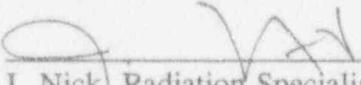
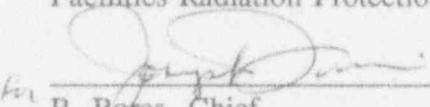


U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-271/93-32
Docket No. 50-271
License No. DPR-28
Licensee: Vermont Yankee Nuclear Power Corporation
Brattleboro, Vermont 05301
Facility Name: Vermont Yankee Nuclear Power Station
Inspection At: Vernon, Vermont
Inspection Period: December 6 - 10, 1993

Inspector: 
J. Nick, Radiation Specialist
Facilities Radiation Protection Section, DRSS
Date 1/4/94

Approved by: 
R. Bofes, Chief
Facilities Radiation Protection Section, DRSS
Date 1/11/94

Areas Inspected: Implementation of the program for maintaining occupational exposure as low as reasonably achievable (ALARA). Areas of this program included organization and staffing levels, audits and appraisals, program changes, worker involvement and awareness, goals and objectives, and program results. Previously identified items were reviewed for status and update.

Results: The program to maintain exposures ALARA was very effective in reducing dose rates in most areas of the plant and lowering accumulated radiation exposures of workers in radiological areas. Areas toured in the facility were well maintained and exhibited good housekeeping. The ALARA group was adequately staffed by qualified individuals. Improvements were noted in the reduction of overall radiation dose rates and housekeeping in contaminated areas. Two previously identified items concerning High Radiation Area controls and use of radioactive waste stream scaling factors were closed. Continuing progress was noted with a previously identified item concerning control of radioactive materials.

DETAILS

1.0 Individuals Contacted

1.1 Licensee Personnel

- *J. Geyster, Plant Health Physicist
- *R. Grippardi, Quality Assurance (QA) Supervisor, YNSD
- *J. Herron, Technical Services Superintendent
- *E. Lindamood, Radiation Protection Manager
- T. McCarthy, ALARA Coordinator
- *R. Wanczyk, Plant Manager

1.2 NRC Personnel

- H. Eichenholz, Senior Resident Inspector
- *P. Harris, Resident Inspector

* Denotes those present during the exit meeting

2.0 Purpose

The purpose of this announced inspection was to assess the licensee's implementation of the program for maintaining occupational exposure as low as reasonably achievable (ALARA). Areas of this program included organization and staffing levels, audits and appraisals, program changes, worker involvement and awareness, goals and objectives, and program results. Previously identified items were reviewed for status and update.

3.0 Previously Identified Items

3.1 (Closed) NRC Violation, Severity Level IV (50-271/93-22-01)

Two areas were identified by the inspector as having inappropriate controls to prevent inadvertent entry into the High Radiation Area (HRA). The licensee's long-term corrective actions to prevent another occurrence of this violation included training for radiation protection technicians and creating a procedure for the radiation protection program self-assessment and observation program. The licensee provided additional training to the technicians in the field on the correct method to barricade an HRA, and formalized the program for surveillance and checking of HRA boundaries, postings, and barricades. The licensee implemented appropriate and timely long-term corrective actions, which together with immediate corrective actions documented in a previous inspection report (NRC 50-271/93-22), appeared adequate to prevent recurring violations in this area.

3.2 (Closest) NRC Violation, Severity Level IV (50-271/93-06-01)

The licensee did not use the most recent waste stream analysis data for scaling factors used to determine classification of radioactive waste. Long-term corrective actions taken by the licensee included changing the use of scaling factors to allow a three-sample average of the waste stream analysis, committing to time requirements for the update of waste stream analysis data, and tracking the periodic commitment for waste stream analysis and update on a computerized system. The licensee implemented appropriate and timely long-term corrective actions, which together with immediate corrective actions documented in a previous inspection report (NRC 50-271/93-06), appeared adequate to prevent recurring violations in this area.

3.3 Control of Radioactive Material

The licensee had documented a problem with control of radioactive material in a recent corrective action report (CAR 93-29) and this was discussed in NRC Inspection Report No. 50-271/93-22. Contaminated items had been found outside the radiologically controlled area (RCA) in the licensee's storage facility located in Vernon, VT. The licensee had proposed many immediate and long-term corrective actions to better control radioactive material, but at the time of this inspection, not all of the long-term corrective actions had been implemented. The licensee performed a thorough investigation and evaluation of the improper release of this material from the PCA. Immediate corrective actions taken included surveying the storage facility for other contaminated items, tightening controls for release of materials from the RCA, and limiting the amount of material entering or exiting the RCA. Longer-term corrective actions included establishing performance criteria for measuring successful control of radioactive materials, developing performance indicators for program surveillance, and evaluating a November 1993 industry group assessment and its recommended improvements for control of radioactive materials. The licensee was still reviewing the assessment report and evaluating its recommendations, researching the problem among other utilities, and obtaining information from plants with good radioactive material control programs. Because the licensee was not finished with their assessment and had not fully implemented all corrective actions, this item will be reviewed during future inspections.

4.0 Facility Tours

The inspector toured many of the radiologically controlled areas (RCAs) of the facility including the reactor building, the refueling floor, the turbine building, the torus room, and radwaste processing areas. All areas were generally well posted and exhibited good housekeeping. No discrepancies in postings were identified.

Improvements in housekeeping were evident in contaminated areas. The inspector had previously identified a concern with identification of poor housekeeping in contaminated areas (NRC Inspection Report No. 50-271/93-22). All areas toured during the period of this recent inspection were well maintained and the inspector did not observe problems as identified in previous inspections.

High Radiation Area (HRA) and Very High Radiation Area (VHRA) postings and barriers were checked throughout the facility. All areas were posted as required by NRC regulations. All areas were appropriately barricaded and all areas were locked as required.

5.0 Organization and Staffing

The radiation protection organization had not changed significantly since the last inspection. The inspector reviewed the organization and staffing levels through interviews with licensee personnel. The licensee maintained five supervisors (including radwaste and radiation protection assistants) to direct the activities of approximately 15 health physics technicians. The ALARA group was small with the ALARA Engineer the only dedicated person during non-outage conditions. The ALARA Engineer had assistance for preparation of the Outage ALARA Report during the period of this inspection. Also, a Radiation Protection Assistant was designated as a back-up individual and was routinely involved with daily activities. During outage preparation and outage conditions, the staff was expanded to include a data manager, an additional supervisor for backshift coverage, and various contractor technicians. The inspector concluded that the staffing levels were minimal, but appropriate for the number of personnel working at the licensee's site.

6.0 Audits/Appraisals

The licensee had performed a quality assurance audit of the radiation protection and radwaste program in September 1993. The ALARA program was included in the audit that was coordinated by the Quality Assurance group and was performed by three licensee auditors, a technical specialist from Yankee Nuclear Services Division, and a health physics supervisor from Seabrook Nuclear Power Station. The auditors reviewed procedures, interviewed plant personnel, observed work activities, reviewed log books, reviewed and evaluated exposure goals and exposures to date, and examined ALARA Review packages. The auditors concluded that the ALARA program continued to be a strength to the radiation protection program due to improvements in dose reduction and increased program awareness. The auditors did not identify any concerns in this area. The inspector reviewed the audit report, but could not determine from the written description whether or not the audit was comprehensive. Through interviews with licensee personnel, the inspector determined that the audit was detailed and significant time was expended in reviewing documents and observing work activities.

The licensee's ALARA committee also reviewed the personnel exposure estimates and accumulated personnel exposure for major jobs. The committee was composed of the plant manager and management representatives from each department within the licensee's organization. Members of the committee commented on performance and suggested ways to maintain personnel radiation exposure ALARA. The inspector observed an ALARA Committee meeting on December 9, 1993 and reviewed the minutes from previous ALARA Committee meetings. The inspector found that the committee discussed appropriate trends and results, and assigned good action items to individual members of the committee.

7.0 Program Changes

The inspector interviewed the ALARA Engineer, reviewed licensee procedures, and examined ALARA review packages to determine any program changes and results of these changes. With the exception of the implementation of the revisions to 10 CFR 20, the program had only minor improvements and no major changes.

The licensee implemented the revisions to 10 CFR 20 in July 1993. The revised regulations included requirements for a formal ALARA program, the summing of internal and external radiation exposure above a certain limit, and evaluation of respirator usage to ensure that total personnel exposure was kept ALARA. The licensee was required to evaluate respirator usage to determine if personnel would receive more total exposure when wearing a respirator, due to loss of worker efficiency and longer time spent in a radiation area, compared to the amount of internal exposure plus external exposure received from personnel not wearing a respirator. The licensee had revised procedures to include an ALARA review for respirator use on jobs performed in the RCA.

The licensee's management was planning to make some personnel changes within the ALARA staff. The two individuals in the ALARA Engineer and the Radiation Protection Training Coordinator positions were to be rotated in January 1994. Licensee management believed that this rotation would be beneficial to the organization and to the individuals involved. No negative impact on the radiation protection or ALARA programs was expected. The results of this rotation will be reviewed during future inspections.

The licensee had implemented many program improvements. The licensee used mock-up training before actually performing many types of activities. These activities included steam plug installation and removal, recirculating pump seal replacement, shroud bolt replacement, and removal of highly radioactive items from the spent fuel pool. The licensee also videotaped major jobs for critique and review before performing the same job again. These jobs included the control rod drive (CRD) work, the recirculating pump seal work, and reactor head disassembly/assembly. Other higher dose areas were videotaped for training use; this allowed personnel to become familiar with an area or view a component without actually touring the areas. These areas included the steam tunnel and the drywell. Still photographs of many components were taken for similar purposes, and the licensee had recently purchased a digitizing camera to enable computer storage and transfer of component

images. In addition, the licensee used live video cameras for surveillance of work activities in high radiation areas to reduce personnel exposures for supervisory, security, and health physics personnel.

8.0 Worker Involvement/Awareness

To determine the amount of worker involvement and awareness of the ALARA program, the inspector reviewed reports and information available to workers, and interviewed various workers. The inspector found good information available to workers concerning dose rates in specific work areas, total personnel radiation exposure for the site, and individual dose totals. The licensee had posted informational "ALARA Alert" signs in areas with higher dose rates and had indicated a range of dose rates for the area. Several areas were also marked as "ALARA Low Dose Areas". These areas allowed individuals who were not performing their specific work, but had to remain in the vicinity, to wait in lower dose areas. Places with very high dose gradients within close proximity of the source were marked as "Hot Spots". These "Hot Spot" postings also indicated contact dose rates. The inspector found the informational postings to be accurate, visible, and valuable program elements.

Through interviews with individuals in the work areas, the inspector determined that the workers were very much aware of the ALARA principle with knowledge concerning dose rates in their work areas. The workers displayed a sense of responsibility about maintaining their radiation exposures ALARA. Although one individual expressed concern with the changes in the respirator use policy, other workers were satisfied with less respirator use and ultimate total exposure savings.

Additionally, the licensee had started an ALARA Suggestion Program; however, the program had not been formally implemented or publicized. The ALARA Engineer had documented suggestions that would potentially save approximately 1 to 2 person-rem per year. The suggestions had not been implemented as of the time of this inspection. The inspector agreed with the licensee concerning the potential opportunities for dose reduction when the program is formally implemented. The implementation and results from this program will be reviewed during future inspections.

9.0 ALARA Goals and Objectives

The inspector reviewed the licensee's exposure goals and objectives. Maintaining exposures ALARA was the licensee's corporate goal #7 for 1993. The licensee had created a goal for total personnel exposure less than 310 person-rem for the year. The inspector found this goal to be reasonable for the scope of work planned in 1993. The licensee was projecting that the total personnel exposure for 1993 would be approximately 213 person-rem. This would bring the licensee under the annual goal by a large margin.

The licensee also set goals for total personnel exposure during the plant outage. The goal for the 1993 refueling outage was less than 190 person-rem. Actual total personnel exposure for the outage was approximately 147 person-rem, even though the total hours for the outage were double the estimated hours. The licensee attributed the lower totals to pre-planning for jobs and aggressive oversight and follow-up during the work evolution.

The inspector noted that there were no exposure goals for departments within the licensee's organization. The licensee tracked personnel exposure by job and task instead. The licensee explained that it was easier to control exposures by the job activity, because individuals from many different departments were working on the same job. The inspector agreed that the licensee's process for controlling and tracking personnel exposure was very effective in reducing and maintaining exposures ALARA.

10.0 ALARA Results

Through a review of licensee trend analysis and reports, the inspector determined that the licensee had produced significant dose reduction from previous years. The licensee's outage reports compared total personnel exposures for similar jobs performed in the past. Additionally, the licensee's dose totals were very good as compared to other boiling water reactors in the United States. The total annual and three-year average exposures were typically less than other plants of similar age and construction.

The licensee used ALARA Reviews to determine methods for reducing personnel exposure during the job planning process. The inspector reviewed various work packages including motor operated valve testing (MOVAT), control rod drive (CRD) inspection and repairs, feedwater heater replacement, miscellaneous drywell work, and fuel drop recovery activities. The inspector found good examples of job planning, work analysis, and job audits for each work package.

Temporary shielding requests were evaluated for 17 areas during 1993. This number was typical for previous years when refueling work was performed. The ALARA staff evaluated the need and justification for installing temporary shielding in certain plant locations. Shielding requests were usually justified if the estimated exposure could be reduced by a factor of two or greater. The overall exposure savings for personnel working in the area had to be more substantial than the total exposure to personnel involved in installing and removing the shielding. The inspector noted that two shielding requests were never implemented due to the complications in coordinating safety (engineering) evaluations on affected equipment. Although the dose reductions were evaluated and approved, the work was performed before the engineering evaluations were performed. This problem with coordination between the licensee's radiation protection and engineering personnel is a minor program weakness that could be improved.

11.0 Exit Meeting

A meeting was held with licensee representatives at the end of the inspection period on December 10, 1993. The purpose and scope of the inspection were reviewed and the findings of the inspection were discussed. The licensee acknowledged the inspector's findings.