

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-271/89-16

Docket No. 50-271

License No. DPR-28

Priority -

Category C

Licensee: Vermont Yankee Nuclear Power Corporation
RD 5, Box 169
Ferry Road
Brattleboro, Vermont 05301

Facility Name: Vermont Yankee Nuclear Power Station

Inspection At: Vernon, Vermont

Inspection Conducted: October 30 - November 3, 1989

Inspector:

W. Thomas
W. Thomas, Radiation Specialist

12/15/89
date

Approved by:

S. Shevlin
for W. Pasciak, Chief, Facilities Radiation
Protection Section

12/19/89
date

Inspection Summary: Inspection conducted on October 30 - November 3, 1989
(Inspection Report No. 50-271/89-16)

Areas Inspected: Routine inspection of the radiation protection program covering status of previous inspection findings, audits and appraisals, and maintenance of occupational exposures ALARA.

Results: No violations were identified.

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DETAILS

1.0 Persons Contacted

1.1 Licensee Personnel

- *S. R. Berger, Acting Health Physicist
- K. Christiansen, Radiation Protection (RP) Technician
- T. Childress, Quality Assurance (QA) Engineer
- *R. P. Grippardi, QA Supervisor
- K. Hinrichsen, RP Technician
- D. Holmquist, RP Technician
- *S. J. Jefferson, Assistant to the Plant Manager
- *E. V. Lindamood, RP Supervisor
- *J. T. McCarthy, ALARA Engineer
- E. C. Miller, Radwaste Engineer
- *R. D. Pagodin, Technical Services Superintendent
- D. P. Tkatch, RP Assistant
- *R. J. Wanczyk, Acting Plant Manager
- *G. D. Weymann, Senior Environmental Program Manager (Corporate)

1.2 NRC Personnel

- G. E. Grant, Senior Resident Inspector
- *W. J. Pasciak, Chief, Facilities Radiation Protection Section
- *W. V. Thomas, Radiation Specialist

*denotes those individuals attending the exit meeting on November 3, 1989.

2.0 Purpose of the Inspection

This inspection was a routine unannounced inspection to review the following areas: status of previous inspection findings, audits and appraisals, and maintenance of occupational exposures ALARA.

3.0 Status of Previous Inspection Findings

- 3.1 (Closed) Inspector Follow-up Item 87-15-01. Licensee procedure RP-0520, "Personnel Decontamination Procedure," incorrectly derives the correction factor, F, used to convert the count rate to dose rate. The licensee committed to changing the personnel decontamination procedure.

The licensee has revised the personnel decontamination procedure and the dose conversion factors in the recently issued version of the procedure "Personnel Decontamination and Skin Dose Assessment" effective August 9, 1989.

- 3.2 (Closed) Inspector Follow-up Item 88-02-01. In the past there were a number of incidents where radioactive contaminated items were

discovered outside of the Radiation Controlled Area (RCA) mixed in with the clean trash.

The licensee has implemented by procedure a new policy for trash removal from the RCA. This procedure, AP 0516, "Survey and Release of Materials, Vehicles, and Trash from the RCA" is dated August 10, 1988. During this inspection several tours of the facility outside of the RCA were made by the inspector. At no time were radioactive materials found improperly stored outside of the RCA.

- 3.3 (Closed) Inspector Follow-up Item 88-02-02. During the previous outage, the licensee's aerosol booth, which is used for quantitative fit testing of respiratory protection devices, became inoperable and was supplemented by equipment from an outside contractor. Due to the inability to obtain repair parts for the inoperable fit booth, the licensee purchased two units that perform quantitative tests utilizing the particles that occur in ambient air rather than with the generation of a controlled aerosol. The new units have been incorporated into the respiratory protection program and are currently operational. The inspector noted, however, that the equipment had not been adequately tested onsite nor has the licensee obtained and evaluated other tests which would document the ability of the units to effectively replace the current industry standard aerosol booth.

During this inspection the inspector verified that the licensee had obtained documentation of the U.S. Army test report documenting the ability of the units to replace the current industry standard aerosol booth.

- 3.4 (Closed) Notice of Violation 88-18-01. The violation was described as follows: "Technical Specification 6.5 B, states that radiation control standards and procedures shall be approved, maintained and made available to all station personnel. Procedure AP 0502, "Radiation Work Permits", requires in Section B. 6., in part, that all working party personnel shall observe all posted and written instructions given by the work party supervisor and/or the assigned Chemistry and Health Physics representative. The I&C technicians entered the "A" and "B" recombiner hallways which were posted "High Radiation Area, RWP Required" without a RWP. Failure to observe the radiological posting constitutes an apparent violation".

The licensee's response to the NRC dated December 2, 1988, was reviewed by the inspector during this inspection and found to be complete. The licensee implemented the corrective actions outlined.

- 3.5 (Closed) Inspector Follow-up Item 89-06-01. Implement Low Level Radwaste Procedures and a Tracking Program for Radwaste Materials stored on the radwaste pad. The inspector reviewed applicable procedures, the tracking program, and the safety evaluation supporting the storage of the materials at the Low Level Rad Waste (LLRW) storage facility.

Overall, during the previous inspection it was determined that the safety review performed by Yankee Atomic for Vermont Yankee appeared thorough and with sound technical bases. However, the following weaknesses were noted in the implementation of either Yankee Atomic's recommendations as documented in the Safety Evaluation Report (SER) or in the licensee's site operating procedure:

1. Plant procedure OP 2505 was still in draft form and had not yet been formally approved.
2. Both Generic Letter 81-38 and the SER had recommended periodic security patrols of the storage area. As of inspection 89-06, Radiation Protection (RP) had not formally coordinated with security to incorporate the LLRW storage facility into their surveillance program.
3. Calculations relating to the stability of stacked containers subjected to a design based tornado (300 mph winds) lead to a recommendation that to avoid a potential tipping problem, a minimum of two containers are to be maintained on ground level when stacking is required. The inspector noted that the proposed site layout plan and procedure OP 2505 did not guarantee that this condition would always be maintained. In discussions with engineers from Yankee Atomic, it was noted that the size and weights of the containers were based upon initial container specifications. Modifications have since been made to the containers that have increased both their base footprint and weight. Additional calculations performed during the inspection utilizing the updated parameters indicate that the tipping potential no longer exists.
4. No acceptance criteria was specified for surveillances that would be performed on the reactor water resin containers for hydrogen gas buildup. The licensee stated that the appropriate guidance would be incorporated into an existing procedure for explosive gas sampling.
5. The On Site Storage Containers (OSSC's) are designed with sampling tubes at one end for determination of liquid build-up. The inspector questioned the effectiveness of this sampling method if the OSSC was not placed in a level position (i.e., the tube was at the high end of a container). The licensee stated that when assembling the containers on uneven ground, the sampling tube will be positioned as appropriate to allow the detection of any accumulated liquids.
6. Although procedure OP 2505 allowed for tracking of activities (Ci's), volumes (cu.ft.) and offsite dose rates (mrem/yr) at the site boundary for each addition to the storage site, it did not allow for tracking of either the site totals for volume, activity limits or the site administrative limit of 1 mrem/yr at the site boundary to ensure that these limits were not exceeded.

The licensee stated that a computer program would be developed that would track these totals and inform them when they were approaching the limits so that the appropriate actions could be taken.

7. The inspector reviewed the Offsite Dose Calculation Manual (ODCM) dose factors determined by Yankee Atomic for estimating mrem/yr at the site boundary based upon both direct and skyshine exposures from the containers. It was noted that to stay within the established guidelines for site boundary exposures, strong management oversight and tight administrative controls will be necessary on the placement of containers to maximize self-shielding and minimize dose.

The licensee's responses to the above inspector concerns were reviewed during this inspection, and found to be acceptable:

1. Plant procedure OP 2505 was formally approved and distributed.
2. Security tours of the LLRW storage facility are being made each shift.
3. Yankee Atomic has adequately addressed the module tipping issue in the SER.
4. The hydrogen gas sampling and acceptance criteria issue was addressed by a Departmental Instruction (DI) (89-12) to OP 2505. This DI is approved and Yankee Nuclear Services Division (YNSD) concurs with this approval.
5. Sample tubing is installed on the OSSC's such that the end of the tubing is positioned at the low point. This positioning is a procedural (OP 2505) requirement.
6. Site storage volume, activity and site boundary exposure rate are tracked via procedure (OP 2505). Additionally, a program was developed which gives a LLRW storage facility activity report that provides a warning at 600 Ci (700 Ci administrative limit) for the cylindrical OSSC's.
7. The placement of containers to maximize self-shielding is specifically directed by the procedure. Additional shielding is being constructed (Purchase Form Requisition (PFR) approved, 8/89) to deal with expected gap exposure and shine from the tops of the OSSC's. Also, specific responsibilities for ensuring the dose limit is not exceeded will be added to the Radwaste Assistant job description by October 1, 1989. Finally, a quarterly report is to be prepared for the RP Supervisor by the Radwaste Assistant detailing the additional site boundary annual dose from the LLRW storage pad and the total curie inventory.

3.6 (Open) Inspector Follow-up Item 89-80-02. Licensee to implement stringent controls over irradiated fuel movement above the bio-shield. Licensee personnel indicated the following actions will be implemented by the licensee prior to the next refueling outage, currently scheduled for September 1990:

- Fuel handling procedural changes will include controls regarding the movement of irradiated fuel close to the reactor vessel wall above the biological shield. Appropriate caution statements will also be added to remind personnel of the potential hazards of fuel movement in this area when the drywell is occupied.
- Training will be provided prior to the outage to personnel involved in the refueling process or who may work in susceptible areas of the drywell. This training will review the potential hazards, controls, and limits associated with work in the drywell during refueling.

4.0 Audits

The following Quality Assurance Audit activity reports were reviewed as a part of this inspection:

- QA Surveillance Report No. 89-160
- QA Surveillance Report No. 89-163
- QA Audit Report No. VY-89-03

The audit reports were complete and thorough and probed for programmatic weaknesses and accurately assessed the quality of the radiation protection program.

No violations were identified.

5.0 Maintaining Occupational Exposures ALARA

The following procedures were reviewed as a part of this inspection:

- DP 0535, ALARA Documentation, Records and Reports
- AP 0536, ALARA Implementation for Design Changes and Work Analysis

The purpose of DP 0535 is to establish a system for the ALARA engineer to maintain and control ALARA documentation and records, and to establish guidelines and criteria for initiating and routing ALARA reports. The purpose of AP 0536 is to designate the criteria and methodology for the ALARA engineer to perform ALARA analyses of Plant Design Change Requests (PDCR), Plant Alteration Requests (PAR), and Engineering Design Change Requests (EDCR), where significant personnel exposure is anticipated.

The total exposure expended for 1988 was 124 man-rem. The initial estimate for 1988 was 135 man-rem. The 124 man-rem compares quite favorably with other light water reactors, both boiling and pressurized water reactors operated throughout the country, and is the lowest annual exposure with no outage in the operating history of Vermont Yankee. The 538 man-rem 3 year average collective dose for Vermont Yankee is near the midpoint of light water reactor collective doses nationwide.

The inspector verified that adequate procedures have been issued to ensure implementation of the ALARA program, and that responsibilities for conduct of the ALARA program have been assigned for the following:

- A full-time ALARA coordinator
- An ALARA committee
- A corporate ALARA organization
- The plant manager
- The radiation protection supervisor
- The health physics department
- Individual workers

Procedure AP 0536 provides for early review during the initial design phase for proposed design changes, plant modifications, or maintenance work. Adequate ALARA reviews have been accomplished within the past six months on proposed changes, modifications, and maintenance work. A checklist is a part of each ALARA package. The ALARA program includes on-going methods to prevent build-up and reduce the concentrations of crud in primary system piping. The ALARA program also provides for continuing review and action for chronic plant radiation problem areas and continual tracking of jobs-in-progress to assure that ALARA projections are not exceeded.

Adequate action levels have been established for work activities within the Radiation Control Area (RCA) or involving radioactive materials. The action levels are as follows: Less than 1 man-rem requires only a Radiation Work Permit (RWP), from 1 to less than or equal to 5 man-rem requires an RWP and approval of the ALARA coordinator, and greater than 10 man-rem requires ALARA committee approval. A routine program exists requiring radiation protection technicians to physically inspect all locked high radiation gates and doors during each shift to ensure that adequate control remains in place. Adequate audits of the ALARA program are performed by members of the corporate quality assurance organization stationed onsite.

The ALARA program includes man-rem goals and objectives for monthly, quarterly and annual periods, as well as individual jobs. The ALARA program goals and objectives were achieved in 1988 resulting in the lowest man-rem dose (124 man-rem) in the operational history of the plant. The ALARA goal of 281 man-rem for 1989 will be exceeded slightly due to unscheduled work activity if the present exposure trend continues. The ALARA program has adequate procedures for modifying or terminating

jobs that significantly deviate from the original objectives or that can substantially increase the projected dose for the job. Post-job briefings are performed by the ALARA coordinator for all major jobs and for jobs that approach 5 man-rem.

Adequate ALARA training is provided during general employee training, however, special training sessions are given for selected groups on an as-needed basis. The ALARA program has provisions for worker's suggestions and feedback. The ALARA program receives proper review and oversight as well as proper support from corporate and plant management. The ALARA coordinator has adequate training and experience to qualify for the position.

The inspector concluded that the ALARA program is effective.

6.0 Exit Meeting

The inspector met with licensee representatives (denoted in Section 1 of this report) on November 3, 1989. The inspector summarized the purpose, scope and findings of the inspection.