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

Report Nos. 50-280/ 80-21 50-281/80-22

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

Facility Name: Surry 1 and 2

Docket Nos. DPR-32 and DPR-37

Inspection at Surry Site, Surry Virginia

Inspector: D.M. Montgomery — 7/7/80
D.M. Montgomery — Date Signed

Accompanying Personnel: E. Workman
P.C. McPhail

Approved by: G. L. Troup — 7/7/80
G. L. Troup, Acting Chief, REW Sections, FFMS Branch — Date Signed

SUMMARY

Inspection on June 3-6, 1980

Areas Inspected

This routine, unannounced inspection involved 26 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 comparison of the results of split samples analyzed by the licensee and the NRC Region II Mobile Laboratory.

Results

Of the four areas inspected, no items of noncompliance or deviations were identified in three areas; one item of noncompliance was found in one area. (Infraction-failure to have written procedures for preparation of efficiency calibration standards for the Ge(Li) detectors (280/80-21-03, 281/80-22-03)

DETAILS

1. Persons Contacted

Licensee Employees

J.L. Wilson, Station Manager
*R.F. Saunders, Assistant Station Manger
*R.M. Smith, Health Physics Supervisor
*B. Garber, Assistant Health Physics Supervisor
A. Stafford, Health Physicist
*F.L. Thomasson, Corporate Health Physicist
F.T. Swindell Chemistry Supervisor

NRC Resident Inspector

*D. Burke

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on June 6, 1980 with those persons indicated in Paragraph 1 above. A licensee representative agreed to perform the analyses referred to in paragraph nine and report the results to NRC:RII. The item of noncompliance was acknowledged by a Licensee representative who also agreed to meet a sensitivity of 5E-7 microcuries per milliliter for the analyses of the principal gamma ray emitters in liquid effluents by September 1, 1980.

3. Licensee Action on Previous Inspection Findings

(Closed) Noncompliance (Report Nos. 50-280/77-22 and 50-281/77-22)

The inspector reviewed the Licensee's response to a previous item of noncompliance (Report Nos. 50-280/77-22 and 50-281/77-22) for failure to include radiological laboratory equipment in the QA program for measuring and test equipment. The inspector verified that the equipment is now included in a QA program as specified in Chapter 12 of the QA Manual. The inspector had no further questions and this item is considered closed.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Laboratory Quality Control Program

The inspector reviewed the licensee's quality control program for chemical and radiochemical measurements in the following areas:

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 the 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 stable Chemistry and associated instrumentation.

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 audit 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 of Purchased and Contracted Services Analyses of liquid effluent samples for Sr-90 , Sr-89 and P-32 are contracted to Teledyne Isotopes, Inc. The Teledyne quality assurance program was audited by Corporate Quality Assurance (Audit Number 78-57) and found to be acceptable. Teledyne Isotopes was added to the list of approved vendors for radiochemical analyses.

6. Review of Chemistry and Radiochemistry Procedures

a. The inspector reviewed the following procedures:

1. H.P.-3.1-1, Liquid Scintillation Counting and Calibration, 2-21-79.

2. H.P.-3.1-2, Internal Proportional Counter-Nuclear Measurement Corporation Model PC-4 Operation and Calibration Check, 5-25-79.

3. H.P.-3.1-10, GELI Detector Calibration, 6-21-78.

4. H.P.-3.1-17, Operating Procedures for ND 6600, 5-2-79.

5. H.P.-3.5-1, Radioactive Liquid Waste Discharges.

6. C.P.-45, Tritium 9-13-78.

7. CP-8, Chloride, Colorimetric Method, 10-12-78.

8. CP-24, Dissolved Oxygen, Indigo-Carmine Method, 9-6-78.

9. CP-13A Fluoride, Specific Ion Electrode Method, 1-25-79.

The inspector discussed the results of the procedure review with licensee representatives as noted in paragraphs 6b, 6c, and 6d.

b. The inspector noted that the procedures for operation of the liquid scintillation counters, gas proportional counter, and Ge(Li) detectors did not specify corrective actions if the acceptance criteria were not met. In addition, there were no provisions for resolution and background checks of the GeLi detectors. A licensee representative agreed to add these QC checks and corrective actions to the procedures. (280/80-21-01, 281/80-22-01)

c. The inspector noted that liquid effluent samples are counted in a 100-cc geometry for ten minutes. This results in an approximate lower limit of detection of 1E-6 to 4E-6 microcuries/cc for principal gamma ray emitters. The inspector stated that this did not meet the recommended sensitivity of 5E-7 microcuries/cc as stated in Appendix A of USNRC Regulatory Guide 1.21 dated June 1979. A licensee representative agreed to meet the sensitivity of 5E-7 microcuries/cc for liquid effluents by September 1, 1980. (280/80-21-02, 281/80-22-02)

d. The inspector noted on June 4, 1980 that there were no procedures for preparation of efficiency calibration standards for Ge(Li) detectors which are used to assure compliance with Technical Specifications for the release of radioactive effluents. The inspector informed the licensee that this constituted an item of noncompliance with Technical Specification 6.4.A that requires detailed written procedures with appropriate check-off lists and instructions to be provided for release of radioactive effluents. A licensee representative acknowledged the

item of noncompliance and stated that procedures for the preparation of standards would be written and implemented. (280/80-21-03, 281/80-22-03).

7. Review of Records and Logs

The inspector reviewed selected parts of the following records and logs and had no further questions:

a. GeLi Calibration Records 1-4-80, 6-5-79, 12-20-78, and 1-3-78.

b. GeLi Daily Performance Checks, June, 1979 - June, 1980.

c. Liquid Scintillation Daily Checks, June 1979 to June 1980.

d. Liquid Scintillation Counter Calibrations, 12-5-78 to 6-5-80.

e. Gas Proportional Counter Calibrations April 1978 to June 1980.

f. Gas Proportional Counter Daily Checks, April 1978 to June 1980.

g. Plateau Determinations for Gas Proportional Counters, January 1978 to June 1980.

h. Liquid Scintillation Statistical Counting Errors, 9-16-77 to 5-31-80.

i. Fluoride Standard Curves, 3-7-80, 9-4-79, 2-5-79, 3-28-78.

j. Chloride Standard Curves, 5-5-80, 1-31-80, 10-25-79, 7-30-79.

k. Orion pH Meter Calibration, August 1978 to May 1980.

l. Beckman pH Meter Calibration, 11-29-79 to 5-9-80.

m. Sartorius Balance Calibration; August 1978 and August 1979.

n. Bausch and Lomb Spectrophotometer Calibration, July 1979 and April 1980.

o. Results of Analyses of Quality Control Samples for Stable Chemistry, 1-7-80, 2-11-80 and 5-5-80.

8. Review of Audits

The inspector reviewed the following audits in the areas of chemistry and health physics and had no further questions:

a. Health Physics Program Audit Number S79-3, April 20, 1979.

b. Chemistry Audit Number S79-25, December 17, 1979.

9. Confirmatory Measurements

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 radionulides in effluent samples. The samples were analyzed by gamma-ray spectroscopy and included samples from a liquid waste tank, reactor coolant system, waste gas decay tank, and station vent (charcoal cartridge and particulate filter). An aliquot of the liquid waste 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 are presented in Table 1 with acceptance criteria in Attachment 1. The data show agreement or possible agreement for all radionuclides.

The inspector noted that the licensee analysis of the waste gas decay tank sample appeared to overestimate the concentration. A licensee representative indicated that the efficiencies for the 100 cc gas geometry were not determined by calibration with actual gas samples. The efficiencies for the 100 cc liquid geometry are used for counting gas samples. The inspector noted that the licensee's calibration procedure states that the actual physical nature or shape of the source should be used for calibration. A licensee representative agreed to review the calibration technique for gases and consider the use of gaseous standards. (280/80-21-04, 281/80-22-04)

Table

Results of Confirmatory Measurements at Surry

June 3-6, 1980

SAMPLE	ISOTOPE	CONCENTRATION, Microcuries/cc SURRY	NRC	RATIO SURRY/NRC	COMPARISON
Waste Gas	Xe-133	7.81±0.02E-1	6.66±.01E-1	1.17	Agreement
Decay Tank	Xe-133M	1.19±0.07E-2	8.6±.04E-3	1.38	Possible Agreement
6/5/80	Xe-135	8.91±0.4E-3	6.9±0.2E-3	1.29	Agreement
Reactor Coolant	Co-58	7.3±0.3E-3	6.4±0.2E-3	1.14	Agreement
6/4/80	Co-60	9.8±2.4E-4	9.2±1.2E-4	1.06	Agreement
	Sr-92	1.3±0.4E-3	8.4±2.6E-4	1.5	Agreement
	Tc-99M	1.2±0.2E-3	1.0±0.1E-3	1.2	Agreement
	I-131	1.98±0.04E-2	1.99±0.02E-2	.99	Agreement
	I-132	3.7±0.1E-2	3.47±0.06E-2	1.07	Agreement
	I-133	2.40±0.04E-2	2.36±0.03E-2	1.02	Agreement
	I-134	6.7±0.6E-2	6.9±0.3E-2	0.97	Agreement
	I-135	3.9±0.2E-2	3.9±0.1E-2	1.0	Agreement
	Cs-137	ND	4.3±1.0E-4	NC	--
	Cs-138	1.5±0.2E-1	2.0±0.1E-1	.75	Agreement
	Na-24	1.9±0.2E-3	8.7±1.4E-4	2.2	Possible Agreement

Liquid Waste	Co-58	5.5±0.3E-5	5.0±0.1E-5	1.1	Agreement
6/4/80	Co-60	2.32±0.06E-4	2.38±0.03E-4	.97	Agreement
	I-131	2.25±0.04E-4	2.09±0.02E-4	1.08	Agreement
	I-133	1.00±0.03E-4	9.5±0.2E-5	1.05	Agreement
	Tc-99M	5.13±1.3E-6	5.7±0.7E-6	.89	Agreement
	Cs-134	6.8±1.8E-6	ND	NC	NC
	Cs-137	1.6±0.2E-5	1.6±0.1E-5	1.0	Agreement
Vent Charcoal	I-131	5.1±0.2E-12	4.8±0.2E-12	1.06	Agreement
Cartridge	I-133	7.6±2.9E-13	6.2±1.2E-13	1.22	Agreement
6/4/80					
Vent	Co-58	4.5±0.3E-13	5.3±0.3E-13	.84	Agreement
Particulate	Co-60	8.0±0.3E-12	1.03±0.05E-11	.78	Agreement
Filter	Mn-54	1.9±1.2E-13	ND	NC	NC
6/4/80	Cs-134	2.9±1.3E-13	ND	NC	NC
	Cs-137	9±2E-13	6.8±1.7E-13	1.32	Agreement

NOTES: ND - Not Detected; NC - No Comparison

Attachment 1

CRITERIA FOR COMPARING ANALYTICAL MEASUREMENTS

This attachment 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 these criteria, the judgment limits are variable in relation to the comparison of the NRC Reference Laboratory's value to its associated uncertainty. As that ratio, referred to in this program as "Resolution", increases, the acceptability of a licensee's measurement should be more selective. Conversely, poorer agreement must be considered acceptable as the resolution decreases.

$$\text{RATIO} = \frac{\text{LICENSEE VALUE}}{\text{NRC REFERENCE VALUE}}$$

Resolution	Agreement	Possible Agreement A	Possible Agreement B
<3	0.4 - 2.5	0.3 - 3.0	No Comparison
4 - 7	0.5 - 2.0	0.4 - 2.5	0.3 - 3.0
8 - 15	0.6 - 1.66	0.5 - 2.0	0.4 - 2.5
16 - 50	0.75 - 1.33	0.6 - 1.66	0.5 - 2.0
51 - 200	0.80 - 1.25	0.75 - 1.33	0.6 - 1.66
>200	0.85 - 1.18	0.80 - 1.25	0.75 - 1.33

"A" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is greater than 250 Kev.

Tritium analyses of liquid samples.

"B" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is less than 250 Kev.

^{89}Sr and ^{90}Sr Determinations.

Gross Beta where samples are counted on the same date using the same reference nuclide.