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John F. Franz, Jr.  
Vice President, Nuclear

November 15, 1995  
NG-95-3157

Mr. William T. Russell, Director  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Station P1-37  
Washington, DC 20555-0001

Subject: Duane Arnold Energy Center  
Docket No: 50-331  
Op. License No: DPR-49  
Response to NRC Bulletin 95-02, "Unexpected Clogging of a Residual Heat Removal (RHR) Pump Strainer While Operating in Suppression Pool Cooling Mode"  
References: NRC Bulletin 95-02, "Unexpected Clogging of a Residual Heat Removal (RHR) Pump Strainer While Operating in Suppression Pool Cooling Mode"  
File: A-101a, E-11

Dear Mr. Russell:

On October 17, 1995, the NRC issued Bulletin 95-02, "Unexpected Clogging of a Residual Heat Removal (RHR) Pump Strainer While Operating in Suppression Pool Cooling Mode." The bulletin discussed a recent plant occurrence which involved the clogging of an RHR pump suction strainer. This event followed the initiation of suppression pool cooling in response to a stuck-open safety relief valve.

The bulletin requested that licensees verify the operability of all pumps which draw suction from the suppression pool when performing their safety functions. In addition, licensees were requested to schedule a suppression pool cleaning consistent with the operability evaluation and to review foreign material exclusion procedures to ensure adequate control of materials in the drywell, suppression pool and interfacing systems.

All licensees were requested to submit reports within thirty days after October 17. The requested information is provided in the attachment to this letter.

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This letter makes the following new NRC commitment:

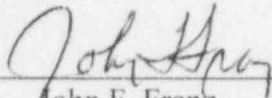
IES Utilities will inspect the Duane Arnold Energy Center (DAEC) torus Emergency Core Cooling System (ECCS) suction strainers during the next refueling outage (RFO) 14 scheduled for the Fall of 1996. After this inspection, torus cleanliness will be assessed and future plant maintenance requirements will be established. A schedule for future strainer inspections and sludge removal will be determined based on the results of the inspection.

Should you have any questions regarding this matter, please contact this office.

This letter is true and accurate to the best of my knowledge and belief.

IES UTILITIES INC.

By

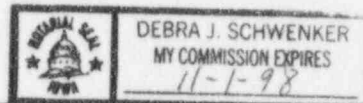


John F. Franz  
Vice President, Nuclear

State of Iowa  
(County) of Linn

Signed and sworn to before me on this 15 day of November, 1995,

by Debra J. Schwenker



Notary Public in and for the State of Iowa

Commission Expires

JFF/CJR/cjr  
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Attachment

cc: C. Rushworth  
L. Liu  
B. Fisher  
G. Kelly (NRC-NRR)  
H. Miller (Region III)  
NRC Resident Office  
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## **IES Response to NRC Bulletin 95-02**

### NRC Request 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.

### IES Response to Request 1

The bulletin stresses the importance of maintaining an extremely clean suppression pool and suction strainers in order to ensure the operability of pumps drawing suction from the pool. IES Utilities strongly agrees with the bulletin's position and has been firmly committed to maintaining torus cleanliness at the Duane Arnold Energy Center (DAEC). In fact, the torus and suction strainers were most recently inspected and cleaned during the last refueling outage (RFO 13) which ended in April of 1995.

Desludging was performed on the torus in 1988, 1990 and 1995, and the torus is extremely clean. In 1993, an underwater inspection of the torus was performed during the refueling outage; however, no desludging was performed. The suction strainers were inspected and cleaned; minor amounts of debris were removed from the strainers. Less than 1% of the screens were fouled.

During RFO 13 in the Spring of 1995, the torus was cleaned and sludge removed to accommodate the ongoing efforts at DAEC to inspect and maintain the existing torus coating. Desludging was performed in all 16 bays. Approximately 250 pounds of very fine particle sized sludge was removed from the torus. Sludge accumulations ranged from about 1/8 inch to 1/4 inch in depth throughout the torus bays, with isolated areas of sludge up to 1/2 inch deep.

All suction strainers were inspected and cleaned in 1995. All strainers were found to be in good condition and free of trash and debris; however, a light coat of sludge was present. As stated in NRC inspection report 50-331/95005 dated June 2, 1995, "The condition of the torus and the six suction strainers, located in the torus, was good. During RFO 13, the torus and ECCS strainers were inspected and cleaned, and repairs were made to small localized areas of pitting corrosion on the sides of the torus walls. The strainers were in good operating condition with no evidence of fouling, damage, or deformation."

The DAEC has implemented foreign material exclusion (FME) procedures which are designed to prevent the introduction of debris into the torus. These administrative controls are adequate to restrict material from inadvertently remaining in containment or systems with which it communicates.

The current housekeeping and cleanliness control procedures in place at the DAEC identify the torus as an FME zone. Specific procedural details are in place to maintain control of material, tools and work in the drywell and torus. Controls include the use of covers over grating when activities could result in waste or small tools or parts falling through the grating. All materials taken into the torus must be attached to appropriate restraining devices and secured to a person or fixed structure. Dust-producing activities in the torus or drywell must be performed within a tent or other means of containment, where practical. Where containment is not practical, a documented work instruction for post-work cleanup must be prepared prior to the start of work. For outages requiring drywell entry, plant management may determine that the drywell to torus downcomers be sealed based on workscope planned.

NRC inspection reports 50-331/95003 (dated April 26, 1995) and 50-331/95005 (dated June 2, 1995) discuss FME controls during RFO 13. Inspection report 50-331/95003 states that the "FME controls for open systems, in the refueling floor, and in the torus were found adequate and properly implemented." Inspection report 50-331/95005 states that the "inspections determined that the amount and type of debris [found in the drywell] could not have caused degradation of the torus suction strainers."

As previously discussed, the torus and suction strainers were most recently inspected and cleaned during the last refueling outage in Spring, 1995. The torus and suction strainers were left in an extremely clean condition. Inspection of the strainers during that outage showed that only a light coat of sludge had accumulated since the strainers were last cleaned in 1993. In addition, the DAEC FME procedures are adequate to prevent the inadvertent introduction of debris into the torus. These inspections, cleanings and procedures ensure that the ECCS suction strainers are not clogged; therefore ECCS pump operability is assured.

#### NRC Request 2

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

#### IES Response to Request 2

As discussed in our response to Request 1, the DAEC torus was cleaned and sludge removed during RFO 13 in the Spring of 1995. The six suction strainers were inspected and cleaned. All strainers were found to be in good condition and free of trash and debris; only a light coat of sludge was present.

Based on these inspection results, IES Utilities does not believe a plant shutdown and containment entry is warranted solely to inspect the strainers. IES Utilities plans to perform an underwater coating inspection of the DAEC torus during the next refueling outage, RFO 14, currently scheduled for the Fall of 1996. We will inspect the torus suction strainers at that time.

### NRC Request 3

Schedule a suppression pool cleaning. The schedule for cleaning the 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.

### IES Response to Request 3

As discussed above, the torus was cleaned and sludge removed during RFO 13. The inspection of the suction strainers completed at that time identified only a slight film on the strainers. Approximately 250 pounds of very fine particle sized sludge was removed from the torus.

IES Utilities plan to perform an underwater coating inspection of the DAEC torus during the next refueling outage, RFO 14, currently scheduled for the Fall of 1996. During this inspection, the condition of the torus ECCS suction strainers and other general areas will be evaluated. After this inspection, torus cleanliness will be assessed and future plant maintenance requirements will be established. A schedule for future strainer inspections and sludge removal will be determined based on the results of the inspection.

### NRC Request 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 whether 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.

### IES Response to Request 4

IES Utilities has implemented FME procedures at the DAEC. Our housekeeping procedures were completely revised prior to RFO 13.

The DAEC FME procedures are designed to prevent the introduction of debris into the torus. The current housekeeping and cleanliness control procedures in place at the DAEC identify the torus as an FME zone. Specific procedural details are in place to maintain control of material, tools and work in the drywell and torus. General housekeeping guidelines are applied to systems

which communicate with the torus. Prior to being allowed access to work areas in the torus, workers are trained on the housekeeping procedure to ensure their awareness of their responsibilities in this regard.

The FME controls in place prior to the 1995 torus cleaning were very effective, as demonstrated by the cleanliness of the torus and suction strainers. When the strainers were inspected in 1995, they were found to be free of trash and debris. Only a light coat of sludge had accumulated since their last cleaning during the 1993 outage. Thus the administrative controls currently in place at the DAEC are adequate to restrict material from inadvertently remaining in containment or systems with which it communicates.

#### NRC Request 5

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

#### IES Response to Request 5

The DAEC currently performs quarterly surveillance tests (STPs) which require operation of the RHR and Core Spray pumps with suction from the suppression pool. These STPs are performed and the results trended to evaluate ongoing pump operation. This information is also used to assess the status of the suction strainers.

The current STPs record data relative to pump flow, pump suction and discharge pressure and vibration. Since low suction pressure can cause cavitation, specific limits for low suction pressure are identified in the STPs and reviewed during the performance of the test. Cavitation is an indicator of suction line restriction and/or insufficient head pressure. It can be detected by vibration analysis and trending of abnormal surveillance data that could be symptomatic of changing strainer conditions. Any significant change due to suction strainer blockage would therefore be easily detected.

We already trend test data for the RHR and Core Spray pumps. Suction strainer clogging would be detected through analysis of vibration and other data. Pump performance shows that no adverse trends have developed over plant life that could be associated with suction piping blockage. Enhancements to current practices are therefore not warranted.