December 16, 2015

LICENSEE: Exelon Generation, LLC

FACILITY: Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT UNIT NOS. 1 AND 2 - SUMMARY OF DECEMBER 1, 2015, MEETING WITH EXELON GENERATION COMPANY, LLC, REGARDING RISK-INFORMED APPROACH RESOLUTION OF GENERIC LETTER 2004-02, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN BASIS ACCIDENTS AT PRESSURIZED-WATER REACTORS" (CAC NOS. MC4672 AND MC4673)

On December 1, 2015, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Exelon Generation, LLC, (or the licensee) at NRC Headquarters, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss the strainer chemical effects head loss testing and the option 2b simplified risk-informed closure plan for the resolution of 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 (Calvert Cliffs). The meeting notice and agenda, dated November 17, 2015, is available in the Agencywide Documents Access and Management System (ADAMS) Accession No. ML15328A047. A list of attendees is provided as Enclosure 1.

The licensee presented information regarding the strainer chemical effects head loss testing and the option 2b simplified risk-informed closure plan to resolve GL 2004-02. The licensee's slides can be viewed at ADAMS Accession Nos. ML15321A370 and ML15327A224.

The licensee presented information on the results of its strainer head loss testing. The licensee discussed the test parameters including the flow rate assumed when chemical precipitates may be present at the strainer. The NRC staff did not have an immediate concern, but did have questions related to the timing of precipitation to determine if the flow rate at the time of chemical addition was appropriate.

The licensee stated that it is pursuing modifications to the recirculation actuation signal logic to ensure that if a low pressure safety injection (LPSI) pump fails to trip, there will be adequate time to stop flow from the LPSI pump before the time when precipitates may form and reach the sump strainer.

At the previous public meeting, held August 20, 2015, the NRC staff queried the licensee on its basis for rejecting test 6. At The December 1, 2015, public meeting the licensee discussed its documented basis for rejecting test 6. The NRC staff questioned the location of the strainers and whether there was the possibility of having water cascading near the strainer that would produce agitation similar to the stirring conditions seen in test 6. The licensee clarified that their strainers are located in the basement next to a cavity and would not have the agitation

conditions equivalent to the stirring in test 6. The staff noted that assurance was needed that the test protocol was followed as there were errors made during test 6. The licensee then further described precautions and oversight during the tests that helped to ensure the tests were performed correctly.

The licensee noted that it would like to use test 5 to establish the head loss in its closure plan. The licensee had determined that test 5 had the highest head loss below the threshold that was set.

The licensee proceeded to discuss its simplified risk-informed approach for resolution. The licensee described how the threshold break size was defined, as well as how the changes in core damage frequency and large early release frequency were calculated, and how the deterministic analysis fits into the risk-informed approach.

While describing the applicable head loss test for the risk-informed approach, the NRC staff asked the licensee if it had head loss test plots for all of the tests that were conducted. The staff noted that having these plots for all of the tests would be useful in their review.

The NRC staff queried the licensee on how the smaller breaks and non-piping breaks were considered in its analyses. The staff informed the licensee that a justification for how these breaks were modeled would be needed in the licensee's eventual submittal. One of the most significant issues discussed was the need for the licensee to justify its methodology for sizing breaks and determining ZOIs for longitudinal welds in the reactor coolant system piping.

The NRC staff also questioned the licensee on the amount of dissimilar metal welds (or welds with known degradation mechanisms) that were included in the total population of welds that would pose a potential problem if failed.

At the end of the presentation the licensee spoke about a potential approach to responding to GL 2004-02 without requesting a license amendment. The NRC staff acknowledged that the licensee is looking into this option. The staff had several questions as to how the licensee would accomplish this. It was determined that this may be a topic of discussion at the next public meeting and in the meantime the staff can discuss this internally and the licensee can prepare a presentation to the staff.

The licensee agreed to further investigate the following items raised by the NRC staff during the meeting:

1. Provide the head loss plots for all of the strainer head loss test runs.
2. Determine the maximum concentration of aluminum in a post-LOCA pool as predicted by WCAP-16530 for Calvert Cliffs.
3. Provide justification for the assumption that chemicals precipitates will not form until after the containment sprays are terminated (i.e., lower emergency core cooling system flow rate).
4. Determine the number of dissimilar metal welds (or welds with degradation mechanisms other than design and construction) included in the sub-set of welds that could pose a problem if the weld failed.

5. Provide the basis for how non-piping loss of coolant accident contributors were considered in the licensee's analyses.
6. Justify the exclusion of small pieces of debris from strainer head loss tests, and that tests that included only fines are adequate for determining debris limits.
7. Provide a representative set (e.g., the top 100) of sequences in the probabilistic risk analysis that would lead to core damage due to debris generation and transport.
8. Confirm the materials used in the reactor coolant system piping.

The NRC staff will follow-up with internal piping experts to discuss the treatment of potential breaks in longitudinal welds in piping.

Members of the public were in attendance. No feedback from the public was received. No members of the public made any comments during the meeting.

Please direct any inquiries to me at 301-415-2549, or Alexander.Chereskin@nrc.gov.

/RA/

Alexander N. Chereskin, 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:
List of Attendees

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5. Provide the basis for how non-piping loss of coolant accident contributors were considered in the licensee's analyses.
6. Justify the exclusion of small pieces of debris from strainer head loss tests, and that tests that included only fines are adequate for determining debris limits.
7. Provide a representative set (e.g., the top 100) of sequences in the probabilistic risk analysis that would lead to core damage due to debris generation and transport.
8. Confirm the materials used in the reactor coolant system piping.

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A. Guzzetta, NRR	A. Obodoako, NRR	J. Stang, NRR
A. Russell, NRR	M.Waters, OEDO	

ADAMS Accession Nos.: PKG: **Meeting Notice: ML15328A047**
Meeting Summary: ML15337A036 **Handouts: ML15321A370 and ML15327A224**

OFFICE	NRR/DORL/LPLI-1/PM	NRR/DORL/LPLI-1/LA	NRR/DSS/SSIB	NRR/DRA/APLA
NAME	AChereskin	KGoldstein	VCusumano	SRosenberg
DATE	12/09/2015	12/ 04 /2015	12/15/2015	12/10/2015
OFFICE	NRR/DE/ESGB	NRR/DORL/LPLI-1/BC	NRR/DORL/LPLI-1/PM	
NAME	GKulesa	TTate	AChereskin	
DATE	12/11/2015	12/16/2015	12/16/2015	

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LIST OF ATTENDEES

DECEMBER 1, 2015, MEETING WITH EXELON GENERATION, LLC TO

DISCUSS CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1, AND 2

RISK-INFORMED APPROACH FOR GL 2004-02 RESOLUTION

U.S. Nuclear Regulatory Commission

A. Chereskin
S. Smith
M. Yoder
P. Klein
M. Diaz-Colon
A. Russell
C.J. Fong
T. Tate
S. Laur*
A. Obodoako*

Exelon Generation, LLC, and Contractors

C. Sellers
M. Gahan
K. Greene
A. Drake
P. Rominc
G. Hughes
E. Federline
A. Elliot
J. Landale
J. Quinn*
S. Kinsey*

Members of the Public

Ron Holloway*
T. Sande*

*via teleconference

Enclosure