

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-271/83-20

Docket No. 50-271

License No. DPR-28 Priority -- Category C

Licensee: Vermont Yankee Nuclear Power Corporation

RD5, Box 169, Ferry Road

Brattleboro, Vermont 05301

Facility Name: Vermont Yankee Nuclear Power Station

Inspection At: Vernon, Vermont

Inspection Conducted: June 27 to July 1, 1983

Inspectors: M. H. McBride 8/29/83  
M. H. McBride, Radiation Specialist date

Approved by: M. Shanbaky 8/30/83  
M. Shanbaky, Chief, Facilities Radiation date  
Protection Section

Inspection Summary: Inspection on June 27 to July 1, 1983 (Report No. 50-271/83-20)

Areas Inspected: Routine unannounced inspection by a region-based inspector of the licensee's Effluent Control and Radioactive Waste Management Programs, including administrative control of effluent releases, process and effluent monitor surveillance and calibration, and the Radioactive Waste Shipping Program. Previously identified items, including plant frisking policy, were also reviewed. The inspection involved 47 hours onsite by one region-based inspector.

Results: No violations were identified. Two open items were reviewed, one of which was closed (Detail 3).

## DETAILS

### 1. Persons Contacted

During the course of this routine inspection, the following personnel were contacted or interviewed.

#### 1.1 Licensee Personnel

- J. Pelletier, Plant Manager
- \* W. Wittmer, Maintenance Superintendent
- \* D. Reid, Technical Services Superintendent
- \* R. Leach, Chemistry and Health Physics Supervisor
- \* R. Pagodin, Engineering Support Supervisor
- P. Donnelly, Instrument and Control Supervisor
- \* D. Mohler, Health Physicist
- M. Prystupa, Chemist

#### 1.2 NRC Personnel

- \* W. Raymond, Senior Resident Inspector

\*attended the exit interview on July 1, 1983. Other persons were also contacted.

### 2. Purpose

The purpose of this routine inspection was to review the licensee's Effluent Control and Radioactive Waste Management Program with respect to the following elements:

- Previously identified items
- Administrative control of effluent releases
- Radiochemical analyses of process and effluent samples
- Process and effluent monitor surveillance and calibration
- Radioactive Waste Shipping Program (including control of transuranic material)

### 3. Previously Identified Items

(Closed) Bulletin 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled, Release of Radioactivity to Environment". The licensee response to the bulletin, dated June 20, 1980, a licensee study of potential unmonitored liquid release path, and licensee sampling data for unmonitored liquid and gaseous release paths were reviewed and found acceptable.

(Open) Inspector Followup Item (83-11-01) Review licensee evaluation of portal monitor use. Preliminary licensee data continues to indicate that contamination levels as high as several hundred thousand disintegrations per minute (dpm) may not be detected by the portal monitors. The licensee had not, at the time of the inspection, evaluated the effects of back-ground radiation on portal monitor sensitivity. The licensee stated that the plant frisking policy would likely be included in a future revision to the plant procedures. This item will be further reviewed during a future inspection.

#### 4. Administrative Control of Effluent Releases

The licensee administrative controls for radioactive effluent releases were reviewed against the criteria contained in:

- 10 CFR 20.106, "Radioactivity in Effluents to Unrestricted Areas"
- Technical Specification 3.8, "Radioactive Effluents" (Surveillance Requirements)
- Technical Specification 6.7.C.1, "Semi-Annual Effluent Release Report"
- Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Release of Radioactivity in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants."
- Procedure O.P. 2610, "Liquid Waste Disposal"
- Procedure O.P. 2611, "Gaseous Radwaste"

The licensee's performance relative to these criteria was determined from discussions with personnel from the Chemistry and Operation Departments, review of 1981 to 1983 radioactive liquid waste transfer and release documentation, and review of 1981 and 1982 semi-annual effluent release reports and supporting data.

Within the scope of this review, no violations were identified.

#### 5. Radiochemical Analyses of Process and Effluent Samples

The type and frequency of licensee radiochemical analyses of process and effluent samples were reviewed against the criteria contained in:

- Technical Specification 4.8, "Radioactive Effluents" (Surveillance Requirements)
- Procedure D.P. 0640, "Chemistry and Health Physics Department Scheduling"

The licensee's performance relative to these criteria was determined from discussions with chemistry personnel and from a review of 1981 through 1983 chemistry sampling and analysis records.

Within the scope of this review, no violations were identified.

6. Process and Effluent Monitor Surveillance and Calibration

The licensee program for process and effluent monitor surveillance and calibration was reviewed against the criteria contained in:

- Technical Specification 3.9, "Radioactive Effluent Monitoring Systems" (Limiting Conditions for Operation).
- Technical Specification 4.9, "Radioactive Effluent Monitoring Systems" (Surveillance Requirements)
- Procedure O.P. 4385, "Liquid Process Radiation Monitoring System Functional/Calibration"
- Procedure O.P. 4382, "Stack Radiation Monitoring Functional/Calibration"
- Procedure O.P. 4381, "AOG Radiation Monitors Functional/Calibration"
- Procedure O.P. 4511, "Source Calibration of Process Radiation Monitoring System (PRMS)"

The licensee's performance relative to these criteria was determined from discussions with personnel from the Chemistry, Operations, and Instrument and Control Departments; from reviews of 1981 through 1983 monitor maintenance, surveillance, and calibration records; from reviews of operator shift logs, and from observing process monitor operation.

Within the scope of this review, no violations were identified. However, the following item was noted.

No instructions for converting stack gas monitor readings to gaseous release concentrations were included in plant procedures. Informal instructions and required calibration curves were, however, prominently posted in the control room, near the stack monitor gauges. The licensee stated that the instructions would be included in the next scheduled revision of plant procedures.

7. Radioactive Waste Shipping Program (Including Control of Transuranic Material)

The licensee's Radioactive Waste Shipping Program (including control of transuranic material) was reviewed against the criteria contained in:

- 10 CFR 20.301, "Waste Disposal, General Requirements"

- Procedure AP 0504, "Shipment and Receipt of Radioactive Materials"
- Burial site license limits for transuranic content of radioactive waste

The licensee's performance relative to these criteria was determined from discussions with health physics personnel and from review of 1983 shipping records and waste analysis results.

Within the scope of this review, the following item was identified.

Results from an NRC-sponsored program conducted earlier this year indicate that measurable levels of transuranic nuclides were detected in Vermont Yankee primary coolant, reactor cleanup system resin, condensate demineralizer resin, and in smears of surface contamination from the condensate phase separator room (Table 1). The analyses were conducted by Science Applications, Incorporated (SAI) as part of an NRC study on the impact of 10 CFR 61 implementation.

The SAI analysis results were transmitted to the licensee corporate staff in a letter dated March 2, 1983. The plant health physics staff recalled that they had received the data from corporate about two months before the inspection.

The licensee stated that the SAI results did not seem credible because: 1) alpha activity, generated by the transuranics, had never been detected in routine alpha surveys of plant contamination or plant systems, 2) the SAI tritium assay results were questionable, 3) direct follow-up on the assay results with SAI was difficult because the licensee was not directly in contact with the analysis laboratory and 4) the relative abundance of the certain nuclides reported by SAI was not readily explainable.

Routine licensee assays of alpha activity on plant smear samples were reviewed and found inconclusive, due to low levels of overall contamination on some smear samples and due to the limited sensitivity of routine alpha counting equipment (reported as 200 dpm/100cm<sup>2</sup> for a portable proportional counter). While more sensitive, low background alpha-beta counting equipment was available and operable at the plant, it was not used for the routine alpha smear surveys. Licensee assays of gross alpha activity in plant coolant were also inconclusive, as the typical assay sensitivity, 1E-9 uCi/ml, was approximately equal to the coolant transuranic levels reported by SAI.

At the time of the inspection, the licensee was preparing to ship a second group of samples to SAI for analysis as part of the next phase of the NRC study. To confirm the NRC results, the licensee also planned to send duplicate samples to a second laboratory. The licensee did not know how long the laboratories would take to analyze the samples, but estimated that it would be some months before analysis results would be available.

TABLE 1. PARTIAL SUMMARY OF SAI

SAMPLE	ANALYSIS RESULTS							
	Co-60	Ce-144	Pu-238	Pu-239,40	Pu-241	Am-241	CM-242	CM-243,4
RCS-UNFILTERED	2.7E-4uCi/ml	<8.5E-7	<3.7E-8	<8E-9	<1.3E-6	<6.1E-7	<2.4E-7	<6.0E-8
RCS-INSOL*	8.7E-6uCi/ml	3.8E-7	1.0E-9	6.0E-10	1.3E-7	<1.1E-9	6.8E-10	4.0E-10
CLEAN-UP RESIN	8.0E+1uCi/g	4.4E-3	7.8E-5	4.8E-5	1.2E-2	3.5E-5	1.0E-4	1.5E-5
COND. RESIN	3.4E-1uCi/g	2.4E-4	7.7E-6	4.4E-6	5.9E-4	3.8E-6	2.3E-6	1.7E-6
SMEARS	1.2E-2uCi**	1.2E-2	1.9E-5	1.4E-4	3.5E-3	2.7E-5	4.6E-7	5.0E-7

Table values are means  $\pm$  2 standard deviations.

\*Reported in terms of milliliters of coolant

\*\*Total activity on a composite sample of six smears.

The licensee Chemistry and Health Physics Supervisor, stated that air samples and smear samples in the Reactor, Turbine, and Rad Waste Buildings will be analyzed for gross alpha activity in the low background counter. The licensee stated that the analytical results would be available by July 11, 1983.

The adequacy of licensee evaluation and control of transuranic nuclides in shipments of radioactive waste and in connection with personnel exposure is unresolved, pending further licensee analysis. (83-20-01)

8. Unresolved Items

Items which need more information to determine acceptability are unresolved. An unresolved within the scope of this inspection is discussed in Detail 7.

9. Exit Interview

On July 1, 1983, a meeting was held with licensee representatives (denoted in paragraph 1) to discuss the inspection scope and findings. The transuranic analysis results, discussed in paragraph 7, were reviewed at that time. At no time during this inspection was written material provided to the licensee by the inspector that was not previously available in the public document room.