

Nebraska Public Power District

Nebraska's Energy Leader

NLS980166

November 4, 1998

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Subject: Response to NRC Generic Letter 98-04
Cooper Nuclear Station, NRC Docket 50-298, DPR-46

- References:
1. NRC Generic Letter 98-04 dated July 14, 1998, "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."
 2. Safety Evaluation Report for Utility Resolution Guidance for ECCS Suction Strainer Blockage, Docket No. PROJ0691, dated August 20, 1998.

Gentlemen:

This letter transmits the Nebraska Public Power District's 120-day response to Generic Letter (GL) 98-04 (Reference 1) for the Cooper Nuclear Station (CNS). GL 98-04 identified the potential for coating debris to affect the operation of safety related Systems, Structures and Components (SSCs) during a Design Basis Loss of Coolant Accident (DB LOCA). Protective coatings are necessary inside containment to control radioactive contamination and to protect surfaces from erosion and corrosion.

The attached response provides information to demonstrate compliance with 10 CFR 50.46(b)(5) and that Service Level 1 protective coatings, used inside primary containment, will not interfere with operation of Emergency Core Cooling System (ECCS) during a DB LOCA at CNS.

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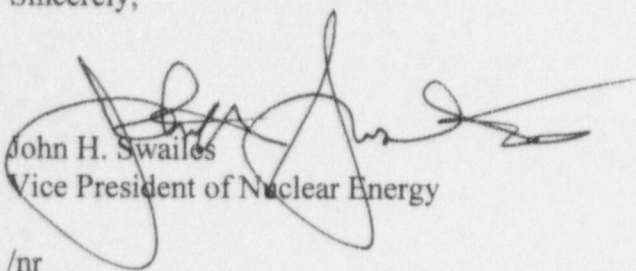
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Should you have any questions concerning this matter, please contact me.

Sincerely,



John H. Swailles
Vice President of Nuclear Energy

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cc: Regional Administrator
USNRC - Region IV

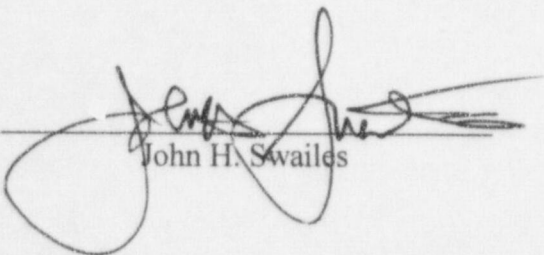
Senior Project Manager
USNRC - NRR Project Directorate IV-1

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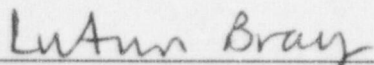
STATE OF NEBRASKA)
)
NEMAHA COUNTY)

John H. Swailes, being first duly sworn, deposes and says that he is an authorized representative of the Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska; that he is duly authorized to submit this correspondence on behalf of Nebraska Public Power District; and that the statements contained herein are true to the best of his knowledge and belief.

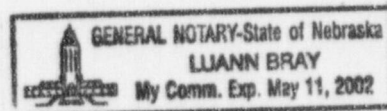


John H. Swailes

Subscribed in my presence and sworn to before me this 4 day of November, 1998.



NOTARY PUBLIC



CNS Response to GL 98-04

To clarify the response the following application distinctions are used:

Application A

Interior surfaces above the torus immersion area and the interior surfaces of the drywell.

Application B

Interior surfaces in the torus immersion areas.

NRC Requested Action 1

- (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.*

CNS Response to Requested Action 1

Application A Program Description

Procurement

General Electric Design Specification 22A1337, "Special Protective Coatings" stipulated the original technical requirements for procurement and application of coatings inside the containment. The design specified the area to be protected, surface preparation, coating systems, and number of required coats including dry film thicknesses.

In 1995, CNS identified two conditions affecting protective coatings inside containment which were entered into the station corrective action process. The first condition involved lack of procedural controls for Service Level 1 protective coatings. The second condition noted peeling paint inside the drywell and evidence of unauthorized paint used for a minor repair.

Corrective actions included: 1) stopping all protective coating application activities in the drywell, 2) conducting visual inspections, testing and evaluations of the coatings inside the drywell to establish the qualification status of the coatings, 3) removing degraded coatings; and, 4) performing an engineering analysis to evaluate debris generation and transport potential of the unqualified coating and its effect on ECCS pump performance.

Control of protective coatings was reestablished by placing procurement and application activities on hold until procedures are implemented. In addition, an owner with responsibility for development and implementation of the coatings program was assigned.

Unqualified and degraded coatings are a change to the facility as described in the Updated Safety Analysis Report. CNS completed an Unreviewed Safety Question Evaluation of the unqualified and degraded coatings within the containment and determined the condition does not involve an unreviewed safety question.

Qualification Testing described in the USAR

Tests of Service Level 1⁴ coatings demonstrated the coating system will satisfactorily withstand the temperatures and pressures of the steam environment postulated during DB LOCA. In addition, the drywell coating system will be subjected to a 30-day dose of 1.5×10^8 Rads at the surface of the drywell and this coating material is capable of withstanding doses more than 10^9 Rads without any deterioration.

Surface Preparation, Application, Surveillance and Maintenance

Coating inspections of the accessible interior surfaces of the drywell and suppression chamber are conducted each refueling outage. The inspection is performed to verify the protective layer on reasonably accessible painted surfaces is still intact and conditions are not occurring which could lead to blockage of the ECCS pump suction strainers. Recordable indications include peeling, cracking, blistering or other surface defects such as bare areas, rust-through or rust bleed.

When localized areas of degraded coatings are identified, they are evaluated and accepted as-is or scheduled for repair or replacement as necessary. Based on the visual condition assessments to date, the majority of existing coatings pass visual inspection. Coatings that do not pass the visual inspection are mechanically scraped down to sound coatings. The removal of these coatings is acceptable because a two-part system with a primer of inorganic zinc (Carbo Zinc 11) and a finish coat of Carboline Phenoline 305 was applied in accordance with design specifications.

⁴ Our response applies to Service Level 1 coatings used in primary containment that are procured, applied and maintained by Nebraska Public Power District or their contractor. This response does not address the relatively small amount of coatings applied by vendors on supplied equipment and miscellaneous structural supports.

The remaining inorganic zinc primer will inhibit corrosion of the substrate with the finish coat removed. The containment is also protected from further corrosion by a nitrogen blanket since CNS operates with an inerted containment in accordance with the Technical Specifications. The periodic inspections, and the resulting repair activities, provide reasonable assurance that coatings which may be susceptible to detachment from the substrate during a DB LOCA event is minimized.

Surveillance and the described repair activities are controlled under the CNS Appendix B Quality Assurance Program. As previously noted, application activities are not currently being conducted.

Application B Program Description

Procurement

General Electric Design Specification 22A1337, "Special Protective Coatings" stipulated the original technical requirements for procurement and application of coatings inside the containment. The design specified the area to be protected, surface preparation, coating systems, and number of required coats including dry film thicknesses.

CNS contracts with S.G. Pinney and Associates, Inc. (SGPAI) for torus underwater repair and inspection work. Work is performed under the SGPAI Corporate Quality Assurance Program which conforms to the requirements of 10 CFR 50 Appendix B. Review and approval of technical and quality requirements is controlled by the CNS procurement process. The methods and criteria for underwater repair and inspection of protective coatings are reviewed and approved by CNS in accordance with site administrative procedures.

Torus underwater coating repairs are performed using UT-15 Underwater Epoxy Coating as supplied by SGPAI. Although UT-15 is not manufactured under a 10 CFR 50 Appendix B Quality Assurance Program, SGPAI commercially dedicates the material through performance of DB LOCA testing in accordance with ASTM D3911 and D4082.

Qualification Testing described in the USAR

Tests of Service Level 1 coatings demonstrated the coating system will satisfactorily withstand the temperatures and pressures of the steam environment postulated during DB LOCA. In addition, the drywell coating system will be subjected to a 30-day dose of 1.5×10^8 Rads at the surface of the drywell and this coating material is capable of withstanding doses more than 10^9 Rads without any deterioration.

Qualification Testing

UT-15 is qualified in accordance with ANSI N101.2 to Service Level 1 as defined in ANSI N101.4. UT-15 met the acceptance criteria of the Final Report titled, "Design Basis Accident and Irradiation Testing of Coating Repair Materials for use in Boiling Water Reactor Suppression Chamber Immersion Areas" dated May 6, 1996.

Surface Preparation, Application, Surveillance and Maintenance

Coating inspections of the accessible interior surfaces of the drywell and suppression chamber are conducted each refueling outage. The inspection is performed to verify the protective layer on reasonably accessible painted surfaces is still intact and conditions are not occurring which could lead to blockage of the ECCS pump suction strainers. Recordable indications include peeling, cracking, blistering or other surface defects such as bare areas, rust-through or rust bleed.

When localized areas of degraded coatings are identified, they are evaluated and accepted as-is or scheduled for repair or replacement as necessary. Based on the visual condition assessments to date, the majority of existing coatings pass visual inspection. Coatings that do not pass the visual inspection are repaired as described below.

Coating repair and inspection work is nuclear safety related (Service Level 1) and conducted in accordance with SGPAI Quality Assurance Manual and the applicable parts of ANSI N101.4-1972 which are pertinent to underwater repair and inspection of protective coatings. Personnel assigned to perform in-process and final acceptance inspection of coating work are Level II and/or Level III Coating Inspectors, trained and certified in accordance with ANSI N45.2.6, ASTM D4537, and Subsection IWE of ASME Section XI, 1992 Edition, 1992 Addenda.

Applied coatings are inspected for bare areas, blisters, cracking, lifting or peeling and rust through or rust bleed. Within 24 hours of application, coating repairs are inspected to verify coating dry film thickness and dry film characteristics. The dry film thickness of a representative area of the repaired area is measured using a calibrated dry film thickness inspection. Repairs exhibiting dry film thickness outside the specified tolerances or unacceptable dry film characteristics are repaired or reworked.

Application A and B Program

CNS is currently evaluating the guidance provided in EPRI TR-109937, "Guideline on Nuclear Safety-Related Coatings," and as appropriate, improvements to our programs and procedures for Service Level 1 coatings will be implemented upon completion of the evaluation.

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

NRC Requested Action 2(i)

- (i) For plants with licensing-basis requirements for tracking the amount of unqualified coatings inside the containment and assessing the impact of potential coating debris on the operation of safety-related SSCs during a postulated DB 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 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;

CNS Response to Requested Action 2(i)

Application A and B

The CNS Current Licensing Basis (CLB) does not contain a requirement for tracking the amount of unqualified coatings inside the containment and assessing the impact of potential coating debris on the operation of safety-related SSCs during a postulated DB LOCA.

NRC Requested Action 2(ii)

- (ii) For plants without the above licensing-basis requirements, information shall be provided to demonstrate compliance with the requirements of 10 CFR50.46b(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. The following information shall be provided:

CNS Response to Requested Action 2(ii)

Passive replacement ECCS strainers were installed at CNS in response to NRC Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors".

The design input to the ECCS strainer calculations for the amount of unqualified coatings, qualified coatings in the break jet, and degraded coatings in the containment (as identified from periodic visual inspections) is documented in the replacement 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 percent of the containment coatings which are installed in the LOCA pipe break jet. This source term is determined in accordance with the methodology documented in the BWR Owners' Group Utility Resolution Guidance document (NEDO-32686), Section 3.2.2.2.1.1. The conservative methodology used to establish the amount of coating debris has been accepted by the NRC as documented in Reference 2.

An additional amount of coating debris is added to the source term. This amount accounts for potential debris which may result from coatings which are unqualified or degraded. Paint located in the drywell at CNS which is not qualified for a post-LOCA temperature and pressure environment, or which is degraded and therefore no longer qualified, is also considered. A total value of 500 pounds of paint debris is assumed for sizing the strainers.

Results of the BWR Owners' Group LOCA testing of coupons representing unqualified coating systems provide evidence that failure of typical unqualified coating systems which pass 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 water 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 CNS, no credit was taken for the delayed release of coating debris; therefore, these designs are conservative with respect to the Owners' Group test results. CNS 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.

NRC Requested Action 2(ii)(a)

(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.

CNS Response to Requested Action 2(ii)(a)

Application A

Surveillance and the previously described repair activities are controlled under the CNS Appendix B Quality Assurance Program. Control of protective coatings was reestablished by placing procurement and application activities on hold until procedures are implemented. As previously noted, CNS will review EPRI TR-109937 and update our programs and procedures accordingly.

Application B

An underwater cured epoxy (UT-15) manufactured by the Picco Coatings Company, Inc., of Houston, Texas and supplied by SGPAI is used for the repair of torus immersion areas. UT-15 is not manufactured under a 10 CFR 50, Appendix B Quality Assurance Program. SGPAI commercially upgrades the material through performance of DB LOCA testing in accordance with ASTM D3911 and D4082. UT-15 was qualified in accordance with ANSI N101.2 to Service Level 1 as defined in ANSI N101.4 by testing conducted by SGPAI. UT-15 met the acceptance criteria of the Final Report titled, "Design Basis Accident and Irradiation Testing of Coating Repair Materials for use in Boiling Water Reactor Suppression Chamber Immersion Areas" dated May 6, 1996.

Correspondence No: NLS980166

The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the NL&S Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
CNS is currently evaluating the guidance provided in EPRI TR-109937, "Guideline of Nuclear Safety-Related Coatings," and as appropriate, improvements to our programs and procedures for Service Level 1 coatings will be implement upon completion of the evaluation.	N/A