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U. S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Subject: Revised Response to a Notice of Violation

References:
(1) Letter from G.E. Grant (NRC Region III) to O.D. Kingsley (Exelon Generation Company, LLC), "Braidwood Station, Units 1 and 2, NRC Inspection Report 50-456/01-11 (DRP); 50-457/01-11 (DRP) and Notice of Violation," dated December 12, 2001
(2) Letter from J.D. von Suskil (Exelon Generation Company, LLC) to U.S. NRC, "Reply to a Notice of Violation," dated January 11, 2002
(3) Letter from J.D. von Suskil (Exelon Generation Company, LLC) to U.S. NRC, "Follow-up Reply to a Notice of Violation," dated May 3, 2002
(4) Letter from J.D. von Suskil (Exelon Generation Company, LLC) to U.S. NRC, "Additional Information Regarding a Reply to a Notice of Violation," dated July 24, 2002

In reference 1, the NRC issued a cited violation to Braidwood Station, Units 1 and 2 which involved an inadequate procedure that could potentially allow the ultimate heat sink (UHS) average temperature to exceed the design basis and Technical Specification limit of 100°F. In reference 2, we responded to the Notice of Violation (NOV) and indicated that we disagreed with the basis of the NOV. Subsequently, we submitted our UHS measurement uncertainty assessment in reference 3 that quantified the inherent design margin that exceeds the UHS temperature measurement uncertainty. A meeting was held at the NRC Region III office on July 18, 2002, with representatives from Exelon Generation Company, LLC and the NRC to discuss the NOV. In reference 4, we committed to submit a revised response to the NOV by August 19, 2002.

The attachment to this letter contains our revised response to the NOV. We have reconsidered our position and acknowledge the violation. The revised response includes the reason for the violation, as well as additional corrective actions.

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If you have any questions regarding this revised response, please contact Ms. Amy Ferko, Braidwood Station Regulatory Assurance Manager, at (815) 417-2699.

Respectfully,

James D. von Suskil
Site Vice President
Braidwood Station

Attachment: Revised Response to a Notice of Violation

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector - Braidwood Station
Director, Office of Enforcement

ATTACHMENT
Revised Response to a Notice of Violation

In a letter from G.E. Grant (NRC Region III) to O.D. Kingsley (Exelon Generation Company, LLC), dated December 12, 2001, the NRC issued a Notice of Violation. The violation of NRC requirements was identified during an NRC inspection conducted on October 1 through November 19, 2001 and is provided below:

> "10 CFR 50, Appendix B, Criterion XI, states, in part, that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.
>
> The maximum analyzed design limit for essential service water temperature was 100 degrees Fahrenheit as referenced below. Instrument uncertainty of +/- 2.6 degrees Fahrenheit for 1TI-SX015A,B (main control board 1A, 1B SX pump discharge analog temperature gauges) was not accounted for in these analyses.
>
> - The Updated Final Safety Analysis Section 9.2.2.1 stated, "The component cooling (CC) system design is based on the design-basis service water supply maximum temperature of 100 [degrees Fahrenheit]." The CC water system provided cooling water to the residual heat removal system and the spent fuel pool cooling system.
>
> - In addition, the Updated Final Safety Analysis Section 6.2.1.1.3, listed the maximum temperature limit analyzed for essential service water inlet temperature for the containment heat removal system (reactor containment fan cooler heat exchanger) as 100 [degrees Fahrenheit].
>
> - Finally, the Updated Final Safety Analysis Section 9.5.5.2 stated that the maximum essential service water inlet temperature to the emergency diesel generator jacket water cooling heat exchanger was 100 [degrees Fahrenheit].
>
> Technical Specification Surveillance Requirement 3.7.9.2 required verification that the average water temperature of the ultimate heat sink (source of the essential service water system) was less than or equal to 100 [degrees Fahrenheit] every 24 hours.
>
> Procedure 1(2)BwOSR 0.1-1,2,3, "Unit One – Modes 1, 2, and 3 Shiftly and Daily Operating Surveillance Data Sheet," Revision 4, was the implementing procedure for Surveillance Requirement 3.7.9.2. Surveillance Requirement 3.7.9.2 acceptance criteria as less than or equal to 100 degrees Fahrenheit.
>
> Contrary to the above, since July 11, 2000, Operating Surveillance Procedure 1(2)BwOSR 0.1-1,2,3 was inadequate, in that, previously identified measurement instrument tolerance band of +/- 2.6 degrees Fahrenheit for 1TI-SX015A,B was not accounted for in the Surveillance Requirement 3.7.9.2 acceptance criteria. Therefore, the test program to assure the satisfactory performance of several safety related systems would have allowed the actual temperature of the essential service water system to exceed acceptance limits contained in applicable design documents."

Reason for the violation

The original licensing basis for the ultimate heat sink (UHS) average temperature limit was 98°F. Braidwood Station raised the UHS average temperature limit in the Technical Specifications (TS) (i.e., TS Amendment No. 107) from 98°F to 100°F. When Braidwood implemented TS Amendment 107 in July 2000, instrument uncertainty was not accounted for in the TS surveillance procedure that verifies the UHS temperature. Therefore, there was a potential that the actual UHS temperature could have exceeded the TS surveillance limit of 100°F.

Corrective steps that have been taken and the results achieved

In response to the Notice of Violation, an UHS measurement uncertainty assessment was performed. The assessment provided the results of the instrument uncertainty calculations and determined that the true value of the essential service water (SX) temperature is within 2.0°F of the indicated reading using the statistically combined uncertainty of all error terms at the appropriate confidence level. The impacts of a 2°F increase in SX temperature on accident analyses, containment analyses, and various components served by SX were also evaluated. It was determined that a 2°F increase in SX temperature has either no impact or an insignificant impact on the LOCA and non-LOCA results. Various conservative assumptions used in the accident analyses were identified. The impact on short-term containment response was quantified and resulted in an increase in peak pressure of 0.02 psig with no increase in vapor or sump temperature. Conservatism in RCFC air flow rate, RCFC setpoint initiation, containment areas, thermal conductivity and specific heat capacity, and ECCS flow temperature were quantified and determined to be well in excess of the nearly insignificant impact of a 2°F increase in SX temperature. Component evaluations were performed and determined that components served by SX would continue to perform satisfactorily despite a 2°F increase in SX temperature. Thus, it was determined that sufficient margin existed to accommodate the instrument uncertainty.

To ensure that the actual UHS temperature does not exceed the TS surveillance limit, the surveillance procedure used to demonstrate compliance with the TS surveillance limit has been revised to accommodate instrument uncertainty. Surveillance procedure 1(2)BwOSR 0.1-1,2,3, "Unit One (Two) – Modes 1, 2, and 3 Shiftly and Daily Operating Surveillance Data Sheet," has been revised to require use of a precision temperature instrument, procured for this specific application, whenever the temperature of any operating SX pump exceeds 97°F as indicated by the installed temperature instrumentation. The difference between 97°F and the TS surveillance limit of 100°F is 3°F, which is greater than the calculated instrument uncertainties associated with the installed instrumentation. Highly accurate measurement can be accomplished by inserting the probe of the precision thermometer into spare thermowells adjacent to the installed instrumentation. The uncertainty of this precision thermometer is no more than 0.07°F. To ensure that the actual UHS temperature does not exceed the TS surveillance limit, the temperature limit in the surveillance procedure has been revised to 99.9°F to account for the uncertainty associated with the precision thermometer. Guidance is also provided in the procedure that requires entering the applicable Conditions and Required Actions of TS 3.7.9, "Ultimate Heat Sink," if the local temperature reading using the precision temperature instrument exceeds 99.9°F.

Additionally, to enhance guidance for the treatment of instrument uncertainties, Exelon Nuclear Training and Reference Material (T&RM) CC-AA-103-2001, "Setpoint Change Control," was issued July 2, 2002. CC-AA-103-2001 Appendix B, indicates that if the design of the system is changed where TS values could be affected, then evaluation is required to ensure that the conservatism and margin is maintained.

Corrective steps that will be taken to avoid further violations

Amendments to the Braidwood Station TS will be reviewed to identify parameters changed in Surveillance Requirements or Limiting Conditions for Operation. The review will confirm that the changes were properly implemented in surveillances and/or analyses, preserving the necessary margin to account for uncertainty in measurement of the changed parameters.

Braidwood Station will review design and safety analyses that form the basis for TS values and have TS values as input parameters. The review will identify changes to TS input parameters and confirm that the changes have been properly implemented in surveillances and/or analyses, preserving the necessary margin to account for uncertainty in measurement of the changed parameters.

Additionally, other Exelon Nuclear configuration management procedures and T&RM's will be reviewed to determine if enhanced guidance needs to be provided for margin management in other areas.

These actions will be completed by December 20, 2002.

Date when full compliance will be achieved

Full compliance was achieved on August 1, 2002 when procedure 1(2)BwOSR 0.1-1,2,3 was revised to account for instrument uncertainty in UHS temperature measurement.