U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

50-29/81-03-31
50-29/81-02-27
50-29/81-01-01
50-29/79-04-11

Report No. 50-29/81-05

Docket No. 50-29

License No. DPR - 3 Priority -- Category C

Licensee: Yankee Atomic Electric Company

1671 Worcester Road

Framingham, Massachusetts 01701

Facility Name: Yankee Nuclear Power Station (Yankee Rowe)

Inspection at: Rowe, Massachusetts

Inspection conducted: March 1 - 31, 1981

Inspectors: T. Foley 4/28/81
T. Foley, Resident Inspector date signed

S. D. Reynolds 5/5/81
S. D. Reynolds, Reactor Inspector date signed

A. A. Varela 5/12/81
A. A. Varela, Reactor Inspector date signed

Approved by: Robert M. Gallo 5/12/81
R. Gallo, Chief, RPS No. 1A date signed
Div. of Resident and Project Insp.

Inspection Summary:

Inspection on March 1 - 31, 1981 (Report No. 50-29/81-05)
Areas Inspected: Routine onsite inspection by the resident and region based inspectors of plant operations including tours of the facility; log and record reviews; operational safety verification; followup of selected IE Bulletins; review of Design Change Modifications; review of TMI Action Plan requirements (TI 2515/42) and observation of Physical Security. The inspection involved 75 inspector hours by the resident NRC inspector and two region based inspectors.

Results: No items of noncompliance were identified in six areas; one item of noncompliance was identified in one area, failure to establish procedures pursuant to 10 CFR 50, Appendix B, Criterion V, (Paragraph 8.a.(3)).

DETAILS

1. Persons Contacted

H. Autio, Plant Superintendent
W. Billings, Chemistry Supervisor
T. Danek, Senior Advisor - Operations
L. French, Technical Assistant
T. Henderson, Plant Reactor Engineer
F. Hicks, Training Coordinator
J. Hoffman, Manager Engineering Group NSD
K. Jurentkuff, Assistant Operations Supervisor
J. Kay, Senior Engineer NSD
L. Laffond, Technical Assistant
W. McGee, Manager of Public Information
F. McWilliams, Engineering Assistant
R. Mitchell, Technical Assistant
L. Reed, Operational Quality Assurance Coordinator
N. St. Laurent, Assistant Plant Superintendent
J. Staub, Technical Assistant to Plant Superintendent
J. Trejo, Health Physicist Supervisor
D. Vassar, Operations Supervisor

Mercury Company Personnel

A. Duda, Construction Superintendent
J. Duguay, QA Supervisor
J. Leh, Construction Superintendent
M. Parle, QC Technician
M. Trombley, Project Manager

Other Personnel

C. McGee, Assistant Administrator Environmental Department; North Adams Regional Hospital

The inspector also interviewed other licensee employees during the inspection, including members of the Operations, Health Physics, Instrument and Control Maintenance, Reactor Engineering, Security and General Office staffs.

2. Licensee Action on Previous Inspection Items

(closed) Item of Noncompliance (29/78-21-03): The inspector has previously reviewed a sampling of calibration, inventory and operational check records, in addition to verifying calibration dates on personnel dosimetry and portable survey instrumentation in emergency kits, including the emergency facilities at the North Adams Regional Hospital. The inspector noted no inadequacies with respect to the calibration dates, however, questioned the licensee in regard to the method by which the licensee kept track of all personnel dosimetry calibration due dates and inventory of the personnel dosimeters. The licensee has recently revised the method of tracking calibration due dates and dosimetry inventory such that all dosimeters are now listed on a computer printout and this will be used to inventory and

as a list for keeping track of calibration due dates for all dosimetry. This item is closed.

3. Shift Logs and Operating Records

a. The inspector reviewed the following plant procedures to determine the licensee established administrative requirements in this area in preparation for review of various logs and records.

-- AP-0001, Plant Procedures and Instructions, Revision 8

-- AP-2002, Operations Department Personnel Shift Relief, Revision 10

-- AP-2009, Control Room Area Limits for Control Room Operators

-- AP-2010, Control Room Access During Accidents and Operations Transients, Original

-- AP-0017, Switching and Tagging of Plant Equipment, Revision 6

-- AP-0018, Bypass of Safety Function and Jumper Control Log, Revision 8

-- AP-2007, Maintenance of Operations Department Logs, Revision 7

-- AP-0216, Housekeeping and Cleanliness Control, Revision 2

-- AP-0042, Housekeeping for Maintenance and Modifications, Revision 1

-- Rules Governing In-Plant Tagging Procedures Local Control Rules, Revision 3

The above procedures, Technical Specifications, ANSI N18.7-1972 "Quality Assurance Requirements for Nuclear Power Plants" and 10 CFR 50.59 were used by the inspector to determine the acceptability of the logs and records reviewed.

b. Shift logs and operating records were reviewed to verify that:

-- Control Room logs and shift surveillance sheets are properly completed and that selected Technical Specification limits were met.

-- Control Room log entries involving abnormal conditions provide sufficient detail to communicate equipment status, lockout status, correction, and restoration.

-- Log book reviews are being conducted by the staff.

-- Operating and Special Orders do not conflict with Technical Specification requirements.

-- Jumper (Bypass) log does not contain bypassing discrepancies with Technical Specification requirements and that jumpers are properly approved and installed.

c. The inspector reviewed, on a sampling basis, the following logs and records for the period March 1 to March 31, 1981.

-- Switching and Tagging Log

-- Maintenance Request Log

-- Bypass of Safety Function and Jumper Control Log

-- Operating Log

-- Rowe Station Log Sheets

-- Primary A.O. Log Sheets

-- Shift Relief Checklist

-- Primary Chemistry Log

-- Secondary Chemistry Log

-- Radioactive Gaseous Release Permits

-- Radioactive Liquid Release Permits

No inadequacies were identified.

4. Plant Tour

The inspector conducted a tour of accessible areas of the plant including the Primary Auxiliary Building, Turbine Building, Safety Injection Building, Switchgear Room, Diesel Rooms, Control Room, Spent Fuel Building, and HP Control Point Areas. Details and findings are noted below:

a. Monitoring Instrumentation and Annunciators

On several occasions during the inspection, control board annunciators were checked for abnormal alarms. The following monitoring instrumentation was checked to verify operability and where applicable, values indicated were verified to be in accordance with Technical Specification requirements:

-- Pressurizer pressure, level and temperature

-- charging flow path

-- RCS temperature

-- SI tank level

-- PWST and DWST levels

-- Batteries 1, 2 and 3 bus voltage

-- Megawatt electrical output

-- Primary Vent Stack radiation monitors

-- Containment air particulate radiation monitor

No abnormal annunciators were energized. No inadequacies were identified.

b. Radiological Controls

Radiation controls established by the licensee, including posting of radiation areas, radiological surveys, condition of step-off pads, and disposal of protective clothing were observed for conformance with the requirements of 10 CFR 20 and OP-8100, "Establishing and Posting Controlled Areas," and OP-8101, "Plant Radiological Surveys."

No inadequacies were identified.

c. Plant Housekeeping

Plant housekeeping conditions, including general cleanliness and storage of materials to prevent fire hazards were observed in all areas toured. Housekeeping and cleanliness were acceptable.

No inadequacies were identified.

d. Fluid Leaks and Piping Vibrations

Systems and equipment in all areas toured were observed for the existence of fluid leaks and abnormal piping vibration.

No inadequacies were identified.

e. Pipe Hangers/Seismic Restraints

Pipe hangers and restraints installed on previous piping systems through the plant were observed for proper installation and tension.

No inadequacies were identified.

f. Control Room Manning/Shift Turnover

Control Room manning was reviewed for conformance with the requirements of 10 CFR 50.54 (k) and Technical Specifications.

The inspector verified, several times during the inspection, that appropriate licensed operators were on shift. Manning requirements were met at all times. Several shift turnovers were observed during the course of the inspection. All were noted to be thorough and orderly.

No inadequacies were identified.

5. Surveillance Testing

The inspector observed portions of the following surveillance tests to verify that testing was performed in accordance with technically adequate procedures, that results were in conformance with Technical Specifications

and procedure requirements, that the results were reviewed by personnel other than the individual directing the test, and that any deficiencies identified during the testing were porperly reviewed and resolved by management personnel. The following surveillances were reviewed by the inspector:

-- OP-4204, Monthly Test or Special Test Operations of the Safety Injection Pumps

-- OP-4217, Test of No. 2 Charging Pump for Surveillance Operablilty Check

-- OP-4207, Surveillance of the Station Power System and Emergency Diesel Generators

-- OP-4210, Fire System Weekly Operability Check

No inadequacies were identified.

6. IE Bulletin Followup

For the IE Bulletins listed below, the inspector verified the following: that the written response was within the time period stated in the bulletin, that the written response included the information required to be reported, that the written response included adequate corrective action commitments based on information presented in the bulletin and the licensee's response, that licensee management forwarded copies of the written response to the appropriate onsite management representatives, that information discussed in the licensee's written response was accurate, and that corrective action taken by the licensee was as described in the written response. The following bulletins were reviewed:

-- IEB 79-06, A and C. Three Mile Island Incident.

This bulletin was addressed in inspection reports 50-29/79-05, 50-29/79-10 and the items left open requiring followup, were addressed in inspection report 50-29/80-07. The inspector additionally reviewed the Safety Evaluation Report for Yankee Rowe responses to IE Bulletins 79-06A and 79-06A revision 1 which states that the appropriate actions have been taken to meet the intent of the bulletin. The SER also requires IE inspection followup. These follow up actions have been completed and are documented in inspection report 50-29/80-07 as Small Break LOCA actions. The unresolved items identified during the review of the Small Break LOCA procedures have been resolved in inspection report 50-29/80-16.

-- IEB 81-01 Surveillance of Mechanical Snubbers

The inspector reviewed the licensee's response to this bulletin dated February 27, 1981, and discussed the adequacy of the response with the NRC Regional Staff and NRC Headquarters Staff personnel cognizant of this bulletin. It was determined thru these discussions that the licensee's commitments made in the response were not entirely adequate to satisfy the concerns addressed in the bulletin.

The inspector informed the licensee management on March 30, 1981 that the minimum acceptable response to the bulletin, that would provide adequate assurance to the NRC, that the licensee's snubbers were operable, would be to perform the stroke test identified in Item 1.a of the bulletin on all snubbers installed on safety-related systems except those which are considered inaccessible and would require an excessive man REM exposure. The inspector will observe the testing and/or test results of the action required by the bulletin during the refueling outage commencing in May 1981.

7. Operational Safety Verification

A detailed review of the High Pressure Safety Injection system was conducted to verify that the system was properly aligned and fully operational in the standby mode. This review was performed utilizing system Flow Diagram 9699-FM-83A, OP-4203 Monthly Valve Check, and OP-2652 Preparation of the Emergency Core Cooling System for Normal Operation. Review of the above system include the following:

-- verification that each accessible valve in the flow path was in the correct position by either visual observation of the valve or remote position indication.

-- verification that power supplies and breakers were properly aligned for components that are required to actuate upon receipt of a safety injection signal.

-- visual inspection of major components for leakage, proper lubrication, cooling water supply, general condition and other factors that might prevent fulfillemnt of their functional requirements.

-- verification by observation that the instrumentation essential for system actuation and performance was operational.

The inspector identified to inadequacies.

8. Design Change Modifications

a. Reactor Support Structure Modification

(1) Modification Description

The inspector reviewed and evaluated the Quality Assurance aspects of the Reactor Support Structure (RSS) modification in progress, and the adequacy of the procedures written to accomplish the modification.

The modification is designed to increase the seismic resistance capabilities of the RSS. This modification resulted from a seismic evaluation of the support structure at Yankee Rowe, identified in Yankee Atomic letter to the NRC dated October 15, 1980 regarding the Seismic Program at Yankee Rowe. This evaluation identified that the column connection to the foundation base plate and anchor

bolt system was deficient in both moment and shear resistance.

Earthquake Engineering Systems Incorporated designed strengthening collars for this connection. These collars are to be installed at the existing foundation. This modification will provide additional resistance to the seismically induced moments and shears, and increase the ductility of that part of the structure.

(2) Inspection Coverage

The inspector reviewed the following documents:

-- The licensee's approved contract specification number YR 80-24-SI, revision #5 for modification of the Yankee Rowe Reactor Support Structure Column Bases.

-- Inspection of work performed and review of NRC Resident Inspector concern of cut reinforcing steel to accommodate modifications.

-- Review of Yankee Atomic surveillance reports on the modification work completed by contractor - activities presently underway for the RSS modifications were observed to consist of clean up of below ground excavation surrounding the reactor column bases.

-- Review of Mercury Company Quality Assurance Program, required by above specifications, to conform to NRC 10 CFR 50, Appendix B.

Additionally, the inspectors interviewed the licensee on site Quality Assurance Engineer, Corporate Office Engineers and the Mercury Company Quality Assurance Supervisor.

(3) Findings

(a) The Resident Inspector's concern of cut reinforcing bars was investigated. The inspector found the bars, specifically identified to be preserved, were indeed intact except for injuries explained in the following paragraph.

Preparations for drilling holes in existing concrete foundation for installation of anchors required concrete removal to expose top reinforcing steel bars in the foundation. Thus drill holes would avoid cutting into the longitudinal No. 14S rebar. This quality control requirement is identified in note number 4 of contract drawing CF-1002, revision No. 5.

(b) The concrete excavation work to expose top reinforcing steel bar of the foundation, surrounding each of six Reactor Support Columns was completed, in the month of January, by jack hammer chipping. All work for the modification is identified to require quality control such that injury to the No. 14S longitudinal reinforcing steel bars would be prevented. However, no implementing quality control procedure existed to control concrete removal during the jack hammer chipping operation. As a result the NRC inspector observed numerous

gouges, cuts and dents in the No. 14S grade 60 longitudinal reinforcing steel, surrounding each column in the foundation. The inspector also observed that the 3 1/2" percussion drilled holes for the anchors had been located and drilled without cutting into the longitudinal reinforcement. Some indentations to rebar from uncontrolled jack-hammer chipping of concrete were estimated to be about 1/4" deep into rebars' nominal cross-section area. Other rebar strikes included nominal area cuts and dents as well as deformation and rib gouges. This lack of quality control is a violation of the intent of drawing CF-1002 note #4 which is a part of the contract specification.

The modification contractor is required by licensee approved specification No. YR 80-24-S1 revision 5, to have a QA program in conformance with the Code of Federal Regulations 10 CFR 50, Appendix B. Criteria V of Appendix B states in part, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings---." Contrary to Criterion V the Mercury Company did not establish work procedures/instructions to control concrete excavation. This resulted in injurious defects to the longitudinal reinforcement of the Reactor Support Column Basemat. This is an item of noncompliance (50-29/81-05-01)

(4) Additional Information

The inspector observed in his review of Yankee Atomic memorandum dated January 28, 1981 on Reactor Column Base Modifications, that as of that date concrete excavation around all six columns was completed and reinforcing steel in the foundation was exposed in the area to be core drilled. Subsequently the inspector interviewed Yankee Atomic Quality Assurance engineers regarding controls imposed on the contractor during concrete excavation. The licensee's representative stated that no control procedure existed and that on February 5, 1981, during his surveillance of the continued concrete removal by rounding the corners off the column pedestals, he observed the previous concrete excavation had caused injury to rebar. He noted in his daily report of February 5, 1981 that "Rebar Strikes" were observed at all column bases. However, no follow up action was documented nor was the matter of "Rebar Strikes" identified for evaluation.

(5) Licensee Commitment to Inspect, Map and Evaluate Injurious Defects in Reactor Support Structure Reinforcing Steel

In a telephone conversation on March 24, 1981 with Licensee Corporate office mechanical engineering manager, the inspector was informed that the Mercury Company's Quality Assurance Manager was directed to inspect, measure and, provide detailed mapping of longitudinal No. 14S reinforcing steel injuries caused by the concrete excavation.

The licensee committed to reviewing and approving the contractor's report and engaging the seismic evaluation consultants, Earthquake Engineering Systems Inc. to evaluate rebar injury as to need for repair of defects in the reinforcing steel.

b. Fuel Pool Liner Fabrication

(1) Record Review

The NRC inspector reviewed the documentation and visually inspected one half of the recently completed fuel pool liner. The following documents were reviewed:

-- YAEC specification YR-EDCR-78-12-59 Revision 2 dated 10/10/80, "Field Fabrication and Erection of Fuel Storage Pool Liner, Fuel Storage Rack Supports, and Permanent Gate Support Bracket.

-- Mercury MCP-2100 Revision 1 dated 9/20/80 "General Welding Procedure". This is not officially a part of the welding WPS and no reference to this document is made in the WPS.

-- Mercury WPS AH Revision 2 dated 7/31/79 and reviewed 10/28/80, "P8 to P8 welding using the GMAW process". This consists of a 2 part WPS with a written first part (general)and tabular second part (specific).

-- Mercury PQR AH 1377 dated 4/8/77 which is written in support of WPS AH. This procedure qualification was made using a 1G rolled pipe test assembly welded with the GMAW short circuiting arc process with 90 He, 7.5 Ar, 2.5 CO2 shielding gas.

-- Mercury Performance qualification test results in accordance with WPS AH Revision 2 for welders BM10, BM18, BM19, BM20, BM22, BM23, BM24, BM26. Most, but not all of the welders welded test assemblies in the 2G, 2F,3F and 4F orientations.

-- Mercury QC Weld Data Reports Form 197 (1/78). Reviewed typical reports which are tabular data reports which include weld number, welder identification, filler metal data, QC fit up inspections, QC visual inspections, and QC Liquid Penetrant (LP) examinations results, in accordance with Mercury SP-N 49805-100 Revision 1 dated 12/8/80.

-- Mercury PT QCP 3104 Revision 0 dated 2/21/78.

-- Mercury Non Destructive Examination (NDE) personnel qualifications for one Level III and two Level II PT inspectors.

-- Filler metal certified test reports for Sandvik Order No. 053883 (ER 308L), Sandvik Control No. 10662-3 (ER 309-16) and McKay Heat No. 15161 - Lot 2978152 (E 309-16) utilized in the Fabrication.

(2) Inspection Coverage

The NRC inspector conducted a visual examination of the fillet welds and one-half of the completed fuel pool modification, (the other half was flooded). Minimal out of flatness distortion from welding thermal cycles was noted. The weld bead appearance is variable based on welding position with the most consistant weld shape and contour in the 2F position and with the 4F position showing the most irregular bead shape and contour. The 3F position welds were of intermediate quality. All P8 to P8 welds were made with the GMAW short circuiting arc process. With the exception of some repair welded areas all welds were left in the as welded (not ground) condition. The requirement in YAEC YR-EDCR-78-12-59 that "all stainless steel weld surfaces on the water faces shall be free from crevices after welding---" was met by successful passage of the liquid penetrant examination. The oxides on the welds were removed by power wire brushing as required by the aforementioned specification. No items of noncompliance were identified.

9. Review of TMI Action Plan Requirements

During the inspection period the inspector received Temporary Instruction (TI 2515/42) Revision 2 TMI Action Plan Inspection Requirements - Procedures and Staffing. This TI addresses the licensees actions required to be completed in 1980 regarding administrative controls/procedures and staffing. The Post TMI Action Plan requirements were clarified and distributed to all licensees of operating power reactors and applicants for operating licenses in a letter from D. Eisenhut, dated October 21, 1980. Information in this letter was published as NUREG 0737. The inspector used this document, NUREG 0660 and NUREG 0578 as well as inspector judgement and the licensee's commitments made in correspondence with the NRC dated December 15, 1980, as the basis for determining acceptability of the inspectors findings.

Many of the requirements required to be completed in 1980 have been previously addressed in inspection reports 50-29/80-02 and 50-29/80-16. The inspector limited his review to those items which have not been previously addressed and are required to be completed in 1980.

Task No.

I.A.2.1. (4) Modify Training

The inspector verified that the training program has been revised to encompass the requirements of paragraph A. 2. C. of NUREG 0737 and the licensee's lesson plans address the topics described in enclosure 2 Training in Heat Transfer, Fluid Flow and Thermodynamics, to NUREG 0737. The inspector noted that the licensee is utilizing the Institute of Nuclear Power Operations Guidlines for Heat Transfer, Fluid Flow and Thermodynamics, in developing the training program lesson plans. The lesson plans have not been formalized or entirely organized at this time however, the inspector reviewed individual instructors informal lesson plans and determined that the revised training program has been im-

plemented and appears to be in good agreement with the criteria in NUREG 0737.

I.C.5. Procedure for Operating Experience Feedback

The inspector reviewed licensee procedures AP-0020 Operating Information Review and AP-2001 Responsibilities and Authorities of Operations Department Personnel, Revision 10. These procedures assure that important information on operating experience originating, both within and outside of the organization, is continually provided to operators and other personnel and is incorporated into training and retraining programs. The procedures appear to satisfy the requirements identified in I.C.5. of NUREG 0737 and the licensee's commitment to the NRC.

I.C.6. Verification of Operating Activities

The inspector reviewed the following licensee procedures and compared them to the requirements identified in NUREG 0737 I.C.6. The licensee procedures reviewed are:

-- AP-0017 Switching and Tagging of Plant Equipment Revision 6

-- AP-0018 Bypass of Safety Function and Jumper Control Revision 7

-- AP-0207 Equipment Control Revision 3

-- Operating Memorandum 2R22 Local Tagging List Rules Governing in-Plant Tagging Procedure

These procedures have been revised and appear to satisfactorly address the concerns identified in item I.C.6. of NUREG 0737 and confirms the commitment made by Yankee Atomic Electric Company in a December 15, 1980 letter to the NRC.

II.B.4. Training for Mitigating Core Damage

The inspector reviewed Yankee NSD memorandum from P. Bergeron to F. Hicks dated December 23, 1980 stating that members of the Nuclear Engineering Department will provide on site classroom training on March 23, 1981 to assist the staff in delivering a program purchased from General Physics. This program provides training in Recognizing and Mitigating Conditions of Severe Core Damage at Yankee Rowe. The program additionally follows the guideline established by the Institute of Nuclear Power Operations "Nuclear Power Plant Training". The Inspector interviewed personnel who attended this training, and compared the training course outline to the requirements of Enclosure 3 of I.A.2.1. The outline consisted of the following topics:

-- Core cooling Mechanics

-- Potentially Damaging Operating Conditions

-- Gas/Steam Binding Affecting Core Cooling

-- Recognizing Core Damage

-- Hydrogen Hazards During Severe Accidents

-- Monitoring Critical Parameters During Accident Conditions

-- Radiation Hazards and Radiation Monitor Response

-- Criteria for Operation and Cooling Mode Selection

All personnel requiring training in this area have not received training at this time, however, the training program has very recently been implemented and schedules have been developed to include all required personnel. The required program was initiated as required.

II.K.3.9. PID Controller

Yankee Rowe does not utilize or maintain a Proportional Integral Derivative Controller. This item is not applicable to Yankee Rowe.

III D.3.3.2. Inplant Radiation Monitoring Modifications to Accurately Measure Iodine

This item was addressed in inspection reports 50-29/80-16 and 50-29/80-05. Some questions exist in regard to acceptability of the use of charcoal filters as collecting iodine selectively over xenon. The licensee presently uses charcoal filters and purges any entrapped noble gases using either nitrogen or air free of the noble gases. This item will be specifically reviewed by the NRC Emergency Planning Appraisal Team during a future inspection.

10. Observations of Physical Security

The inspector made observations, witnessed and/or verified during the regular and offshift hours that selected aspects of plant physical security were in accordance with regulatory requirements, the physical security plan and approved procedures.

a. Physical Protection Security Organization

-- inspector observations indicated that a full time member of the security organization with authority to direct physical security actions was present as required.

-- manning of all shifts on various days was observed to be as required.

b. Physical Barriers

-- selected barriers in the protected area and vital area were observed and random monitoring of isolated zones was performed.

c. Access Control

Observations of the following items were made:

-- identification, authorization and badging;

-- access control searches, including the use of compensatory measures during periods when equipment was inoperable; and,

-- escorting

The inspector identified no inadequacies in this area

11. Management Meetings

At periodic intervals during the course of the inspection, meetings were held with senior facility management to discuss the inspection scope and preliminary findings of the resident inspector.