


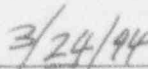
U.S. NUCLEAR REGULATORY COMMISSION

Region I

Report No.: 93-06
Docket No.: 50-333
License No.: DPR-59
Licensee: New York Power Authority
P.O. Box 41
Lycoming, New York 13093
Facility: James A. FitzPatrick Nuclear Power Plant
Location: Scriba, New York
Dates: February 6, 1994 through March 12, 1994
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Date

INSPECTION SUMMARY: Routine NRC resident inspection of plant operations, maintenance, engineering, plant support, and quality assurance/safety verification.

RESULTS: See Executive Summary

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NOTE: The NRC inspection manual procedure or temporary instruction that was used as inspection guidance is listed for each applicable report section.

EXECUTIVE SUMMARY

James A. FitzPatrick Nuclear Power Plant

Inspection Report No. 50-333/94-06

Plant Operations: The plant continued to operate at 100% power with few operational problems. The high pressure coolant injection (HPCI) system was promptly restored after being declared inoperable due to a turbine steam leak. A detailed inspection of the emergency diesel generators identified no significant problems. The ongoing review of the control room ventilation system continues to identify design inadequacies.

Maintenance: Numerous maintenance activities were observed including repairs to the HPCI turbine and control room ventilation system. No discrepancies were noted. Several surveillance tests were also observed. Corrective actions for residual heat removal service water (RHRSW) strainer failures appear to be appropriate.

Engineering: NYPA identified that calculations used to demonstrate that emergency core cooling system pumps had sufficient net positive suction head were nonconservative. Preliminary analysis shows that a margin to cavitation still exists. A violation regarding control room chiller safety classifications was closed. A deviation regarding crescent emergency service water (ESW) flow was updated.

Plant Support: Plant housekeeping and material conditions were found to be good. Limiting condition for operation for the East and West cable tunnels was exited following completion of sprinkler modifications and issuance of a Technical Specification amendment.

Safety Assessment/Quality Verification: NYPA conducted several enhanced work practices seminars in response to some personnel performance problems during your fall outage. The seminars appeared to have been beneficial and several action items were generated to improve work practices and communications. Good safety perspective was noted during the observations of PORC meetings. Inspector review of temporary leak repair controls identified that adequate procedures were in place and adequate management attention was being applied to this activity.

DETAILS

1.0 SUMMARY OF FACILITY ACTIVITIES

1.1 NYPA Activities

The plant operated at 100% power for nearly the entire period. On February 24, 1994, NYPA made two 10 CFR 50.72 notifications regarding an inoperable high pressure coolant injection (HPCI) turbine and further problems identified with the control room ventilation system. The HPCI system was restored on February 26 and the control room ventilation system remained in the emergency lineup throughout the inspection period. On March 12, power was briefly reduced to 60% to allow condenser tube inspections and steam isolation valve surveillance tests.

1.2 NRC Activities

The inspection activities during this report period included inspection during normal, backshift and weekend hours by the resident staff. There were 45.5 hours of backshift (evening shift) and 6 hours of deep backshift (weekend, holiday and midnight shift) inspections during this period.

A region based inspector conducted a motor operated valve inspection during the week of February 7, 1994.

A region based inspector conducted a review of FitzPatrick's radiation protection program during the week of February 28, 1994.

A region based inspector inspected the site's security program during the week of March 7, 1994.

An enforcement conference was held on February 25, 1994 to discuss issues concerning a contaminated TN-RAM shipping cask.

2.0 PLANT OPERATIONS (71707,71710,93702,92701)

2.1 Followup of Events Occurring During Inspection Period

2.1.1 HPCI Inoperable Due to Steam Leak

With the plant at 100% power on February 24, 1994, the high pressure coolant injection (HPCI) system was taken out of service (7-day LCO) for performance of Surveillance Test (ST)-4P, "HPCI Annual Quick-Start Transient Monitoring Test (IST)," Rev. 6, 10/9/93. Subsequent to starting the HPCI pump, greater than expected steam leakage was observed from the coupling side (pump side) of the turbine shaft. The control room operator tripped the HPCI turbine. HPCI was declared inoperable and NYPA made a 10 CFR 50.72 non-emergency notification to the NRC.

The shaft seal at the area of leakage consists of three carbon rings. NYPA has experienced small amounts of leakage in this area in the past upon starting the HPCI pump due to turbine shaft pitting, which is prevalent at other BWR facilities. However, the leakage during this evolution was worse than normal and did not decrease as the rotor heated up and expanded. An engineering memorandum (JSEM 90-022) and an adverse quality condition report (AQCR 89-112) address the shaft pitting phenomenon, which is also seen at the governor end of the turbine shaft. The apparent cause is due to moisture collecting in those areas. NYPA's action plan that has been in place since 1989 is to periodically monitor and trend the pitting conditions. Additional steps have also been taken to reduce the progression of pitting.

The existing carbon rings had been in place for about 2 years. NYPA already had a work package in place to replace the carbon rings on both the coupling and governor side of the turbine because they were due for replacement during the upcoming Fall 1994 outage. After the carbon rings were replaced, the HPCI system was successfully tested and declared operable on February 26.

2.1.2 Control Room Habitability; (URI 93-14-03 Update)

On February 24, 1994, NYPA made a 10 CFR 50.72 notification to the NRC when they determined that the control room emergency ventilation system would not maintain the habitability of the control room during an accident where a radiological release occurs and the ventilation system is in its normal lineup.

NYPA discovered the problem during ongoing efforts with their control room ventilation action plan (see IR 50-333/93-14 and 93-20). Due to previously identified problems, the control room emergency ventilation has not been in its normal lineup, but in the emergency lineup (isolate). Therefore, no immediate corrective actions were necessary to correct this recently identified problem.

The original design basis calculations assumed immediate operator response and 99% filter train efficiency. Since FitzPatrick's control room ventilation swap-over from its normal configuration to the isolate mode is not automatic, habitability design calculations must assume a conservative twenty minute time delay for operator action. In addition, since the emergency filter trains do not have heaters to control humidity, calculations must assume a 90% filter train efficiency. These new assumptions taken collectively lead to the noted unacceptable radiation levels in the control room.

The inspector verified that the control room ventilation system will remain in the isolate mode until corrective actions are completed per the established action plan. The existing unresolved item (URI 93-14-03) will be expanded to followup this concern.

2.1.3 Nitrogen Valve Failure

On March 10, 1994, a chemistry technician was filling a dewar flask from the B nitrogen tank. The chemistry department uses the nitrogen to cool radiochemistry counting equipment. After filling the flask, the technician attempted to shut the filling isolation valve, 27 CAD-59. However, the handwheel for the one-half inch isolation valve was stripped and the valve would not close. No other isolation valve existed in the dewar fill line and the entire B tank eventually blew down via the dewar flask relief valve. The A nitrogen tank continued to supply the plant's nitrogen requirements. After the tank emptied, the fill connection was capped and welded and the B tank was subsequently refilled. NYPA's critique of this event is ongoing.

2.2 Engineered Safety Features System Walkdown

The inspector conducted partial control room and in-plant walkdowns of the following systems:

- Control Room Ventilation
- High Pressure Coolant Injection
- Low Pressure Coolant Injection

No discrepancies were noted during the inspection walkdowns of the above systems.

2.2.1 Emergency Diesel Generator System

During the period February 28 - March 4, 1994, the inspector conducted a detailed walkdown of the emergency diesel generators (EDGs) and support systems to verify operability. The walkdown included a review of the actual system configuration against the flow diagrams (Drawings FM-93A, FM-94A, and FM-93C). Normal system lineups (i.e. valves, switches, power supplies) were verified to be correct using the EDG system operating procedure (OP-22). The system condition, including component labeling, housekeeping, calibration of instrumentation, valve condition, and control of flammable materials, was found to be adequate. The inspector identified and notified the shift supervisor (SS) of a very small lubricating oil leak at a mechanical fitting upstream of 'B' EDG circulating lube oil pump 93P-2B. The SS immediately dispatched an operator to investigate the condition and initiated a deficiency report (PID). On March 2, the inspector observed performance of the monthly full load operability test of the 'B' and 'D' EDGs per procedure ST-9B, and verified that all precautions and prerequisites, including manual rotation (barring over) of the EDGs within 48 hours (ST-9K) and completion of fuel oil transfer pump operability test ST-9L within eight hours were completed satisfactorily. The surveillance tests were performed properly, in accordance with the procedures, and all technical specification requirements were satisfied.

The inspector noted that procedure ST-9K, EDG Barring, renders the EDGs inoperable by closing the air start system isolation valves and placing the engine control switch in the "maintenance" position. The inspector reviewed the SS logs which indicated that the seven-day limiting condition for operation (LCO) of Technical Specification (TS) 3.9.B.3, Emergency A-C Power System, had not been entered. Although the allowed outage time of the LCO was not exceeded, failure to enter an LCO during the performance of surveillance tests which render safety systems inoperable is contrary to the guidance contained in NRC Generic Letter 91-18, and was identified previously in inspection report 50-333/94-03. Through discussions with licensee management, the inspector determined that the licensee had reviewed its surveillance procedures, including procedure ST-9K, against TS operability requirements, and intends to add steps to the applicable procedures to ensure that LCOs are entered. The licensee stated that procedure ST-9K would be changed prior to conducting the next EDG operability test. The inspector concluded that the licensee was taking adequate action to address the issue and had no further questions.

In summary, the inspector concluded that the EDGs and support systems were maintained properly. No significant problems impacting system performance or operability were observed.

3.0 MAINTENANCE (62703,61726,92701)

3.1 Maintenance Observations

The inspector observed and reviewed selected portions of preventive and corrective maintenance to verify compliance with codes, standards and Technical Specifications, proper use of administrative and maintenance procedures, proper QA/QC involvement, and appropriate equipment alignment and retest. The following activities were observed:

- B CRD pump coupling maintenance on February 11-15.
- Work Request 94-1275, Replace HPCI Inboard and Outboard Shaft Seals, on February 24.
- Work Request 93-0077, Transport Cask to Reactor Building/Refuel Floor, on February 23.
- Work Request 93-23159, 70 MOV 107 repair on March 9.

No concerns were identified during inspector review of the above activities.

3.2 Surveillance Observations

The inspector observed and reviewed portions of ongoing and completed surveillance tests to assess performance in accordance with approved procedures and Limiting Conditions for

Operation, removal and restoration of equipment, and deficiency review and resolution. The following tests were reviewed:

- ISP-15, Drywell Equipment Drain Sump Flow Loop Functional Test/Calibration, on February 23.
- ST-2A, RHR Pump Flow Rate and Inservice Test, on February 8.
- ST-2B, RHR Pump and MOV Operability and Keepfull Level Switch Functional Test, on February 8.
- ISP-16, Drywell Floor Drain Sump Flow Loop Functional Test/Calibration, on February 23.
- ST-4P, HPCI Annual Quick-Start Transient Monitoring Test (IST), on February 24. A steam leak occurred during this test which caused NYPA to declare the HPCI system inoperable. See section 2.1.1 for more information.
- ST-4B, HPCI Pump and MOV Operability Test on February 25. During performance of this test, some HPCI system oil pressures were just out of the acceptance range and in need of calibration. They were subsequently recalibrated. The inspectors had no further questions on this matter.
- ST-2X, RHR Service Water Flow Rate, Strainer and Inservice Test (IST), on February 9. The surveillance was unsatisfactory due to the inability to shift strainer 10S-5B from the inservice to standby basket. The cause of the failure was scale buildup on the valve stem that shifts the strainer. On February 16, strainer 10S-5A experienced a similar failure. The strainers are normally cycled once every three months for IST. In response to these failures, NYPA is exercising the strainers every two weeks. No further difficulties have been noted and the situation will continue to be monitored.

Other than noted, no concerns were identified during inspector review of the above activities.

4.0 ENGINEERING (37700,93702,92700,92701)

4.1 ECCS Strainer Performance

The NRC issued Generic Letter 85-22, Post-LOCA Potential for Loss of Recirculation Capability Due to Insulation Debris Blockage, to alert licensee's to a generic safety concern regarding LOCA-generated debris that could block emergency core cooling system (ECCS) suction strainers causing a loss of net positive suction head. In response to this generic letter, NYPA commissioned a study to analyze FitzPatrick's vulnerability to this phenomenon. The study, NUTECH report PNY-06-006, "Effect of Insulation Debris on the

Post-LOCA Operation of ECCS Pumps at the James A. FitzPatrick Nuclear Power Plant," dated May 1987, concluded that sufficient NPSH is available to preclude cavitation of the ECCS pumps. The study assumed 100% NUKON or NUKON equivalent insulation in the drywell. This was considered an acceptable assumption because modification F1-86-058 was in progress and was replacing all insulation with NUKON or NUKON equivalent.

The modification is approximately 75% complete with remaining insulation consisting of 20% mineral wool and 5% fiberglass (Temp Mat). The modification was scheduled for completion during the 1992-93 refuel outage. However, the work was cancelled and has not been rescheduled. As mineral wool and fiberglass is removed for the work, it is being replaced with NUKON. NRC Information Notice 92-71 was issued to notify licensees of an incident at a Swedish BWR where the ECCS strainers became clogged with mineral wool insulation. In response to this Information Notice, NYPA performed a calculation, JAF-CALC-MISC-01118, to determine the effect of the 20% remaining mineral wool in the ECCS suction strainers. The calculation concluded that there was sufficient NPSH available to the ECCS pumps with the existing drywell insulation configuration.

NRC Bulletin 93-02, Debris Plugging of Emergency Core Cooling Suction Strainers, again addressed the strainer plugging issue. Supplement 1 to this bulletin was issued February 18, 1994. During the NYPA followup to the bulletin supplement, an error was found with JAF-CALC-MISC-01118. Specifically, the suction pipe/strainer configuration used in the calculation was not accurate. The actual effective strainer area was about half of what was used in the calculation. Additionally, with a reduced strainer area, the flow velocity will increase which increases head loss. NYPA's preliminary analysis concludes that there is still sufficient NPSH. NYPA will be submitting a followup response which will be reviewed in a subsequent report along with the analysis. Inspector Followup Item (94-20-01).

4.2 Previously Identified Items

4.2.1 (Closed) Violation (92-81-03); Control Room Chiller Condensers Reclassified as Non-Safety Related

In 1990, a NYPA design change review incorrectly downgraded the control room chiller condensers to non-safety-related. During a design basis event, the control room would be cooled by the safety-related air handling units, which are fed by emergency service water (ESW). The reclassification failed to conclude that the service water (SW) piping supplying the chiller condensers also provides a safety-related pressure boundary for the ESW supplying the air handling units. In addition, an outdated calculation for the control room heat loads was used to support the reclassification because NYPA did not establish and maintain as-built control room heat loads.

NYPA reclassified the SW/ESW pressure boundary supplying the control room chiller condensers as QA Category I as depicted on drawing ISI-FB-35E, and revised the Master Equipment List. A nuclear safety evaluation (JAF-SE-90-067) was updated to verify that the

installed components in the system meet QA Category I requirements. NYPA revised Modification Control Manual (MCM)-6A, "Component Classification and System Safety Function Control," to ensure that appropriate personnel are assigned to review classifications and to provide additional guidance to ensure interfacing safety-related systems are identified and evaluated during component classifications. Training of affected plant staff on the new procedure was completed. In addition, NYPA is developing a heating, ventilation and air conditioning design basis document so that heat loads in various buildings can be periodically updated and documented. The inspector verified the above actions and this violation is closed.

4.2.2 (Update) Deviation (92-81-01); Failure to Provide FSAR Minimum ESW Flow

The acceptance criteria provided in Surveillance Test (ST)-8Q, "Testing of the ESW System," required the minimum total ESW flow to the five crescent area unit coolers to be 120 gallons per minute (GPM). Table 9.7-1 of the FitzPatrick FSAR specified that the minimum ESW flow to each of the five crescent area unit coolers to be 24 GPM. During several performances of ST-8Q in 1991, the total ESW flow to all five crescent area unit coolers was greater than 120 GPM, but ESW flow to several crescent area unit coolers was less than 24 GPM.

NYPA has established a Nuclear Generation Business Plan objective and Results Improvement Program item to enhance the process for review and revision of the FSAR to reflect current plant configuration and design basis documents. NYPA revised their FSAR to include both the design specifications and the operability requirements of the crescent area unit coolers. In a letter to NYPA dated September 9, 1992, the NRC stated that the crescent area temperature profile should be evaluated to support an FSAR change. The original ESW flow rate of 24 GPM in FSAR Table 9.7-1 was not changed, but the FSAR revision specifies that the required heat removal can be met at lower than design flow rates based on thermal performance testing. The nuclear safety evaluation for the ESW system (JAF-SE-90-067) was updated to support this FSAR revision. NYPA's evaluation of the temperature profile should be complete in April 1994, and the FSAR and safety evaluation will be further revised, if necessary. In addition, NYPA is in the final stages of revising two procedures that control the update process to the FSAR. This item will remain open pending NRC review of NYPA's temperature profile evaluation and procedure revisions.

5.0 PLANT SUPPORT (64704,71707,83750,40500,92701)

5.1 Plant Housekeeping

General tours in the reactor building and turbine building covering material condition and housekeeping were conducted. No significant deficiencies were identified.

5.2 Fire Protection

On March 3, 1994, the NRC issued Technical Specification amendment 206 to reflect the installation of a new full-area fire suppression system in the East and West cable tunnels. This new full-area fire suppression system was installed because the previous sprinkler system did not provide coverage to some cable trays and the sprinkler head orientation did not provide full coverage of the cable trays where it was installed. With the new amendment, NYPA was able to exit a longstanding limiting condition for operation (LCO) action statement and secure the fire watches in the East and West cable tunnels. The relay room remains the only fire zone in a longstanding LCO.

6.0 SAFETY ASSESSMENT/QUALITY VERIFICATION

6.1 Enhanced Work Practices Seminars

NRC Inspection Report 93-24 identified and cited several examples of poor personnel performance and procedural noncompliance. In response to these violations, NYPA committed to conducting enhanced work practice workshops to improve personnel performance in the areas of procedural adherence, attention to detail, and self-verification. Four workshops were held from February 11 to March 10, 1994. The seminars were facilitated by department managers and attended by all employees who work in the power block. The participatory workshops allowed management to present work practice expectations and receive feedback on roadblocks to achieve these expectations. Several action items were generated from these workshops to improve communications and work practices. The seminar appeared to have been very beneficial. Performance during the upcoming maintenance outage will demonstrate whether these initiatives have been effective.

6.2 Plant Operating Review Committee (PORC)

Two plant operating review committee (PORC) meetings were attended by the inspector. Good discussions were observed with a good questioning attitude and safety perspective being demonstrated by the PORC members.

6.3 Review of Temporary Leak Repair Controls

In August 1993, at the Millstone Nuclear Power Station, Unit 2 (Northeast Utilities), excessive leakage of reactor coolant from the body-to-bonnet joint of a letdown system manual isolation valve resulted in shutdown of the plant. The valve was not isolable from the reactor coolant system. The event occurred when a body-to-bonnet stud broke during performance of a temporary leak sealant injection repair of the joint. Between June and August, 1993, the valve had been injected approximately 30 times, and the body-to-bonnet joint had been peened repeatedly. Subsequent testing revealed that valve studs can be loaded to failure by peening due to the wedging action of the deformed valve flanges. The NRC found that the technical and safety evaluations associated with the attempted repairs had been

inadequate, and that licensee management and quality assurance oversight of the job had failed to identify failures to follow procedures and adhere to engineering instructions. The event was documented in NRC Information Notice 93-90, Unisolable Reactor Coolant System Leak Following Repeated Applications of Leak Sealant, dated December 1, 1993.

The inspector reviewed the licensee's temporary leak repair controls to verify that information regarding the Millstone event had been disseminated to the appropriate personnel and incorporated into procedures. Through discussions with licensee managers and supervisors, the inspector determined that a lessons-learned video tape produced by Northeast Utilities had been shown to and discussed with engineering, maintenance, and quality assurance personnel. The inspector also found that personnel were quite familiar with the Millstone event. At Fitzpatrick, temporary leak repairs are controlled by procedures WACP-10.1.3, Control of Jumpers, Lifted Leads, and Temporary Modifications, and MDSO-03, Temporary Leak Repair. The inspector noted that the MDSO requires initiation of a jumper per procedure WACP-10.1.3, which would require completion of detailed technical reviews and a safety evaluation pursuant to 10 CFR 50.59 to assess the safety significance of the proposed repair. The evaluations receive multidisciplinary review by the plant operations review committee prior to implementation of the repair. Also, additional safety evaluations are required by procedure MDSO-03 for repeated sealant injections and prior to peening. The procedure also was strengthened by the addition of a warning that peening can cause a substantial increase in fastener loads, by requiring that personnel review the Millstone event prior to peening, and by requiring that a visible gap between valve flange surfaces be maintained during peening to preclude wedging action. Finally, the licensee Quality Assurance (QA) supervisor informed the inspector of his expectation, which was communicated to QA work planning personnel, that engineering controls and critical attributes associated with the leak repair process would be critically assessed. The inspector concluded that the licensee's temporary leak repair controls were adequate.

7.0 MANAGEMENT MEETINGS (30762,71707)

7.1 Exit Meetings

At periodic intervals during the course of this inspection, meetings were held with senior facility management to discuss inspection scope and findings. In addition, at the end of the period, the inspectors met with licensee representatives and summarized the scope and findings of the inspection as they are described in this report. The licensee did not take issue with any of the findings reviewed at this meeting.