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10 CFR 50.55a

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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
NRC Docket Nos. 50-317 and 50-318

Subject: Relief Requests Associated with Fifth Ten-Year Inservice Testing Interval - Supplement 1 - Response to Request for Additional Information

References:
1. Exelon letter to the NRC, "Relief Requests Associated with Fifth Ten-Year Inservice Testing Interval," dated August 2, 2017 (ADAMS Accession No. ML17215A007)
2. Letter from M. Marshall (USNRC) to D. Neff (Exelon), "Calvert Cliffs Nuclear Power Plant, Units 1 and 2 - Request for Additional Information Regarding Alternative Request SI-RR-01, Rev. 0 (CAC Nos. MG0068 and MG0069; EPID L-2017-LLR-0078," dated January 19, 2018 (ADAMS Accession No. ML17345A091)

In accordance with 10 CFR 50.55a, Exelon Generation Company, LLC (Exelon) requested relief requests associated with the fifth ten-year Inservice Testing (IST) interval for Calvert Cliffs Nuclear Power Plan (CCNPP), Units 1 and 2. The fifth interval of the CCNPP, Units 1 and 2 IST program complies with the ASME OM Code, 2012 Edition. The fifth ten-year interval for CCNPP, Units 1 and 2 begins on July 1, 2018, and will conclude on June 30, 2028. During their technical review of the application, the NRC Staff identified the need for additional information. Reference 2 provided the Requests for Additional Information (RAIs) and included a request for a response within 30 days of January 19, 2018. The Attachment to this letter provides the responses to the RAIs.

There are no regulatory commitments contained within this letter.

If you have any questions concerning this letter, please contact Mr. David Neff at (267) 533-1132.

Sincerely,

David T. Gudger
Manager - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Inservice Testing Relief Requests- Supplement 1

cc: USNRC Region I, Regional Administrator
USNRC Project Manager, CCNPP
USNRC Senior Resident Inspector, CCNPP
S. T. Gray, Maryland Department of Natural Resources

ATTACHMENT

Calvert Cliffs Nuclear Power Plant, Units 1 and 2

NRC Docket Nos. 50-317 and 50-318

Inservice Testing Relief Requests - Supplement 1

Response to Request for Additional Information

Responses to NRC Staff's
Request for Additional Information

By submittal dated August 2, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17215A007), Exelon Generation Company, LLC (Exelon) requested relief requests associated with the fifth ten-year Inservice Testing (IST) interval for Calvert Cliffs Nuclear Power Plan (CCNPP), Units 1 and 2. The fifth interval of the CCNPP, Units 1 and 2 IST program complies with the ASME OM Code, 2012 Edition. The fifth ten-year interval for CCNPP, Units 1 and 2 begins on July 1, 2018, and will conclude on June 30, 2028.

During their technical review of the application, the NRC Staff identified the need for additional information. In letter dated January 19, 2018, from the NRC (Michael Marshall) to Exelon (David Neff) (ADAMS Accession No. ML17345A091), the NRC provided Requests for Additional Information (RAIs) seeking clarification of certain issues related to those relief requests. In a phone call on January 17, 2018, Mr. Neff stated that Exelon would provide a response to the RAI questions within 30 days of issuance of the NRC RAIs.

RAI-1

In Section 4 of the alternative request, it states:

> Additionally, in Generic Letter (GL) 89-04, Position 9, the NRC determined that, in cases where pump flow can only be established through a non-instrumented, minimum-flow path during quarterly pump testing, and a path exists at cold shutdown or refueling outages to perform a test of the pump under full or substantial flow conditions, the increased interval is an acceptable alternative to the Code requirements. Therefore, the proposed alternative testing of [Low Pressure Safety Injection] (LPSI) pumps as Group B during Modes 1-4 and as Group A during Modes 5-6 is consistent with GL 89-04, Position 9.

Provide an explanation describing how the proposed alternative is consistent with Generic Letter 89-04, Position 9 when the minimum recirculation flow common header used for quarterly testing is instrumented with an ultrasonic flow meter.

RESPONSE

Within GL 89-04, Position 9, discusses limitations on pump testing based on the system configuration. Specifically, the position discusses a system configuration that is designed such that the minimum-flow return line is the only flow path that can be used for quarterly pump testing. In this configuration, the pump is operating on a flat portion of the curve and the ability to detect and monitor for component degradation is limited. However, the pump can be tested at full or substantial flow conditions during cold shutdowns or refueling outages. As stated in GL 89-04, minimum flow lines are not designed for pump testing purposes and few have installed flow measuring devices.

In the specific case for Calvert Cliffs, Unit 1 and Unit 2, the LPSI pumps have a recirculation line that is limited to providing only minimum flow protection and cannot be

used for full flow testing. Additionally, the LPSI system piping configuration is such that it is feasible to install temporary flow measurement equipment on the recirculation line and monitor the minimum flow rate quarterly. However, the limitations for the quarterly test (i.e., can only be tested using the minimum recirculation line) are the same as discussed in the GL.

Full flow testing of the LPSI pumps can only be performed during plant shutdown conditions using the normal system flow path. All Code parameters (i.e., pump flow, differential pressure, and vibration) are monitored during the full flow test run during cold shutdowns or refueling outages.

RAI-2

In Section 4, it is stated that:

> The low pressure safety injection (LPSI) pumps are tested at a substantial flow rate (approximately 3000 gallons per minute (gpm)) during every refueling outage, as well as during planned and unplanned cold shutdown periods when plant conditions and circumstances permit.

It is also stated that:

> The quarterly tests are performed at approximately 55 - 65 gpm, which is between approximately 1.3% - 1.6% the LPSI pumps' Best Efficiency Flow rate.

There are large differences in the substantial flow rate, the best efficiency flow rate, and the low quarterly test flow rate.

a. Are the LPSI pumps operated below the manufacturer's minimum continuous stable flow?

b. Provide the manufacturer's recommended minimum flow and maximum run time at the minimum flow for the LPSI pumps and compare that to the flow rate and maximum run time for the LPSI pumps for the quarterly test.

c. Explain any differences between manufacturer's recommended minimum flow and maximum run time at the minimum flow and the flow rate and maximum run time for the LPSI pumps for the quarterly test.

RESPONSE

a. For the LPSI pumps, the manufacturer did not provide a minimum continuous stable flow but did provide the minimum pump flowrate of 40 gpm to provide thermal pump protection during low pump flows. During LPSI pump operation, the minimum flow rate is maintained between 55-65 gpm by a

permanently installed flow orifice in the minimum recirculation line and is above the manufacturer's recommended minimum flow rate.

b. For the LPSI pumps, the manufacturer's recommended minimum flow rate is 40 gpm but a maximum run time at the minimum flow rate was not provided by the manufacturer.

   During pump operation, including the quarterly surveillance tests, the minimum flow rate is maintained between 55-65 gpm by a permanently installed flow orifice in the minimum recirculation line and is above the manufacturer's recommended minimum flow rate. This flow rate is measured by temporarily installed ultrasonic flowmeters. While no maximum run time for the LPSI pumps was provided, there are several factors employed to minimize the potential for degradation of the LPSI pumps due to low pump flows. These factors are discussed below.

c. For the minimum pump flowrates, the LPSI pump quarterly surveillance testing is in conformance with the manufacturer's recommended minimum flow rate and there is no further explanation necessary.

   For the maximum run time consideration, design, vibration monitoring and operating factors are employed instead to minimize the potential for pump degradation due to low pump flows. These factors include a stainless-steel pump impeller design, pump vibration monitoring during testing, vibration trending and augmented pump internal inspections. These factors were included in the NRC accepted response to NRC Bulletin 88-04, "Potential Safety-Related Pump Loss," for CCNPP, Units 1 and 2, dated July 5, 1988. This response stated the LPSI pumps have adequate flow (Item 1) and the minimum flow bypass line was determined to be adequate provided vibration monitoring was employed and acceptable stable vibration levels were observed at the minimum flow conditions (Item 3.B). Augmented pump inspections would be necessary if pump vibration levels do not remain unchanged (Item 3.B).

   Furthermore, in Section 4 of the alternative request, several operational factors are requested that will continue to minimize the cumulative run-time for each LPSI pump under low-flow conditions. These factors include elimination of the two-minute minimum pump run-time for quarterly tests and combining the IST pump test into the engineering safety features actuation logic test for each pump when the testing is scheduled in the same quarter. These factors have been in place in accordance with the same alternative request approved for the previous IST intervals. Testing and Maintenance history has shown that the LPSI pumps' vibration levels have remained stable and internal pump inspections have shown no abnormal pump degradation and indicates no adverse impact from low-flow conditions.