



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO NRC BULLETIN 95-02

COMMONWEALTH EDISON COMPANY

QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2

DOCKET NOS. 50-254 AND 50-265

1.0 INTRODUCTION

NRC Bulletin 95-02, "Unexpected Clogging of a Residual Heat Removal (RHR) Pump Strainer While Operating in Suppression Pool Cooling Mode," was issued on October 17, 1995. It requested all holders of boiling-water reactor (BWR) operating licenses or construction permits for nuclear power reactors to take five actions to ensure that unacceptable buildup of debris that could clog strainers does not occur during normal operation. By letters dated November 14, 1995, and September 15, 1997, Commonwealth Edison Company (ComEd, the licensee) submitted their response to NRC Bulletin 95-02 for Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities). In its response, the licensee stated their intent to comply with the requested actions in the bulletin.

2.0 DISCUSSION

The following describes the requested actions in NRC Bulletin 95-02 and the licensee's response to each requested action.

Action 1

Verify the operability of all pumps which draw suction from the suppression pool when performing their safety functions (e.g., ECCS [emergency core cooling system], containment spray, etc.), based on an evaluation of suppression pool and suction strainer cleanliness conditions. This evaluation should be based on the pool and strainer conditions during the last inspection or cleaning and an assessment of the potential for the introduction of debris or other materials that could clog the strainers since the pool was last cleaned.

Response

The licensee evaluated the design of the suction strainers including flow requirements and screen size, the potential sources of material and flow path to the strainers, and torus water conditions during ECCS suction. This evaluation determined that there are relatively few sources of potentially damaging material, the amount of contaminants is small compared to the torus water volume, and it is difficult for contaminants to reach the suction strainers. Therefore, the licensee concluded that the probability of torus contamination creating a safety problem is extremely remote.

ENCLOSURE

The licensee's assessment of operability for the Unit 1 pumps considered the following. During the Quad Cities, Unit 1, refueling outage in 1994, and the Quad Cities, Unit 2, refueling outage in 1995, the suppression pools' strainers were inspected and the suppression pools were drained, the walls and floor hydrolyzed, surfaces sandblasted, and new protective coatings applied. The pools were refilled with fresh demineralized water. A cleaning of the Unit 1 drywell was also performed. Inservice testing data for the ECCS pump surveillances were reviewed and no degradation of suction pressure was identified. Foreign material exclusion (FME) controls, enhanced in response to NRC Bulletins 92-02 and 93-02, Supplement 1, were also reviewed. Based on the above, the licensee concluded that all pumps which draw suction from the suppression pools while performing their safety function for Quad Cities, Units 1 and 2, were operable.

Action 2

Confirm the operability evaluation in requested action 1 above through appropriate test(s) and strainer inspection(s) within 120 days of the date of this bulletin.

Response

In October of 1995, multiple pump tests were performed to confirm operability of the ECCS suction strainers. Suction pressure on each pump was measured at the beginning and end of the test and no decrease in suction pressure was observed. Subsequently, a diver performed an inspection of the Unit 1 suppression pool. Inspected strainers had no indication of any buildup of fiber or debris after the pump test. The observed sludge film thickness after 14 months of operation was approximately 1/32 of an inch. The FME program is intended to minimize the possibility of material being left in the pool. Pump suction pressures are recorded and trended during in-service quarterly ECCS pump surveillances which would provide indications of strainer blockage. Additionally, full inspections of the suppression pools and strainers are scheduled for future outages. Based on the above, the licensee concluded that the ECCS suction strainers were operable.

Action 3

Schedule a suppression pool (torus) cleaning. The schedule for cleaning the suppression pool should be consistent with the operability evaluation in requested action 1 above. In addition, a program for periodic cleaning of the suppression pool should be established, including procedures for the cleaning of the pool, criteria for determining the appropriate cleaning frequency, and criteria for evaluating the adequacy of the pool cleanliness.

Response

Based on the Unit 1 cleaning in 1994, the Unit 2 cleaning in 1995, and the current satisfactory condition of the torus, the licensee did not identify an immediate need for an additional cleaning. The licensee stated that appropriate commitments regarding torus pool inspections, tests, and cleaning will be made based on the results of future inspections and tests and subsequent NRC guidance on strainer performance.

Action 4

Review FME procedures and their implementation to determine whether adequate control of materials in the drywell, suppression pool, and systems that interface with the suppression pool exists. This review should determine if comprehensive FME controls have been established to prevent materials that could potentially impact ECCS operation from being introduced into the suppression pool, and that workers are sufficiently aware of their responsibilities regarding FME. Any identified weaknesses should be corrected. In addition, the effectiveness of the FME controls since the last time the suppression pool was cleaned and the ECCS strainers inspected, and the impact that any weaknesses noted may have on the operability of the ECCS should be assessed.

Response

The licensee reviewed existing procedures and training for FME and recent Problem Identification Forms for FME issues. The licensee concluded that modifications to the FME programs were not currently needed.

Action 5

Consider additional measures such as suppression pool water sampling and trending of pump suction pressure to detect clogging of ECCS suction strainers.

Response

Quad Cities currently samples suppression pool water weekly and analyzes for conductivity weekly and for pH, Chloride, Silica, Sulfate, and total organic carbon monthly. The licensee also trends the ECCS pump suction pressures as part of the inservice testing program. No further measures were proposed.

3.0 EVALUATION

The purpose of the requested actions in the bulletin is to ensure that ECCS and other pumps drawing suction from the suppression pool do not experience unacceptable buildup of debris that could clog strainers during normal operation which would prevent them from performing their safety function. Requested action 1 requested licensees to evaluate the operability of their pumps based on the cleanliness of the suppression pool and strainers. Requested action 2 then requested a verification of the licensee's assessment through a pump test and strainer inspection. These two actions serve to ensure that the pumps are currently operable and not experiencing unacceptable debris buildup. Requested actions 3, 4 and 5 serve to ensure that appropriate measures, such as cleaning of suppression pools and strengthening of FME practices, are taken in the long term to prevent debris accumulation in the pool.

The staff has concluded that the licensee's assessment of the ability of all pumps drawing suction from the suppression pool to perform their safety function has a reasonable basis for concluding that all of the pumps evaluated are operable. The licensee conducted an inspection to confirm that the ECCS systems were not affected by an unacceptable buildup of debris that could clog the pump strainers. Initial strainer cleanliness was considered good. The staff has concluded that the licensee's response meets the intent of requested actions 1 and 2 and is

acceptable. The staff has also concluded that the licensee's evaluation of their FME program and suppression pool cleaning program meet the intent of requested actions 3 and 4, and are acceptable. The licensee's programs for trending pump suction pressure data, sampling torus water/sediment, and periodically inspecting the strainers and torus provide additional opportunity for early identification of potential strainer fouling. The staff has concluded that these additional actions meet the intent of requested action 5 and are acceptable. The staff has also concluded that the schedule for implementation of the actions proposed by the licensee is appropriate given the actions already taken.

4.0 CONCLUSION

Based on the staff's evaluation of the licensee's submittal(s), the staff finds the licensee's response to NRC Bulletin 95-02 to be acceptable.

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