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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Dresden Nuclear Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

LaSalle County Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Additional Information Regarding Request for License Amendment to Address Secondary Containment Access Openings

References:
1. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "Request for License Amendment to Address Secondary Containment Access Openings," dated February 3, 2016
2. Letter from B. Purnell (U.S. NRC) to B. C. Hanson (Exelon Generation Company, LLC), "Dresden Nuclear Power Station, Units 2 and 3; LaSalle County Station, Units 1 and 2; and Quad Cities Nuclear Power Station, Units 1 and 2 – Request for Additional Information Regarding License Amendment Request to Revise Secondary Containment Access Opening Requirements (CAC Nos. MF7325–MF7330)," dated November 10, 2016

In Reference 1, Exelon Generation Company, LLC (EGC) requested an amendment for Dresden Nuclear Power Station, Units 2 and 3, LaSalle County Station, Units 1 and 2, and Quad Cities Nuclear Power Station, Units 1 and 2. The proposed change revises Technical Specifications (TS) 3.6.4.1, "Secondary Containment," Surveillance Requirement (SR) 3.6.4.1.2 to provide an allowance for brief, inadvertent, simultaneous opening of redundant secondary containment access doors during normal entry and exit conditions.

The NRC requested additional information that is needed to complete review of the proposed change in Reference 2. In response to this request, EGC is providing the attached information.

EGC has reviewed the information supporting a finding of no significant hazards consideration, and the environmental consideration, that were previously provided to the NRC in Attachment 1 of Reference 1. The additional information provided in this submittal 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 submittal 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 regulatory commitments contained in this letter. Should you have any questions concerning this letter, please contact Mr. Kenneth M. Nicely at (630) 657-2803.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 12th day of December 2016.

Respectfully,

Patrick R. Simpson
Manager – Licensing

Attachment: Response to Request for Additional Information

cc: NRC Regional Administrator, Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station
NRC Senior Resident Inspector – LaSalle County Station
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station
Illinois Emergency Management Agency – Division of Nuclear Safety

ATTACHMENT
Response to Request for Additional Information

NRC RAI-3 (LSCS)

In its letter dated July 28, 2016, the licensee stated in response to RAI-2:

> The LSCS alternative source term analyses assume a 15 minute reactor building drawdown time. LSCS SR 3.6.4.1.3 requires verification that the secondary containment can be drawn down to ≥ 0.25 inch of vacuum water gauge in ≤ 900 seconds using one SGT subsystem.

For LSCS, provide a quantitative comparison of the time when both doors may be opened simultaneously to the margin in the secondary containment drawdown time assumed in the design-bases analysis.

Response

LaSalle County Station (LSCS) adopted alternative source term (AST) in accordance with 10 CFR 50.67, "Accident source term," using the methodology described in NRC Regulatory Guide 1.183. This resulted in revising Surveillance Requirement (SR) 3.6.4.1.3 allowing a 900-second drawdown time to ensure the secondary containment is ≥ 0.25 inches of vacuum water gauge. Because the typical drawdown time using one Standby Gas Treatment (SGT) subsystem is less than 180-seconds, substantial margin exists to ensure that the secondary containment can be re-established during brief simultaneous opening of secondary containment access doors. The proposed SR 3.6.4.1.2 wording uses the phrase "being used for entry and exit" to ensure that the time both doors may be open simultaneously is limited to the time it takes to traverse through a door, typically less than 10 seconds.

NRC RAI-4 (DNPS and QCNPS)

By letter dated September 11, 2006 (ADAMS Package Accession No. ML062070292), the NRC staff approved license amendments for DNPS and QCNPS to adopt the AST methodology permitted by Title 10 of the *Code of Federal Regulations* Section 50.67, "Accident source term." These amendments were issued in response to the licensee's application dated October 10, 2002 (ADAMS Package Accession No. ML022940351). The AST methodology is used in the design-basis analysis for DNPS and QCNPS. In a letter dated September 15, 2003 (ADAMS Accession No. ML032671358), the licensee provided supplemental information in support of the AST amendments. Attachment 1 to the licensee's supplemental letter states, on page 11 of 15 (emphasis added):

> In the event of a design basis LOCA [loss-of-coolant accident], secondary containment instrumentation automatically initiates closure of appropriate secondary containment isolation valves and starts the SGT System to limit fission product release. The reactor building is at a negative pressure at the beginning of the event, SGT automatically starts and maintains negative pressure, hence the reactor building pressure is always negative and no exfiltration will occur in the LOCA accident sequence.

The licensee's February 3, 2016, application states (emphasis added):

> If an accident should occur during the brief period that both doors could be open for entry and exit, and should that accident require secondary containment vacuum to be established by the SGT system, it might not be possible for the SGT system to establish the required vacuum until the door is closed. However, the accident analyses assume only one SGT subsystem is in operation and the secondary containment is initially at atmospheric pressure. Therefore, the few seconds required to close at least one secondary containment door should not have any significant effect on the ability to establish secondary containment vacuum as assumed in the accident analysis.

Given that the reactor building serves as the secondary containment structure, the two statements above appear to be inconsistent.

Clarify the assumptions regarding secondary containment pressure used in the design-basis accident analysis for DNPS and QCNPS.

Response

There is not an explicit assumption in the Dresden Nuclear Power Station (DNPS) and Quad Cities Nuclear Power Station (QCNPS) AST calculations concerning secondary containment pressure. The implicit assumptions regarding secondary containment pressure used in the design-basis accident analysis for DNPS and QCNPS are as described in the September 15, 2003, letter (i.e., Reference 1) discussed above. The secondary containment is maintained at a negative pressure during normal plant operation to comply with Surveillance Requirement 3.6.4.1.1, and in the event of a design basis LOCA, secondary containment instrumentation automatically initiates closure of appropriate secondary containment isolation valves and starts the SGT system to maintain negative pressure. The NRC-approved AST analyses do not model any exfiltration from the secondary containment occurring during the period of time from event initiation through two minutes, which is when the SGT system is credited for being in operation after which all reactor building leakage is modeled as being filtered by the SGT system.

AST assumes that there is insignificant release to the environment for the first two minutes during the coolant activity release phase. The onset of the gap activity release phase is two minutes after the initiation of the accident. The automatic start of the SGT system will ensure that the reactor building negative pressure will be maintained beyond the two-minute coolant activity release period.

The above underlined portion of the sentence in the February 3, 2016, application is incorrect and an issue report has been entered into the Exelon Generation Company, LLC (EGC) Corrective Action Program.

NRC RAI-5 (DNPS and QCNPS)

In its letter dated July 28, 2016, the licensee stated in response to RAI-2:

> The DNPS and QCNPS alternative source term analyses do not assume an explicit secondary containment drawdown time. The reactor building ventilation system maintains the reactor building atmosphere at a slight negative pressure during normal plant operation. In the event of a design basis loss-of-coolant accident, secondary containment instrumentation automatically initiates closure of appropriate secondary containment isolation valves and starts the Standby Gas Treatment (SGT) system to limit fission product releases.

For DNPS and QCNPS, the AST analysis for a LOCA assumes the following: (1) negative pressure is always maintained in secondary containment, (2) there is no secondary containment drawdown time, (3) there is zero secondary containment bypass, and (4) no exfiltration will occur in the LOCA accident sequence.[1] Allowing the secondary containment access doors to be simultaneously opened, even during brief periods of time, appears to be inconsistent with these assumptions.

For DNPS and QCNPS, demonstrate that the functional capability of secondary containment is maintained during accident conditions, without an explicit secondary containment drawdown time. The demonstration shall include the brief, inadvertent, simultaneous opening of the secondary containment access doors.

Response

In Reference 2, EGC provided results of a review of Licensee Event Reports (LERs) that was performed to determine whether the functional capability of secondary containment was maintained during previous events involving brief, inadvertent, simultaneous opening of secondary containment access doors. For each event documented in the LERs reviewed, secondary containment differential pressure was maintained. Therefore, EGC concluded that the functional capability of secondary containment was maintained during these events involving brief, inadvertent, simultaneous opening of secondary containment access doors. Additional information to support maintaining the functional capability of secondary containment is provided below.

The proposed SR 3.6.4.1.2 wording uses the phrase "being used for entry and exit" to ensure that the time both doors may be open simultaneously is limited to the time it takes to traverse through a door, typically less than 10 seconds. In the event of a design basis LOCA, secondary containment instrumentation automatically initiates closure of appropriate secondary containment isolation valves (SCIVs) and starts the SGT system to limit fission product release.

As described in the DNPS and QCNPS Updated Final Safety Analysis Reports (UFSARs), the analysis for a design basis accident (DBA) LOCA assumes a simultaneous loss of offsite power with the break together with the worst single failure in the Emergency Core Cooling System.

[1] Licensee's October 10, 2002, AST application, Attachment A, page 36 of 48, and September 15, 2003, supplemental letter, Attachment 1, page 11 of 15.

For a LOCA coincident with a loss of offsite power, the SGT system would not be available until after the diesel generators (DGs) start and achieve the required voltage and frequency. SR 3.8.1.8 for DNPS and QCNPS specify that the DG start time is $\leq$ 13 seconds. This time, coupled with the time needed to initiate the DG start signal and sequence other loads, bounds the time (i.e., typically less than 10 seconds) that redundant secondary containment access doors would be inadvertently simultaneously open. As a result, there would not be any impact on the ability of the SGT system to draw down secondary containment to the TS required vacuum condition. In addition, AST assumes that there is insignificant release of activity for the first two minutes during the coolant activity release phase. The onset of the gap activity release phase is two minutes after the initiation of the accident. This release would then have to be transported from the reactor pressure vessel into primary containment, and then into the secondary containment volume. Therefore, the functional capability of secondary containment will be maintained during accident conditions, without an explicit secondary containment drawdown time, since the timeframes currently assumed in the accident analyses significantly bound the time that both doors in a secondary containment access opening may be open under the proposed change (i.e., typically less than 10 seconds).

References

1. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "Additional Information Supporting the Request for License Amendment Related to Application of Alternative Source Term," dated September 15, 2003

2. Letter from D. M. Gullott (Exelon Generation Company, LLC) to U.S. NRC, "Additional Information Regarding Request for License Amendment to Address Secondary Containment Access Openings," dated July 28, 2016