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

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Renewed Facility Operating License Nos. DPR-53 and DPR-69
Docket Nos. 50-317 and 50-318

Subject: Response to Request for Additional Information Revised - Final Response to Generic Letter 2004-02

References:

1. Final Response to Generic Letter 2004-02, dated August 13, 2018.
2. Supplement to Final Response to Generic Letter 2004-02, dated October 19, 2018.
3. Revised – Final response to Generic letter 2004-02, dated June 7, 2019.
4. E-mail from Michael Marshall (NRC) to Enrique Villar (Exelon) Calvert Cliffs Nuclear Power Plant, Units 1 and 2 – Request for Additional Information Regarding Final Response to Generic letter 2004-02 (EPID L-2018-LLE-0222), dated September 18, 2019.

By letter dated August 13, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18226A189) as supplemented by letters dated October 10, 2018 and June 7, 2019 (ADAMS Accession Nos. ML18283A034, and ML19158A075, respectively), Exelon Generation Company, LLC (Exelon) submitted license amendment requests (LARs) for Calvert Cliffs Nuclear Power Plant, Units 1 and 2 (Calvert Cliffs). The proposed amendments would change the Calvert Cliffs' licensing bases, including the affected portions of the Technical Specifications and Updated Final Safety Analysis Report. The methodologies in the submittal describe the use of a risk-informed approach to address safety issues discussed in Generic Safety Issue -191, "Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance" and close out generic letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors" (ADAMS Accession No. ML042360586).

A request for additional information (RAI) was transmitted via e-mail on September 18, 2019 (Reference 3).

Attachment 1 to this letter contains the Nuclear Regulatory Commission (NRC) RAI followed immediately by Exelon's response.

There are no regulatory commitments contained in this letter.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 3rd day of October 2019.

If you should have any questions regarding this submittal, please contact Enrique Villar at 610-765-5736.

Respectfully,

David T. Gudger
Acting Director - Licensing
Exelon Generation Company, LLC

Attachment: 1. Response to Request for Additional Information

cc:	NRC Regional Administrator, Region I	w/attachment
	NRC Senior Resident Inspector, CCNPP	"
	NRC Project Manager, NRR, CCNPP	"
	D. A. Tancabel, State of Maryland	"

ATTACHMENT 1
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION -
FINAL RESPONSE TO GENERIC LETTER 2004-02.

NRC REQUEST FOR ADDITIONAL INFORMATION

1. Attachment 1-2, "Deterministic (Approved Methodologies) Bases," (Page 88) of the letter dated June 7, 2019 states the largest quantity of NaAlSi3O8 predicted from all breaks analyzed is 115.9 pounds mass (lbm). Attachment 1-2 (page 92) states that the break that produces the largest quantity of chemical precipitates (117.21 lbm) of sodium aluminum silicate is a longitudinal break. The aluminum concentration for that break is 3.64 ppm. Attachment 1-4 (page 14), however, indicates the maximum aluminum concentration in the Calvert Cliffs sump pool for the break that produces the largest quantity of precipitate is 3.39 ppm. Please discuss which values of maximum precipitate quantity and maximum aluminum concentration are appropriate.

Exelon's Response

The Attachment 1-2 values for chemical precipitate of 117.21 lbm, and aluminum concentration of 3.64 ppm are the correct values. The values listed in other attachments have been superseded.

NRC REQUEST FOR ADDITIONAL INFORMATION

2. The values in data columns of Table 2, "Description of Operating Margins," in Attachment 1-4, "Defense in Depth and Safety Margin," (Page 21) appear to be inconsistent.

   a. The aluminum surface area in the actual value column appears to be the value used in the analysis. However, the difference between the "actual value" column and "maximum value used in the analysis" do not sum to the value in the operating margin column. Confirm that the values for aluminum surface area shown in Attachment 1-4, Table 2 are correct. If the values are correct, explain why the maximum value used in the analyses is greater than the sum of the actual value and operating margin.

Exelon's Response

The Maximum Value Used in Analysis for Aluminum of 150 ft^2 is correct, as is the Actual Value of 86.945 ft^2. The Operating Margin should be 63.055 ft^2.

b. The fiber values in the actual value and maximum value columns do not appear to correspond to values provided elsewhere in the submittal. For example, the values used in the analysis would likely be consistent with Attachment 1-3, Table 4. Confirm that the values for fiber shown in Attachment 1-4, Table 2 are correct. If the values are correct, please explain the apparent discrepancies.

Exelon's Response

Test 2 shown in Table 4 of Attachment 1-3 has a Total Fiber Fines of 403 lbm. There is 22.5 lbm (~ 23 lbm) of latent fiber included in this total (refer to Table 4 of Attachment 1-2). The Maximum amount of E-Glass Fine Fibers is therefore 403 lbm – 23 lbm = 380 lbm which is consistent with the value given in Table 2 of Attachment 1-4.

The Actual Value for E-Glass Fine Fibers are based on the amount generated by a break in a 14" Sch. 160 line, and is not provided anywhere else in the submittal. The fiber fines values shown in Table 4 and Table 7a are based on double-ended guillotine breaks (DEGBs) of Main Loop RCS piping. As discussed previously with the NRC, since the debris loads from these DEGB breaks are predicted to result in strainer failure based on deterministic methods it is not appropriate to consider them in a table on Operating Margins.

c. The maximum coating values correspond to values in Table 7a of attachment 1-2, but the origin of the actual values for coatings was not apparent. Unqualified and degraded qualified coatings are assumed to fail independent of break location. Identify the sources for each value in the "actual value" and "maximum values used in the analysis" columns. How are other sources of particulate evaluated? Should particulate be evaluated including all potential sources since that is how the analysis models particulate? If the values in the table are not taken from the submittal provide the bases for the values.

Exelon's response

The Actual Values for Degraded-Qualified Coatings come from a design calculation which tabulates and tracks the amount of unqualified coatings inside containment. The Maximum coating values are documented in the same design calculation and is equal to the sum of the actual values and margin that has been assigned to assure that future unqualified coating additions to containment do not invalidate the strainer design analyses.

Other sources of particulate include Never-Qualified Coatings, Qualified Coatings in the ZOI, Latent Debris particulate, and a small amount of Nuke Tape particulate. Margin is included for Never-Qualified coatings, and Qualified Coatings in the ZOI,

but is not specifically identified in Table 2 of Attachment 1-4. No margin is assigned to Latent particulate beyond the conservative method by which this value was determined.

The total particulate amount from all these sources, including any assigned margin, is obtained by summing the contribution from each source and ensuring that the total amount is less than that determined acceptable per head loss test.

d. If relevant to the method for establishing margin, describe how the amount of debris considered to be margin is assessed in combination with other types of debris from potential breaks. Describe the most limiting combinations of debris that could occur (including the "margin" amounts of debris).

Exelon's Response

The amount of particulate debris, including margin, from each source is summed together to yield a limiting total particulate amount which is then compared to allowable amounts as determined by head loss testing.

NRC REQUEST FOR ADDITIONAL INFORMATION

3. Attachment 1-2, response to issues 3b1 and 3b2 (Page 9) includes a zone of influence of 4 diameters for welded stainless steel cassettes containing mineral wool. During the regulatory audit on January 29-31, 2019, Exelon stated that some of their cassettes were modified to use rivets. Testing has identified that riveted cassettes are much less robust than welded cassettes. Discuss whether any field modifications or repairs made to the cassettes using rivets within potential zones of influence at Calvert Cliffs do or do not result in non-conservative debris generation values for mineral wool.

Exelon's Response

The stainless steel cassettes which encase the Mineral Wool are the same design for RMI which has a ZOI of 2 diameters. A ZOI of 4 diameters for the Mineral Wool cassettes was assigned for conservatism.

During original installation some Mineral Wool cassettes needed to be modified in order to allow proper fit-up. These modified cassettes were typically resealed using rivets as opposed to welding. The joint that was resealed using rivets was the circumferential joint at the end of the cassette, and not the longitudinal joint that runs along the length of the cassette which was the joint of interest during ZOI testing, because if the longitudinal joint were to fail the insulation inside the cassette would become free. If the LOCA jet were more or less along the axis of the pipe so that it could impinge the circumferential joint straight-on only a portion

of the joint would be impacted because the pipe itself would shield other portions of the joint. Furthermore, this joint has an overlapping lip to prevent water from entering the gap between cassettes. This overlapping lip would act to reinforce the circumferential joint if the LOCA jet were acting to pry it apart. Finally, the contact of the end-cap held on by the circumferential joint with the adjacent cassette would prevent the piece held on by the circumferential joint from experiencing gross failure. Therefore, the cassette is not as vulnerable to having its insulation material become debris as compared to failure of the longitudinal joint.

During the 2013 and 2014 RFOs much of the Mineral Wool inside containment was replaced with RMI. The Mineral Wool that was not replaced was in high radiation areas and was covered by lead blankets so it is not known what percentage of cassettes were modified with rivets. However, overall Mineral Wool fines now account for less than 6% of the total fiber fines generated by the limiting break, and is no longer a major debris source.