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

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U. S. Nuclear Regulatory Commission
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**SUSQUEHANNA STEAM ELECTRIC STATION
RESPONSE TO GENERIC LETTER 98-04:
CONTAINMENT COATINGS
PLA-5003**

Docket Nos. 50-387
and 50-388

- References:*
- (1) *NRC Generic Letter 98-04: "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment," dated July 14, 1998.*
 - (2) *EPRI TR-109937: Guidelines on the Elements of a Nuclear Safety-Related Coatings Program, dated April 1998*

The purpose of this letter is to provide PP&L, Inc.'s required 120 day response to Generic Letter 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment."

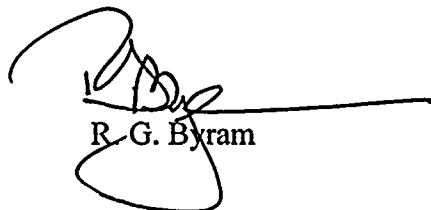
On July 14, 1998, the Nuclear Regulatory Commission issued the referenced generic letter regarding issues which have generic implications concerning the impact of potential coating debris on the operation of safety related systems, structures, and components (SSC) during a postulated design basis LOCA. Protective coatings are necessary inside containment to control radioactive contamination and to protect surfaces from erosion and corrosion. Detachment of the coatings from the substrate may make the ECCS unable to satisfy the requirement of 10 CFR 50.46(b)(5) to provide long-term cooling. It may also make the safety-related containment spray system (CSS) unable to satisfy the plant-specific licensing basis of controlling containment pressure and radioactivity releases following a LOCA. The Generic Letter requests information under 10 CFR 50.54(f) to evaluate the addressees' programs for ensuring that Service Level 1 protective coatings inside containment do not detach from their substrate during a design basis LOCA and interfere with the operation of the ECCS or the safety-related CSS. Per the Generic Letter, the NRC intends to use this information to assess whether current regulatory requirements are being correctly implemented and whether these requirements need to be revised.

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Attachment 1 to this letter provides the required 120-day response for PP&L, Inc. Any questions should be directed to Mr. R. R. Sgarro at (610) 774-7552.

Sincerely,



R. G. Byram

Affidavit
Attachment

copy: NRC Region I
Mr. S. T. Barr, NRC Acting Sr. Resident Inspector
Mr. V. Nerses, NRC Sr. Project Manager



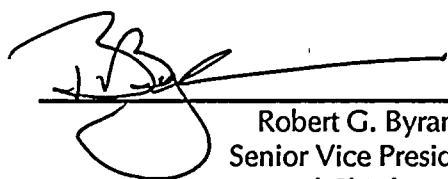
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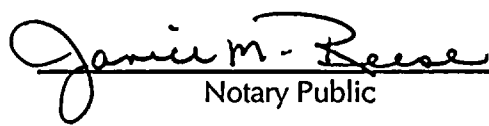
COMMONWEALTH OF PENNSYLVANIA)
 : SS
COUNTY OF LEHIGH)

I, ROBERT G. BYRAM, being duly sworn according to law, state that I am Senior Vice President - Generation and Chief Nuclear Officer of PP&L, Inc. and that the facts set forth on the attached response to Generic Letter 98-04 : Containment Coatings are true and correct to the best of my knowledge, information and belief.

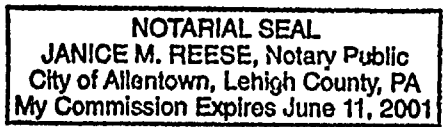


Robert G. Byram
Senior Vice President
Generation and Chief Nuclear Officer

Sworn to and subscribed
before me this *11th* day
of *November* , 1998.



Notary Public





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PP&L RESPONSE TO NRC GENERIC LETTER 98-04

- (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.

PP&L Inc. (PP&L) 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 Susquehanna Steam Electric Station (SSES). The requirements of 10 CFR 50 Appendix B are implemented through specification of appropriate technical and quality requirements for the Service Level 1 coatings program that includes ongoing maintenance activities.

For SSES, Service Level 1¹ coatings are subject to the requirements of Regulatory Guide 1.54 and ANSI N101.2 with the exceptions described in the FSAR. Service Level 1 coating application is performed in accordance with the requirements of ANSI N101.4 (referenced as a part of ANSI N101.2).

The coatings on the drywell liner and structural steel within the drywell and all current coating applications are qualified in accordance with ANSI N101.2 and Regulatory Guide 1.54. The exceptions as described in the FSAR are as follows:

- Most of the NSSS equipment was ordered prior to issuance of the Regulatory Guide 1.54 so the requirements of that guide were not imposed. However, these coatings were among the first to be qualified under ANSI N101.2 for DBA, radiation etc. in nuclear applications. Of the paint used on NSSS equipment within containment, less than 12 Kg

¹ This response applies to Service Level 1 coatings used in primary containment that are procured, applied and maintained by PP&L. Consistent with exceptions noted in NUREG 0800 SRP Section 6.1.2, this response does not address the relatively small amount of coatings applied by vendors on supplied equipment and miscellaneous structural supports.



was not qualified to ANSI N101.2, not including the paint tightly covered with insulation.

- Both containments were constructed with significant amounts of unqualified inorganic zinc paint applied to the pipe supports and hangers, non-NSSS equipment, and ductwork. The vast majority of the inorganic zinc in each unit was DBA qualifiable paint, however, it was applied without the proper documentation and in accordance with a non-Q procedure. In order to reduce the quantity of non-Q paint, an in-situ DBA test was conducted on representative samples of the qualifiable paint in each drywell. The testing resulted in an approximate 90% reduction of non-Q, unqualified inorganic zinc.
- Inorganic zinc was used to touch-up galvanized ductwork and is not DBA qualifiable in these applications.
- Unit 1 contains unqualified inorganic zinc applied to surfaces in the wetwell.
- In the past, small quantities of inorganic zinc and/or epoxy were added to both containments in the form of touch-up due to modifications of systems and components.

The quantities of both qualified and unqualified paint are identified and tracked.

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 Susquehanna Steam Electric Station Quality Assurance Program. PP&L is evaluating the guidance provided in EPRI TR-109937 "Guideline on Nuclear Safety-Related Coatings" and, as appropriate, improvements to our existing programs and procedures for Service Level 1 coatings will be implemented upon completion of the evaluation. Completion of this evaluation is currently scheduled for January 31, 1999.

- (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 50 Appendix B. The applicable technical and quality requirements that the vendor is required to meet are specified by PP&L in procurement documents and specifications. Acceptance activities are conducted in accordance with procedures which are consistent with ANSI N45.2 requirements (e.g., receipt inspection, source surveillance, etc.). This specification of required technical and quality requirements combined with appropriate acceptance activities provides adequate



assurance that the coatings received for use at SSES 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 requirements contained in the standards and regulatory commitments referenced above. These coatings, including any substitute coatings, have been evaluated to meet the applicable standards and regulatory requirements previously referenced. In one instance, where the requirements of the referenced standards and regulatory commitments did not address appropriate test specimen evaluation criteria, industry accepted practices were used to assure acceptable coating performance following a DBA.

These practices are described in an ASTM standard and in industry coating practice guidelines issued subsequent to those to which PP&L has a regulatory commitment. PP&L recognizes that the NRC has not formally endorsed many of the more recent ASTM standards or industry guidelines, but nonetheless, they provide useful information which can be appropriately applied to provide assurance that Service Level 1 coating qualifications are effective in maintaining the acceptability of the coatings.

- (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 requirements.

Where the requirements of the standards and regulatory commitments did not address or were not applicable to repair/replacement activities, these activities were performed in a manner consistent with the generally accepted practices for coatings repair/replacement. These practices are described in various ASTM standards and industry coating practice guidelines issued subsequent to those to which PP&L has a regulatory commitment. PP&L recognizes that the NRC has not formally endorsed many of the more recent ASTM standards or industry guidelines, but nonetheless, they provide useful information which can be appropriately applied to provide assurance that repair/replacement activities on Service Level 1 coatings are effective in maintaining the acceptability of the coatings.

PP&L periodically conducts condition assessments of Service Level 1 coatings inside containment. Coating condition assessments are conducted on drywell walls, floors and components that are attached to those surfaces each refueling and



inspection outage in accordance with plant procedures. The assessments require the identification and evaluation of coating defects on these surfaces.

Wetwell coating condition assessments have been performed during the last refueling and inspection outage on each unit in accordance with engineering specifications and plant procedures. The assessments include the inspection of both submerged and vapor phase coated surfaces.

In addition, inspections are performed as part of routine work within the containment during refueling and inspection outages. Any unusual conditions are identified to the Nuclear Coatings Engineer and subsequently evaluated and dispositioned using the corrective action program.

Susquehanna Steam Electric Station does not currently have any regulatory or programmatic requirements for performing comprehensive containment coating inspections. However, a complete coatings condition assessment was performed on Unit 1 in April of 1992 and on Unit 2 in November of 1993. Subsequent to all of Susquehanna's coating condition assessments, areas of degraded coatings are entered into the corrective action program, and evaluated and scheduled for repair or replacement, as necessary. The periodic condition assessments, and the resulting repair/replacement activities, assure that the amount of Service Level 1 coatings which may be susceptible to detachment from the substrate during a LOCA event is minimized. As previously noted, PP&L is evaluating the guidance contained in the EPRI coatings guideline. A formal containment coatings condition assessment program is currently scheduled to be prepared by December 31, 1999.

- (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 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.**
 - (b) **The limit for the amount of unqualified protective coatings allowed in the containment and how this limit is determined. Discuss any conservatism in the method used to determine this limit.**

- (c) **If a commercial-grade dedication program is 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,**

This item is not currently applicable to Susquehanna Steam Electric Station, but will be upon establishment of the final licensing basis for the design of our new ECCS suction strainers; see Item (ii) below.

- (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.**

Consistent with applicable regulatory requirements existing at the time of initial plant licensing, the type and quantity of debris were not explicitly considered when the original calculations for the ECCS strainer head loss were performed.

In response to NRC Bulletin 96-03, large passive replacement ECCS strainers have recently been installed in Susquehanna Unit 1 and will be installed in Susquehanna Unit 2 in the Spring of 1999. In the anticipated design/licensing basis that is in the process of being established as part of resolution of NRC Bulletin 96-03, the total amount of unqualified coatings along with the amount of qualified coatings in the steam/water jet zone of influence will be accounted for in the final ECCS strainer hydraulic calculations. Consequently, the amount of unqualified coating materials will be managed, in addition to the quantity of fibrous, particulate, and other miscellaneous debris, to assure that the analyzed functional capability of the ECCS is not compromised. The quantity of coatings assumed in the strainer hydraulic analysis will be considered to be the maximum allowable amount of unqualified coatings allowed in containment. No specific margin will be assigned to the allowable amount of unqualified coatings. Any margin in the strainer hydraulic analysis will be used to justify future additional coatings in the containment (or additional amounts of other debris types) if necessary.

In support of resolution of NRC Bulletin 96-03, the initial strainer sizing calculations conservatively assume that 100% of the qualified coatings in the steam/water jet zone of influence and 100% of the unqualified coatings in containment will be transported to the suppression pool immediately after the pipe break. Settling calculations consistent with those described in NUREG/CR-6224 will be performed to determine the amount of coatings that will be filtered by the strainers.

Results of BWR Owners' Group LOCA testing of coupons representing unqualified coating systems provide compelling evidence that failure of typical unqualified coating systems that 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, little or none of the coating debris (if eventually released sometime after the first 30 minutes of the LOCA) would be available to accumulate on the strainers. PP&L 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. The Susquehanna strainer sizing design calculations may be changed at the conclusion of the BWROG activities to reflect these results.

Based on the above, and pending finalization of the design/licensing basis of the new ECCS suction strainers, PP&L believes that reasonable assurance exists that the SSES design is in compliance with 10 CFR 50.46.

- 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.**

PP&L does not currently employ commercial grade dedication for Service Level 1 coatings used inside containment at Susquehanna Steam Electric Station.

