

James A. Spina
Vice President

Calvert Cliffs Nuclear Power Plant, Inc.
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657
410.495.5200
410.495.3500 Fax



February 1, 2007

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
License Amendment Request: Revise Containment Sump Surveillance
Requirement to Verify Strainer Integrity

Pursuant to 10 CFR 50.90, the Calvert Cliffs Nuclear Power Plant, Inc. hereby requests an amendment to the Renewed Operating License Nos. DPR-53 and DPR-69 to revise Surveillance Requirement 3.5.2.8 in Technical Specification 3.5.2, "ECCS - Operating," to reflect the replacement of the containment recirculation sump suction inlet trash racks and screens with strainers. The containment recirculation sump suction inlet trash racks and screens are being replaced with a strainer design with significantly larger effective surface area in response to Nuclear Regulatory Commission (NRC) Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors." Although the configurations of the existing trash racks and screens and the replacement sump strainer assemblies are different, they serve the same fundamental purpose of passively removing debris from the recirculation sump's suction supply of the Emergency Core Cooling System pumps. The descriptive terminology of trash racks and screens is not descriptive of the new sump strainers. The proposed replacement of "trash racks and screens" with "strainers" is a descriptive change and Surveillance Requirement 3.5.2.8 will continue to ensure the containment recirculation sump strainers are not restricted by debris and show no evidence of structural distress or abnormal corrosion.

The significant hazards discussion and the technical basis for this proposed change are provided in Attachment (1). A mark-up of the affected Technical Specification page is provided in Attachment (2). The Technical Specification Bases will be changed as appropriate to support this information.

Schedule

We request approval of the proposed change during the spring 2008 refueling outage, scheduled to start February 24, 2008, to support completion of the strainer installation on Unit 1 during that refueling outage. Strainer installation is scheduled to be completed on Unit 2 in the spring 2007 refueling outage. The new Unit 2 strainer will be inspected to the same requirements as the existing surveillance prior to start-up from the spring 2007 refueling outage (i.e., Emergency Core Cooling System train containment sump suction inlet is not restricted by debris and the strainer shows no evidence of structural distress or abnormal corrosion). Therefore, we will be in compliance with the revised surveillance requirement wording when the proposed amendment request is approved. In addition, the supporting 10 CFR 50.59 evaluation concludes that the new strainer system will perform the required safety function as well as or better than the existing system.

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cc: D. V. Pickett, NRC
S. J. Collins, NRC

Resident Inspector, NRC
R. I. McLean, DNR

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**TECHNICAL BASIS AND
NO SIGNIFICANT HAZARDS CONSIDERATION**

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EVALUATION

1.0 DESCRIPTION

This license amendment request revises Surveillance Requirement (SR) 3.5.2.8 in Technical Specification 3.5.2, "ECCS - Operating," to reflect the replacement of the containment recirculation sump suction inlet trash racks and screens with strainers. The containment recirculation sump suction inlet trash racks and screens are being replaced with a strainer design with significantly larger effective surface area in response to Nuclear Regulatory Commission (NRC) Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors" (Reference 1).

2.0 PROPOSED CHANGE

Technical Specification 3.5.2, SR 3.5.2.8 is revised to reflect the replacement of the containment recirculation sump suction inlet trash racks and screens with strainers. Surveillance Requirement 3.5.2.8 currently states: "Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion." Surveillance Requirement 3.5.2.8 is revised to: "Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet strainers show no evidence of structural distress or abnormal corrosion."

3.0 BACKGROUND

Generic Safety Issue-191, "Assessment of Debris Accumulation on PWR Sump Performance," deals with the possibility that debris could accumulate on the Emergency Core Cooling System (ECCS) sump screen resulting in a loss of net positive suction head (NPSH) margin. The loss of NPSH margin to ECCS pumps drawing suction from the sump may impede or prevent the flow of water needed to meet the criteria of Title 10, Code of Federal Regulations, Section 50.46 (10 CFR 50.46), "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors." Title 10 CFR 50.46 requires that licensees design their ECCS to meet five criteria, one of which is to provide the capability for long-term cooling. Following a successful system initiation, the ECCS must be able to provide cooling for a sufficient duration that the core temperature is maintained at an acceptably low value. In addition, the ECCS must be able to continue decay heat removal for the extended period of time required by the long-lived radioactivity remaining in the core.

Nuclear Regulatory Commission Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," (Reference 2) requested information to verify compliance with NRC regulations and to ensure that any interim risks associated with post-accident debris blockage are minimized while evaluations of the latest sump knowledge proceed. Nuclear Regulatory Commission Generic Letter 2004-02 is the follow-on generic communication to NRC Bulletin 2003-01 and requested information on the results of the evaluations referenced in the bulletin. Calvert Cliffs Nuclear Power Plant (CCNPP) has evaluated the containment recirculation sumps for adverse effects due to debris blockage of flow paths necessary for ECCS and Containment Spray System recirculation and containment drainage. That evaluation concluded that in order to continue to comply with applicable regulatory requirements large sump strainers of a different design are required. Consequently, this license amendment request is to change the Calvert Cliffs Technical Specifications in support of plant modifications required by NRC Generic Letter 2004-02.

4.0 TECHNICAL ANALYSIS

Calvert Cliffs Nuclear Power Plant plans to install new containment recirculation sump strainers to increase the available (i.e., submerged) strainer area from approximately 102 square feet currently

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available to an expected area of approximately 6000 square feet (Reference 3). The existing recirculation sump design uses multiple screens located above the sump area. The sump screens consist of: (1) an outer trash rack which is constructed of grating material, (2) an inner stainless steel wire mesh screen with a nominal opening of 0.244-inches, and (3) a stainless steel frame constructed of ¼ inch angle iron and bar stock. In addition, a 12-inch concrete curb is provided on which the sump screen is supported to prevent high density particles from entering the recirculation sump. The new design will remove the existing screen hardware described above and replace it with new fabricated strainer assemblies utilizing the Control Components Inc. cassette type suction strainer system. On the floor of each containment building, modules of the cassettes will be installed and will extend approximately three feet above the containment building floor. This strainer design was chosen based on the largest available sump strainer area that would fit within the available space within the containment building and to be compatible with anticipated water level.

The new sump strainer is designed to reduce both head loss and the ingestion of debris which could affect downstream components. The containment recirculation sump strainers are sized to preclude the passage of debris large enough to damage downstream Containment Spray System and ECCS components or block flow passages such as flow channels in the fuel and the Containment Spray System nozzles. This function is required to support operation of the supported systems during postulated accidents which credit recirculation flow from the containment recirculation sump. Activities are currently underway to ensure that the containment recirculation sump functions under debris loading conditions at CCNPP will be in full compliance with the regulatory requirements listed in the Applicable Regulatory Requirements section of NRC Generic Letter 2004-02 following the Unit 1 refueling outage scheduled to begin February 24, 2008 (Reference 4). Full compliance will be achieved through a combination of analysis, testing, modifications to increase the available recirculation sump screen area, other changes to the plant to reduce the potential debris loading on the installed containment recirculation sump strainers, and programmatic and process changes as needed.

This proposed amendment to Technical Specification SR 3.5.2.8 is necessary to reflect the new strainer design. Although the configurations of the existing trash racks and screens and the replacement sump strainer assemblies are different, they serve the same fundamental purpose of passively removing debris from the recirculation sump's suction supply of the supported system pumps. The descriptive terminology of trash racks and screens is not descriptive of the new sump strainers. The proposed replacement of "trash racks and screens" with "strainers" is a descriptive change and SR 3.5.2.8 will continue to ensure the containment recirculation sump strainers are not restricted by debris and show no evidence of structural distress or abnormal corrosion.

5.0 REGULATORY ANALYSIS

This section addresses the standards of 10 CFR 50.92 as well as the applicable regulatory requirements and acceptance criteria.

5.1 No Significant Hazards Consideration

Calvert Cliffs Nuclear Power Plant (CCNPP) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," Part 50.92(c), as discussed below:

- (1) *Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?*

The consequences of accidents evaluated in the Updated Final Safety Analysis Report that could be affected by the proposed change are those involving the pressurization of Containment and

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associated flooding of the Containment and recirculation of this fluid within the Emergency Core Cooling System (ECCS) or the Containment Spray System (CSS) (e.g., loss-of-coolant accidents [LOCAs]). The proposed change does not impact the initiation or probability of occurrence of any accident. Although the configurations of the existing containment recirculation sump trash racks and screen and the replacement sump strainer cassettes are different, they serve the same fundamental purpose of passively removing debris from the sump's suction supply of the supported system pumps. Removal of trash racks does not impact the adequacy of the pump net positive suction head assumed in the safety analysis. Likewise, the change does not reduce the reliability of any supported systems or introduce any new system interactions. The greatly increased surface area of the new strainer is designed to reduce head loss and reduce the approach velocity at the strainer face significantly, decreasing the risk of impact from large debris entrained in the sump flow stream.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

- (2) *Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?*

The containment recirculation sump strainers are a passive system used for accident mitigation. As such, they cannot be accident initiators. Therefore, there is no possibility that this change could create any new or different kind of accident. No new accident scenarios, transient precursors, or limiting single failures are introduced as a result of the proposed change. There will be no adverse effect or challenges imposed on any safety-related system as a result of the change. Therefore, the possibility of a new or different type of accident is not created.

There are no changes which would cause the malfunction of safety-related equipment, assumed to be OPERABLE in the accident analyses, as a result of the proposed Technical Specification change. No new equipment performance burdens are imposed. The possibility of a malfunction of safety-related equipment with a different result is not created.

Therefore, the proposed change does not create the possibility of a new or different accident from any accident previously evaluated.

- (3) *Does the proposed change involve a significant reduction in a margin of safety?*

The proposed change does not affect the acceptance criteria for any analyzed event nor is there a change to any safety analysis limit. There will be no effect on the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are determined nor will there be any effect on those plant systems necessary to assure the accomplishment of protection functions. The proposed change does not adversely affect the fuel, fuel cladding, Reactor Coolant System, or containment integrity. The radiological dose consequence acceptance criteria listed in the Updated Final Safety Analysis Report will continue to be met.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Conclusion:

Based on the above evaluation, CCNPP concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c) and, a finding of "no significant hazards consideration" is justified.

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5.2 Applicable Regulatory Requirements/Criteria

This license amendment request involves replacing the current "trash racks and screens" of the containment sump by installing new "strainers" that increase the area that would filter debris from the water in the containment sump.

The NRC's regulatory requirements related to the application to replace the existing containment sump screen or strainer are the following:

- Paragraph 50.46(b)(5) of Title 10 to Part 50 of the *Code of Federal Regulations* (10 CFR 50.46(b)(5)), "Acceptance criteria for emergency core cooling systems for light water-nuclear power reactors," which states that after any calculated successful initial operation of the ECCS, the calculated core temperature shall be maintained at an acceptably low value and decay heat shall be removed for the extended period of time required by the long-lived radioactivity remaining in the core.
- Draft General Design Criterion (GDC) 44, "Emergency core cooling systems capability," which requires, in part, abundant emergency core cooling to prevent fuel and clad damage that would interfere with the emergency core cooling function and to limit the clad metal-water reactions to negligible amounts.
- Draft GDC 49, "Containment design basis," which requires, in part, that the containment structure including any necessary containment heat removal systems is designed so the containment structure can accommodate the pressures and temperatures resulting from the largest credible energy release following a LOCA.
- Draft GDC 52, "Containment heat removal," which requires, in part, that when active heat removal systems are needed to maintain containment pressure at acceptably low levels they shall be of different design principles and each with full capacity.
- Nuclear Regulatory Commission Generic Letter 2004-02, which addresses safety issues associated with Generic Safety Issue-191, "Assessment of Debris Accumulation on PWR [pressurized-water reactor] Sump Performance," requested that PWR licensees improve their plant capability to meet the requirements of 10 CFR 50.46(b)(5) for long-term cooling in the aftermath of a design-basis loss-of-coolant accident (LOCA) with debris loading in the containment sumps.

This amendment only affects the containment sump in terms of the screens or strainers that remove debris during accidents. The trash racks, screens, or strainers ensure that sufficient flow goes from the sump to the ECCS pumps (to provide cooling to the core) and CSS pumps (to provide spray for cooling of the Containment and to reduce the radioiodine and particulate radioactivity in the containment atmosphere). Therefore, 10 CFR 50.46(b)(5) and draft GDC 44, 49, and 52 must be addressed in the license amendment as to the requirements for long-term flow from the containment sumps to the ECCS and CSS with debris loading in the containment sumps. The amendment does not involve a change to the design, testing, or inspection requirements for the ECCS and CSS in draft GDC 45 through 48 and 58 through 65.

The containment recirculation sump strainers are sized to limit the passage of debris precluding damage to the downstream CSS and ECCS components or block flow passages such as flow channels in the fuel and the CSS nozzles. This function is required to support operation of the supported systems during postulated accidents which credit recirculation flow from the containment recirculation sump. Evaluations performed by CCNPP confirm that CCNPP will continue to comply with all applicable regulatory requirements.

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In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

Calvert Cliffs has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20, or would change an inspection or surveillance requirement. Calvert Cliffs has evaluated the proposed amendment and has determined that the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 PRECEDENT

A similar change was approved for the Oconee Nuclear Station, Units 1 and 2 in Amendment Nos. 348 and 350 on November 1, 2005. This amendment revised SRs 3.5.2.6 and 3.5.3.6 to accommodate the replacement of the reactor building emergency sump suction inlet trash racks and screen with strainers.

Additionally, a similar change was approved for the Wolf Creek Nuclear Generating Station in Amendment No. 168 on October 5, 2006. This amendment revises SR 3.5.2.6 to accommodate the replacement of the containment emergency sump suction inlet trash racks and screen with strainers.

8.0 REFERENCES

- (1) NRC Generic Letter 2004-02, dated September 13, 2004, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors"
- (2) NRC Bulletin 2003-01, dated June 9, 2003, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors"
- (3) Letter from J. A. Spina (CCNPP) to Document Control Desk (NRC), dated September 20, 2006, Update of Response to Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors (TAC Nos. MC4672 and MC4673)
- (4) Letter from P. D. Milano (NRC) to J. A. Spina (CCNPP), dated December 18, 2006, Approval of Extension Request for Completion of Corrective Actions in Response to Generic Letter 2004-02 (TAC No. MC4672)

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MARKED UP TECHNICAL SPECIFICATION PAGE

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	24 months
SR 3.5.2.7	Verify each low pressure safety injection pump stops on an actual or simulated actuation signal.	24 months
SR 3.5.2.8	Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	24 months
SR 3.5.2.9	Verify the Shutdown Cooling System open-permissive interlock prevents the Shutdown Cooling System suction isolation valves from being opened with a simulated or actual Reactor Coolant System pressure signal of ≥ 309 psia.	24 months

Strainers →