

U.S. NUCLEAR REGULATORY COMMISSION

Docket/Report 50-309/85-32

License: DRP-36

Licensee: Maine Yankee Atomic Power Company

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Augusta, Maine 04336

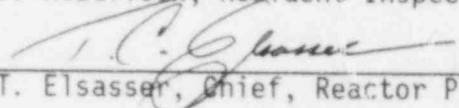
Facility Name: Maine Yankee Nuclear Power Station

Inspection At: Wiscasset, Maine

Dates: November 1 - December 13, 1985

Inspectors: C. Holden, Senior Resident Inspector
J. Robertson, Resident Inspector

Approved by:


T. Elsasser, Chief, Reactor Projects Section 3C

1/10/86
Date

Summary: November 1 - December 13, 1985: Inspection Report 50-309/85-32

Areas Inspected: Routine, regular and backshift inspection by the Resident Inspectors of the control room, accessible parts of plant structures, plant operations, radiation protection, physical security, fire protection, plant operating records, maintenance, surveillance, open items, and reports to the NRC. Inspection hours totaled 139.

Results: During the period the licensee took required actions for identification and tracking of failed fuel detected after startup from the refueling outage (Section 4). Two plant trips occurred as a result of secondary plant equipment failures (Section 3). The need for improvement in compliance with Radiation Work Permits is necessary as indicated by two allegations concerning respirator usage (Section 7). No violations were identified during this report period.

DETAILS

1. Persons Contacted

Within this report period, interviews and discussions were conducted with various licensee personnel, including reactor operators, maintenance and surveillance technicians, and the licensee's management staff.

2. Summary of Facility Activities

On November 1, 1985 the plant was at 77 percent power with the main turbine in manual control because of problems with the turbine control circuit. Additionally, loop 2 cold leg temperature (Tc) was experiencing problems with a high resistance connection to the RTD and the Refueling Water Storage Tank (RWS) was being cleaned to remove sodium. The plant was loading at 1% an hour coming out of the cycle 8-9 refueling outage. On November 4, the plant reduced power to 94 percent because of high stator gas temperatures on the main generator. On November 5, the plant reduced power to 89% for high stator gas temperature.

On November 6, 1985, the plant tripped at 11:28 a.m. when the recirculation valve for the steam driven feedwater pump (P-2C) failed open. The result was a low suction pressure trip of P-2C which caused a turbine and reactor trip. All systems functioned normally. The reactor was taken critical later the same day. The plant reached 97% power on November 15.

The plant detected an increase in radiation monitoring readings on November 19, 1985, and subsequent chemical analysis of primary coolant showed a small fuel leak. On November 22, the plant tripped because of a failure of the main turbine electro-hydraulic control (EHC) system. The plant was in the process of reducing power in order to come off line and make repairs to the EHC system and the temperature detectors for the Reactor Protective System. The reactor was taken critical on November 23 after maintenance and returned to power operations.

The plant attained 75% power on November 26 and then reduced power to place the electric driven feed pumps in service. On November 28, the plant reached 97% power, the maximum power with two electric driven feed pumps running.

During Control Element Assembly (CEA) exercise surveillance on December 4, 1985, CEA #15 became mispositioned and required reducing power. The problem was traced to a faulty reed switch. The plant returned to 97% power and remained there for the remainder of this report period.

3. Review of Plant Operations

The inspector reviewed plant operations through direct observation throughout the reporting period. Except as noted below, conditions were found to be in compliance with the following licensee documents:

-- Maine Yankee Technical Specifications

- Maine Yankee Technical Data Book
- Maine Yankee Fire Protection Program
- Maine Yankee Radiation Protection Program
- Maine Yankee Tagging Rules
- Administrative and Operating Procedures

a. Instrumentation

Control room process instruments were observed for correlation between channels and for conformance with Technical Specification requirements. No unacceptable conditions in process instrumentation were identified.

b. Annunciator Alarms

The inspector observed various alarm conditions which had been received and acknowledged. These conditions were discussed with shift personnel who were knowledgeable of the alarms and actions required. Operator response was verified to be in accordance with procedure 2-100-1, Response to Panalarms, Revision 5.

During plant inspections, the inspector observed the condition of equipment associated with various alarms. No unacceptable conditions were identified.

c. Shift Manning

The operating shifts were observed to be staffed to meet the operating requirements of Technical Specifications, Section 5, both to the number and type of licenses. Control room and shift manning were observed to be in conformance with 10 CFR 50.54.

d. Radiation Protection Controls

Radiation Protection control areas were inspected. Radiation Work Permits in use were reviewed, and compliance with those documents, as to protective clothing and required monitoring instruments, was inspected. Proper posting and control of radiation and high radiation areas was reviewed in addition to verifying requirements for wearing of appropriate personnel monitoring devices. There were no unacceptable conditions identified.

e. Plant Housekeeping Controls

Storage of material and components was observed with respect to prevention of fire and safety hazards. Plant housekeeping was evaluated with respect to controlling the spread of surface and airborne contamination. There were no unacceptable conditions identified.

f. Fire Protection/Prevention

The inspector examined the condition of selected pieces of fire fighting equipment. Combustible materials were being controlled and were not found near vital areas. Selected cable penetrations were examined and fire barriers were found intact. Cable trays were clear of debris. No abnormal conditions were identified.

g. Control of Equipment

During plant inspections, selected equipment under safety tag control was examined. Equipment conditions were consistent with information in plant control logs.

h. Plant Trips

The plant experienced a trip on November 6, 1985 when the recirculation valve for the steam driven feedwater pump (P-2C) failed open. This resulted in a low suction pressure trip of P-2C which caused a turbine trip and reactor trip. All other systems functioned normally.

On November 22, while reducing power for a planned maintenance outage, the turbine manual control system failed which resulted in the rapid opening of all four governor valves. The reactor tripped on variable overpower. A failed circuit card was replaced to correct the problem. Additional maintenance was performed on the turbine limiter control circuit which had previously failed. All other systems functioned normally.

4. Fuel Leakage

On November 19, 1985, the licensee detected an increase in containment gaseous and air particulate activity levels on the installed Radiation Monitoring System. An investigation was conducted. Chemistry samples of the primary coolant showed an increase in fission product activity. Sampling frequency was increased and trending of chemistry results was commenced. Letdown flow was adjusted to increase purification flow.

Maine Yankee's Technical Specifications set a limit on Reactor Coolant System Activity. The most limiting case requires a reactor shutdown if the primary coolant activity is greater than 1.0 micro Ci/gm Dose Equivalent Iodine 131 (I-131) for more than 48 continuous hours. Dose Equivalent I-131 is defined as that concentration of I-131 which alone would produce the same thyroid dose as the quantity and isotopic mixture of Iodine 131, 132, 133, 134 and 135. This limitation on specific activity ensures that the resultant 2 hour dose at the site boundary will not exceed an appropriately small fraction of the Part 100 limit following a steam generator tube rupture. The licensee discussed the results of their analysis with the fuel manufacturer and the Yankee Atomic Electric Company (YAEC). They concluded that some small leak had developed in the fuel. The best estimate for the number of fuel rods affected was from 1 to 40 pins. There are 196 fuel pins in each bundle and 217 bundles

make up the core. Because of the absence of long lived fission product elements, it is believed that the leaking fuel is new fuel (or one eight year old bundle from the center position in the core).

The highest activity level in the reactor coolant was 62% of the 1.0 micro Ci/gm dose equivalent iodine. Following the plant trip on November 22, dose equivalent I-131 peaked at 94% of the 1.0 micro Ci/gm dose equivalent iodine (a peak in this parameter is expected after a plant trip due to temperature changes in the core). By the end of the inspection period, the dose equivalent iodine was averaging approximately 15% of the 1.0 micro Ci/gm limit.

The licensee plans to continue monitoring coolant activity levels and plant radiation levels. During the next refueling outage, the fuel bundles will be sampled to identify the leaking fuel pins and remove them. The inspector will continue to follow the licensee's actions in this matter (IFI 50-309/85-32-01).

5. Review of License Event Reports (LER's)

The inspector reviewed the following LERs to verify that the details were clearly reported, including accuracy of the description of cause and adequacy of corrective action. The inspector had previously verified that appropriate corrective action was taken or responsibility assigned and that continued operation of the facility was conducted in accordance with Technical Specifications and did not constitute an unreviewed safety question as defined in 10 CFR 50.59. No discrepancies were identified.

<u>LER NO.</u>	<u>SUBJECT</u>
85-09	Steam generator pressure sensing line root valves not fully open.
85-10	RPS Channel Design Error.
85-11	ECCS train inadvertent activation during shutdown.
85-12	Fire system sprinklers isolated without required fire watch.
85-13	DP Transmitters improperly installed and maintained for environmental qualification.
85-14	Type A test failure due to integration of Type C test.
85-15	SIAS "A" Train actuation.
85-16	Reactor Trip due to low Steam Generator level.

<u>LER NO.</u>	<u>SUBJECT</u>
85-17	Two plant trips resulting from spurious closure of Excess Flow Check Valves.
85-18	Plant trip on turbine driven feed pump recirculation valve controller failure.

6. TMI Action Plan Items (NUREG-0737)

- a. I.A.1.3 (closed) Shift Manning. The intent of this item is to limit the amount of overtime that plant operators are allowed in order to maintain an alert shift crew and to require a minimum shift crew size. The licensee has developed procedures to conform with the minimum crew size consistent with 10 CFR 50.54. The inspector reviewed the overtime hours worked by operators for the past year and found them to be consistent with NRC guidance. The licensee submitted Technical Specification Proposed Change 109 on September 26, 1984 to address crew overtime. This proposed change is under review by NRR. This item is closed.
- b. II.B.2.3. (closed) Plant Shielding. Maine Yankee has completed the shielding analysis and modifications associated with this item. Inspection Report 83-08 contains the details of the onsite review by the NRC. The environmental qualification reviews required by this item have been superseded by 10 CFR 50.49 and will be reviewed during upcoming Environmental Qualification inspection. This item is closed.
- c. II.K.3.1.b. (closed) Auto PORV Isolation. A safety evaluation report dated October 4, 1983 concluded that "the requirements of NUREG-0737 Item II.K.3.2 are met with the existing PORV safety valve and reactor high-pressure trip set points and that an automatic PORV isolation system is not required for Maine Yankee. This item is closed.
- d. III.D.3.4. (closed) Control Room Habitability. In order to assure that control room operators will be adequately protected against the effects of accidental releases of toxic and radioactive gases the licensee committed to the following actions:
 - automating of the control room breathing air supply.
 - providing sufficient self-contained breathing apparatus for use by control room personnel.
 - establishing proper procedures and operator training to assure appropriate response to toxic chemical conditions.

A safety evaluation dated March 1, 1983 concluded that with the inclusion of the previously identified modifications, the design meets the criteria identified in Item III.D.3.4 of NUREG-0737 and is acceptable. The inspector verified completion of the licensee's commitments and found no discrepancies. This item is closed.

7. Allegation Follow Up

The inspector received two allegations concerning an incident during which five contractor personnel were found working in a respirator required area without respirators. The first allexer said that the contractor had been involved in a number of recent violations of plant Health Physics procedures and that corrective action had not been sufficient. The second allegation was from an individual involved in the respirator incident who alleged that the control provided by the licensee and the Health Physics department was insufficient to protect the contractors from potentially receiving an unnecessary amount of radiation exposure.

The inspector reviewed the events of September 24, 1985 when the contractors were found in the respirator area. Interviews were conducted with the personnel involved including both the contractor and licensee managers. Records of training and whole body counts were reviewed. The following are the results of the investigation.

The contractor personnel were providing insulation services for the refueling outage. Training records showed they had received General Employee Training which included Radiation Protection and Radiological Health and Safety training. The contractor provided services throughout the outage including insulation removal and installation. The contractors had worked in the loop areas of the Reactor Coolant System (RCS) and were accustomed to using respirators for radiation jobs as well as breathing protection for asbestos insulation jobs.

The licensee also contracts Health Physics (H.P.) services during refueling outages. These H.P. Technicians are used to supplement the Maine Yankee staff. They are familiar with Maine Yankee procedures and were also used throughout the outage.

On September 24, 1985 at approximately 7:15 a.m., five insulators entered containment using Radiation Work Permit (RWP) 85-8-137. Worker instructions on the RWP stated that no work was allowed in the loop areas without specific work site surveys and that H.P. technicians determine the need for respirators based upon survey results. The insulators were bringing insulation pads into containment for installation on the main coolant loop. The insulation had been removed earlier in the outage in order to support Steam Generator (S/G) eddy current inspection. The temporary platform erected for access to the primary manway on #3 S/G was a respirator required area.

The job supervisor contacted the H.P. technician in containment and discussed what areas were accessible. The H.P. technician informed the inspector that he told the supervisor that loop 3 platform was contaminated and a respirator area. Further, the H.P. technician told the supervisor limited work could be performed in the loop 3 cubical without respirators as long as no actual work took place on the containment platform. Interviews with the H.P. technician indicated that the contractors were told loop 2 was accessible without respirators since the primary manway was closed and the platform was decon-

taminated. The H.P. technician monitored the work that the insulators were performing. The insulators were bringing pads into containment, loading the elevator and removing the pads from the elevator in the lower level of containment. At approximately 8:30 a.m. the H.P. technician called the insulators out of the loop 3 area because another team was preparing to torque the primary manway cover on loop 3. The H.P. technician assumed the insulators were in the designated non-respirator areas of loop 3. He did not check to see exactly where the five insulators were working. The H.P. technicians changed shifts at 9:00 a.m.

At approximately 10:00 a.m. the insulators returned to containment. They told the H.P. technician they were going to continue the job they had started in the morning using the same restrictions. At approximately 10:30 a.m., the H.P. on duty was making a tour of the loop 3 area and found the insulators working on the platform for loop 3 (respirator area). The insulators were not wearing respirators. The H.P. technician told the insulators to leave containment and alerted the H.P. Checkpoint that the five individuals were found in the respirator area. Three of these individuals were found to have slight surface contamination which was removed by washing (1500 cpm on mustache, 100 cpm on eye and 150 cpm on cheek). All five insulators were given whole body counts and no uptake of radiation was found.

The inspector interviewed the insulators who said they were given permission to enter loop 3 from the first H.P. technician and that the platform was not a posted respirator area. The inspector was unable to verify either of these points.

The H.P. technicians stated that the insulators had been the source of problems throughout the outage because there were frequent minor problems with access control, radiation exposure control and radiation limits. The inspector determined that even though the H.P. technicians were finding these problems, they were not documented and plant managers were not informed of these problems. Further, the H.P. technicians chose to correct the problem and allow the insulators to continue to work. After the respirator problem was identified, management was informed of the day-to-day problems that the H.P. technicians were finding. Had the H.P. technicians tracked these problems as they were identified, a trend might have been identified prior to the respirator incident.

The inspector concluded that the insulators were in error when they began work in the respirator area of loop 3. The insulators claimed the area was not posted, however, the insulators were transporting awkward insulation pads (approximately 6 ft. by 2 1/2 ft. by 4 inches) which could have prevented them from seeing the posting. Additionally, all three loop areas look identical. Without a conscious effort to correctly identify the loop being entered, someone unfamiliar with the plant could make an error.

The licensee conducted an investigation into this incident documented under Radiological Incident Report 85-5. The inspector reviewed this Incident Report. Immediate corrective action taken by the licensee, in addition to those

above, included the assignment of a H.P. "Coordinator" (an individual knowledgeable in Maine Yankee H.P. practices) to assist the insulation contractors during jobs associated with radiation. The licensee and the insulation contractor conducted several meetings and stressed the importance of RWP compliance. As a result of these meetings, the contractor made several changes to assure compliance with Maine Yankee's procedures. The H.P. technicians were also instructed to report any repeat problems with contractors to Maine Yankee management. The licensee identified other long term corrective action including improvements in the training provided in RWP compliance and a periodic review of long term RWP requirements.

This item is closed.

8. Exit Interview

Meetings were held periodically with senior facility management to discuss the inspection scope and findings.