Exelon Generation®

4300 Winfield Road
Warrenville, IL 60555
630 657 2000 Office

RS-12-154

10 CFR 50.90

September 17, 2012

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: Supplemental Information Related to License Amendment Request to LaSalle County Station, Units 1 and 2 Technical Specification 3.7.3, "Ultimate Heat Sink"

References:

1. Letter from D. M. Gullott (Exelon Generation Company, LLC (EGC)) to U. S. NRC, "Request for a License Amendment to LaSalle County Station, Units 1 and 2, Technical Specification 3.7.3, 'Ultimate Heat Sink,'" dated July 12, 2012

2. Letter from N. Di Francesco (NRC) to M. J. Pacilio (EGC), "LaSalle County Station, Units 1 and 2 – Supplemental Information Needed for Acceptance of Requested Licensing Action Regarding Request for License Amendment to Technical Specification 3.7.3 Ultimate Heat Sink (TAC Nos. ME9076 and ME9077)," dated September 14, 2012

In Reference 1, Exelon Generation Company, LLC (EGC) requested an amendment to the Technical Specifications (TS) of Facility Operating License Nos. NPF-11 and NPF-18 for LaSalle County Station, Units 1 and 2 (LSCS). The license amendment would allow the TS temperature limit of the cooling water supplied to the plant from the UHS to vary with the observed diurnal cycle. In Reference 2, the NRC requested that EGC provide additional information in support of their review of Reference 1. The information requested in Reference 2 is provided in the attachments to this letter. Data files requested by the NRC for the purposes of independent analyses have been provided electronically via an optical compact disk.

Additionally, the No Significant Hazards Consideration provided in Attachment 1 supersedes the No Significant Hazards Consideration provided to the NRC in Reference 1. While the No Significant Hazards Consideration determination has been revised to add clarity, the additional information provided in this submittal does not affect the basis for concluding that the proposed license amendment does not involve a significant hazards consideration.

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NRR

CD was picked up by
PM - Pete Hernandez

In accordance with 10 CFR 50.91(b), "State consultation," EGC is providing the State of Illinois with a copy of this letter and its attachments to the designated State Official.

This letter contains no new regulatory commitments. If you have any questions concerning this letter, please contact Mr. Mitchel A. Mathews at (630) 657-2819.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 17th day of September, 2012.

Respectfully,

David M. Gullott
Manager – Licensing

Attachments:

1. Supplemental Information Related to License Amendment Request for Technical Specification 3.7.3, "Ultimate Heat Sink"
2. Heat transfer calculations used to develop Attachment 5 and Table A5-1 in the July 12, 2012, License Amendment Request
3. LaSalle County Station Calculation L-002457, Revision 7, "LaSalle County Station Ultimate Heat Sink Analysis"
4. LaSalle County Station Calculation L-003230, Revision 1b, "CW Inlet Temperature Uncertainty Analysis"
5. LaSalle County Station Engineering Change (EC) 389677, Revision 0, "Evaluate UHS for 107 DegF Temperature"
6. LaSalle County Station Engineering Change (EC) 388666, Revision 0, "Revise Design Analyses for UHS Temperature of 107 °F"
7. LaSalle County Station Engineering Change Piping and Instrumentation Drawings (P&IDs) for the Residual Heat Removal System and Core Standby Cooling System
8. Aerial photographs from www.bing.com/maps and site layout drawings (i.e., Figures 4A-4E), Site Layout Drawings 1E-0-4900A, 1E-0-4900B, and S-1561, Revision B

cc: Illinois Emergency Management Agency – Division of Nuclear Safety

ATTACHMENT 1
Supplemental Information Related to License Amendment Request for Technical Specification 3.7.3, "Ultimate Heat Sink"

NRC Question 1:

The Regulatory Issue Summary [RIS]-2001-22, "Attributes of a Proposed No Significant Hazards Consideration Determination," states that licensees should "identify previously evaluated accidents that are affected by the proposed change and explain why any change in the probability, consequences, or margins of safety is or is not significant." The no significant hazards consideration (NSHC) in Exelon's submittal concludes that there is "no impact to safety analysis" without clarification or explanation. Please revise the NSHC submitted in accordance with Title 10 of the Code of Federal Regulations (10 CFR), Section 50.92, "Issuance of amendment," to reflect whether there is an impact to increasing the transient UHS temperature in safety analysis limits and operations of safety-related plant systems. Also, please identify the affected analysis and explain how it is impacted by the NSHC.

Exelon Generation Company LLC's (EGC's) Response to NRC Question 1:

The following No Significant Hazards Consideration supersedes the No Significant Hazards Consideration previously provided in Attachment 1, Section 5.1 of EGC's July 12, 2012, application (i.e., ADAMS Accession No. ML12200A330) with the following:

5.1 No Significant Hazards Consideration

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (EGC) is requesting a change to the Technical Specifications (TS) of Facility Operating License Nos. NPF-11 and NPF-18 for LaSalle County Station (LSCS), Units 1 and 2.

The Core Standby Cooling System (CSCS) Pond is the Ultimate Heat Sink (UHS) for LSCS, Units 1 and 2. The CSCS pond is excavated and integral with the LSCS Cooling Lake. The volume of the CSCS Pond is sized to permit the safe shutdown and cooldown of both LSCS units for a 30 day period, including a design basis event with no additional makeup water source. As discussed in the LSCS Updated Safety Analysis Report (UFSAR), the design basis event for the LSCS UHS is a failure of the LSCS cooling lake dike coincident with a loss of offsite power, and a design basis loss of coolant accident (LOCA) on one unit and a normal shutdown of the other unit. The UHS provides a heat sink for process and operating heat from safety-related components during the UHS design basis event. The Residual Heat Removal Service Water system and Diesel Generator Cooling Water system are the principal systems at LSCS that utilize the UHS to reject heat from safety-related plant loads.

The maximum safety-related cooling water design temperature at LSCS has been evaluated in accordance with 10 CFR 50.59, "Changes, tests and experiments," and found to be acceptable. Currently, Surveillance Requirement (SR) 3.7.3.1 verifies the cooling water temperature supplied to the plant from the CSCS Pond is ≤ 101.25 °F. If the temperature of the cooling water supplied to the plant from the CSCS Pond exceeds 101.25 °F, the UHS must be declared inoperable in accordance with TS 3.7.3. Additionally, TS 3.7.3 Required Action B.1 requires that both units be placed in Mode 3 within 12 hours, and Required Action B.2 requires that both units be placed in Mode 4 within 36 hours, concurrently.

The proposed change modifies the acceptance criterion for verification of cooling water temperature supplied to the plant from the CSCS Pond from a fixed temperature limit to a variable limit based on time-of-day. If the indicated UHS temperature exceeds the time-of-day-based limit, TS 3.7.3 Required Actions would be entered, and both units would be required to be placed in Mode 3 within 12 hours and in Mode 4 within 36 hours.

The proposed change will continue to ensure that the maximum temperature of the safety-related cooling water supplied to the plant during the UHS design basis event remains less than the design limit for LSCS, Units 1 and 2. In addition, there are no adverse influences on risk associated with any other Design Basis Accident (DBA) and; therefore, a Probabilistic Risk Analysis (PRA) assessment is not required for this change.

According to 10 CFR 50.92, "Issuance of amendment," paragraph (c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or

(2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or

(3) Involve a significant reduction in a margin of safety.

In support of this determination, an evaluation of each of the three criteria set forth in 10 CFR 50.92 is provided below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed change makes no physical changes to the plant, nor does it alter any of the assumptions or conditions upon which the UHS is designed. These assumptions and conditions as described in the LSCS UFSAR include failure of the cooling lake dike, a loss of offsite power, and a DBA LOCA on one unit and a normal shutdown of the other unit.

   The accidents analyzed in the UFSAR are assumed to be initiated by the failure of plant structures, systems, or components (SSCs). An inoperable UHS is not an initiator of any analyzed events as described in the UFSAR. The impact on the structural integrity of the UHS due to a potential increase water temperature prior to and during the UHS design basis event has been evaluated, and does not increase the probability of the failure of the cooling lake dike. The proposed temperature limit for cooling water supplied to the plant from the CSCS Pond could reduce the commercial capability of the LSCS units; however, it does not result in an increase in the probability of occurrence for any of the events described in the UFSAR.

The basis provided in Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants," Revision 1, dated March 1974, was employed for the temperature analysis of the LSCS UHS to implement General Design Criteria 2, "Design bases for protection against natural phenomena," and 44, "Cooling water," of Appendix A to 10 CFR 50. This Regulatory Guide was employed for both the original design and licensing basis of the LSCS UHS and a subsequent evaluation which investigated the potential for changing the average water temperature of the cooling water supplied to the plant from the CSCS Pond from a fixed temperature limit to a limit based on the time of day. The meteorological conditions chosen for the LSCS UHS analysis utilized a 31-day period consisting of the most severe one day, combined with the most severe 30 days based on historical data. The heat loads selected for the UHS analysis considered failure of the cooling lake dike, a loss of offsite power, and a DBA LOCA on one unit and a normal shutdown of the other unit. The LSCS cooling lake is conservatively assumed to be unavailable at the start of the event. The analysis shows that with an initial UHS temperature less than or equal to the proposed time-of-day-based limit, the required safety-related heat loads can be adequately cooled for 30 days while continuing to ensure safety-related cooling water temperature remains less than the design temperature for LSCS, Units 1 and 2.

Based on the above, it has been demonstrated that the change of the initial temperature limit for cooling water supplied to the plant from the CSCS Pond to less than or equal to a temperature based on the time of day will not impede the ability of the equipment and components cooled by the UHS during a UHS design basis event to perform their safety functions.

There is no impact of this change on LSCS safety analyses including the consequences of all postulated events since all required safety-related equipment continues to perform as designed. The effects of the proposed change on the ability of the UHS to assure that a 30-day supply of water is available considering losses due to evaporation, seepage, and firefighting have been considered. Sufficient inventory remains available to mitigate the design basis event for the LSCS UHS for the required 30-day period.

Therefore, the proposed activity does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change does not physically alter the operation, testing, or maintenance of any plant SSCs beyond operating with a UHS temperature limit based on the time of day. The proposed change is bounded by existing design analyses. Moreover, the UHS temperature does not initiate accident precursors. The impact of increased UHS temperature can affect the commercial operation of the plant, but the proposed change would not create any accident not considered in the LSCS UFSAR.

This proposed change will not alter the manner in which equipment operation is initiated, nor will the functional demands on credited equipment be changed. No alteration in the procedures that ensure the LSCS units remain within analyzed limits is proposed, and no change is being made to procedures relied upon to respond to an off-normal event. As such, no new failure modes are being introduced. The proposed change does not alter assumptions made in the LSCS safety analysis.

Changing the temperature of cooling water supplied to the plant from the CSCS Pond (i.e., the UHS) as proposed has no impact on plant accident response. The proposed temperature limits do not introduce new failure mechanisms for SSCs. An engineering analysis performed to support the change in temperature of cooling water supplied to the plant from the CSCS Pond provides the basis to conclude that the equipment is adequately designed for operation as proposed.

All systems that are important to safety will continue to be operated and maintained within their design bases, and the proposed change will continue to ensure that all associated systems and components are operated reliably within their design capabilities.

The proposed change will ensure the maximum temperature of the cooling water supplied to the plant during the UHS design basis event remains less than the current safety-related cooling water design temperature for LSCS, Units 1 and 2. Therefore, there is no impact of this change on the LSCS safety analyses including inventory and cooling requirements for safety-related systems using the UHS as their cooling water supply.

All systems will continue to be operated within their design capabilities, no new failure modes are introduced, nor is there any adverse impact on plant equipment; therefore, the proposed change does not result in the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The margin of safety is determined by the design and qualification of the plant equipment, the operation of the plant within analyzed limits, and the point at which protective or mitigative actions are initiated. The proposed change does not impact any of these factors. There are no required design changes or equipment performance parameter changes associated with the proposed change. No protection setpoints are affected as a result of this change. The proposed change in the limit for the temperature of cooling water supplied to the plant from the CSCS Pond will not change the operational characteristics of the design of any equipment or system. All accident analysis assumptions and conditions will continue to be met.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above evaluation, EGC concludes that the proposed change does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), "Issuance of Amendment," and, accordingly, a finding of no significant hazards consideration is justified.

NRC Question 2a through 2f:

The license amendment request (LAR) proposes a change to input parameters used in design analyses that demonstrate the heat removal capability of the safety-related heat exchangers/coolers credited in the safe shutdown and cooldown of LSCS during design basis events. Please provide the following Engineering Design Analyses to enable the NRC staff to review the LAR:

NRC Question 2a. Heat transfer calculations used to develop Attachment 5 in the LAR and its corresponding Table A5-1.

EGC's Response to NRC Question 2a:

The design analyses used in support of the development of Table A5-1 are shown in Table 1 below and are included in Attachment 2.

Table 1: Design Analyses Used to Develop Attachment 5, Table A5-1

EPN	Name	Design Analysis
1(2)E12-B001A/B	RHR Heat Exchanger	97-201, Rev. A02
0DG01A	0 DG Jacket Water Cooler	97-195, Rev. A01
1(2)DG01A	A DG Jacket Water Cooler	97-195, Rev. A01
1(2)E22-S001	B DG Jacket Water Cooler	97-197, Rev. A04
1(2)VY01A	NW ECCS (A RHR) Pump Cubicle Cooler	97-200, Rev. A05
1(2)VY02A	SW ECCS (HPCS) Pump Cubicle Cooler	97-200, Rev. A05
1(2)VY03A	SE ECCS (B/C RHR) Pump Cubicle Cooler	97-199, Rev. B03
1(2)VY04A	NE ECCS (LPCS/RCIC) Pump Cubicle Cooler	97-198, Rev. A03

NRC Question 2b. L-002457, Revision 7, "LaSalle County Station Ultimate Heat Sink Analysis."

EGC's Response to NRC Question 2b:

L-002457, Revision 7, "LaSalle County Station Ultimate Heat Sink Analysis," is included as Attachment 3.

NRC Question 2c. L-003230, Revision 1b, "CW Inlet Temperature Uncertainty Analysis."

EGC's Response to NRC Question 2c:

LaSalle Calculation L-003230, Revision 1b, "CW Inlet Temperature Uncertainty Analysis," is included as Attachment 4.

NRC Question 2d. EC 389677, Revision 0, "Evaluate UHS for 107 DegF Temperature."

EGC's Response to NRC Question 2d:

LSCS Engineering Change (EC)- 389677, Revision 0, "Evaluate UHS for 107 DegF Temperature," is included as Attachment 5.

NRC Question 2e. EC-388666, Revision 0, "Revise Design Analyses for UHS Temperature of 107 °F."

EGC's Response to NRC Question 2e:

LSCS EC-388666, Revision 0, "Revise Design Analyses for UHS Temperature of 107 °F," is included as Attachment 6.

NRC Question 2f. Piping and instrumentation drawing (P&ID) for the UHS, residual heat removal system, and core standby cooling system.

EGC's Response to NRC Question 2f:

There is no piping and instrumentation drawing (P&ID) for the LSCS UHS. The P&IDs associated with the residual heat removal (RHR) system and CSCS are listed in Table 2 below and included in Attachment 7.

Table 2: Piping and Instrumentation Drawings for the LSCS RHR and CSCS Systems

System	P & ID
RHR System – Unit 1	M-96, Sheet 1, Rev. AY
	M-96, Sheet 2, Rev. AY
	M-96, Sheet 3, Rev. AT
	M-96, Sheet 4, Rev. AG
RHR System – Unit 2	M-142, Sheet 1, Rev. AX
	M-142, Sheet 2, Rev. AW
	M-142, Sheet 3, Rev. BB
	M-142, Sheet 4, Rev. AD
CSCS – Unit 1	M-87, Sheet 1, Rev. BD
	M-87, Sheet 2, Rev. AR
	M-87, Sheet 3, Rev. N
CSCS – Unit 2	M-134, Sheet 1, Rev. AT
	M-134, Sheet 2, Rev. AK
	M-134, Sheet 3, Rev. O

NRC Question 3:

The proposed LAR references an approved setpoint methodology used in LSCS Amendment No. 183, and describes the proposed revisions to the SR 3.7.3.1 temperature limit. However, the LAR does not demonstrate that the setpoint methodology remains bounded by the proposed Surveillance Requirement [SR] 3.7.3.1 limits (presented on Figure 3.7.3-1 of the LAR). Please provide justification that the increased range in the maximum cooling water temperatures does not adversely affect the loop accuracy or uncertainty of the UHS temperature instruments.

EGC's Response to NRC Question 3:

The increase in circulating water (CW) Inlet Temperature Indication (i.e., the temperature used to monitor the temperature supplied to the plant from the UHS) from 101.5 °F to 107 °F results in an increase in the resistance values used in LSCS Calculation L-003230, Revision 1b, "CW Inlet Temperature Uncertainty Analysis" (i.e., Attachment 4), from 115.013 ohms to 116.190 ohms. This increase in resistance, results in a 0.001 °F increase in the Total Calibration Error for the CW Inlet Temperature instruments. This Total Calibration Error is used to calculate the Total Random Error. This minor revision described in LSCS Calculation L-003230, Revision 1b shows that the Total Calibration Error increase does not change the Total Random Error. Therefore, based on the Total Random Error remaining unchanged, the total uncertainty for the CW Inlet Temperature Indication at temperatures up to 107 °F (i.e., a temperature greater than the maximum temperature proposed in Figure 3.7.3-1) does not change.

NRC Question 4:

The proposed LAR references the computer program (LAKET-PC) used to model the LaSalle UHS during a design basis event. It is unclear whether the LAKET-PC code adequately applies to the LaSalle site, facility, and/or facility operations, however, please provide additional description of the LAKET-PC code's input and output file and describe any of the assumptions or inputs that were made.

EGC's Response to NRC Question 4:

The LAKET-PC code is described in LSCS Calculation L-002457, Revision 7 (i.e., Attachment 3), "LaSalle County Station Ultimate Heat Sink Analysis," Attachment N, "LAKET-PC Methodology Validation."

A listing of the input and output files used for the LAKET-PC model runs of LSCS Calculation L-002457, Revision 7, are shown in L-002457, Revision 7 Attachment M, Appendix M9.1 and Attachment I, Table I6.1, respectively. The Table I6.1 files correspond to the LAKET case runs as listed in Table I2-2 for various Power Levels (i.e., MUR Power Uprate and EPU), Sediment Levels (i.e., 0", 6", 12", and 18"), and maximum plant inlet temperatures (i.e., 104 °F and 107 °F) during worst weather and worst net evaporation periods. The Appendix M9.1 electronic files contain the worst weather and worst net evaporation files for input to the LAKET case runs. Copies of these input and output files are provided on a compact disk.

The assumptions, inputs, and LAKET-PC code that apply to LSCS are shown in Calculation L-002457, Revision 7, Attachment I, Section 3, Section 4, and Attachment N, respectively.

NRC Question 5:

To facilitate a staff analysis of the UHS pool heat transfer calculations and the bounding weather conditions of the UHS design, please provide the following information:

NRC Question 5(a): The final formatted onsite meteorological data set (i.e., data that have been verified through quality control) for the years used in the LAR UHS calculations. This data set should be accompanied by a description of the screening and review process used to identify and remove suspect or erroneous data.

EGC's Response to NRC Question 5(a):

The final data set consists of meteorological data for LSC and Peoria, IL from January 1, 1995, through September 30, 2010. This meteorological data is contained in a file entitled "PIALSL9510.txt," and is included on the provided compact disk. The column headers for onsite (i.e., LSCS) data parameters are annotated with an asterisk.

The meteorological data set screening and review process used to identify and remove suspect or erroneous data is described in Calculation L-002457, Revision 7, Attachment K, Section 6.

NRC Question 5(b): A description of the onsite meteorological monitoring program. This description should include (but is not limited to):

- ***How the meteorological data inputs and periods were determined to be most limiting.***

EGC's Response:

A description of how the meteorological data inputs and periods were determined to be most limiting is contained in Calculation L-002457, Revision 7, Attachment M, Sections M6.1 and M6.2.

- ***A site map (drawn to scale) that shows the tower's grade elevation, plant and true north, and the tower's location with respect to man-made structures and plant features (such as buildings, paved and improved surfaces, and cooling towers and ponds), topographic features (such as hills, trees, and bodies of water), and any other man-made or natural features that may affect onsite meteorological measurements.***

EGC's Response:

Aerial photographs from www.bing.com/maps and Site Layout Drawings 1E-0-4900A, 1E-0-4900B, and S-1561, Revision B (i.e., Figures 4A-4E), are provided in Attachment 8.

- ***Measurements made and elevations of measurements for onsite and offsite sources.***

EGC's Response:

Measurements made and elevations of measurements for onsite and offsite sources are identified in Calculation L-002457, Revision 7, Attachment M, in Section M2.0, and Attachment I in Section I4.4, respectively.

- ***Types of instruments (e.g., cup, propeller, or sonic anemometers; resistance temperature detector or thermistor temperature sensors; chilled mirror or lithium chloride dew point sensors).***

EGC's Response:

At LSCS, the wind speed sensors utilize cup anemometers, wind direction is determined using a wind vane with a potentiometer, air temperatures are measured by thermistors sheathed in a stainless steel case, and precipitation is measured by a heated tipping bucket rain gauge. Dew point is not measured at LSCS.

- ***Data recovery rates (in percent) for each of the recorded parameters***

EGC's Response:

The data recovery summary for recorded parameters at LSCS during the period 1995 to 2010 is contained in Table 3 below.

Table 3: LSCS Site Data Recovery Summary*

	Measurement (Elevation 33')		
Year	**Wind Speed (%)**	**Wind Direction (%)**	**Ambient Temperature (%)**
1995	100	100	100
1996	100	99.8	100
1997	100	98.9	100
1998	100	100	99.7
1999	100	100	100
2000	99.9	99.9	99.9
2001	100	100	100
2002	96.6	99.9	99.9
2003	99.9	99.9	99.9
2004	99.6	99.8	99.8
2005	99.3	99.1	99.9
2006	99.6	99.8	99.8
2007	99.9	99.9	99.9
2008	99.6	98.7	99.9
2009	99.9	99.8	99.9
2010	99.8	99.9	99.6

*Summary data obtained from Murray & Trettel, Inc.

NRC Question 5(c): ***The final data sets of offsite (Peoria, IL and Springfield, IL) meteorological information for the years used in the LAR UHS calculations. These data sets should be accompanied by a description of the screening and review process used to identify and remove suspect or erroneous data.***

EGC's Response to NRC Question 5(c):

The final data set of offsite meteorological information is provided on a compact disk in a data file entitled, "PIALSL9510.txt." This data consists of meteorological data from LSCS and Peoria, IL from January 1, 1995, through September 30, 2010. The column headers for onsite (i.e., LSCS measurement) data parameters are annotated with an asterisk (*).

The final data set of offsite (i.e., from Peoria, IL and Springfield, IL) for the dates between July 4, 1948, through June 30, 1996, is provided on a compact disk in a file entitled, "PS489661.txt."

The meteorological data set screening and review process used to identify and remove suspect or erroneous data is described in LSCS Calculation L-002457, Revision 7, Attachment K, Section 6.