U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 78-18

Docket No. 50-271

License No. DPR-28 Priority -- Category C

Licensee: Vermont Yankee Nuclear Power Corporation

20 Turnpike Road

Westborough, Massachusetts 01581

Facility Name: Vermont Yankee Nuclear Power Station

Inspection at: Vernon, Vermont

Inspection conducted: August 15-17, 1978

Inspectors: J. J. Kottan — 9/1/78
J. J. Kottan, Radiation Specialist — date signed

J. P. Stohr for D. E. Donaldson, Radiation Specialist — 9/1/78
date signed

T. O. Jackson, Radiation Specialist-Intern — 9/1/78
date signed

Approved by: J. P. Stohr — 9/1/78
J. P. Stohr, Chief, Environmental and Special Projects Section, FF&MS Branch — date signed

Inspection Summary:

Inspection on August 15-17, 1978 (Report No. 50-271/78-18)
Areas Inspected: Routine, unannounced inspection of the licensee's chemical and radiochemical measurements program using NRC:I Mobile Laboratory and laboratory assistance provided by DOE Radiological and Environmental Services Laboratory. Areas reviewed included: program for quality control of analytical measurements, audit results, performance on radiological analyses of split actual effluent samples, and effluent control records and procedures. The inspection involved 56 inspector-hours on site by three NRC regional based inspectors.
Results: Of the four areas inspected, no items of noncompliance were identified in two areas, and two items of noncompliance were identified in two areas (Infractions: failure to survey and follow procedures - paragraph 4; failure to follow procedures - paragraph 5).

Region I Form 12
(Rev. April 77)

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DETAILS

1. Persons Contacted

Principal Licensee Employees

*W. P. Murphy, Assistant Plant Superintendent
*G. D. Weyman, Chemistry and Health Physics Supervisor
*J. R. Sipp, Plant Chemist
*W. T. Penniman, Security Supervisor

The inspector also interviewed other licensee employees including members of the chemistry, health physics and QC staff.

* denotes those present at the exit interview.

2. Laboratory QC Program

The inspector reviewed the licensee's program for quality control of analytical measurements in the following areas.

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

The licensee's laboratory QC program is detailed in Procedure AP 6600, Chemistry and Health Physics Department Quality Assurance. This procedure assigns responsibility for the program to the Chemistry and Health Physics Supervisor, the Plant Health Physicist or the Plant Chemist.

b. Provisions for Audits/Inspections

The licensee's program contains no provisions for audits of the program by the Chemistry and Health Physics Supervisor. The program does provide, however, for the review and approval of the Quality Assurance Check Sheets by the Chemistry and Health Physics Supervisor or the Plant Chemist.

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

The inspector noted the licensee's QC program contains provisions for recognizing results that do not meet acceptance criteria.

d. Methods for Taking Corrective Actions on Identified Deficiencies

The inspector noted the licensee's QC program contains provisions for taking corrective actions on identified deficiencies.

e. Method of Recording Audits/Inspections

The licensee's laboratory QC program contains no provisions for audits/inspections and therefore, contains no provisions for recording the audits/inspections.

f. Method of Reporting Results of Audits/Inspections to Supervisor for Review and Approval

The inspector noted the licensee's laboratory QC program contains no methods or provisions for reporting results of audits/inspections to supervisory personnel for review in that the licensee's program requires that no audits be performed.

g. Requirements for Purchased or Contracted Services

The inspector noted the licensee's QC program contains management and procedural controls for purchased and/or contracted laboratory services.

The inspector discussed laboratory QC with the licensee. The inspector also discussed various aspects of NRC Regulatory Guide 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment. The inspector noted the licensee had no regulatory requirements in the area of laboratory QC and had no further questions in this area. No items of noncompliance were identified.

3. Audit Results

The inspector determined that the licensee's effluent monitoring program was on the corporate QA audit list. The inspector reviewed Audit 77-02, dated April 12-13, 1977, which was the last audit performed in this area. The inspector noted that an audit in this area was scheduled for 1978. The inspector had no further questions in this area.

No items of noncompliance were identified.

4. Confirmatory Measurements

During the inspection, actual liquid and gaseous effluent samples were split between the licensee and NRC:I for the purpose of intercomparison. The effluent samples were analyzed by the licensee using his normal methods and equipment, and the NRC using the NRC:I Mobile Laboratory. Joint analyses of actual effluent samples determine the licensee's capability to measure radioactivity in effluent samples.

In addition, a liquid effluent sample was sent to the NRC reference laboratory, Department of Energy, Radiological and Enviromental Services Laboratory (RESL), for analysis requiring wet chemistry. The analyses to be performed on the sample are: Sr-89, Sr-90, gross alpha, gross beta and tritium. These results will be compared with the licensee's results when received at a later date, and will be documented in a subsequent inspection report.

The results of the sample measurements compared, indicated that all of the measurements were in agreement, or possible agreement, under the criteria used for comparing results. (See Attachment 1) The results of the comparisons are listed in Table I.

On August 16, 1978, as part of the gaseous effluent sample splitting, the inspector witnessed two off gas samples being taken. The inspector noted that Procedure OP 2611 requires that when off gas samples are taken a radiation survey instrument be used to check the exposure rate from the sample vials, and the vials be carried in a plastic bag to reduce exposure to the hand. The inspector noted that when he witnessed the off gas sampling a radiation survey instrument was not used to check the exposure rate of the sampling vials and the vials were not carried in a plastic bag. The inspector stated that this was an Item of Noncompliance with regard to 10 CFR 20.201(b) and Section 6.5.B of the Technical Specifications. The inspector had no further questions in this area. (77-18-01)

5. Records and Procedures

The inspector reviewed the following records and procedures:

a. Gaseous effluent analysis data (January, 1978 to July, 1978).

b. Liquid effluent analysis data (January, 1977 to July, 1978).

c. Counter calibration and check records (January, 1978 to July, 1978).

d. Laboratory QC sample analyses (January, 1977 to July, 1978).

e. The following procedures:

(1) OP 2610, Liquid Waste Disposal
(2) OP 2611, Gaseous Radwaste
(3) AP 6010, In-Plant Audits
(4) AP 6600, Chemistry and Health Physics Department Quality Assurance
(5) DP 0630, Water Chemistry
(6) DP 0631, Radiochemistry
(7) DP 2631, Radiochemical Instrumentation
(8) DP 0641, Procedure for Logging Results of Chemical Analyses

In reviewing the above procedures, the inspector noted that Procedure DP 0630 requires the mixed chloride indicator, which is used in the reactor coolant chloride analysis, to have a six month shelf-life. The inspector noted the bottle of mixed chloride indicator in the chemistry lab was made up on February 6, 1978 and was still being used on August 16, 1978, a period in excess of six months. In addition, the bottle was not labeled with an expiration date as required by Procedure DP 0641. The inspector stated that failure to follow Procedures DP 0630 and DP 0641 was an Item of Noncompliance. The inspector had no further questions in this area. (77-18-02)

6. Exit Interview

The inspector met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on August 18, 1978. The inspector summarized the purpose and scope of the inspection and the inspection findings.

The licensee agreed to perform the analyses listed in paragraph 4 and report the results to the NRC.

The licensee acknowledged the items of noncompliance.

TABLE I

Vermont Yankee - Verification Test Results

SAMPLE	ISOTOPE	NRC VALUE	LICENSEE VALUE	COMPARISON
		RESULTS IN MICROCURIES PER MILLILITER		
Off-Gas #1	Xe-133	5.38 ± 0.13E-3	8.93 ± 1.15E-3	Possible Agreement
0847 hrs	Xe-135	8.43 ± 0.03E-2	9.56 ± 0.09E-2	Agreement
08/16/78	Kr-85m	1.88 ± 0.02E-2	1.57 ± 0.06E-2	Agreement
	Kr-87	4.69 ± 0.18E-2	4.43 ± 0.12E-2	Agreement
	Kr-88	3.39 ± 0.11E-2	3.40 ± 0.15E-2	Agreement
Off-Gas #2	Xe-133	5.74 ± 0.14E-3	8.81 ± 1.11E-3	Possible Agreement
0845 hrs	Xe-135	8.27 ± 0.02E-2	9.97 ± 0.08E-2	Possible Agreement
08/16/78	Kr-85m	1.83 ± 0.01E-2	1.72 ± 0.06E-2	Agreement
	Kr-87	5.09 ± 0.10E-2	4.48 ± 0.12E-2	Agreement
	Kr-88	3.29 ± 0.09E-2	3.66 ± 0.15E-2	Agreement
Reactor Water	I-131	2.52 ± 0.04E-3	2.37 ± 0.20E-3	Agreement
0850	Cs-134	1.96 ± 0.20E-4	1.49 ± 0.52E-4	Agreement
08/16/78	Cs-137	2.72 ± 0.19E-4	2.30 ± 0.59E-4	Agreement
	Co-58	9.63 ± 1.73E-5	1.21 ± 0.55E-4	Agreement
	Zn-65	1.00 ± 0.06E-3	8.35 ± 3.68E-4	Agreement
	Co-60	6.62 ± 0.26E-4	5.48 ± 0.69E-4	Agreement
	Na-24	6.18 ± 0.31E-3	5.42 ± 0.31E-3	Agreement
	I-133	3.23 ± 0.03E-2	2.43 ± 0.04E-2	Possible Agreement

SAMPLE	ISOTOPE	NRC VALUE	LICENSEE VALUE	COMPARISON
		RESULTS IN MICROCURIES PER MILLILITER		
Waste Surge Tank 0800 08/16/78	Co-60	3.21 ± 0.16E-5	3.78 ± 1.19E-5	Agreement
	Cs-137	1.62 ± 0.24E-6	4.01 ± 0.45E-6	Possible Agreement
		RESULTS IN TOTAL MICROCURIES		
Stack Charcoal Cartridge 0730 08/15/78	I-131	2.49 ± 0.25E-3	2.25 ± 0.50E-3	Agreement
Particulate Filter 0900 08/17/78	Mn-54	4.09 ± 0.35E-3	5.04 ± 1.49E-3	Agreement
	Co-60	3.10 ± 0.01E-1	2.77 ± 0.03E-1	Agreement
	Zn-65	5.55 ± 0.12E-2	5.17 ± 0.39E-2	Agreement

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 judgement 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.

89Sr and 90Sr Determinations.

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