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

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Report Nos. 50-280/92-01 and 50-281/92-01

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: Onsite, January 6-10, 1992; By Telephone February 5-7, 1992.

Inspector: D. A. Seymour 2.11.92
Date Signed

Approved by: T. R. Decker, Chief 2/11/92
Date Signed
Radiological Effluents and Chemistry Section
Radiological Protection and Emergency Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of the radioactive waste processing and transportation, process and effluent monitors, the radioactive gaseous effluent treatment system, and the main control room emergency ventilation system.

Results:

The licensee had an effective program for controlling and monitoring liquid waste effluents from the Surry Radwaste Facility. The licensee had received interim approval to stabilize boric acid waste with bitumen prior to near-surface burial. Additional testing will have to be performed, and the results reviewed by the Office of Nuclear Materials Safety and Safeguards to verify stability of the waste forms, prior to final approval of the waste forms (Paragraph 2).

The testing of the radioactive gaseous effluent treatment system, and the main control room emergency ventilation system was in conformance with regulations (Paragraph 3).

The technicians who performed radioactive waste shipments were adequately trained and performed their duties competently. One unresolved item was identified, URI 50-280, 50-281/92-01-01 for apparent use of an unapproved radioactive waste transportation procedure (Paragraph 4).

The sources contained in process and effluent monitors were being leak checked as required by Technical Specifications (Paragraph 5).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Benthall, Supervisor, Licensing
*R. Bilyeu, Licensing Engineer
*M. Biron, Supervisor, Radiation Engineering
*P. Blount, Supervisor, Radiation Analysis
*D. Christian, Assistant Station Manager
*D. Erickson, Superintendent, Radiation Protection
*B. Garber, Supervisor, Health Physics
*L. Morris, Superintendent, Radiological Waste
*T. Sowers, supervisor, Engineering
*W. Thorton, Director, Health Physics and Chemistry

Other licensee employees contacted during this inspection included engineers, technicians, and administrative staff.

Nuclear Regulatory Commission

*S. G. Tingen, Resident Inspector

*Attended exit interview.

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

2. Radioactive Waste Processing (84750)

Section 6.2.4 of Surry's Offsite Dose Calculation Manual specifies the requirements for the Surry Radwaste Facility (SRF) liquid radwaste treatment. The amounts and types of liquid effluent releases have a direct impact on offsite dose.

At the time of this inspection, the SRF had approximately twelve weeks of full operability. The inspector reviewed SRF Effluent Release Summary sheets for December, 1991, and determined that "0" curies of activity in 337,022 gallons of effluent (counting at effluent Lower Limit of Detection levels) had been released from the SRF during this time frame. Surry Power Station (other than the SRF) released 0.00421 curies of activity in liquid effluents in December, 1991. The licensee processed laundry waste water through the evaporator in December, 1991, and did not encounter problems with foaming in the evaporator, which would have limited its usefulness in processing the laundry water. During a telephone conversation on February 6, 1991, a licensee representative indicated that they had also had zero curies released from the SRF in liquid effluents for January, 1992.

The inspector determined, through a documentation review and personnel interviews, that a total of 52 bitumen drums had been processed in 1991 and were stored at the facility. These drums would be shipped for offsite burial after verification that the burial site license included this specific waste form, or that an amendment to the license had been enacted. SRF processing system availability for September through December 1991 was high (greater than 80 percent to 100 percent), for the demineralizers, the evaporator, the bitumen system, laundry filtration, and the dry active waste compaction system. SRF personnel exposure was 215 millirem in December 1991. There was one personnel contamination event in 1991. There was 354 square feet of contaminated area out of a total of 46,000 square feet in the Radiation Controlled Area (0.77 percent).

The inspector briefly reviewed the Topical Report Number USE-61-002-P, "Stability of Low Level Radioactive Wastes solidified With High Strength Asphalt," Revision 0, dated June 19, 1989. The inspector also reviewed supporting documentation and correspondence. This report described and summarized the results of the stability testing of bitumen-solidified simulated low level waste streams, in an effort to prove that the bitumen-solidified waste forms were stable and met the requirements for near-surface burial. These tests included: compressive strength, thermal cycle resistance, radiation resistance, biodegradation resistance, leach resistance, immersion resistance, correlation testing (small, simulated laboratory sized samples versus full-scale products), determination of homogeneity, dimensional stability, free liquids and void spaces.

This report was evaluated by cognizant personnel in the Office of Nuclear Material Safety and Safeguards (ONMSS). The staff concluded that there was reasonable assurance that the low-level waste forms of boric acid wastes produced by the bitumen process would meet the stability requirements of 10 CFR 61 for waste characteristics. Because of limited or incomplete data, an interim, one-year approval was granted for these waste forms, and additional verification testing was requested. The interim period ends on July 31, 1992. The interim approval did not approve of waste forms created from the solidification of bead resins or powdered resins.

An interim Technical Evaluation Report (TER) related to the Topical report was issued by ONMSS in July 1991. The TER summarized the findings of the ONMSS relative to the Topical Report, and granted interim approval for the bitumen-solidified, boric-acid waste stream. In addition, it included information on the recent revision to the "Technical Position on Waste Form," dated January, 1991. This revision requires vendors and processors to report

mishaps to the NRC within 30 days of knowledge of the incident. The TER contained examples of possible mishaps for the bitumen-solidified waste form, and included: "shows instability evidenced by crumbling, cracking, spalling, voids."

The inspector observed a bucket of solidified bitumen produced during testing of the bitumen delivery system that appeared to evidence flaking or spalling. This "sample" was not a simulated waste sample used for stability testing. The bitumen also contained a piece of aluminum foil. The inspector determined that curious licensee personnel had poked at the surface of the bitumen with pens and pencils in efforts to "informally" gauge its strength and hardness. It should be noted that this sample was "glass-like" in surface appearance.

The inspector noted that the Topical Report did not address hardness or brittleness testing (as opposed to compressive strength, which is related to, but not identical to these parameters). The inspector was not certain of the relative significance of these parameters in considering the overall stability of the waste forms formed by this process. The inspector notified cognizant licensee personnel at the SRF of these observations. The inspector also discussed these observations with personnel associated with the ONMSS for consideration of the validity of including these types of tests into the approval process for bitumen-stabilized systems.

The inspector concluded that the licensee had an effective program for controlling and monitoring liquid waste effluents from the SRF. In addition, the licensee had received interim approval to stabilize boric acid waste with bitumen prior to near-surface burial. Additional testing will have to be performed, and the results reviewed by the Office of Nuclear Materials Safety and Safeguards, to verify stability of the waste forms, prior to final approval of the waste forms.

No violations or deviations were identified.

3. Auxiliary Building Ventilation System and Main Control Room Emergency Ventilation (84750)

TS 4.12.A lists the tests and test frequencies for the Auxiliary Ventilation Exhaust Filter Trains. TS 4.20.A lists the tests and test frequencies for the Control Room air filtration system. These filter trains consist of roughing filters, high efficiency particulate absorbers (HEPA) filters, and charcoal absorbers. These tests verify that leakage efficiency and iodine removal efficiency are within

acceptable limits. This safety-related systems would remove particulates and adsorb gaseous iodine following a loss of coolant accident or a refueling accident.

Pursuant to these requirements, the inspector reviewed selected portions of several procedures which verified the operability of these systems and compliance to technical specifications. A summary of this review follows.

TS 4.12.A.1 requires that each redundant Auxiliary Ventilation filter train circuit shall be operated every month if it has not already been in operation. The inspector reviewed selected portions of PT-32.1, titled "Auxiliary Ventilation Filter Train Test," dated October 9, 1990, which listed the results for this test on installations FI-VS-117A and 117B (flow indicators), and for 1-VS-F-58A and 58B (fans) for November 26, 1991. The test results were considered satisfactory if air flow through the filters (36000 cubic feet per minute (cfm) ± 10 percent) was demonstrated for fifteen minutes; and if filter total pressure drop was less than seven inches of water. The test results were satisfactory.

TS 4.20.A.10 requires that Control Room air filter train circuits shall be operated every month. The inspector reviewed selected portions of PT-32.2, titled "Control Room Ventilation System Test," dated March 23, 1989, which listed the results for this test on installations 1-VS-F-41, 1-VS-F-42, 2-VS-F-41, and 2-VS-F-42 (fans). The test results were considered satisfactory if air flow was demonstrated through the running filters for 15 minutes; and by observation of Control Room pressure gauges indicating that the Control Room pressure was a minimum of 0.05 inches of water higher than without the fan running. In addition, the filter differential pressure could not exceed 3.5 inches of water. The inspector reviewed the test results for April 17, 1991 and November 26, 1991, and determined that they were satisfactory.

PT-32.3, titled "Compressed Air Piping Capacitance Test for Auxiliary Ventilation," dated June 1, 1989, is performed to measure the ability of the compressed air remaining in instrument air lines to hold the Auxiliary Building dampers in the emergency position for two hours following a fuel handling accident coincident with the loss of station compressed air. The inspector reviewed the test results for June 13, 1991, and determined that they were satisfactory.

TS 4.12.A.2 specifies that at least once per refueling cycle, the operability of the entire safety-related portion of the auxiliary ventilation system shall be demonstrated. The inspector reviewed selected portions of PT-32.4, titled

"Flow Switch FS-V-117A and B Test," dated February 22, 1991, which verified low flow setpoints for 1-VS-58A and 58B. This test, performed on November 18, 1990, verified that fans 1-VS-F-58A and B would trip off on a low flow signal, closing the associated system dampers and preventing backflow.

TS 4.20.A.1. specifies that the Control Room Air Filtration System flow rate test shall be performed at least once per refueling cycle; following painting, fire, or chemical release; after each complete or partial replacement of the HEPA filter or charcoal absorbers; following structural maintenance of the HEPA filter or charcoal absorber housings; and following major modification or repair of the air cleaning system. TS 4.20.B.1. specifies that the fan flow rate shall show a flow rate through any single filter train of 1000 ± 10 percent cfm. The inspector reviewed PT-32.5, titled "Control Room Air Filtration System Flow Test," dated March 23, 1989, for Fan 1-VS-F-41, performed on October 14, 1990. The resulting flow rate was 1134 cfm, which did not meet the acceptance criteria for this PT. The inspector determined, through discussions with the licensee, that a work order was issued to adjust the fan. The fan motor received minor adjustment bringing the flow rate to 991 cfm. PT-32.5 was repeated successfully on October 16, 1990 to verify the flow rate.

TS 4.12.A.9 specifies that the pressure drop across the high efficiency particulate absorber filter and absorber banks for the Auxiliary Ventilation System shall be checked at least once per refueling cycle if the system had been maintained in a standby status; after 720 hours of system operation; and after each complete or partial replacement of filters or absorbers. The inspector reviewed PT-32.6, titled "Auxiliary Ventilation Pressure Drop Test," dated August 22, 1989. This PT was performed on Train B on April 20, 1991 for Fan 1-VS-F-58B. The measured flow rate and pressure drop were within the acceptance criteria for this test.

TS 4.12.A.3. specifies that the Auxiliary Ventilation System exhaust fan flow rate through each filter train in the Loss of Coolant Accident (LOCA) mode of operation shall be determined at least once per refueling cycle; after any structural maintenance on the HEPA filter of charcoal absorber housing; and after complete or partial replacement of the HEPA filter or charcoal absorbers. TS 4.12.B.3. specifies that this flow rate should be 36,000 cfm ±10 percent with the system in the LOCA mode of operation. The inspector reviewed PT-32.7, titled "Auxiliary Ventilation Filter Flow Test," dated May 5, 1986, performed on January 13, 1991, for train A (Fan 1-VS-F-58A). The acceptance criteria for this PT were met.

TS 4.12.A.8 specifies that laboratory analysis of in-place charcoal samples shall be performed after 720 hours of system operation. The inspector reviewed selected portions of PT-32-8A, titled "HEPA and Charcoal Filter Test After 720 Hours of Operation," dated March 27, 1991. This PT ensures that in-place charcoal samples are taken as required after 720 hours of operation, after a refueling cycle, upon receipt of a new batch of charcoal, following painting, and following a fire or chemical release. The inspector reviewed the results of this test for filter 1-VS-FL-3B. The in-place charcoal sample was removed for analysis on April 26, 1991.

TS 4.12.B.7 requires laboratory analysis of in-place charcoal samples. The inspector reviewed selected portions of PT-32.8B, titled "Charcoal Filter Test Analysis," dated March 27, 1991, which listed the results for this test on 1-VS-FL-3B (Auxiliary Ventilation System charcoal). The charcoal was sampled on April 26, 1991. The date the analysis results were received was May 10, 1991, within the 31 days as required. The test criteria for this PT (at least 96 percent methyl iodide removal, etc.) were met.

The inspector also reviewed PT-32.9, titled "HEPA and Charcoal Test for Auxiliary and Control Room Ventilation," dated May 16, 1989. The inspector reviewed the test results for Auxiliary Ventilation System Filter 1-VS-FL-3A performed on January 13, 1991. Tests which were performed included: flow rate, pressure drop, in-place halogenated hydrocarbon leakage test, and a visual test for physical damage. All test results were satisfactory.

Based on the scope of this review, the testing of these systems was in conformance with regulations.

No violations or deviations were identified.

4. Transportation of Radioactive Waste (86750)

10 CFR 71.5 (a) requires each licensee who transfers licensed material outside of the confines of its plant or other place of use, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of the regulations appropriate to the mode of transport of DOT in 49 CFR Parts 170 through 189. These requirements help ensure that the licensee effectively processes, packages, stores and ships radioactive solid materials.

10 CFR 20.311(b) requires that each shipment of radioactive waste to a licensed disposal facility be accompanied by a shipment manifest and specifies required entries on the manifests. 10 CFR 61.55 and 10 CFR 61.56, in part, specify

the classification and waste characteristics of radioactive waste destined for near surface burial.

These requirements facilitate the handling of the waste at the burial site, and provide for the health and safety of personnel at the disposal site. These requirements also delay the time when long-lived radionuclides could potentially cause personnel exposures, and limit the magnitude of these potential doses.

Pursuant to these requirements, the inspector reviewed selected portions of several procedures affiliated with the packaging and transportation of radioactive waste. These procedures included:

Procedure Number HP-7.2.21, Revision 1, dated February 12, 1991, titled "Sampling, Analyzing and Classifying Solid Radioactive Waste," provided the requirements for the sampling and analysis of the waste streams in the plant which produced solid radioactive waste; and established the methods for classifying the waste for compliance with 10 CFR 61. This procedure provided the methods for estimating the concentrations of radionuclides which were not readily detectible by instrumentation used onsite (beta emitters) by establishing scaling factors for these radionuclides. The scaling factors are developed from a radiochemical analyses which relate the concentrations of readily measured nuclides (gamma emitters) to the concentrations of the beta emitters. This procedure allowed the licensee to determine the radioactive waste classification for burial purposes using the characterized waste stream results, onsite radioanalysis, and scaling factors.

Procedure Number HP-7.2.30, Revision 1, dated February 12, 1991, titled "Computer Programs For Radwaste," provided the instructions for operating a vendor supplied computer program to classify radioactive waste packages, inventory records and to print shipment manifests and associated reports. This program also had the ability to characterize and track individual filter elements for accumulation as a single container for shipment. This program required the users to have specific data to be input during execution. The program either classified the package based on package radiation level and waste form, or on specific nuclide activity sample data. The measurement of the package radiation level at one meter was also required.

Procedure Number HP-7.2.40, Revision 2, dated November 19, 1991, titled "Disposal Of Radioactive Waste Using The Barnwell Disposal Facility," provided the requirements for the disposal of solid radioactive waste at Barnwell, including: disposal permits, package inspections, package labeling and marking, vehicle checklists and surveys, prior notification of shipments, and preparation of shipping papers.

As part of this inspection, the inspector also observed portions of the loading of a high integrity container into a transport cask. The HIC was filled with dewatered, spent resin being shipped for offsite burial. The inspector observed the transport vehicle inspection, portions of the inspection by a Quality Control inspector, radiation field measurements, and loading of the HIC into the cask. The inspector also reviewed the paperwork associated with the shipment.

The inspector noted, at the time of the inspection, that the licensee was using the HIC supplier's procedure for loading the transport cask. The licensee's explanation for this was that their procedure (HP-7.2.40) referenced the vendor's procedure. The inspector determined that, although the licensee's procedure did reference loading the cask in accordance with the Certificate of Compliance (COC), it did not reference the actual procedure being used. The inspector telephoned the vendor supplying the cask on February 5, 1992 and verified that the COC did not contain this procedure. The vendor explained that the COC referenced a Final Safety Analysis Report (FSAR), which included generic directions for loading and unloading the cask. The vendor developed a detailed procedure from these directions.

The inspector communicated with the licensee by telephone several times from February 5-7, 1992, in an effort to understand what requirements must be met by the licensee prior to their using a vendor's procedure on site; in particular, how were copies of vendor's procedures controlled and reviewed. Initially, the inspector understood that the licensee believed that the procedure was part of the COC. On September 7, 1992, the licensee telephoned the inspector and indicated that by changing their procedure reference to "Cask loaded in accordance with Certificate of Compliance and supporting documents," they would have eliminated any inconsistencies, and would be meeting their program requirements.

The inspector determined, on February 7, 1992, that Surry procedure VPAP-0502, "Procedure Process Control," dated December 17, 1990, did list requirements for vendor procedures review and approval, which based on the

inspector's review, appeared not to have been met. On February 7, 1992, the inspector telephoned a licensee representative and asked why the vendor procedure would not fall under VPAP-0502's requirements. Based on insufficient information, this area will be reviewed during a subsequent inspection. The licensee was informed by telephone on February 10, 1992, that this apparent use of an unapproved procedure was identified as URI 50-280, 50-281/92-01-01.

The inspector reviewed selected portions of records of two additional shipments, and verified that the manifests had been properly completed.

Based on personnel interviews, the inspector determined that there had not been any significant changes in 1991 in organization, personnel, equipment, programs or procedures which would affect the transportation of radioactive materials.

The inspector determined that the licensee had up-to-date copies of Department of Transportation (DOT) and NRC regulations. The inspector determined that the licensee had provided training and periodic retraining in DOT and NRC regulatory requirements, waste burial requirements, and in the instructions and procedures for the transfer, packaging and transport of radioactive material. The inspector determined that the personnel who performed radioactive waste shipments received, at a minimum, one week of training by an outside vendor in these requirements every three years. In addition, the technicians were receiving one-half day of on-site training in this area four times per year (approximately 16 hours).

TS 6.1.3.a.13 requires that the Quality Assurance Department audit the Process Control Program and implementing procedures for processing and packaging of radioactive waste at least once per 12 months. These audits verify that the program is being effectively implemented and is in compliance with the requirements of Surry's TSs and the Quality Assurance Department.

The inspector reviewed selected portions of Audit Number 91-03. This audit was conducted on February 6, 1991, and March 4-21, 1991. Portions of this audit covered the Process Control Program. The audit included review of: sampling and analysis of waste streams, procedures, the waste classification program, and radioactive waste processing equipment. The audit report did not list any findings or observations in this area.

The inspector determined, based on this review, that the technicians were adequately trained and performed their duties competently. One unresolved item was identified, URI 50-280, 50-281/92-01-01 for apparent use of an unapproved procedure was identified.

5. Radiation Monitoring System (RMS) (84750)

Pursuant to 10 CFR 20.201(b), this area was inspected to determine whether the licensee had a system sufficient to perform the surveys necessary to adequately evaluate the extent of radiation hazards.

Typically, most radiation monitors contain a sealed source for use in response checking the monitor. TS 4.16.B.1.a. requires that sealed sources that are not stored (i.e. in use) be tested for leakage and/or contamination at intervals not to exceed six months; and these leak tests shall be capable of detecting the presence of 0.005 microcuries or more of removable contamination. These requirements help assure that leakage from radioactive materials sources does not exceed allowable regulatory limits.

Pursuant to these requirements the inspector reviewed HP-7.1.21, "Radioactive Source Master Listing," initiated on July 30, 1991. The inspector also reviewed HP-7.1.21, "Sealed Source Leak Test Record." The inspector reviewed the records for approximately 20 sources and verified that the sources were being leak tested as required. The inspector also reviewed the calibration records for the last performed calibration on the instruments used to count the smears generated during the performance of the leak test and determined that the detection criteria of 0.005 microcuries had been met.

Based on this review, the inspector determined that the sources contained in process and effluent monitors were being leak checked as required by Technical Specifications.

The inspector also reviewed the results of Station Deviation S920038. On January 8, 1992 at 12:58, an alert alarm was received on radiation monitor RM-GW-101. The highest monitor reading was observed to be 3000 counts per minute. A Unit 2 mixed bed demineralizer had just finished being transferred to a HIC at the time of the alert, and dewatering of the resin in the HIC had started. Surry Radiation Protection personnel calculated the release to be 0.006 percent of the TS limits.

The licensee indicated that when resin was removed from service it would typically be allowed to "sit" or decay for approximately 20 to 30 days prior to transfer to a HIC. This

particular resin bed had only aged for nine days prior to transfer, not long enough to decay short-lived radionuclides. The licensee determined that the valve line-up was as specified by procedure. During a telephone conversation held on February 7, 1992, the licensee indicated that the corrective actions for the incident would most likely include having Operations amend their procedures to state that when ever possible, to let the demineralizer beds decay for 35 days, prior to transfer to a HIC and dewatering.

No violations or deviations were identified.

6. Exit Interview

The inspection scope and results were summarized on January 10, 1992 with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results as listed in the summary. One unresolved item was identified, URI 50-280, 50-281/92-01-01 for apparent use of an unapproved radioactive waste transportation procedure. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

7. Acronyms and Initialisms

cfm	cubic feet per minute
COC	Certificate of Compliance
FSAR	Final Safety Analysis Report
HEPA	High Efficiency Particulate Absorber
HIC	High Integrity Container
LOCA	Loss of Coolant Accident
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
ONMSS	Office of Nuclear Materials Safety and Safeguards
PT	Periodic Test
RCS	Reactor Coolant System
REMP	Radiological Environmental Monitoring Program
RMS	Radiation Monitoring System
SRF	Surry Radwaste Facility
TER	Technical Evaluation Report
TS	Technical Specifications