



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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August 12, 2002

Mr. Kenneth Heider, Vice President
Operations and Decommissioning
Yankee Atomic Electric Company
49 Yankee Road
Rowe, Massachusetts 01367

SUBJECT: NRC INSPECTION REPORT NO. 50-029/2002-001

Dear Mr. Heider:

On July 7, 2002, the NRC completed an inspection at your nuclear reactor facility in Rowe, Massachusetts which covered an inspection period that began on February 16, 2002. The findings of the inspection were discussed with Mr. Brian Wood and members of his staff on July 8, 2002. The enclosed report presents the results of that inspection.

Your test program to demonstrate your capability to safely load spent fuel from the spent fuel pool into a dry cask storage system and transfer the loaded canister to the ISFSI was inspected during this twenty-week inspection period. In addition, the transfer of the first spent fuel from the spent fuel pool to the ISFSI using the NAC-MPC dry cask system was observed. The programs were considered to be appropriately implemented and no safety concerns were identified. Effective programs for protecting the safety of workers and the public during fuel handling activities and transfer operations from the spent fuel pool to the ISFSI were noted.

In accordance with Section 2.790 of the NRC's "Rules and Practices," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and its enclosure will be placed in the NRC Public Document Room (PDR) and will be accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html>. No reply to this letter is required.

Sincerely,

/RA Francis Costello Acting for/

Ronald R. Bellamy, Chief
Decommissioning and Laboratory Branch
Division of Nuclear Material Safety

Docket No. 05000029
License No. DPR-03

Mr. K. Heider

2

Enclosure: NRC Region I Inspection Report No. 50-029/2002-001

cc w/encl:

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B. Woods, Site Manager

R. Hallisey, Department of Public Health, Commonwealth of Massachusetts

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T. Rapone, Massachusetts Executive Office of Public Safety

L. Stevens, New England Conference of Public Utilities Commissioners, Inc.

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Citizens Awareness Network

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Mr. K. Heider

3

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No. 05000029

License No. DPR-03

Report No. 50-029/2002-001

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

Facility Name: Yankee Nuclear Power Station

Location: Rowe, Massachusetts

Dates: February 16, 2002 to July 7, 2002

Inspectors: John Wray, Health Physicist
E. Harold Gray, Senior Reactor Inspector
J. Pearson, SFPO

Approved by: Ronald R. Bellamy, Chief
Decommissioning and Laboratory Branch
Division of Nuclear Materials Safety, RI

EXECUTIVE SUMMARY

Yankee Facility NRC Inspection Report No. 50-029/2002-001

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 twenty week period of inspection. Areas reviewed included the preoperational testing program (NRC Dry Run) for safely loading spent fuel from the spent fuel pool into a dry cask storage system (NAC-MPC) and transferring the spent fuel to the Independent Spent Fuel Storage Installation (ISFSI). The first loading and transfer of spent reactor fuel was observed. The inspectors noted good development and performance of the preoperational test program and observed the safe transfer of spent fuel to the ISFSI.

Preoperational Test Program (NRC Dry Run)

Based on direct observation and review of the preoperational test procedure, the inspectors determined that the licensee is capable of safely loading spent fuel from the SFP into the approved NAC-MPC and VCC and transferring the loaded canister in the VCC to the ISFSI. Procedures and administrative controls have been established to ensure compliance with C of C requirements. The inspectors also determined by observation of equipment and video documentation that the licensee is capable of retrieving spent fuel from the ISFSI. No safety concerns were identified.

First Fuel Transfer to ISFSI

The licensee loaded spent fuel from the SFP into a NAC-MPC canister, transferred the canister into a VCC, and transferred the VCC to the ISFSI in a safe and compliant manner. The licensee conducted good investigations when abnormal conditions were encountered which resulted in technically sound solutions and program enhancements.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
TABLE OF CONTENTS	iii
REPORT DETAILS	1
<u>Summary of Facility Activities</u>	1
<u>I. Decommissioning Operations</u>	1
O1 Conduct of Operations	1
O1.1 <u>Preoperational Spent Fuel Transfer Test Program (NRC Dry Run)</u>	1
O1.2 <u>First Fuel Transfer to ISFSI</u>	3
III. MANAGEMENT MEETINGS	6
X1 Exit Meeting Summary	6
PARTIAL LIST OF PERSONS CONTACTED	7
LIST OF ACRONYMS	8
INSPECTION PROCEDURES USED	8
ITEMS OPENED, CLOSED, AND DISCUSSED	8

REPORT DETAILS

Summary of Facility Activities

Decommissioning activities at the Yankee Rowe Nuclear Power Station 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).

I. Decommissioning Operations

O1 Conduct of Operations

O1.1 Preoperational Spent Fuel Transfer Test Program (NRC Dry Run)

a. Inspection Scope (60854)

The inspectors reviewed the licensee's preoperational test program and observed activities in progress to determine whether the licensee and contractor organizations were capable of safely loading spent nuclear fuel from the SFP into the NAC Multi-Purpose Canister (NAC-MPC) and transferring the loaded canister to the ISFSI. The preoperational test program was examined to ensure that all conditions and requirements of the C of C for the NAC-MPC were being met and that the licensee was capable of safely retrieving spent fuel from an ISFSI and transferring it either to the SFP or a separate canister.

b. Observations

The inspectors reviewed licensee procedure 13200-Op-2969, "Yankee Rowe Fuel Load Internal Dry Run" and observed the implementation of the attachments to the procedure, which tested the site's capability to safely load spent fuel from the SFP into the NAC-MPC and transfer the loaded canister to the ISFSI. The procedure and work packages were well developed and complete. The licensee held pre-job briefings prior to each segment of the procedure, and these prejob meetings were conducted in a professional manner and discussed the necessary items to enhance safety in the completion of the task (such as the need for three way communication, pre-staging of equipment, and team work among work parties).

The inspectors reviewed welder qualification documentation and observed welding practices in the field. Training records for welders were adequate and up to date. Only qualified welders were used on the project. The inspectors interviewed the welders and concluded that they were knowledgeable in the requirements for the task. Welding of the shield lid and the structural lid was completed using a remote welding machine to reduce the time welders needed to be in a high dose field. Welding of the vent and drain ports were completed by hand and used temporary shielding to reduce the worker's exposure. Most of the time spent in the radiation field was by the liquid penetrant test (PT) quality assurance examiners. The inspector stated that ways to reduce the exposure of the PT examiners should be explored and would be reviewed during future fuel transfers.

The inspectors reviewed fuel move logs and observed the loading of a dummy fuel element into the Transportable Storage Canister (TSC). The licensee demonstrated that fuel assemblies could be taken from the SFP racks and placed into the TSC with precision. The Certified Fuel Handlers (CFH) were trained and qualified, based on a review of training documentation and

observation of their activities on the refuel floor. Video tapes of the transfers, including identification numbers of the spent fuel assemblies, were available and reviewed by the inspector.

Operation of the crane to safely lift and transfer heavy loads were observed by the inspectors, including the load test of the yard crane to 125 percent of expected load. Lifts of the Transfer Cask (TFR) containing a loaded TSC from the SFP to the Fuel Transfer Enclosure (FTE) and from the FTE to the Vertical Concrete Cask (VCC) were observed. The licensee exercised good safety practices during these lifts and completed them in accordance with approved procedures.

The inspectors observed the successful transfer of the VCC to the ISFSI and the off loading of the VCC onto the storage pad. Proper controls were in place during the transfer of the TSC from the TFR into the VCC and during the truck travel route to the ISFSI. These controls included health physics coverage and appropriate security oversight. Good communication and team work between departments was observed.

The inspector reviewed the health physics program for the project and observed coverage of all the radiologically significant work which will occur. The inspector noted that a number of as low as reasonably achievable (ALARA) enhancements were not ready for use during the dry run. For instance, water walls for shielding areas in the FTE and cameras for indirect platform observations were not in place. The licensee stated that all required ALARA enhancements will be in place before the first fuel transfer commences. The inspector stated that health physics controls will be examined during the first transfer.

During this inspection, the inspector reviewed the 10 CFR 72.212 report comparing site activities to license requirements and a random sample of 10 CFR 72.48 evaluations. The licensee had not finalized the 10 CFR 72.212 report at the time of the inspection. However, the inspector stated that the report appeared to be complete, comprehensive, and thorough. The licensee stated that the report would be approved prior to the first fuel movement. No significant issues were raised during review of the 10 CFR 72.48 documentation. The inspector noted that a prior review by NAC Quality Assurance (QA) and Yankee QA Oversight was thorough and detailed. Findings from these audits were addressed and closed prior to NRC review.

The inspectors looked at construction records for the VCCs. No concerns were identified. The VCCs were constructed in accordance with C of C requirements. During a previous inspection, records for construction of the TSCs were reviewed. Based on our review and the audits conducted by the QA oversight organization of the receipt and manufacture of the TSCs, no concerns were identified.

During this inspection, records for slings and chainfalls used to lift heavy loads and torque wrenches were examined. The slings and chainfalls appeared to be appropriately tested and controlled. Torque wrenches were in calibration and adequately maintained.

A representative sample of personnel training and qualification records were reviewed. Qualification and training of personnel whose work practices were observed in the field were examined. Workers performing health physics coverage, fuel loading, heavy lifts, PT examinations, welding, and QA and management oversight were evaluated. The inspector

observed a training class for VCC movement and observed the hands on field practice for VCC movement. No safety concerns were identified in this area.

The Security program was reviewed during this inspection, including enhancements enacted for the ISFSI. The inspector stated that adequate measures appear to be in place to protect the fuel during its transfer from the SFP and on the ISFSI pad. No safety concerns were identified.

The inspector reviewed the health physics program to determine if adequate controls were established for high radiation exposure and high contamination jobs. Appropriate procedures and training had been developed for external exposure control, internal exposure control, air sampling, hot particle control, radiation and contamination surveys, instrumentation, ALARA controls, alpha contamination control, neutron surveys, and engineering controls. The inspector reviewed procedures for various segments of the health physics program and identified no significant concerns. The inspector stated that ALARA estimates for the transfer and ALARA enhancements should be completed prior to first fuel movement.

c. Conclusions

Based on direct observation and review of the preoperational test procedure, the inspectors determined that the licensee is capable of safely loading spent fuel from the SFP into the approved NAC-MPC and VCC and transferring the loaded canister in the VCC to the ISFSI. Procedures and administrative controls have been established to ensure compliance with C of C requirements. The inspectors also determined by observation of equipment and video documentation that the licensee is capable of retrieving spent fuel from the ISFSI. No safety concerns were identified.

O1.2 First Fuel Transfer to ISFSI

a. Inspection Scope (60855)

The inspector observed and evaluated licensee activities during the first fuel movement from the SFP to the ISFSI. Compliance with the C of C, Safety Analysis Report, Technical Specifications, licensee procedures, and 10 CFR 72 was evaluated.

b. Observations

Between May 30, 2002, and June 26, 2002, the inspector observed activities associated with loading TSC #1 with spent fuel from the SFP and the transfer of the canister in the VCC to the ISFSI. The inspector verified that an approved 10 CFR 72.212 was completed prior to initiation of fuel transfer activities. The licensee maintained a list of items needed to be completed before fuel movement which provided the necessary administrative controls to track necessary items. No safety concerns were identified regarding placing the TFR in the SFP and loading spent fuel assemblies into the TSC. The inspector observed fuel movement and reviewed move sheets to ensure designated fuel assemblies were positioned properly in the canister. Adequate procedure controls were established to conduct this evolution. Proper management and QA oversight was observed in the field.

During the lift of the loaded TSC from the SFP and transfer to the FTE, the yard crane malfunctioned and the load was put in a safe configuration. The licensee initiated a condition

report and contacted the crane vendor. Although it appeared that the work could have continued, the licensee stopped work pending resolution of the crane discrepancy. The investigation discovered that the acceleration time limit for the main hoist was incorrectly set during installation and that no passcode controls were established to safeguard the setting. During the lift of the loaded TFR and crane movements required to safely place it in the FTE, an instantaneous current draw was created that caused a trip of the control power circuit. The licensee modified the logic setting and provided enhanced passcode protection to prevent recurrence of this problem. The fuel was maintained in a safe condition during the investigation and subsequent corrective testing. The crane fault was determined to be a unique condition and could not have been expected to have been discovered during the crane load test program.

The inspector remotely observed welding of the shield lid to the TSC. Good ALARA controls were used including remote dosimetry, shadow shields on the platform, and water shield walls. During the vacuum drying evolution, the licensee could not maintain the required criteria. The inspector verified that the proper contingency actions were taken, which included air cooling for 24 hours. The licensee initiated a condition report and investigation. During removal of the drain tube, required prior to initiating air cooling, the internals of the drain valve were found to be misconfigured. A rubber o-ring was mispositioned and had become lodged in the spring, preventing a tight fit necessary to draw the required vacuum. The licensee replaced the valve and successfully dried the TSC. The spent fuel was maintained in a safe condition through the initial drying process and the investigation. The licensee immediately investigated the other valves onsite which were to be used in future TSC operations, and discovered that approximately 50% of those valves inspected had similar o-ring problems. The valve internals were correctly aligned and the licensee informed other users of the NAC-MPC Cask Storage System. No safety concerns were identified.

The inspector observed leak testing of the canister, welding of the structural lid, and liquid PT examinations of the welds. Section 9.2.3 of the NAC Specification 455-S-21 requires video or photographic records be maintained of the results of the PT examinations, including all relevant indications, as a supplemental record. The inspector verified that video of the shield lid PTs were taken, but no video record of the PT of the drain and vent ports was available. Re-examination of the two welds was performed to ensure strict compliance with the approved procedure. The licensee entered this discrepancy into their condition report tracking system and contacted the vendor for clarification of the requirements. The NRC Spent Fuel Project Office (SFPO) was also consulted and it was determined that the applicable code only required video records of the outer structural lid welds. The licensee revised its procedure to reflect this guidance. No safety concerns were identified.

The inspector observed the transfer of the TSC into the VCC which was positioned on the Heavy Haul Trailer (HHT) in the alleyway between the SFP building and the FTE. Required seismic constraints were attached in accordance with procedures. Appropriate access controls were employed by health physic and security personnel to limit the number of workers. The inspector noted that surveys of the floor panels of the TFR indicated contamination greater than the C of C limit of 10000 dpm per 100 square centimeters. The licensee immediately entered the contingency section of their procedure and decontaminated the floor surfaces. The inspector observed the surveillance and decontamination activities and identified no regulatory concerns. The licensee stated that they will evaluate the possibility of contamination leaching

from the TFR after extended exposure to SFP water, as was the case with TSC #1 due to the lengthy time required to resolve the crane control power problem.

Radiation surveys were performed around the VCC once the TSC was loaded. Dose rates at the entry and exit ports were obtained and compared to the NAC-MPC Technical Specification average dose rate limits of 100 mrem per hour. The average dose rate of the eight air inlet and outlet vent locations was 64 mrem per hour. However, the average of the four air inlet vent locations was 112 mrem per hour with the highest exposure rate of 135 mrem per hour. The inspector reviewed the dose rate information with licensee representatives and SFPO personnel. Although the dose rates were greater than expected, no regulatory or procedure limits were exceeded. The licensee stated that they will evaluate ways to orient the VCC on the ISFSI pad to ensure compliance with 10CFR20 exposure rate limits for members of the public. The licensee stated that air vent shields will be installed to reduce exposure rates. The inspector reviewed a 10 CFR 72.48 evaluation and discussed the design change with cognizant SFPO personnel. No safety concerns were identified.

The licensee investigated why the dose rates were asymmetrical and determined that the TSC was not centered in the VCC. Safety evaluations performed by SFPO for design controls such as temperature and criticality did not include a non-centered TSC. The NRC reviewed a 10 CFR 72.48 evaluation in which the licensee concluded that a non-centered TSC is safe and acceptable as long as the TSC does not touch any inner surface of the VCC. SFPO representatives discussed this issue with the vendor and determined that a condition where a TSC is loaded into a VCC and is not in direct contact with the inner wall of the VCC is acceptable. The licensee revised its loading procedure to control the position of the TSC in the VCC. The inspector had no further questions. No safety concerns were identified.

c. Conclusions

The licensee loaded spent fuel from the SFP into a NAC-MPC canister, transferred the canister into a VCC, and transferred the VCC to the ISFSI in a safe and compliant manner. The licensee conducted good investigations when abnormal conditions were encountered which resulted in technically sound solutions and program enhancements.

III. MANAGEMENT MEETINGS

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management periodically during the inspection, and during an exit meeting with Mr. B. Wood and others on July 8, 2002. The licensee acknowledged the findings presented by the inspectors. The inspector reviewed with the licensee whether any materials examined during the inspection should be considered proprietary. While proprietary information was reviewed during the inspection, no proprietary information is contained in this report.

PARTIAL LIST OF PERSONS CONTACTED

*G. Babineau, Safety Oversight Manager
W. Blackadar, DE&S, Radiation Protection Oversight
R. Dee, NAC, Scheduler
S. Garvie, Security Supervisor
*E. Heath, Asst. Safety Oversight Manager
K. Heider, Vice President, YAEC
*F. Helin, NAC, Site Project Manager
B. Holmgren, Dry Cask Storage Oversight Manager
*J. Kay, Manager of Regulatory Affairs
C. Lloyd, Lead QA Engineer
K. LaDuke, QA Auditor
D.R. LeFranois, NAC, Site Engineering Manager
J. McCumber, DE&S, YAEC Oversight
T. Osterhoudt, NAC, Operations Manager
*C. Palmer, NAC, Health Physics Manager
N. Rademacher, NAC, Site QA Manager
J. Rollins, NAC, Licensing Manager
B. Sklar, NAC, Plant Services Manager
L. Tremblay, NAC, Licensing & Contracts manager
M. Vandale, Radwaste Supervisor, DE&S
F. Williams, Plant Superintendent
M. Williams, Framatone, Fuel Handling Operations Manager
*B. Wood, Site Manager

* These individuals participated in the exit briefing held on July 8, 2002

LIST OF ACRONYMS

ALARA	As Low as Reasonably Achievable
CFH	Certified Fuel Handler
CFR	Code of Federal Regulations
C of C	Certificate of Compliance
FTE	Fuel Transfer Enclosure
HHT	Heavy Haul Trailer
ISFSI	Independent Spent Fuel Storage Installation
NAC-MPC	NAC Multi-Purpose Cask Storage System
NRR	Nuclear Reactor Regulation
PDR	Public Document Room
PT	Liquid Penetrant Test
QA	Quality Assurance
SFP	Spent Fuel Pool
SFPO	Spent Fuel Project Office
TFR	Transfer Cask
TSC	Transportable Storage canister
FTE	Fuel Transfer Enclosure
VCC	Vertical Concrete Cask

INSPECTION PROCEDURES USED

IP 60854	Preoperational Testing of an ISFSI
IP 60855	Operation of an ISFSI

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NONE

Closed

NONE

Discussed

NONE