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REGION I

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Report No. 50-29/99-03

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

Facility Name: Yankee Nuclear Power Station

Location: Rowe, Massachusetts

Dates: July 15 - September 30, 1999

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Decommissioning and Laboratory Branch
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EXECUTIVE SUMMARY

Yankee Facility
NRC Inspection Report No. 50-29/99-03

Inspections were conducted to determine whether the decommissioning activities carried out at the Yankee (Rowe) facility were conducted safely and in accordance with NRC requirements. This report covers a three-month period of inspection. Areas reviewed included maintenance and surveillance, solid radioactive waste management and transportation of radioactive materials, radiological controls, annual environmental and effluent reports, and radiological surveys of site buildings for dismantlement. In general, there were effective programs for protecting the safety of workers and the public during dismantlement and decommissioning activities.

The licensee's maintenance and surveillance program is being implemented in a manner that ensures safety at the plant. No concerns were identified.

The licensee had provided good controls for radiation exposure and very good controls for radioactive materials and contamination, surveys and monitoring during decommissioning work activities. No violations or significant safety concerns were identified.

The licensee maintained excellent programs for solid radwaste management and transportation of radioactive materials. Audits and appraisals were performed to identify and correct minor problems in the programs. Training and qualifications of personnel involved with hazardous material handling and shipping programs were maintained as required. Shipment records were kept in good condition with extremely few omissions or errors. Most radioactive materials were sent to a processor, but some low level waste was sent directly for disposal to an appropriately licensed facility.

The licensee implemented and met the Technical Specification (TS)/Offsite Dose Calculation Manual (ODCM) requirements for sampling, analyzing, and assessing the projected dose to the public. The reporting for the Radiological Environmental Monitoring Program (REMP) and the radioactive liquid and gaseous effluent control programs also met the requirements.

Based on the review of the licensee's radiological survey program and survey records, the results of the NRC confirmatory surveys, and the licensee's dismantlement plans, the NRC does not object to the dismantlement of the safety injection (SI) and diesel generator (DG) buildings.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
REPORT DETAILS	1
O1 Summary Of Facility Operations	1
O2 Operations	1
O2.1 <u>Facility Tours</u>	1
O2.2 <u>Current Activities</u>	2
M1 Maintenance and Surveillance	2
R1 Plant Support - Radiological Protection and Chemistry (RP&C) Controls	3
R1.1 <u>Exposure Control</u>	3
R1.2 <u>Control of Radioactive Materials and Contamination, Surveys and Monitoring</u>	4
R2 Site Surveys	4
R3 Review of Annual Reports	5
R7 Solid Radwaste Management and Transportation of Radioactive Materials	6
MANAGEMENT MEETINGS	7
X1 Exit Meeting Summary	7
PARTIAL LIST OF PERSONS CONTACTED	8
LIST OF ACRONYMS	8
INSPECTION PROCEDURES USED	9
ITEMS OPENED, CLOSED, AND DISCUSSED	9

REPORT DETAILS

O1 Summary Of Facility Operations

Decommissioning activities at the Yankee Nuclear Power Station (NPS) continued under the approval granted through a letter from the NRC (reference correspondence, dated October 28, 1996, from Mr. Morton Fairtile to Mr. James Kay).

Yankee Atomic Energy Company (YAEC) submitted their License Termination Plan (LTP) to the NRC on May 15, 1997. However, on May 26, 1999, YAEC filed a motion with the NRC to withdraw the LTP. The licensee had completed surveys in the turbine building and the safe shutdown/diesel generator building so these buildings would be available for dismantlement. The licensee's plans were not fully developed, but some buildings may be dismantled in late 1999 and the materials would be released under existing NRC guidance for unrestricted use or sent to a vendor for radioactive waste processing and disposal.

O2 Operations

O2.1 Facility Tours

The inspectors toured most of the radiological controlled areas (RCAs) outside the vapor containment (VC) including the primary auxiliary building (PAB), the service building, the radioactive waste processing (compactor) building, the potentially contaminated area (PCA) storage building (a storage/staging area for potentially contaminated equipment and materials), the PCA warehouse attached to the radwaste processing building, and the spent fuel pool building (SFPB). The PAB and the compactor building had been completely cleared of equipment, conduit, and piping. Decontamination and removal of pipe penetrations and pipe chases were complete. Underground/underfloor piping was dug up and removed. Posting and labeling of radioactive materials continued to be excellent. All radiation areas (RAs) and high radiation areas (HRAs) were posted and barricaded as required. There were no locked HRAs in use at the site during the period of this inspection. Areas that were turned over for the final survey process were maintained through administrative controls to prevent re-contamination. The PCA warehouse had a significant number of storage boxes filled with mixed hazardous waste. The material was staged in the warehouse while the licensee was negotiating with a disposal facility to accept the hazardous waste. There were also numerous storage/transport containers (cargo-vans) staged in areas around the controlled area.

Areas inside the VC were also toured by the inspectors. Most of the piping and conduit had been removed in the VC. All RAs were posted as required. Housekeeping in contaminated areas was very good. Areas that had previously presented a challenge due to work conditions continued to show improvement since the last period of inspection. Contamination control was evident by the use of "step-off pads", personnel monitoring equipment (friskers), and contaminated area postings at the boundaries. No significant safety or NRC regulatory concerns were noted by the inspectors during tours of the facility.

O2.2 Current Activities

Most mechanical and structural components have been removed from areas in the VC. Workers continued the chipping and removal of concrete around the area where the reactor vessel was formerly located. Asbestos and PCB abatement on building surfaces continued in the loop areas of the VC.

Earlier in the decommissioning process, the licensee experienced delays in their decommissioning schedule due to the identification of PCBs in the paint on many metal surfaces. Many painted surfaces inside and outside the VC contained PCBs. Pieces of painted metal were temporarily stored in cargo vans, storage boxes, and barrels at the site while the licensee worked with the Environmental Protection Agency (EPA) regarding removal and disposal methods for the contaminated paint. The licensee was continuing to send shipments of the mixed hazardous waste for disposal at a licensed facility in Utah.

Other work planned for 1999 includes completion of the items mentioned above. Also, dives in the spent fuel pool are planned to remove the fuel up-ender and other miscellaneous equipment to make more room in the pool for spent fuel transfer casks. The final site survey project was discontinued due to the uncertainty regarding the specifics of a new LTP. The licensee had completed final surveys in the turbine building and the safe shutdown building so these buildings would be available for dismantlement. The licensee had not made any final decisions regarding when the buildings would be dismantled.

Occupational safety awareness was evident among the workers at the site. The use of protective equipment and safety processes were observed in all areas. Safety warning signs and barricades were used appropriately.

M1 Maintenance and Surveillance

a. Inspection Scope (62801)

The licensee's maintenance and surveillance program for structures, systems, and components (SSCs) was reviewed.

b. Observations and Findings

Due to the facility's current decommissioning status the number of on-going maintenance work orders and surveillances is limited; however, the inspector observed the performance of two surveillances. The surveillances were the bi-weekly checks of the security diesel generator batteries and the diesel fire pump batteries. The surveillance of the security diesel generator batteries was completed in accordance with licensee procedure DP-4583. The surveillance of the diesel fire pump batteries was completed in accordance with licensee procedure OP-4565. The workers who performed both surveillances worked as a team and demonstrated a high level of attention to detail. The inspector observed that the workers followed all the requisite safety precautions. During the surveillance on the diesel fire pump batteries, the inspector investigated the sound of running water. The inspector found that a discharge pipe approximately seven feet from the ground exiting the back of the fire pump house was leaking water. The inspector asked the

workers performing the surveillance if the discharge pipe normally leaked water. The workers were unable to answer the question. The question was raised further to supervision/management until it was determined that this discharge pipe was not supposed to be leaking. The licensee dispatched a shift operator who quickly determined that the source of the leak was from an improperly closed valve and the shift operator immediately corrected the situation. The licensee also initiated a condition report for this incident.

The inspector conducted a walk through of the SSCs associated with the spent fuel pool. The systems are in working order and emergency and/or back up systems are tested regularly.

The licensee's maintenance backlog was reviewed. There are only 55 open maintenance requests, of which there are none classified by the licensee as priority one (the highest classification) and only three classified as priority two. The licensee's prioritization system ensures that the plant systems are maintained in a safe and effective manner.

The inspector reviewed licensee procedure AP-0916. The licensee's list of SSCs covered by maintenance activities appears to be conservative. The procedure also defines which departments have responsibilities for the different systems.

c. Conclusions

The licensee's Maintenance and Surveillance program is being implemented in a manner that ensures safety at the plant. No concerns were identified.

R1 Plant Support - Radiological Protection and Chemistry (RP&C) Controls

R1.1 Exposure Control

a. Inspection Scope (83750)

The inspectors reviewed the controls for radiation exposure through observation of work activities, tours of the facility, interviews with personnel, and a review of licensee documents.

b. Observations and Findings

A significant portion of the radiological source term (not including spent fuel) was previously removed from the Yankee facility. Average area dose rates were typically under 5 millirem per hour in most areas. Three areas were appropriately maintained as HRAs with warning signs and barriers to prevent inadvertent entry. Administrative controls and planning were used to maintain workers radiation exposures As Low As Reasonably Achievable (ALARA). The total effective dose assigned to all site workers in the first half of 1999 (January 1 through June 30, 1999) was 1.4 person-rem.

c. Conclusions

The licensee provided good controls for radiation exposure. No violations of NRC regulations and no safety concerns were noted.

R1.2 Control of Radioactive Materials and Contamination, Surveys and Monitoring

a. Inspection Scope (83750)

The inspectors reviewed the controls for radioactive materials and contamination, surveys and monitoring through observation of work activities, tours of the facility, interviews with personnel and a review of licensee documents.

b. Observations and Findings

The inspectors verified that there was an adequate supply of radiation survey and monitoring equipment. All equipment checked by the inspectors was operable and within the current calibration period. Portal monitors and frisking instruments were located throughout the facility for use by workers as they left radioactive materials areas or contaminated areas. Current radiological surveys of various work locations were reviewed by the inspector. The surveys contained detailed information regarding current radiological dose rates and hazards in the work areas. Surveys were posted at the main control point for the RCA and also available at the VC control point. Appropriate licensee management personnel had reviewed the radiological surveys.

Radiological housekeeping was good throughout the plant with appropriate controls established to minimize the spread of contamination. Posting of radioactive material areas and labeling of radioactive materials was excellent. Continued good performance was noted by the inspectors as a result of major efforts by the licensee's radiation protection staff to keep items labeled.

c. Conclusions

The licensee provided very good controls for radioactive materials and contamination, surveys and monitoring during decommissioning work activities. No violations or significant safety concerns were identified.

R2 Site Surveys

a. Inspection Scope (83801)

The NRC inspectors reviewed licensee survey packages for the Safety Injection (SI) building and the diesel generator (DG) building. Radiological survey activities included confirmatory measurements of exposure rates on the interior surfaces of the buildings.

b. Observations and Findings

The inspectors reviewed the licensee's survey packages for the SI and DG buildings. During the review of the survey packages, the inspectors verified that some areas contained measured radiological contamination. The inspectors randomly selected areas on the interior surfaces of the buildings (floors, walls, and ceilings) for confirmatory radiological exposure rate measurements.

Random surface activity measurements performed by the inspectors in the SI and DG buildings generated results that indicated agreement with the licensee's survey measurements. These measurements were a continuation of side-by-side measurements taken during previous inspections that were also in agreement. Independent scan measurements for beta and gamma surface activity indicated good agreement with the licensee's results.

The licensee planned to dismantle the SI and DG buildings in the near future. Building materials with measurable radiological contamination would be decontaminated or sent to a proper disposal facility as radwaste. Other materials with no measurable contamination would be sent to a normal landfill or released for unrestricted use. The poured concrete portion of the building would be kept at the site for potential re-use (filling holes) left from building basements.

c. Conclusions

Based on the review of the licensee's radiological survey program and survey records, the results of the NRC confirmatory surveys, and the licensee's dismantlement plans, the NRC does not object to the dismantlement of the SI and DG buildings.

R3 Review of Annual Reports

a. Inspection Scope

The inspector reviewed the licensee's annual reports to the NRC for sampling, analyzing and assessing the projected dose to the public.

b. Observations and Findings

The 1998 Annual Radiological Environmental Operating Report provided measurement results of the Radiological Environmental Monitoring Program (REMP) samples around the Yankee Rowe site and met the Technical Specification/Offsite Dose Calculation Manual (TS/ODCM) reporting requirements. The report included results of the environmental monitoring program, land use census, and interlaboratory comparison program, as required. Over 400 REMP samples (including TLDs) were collected and analyzed in 1998. There were no anomalous measurements, omissions or adverse trends in the report.

The second half of the 1998 Semiannual Radiological Effluent Report provided data indicating total released radioactivity for liquid and gaseous effluents, as well as waste disposals. There were no anomalous measurements, omissions or adverse trends in the report. The 1998 assessment of the projected maximum individual doses resulting from routine radioactive

airborne and liquid effluents was included, as required. The 1998 projected doses to the public were well below the TS limits.

c. Conclusion

The licensee implemented and met the TS/ODCM requirements for sampling, analyzing, and assessing the projected dose to the public. Reporting for the REMP and for the radioactive liquid and gaseous effluent control programs also met the requirements.

R7 Solid Radwaste Management and Transportation of Radioactive Materials

a. Inspection Scope (86750)

The inspector reviewed the licensee's programs for solid radioactive waste (radwaste) management and transportation of radioactive materials through observation of work activities, tours of the facility, interviews with personnel and a review of licensee documents.

b. Observations and Findings

The licensee had performed periodic audits of the programs for solid radwaste management and transportation of radioactive materials. The inspector reviewed the latest audit that was performed in August 1998. The auditors determined that the programs were effective and met the requirements. No deficiencies were identified, but some minor observations were noted by the auditors. The inspector verified that the licensee had implemented corrective actions for the observations. The next audit of the programs was scheduled for November 1999.

With the exception of some personnel changes, there were no major changes to the solid radwaste and transportation programs. The inspector reviewed the records for training and qualifications of personnel involved in the program. A random selection of personnel indicated that new personnel were provided initial training (hazardous material/radwaste handling) and other personnel were provided re-qualification training. The qualifications of personnel were maintained in a matrix and kept on file in the facility so supervision could verify the workers were qualified prior to assignment of work. The persons certifying the radioactive material shipments were qualified through attendance at a training session every three years.

The implementation of the solid radwaste program was performed by sending most radioactive waste to a vendor for processing (volume reduction, decontamination, sorting, etc.) prior to disposal. Some limited sorting and decontamination were performed on the site, and surveys were performed to verify that the material for disposal did not have any measurable radioactive contamination.

The program for shipping of low level radwaste for disposal and transportation of radioactive material was maintained by the licensee. Approximately 150 packages/truckloads were prepared and shipped in 1999 (up to October 25, 1999). Records of radiological surveys and shipments were kept in excellent condition with very good attention to detail. The inspector observed the licensee's staff as they prepared a load of radioactive waste for shipment. No deficiencies were identified by the inspector.

c. Conclusions

The licensee maintained excellent programs for solid radwaste management and transportation of radioactive materials. Audits and appraisals were performed to identify and correct minor problems in the programs. Training and qualifications of personnel involved with hazardous material handling and shipping programs were maintained as required. Shipment records were kept in good condition with extremely few omissions or errors. Most radioactive materials were sent to a processor, but some low level waste was sent directly for disposal to an appropriately licensed facility.

MANAGEMENT MEETINGS

X1 Exit Meeting Summary

The inspectors met with the licensee representatives denoted below at the conclusion of the on-site inspection on September 29, 1999. The inspectors summarized the purpose, scope, and findings of the inspection. The licensee representatives acknowledged the inspection findings.

PARTIAL LIST OF PERSONS CONTACTED

- M. Atkins, Licensing
- * G. Babineau, Support
- * W. Blackadar, Radiation Protection Engineer
- * C. Ellis, Radiological Engineer
- * R. Grippardi, Quality Assurance Supervisor
- * E. Heath, Radiation Protection and Chemistry Manager
- L. Johnson, Site Surveys
- S. Litchfield, Health and Safety Supervisor
- S. Mullet, Radiation Protection Technician
- * D. Reid, Site Manager
- F. Williams, Plant Superintendent

* Denotes those individuals participating in the exit briefing held on September 29, 1999

LIST OF ACRONYMS

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DG	Diesel Generator
EPA	Environmental Protection Agency
HRA	High Radiation Area
LTP	License Termination Plan
NPS	Nuclear Power Station
ODCM	Offsite Dose Calculation Manual
PAB	Primary Auxiliary Building
PCA	Potentially Contaminated Area
QA	Quality Assurance
RA	Radiation Area
RCA	Radiological Controlled Area
REMP	Radiological Environmental Monitoring Program
RP&C	Radiological Protection & Chemistry
SFPB	Spent Fuel Pool Building
SI	Safety Injection
SSC	Structures, System, and Components
TS	Technical Specifications
VC	Vapor Containment
YAEC	Yankee Atomic Energy Company

INSPECTION PROCEDURES USED

IP 62801: Maintenance and Surveillance
IP 83750: Occupational Radiation Exposure
IP 84750: Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 86750: Solid Radioactive Waste Management and Transportation of Radioactive Materials

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NONE

Closed

NONE

Discussed

NONE