



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

10 CFR 50.54(f)

November 10, 1998

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

Gentlemen:

In the Matter of)	Docket Nos.	50-259	50-390
Tennessee Valley Authority)		50-260	50-327
			50-296	50-328

BROWNS FERRY NUCLEAR PLANT (BFN), SEQUOYAH NUCLEAR PLANT (SQN), AND WATTS BAR NUCLEAR PLANT (WBN), 120-DAY RESPONSE GENERIC LETTER (GL) 98-04, "POTENTIAL FOR DEGRADATION OF THE EMERGENCY CORE COOLING SYSTEM (ECCS) AND THE CONTAINMENT SPRAY SYSTEM (CSS) AFTER A LOSS-OF-COOLANT ACCIDENT (LOCA) BECAUSE OF CONSTRUCTION AND PROTECTIVE COATING DEFICIENCIES AND FOREIGN MATERIAL IN CONTAINMENT," DATED JULY 14, 1998

This letter provides TVA's 120-day response to the subject GL which addresses issues that 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. This GL requests information under 10 CFR 50.54(f) to evaluate TVA's program 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 CSS.

In accordance with NRC's information request, Enclosures 1 through 3 provide the requested information for BFN (Units 2 and 3), SQN (Units 1 and 2), and WBN (Unit 1), respectively. BFN Unit 1 is shut down in an extended outage. Therefore, TVA will address GL 98-04 concerns prior to its restart.

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Enclosure 4 provides the commitment contained in this letter.
If you have questions regarding this response, please contact
Terry Knuettel at (423) 751-6673.

Sincerely,

Mark J. Burzynski

Mark J. Burzynski
Manager
Nuclear Licensing

Subscribed and sworn to before me
this 10th day of November 1998

Janet P. Petty

Notary Public

My Commission Expires March 21, 2001

Enclosures
cc: See page 3

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cc (Enclosures):

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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY (TVA)
BROWNS FERRY NUCLEAR PLANT (BFN) UNITS 2 AND 3

120-DAY RESPONSE GENERIC LETTER (GL) 98-04, "POTENTIAL FOR DEGRADATION OF THE EMERGENCY CORE COOLING SYSTEM (ECCS) AND THE CONTAINMENT SPRAY SYSTEM (CSS) AFTER A LOSS-OF-COOLANT ACCIDENT (LOCA) BECAUSE OF CONSTRUCTION AND PROTECTIVE COATING DEFICIENCIES AND FOREIGN MATERIAL IN CONTAINMENT,"
DATED JULY 14, 1998

TVA's 120-Day Response To NRC's GL 98-04

NRC Required Information:

NRC's July 14, 1998, GL 98-04 requires addressees to submit a written response that includes the following information:

- (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.

TVA RESPONSE:

TVA has implemented controls for the procurement, application, and maintenance of Service Level 1 protective coatings used inside the primary containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to BFN. 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 BFN, Service Level 1 coatings are subject to the requirements of Regulatory Guide (RG) 1.54, American National Standard Institute (ANSI) N101.2, and ANSI N101.4. 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 TVA Nuclear Quality Assurance (QA) Program. As part of an industry initiative, TVA is evaluating the guidance provided in Electric Power Research Institute (EPRI) TR-109937, "Guideline on Nuclear Safety-Related Coatings." If any appropriate enhancements are identified, TVA plans to implement them into the existing programs and procedures for Service Level 1 Coatings.¹

The following information addresses NRC's request for 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."

- (a) Service Level 1 coatings used for new applications or repair/replacement activities are procured from vendors with QA programs meeting the applicable requirements of 10 CFR Part 50, Appendix B. The applicable technical and quality requirements which the vendor is required to meet are specified by TVA's procurement program. Acceptance activities (e.g., receipt inspection, materials identification and control, vendor audits, etc.) are conducted in accordance with procedures which are consistent with ANSI N45.2 requirements. This specification of required technical and quality requirements imposed on vendors, combined with TVA's QA Program acceptance activities, provides adequate assurance that the coatings received meet the requirements of the procurement documents.
- (b) The qualification testing for Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable requirements contained in the standards and regulatory commitments referenced above (e.g., RGs and ANSI standards). Any deviations in qualification testing (e.g., exceeding the acceptance criteria for blister size as defined in ANSI N101.2) have been evaluated for impact on ECCS strainer blockage.
- (c) The surface preparation, application, and inspection 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. Where the requirements of the standards and regulatory commitments did

¹ This action is controlled through industry initiatives and is not considered a regulatory commitment.

not address the repair/replacement activities, the repair activities were performed in a manner consistent with the general industry-accepted practices for coatings repair/replacement and, in accordance with TVA standards including site-specific procedures. These practices are described in various American Society for Testing Materials standards and coating practice guidelines by industry organizations issued subsequent to those to which TVA has a regulatory commitment.

TVA periodically conducts condition assessments of Service Level 1 coatings inside containment. These assessments are conducted as part of TVA General Engineering Specification, G-55, "Technical and Programmatic Requirements for the Protective Coating Program for TVA Nuclear Plants," and in conjunction with BFN's site-specific procedures. TVA's Service Level 1 protective coating program requires the performance of visual inspections every refueling outage. These inspections include the inside surface of the containment shell and the exposed coated components and surfaces inside the primary containment.

As localized areas of degraded coatings are identified, they are evaluated and dispositioned. These areas are subsequently 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.

NRC Required Information:

- (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 structures, systems, and components (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.

TVA RESPONSE:

NUREG 1232, Volume 3, Supplement 2, "Safety Evaluation Report on TVA BFN Nuclear Performance Plan," dated January 1991 issued for Unit 2 restart, states: "Consistent with its commitments in Section III.14.3 of the BFNPP, TVA conducted containment walkdown inspections to establish a baseline for the uncontrolled coating log and to examine the general condition of

qualified coatings." As documented in TVA's letter to NRC dated February 8, 1996, "Completion Status of Unit 3 Restart Issues," TVA implemented the Unit 3 Restart Coating Program in accordance with the Unit 2 precedent. To maintain this "uncontrolled coatings log," TVA tracks the amount of unqualified coatings inside containment at BFN and has evaluated the impact of coating debris on the operation of safety-related SSCs during a postulated design basis LOCA.

A condition assessment of BFN containment coating for Units 2 and 3 was performed during each unit's last refueling outage. These inspections were performed on Unit 2 in October of 1997 and Unit 3 in October of 1998. The results of these assessments are as follows:

Unit 2

The last assessment of the Unit 2 drywell surface (visual inspections) identified localized areas of coating degradation. Specifically, the epoxy topcoat had delaminated from the inorganic zinc primer in localized, isolated areas. Additional small areas of coating degradation were identified on miscellaneous components inside primary containment. As required by plant procedures, the degraded coatings were removed back to sound coating to eliminate possible contribution to ECCS strainer blockage. The affected areas are currently scheduled for recoat/repair during the next refueling outage². The exposed inorganic zinc primer remains intact at these localized locations and provides acceptable corrosion protection to the containment shell.

The next Unit 2 condition assessment required by TVA's Coatings Program is scheduled during the Unit 2, Cycle 10 (U2C10) refueling outage in April 1999.

Unit 3

The last assessment of the Unit 3 drywell surface (visual inspections) identified localized areas of coating degradation. Specifically, the epoxy topcoat had delaminated from the inorganic zinc primer. As required by plant procedures, the degraded coatings were removed back to sound coating to eliminate possible contribution to ECCS strainer blockage. The affected areas are currently scheduled for recoat/repair during the next refueling outage.² The exposed inorganic zinc primer remains intact at these localized locations and provides acceptable corrosion protection to the containment shell.

The next Unit 3 condition assessment required by TVA's Coatings Program is scheduled during the Unit 3, Cycle 9 (U3C9) refueling outage in March 2000.

² This action is tracked under BFN's Corrective Action Program and is not considered a regulatory commitment.

NRC Required Information:

- (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.

TVA RESPONSE:

The current licensing basis limit for unqualified coatings for each BFN unit is 157 ft². However, in response to NRC Bulletin (NRCE) 96-03, large passive replacement ECCS strainers have recently been installed at BFN Units 2 and 3. Consequently, the following discussion addresses the anticipated licensing basis pending resolution of NRCE 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 amount of fibrous, particulate, and other miscellaneous debris, to ensure that the analyzed functional capability of the ECCS is not compromised.

The new ECCS pump suction strainers have been designed to perform satisfactorily with the assumption that 100% of the containment coatings which are installed in the LOCA pipe break steam/water jet "zone of influence" fail. 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 3.2.2.2.1.1. The conservative methodology used to establish the amount of coating debris has been accepted by the NRC, as documented in the Safety Evaluation Report on the URG, (NRC letter dated August 20, 1998, "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 (Testing Project No. 03471) 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 some time after the first 30 minutes of the LOCA) would be available to accumulate on the strainers. In sizing the replacement ECCS strainers for BFN, TVA conservatively assumed that the coatings debris is released immediately. Therefore, the design is conservative with respect to the limit on the coating debris.

The allowance of additional coating debris for the new strainers resulted in an increase in the coating debris loading to 10,000 ft² (volume of 4.2 ft³) which includes anticipated fiber debris. As previously discussed, TVA installed large passive replacement strainers in Units 2 and 3 as part of their resolution to NRCB 96-03. Additionally, for NRCB 96-03 resolution, TVA has requested 3 psig pressure in excess of atmospheric (containment overpressure) to maintain adequate net positive suction head on the ECCS pumps during a LOCA. The debris loading for the new BFN strainers (reflective metal insulation, fiber, coatings, etc.) postulated as a result of NRCB 96-03 is contingent on approval of containment overpressure credit currently under NRC review.

It should be noted that head loss by the coating debris does not require additional overpressure over that previously analyzed. BFN 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 Required Information:

- (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,

TVA RESPONSE:

TVA has not employed commercial-grade dedication for Service Level 1 coatings used inside primary containment at BFN.

NRC Required Information:

- (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.

TVA RESPONSE:

Not Applicable

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY (TVA)
SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

120-DAY RESPONSE GENERIC LETTER (GL) 98-04, "POTENTIAL FOR DEGRADATION OF THE EMERGENCY CORE COOLING SYSTEM (ECCS) AND THE CONTAINMENT SPRAY SYSTEM (CSS) AFTER A LOSS-OF-COOLANT ACCIDENT (LOCA) BECAUSE OF CONSTRUCTION AND PROTECTIVE COATING DEFICIENCIES AND FOREIGN MATERIAL IN CONTAINMENT,"
DATED JULY 14, 1998

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NRC Required Information:

NRC's July 14, 1998, GL 98-04 requires addressees to submit a written response that includes the following information:

- (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.

TVA RESPONSE:

TVA 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 SQN. 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 SQN, Service Level 1 coatings are subject to the requirements of American National Standard Institute (ANSI) N101.2; N5.9; ANSI N5.12; and Regulatory Guide (RG) 1.54, with the exception of the Regulatory Position C.1 endorsement of ANSI

N101.4. 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 TVA Nuclear Quality Assurance (QA) Program. As part of an industry initiative, TVA is evaluating the guidance provided in Electric Power Research Institute (EPRI) TR-109937, "Guideline on Nuclear Safety-Related Coatings." If any appropriate enhancements are identified, TVA plans to implement them into the existing programs and procedures for Service Level 1 Coatings.¹

The SQN FSAR Section 6.2.1.6, "Protective Coatings," states that TVA is committed to adhere to Appendix B of 10 CFR 50 and ANSI N45.2, as required, to produce a quality end product. Additionally, TVA's QA Program for protective coatings inside the containment controls four activities in the coating program. The four major areas controlled are:

- 1) The coating material itself, by extending requirements on the manufacturing process and qualification of coating systems through the use of applicable portions of ANSI Standards N101.2 and N5.9 or its revision N5.12.
- 2) The preparation of the surface to which coatings are to be applied.
- 3) The inspection process.
- 4) The application of the coating system.

These four controlled activities have appropriate documentation to meet Appendix B requirements.

The following information addresses NRC's request for 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."

- (a) Service Level 1 coatings used for new applications or repair/replacement activities are procured from vendors with QA programs meeting the applicable requirements of 10 CFR Part 50, Appendix B. The applicable technical and quality requirements which the vendor is required to meet are specified by TVA's procurement program. Acceptance activities (e.g., receipt inspection, materials identification and control, vendor audits, etc.) are conducted in accordance with procedures which are consistent with ANSI N45.2 requirements. This specification of required technical and quality requirements imposed on vendors, combined with TVA's QA Program acceptance activities, provides adequate assurance that the coatings received meet the requirements of the procurement documents.

¹ This action is controlled through industry initiatives and is not considered a regulatory commitment.

- (b) The qualification testing for Service Level 1 coatings used for application or repair/replacement activities inside containment meets the applicable requirements contained in the standards and regulatory commitments referenced above. Any deviations in qualification testing (e.g., exceeding the acceptance criteria for blister size as defined in ANSI N101.2) have been evaluated for impact to ECCS containment sump blockage.
- (c) The surface preparation, application, and surveillance during installation of Service Level 1 coatings used for application or repair/replacement activities inside containment meet the applicable portions of the standards and regulatory commitments referenced above. Where the requirements of the standards and regulatory commitments did not address the repair/replacement activities, the repair activities were performed in a manner consistent with the general industry-accepted practices for coatings repair/replacement and in accordance with TVA standards and site-specific procedures. These practices are described in various American Society For Testing Materials standards and coating practice guidelines by industry organizations issued to which TVA has a regulatory commitment.

TVA periodically conducts condition assessments of Service Level 1 coatings inside containment. Coating condition assessments are conducted as part of TVA General Engineering Specification, G-55, "Technical and Programmatic Requirements for the Protective Coating Program for TVA Nuclear Plants," and in conjunction with SQN's site-specific procedures. TVA's Service Level 1 protective coating program requires the performance of visual inspections every refueling outage. These inspections include the inside surface of the containment shell and the exposed coated components and surfaces inside the primary containment.

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, ensure that the amount of Service Level 1 coatings which may be susceptible to detachment from the substrate during a LOCA event is minimized.

NRC Required Information:

- (2) Information demonstrating compliance with item (i) or 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 structures, systems, and components (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.

TVA RESPONSE:

In accordance with the SQN FSAR, Section 6.2.1.6, "Protective Coatings," TVA tracks the amount of unqualified coatings inside containment through the use of a coatings log. Additionally, TVA has evaluated the impact of coating debris on the operation of safety-related SSCs during a postulated design basis LOCA. This analysis is addressed in TVA's response to question (2)(i)(b). The date of the latest condition assessments and results of the assessments at SQN are as follows:

Unit 1

The most recent Unit 1 condition assessment at SQN was performed in September 1998 during the Cycle 9 (U1C9) refueling outage. This condition assessment did not identify any new coating failures (past failures had been identified and dispositioned by TVA's corrective action program).

The next Unit 1 condition assessment required by TVA's Coatings Program is scheduled during the Unit 1, Cycle 10 (U1C10) refueling outage in March 2000.

Unit 2

The most recent Unit 2 condition assessment at SQN was performed in October 1997 during the Cycle 8 (U2C8) refueling outage. This condition assessment did not identify any new coating failures (past failures had been identified and dispositioned by TVA's corrective action program).

The next Unit 2 condition assessment required by TVA's Coatings Program is scheduled during the Unit 2, Cycle 9 (U2C9) refueling outage in April 1999.

NRC Required Information:

- (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.

TVA RESPONSE:

SQN's licensing basis limit for unqualified coatings is 84 ft² in the "zone of influence" for Units 1 and 2. Although this amount of unqualified coatings located in the "zone of influence" is the maximum that would contribute to sump blockage, SQN tracks all unqualified protective coatings inside containment.

The limit identified for the "zone of influence" is based on a Westinghouse physical transport study for the containment sump screen blockage. This evaluation was approved by NRC in NUREG 1232, Volume 2, "Safety Evaluation Report on Tennessee Valley Authority: Sequoyah Nuclear Performance Plan," dated May 1988. The methodology focused on a near-sump region of influence based on post-accident flow fields and the settling characteristics of failed coating particles. In order to ensure a conservative analysis, this study also addressed potential effects such as those caused by the return of containment spray flow through the refueling canal drains and by flow from the LOCA short-term blowdown. The Westinghouse study concluded that a maximum of 84 ft² of failed coatings could potentially be transported to the containment recirculation sump during a Design Basis Accident without degrading the capabilities of the required accident mitigation systems.

NRC Required Information:

- (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,

TVA RESPONSE:

TVA has not employed commercial-grade dedication for Service Level 1 coatings used inside containment at SQN.

NRC Required Information:

- (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.

TVA RESPONSE:

Not Applicable

ENCLOSURE 3

TENNESSEE VALLEY AUTHORITY (TVA)
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1

120-DAY RESPONSE GENERIC LETTER (GL) 98-04, "POTENTIAL FOR DEGRADATION OF THE EMERGENCY CORE COOLING SYSTEM (ECCS) AND THE CONTAINMENT SPRAY SYSTEM (CSS) AFTER A LOSS-OF-COOLANT ACCIDENT (LOCA) BECAUSE OF CONSTRUCTION AND PROTECTIVE COATING DEFICIENCIES AND FOREIGN MATERIAL IN CONTAINMENT,"
DATED JULY 14, 1998

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- (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.

TVA RESPONSE:

TVA 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 WBN. 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 WBN, Service Level 1 coatings are subject to the requirements of American National Standard Institute (ANSI) N101.2, ANSI N5.12, and Regulatory Guide (RG) 1.54, with the exception of the Regulatory Position C.1 endorsement of ANSI N101.4. 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 TVA Quality Assurance (QA) Program. As part of an industry initiative, TVA is evaluating the guidance provided in Electric Power Research Institute (EPRI) TR-109937, "Guideline on Nuclear Safety-Related Coatings." If any appropriate enhancements are identified, TVA plans to implement them into the existing programs and procedures for Service Level 1 Coatings.¹

Additionally, the WBN FSAR Section 6.1.4, "Degree of Compliance with RG 1.54 for Paints and Coatings Inside Containment," states that TVA is committed to adhere to Appendix B of 10 CFR 50 and ANSI N45.2, as required, to produce a quality end product. TVA implements RG 1.54, with the exception noted above for WBN. The applicable provisions found in ANSI N101.4 have been incorporated into TVA surface preparation, coating application/inspection specifications, and QA procedures.

Specifically, TVA's QA program for protective coatings inside the containment controls four activities in the coating program. The four major areas controlled are:

- (1) The coating material itself, by extending requirements on the manufacturing process and qualification of coating systems through the use of applicable portions of ANSI Standards N101.2 and N5.12.
- (2) The preparation of the surface to which coatings are to be applied.
- (3) The inspection process.
- (4) The application of the coating system.

These four controlled activities have appropriate documentation to meet Appendix B requirements.

The following information addresses NRC's request for 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."

- (a) Service Level 1 coatings used for new applications or repair/replacement activities are procured from vendors with QA programs meeting the applicable requirements of 10 CFR

¹ This action is controlled through industry initiatives and is not considered a regulatory commitment.

requirements which the vendor is required to meet are specified by TVA's procurement program. Acceptance activities (e.g., receipt inspection, materials identification and control, vendor audits, etc.) are conducted in accordance with procedures which are consistent with ANSI N45.2 requirements. This specification of required technical and quality requirements imposed on vendors, combined with TVA's QA Program acceptance activities, provides adequate assurance that the coatings received meet the requirements of the procurement documents.

- (b) The qualification testing for Service Level 1 coatings used for application or repair/replacement activities inside containment meets the applicable requirements contained in the standards and regulatory commitments referenced above. Any deviations in qualification testing (e.g., exceeding the acceptance criteria for blister size as defined in ANSI N101.2) have been evaluated for impact to ECCS containment sump blockage.
- (c) The surface preparation, application, and surveillance during installation of Service Level 1 coatings used for application or repair/replacement activities inside containment meet the applicable portions of the standards and regulatory commitments referenced above. Where the requirements of the standards and regulatory commitments did not address the repair/replacement activities, the repair activities were performed in a manner consistent with the general industry-accepted practices for coatings repair/replacement and in accordance with TVA standards and site-specific procedures. These practices are described in various American Society For Testing Materials standards and coating practice guidelines by industry organizations issued subsequent to those that TVA has a regulatory commitment.

TVA periodically conducts condition assessments of Service Level 1 coatings inside containment. These assessments are conducted as part of TVA General Engineering Specification, G-55, "Technical and Programmatic Requirements for the Protective Coating Program for TVA Nuclear Plants," and in conjunction with WBN's site-specific procedures. TVA's Service Level 1 protective coating program requires the performance of visual inspections every refueling outage. These inspections include the inside surface of the containment shell and the exposed coated components and surfaces inside the primary containment.

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, ensure that the amount of Service Level 1 coatings, which may be susceptible to detachment from the substrate during a LOCA event, is minimized.

NRC Required Information:

(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 structures, systems, and components (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.

TVA RESPONSE:

WBN's FSAR, Section 6.1.4, "Degree of Compliance with RG 1.54 for Paints and Coatings Inside Containment," states: "Controlled coatings are accounted for and maintained within the limits specified in the analysis for containment coatings and in the transport analysis for the zone of influence." TVA accounts for and maintains coatings by tracking the amount of unqualified coatings inside containment at WBN. Additionally, TVA has evaluated the impact of coating debris on the operation of safety-related SSCs during a postulated design basis LOCA.

The date of the latest condition assessment at WBN was performed in September 1997 during the Unit 1, Cycle 1 (U1C1) refueling outage. Results of this condition assessment identified numerous small localized areas of coating failure (primarily delamination between the primer and the topcoat). This condition was evaluated and dispositioned utilizing TVA's corrective action program. Areas determined to be coating failures were scraped back to sound coating prior to restart. One area, determined to need recoating prior to restart, was completed during the U1C1 refueling outage. Recoating of areas within the lower compartment is scheduled for repair during the next refueling outage (Unit 1, Cycle 2 [U1C2]) under WBN's routine maintenance program.²

The next WBN Unit 1 condition assessment required by TVA's Coatings Program is scheduled during the U1C2 refueling outage in March 1999.

² This action is being tracked under WBN's Corrective Action Program and is not considered a regulatory commitment.

NRC Required Information:

- (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.

TVA RESPONSE:

WBN's limit for unqualified coatings in the "zone of influence" is 236 ft² for Unit 1. The total limit for uncontained (e.g., not covered by insulation), unqualified coatings inside containment is 27,256 ft². As previously stated, WBN tracks all unqualified coatings inside containment; however, only those in the "zone of influence" are considered consequential.

The basis for this limit is documented in calculation WBN-OSG4-196, "Transport Analysis for Containment Coatings." This limit includes:

- 15,000 ft² - lower compartment outside the crane wall;
- 10,000 ft² - lower compartment inside the crane wall but outside the zone of influence;
- 2,000 ft² - upper compartment;
- 236 ft² - within the zone of influence (two trash racks 118 ft², each); and
- 20 ft² - inside the trash rack.

Areas of conservatism utilized in the transport analysis include:

- 1) Maximizing flow through the trash racks;
- 2) using the flood water level based on LOCA (720 ft.) as opposed to a Main Steam Line Break (716 ft.); and
- 3) using the minimum settling velocity of a paint chip.

These limits were established during initial plant licensing and have been revised as conditions warrant change.

NRC Required Information:

- (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,

TVA RESPONSE:

TVA has not employed commercial-grade dedication for Service Level 1 coatings used inside containment at WBN.

NRC Required Information:

- (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.

TVA RESPONSE:

Not Applicable