



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

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Report Nos. 50-280/91-34 and 50-281/91-34

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: December 2-6, 1991

Inspectors:

N. G. McNeill
N. G. McNeill

12/24/91
Date Signed

D. A. Seymour
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12/24/91
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Approved by:

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12/24/91
Date Signed

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of the Environmental Monitoring Program, liquid effluents, the Meteorological Monitoring Program, the Post Accident High Radiation Sampling System (HRSS), and the Radwaste Facility post-operational status.

Results:

The inspectors accompanied Surry personnel on the Environmental Sampling Route and observed sample collection and equipment use and calibration. The personnel were proficient in these areas and the samples were properly processed according to procedures (Paragraph 2).

The Meteorological Tower was visited and found to be in operating condition and well maintained (Paragraph 3).

The licensee had an effective program for controlling and monitoring liquid waste effluents from the Surry Radwaste Facility (Paragraph 4).

The program for the Post Accident High Radiation Monitoring System (HRSS) was effectively implemented and maintained (Paragraph 5).

The low estimation of flow for a plant vent did not result in significant differences in the dose reported to the general public (Paragraph 6).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *W. Benthall, Supervisor, Licensing
- *M. Biron, Supervisor, Radiation Engineering
 - E. Batiste, Technician, Decontamination
- *P. Blount, Supervisor, Radiation Analysis
 - E. Castillo, Senior Technician, Chemistry
- *R. Cox, Senior Technician, Chemistry
- *D. Erickson, Superintendent, Radiation Protection
- *B. Garber, Supervisor, Health Physics
- *D. Hart, Supervisor, Quality Assurance
- *R. Irwin, Senior Staff, Health Physics
- *M. Kansler, Station Manager
- *L. Morris, Superintendent, Radiological Waste
- *E. Swindell, Supervisor, Chemistry
 - S. Tross, Technician, Health Physics
 - M. Troy, Nuclear Instrumentation Technician

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

Nuclear Regulatory Commission

- *T. R. Decker, Section Chief
- *S. G. Tingen, Resident Inspector

Acronyms and initialisms used throughout this report are listed in the last paragraph (Paragraph 8).

2. Environmental Monitoring Program (84750)

Section 6.5.1.a.1 of Surry's Offsite Dose Calculation Manual (ODCM) specifies that the Radiological Environmental Monitoring Program (REMP) be conducted as outlined in Attachment 20 of that manual. Attachment 20 specifies the exposure pathway and/or sample, the numbers of samples and sample locations, the sampling and collection frequency, and the type and frequency of analysis. The REMP provides measurements of radiation and radioactive materials in those exposure pathways and for those radionuclides that lead to the highest potential exposures of the maximum exposed member of the public resulting from the station operation. The REMP also verifies that radioactive materials and levels of radiation in the environment are not higher than expected based on effluent measurements and modeling of the exposure pathways.

Pursuant to these requirements, the inspectors accompanied licensee personnel during a portion of their regular collection of week-long air samples from air sampling stations established for the Surry site. The inspectors observed sample change methods and noted that good sample handling practices were used. The licensee knew the sampling route and locations and performed their tasks in a competent manner. All sampling equipment was well-maintained. One air sampling unit was found to be non-functional and was replaced in the field. Documentation of the change as well as noting sample time and duration corrections were completed. Sample enclosures were clean and free of debris and extraneous materials. Collected samples were clearly labeled as to volume, sample type, sampling on and off times, and air flow rates. Samples were to be shipped to the vendor for analysis. The inspectors also observed the collection of milk and water samples; these were also collected in a like manner.

The inspectors discussed various aspects of the REMP with cognizant licensee personnel, including sample collection and compositing of liquid samples, and vegetation and milk sampling.

Based on this selective review, the inspectors determined that the REMP was effectively managed.

No violations or deviations were identified.

3. Meteorological Monitoring Program (84750)

Section 6.6.3 of Surry's ODCM specifies that Meteorological data collected over the previous year shall be in the form of joint frequency distributions of wind speed, wind direction, and atmospheric stability. The Meteorological Monitoring Program provides information critical to determining offsite doses due to gaseous effluents; and would provide key information for the determination of gaseous pathways and resultant doses in the event of an accident

Pursuant to these requirements, the inspectors reviewed the Meteorological Monitoring Program to determine whether the meteorological instrumentation and equipment were operable, calibrated, and maintained.

The inspectors determined, through direct observation, discussions with the licensee, and review of records, the following: Surry had two meteorological towers, a 150-foot primary tower, and a 30-foot backup tower. The primary tower had two sets of instrumentation located at either the 35 or 150 foot levels. Wind speed, wind direction, wind direction

fluctuation (σ theta), and delta temperature were located at both levels. Dew point and temperature were also located at the 35 foot level. The backup tower had wind speed, wind direction, and wind direction fluctuation instrumentation located at the 30 foot level. The location of the towers was such that there would be no interference with the flow of air.

The inspectors verified by direct observation and by records review that the meteorological monitoring instrumentation channels were operable and well maintained. The inspectors reviewed selected portions of the meteorological monitoring instrumentation channel calibration records and procedures for: wind speed and direction monitoring systems, ambient temperature and differential temperature monitoring system, delta T loop calibration, the MRI tipping bucket calibration procedure, and the σ theta loop calibration procedure.

According to the Control Room Log for December 2, 1991, during the time frame of 14:40 hours to 16:05 hours, power was lost to the primary system. This data was also included in the Liquid Waste Operators Log for the same date and time. The backup system was fully operational during this time and continued to operate effectively. Power was restored to the system and calibration reviews determined there was no loss of functionality to the system. The advantages of the backup system's presence for just such a situation were apparent and both systems were operated in a competent and professional manner.

Based on this selective review, the inspectors determined that the meteorological instrumentation and equipment were operable, calibrated, and maintained.

No violations or deviations were identified.

4. Liquid Radwaste Systems (84750)

Surry's ODCM establishes the requirements of the Radioactive Effluent Monitoring Program, and includes the methodology and parameters for liquid effluent monitoring alarm/trip setpoints. Section 6.2.1 of the ODCM specifies liquid effluent concentration limits. Section 6.2.2 of the ODCM specifies requirements for the radioactive liquid effluent monitoring instrumentation. Section 6.2.4 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.

Pursuant to these requirements, the inspectors observed a liquid batch release from the Liquid Waste Monitoring Tank-A (LWMT-A) of the Liquid Waste System (LWS), located in the SRF. The inspectors observed all phases of the release which included: agitation of the LWMT-A, pre-release tank sampling and gamma radionuclide analysis, effluent monitor setpoint calculation and adjustment, review of the actual release data, and valve line up and actual discharge of the tank. The inspectors noted that the chemistry personnel as well as the Radwaste Operations Facility personnel worked closely together in the discharge. All phases of the LWS are monitored in the Radwaste Control Room and the operators were competent and proficient in the tasks performed.

At the time of this inspection, the SRF had approximately seven weeks of full operability. The inspectors determined through discussions with the licensee that the evaporator was being used approximately 50 percent of the time. The inspectors reviewed SRF Evaporator Release Summary sheets for October and November, 1991, and determined that 1511 microcuries were released in 759,064 gallons of water. Much of this activity was attributed to start-up testing which involved determining the decontamination factors of the demineralizers. Also, for this time frame, the licensee was not processing laundry waste water.

The licensee planned on processing the laundry waste water in December, 1991, and anticipated having "0" curies released from the SRF (counting at effluent Lower Limit of Detection levels).

The inspectors determined, based on this review, that the licensee had an effective program for controlling and monitoring liquid waste effluents from the SRF.

No violations or deviations were identified.

5. Post Accident High Radiation Sampling System (HRSS), (84750)

NUREG-0737, Criterion 2a provides specifications for the establishment of onsite radiological analysis capabilities to provide quantification of noble gases, iodines, and non-volatile radionuclides in the reactor coolant system (RCS) and containment atmosphere. Technical Specification (TS) 6.8.4.d requires that a program be established, implemented and maintained to ensure the capability to obtain and analyze, under accident conditions, reactor coolant, radioactive iodines and particulates in plant gaseous effluents, and containment atmosphere samples. The HRSS should provide these capabilities, and should enable the licensee to obtain information critical to the efforts to assess and control the course and effects of an accident.

Pursuant to these specifications, the inspectors reviewed portions of selected procedures for the operation, maintenance, and testing of the HRSS, and discussed system operation, performance testing, and analytical capabilities of the HRSS with the licensee.

The inspectors determined that the HRSS at Surry was divided into three subsystems; these were: the Liquid Sampling System, the Containment Atmospheric Sampling System, and the Chemical Analysis System. Each of these systems had two instrument panels; one which housed sampling and analysis equipment, and a second panel (remotely located) which allowed for monitoring and control. In addition, there was a Post-Accident Monitoring Panel in the Control Room which allowed monitoring of the sampling and housed the controls for the Containment Isolation Valve.

The Liquid Sampling System would be used for obtaining a depressurized, diluted or undiluted reactor coolant system sample, an in-line pressurized RCS sample, or a sample of the off-gas from a RCS sample. This RCS off-gas could be used to determine hydrogen gas concentration. This system also provided the ability to obtain liquid samples from the containment sump and the Chemical and Volume Control System.

The Containment Atmospheric Sampling System would be used to obtain samples of iodines, particulates and gases which would be used for lab analysis of containment atmosphere. In this system, a small aliquot of the gas sample is passed through a particulate air filter and a silver zeolite cartridge into a dilution flask fitted with a septum. The particulate filter would be isotopically analyzed, the silver-zeolite cartridge would be analyzed for iodine; and the gas in the dilution flask could be sampled with a syringe through the septum and analyzed for hydrogen concentration or isotopic noble gases.

This system also allowed for the transfer of a gas sample to the Chemical Analysis System for hydrogen gas analysis of containment atmosphere, and for obtaining additional grab samples in shielded containers for offsite analysis.

The Chemical Analysis System would be used for in-line chemical analysis of pH, dissolved oxygen, chlorides, and boron in the RCS; and for hydrogen gas concentration analysis of RCS off-gas and containment atmosphere.

The inspectors reviewed selected portions of procedure PT-38.48, "High Radiation Sampling System Operability Test and Operator Training," dated May 25, 1989. This periodic test (PT) was run bimonthly on each unit. There were several purposes for this periodic test; it ensured that the

analytical results were within acceptable limits, provided operator training on the instrumentation, and ensured that the equipment received maintenance when required. The inspectors reviewed the results of this PT for the time frame of January to November, 1991. These records summarized the results of the monthly tests in terms of passing or failing the comparisons between HRSS analyses and routine RCS sampling, as detailed in NUREG-0737 Criterion 10 and Attachment No. 1 to the Generic Letter. This PT included pH; boron, hydrogen and oxygen concentrations; and liquid and stripped gas isotopics. The point of this comparison is to verify that the HRSS system operates, and that the dilution ratios and sample volumes have been accurately determined. In general, there was good agreement with the analytical results between the HRSS sample and the samples obtained from routine RCS sampling points.

This PT requires the licensee to "ensure that current lab analysis data is available to evaluate the HRSS results." The licensee representative indicated that the results from the last acquired RCS sample was to be used to make this comparison, however this sometimes resulted in a comparison being made with two or three day old RCS routine sample results. A licensee representative indicated that this procedure was going to be amended to specify that the RCS sample used for this comparison be acquired in the same time frame (within hours) as the HRSS sample. This improvement is expected to increase the agreement between the two samples.

The inspectors also reviewed selected portions of PT-38.47, "High Radiation Sampling System Chemistry Instrumentation Calibration," dated December 18, 1988. The inspectors determined that this PT was performed weekly, and that the purpose of this PT was to ensure the operability of the HRS chemistry instrumentation. This calibration included the oxygen monitor, boron titrator, pH meter, and the gas chromatograph used for the hydrogen concentration determinations. The inspectors reviewed the results of this PT for the time period of January 8 to November 26, 1991, and determined that the PT had been performed as required, and that maintenance problems with the instrumentation had been addressed.

The inspectors also reviewed the data sheets for PT-38.49, "High Radiation Sampling System Containment Air Sample Routine Operation and Operator Training," dated March 9, 1989. This PT was performed bimonthly. The purpose of this PT was to maintain system operability, and to provide HRSS training for the operators. The inspectors reviewed the results of this PT for the time period of February 12, 1991

to November 11, 1991, and determined that the PT had been performed as required. In general, however, the level of activity in the containment atmospheric samples were too low to provide meaningful results.

From a review of records, the inspectors determined that the licensee had experienced continuing difficulties performing PT 38.62, "HRSS Waste Tank Valve Test for Post Accident Conditions." This test was required to be performed quarterly by procedure. The inspectors determined that a maintenance request to correct this problem had been issued. The inspectors discussed, with licensee management, the importance of maintaining the HRSS in a fully operational condition. This issue will be reviewed during subsequent inspections.

The inspectors also reviewed selected portions of the following procedures:

COP-16.2, Post Accident High Radiation Sampling System, dated April 17, 1990.

COP-16.3, High Radiation Sampling System - Containment Air Sample, dated January 19, 1988.

COP-16.8, "HRSS Containment Sump Sampling (Diluted Sample), dated July 27, 1989.

The inspectors determined that the portions of the procedures reviewed were adequate for their intended purpose.

The inspectors also reviewed the training that the chemistry technicians received on the HRSS. This included interviews with the licensee, and a document review. The inspectors determined that new, or previously untrained, technicians initially received three weeks of training; portions of which addressed the HRSS. Annually, each technician also received an additional four days of emergency preparedness and HRSS retraining. This annual retraining included eight hours of experience with a HRSS simulator, running through different accident scenarios. This training included "hands-on" experience, as well as observation of other technicians performing the required tasks. The HRSS simulator was almost identical to the HRSS instrumentation and control panels located in the plant. In addition, technicians received "on-the-job" training by performing the weekly, bimonthly, and quarterly PTs.

The inspectors also discussed the licensee's ability to provide an alternate source of power to the HRSS, in the

event of the loss of site power during an accident, as required by the criteria of NUREG 0737. The licensee provided information to the inspectors that indicated that this capability existed.

The inspectors determined, based on this selective review, that the HRSS program was effectively implemented and maintained.

No violations or deviations were identified.

6. Effluent Stack Monitoring Calibration

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.

During interviews with the licensee and with the resident inspectors, the inspectors determined that from October 9, 1991 to October 15, 1991, the flow in Vent FL-VS-116 was underestimated by approximately 20 percent. This error was due to a calibration error involving the flow measuring device on the vent. The error occurred when an Instrumentation and Control technician inadvertently used the wrong fluid in a manometer during the calibration process. The flow measurement device on this stack was the only TS flowmeter affected by this mistake. This error was discovered by the licensee and prompt corrective actions were enacted. These corrective actions included eliminating the manometers for this measurement by switching to electronic, digital read-out instrumentation.

The inspectors reviewed the results of licensee's evaluation for this issue for the time frame in question. Based on this evaluation, the licensee determined that the low estimation of flow resulted in an effluent dose discrepancy of approximately 3.14 E-05 millirem to the thyroid. The inspectors determined that the error in the stack flow measurement was approximately the same magnitude as the error associated with the isokinetic sampler for the vent. It was determined, due to the low safety impact of this event and the licensee's prompt corrective actions, that the licensee would not be cited.

No violations or deviations were identified.

7. Exit Interview

The inspection scope and results were summarized on December 6, 1991 with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in

detail the inspection results as listed in the summary. No violations or deviations were identified. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

8. Acronyms and Initialisms

FSAR	Final Safety Analysis Report
HRSS	High Radiation Sampling System
LWS	Liquid Waste System
LWMT	Liquid Waste Monitor Tank
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PT	Periodic Test
RCS	Reactor Coolant System
REMP	Radiological Environmental Monitoring Program
SRF	Surry Radwaste Facility
TS	Technical Specifications