



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARIETTA ST., N.W., SUITE 3100  
 ATLANTA, GEORGIA 30303

Report Nos. 50-280/81-2 and 50-281/81-29

Licensee: Virginia Electric and Power Company  
 P. O. Box 26666  
 Richmond, VA 23262

Facility Name: Surrury 1 and 2

Docket Nos. 50-280, 50-281

License Nos. DPR-32 and DPR-37

Inspection at Surry Site, Surry, Virginia

Inspectors: C. D. Evans 12/8/81  
 C. D. Evans Date Signed  
D. M. Montgomery 12/8/81  
 D. M. Montgomery Date Signed

Accompanying Personnel: D. Wellbaum  
 Approved by: J. Phillip Stohr 12/9/81  
 J. Phillip Stohr, EPOS Branch Chief Date Signed

SUMMARY

Inspection on November 2-5, 1981

Areas Inspected

This routine, unannounced inspection involved 52 inspector-hours on site in the areas of quality control and confirmatory measurements including: review of the laboratory quality control program; review of chemical and radiochemical procedures; review of quality control audits and effluent accountability; and comparison of the results of split samples analyzed by the licensee and the NRC Region II Mobile Laboratory.

Results

Of the five areas inspected, no violations or deviations were identified in four areas; one violation was found in one area (failure to report total radioiodine (I-131, I-133, I-135) released; 280/81-29-02; 280/81-29-02; in paragraph 6.d).

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*J. L. Wilson, Station Manager
- \*R. F. Saunders, Assistant Station Manager
- \*S. Sarver, Health Physics Supervisor
- \*C. Foltz, Assistant Health Physics Supervisor
- \*F. Swindell, Chemistry Supervisor
- \*D. Johnston, Quality Assurance Staff
- \*G. Cane, Operations Supervisor

Other licensee employees contacted included 3 technicians and 1 operator.

#### NRC Resident Inspector

- \*D. Burke
- \*M. Davis

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on November 5, 1981 with those persons indicated in paragraph 1 above. The violation disclosed herein was discussed. The inspector informed licensee representatives that the response to the violation should include an evaluation of the errors associated with the failure to make decay corrections for radioiodine measurements. The plant manager acknowledged the violation and stated that an appropriate response would be made to the Notice of Violation.

### 3. Licensee Action on Previous Inspection Findings

(Closed) Infraction (280/80-21-03, 281/80-22-03): Failure to have procedures for preparation of efficiency calibration standards for Ge(Li) detectors. The inspector reviewed the approved procedures for preparation of efficiency calibration standards and noted that the new procedures had been implemented.

### 4. Unresolved Items

Unresolved items were not identified during this inspection.

## 5. Laboratory Quality Control Program

The inspector reviewed the licensee's quality control (QC) program for chemical and radiochemical measurements in the areas identified below.

### a. Assignment of Responsibility and Authority to Manage and Conduct the QC Program:

The Health Physics Supervisor is responsible for radiological measurements including the QC program for radiation detection instrumentation. Authority to manage day to day operations of the QC program has been delegated to an Assistant Health Physics Supervisor, who is responsible for the counting room. The Chemistry Supervisor is responsible for the QC program for primary water chemistry and for the secondary water chemistry monitoring program.

### b. Provisions for Audits/Inspections

Chapter 18 of the VEPCO Nuclear Power Station Quality Assurance Manual provides for annual audits in the areas of chemistry and health physics to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program. The Station Resident Quality Control Engineer is responsible for the implementation of the station audit program.

### c. Methods for Assuring Deficiencies and Deviations in the Program are Recognized, Identified, and Corrected.

The individuals conducting audits are required to become familiar with the requirements of the areas to be audited and prepare an audit checklist that is approved prior to use. A written audit report is prepared and distributed within five days from the post audit conference. All audits reports are reviewed by the cognizant supervisor and, when applicable, members of the Station Nuclear Safety Operating Committee. The Quality Control Staff is responsible for follow-up action to :

- (1) Obtain the written reply to the audit report.
- (2) Evaluate the adequacy of the response.
- (3) Assure that corrective action is identified and scheduled for each recommendation.
- (4) Assure that any required auditee follow-up reply is received when due.
- (5) Confirm that corrective action is accomplished as scheduled.

### d. Quality Control Cross Checks

Specific quality control cross checks for laboratory and counting equipment are detailed in the Corporate Health Physics Procedure CHP-3,

Rev. 1, "Confirmatory Measurements Using Spiked Samples." Acceptance criteria for the quality control checks are provided with corrective action.

e. Quality Control of Purchased and Contracted Services

Analyses of composite liquid effluent samples for Sr-89, and Sr-90, are contracted to Teledyne Isotopes, Inc. The Teledyne quality assurance program was audited by Corporate Quality Engineering (Audit Subject - Analytical Measurements of Environmental Samples dated October 21, 1981) and found to be acceptable.

6. Review of Procedures and Records

The inspector reviewed the procedures and records listed below.

a. Procedures:

1. HP-3.4.1.1, Liquid Scintillation Counter LS-100C, 11-17-80
2. HP-3.4.1.2, Instrument Operation and Calibration of NMC Proportional Counters PC-4, 11-17-80
3. HP-3.4.1.3, ND 6600 Multichannel Analyzer, 11-17-80
4. HP-3.4.2, Health Physics Count Room Standard Source Preparation, 11-17-80
5. HP-3.3.10, Minimum Detectable Activity Determinations, 11-17-80
6. HP-3.2.2, Radioactive Gaseous Waste Sampling and Release Rate, 8-20-81
7. CP-5, Boron Titration, 6-25-81
8. CP-37A, Determination of Radioiodines, 9-13-78
9. CP-66, Post Accident Reactor Coolant Sampling, 5-17-80
10. PT-38.42, Steam Generator Secondary Coolant, 12-04-80

b. Records:

1. Calibration data for the Liquid Scintillation Counter, LS-100C, 1-1-81 to 11-3-81
2. Liquid Scintillation Statistical Counting Errors, 1-1-81 to 11-3-81
3. Liquid Scintillation Daily Checks, 1-1-81 to 11-3-81
4. Calibration Records for Ge(Li) Systems, 6-5-79, 7-26-80, 1-23-81, 7-16-81.

5. Ge(Li) Daily Performance Check, 1-1-81 to 11-4-81
6. Gas Proportional Counter Calibrations, 1-1-81 to 11-4-81
7. Gas Proportional Counter Daily Check, 1-1-81 to 11-4-81
8. Gaseous Radioactive Waste Discharge - Waste Gas Decay Tanks (Nos. 1981-1 to 1981-4 dated 4-20-81 to 9-20-81).
9. Liquid Releases - Low Level Liquid Waste Test Tank, September 1981
10. Gaseous Releases - Unplanned and Miscellaneous (Process Vent), January 1981 to June 1981.

The inspector discussed the results of the procedure and records review with cognizant licensee representatives. Inspector findings are summarized below.

- a. The inspector noted that procedure H.P. 3.4.1.3 had been changed to require that liquid effluent samples be counted in a 1-liter marinelli beaker; therefore meeting the recommended sensitivity of 5E-07 microcuries/cc as stated in Appendix A of NRC Regulatory Guide 1.21. This closes a previously identified item (280/80-21-02, 281/80-22-02).
- b. The inspector noted the addition of specific acceptance criteria to compare the daily performance check data of the gas proportional counter and the liquid scintillation counters, and the addition of a quality control chart and background counting requirements for the Ge(Li) detectors. The quality control chart plots daily response consistency of the Ge(Li) detectors to a Cs-137 source, with an acceptance criterion of  $\pm 2.0$ -standard deviation error. However, the inspector noted that no resolution check requirements had been instituted. A licensee representative indicated that they did not feel this performance check was necessary. This closes a previously identified item (280/80-21-01, 281/80-22-01).
- c. The inspector determined from discussions with licensee representatives that the charcoal cartridges used for radioiodine sampling are not impregnated with TEDA. The inspector noted that the cartridges without TEDA may not be as efficient for collection of organic radioiodine species. Licensee representatives indicated that they will evaluate the collection efficiency of their charcoal cartridges for different radioiodine species and different sampling flow rates. The results of this study will be reviewed during a subsequent inspection. (280/81-29-01, 281/81-29-01)
- d. The inspector determined from discussions with licensee representatives that the weekly charcoal cartridge samples from the process and ventilation vents are not corrected for decay during sampling. The inspector stated that this did not meet the recommendation that decay corrections be made as though the effluent were released uniformly throughout the sampling period as stated in NRC Regulatory Guide 1.21. The failure to correct for decay during sampling has resulted in

underestimation of the radioiodines (I-131, I-133, I-135) as reported in the 1980 annual effluent report. The inspector noted that surveys to demonstrate compliance with radioiodine release rate limits were not affected since weekly radioiodine samples from the process and ventilation vents are used only for measurement of the total quantity released and not for pre-release calculations for determination of process stream flow. The inspector informed licensee representatives that failure to quantify the total radioiodine releases for 1980 was a violation of Technical Specification 6.6.3c which requires the licensee to report annually to the NRC the total quantity of total radioiodine released to the environment during the preceding year (280/81-29-02, 281/81-29-02).

## 7. Confirmatory Measurements

- a. Liquid and gaseous samples were collected during this inspection and counted by the licensee and the NRC RII Mobile Laboratory to verify the licensee's capability to measure radionuclides in effluent samples. The samples were analyzed by gamma ray spectroscopy and included samples from the liquid waste test tank, the waste decay tank, and the charcoal cartridge and particulate filter from the plant process vent. An aliquot of the liquid waste test tank sample was sent to the NRC contract laboratory for H-3, Sr-89, and Sr-90 analyses. The licensee was requested to perform the same analyses and report the results to NRC:RII for comparison. The results of the licensee and NRC analyses by gamma ray spectroscopy are presented in Table 1 with the acceptance criteria in Attachment 1. The results show agreement for all analyses except the gaseous waste 100cc. chamber sample where the licensee's reported concentration for Xe-133 was 30% less than the NRC concentration for the first comparison and 19% less than for the second comparison. Based on the acceptance criteria this constitutes "possible agreement" for the first comparison and "agreement" for the second comparison. The licensee representatives agreed to reevaluate their gas calibration procedure with regard to the physical nature of the calibration source not closely approximating that of the gas, sample. This item will be reviewed during a subsequent inspection (280/81-29-03, 281/81-29-03).
- b. The inspector reviewed licensee results for H-3, Sr-89, and Sr-90 analyses of a liquid waste test tank sample collected during a previous inspection. The comparison of licensee and NRC analyses are given in Table 2 with the acceptance criteria in Attachment 1. The licensee's reported concentration for H-3 was 53% less than the NRC concentration. This area will be reviewed subsequently on receiving results from the licensee on the liquid waste test tank taken during this inspection and as noted in paragraph 9.a (280/81-29-04, 281/81-29-04).

## 8. Review of Interlaboratory Cross Check Program

The inspector discussed the interlaboratory crosscheck program in the radiochemistry area administered by the VEPCO corporate health physics staff. The inspector reviewed a corporate memorandum dated May 13, 1981, which listed the results of the licensee's analysis of a spiked liquid sample within a one liter - marinelli beaker. The results of the

comparison indicated that the licensee was about 13% low for all spiked radionuclides. The NRC split comparison between the licensee on a liquid waste test tank sample taken during the inspection identified that the licensee was 20% low for all principle nuclide gamma emitters. According to the corporate acceptance criterion, the licensee results were in agreement. The inspector has no questions regarding this item.

TABLE 1 RESULTS OF CONFIRMATORY MEASUREMENTS AT SURRY NUCLEAR PLANT

Samples	Isotope	(Concentration, microcuries/cc.)		Ratio	Resolution	Comparison
		NRC	Surry			
Charcoal Cartridge Process Vent	I-131	(2.52±.014)E-10	2.58E-10	1.05	179	Agreement
	I-133	(7.28±0.9)E-11	7.96E-11	1.09	78	Agreement
Spiked Particulate Filter	Co-57	(6.3±.2)E-4	6.89E-4	1.09	31	Agreement
	Co-60	(2.13±.06)E-3	2.49E-3	1.17	34	Agreement
	Cs-134	(1.40±.05)E-3	1.69E-3	1.21	28	Agreement
Waste Gas Decay Tank						
Comparison I	Xe-133	(2.29±.02)E-02	1.62E-2	.70	153	Possible Agreement
	Xe-133m	(5.81±.52)E-03	5.43E-3	.93	11	Agreement
Comparison II	Xe-133	(2.11±.02)E-02	1.71E-02	.81	131	Agreement
	Xe-131m	(6.43±.44)E-03	5.12.	.80	15	Agreement
Reactor Coolant	I-131	(1.54±.01)E-01	1.7E-01	1.11	128	Agreement
	I-133	(2.29±.01)E-01	2.27E-01	.99	163	Agreement
	I-135	(1.09±.09)E-01	1.12E-01	.97	66	Agreement
	I-132	(9.11±.14)E-02	8.87E-02	1.03	12	Agreement
	Cs-137	(1.32±.06)E-02	1.82E-02	1.38	21	Possible Agreement
	Cs-138	(4.85±.09)E-01	5.92E-01	1.22	55	Agreement
Liquid Waste Tank Test	I-131	(2.94±.06)E-05	2.32E-05	.79	45	Agreement
	I-133	(1.33±.06)E-05	1.13E-05	.85	23	Agreement
	Cs-134	(2.98±.07)E-05	2.33E-05	.78	40	Agreement
	Cs-137	(4.26±.08)E-05	3.34E-05	.78	53	Agreement
	Co-58	(4.41±.08)E-05	3.35E-05	.76	58	Agreement
	Co-60	(1.11±.06)E-05	0.93E-06	.84	18	Agreement
	Mn-54	(1.52±.31)E-06	Not Detected			



Table 2 RESULTS OF CONFIRMATORY MEASUREMENTS AT SURRY NUCLEAR PLANT

(concentration, microcuries/cc.)

<u>Sample</u>	<u>Isotope</u>	<u>NRC Contract Laboratory</u>	<u>Surry</u>	<u>Ratio</u>	<u>Resolution</u>	<u>Comparison</u>
Liquid Waste Test Tank	Sr-89	(0±2)E-08	3.0E-08	NC	NC	NC
	Sr-90	(1±2)E-08	0.6E-08	.60	0.5	Agreement
	H-3	(6.64±0.2)E-03	3.13E-03	.47	330	Disagreement

NC - No Comparison