U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No: 50-309/89-25 License No: DPR-36

Licensee: Maine Yankee Atomic Power Company

Facility: Maine Yankee Atomic Power Plant, Wiscasset, Maine

Dates: December 12, 1989 through January 22, 1990

Inspectors: Cornelius F. Holden, Senior Resident Inspector
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Approved by: _____ 2/21/90
E. C. McCabe, Chief, Reactor Projects Section 3B Date

Summary: Resident Inspection Report 50-309/89-25

Scope: Routine resident inspection of special reports, events, operational safety, maintenance, surveillance, physical security, radiation protection, fire protection, and licensee assessment of quality improvement. The inspection involved 106 inspector hours including eighteen (18) backshift and eight (8) deep backshift hours.

Results:

Operator performance during the plant shutdown on January 15 (Detail 1.a.) and in response to the dropped Control Element Assembly event on January 9 (Detail 3.a.) was noted to be good.

Unresolved Item 89-25-01 was identified on the issuance of termination radiation exposure information within the time required by 10 CFR 20.408 (Detail 2.b.). Radiological control program review noted good causal analysis of personnel contaminations during 1989 (Detail 2.a.) and the identification of significant improvement opportunities during maintenance on radioactive equipment (Detail 3.b.).

Two design issues were identified by Maine Yankee during the report period. One is considered Unresolved Item 89-25-02 and refers to the alignment of the containment spray building ventilation system (Detail 5.a.). The other pertains to adequacy of Inverter 5 installation (Detail 5.b.).

A concern was identified regarding the licensee's method of evaluating and correcting the acceptance criteria for a component cooling water valve cycle time. This is considered Unresolved Item 89-25-03 (Detail 1.a).

TABLE OF CONTENTS

		PAGE
1.	Operations (IP 71707)	1
2.	Radiological Control (IP 71707)	2
3.	Maintenance/Surveillance (IP 62703, 61726)	3
4.	Security (IP 71707)	5
5.	Engineering/Technical Support (IP 71707)	6
6.	Safety Assessment/Quality Verification (IP 71707)	8
7.	Administrative	8
	a. Summary of Facility Activities	8
	b. Interface with the State Of Maine (IP 94600)	9
	c. Exit Meeting (IP 30703)	9

DETAILS

1. Plant Operations

During routine daily facility tours the following were checked: manning, access control, adherence to procedures and Limiting Conditions for Operation, instrumentation, recorder traces, protective systems, control room annunciators, radiation monitors, emergency power source operability, operability of the Safety Parameter Display System (SPDS), control room logs, shift supervisor logs, and operating orders. Plant equipment condition, radiological controls, and security were assessed. On a weekly basis, selected Engineered Safety Feature (ESF) trains were checked for operability. On a biweekly frequency the inspector reviewed a safety-related tagout, chemistry sample results, shift turnovers, portions of the containment isolation valve lineup and the posting of notices to workers. Plant housekeeping and cleanliness were also evaluated.

NRC review concluded that the areas inspected were generally acceptable. The following item was considered noteworthy.

a. Component Cooling Water Isolation Valve Stroke Time Criteria

On November 13, 1989, stroke time testing was performed in accordance with operations surveillance procedure 3.1.20, "Safeguards Valve Testing," on valves SCC-A-460 and SCC-A-461 as a maintenance functional test following a packing adjustment. These valves are pneumatically operated, butterfly isolation valves to the non-safety-related portions of the secondary component cooling water system. The test results were 5.5 seconds for SCC-A-460 and 2.5 seconds for SCC-A-461. The acceptance criterion listed in the operations surveillance procedure was a stroke time in the close direction of four seconds or less. However, Plant Engineering Department Procedure 3.17.8.2, "ISI/IST Valve Tests for Discrepancy Reports or Repair Orders," contained acceptance criteria of ten (10) seconds or less. Since the operations department relies on the Plant Engineering Department for valve stroke time acceptance criteria, Procedure Change Report (PCR) 89-142 was written to change the operations department procedure (3.1.20) acceptance criteria to agree with the Plant Engineering Department procedure (3.17.8.2). The test was declared successful based upon the change to the acceptance criterion.

On January 15, 1990, a Plant Shift Supervisor identified that PCR 89-142, which changed the allowed stroke time for valves SCC-A-460 and SCC-A-461 from four seconds to ten seconds, was incorrect based on Yankee Atomic memorandum MYP 89-306, "Review of Surveillance Procedure 3.1.20, Secondary Component Cooling Water Trip Valve Testing," dated April 4, 1989. SCC-A-460 was declared inoperable at 4:15 p.m. and a 72-hour Technical Specification remedial action statement was entered. A plant shutdown was commenced at 7:15 p.m. to perform stroke time testing and maintenance on SCC-A-460. The NRC Operations

center was notified of the plant shutdown in accordance with 10 CFR 50.72. The inspector observed portions of the plant shutdown from the control room and witnessed the stroke timing of the valves locally. As-found test results were 2.7 seconds for SCC-A-460 and 2.4 seconds for SCC-A-461. The valves were declared operable, Technical Specification Remedial Action was exited, and a plant startup was commenced.

Licensee review of the discrepancy between the operations department surveillance procedure and the engineering department procedure found that both departments had received the information included in the above mentioned Yankee Atomic memorandum. The operations department updated their surveillance procedure promptly. The engineering department evaluated the change in the acceptance criteria from ten seconds to four seconds and found that, historically, the valves stroked in three seconds or less. Therefore, there were no immediate operability concerns and a procedure update prior to the next refueling interval test of the valves was accepted. The determination that the procedure change could be delayed apparently did not include consideration of the fact that the engineering procedure is used as a reference for maintenance functional testing requirements.

The inspector considered plant management's actions to shut down the plant to resolve the operability question of SCC-A-460 to be appropriate. Plant maneuvers for the shutdown were well controlled, with shift personnel coordination notably good. However, the acceptability of the licensee's program for control of acceptance criteria for safety-related valve stroke time tests is considered unresolved (50-309/89-25-03).

2. Radiological Controls

Radiological controls were routinely observed. Areas reviewed included overall organization and management for external radiation exposure control and contamination control. Radiological work practices, conformance to radiological control procedures and 10 CFR Part 20 adherence were evaluated.

a. 1989 Personnel Contamination Event Summary

The inspector reviewed the 1989 Personnel Contamination Event Summary. This report was prepared by the Radiological Controls Section and provided to all plant departments with personnel who work in the Radiological Control Area. The report contained breakdowns of all the personnel contaminations by department, individual, root cause, date, plant areas, dose and location of the contamination (shoes, shirt, skin, etc.) The inspector considered the report to be a potentially valuable tool for identifying areas for improvement. No unacceptable conditions were identified.

b. Termination Exposure Letter

During the quarterly dosimetry change on December 30, 1989, dosimetry personnel identified a discrepancy involving a contractor employee who had terminated employment on September 28, 1989. The licensee's staff identified that the report of personnel monitoring required by 10 CFR 20.408 was not completed within the time frame established by that requirement. A verification of employment status was completed during December, but the individual's termination had not been identified to the dosimetry office at that time. Immediate actions were to issue the termination letters and evaluate the occurrence for reportability. No report to the NRC was deemed necessary by the licensee. Long term corrective actions included a review of all departments' employment status and evaluation of the termination process to assure that suitable controls will prevent recurrence. By the end of the report period the licensee had identified several other contractor employees who had terminated employment at Maine Yankee without notification to the dosimetry office. Revision of the termination process for contractor employees was under evaluation. This item is unresolved pending further inspection (UNR 50-309/89-25-01).

The inspector had no additional questions. Overall performance was acceptable.

3. Maintenance/Surveillance

The inspector observed and reviewed maintenance and problem investigation activities to verify overall plant safety and compliance with regulations, administrative and maintenance procedures, codes and standards. The inspector also reviewed proper QA/QC involvement, safety tag use, equipment alignment, jumper use, personnel qualifications, radiological controls for worker protection, retest requirements, and reportability per Technical Specifications.

Also, the inspector observed parts of surveillance tests to assess performance in accordance with approved procedures and Limiting Conditions for Operation, test results, removal and restoration of equipment, and deficiency review and resolution. The following activities reviewed were considered noteworthy:

a. Control Element Assembly 54 (CEA-54) Dropped

On October 30, 1989, a power supply associated with CEA-48 failed. During power supply replacement, the CEA dropped into the core. As described in Region I Inspection Report 50-309/89-18, Detail 4.a, NRC inspection concluded that the licensee had acted prudently to prevent damage to equipment located in a high radiation area and was knowledgeable of the risk of dropping the CEA prior to authorizing the work to begin.

A similar power supply failure affected CEA-54 on January 9, 1990. Again the licensee consulted with the vendor to generate a procedure for the replacement of the power supply while minimizing the risk of dropping the CEA. The inspectors observed activities in the Control Room and at the Control Element Drive Mechanism (CEDM) logic cabinets during the replacement of the control circuitry for CEA-54. Discussions were conducted between the operators and the I&C technicians to identify high risk steps of the evolution and the licensed operators reviewed Abnormal Operating Procedure 2-21, "Misaligned (Dropped) CEA," prior to authorizing the start of work. Communications were established between the work location and the Control Room. The CEA dropped subsequent to the installation of a temporary power supply which was intended to hold the CEA while the faulty supply was replaced. A power reduction was conducted and reactor parameters were verified to be within limits in accordance with Technical Specification requirements. The power supply was replaced and the CEA was withdrawn a short time later.

During the previous operating cycle, Control Element Drive Mechanism (CEDM) control circuitry problems resulted in a number of inadvertent dropped Control Element Assemblies (CEAs). The licensee identified short and long term actions to improve the reliability of the CEDM control circuitry. The final long term action to be completed by the licensee is to modify the CEDM control circuity to install redundant power supplies, the failure of which has been common to many of the dropped CEAs. This modification is to be installed during the next refueling outage, scheduled to begin April 7, 1990.

Although the January 9 maintenance associated with the control circuitry of CEA-54 resulted in dropping the CEA and was similar to the October 30 dropped CEA, the inspector concluded that the licensee had acted prudently. The evolution was well controlled and coordinated.

b. Letdown Prefilter Replacement

On December 27 and 28, the inspector observed portions of the maintenance involving replacing the Letdown System Prefilter (FL-35A). This process included the removal of the internals, transport to the storage bunker, and replacement of the filter assembly. The used filter assembly had a contact dose rate of approximately 300 R/hr. A shielded cask was used to transport the assembly to the storage bunker, where the filter assembly was placed into a High Integrity Container (HIC) suitable for disposal.

The evolution was conducted in an acceptable manner, but the exposure estimate (300 mrem) for the evolution was exceeded by approximately ten percent and a worker was contaminated after performing an unanticipated task. Licensee observation and evaluation, documented in a radiological observation report, identified several factors that may

have prevented these difficulties. These included improved preplanning, with a dry run and potential equipment enhancements such as a permanent solid lifting rig to permit shield rigging time and associated exposure reduction. After the filter assembly was lowered into the housing, it was discovered that the bottom plate of the filter assembly was improperly installed. The worker was contaminated during repositioning of the the now highly contaminated lower plate. The personnel contamination could have been prevented by improved contamination control techniques or more thorough verification of proper installation of the lower support plate.

The inspector observed that, although weaknesses were evident in this evolution, the licensee was identifying opportunities to improve performance of the maintenance evolution.

c. Turbine-Driven Auxiliary Feed Pump Monthly Surveillance

The inspector observed the return to service of the turbine-driven auxiliary feed pump (P-25B) following a monthly test run in accordance with operations surveillance procedure 3.1.5, "Emergency and Auxiliary Feed Pump Test." The evolution involved verification of proper valve and equipment alignment by a non-licensed operator. The operator appropriately performed the evolution in accordance with the procedure. NRC observation found acceptable performance.

d. Control Room Ventilation Monthly Surveillance Test

The inspector observed the performance of operations surveillance procedure 3.1.18, "Control Room Ventilation Filter Flow Verification." The test was conducted by a licensed control room operator and consisted of realignment of the control room air conditioning system to the recirculation mode and operation of the control room breathing air system. The operator noted that one of the two outside air supply motor operated valves had a stroke time that was approaching the "Alert" value specified for Inservice Test (IST) requirements. Although no action was necessary to comply with the procedures at that time, the operator conservatively contacted the Plant Engineering Department for evaluation of the condition of the valve. The inspector considered the operator's actions to be indicative of careful attention to off normal equipment performance.

4. Security

Inspector checks were made to determine whether security conditions met regulatory requirements, the physical security plan, and approved procedures. Those checks included security staffing, protected and vital area barriers, vehicle searches, personnel identification, access control, badging, and compensatory measures when required. No deficient conditions were identified.

5. Engineering/Technical Support

a. Containment Spray Building Ventilation

The containment spray building houses the containment spray pumps, the low pressure safety injection pumps, the residual heat removal (RHR) heat exchangers and the piping, valves, and instrumentation associated with these safety related systems.

On December 6, 1988, with the plant in a refueling shutdown, air flow measurements were taken with several different ventilation system damper, louver, and floor plate position configurations. Air flow measurements were taken in the "as found" condition as well as the configuration described by drawings included in the Final Safety Analysis Report (FSAR). The "as found" data indicated that ventilation air flow through a low pressure safety injection pump motor cubicle was less than half of the flow in the FSAR drawing. With the ventilation system aligned as shown in the FSAR drawing, the ventilation air flow through the pump motor cubicles was measured to be within two (2) percent of the value shown on the FSAR drawing.

At the completion of the air flow measurements, the ventilation system was returned to its "as found" configuration. There was no indication that the preliminary results of the flow measurements were communicated to the Operations Department prior to startup from the refueling outage.

In a memorandum dated January 4, 1989, the engineers involved in the air flow measurements reported their findings to the Vice-President, Engineering and Licensing. The memorandum contained a description of the tests performed, results, and recommended corrective actions. A copy of the memorandum was forwarded to the operations department and entered into the department's Task Management System (TMS).

On December 29, 1989, while reviewing his TMS assignments, a Plant Shift Superintendent (PSS) identified that the containment spray building ventilation system was still aligned in the "as found" test configuration and that none of the recommendations included in the memorandum had been acted upon. He took immediate action to have the system realigned as described in the FSAR drawings and initiated an evaluation of the operability of the safety related systems in the containment spray building. The evaluation was based on the potential that insufficient air flow had existed through the pump motor cubicles to prevent over heating of the motors during a design basis accident scenario. Maine Yankee review of the FSAR design drawing for the system indicated that the flow values were based on the division of the purchase specification flow capabilities of the exhaust fans among the pump motor cubicles. No specification of the minimum air flow (required through the motor cubicles to consider the systems operable) existed.

As of December 29, 1989, when the system was realigned as described in the FSAR drawing, the systems in the containment spray building were considered operable. This determination was based on test data (from the December 6, 1988 test) that showed the air flow through the pump cubicles to be within a close tolerance of the values specified in the FSAR. The inspector verified the alignment of the system to be in accordance with the FSAR drawing configuration.

The operability determination of the systems in the containment spray building prior to December 29, was assigned to the Nuclear Safety Section. An engineering evaluation of the required air flow through the pump motor cubicles to prevent overheating the motors as well as the impact on environmentally qualified equipment in the building was underway at the end of the report period. Also, the Quality Assurance Section has initiated a review of the Engineering Department/ Operations Department interface associated with this issue due to the delay in implementing corrective action to realign the containment spray building ventilation system. This issue is unresolved pending the completion of the above evaluations and further NRC inspection (UNR 50-309/89-25-02).

b. Emergency Battery 2 in Condition Outside Design Basis

The 125 VDC system consists of four battery busses. Each battery bus is continuously supplied by a separate battery charger. If a battery charger fails, the battery supplies the bus loads. Busses 1 and 4 or 2 and 3 can be cross-tied. When in the cross-tied condition, train separation is eliminated. Final Safety Analysis Report (FSAR) assumptions include the capability for any battery to have the capacity to supply the loads on its associated busses for two (2) hours when in the cross-tied condition.

Battery bus 2 originally supplied Inverter 2 and its safety-related loads only. A design change added an additional inverter (Inverter 5) to supply non-safety-related loads during normal operation. At the time of installation, it was intended that Inverter 5 trip during conditions that would require the safety-related loads to be supplied by the battery (i.e., station blackout).

During engineering review of options to improve reliability of the safety-related inverters, it was identified that Battery Bus 2 would not be capable of meeting the FSAR assumptions due to inability of Inverter 5 to shed its loads from the bus as intended by the design. Inverter 5 supplied several non-safety-related loads and was intended to trip ten (10) minutes after Battery Charger 2 stopped supplying the bus. The circuit intended to trip Inverter 5 was found to be incapable of performing this function. The resulting loads which remained connected to the battery would have resulted in Battery 2 depletion in significantly less than the two hours assumed by the FSAR.

The loads supplied by Inverter 5 were transferred to alternate supplies and Inverter 5 was de-energized and administratively controlled by tagging the equipment out of service. The as-found condition of battery bus 2 was outside design basis assumptions, therefore the NRC was notified in accordance with 10 CFR 50.72 (b) (2).

The inspector observed that, once the deficiency was identified, the actions to correct it were technically correct and timely.

A cause determination had not been made at the end of the report period. Maine Yankee plans to submit a Licensee Event Report on this subject. The inspector plans to review the cause determination and corrective action as a result of this issue as part of the LER review in accordance with the NRC inspection program.

6. Safety Assessment/Quality Verification

a. Periodic Quality Improvement Assessment

The Quality Programs Department recently issued a report of its first attempt to assess quality improvement efforts at Maine Yankee. The assessment covered the period from November 1988 to October 1989. The report was organized by functional areas. It included a listing of internal evaluations and audits as well as external inspections conducted during the period, a summary of the findings, and an evaluation of future internal areas for emphasis. The inspector considered the assessment to be a positive initiative.

7. Administrative

a. Summary of Facility Activities

At the beginning of the report period the plant was operating at full power. Power reductions to approximately seventy-five percent power were accomplished on December 20 and January 9 for a generator condition monitor alarm and a dropped control element assembly (see Detail 3.a.), respectively. On January 15, the plant was shut down for testing of an isolation valve in the secondary component cooling water system (see Detail 1.a.) The plant operated at full power for the remainder of the report period.

A Safety System Functional Inspection Follow-up inspection was conducted from January 16 to 19. The results of the inspection will be documented in Region I Inspection Report 50-309/90-80.

A meeting was held in the Region I office on January 9 to discuss several recent plant occurrences and is documented in NRC Meeting Report No. 50-309/89-24 dated January 31, 1990.

b. Interface with the State of Maine

Periodically, the resident inspectors and the on site representative of the State of Maine discussed findings and activities of their corresponding organizations. No unacceptable plant conditions were identified.

c. Exit Meeting

Meetings were periodically held with senior facility management to discuss the inspection scope and findings. A summary of findings for the report period was also discussed at the conclusion of the inspection.