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10 CFR 50.90

April 16, 2014

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

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: Response to Request for Additional Information - License Amendment Request – Main Steam Line Flow-High Isolation Response Time Change from ≤ 0.5 seconds to ≤ 1.0 seconds

References:
1) Letter from J. Barstow (U.S. Nuclear Regulatory Commission) to U.S. Nuclear Regulatory Commission, "License Amendment Request – Main Steam Line Flow-High Isolation Response Time Change from ≤ 0.5 seconds to ≤ 1.0 seconds," dated November 15, 2013

2) Internal Memorandum from R. B. Ennis (Senior Project Manager, U.S. Nuclear Regulatory Commission) to M. K. Khanna, Chief, Plant Licensing Branch I-2, U.S. Nuclear Regulatory Commission), "Limerick Generating Station, Units 1 and 2, Draft Request for Additional Information (TAC Nos. MF3085 and MF3086)," ML14066A097, dated March 7, 2014

In the Reference 1 letter, Exelon Generation Company, LLC (Exelon) requested changes that would modify Technical Specification (TS) Table 3.3.2-3, "Isolation System Instrumentation Response Time," for the Main Steam Line Flow-High from ≤ 0.5 seconds to ≤ 1.0 seconds. In the Reference 2 memorandum, the U.S. Nuclear Regulatory Commission requested additional information. Attachment 1 is our response.

Exelon has reviewed the information supporting a finding of no significant hazards consideration and the environmental consideration provided to the U.S. Nuclear Regulatory Commission in Reference 1. The additional information provided in this response does not affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration. In addition, the additional information

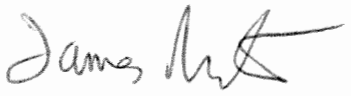
provided in this response does not affect the bases for concluding that neither an environmental impact statement nor an environmental assessment needs to be prepared in connection with the proposed amendment.

There are no commitments contained in this response.

Should you have any questions concerning this letter, please contact Frank Mascitelli at (610) 765-5512

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 16th day of April 2014.

Respectfully,



James Barstow
Director, Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachments: 1) Response to Draft Request for Additional Information

cc: USNRC Region I, Regional Administrator
USNRC Senior Resident Inspector, LGS
USNRC Senior Project Manager, LGS
Director, Bureau of Radiation Protection - PA Department of Environmental Resources

**Response to Draft Request for Additional Information Regarding
License Amendment Request Regarding
Main Steam Line Flow-High Isolation Response Time**

In the Reference 1 letter, Exelon Generation Company, LLC (Exelon) requested changes that would modify the Limerick Generating Station (LGS) Technical Specification (TS) Table 3.3.2-3, "Isolation System Instrumentation Response Time," for the Main Steam Line Flow-High from ≤ 0.5 seconds to ≤ 1.0 seconds. The NRC reviewed the license amendment request and identified the need for additional information in order to complete their evaluation of the amendment request. A draft request for additional information (RAI) was electronically transmitted to Exelon on March 7, 2014 (Reference 2). The questions are restated below along with Exelon's response.

RAI Question 1

Please describe the reasons that have caused the instrument channel response time to drift, and thus reduce the margin in response time for the trip unit and relays to meet the TS response time limit.

Response

The Surveillance Test (ST) to perform response time testing is performed every two years. Following implementation of license amendments 135 and 93 in December 1998, a fixed response time of 355 milliseconds (msec) was assigned to the transmitter in each loop. This reduced the margin available for any change in the response time associated with the trip-units and relays. Drift in response time is normally expected for analog components; however, the reduced margin challenged the ability to consistently meet the LGS administrative limits and sometimes TS requirements. Bench testing (and Exelon Power Labs testing) performed on the quarantined relays verified that they were relatively slower compared to newer relays, but well within vendor specifications.

Bench testing (and Exelon Power Labs testing) and Engineering review of the history of surveillance testing verified that the challenge for the individual relays and trip-units to satisfy ST response time requirements were not a result of equipment performance, but rather a result of the limited margin available towards LGS administrative and TS requirements.

RAI Question 2

Please describe testing or analysis performed to confirm that increasing the instrument channel response time to 1.0 seconds will be sufficient to rectify the problem of the instrument channels not meeting the TS-required response time limit. In addition, please describe the tolerance limit for the relays and how this will be taken into consideration for the increased channel response time.

Response

Since a 1.0 seconds response time is justified for a main-steam line break, high-energy line break, and radiological consequences, a response time of 1.0 seconds was determined to be adequate in providing sufficient margin for instrumentation response.

It should also be noted that existing processes (preventative maintenance) and ST-data indicate that the response time tests for the instrumentation channel (transmitter, trip unit and 3 relays) have not exceeded 1.0 seconds. Each Main Steam Isolation High Flow division system uses one transmitter, one Rosemont trip-unit, one DC relay (Agastat model # EGPB004) and two AC relays (Agastat model # EGPI004). Per vendor specifications, the EGPB004 relay has a maximum response time of 25 msec release time while the EGPI004 has 85 msec release time. The trip-unit has a 4 msec response time. Therefore, based on the individual maximum release times for the tested instrumentation, 199 msec is the cumulative response time for the instrument channel. This time will be used as the administrative limit to proactively identify equipment concerns.

Additionally, the NEDO bounding analysis (NEDO-32291-A Supplement 1 Table 6-2) concludes a total bounding response time (BRT) of 444 msec for the Limerick instrument channel configuration for Main Steam Line High Flow.

Based on an Engineering review of similar instrument channel logic designs for GE BWR 4 vintage plants (e.g., Susquehanna, LaSalle, etc.,), it was concluded that Limerick uses an additional relay in its logic configuration to get a Main Steam Line High Flow isolation (transmitter + one trip unit + one DC relay + one AC relay + one AC Relay- in series). When considering the BRT analysis in GE NEDO-322291-A Supplement 1, this logic configuration causes low margin and challenges LGS in satisfying the 145 msec response time criteria.

RAI Question 3

As discussed on page 1 of Attachment 1 to the application dated November 15, 2013:

> The total response time for a main steam line isolation on high steam flow is 5.5 seconds. The Main Steam Isolation Valves (MSIVs) start to close at 0.5 seconds on a high flow signal and are fully closed at 5.5 seconds. The TS-required instrument response time for the MSIV closure initiation instrument channel on high steam line flow is 500 milliseconds (0.5 seconds). The TS Table 3.3.2-3 had been previously amended, in license amendments 132 and 93 (Reference 2) in December 1998 to eliminate response time testing of the flow transmitter in each main steam line flow instrument channel. Prior to the license amendment, the allotted allowable response time limit for the trip unit and the output, isolation and implementation relays was ≤ 184 milliseconds (msec), allowing 316 msec for the transmitter response time. Per the amendment, 355 msec has been allotted for the transmitter and, as such, the remaining 145 msec has become the TS required limit for the trip unit and the three relays of the instrument channel. An administrative limit (allotted time) of 135 msec is used to proactively identify for drift, and hence alert if the TS limit is being approached.

Page 4 of Attachment 1 to the application dated November 15, 2013, states that the proposed amendment will change the assumptions and conditions for the main steam line break analysis with respect to the MSIV closure time. Specifically, following implementation of the proposed

amendment, it will be assumed that the MSIVs start to close at 1.0 seconds on a high flow signal and are fully closed at 6.0 seconds.

The following table presents the current design basis versus the proposed design basis. Please provide the missing values in the table:

Parameter	Current Design Basis	Proposed Design Basis
MSIVs start to close on high flow signal	0.5 seconds	1.0 seconds
Response time allotted for transmitter	0.355 seconds	?
Response time allotted for trip unit and relays	0.145 seconds	?
Administrative limit for response time of trip unit and relays	0.135 seconds	?

Response

Parameter	Current Design Basis	Proposed Design Basis
MSIVs start to close on high flow signal	0.5 seconds	1.0 seconds
Response time allotted for transmitter	0.355 seconds	0.355 seconds
Response time allotted for trip unit and relays	0.145 seconds	0.645 seconds *(Basis: 1.0 sec – 0.355 sec = 0.645 sec)*
Administrative limit for response time of trip unit and relays	0.135 seconds	0.199 seconds *(Basis: Cumulative response time based on vendor specifications)*