CATEGORY 1

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SUBJECT: Forwards 120-day response to NRC GL 98-04, "Potential For Degradation of ECCS & CSS After LOCA Because of Construction & Protective Coating Deficiencies & Foreign Matl in Containment."

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November 11, 1998

U.S. Nuclear Regulatory Commission
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Subject: Catawba Nuclear Station Units 1 & 2
Docket Nos. 50 -413, 414
McGuire Nuclear Station Units 1 & 2
Docket Nos. 50 -369, 370
Oconee Nuclear Station Units 1, 2 & 3
Docket Nos. 50 -269, 270, 287
Response to 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

Reference: (1) EPRI TR-109937: Guidelines on the Elements of a Nuclear Safety-Related Coatings Program, dated April 1998

On July 14, 1998, the NRC issued Generic Letter (GL) 98-04 addressing issues which have generic implications regarding the impact of potential coating debris on the operation of safety related systems, structures, and components 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 Emergency Core Cooling System (ECCS) unable to satisfy the requirement of 10 CFR 50.46(b)(5) to provide long-term cooling and may make the safety-related

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Containment Spray system unable to satisfy the plant-specific licensing basis of controlling containment pressure and radioactivity releases following a LOCA. The GL 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 and the Containment Spray system. 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.

Duke's 120-day response to GL 98-04 is provided in Attachments 1, 2 and 3 for McGuire, Catawba and Oconee Nuclear Stations, respectively.

I declare under penalty of perjury that these statements are true and correct to the best of my knowledge.

If you have questions or need additional information, please contact Allison Jones-Young at (704) 382-3154.

Very truly yours,

M. S. Tuckman

M.S. Tuckman
Executive Vice President
Nuclear Generation

Attachments

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ATTACHMENT 1
McGUIRE Nuclear Station's RESPONSE TO GL 98-04

McGUIRE NUCLEAR STATION'S RESPONSE TO GL-98-04

Per the above referenced generic letter, licensees were requested to provide information on two issues relating to the importance of ensuring system functionality. The exact requests, and the specific McGuire responses, are included in the following:

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 program licensing basis for the facility. Include a discussion of how the plant-specific program meets the applicable criteria of 10CFR 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 coatings.**

Duke 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 McGuire. The requirements of 10 CFR 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 Service Level 1 coatings, Duke is committed to Regulatory Guide 1.54 for all civil coating work at McGuire. Vendor coated mechanical and electrical equipment did not comply since equipment was ordered prior to

issuance of the regulatory guide and these coatings have been documented as unqualified. The following information is extracted from McGuire UFSAR, Section 6.2.1.8.

"The original coating materials and coating systems were specified by Engineering and applied by the Duke Power Construction Department to all structures within the containment and to the Containment Vessel. The coating systems were qualified for radiation exposure, pressure, temperature, and water chemistry exposure during a DBA in accordance with ANSI N101.2."

"Carboline coating materials are now used for maintenance of the existing coating systems and for any new applications. These coating systems are specified by Engineering and applied by the Duke Power Maintenance Department. The Carboline coating materials have been qualified for radiation exposure, pressure, temperature, and water chemistry exposure during a DBA in accordance with ANSI N101.2."

"The original, maintenance, and new coating systems defining temperature limitations, surface preparation, type of coating, and dry film thickness are tabulated on Table 6-143."

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 Duke Power's Quality Assurance Program. Duke's Service Level 1 coating program for McGuire is consistent with the guidance provided in EPRI TR-109937 "Guideline on Nuclear Safety-Related Coatings."

a) Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor with a quality assurance program meeting the applicable requirements of 10 CFR 50 Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified in procurement documents. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N 45.2

requirements (e.g. receipt inspection, source surveillance, etc.). The specification of technical and quality requirements combined with appropriate acceptance activities provide adequate assurance that the coatings received meet the requirements of the procurement documents.

b) The original Service Level 1 coating materials applied by Duke to all structures within the primary containment during plant construction were qualified to meet the applicable requirements contained in the standards and regulatory commitments referenced above. The qualification testing of Service Level 1 substitute coatings now used for new applications or repair/replacement activities inside containment also meet the applicable requirements contained in the standards and regulatory commitments referenced above. The substitute coatings when used for maintenance over the original coatings were tested, with the appropriate documentation, to demonstrate a qualified coating system. The surface area of any unqualified coatings used on vendor supplied equipment or any other component in containment must be approved and documented in the unqualified coatings log prior to installation.

c) The surface preparation, application, and surveillance during installation of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable portions of the standards and regulatory commitments referenced above.

The McGuire Nuclear Maintenance Coating Schedule specifies the applicable Service Level 1 coating specification for all structures and components inside primary containment and provides any special requirements for these coating systems.

The Nuclear Coating Maintenance Manual is used in conjunction with the Nuclear Maintenance Coating Schedule and provides detailed specification criteria for the surface preparation, application, and inspection of Service Level 1 coating activities. These coating

specifications define the coating system for new applications or repair/replacement coating work and provide detailed surface preparation and application requirements during installation of the Service Level 1 coating materials. Verification of completion of these activities is performed consistent with the applicable requirements.

McGuire conducts periodic condition assessments of Service Level 1 coatings used inside containment. These assessments are used for evaluating the condition of in-service coating systems and are performed during each refueling outage. 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:

(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 SSC's 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.

Unit #1 - The last assessment of the coatings in containment was performed during the 1E0C12 refueling outage (June 1998) and the results of this inspection were documented. The overall condition of the coatings was satisfactory with only minor localized coating deficiencies noted. These localized areas were evaluated and scheduled for repair or replacement as necessary. The next scheduled coating assessment is during the 1E0C13 refueling outage (September 1999).

Unit #2 - The last assessment of the coatings in containment was performed during the 2E0C11 refueling outage (December 1997) and the results of this inspection were documented. The overall condition of the coatings was satisfactory with only minor localized coating deficiencies noted. These localized areas were evaluated and scheduled for repair or replacement as necessary. The next scheduled coating assessment is during the 2E0C12 refueling outage (March 1999).

(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.

The limit for unqualified coatings inside the McGuire containment is 20,000 square feet. This limit is documented in the McGuire UFSAR, Chapter 6, Section 6.2.1.8, Materials. In a letter dated July 29, 1992, McGuire submitted a request for NRC approval of our program

for control of unqualified coatings inside containment. This submittal included the technical justification for the limit of 20,000 square feet. In a response dated February 24, 1993, the NRC issued the Safety Evaluation of Unqualified Coatings Inside Containment (TAC Nos. M84383/M84384), which gave concurrence with McGuire's program and limits.

The question of conservatism was viewed from two different perspectives. The first was to establish an adequately high limit such that a regulatory commitment is not exceeded; the second perspective is to ensure there would be no adverse consequences from this maximum area of unqualified coatings.

In the context of regulatory commitment, the margin between the area of actual and planned unqualified coatings as compared to the established limit constitutes a conservatism. Vendor supplied mechanical equipment (valves, pumps, hoists, tanks, etc) that was procured prior to the issuance of Reg Guide 1.54 all have coatings that cannot be certified to comply with the standards, and are thus defined as unqualified. The actual square footage of all such unqualified coatings was calculated on 3/31/92 to be 15,184 sq. ft. In order to allow for the possibility of some additional unqualified coatings (such as miscellaneous vendor equipment or potential coatings repairs where surface preparations cannot be fully performed per the standards), a regulatory limit of 20,000 square feet was proposed.

In the context of ECCS sump and active component performance, the issue of conservatism relates to the possibility of function impairment due to debris generated from coatings failures. Quoting from the NRC's February 24, 1993 Safety Evaluation accepting the above technical justification:

"2.0 EVALUATION

In support of the position that the 20,000 square feet of unqualified coatings will not degrade ECCS/containment sump performance, the licensee makes the following arguments:

(1) Lighter debris floating in water collected in the lower containment compartments should not reach the sump since this water travels to the sump through spare penetrations located near floor level. Floating debris should not pass through these penetrations since they are located below surface level.

(2) Heavier particles that settle to the containment floor should not reach the containment sump due to the low water velocities not being sufficient to transport such particles to the sump screens. (Estimated velocity of water approaching the sump is approximately .24 ft/sec versus a required velocity of greater than 2 ft/sec to transport this debris.)

(3) Following a loss-of-coolant accident, there is approximately 20 minutes (while the RWST empties) until ECCS suction must be switched to the containment sump. During this time period, sump water levels will rise above the coverplate making it more unlikely that floating debris will be drawn into the sump suction. In addition, Alden Research Laboratory (ARL) sump model tests indicate that air entrainment and vortex formation are unlikely in the containment sump. Floating debris in the sump should not be drawn into the sump suction.

(4) There is an insignificant amount of unqualified coatings in the near vicinity of

the containment sump. Therefore, given the difficulty for debris to travel to the sump and the small amount of potential failed coatings in the near vicinity of the sump, sump screen blockage should not be significant due to failed unqualified coatings.

The licensee concludes, from the above qualitative arguments, that sump screen blockage resulting from failed coatings should not be significant. Previous ARL sump model tests indicate that up to 50% sump screen blockage does not degrade ECCS performance. As a result, the ECCS and containment spray (NS) systems' performance should not be degraded due to failed unqualified coatings.

In addition to the above arguments, the licensee performed a conservative calculation assuming all 20,000 square feet of unqualified coatings fail and are drawn into the sump structure. The licensee assessed the impact of the failed coatings on the performance of the ECCS and NS systems following a postulated large or small break loss-of-coolant accident. The licensee concludes from this analysis that ECCS performance would not be significantly degraded based on a low debris/water ratio, input from equipment suppliers, and engineering judgement. The licensee stated that overall amount of debris that is postulated to reach the sump during a design basis event is not significantly increased even if all 20,000 square feet of unqualified coatings were to fail. In addition, the licensee states that the original conclusions reached in evaluation of the impact of debris on the McGuire sump during licensing have not changed."

(c) If commercial-grade 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,

Duke does not currently employ commercial grade dedication for Service Level 1 coatings used inside containment at McGuire.

ATTACHMENT 2
CATAWBA Nuclear Station's RESPONSE TO GL 98-04

CATAWBA NUCLEAR STATION'S RESPONSE TO GL-98-04

Per the above referenced generic letter, licensees were requested to provide information on two issues relating to the importance of ensuring system functionality. The exact requests, and the specific Catawba responses, are included in the following:

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 program licensing basis for the facility. Include a discussion of how the plant-specific program meets the applicable criteria of 10CFR 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 coatings.**

Duke 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 Catawba. The requirements of 10 CFR 50 Appendix B are implemented through specification of appropriate technical and quality requirements for the Service Level 1 coatings program that includes ongoing maintenance activities.

For Service Level 1 coatings, Duke is committed to comply with Regulatory Guide 1.54 at Catawba. The following information is extracted from Section 6.1.2.2 of the UFSAR.

- "The original coating materials and coating systems were specified by Engineering and applied by the Duke Power Construction Department to all structures within the containment and the Containment Vessel. The coating systems were qualified for radiation exposure, pressure, temperature, and water chemistry exposure during a DBA in accordance with ANSI N101.2."

- "Carboline coating materials are now used for maintenance of the existing coating systems and for any new applications. These coating systems are specified by Engineering and applied by the Duke Power Maintenance Department. The Carboline coating materials have been qualified over the existing Mobil/Valspar coatings as a mixed system and as a new coating system for radiation exposure, pressure, temperature, and water chemistry exposure during a DBA in accordance with ANSI N101.2".

- "The original, maintenance, and new coating systems defining temperature limitations, surface preparation, type of coating, and dry film thickness are tabulated on Table 6-135."

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 Duke Power's Quality Assurance Program.

(a) Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor with a quality assurance program that meets the applicable requirements of 10 CFR 50 Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified by Duke Power in procurement documents. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N45.2 requirements (e.g. receipt inspection, source surveillance, etc.). The specification of technical and quality requirements combined with appropriate acceptance activities provide adequate assurance that the coatings received meet the

requirements of the procurement documents.

b) The original Service Level 1 coating materials applied to all structures within the primary containment during plant construction were qualified to meet the applicable requirements contained in the standards and regulatory commitments referenced above. The qualification testing of Service Level 1 substitute coatings now used for new applications or repair/replacement activities inside containment also meets the applicable requirements contained in the standards and regulatory commitments referenced above. The substitute coatings when used for maintenance over the original coatings were tested, with the appropriate documentation, to demonstrate a qualified coating system. The surface area of any unqualified coatings used on vendor supplied equipment or any other component in containment must be approved and documented prior to installation.

c) The surface preparation, application, and surveillance during installation of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable portions of the standards and regulatory commitments referenced above.

The Catawba Nuclear Maintenance Coating Schedule specifies the applicable Service Level 1 coating specification for all structures and components inside primary containment and provides any special requirements for these coating systems.

The Nuclear Coating Maintenance Manual is used in conjunction with the Nuclear Maintenance Coating Schedule and provides detailed specification criteria for the surface preparation, application, and inspection of Service Level 1 coating activities. These coating specifications define the coating system for new applications or repair/replacement coating work and provide detailed surface preparation and application requirements during installation of the Service Level 1 coating materials. Verification of completion of these activities is performed consistent with the applicable

requirements.

Catawba conducts periodic condition assessments of Service Level 1 coatings used inside containment. These assessments are used for evaluating the condition of in-service coating systems and are performed during each refueling outage. 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 that may be susceptible to detachment from the substrate during a LOCA event is minimized.

2. Information demonstrating compliance with item (i):

(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 SSC's 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

Unit #1 - The last assessment of the coatings in containment was performed during the 1E0C10 (December 1997) refueling outage and the results of this inspection were documented. The overall condition of the coatings was satisfactory with only minor localized degraded coatings noted. These localized areas were evaluated and prioritized for maintenance repair. The next scheduled coating assessment is during the 1E0C11 (May 1999) refueling outage.

Unit #2 - The last assessment of the coatings in containment was performed during the 2E0C9 (September 1998) refueling outage and the results of this inspection were documented. The overall condition of the coatings was satisfactory with only minor localized degraded coatings

noted. These localized areas were evaluated and prioritized for maintenance repair. The next scheduled coating assessment is during the 2E0C10 (March 2000) refueling outage.

(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.

The limit for unqualified coatings of 11,200 ft^2 is documented in the Catawba UFSAR Chapter 6, sections 6.1.2.1, (Westinghouse scope of supply), 6.1.2.2 (Duke Scope of supply), and documented in a Duke calculation, which is referenced in Table 6-135 "Containment Coatings". This limit was established during initial plant licensing. Per these sections and Table 6-3 for intermediate and small equipment, the Catawba UFSAR licensing basis allows up to 3450 ft^2 + 1300 ft^2 = 4750 ft^2 of Westinghouse scope unqualified coating and up to 6450 ft^2 of Duke scope. Currently, through emphasis on the qualified coatings program, the Catawba inventory of unqualified coatings is less than 4600 ft^2 of Duke scope. Consistent with applicable regulatory requirements, the type and quantity of debris were not explicitly considered when the original calculations for ECCS sump head loss were performed.

The licensing basis discussion regarding the recirculation sump screen is presented in UFSAR Sections 6.3.4.1. and 6.2.2.2 System Design. These discussions are not based on quantitative calculations but rather a qualitative discussion regarding the Post LOCA failure of unqualified coatings, insulation and other LOCA generated debris inside containment.

The following is excerpted from UFSAR section 6.3.4.1: "Due to the location of the Catawba containment sump screen, in the pipe tunnel outside the polar crane wall, it is unlikely that paint chips would reach the screen. The flow paths to the sump screen are spare piping sleeves located in the crane wall near containment floor level. Therefore, lighter paint chips floating on the water surface are unable to reach the sump screen. Heavier chips

which settle to the containment floor inside the crane wall also are unable to reach the sump screen due to the low approach velocity (0.24 fps), as determined by Alden Research Laboratory (ARL) from sump model testing. However, if paint chips were able to reach the sump screen, a fine screen (less than 0.25 inch mesh size) is provided to prevent degradation of ECCS performance. In addition, the sump screen has been evaluated for the clogging potential for qualified blanket insulation used as an option to the original, reflective insulation. In order to minimize the sump screen loading due to paint chips or blanket insulation material which has been affected by the LOCA or Steam Line Break, the bottom row of pipe sleeves closest to the floor have been closed. Remaining, open sleeves at higher elevations are sufficient, alone, to allow the free movement of water from the area inside the crane wall (where all high energy pipe is located) to the tunnel area outside the crane wall, where the sump recirculation screen is located. Sump model tests were performed by ARL with up to 50 percent screen blockage (67.5 ft^2 screen surface area) without degrading ECCS performance. The containment spray nozzles, which have 3/8 inch spray orifices, are not subject to clogging by particles less than 1/4 inch maximum dimension. All other valves, pumps and heat exchangers have sufficient clearances to pass particles of less than 1/4 inch."

The final decision on the fine mesh was determined by Westinghouse as explained in the following excerpt from UFSAR section 6.2.2.2:
"Each "sump" screen assembly consists of a horizontal solid top (approximate elevation 558'-0") and filtering screen panels which extend to the floor. The screen panels contain an outer trash rack which prevents large debris from reaching the inner fine screen. The fine screen prevents particles which are large enough to impair ECCS or containment spray (NS) performance from being drawn into these systems. The fine screen mesh is sized to preclude any particle larger than 1/8" in diameter. This size particle would be the largest size particle which could freely flow through a fuel assembly, and is significantly smaller than the size needed to prevent clogging of the NS spray nozzles."

In the context of regulatory commitment, the margin between the area of actual and planned unqualified coatings as compared to the established limit constitutes a conservatism. Vendor supplied mechanical equipment (valves, pumps, hoists, tanks, etc) that was procured prior to the issuance of Reg Guide 1.54 (or that are impractical to purchase with qualified coatings) all have coatings that cannot be certified to comply with the standards, and are thus defined as unqualified. The actual square footage of all such unqualified coatings was calculated to be less than 3667 ft^2 of vendor scope and less than 4600 ft^2 of Duke scope. In order to allow for the possibility of some additional unqualified coatings (such as miscellaneous vendor equipment or potential coatings repairs where surface preparations cannot be fully performed per the standards), a regulatory limit of 11,200 ft^2 is considered sufficient.

As documented in the Catawba SER Supplement 2, section 6.3.4, the NRC closed out Confirmatory Issue 23 "Inside-containment insulation and containment sump test" through reference to a detailed comparison between the configurations of the McGuire and the Catawba sumps provided by a Duke letter dated January 14, 1983. As stated in the SER: "The staff has reviewed that comparison and concludes that the McGuire sump test is applicable to Catawba and, therefore, the staff finds the applicant's response acceptable. In the same letter, the applicant committed to provide results of a survey quantifying the insulation in the containment by type and location before startup following the first refueling so that the staff may ascertain that such insulation will not block the containment sumps. The staff finds this commitment acceptable, and, therefore, Confirmatory Issue 23 is resolved." The results of the survey quantifying the insulation in the containment by type and location before startup following the first refueling were transmitted in Duke letter dated June 19, 1986. By this means it was demonstrated that the selection of insulation, in addition to the specified amount of unqualified coatings material, was judged in the Catawba licensing basis to not significantly affect sump screen safety function.

(c) If commercial-grade 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;

Duke does not currently employ commercial grade dedication for Service Level 1 coatings used inside containment at Catawba.

ATTACHMENT 3
Oconee Nuclear Station's RESPONSE TO GL 98-04

OCONEE NUCLEAR STATION'S RESPONSE TO GL-98-04

Per the above referenced generic letter, licensees were requested to provide information on the impact of failed coatings on ECCS and Containment Spray Systems. The specific request, as it applies to Oconee Nuclear Station, was as follows:

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 program licensing basis for the facility. Include a discussion of how the plant-specific program meets the applicable criteria of 10CFR 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 coatings.**

Oconee 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 Oconee. The requirements of 10 CFR 50 Appendix B are implemented through specification of appropriate technical and quality requirements for the Service Level 1 coatings program that includes ongoing maintenance activities.

For Service Level 1 coatings, Oconee is not committed to Regulatory Guide 1.54 since the guide was not issued until

1973. Original coating systems used during construction on Civil components were successfully tested by Carboline to withstand anticipated LOCA conditions. Vendor coated mechanical and electrical equipment did not comply since equipment was ordered prior to issuance of the regulatory guide and the coating systems were not tested.

The original and substitute coating systems used for new applications and repair/replacement activities are tabulated on Table 3-12 in the UFSAR.

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 Duke Power's Quality Assurance Program.

a) Substitute Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor with a quality assurance program meeting the applicable requirements of 10 CFR 50 Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified in procurement documents. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N 45.2 requirements (e.q. 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 original Service Level 1 coating materials applied to all structures within the primary containment during plant construction were qualified by withstanding autoclave tests designed to simulate LOCA conditions. The qualification testing of Service Level 1 substitute coatings now used for new applications or repair/replacement activities inside containment was in accordance with ANSI N101.2 for LOCA conditions and radiation tolerance. The substitute coatings when used

for maintenance over the original coatings were tested, with the appropriate documentation, to demonstrate a qualified coating system.

c) The Oconee Nuclear Maintenance Coating Schedule specifies the applicable Service Level 1 coating specification for all structures and components inside primary containment and provides any special requirements for these coating systems.

The Nuclear Coating Maintenance Manual is used in conjunction with the Nuclear Maintenance Coating Schedule and provides detailed specification criteria for the surface preparation, application, and inspection of Service Level 1 coating activities. These coating specifications define the coating system for new applications or repair/replacement coating work and provide detailed surface preparation and application requirements during installation of the Service Level 1 coating materials. Verification of completion of these activities is performed consistent with the Quality Assurance Program.

Oconee conducts periodic condition assessments of Service Level 1 coatings used inside containment. These assessments are used for evaluating the condition of in-service coating systems and are performed during each refueling outage. 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 that may be susceptible to detachment from the substrate during a LOCA event is minimized.

In addition to the above information, the following coating assessments have been performed and documented for each of the units.

Unit #1 - The last assessment of the coatings in containment was performed during the 1E0C17 (September 1997) refueling outage and the results of this inspection were documented. Except for the sprinkler grid system and

the polar crane, the overall condition of the coatings was satisfactory with any degraded coatings evaluated and prioritized for repair during the outage or future repair as necessary. The degraded coatings on the sprinkler grid system and on localized areas of the polar crane have been documented and will continue to be evaluated for possible removal. The next scheduled coating assessment is during the 1E0C18 (June 1999) refueling outage.

Unit #2 - The last assessment of the coatings in containment was performed during the 2E0C16 (March 1998) refueling outage and the results of this inspection were documented. Except for the sprinkler grid system, polar crane, and dome area, the overall condition of the coatings was satisfactory with any degraded coatings evaluated and prioritized for repair during the outage or future repair as necessary. The degraded coatings on localized areas of the sprinkler grid system, polar crane, and dome area have been documented and will continue to be evaluated for possible removal. The next scheduled coating assessment is during the 2E0C17 (November 1999) refueling outage.

Unit #3 - The last assessment of the coatings in containment was performed during the 3E0C17 (October 1998) refueling outage and the results of this inspection were documented. Except for the polar crane, the overall condition of the coatings was satisfactory in with any degraded coatings evaluated and prioritized for repair during the outage or future repair as necessary. The degraded coatings on localized areas of the sprinkler grid system, polar crane, and dome area have been documented and will continue to be evaluated for possible removal. The next scheduled coating assessment is during the 3E0C18 (April 2000) refueling outage.

2(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.

Principally, the long-term cooling requirements of 10 CFR 50.46(b)(5) are met by the Low Pressure Injection (LPI) System which is comprised of two independent trains. However, if an accident occurs and the Reactor Coolant System (RCS) pressure remains above the shutoff head of the LPI pumps as the Borated Water Storage Tank (BWST) approaches depletion, the High Pressure Injection (HPI) System would deliver water to the RCS using the LPI discharge piping as its suction source (i.e., HPI piggyback mode of operation). There are two independent flow paths which allow the HPI System to take suction from the discharge of the LPI System by manual operator action. Utilization of the HPI piggyback mode of operation is limited to establishing conditions which permit the use of the LPI System.

The Reactor Building Spray (RBS) System is required to provide containment pressure control and heat removal from the containment atmosphere following a design basis LOCA (UFSAR Section 6.2) in addition to providing fission product iodine removal for the Maximum Hypothetical Accident (UFSAR Section 15.15). A flow rate of 1500 gpm is credited during the injection phase of post-LOCA operation for short term pressure control, heat removal, and iodine removal. Prior to transferring to the sump recirculation mode of operation, RBS flow is throttled to 1000 gpm, which is sufficient to meet the long term fission product release requirements imposed by 10CFR100 for a maximum hypothetical accident.

Oconee was licensed without a specific sump blockage model showing the effects of debris on ECCS performance. The original B&W design criteria for the sump was that it permit a maximum average fluid velocity of approximately

one foot per second when considering a 50% particle blockage area. This criteria is consistent with early NRC guidance provided through Regulatory Guide 1.82, which directed licensees to use an assumption of 50% sump screen area blockage as an input to the ECCS pump NPSH evaluations. The assumption of 50% blockage of the reactor building emergency sump screen and grating is non-mechanistic. It is not dependent upon the generation of specific debris type, form, size, shape, or material. Oconee Nuclear Station has maintained the original basis for sump blockage in recent NPSH analyses performed in support of operability evaluations for the RBS and LPI pumps. The analyses conclude that, with single failure assumptions consistent with the NPSH modeling assumptions, the sump screen (and grating) head loss was less than 0.007 ft., which was concluded to be insignificant with respect to the NPSH analysis results. Without a postulated single failure, the head loss would be roughly four times this amount, or approximately 0.03 ft. Again, this is considered insignificant with respect to NPSH analysis, and would have essentially no effect on the operation of the ECCS and Containment Spray pumps. In all cases analyzed, both the RBS and LPI Pumps were shown to have adequate NPSH available during operation in the sump recirculation phase of a LOCA. Given that adequate NPSH is available for the LPI pumps during operation in the sump recirculation phase of a LOCA, procedural guidance is provided to ensure adequate NPSH to the HPI pumps in the piggyback mode.

(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.

Duke Power does not currently employ commercial grade dedication for Service Level 1 coatings used inside containment at Oconee.