the radiation control area (RCA), that proper training had been given to those individuals prior to RCA entry. Also, through discussions with training personnel, the inspector determined that a good line of communication existed

between operational HP and GET training personnel. This allowed instructors to quickly address poor work practices identified in the field through improvements in training.

b. Mock-up Training

The inspector discussed, with licensee training personnel, the planned development of a mock-up training area, described as the integrated radiological/mechanical maintenance practical factors area. The inspector toured the unfinished facility which currently contains various pumps, valves, and a recently purchased reactor coolant pump seal mock-up. Licensee representatives indicated that they are in the process of assessing the merits of purchasing an elevated working platform for the facility to create realistic hoisting, climbing, and working conditions. The licensee also indicated that plans are being developed to create training situations which integrate certain maintenance, electrical engineering, operations, and HP training activities.

No violations or deviations were identified.

4. Occupational Exposure, Shipping and Transportation - External Exposure Control and Personnel Dosimetry (83750)

a. Personnel Dosimetry

10 CFR 20.201(b) requires each licensee to make or cause to be made such surveys as (1) may be necessary for the licensee to comply with the regulations in this part and (2) are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present. 10 CFR 20.201(a) defines a "survey" as an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions.

10 CFR 20.202 requires each licensee to supply appropriate personnel monitoring equipment to specific individuals and requires the use of such equipment.

TS 6.4.D requires that radiation control procedures be followed.

Health Physics Procedure HP-3.1.3, "Personnel Dosimetry - Dosimetry Issue and Dose Determination," dated July 27, 1988, requires in step 4.7.3.2 that the licensee evaluate the need for extremity badges when the expected exposure to the hands and forearms or feet and ankles is equal to or greater than one rem per hour and the extremity to whole body dose (12 inches from the contact dose rate) ratio is 5:1 or greater.

Health Physics Procedure HP-5.1.20, "Administrative Dose Control," dated December 16, 1988, requires in step 4.5 that a worker receive

an exposure extension approved by station management prior to exceeding the administrative dose limits established for the quarter.

The inspector reviewed SDR, Number S1-88-1626, which dealt with the radiological conditions for seal welding of the Unit 2 reactor head conoseal. During a review of the possible applications of engineering controls for the welding job, the licensee determined that the criteria for use of multiple dosimetry was met. The radiation work permit (RWP) (88-3045) did not require special or multiple dosimetry initially, but following the review, the RWP was modified to specify extremity and upper body dosimetry for the job.

The two contract welders, who subsequently performed the work, indicated that they had performed the Unit 1 conoseal welding but that special dosimetry had not been required for the job at that time. A concern was then raised about exposure received during the welding on the Unit 1 conoseal. The licensee initiated a review of the Unit 1 work package and the RWP (88-1516) used to control the job. Survey data indicated that contact and 12 inch radiation level readings were similar to those found in the Unit 2 conoseal work area. Licensee representatives determined that special dosimetry was apparently warranted and should have been worn during the Unit 1 conoseal work as well.

Through a compilation of RWP 88-1516 survey data and an estimate of the dose rate inside the reactor head shield, a calculated or estimated "survey" was developed indicating the "typical" dose rates of a Unit 1 thermocouple column conoseal. The licensee used the highest radiation level readings for the "typical" dose rates, to be conservative. Then, through interviews with the welders, the licensee determined that, during the actual time spent in the conoseal area, the whole body dosimetry (worn in the upper chest area) was located approximately 16 to 20 inches from the conoseal weld area. The workers' heads were thus located approximately 12 inches from the weld area and were determined to be the part of the whole body in the highest radiation field. The wrists and hands were located approximately 3 to 6 inches from the conoseal.

Based on the calculated "survey" results, the workers' whole body dosimetry was located in an estimated 400 mR/hr dose rate area while the workers' heads were in an estimated 800 mR/hr dose rate area. The hands and wrists were located in up to a 1.2 R/hr dose rate area. Since the head was in a radiation field of twice that of the whole body dosimetry location, the welders' whole body exposures recorded during the entire Unit 1 conoseal job were increased by a factor of two: from 685 mrem to 1370 mrem for one worker for a quarterly total of 1412 mrem and from 884 mrem to 1768 mrem for the other for a quarterly total of 2710 mrem. The workers' administrative limits for the second quarter were 1000 mrem and 1750 mrem, respectively.

The issue described above is similar to an event detailed in Inspection Report (IR) No. 50-280, 281/88-49. That was an event which dealt with the inadequate evaluation of the radiation hazards present prior to and during decon operations in the Unit 1 reactor cavity. The event described in this report occurred prior to the Unit 1 reactor cavity decon event but was not discovered until after the cavity decon event occurred. The licensee has not yet responded to the Notice of Violation (NOV) issued concerning the cavity decon event. Because no response has been issued, the adequacy of the corrective actions taken to ensure the proper evaluation of future radiation hazards have not been reviewed nor evaluated. Consequently, the issue outlined above will be considered as an URI* pending receipt, review, and evaluation of the licensee's response to the NOV concerning the Unit 1 reactor cavity decon event (50-280, 281/89-02-01).

b. Administrative Exposure Limits

TS 6.4.D requires that radiation control procedures be followed.

Health Physics Procedure HP-5.1.20, "Administrative Dose Control," dated December 16, 1988, requires in step 4.5 that a worker receive an exposure extension approved by station management prior to exceeding the administrative dose limit of 1250 mrem per quarter.

The inspector reviewed an SDR, Number S1-88-1602, which dealt with exceeding an administrative exposure limit without proper authorization. On December 18, 1988, a contract electrician prepared to enter the "C" reactor coolant pump (RCP) cubicle of Unit 1 under the radiological constraints of RWP 88-2948 to work on the reactor coolant system (RCS) thermocouples. He was wearing special dosimetry, as required by the RWP, as well as a whole body thermoluminescent dosimeter (TLD). After attending a pre-job briefing and receiving a stay time of 5 minutes, the contractor entered the area which had a general area dose rate of 2 R/hr. After working for the designated 5 minutes, the individual was brought out of the area by a licensee HP technician covering the job. The worker's self-reading pocket dosimeters (SRPDs) were read and they all indicated an exposure of approximately 150 mrem. The individual was again given a 5 minute stay time and allowed back into the area to continue working. After about 6 minutes the worker was again brought out and his SRPDs read. The SRPD that had been located on the right knee read 800 mrem while all the other SRPDs read between 180 and 390 mrem. At this point, the HP technician stopped the job and had the worker's TLDs read.

*An unresolved item is a matter about which more information is required to determine whether it is acceptable or may involve a violation or deviation.

The TLD results varied from 170 mrem to 470 mrem with the exception of the right knee TLD. The results of the right knee TLD indicated an exposure of 1093 mrem which was then assumed to be the highest whole body dose received. Through a review of the results of the periodic testing performed on the dosimetry, the licensee determined that both the TLD and the SRPD used to monitor exposure to the right knee had passed the normal response check required and prescribed by procedure. The SRPD and TLD from the worker's right knee were then tested to determine if they still met the licensee's acceptance criteria of plus or minus 10% of a calculated exposure of 800 mrem received from a Cs-137 source. The test results indicated that the TLD failed high and the SRPD failed low. The dosimeters were then exposed to a calculated exposure of 1000 mrem to test their performance again. Following this test, the results indicated that the TLD passed on the upper end of the acceptance criteria while the SRPD again failed low.

The licensee investigated the work site and found that the insulation on a pipe where the individual had been working had been shifted out of its normal location. It was assumed that the individual had inadvertently moved the insulation during the job and had then placed his right knee against the pipe. The licensee indicated that this had probably caused the added exposure accumulation. The pipe was surveyed and had a radiation level reading of 3 R/hr on contact.

The licensee assumed the 1093 mrem initial reading of the right knee TLD to be correct and assigned this dose to the individual as whole body dose. This dose, when added to the previous quarter dose total, resulted in an exposure of 1268 mrem for the quarter, 18 mrem above the established quarterly administrative limit of 1250. The incident was assumed to have been caused by the in-service failure of the SRPD even though both the TLD and the SRPD had passed the response check during normal periodic testing.

Allowing an individual to exceed the established administrative dose limit without obtaining the required management approval was identified as an apparent violation of TS 6.4.D. However, pursuant to 10 CFR 2, Appendix C.V.G., this issue was considered a licensee identified violation (LIV) and a Notice of Violation (NOV) was not issued due to the violation being (1) licensee identified, (2) of severity level IV or V, (3) not reportable, (4) corrected, and (5) not expected to have been preventable by corrective action for a previous violation (50-280, 281/89-02-02).

c. Radiologically Controlled Areas

10 CFR 20.203 specifies posting and control requirements for radiation areas, high radiation areas, airborne radioactivity areas, radioactive material areas, and radioactive material.

TS 6.4.B.1.b requires that the entrance to each radiation area in which the intensity of radiation is equal to or greater than 1000 mrem/hr shall be provided with locked barricades to prevent unauthorized entry into these areas.

During plant tours, the inspector observed the licensee's posting and control of radiation, high radiation, airborne radioactivity, radioactive material areas, and the labeling of radioactive material. The inspector determined that the posting and controls for the various radiological control areas were adequate. The inspector also verified that various locked high radiation areas in the Unit 1 and Unit 2 containment buildings and in the auxiliary building were being maintained locked as required.

The inspector reviewed an SDR, Number S2-89-031, concerning a high radiation area that was not controlled as required. On January 8, 1989, during a walkdown of the Unit 2 Containment, an HP technician noted that the chain and padlock used to lock the gate to "B" RCP cubicle were found wrapped around the gate to give the appearance of securing the entrance. However, the chain was not secured by the padlock in such a manner as to prevent the gate from opening. A second HP technician was summoned to control entrance to the cubicle and the area was searched to ensure that no one was inside. Radiation level surveys in the cubicle indicated radiation dose rates in excess of 1000 mrem/hr. The gate was then locked properly with the chain and padlock. The licensee's investigation of the event determined that the individual who initially "locked" the gate thought the padlock was locked on the chain so as to secure the gate from opening but had not checked it adequately.

The initial corrective actions taken by the licensee in response to this incident were to shorten all chains at gates to high radiation areas to allow for easier locking. This was also done to allow the person securing the area to more easily determine that the gate was, in fact, locked as required. HP personnel were also instructed to verify that all gates to high radiation areas that were required to be locked were secured as required or properly controlled during walkdowns of the containment. As a long-term corrective action, work requests have been submitted to replace all the old gates with new gates having built-in locking mechanisms. The gates are to be designed to close and lock automatically and yet allow for opening from the inside to permit unrestricted exit from the high radiation area.

Failure to maintain the entrance to an area in which the intensity of radiation was greater than 1000 mrem/hr locked was identified as an apparent violation of TS 6.4.B.1.b. However, pursuant to 10 CFR 2, Appendix C.V.G., this issue was considered an LIV and an NOV was not issued (50-280, 281/89-02-03).

5. Occupational Exposure, Shipping, and Transportation - Internal Exposure Control and Assessment (83750)

a. Engineering Controls

10 CFR 20.103(b) requires the licensee to use process or other engineering controls to the extent practical to limit concentrations of radioactive material in air to levels below those specified in 10 CFR Part 20, Appendix B, Table 1, Column 1.

During tours of the Auxiliary Building and Units 1 and 2 Containments, the inspector observed the use of process controls and engineering controls to limit airborne radioactivity in the plant. The licensee used tent enclosures and vendor supplied sealed chambers to decontaminate various tools and items of equipment and to perform maintenance on contaminated items. These tents and chambers were kept under negative pressure by means of high efficiency particulate air (HEPA) filtration systems.

No violations or deviations were identified.

b. Respiratory Protection

10 CFR 20.103(c) requires that, when respiratory protection equipment is used to limit the inhalation of airborne radioactive material, the licensee train, medically qualify, and fit test the individual user of such equipment.

TS 6.4.D requires that radiation control procedures be followed.

Health Physics Procedure HP-5.2A.13, "Responsibilities, Requirements, and Restrictions of Respirator Use," dated July 20, 1988, requires in step 4.1.2 individuals using respiratory protection must attend and satisfactorily complete respirator protection training prior to respirator use and retraining once per 12 months to maintain their respirator use qualification.

The use of respiratory protection was observed and discussed with licensee representatives. The inspector noted that, on occasion, respiratory protection is issued to individuals as a precaution against facial contamination and not necessarily due to airborne radioactivity or high levels of surface contamination. This practice was not as widespread as noted during previous inspections, due in part to the efforts expended during the outage in progress to decontaminate the containments.

The inspector also reviewed an SDR, Number S1-88-1650, which detailed a problem noted with issuing respirators. On November 23, 1988, an individual reported to the main protective clothing (PC) issue point in the service building to obtain PCs and a respirator. The laundry personnel stationed at the clothing issue point had a Personnel

Radiation Exposure Management System (PREMS) computer terminal to enable them to check and verify the training, medical and fit test qualifications of persons requesting a respirator for use in the RCA. On November 23, the PREMS computer system was not operating properly and the personnel issuing PCs then checked the computer printout issued every shift as a backup to the PREMS system. The computer printout was misinterpreted by the laundry personnel and a respirator was issued to an individual whose training qualifications had lapsed.

When the individual again tried to obtain the use of a respirator on December 28, 1988, the error was discovered and the licensee initiated several corrective actions. The individual, whose training had expired February 11, 1988, was given a whole body count. No internal deposition of radioactive material was detected. Through interviews with the laundry personnel, it was determined that they did not have sufficient training to review the computer printout and manually issue a respirator. Their training had covered issuance of respirators using the PREMS computer terminal but not using a printout to determine a person's qualification status. The laundry personnel were subsequently allowed to issue respiratory protective devices to individuals based on confirmation by the PREMS computer system. If the computer was not functioning or if problems were flagged by the computer when it was functioning, the laundry personnel were required to refer the individual requesting a respirator to Dose Control personnel for appropriate action. (When the computer system is functioning and training, medical or fit test qualifications do not meet the requirements, respirator issue via the computer is automatically denied.) The laundry personnel were also instructed not to issue a respirator "manually," i.e. by referring to the computer printout.

Failure to ensure that an individual had been properly trained to use a respirator was identified as an apparent violation of TS 6.4.D. However, pursuant to 10 CFR 2, Appendix C.V.G., this issue was considered an LIV and an NOV was not issued (50-280, 281/89-02-04).

6. Occupational Exposure, Shipping, and Transportation - Control of Radioactive Material and Contamination, Surveys, and Monitoring (83750)

a. Plant Surveys

The licensee is required by 10 CFR 20.401 and 20.403 to maintain records of such surveys necessary to show compliance with regulatory limits. Survey methods and instrumentation are outlined in Chapter 12 of the FSAR.

During plant tours, the inspector reviewed radiation level and contamination survey results posted outside various areas and cubicles. The inspector verified these radiation levels using NRC instrumentation. The inspector also reviewed selected records of

radiation and contamination surveys performed during the inspection and discussed the survey results with licensee representatives.

No violations or deviations were identified.

b. Radiation Detection and Survey Instrumentation

TS 6.4.D requires that radiation control procedures be followed.

Health Physics Procedure HP-9.0.701, "Calibration and Operation of Eberline Model PM-6," and Health Physics Procedure HP-9.0.720, "Calibration and Operation of Eberline Model PCM-1A," each dated August 29, 1988, both require in step 3.4 that an operational check and calibration verification, in accordance with step 4.10, be performed following repair or replacement of a detector. Step 4.10 requires the completion of forms HP 9.0.701-2 and HP 9.0.720-2 respectively to verify completion of the calibration verification.

The inspector reviewed the licensee's use of portable radiation detection instruments for routine radiation protection activities. During plant tours, the inspector verified that all instruments observed in use had been calibrated within the prescribed time period and also observed that the selection and use of instruments was appropriate for the radiation protection activity involved.

Following a tour of the Auxiliary Building and Unit 1 Containment and upon exiting the RCA, the inspector noted that the licensee was using plastic tape to repair damaged mylar windows in the whole body personnel friskers or personnel contamination monitors (PCM-1As). Discussions with licensee representatives indicated that repairing the damaged mylar windows with tape had not proven to change the instruments' sensitivity. The licensee also informed the inspector that the vendor's technical manuals allowed the use of tape to repair mylar windows until such time as the detector could be removed and the mylar covering replaced. Through a review of the PCM-1A technical manual and the portal monitor (PM-6) technical manual and a review of the calibration verification forms completed following detector repair or replacement, it was determined that this was the case.

However, a review of the PCM-1A and PM-6 operational check and calibration verification forms, also indicated that all the forms had not been completed as required further indicating that all the calibration verifications had not been performed. No calibration

verification forms were on file for the following:

	Monitor	Date
PCM-1A	Serial #201	January 12 and 19, 1989
	Serial #210	January 19, 1989
PM-6	Serial #189	January 10 and 12, 1989
	Serial #190	January 10 and 16, 1989

Upon investigating this problem, the licensee found that the instrument technician responsible for performing the verifications following detector repair or replacement had been terminated due to attendance problems. Another individual, who also worked the same shift as the person who had been terminated, had noted that some of the monitors needed to have detectors repaired or replaced. Even though the second individual had only been officially trained to perform daily source checks on portable friskers, he completed the needed repairs on the detectors and source checked them to ensure that they were responding "properly."

Following discovery of the problem, the licensee informed the untrained individual that he was to make no further repairs to the monitors but only to remove the monitors from service if a detector failed due to a leak or other problem. Also, all operating detectors that were involved in the documentation problem were reverified and the proper documentation completed. All detectors involved passed the efficiency verification. The licensee determined that this was an isolated incident and involved only one individual who went beyond what he was trained or expected to do.

Failure to perform the appropriate calibration verifications and verification forms as required following repair or replacement of PCM-1A or PM-6 detectors was identified as an apparent violation of TS 6.4.D. However, this violation meets the criteria specified in Section V of the NRC Enforcement Policy for not issuing a Notice of Violation and is not cited (50-280, 281/89-02-05).

c. Personnel and Material Release Surveys

During tours of the facility, the inspector observed the exit of workers and the movement of material from contamination control to clean areas to determine if proper frisking was performed by the workers and if proper direct and removable contamination surveys were performed on materials. The inspector determined that frisking and material release surveys were adequate.

No violations or deviations were identified.

7. Occupational Exposure, Shipping, and Transportation - Solid Radioactive Waste (83750)

a. Waste Classification

10 CFR 20.311(d)(1) requires that licensees prepare all waste such that the waste is classified in accordance with 10 CFR 61.55.

With the exception of dry active waste (DAW), the licensee is currently sampling waste streams prior to making a shipment due to changes noted in the isotopic mixture. The waste streams being sampled are ion exchange resins and filter elements involved in processing reactor coolant or spent fuel pool water, ion exchange resin and filter elements involved in processing liquid radwaste, secondary side ion exchange resins and filter elements and DAW. Samples are sent to a vendor for analysis and the results reviewed and verified by on site and corporate staff members. The vendor also develops the site-specific scaling factors from these results and these are likewise reviewed and verified by the corporate staff.

The licensee uses a vendor-supplied computer program (RADMAN) which processes input information obtained from a package of waste to determine the package's waste classification and transportation type. The program identifies non-gamma emitters based on the scaling factors developed for the particular waste stream in question.

b. Waste Stability

10 CFR 20.311(d)(1) requires that any generating licensee prepare all wastes so that the waste meets the waste characteristics requirements in 10 CFR 61.56.

Through discussions with licensee representatives and review of selected 1988 shipping records, the inspector determined that shipment preparations had been in conformance with the licensee's Process Control Program. The licensee purchased a vendor-developed dewatering system which the licensee now operates. No solidification has been performed at the site for approximately two years following problems encountered with a vendor-operated project which yielded unsolidified waste in the form of a paste-like substance.

c. Manifests

10 CFR 20.311(b) requires that each shipment of radioactive waste to a licensed land disposal facility be accompanied by a shipment manifest and specifies required entries on the manifests.

The inspector reviewed selected records of radioactive waste shipments completed during 1988 and 1989, and verified that the manifests had been properly completed.

No violations or deviations were identified.

8. Occupational Exposure, Shipping, and Transportation - Transportation (83750)

a. Approved Procedures

The inspector reviewed selected licensee procedures and instructions pertaining to the transportation of radioactive materials. The documents reviewed had been approved as required and appeared to be adequate to assure compliance with the applicable regulations. The primary procedure used for shipping radioactive material was Health Physics Procedure HP-7.1.40, "Packaging and Shipment of Radioactive Material," dated August 29, 1988.

b. Shipping Records

10 CFR 71.5 requires that licensees who transport licensed material outside the confines of their plant or other place of use, or who deliver licensed material to a carrier for transport, shall comply with the applicable requirements of the regulations appropriate to the mode of transport of the Department of Transportation (DOT) in 49 CFR 170 through 189.

In addition to the shipments referenced in Paragraph 7, the inspector reviewed selected records of radioactive material shipments performed during 1988 and 1989. Records reviewed included shipping manifests, package and vehicle radiation and contamination surveys, waste classification, and records indicating what package marking and labeling and vehicle placarding was used. The manifests and shipping documents examined were prepared consistent with 49 CFR requirements. The radiation and contamination survey results reviewed were found to be within the limits specified for the mode of transport. The inspector determined that shipping documentation was being completed and maintained as required.

No violation or deviations were identified.

9. Facility Statistics

a. Annual Personnel Dose

In 1987, the station's cumulative personnel dose was 356 person-rem per reactor as compared to the Pressurized Water Reactor (PWR) national average of 369 person-rem per reactor. This dose was accumulated during 115 days of scheduled and unplanned outage days. The 1988 dose goal was set at 734 person-rem per reactor due to two anticipated refueling outages. The actual cumulative dose received in 1988 was 762 person-rem per reactor as measured by TLD. This dose was accumulated during 220 days of scheduled and unplanned outage days involving Units 1 and/or 2.

b. Personnel Contaminations

During 1988, the licensee experienced a total of 226 skin and 275 clothing contaminations compared to a total of 174 skin and 319 clothing contaminations for 1987. This is a downward trend in personnel contaminations when the number of outage days for the two years are considered. The downward trend was attributed to wearing paper coveralls over the outer set of PCs thus reducing the amount of contamination reaching the cloth PCs. The trend was also thought to be a direct result of the major efforts expended in decontaminating the Unit 1 and Unit 2 containments.

c. Solid Radioactive Waste

Licensee representatives indicated that approximately 25,000 cubic feet (ft^3) of solid radioactive waste containing 193 curies of activity had been shipped to waste collectors or burial sites during 1988. During 1987, the licensee had shipped approximately 24,000 ft^3 of solid waste containing 29,000 curies of activity. The high curie total for 1987 was attributed to shipping process resins and activated material which came from cleaning up the spent fuel pool.

d. Area Contamination Control

At the end of 1987, the licensee maintained approximately 22,400 square feet (ft^2) within the RCA, excluding the containment buildings, as contaminated. This represented about 24% of the total 92,000 ft^2 within the RCA. As of December 31, 1988, approximately 20,630 ft^2 were being controlled as contaminated area or about 23% of the RCA.

No violations or deviations were identified.

10. Action on Previous Inspection Findings (92701)

a. (Closed) Inspector Followup Item (IFI) 50-280, 281/88-FRP-05: Complete Radiation Protection Plan Implementation.

Through interviews with licensee representatives and review of associated documents, the inspector determined that the corporate radiation protection program had been fully implemented. This project was completed following revision of the company Radiation Protection Plan (RPP) document, Virginia Power Nuclear Operations RPP, and training on the revised procedures implementing the RPP at each site.

b. (Closed) IFI 50-280, 281/88-FRP-09: Implement and Train Personnel on Group II Procedures by December 31, 1988.

Through interviews with licensee representatives and review of various records, the inspector determined that the revision,

implementation and training of HP technicians on "Group II" procedures had been completed. This group of procedures dealt with external dosimetry, solid radioactive waste control, effluent control, radioactive environmental monitoring, surveillance and evaluations, and radiological incident investigation and analysis. Due to the specific nature of these procedures, the initial training was targeted for and given to only those involved in implementing and using the procedures. It is anticipated that these procedures will be reviewed with all HP personnel during 1989.

The training consisted of classroom instruction, in-plant training, guided self-study and group discussions. Evaluation of the effectiveness of the training consisted of completing performance checklists through discussions and demonstrations with an evaluator and completing examinations on the subjects covered. The inspector reviewed training schedules, lesson plans, performance checklists, attendance records and examinations. All the records reviewed appeared to be adequate and covered the appropriate topics.

c. (Closed) IFI 50-280, 281/88-FRP-16: Consolidate Procedure Development to Ensure Consistency and Integration

The licensee indicated that a centralized procedure development staff was needed to ensure consistency and proper integration of procedures at the station. Procedures had not been written in a consistent manner in the past and the proper interface between groups did not exist. Procedures had evolved from general guidelines to specific step-by-step guidance. As a result, people had erroneously developed the idea that procedures did not need to followed. Due to this, it was determined that a procedure writing guide would be published and a group of writers assembled to revise the existing procedures and write future procedures in a consistent and standardized manner.

Through interviews with licensee representatives, including the Supervisor of the station Procedure Writing Group, the inspector verified that a procedure writer's guide had been developed and approved for use and a procedure writing group had been formed. It was noted that, following the outage, the group's main objective would be to review the station's procedures and determine what procedures needed to be revised first. A priority list would be developed and the procedures would be revised in a consistent and standardized manner.

Although the licensee indicated that the procedures upgrade would take approximately three years to complete, this item is considered closed due to the fact that it is being followed by the resident inspectors through IFI 50-280, 281/88-18-03.

d. (Closed) IFI 50-280,281/88-FRP-17: Ensure Proper Procedural Architecture and Human Factors Implementation.

The inspector reviewed the establishment of a procedure writing group at the station and the group's charter. The group was to upgrade the existing operating procedures for the instrumentation and control, and electrical and mechanical maintenance departments and correct any problems noted. The licensee indicated that this upgrade would take three years to complete. This item is considered closed but will be followed by a previously established IFI 50-280, 281/88-18-03.

11. Exit Interview

The inspection scope and findings were summarized on January 27, 1988, with those persons indicated in Paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings listed below. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection. Licensee management was informed that the items discussed in Paragraph 10 were considered closed. On February 21, 1989, a telephone conversation was held between the inspector and a licensee representative to inform the licensee that the issue surrounding an event which involved welding work in the Unit 1 conoseal area would be considered an URI pending further evaluation.

Item Number	Description and Reference
50-280, 281/89-02-01	URI - Failure to adequately evaluate the radiation hazards present prior and incident to welding work in the Unit 1 conoseal area which lead to failure to adequately determine the need to provide extremity dosimetry and exceeding specific administrative dose limits (Paragraph 4.a).
50-280, 281/89-02-02	LIV - Allowing an individual to exceed the established administrative dose limit without obtaining the required management approval (Paragraph 4.b).
50-280, 281/89-02-03	LIV - Failure to maintain the entrance to a high radiation area locked (Paragraph 4.c).
50-280, 281/89-02-04	LIV - Failure to ensure that an individual had been properly trained to use a respirator (Paragraph 5.b).
50-280, 281/89-02-05	Violation - Failure to perform the required calibration verifications and verification forms following repair or replacement of PCM-1A and PM-6 detectors (Paragraph 6.b)

12. Acronyms and Initialisms

ANSI	American National Standards Institute
CFR	Code of Federal Regulations
DAW	Dry Active Waste
DOT	Department of Transportation
FSAR	Final Safety Analysis Report
ft^2	Square feet
ft^3	Cubic feet
GET	General Employee Training
HEPA	High Efficiency Particulate Air (filter)
HP	Health Physics
HRA	High Radiation Area
IFI	Inspector Followup Item
IR	Inspection Report
LIV	Licensee Identified Violation
mR/hr	Milliroentgen per hour
mrem	Millirem
NOV	Notice of Violation
PC	Protective Clothing
PCM-1A	Personnel Contamination Monitor (Eberline)
PCP	Process Control Program
PM-6	Portal Monitor (Eberline)
PREMS	Personnel Radiation Exposure Management System
PWR	Pressurized Water Reactor
R/hr	Roentgen per hour
RCA	Radiation Control Area
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RPM	Radiation Protection Manager
RPP	Radiation Protection Program
RWP	Radiation Work Permit
SDR	Station Deviation Report
SNSOC	Station Nuclear Safety and Operating Committee
SRPD	Self-reading Pocket Dosimeter
TLD	Thermoluminescent Dosimeter
TS	Technical Specification
URI	Unresolved Item