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

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Report Nos.: 50-280/86-01 and 50-281/86-01

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

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

Facility Name: Surry 1 and 2

Inspection Conducted: January 6-10, 1986

Inspector: William B. Gloersen February 3, 1986
W. B. Gloersen Date Signed

Approved by: for W. B. Kyp 3 February 1986
W. E. Cline, Chief Date Signed
Radiological Effluents and Chemistry Section
Division of Radiation Safety and Safeguards

SUMMARY

Scope: This routine, unannounced inspection involved 35 inspector-hours on site in the areas of liquid and gaseous radwaste systems, liquid and gaseous effluent sampling, analysis, monitoring, and reporting, and previously identified inspector followup items.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*R. F. Saunders, Station Manager
*H. L. Miller, Assistant Station Manager
*J. A. Price, Supervisor, QC
*S. P. Sarver, Superintendent, Health Physics
*B. Garber, Operational Health Physicist
*K. R. LeFever, Corporate Health Physics
*P. F. Blount, Assistant Health Physics Supervisor
*W. Craft, Licensing Coordinator
T. E. Stallings, Senior Nuclear Instrumentation Technician
E. J. Ferreira, Assistant Nuclear Instrument Supervisor

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

NRC Resident Inspectors

*D. J. Burke
*M. J. Davis

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on January 10, 1986, with those persons indicated in Paragraph 1. The inspector described the areas examined and discussed in detail the inspection findings. Licensee representatives acknowledged the inspector's comments and expressed no contrary opinions. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previously Identified Inspector Followup Items (92701)

a. (Closed) IFI 50-280/82-25-02, Correction for sample conditions for gas monitoring (I.E. Information Notice 82-49). This item pertains to a problem reported in IE Information Notice 82-49 in which the reduction in pressure in the sample chamber results in a reduction in the density of the sample chamber gas and a commensurate reduction in the quantity of gas in the chamber. The failure to correct for this pressure differential could introduce both direct reading gas monitoring and flow indication errors when monitoring gaseous effluents with offline sampling systems. These sampling errors can cause a significant underestimation when quantifying effluent releases. The licensee had purchased and installed a pressure compensation enhancement kit which

was specifically designed for their post-TMI high range gaseous effluent monitoring system (Kaman Sciences Monitoring System). The kit compensated for errors introduced by potential differences in the absolute pressure occurring between the effluent airstream sampling point and the sampled airstream at the monitor. The flow measurement error was corrected through the use of a mass-flow transducer operating on the principle of heat transfer detection, thereby providing for pressure and temperature compensation of the sampled airstream. The inspector noted that the licensee uses an additional gaseous effluent monitoring system (Victoreen Monitoring System). In practice, the Kaman monitors supplement the Victoreen monitors so that the licensee has a system with increased capabilities for monitoring during and following an accident. Although the licensee did not modify the Victoreen system with a pressure compensation package, the licensee did perform a correlation study that compared actual noble gas concentration instrument readings (uCi/ml) of both the Kaman and Victoreen systems to grab sample analysis results obtained from both systems. The various measurement comparisons were favorable. On the Victoreen system, the licensee has an "accountability" sampler used for measuring particulates and iodine. This sampler is offline from the Victoreen gas monitor. The licensee has provided compensation for measurement of actual gas flow in the sampling system at reduced pressure by applying pressure correction factors for the airstream flow measurement device in use. This item is considered closed.

b. (Closed) TMI 50-280/84-02-05, Sampling of iodines and particulates. This item pertained to NUREG-0737, Item II.F.1(2) which specified that representative sampling was to be performed in accordance with ANSI N13.1-1969. The licensee was requested to provide information on the effluent monitors of the process vent and ventilation vent addressing the consideration of plateout of iodines and particulates in long sample line runs and a demonstration that the samples drawn are representative and isokinetic. The inspector reviewed the licensee's response which was prepared by Stone and Webster Engineering Corporation (SWEC) in a letter dated June 22, 1984. The response included information that addressed the guidelines contained in ANSI N13.1-1969 "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities." Basically, the licensee's gaseous effluent monitoring system was designed to meet the ANSI N13.1 requirements. This item is considered closed.

c. (Open) TMI 50-280/84-02-06, Vendor calibration data of the high range noble gas monitoring system. This item dealt with the calibration of gaseous effluent monitors utilizing the transfer calibration procedures of ANSI N323-1978. In reference to the calibration of gaseous effluent monitors, the NRC considers it acceptable for the instrument vendor to perform a one-time "type" calibration for the monitor on the upper range of the noble gas channel using NBS traceable gaseous sources. Subsequently, the vendor would calibrate all production units against a laboratory standard solid source. Secondary calibration standards would then be provided to the licensee for all subsequent in-place

calibration tests. Although the licensee received a calibration report from the vendor, the report did not address adequately the "type" calibration data and other information needed to demonstrate the monitor's response in the normal and accident range.

The licensee had been and is still attempting to obtain this additional information from the vendor. The inspector stated that this item will remain open and will be reviewed during a subsequent inspection.

d. (Closed) TMI 50-280/84-02-07, Correction of high energy over-response of Kaman Science noble gas monitor. This item pertained to the gross gamma energy dependence of the Kaman Science noble gas monitor and in particular, the monitors over-response to high energy gamma radiation. Although the vendor claimed that the monitor was designed to meet the criteria specified in NUREG-0737, an energy compensation modification was developed for the monitor. The inspector reviewed the design change documents that described the installation of the high energy compensation package for the Kaman Science monitors. The inspector discussed with the licensee how the modification enhanced the energy response of the monitor. The inspector also reviewed the Surry Outstanding Items Form dated February 27, 1985, which stated that the Kaman Science monitors had been declared operable. This item is considered closed.

e. (Closed) IFI 50-280/84-32-01 and 50-281/84-32-01, Resolve disposition of possible generic problem in Kaman Science high range gaseous effluent monitors involving discrepancy between pump capacity and computer software requirements. This item identified the problem that developed when the instrument system computer required a volumetric flow of three scfm through the sampling system while the instrument system pumps appeared to be unable to develop the three scfm flow required by the computer system. This mismatch in the sampling flow resulted in a system malfunction. The inspector discussed this item with instrumentation personnel who described the resolution to the problem. Apparently, a faulty microswitch on a motor-operated valve in the sampling system was discovered and replaced. This item is considered closed.

f. (Open) IFI 50-280/84-32-02 and 50-281/84-32-02, Verify inclusion of cross-calibration data for radioactive gaseous effluent monitors in plant calibration file. This item pertained to the licensee's problem in providing data relative to the traceability of the manufacturer's original calibration of the gaseous monitor's detector and sample geometry to a National Bureau of Standard's gaseous source (see Paragraph 3.c). The licensee was able to demonstrate an acceptable cross-calibration through analyses of samples taken during periods of release of radioactive gaseous effluents and comparing those results to actual instrument readings at the times samples were obtained. The licensee had assembled and collated the instrument readings and sample analysis results and was in the process of entering this material in the plant instrumentation calibration files. The licensee should

complete the incorporation of the cross-calibration data in the plant instrumentation calibration file in a timely manner. This item remains open.

4. Audits and Appraisals (84723 and 84724)

Technical Specification 6.1.C.3 requires that audits encompassing conformance of facility operation to provisions contained within the Technical Specifications and applicable license conditions at least once per 12 months, the Offsite Dose Calculation Manual (ODCM) and implementing procedures at least once per 24 months, and the Process Control Program (PCP) and implementing procedures at least once per 24 months. The inspector reviewed the following audit reports:

- Quality Assurance Audit Report S85-32, Compliance to 10 CFR 50, Appendix I, November 27, 1984
- Quality Assurance Audit Report S85-25, Process Control Program, August 19, 1985

The above audits included, in addition to a review of the ODCM and PCP, a review of the Radiological Effluent Technical Specifications. The inspector discussed the audits listed above with licensee personnel and reviewed the corrective actions taken by the licensee. The inspector noted that corrective actions had been taken or were in progress to resolve items of concern.

No violations or deviations were identified.

5. Procedures (84723, 84724)

Technical Specification 6.4.A requires detailed written procedures with appropriate check-off lists and instructions to be provided for the release of radioactive effluents. Technical Specification 6.4.B requires written procedures to be established, implemented, and maintained for the Process Control Program and Offsite Dose Calculation Manual implementation. Technical Specification 6.4C requires the procedures and changes thereto to be reviewed by the Station Nuclear Safety and Operating Committee and approved by the Station Manager prior to implementation. The inspector reviewed selected calibration procedures, and Periodic Test Procedures:

HP-3.2.1, Radioactive Gaseous Waste Sampling Program, October 18, 1985

HP-3.2.2 Gaseous Waste Discharge Records and Permits, June 29, 1984

HP-3.2.3 Unplanned Gaseous Releases, September 10, 1985

HP-3.2.4 Radioactive Liquid Waste Sampling Program, December 27, 1984

HP-3.2.5 Liquid Waste Discharge Records, June 29, 1984

HP-3.2.7 Radiation Monitoring System Setpoints, June 29, 1984

CAL-001 Log Ratemeter Scintillation Detector Source Calibration, November 26, 1985

CAL-044, Log Ratemeter Calibration Models 842-1 and 842-11, November 26, 1985

CAL-255 Kaman Normal Range Gas Effluent Monitor R1-GW-130-1A, November 12, 1985

CAL-259 Kaman Accident Range Gas Effluent Monitor R1-GW-130-2A, November 26, 1985

IMP-C-RM-36 Checking, Repairing, or Replacing a Component in the Radiation Monitoring System, November 12, 1985

PT-32.8B Charcoal Filter Test Analysis, May 10, 1984

PT-32.9 HEPA and Charcoal Filter Test for Auxiliary and Control Room Ventilation, June 17, 1985

PT-50.10 Health Physics Sampling Waste Gas Decay Tank "B", October 24, 1985

The inspector noted that the above procedures were being reviewed and approved in accordance with administrative control directives and Section 6.4.C of the Technical Specifications. Results of the procedure review were discussed with cognizant licensee representatives as noted in Paragraph 1.

No violations or deviations were identified.

6. Records (84723, 84724)

The inspector reviewed selected portions of the following test and calibration records:

a. Effluent Monitor Calibrations

(1) Process Vent Particulate Monitor, RM-GW-101: 3/30/84, 2/8/85

(2) Process Vent Gas Monitor, RM-GW-102: 3/30/84, 2/8/85

(3) Process Vent System

(a) Kaman Normal Range Gas Effluent Monitor, RM-GW-130-1A: 2/21/85, 7/31/85

(b) Kaman Accident Range Gas Effluent Monitor; RM-GW-130-2A: 9/18/84, 9/12/85

(4) Ventilation Vent System

(a) Kaman Normal Range Gas Effluent Monitor, RM-VG-101-1A: 9/5/84, 8/28/85
(b) Kaman Accident Range Gas Effluent Monitor, RM-VG-131-2A: 9/5/84, 9/6/85

(5) Liquid Radwaste Disposal Effluent Line Radiation Monitor, RM-LW-108: 9/24/84, 6/11/85, 9/5/85

b. Liquid Waste Flow Transmitter, F-LW-104A: 3/5/185

c. Containment and Particulate Gas Monitors

(1) Unit 1, RM-RMS-159 and RM-RMS-160: 4/3/84, 2/5/85

(2) Unit 2, RM-RMS-259 and RM-RMS-260: 5/22/84, 2/28/85

d. Nuclear Air-Cleaning Filter Testing

(1) Laboratory Analysis of Adsorbent (in-place charcoal samples) for Auxiliary Building Ventilation

(a) Train A: 11/9/84, 4/25/85, 5/30/85, 8/7/85, 8/29/85
(b) Train B: 11/29/84, 1/11/85, 9/4/85, 10/16/85, 12/5/85

(2) In-Place HEPA and Charcoal Leak Testing

(a) Auxiliary Building Ventilation

Train A: 5/14/84, 9/4/84
Train B: 2/3/84, 9/5/84

(b) Control Room Ventilation

Unit 1 - 9/6/84
Unit 2 - 9/6/84

(c) Relay Room Ventilation

Unit 1 - 9/5/84
Unit 2 - 9/5/84

Based on the review of the selected records noted above, the inspector determined that the required sampling, testing, and calibration frequencies were followed and the records required by Technical Specification 6.5 were maintained. The inspector noted that the licensee had an adequate tracking system for monitor testing and calibration status. The various records reviewed were readily available.

No violations or deviations were identified.

7. Effluents (84723, 84724)

Technical Specification 6.6.3.c requires the licensee to submit within 60 days after January 1 and July 1 of each year Routine Radioactive Effluent Release Reports covering the operation of the unit during the previous six months of operation. The inspector reviewed the Semi-Annual Radiological Effluent Release Reports for the periods July 1, 1984 through December 31, 1984 and January 1, 1985 through June 30, 1985. The review included an examination of the liquid and gaseous effluent release data. From liquid radwaste release records for the second half of 1985 and the Semi-Annual Radiological Release Report for the period January 1, 1985 through June 30, 1985, the inspector noted that 8.31 curies of radioactive liquid waste consisting of fission and activation products (not including tritium, dissolved and entrained gases, or gross alpha radioactivity) was released during 1985. The total releases for the same type of liquid effluents for 1984 and 1983 were 9.73 curies and 14.5 curies, respectively. The licensee had undertaken efforts to reduce both the volume of liquid radwaste entering the process stream and the radioactivity of the effluent streams. The radioactivity content of liquid leakage from both units had been running at a relatively high level as the result of leaking fuel. Efforts have been made to replace the leaking fuel during each refueling outage..

Technical Specification 6.6.3.c also requires the Radioactive Effluent Release Report submitted within 60 days after January 1 of each year to include an assessment of the radiation doses to the maximum exposed member of the public due to radioactive liquid and gaseous effluents released from the site during the previous calendar year. The assessment of radiation doses is to be performed in accordance with the Offsite Dose Calculation Manual (ODCM). The inspector reviewed the 1984 annual and quarterly doses to the maximum exposed member of the public. According to the ODCM, the maximum exposed member of the public from the release of airborne iodine-131, tritium, and all radionuclides in particulate form with half lives greater than eight days was defined as an infant, exposed through the grass-cow-milk pathway, with the thyroid as the critical organ. The beta and gamma air doses due to noble gases released from the site were calculated at the site boundary. The maximum exposed member of the public from radioactive materials in liquid effluents in unrestricted areas was defined as an adult, exposed by either the invertebrate or fish pathway with the critical organ being either the thyroid or the gastro-intestinal tract. The whole body dose due to the liquid effluents was also determined. A summary of the 1984 annual doses to the maximum exposed member of the public is presented in the table below:

Liquid Effluents

Total Body (mRem)	Thyroid (mRem)	GI-LLI (mRem)
4.85×10^{-2}	5.89×10^{-2}	2.58×10^{-1}

Gaseous Effluents

Gamma (mRad)	Beta (mRad)	Thyroid (mRem)
4.93×10^{0}	1.31×10^{1}	1.05×10^{0}

Additionally, the inspector and a licensee representative verified the dose to an infant's thyroid, exposed through the grass-cow-milk pathway using the licensee's ODCM for I-131. The hand-calculated dose was in agreement with the dose reported during the last reporting interval. The inspector also noted that the licensee had no unplanned liquid or gaseous releases that exceeded Technical Specification 3.11.A.1.a or 3.11.B.1.a during the period July 1, 1984 through June 30, 1985.

No violations or deviations were identified.

8. Air-Cleaning Systems (84724)

Technical Specification 4.12 describes the testing and surveillance requirements of safety-related air filtration systems which includes the Auxiliary Ventilation Exhaust Filter Trains. The inspector examined records of the laboratory efficiency tests of charcoal adsorber samples and in-place leak tests of HEPA filters and iodine adsorber units (see Paragraph 6). Additionally, the inspector reviewed similar charcoal and HEPA filter test results for the Unit 1 and Unit 2 Control Room and Relay Room ventilation systems.

No violations or deviations were identified.

9. Gaseous Effluent Monitoring and Sampling (84724)

Technical Specification 4.9 provides criteria for the monitoring, sampling, and analysis of liquid and gaseous effluents. The inspector examined gaseous effluent monitoring equipment and sampling stations for operation and evidence of adequate maintenance and calibration. Additionally, the inspector observed effluent monitor readouts in the control room.

No violations or deviations were identified.