U. S. NUCLEAR REGULATORY COMMISSION
REGION I

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Report No:	50-309/96-13
Licensee:	Maine Yankee Atomic Power Company (MYAPC)
Facility:	Maine Yankee Atomic Power Station
Location:	Bailey Point Wiscasset, Maine
Dates:	October 27 through December 7, 1996
Inspectors:	Jimi Yerokun, Senior Resident Inspector Division of Reactor Projects William Olsen, Resident Inspector Division of Reactor Projects
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EXECUTI' E SUMMARY

Maine Yankee A omic Power Company
NRC Inspection Report 50-309/96-13

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 6-week period of resident inspection activities.

Operations

- Performance in operations was good. Operators responded appropriately to the loss of offsite power and maintained the plant in a stable condition. They promptly evaluated and assessed the plant's safety systems including the emergency diesel generators.

- Safety related systems were properly tested and maintained such that they would be available when required as evident by the condition of the emergency diesel generator and emergency feedwater systems.

- Maine Yankee made good preparations to ensure that the plant would be maintained safely in the event of the potential strike by union personnel. However, an oversight was identified in that the actions did not properly include ensuring that the minimum staffing requirements in the emergency preparedness area would be fulfilled. Communications with NRC staff was well done and very timely.

Maintenance

- There was generally good performance by maintenance personnel during the conduct of repair and testing activities. Engineering support of maintenance such as analysis to for unreviewed safety questions was very good. The operations department initiative to model the testing of the auxiliary feedwater pump full flow test on the station simulator prior to actual test performance indicated an excellent safety perspective.

- Maine Yankee properly responded to the failure of the service water pumps gland cooling check valves during testing by increasing the frequency of testing which in turn identified the design problem. This corrective action appears to have been timely and comprehensive. Operators properly followed TS actions statements.

- Maine Yankee personnel properly performed surveillance tests. The testing of the emergency diesel generator EDG-1A was completed well. The operator in the diesel generator room performed the task in an excellent manner and was very knowledgeable of the procedure requirements. All equipment was observed to function properly observation and the testing was completed satisfactory. The testing of the diesel fire pump was also completed well. There was good engineering involvement. The PED involvement demonstrated the increased attention to attempt to resolve long standing problems with the diesel fire pump.

The nuclear plant operator demonstrated an excellent understanding of the past problems with the diesel fire pump and closely monitored the pump's performance during the test period.

- The revised Work Control Process procedure was appropriate to enable maintenance sections to provide better work controls. All sections of the maintenance department contributed in the revision process to ensure that the completed document will meet all the departmental needs.

Engineering

- Engineers continued to provide excellent support to the plant. Identification of cable separation issues reflected good engineering efforts. However, it also revealed that there had been some weaknesses in the past that caused the problems to exist.

- Good efforts and appropriate actions were taken to ensure that safety related equipment and structures in the turbine building would not be adversely affected by a design basis HELB or flooding.

- Engineering department personnel provided good support to the plant such as with the efforts to correct the problems with the service water pump gland cooling check valves. They properly conducted testing of the original valves in a proactive manner outside the system and identified the valve clearance problem.

- Engineering personnel properly developed and implemented the EDCR for the Containment Spray building heating and ventilation unit, HV-7, in a well controlled and safe manner.

Plant Support

- While the few unscheduled radioactive releases that occurred were minor in nature, they indicated that Maine Yankee needs to perform more extensive review of the events to determine a root cause and provide adequate corrective action to prevent recurrence.

- Good and prompt efforts were taken in response to the identification of a hot particle in a chair in the radiologically controlled area. Maine Yankee properly analyzed the hot particle to determine possible levels of exposure to the personnel involved and the source of the particle. In addition, the analysis to determine exposure level was sent to an outside technical consultant for independent review.

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Report Details

Summary of Plant Status

Maine Yankee began this inspection period at 90% power. The station reduced power to 80% on October 29, November 5, November 23 and December 2, 1996, for backwashing the main condensers, waterbox cleaning or mussel control and returned to 90% power by the next day. On December 5, 1996, at 9:45 pm, a plant shutdown was commenced due to the manual reactor trip pushbuttons being declared inoperable because of inadequate cable separation. Reactor power was less than 2% (Hot Standby) on December 6, 1996 at 1:30 a.m. and the reactor was made subcritical (Hot shutdown) at 2:21 a.m. The plant was in Hot Shutdown condition at the close of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using Inspection procedure 71707, the inspectors conducted reviews of ongoing plant operations. Operators performed all observed tasks to be in accordance with approved station procedures and done by a staff with a very good safety perspective. Prompt action was taken when (hot shutdown condition) after engineering personnel identified some inadequate cable separation problem with the Reactor Protection System (RPS) Manual Trip PushButtons.

O2 Operational Status of Facilities and Equipment

O2.1 Loss of Designated Offsite Power

a. Inspection Scope (71707, 93702)

The inspectors observed and reviewed licensee's actions taken to address the loss of both offsite 115 kV lines on November 9, 1996.

b. Observations and Findings

On November 9, 1996, an electrical disturbance on the Mason line, one of two 115 kV incoming lines at Maine Yankee, caused the supply breaker (K207-1) to trip at about 8:41 A.M. At that time, the other 115 kV line (Suroweic) was out of service (since November 4, 1996) because it's breaker (K69-7) was undergoing repair. The plant was at 90% power and using the station service power for in house loads and was not adversely impacted by the loss of the offsite 115 kV power.

The electrical disturbance of November 9 occurred when a lightening arrestor on section 207 (Mason Station) of the 115 kV line catastrophically failed (blown apart). The lightening arrestor consists of 3 insulating sections in series connected to ground. Due to local weather conditions the 115 kV line had exhibited instability

throughout the day. However, the cause of the failure of the lightening arrestor was not immediately known. Plant personnel distinctly heard three loud noises from the 115 kV switchyard a few seconds apart.

Plant operators entered the remedial actions of station technical specification 3.12.B due to both off-site reserve 115 kV lines being out of service. The technical specification requires that one 115 kV be available for service. Upon loss of 115 kV to the station, the NRC is to be notified within 24 hours with information concerning the plans to restore service. If power cannot be restored within 7 days, the station is to be brought to cold shutdown. Both emergency diesel generators were operable at the time. There was no requirement to start or test either emergency diesel generator under the conditions described above.

With support from Maine Yankee, Central Maine Power personnel conducted repairs on the Mason line and finished the maintenance activities and restoration of the Suroweic line. During the day, K207-1 (Mason line) and KR-1 (Suroweic line) repeatedly automatically tripped open when attempts were made to restore the lines. At approximately 7:00 pm capacitor bank KR-1 was returned to service and circuit breaker K207-1 was closed. Capacitor bank KR-1 was tested satisfactory and the Mason Station line restored to service. A complete inspection of the 115 kV switchyard was conducted to identify any other problems. None were identified.

As a result of this event, NRC staff conducted several conference calls with the licensee and reviewed system design and licensing basis:

- During power operation, power for in house loads is provided by the main generator through station transformers X-24 and X-26. The 115 kV offsite lines are the standby power source and would be available through transformers X-14 and X-16 upon a loss (plant trip) of the normal power. When the plant is off-line, the offsite 115 kV lines provide in house power and could be backed up by back feeding through the 345 kV yard. To do this, certain disconnects would have to be removed from the main generator and certain physical connections and alignment would have to be made.

- The 115 kV offsite source consists of 115 kV section 69 (Suroweic line) and 115 kV section 207 (Mason line). Either line is able to function as the primary source of offsite power. However, for the Suroweic line to be the primary source, it's capacitor bank has to be in service (breaker KR-1 closed). The backup source is the 345 kV offsite supply which is comprised of the 345 kv transmission system. The backup source can be made available within 6 hours. This arrangement was reviewed by the NRC as documented in Safety Evaluations dated February 29, 1972, April 23, 1987, and September 7, 1988.

- To improve the voltage stability on the Suroweic line, a capacitor bank was installed several years ago. KR-1 is the breaker for the capacitor bank the Suroweic line. Since initial licensing, the licensing basis for Maine Yankee has been two redundant 115 kV lines and a 345 kV line available within 6 hours. However, the technical specification requires one 115 kV line to be operable.

The licensee informed the NRC as well as the resident inspectors of the loss of both 115 kV lines later on in the day. Although within the technical specification time requirement, the timeliness of this notification was unnecessarily delayed in considering it was a loss of both 115 kV lines - a potential safety significant problem. It was not until the lines were restored that the NRC was informed of the problem. This issue was discussed with licensee management. The inspectors conducted independent reviews of safety related systems, specifically the emergency diesel generator system, to ensure that they were operable and not negatively impacted by the loss of offsite power.

Operators responded appropriately and continued to ensure that the plant was maintained stable. The NRC is reviewing the adequacy of these 115 kV lines and the technical specification requirements. (URI 50-309/96-13-01)

c. Conclusions

Operators responded appropriately to the loss of offsite power. They promptly evaluated and assessed the plant's safety systems including the emergency diesel generators and ensured continued stable plant operation.

O2.2 Emergency Feedwater System Walkdown

a. Inspection Scope (71707)

The inspector conducted a walkdown of portions of the emergency feedwater (EFW) system to verify proper alignment and availability for operation.

Following the conduct of a surveillance testing of EFW Pump, P-25A, the inspector conducted a walkdown of portions of the system to verify that it had been properly restored to the standby condition as required for system operability. The surveillance test that had been conducted was the quarterly testing of pump P-25A, in accordance with procedure 3-1-5.2, Emergency Feed Pump, P-25A, Test.

The system walkdown included valve position verification, demineralized water storage tank (DWST) volume verification, pump inspection, and switches and instruments inspection.

b. Observations and Findings

The inspector reviewed the results of the surveillance and verified that test results were satisfactory and that the pump had been restored to proper operable status. Using Piping and Instrument Drawing (P&ID) # 11550-FM-73A, the inspector verified that valves were in their required positions. The suction valves from the DWST were open, those from the Primary Water Storage Tank were closed, the pump's discharge valves to the EFW regulating valves were open, and those to the first point heaters were closed. An inspection of the pump revealed no adverse condition. The inboard and outboard bearing gland cooling support system appeared normal, and there was no oil or water leakage observed from the pump or motor. All instruments and switches were in their proper positions.

c. Conclusions

Maine Yankee properly tested and maintained operationally, the EFW system, such that, it would be available when required to perform its safety function.

08 Miscellaneous Operations Issues

O8.1 Preparation for a Potential Strike

a. Inspection Scope (92709)

During the onset of a potential strike by union personnel, the inspectors reviewed the licensee's actions taken to ensure continued safe plant operation should the strike occur. In accordance with NRC Inspection Manual 92709, Licensee Strike Contingency Plans, the inspectors reviewed the actions taken by the licensee management during the contract negotiation period to be prepared for a potential strike.

b. Observations and Findings

There was good preparation by the Operations and Security departments. The departments developed contingency plans that were approved by senior management. The operations department staffing plan ensured that enough licensed and non-licensed operators will be available during all shifts. Three crews, each of at least 4 licensed operators and 3 or 4 nuclear plant operators, were planned. The plans ensured that the plant would be maintained safely including taking to a cold shutdown condition if needed. However, proper consideration had not been given to the Emergency Preparedness minimum staffing requirements. Personnel in that department were not aware of the potential strike timely enough to make adequate preparations including developing a strike plan. It wasn't until the question was raised by the NRC that the adequacy of response personnel was assessed.

The inspector maintained communication with the licensee and the Union representatives (collective bargaining agent) to keep abreast of the situation and to ensure that no actions taken or planned would negatively impact safe plant operation. The inspector kept NRC officials informed of developments to ensure that the NRC would be prepared to take timely and appropriate actions should a strike occur to ensure that the plant continued to be maintained safely.

The union negotiations were accomplished without a strike. Both the licensee management and union representatives provided timely information to the NRC.

c. Conclusions

Overall, Maine Yankee made good preparations to ensure that the plant would be maintained safely in the event of the potential strike by union personnel. However, an oversight was identified in that the actions did not properly include ensuring that the minimum staffing requirements in the emergency preparedness area would be fulfilled. Communications with NRC staff was well done and very timely.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

The inspector observed troubleshooting and repair activities for the auxiliary feedwater pump, service water pump packing gland cooling water check valves, and the removal and repair of service water pump P-29C. The maintenance personnel performed these activities as directed by the station work control program.

The inspector observed several surveillance activities which included auxiliary feedwater pump (P-25B) quarterly testing, weekly diesel fire pump (P-5) testing and emergency diesel generator (EDG-1A) surveillance testing. These activities were conducted well and in accordance with approved procedures.

On occasions, the inspector attended work planning meetings to monitor the licensee's work planning process. Representatives from the various departments were present at the meetings. Issues were discussed in a professional manner with good safety focus in evidence.

M1.2 Auxiliary Feedwater Pump, P-25B (URI 50-309/96-13-02)

a. Inspection Scope (62707, 61726, 37551)

The inspector reviewed and observed troubleshooting and repair activities associated with the Auxiliary Feedwater (AFW) pump, P-25B, and also with the controller for the steam admission valve (MS-P-168) for the pump's turbine.

The inspectors also reviewed and observed portions of post maintenance testing activities, which involved a full flow test of the AFW pump at 80% reactor power. This testing was performed to demonstrate that the pump was capable of providing full flow to the steam generators during accident conditions.

b. Observations and Findings

During the inspection period, Maine Yankee maintenance personnel, with assistance from plant engineers, performed repairs to auxiliary feedwater pump P-25B. These repairs were necessary because of the pump's relatively poor past operating history. The pump reliability had been declining over the past several years. Maine Yankee

formed a team to analyze the problem and institute corrective actions. The pump was placed in Maintenance Rule category A-1 status to monitor performance for trending.

After completion of repairs, the inspector witnessed a test run of the auxiliary feedwater pump that was performed to ensure that all repairs were satisfactory prior to the full flow test. This testing was performed by providing a flow path through the minimum flow line recirculating back to the demineralized water storage tank. During the performance of this test the inspector observed that the outboard shaft gland overheated. The operators performing the test immediately stopped the pump. Investigation by maintenance and engineering personnel determined that the innermost pump packing rings were dry and were not receiving cooling water flow. The old packing was removed and the shaft was examined for scoring and any other signs of degradation. The inboard packing gland was also inspected for signs of degradation. No indications of damage to the packing glands or shaft were identified. After the packing glands were repacked the pump was retested satisfactory.

The inspector reviewed the functional test developed to verify the proper operation of the auxiliary feedwater pump steam admission valve controller. The test involved properly adjusting the new controller after installation, while operating the pump as directed by surveillance procedure 3-1-5.3, Auxiliary Feed Pump, P-25B, Test, in the minimum flow recirculation mode. After completion of this testing a full flow test to the steam generators was performed to verify proper valve controller response under full demand. The full flow test was conducted with temporary procedure changes (TPC) to procedure 3-1-5.3.

The full flow test was analyzed by the station engineering department prior to performance to ensure that testing during power operation would not present an unreviewed safety question. The steam generator design encompasses cold water transients and the testing was modeled on the station simulator, which indicated that approximately two degrees temperature change due to the addition of the relatively colder water to the operating steam generators was expected to occur. This analysis was also performed to ensure that in addition to the thermal shock concerns identified previously, no reactivity addition concerns were associated with the testing.

The inspector reviewed temporary procedure changes (TPC's) (96-367 and 96-368) to procedure 3-1-5.3 and found that they properly addressed the required testing and plant conditions, and contained the appropriate 10 CFR 50.59 evaluation. The prerequisites, test conditions and expected parameters were clearly established. Detailed engineering reviews, and safety evaluation were conducted and documented in Yankee Atomic memoranda MYP 96-0727 and 0745. The full flow direct feed test was conducted with the reactor at an initial power level of 80%.

The test duration was for approximately five minutes and the operators conducted the testing in a safe and well controlled manner. There was a four inch increase in steam generator level, and a one half degree decrease in reactor coolant system temperature. The total effect on the reactor coolant system was observed to be minimal.

However, during the initial controller adjustment pump runs there were some problems noted by the inspector. In addition to the previously noted pump packing gland overheating, an instrument and controls technician adjusted the steam admission valve controller contrary to test requirements. This occurred when all adjustments had supposedly been completed and the pump was being operated in accordance with test procedure 3-1-5.3 for a valid surveillance test. The plant shift supervisor observing the pump runs locally questioned the I & C technicians actions and appropriately terminated the test. The test was later performed satisfactory. The technicians' actions appeared to be a result of inadequate test control and inattentiveness. Maine Yankee is currently reviewing this issue. This item remains unresolved pending completion of licensee action and further NRC staff review. (URI 50-309/96-13-02)

c. Conclusions

The inspectors observed generally good performance by operations, maintenance and engineering personnel during the conduct of repair activities and testing. The engineering analysis to review for unreviewed safety questions was very comprehensive and thorough. The operations department initiative to model the testing on the station simulator prior to actual test performance indicated an excellent safety perspective. I & C technicians' inconsistent performance is under further review with the licensee.

M1.3 Service Water Pump Gland Cooling Flow Problems

a. Inspection Scope (62707)

The inspector observed work activities in the field and reviewed completed work packages and engineering technical evaluations concerning the problems identified with service water pump gland cooling check valves during recent surveillance testing.

b. Observations and Findings

On November 12, 1996, plant operations personnel conducted station procedure 3-1-2.9, ECCS Routine Testing - Service Water Pump Test. This procedure was used to perform the gland cooling test for service water pump P-29C. The surveillance interval was changed from quarterly to monthly due to previously identified problems with cooling water flow to the pumps. A corrective action from a previous root cause determination directed the change in surveillance periodicity as a maintenance rule monitoring action.

After testing, it was determined that check valve RW-133 (raw water to the gland cooling for SW pump P-29C) was leaking by the seat. The service water pump was declared inoperable at 11:50 am and the remedial actions of station technical specifications 3.6.B & C and 3.12 B were entered. At 12:05 pm service water pump P-29D was started and the remedial actions of technical specifications 3.6.B & D and 3.12 B were exited. A work order (WO 96-4079) was written to investigate and repair the cause of the leakage through check valve RW-133.

On November 14, 1996, at 12:42 pm, all four service water pumps were declared inoperable when plant engineering personnel identified a design problem with the raw water supply check valves that would render them incapable of performing their intended function. Specifically, due to excessive clearances, the top of the check valve disk could catch on the valve body seat and fail in the open position. Station technical specification 3.0.A.2 was entered, which required commencement of a plant shutdown within one hour from the time of discovery of the problem and placement of the plant in hot shutdown within six hours. At 12:59 pm that day, service water pump P-29A was declared operable after the raw water cooling flow was secured and the pump discharge cooling flow was initiated. The check valve for this pump (SW-179) was verified to be seated by removing a test connection and verifying no back leakage. The raw water cooling supply was isolated and the test connection open to verify that there was no back leakage through the check valve. At 1:04 pm service water pump P-29C was declared operable after the same process was used to verify RW-133 was seated with the required pump in each train operable, the remedial actions of technical specifications 3.6.B & C and 3.12B were exited.

After further evaluation, plant engineering department personnel determined a need to replace the existing check valves for gland cooling flow with a different design to prevent recurrence of the above noted problem. Station technical evaluation (TE 208-96) was issued to address the problem, which consisted of replacing the existing valves with a different design swing check valve to eliminate the possibility of the valve failing to close due to internal clearance problems. The inspector reviewed the technical evaluation and determined that a proper evaluation had been conducted and included an appropriate 10 CFR 50.59 screening. The new valves were installed using station work order (WO-96-4121) and the equipment was declared operable on November 15, 1996.

c. Conclusions

Maine Yankee properly responded to the failure of the check valves during testing by increasing the frequency of testing which in turn identified the design problem. Engineering department personnel properly conducted testing of the original valves in a proactive manner outside the system and identified the valve clearance problem. Operators properly followed TS action statements. These corrective actions were timely and comprehensive.

M1.4 Emergency Diesel Generator, EDG 1A, Surveillance

a. Inspection Scope (61726)

The inspector witnessed a portion of the emergency diesel generator surveillance testing and reviewed the completed test surveillance procedure to verify proper performance and compliance with station technical specifications.

b. Observations and Findings

On December 3, 1996, Maine Yankee operations personnel performed the required monthly testing of emergency diesel generator EDG-1A, in accordance with station procedure 3-1-4.A, DG-1A Surveillance Testing. The diesel engine was started from the diesel generator room and phased on to the electrical system from the control room. The generator was loaded to the proper load range as specified in the procedure and ran for two hours. The inspector observed the test in the diesel generator room and the control room and determined that all equipment operated as required. No abnormal conditions were noted during the run. The operator was observed to use the test procedure in the diesel generator room during performance of the testing and the inspector verified that all required data were documented.

c. Conclusions

Maine Yankee operations personnel properly performed the required monthly surveillance testing of emergency diesel generator EDG-1A. The operator in the diesel generator room performed the task in an excellent manner and was very knowledgeable of the procedure requirements when questioned by the inspector. All equipment was observed to function properly and the testing was completed satisfactory.

M1.5 Diesel Fire Pump Surveillance

a. Inspection Scope (61726)

The inspector observed a weekly test of the diesel fire pump from the fire pumphouse. The performance of the operations department auxiliary operator was monitored to verify proper usage of station procedures and to observe the level of knowledge and training of the operator.

b. Observations and Findings

On December 2, 1996, the inspector observed a nuclear plant operator conduct the diesel fire pump test in accordance with station procedure 3-1-9, "Fire Pump Testing". This test demonstrates operability for the diesel fire pump as required by the Maine Yankee Fire Protection Plan. The fire pump ran for one hour to allow the diesel to reach full operating temperature in a recirculation mode of operation.

Although the Maine Yankee Fire Protection Plan requires that the fire suppression system shall be operable at all times, operator action is credited for restoration of the system when the diesel engine control switch or throttle lever are repositioned in accordance with the test procedure.

The inspector observed operator actions during the starting sequence and monitoring period of the test. The operator was very professional in the performance of his tasks and was very knowledgeable of the procedure requirements. The pump run was conducted satisfactory but a raw cooling water gauge (PI-8029) was noted by the inspector to be half full of water. The nuclear plant operator noted the discrepancy in the procedure and a work request was subsequently written to repair/replace the gauge. No other discrepancies were noted by the inspector during the period of observation. During the test, plant engineering department (PED) personnel monitored the engine and fire pump performance due to this pump having many problems with the control circuitry and pump packing glands. PED had requested that this pump be placed in a maintenance rule category A-1 to require increased monitoring of the pump's performance. Maine Yankee has assembled a team to develop a plan to upgrade the pump.

c. Conclusions

Operation's personnel conducted the test well with good engineering involvement. The PED involvement demonstrated the increased attention to attempt to resolve long standing problems with the diesel fire pump. The nuclear plant operator demonstrated an excellent understanding of the past problems with the diesel fire pump and closely monitored the pump's performance during the test period.

M3 Maintenance Procedures and Documentation

M3.1 Revision of Work Control Program Procedure

a. Inspection Scope (62707)

The inspector reviewed the newly revised work control program procedure 0-16-3, Work Order Process, and discussed the changes with maintenance management.

b. Observations and Findings

A new revision (11) of procedure 0-16-3, Work Order Process, was issued during the inspection period. The inspector reviewed the new procedures and found the changes to be appropriate. The original work control procedure provided guidance for electrical, mechanical and instrument and controls maintenance activities in one procedure. In the new revision, the function of each discipline was relegated to separate procedures. The separation of maintenance disciplines into separate procedures reduces the size of station procedure 0-16-3, Work Order Process and makes it less cumbersome. This procedure remains the overall guidance document, but provides "what to do" information rather than "how to do" information which is provided in the separate discipline procedures. New implementing procedures have been developed specific to each section of the maintenance department. In addition,

a new expanded section in the procedure concerning "Post Maintenance Testing" (PMT) has been incorporated. This section provides more detailed guidance concerning the control of PMT and requirements and responsibilities for completion and turnover to the operations department.

c. Conclusions

The revised Work Control Process procedure was appropriate to enable maintenance sections to provide better work controls. All sections of the maintenance department contributed in the revision process to ensure that the completed document will meet all the departmental needs.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Cable Separation Issues

a. Inspection Scope (37551)

The inspectors reviewed the licensee's immediate actions taken to address the cable separation problems identified during this period.

b. Observations and Findings

On December 5, 1996, Maine Yankee Engineering Department personnel identified certain inadequate cable separation issues affecting the reactor protection system. The identification was made during the licensee's review of NRC Generic Letter 96-01 issues. The issues initially identified were:

(1) Inadequate separation of 125 volts DC control power to four of eight Reactor Trip Breakers (RTB). The control power to RTB 3 and 7 was from Vital DC Bus 4 instead of from Vital DC Bus 3. The control power to RTB 4 and 8 was from Vital DC Bus 3 instead of from Vital DC Bus 4.

(2) Inadequate separation of cables to all four Manual Reactor Trip Push Buttons in the Control Room.

The control power supply to the other RTBs, were not affected. RTB 1 and 5 were powered from Vital DC Bus 1 as expected, and RTB 2 and 6 were powered from Vital DC Bus 2 as expected.

When the control room was notified of these problems, operators promptly declared the 2 sets of Manual Reactor Trip PushButtons inoperable. Technical Specification 3.9, Operational Safety Instrumentation, Control Systems, and Accident Monitoring Systems, requires that at least 1 of 2 sets of the pushbuttons be operable. With

both inoperable the plant could not comply with the requirements of Tech. Specs 3.9, and therefore operators entered the remedial action of Technical Specification 3.0, Limiting Conditions for Operations, Specification A, which required that the plant be placed in Hot Shutdown condition within the following 6 hours. A reactor shutdown was initiated and the reactor was in Hot Shutdown condition (subcritical) early on December 6, 1996. The plant notified the NRC as required by 10 CFR 50.72 for a technical specification required plant shutdown.

Work orders were initiated to commence repairs to the affected cables. During the course of the work activities, other problems were identified with cable separation that necessitated an expanded review. Some other problems that were identified included:

- Inadequate separation of Control, Power and Instrument cables for the Containment Hydrogen Analyzer System.

- Inadequate separation of a cable for the Steam Generator Blowdown System Trip Valves.

- Inadequate separation of a control cable for an Auxiliary Steam System High Energy Line Break (HELB) valve.

- Inadequate testing of station power supply breaker auxiliary contacts in Emergency Diesel Generator, EDG-1A and EDG-1B circuits.

- Inadequate testing of the Reactor Trip Breakers Undervoltage and Shunt Trip Coils.

At the end of this inspection period, the licensee was in the process of developing the scope for an expanded review and the process for field verification that will be accomplished prior to plant restart. Details of NRC's inspection activities in this area of cable separation will be documented in NRC Inspection Report 50-309/96-14.

c. Conclusions

The inspector noted that while identification of this issue reflected good engineering efforts, it revealed that there had been some weaknesses in the past that caused these problems to exist. It was not clear what the extent of the problem was nor when its problems occurred with respect to new construction or during later plant modifications. The root cause analysis to determine why these problems existed was still ongoing at the end of this inspection period.

E8 Miscellaneous Engineering Issues

E8.1 Cold Weather Operations (Update, URI 50-309/96-08-02 and 96-08-04)

a. Inspection Scope (37551)

The inspectors reviewed and discussed the licensee's actions to address two previously identified issues involving cold weather operations. The issues involved the temporary modifications installed to mitigate the effects of a High Energy Line Break (HELB) (URI 50-309/96-08-02) or Flooding (50-309/96-08-04) in the turbine building.

b. Observations and Findings

Maine Yankee had implemented temporary modifications in the past to address the concerns with a HELB or a Flooding in the turbine building. For the HELB concern, the temporary modification included removal of blowout panels in the building siding, and removal of some roof louvers. For Flooding protection, the temporary modification included leaving the North and South roll up doors slightly open (at least 5 inches) to be able to mitigate the effects of a design basis flood in the turbine building. However, with the onset of Winter, changes were required with these temporary modifications due to the habitability concerns they presented.
The turbine building environment, based on a slot break type HELB, with the building closed in the "winter" configuration was established. Temporary modifications that needed to be accomplished prior to cold weather to allow the turbine hall doors and louvers to be closed were identified.

An engineering design change request (EDCR) number 96-41 was generated to provide permanent modifications to the turbine building to mitigate the effects of the design basis turbine building internal flooding events and Individual Plant Evaluation for External Events (IPEEE) flooding scenario. The modification included a control room door berm, a trench and site drainage installation and a flood relief panel in the north wall of the turbine building.

A design discrepancy evaluation (DDE) number 96-63, revision 1, was generated to address the environmental conditions in the turbine building caused by a 24-inch feedwater pipe slot break and to clarify the applicability for temperatures under 60 ° F. The DDE included the consideration of a HELB in the turbine building during the Winter configuration. The building would be placed in a "winter" configuration as follows: (1) Four banks of the building roof louvers would be kept open, (2) A hinged plywood section would be provided on the building East wall louvers that can be easily opened from the outside, and (3) A temporary vestibule (personnel door) would be constructed inside the security door located in the North wall of the building.

The inspector will continue to monitor licensee's activities in these areas. These items remain open pending completion of licensee actions and NRC's reviews of those actions including the adequacy of the modifications installed.

c. Conclusions

The inspector reviewed the licensee's efforts and held discussions with members of the corporate engineering department. Good progress was made on the resolutions to ensure that safety related equipment and structures in the turbine building would not be adversely affected by a design basis HELB or flooding.

E8.2 Replacement of Heating and Ventilating Unit, HV-7

a. Inspection Scope (37551, 62707)

The inspector reviewed the engineering design change request (EDCR 96-33) for the replacement of the containment spray building heating and ventilation unit, HV-7. In addition, work activities in the field were observed during removal of the existing unit and preparations for installation of the new equipment.

b. Observations and Findings

The inspector determined that Maine Yankee engineering personnel properly prepared the engineering design change request (EDCR 96-33) as directed by station procedure 17-21-2, revision 10, Engineering Design Change Request-Maine Yankee. The new heating and ventilation unit was classified as a major modification and a 10 CFR 50.59 screening was performed as required. The inspector reviewed the 50.59 screening and found that the conclusions reached were appropriate.

The reason for the modification was that the originally installed unit was not reliable during winter operation and subject to freezing coils and snow blockage, thereby rendering the unit inoperable. The HV-7 unit provides air supply to the containment spray (CS) and low pressure safety injection (LPSI) pump area and is required for fans FN-44A and FN-44B to be considered operable. Those fans are the exhaust fans for the CS and LPSI pump area.

The original unit was configured as a vertical unit with a horizontal steam coil and a ground level air intake. The new unit is configured with the same capacity and the heating coils are mounted vertically and adequate steam condensate drainage is assured by proper pitching of the heating coil elements, thereby eliminating the potential for freezing. In addition, the intake ducting has been redesigned and located above the existing inlet to eliminate ice and snow blockage. A new feature was added which will allow the unit to be bypassed if the unit fan is off and exhaust fans FN-44A or B are operating. The new unit will be seismically supported and a new pneumatic temperature control system will be installed as part of the modification.

During the installation phase the inspector observed the removal of the old unit and a portion of the preparation work on the new equipment. The work was well controlled with Maine Yankee engineering personnel properly overseeing contractor personnel as required by station procedures. Installation was still ongoing at the end of this inspection period.

c. Conclusions

Maine Yankee engineering personnel properly developed and implemented the EDCR in a well controlled and safe manner. The inspector witnessed excellent field oversight of contractor personnel during the installation of the unit.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Unscheduled Radioactive Gaseous Releases

a. Inspection Scope (71750)

The inspector conducted a review of the unscheduled radioactive gaseous release of November 18, 1996, to determine the safety significance of the event. In addition, a review was conducted of the previous unscheduled radioactive gaseous releases during the current year.

b. Observations and Findings

The radioactive gaseous release of November 18, 1996, involved a slightly elevated radioactive noble gas release from 15:30 pm until 3:30 pm on November 19, 1996. Normal primary vent stack release values are less than minimum detectable activity, 3E-8 uC/cc (less than 0.09 Curies), which had been reported to the State of Maine as the 24 hour forecast.

Maine Yankee personnel performed grab sampling during the sixteen hour period noted above and recorded radioactivity levels of 5E-7 uC/cc which corresponds to 0.77 curies of radioactive noble gas released. The dose consequences of the event was estimated to be 3.9E-5 mrem. This was negligible compared to the TS noble gas limit of 500 mrem/year. A review of the primary vent stack recorded readings did not indicate any readings over the normal 100 cpm reading. The Maine Yankee Emergency Plan requires that an Unusual Event be declared when the primary vent stack monitor indicates greater than 400,000 cpm.

Maine Yankee investigated two possible causes for the elevated radioactive noble gas, but neither were able to be substantiated. At the close of the inspection period no cause for the release had been determined.

Maine Yankee reported four unscheduled radioactive gaseous release during 1996 listed below:

February 29, 1996, forecast less than 0.01 Curies - actual 0.16 Curies (3E-5 mrem) caused by known maintenance work.

October 14, 1996, forecast less than 0.01 Curies - actual 0.103 Curies (5.2E-6 mrem) cause unknown.

October 30, 1996, forecast less than 0.01 Curies - actual 0.0535 Curies (3.79E-6 mrem) caused by known chemistry sample purge.

November 18-19, 1996, forecast 0.01 Curies - actual 0.77 Curies (3.9E-mrem) cause unknown.

Due to the relatively minor radioactive releases, no immediate safety concern has been identified due to these events.

c. Conclusions

The inspector determined that the unscheduled radioactive releases were minor in nature. Although minor events, Maine Yankee did not trend and thoroughly pursue underlying causes for the number and nature of the events.

R1.2 Hot Particle Exposure to Security Personnel (URI 50-309/96-13-03)

a. Inspection Scope (71750)

The inspector reviewed the circumstances involving the hot particle exposure to security personnel. The reviews included Maine Yankee's radiological incident report (RIR) which documented the event, and discussions with radiological controls personnel, security department personnel and the Region I radiological controls specialist.

b. Observations and Findings

Maine Yankee radiation controls technicians identified two chairs in the Radiologically Controlled Area (RCA) as being contaminated. One chair had minor surface contamination on the back and the other chair was found to have a hot particle embedded in the foam rubber underneath the cloth covering of the seat. The chair was located near the entrance to the containment personnel hatch, and was used 24 hours a day by security personnel assigned as fire watches.

Maine Yankee personnel analyzed the hot particle and determined that the major isotope was Cesium (Ce)-144 which is a beta and gamma emitter with a 284.4 day half-life. Direct contact surveys with the area of the seat resulted in dose rates of 1.8 mR/hr beta-gamma. A review of the fire watch log indicated that the maximum occupancy time by any individual was approximately 51 hours per month. Assuming the dose rates as measured, the maximum skin dose a person would have received in a year would be 1.1 rem, well within regulatory limits but no ALARA.

In addition to the radiological incident report, Maine Yankee radiation controls department directed that a root cause determination be performed to identify the source of the particle, and to determine the necessary corrective actions to prevent recurrence of the problem. The root cause investigation was on-going at the close of the inspection period.

Conclusions

Mine Yankee properly responded to the event by analyzing the hot particle to determine possible levels of exposure to the personnel involved and the source of the particle. In addition, the analysis to determine exposure level was sent to an outside technical consultant for independent review. This item remains open pending completion of NRC's review of the dose calculations and root cause analysis, and final assessment of the regulatory significance. (URI 50-309/96-13-03).

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of the licensee on December 20, 1996. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Blackmore, Plant Manger
S. Smith, Operations Manger
E. Heath, Radiation Protection Manager
J. Weast, Licensing Engineer
G. Leitch, Vice President - Operations
T. Gifford, Corporate Engineering Department
H. Gilpatrick, Corporate Engineering Department
L. McCabe, Corporate Engineering Department

NRC

R. Ragland, Radiation Specialist
J. Noggle, Radiation Specialist

Other

P. Dostie, Maine, State Nuclear Safety Inspector
U. Vanags, Maine, State Nuclear Safety Advisor

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 92700:	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92709:	Licensee Strike Contingency Plans
IP 92902:	Followup - Engineering
IP 92903:	Followup - Maintenance
IP 93702:	Prompt Onsite Response to Events

ITEMS OPENED, CLOSED, AND DISCUSSED

Items Opened:	URI 50-309/96-13-01	Loss of offsite power; adequacy of 115Kv line and related Technical Specifications (02.1).
	URI 50-309/96-13-02	Inconsistent performance during post maintenance testing of the auxiliary feedwater pump, P-25B, involving inappropriate adjustment of the steam (R8.2) admit valve controller. (M1.2)
	URI 50-309/96-13-03	Review of the circumstances surrounding a radioactive (hot) particle found in a chair in the radiological controlled area.
Items Closed:	None	
Items Discussed:	URI 50-309/96-08-02/04	Cold weather operations with temporary modifications in the turbine building for HELB and Flooding protection. (E8.1)

LIST OF ACRONYMS USED

AEOD	Office for Analysis and Evaluation of Operational Data
ALARA	As Low As Is Reasonably Achievable
CED	Corporate Engineering Department
CFR	Code of Federal Regulations
CVCS	Chemical and Volume Control System
CS	Containment Spray
DDE	Design discrepancy Evaluation
DWST	Demineralized Water Storage Tank
EA	Escalated Action
ECCS	Emergency Core Cooling System
EDCR	Engineering Design Change Request
EDG	Emergency Diesel Generator
EFW	Emergency Feedwater
EP	Emergency Preparedness
ESF	Engineered Safety Feature
gpm	gallons per minute
HELB	High Energy Line Break
IFI	Inspection Follow-Up Item
IFS	Inspection Follow-Up System
IMC	Inspection Manual Chapter
IPAP	Integrated Performance Assessment Process
IPEEE	Individual Plant Evaluation for External Events
ISI	In-Service Inspection
kV	Kilo Volts
LER	Licensee Event Report
LPSI	Low Pressure Safety Injection
MD	Management Directive
NCV	Non-Cited Violation
NMSS	Office of Nuclear Material Safety and Safeguards
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OE	Office of Enforcement
OI	Office of Investigations
PED	Plant Engineering Department
P&ID	Piping and Instrument Drawing
PIPB	Inspection Program Branch
PMT	Post Maintenance Testing
PPR	Plant Performance Review
RA	Regional Administrator
RHR	Residual Heat Removal
RIR	Radiological Incident Report
RP	Radiation Protection
RP&C	Radiological Protection and Chemistry
RPS	Reactor Protection System
RTB	Reactor Trip Breaker

RW	Raw Water
SALP	Systematic Assessment of Licensee Performance
SI	International System of Units
SW	Service Water
TE	Technical Evaluation
TI	Temporary Instruction
TPC	Temporary Procedure Change
TS	Technical Specification
UOR	Unusual Occurrence Report
URI	Unresolved Item
WO	Work Order