

LaSalle County Station

**Pre-Application Meeting
License Amendment Request
Ganged Rod Drive Capability**

Objective of Meeting

- Review the technical and regulatory aspects of a planned License Amendment Request (LAR) for Ganged Rod Drive Capability at LaSalle County Station (LSCS).
- Review an outline of a draft LAR with respect to the required scope and level of detail.
- Confirm that current LAR outline, including any identified enhancements, satisfy required scope.
- Discuss the Regulatory Finding that would be necessary for LAR approval.

Topics and Presenters

- Review of Issue - Terry Simpkin, Regulatory Assurance Manager, LSCS
- Review of LAR Outline - Darin Benyak, Licensing and Regulatory Affairs
- Proposed Regulatory Finding - Darin Benyak
- Current Project Status - Bob Fredricksen, Lead Design Engineer, LSCS

Rod Control Management System

- EGC is replacing the current LSCS Reactor Manual Control System (RMCS) with a new design called the Rod Control Management System (RCMS).
- The current RMCS uses discrete digital electronics and dynamic logic to control rod motion. The replacement RCMS will be a digital microprocessor-based system.
- The RCMS will retain all of the system-level functions of the existing RMCS and Rod Worth Minimizer (RWM), as well as add additional capabilities.
- The replacement system is classified as non-safety-related, and has been designed to the same regulatory criteria and standards as the existing system.

Added Functionality of RCMS

- Enhanced implementation and documentation of control rod maintenance and surveillance activities.
- Improved control rod movement operations that are required for control rod drive functionality.
- Enhanced the confirmation of reactor shutdown following a scram.
- Added the capability to move multiple rods (up to four) in a single gang (i.e., Ganged Rod Drive Capability).

The RCMS is being installed in accordance with the requirements of 10 CFR 50.59, with the exception of Ganged Rod Drive Capability.

Operational and Safety Benefits

With Ganged Rod Drive Capability, the RCMS will:

- Reduce operational challenges by reducing the amount of time that the reactor is in the Intermediate and Startup range power levels during startups. These power levels require a heightened level of reactivity management attention and resources.
- Enhance SCRAM avoidance by allowing the rapid insertion of CRAM rods (rods specified in analyzed sequences for the purpose of significantly reducing reactor power rapidly) during plant transients.

Ganged Rod Drive Capability

- Current Licensing Basis (i.e., LSCS Updated Final Safety Analysis Report (UFSAR) Section 15.4.1, “Rod Withdrawal Error - Low Power,” does not address or consider simultaneous movement of multiple rods.
- EGC proposes to revise the LSCS Licensing Basis to include, in the UFSAR, the description of a potential multiple rod withdrawal error at low power event as an “infrequent incident,” similar to the description of a potential single rod withdrawal error event (i.e., UFSAR Section 15.4.1.2, “Continuous Rod Withdrawal Error”).

September 19, 2006 Pre-Application Meeting

- Objective was to identify the specific scope and level of detail of information needed to complete a review of an LAR for Ganged Rod Drive Capability at LSCS.
- Meeting Summary was issued on November 28, 2006 with nine specific information requirements.

September 19, 2006 Meeting: LAR Information Requirements

1. Describe intent of LAR
2. Describe internal and external communication interfaces
3. Describe hardware and software controls that restrict rod movement
4. Describe cyber security
5. Describe component qualification
6. Address Regulatory Guide 1.97 and Emergency Operating Procedure applicability
7. Describe the processing of Rod Block signals
8. Provide a Failure Analysis (three sub-items)
 - a. Analysis of Single Failures and submittal of Failure Modes and Effects Analysis
 - b. Characterization of likelihood of common-mode software failure, including description of software development and testing
 - c. Description of the consequences if the low probability event were to occur (i.e., failures leading to uncontrolled withdrawal of rod gang)
9. Address all NUREG-0800 accidents involving rod movement in No Significant Hazards Consideration

General LAR Outline; Detailed Outline Provided as Attachment

- **Description**
 - Intent of LAR (Item 1)
- **Proposed Change**
 - Revision of Licensing Basis (Item 1)
- **Technical Evaluation**
 - Description and Design Basis (Items 2, 3, 4, 5, 6, and 7)
 - Failure Analysis (Items 8a, 8b, and 8c)
- **Regulatory Analysis**
 - No Significant Hazards Consideration (Item 9)
- **Appendices**
 - Network Diagram (Item 4)
 - RCMS Failure Modes and Effects Analysis (Item 8a)

“The requirements of General Design Criteria (GDC) 10, 17, 20, 24, and 25 had been met for ganged rod drive capability at LaSalle County Station as part of the Rod Control Management System, since the system design contains a Rod Worth Minimizer.

This system has been reviewed and found acceptable because single failures in the reactor control system, which could result in uncontrolled withdrawal of control rods under low-power conditions, have been precluded.

The scope of this review has included the design features which act to prevent such withdrawals.”

- Design Specifications Complete
- Hardware Build Complete
- Software Code Written; Code tested
- Integration Testing in progress
- V&V and Factory Acceptance Testing will be completed in July
- Parallel unit on-site for Exelon evaluation
- Infrastructure installation in-progress

LaSalle County Station
Draft License Amendment Request
Ganged Rod Withdrawal
Detailed Outline

LaSalle County Station

**Ultimate Heat Sink
Regulatory Resolution and
Optimum Approach for Submittal of
License Amendment Request**

Objective of Meeting

- Review the 2006 License Amendment Request (LAR) for Ultimate Heat Sink (UHS) at LaSalle County Station
- Review of the NRC Safety Evaluation
- Discussion of the NRC approved LaSalle County Station UHS Licensing Basis and Plant Design
- Exelon's Perspective of the License Amendment Denial
- Regulatory Resolution Pathways

Topics and Presenters

- Review of the original LAR
Alison Mackellar, Corporate Licensing Engineer
- Discussion of Licensing Basis and Design
Terry Simpkin, Regulatory Assurance Manager LaSalle
- Review of Denial SE
Alison Mackellar, Corporate Licensing Engineer
- Exelon's Perspective on the Denial
Darin Benyak, Corporate Licensing Manager
- Regulatory Resolution Pathways
Darin Benyak, Corporate Licensing Manager

UHS License Amendment Request

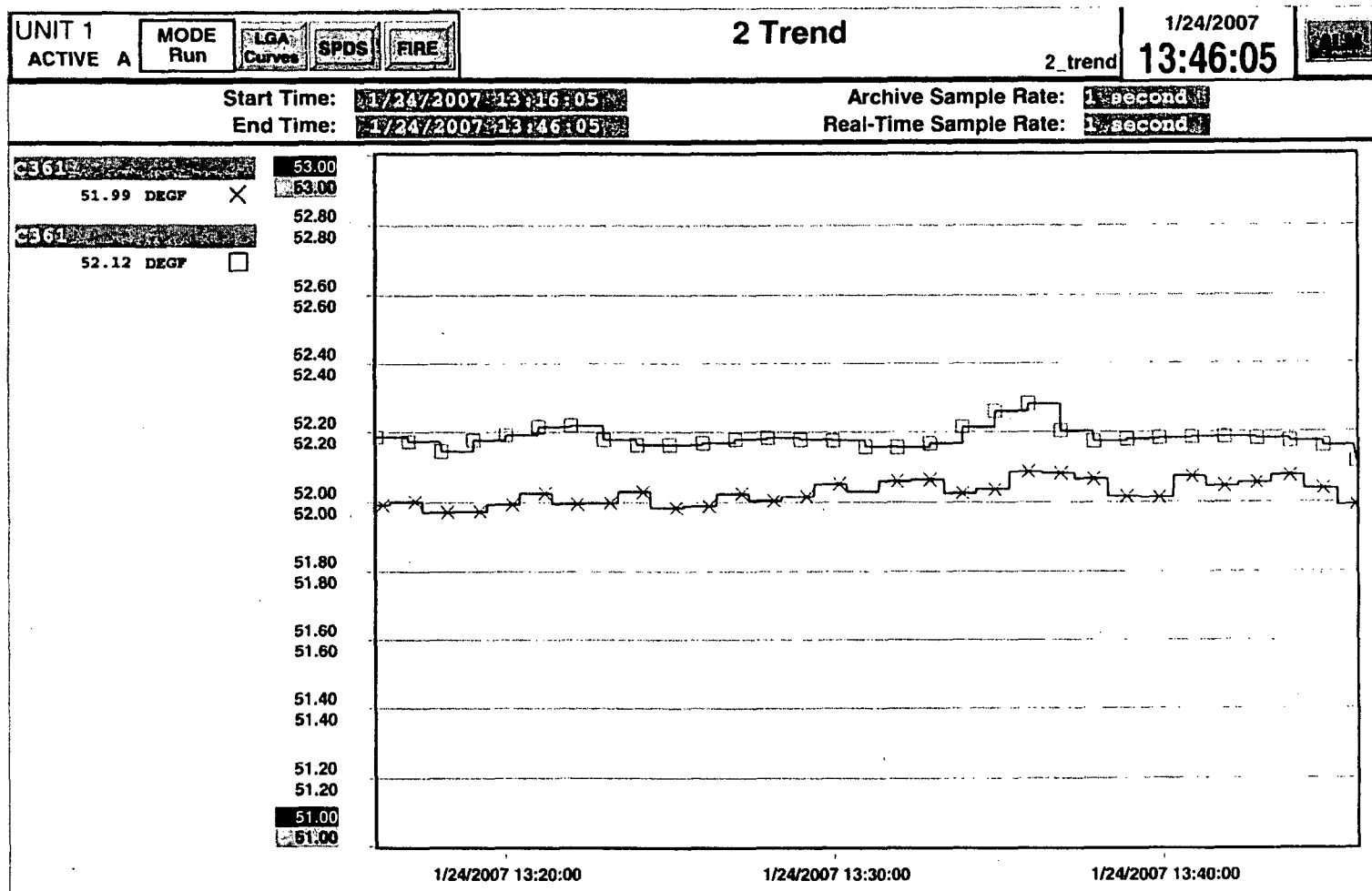
- The original LAR proposed a change to increase the Technical Specification (TS) indicated temperature limit of UHS from $\leq 100^{\circ}\text{F}$ to $\leq 101.5^{\circ}\text{F}$
- The increase was to be achieved by reducing the measurement uncertainty by replacing existing thermocouples with higher precision temperature measuring equipment (i.e., RTDs)
- The Circulating Water (CW) temperature instrumentation indication loop(s) are of an equivalent design
- The method and procedures used to determine UHS are unchanged

Original LAR

ExelonSM

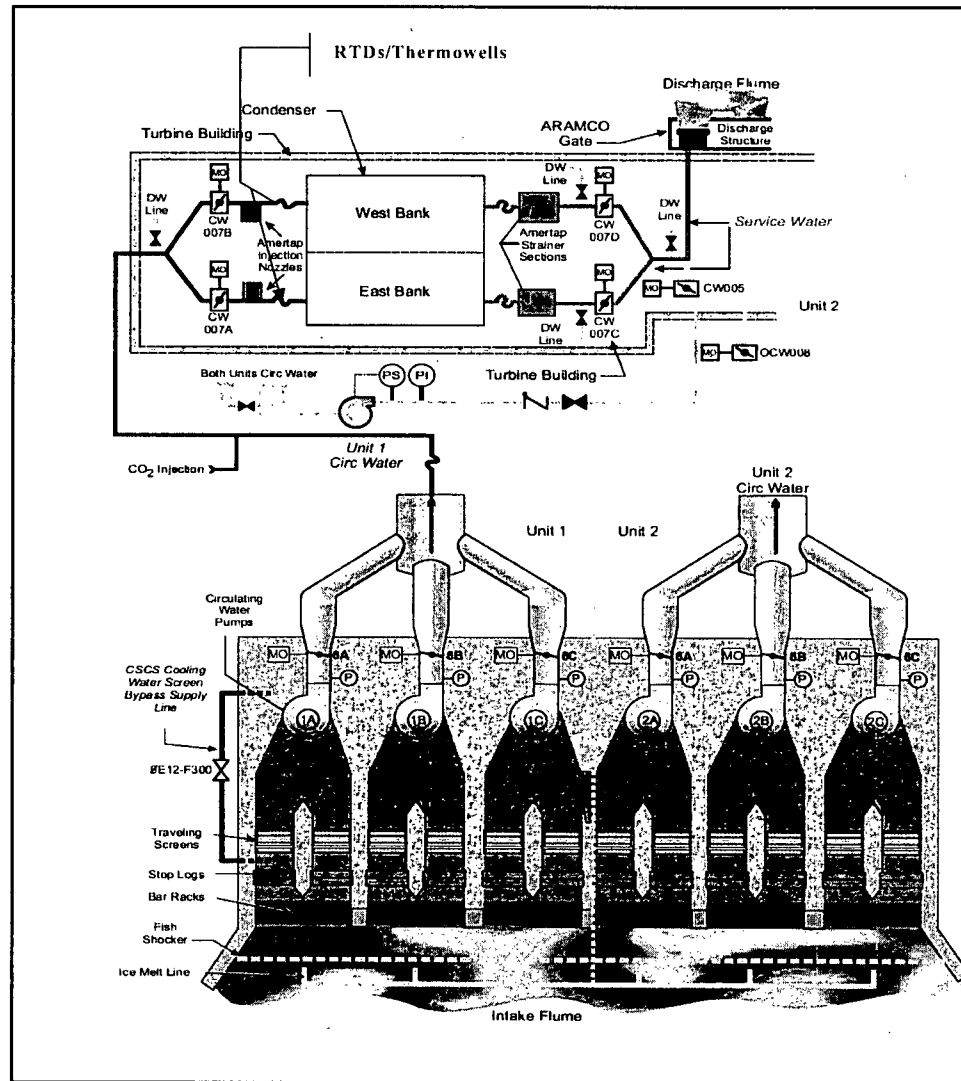
Nuclear

CW Inlet Temperature Trend Data from Plant Process Computer



Simplified Circulating Water (CW) System

Nuclear



UHS LAR Technical Basis

- The UHS post-accident temperature maximum allowable cooling water inlet value = 104°F
- Existing Analysis
 - $104^{\circ}\text{F} = 100^{\circ}\text{F} \text{ (TS max)} + 2^{\circ}\text{F} \text{ (transient)} \pm 1.8^{\circ}\text{F}$
(calculated thermocouple uncertainty) + .2°F (margin added)
- Analysis Results Remains Unchanged
 - $104^{\circ}\text{F} = 101.5^{\circ}\text{F} \text{ (new TS max)} + 2^{\circ}\text{F} \text{ (transient)} \pm 0.31^{\circ}\text{F}$
(calculated RTD uncertainty) + 0.19°F (margin added)

UHS Licensing Basis and Plant Design

- SR 3.7.3.1 was added to LaSalle TS during ITS in 2001
- The CW temperature instrumentation indication loop(s) originally designed as non-safety-related
- The replacement instrumentation used to measure the UHS temperature is non-safety-related
- NES-EIC-20.04 – methodology reviewed during ITS
- Calculation performed in accordance with NEC-EIC-20.04 and was appropriate for instrument uncertainty for non-safety related indicating loops
- The method and procedures used to determine UHS are unchanged

Review of the NRC Safety Evaluation (SE)

- “the degree of measurement accuracy that would be required to support the requested modification is not adequately demonstrated in Exelon’s analysis”
- “the TS modification itself does not adequately address single-unit operation (if only one unit is operating the lack of flow to the other unit could cause the temperature measurements associated with that unit to become non-representative of the UHS temperature.)”

Review of the NRC Safety Evaluation (SE)

- “the degree of measurement accuracy that would be required to support the requested modification is not adequately demonstrated in Exelon’s analysis”
 - RG 1.105 – graded approach
 - HICB-12
 - ISA-S67.04
 - NES-EIC-20.04 – reviewed with ITS
 - HICB issued TIA on UHS instrument accuracy for Millstone 2
 - Waterford Unit 3

Review of the NRC Safety Evaluation (SE)

- “the TS modification itself does not adequately address single-unit operation (if only one unit is operating the lack of flow to the other unit could cause the temperature measurements associated with that unit to become non-representative of the UHS temperature)”
 - The Circulating Water (CW) temperature instrumentation indication loop(s) are of an equivalent design
 - The replacement instrumentation used to measure the UHS temperature is non-safety-related, installed and fully functional
 - The method and procedures used to determine UHS are unchanged
 - The CW temperature of the installed RTDs on either unit is representative of the UHS temperature with a CW pump running
 - If the unit does not have a CW pump in operation, the surveillance procedure directs the CW temperature to be recorded from a unit that does have a CW pump in operation

Exelon Perspective of Denial

- Change in NRC position on measurement uncertainty methodology for non-safety related systems
- Challenging current design and licensing basis for LaSalle CW system

Regulatory Resolution Pathways

- Identify additional issues with Exelon approach
- Resolve Issues
- Resubmittal