



November 12, 1998

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

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Dresden Nuclear Power Station, Units 2 and 3
Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

LaSalle County Station, Units 1 and 2
Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

Quad Cities Nuclear Power Station, Units 1 and 2
Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

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

On July 14, 1998, the Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 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." This GL addressed issues having generic implications regarding the impact of the potential detachment of primary containment protective coatings, and the resulting debris, on the operation of safety-related systems, structures, and components (SSC) during a postulated design basis loss-of-coolant accident (LOCA).

Protective coatings inside containment are necessary to protect surfaces from erosion and corrosion, and to control radioactive contamination. Detachment of the coatings from the

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November 12, 1998
U.S. Nuclear Regulatory Commission
Page 2

substrate may cause blockage of sump screens or suction strainers, interfering with the ability of the Emergency Core Cooling System (ECCS) to provide long-term cooling and core spray functions following a LOCA as required by 10CFR50.46(b)(5).

The GL requires that we provide the information requested in the GL for each of our facilities within 120 days of the date of the GL, i.e., by November 12, 1998. Attached are the Commonwealth Edison (ComEd) Company responses for our five operating nuclear stations.

If you have any questions concerning this correspondence, please contact Mr. D.J. Chrzanowski at (630) 663-7205.

Respectfully,



R.M. Krich
Vice President - Regulatory Services

Attachments

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector - Braidwood Station
NRC Senior Resident Inspector - Byron Station
NRC Senior Resident Inspector - Dresden Nuclear Power Station
NRC Senior Resident Inspector - LaSalle County Station
NRC Senior Resident Inspector - Quad Cities Nuclear Power Station

STATE OF ILLINOIS)
 IN THE MATTER OF)
 COMMONWEALTH EDISON (COMED) COMPANY) Docket Nos.
 BRAIDWOOD STATION – UNITS 1 AND 2) STN 50-456 and STN 50-457
 BYRON STATION – UNITS 1 AND 2) STN 50-454 and STN 50-455
 DRESDEN NUCLEAR POWER STATION - UNITS 2 AND 3) 50-237 and 50-249
 LASALLE COUNTY STATION – UNITS 1 AND 2) 50-373 and 50-374
 QUAD CITIES NUCLEAR POWER STATION - UNITS 1 AND 2) 50-254 and 50-265

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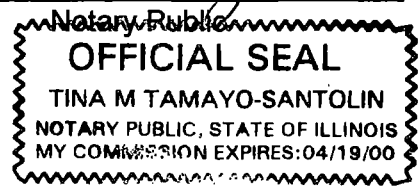
I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.

R.M. Krich

 R.M. Krich
 Vice President - Regulatory Services

Subscribed and sworn to before me, a Notary Public in and
 for the State above named, this 15th day of
November, 1998

Tina M. Tamayo-Santolin



Attachment 1
Braidwood Station, Units 1 and 2
Response to NRC Generic Letter 98-04
“Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment”

REQUEST:

- (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.**

RESPONSE:

Commonwealth Edison (ComEd) Company has implemented controls for the procurement, application, and maintenance of Service Level 1¹ protective coatings used inside the containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to the Braidwood Station. 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.

The Braidwood Station Updated Final Safety Analysis Report (UFSAR), Revision 6, Appendix A, “Application of NRC Regulatory Guides,” specifies that Service Level 1 coatings conform to the guidance of NRC Regulatory Guide (RG) 1.54, “Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants,” Revision 0, American National Standards Institute (ANSI) N101.2-1972, “Protective Coatings (Paint) for Light Water Nuclear Reactor Containment Facilities,” ANSI N101.4-1972, “Quality Assurance for Protective Coatings Applied to Nuclear Facilities,” and ANSI N5.12-1974, “Protective Coatings (Paint) for the Nuclear Industry.” Adequate assurance that the applicable guidance for the procurement, application, inspection, and maintenance

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

is currently provided by procedures and programmatic controls, approved under the ComEd Quality Assurance program. ComEd has used the guidance provided in Electric Power Research Institute (EPRI) Technical Report TR-109937, "Guidelines on Nuclear Safety-Related Coatings," to develop a corporate procedure for performing coating inspections to meet the requirements of 10 CFR Part 50 Appendix B.

- (a) Procurement of Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor(s) with a quality assurance program meeting the applicable requirements of 10 CFR Part 50 Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified by ComEd in procurement documents. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N45.2-1977, "Quality Assurance Program Requirements for Nuclear Power Plants," guidance (e.g., receipt inspection, source surveillance, etc.) as stated in our Quality Assurance Program Topical Report CE-1A, Revision 65h. This specification of technical and quality requirements combined with appropriate acceptance activities provides adequate assurance that the coatings received meet the requirements of the procurement documents.
- (b) The qualification testing of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable guidance contained in the standards and regulatory documents referenced above. These coatings, including any substitute coatings, have been evaluated to meet the applicable standards and regulatory guidance previously referenced.
- (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. Documentation of completion of these activities is performed consistent with the applicable guidance.

Condition assessments of Service Level 1 coatings inside containment are periodically conducted at the Braidwood Station as a "good practice" to meet the intent of RG 1.54. Coating condition assessments are typically conducted 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 loss of coolant accident (LOCA) event is minimized.

REQUEST:

(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 systems, structures, and components (SSC) during a postulated design basis LOCA, the following information shall be provided to demonstrate compliance:**

RESPONSE:

This question is not applicable. See the response to Item (ii).

REQUEST:

- (ii) For plants without the above licensing-basis requirements, information shall be provided to demonstrate compliance with the requirements of 10 CFR Part 50.46b(5), "Long-term cooling," and the functional capability of the safety-related Containment Spray System (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.**

RESPONSE:

The following description and referenced materials describe the licensing basis for the Braidwood Station relative to conformance with 10 CFR Part 50.46(b)(5), "Long-term Cooling," specifically with regard to the ability of the station to provide extended decay heat removal, including related assumptions for debris that could block containment emergency sump screens.

Paragraph 15.6.5.1.1 of the Braidwood UFSAR provides the performance criteria for the Emergency Core Cooling System (ECCS).

The ECCS, even when operating during the injection mode with the most severe single active failure, is designed to meet the requirements of 10 CFR Part 50.46.

The detailed licensing basis requirements for the ECCS are contained in the UFSAR, Section 6.3. Specific assumptions associated with debris accumulation on the containment emergency sump screens are contained in the UFSAR, Appendix A, as discussed below.

As documented in the Braidwood Station UFSAR, Appendix A, specifically the commitment to Regulatory Guide 1.82, Revision 0, "Sumps for Emergency Core Cooling and Containment Spray Systems," the design bases include the assumption that the systems that draw from the containment sumps for ECCS and CSS may experience sump blockage of up to 50% of the effective sump area from debris generated as a result of a LOCA. At the time that Braidwood Station was licensed, no

distinction was drawn between the various potential sources for post-LOCA debris; these systems were intended to function, even with debris partially obstructing the sumps. The analyses submitted to the NRC as part of the licensing process for the Braidwood Station demonstrate, however, that, even with this blockage, the ECCS and CSS will continue to provide sufficient cooling flow to fulfill the long-term cooling functions required by 10 CFR Part 50.46(b)(5).

The NRC originally accepted these analyses and these systems as meeting the requirements of 10 CFR Part 50.46(b)(5) in NUREG-1002, "SER Related to the Operation of Braidwood Station, Units 1 and 2," dated November, 1983, Section 6.2.2, as restated below:

"The applicant's sump design conforms to the guidelines in Regulatory Guide 1.82 except that the floor in the vicinity of each sump is level and does not slope gradually down away from the sump to assist in preventing heavier debris from accumulating at the sump, and the design coolant velocity at the inner screen surface, based on one half of the free surface area of the inner screen, is 1.0 ft/sec, five times the recommended velocity of 0.2 ft/sec. To compensate, the applicant has committed to add an additional outer screen that will encompass both of the existing outer containment recirculation sump screens. The new outer screen will be sized so that the water inlet velocity will be 0.2 ft/sec, with one half of the screen area blocked, it will be elevated on a 6- to 12-in.-high concrete curb, and it will otherwise be similar to the existing outer screen. The staff finds that with the addition of this new outer screen, the applicant's containment recirculation sump design is acceptable. The staff will confirm that the applicant has properly installed this new outer screen prior to initial fuel loading.

The staff has reviewed the information in the FSAR and the responses to staff requests for additional information concerning the containment heat removal systems to ensure conformance to all of the acceptance criteria in SRP Section 6.2.2. The staff concludes that the containment heat removal systems satisfy the requirements of GDC 38, 39, and 40 and the provisions of Regulatory Guides 1.1 and 1.82 on an acceptable alternative basis as defined above. The systems are, therefore, acceptable. The staff must confirm, however, that the applicant ... has acceptably installed a new containment recirculation sump outer screen."

Section 6.2.2 of Braidwood SER indicated that the staff would confirm that the applicant's sump design conforms to the guidelines in Reg. Guide 1.82. The latest revisions of drawings S-904, S-905, S-995, S-996 and S-1065, which detail the addition of an outer screen that encompasses both of the existing outer containment recirculation sump screens, have been reviewed and approved for Byron Unit 1 (See Inspection Report No. 50-454/84-19). Because the sump design is identical for all four Byron/Braidwood units, the staff considers Confirmatory Issue B(5) closed for Braidwood Unit 1 and 2.

The licensing basis for the Braidwood Station, as reviewed and accepted by the NRC, provides the regulatory basis for safety system performance. Coatings are not treated separately in the licensing basis for the Braidwood Station because the sump screen blockage assumption does not distinguish among the source terms for the LOCA-

generated debris. Moreover, the analysis for coating failure alone during a LOCA, and testing of coating failure conducted to date, does not contradict the determination by the station that ECCS flow following a LOCA will be adequate to maintain the core temperature at an acceptably low value and remove decay heat for the extended period of time required by the long-lived radioactive nuclides remaining in the reactor core following a design-basis accident. Accordingly, a separate demonstration of the regulatory basis for safety system performance is not required.

REQUEST:

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

RESPONSE:

ComEd does not currently employ commercial grade dedication for Service Level 1 coatings used inside containment at the Braidwood Station.

Attachment 2
Byron Station, Units 1 and 2
Response to NRC Generic Letter 98-04
“Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment”

REQUEST:

- (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.**

RESPONSE:

Commonwealth Edison (ComEd) Company has implemented controls for the procurement, application, and maintenance of Service Level 1¹ protective coatings used inside the containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to the Byron Station. 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.

The Byron Station Updated Final Safety Analysis Report (UFSAR), Revision 6, Appendix A, “Application of NRC Regulatory Guides,” specifies that Service Level 1 coatings conform to the guidance of NRC Regulatory Guide (RG) 1.54, “Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants,” Revision 0, American National Standards Institute (ANSI) N101.2-1972, “Protective Coatings (Paint) for Light Water Nuclear Reactor Containment Facilities,” ANSI N101.4-1972, “Quality Assurance for Protective Coatings Applied to Nuclear Facilities,” and ANSI N5.12-1974, “Protective Coatings (Paint) for the Nuclear Industry.” Adequate assurance that the applicable guidance for the procurement, application, inspection, and maintenance is currently provided by procedures and programmatic controls, approved under the ComEd Quality

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

Assurance program. ComEd has used the guidance provided in Electric Power Research Institute (EPRI) Technical Report TR-109937, "Guidelines on Nuclear Safety-Related Coatings," to develop a corporate procedure for performing coating inspections to meet the requirements of 10 CFR Part 50 Appendix B.

- (a) Procurement of Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor(s) with a quality assurance program meeting the applicable requirements of 10 CFR Part 50 Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified by ComEd in procurement documents. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N45.2-1977, "Quality Assurance Program Requirements for Nuclear Power Plants," guidance (e.g., receipt inspection, source surveillance, etc.) as stated in our Quality Assurance Program Topical Report CE-1A, Revision 65h. This specification of technical and quality requirements combined with appropriate acceptance activities provides adequate assurance that the coatings received meet the requirements of the procurement documents.
- (b) The qualification testing of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable guidance contained in the standards and regulatory documents referenced above. These coatings, including any substitute coatings, have been evaluated to meet the applicable standards and regulatory guidance previously referenced.
- (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. Documentation of completion of these activities is performed consistent with the applicable guidance.

Condition assessments of Service Level 1 coatings inside containment are periodically conducted at the Byron Station as a "good practice" to meet the intent of RG 1.54, and are performed in accordance with Procedure 1/2BVS XII-11, "Containment Building Interior Surface Coating Inspection." Coating condition assessments are typically conducted 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 loss of coolant accident (LOCA) event is minimized.

REQUEST:

(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 systems, structures, and components (SSC) during a postulated design basis LOCA, the following information shall be provided to demonstrate compliance:**

RESPONSE:

This question is not applicable. See the response to Item (ii).

REQUEST:

- (ii) For plants without the above licensing-basis requirements, information shall be provided to demonstrate compliance with the requirements of 10 CFR Part 50.46b(5), "Long-term cooling," and the functional capability of the safety-related Containment Spray System (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.**

RESPONSE:

The following description and referenced materials describe the licensing basis for the Byron Station relative to conformance with 10 CFR Part 50.46(b)(5), "Long-term Cooling," specifically with regard to the ability of the station to provide extended decay heat removal, including related assumptions for debris that could block containment emergency sump screens.

Paragraph 15.6.5.1.1 of the Byron UFSAR provides the performance criteria for the Emergency Core Cooling System (ECCS).

The ECCS, even when operating during the injection mode with the most severe single active failure, is designed to meet the requirements of 10 CFR Part 50.46.

The detailed licensing basis requirements for the ECCS are contained in the UFSAR, Section 6.3. Specific assumptions associated with debris accumulation on the containment emergency sump screens are contained in the UFSAR, Appendix A, as discussed below.

As documented in the Byron Station UFSAR, Appendix A, specifically the commitment to Regulatory Guide 1.82, Revision 0, "Sumps for Emergency Core Cooling and Containment Spray Systems," the design bases include the assumption that the systems that draw from the containment sumps for ECCS and CSS may experience sump blockage of up to 50% of the effective sump area from debris generated as a result of a LOCA. At the time that Byron Station was licensed, no distinction was drawn

between the various potential sources for post-LOCA debris; these systems were intended to function, even with debris partially obstructing the sumps. The analyses submitted to the NRC as part of the licensing process for the Byron Station demonstrate, however, that, even with this blockage, the ECCS and CSS will continue to provide sufficient cooling flow to fulfill the long-term cooling functions required by 10 CFR Part 50.46(b)(5).

The NRC accepted these analyses and these systems as meeting the requirements of 10 CFR Part 50.46(b)(5) in NUREG-0876, "SER Related to the Operation of Byron Station, Units 1 and 2," dated February, 1982, Section 6.2.2, as restated below:

"The applicant's sump design conforms to the guidelines in Regulatory Guide 1.82 except that the floor in the vicinity of each sump is level and does not slope gradually down away from the sump to assist in preventing heavier debris from accumulating at the sump, and the design coolant velocity at the inner screen surface, based on one half of the free surface area of the inner screen, is 1.0 ft/sec, five times the recommended velocity of 0.2 ft/sec. To compensate, the applicant has committed to add an additional outer screen that will encompass both of the existing outer containment recirculation sump screens. The new outer screen will be sized so that the water inlet velocity will be 0.2 ft/sec, with one half of the screen area blocked, it will be elevated on a 6- to 12-in.-high concrete curb, and it will otherwise be similar to the existing outer screen. The staff finds that with the addition of this new outer screen, the applicant's containment recirculation sump design is acceptable. The staff will confirm that the applicant has properly installed this new outer screen prior to initial fuel loading.

The staff has reviewed the information in the FSAR and the responses to staff requests for additional information concerning the containment heat removal systems to ensure conformance to all of the acceptance criteria in SRP Section 6.2.2. The staff concludes that the containment heat removal systems satisfy the requirements of GDC 38, 39, and 40 and the provisions of Regulatory Guides 1.1 and 1.82 on an acceptable alternative basis as defined above. The systems are, therefore, acceptable. The staff must confirm, however, that the applicant ... has acceptably installed a new containment recirculation sump outer screen."

Installation of the outer sump screens has been completed on both units and was verified by the NRC on Unit 1 (i.e., Inspection Report No. 50-454/84-19).

The licensing basis for the Byron Station, as reviewed and accepted by the NRC, provides the regulatory basis for safety system performance. Coatings are not treated separately in the licensing basis for the Byron Station because the sump screen blockage assumption does not distinguish among the source terms for the LOCA-generated debris. Moreover, the analysis for coating failure alone during a LOCA, and testing of coating failure conducted to date, does not contradict the determination by the station that ECCS flow following a LOCA will be adequate to maintain the core temperature at an acceptably low value and remove decay heat for the extended period of time required by the long-lived radioactive nuclides remaining in the reactor core following a design-basis accident. Accordingly, a separate demonstration of the regulatory basis for safety system performance is not required.

REQUEST:

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

RESPONSE:

ComEd does not currently employ commercial grade dedication for Service Level 1 coatings used inside containment at the Byron Station.

Attachment 3
Dresden Nuclear Power Station, Units 2 and 3
Response to NRC Generic Letter 98-04
“Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment”

REQUEST:

- (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.

RESPONSE:

Commonwealth Edison (ComEd) Company has implemented controls for the procurement, application, and maintenance of Service Level 1¹ protective coatings used inside the containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to the Dresden Nuclear Power Station (DNPS), Units 2 & 3. 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.

The DNPS Updated Final Safety Analysis Report (UFSAR), Revision 2a, Table 1.8-1, “Conformance to NRC Regulatory Guides,” and our Quality Assurance Program Topical Report (QATR) CE-1A, Revision 65h, specifies that Service Level 1 coatings conform to the guidance of NRC Regulatory Guide (RG) 1.54, “Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants,” Revision 0, American National Standards Institute (ANSI) N101.4-1972, “Quality Assurance for Protective Coatings Applied to Nuclear Facilities,” and ANSI N45.2-1971, “Quality Assurance Program Requirements for Nuclear Power Plants.” The UFSAR does not make a commitment pertaining to tracking or monitoring of the Service Level 1 coatings. Adequate assurance that the applicable guidance for the procurement, application, inspection, and maintenance is currently provided by procedures and programmatic controls, approved under the

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

ComEd Quality Assurance program. ComEd has used the guidance provided in Electric Power Research Institute (EPRI) Technical Report TR-109937, "Guidelines on Nuclear Safety-Related Coatings," to develop a corporate procedure for performing coating inspections to meet the requirements of 10 CFR Part 50 Appendix B.

- (a) Procurement of Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor(s) with a quality assurance program meeting the applicable requirements of 10 CFR Part 50 Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified by ComEd in procurement documents. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N45.2-1977, "Quality Assurance Program Requirements for Nuclear Power Plants," guidance (e.g., receipt inspection, source surveillance, etc.) as stated in our QATR. This specification of technical and quality requirements combined with appropriate acceptance activities provides adequate assurance that the coatings received meet the requirements of the procurement documents.
- (b) The qualification testing of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable guidance contained in the standards and regulatory documents referenced above. These coatings, including any substitute coatings, have been evaluated to meet the applicable standards and regulatory guidance previously referenced.
- (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. Documentation of completion of these activities is performed consistent with the applicable guidance.

Condition assessments of Service Level 1 coatings inside containment are periodically conducted at DNPS as a "good practice" to meet the intent of RG 1.54. Coating condition assessments are typically conducted 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 loss of coolant accident (LOCA) event is minimized.

REQUEST:

(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 systems, structures, and components (SSC) during a postulated design basis LOCA, the following information shall be provided to demonstrate compliance:**

RESPONSE:

This question is not applicable. See the response to Item (ii).

REQUEST:

- (ii) For plants without the above licensing-basis requirements, information shall be provided to demonstrate compliance with the requirements of 10 CFR Part 50.46b(5), "Long-term cooling," and the functional capability of the safety-related Containment Spray System (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.**

RESPONSE:

In response to NRC Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors," large passive replacement Emergency Core Cooling System (ECCS) strainers have recently been installed at DNPS.

The design input to the ECCS strainer calculations for the amount of unqualified and qualified coatings in the steam/water jet zone of influence, and the amount of coatings in the containment that did not pass visual inspection, is being incorporated in the new ECCS strainer hydraulic calculations. Consequently, the amount of these coatings will be evaluated, in addition to the quantity of fibrous, particulate, and other miscellaneous debris, to confirm the design basis of the new ECCS strainers and assure that the analyzed functional capability of the ECCS is not compromised.

The new ECCS pump suction strainers have been designed to perform satisfactorily in the presence of 100% of the containment coatings which are installed in the LOCA pipe break steam/water jet zone of influence. This amount of coating debris is determined in accordance with the methodology documented in the Boiling Water Reactor Owners' Group (BWROG) Utility Resolution Guidance (URG) General Electric Company document NEDO-32686, "URG for ECCS for Suction Strainer Blockage," Section 3.2.2.2.1.1. The methodology used to establish the amount of coating debris has been accepted by the NRC, as documented in the Safety Evaluation (SE) for NEDO-32686, transmitted by NRC letter from T. H. Essig to R. Sgarri, dated August 20, 1998.

The unqualified coatings in the primary containment drywell/wetwell are periodically inspected, and have been found to be in good condition. Except for a number of small areas in the primary containment drywell/wetwell that show wear, nicks, and scratches, all of the coatings are intact and tightly adhering. Results of BWROG LOCA testing of coupons representing unqualified coating systems provide strong empirical evidence that failure of typical coating systems which passes 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 released after the first 30 minutes of the LOCA would be available to accumulate on the strainers.

REQUEST:

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

RESPONSE:

ComEd currently does not typically employ commercial grade dedication for Service Level 1 coatings used inside containment at DNPS, except for limited applications. For those limited applications, the dedication and control of these coatings is accomplished under the ComEd Quality Assurance program.

Attachment 4
LaSalle County Station, Units 1 and 2
Response to NRC Generic Letter 98-04
“Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment”

REQUEST:

- (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.**

RESPONSE:

Commonwealth Edison (ComEd) Company has implemented controls for the procurement, application, and maintenance of Service Level 1¹ protective coatings used inside the containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to LaSalle County Station (LCS), Units 1 and 2. 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.

The LCS Updated Final Safety Analysis Report (UFSAR), Revision 12, Section 6.1.2, and Appendix B, “Conformance to NRC Regulatory Guides,” specifies that Service Level 1 coatings conform to the guidance of NRC Regulatory Guide (RG) 1.54, “Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants,” Revision 0, American National Standards Institute (ANSI) N101.2-1972, “Protective Coatings (Paint) for Light Water Nuclear Reactor Containment Facilities,” ANSI N101.4-1972, “Quality Assurance for Protective Coatings Applied to Nuclear Facilities,” ANSI N5.12-1974, “Protective Coatings (Paint) for the Nuclear Industry,” and ANSI N45.2.6-1972, “Qualifications of Inspection, Examination and Testing Personnel for Nuclear Power Plants.” Adequate assurance that the applicable guidance for the procurement, application, inspection, and maintenance is currently provided by procedures and programmatic controls, approved under the ComEd Quality Assurance program. ComEd has used the

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

guidance provided in Electric Power Research Institute (EPRI) Technical Report TR-109937, "Guidelines on Nuclear Safety-Related Coatings," to develop a corporate procedure for performing coating inspections to meet the requirements of 10 CFR Part 50 Appendix B.

- (a) Procurement of Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor(s) with a quality assurance program meeting the applicable requirements of 10 CFR Part 50 Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified by ComEd in procurement documents. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N45.2-1977, "Quality Assurance Program Requirements for Nuclear Power Plants," guidance (e.g., receipt inspection, source surveillance, etc.) as stated in our Quality Assurance Program Topical Report CE-1A, Revision 65h. This specification of technical and quality requirements combined with appropriate acceptance activities provides adequate assurance that the coatings received meet the requirements of the procurement documents.
- (b) The qualification testing of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable guidance contained in the standards and regulatory documents referenced above. These coatings, including any substitute coatings, have been evaluated to meet the applicable standards and regulatory guidance previously referenced.
- (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. Documentation of completion of these activities is performed consistent with the applicable guidance.

Condition assessments of Service Level 1 coatings inside containment are periodically conducted at LCS as a "good practice" to meet the intent of RG 1.54. Coating condition assessments are typically conducted 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 loss of coolant accident (LOCA) event is minimized.

REQUEST:

(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 systems, structures, and components (SSC) during a postulated design basis LOCA, the following information shall be provided to demonstrate compliance:**

RESPONSE:

This question is not applicable. See the response to Item (ii).

REQUEST:

- (ii) For plants without the above licensing-basis requirements, information shall be provided to demonstrate compliance with the requirements of 10 CFR Part 50.46b(5), "Long-term cooling," and the functional capability of the safety-related Containment Spray System (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.**

RESPONSE:

In response to NRC Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors," large passive replacement Emergency Core Cooling System (ECCS) strainers have recently been installed in LaSalle, Unit 1, and will be installed in LaSalle, Unit 2, prior to the end of the current refueling outage.

The design input to the new LaSalle ECCS strainer head loss calculations for the amount of coatings in steam/water jet zone of influence was based on a study performed by Bechtel Corporation for the Boiling Water Reactor Owners' Group (BWROG) (i.e., "Performance of Containment Coatings During a Loss of Coolant Accident," Bechtel Corporation, Volume III, Tab 12, of the Utility Resolution Guidance Technical Support Documentation, dated November 10, 1994).

The design input for the new LaSalle ECCS strainer calculations for the amount of unqualified/degraded coatings in the containment is based on the limit of 44 gallons of unqualified coatings as documented in the UFSAR, Section 6.1.2, Table 6.1-2, Final Safety Analysis Report (FSAR), Amendment 24, Question 312.21, and NUREG-0519, "SER Related to the Operation of LaSalle County Station, Units 1 and 2," March, 1981, Section 6.1.2. This limit was established during initial plant licensing. Consequently the amount of these coatings have been evaluated, in addition to the quantity of fibrous, particulate, and other miscellaneous debris, in the new LaSalle ECCS strainer calculations to assure that the analyzed functional capability of the ECCS is not compromised.

Results of BWROG LOCA testing of coupons representing unqualified coating systems provide strong empirical evidence that failure of typical coating systems which passes 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 released after the first 30 minutes of the LOCA would be available to accumulate on the strainers.

REQUEST:

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

RESPONSE:

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

Attachment 5
Quad Cities Nuclear Power Station, Units 1 and 2
Response to NRC Generic Letter 98-04
“Potential for Degradation of the Emergency Core Cooling System and the
Containment Spray System After a Loss-of-Coolant Accident Because of Construction
and Protective Coating Deficiencies and Foreign Material in Containment”

REQUEST:

- (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.

RESPONSE:

Commonwealth Edison (ComEd) Company has implemented controls for the procurement, application, and maintenance of Service Level 1¹ protective coatings used inside the containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2. 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.

The QCNPS Updated Final Safety Analysis Report (UFSAR), Revision 4, Table 1.8-1, “Conformance to NRC Regulatory Guides,” and our Quality Assurance Program Topical Report (QATR) CE-1A, Revision 65h, specifies that Service Level 1 coatings conform to the guidance of NRC Regulatory Guide (RG) 1.54, “Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants,” Revision 0, American National Standards Institute (ANSI) N101.4-1972, “Quality Assurance for Protective Coatings Applied to Nuclear Facilities,” and ANSI N45.2-1971, “Quality Assurance Program Requirements for Nuclear Power Plants.” The UFSAR does not make a commitment pertaining to tracking or monitoring of the Service Level 1 coatings. Adequate assurance that the applicable guidance for the procurement, application, inspection, and maintenance is currently provided by procedures and programmatic controls, approved under the

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

ComEd Quality Assurance program. ComEd has used the guidance provided in Electric Power Research Institute (EPRI) Technical Report TR-109937, "Guidelines on Nuclear Safety-Related Coatings," to develop a corporate procedure for performing coating inspections to meet the requirements of 10 CFR Part 50 Appendix B.

- (a) Procurement of Service Level 1 coatings used for new applications or repair/replacement activities are procured from a vendor(s) with a quality assurance program meeting the applicable requirements of 10 CFR Part 50 Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified by ComEd in procurement documents. Acceptance activities are conducted in accordance with procedures that are consistent with ANSI N45.2-1977, "Quality Assurance Program Requirements for Nuclear Power Plants," guidance (e.g., receipt inspection, source surveillance, etc.) as stated in our QATR. This specification of technical and quality requirements combined with appropriate acceptance activities provides adequate assurance that the coatings received meet the requirements of the procurement documents.
- (b) The qualification testing of Service Level 1 coatings used for new applications or repair/replacement activities inside containment meets the applicable guidance contained in the standards and regulatory documents referenced above. These coatings, including any substitute coatings, have been evaluated to meet the applicable standards and regulatory guidance previously referenced.
- (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. Documentation of completion of these activities is performed consistent with the applicable guidance.

Condition assessments of Service Level 1 coatings inside containment are periodically conducted at QCNPS as a "good practice" to meet the intent of RG 1.54. Coating condition assessments are typically conducted 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 loss of coolant accident (LOCA) event is minimized.

REQUEST:

(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 systems, structures, and components (SSC) during a postulated design basis LOCA, the following information shall be provided to demonstrate compliance:**

RESPONSE:

This question is not applicable. See the response to Item (ii).

REQUEST:

- (ii) For plants without the above licensing-basis requirements, information shall be provided to demonstrate compliance with the requirements of 10 CFR Part 50.46b(5), "Long-term cooling," and the functional capability of the safety-related Containment Spray System (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.**

RESPONSE:

In response to NRC Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors," large passive replacement Emergency Core Cooling System (ECCS) strainers have recently been installed at QCNPS Unit 2. QCNPS Unit 1 strainers are scheduled for replacement during an upcoming refueling outage in November of 1998.

The design input to the ECCS strainer calculations includes the amount of coatings in steam/water jet zone of influence, and the additional amount of coatings debris in the containment with the potential to clog the ECCS strainers. Consequently the amount of these coatings have been evaluated, in addition to the quantity of fibrous, particulate, and other miscellaneous debris, to assure that the analyzed functional capability of the ECCS is not compromised.

The new ECCS pump suction strainers have been designed to perform satisfactorily in the presence of 100% of the containment coatings which are installed in the LOCA pipe break steam/water jet zone of influence. This amount of coating debris is determined in accordance with the methodology documented in the Boiling Water Reactor Owners' Group (BWROG) Utility Resolution Guidance (URG) General Electric Company document NEDO-32686, "URG for ECCS for Suction Strainer Blockage," Section 3.2.2.2.1.1. The methodology used to establish the amount of coating debris has been accepted by the NRC, as documented in the Safety Evaluation (SE) for NEDO-32686, transmitted by NRC letter from T. H. Essig to R. Sgarri, dated August 20, 1998.

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 BWROG LOCA testing of coupons representing unqualified coating systems provide strong empirical evidence that failure of typical coating systems which passes 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 released after the first 30 minutes of the LOCA would be available to accumulate on the strainers.

REQUEST:

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

RESPONSE:

ComEd currently does not typically employ commercial grade dedication for Service Level 1 coatings used inside containment at QCNPS, except for limited applications. For those limited applications, the dedication and control of these coatings is accomplished under the ComEd Quality Assurance program.