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

PUBLIC SERVICE ELECTRIC & GAS COMPANY

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

1.0 INTRODUCTION

NRC Bulletin 95-02 entitled, "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 15, 1995, and February 22, 1996, Public Service Electric & Gas Company (the licensee) submitted their response to NRC Bulletin 95-02 for Hope Creek Generating Station. In its response, the licensee stated that Hope Creek last cleaned their torus during their last refueling outage. The cleaning included vacuuming of sludge in areas where there was appreciable accumulation.

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, 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

In response to requested action number 1, the licensee concluded that all pumps taking suction from the pool were operable. The licensee's conclusion was based on their cleaning and desludging of the torus and inspections of the strainers conducted during the last refueling outage. During the cleaning of the torus, the licensee found very little foreign debris in the pool, and inspection of the strainers revealed no appreciable accumulation of debris on

the strainer surfaces. The licensee stated that the debris found in the torus was insufficient to foul any of the strainers and challenge any of the pumps drawing suction from the torus. The debris found primarily consisted of a short length of duct tape and a few nuts and bolts. Since this is all the material that had migrated to the torus since construction, the licensee concluded that there was little potential for introduction of additional debris in the torus since the pool cleaning was conducted during the last refueling outage.

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 response to requested action number 2, the licensee conducted a 6-hour test run of three pumps on February 13, 1996. The test was conducted using one residual heat removal (RHR) and two core spray pumps. The flowrate for the test was 16,400 GPM which was considered sufficient to suspend any debris on the bottom of the pool. The six-hour length of the test was judged sufficient to allow accumulation of any suspended debris in the pool on the strainer surfaces. Prior to the test, the licensee had established a success criteria of less than 0.5 psi differential pressure across the pump suction strainers. During the test, no degradation in pump suction pressure was observed. The pump run was followed by a video inspection of the pump suction strainers. The video showed no significant accumulation of debris on any of the suction strainers for the pumps tested. The only items identified on the strainers from the video were a 6-inch piece of wire, three tags measuring approximately one inch by two inches, and a small metallic object measuring approximately ¼-inch by ¼-inch. The licensee has concluded based on these results that the torus cleanliness is adequate and that the pumps drawing suction from the torus are 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

In response to requested action number 3, the licensee stated that they cleaned their torus during the last refueling outage, and that strainer and torus inspections have verified that an acceptable level of suppression pool cleanliness currently exists. In addition, results of water and bottom

sediment analysis also support that the suppression pool is adequately clean. The licensee has committed to establishing a suppression pool cleanliness program including criteria for acceptability of debris/sediment levels, requirements to periodically sample torus water and/or sediment and examining the samples for the presence of fibrous material, and criteria for determining the inspection and cleaning frequency. The licensee has committed to issuing this procedure by December 31, 1996.

Action 4

Review foreign material exclusion (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

In response to requested action number 4, the licensee has reviewed their FME practices and concluded that they are adequate. This conclusion is based on the identification of the drywell and torus as zone II areas which by station procedure require the use of personnel/material accountability logs, barrier rope and single point of entry/exit, and temporary plugs or catch drapes while work is in progress. In addition, the licensee notes that inspections made last outage and this outage have identified very little foreign material in the suppression pool demonstrating the effectiveness of their program. Inspections for foreign material are performed by the licensee prior to closure of the drywell or torus.

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

In response to requested action number 5, the licensee committed to several additional measures including the trending of pump suction pressure data during inservice testing; sampling of torus water and/or sediment and examining the samples for the presence of fiber; and periodic inspection of the torus bottom and suction strainers as part of their suppression pool cleaning program. The licensee has concluded that these measures will help provide early detection of potential pump suction strainer clogging situations.

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. In addition, the licensee conducted a test on February 13, 1996, which confirmed their operability assessment. Therefore, 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 commitment to establish a suppression pool cleaning program meet the intent of requested actions 3 and 4, and are acceptable. The licensee's commitment to additional measures such as trending of pump suction pressure data, sampling of torus water/sediment for fiber, and periodic inspections of 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 submittals, the staff finds the licensee's response to NRC Bulletin 95-02 to be acceptable.

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Date: April 2, 1996