UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 27, 2012

LICENSEE: Exelon Generation Company, LLC

FACILITY: LaSalle County Station, Units 1 and 2

SUBJECT: SUMMARY OF JUNE 28, 2012, PRE-APPLICATION MEETING WITH EXELON GENERATING COMPANY, LLC, TO DISCUSS LICENSING AMENDMENT REQUEST FOR LASALLE COUNTY STATION UNIT 1 AND UNIT 2 ULTIMATE HEAT SINK AT AT EXTENDED POWER UPRATE POWER LEVELS (TAC NOS. ME8866 AND ME8867)

On June 28, 2012, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Exelon Generation Company, LLC (EGC, the licensee) via teleconference. The purpose of the meeting was to discuss a proposed license amendment request (LAR) related to LaSalle County Station (LSCS) Units 1 and 2, ultimate heat sink (UHS) with extended power uprate (EPU) decay heat loads. A list of attendees is provided as Enclosure 1.

During the meeting, EGC informed the NRC staff of their plans to submit an LAR to modify the Technical Specification (TS) 3.7.3, "Ultimate Heat Sink." The current TS surveillance requirement (SR) 3.7.3.1 requires that the cooling water temperature supplied to the plant from the Core Standby Cooling System (CSCS) pond is maintained ≤ 101.25 °F. If the water temperature supplied to the plant from the CSCS pond exceeds the limit, the UHS must be declared inoperable in accordance with TS and both units must be place in Mode 3 within 12 hours and in Mode 4 in 36 hours.

The licensee discussed the slides provided as Enclosure 2. EGC stated that prolonged hot weather in the area during the summer months, in conjunction with high humidity during the daytime, minimal cooling at night, and little precipitation could result in sustained elevated cooling water temperature supplied to the plant from the CSCS pond. The licensee's proposal is to modify the cooling water temperature TS requirement to be a variable limit based on the analyzed diurnal temperature cycle of the CSCS pond ranging between 101.5 °F to approximately106 °F.

The licensee presented information regarding the proposed TS change to demonstrate the safety margin in the design requirements of the UHS. The licensee safety basis provides three important assumptions:

1. Safety related equipment (e.g. diesel generators, RHR heat exchangers, and pump seal coolers) can handle higher water inlet temperatures,

2. Controlling meteorological record bounds worst case weather conditions, and

3. UHS design and analysis demonstrates adequate safety margin with diurnal temperature changes along with design basis events

The licensee advised the NRC staff that they recently changed the inlet safety related temperature for safety related equipment from 104 °F to 107 °F utilizing Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59, "Changes, Test and Experiments," and the Nuclear Energy Institute 96-07, "Guidelines for 10 CFR 50.59 Evaluations." The staff requested the safety basis for this change and the licensee stated that the design capability of the systems were capable of transferring heat with an inlet temperature of 107 °F. Based on the answer provided, the NRC staff requested that the licensee clarify how these changes were made and what are the remaining design margins (within the design capabilities) should be.

Additionally, the staff expressed concerns that the licensee did not adequately bound the controlling weather conditions as discussed in Regulatory Guide (RG) 1.27 "Ultimate heat sink for nuclear power plants." The licensee proposed to utilize RG 1.27, Revision 1, and considered the worst 24 hours period followed by the worst 30 day period. The staff stressed the importance of screening the meteorological record and the importance of ensuring that weather conditions screened conservatively bound the performance characteristics of the cooling pond system design. The staff also questioned whether other probable weather conditions would be more bounding of the cooling pond design consistent with RG 1.27.

The licensee proposed a methodology that models the diurnal temperature cycle (temperature pattern that recurs daily) of the UHS heating and cooling. This approach is intended to utilize analytical margins traditionally apart of the existing linear UHS TS limit. The licensee stated that the UHS would remain conservatively below the proposed diurnal safety analysis limit of 107 °F. The staff expressed the following concerns with this proposed methodology. First, the staff questioned the analysis assumptions that only predict a 0.25 °F heat up for a design basis accident occurring at the proposed TS limit of approximately106 °F at 3:00 p.m. Second, the NRC staff questioned whether in Enclosure 2 - Slide 16 indicated favorable weather condition for the 2nd and 3rd day of the accident. Third, the staff questioned how the licensee transitioned from the worst 24-hour period to the 2nd day of the analysis. Fourth, the staff requested that the licensee provide in their submittal the weather conditions by the hour for the first 72 hours following the accident. Fifth, given the significant number of important analysis assumptions the staff requested that the licensee describe and justify these assumptions in detail in their license submittal.

EGC submitted their UHS license amendment request on July, 12, 2012, and is planning to submit an extended power uprate (EPU) request in the 4th quarter of 2012 (as discussed in a public meeting in April 4, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12130A044)). The EPU application as ECG described may require prior staff approval of the proposed UHS LAR. The staff asked the licensee for their assessment of the acceptance review criteria contained in LIC-109, "Acceptance review procedures." LIC-109 contains provisions to not accept for NRC review LARs which are linked to a pending or subsequent licensing action if not yet approved (i.e. LIC Section 3.1.1). LIC-109 is intended to ensure that limited staff resources are best utilized and that the staff can provide a timely and predictable review for licensing requests without unnecessary delays. Previously, the staff has reviewed LSCS UHS LARs in 2001, 2006, 2007, and 2011 (only the 2007 UHS LAR concluded in an NRC approval). The licensee stated that they did not consider the UHS LAR linked to the future EPU application.

No regulatory decisions were made during this meeting. The meeting notice and agenda are available under ADAMS Accession No. ML12167A129.

The public was invited to observe the meeting. No members of the public were in attendance or on the bridge line. Public Meeting Feedback forms were not received.

Please direct any inquiries to me at 301-415-1115, or Nicholas.DiFrancesco@nrc.gov.

Sincerely,

/ RA /

Nicholas DiFrancesco, Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-373 and 50-374

Enclosures:
1. List of Attendees
2. LaSalle County Station Pre-Application Meeting Slides

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LIST OF ATTENDEES

JUNE 28, 2012, PUBLIC MEETING

WITH EXELON GENERATION COMPANY, LLC

TO DISCUSS LICENSING AMENDMENT REQUEST

FOR LASALLE COUNTY STATION UNIT 1 AND UNIT 2

ULTIMATE HEAT SINK

NRC

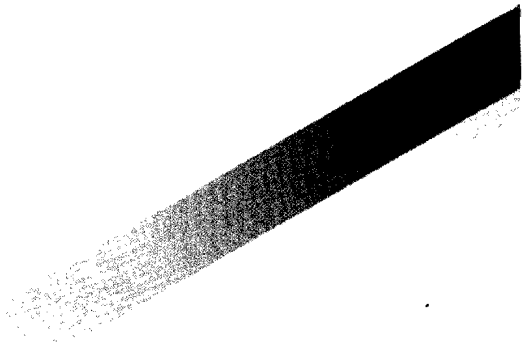
J. Zimmerman – Branch Chief, Plant Licensing Branch 3-2
N. DiFrancesco – Project Manager, Plant Licensing Branch 3-2
H. Rodríguez – Project Engineer, Plant Licensing Branch 3-2
G. Purciarello – Senior Reactor Systems Engineer, Balance of Plant Branch
M. Hamm – Reactor Systems Engineer, Technical Specifications Branch
K. Martin – Human Factors Engineer, Health Physics and Human Performance Branch

EGC

D. Rhoades – LSCS Site Vice President
H. Vinyard – LSCS Engineering Director
T. Simpkin – LSCS Regulatory Assurance Manager
B. Hilton – LSCS Sr. Design Engineering Manager
D. Schmit – LSCS Design Engineering Manager
M. Peters – LSCS Engineering Power Uprate
G. Engels – LSCS Design Engineering
P. Kut – Sargent and Lundy
S. Shields – LSCS Regulatory Assurance
G. Kaegi – EGC Director of Corporate Licensing
D. Gullott – EGC Corporate Licensing Manager
M. Mathews – EGC Corporate Licensing

LaSalle County Station
Pre-Application Meeting

Core Standby Cooling System Pond – The Ultimate Heat Sink



Exelon Generation.

Agenda

- Introductions
- LaSalle County Station (LSCS) Ultimate Heat Sink (UHS) Background
- UHS Regulatory Requirements
- License Amendment Request (LAR) Scope
- Proposed Technical Specifications Changes
- Technical Justification for Proposed Changes
- Summary
- Discussion/Regulatory Challenges/Feedback
- Public Comments and Feedback

Introductions - Exelon Personnel in Attendance

- Terry Simpkin – LSCS Regulatory Assurance Manager
- Steve Shields – LSCS Regulatory Assurance
- Bill Hilton – LSCS Senior Design Engineering Manager
- Dan Schmit – LSCS Design Engineering Manager
- Mike Peters – LSCS Power Uprate
- Glen Kaegi – Director – Corporate Licensing and Regulatory Affairs
- David Gullott– Corporate Licensing Manager
- Mitch Mathews – Corporate Licensing

LaSalle County Station (LSCS) Core Standby Cooling System (CSCS) Pond – Ultimate Heat Sink (UHS) - Background

- The LSCS UHS:
  - Consists of a single water source - an excavated CSCS pond integral within the larger LSCS cooling lake
  - Serves as the heat sink for heat removed from both units' reactor cores following all postulated accidents and anticipated operational occurrences in which the units are cooled down and Residual Heat Removal (RHR) is placed in service
- The CSCS pond is sized to contain sufficient volume to permit the safe shutdown and cooldown of both LSCS units for a 30 day period with no additional makeup water source available for normal and accident conditions
- The function of the CSCS pond is to provide for cooling of the:
  - RHR heat exchangers
  - Diesel generator coolers
  - CSCS cubicle area cooling coils
  - RHR pump seal coolers
  - Low Pressure Core Spray (LPCS) pump motor cooling coils

LSCS UHS – Background (continued)

- The CSCS pond also provides:
  - Indirect heat rejection for the containment through the RHR heat exchangers
  - A backup source of emergency makeup water for spent fuel pool cooling
  - Water for fire protection equipment

Note: Neither the ability to provide emergency makeup water for spent fuel pool cooling nor fire protection is limited by heat rejection considerations

- The operating limits for heat rejection capability are based on conservative heat transfer analyses for the design basis loss of coolant accident (LOCA)
- There are four temperature measuring instruments used for monitoring the CSCS temperature provided to the plant:
  - Located in circulating water (CW) system inlet thermowells (i.e., two per unit)
  - Provide input to the Plant Process Computer (PPC)
  - Used to monitor and trend the temperature of the UHS cooling water temperature supplied to the plant from the CSCS pond
  - Used to verify the requirement of Technical Specifications (TS) Surveillance Requirement (SR) 3.7.3.1 is met at a 24-hour Frequency

LSCS UHS – Background (continued)

- The LSCS cooling lake is a relatively shallow perched lake (i.e., a perennial lake whose surface level lies at a higher elevation than the surrounding area; the lake was created by constructing dikes on three sides)
- The temperature of the cooling lake is sensitive to solar energy and ambient temperature, humidity, and wind speed
- In recent years, minimal cooling at night and high solar energy input along with high humidity and low wind speeds has resulted in elevated cooling water temperatures during the summer months
- Weather conditions in the future may result in the temperature of the UHS challenging the current TS limit of $\leq$101.25 °F

UHS Regulatory Requirements - GDC

- **GDC 2**: capability of structures housing the system and the system itself to withstand the effects of natural phenomena like earthquakes, tornadoes, hurricanes, and floods
- **GDC 5**: capability of shared systems and components important to safety to perform required safety functions
- **GDC 44**:
  A. The capability to transfer heat loads from safety-related structures, systems, and components (SSCs) to the heat sink under both normal operating and accident conditions
  B. Suitable component redundancy so that safety functions can be performed assuming a single, active component failure coincident with loss of offsite power
  C. The capability to isolate components, systems, or piping if required so safety functions are not compromised

UHS Regulatory Requirements – RG 1.27

- The LSCS UHS was designed and licensed in accordance with NRC Regulatory Guide (RG) 1.27, "Ultimate Heat Sink for Nuclear Power Plants," Revision 1 as discussed in Appendix B of the LSCS Updated Final Safety Analysis Report (UFSAR)
- Compliance with the four Regulatory Positions contained in RG 1.27, Revision 1 ensures that the LSCS UHS meets GDC 2, 5, and 44:
- Regulatory Position C.1 defines the required cooling capabilities of the UHS:
  - Sufficient cooling capability for 30 days to:
    - Permit simultaneous shutdown and cooldown of all reactor units the UHS serves
    - Maintain unit(s) in safe shutdown condition
    - Limit effects of accident on one unit while permitting shutdown, cooldown, and maintenance of safe shutdown on the remaining unit(s)
  - C.1.a defines the environmental parameters to be used in determining worst-case evaporation on UHS volume
  - C.1.b defines the environmental parameters to be used in determining worst case UHS temperatures

RG 1.27 (continued)

- Regulatory Position C.2 describes the events or natural phenomena that must be accounted for the in the design of the UHS
- Regulatory Position C.3 describes the requirements for the number of water sources that must be used in designing a UHS
- Regulatory Position C.4 describes the provisions for the plant TS related to actions to be taken in the event that conditions threaten partial loss of the capability of the UHS or the plant temporarily does not meet Regulatory C.1 and C.3 during operation

License Amendment Request Scope

- Revise Technical Specification (TS) 3.7.3, "Ultimate Heat Sink," to modify acceptance criterion for verification of cooling water temperature supplied to the plant from the core standby cooling system (CSCS) pond
- Currently, Surveillance Requirement 3.7.3.1 verifies that cooling water from CSCS pond is $\leq$ 101.25 °F
- Proposal is to verify that cooling water temperature is less than a variable limit that is based on the analyzed diurnal temperature cycle of the CSCS pond
- Variable limit accounts for single-channel instrument uncertainty of 0.75 °F (two-channel uncertainty not more than 0.53 °F) and 0.3 °F of margin
- New Condition and associated Required Action to verify cooling water temperature is within limits on a once per hour frequency if above 101 °F
- No other changes to the Technical Specifications are proposed

Proposed TS 3.7.3 – UHS Changes

B.	Required Action and associated Completion Time of Condition A not met. C OR CSCS pond inoperable for reasons other than Condition A.	B.1 AND B.2	Be in MODE 3. C Be in MODE 4. C	12 hours 36 hours
B.	Cooling water temperature supplied to the plant from the CSCS pond ≥ 101°F.	B.1	Perform SR 3.7.3.1.	Once per hour

Proposed TS 3.7.3 – UHS Changes (continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.3.1	Verify cooling water temperature supplied to the plant from the CSCS pond is ≤ ~~101.25°F~~ within the limits of Figure 3.7.3-1.	In accordance with the Surveillance Frequency Control Program
SR 3.7.3.2	Verify sediment level is ≤ 1.5 ft in the intake flume and the CSCS pond.	In accordance with the Surveillance Frequency Control Program
SR 3.7.3.3	Verify CSCS pond bottom elevation is ≤ 686.5 ft.	In accordance with the Surveillance Frequency Control Program

Proposed TS 3.7.3 – UHS Changes (continued)

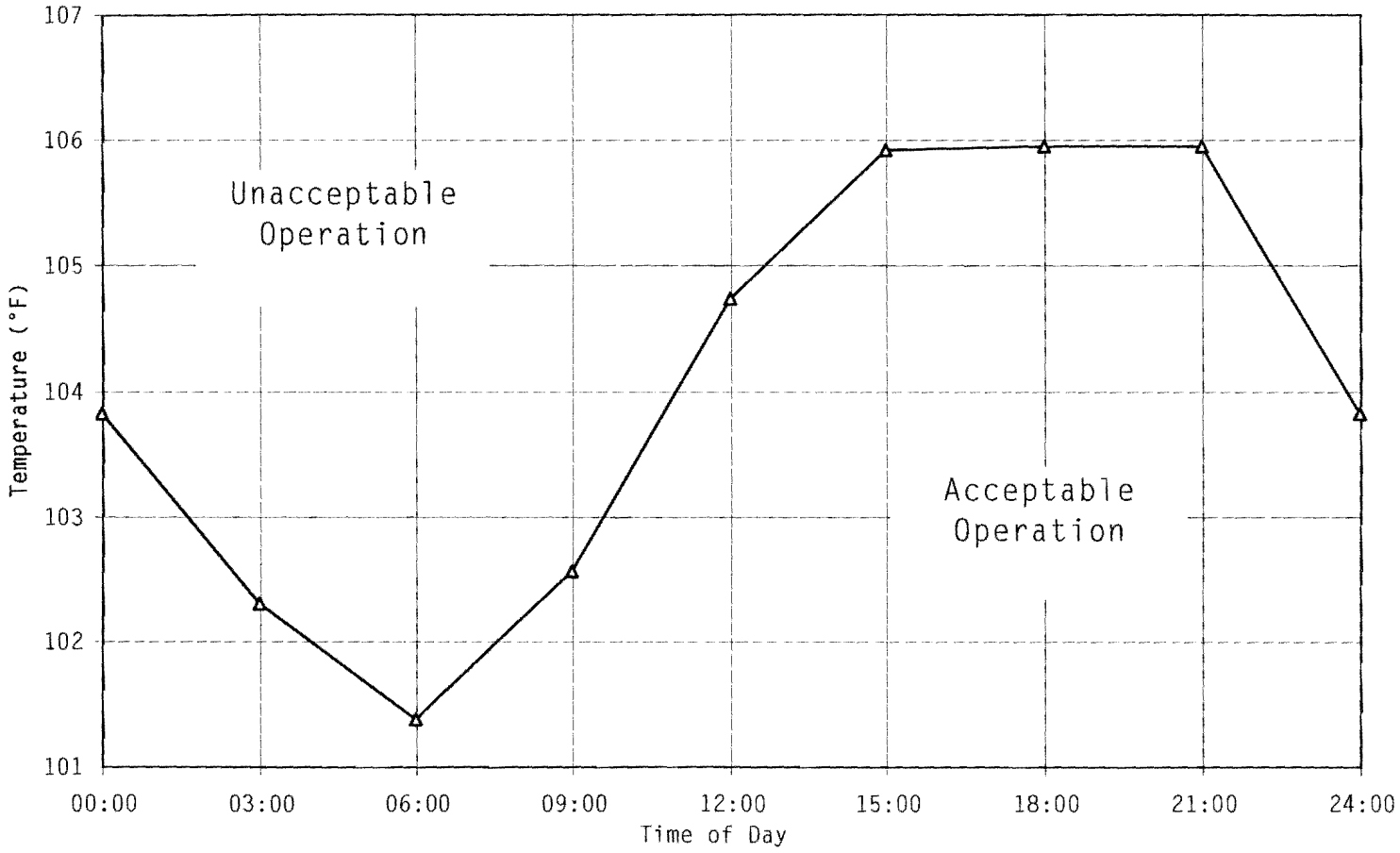


Figure 3.7.3-1 (page 1 of 1)
Temperature of Cooling Water Supplied to the Plant from the CSCS Pond Versus Time of Day Requirements

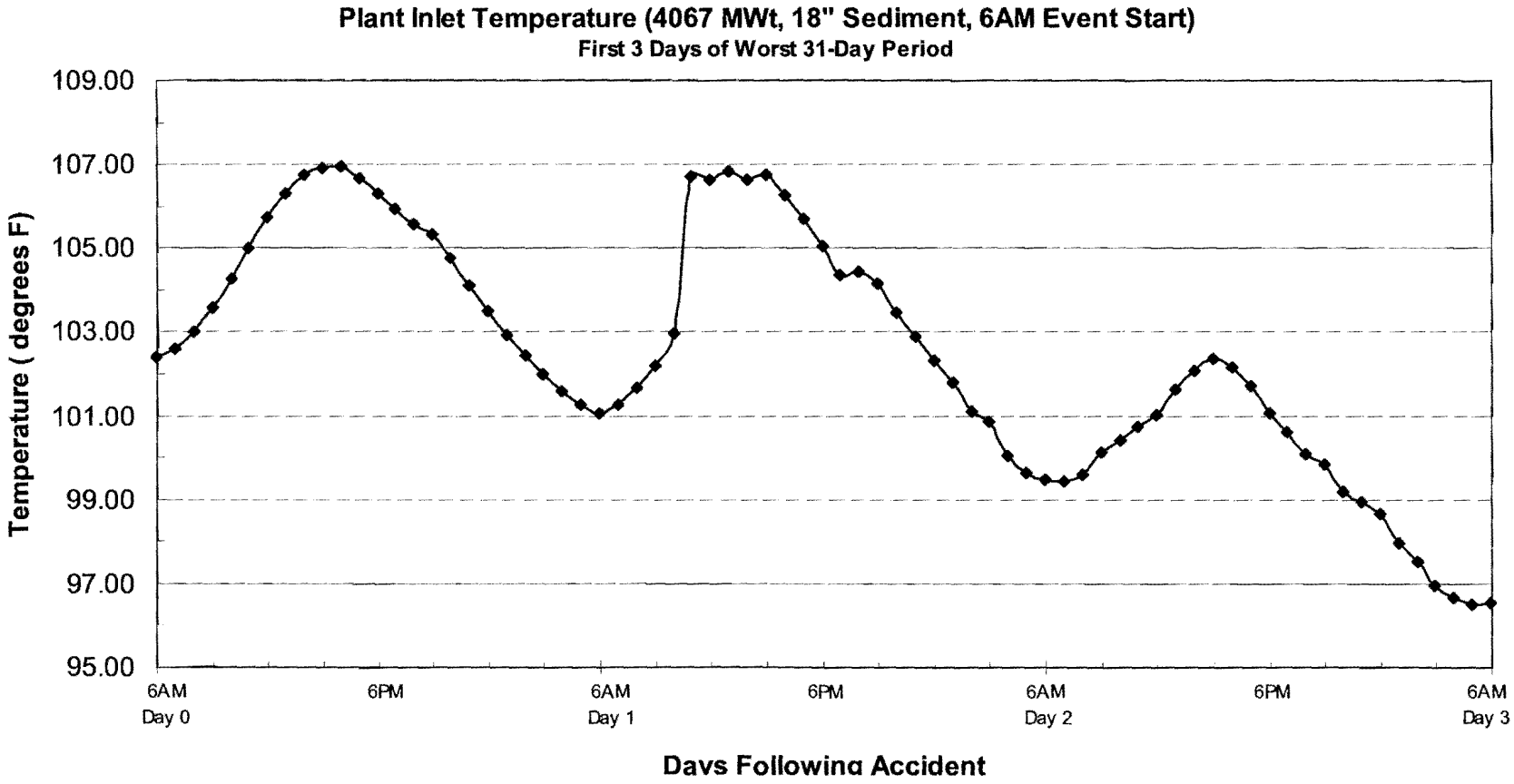
Technical Justification for Changes

- Basis for UHS transient analysis is RG 1.27, Rev. 1 and NUREG-0693, "Analysis of Ultimate Heat Sink Cooling Ponds"
- With design basis accident loss of coolant accident (DBA LOCA) on one unit, normal shutdown of the other
- Analysis performed for 4067 MWt vs. CLTP of 3546 MWt
- Determines allowable initial UHS temperature and water loss for updated historical weather data (i.e., July 1948 – Sept. 2010)
  - Data screened using NUREG-0693 methodology to determine worst single 24-hour and worst 30-day periods
  - Worst single 24-hour period begins July 24, 2001, at 7:00 a.m.
  - Worst 30-day period is July 21, 1995, to August 20, 1995
  - Worst 24-hour period followed by worst 30-day period used in analysis
  - Maximum evaporative loss period remains unchanged (June – July 1954)
- Methodology consistent with thermal model in NUREG-0693 - Utilizes Ryan wind function to account for evaporative losses

Technical Justification for Changes (cont)

- Analysis includes determination of CSCS pond effective surface area (~ 58 % of total surface area) and volume (~63% of total volume)
- Proposed maximum allowable UHS initial temperature based on:
  - Time of day
  - Maximum TS allowable sediment depth of 18"
  - Temperature monitoring instrumentation uncertainty
- Analyzed accident start times every 3 hrs for 24 hrs to determine start time resulting in most limiting initial UHS temperature (6 a.m., 102.4 °F)
- UHS temperature response over first 3 days and 31 days with worst weather and 6 a.m. accident start time provided
- Ensures peak post accident UHS temperature does not exceed safety related cooling water design basis of 107 °F

Technical Justification for Changes – Analysis Results



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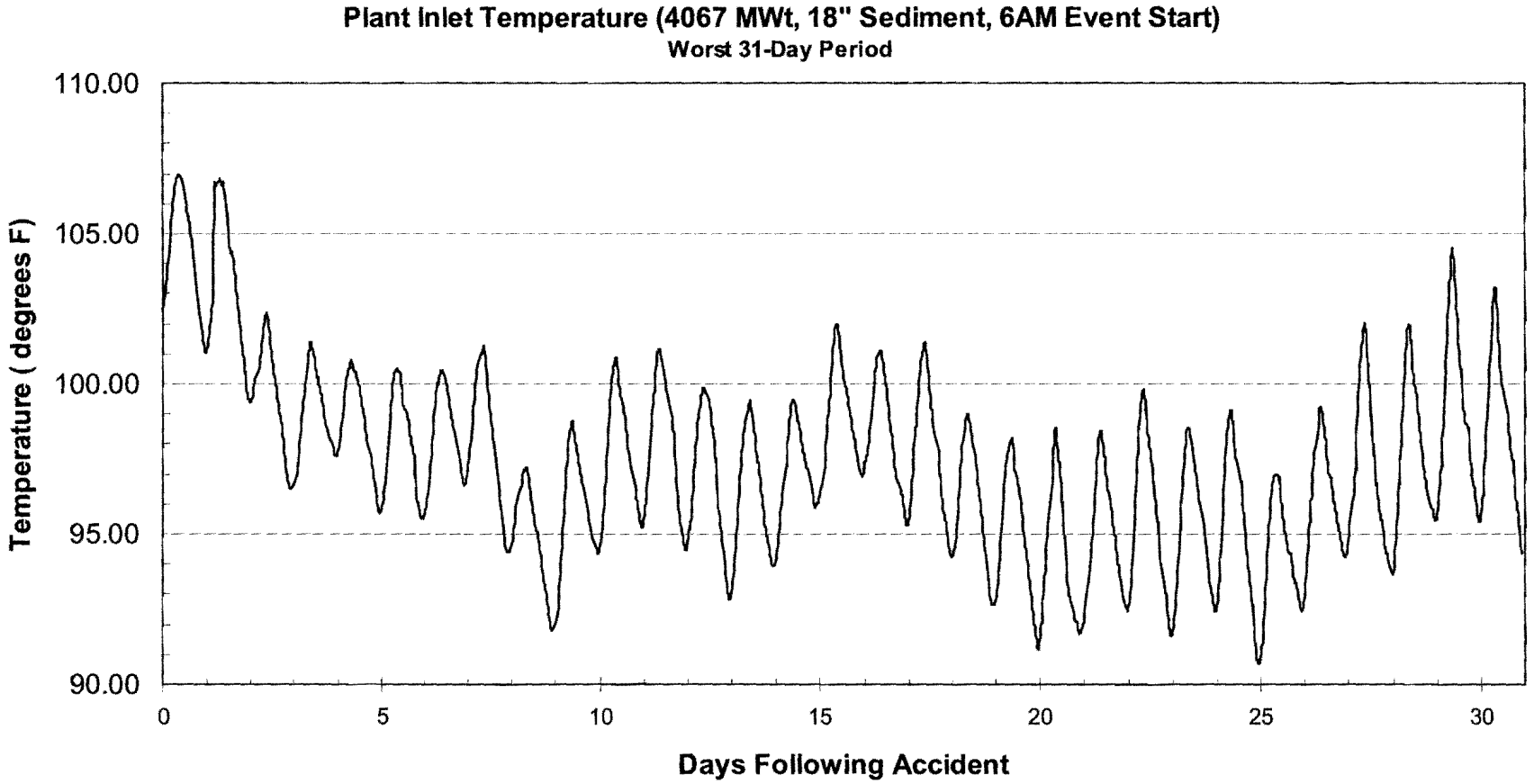
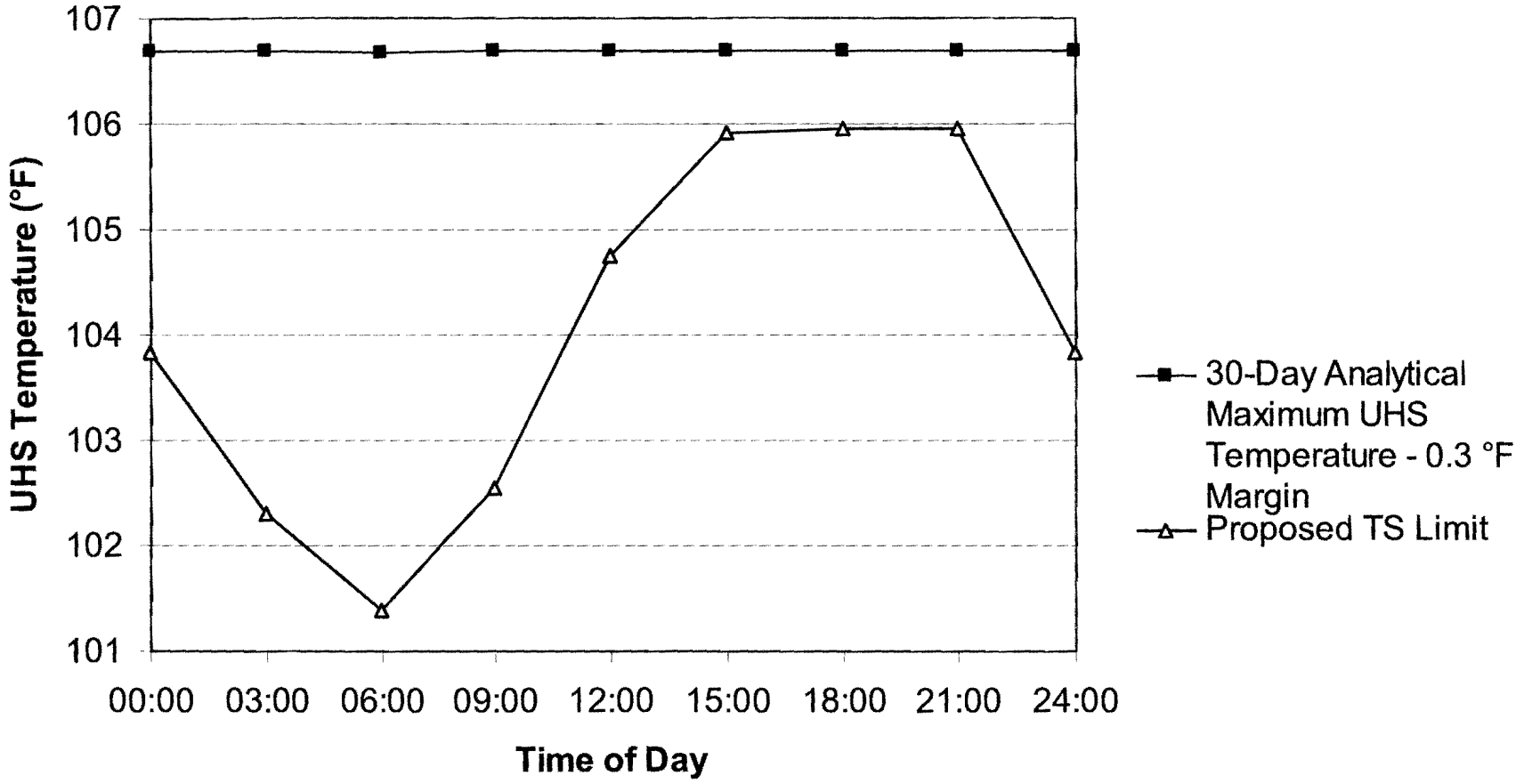


Technical Justification for Changes (cont)



UHS Temperature (°F) Versus Time of Day

Summary

- LaSalle lake temperatures continue to challenge the existing single-value TS limit for cooling water supplied to the plant from the CSCS pond
- Analysis performed in accordance with regulatory requirements
- Results ensure that cooling water design basis limit is not exceeded with additional conservatism
- Proposed changes:
  - Do not involve a significant increase in the probability or consequences of an accident previously evaluated
  - Continue to ensure that all systems will continue to be operated within their design capabilities, no new failure modes are introduced, nor is the possibility of a new or different kind of accident created through operation in the proposed manner
  - Do not involve a significant reduction in a margin of safety
  - Do not involve a significant hazards consideration

Discussion/Regulatory Challenges/Feedback

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NAME	HRodríguez	NDiFrancesco	SRohrer	GCastro	MDudek	NDiFrancesco *Via e-mail*
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