

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

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Report No.: 50-280/98-10, 50-281/98-10

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: Surry Power Station, Units 1 & 2

Location: 5850 Hog Island Road
Surry, VA 23883

Dates: December 6, 1998 - January 16, 1999

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Enclosure

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EXECUTIVE SUMMARY

Surry Power Station, Units 1 & 2
NRC Inspection Report Nos. 50-280/98-10, 50-281/98-10

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a six-week period of resident inspection; in addition, it includes the results of announced inspections by two regional radiation specialists, a regional security specialist, a regional Branch Chief, and a regional project engineer.

Operations

- Licensee actions to resolve a low pressure alarm on a spent fuel storage cask demonstrated that cask integrity was intact and adequately returned the alarm function to service. A negative observation was identified in that the licensee did not expeditiously address the low pressure alarm (Section O1.2).

Maintenance

- The Number 2 Emergency Diesel Generator (EDG) excitation cabinet inspection was thorough and conducted in accordance with the procedural requirements. No deficiencies were noted during the inspection. The licensee has completed visual inspections of the EDG excitation cabinets initiated in response to a catastrophic component failure in the Number 3 EDG excitation cabinet (Section M1.1).
- Low Head Safety Injection system recirculation flow testing was performed in accordance with approved procedures and all test acceptance criteria were met (Section M1.2).
 - The incore flux mapping system was properly used to measure the incore power levels and adequately demonstrated that the core power distribution met thermal requirements. The engineers demonstrated detailed knowledge of the operation and limitations of the flux measurement equipment and the effects of the testing on plant operation (Section M1.3).
 - The licensee has taken action to resolve a problem with decreasing lube oil temperatures for the Number 2 EDG while in a standby condition. However, these actions have not been successful and the licensee has periodically run the diesel to increase lube oil temperatures to the normal level for standby conditions. The inspectors have noted that operating shift personnel have displayed an appropriate level of sensitivity to the lube oil temperature issue (Section M1.4).

Engineering

- The number of temporary modifications installed on Units 1 and 2 were minimal and were adequately justified by the associated safety evaluations (Section E1.1).

Plant Support

- The licensee effectively implemented a program for transportation of radioactive materials pursuant to Department of Transportation and NRC regulations. Individuals involved in preparing shipments of radioactive materials were adequately trained. The licensee effectively characterized and classified radioactive waste and properly prepared radioactive material for safe transport (Section R1.1).
- The licensee's water chemistry control program for monitoring primary and secondary water quality had been implemented in accordance with the Technical Specification requirements and industry guidelines for PWR water chemistry (Section R1.2).
- The licensee's contamination control practices were consistent with the requirements of the Radiation Protection Program manual and were effective in minimizing the spread of contamination (Section R1.3).
- Radiological surveys and controls for work to resolve an Independent Spent Fuel Storage Installation cask low differential pressure alarm were sufficiently comprehensive to control worker radiation exposure (Section R1.4).
- Training was provided to Radiation Protection and Chemistry personnel in accordance with the descriptions delineated in the licensee's Radiation Protection, Chemistry, and Nuclear Training manuals (Section R4.1).
- Audits in the areas of chemistry, radiological controls, and transportation were of sufficient scope and depth to identify potential problems. Corrective actions for identified issues were documented and tracked for completion of warranted follow-up. The licensee complied with the program requirements for conducting audits of those activities (Section R7.1).
- A Non-Cited Violation was identified for the failure to terminate a contractor employee's protected area access after access authorization was no longer required. The station badge coordinator failed to deactivate the contractor's badge and a subsequent verification failed to identify the discrepancy (Section S1.1).
- Material, package, and vehicle access controls for items entering the protected and vital areas met the criteria of the current Physical Security Plan and appropriate security procedures. The vehicle barrier system was functional, well maintained, and effective in its intended purpose. The licensee's vehicle barrier system met the Physical Security Plan commitments and regulatory requirements and was considered a strength in the security program (Sections S1.2 and S2.1).
- The licensee's security procedures were thorough, well documented, and consistent with the Physical Security Plan commitments and 10 CFR Part 50.54 (Section S3.1).

- The inspector concluded through observation and interviews of security force personnel, and reviews of procedures that the security force had the requisite knowledge to cope with the design-basis threat described in 10 CFR 73.1(a) and the Physical Security Plan (Section S4.1).
- The inspector verified that response capabilities of the security organization to security threats, contingencies, and routine response situations were consistent with the security procedures, the Physical Security Plan and Security Contingency Plan. The total number of trained security officers and armed personnel immediately available to fulfill response requirements met the number specified in the Physical Security Plan (Sections S4.2 and S6.1).

Report Details

Summary of Plant Status

Unit 1 operated at power for the entire reporting period. On December 12, Unit 1 pressurizer power operated relief valve (PORV), 1-RC-PCV-1456, was returned to an operable status when its associated block valve was opened. The PORV's tailpipe temperatures remained stable during the rest of the reporting period.

Unit 2 operated at power the entire reporting period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707, 40500)

The inspectors conducted frequent control room tours to verify proper staffing, operator attentiveness, and adherence to approved procedures. The inspectors attended daily plant status meetings to maintain awareness of overall facility operations and reviewed operator logs to verify operational safety and compliance with Technical Specifications (TS). Instrumentation and safety system lineups were periodically reviewed from control room indications to assess operability. Frequent plant tours were conducted to observe equipment status and housekeeping. Deviation Reports (DRs) were reviewed to assure that potential safety concerns were properly reported and resolved. The inspectors found that daily operations were generally conducted in accordance with regulatory requirements and plant procedures.

O1.2 Independent Spent Fuel Storage Installation (ISFSI) Cask Low Pressure Alarm

a. Inspection Scope (71707)

The inspectors reviewed the licensee's actions associated with a low pressure alarm on a cask stored at the ISFSI.

b. Observations and Findings

On December 24, 1998, a low pressure alarm was received on ISFSI cask 15. The alarm came in following a momentary loss of power at the ISFSI facility caused by severe weather and would not clear when the operator subsequently tried to reset the alarm. Cask 15 is a Westinghouse MC-10 cask and was loaded in November 1991. The Westinghouse MC-10 cask low pressure switch measures the pressure differential between the fuel storage area of the cask and a secondary plenum adjacent to the fuel storage portion. The fuel storage area is pressurized slightly above atmospheric pressure with helium and the plenum area is evacuated to an absolute pressure of less than 5 mbars (subatmospheric). A low differential pressure alarm indicates either leakage of helium from the fuel storage portion of the cask or in-leakage of air into the secondary plenum. A leak in the fuel storage portion would require that the cask be returned to the spent fuel pool to resolve the leakage. The licensee determined that the secondary plenum had pressurized to approximately 267 mbars resulting in the alarm.

The licensee obtained gas samples from the secondary plenum and determined that the leakage was into the secondary plenum from the atmosphere. The licensee performed a leak check on the secondary plenum and evacuated the secondary plenum to 1 mbar. The leak check determined that the integrity of the secondary plenum was intact, however, the leakage value calculated was slightly higher than the initial leakage value recorded during initial loading of the cask. The low differential pressure alarm cleared following the reestablishment of the secondary plenum vacuum.

The inspectors monitored licensee actions to determine the cause of the low pressure alarm, observed initial troubleshooting work activities and reviewed the cask design characteristics with respect to the operation of the pressure switch. The inspectors determined that the integrity of the fuel storage portion of the cask was intact and that licensee actions adequately returned the low pressure alarm function to service. The inspectors noted that the low differential pressure alarm was not expeditiously addressed by the licensee. The initial alarm was received on December 24, 1998, and actions to determine the cause of the alarm were not initiated until December 30, 1998. The corrective actions to return the alarm function to service were not completed until January 6, 1999. The inspectors discussed this item with licensee management and identified it as a negative observation.

c. Conclusions

Licensee actions to resolve a low pressure alarm on a spent fuel storage cask demonstrated that cask integrity was intact and adequately returned the alarm function to service. A negative observation was identified in that the licensee did not expeditiously address the low pressure alarm.

O8 Miscellaneous Operations Issues (92700, 92901)

- O8.1 (Closed) Licensee Event Report (LER) 50-280, 281/97003-00: Loss of pressurizer heaters results in manual Unit 1 trip and Unit 2 ESF actuation. This LER described a Unit 1 reactor trip caused by an inability to maintain reactor coolant system pressure due to a loss of pressurizer proportional heater Group C. The LER also described an automatic actuation of the Unit 2 motor driven auxiliary feedwater pumps following the Unit 1 trip due to load shed of selected station service loads. This event was discussed in NRC Inspection Report 280, 281/97-02. The inspectors reviewed the reactor trip report, the associated Root Cause Evaluation and verified that the corrective actions identified in the licensee's commitment tracking system had been accomplished.
- O8.2 (Closed) LER 50-280/97005-00: Unit 1 power range nuclear instrumentation inoperable due to personnel error. This matter was discussed in detail in NRC Inspection Report 50-280, 281/97-04 and resulted in the issuance of NCV 50-280/97004-01. The inspectors reviewed the corrective actions delineated in the subject LER and determined that adequate measures had been taken by the licensee to prevent recurrence.

- O8.3 (Closed) LER 50-280, 281/97008-00: Invalid actuation of engineered safety features due to personnel errors. This matter was discussed in detail in NRC Inspection Report 50-280, 281/97-10 and resulted in the issuance of violation (VIO) 50-281/97010-05. The closure of VIO 50-281/97010-05 is discussed in Section O8.4. The inspectors reviewed the corrective actions delineated in the subject LER and determined that adequate measures had been taken by the licensee to prevent recurrence.
- O8.4 (Closed) VIO 50-281/97010-05: Inadequate work instructions resulted in the failure to implement the requirements of a safety evaluation. The licensee reported the events associated with the violation in LER 50-280, 281/97008-00. The closure of LER 50-280, 281/97008-00 is discussed in Section O8.3. The inspectors reviewed the licensee's response to the violation dated January 14, 1998. The inspectors reviewed the corrective actions delineated in the violation response and verified that the corrective actions were fully implemented.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Number 2 Emergency Diesel Generator (EDG) Excitation Cabinet Inspection

a. Inspection Scope (62707)

The inspectors observed the performance of procedure 0-ECM-0704-04.

b. Observations and Findings

On December 13, 1998, the inspectors observed work activities associated with Work Order (WO) 00400172, Inspect EDG 2 Remote Excitation Cabinet. The work activity was accomplished in accordance with procedure 0-ECM-0704-04, "EDG Remote Excitation Cabinet Inspection," Revision 0. The inspection was initiated as a result of a catastrophic component failure in the Number 3 EDG excitation cabinet during a routine monthly surveillance. The inspection did not identify any obvious discrepancies in the Number 2 EDG excitation cabinet components. The inspection was thorough and accomplished in accordance with the procedural requirements. The results of the followup inspection of the Number 1 EDG are documented in NRC Inspection Report 50-280, 281/98-09. The inspection of the Number 2 EDG excitation cabinet completed visual inspections of the EDG excitation cabinets following the component failure in the Number 3 EDG excitation cabinet.

c. Conclusions

The Number 2 EDG excitation cabinet inspection was thorough and conducted in accordance with the procedural requirements. No deficiencies were noted during the inspection. The licensee has completed visual inspections of the EDG excitation cabinets initiated in response to a catastrophic component failure in the Number 3 EDG excitation cabinet.

M1.2 Low Head Safety Injection (LHSI) Recirculation Flow Test**a. Inspection Scope (61726)**

The inspectors observed a quarterly performance test of the Unit 1 LHSI pumps.

b. Observations and Findings

The inspectors observed a recirculation flow test of the Unit 1 LHSI pumps in accordance with procedure 1-OPT-SI-005, "LHSI Pump Test," Revision 9. The test adequately checked the flow characteristics of the LHSI pumps and measured the system leakage with the pumps operating. Proper radiological control methods were used to collect the liquid released during system venting and to minimize the spread of contamination during the test. The pre-job briefing was complete and the work was performed in accordance with approved procedures. There was no preconditioning of the system prior to the testing. The test results indicated that the LHSI pumps were operating properly.

c. Conclusions

Low Head Safety Injection system recirculation flow testing was performed in accordance with approved procedures and all test acceptance criteria were met.

M1.3 Unit 2 Flux Measurement**a. Inspection Scope (61726)**

The inspectors observed the measurement of Unit 2 incore power levels.

b. Observations and Findings

The inspectors observed the plant engineers measure the incore neutron flux using procedure 2-NPT-RX-002, "Flux Maps," Revision 11. The engineers demonstrated detailed knowledge of the operation and limitations of the flux measurement equipment, as well as knowledge of the effects of the testing on plant operation. Although several flux thimble tubes are blocked or otherwise out of service, an adequate number of tubes are available to measure the power distribution within the core.

c. Conclusions

The incore flux mapping system was properly used to measure the incore power levels and adequately demonstrated that the core power distribution met thermal requirements. The engineers demonstrated detailed knowledge of the operation and limitations of the flux measurement equipment and the effects of the testing on plant operation.

M1.4 Number 2 EDG Standby Lube Oil Temperature Concern

a. Inspection Scope (62707)

The inspectors reviewed the licensee's efforts in troubleshooting the decrease in the standby lube oil temperature for the Number 2 EDG.

b. Observations and Findings

One of the functions of the EDG auxiliary lubricating oil system is to maintain lube oil temperature at approximately 130°F while in the standby condition in order to prevent engine damage upon receipt of a fast start signal. This function is performed by constantly circulating lube oil through a heat exchanger via an auxiliary lube oil pump. If the lube oil temperature decreases below 95°F, the EDG is considered to be inoperable.

On November 25, 1998, the lube oil temperature on the Number 2 EDG, with the engine in the normal standby readiness condition, was noted to have decreased to approximately 102°F. To alleviate the concern with low lube oil temperature, the engine was started. Following a normal engine run and cooldown period, the lube oil temperature returned to its normal standby temperature of approximately 130°F. The cause of the decreasing lube oil temperature was not identified.

The phenomena of decreasing lube oil temperature was observed on at least two more occasions in December. In each case, the engine was started and run to raise the lube oil temperature to a standby readiness condition. On January 10, 1999, the licensee removed the Number 2 EDG from service to perform troubleshooting activities on the auxiliary lube oil system as recommended by the EDG's vendor and plant engineering. Oil flows were checked and found to be satisfactory. The auxiliary lube oil pump discharge check valve and strainer were replaced, however, the removed components were found to be in satisfactory condition. The engine was returned to service with no definitive corrective action performed. The inspectors reviewed the maintenance performed and monitored the licensee's progress in resolving the lube oil temperature condition. The licensee has continued to pursue identification and resolution of the cause of the lube oil temperature decrease. The inspectors have noted that operating shift personnel have displayed an appropriate level of sensitivity to the lube oil temperature issue.

c. Conclusions

The licensee has taken action to resolve a problem with decreasing lube oil temperatures for the Number 2 EDG while in a standby condition. However, these actions have not been successful and the licensee has periodically run the diesel to increase lube oil temperatures to the normal level for standby conditions. The inspectors have noted that operating shift personnel have displayed an appropriate level of sensitivity to the lube oil temperature issue.

M8 Miscellaneous Maintenance Issues (92700, 92902)

- M8.1 (Closed) LER 50-280/97004-00: Main Steam Safety Valve As-Found Setpoint Out of Tolerance. This LER was submitted when testing of a Main Steam Safety Valve (1-MS-SV-104C) during a refueling outage revealed that the lift setting was 3.7% above its nominal value. Technical Specifications allow a tolerance of $\pm 3\%$ for the as-found setpoint. This failure was attributed to setpoint drift and was not considered to be maintenance preventable. The inspectors reviewed the LER and the proposed corrective actions and found them adequate.
- M8.2 (Closed) VIO 50-280/97004-02: Failure to follow maintenance procedures associated with the Number 1 EDG. Contrary to procedural requirements, the licensee used an ohmmeter/multimeter in place of an oscilloscope during performance of EDG relay checks conducted per Electrical Corrective Maintenance Procedure 0-ECM-0704-01, "EDG Start and Shutdown Circuit Relay Adjustment and Replacement." The inspectors reviewed the licensee's response letter, dated July 29, 1997, and verified that corrective actions were adequate and appropriately implemented.

III. Engineering**E1 Conduct of Engineering****E1.1 Temporary Modifications (TM)****a. Inspection Scope (37551)**

The inspectors reviewed the Unit 1 and Unit 2 Temporary Modification logs.

b. Observations and Findings

On January 15, 1999, the inspectors reviewed the Unit 1 and Unit 2 TM logs. Unit 1 had one active TM. The TM was installed to allow removal of an isolation manifold associated with main steam flow transmitter 1-MS-FT-1475. Blockage in the manifold prevented proper operation of the flow instrument. The TM was implemented to return the instrument to service. The associated safety evaluation adequately justified implementation of the TM.

Unit 2 had three active TMs installed. Two of the TMs are installed on non-safety related systems. The one safety related TM installed a passive catalytic hydrogen recombiner in the Unit 2 containment to reduce an increased containment hydrogen concentration due to leakage past the pressurizer vent valves. The events leading to the installation of the recombiner in Unit 2 were previously discussed in NRC Inspection Report 50-280, 281/98-05. The hydrogen recombiner installed in Unit 2 had been previously installed in Unit 1 following the May, 1997, refueling outage. The inspectors evaluated installation of the passive catalytic hydrogen recombiner in Unit 1 in NRC Inspection Report 50-280, 281/97-07.

c. Conclusions

The number of temporary modifications installed on Units 1 and 2 were minimal and were adequately justified by the associated safety evaluations.

E8 Miscellaneous Engineering Issues (92700)

- E8.1 (Closed) LER 50-280, 281/98003-00: No procedural guidance for maintaining EDG minimum fuel supply during LOOP. This LER described a condition where the Number 3 EDG would not have the required available fuel oil supply specified in the design basis due to any procedural controls to reestablish power to a de-energized electrical bus supplying a fuel oil transfer pump following a loss of offsite power (LOOP). The licensee revised the emergency operating procedures to re-energize the electrical bus following a loss of power to maintain the design basis fuel oil supply. The licensee plans to modify the electrical power supply to the fuel oil transfer pumps such that power is automatically restored to the pumps following a loss of offsite power. The inspectors verified that the emergency operating procedures had been revised and verified that the planned modification to the fuel oil transfer pump electrical power supply was being tracked in the licensee commitment tracking system.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls (71750)

On numerous occasions during the inspection period, the inspectors reviewed radiological protection practices. Radiological postings observed by the inspectors were in accordance with NRC regulations. Personnel within the radiologically controlled area were observed to be following the licensee's procedures for radiological protection. Copies of the current revision of NRC Form 3, "Notice to Employees," were posted in designated areas as required by 10 CFR 19.11(c)(1). No radiological control discrepancies were noted.

R1.1 Transportation of Radioactive Materials

a. Inspection Scope (86750)

The inspectors reviewed the licensee's program for transportation of radioactive materials to determine whether the licensee processes, packages, stores, and ships radioactive materials in accordance with Department of Transportation (DOT) and NRC regulations. The review included personnel training records, observation of a radioactive material shipment, facility tours and shipping papers. The program was evaluated for consistency with the requirements delineated in 49 CFR Parts 170 - 179, 10 CFR Part 20, 10 CFR Part 61 and 10 CFR Part 71.

b. Observations and Findings

The inspectors reviewed the training records for the three individuals authorized to certify that radioactive material and radwaste shipments meet DOT and NRC requirements. The inspectors also reviewed training records of three technicians that had performed packaging and radiological shipment surveys, and one individual that verified transport vehicle suitability. The inspectors determined that the training records were complete and that the DOT requirement for retraining every three years was being met.

The inspectors toured the Surry Radwaste Facility (SRF) and the low level radwaste storage area and determined that radioactive material containers were properly labeled in accordance with NRC requirements.

The inspectors observed the preparation of the paperwork for shipment SH-1999-02. The shipment was properly classified as a DOT Limited Quantity using the RADMAN computer program and packaged in excepted packaging certified to meet the DOT general design criteria for packages (49 CFR Part 173.410). The inspectors reviewed the licensee's shipment log for 1998 and selected ten of the eighty-six radioactive material shipments made during the period for further review. This selection included shipments classified as Waste Type A, Waste Type C, Low Specific Activity (LSA), Surface Contaminated Objects (SCO) and Limited Quantity. The inspectors verified for the shipments utilizing NRC Licensed Casks that the licensee was an authorized user and that selected elements of the cask Certificate of Compliance (COC) were being met. In the review of the COC and the shipping records, the inspectors noted that shipment number B98-05 using cask USA/6601/A and shipment number D98-02 using cask USA/9249/A did not include documentation that the cask o-ring/gaskets were replaced at the frequency required by the COCs. The licensee initiated immediate actions to retrieve this information from the cask owner for the shipments identified and for all cask shipments made in 1998. Based on information supplied by the cask owner, the inspectors verified that the cask o-ring/gaskets had been replaced at the required frequency. The licensee also initiated a deviation report to evaluate COC requirements and take corrective actions as needed.

The inspectors reviewed the two most recent 10 CFR 61 analysis reports for the dry active waste, resin and evaporator bottoms waste streams. The USNRC Low Level Waste Licensing Branch Technical Position on Waste Classification (May 1983, Revision 0) states that, "confirmatory analysis for Class A waste should be performed on at least a bi-annual basis, however these frequencies may be raised or lowered based upon plant specifics." The inspectors noted that the confirmatory analysis frequency for the evaporator bottoms, a class A waste stream, exceeded the recommended bi-annual frequency from approximately late January 1997 to early April 1997. Two shipments of evaporator bottoms were made during this period. The licensee provided documentation of the more conservative methodology used, which included the data of a more conservative waste stream used for the shipment, approval from the waste processor that received and held the shipment until updated sample analyses were performed, and revised the manifest using updated samples. Based on plant specifics, the inspectors determined that the licensee's justification of the confirmatory analysis frequency and classification of the shipments as waste class A was acceptable. The

inspectors also determined that the revised manifest total radioactivity was less than the original manifested shipment.

c. Conclusions

The licensee effectively implemented a program for transportation of radioactive materials pursuant to DOT and NRC regulations. Individuals involved in preparing shipments of radioactive materials were adequately trained. The licensee effectively characterized and classified radioactive waste and properly prepared radioactive material for safe transport.

R1.2 Water Chemistry Controls

a. Inspection Scope (84750)

The inspectors reviewed implementation of selected elements of the licensee's water chemistry control program for monitoring primary and secondary water quality. The review included examination of program guidance and implementing procedures, and analytical results for selected chemistry parameters. Procedures and data were compared to the requirements in Technical Specifications (TS) 3.1.D, 3.1.F and 4.1.C for monitoring specific primary coolant chemistry parameters and to the programmatic requirements, delineated in License Condition 3.K, for monitoring secondary water chemistry.

b. Observations and Findings

The inspectors reviewed Virginia Power Administrative Procedure (VPAP) 2201, "Nuclear Plant Chemistry Program," Revision No. 3, and determined that it included provisions for sampling and analyzing reactor coolant at the prescribed frequency for the parameters required to be monitored by the TSs. The procedure also included provisions for monitoring primary and secondary water quality based on established industry guidelines and standards, which included the Electric Power Research Institute (EPRI) guidelines for PWR primary and secondary water chemistry. The inspectors noted that VPAP-2201 listed the sampling frequency and typical values for each parameter to be monitored. Action levels applicable to various operational modes were given where appropriate. Guidance was also provided for actions to be taken if analytical results exceeded prescribed limits. The inspectors determined that the above guidance and procedures were consistent with the applicable TS requirements and, with a few minor plant specific exceptions, the EPRI guidelines.

The inspectors also reviewed records of analytical results for selected parameters generated during the period September 1998 through mid-January 1999. The parameters selected included dissolved oxygen, chloride, fluoride, and dose equivalent iodine-131 in reactor coolant; iron and hydrazine in feedwater; sodium in steam generator blowdown; and dissolved oxygen in condensate. Those parameters were maintained well within the relevant TS limits and within the EPRI guidelines for power operations.

The inspectors noted that an intrusion of sodium and chloride into the Unit 1 feedwater system occurred on November 20, 1998, during the unit startup from the refueling outage. The licensee initiated an investigation of that event and determined that the intrusion was caused by condenser tube leakage. The source of the leakage was 13 tubes with missing end plugs. The licensee determined that this condition was caused by inadequate maintenance practices during the outage in that verification that the tubes were plugged on both ends was not performed. The inspectors determined that the chemistry control program functioned as intended by promptly detecting the impurity intrusion and reestablishing secondary water quality following repairs to correct the inadequate maintenance practices.

c. Conclusions

The licensee's water chemistry control program for monitoring primary and secondary water quality had been implemented in accordance with the TS requirements and industry guidelines for PWR water chemistry.

R1.3 Contamination Control

a. Inspection Scope (83750)

The inspectors reviewed implementation of selected elements of the licensee's contamination control program. The review included examination of records for personnel contamination events and independent contamination surveys in areas adjacent to the entrance to the Radiologically Controlled Area (RCA). The licensee's contamination control practices were evaluated for consistency with the programmatic requirements specified in section 6.6 of the Radiation Protection Program manual (VPAP 2101).

b. Observations and Findings

The inspectors reviewed the licensee's procedures for follow-up actions to Personnel Contamination Events (PCEs) and reviewed selected records for those events. Procedure HP-1061.020, "Personnel Contamination Monitoring and Decontamination," indicated that the threshold for initiating follow-up actions was skin or clothing contamination in excess of 100 net counts per minute (ncpm) as measured by a hand-held frisker. The licensee's records indicated that 104 PCEs occurred during the fourth quarter of 1998, and that 28 bioassays were performed to evaluate possible intakes of radioactive material. Dose history records for four individuals who had bioassays during that period were also reviewed by the inspectors. Those records indicated that the selected individuals did not receive intakes greater than the threshold for assigning internal dose, i.e., three tenths of one percent of the Annual Limit on Intake (ALI).

The inspectors also reviewed records for contamination surveys performed in the areas adjacent to the entrance to the RCA during January 1 - 14, 1999. Daily survey results from large area smears of those areas indicated that the loose surface beta-gamma activity was less than 1000 dpm/ft². At the inspector's request, a licensee Health Physics Technician performed contamination surveys in the Men's Clean Change Locker Room. A large area smear was taken in approximately 20 randomly selected

lockers and general area smears were taken in three randomly selected individual lockers. The inspectors verified, by observing the survey instrument readings, that the loose surface beta-gamma activity was less than 1000 dpm/100 cm². Based on the review of the licensee's records for contamination surveys performed in the areas adjacent to the entrance to the RCA and the independent contamination surveys performed by the licensee of the lockers in the men's change room, the inspectors concluded that the licensee had maintained adequate contamination control around the entrance to the RCA.

c. Conclusions

The licensee's contamination control practices were consistent with the requirements of the Radiation Protection Program manual and were effective in minimizing the spread of contamination.

R1.4 Spent Fuel Cask Surveys

a. Inspection Scope (83750)

The inspectors reviewed the radiological survey records and Radiation Work Permits (RWP) for work on cask MC-10 located at the Independent Spent Fuel Storage Installation (ISFSI) facility to determine the adequacy of the work controls. Work performed at the facility was in response to a cask differential pressure alarm that occurred on December 24, 1998.

b. Observations and Findings

Work to determine the cause of the alarm began on December 30, 1998, and used RWP 98-2-1020, Revision 0. Work extended into the beginning of calendar 1999 and used RWP 99-2-1010. Both RWPs were primarily focused on activities associated with loading and transporting the cask to the ISFSI. Although not written to cover the specific tasks performed at the ISFSI, both RWPs contained sufficient instructions to control worker radiation exposure during the work performed.

Surveys conducted on December 31, 1998, of the cask external surfaces showed maximum contact radiation levels of 15 mrem/hour gamma radiation and 14 mrem/hour neutron radiation. No radiological contamination or airborne activity above background was detected.

c. Conclusions

Radiological surveys and controls for work to resolve an ISFSI cask low differential pressure alarm were sufficiently comprehensive to control worker radiation exposure.

R4 Staff Knowledge and Performance in RP&C**R4.1 Training and Qualification of Personnel****a. Inspection Scope (83750, 84750)**

The inspectors reviewed implementation of the licensee's training and qualification program for Radiation Protection and Chemistry personnel. The review included an evaluation of the training provided to selected individuals for consistency with the training program descriptions in the licensee's Radiation Protection Program and Plant Chemistry Program manuals.

b. Observations and Findings

As described in the licensee's Radiation Protection and Plant Chemistry program manuals (VPAPs 2101 and 2201), the training and qualification programs for Health Physics Technicians and Chemistry Technicians included basic health physics/chemistry training, on-the-job training, continuing training, and speciality training. The program was administered by the Nuclear Training Department and implemented through Health Physics/Chemistry Technician Development Program and Continuing Training Manuals. The inspectors reviewed the training records for two randomly selected Health Physics Technicians and two Chemistry Technicians. Those records included listings of the fundamental health physics/chemistry courses completed for basic training, prescribed tasks performed during on-the-job training for qualification to perform specific functions, and courses attended for continuing training. The inspectors determined that training had been provided for the selected individuals in accordance with the licensee's established training program requirements.

c. Conclusions

Training was provided to Radiation Protection and Chemistry personnel in accordance with the descriptions delineated in the licensee's Radiation Protection, Chemistry, and Nuclear Training manuals.

R7 Quality Assurance in RP&C Activities**R7.1 Audits****a. Inspection Scope (83750, 84750 and 86750)**

The inspectors reviewed selected audit reports for adequacy and consistency with Technical Specifications 6.1.C.2.h and 6.1.C.2.j regarding program areas required to be audited and audit reporting requirements.

b. Observations and Findings

The inspectors reviewed Nuclear Oversight Audit Reports 97-06, 97-13, and 98-06 which documented the licensee's most recent audits in the areas of chemistry,

radiological protection, effluent monitoring, environmental monitoring, radwaste processing, and transport of radioactive materials. Those reports delineated the specific elements of the program areas evaluated and included overall conclusions, based on audit results, that the programs were being effectively implemented. The inspectors also reviewed the completed audit checklists which provided extensive documentation of the supporting details for the audit conclusions. Substantive issues identified by the audits were entered into the licensee's corrective action program by issuance of Deviation Reports.

c. Conclusions

Audits in the areas of chemistry, radiological controls, and transportation were of sufficient scope and depth to identify potential problems. Corrective actions for identified issues were documented and tracked for completion of warranted follow-up. The licensee complied with the program requirements for conducting audits of those activities.

S1 Conduct of Security and Safeguards Activities (71750)

On numerous occasions during the inspection period, the inspectors performed walkdowns of the protected area perimeter to assess security and general barrier conditions. The inspectors concluded that security posts were properly manned and the perimeter barrier's material condition as well as the isolation zones were being properly maintained. Additionally, proper control of escorted individuals within the protected area was observed by the inspectors.

S1.1 Access Authorization Program

a. Inspection Scope (81700)

The inspectors evaluated the key aspects of the access authorization program (AAP) to verify that the licensee's AAP was being implemented according to regulatory requirements and plan commitments.

b. Observations and Findings

The inspectors reviewed and evaluated LER 50-280, 281/98S01-00. This LER was reported to NRC on December 4, 1998, and pertained to an August 11, 1998, event. On June 22, 1998, the licensee received a letter from Freeze Seal Incorporated, a contractor, indicating that an employee of their company no longer required clearance for Virginia Electric and Power Company (VEPCO) nuclear facilities. A nuclear access specialist processed the favorable termination by revoking the individual's clearance in the Corporate Security Information System (CSIS) database. On June 23, 1998, a Daily Clearance Processing Report for June 22, 1998, was generated by the CSIS computer and printed at the Surry Nuclear Station (SNS). This report listed all the clearance revocations processed on the referenced date, including the contractor employee. To complete the normal processing of favorable termination requests, the badging coordinator at the station reviewed the above report on June 23, 1998. Security badges

for the individuals listed on the report were deactivated in the access control computer systems. The station badge coordinator, however, failed to deactivate the badge for the contractor employee. Verification of the badge deactivation process was performed on June 24, 1998, by reviewing a Badge Activation/Deactivation Report generated by the CSIS computer for work completed on June 23, 1998. The report was compared to individual badge data sheets which maintain a history on the badge. This verification was inadequate because no badge data sheets were pulled and edited for the contractor employee.

On August 11, 1998, the same contractor employee was sent to the station to retrieve equipment left from a previous job. He verified with the badging coordinator that his badge was still active and at 11:49 a.m. entered the protected area (PA). At 11:59 a.m., the same individual exited the PA. On November 4, 1998, a Freeze Seal Incorporated representative called the licensee to determine the procedure for reestablishing clearance for this contractor employee. It was discovered during the review for reinstatement, that the employee's badge was still active in the site access control computer systems. The badge was deactivated on November 4, 1998. On November 5, 1998, a review was performed on the access history of the contractor employee. The review determined that the individual entered the PA only once since June 22, 1998. A deviation report was submitted to document the event. On November 5, 1998, a 1-hour notification was made according to 10 CFR 73.71(b)(1) due to an actual entry of an unauthorized person into the PA.

North Anna Power Station, Surry Power Station, Independent Spent Fuel Storage Installation Physical Security Plan (PSP), Revision 4, Chapter 3, paragraph 3.1.1(b) requires that an individual's unescorted access authorization be revoked when no longer required.

Once the licensee discovered that the contractor employee's badge was active, immediate corrective action was taken to remove the badge from the access control computer systems. A review was conducted to determine if there were other individuals with active badges but without an access authorization clearance. This reviewed indicated that this was an isolated event and there were no other individuals with active badges and revoked clearances. The individual who caused this incident was counseled and retrained. Software improvements in this area were being pursued by the licensee. The failure to terminate an individual's PA access after access authorization was no longer required is contrary to the PSP, Chapter 3, paragraph 3.1.1(b). This non-repetitive, licensee-identified and corrected violation is being treated as a Non-Cited Violation (NCV), consistent with Section VII.B.1 of the NRC Enforcement Policy. This matter is identified as NCV 50-280, 281/98010-01.

c. Conclusions

A Non-Cited Violation was identified for the failure to terminate a contractor employee's protected area access after access authorization was no longer required. The station badge coordinator failed to deactivate the contractor's badge and a subsequent verification failed to identify the discrepancy.

S1.2 Protected Area Access Control - Vehicles

a. Inspection Scope (81700)

The inspectors evaluated the licensee's vehicle access control activities to ensure compliance with Chapters 2, 3, and 9 of the PSP, Security Plan Implementing Procedure (SPIP) 8, "Vehicle/Material Access Control," Revision 3, and regulatory requirements.

b. Observations and Findings

The inspectors verified by observation that the licensee had positive access control measures in place to properly identify, authorize, and search materials, packages, and vehicles before allowing them to be introduced into the PA. An active land vehicle barrier system was utilized to control vehicle access to the PA. The vehicle barrier system (VBS) is discussed in more detail in Section S2.1. Security officers searched vehicles and their contents entering the PA through the vehicle access portal. Personnel accompanying the vehicles were processed through the primary access portal.

c. Conclusions

Material, package, and vehicle access controls for items entering the protected and vital areas met the criteria of the current Physical Security Plan and appropriate security procedures.

S2 **Status of Security Facilities and Equipment**

S2.1 Vehicle Barrier System

a. Inspection Scope (81700)

The inspectors evaluated and reviewed Chapter 2 of the PSP and SPIP 13, "Security Patrols," Revision 6, to ensure that the licensee was complying with the VBS commitments and 10 CFR 73.55(c)(7).

b. Observations and Findings

The inspectors verified by touring the site perimeter that the VBS was in place and functioning according to the PSP and SPIP. The licensee continued to use a combination of double surface mounted anchored jersey barriers filled with rock, bollards, buildings, intake and discharge canals and natural barriers as part of the barrier system. The licensee used both active embassy style gates and passive gate barriers. The inspectors reviewed quarterly and annual inspection records of the VBS and found that the licensee was complying with various testing and maintenance commitments. The VBS was well planned and substantial in construction.

c. Conclusions

The vehicle barrier system was functional, well maintained, and effective in its intended purpose. The licensee's vehicle barrier system met the Physical Security Plan commitments and regulatory requirements and was considered a strength in the security program.

S3 Security and Safeguards Procedures and Documentation

S3.1 Security Procedures

a. Inspection Scope (81700)

The inspectors evaluated a sample of implementing procedures to ensure that the procedures were consistent with PSP commitments in Chapters 1 and 9 and to determine their adequacy and compliance with 10 CFR Part 50.54.

b. Observations and Findings

The inspectors reviewed three site security procedures, one Virginia Power Administrative Procedure and related supporting records and reports. The inspectors also interviewed security force personnel to determine their familiarity with these documents. The procedures reviewed pertained to format, content, and requirements for the PSP, authorized personnel access control, vehicle/material access control, and security and access control. The reviewed documents were consistent with plan commitments.

c. Conclusions

The licensee's security procedures were thorough, well documented, and consistent with the Physical Security Plan commitments and 10 CFR Part 50.54.

S4 Security and Safeguards Staff Knowledge and Performance

S4.1 Security Force Requisite Knowledge

a. Inspection Scope (81700)

The inspectors interviewed and observed security personnel to determine if they possessed adequate knowledge to carry out their assigned duties and responsibilities, including response procedures, use of deadly force, and armed response tactics as committed to in Chapters 1 and 12 of the PSP.

b. Observations and Findings

The inspector interviewed approximately 15 security personnel, including supervisors, and witnessed approximately 10 others in the performance of their duties. Members of

the security force were knowledgeable in their duties and responsibilities, response commitments and procedures, and armed response tactics. The inspector found that armed response personnel had been instructed in the use of deadly force as required by 10 CFR Part 73.

c. Conclusions

The inspector concluded through observation and interviews of security force personnel, and reviews of procedures that the security force had the requisite knowledge to cope with the design-basis threat described in 10 CFR 73.1(a) and the Physical Security Plan.

S4.2 Response Capabilities

a. Inspection Scope (81700)

The inspectors evaluated responses by the security organization to security threats, contingencies, and routine response situations, including drills, against security procedures and Chapters 1 and 12 of the PSP and Safeguards Contingency Plan (SCP).

b. Observations and Findings

The inspector evaluated the tactical equipment prepositioned within the PA to verify that tactical equipment commitments were implemented. Tactical response personnel were also interviewed to ascertain their familiarity with the prepositioned equipment.

Response personnel were familiar with their duties and the locations of the response equipment, as well as the type and quantity of items at the locations. Response personnel were familiar with the 24 event response conditions listed in the contingency plan. Response personnel knew the shift chain of command during a tactical response. The number of tactical responders available on each shift met the plan commitments.

c. Conclusions

The inspector verified that response capabilities of the security organization to security threats, contingencies, and routine response situations were consistent with the security procedures, the Physical Security Plan and Security Contingency Plan.

S6 Security Organization and Administration

S6.1 Staffing Level

a. Inspection Scope (81700)

The inspectors reviewed the staffing of trained security officers and armed personnel that would be immediately available at the facility to fulfill response requirements.

b. Observations and Findings

The licensee had an onsite physical protection system and security organization. The security organization and physical protection systems were designed to protect against the design basis threat of radiological sabotage as stated in 10 CFR 73.1(a). At least one full-time manager of the security organization was always onsite and had no duties that conflicted with the assignment to direct activities during an incident. This individual had the authority to direct the physical protection activities of the organization. The four shifts had the number of trained security officers and armed personnel immediately available to fulfill response requirements and commitments of the PSP.

c. Conclusions

The total number of trained security officers and armed personnel immediately available to fulfill response requirements met the number specified in the Physical Security Plan. One full-time member of the security organization who has the authority to direct security activities did not have duties that conflicted with the assignment to direct activities during an incident.

S8. Miscellaneous Security and Safeguards Issues

S8.1 (Closed) Inspection Follow-up Item (IFI) 50-280, 281/98006-02: Security Uninterrupted Power Supply (UPS) inverter was out of service and due to be replaced by December 31, 1998. The inspectors reviewed and evaluated licensee's documented actions to update the security UPS. New automatic transfer switches, a battery charger, an inverter, static switches, and a bypass transformer were installed and made operational on October 12, 1998. The new UPS had been satisfactorily tested twice since it was returned to service.

S8.2 (Closed) LER 50-280, 281/98S01-00: Failure to terminate access results in unauthorized protected area entry. The review of the subject LER is discussed in Section S1.1. This LER is closed.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on January 26, 1999. Prior to this exit meeting, the inspectors presented the preliminary results of the radiological protection inspection to members of licensee management on January 15, 1999. The inspectors also presented the results of the security inspection during a pre-exit meeting on December 11, 1998. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

M. Adams, Superintendent, Engineering
 R. Allen, Superintendent, Maintenance
 R. Blount, Manager, Operations & Maintenance
 M. Crist, Superintendent, Operations
 E. Collins, Director, Nuclear Oversight
 J. Grau, Acting Superintendent, Training
 E. Grecheck, Site Vice President
 C. Luffman, Security Manager
 R. Savedge, Security Supervisor
 T. Sowers, Manager, Nuclear Safety & Licensing
 B. Stanley, Supervisor, Licensing
 W. Thornton, Superintendent, Radiological Protection

INSPECTION PROCEDURES USED

IP 37551	Onsite Engineering
IP 40500	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726	Surveillance Observation
IP 62707	Maintenance Observation
IP 71707	Plant Operations
IP 71750	Plant Support Activities
IP 81700	Physical Security Program for Power Reactors
IP 83750	Occupational Radiation Exposure
IP 84750	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 86750	Solid Radioactive Waste Management and Transportation of Radioactive Materials
IP 92700	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92901	Followup - Plant Operations
IP 92902	Followup - Maintenance

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-280, 281/98010-01	NCV	Failure to revoke an individual's unescorted access authorization when no longer required (Section S1.1).
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Closed

50-280, 281/97003-00	LER	Loss of pressurizer heaters results in manual Unit 1 trip and Unit 2 ESF actuation (Section O8.1).
50-280/97005-00	LER	Unit 1 Power range nuclear instrumentation inoperable due to personnel error (Section O8.2).
50-280, 281/97008-00	LER	Invalid actuation of engineered safety features due to personnel errors (Section O8.3).
50-281/97010-05	VIO	Inadequate work instructions results in the failure to implement the requirements of a safety evaluation (Section O8.4).
50-280/97004-00	LER	Main steam safety valve as found setpoint out of tolerance (Section M8.1).
50-280/97004-02	VIO	Failure to follow maintenance procedures associated with the Number 1 EDG (Section M8.2).
50-280, 281/98003-00	LER	No procedural guidance for maintaining EDG minimum fuel supply during LOOP (Section E8.1).
50-280, 281/98006-02	IFI	Security UPS inverter was out of service and due to be replaced by December 31, 1998 (Section S8.1).
50-280, 281/98010-01	NCV	Failure to revoke an individual's unescorted access authorization when no longer required (Section S1.1).
50-280, 281/98S01-00	LER	Failure to terminate access results in unauthorized protected area entry (Section S8.2).