

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 89-19  
Docket No. 50-29  
License No. DPR-3 Priority -- Category C

Licensee: Yankee Atomic Electric Company  
580 Main Street  
Bolton, Massachusetts 01740-1398

Facility Name: Yankee Nuclear Power Station

Inspection At: Rowe, Massachusetts

Inspection Conducted: November 6-9, 1989

Inspected By:

*P. O'Connell*  
P. O'Connell, Radiation Specialist

11-22-89  
date

Approved By:

*W. Paselak*  
W. Paselak, Chief, Facilities  
Radiation Protection Section

11/29/89  
date

Inspection Summary: Inspection conducted on November 6-9, 1989. NRC Inspection Report No 50-029/89-19.

Areas Inspected: Routine unannounced inspection of the licensee's radiation protection program. Areas reviewed included: audits and appraisals, training, external exposure controls, internal exposure controls, and ALARA.

Results: Within the scope of this review, one non-cited violation was identified. One open item was reviewed and closed.

## DETAILS

### 1.0 Individuals Contacted

#### 1.1 Licensee Personnel

- \* G. Babineau, Radiation Protection Manager,
- \* J. Geyster, Radiation Protection Engineer,
- \* T. Henderson, Acting Plant Superintendent,
- P. Hollenbeck, Radiation Protection Engineer,
- R. Mellor, Technical Director,
- \* T. Shippee, Radiation Protection Senior Engineer,
- \* N. St. Laurent, Acting Manager of Operations,
- S. Wisla, Radiation Protection Engineer.

#### 1.2 NRC Personnel

H. Eichenholtz, Senior Resident Inspector.

Other personnel were also contacted or interviewed during the course of this inspection.

\* Denotes those who attended the exit meeting on November 9, 1989.

### 2.0 Purpose and Scope of Inspection

This inspection was a routine unannounced Radiological Controls inspection. Areas reviewed included: audits and appraisals, training, external exposure controls, internal exposure controls, and ALARA.

### 3.0 Licensee Actions on Previous Findings

(Closed) Unresolved Item 89-16-02. The inspector reviewed the licensee's corrective actions regarding an incident where several individuals were contaminated while working on a relief valve in the machine shop on August 20, 1989. The incident occurred during an unplanned two week shutdown. Contamination was found on three individuals at levels between 100 to 20,000 counts per minute. The individuals were decontaminated by showering. Whole body counts indicated no internal deposition of radioactive material.

The licensee's initial evaluation did not specify corrective actions for several of the weaknesses which were identified. During the inspection the licensee completed a more detailed root cause analysis of the incident and actions.

The licensee determined that on August 20, 1989 the number of work activities which were on-going precluded the Radiation Protection Technician (RPT) from adequately supporting the work on the relief valve. The RPT providing support for this work was also responsible for manning the access control point. The licensee's staffing level is such that

adequate RPT support is available for periods of routine activities. The RPT support is minimal for periods of unplanned, heavy work load activities, such as the two week outage. The licensee is addressing this weakness by:

The plant management reemphasized the need to limit the work scope to within the ability of the Radiation Protection (RP) Department to provide adequate support.

The licensee is planning on utilizing corporate radiological engineers to augment their supervisory staff during periods of increased work load.

During periods of unplanned activities the licensee will use personnel from departments other than the RP Department to man the access control point.

The licensee is evaluating how to augment their staffing of RPTs during future periods of unplanned activities. The licensee is considering having an agreement with a vendor to supply the licensee with site qualified RPTs with little advance notice. The licensee is also considering initiating a reciprocal agreement with nearby utilities to supply RPTs during these periods.

The inspector will review this matter during a future inspection. This item is closed.

#### 4.0 Audits and Appraisals

The inspector reviewed the last three independent audits of the RP program. The qualifications of the auditors who conducted these audits was considered strong in that the auditors included radiological engineers from the licensee's corporate office as well as RP supervisors from other nuclear facilities. The audit findings indicated that a thorough assessment of the RP program was conducted. While the licensee had not yet responded to the findings of the most recent audit, the licensee was responsive to the findings of the previous audits.

The inspector reviewed several Quality Assurance (QA) Surveillance Reports. These surveillances are conducted, partially, to ensure that RP work is conducted in compliance with licensee procedures. The surveillance reports reviewed indicated that adequate surveillances were being conducted. A corporate radiological engineer also conducted QA surveillances during the previous outage. The inspector reviewed the qualifications of the QA Engineer who conducts the QA surveillances. Although this individual does not have an RP background, it appears that individuals with sufficient technical knowledge conduct the annual audits and surveillances.

The inspector reviewed several Radiological Occurrence Reports (RORs) and quarterly summaries of personnel contamination events. The licensee uses the results from these reports to track and trend events which have radiological consequences. In September 1989 the licensee revised Procedure AP-0802, "Radiological Occurrence Reports", to ensure that a root cause analysis of events are properly conducted. This revision was implemented, partially, because of the weaknesses noted in the evaluation of the contamination incident on August 20, 1989.

Generally the licensee's corrective actions for RORs were prompt and appropriate. The inspector reviewed an ROR involving an incident where an individual made an unauthorized entry into a High Radiation Area (HRA) on September 25, 1989. Although the licensee took prompt corrective actions, the initial evaluation, by the RP supervisor, did not address all aspects of this incident. The fact that an individual entered a HRA without an alarming dosimeter, in violation of Technical Specification 6.12.1, was not noted until three days after the incident. At that time the licensee determined that stronger disciplinary actions were necessary. An improvement could be made by upgrading first line RP supervision review of RORs.

The inspector reviewed this incident against criteria found in 10 CFR 2, App. C, V. G. 1. and determined that this incident met the criteria for a non cited violation (50-029/89-19-01).

The licensee stated that they are planning a further improvement in the ROR program by having the Technical Director review the RORs. The licensee anticipates that this will heighten site awareness as to the significance of events which cause RORs to be initiated.

## 5.0 Training

The inspector reviewed the lesson plans for the licensee's initial and annual requalification General Employee Training. The scope of the training was adequate to ensure that workers were given proper instructions on radiation protection problems. The training records of several permanent employees and long term contractors were reviewed and the inspector verified that these individuals had received annual training as required.

RP supervisory personnel were recently given one week of training, by a contractor, on how to implement the new 10 CFR 20 regulations. All of the RPTs are receiving one week of training, by a contractor, on the principles of radiochemistry. The inspector reviewed these lesson plans and considered this training to be a good initiative.

The licensee recently implemented an improvement in their training program. Diagnostic testing of the RPTs is now conducted. Using the results of this testing, the training department is able to focus their training of the RPTs on those areas where training is required.

The inspector noted that the instructor who provides the respiratory protection training does not have formal training or work experience in this area. NUREG 0041, "Manual of Respiratory Protection Against Airborne Radioactive Materials", offers guidance, in Section 8.1, as to the qualifications of training personnel. The NUREG states, in part, that training is to be given by a qualified and experienced instructor such as a health physicist, industrial hygienist, or safety engineer. The licensee stated that they would evaluate what additional training could be given to the instructor.

#### 6.0 External and Internal Exposure Control

The inspector made several tours of the facility and noted that areas were properly posted for radiation protection purposes. The licensee continues to have difficulties in this area though, for example, on October 24, 1989, the Resident Inspector noted a HRA where the placard denoting the area as a HRA had fallen out of the posting. The licensee is attempting to improve performance in this area and utilizes three methods to verify postings. Once each shift, a RPT tours the facility to verify that areas are properly posted. Once each week RP supervisors verify HRA postings. The licensee stated that by the end of the first quarter of 1990, they will proceduralize the "R. P. Postings Surveillance Program". Under this program, a RP supervisor, using a master sheet that indicates the correct posting for each area of the facility, conducts a weekly tour and verifies that the postings are correct.

On November 8, 1989 the inspector accompanied a work crew making a power entry into the vapor containment (VC). The inspector reviewed the controlling radiation work permit, associated radiation surveys and airborne radioactivity monitoring. The inspector also observed the RPTs provide job coverage for the entry. The RP coverage for this activity was good.

The inspector reviewed dosimetry records for selected individuals to determine if the licensee had complete dosimetry records, i.e. a completed NRC Form 4 or equivalent, prior to allowing those individuals to exceed 1.25 rems to the whole body per calendar quarter. No discrepancies were noted in this area.

The licensee's corporate environmental laboratory processes the thermoluminescent dosimeters (TLDs) used at the site. The inspector reviewed the laboratory's National Voluntary Accreditation Program (NVLAP) certification for the types of TLDs worn by individuals on site. During routine operations individuals are issued TLDs for which the laboratory has NVLAP accreditation in categories I through VII, inclusive. In situations where personnel will be exposed to neutron radiation, such as during the VC power entry on November 8, 1989 these TLDs were replaced with a different type of TLD. The laboratory is NVLAP accredited in categories I through VIII, inclusive, for this type of TLD. The inspector noted that proper dosimetry was being issued and dosimetry was being worn correctly.

The inspector reviewed selected whole body count (WBC) results. The licensee tracks WBC results which indicate personnel exposures to the Maximum Permissible Concentration (MPC) of airborne radioactivity for 10 hours or greater. This is significantly lower than the regulatory limit for personnel exposure of 520 MPC hours per calendar quarter. The licensee's records indicated no significant WBC results. Since June 1987, only three WBC results indicated exposures slightly greater than 10 MPC hours. The licensee has an effective program for limiting personnel internal exposures.

The licensee recently purchased two respirator fit testing devices. The licensee's previous fit test booth required frequent maintenance and repairs, which at times caused delays in qualifying individuals for respirator use. Having the new fit testing devices should facilitate this, particularly for outages.

A previous NRC inspection report identified a concern that control charts were not established for several of the counters used to determine airborne radioactivity concentrations. The licensee was responsive to this concern and established control charts for the counting equipment. The inspector noted that one of the control charts indicated a negative bias in the counting system. The cognizant engineer was aware of this bias and stated that the counter would be recalibrated soon and the bias would be corrected at that time. This indicated that licensee supervision was routinely reviewing the control charts.

In response to an NRC concern, the licensee is establishing criteria for acceptable background levels for the counting equipment. A previous NRC inspection report identified a concern that acceptable background levels were not established for the counting equipment. A high background count rate could adversely affect the lower limit of detection of the counting system. The licensee provided the inspector with a draft report which calculated acceptable background counts. Although the licensee has not yet incorporated the results of this report into the count room procedures, the inspector noted that one of the counters had been taken out of service due to high background counts. This item will be reviewed during a future inspection.

The licensee revised Procedure DR-8521, "Operation of the Eberline AMS-3 Beta Continuous Air Monitor", in response to a NRC inspection report finding that improvements could be made in the area of real time air monitoring by establishing criteria for alarm set points, ensuring the operability of the AMS-3, and specifying the frequency of changing the filter on the AMS-3. The revision to the procedure addressed the NRC concerns with the exception that the frequency of changing the filter was not specified. Procedure DR-8042, "RP Shift Personnel Duties and Surveillances", specifies the filter change frequency while the plant is in modes one through four, but this procedure does not apply while the plant is in mode five, i. e. during a refueling outage. The licensee stated that, in January 1990, this procedure would be revised to specify the frequency of changing the filter during mode five.

The inspector noted that the AMS-3 in operation had a graph attached to the unit. This graph could be used to quickly estimate the gross beta particulate airborne concentration. The inspector discussed the proper use of this graph with several RP supervisors and RPTs and noted that most individuals were not knowledgeable as to the proper use of the graph. RP management stated that the RP staff would receive training on the use of this graph prior to the next refueling outage.

#### 7.0 ALARA

The ALARA engineers initially set a 1989 ALARA goal at 108 man-rem. The licensee's corporate office set an ALARA incentive goal at 200 man-rem. The corporate incentive goal did not reflect a challenging ALARA goal. The licensee stated that they are revising the manner in which corporate ALARA incentive goals are set. The licensee stated that in the future the corporate ALARA goal will be more challenging and reflect the ALARA engineers' ALARA goal.

Due to changes in the work scope during the year the ALARA engineers revised the 1989 ALARA goal to 84 man-rem. The 1989 personnel exposure, up to November 8, 1989, was 57 man-rem. Given the scope of the work completed in 1989 it appeared that the licensee's ALARA program has improved. The ALARA goal for 1990 is 218 man-rem. This goal appears to be challenging based on the work scope anticipated for 1990.

The licensee has made equipment improvements in order to reduce personnel exposures. The licensee purchased four automatic manway lifting fixtures which should reduce personnel exposures for steam generator manway removal and replacement. The licensee also constructed a movable shield, i. e. a crud shield, for the work on the Waste Hold Up Tank and the Activity Dilution and Decay Tank. The ALARA engineers anticipate that this movable shield will save approximately 9 man-rem. During the next refueling outage, the licensee will use a submersible paint in the reactor cavity in order to limit personnel exposure during reactor cavity decontamination.

The inspector noted that workers' awareness of the importance of ALARA and good ALARA work practices needs improvement. During the VC power entry on November 8, 1989, the inspector noted that one of the workers made the entry without the proper tools. This resulted in the worker and the RPT providing job coverage remaining in the VC, a Radiation Area and an Airborne Radioactivity Area, for an additional one half hour. RP supervisors state that, while worker performance in this area has improved, this is an area that needs more attention. The licensee stated that they are considering methods to address this matter. This item will be reviewed during a future inspection.

#### 8.0 Exit Meeting

The inspector met with licensee management listed in Section 1.0 on November 9, 1989. The findings of the inspection were discussed at that time.