Duke Energy Pre-submittal Meeting
January 7, 2026

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Pre-Submittal Meeting

License Amendment Request to Relocate Ultimate Heat Sink Level Requirement and Update Unit Staff Responsibility Requirement

Shearon Harris Nuclear Power Plant (HNP)

Duke Energy Attendees

Ryan Treadway (Director, Nuclear Fleet Licensing)

Dennis Earp (Nuclear Fleet Licensing)

Mike Welker (HNP Engineering)

Trae Hartley (HNP Engineering)

Agenda

- System Design and Operation
- Background
- Description of Change
- Reason for Change
- Technical Evaluation
- Regulatory Evaluation
- Precedent
- Schedule

Ultimate Heat Sink (UHS)

- Complex of water sources, including associated retaining structures and any canals or conduits connecting the sources with the intake structure
- Dissipates the Service Water System heat load during emergency operation
- Two alternate sources of cooling water
  - Auxiliary Reservoir (primary source)
  - Main Reservoir
- Each reservoir is capable of providing 30-day cooling supply
- The water control structures of the UHS inspected based on Regulatory Guide (RG) 1.127
- The Technical Specifications (TS) contain the periodic testing requirements and limiting conditions for operation of the UHS
  - Limits on the UHS level and temperature ensure that sufficient cooling capacity is available either to: (1) provide normal cooldown of the facility or (2) mitigate the effects of accident conditions within acceptable limits.

Background

- License Amendment No. 80 (ADAMS Accession No. ML020590029)
  - Issued September 8, 1998, increased required minimum level of Main Reservoir from originally licensed 205.7 feet mean sea level (MSL) to 215 feet MSL
  - Based on results of revised calculations and analyses to address NRC Generic Letter (GL) 89-13, “Service Water System Problems Affecting Safety-Related Equipment”
- License Amendment No. 132 (ADAMS Accession No. ML092640247)
  - Issued October 14, 2009, restored minimum level in Main Reservoir back to 206 feet MSL (rounded up from original 205.7 feet MSL)
  - Based on results from improvements made to the Emergency Service Water (ESW) system

Description of Change

- Proposing a revision to HNP TS 3.7.5, “Ultimate Heat Sink”
  - Relocate the minimum UHS level values to the licensee-controlled Technical Requirements Manual (TRM)
  - Reflect that either the Auxiliary Reservoir **or** the Main Reservoir is required to maintain operability of the UHS

- Proposing an administrative change to HNP TS 6.1.2 to consolidate content from TS Table 6.2-1, “Minimum Shift Crew Composition,” regarding responsibility of control room command function during absence of Shift Manager.

Reason for Change – TS 3.7.5

- Minimum level requirement for Main Reservoir is non-conservative based upon current as-found sediment accumulation within the ESW / Cooling Tower Makeup (CTMU) Main Reservoir Intake Channel.
  - Would not meet the maximum fluid velocity limits described in the Updated Final Safety Analysis Report (FSAR)
- Ability to increase minimum reservoir level limits based on inspection results ensures that channel fluid velocities remain below the maximum limit.
  - Technical Requirements Manual (TRM) is a licensee-controlled document where changes are processed in accordance with 10 CFR 50.59
- Both reservoirs currently required to meet temperature and level requirements for UHS operability, despite each being independently capable of meeting the 30-day long term cooling requirement

Reason for Change – TS 6.1.2

- Administrative change to consolidate the requirements of the control room command function
- Makes TS consistent with corresponding requirement in Revision 5 of NUREG-1431, “Standard Technical Specifications - Westinghouse Plants” (ADAMS Accession No. ML21259A155)
- Removes unnecessary restriction on Shift Technical Advisor from assuming control room command function during absence of Shift Manger

Current Technical Specification

PLANT SYSTEMS

3/4.7.5 ULTIMATE HEAT SINK

LIMITING CONDITION FOR OPERATION

3.7.5 The ultimate heat sink shall be OPERABLE with:

a. A minimum auxiliary reservoir water level at or above elevation 250 feet Mean Sea Level, USGS datum, and a minimum main reservoir water level at or above 206 feet Mean Sea Level, USGS datum, and

b. A water temperature as measured at the respective intake structure of less than or equal to 94°F.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the requirements of the above specification not satisfied, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.7.5 The ultimate heat sink shall be determined OPERABLE at the frequency specified in the Surveillance Frequency Control Program by verifying the water temperature and water level to be within their limits.

Proposed Technical Specification

PLANT SYSTEMS

3/4.7.5 ULTIMATE HEAT SINK

the respective reservoir limit provided in the Technical Requirements Manual

LIMITING CONDITION FOR OPERATION

3.7.5 The ultimate heat sink shall be OPERABLE with:

or

a. A minimum auxiliary reservoir water level ~~at or above elevation 250 feet Mean Sea Level, USGS datum, and~~ a minimum main reservoir water level at or above ~~206 feet Mean Sea Level, USGS datum~~, and

b. A water temperature as measured at the respective intake structure of less than or equal to 94°F.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the requirements of the above specification not satisfied, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

Proposed Content for TRM

16.0 OPERATIONAL REFERENCES

16.10 Ultimate Heat Sink

REFERENCE: The Ultimate Heat Sink (UHS) minimum reservoir levels covered by TECHNICAL SPECIFICATION 3.7.5.a shall be listed in Table 16.10-1. The levels to be used for determining operability of the UHS shall not be less than those approved by the NRC in NUREG-1038, Safety Evaluation Report Related to the Operation of Shearon Harris Nuclear Power Plant, Units 1 and 2 (dated November 1983).

Ultimate Heat Sink Minimum Reservoir Water Levels

Table 16.10-1

Reservoir		Level approved in NUREG-1038 (Feet Mean Sea Level)	Minimum Level Limit (Feet Mean Sea Level)
1.	Auxiliary Reservoir	250	250
2.	Main Reservoir	205.7	215

Current Technical Specification

6.0 ADMINISTRATIVE CONTROLS

6.1 RESPONSIBILITY

6.1.1 The plant manager shall be responsible for overall unit operation and shall delegate in writing the succession to this responsibility during his absence.

6.1.2 The Shift Manager (or, during his absence from the control room, a designated individual) shall be responsible for the control room command function.

Current Technical Specification

TABLE 6.2-1

MINIMUM SHIFT CREW COMPOSITION

POSITION	NUMBER OF INDIVIDUALS REQUIRED TO FILL POSITION	
	MODE 1, 2, 3, or 4	MODE 5 or 6
SM	1	1
SRO	1	None
RO	2	1
AO	2	1
STA	1*	None

SM - Shift Manager with a Senior Operator license on Unit 1

SRO - Individual with a Senior Operator license on Unit 1

RO - Individual with an Operator license on Unit 1

AO - Auxiliary Operator - license not required

STA - Shift Technical Advisor

The shift crew composition may be one less than the minimum requirements of Table 6.2-1 for a period of time not to exceed 2 hours, in order to accommodate unexpected absence of on-duty shift crew members, provided immediate action is taken to restore the shift crew composition to within the minimum requirements of Table 6.2-1. This provision does not permit any shift crew position to be unmanned upon shift change due to an oncoming shift crewman being late or absent.

During any absence of the Shift Manager from the control room while the unit is in MODE 1, 2, 3, or 4, an individual (other than the Shift Technical Advisor) with a valid Senior Operator license shall be designated to assume the control room command function. During any absence of the Shift Manager from the control room while the unit is in MODE 5 or 6, an individual with a valid Senior Operator license or Operator license shall be designated to assume the control room command function.

Proposed Technical Specification

6.0 ADMINISTRATIVE CONTROLS

6.1 RESPONSIBILITY

6.1.1 The plant manager shall be responsible for overall unit operation and shall delegate in writing the succession to this responsibility during his absence.

6.1.2 The Shift Manager ~~(or, during his absence from the control room, a designated individual)~~ shall be responsible for the control room command function.

ADD: INSERT (below)

INSERT:

During any absence of the Shift Manager from the control room while the unit is in MODE 1, 2, 3, or 4, an individual with an active Senior Reactor Operator (SRO) license shall be designated to assume the control room command function. During any absence of the Shift Manager from the control room while the unit is in MODE 5 or 6, an individual with an active SRO license or Reactor Operator license shall be designated to assume the control room command function.

Proposed Technical Specification

TABLE 6.2-1

MINIMUM SHIFT CREW COMPOSITION

POSITION	NUMBER OF INDIVIDUALS REQUIRED TO FILL POSITION	
	MODE 1, 2, 3, or 4	MODE 5 or 6
SM	1	1
SRO	1	None
RO	2	1
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STA	1*	None

SM - Shift Manager with a Senior Operator license on Unit 1

SRO - Individual with a Senior Operator license on Unit 1

RO - Individual with an Operator license on Unit 1

AO - Auxiliary Operator - license not required

STA - Shift Technical Advisor

The shift crew composition may be one less than the minimum requirements of Table 6.2-1 for a period of time not to exceed 2 hours, in order to accommodate unexpected absence of on-duty shift crew members, provided immediate action is taken to restore the shift crew composition to within the minimum requirements of Table 6.2-1. This provision does not permit any shift crew position to be unmanned upon shift change due to an oncoming shift crewman being late or absent.

~~During any absence of the Shift Manager from the control room while the unit is in MODE 1, 2, 3, or 4, an individual (other than the Shift Technical Advisor) with a valid Senior Operator license shall be designated to assume the control room command function. During any absence of the Shift Manager from the control room while the unit is in MODE 5 or 6, an individual with a valid Senior Operator license or Operator license shall be designated to assume the control room command function.~~

TS 3.7.5

- Limitations on the UHS level and temperature ensure that sufficient cooling capacity is available either to:
  - provide normal cooldown of the facility; or
  - mitigate the effects of accident conditions within acceptable limits.
- Based on providing a 30-day cooling water supply to safety-related equipment without exceeding design basis temperature
  - Consistent with the recommendations of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Plants," Rev. 2, January 1976.
- Minimum level reflected in TRM will be limited to a value no less than that analyzed in NUREG-1038, Safety Evaluation Report Related to the Operation of Shearon Harris Nuclear Power Plant, Units 1 and 2 (dated November 1983)

Technical Evaluation

- Future water elevation changes will be evaluated and verified to continue to meet the recommendations for integrity and availability of the UHS.
- When reducing reservoir level, areas of consideration for analysis are the effects on:
  - Minimum ESW flow rates
  - Minimum ESW pressures inside containment
  - Maximum ESW supply/inlet temperature
  - Minimum ESW Pump submergence
  - RG 1.27 compliance
  - Minimum CTMU pump (Main) or Fire Protection pump (Auxiliary) submergence
  - Impact on plant setpoints and procedures
  - FSAR Chapter 15 Accident Analysis considerations
- Furthermore, changes to the TRM would have to be processed in accordance with procedure and the requirements of 10 CFR 50.59

Technical Evaluation

- While at their minimum normal operation levels, both the Auxiliary and Main Reservoirs, taken separately, are more than adequate to permit emergency shutdown and cooldown of the plant.
- The Auxiliary Reservoir will perform its function as the UHS in the event of a loss of service water from the Cooling Tower.
- A minimum level of 250 ft. Elevation in the Auxiliary Reservoir is maintained at all times during normal operation by creek inflow above the Auxiliary Dam and by pumping water from the Main Reservoir.
- The Main Reservoir will function as a cooling reservoir in the case where the Auxiliary Reservoir is not available.
- The Main Reservoir is normally maintained at a level of 220 ft. MSL, but may decrease to 206 ft. MSL during normal operation
- Emergency Service Water from either source is discharged to the Auxiliary Reservoir.

Technical Evaluation

TS 6.1.2

- Proposed changes are administrative in nature
- Does not functionally change the responsibility of the person designated for control room command function
  - Individual with valid Senior Operator license
  - STA is required to have a Senior Operator License
- Consistent with Standard Technical Specification (STS) 5.1.2 in NUREG-1431

Regulatory Evaluation

- 10 CFR 50.36, “Technical specifications”

- Appendix A to Part 50, General Design Criteria (GDC) for Nuclear Power Plants
  - GDC-2: Design bases for protection against natural phenomena
  - GDC-44: Cooling Water
  - GDC-45: Inspection of cooling water system
  - GDC-46: Testing of cooling water system

- Regulatory Guide 1.27, “Ultimate Heat Sink for Nuclear Power Plants” Revision 2 (ADAMS Accession No. ML003739969)
- Regulatory Guide 1.127, “Inspection of Water-Control Structures Associated with Nuclear Power Plants” Revision 1 (ADAMS Accession No. ML003739392)

Precedent

- Relocation of UHS level limit value to TRM
  - No specific precedent exists.
  - Other items have been determined to be acceptable for relocation to the TRM
    - Containment Isolation Valves and Isolation Times
    - Reactor Trip System Instrumentation Response Times
    - Instrument Uncertainties
- Consolidation of content from TS Table 6.2-1, “Minimum Shift Crew Composition”
  - Turkey Point Nuclear Generating Station, Unit Nos. 3 and 4
  - Letter dated March 19, 2018 (ADAMS Accession No. ML18019A078)
  - Revised TS 6.1.2 regarding the control room command function to consolidate information from TS Table 6.2-1 and make it consistent with the associated content in STS 5.1.2.
  - The amendment also addressed several other items that are not within the scope of this submittal, but of no impact to the proposed request.

Schedule

- Submit License Amendment Request January/February 2026
- Requesting approval on a schedule consistent with the NRC’s graded review approach, but not greater than one year from completion of the NRC's acceptance review.
- Implementation within 120 days of NRC approval.


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