

December 27, 2007

Mr. James A. Spina, Vice President
Calvert Cliffs Nuclear Power Plant, Inc.
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: EXTENSION FOR COMPLETION OF ACTIVITIES RELATED TO GENERIC LETTER 2004-02, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN BASIS ACCIDENTS AT PRESSURIZED WATER REACTORS," CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 (TAC NOS. MC4672 AND MC4673)

Dear Mr. Spina:

Generic Letter (GL) 2004-02 (Agencywide Documents Access and Management System Accession No. ML042360586) identified potential susceptibility of pressurized-water reactor recirculation sump screens to debris blockage during design-basis accidents requiring recirculation operation of emergency core cooling systems (ECCS) or containment spray systems (CSS), and on the potential for additional adverse effects due to debris blockage of flowpaths necessary for ECCS and CSS recirculation and containment drainage. The GL requested that all corrective activities be completed no later than December 31, 2007.

By letter dated December 10, 2007, as supplemented by letter dated December 20, 2007, you requested an extension for certain activities associated with your response to GL 2004-02. The Nuclear Regulatory Commission staff has evaluated the information provided in your letters and concluded that for Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2, it is acceptable to extend the due date for completion of corrective actions, as described in the enclosed staff's evaluation, until June 30, 2008.

Please contact me at 301-415-1364, if you have any questions on this matter.

Sincerely,

/RA/

Douglas V. Pickett, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosure:
As stated

cc w/encl: See next page

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CALVERT CLIFFS UNITS 1 AND 2
GENERIC SAFETY ISSUE-191/GENERIC LETTER 2004-02
EXTENSION REQUEST APPROVAL

By letter dated December 10, 2007, Calvert Cliffs Nuclear Power Plant Inc. (Calvert Cliffs, the licensee), requested an extension to the corrective action due date of December 31, 2007, stated in NRC Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors," for the Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2. By letter dated December 20, 2007, the licensee provided additional information relating to its extension request in response to a request by the Nuclear Regulatory Commission (NRC) staff during a telephone conversation held on December 17, 2007.

Calvert Cliffs stated that it has taken actions, described in its letters dated March 3, 2005, and September 20, 2006, toward bringing the plant into compliance with the recommendations of GL 2004-02, which included the replacement of the Unit 2 sump screens with a substantially larger sump strainer during the spring 2007 refueling outage. By letter dated December 18, 2006, the NRC staff approved a previous extension request by the licensee to complete the Unit 1 GL 2004-02 corrective actions by the end of the spring 2008 refueling outage. Further, Calvert Cliffs is continuing its evaluation of the adequacy of the replacement strainers.

The licensee stated that Calvert Cliffs Unit 2 has completed all modifications projected to be required to resolve issues associated with potential sump strainer clogging as described in GL 2004-02. As part of the modifications to address the issues, Calvert Cliffs installed new sump strainers on Unit 2 and will install new strainers on Unit 1 during the spring 2008 refueling outage. Initial non-chemical head loss testing resulted in very low head losses. The licensee anticipated, based on the initial testing, that even with a large contribution from chemical debris, the head losses would remain within the design limits. However, chemical effects testing performed in November 2007 resulted in excessive head losses. During this testing, non-chemical head losses were measured prior to adding the chemical debris. Calvert Cliffs stated that these non-chemical head losses were much larger than those measured during the previous non-chemical strainer testing. The head losses observed after chemicals were added were greater than those allowed by the existing Calvert Cliffs analysis. The licensee believes that the first non-chemical testing that was completed was more representative of the plant installation. Therefore, the licensee is currently evaluating the different test facilities and procedures, revising debris loads to remove conservatism, revising chemical precipitate loads based on walk down information, and will commission additional testing using the new inputs in order to qualify the strainers.

Enclosure

Calvert Cliffs stated that it also completed a downstream effects evaluation to determine whether components downstream of the sump strainers could be adversely affected by debris that could bypass the strainers. The original evaluation of downstream effects was completed prior to the August 2007 issuance of WCAP-16406-P, "Evaluation of Downstream Sump Debris Effects In Support of GSI-191," Revision 1, and accompanying safety evaluation. The licensee stated that this new guidance requires a revision to the analysis previously completed by Calvert Cliffs. The licensee anticipates the analysis to be completed by the end of April 2008. In addition to the evaluation, Calvert Cliffs stated that it has commissioned testing to demonstrate the qualification of containment spray pump seals with downstream effects. The licensee also is working with the vendor of the high-pressure safety injection pump to ensure that the cyclone separators, used for cleaning the seal cooling water, can operate successfully with the fibrous loading predicted to occur during a loss-of-coolant accident. The licensee anticipates completing testing to resolve both of the pump seal issues during the first quarter of 2008.

The in-vessel downstream effects evaluation has not yet been completed in accordance with the latest industry guidance. The evaluation required for this area will use guidance from WCAP-16739-NP, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous, and Chemical Debris in the Recirculating Fluid," Revision 0. This WCAP is currently under review by the NRC staff. Calvert Cliffs states that the in-vessel downstream evaluation will be completed by the end of April 2008.

The criteria for granting an extension to the due date of December 31, 2007, for completion of GL 2004-02 corrective actions are stated in SECY-06-0078. Specifically, an extension may be granted if:

- the licensee has a plant-specific technical/experimental plan with milestones and schedule to address outstanding technical issues with enough margin to account for uncertainties, and
- the licensee identifies mitigative measures to be put in place prior to December 31, 2007, and adequately describes how these mitigative measures will minimize the risk of degraded emergency core cooling system (ECCS) and containment spray system (CSS) functions during the extension period.

With regard to the first extension criterion, Calvert Cliffs has a plant-specific technical/experimental plan, with milestones and schedules, to complete the GL 2004-02 corrective actions and modifications by June 30, 2008. Specifically, the licensee has stated that it will:

1. Complete downstream effects testing during the first quarter 2008,
2. Reevaluate ex-vessel downstream effects to address Westinghouse WCAP-16406-P, Revision 1, by the end of April 2008,
3. Complete an evaluation of in-vessel downstream effects by the end of April 2008, and
4. Perform additional integrated chemical effects testing for the strainers and incorporate the results into the required analyses by June 30, 2008.

On December 17, 2007, the staff held a telephone conversation with the licensee regarding whether the licensee had confidence in the margins to account for uncertainties associated with testing and analysis planned for 2008. This discussion focused on Unit 1 considering the upcoming spring 2008 refueling outage and associated opportunity to ensure adequate margin with additional modifications. The licensee's letter dated December 20, 2007, responded to the staff's request for additional information, as described below.

Calvert Cliffs committed to resolution of GSI 191 as expeditiously as possible. The licensee stated it is taking proactive steps during the Unit 1 spring 2008 refueling outage to support possible resolution paths that would mitigate the November 2007 head loss testing results. Additional evaluation before June 30, 2008, will determine if these steps are also required for Unit 2.

Calvert Cliffs stated it will install debris interceptors in Unit 1 during the spring 2008 refueling outage. Debris interceptors will protect a portion of the strainer filtration surface from debris loading, thus allowing an acceptable head loss to be maintained. Testing of this feature will occur in parallel with other testing efforts. If the licensee finds this feature to be necessary to ensure compliance with Generic Letter 2004-02, it will install the debris interceptors in Unit 2 during its next refueling outage (spring 2009).

The licensee stated that aluminum materials inside containment were significant contributors to the November 2007 head loss testing results. Therefore, the licensee plans to reduce the impact of this aluminum source in containment. The licensee reviewed documentation to determine the location of the sources of aluminum inside the Calvert Cliffs Unit 1 and 2 containments. The licensee stated that it will remove, shield, or otherwise mitigate the aluminum during the 2008 refueling outage to reasonably ensure successful testing to meet design basis requirements for Unit 1. Further, if the licensee finds this action to be necessary to ensure compliance with GL 2004-02, it will subsequently be employed on Unit 2 during its next refueling outage

Concerning the second extension criterion, the licensee stated that several modifications, mitigative measures, compensatory measures, and/or favorable conditions are in effect at Calvert Cliffs Unit 1 and 2 that minimize the risk of degraded ECCS and CSS functions during the extension period. First, the licensee stated that larger surface area sump strainers have been installed on Unit 2 (and will be installed on Unit 1 as allowed by a previously approved extension). The licensee stated that it installed or will install strainers with about 6000 ft² surface area in place of the original screens of approximately 115 ft². In addition, Calvert Cliffs stated that calcium silicate insulation in Unit 2, which has been shown to be a problematic insulation type for strainer head loss, has been replaced with less problematic insulation or has had banding installed. The banding will reduce the insulation's potential to be degraded during a loss-of-coolant accident with subsequent transport to the strainer. The licensee stated that Unit 1 has no calcium silicate insulation identified within a loss-of-coolant accident zone of influence. With respect to the head loss for the strainer, Calvert Cliffs states that there are several conservatisms and physical phenomena that, if accounted for in the testing and head loss analysis, would result in significant additional margin.

Calvert Cliffs provided an assessment of the increased risk of core damage as a result of continued operation during the extension period. For a six-month extension, the NRC recognizes that the risk is small given the previously completed modifications, compensatory measures, and for favorable conditions as discussed above.

The NRC believes that Calvert Cliffs has a reasonable plan for Calvert Cliffs Unit 1 and 2 that should result in the completion of final GSI-191 evaluations and modifications that will ensure acceptable strainer function with adequate margin for uncertainties. Further, the NRC has concluded that Calvert Cliffs has put mitigation measures in place at Calvert Cliffs Unit 1 and 2 to adequately reduce risk for the requested six-month extension period. Calvert Cliffs also provided a quantitative risk assessment of the extension, which showed that the increase in core damage frequency associated with the extension is very small. Therefore, the NRC staff concludes that it is acceptable to extend the completion date for certain corrective actions for the issues discussed in Generic Letter 2004-02 (specifically, strainer chemical effects testing and evaluation, and in-vessel and ex-vessel downstream effects evaluations discussed above) until June 30, 2008. While the NRC accepts this date as reasonable allowance for contingencies regarding completion of remaining activities to address GL 2004-02, the NRC expects Calvert Cliffs to place a high priority on completing remaining actions and updating the plants' licensing bases as soon as possible.

This letter does not change the NRC's previous approval of extending the due date for strainer installation in Unit 1 to the spring 2008 refueling outage.