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

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

Subject: Additional Information Supporting the License Amendment to Technical Specification 3.5.1, "Emergency Core Cooling Systems (ECCS) Operating"

References:

1. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "Request for a License Amendment to Technical Specification 3.5.1, 'Emergency Core Cooling Systems (ECCS) Operating'," dated March 26, 2009

2. Letter from C. S. Goodwin (U.S. NRC) to C. G. Pardee, "LaSalle County Station, Units 1 and 2 – Request for Additional Information Related to Request for a License Amendment to Technical Specification 3.5.1, 'Emergency Core Cooling Systems (ECCS) Operating (TAC Nos. ME0994 and ME0995)'," dated October 2, 2009

In Reference 1, Exelon Generation Company, LLC (EGC), requested an amendment to Appendix A, Technical Specifications (TS), of Facility Operating License Nos. NPF-11 and NPF-18 for LaSalle County Station (LSCS), Units 1 and 2. Specifically, the proposed change will revise TS 3.5.1, "Emergency Core Cooling Systems (ECCS) Operating," to delete the existing allowance associated with the Automatic Depressurization System (ADS) accumulator backup compressed gas system that currently allows a Completion Time (CT) of 72 hours to restore bottle pressure to ≥ 500 psig.

In Reference 2, the NRC requested additional information to complete the review of the proposed license amendment. In response to this request, EGC is providing the attached information.

The information provided in this letter and attachment does not affect the No Significant Hazards Consideration, or the Environmental Consideration provided in Attachment 1 of the original Reference 1 license amendment request.

There are no regulatory commitments in this letter. Should you have any questions concerning this letter, please contact Ms. Alison Mackellar at (630) 657-2817.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th day of October 2009.

Respectfully,

Patrick R. Simpson
Manager - Licensing

Attachment: Response to Request for Additional Information

ATTACHMENT
Response to Request for Additional Information

NRC Request 1

"Please clarify how the existing deficiency in the LSCS TS was first identified as it relates to TS 3.5.1, concerning the common pneumatic supply utilized to support the Low-Low Setpoint (LLS) function of the Safety Relief Valves (SRVs) and the ADS function of the SRVs. Is there any precedence of similar deficiency that existed in other plants?"

Response

The deficiency was identified by LaSalle County Station (LSCS) personnel in June 2006 during a review of the design basis of the Automatic Depressurization System (ADS). Exelon Generation Company, LLC (EGC) is not aware of another plant having the same deficiency.

NRC Request 2

"Out of the seven SRVs that utilizes the ADS function, how many are credited in the analysis-of-record for LSCS for the limiting loss of coolant accident (LOCA) for Peak Central [Cladding] Temperature (PCT)."

Response

As documented in the LSCS Updated Final Safety Analysis Report (UFSAR) Chapter 15.0, "Accident Analyses," Section 15.6.5, the design basis LOCA is a complete circumferential piping break in one of two recirculation loops. For this event, the break causes a rapid depressurization of the reactor pressure vessel and therefore no SRVs are required.

LSCS Units 1 and 2 employ a mixed core design containing co-resident GE and AREVA NP fuel. The LSCS 10 CFR 50.46,"Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," analysis of record (Reference 3) for the GE fuel defines the limiting break as a 0.08 ft^2 recirculation pump suction line break with failure of the High Pressure Core Spray Diesel Generator. The net peak cladding temperature is 1470°F. The 10 CFR 50.46 analysis of record (Reference 3) for AREVA NP fuel defines the limiting break as a double-ended guillotine of the recirculation pump suction piping with failure of the Low Pressure Coolant Injection Diesel Generator. The net peak cladding temperature is 1729°F.

The above referenced analyses were performed assuming only six of the seven ADS valves were operable. This supports operation with one SRV out-of-service as permitted by Technical Specification (TS) 3.5.1, "Emergency Core Cooling Systems (ECCS) Operating." In the case of a single active failure of one ADS valve, five valves are assumed (Refer to LSCS UFSAR Table 6.3-3 and Table 6.3-6).

NRC Request 3

"In page 8 of Attachment 1 of the submittal, it is stated, 'This event involves a specific loss-of-coolant-accident (LOCA) inside the primary containment with a concurrent loss of offsite power and a random failure that results in the inoperability of one of the two ADS bottle banks.' Please clarify the following:

a. Is the above mentioned event the limiting LOCA for PCT, and the most limiting single-failure being the random failure that results in the inoperability of one of the two ADS bottle banks? If not, then describe the limiting LOCA with the most limiting single-failure for LSCS. Is the limiting LOCA a small or large break LOCA?

b. Were there any other postulated transients or accidents which were impacted by the existing deficiency in the TS? If there were, then describe the events."

Response

a. The limiting PCT LOCAs are not the limiting LOCA for the ADS/LLS interface issue. The most limiting scenario for the ADS/LLS interface issue is a small break LOCA in the High Pressure Core Spray (HPCS) injection piping concurrent with a single failure that prevents one of the ADS bottle banks from being capable of refilling the ADS accumulators it serves. This hypothetical HPCS injection piping LOCA would be a small break LOCA. This particular small break LOCA would be large enough to cause HPCS to be inoperable but not large enough to rapidly depressurize the reactor pressure vessel. The break is limiting with respect to the subject ADS/LLS interface. This break size would be included within the complete spectrum of postulated break sizes and locations considered in the evaluation of Emergency Core Cooling System (ECCS) performance.

b. Yes, the Main Steam Line Break outside containment (UFSAR 15.6.4) with a single failure of the HPCS System and no operator action is the LSCS licensing basis event that establishes the maximum number of SRV actuations prior to ADS.

NRC Request 4

"It was stated in the submittal that with the backup compressed gas system bottle pressure of > 500 psig, or the reserve bottle pressure of > 1100 psig, there is sufficient nitrogen available for any postulated event involving LLS actuation and a subsequent need for ADS. Please explain how these numeric values of minimum required pressure (500 psig for backup and 1100 psig for reserve bottles), were determined to be sufficient pressure in order to perform its intended safety function."

Response

The required volume of compressed nitrogen was determined as follows:

$$V_{required} = (N_{actuations})(V_{consumed/actuation}) + \text{Design Leakage}$$

Where:

$V_{required}$ = Volume of usable compressed nitrogen the bottle(s) must provide
$N_{actuations}$ = Number of required SRV actuations for LLS
$V_{consumed/actuation}$ = Volume of gas consumed per actuation

Two models were used to determine the volume consumed per actuation, the isothermal model and the adiabatic model. When the compressed nitrogen stored in an ADS accumulator rushes into the SRV's pneumatic actuator, the compressed nitrogen will rapidly expand. If no heat is transferred to the nitrogen its temperature will decrease. The isothermal model assumes the temperature of the compressed nitrogen remains constant (i.e., heat is transferred from the drywell ambient environment to the piping, accumulator, and actuator). The adiabatic model assumes no heat is transferred to the compressed nitrogen. In reality, heat will be transferred to the compressed nitrogen, so the actual response will be closer to an isothermal model. Since the adiabatic model yields more conservative results, the results are used in determining $V_{required}$.

The required pressure in each backup compressed gas system bottle bank (consisting of four bottles per bottle bank) of ≥ 500 psig or the reserve bottle pressure of ≥ 1100 psig yields the required volume and assures the ADS accumulators remain pressurized to 150 psig.

NRC Request 5

"In page 4 of Attachment 1 of the submittal, it is stated, 'The safety-related portion, referred to as the ADS accumulator backup compressed gas system, maintains the ADS accumulators pressurized following a loss of the normal non-safety related pneumatic supply.' This statement implies that the backup compressed gas system is considered safety-grade. Since the reserve compressed gas system installed at LSCS will also perform safety-related function, please clarify whether that system will be maintained as safety-grade system. If not, then explain why not."

Response

The piping and components associated with the reserve bottle are part of the backup compressed gas system. The ADS accumulator backup compressed gas system is classified as safety-related and there are no current plans to change its classification.

NRC Request 6

"In page 4 of Attachment 1 of the submittal, it is stated, 'A control room alarm is also annunciated for low pressure in the ADS nitrogen bottle banks supply headers to indicate that the pressure in a bottle bank is approaching the bottle change-out pressure.' Please clarify whether low pressure in the reserve bottles can also be detected through control room alarm. If not, then explain why it is not necessary."

Response

A pressure indicator is installed locally at the location where the reserve bottle is connected. This pressure indicator allows the operator to verify pressure in the reserve bottle before it is valved-in and after it is valved-in. The TS minimum bottle pressure of ≥1100 psig assures should the worst-case scenario occur during bottle bank change-out activities that the reserve bottle will contain sufficient compressed nitrogen to support the required number of SRV actuations (i.e., 15 actuations) and design leakage.

A low-pressure alarm is not provided for the reserve bottle. The reserve bottle is intended for use only during bottle bank change-out activities. These activities are typically of short duration. Therefore, the reserve bottle is for limited use only and is not intended as the normal supply for the ADS backup compressed gas system.

References:

1. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "Request for a License Amendment to Technical Specification 3.5.1, 'Emergency Core Cooling Systems (ECCS) Operating'," dated March 26, 2009

2. Letter from C. S. Goodwin (U.S. NRC) to C. G. Pardee, "LaSalle County Station, Units 1 and 2 – Request for Additional Information Related to Request for a License Amendment

to Technical Specification 3.5.1, 'Emergency Core Cooling Systems (ECCS) Operating (TAC Nos. ME0994 and ME0995),' dated October 2, 2009

3. Letter from P. R. Simpson (Exelon Generation Company, LLC) to U.S. NRC, "Plant Specific ECCS Evaluation Changes – 10 CFR 50.46 Report," dated March 27, 2009