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November 11, 1998
NG-98-1901

Office of Nuclear Regulatory Commission
United States Nuclear Regulatory Commission
Attention: Document Control Desk
Mail Station 0-P1-17
Washington DC 20555-0001

Subject: Duane Arnold Energy Center
Docket Number 50-331
Op. License Number DPR-49
Response to Generic Letter 98-04 dated July 14, 1998

Reference: NRC Generic Letter 98-04: Potential for Degradation of the Emergency Core Cooling System (ECCS) and Containment Spray System (CSS) After a Loss-of-Coolant Accident (LOCA) Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment

File: A101b, A105

On July 14, 1998, the Nuclear Regulatory Commission issued the referenced Generic Letter that addressed issues having generic implications regarding the impact of potential coating debris on the operation of safety related systems, structures, and components (SSC) during a postulated design basis LOCA. Protective coatings are necessary inside containment to control radioactive contamination and to protect surfaces from erosion and corrosion. Detachment of the coatings from the substrate may make the ECCS unable to satisfy the requirement of 10 CFR 50.46(b)(5) to provide long-term cooling and core spray functions following a LOCA. Generic Letter 98-04 requests information under 10 CFR 50.54(f) to evaluate the addressees' programs for ensuring that Service Level 1 protective coatings inside containment do not detach from their substrate during a design basis LOCA and interfere with the operation of the ECCS. The NRC intends to use this information to assess whether current regulatory requirements are being correctly implemented and whether these requirements need to be revised.

Attached is our response to the requested information.

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A085

This letter and the enclosed attachment, which addresses the specific portions of the NRC Generic Letter 98-04 that are applicable to the DAEC, are true and accurate to the best of my knowledge and belief.

IES UTILITIES INC.

By Gary D. Van Middlesworth for JFF
John F. Franz
Vice President, Nuclear

State of Iowa
(County) of Linn

Signed and sworn to before me on this 11 day of November, 1998,

by Gary D. Van Middlesworth

KATHRYN DUNLAP
MY COMMISSION EXPIRES

Kathryn Dunlap
Notary Public in and for the State of Iowa

7-24-99
Commission Expires

Attachment

cc: L. Sueper
E. Protsch
D. Wilson
R. Laufer (NRC-NRR)
J. Caldwell (Region III)
NRC Resident Office
DOCU

Generic Letter 98-04 Request
(in bold face print)

(1) **A summary description of the plant-specific program or programs implemented to ensure that Service Level 1 protective coatings used inside the containment are procured, applied, and maintained in compliance with applicable regulatory requirements and the plant-specific licensing basis for the facility. Include a discussion of how the plant-specific program meets the applicable criteria of 10 CFR Part 50, Appendix B, as well as information regarding any applicable standards, plant-specific procedures, or other guidance used for: (a) controlling the procurement of coatings and paints used at the facility, (b) the qualification testing of protective coatings, and (c) surface preparation, application, surveillance, and maintenance activities for protective coatings. Maintenance activities involve reworking degraded coatings, removing degraded coatings to sound coatings, correctly preparing the surfaces, applying new coatings, and verifying the quality of the coatings.**

DAEC Response to Item (1)

IES Utilities has implemented controls for the procurement, application, and maintenance of Service Level 1 protective coatings used inside the containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to the Duane Arnold Energy nter. The requirements of 10 CFR 50 Appendix B are implemented through specification of a, propriate technical and quality requirements for the Service Level 1 coatings program which includes ongoing maintenance activities.

For Duane Arnold Energy Center, Service Level 1[1] coatings are subject to the requirements of the DAEC Updated Final Safety Analysis Report (UFSAR) Section 17.2.9.5 which states:

The application of special protective coatings shall be controlled as a special process when the failure (i.e. peeling or spalling) of the coating to adhere to the substrate can cause the malfunction of a safety-related structure, system or component. Special process coatings shall be applied by qualified personnel using qualified materials and equipment, and approved procedures. Documentation shall include identification of the following:

- *person applying the coating (and qualification)*
- *materials used*
- *procedure used (and qualifying procedure if different)*
- *test performed and results*
- *date of application of coating*
- *traceability of coating location*

[1] Our response applies to Service Level 1 coatings used in primary containment that are procured, applied and maintained by IES Utilities or their contractor. This response does not address the relatively small amount of coatings applied by vendors on supplied equipment and miscellaneous structural supports.

Adequate assurance that the applicable requirements for the procurement, application, inspection, and maintenance are implemented is provided by procedures and programmatic controls, approved under the IES Utilities Quality Assurance program.

a) Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor(s) with a quality assurance program meeting the applicable requirements of 10 CFR 50 Appendix B. The applicable technical and quality requirements which the vendor is required to meet are specified by IES Utilities in procurement documents. Acceptance activities are conducted in accordance with procedures which are consistent with ANSI N 45.2 requirements (e.g., receipt inspection, source surveillance, etc.). This specification of required technical and quality requirements combined with appropriate acceptance activities provides adequate assurance that the coatings received meet the requirements of the procurement documents.

b) The qualification testing and evaluation of the Service Level 1 coatings used for new applications or repair/replacement activities inside containment were performed in accordance with the ANSI Standard N101.2 "Protective Coatings (Paints) for Light Water Nuclear Reactor Containment Facilities." These coatings have been evaluated to meet the UFSAR licensing commitments for in-service and DBA conditions.

c) The surface preparation, application and surveillance during installation of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meet or exceed the DAEC UFSAR licensing commitments. Documentation of completion of these activities is performed consistent with the applicable requirements. Where the DAEC UFSAR licensing commitments did not address or were not applicable to repair/replacement activities, these activities were performed in a manner consistent with the generally accepted practices for coatings repair/replacement. These practices are described in various ASTM standards and coating practice guidelines issued by industry organizations subsequent to those to which IES Utilities has a regulatory commitment. IES Utilities recognizes that the NRC has not formally endorsed many of the more recent ASTM standards or industry guidelines, however, they provide useful information which can be appropriately applied to provide assurance that repair/replacement activities on Service Level 1 coatings are effective in maintaining the acceptability of the coatings.

The DAEC periodically conducts condition assessments (maintenance) of Service Level 1 coatings inside containment. Coating condition assessments are conducted as follows:

1. The DAEC Surveillance Test Procedure (STP) 3.6.1.1-01 "Suppression Chamber and Drywell Visual Inspection" is performed once per cycle to satisfy the UFSAR Section 6.2.1.4.2 coating surveillance requirements. The purpose of this STP is to visually inspect the accessible portions of the interior and exterior surfaces of the suppression chamber, vent lines, vent header, and downcomers, and the interior surface of the drywell for evidence of deterioration. This STP includes a visual inspection of the coating for discoloration, bubbling or flaking, corrosion or pitting. These inspections are performed and documented by DAEC Quality Control (QC)

personnel, ANSI N45.2.6 Certified Level II Visual Inspectors, who have been trained to perform ASME XI - IWE containment coatings inspections. If coating deficiencies are identified during this inspection, an engineering evaluation is performed to determine if repair is necessary prior to power resumption from the outage.

2. As part of the DAEC project "Long-Term Strategy for Primary Containment Suppression Chamber (Torus)," the torus was drained for inspections and coating repairs in 1977, 1980, 1981, and 1983. In 1985, all internal surfaces of the torus shell and external surfaces of the vent system were recoated. Additional maintenance inspections and repairs were performed in 1987, 1988, 1990, 1992, 1993, 1995, 1996, and 1998. Although no deficiencies were identified, the results from the most recent maintenance inspection (1998, Refueling Outage RFO 15), are currently being evaluated by the DAEC's Program Engineering Department. This evaluation will make recommendations for future Torus coating inspections, repairs, and/or recoating. These recommendations will be incorporated into future RFO schedules as applicable.

3. During the 1996 RFO 14, the DAEC utilized an outside contractor to perform a structural visual inspection of specific areas of the reactor building (drywell) only accessible during plant refueling outages. The scope of this inspection included a general evaluation of the protective coatings applied to concrete and masonry walls, concrete floors, metal floor decking, structural and miscellaneous steel, and major equipment pedestals. The report documented that the "overall condition of the reactor building is excellent." This visual inspection marks the completion of the reactor building baseline inspection to fulfill the requirements of the "DAEC Plant Structures Monitoring Program" performed in response to 10 CFR 50.65. Ongoing monitoring inspections at intervals of five to ten years have been scheduled.

4. During the 1998 RFO 15, the DAEC utilized an outside contractor to perform a detailed qualitative visual inspection of the primary interior surfaces of the drywell and torus. The inspection was performed by an ANSI N45.2.6 certified Level III Coatings Inspector. The inspection was performed and documented in conjunction with the DAEC program items (1 and 2) above. The results from this inspection will be used as a baseline for future containment coating inspections and assessments. This report concluded that "...the overall coating system appears to be in good condition. It continues to provide excellent protection for the carbon steel substrate."

As localized areas of degraded coatings are identified, those areas are evaluated and scheduled for repair or replacement, as necessary. The periodic condition assessments, and the resulting repair/replacement activities, assure that the amount of Service Level 1 coatings which may be susceptible to detachment from the substrate during a LOCA event is minimized.

(2) Information demonstrating compliance with item (i) or Item (ii):

(i) For plants with licensing-basis requirements for tracking the amount of unqualified coatings inside the containment and for assessing the impact of potential coating debris on the operation of safety-related SSCs during a postulated design basis LOCA, the following information shall be provided to demonstrate compliance:

a) The date and findings of the last assessment of coatings, and the planned date of the next assessment of coatings.

b) The limit for the amount of unqualified protective coatings allowed in the containment and how this limit is determined. Discuss any conservatism in the method used to determine this limit.

c) If a commercial-grade dedication program is being used at your facility for dedicating commercial-grade coatings for Service Level 1 applications inside the containment, discuss how the program adequately qualifies such a coating for Service Level 1 service. Identify which standards or other guidance are currently being used to dedicate containment coatings at your facility; or,

(ii) For plants without the above licensing-basis requirements, information shall be provided to demonstrate compliance with the requirements of 10CFR50.46b(5), "Long-Term cooling" and the functional capability of the safety-related CSS as set forth in your licensing basis. If a licensee can demonstrate this compliance without quantifying the amount of unqualified coatings, this is acceptable.

DAEC Response to item (2)

Based on the DAEC's licensing-basis commitments, the following response is provided for item (2)(ii) above:

In response to NRC Bulletin 96-03, large passive replacement ECCS strainers were installed in the Residual Heat Removal and Core Spray systems at the DAEC during the 1998 RFO 15. Consequently the following discussion addresses the anticipated licensing basis pending resolution of NRC Bulletin 96-03.

The design input to the ECCS strainer calculations for the amount of unqualified coatings, qualified coatings in steam/water jet zone of influence, and degraded qualified coatings in the containment (as identified from periodic visual inspections) is documented in the new ECCS strainer hydraulic calculations. Consequently the amount of these

coating materials must be managed, in addition to the quantity of fibrous, particulate, and other miscellaneous debris, to assure that the analyzed functional capability of the ECCS is not compromised.

The new ECCS pump suction strainers have been designed to perform satisfactorily in the presence of 100% of the containment coatings which are installed in the LOCA pipe break steam/water jet zone of influence. This amount of coating debris is determined in accordance with the methodology documented in the BWR Owners' Group Utility Resolution Guidance (URG) document (NEDO-32686), Section 3.2.2.2.2.1.1. The conservative methodology used to establish the amount of coating debris has been accepted by the NRC, as documented in the Safety Evaluation for NEDO-32686 Rev 0, "Utility Resolution Guidance Document for ECCS Suction Strainer Blockage."

An additional amount of coating debris is added to the debris from the zone of influence. This amount accounts for potential debris which may result from coatings which are unqualified and/or degraded. Results of BWR Owners' Group LOCA testing of coupons representing unqualified coating systems provide compelling evidence that failure of typical unqualified coating systems which pass a visual inspection is highly unlikely in the first 30 minutes of the LOCA. Only for the first 2 to 15 minutes of the LOCA event, depending upon the pipe break size, are suppression pool turbulence levels adequate to maintain coating debris in suspension in the pool where it would be available for accumulation on the ECCS strainers. Since the coating debris will quickly settle to the bottom of the suppression pool after the turbulence subsides, none of the coating debris (if eventually released sometime after the first 30 minutes of the LOCA) would be available to accumulate on the strainers. In sizing the replacement ECCS strainers for the Duane Arnold Energy Center, no credit was taken for the delayed release of coating debris; therefore, these designs are conservative with respect to the limit on this coating debris source. IES Utilities is participating in the BWR Owners' Group Containment Coatings Committee and activities in progress are expected to result in an increase in the quantity of containment coating debris that can be accommodated on the strainers without challenging their functional capability.

The following information shall be provided:

a) If commercial-grade coatings are being used at your facility for Service Level 1 applications, and such coatings are not dedicated or controlled under your Appendix B Quality Assurance Program, provide the regulatory and safety basis for not controlling these coatings in accordance with such a program. Additionally, explain why the facility's licensing basis does not require such a program.

DAEC Response to Item (a)

IES Utilities does not currently employ commercial grade dedication for Service Level 1 coatings used inside containment at the DAEC.