



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

September 23, 2010

Mr. Michael J. Pacilio  
President and Chief Nuclear Officer  
Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

**SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3, AND QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION RELATED TO EXELON GENERATION COMPANY'S REQUEST TO AMEND STANDBY LIQUID CONTROL TECHNICAL SPECIFICATIONS (TAC NOS. ME2567 THRU ME2670)**

Dear Mr. Pacilio:

By letter to the Nuclear Regulatory Commission (NRC) dated November 10, 2009, Exelon Generation Company, LLC submitted a request to amend the technical specifications (TSs) to extend the completion time for Condition B of TS 3.1.7 from 8 to 72 hours for the Dresden, Units 2 and 3, and Quad Cities Nuclear Power Station, Units 1 and 2.

The NRC staff is reviewing your submittal and has determined that additional information is required to complete the review. The specific information requested is addressed in the enclosure to this letter. During a discussion with your staff on September 21, 2010, it was agreed that you would provide a response by October 12, 2010.

The NRC staff considers that timely responses to requests for additional information help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-1055.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Gratton", written over a white background.

Christopher Gratton, Senior Project Manager  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-237, 50-249, 50-254,  
and 50-265

Enclosure:  
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

DRESDEN NUCLEAR POWER STATION, UNITS 1 AND 2

AND

QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2

DOCKET NOS. 50-237, 50-249, 50-254, AND 50-265

In reviewing the Exelon Generation Company's (EGC's) submittal dated November 10, 2009 (Agencywide Documents Access and Management System Accession No. ML093140516), related to your request to amend Technical Specification (TS) 3.1.7, "Standby Liquid Control (SLC) System," for the Dresden Nuclear Power Station (DNPS), Units 1 and 2, and Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2, the NRC staff has determined that the following information is needed in order to complete its review:

Question 1

Identify adequate defense-in-depth for mitigation of anticipated transient without scram (ATWS) events for the extended 72-hour completion time period.

The SLC system mitigates an ATWS event by delivering a concentrated borated solution to the reactor pressure vessel to shutdown the reactor. The TS Required Action being modified addresses the condition where both SLC trains are inoperable. In the event of an ATWS during this condition, there is no system available to inject concentrated borated solution into the reactor pressure vessel in a timely manner to achieve shutdown. The licensee submittal addresses the low probability of an ATWS event due to the reliability and diversity of the control rods, and also discusses the recirculation pump trip feature which reduces reactor power. However, there is no mechanism identified to assure safe shutdown to subcritical conditions as normally ensured by the operation of one of the two SLC trains.

Question 2

Clarify the intended reliance on emergency operating procedure (EOP) actions as an alternate means of boration and provide evaluations that justify any credited actions related to the requirements of Title 10 of the *Code of Federal Regulations*, Section 50.67, "Accident source term," as appropriate.

Page 17 of 19 of Attachment 1 states the following:

By letter dated October 10, 2002, EGC requested an amendment to the DNPS and QCNPS TSs regarding the adoption of an alternate source term (AST) methodology. The [Nuclear Regulatory Commission] NRC approved the requested license amendment by letter and safety evaluation (SE) dated September 11, 2006. As part of the proposed [alternate source term] AST methodology, EGC proposed the use of the SLC system to inject sodium

Enclosure

pentaborate into the [reactor pressure vessel] RPV following a [loss-of-coolant-accident] LOCA in order to maintain suppression pool pH above 7 (i.e., in order to ensure against re-evolution of elemental iodine). As such, the SLC is required to be operable in Mode 3 to ensure that offsite doses remain within the limits of 10 CFR 50.67, "Accident source term" following a loss-of-coolant accident (LOCA) involving significant fission product releases. However, additional redundancy for the control of suppression pool pH control following a LOCA is established by the DNPS and QCNPS Emergency Operating Procedures (EOPs). The EOPs describe the actions and criteria for manual addition of boron into the condensate systems, should [reactor protection system] RPS, control rods, the control rod drive system, and the SLC be unable to perform the specified [sic] design functions. Therefore, the proposed SLC [completion time] CT extension will not impact the ability of DNPS and QCNPS to comply with the requirements of 10 CFR 50.67.

The license amendment request (LAR) describes alternative means for boration as additional redundancy in support of defense-in-depth measures to justify the proposed extension of the TS 3.1.7 completion time. These alternative means of boration consist of actions in the EOPs. Page 4 of Attachment 1 of the LAR states that the SLC system is required to be operable to ensure that offsite doses remain within 10 CFR 50.67 limits following a LOCA. The SLC system is credited for maintaining pH balance in the suppression pool at or above 7 following a LOCA to ensure that iodine will be retained in the suppression pool.

The NRC staff has identified that the proposed alternate means of boration are not currently included in the DNPS and QCNPS licensing basis. The LAR indicates that the licensees intend to credit the referenced EOP actions as an alternate boration pathway to meet the requirements of 10 CFR 50.67. If so, then additional justification is required to support reliance on these actions as a credited alternate boration pathway. The NRC document "Guidance on the Assessment of a BWR [boiling-water reactor] SLC System for pH Control," dated February 12, 2004 (ADAMS Accession No. ML040640364) provides an approach that is acceptable to the NRC staff for evaluating the alternative controls of the suppression pool pH against appropriate methodologies.

If Exelon's intent is not to credit a new alternate boration pathway, then clarification is needed regarding the use of the EOP actions as an alternative means of boration with respect to defense-in-depth as related to 10 CFR 50.67. Please provide the following information:

- 1) Does the alternate injection path require actions in areas outside the control room?
- 2) Confirm that these areas will be accessible during the design basis accidents in your licensing bases (LOCA, Main Steamline Break etc.)?
- 3) What additional personnel will be required?
- 4) Confirm that these actions can be completed within a timeframe consistent the current licensing basis.

Question 3

Please demonstrate how General Design Criteria (GDC) 26, "Protection Systems Fail-Safe Design," and GDC 27, "Redundancy of Reactivity Control," regulatory requirements are met during the requested extended outage time for both trains of SLC inoperable.

Question 4

The Notices of Enforcement Discretion (NOEDs) referenced in the application provide lists of compensatory actions and additional committed actions. The NRC's basis for the NOEDs considered the compensatory measures to reduce the probability of a plant transient while ensuring the availability of other safety related equipment. Please describe how each compensatory action is addressed in the proposed change or demonstrate why it is not necessary. (Compensatory actions: 1) both ATWS recirculation pump trip systems would be protected, 2) the reactor protection system (RPS) would be protected, and 3) all production risk activities would be prohibited)

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Sincerely,

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Christopher Gratton, Senior Project Manager  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

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