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U.S. Nuclear Regulatory Commission  
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Shearon Harris Nuclear Power Plant, Unit 1  
Docket No. 50-400

Subject: Clarification of Harris Nuclear Plant Response to NRC Generic Letter 2004-02,  
*Potential Impact of Debris Blockage on Emergency Recirculation during Design  
Basis Accidents at Pressurized-Water Reactors*

References:

1. Generic Letter 2004-02, *Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors*, dated September 13, 2004
2. Letter from J. Scarola, to the NRC, *Response to NRC Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors*, Serial HNP-05-101 dated September 1, 2005
3. Letter from R. J. Duncan II, to the NRC, *Supplemental Response to NRC Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors*, Serial HNP-08-015 dated February 28, 2008

Ladies and Gentlemen:

NRC Generic Letter (GL) 2004-02 (Reference 1), issued September 13, 2004, requested that addressees perform an evaluation of the emergency core cooling system (ECCS) and containment spray system (CSS) recirculation functions in light of the information provided in the GL, and, if appropriate, take additional actions to ensure system function. Carolina Power & Light Company (CP&L) provided its written response to the NRC on September 1, 2005 (Reference 2).

Harris Nuclear Plant (HNP) completed its modification to the containment sump in 2007. The new sump strainer was installed, debris generation and transport analyses performed, and strainer head loss and chemical testing completed. CP&L provided a supplemental response reflecting information current as of the time of the submittal on February 28, 2008 (Reference 3).

At the request of NRC staff, HNP participated on a conference call on June 12, 2012, related to site implementation of actions addressed in HNP Reference 2 and 3 submittals. On that call, HNP agreed to clarify the following topics:

- Describe explicit criteria used to classify the different categories of coatings with respect to their behavior outside the zone of influence.
  - Define terms to be used consistently.
  - Differentiate between unqualified epoxy coatings that are from HNP Design Basis Accident (DBA) coatings systems and epoxy coatings that are not one of HNP DBA coating systems.
- Describe the types of documentation credited to provide assurance the behavior of unqualified DBA epoxy would be similar to degraded qualified DBA epoxy.
- Document the conservatism in HNP treatment of non-DBA epoxy coatings. That is, EPRI studies have reported that OEM-applied epoxy coatings exposed to DBA conditions experience relatively low failure rates, but the HNP analysis assumes 100% failure of OEM coatings known to be epoxy.

The enclosure to this letter provides the requested clarifications.

This document contains no regulatory commitments.

Please refer any questions regarding this submittal to Dave Corlett at (919) 362-3137.

I declare, under penalty of perjury, that the foregoing is true and correct.  
Executed on [ *AUGUST 27, 2012* ].

Sincerely,



Enclosure: Clarification of Harris Nuclear Plant Response to NRC Generic Letter 2004-02,  
*Potential Impact of Debris Blockage on Emergency Recirculation during Design  
Basis Accidents at Pressurized-Water Reactors*

cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP  
Ms. A. T. Billoch Colón, NRC Project Manager, HNP  
Mr. V. M. McCree, NRC Regional Administrator, Region II

**Clarification of Harris Nuclear Plant Response to NRC Generic Letter 2004-02,  
*Potential Impact of Debris Blockage on Emergency Recirculation  
during Design Basis Accidents at Pressurized-Water Reactors***

The following information is provided to clarify prior GL 2004-02 responses regarding the Harris Nuclear Plant (HNP) treatment of coatings outside the zone-of-influence (ZOI).

- **Describe explicit criteria used to classify the different categories of coatings with respect to their behavior outside the zone of influence.**
  - **Define terms to be used consistently.**
  - **Differentiate between unqualified epoxy coatings that are from HNP Design Basis Accident (DBA) coatings systems and epoxy coatings that are not one of HNP DBA coating systems.**

The following terms describe the categories of coatings within the HNP Generic Safety Issue (GSI) 191 analysis and their treatment outside the ZOI.

1. Qualified Coatings

Criteria: A fully qualified Design Basis Accident (DBA) coating.

Behavior outside ZOI: Does not fail

2. Unqualified DBA coatings (referred to in previous responses as “unqualified epoxy” coatings)

Criteria: DBA coatings that include:

- Qualified DBA coatings that are physically degraded.
- DBA coatings that cannot be fully qualified due to incomplete documentation or inaccessibility for the required preparation, application, or inspection. HNP’s DBA coating systems are epoxies, hence the previous designation as “unqualified epoxy.” Only DBA type epoxies fall in this category.

Behavior outside of ZOI: Assumed to fail as 21-mil chips, which is the nominal thickness of the DBA coating systems per HNP original coating specifications.

3. Unqualified OEM/vendor coatings (has also been referred to as “unqualified unknown” coatings)

Criteria: A coating system which is unknown or is not one of HNP’s DBA coating systems or was not applied using HNP coating specifications as a guideline.

Behavior outside ZOI: Assumed to fail as 10 micron diameter particulate. Although some of these coating systems are known to be epoxies through sampling and available information, they are conservatively not treated the same as one of HNP's DBA epoxies.

- **Describe the types of documentation credited to provide assurance the behavior of unqualified DBA epoxy would be similar to degraded qualified DBA epoxy.**

Unqualified DBA coatings are comprised of degraded qualified DBA coatings and DBA coatings which cannot be fully qualified, all of which are epoxies. In the answer to this question they will be referred to as degraded qualified DBA epoxy and unqualified DBA epoxy respectively for clarity.

Unqualified DBA epoxy coatings and degraded qualified DBA epoxy coatings are assumed to fail as 21-mil chips outside the ZOI in the HNP GSI-191 analysis. The Crystal River 3 pilot plant audit report did not take issue with the concept of degraded qualified epoxy coatings outside the ZOI failing as chips instead of particulates. Section 3.7.2 of the CR3 pilot plant audit report states that "(t)he NRC staff agrees that degraded qualified coatings outside the ZOI failing as chips is a reasonable assumption." The behavior of unqualified DBA epoxy coatings will be similar. The types of coating systems (manufacturer & type) that make up the populations of qualified epoxy coatings, degraded qualified epoxy coatings and unqualified DBA epoxy coatings at HNP are the same. The initial guidance provided for their application was also the same. Supporting this is the HNP unqualified coatings log and referenced documentation. The log contains entries for locations of unqualified DBA epoxy coatings and references plant procedure attachment documents such as Coatings exception documents, Coatings acceptance documents, or Protective Coatings transmittals which were utilized in the earlier plant procedure TP-29 *Inspection of Service Level I – Protective Coatings*. Review of these TP-29 attachments from Quality Assurance Records shows that the coatings applied at these locations were Service Level I DBA epoxy coatings that either could not be applied in full accordance with the required coating application or inspection criteria or had missing application documentation. This provides evidence that a robust coating system is present but in a sense degraded in some manner from what is expected of a fully qualified coating. Because of this it is expected that the unqualified DBA epoxy coatings will fail as chips outside the ZOI similar to physically degraded DBA qualified epoxy coatings.

- **Document the conservatism in HNP treatment of non-DBA epoxy coatings. That is, EPRI studies have reported that OEM-applied epoxy coatings exposed to DBA conditions experience relatively low failure rates, but the HNP analysis assumes 100% failure of OEM coatings known to be epoxy.**

Making up the population of Unqualified OEM/vendor coatings are some epoxy based coatings, an example of which includes the Digital Rod Control Cabinets (~220 sq. ft) which were shown to be coated with epoxy through analysis of samples via Fourier transform infrared spectroscopy. HNP conservatively assumes that OEM-applied epoxy coatings outside the ZOI such as this (i.e. epoxies which are not one of HNP's DBA epoxy coating systems or were not applied using HNP coating specifications as guidelines) fail as 10 micron diameter particulate. This is conservative as EPRI Report No. 1011753 (Design Basis Accident Testing of Pressurized Water Reactor

Unqualified OEM Coatings) showed that epoxies in general performed well in testing at DBA conditions, with most showing only 5-10% failure and only two types failing in the 20% to 50% range. NRC Staff Review Guidance on Coatings Evaluation also allows licensees to credit a reduction in assumed extent of failure of these coatings if the licensee shows that the coating is consistent with the specific types of epoxy tested in the EPRI report. HNP does not take such credit at this time and conservatively assumes OEM-applied epoxies outside the ZOI fail, and fail as particulate.