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Docket Number 50-346

License Number NPF-3

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Subject: Response to NRC Generic Letter 98-04: Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant-Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment

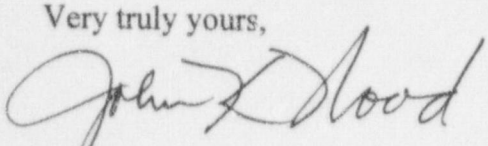
Ladies and Gentlemen:

This letter provides Toledo Edison's response for the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS) to Nuclear Regulatory Commission (NRC) Generic Letter 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant-Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment", dated July 14, 1998 (Toledo Edison Log Number 5311). Generic Letter 98-04, requests information to evaluate licensees' programs for ensuring that Service Level 1 protective coatings inside the containment vessel do not detach from their substrate during a design basis loss-of-coolant accident (LOCA) and interfere with the operation of the Emergency Core Cooling System (ECCS) and the safety-related Containment Spray System (CSS).

The information requested by Generic Letter 98-04 is provided in the Attachment to this letter. The response describes the program implemented at the DBNPS for procuring, applying, and maintaining Service Level 1 protective coatings inside the containment vessel.

Should you have any questions or require additional information, please contact Mr. James L. Freels, Manager - Regulatory Affairs, at (419) 321-8466.

Very truly yours,



JCS/laj

Attachment

cc: J. L. Caldwell, Acting Regional Administrator, NRC Region III
S. J. Campbell, NRC Region III, DB-1 Senior Resident Inspector
A. G. Hansen, NRC/NRR Project Manager
Utility Radiological Safety Board

Docket Number 50-346
License Number NPF-3
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Enclosure

RESPONSE TO

NRC GENERIC LETTER 98-04

FOR

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NUMBER 1

This letter is submitted pursuant to 10 CFR 50.54(f) and contains information pursuant to NRC Generic Letter 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant-Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment," for the Davis-Besse Nuclear Power Station, Unit Number 1.

I, John K. Wood, state that (1) I am Vice President - Nuclear of the Centerior Service Company, (2) I am duly authorized to execute and file this certification on behalf of the Toledo Edison Company and The Cleveland Electric Illuminating Company, and (3) the statements set forth herein are true and correct to the best of my knowledge, information and belief.

By: John K Wood
John K. Wood, Vice President - Nuclear

Affirmed and subscribed before me 11th day of November, 1998.

Nora Lynn Flood
Notary Public, State of Ohio
Nora Lynn Flood
My Commission expires September 4, 2002.

TOLEDO EDISON
RESPONSE TO GENERIC LETTER 98-04
FOR
THE DAVIS-BESSE NUCLEAR POWER STATION

The following provides Toledo Edison's response to each NRC-requested item as applicable to the Davis-Besse Nuclear Power Station Unit 1 (DBNPS).

Item 1

Provide 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.

Response

The Toledo Edison Company (TE) has implemented controls for the procurement, application, and maintenance of Service Level 1 protective coatings used inside the containment vessel in a manner that is consistent with the licensing basis and regulatory requirements applicable to the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). The requirements of 10 CFR Part 50 Appendix B are implemented through specification of appropriate technical and quality requirements for the Service Level 1 coatings program which includes ongoing maintenance activities.

For the DBNPS, Service Level 1[1] coatings are subject to the requirements of Regulatory Guide 1.54 (6/73), " Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants" and ANSI N 101.4-1972, "Quality Assurance for Protective Coatings Applied to Nuclear Facilities" as described in the DBNPS Updated

[1] Service Level 1 coatings used in primary containment that are procured, applied and maintained by the Toledo Edison Company or their contractor.

Safety Analysis Report (USAR) Table 17.2-1, "Applicable NRC Regulatory Guides, ANSI Standards, and Industry Codes".

The function of the containment vessel coatings is described in the DBNPS USAR Section 3.8.2.1.11, "Containment Vessel Painting". Its purpose is to provide surfaces that resist exposures due to both normal operating and LOCA conditions including exposure to ionizing radiation, high temperature, and impingement from sprays. These coatings were tested under simulated LOCA conditions and for gamma radiation resistance.

Two coating systems have been used within the containment. The first system consists of epoxy or modified phenolic coatings, such as Amercoat No. 66, Phenoline No. 305 finish, Val-Chem Hi-Build Epoxy, or approved equal coating as listed in the DBNPS Specification A-024Q, "Technical Specification for Operational Phase for Field Coating Inside Containment for the Toledo Edison Company Davis-Besse Nuclear Power Station Unit 1". This system is applied to concrete floors, walls, and ceilings. The second system is an inorganic zinc primer followed by an organic topcoat, such as Dimetcote No. 4 or No. 6 primer followed by Amercoat No. 66 epoxy topcoat, Carbo-Zinc No. 11 primer followed by Phenoline No. 305 modified phenolic finish, Mobilzinc 7 primer followed by Val-Chem Hi-Build epoxy, or approved equal systems as listed in DBNPS Specification A-024Q. This system is applied to ferrous metal surfaces, such as structural steel, liner plate, piping, and equipment within the entire containment boundary and up to wainscot height above the floor levels in areas subject to hard usage or to contamination.

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 DBNPS Quality Assurance program. However, in order to further assess these procedures and controls, the guidance provided in EPRI TR-109937, "Guideline on Nuclear Safety-Related Coatings," dated April 1998 is currently being evaluated by the DBNPS staff. This evaluation is scheduled to be completed by December 31, 1998. Following completion of the evaluation, improvements, as necessary, will be made to the DBNPS's existing procedures and controls for Service Level 1 coatings.

(a) Procurement of Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor(s) having a Quality Assurance program meeting the applicable requirements of 10 CFR Part 50, Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified in the procurement documents. The coatings used inside containment are procured, handled and stored in accordance with the DBNPS Specification A-024Q. This specification defines the technical and quality requirements for coatings used within the containment or coating of items that will be placed within the containment consistent with the DBNPS

commitments to Regulatory Guide 1.54 (6/73) and ANSI N101.4-1972. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N45.2.2-1972, "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants," 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. Although the DBNPS is not committed to ANSI N101.2-1972, "Protective Coatings (Paints) for Light Water Nuclear Reactor Containment Facilities," the qualification testing of Service Level 1 coatings used for new applications or repair/replacement activities inside containment (except as noted below) meets the regulatory commitments of USAR Section 3.8.2.1.11 and meets the intent of the testing described in ANSI N101.2-1972. The coatings, described above, are listed in DBNPS Specification A-024Q.

Coatings specified for use in containment were tested under simulated LOCA conditions and for gamma radiation resistance. As described in USAR Section 3.8.2.1.11, the coating materials listed resist, without harmful effect, individually and as a system, intermittent temperatures of up to 300°F, and are designed for use at continuous temperatures of up to 200°F. The materials listed above also resist, as systems, accumulated gamma radiation of 3×10^9 rads from a Cobalt 60 source.

Exceptions to Regulatory Guide 1.54 (6/73), as described in USAR Table 17.2-1, have been taken for the following surfaces within containment: surfaces to be insulated; surfaces contained within a cabinet or enclosure; repair/touch-up areas less than thirty square inches or surfaces such as cut ends, bolt heads, nuts and miscellaneous fasteners, damage from tack, spot or arc welding; small items such as small motors, handwheels, electrical cabinets, control panels, loud speakers, motor operators, etc. where special painting requirements would be impractical; stainless steel or galvanized surfaces; and banding that is used for insulating pipe.

(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 the applicable portions of Regulatory Guide 1.54 (6/73) and ANSI N101.4-1972 with the exceptions noted above.

At the DBNPS, the application of protective coatings is considered a special process as described in 10 CFR 50 Appendix B, Criterion IX, "Control of Special Processes," and USAR Section 17.2.9, "Special Process Control". Special processes are those processes

which are highly dependent on the control of the process or the skill of the operators, or both, and in which the specified quality cannot be readily determined by inspection or test of the product. Application of protective coatings inside containment is described in DBNPS procedure DB-MM-09127, "Application of Protective Coatings Inside Containment". This procedure provides guidance for the initial application and repair of protective coatings to surfaces inside containment and for applying coatings to components that will be installed inside containment. This procedure contains guidance for personnel qualification, material storage and shelf life, surface preparation, monitoring of application environment (e.g., temperature, relative humidity, dew point), coating application, drying and cure time, post-application testing (i.e., film thickness), and acceptance criteria.

Documentation of completion of these activities is performed consistent with the applicable requirements of Regulatory Guide 1.54 (6/73) and ANSI N101.4-1972 as implemented by DB-MM-09127. Documentation of surface preparation, coating application and surveillance activities is contained in the appropriate work document (Maintenance Work Order). Where the requirements of the Regulatory Guide or ANSI standard do not address, or are not applicable to repair/replacement activities, these activities are performed in a manner consistent with generally accepted practices for coatings repair/replacement. These practices are typically described in various ASTM standards and coating practice guidelines (e.g., Steel Structures Painting Council) issued by industry organizations. It is recognized that the NRC has not formally endorsed many of the more recent ASTM standards or industry guidelines, but they provide useful information which can be applied to provide assurance that repair/replacement activities on Service Level 1 coatings are effective in maintaining the acceptability of the coatings.

Periodic condition assessments of Service Level 1 coatings inside containment are now conducted as part of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" as implemented at the DBNPS by DB-PF-00003, "Maintenance Rule". These inspections will be typically performed each refueling outage, and began with Refueling Outage 11, which was completed in May 1998. As localized areas of degraded coatings (e.g., paint chips and flakes) are identified, those areas are evaluated and scheduled for repair or replacement, as necessary. The periodic condition assessments, and the resulting repair/replacement activities, ensure that the amount of Service Level 1 coatings which may be susceptible to detachment from the substrate during a LOCA event is minimized.

Item 2 (ii)

For plants without 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 Structures, Systems or Components (SSC) during a postulated LOCA, information shall be provided to demonstrate compliance with the requirements of 10 CFR 50.46(b)(5), "Long-Term Cooling," and the functional capability of the safety-related Containment Spray System (CSS) as set forth in the licensing basis. If a licensee can demonstrate this compliance without quantifying the amount of unqualified coatings, this is acceptable. 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.

Response

The Service Level 1 protective coatings used inside containment at the DBNPS are qualified with the exceptions noted in the response to Item 1. The DBNPS does not currently employ commercial grade dedication for Service Level 1 coatings used inside containment.

In response to the exceptions taken to Regulatory Guide 1.54 (6/73), small equipment (motors, handwheels, cabinets, etc.) are not necessarily procured with qualified coatings. These exceptions are described in USAR Table 17.2-1 of the NRC accepted Quality Assurance (QA) program (USAR Section 17.2, "Quality Assurance During The Operations Phase". The DBNPS is not required to track the amount of these unqualified coatings inside containment. The following descriptions and referenced materials describe the licensing basis for the DBNPS relative to conformance with 10 CFR 50.46(b)(5), "Long-Term Cooling," specifically with regard to the DBNPS's ability to provide extended decay heat removal, including related assumptions for debris that could block containment emergency sump screens:

The Emergency Core Cooling System (ECCS) is described in USAR Section 6.3. The ECCS provides the capability to meet the functional requirements over both the short and long term cooling following an accident. Separate and independent flow paths are provided in the ECCS, and redundancy in the active components ensures that the required functions will be performed if a single active failure occurs.

The ECCS is made up of the High Pressure Injection (HPI) System, the Low Pressure Injection (LPI) System, and the Core Flooding (CF) System. The LPI System is used for long term cooling of the reactor core during a loss-of-coolant accident (LOCA). During the injection phase, the HPI System and LPI System will operate to provide full

protection over the entire spectrum of break sizes. During the recirculation phase, the LPI System will recirculate the spilled reactor coolant and injection water from the containment emergency sump to the reactor vessel and will maintain long-term core cooling.

The containment vessel heat removal systems described in USAR Section 6.2.2, "Containment Vessel Heat Removal Systems," are composed of the Containment Air Cooling (CAC) System and the Containment Spray (CS) System. The Containment Spray System is an engineered safety feature which has the dual function of removing heat and fission product iodine from the post-accident containment atmosphere. The Containment Air Cooling System is designed to remove heat from the containment atmosphere during normal operation. In the event of a LOCA, the systems provide cooling of the containment atmosphere to reduce the pressure build-up in the containment vessel and thus reduce the leakage of airborne and gaseous radioactivity from the containment vessel.

The CS System is placed in operation automatically following a LOCA. The containment spray nozzles are installed on two containment ring headers. Each header has 90 nozzles, for a total of 180 nozzles. The CS System is designed so that a single active failure during the injection phase, or a single active or passive failure during the recirculation phase, cannot impair the system's ability to comply with its safety design basis.

Clogging of the containment spray nozzles was evaluated and is described in USAR Table 6.2-21, "Single Failure Analysis-Containment Vessel Heat Removal Systems". This evaluation concluded that the large number of nozzles on each of two headers renders clogging of a significant number of nozzles as incredible. The nozzles are designed to pass up to ¼-inch size particles. Additionally, other failures were evaluated, such as a containment spray pump failure-to-start, assuming that flow and cooling capacity was reduced to 50 percent of design. The conclusion was that containment spray, in combination with the containment air coolers, still provided the total required cooling capacity.

The Containment Vessel Emergency Sump, is described in USAR Section 6.2.2.6, "Containment Vessel Emergency Sump". The sump, located inside the containment vessel, is an open-top concrete structure. Following a LOCA, after the Borated Water Storage Tank (BWST) has been exhausted, the Containment Vessel Emergency Sump provides a water source for continuous injection of the reactor coolant, through the low pressure injection/decay heat pumps, into the Reactor Coolant System. This maintains long-term core cooling by recirculating the spilled reactor coolant back to the reactor

vessel and/or through the containment spray pumps into the containment vessel atmosphere to decrease the pressure and temperature in the containment vessel. It should be noted that the containment air coolers provide the primary containment cooling during the recirculation phase.

The Containment Vessel Emergency Sump consists of one sump, two horizontal exit openings, an intake screen on top of the sump and antivortexing plates. The Containment Vessel Emergency Sump provides the suction for the post-LOCA recirculation of the reactor coolant for long-term emergency core cooling. Each of the two exit lines is sized for carrying the maximum flow rate of one low-pressure injection and one containment spray pump. The Containment Vessel Emergency Sump provides an adequate net positive suction head (NPSH) based on the maximum flow rate of the pumps. An intake screen is installed over the sump to prevent large particles from getting into the recirculating line and plugging up the spray nozzles and/or damaging the pump. The wire mesh intake screen has ¼-inch openings. The intake has openings to the containment on three sides and has a vertical face area of approximately 49 square feet. Adequate free-flow area is provided in the screen so that there is negligible flow resistance even if 50 percent of the screen gets clogged with debris.

As stated previously, coatings used in containment are qualified, with the exceptions noted above for small equipment such as motors, handwheels, electrical cabinets, loud speakers, etc. If some of the unqualified coating became loose, a portion might reach the emergency sump elevation. However, because of the small components and associated surface areas involved, they would not be expected to produce large sheets of debris that would block a significant amount of the intake screen surface area. In addition, coating material that becomes loose would have to make its way to the intake screen via potentially tortuous paths, transported by very low flow rates in most areas. In these low flow rates, paint flakes are expected to settle out and not be transported to the emergency sump intake screen. Therefore, based on reasonable engineering judgment, due to the relatively small amount of unqualified coatings in containment and the flow paths and flow velocities that will be present, large amounts of paint are not likely to be carried to the emergency sump screen and clog over 50 percent of the screen area preventing long-term or containment atmosphere cooling by HPI, LPI, CS or the CACs. Any paint debris fragments that are small enough to pass through the ¼-inch emergency sump intake screen openings would not clog spray nozzles or damage pumps.

Additionally, as described in the above response to Item 1, periodic evaluations of Service Level 1 coatings inside containment are now conducted as part of the DBNPS Maintenance Rule Program. 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. As previously noted, the guidance contained in the EPRI coatings guideline is currently being evaluated and, as appropriate, improvements to the DBNPS's existing programs and procedures for Service Level 1 coatings will be implemented.