

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-293/85-21
Docket No. 50-293 Category C
Licensee: Boston Edison Company
800 Boylston Street
Boston, Massachusetts 02199
Facility: Pilgrim Nuclear Power Station
Dates: July 16 - 30, 1985

Inspector: *L. Tripp*
McBride, Resident Inspector

8/5/85
Date

Approved by: *L. Tripp*
L. Tripp, Chief, Reactor Projects Section 3A

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Date

Inspection Summary: Inspection on July 16-30, 1985 (Report No. 50-293/85-21)

Areas Inspected: Special unannounced inspection of the licensee's response to a secondary containment damper surveillance test conducted on July 15, 1985 and to an emergency diesel generator fuel oil surveillance test conducted on July 23, 1985. The inspection involved 24 inspector hours by one resident inspector.

Results: Two examples of an apparent violation of a procedure for Failure and Malfunction Reports were noted (Failure to initiate Failure and Malfunction Reports on July 15 and 23, 1985, Detail 5). As a result of this apparent violation, secondary containment integrity was not maintained between July 15 and 16, 1985 (Detail 3) and surveillance testing required by the technical specifications was not conducted between July 23 and 26, 1985 (Detail 4). In addition, an overall concern was identified regarding the adequacy of secondary containment integrity considering the recent damper failures and decreasing ability to maintain vacuum (Detail 6).

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DETAILS

1. Persons Contacted

Within this report period, interviews and discussions were conducted with members of the licensee staff and management to obtain information pertinent to the subjects being inspected.

2. Introduction

On July 16, 1985 at 9:50 a.m. while the reactor was at 100% power, the inspector discussed an ongoing inspection of automatic secondary containment isolation dampers with a licensee maintenance supervisor. The supervisor indicated that damper AO-N-90 had failed to meet inspection acceptance criteria and a maintenance request (MR) had been issued to repair it. The supervisor was not aware at that time of the implications of the failed damper and had not notified the Operations Department. Subsequently, the control room was informed of the damper problem and a redundant isolation damper was closed.

On July 23, 1985, the Chief Chemical Engineer (CCE) was informed by a contractor laboratory that a fuel oil sample from the "A" emergency diesel generator oil storage tank had an unacceptably high water content. The control room was not notified of the problem until July 26, 1985, three days later. The "A" diesel generator was subsequently declared inoperable and appropriate surveillance tests were initiated.

3. Sequence of Events for the Secondary Containment Damper Failure

On July 15, 1985 at approximately 3:00 p.m., a contractor noted that the AO-N-90 damper would not fully close during an inspection of secondary containment dampers, procedure no. 8.7.3.1. The inspection was conducted as part of an increased damper surveillance program initiated in response to damper failures earlier this year.

The AO-N-90 damper is one of two secondary containment dampers mounted in series in the the refuel floor exhaust duct. The other damper, AO-N-91, was verified to be operable during the inspection on July 15, 1985. Both dampers were opened (their normal position) shortly after the inspection of AO-N-90 and maintained open until the next morning.

The contractor indicated that a small opening was detected between the sealing surfaces of four of twenty-four louvers in AO-N-90 while the damper was closed during the inspection. This opening was caused by slippage in damper drive gears. The opening extended over the total sealing surface of the four louvers and exceeded the acceptance criteria in procedure 8.7.3.1, i.e., a positive seal must exist over 90% of the damper edge seal when the dampers are closed.

The inspection was halted and an MR was issued to repair AO-N-90. The MR indicated that the maintenance problem was: "repair gears on AO-N-90 damper to meet 8.7.3.1". During the afternoon of July 15, the contractor submitted the maintenance request to the control room for approval. The MR (no. 85-24-122) was approved by supervisory personnel in the Maintenance and Operations Departments and given a "B" priority. This priority indicated that the maintenance was not urgent and would not require interrupting lower priority work in progress.

A Failure and Malfunction Report (F&MR) describing the damper problem was not initiated on July 15. The maintenance supervisor in charge of the damper inspection told the contractor that he (the supervisor) would write an F&MR if control room personnel asked for one. No one in the control room subsequently asked about an F&MR when the contractor had the MR approved.

On July 16, 1985 at 9:50 a.m., the inspector discussed the damper inspection with the maintenance supervisor. During the discussion, the supervisor indicated that an MR had been issued for the repair of AO-N-90, but work had not started. The supervisor said that he did not know if AO-N-90 was operable. The inspector suggested that the supervisor check with the control room to ensure that operations personnel understood the significance of the problem with AO-N-90.

Ten minutes later, at 10:00 a.m., the inspector entered the control room and noted that both the AO-N-90 and AO-N-91 dampers were open. The maintenance supervisor was discussing the damper problem with the Watch Engineer at that time. Following this discussion, the Watch Engineer instructed the control room supervisor to close both dampers, isolating the refueling exhaust ventilation duct. The control switches for the dampers were tagged shut. The Watch Engineer also instructed the maintenance supervisor to submit an F&MR. At 10:35 a.m., the licensee notified the NRC of the damper problem via the ENS telephone line.

On July 19, 1985, the licensee determined that the opening between the four louvers in the AO-N-90 damper was large enough to make the damper inoperable. As a result, the licensee concluded that secondary containment integrity had not been maintained between 3:00 p.m. on July 15 and 10:00 a.m. on July 16, 1985.

4. Sequence of Events for the Diesel Generator Fuel Oil Water Problem

On July 2, 1985, routine monthly composite samples were collected from the T-126A and T-126B emergency diesel generator fuel oil storage tanks, as required by Technical Specification 4.9.A.1. Each tank has a 25,000-gallon capacity and supplies fuel oil to an 800-gallon diesel generator day tank via the diesel oil transfer system. The composite samples were formed by combining grab samples from the top, middle, and bottom levels of the tanks. Qualitative indicator tests were conducted on July 2 and did not detect water in either tank. The composite samples were subsequently sent to a contractor testing laboratory for analysis.

On July 23, 1985, the CCE was notified by the contractor laboratory that the July 2 sample from the T-126A tank had a water and sediment content of 1.0%. This exceeded the maximum level of water and sediment specified in Table 1 of ASTM D975-77 for no. 2-D fuel oil, 0.05%. Technical Specification 4.9.A.1 requires that fuel oil quality meet the limits in Table 1 in the ASTM standard. No water was detected in the T126B tank sample.

Confirmatory oil samples from both storage tanks were taken on July 23 and analyzed by the contractor laboratory the same day. The analysis detected 0.5% of water and sediment in the T-126A tank composite sample. The licensee's qualitative test also indicated the presence of about a half inch of water in the bottom of the T-126A storage tank on July 23. No water was detected in the T-126B tank sample.

The Nuclear Watch Engineer was notified that there was water in the T-126A tank on July 23, but was apparently not told that the technical specification surveillance test limits had been exceeded. During the next two days, the Station Manager and the Chief Operating Engineer were also told that water had been found in the T-126A tank, but were not aware that the surveillance limit had been exceeded.

About 60 gallons of water and oil were subsequently pumped from the T-126A tank. However, water and sediment were still detected in a fuel oil sample collected on July 25 in excess of ASTM D975-77 limits after the pumping had been completed.

On July 26 at approximately 3:15 p.m., the CCE notified the operations department that the fuel oil in the T-126A tank did not meet the water and sediment requirements of the Technical Specification 4.9.A.1 (i.e., did not meet the limit in Table 1 in ASTM D975-77). The "A" emergency diesel generator was promptly declared inoperable and appropriate surveillance tests on the "B" diesel generator and core standby and containment cooling systems were initiated. The NRC was notified that the "A" diesel generator had been inoperable since July 23 via the ENS telephone line.

An F&MR concerning the water in the fuel oil was not initiated until July 26. The CCE later stated that he had not filled out an F&MR because he had been involved with an evaluation of an unexpected hydrogen burn in the augmented offgas system on July 23. The offgas problem was resolved on July 23, 1985.

The licensee subsequently pumped out an additional 200 gallons of water and oil from the bottom of the T-126A tank. Following the pumping, a sample analysis indicated that there was less than 0.015% water and sediment in the fuel oil. The "A" diesel generator was declared operable after the analysis on July 27, 1985.

On July 30, 1985 the inspector questioned the licensee about the quality of fuel oil in the "A" diesel generator day tank, T-124A. The licensee subsequently verified that no water was present in the day tank by visually inspecting an oil sample from the bottom of the tank. Also, it was noted that the "A" diesel was successfully surveillance tested on July 29, 1985.

At the end of the inspection period, the licensee had not identified the source of the water in the T-126A tank. At the exit meeting, the licensee stated that weekly samples would be collected and analyzed from the T-126A tank for the next several weeks. The analysis of these samples will be expedited.

The licensee indicated at the exit meeting that the "A" diesel generator was probably operable, despite the water in the bottom of the storage tank because the suction for the fuel oil transfer system was located several inches off the bottom of the tank. However, the licensee had not formally evaluated the condition at the end of the inspection. This evaluation, if performed, should determine what level of water is required to degrade diesel generator performance. The evaluation should also demonstrate that fuel oil additions to the tank would not cause sufficient turbulence in the tank to stir water off the tank bottom and into the suction for the oil transfer system.

5. Summary and Conclusions

Two instances were identified during the inspection where the results of surveillance tests were not acted on in a timely manner. In both cases, failure and malfunction reports were not completed as soon as possible after abnormal conditions were identified during surveillance tests.

Procedure no. 1.3.24 indicates that the purpose of the F&MRs is in part to ensure that an initial internal review and safety assessment is made of events of potential safety significance. The reports are turned in to the Nuclear Watch Engineer who reviews them to identify events that are related to technical specification requirements and that may require NRC notification.

Procedure no. 1.3.24 states that F&MRs shall be initiated "whenever failures or malfunctions are identified during surveillance testing ... of safety related ... structures or components that do or could prevent the systems from fulfilling their individual functions in their intended manner". The procedure also states that "the individual responsible for initiation of the report shall be the person who first identifies an abnormality or a deviation-from-normal condition." Failure to initiate F&MRs following the discovery of openings in the AO-N-90 damper on July 15 and after the discovery of water in the T-126A storage tank on July 23 are examples of an apparent violation of Procedure no. 1.3.24. (85-21-01)

Technical Specification 3.7.C requires, in part, that secondary containment integrity be maintained while the reactor is at power or that procedures be initiated to shut the reactor down. Secondary containment integrity is defined, in part, as having all automatic ventilation system isolation dampers operable or secured in the isolated position. Secondary containment integrity was not maintained between 3:00 p.m. on July 15, 1985 and 10:00 a.m. on July 16, 1985 while the reactor was at power because AO-N-90 was not operable and neither AO-N-90 nor AO-N-91 was secured in the isolated position. As a result of the failure to complete an F&MR on July 15, Technical Specification 3.7.C was violated as a result of the above violation.

Technical Specification 4.5.F requires that the remaining diesel generator and all low pressure core and containment cooling systems be tested immediately and daily thereafter when one diesel generator is inoperable. Surveillance testing of the remaining diesel generator and the cooling systems were not conducted between July 23 and 26, 1985 while the "A" diesel generator was inoperable. As a result of the failure to complete an F&MR on July 23, 1985, Technical Specification 4.5.F was violated. None of the low pressure core and containment cooling systems on the remaining diesel generator were taken out of service between July 23 and 26, 1985.

In response to the first incident, the licensee indicated that the supervisor and all maintenance personnel had been instructed on the importance of promptly initiating F&MRs. In response to the second incident, the CCE and the chemistry supervisors were also reminded of the requirement for F&MR submittal. At the exit interview, the licensee stated that plans were being made to instruct all station personnel on the F&MR system.

6. Secondary Containment Leakage Test

During the inspection, the inspector discussed the significance of recent secondary containment damper problems with the licensee. During the damper inspection on July 15 to 17, 1985, for example, two secondary containment dampers (AP-N-90 and AO-N-83) did not fully close. The inspector questioned the reliability of current dampers and expressed concern about the operability of four secondary containment dampers that are not routinely inspected because they are inaccessible while the plant is at power.

Secondary containment leakage has increased during the current operating cycle. The reactor building vacuum ranged between 0.34 and 0.40 in. of water during a leak rate test prior to startup on October 28, 1984. A subsequent leak rate test on March 18, 1985 indicated a lower vacuum of 0.25 to 0.29 in. of water. Technical Specification 4.7.C requires that a vacuum of 0.25 in. of water be demonstrated for secondary containment integrity. The licensee has no explanation for the increased leakage.

In light of the damper failures this year and the marginal secondary containment leakage test results in March, 1985, the inspector asked the licensee to consider conducting another leakage test to confirm the operability of the inaccessible dampers.

At the exit meeting on July 30, 1985, the licensee stated that an evaluation of secondary containment integrity would be completed by August 2, 1985 and include the following items:

- A review of the damper maintenance conducted in 1985 to determine which damper problems would have affected secondary containment integrity,
- An evaluation of the operability of the four inaccessible secondary containment dampers

- The results from a walkdown of secondary containment penetrations, and
- An evaluation of the risks of conducting a secondary containment leakage test at power. The licensee is concerned that the main steam isolation valves may isolate and scram the reactor during a leakage test, due to increasing main steam turbine tunnel temperatures during the test.

The secondary containment integrity evaluation will be reviewed during a future inspection of the licensed program. (85-21-02)

7. Management Meetings

Preliminary findings were discussed with licensee management in exit meetings on July 22 and 30, 1985. No written material was provided to the licensee during this inspection. No proprietary information was identified as being included in this report.