



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W., SUITE 2900
 ATLANTA, GEORGIA 30323-0199

MAY 21 1994

Report Nos.: 50-280/94-14 and 50-281/94-14

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: May 23-26, 1994

Inspector: N. G. McNeill
 N. G. McNeill

6/10/94
 Date Signed

Accompanied by: R. B. Shortridge

Approved by: T. R. Decker
 T. R. Decker, Chief

4/12/94
 Date Signed

Radiological Effluents and Chemistry Section
 Radiological Protection and Emergency Preparedness Branch
 Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of audits, Technical Specification (TS) chemistry parameters, radwaste management, transportation of radioactive material, effluent reports, and confirmatory measurement samples.

Results:

The inspector, based on the results of the inspection, found the licensee's program for Radiological Effluent and Chemistry, and Shipping and Management of Radioactive Waste, and Transportation of Radioactive Material to be functioning efficiently and within regulations.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *W. Benthall, Supervisor, Licensing
- *R. Bilyeu, Licensing Engineer
- *M. Biron, Supervisor, Radiological Engineering
- *B. Bryant, Vice President, Licensing
- *D. Erickson, Superintendent, Radiological Protection
- *D. Miller, Health Physics Supervisor
- *R. Morgan, Quality Assurance Supervisor
- *L. Morris, Radwaste Superintendent, Health Physics
- *M. Olin, Technical Supervisor, Health Physics
- *J. Price, Acting Station Manager, Nuclear Safety
- *W. Thronton, Corporate Health Physics

Other licensee employees contacted included engineers, technicians, office personnel.

Nuclear Regulatory Commission

- *S. Tingen, Resident Inspector
- *D. Tamai, Intern Resident Inspector

*Attended exit meeting on May 26, 1994

2. Audits (84750)

Technical Specification (TS) 6.1.C.2.h requires that audits of unit activities be performed under the cognizance of the Management Safety Review Committee (MSRC) in the following areas: (1) the conformance of facility operation to provisions contained within the TSs and applicable license conditions at least once per 12 months; (2) the radiological environmental monitoring program at least once per 12 months; (3) the Offsite Dose Calculation Manual (ODCM) and implementing procedures at least once per 12 months; and (4) the Process Control Program (PCP) and implementing procedures for processing and packaging of radioactive wastes at least once per 12 months.

The inspector reviewed the following audit report:

- QA Audit 94-01: Radiological Environmental Monitoring Program/ Environmental Protection Plan, dated January 5, 1994

The above audit assessed the techniques used to obtain, analyze, and prepare and ship acquired samples. Also, the monitoring of direct radiation emissions; and maintenance and calibration of radiation detection monitors utilized for program purposes was reviewed.

- QA Audit 94-02: Offsite Dose Calculation Manual (OCDM)/Process Control Program, dated March 18, 1994

This audit satisfied TS requirements and evaluated the implementation of the OCDM requirements for sampling and analysis of liquid and gaseous effluents, calibration and functional checks of effluent monitoring instrumentation, control of radiation monitoring setpoints, accountability of unplanned releases of radioactive material, and liquid and gaseous effluent reporting. In addition, implementing procedures were reviewed to verify that the methodology and parameters used in calculating offsite doses were in accordance with the OCDM, and that program changes created by the revised 10 CFR 20, were accurately translated into program procedures.

Both audits were comprehensive in scope. The programs were found to be functioning effectively and there were no significant findings or followup issues for the Surry site.

No violations or deviations were identified.

3. Radiological Environmental Monitoring Program (REMP) (84750)

Surry OCDM, VPAP-2103, Revision 3, dated June 1, 1992, Section 6.5 specifies the requirements for the environmental radiological monitoring program, including the detection capabilities of analytical techniques, land use census, and the interlaboratory comparison program.

The REMP provides representative measurements of radioactivity in the highest potential exposure pathways and verification of the accuracy of the effluent monitoring program and modeling of environmental exposure pathways. Accumulation of radioactivity in the environment can thereby be measured and trends can be assessed to determine whether the radioactivity resulted from plant operations and to project the potential dose to off-site populations based on the cumulative measurements of any plant-originated radioactivity, as well as to detect unanticipated pathways for the transport of radionuclides through the environment. The Surry Power Station (SPS) Environmental Monitoring Program is designed to detect the effects, if any, of plant operation on environmental radiation levels by monitoring radiation pathways in the area surrounding the plant site. It also verifies that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. Indicator sampling stations are located where detection of the radiological effects of the plant's operation would be most likely, where the samples collected should provide a significant indication of potential dose to man, and where an adequate comparison of predicted radiological levels might be

made with measured levels. Control stations are located where radiological levels are not expected to be significantly influenced by plant operation, i.e., at background locations. An environmental impact assessment of plant operation is made from the radiological measurements of the sampling stations.

a. Annual Radiological Environmental Operating Report

TS 6.6.b.1 requires that the Annual Radiological Environmental Operating Report be submitted prior to May 1 of the following year of the Report. TS 6.6.b.1 also states format and content requirements for the Report.

The inspector reviewed the Report for calendar year 1993 to verify compliance with the TSs. The Report had been submitted in compliance with TS 6.6.b.1 and the format and contents were as prescribed by the TS.

Surry's contract vendor laboratory is a participant in the Environmental Protection Agency's (EPA's) cross-check program and uses its performance in the program as a major determinant for the accuracy and precision of its own analytical results of environmental measurements. During 1993, a comparison of the laboratory's reported values with those of the EPA's known activity found 96 percent to be within three standard deviations. Specifically, two of 57 samples exceeded the three-sigma action level. A gross alpha analysis of a water sample received in January 1993 fell outside the limit. The Zinc-65 portion of a "gross gamma radionuclides in water" test was also slightly outside the action level.

The inspector concluded that the report was complete and complied with TS requirements.

b. Observation of Sample Collection

The inspector accompanied a technician on his normal weekly rounds to collect samples to observe collection technique and to check the physical condition and operability of the sampling stations. Samples were observe at only four stations near the plant. They included both indicator and control stations and various combinations of media (air only, water only, and/or both, plus generally a thermoluminescent dosimeter (TLD)). Some of the stations were co-located with sampling stations of the Commonwealth of Virginia. All air sampling stations were located in areas free of tall weeds/vegetation which might interfere with the taking of a representative sample. Generally, a TLD was also placed at each of the air sampling stations; the exception being at Station #4, where the TLD was apparently vandalized. The inspector noted that all of the sampling units were within calibration and were well maintained. The inspector noted that the TLDs were properly located and that there was no evidence of

vandalism except for the station mentioned, although comments by the technician indicated that vandalism was not uncommon despite efforts by the licensee to mitigate its effects.

The inspector concluded that the technician was knowledgeable, well-trained, and conducted his activities in a professional manner.

The inspector concluded that the licensee had an effective program in place to monitor radiological effluents, direct radiation, etc. due to plant operations and that the Report was in compliance with the TSs. In 1993, plant operations caused minimum impact to the environment and virtually no dose to the general public from those effluents.

No violations or deviations were identified.

4. Confirmatory Measurements Sample Analysis (84750)

10 CFR 20.1501 requires the licensee to perform surveys as necessary to evaluate the extent of radiation hazards.

a. Laboratory Equipment

The inspector examined the licensee's facilities for performing required radioanalytical measurements of alpha radioactive material in various sampling media. This examination included a review of the licensee's analytical equipment, including the Gamma products Series 5000 alpha/beta proportional counter.

b. Confirmatory Measurements

The licensee uses measurements of effluent streams to assess doses to the public resulting from the operation of the plant. In order for the licensee to assess the doses accurately, it is imperative that the measurements of the different streams be representative and accurate.

Pursuant to these requirements, the inspector evaluated the licensee's analytical capability to make accurate radioactivity measurements. Prior to the inspection, samples containing beta/gamma-emitting radionuclides were shipped to the licensee. These samples, which are one portion of the NRC's Confirmatory Measurements Program, are supplied by the Department of Energy's RESL at INEL in Idaho Falls, Idaho.

The results of the licensee's analysis were received by the Radiological Effluents and Chemistry Section within the allotted 60 day time frame. The results of the licensee are presented in Attachment 2 and a discussion of the NRC's acceptance criteria is included in Attachment 1.

The results submitted by the licensee were found to be in agreement for all radionuclides contained in the sample. These values were within the acceptability limits as detailed in the NRC's Acceptance Criteria.

No violations or deviations were identified.

5. Semiannual Radioactive Effluent Release Report (84750)

TS 6.6.B.3 and OCDM Section 6.6.2 requires that a Semi-Annual Radioactive Effluent Release Report covering the operation of the unit during the previous six months of operation shall be submitted within 60 days after January 1 and July 1 of each year. The OCDM and TS also specify the requirements for the content and format of the report.

The inspector reviewed both halves of the 1993 Semi-Annual Effluent Release Report. In addition, the inspector reviewed effluent release data from previous years to evaluate trends. Data in the following table was obtained from previous and current effluent reports.

Radioactive Effluent Release Summary

Surry, Units 1 and 2	1991	1992	1993
Unplanned Releases	0	1	0
Inoperable Effluent Monitoring Instruments for Greater than 30 Days	1	1	1

Activity Released (curies)

a. Liquid			
1. Fission and Activation Products	2.85E+0	3.94E-1	2.08E-2
2. Tritium	9.13E+2	3.94E-1	2.08E-2
3. Gross Alpha	1.06E-5	0.00E+0	0.00E+0
4. Volume of Liquid Waste Released (liters)	3.91E+8	1.50E+8	1.10E+8
b. Gaseous			
1. Fission and Activation Gases	3.54E+1	1.06E+1	4.15E+1
2. Particulates	6.68E-4	3.06E-4	1.74E-4
3. Iodines	5.16E-4	4.97E-4	6.11E-4
4. Tritium	2.55E-1	2.36E+1	2.31E+1

The Liquid Radwaste Effluent Monitor, 1-LW-RM-108 was taken out of service in November, 1992. This monitor is no longer used to monitor effluents since the liquid waste was permanently re-routed to the Surry Radwaste Facility. The permanent abandonment of 1-LW-RM-108 was

approved March 24, 1993, in accordance with Design Change 91-063, Revision H. The deletion of 1-LW-RM-108 from the OCDM, is documented in Attachment 3 of the first half of Semi-Annual Effluent Report for 1993.

No changes to the PCP were made during the reporting period. The inspector concluded that the Semiannual Radioactive Effluent Release Report satisfied the requirements of the TSs.

No violations or deviations were identified.

6. Radwaste Handling/Management (86750)

10 CFR 20.2006(b) requires that each shipment of radioactive waste intended for disposal at a licensed land disposal facility must be accompanied by a shipment manifest as specified in Section I of Appendix F to 10 CFR 20.1001-20.2410.

10 CFR 20.2006(c) requires that each shipment manifest must include a certification by the waste generator as specified in Section II of Appendix F to 10 CFR 20.1001-20.2401.

The inspector attended a pre-job briefing for the transfer of a High Integrity Container (HIC) containing resin classified as class A waste. Sixteen attended the briefing which covered the radiological aspects of the operation in a comprehensive manner. The operation was to be conducted in accordance with Radiation Work Permit (RWP) 94-2-1100, Load and Move HIC to Shipping Cask. The work included dewatering, installing the skirt, installing the HIC cover, removing the shielding, removing the HIC and placing it in the shipping cask, torquing the cover, and rigging support. The briefing included a good discussion as to what the current radiation dose rates were and what could be expected. Digital alarming dosimeters (DADs) were set to alarm at a rate of 3 Rem/hr and 75 millirem integrated dose. In addition, DADs were used that were protected from RF interference. A stop work dose rate of 10 Rem/hr was stated with a contact dose rate of 10-18 Rem/hr on the HIC. The licensee made two dry runs with the crane to ensure smooth operation and briefed on contingencies if crane failure occurred. The certificate of compliance for the shipment was # 9111, Revision 13, dated January 11, 1994. The operation was conducted in accordance with Handling Procedure TR-OP 010, Revision E, dated May 21, 1992, Handling Procedure for Transport of Cask 6-80-2. The licensee used a video camera to monitor the lift and transfer for the purposes of saving dose and future training. The inspector observed the operation through the seating of the HIC in the shipping cask and noted the operation was performed without a delay or a problem. The licensee stated that prior to comprehensive pre-job briefings, innovative shielding, and the use of video cameras, the operation once required approximately 400 millirem; however, this operation was performed for approximately 75 millirem.

Licensee management stated at the exit that they were not satisfied with this much dose and were looking for methods to lower the dose. The inspector discussed the strengths of the performance with management at the exit briefing.

No violations or deviations were identified.

7. Shipping of Low-Level Radioactive Wastes for Disposal and Transportation Activities (86750, 86740)

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

49 CFR 172.203(d)(1) requires, in part, that a shipping paper contain a 24-hour emergency telephone number, as prescribed in subpart G of Part 172 of this subchapter.

The inspector reviewed selected records of radioactive waste and materials shipments and the specific shipment of the HIC discussed in Paragraph 6. The shipping manifest examined were in accordance with the requirements listed above and the surveys of the transport vehicle were satisfactory.

The inspector noted that the licensee listed several emergency telephone numbers at the top of the shipping papers for the HIC shipment to Barnwell, South Carolina. The shipment left the site at approximately 3:00 p.m. and was scheduled for arrival at Barnwell at 8:00 a.m. the following day. The inspector called the emergency telephone number at 7:18 p.m. on May 25, 1994, and plant security answered the telephone. When asked about the radioactive shipment the security guard was aware that the plant had one that was on the road but he could not answer any specific questions about its contents. The security guard put his supervisor on the telephone and when questioned he stated that he would put me in contact with health physics (HP). HP supervision called the inspector back and was knowledgeable of the radioactive shipment on the road. In addition, the supervisor was able to answer hypothetical questions regarding an emergency with the shipment. The inspector reiterated that the problem was hypothetical. The inspector also discussed the plant's appropriate response at the exit.

8. Exit Meeting

The inspector met with licensee representatives indicated in Paragraph 1 at the conclusion of the inspection on May 26, 1994. The inspector summarized the scope and findings of the inspection. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the

inspection. The licensee did not identify any proprietary documents or processes during this inspection. Dissenting comments were not received from the licensee.

ATTACHMENT 1

CRITERIA FOR COMPARING ANALYTICAL MEASUREMENTS

This enclosure provides criteria for comparing results of capability tests and verification measurements. The criteria are based on an empirical relationship which combines prior experience and the accuracy needs of this program.

In this criteria, the judgement limits denoting agreement or disagreement between licensee and NRC results are variable. This variability is a function of the NRC's value to its associated uncertainty. As the ratio of the NRC value to its uncertainty, referred to in this program as the resolution¹ increases, the range of acceptable differences between the NRC and licensee values should be more restrictive. Conversely, poorer agreement between NRC and licensee values must be considered acceptable as the resolution decreases.

For comparison purposes, a comparison ratio² of the licensee value to the NRC value for each individual nuclide is computed. This ratio is then evaluated for agreement based on the calculated resolution. The corresponding resolution and calculated ratios which denote agreement are listed in Table 1 below. Values outside of the agreement ratio for a particular nuclide are considered in disagreement.

TABLE 1

Confirmatory Measurements Acceptance Criteria Resolutions vs. Comparison Ratio

<u>Resolution</u>	<u>Comparison Ratio for Agreement</u>
< 4	0.40 - 2.5
4 - 7	0.50 - 2.0
8 - 15	0.60 - 1.66
16 - 50	0.75 - 1.33
51 - 200	0.80 - 1.25
> 200	0.85 - 1.18

¹ Resolution = $\frac{\text{NRC Reference Value for a Particular Nuclide}}{\text{Associated Uncertainty for the Value}}$

² Comparison Ratio = $\frac{\text{Licensee Value}}{\text{NRC Reference Value}}$

ATTACHMENT 2

RESULTS OF SURRY ANALYSIS OF CONFIRMATORY MEASUREMENTS SAMPLES

<u>Isotope</u>	<u>NRC (pCi/mL)</u>	<u>Licensee (uCi/mL)</u>	<u>Resolution</u>	<u>Ratio (Licensee/NRC)</u>	<u>Comparison</u>
H-3	101.44	1.03E-05	20	1.02	Agreement
Sr-89	NDA	LLD	—	—	—
Sr-90	17.97	1.61E-05	20	0.896	Agreement
Fe-55	9.81	0.851E-05	20	0.867	Agreement

¹ Resolution = $\frac{\text{NRC Reference Value for a Particular Nuclide}}{\text{Associated Uncertainty for the Value}}$

² Comparison Ratio = $\frac{\text{Licensee Value}}{\text{NRC Reference Value}}$