




Harris Nuclear Plant Pre-Submittal Meeting – December 20, 2018

DUKE ENERGY®

License Amendment Request for

Extension of the Essential Services Chilled Water System

Allowed Outage Time

Duke Energy Participants

- Sarah McDaniel, HNP Regulatory Affairs
- Russ Andrews, HNP Engineering
- Paul Farish, Corporate PRA
- Richard Howard, HNP Operations

Agenda

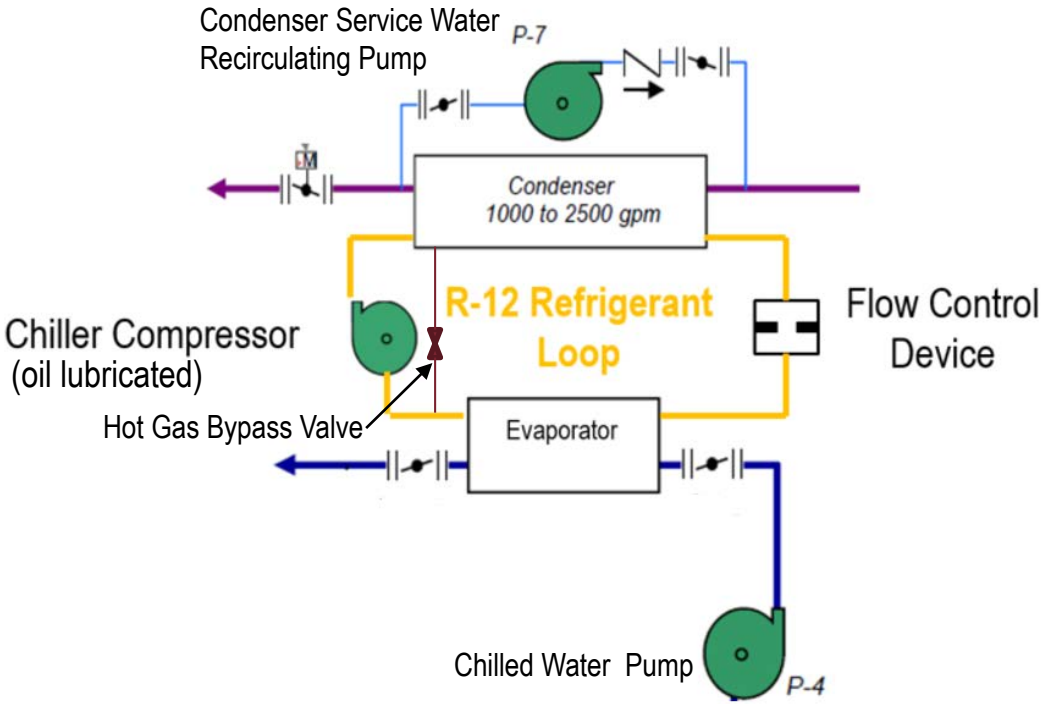
Essential Services Chilled Water System (ESCWS) Allowed Outage Time (AOT) Extension from 72 hours to 7 days

I. Description
- System Design and Operation
- Reason for Change
- Description of Change

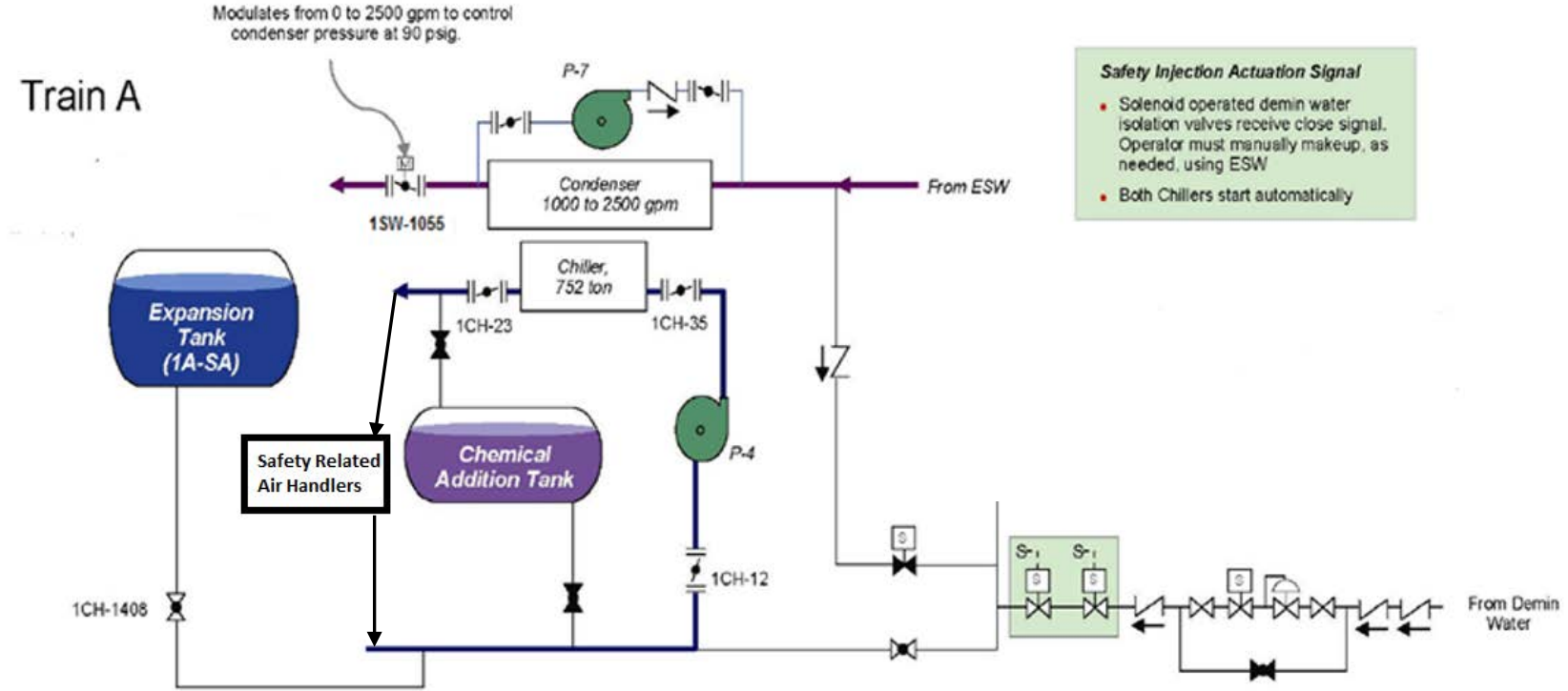
II. Technical Evaluation

III. Conclusion

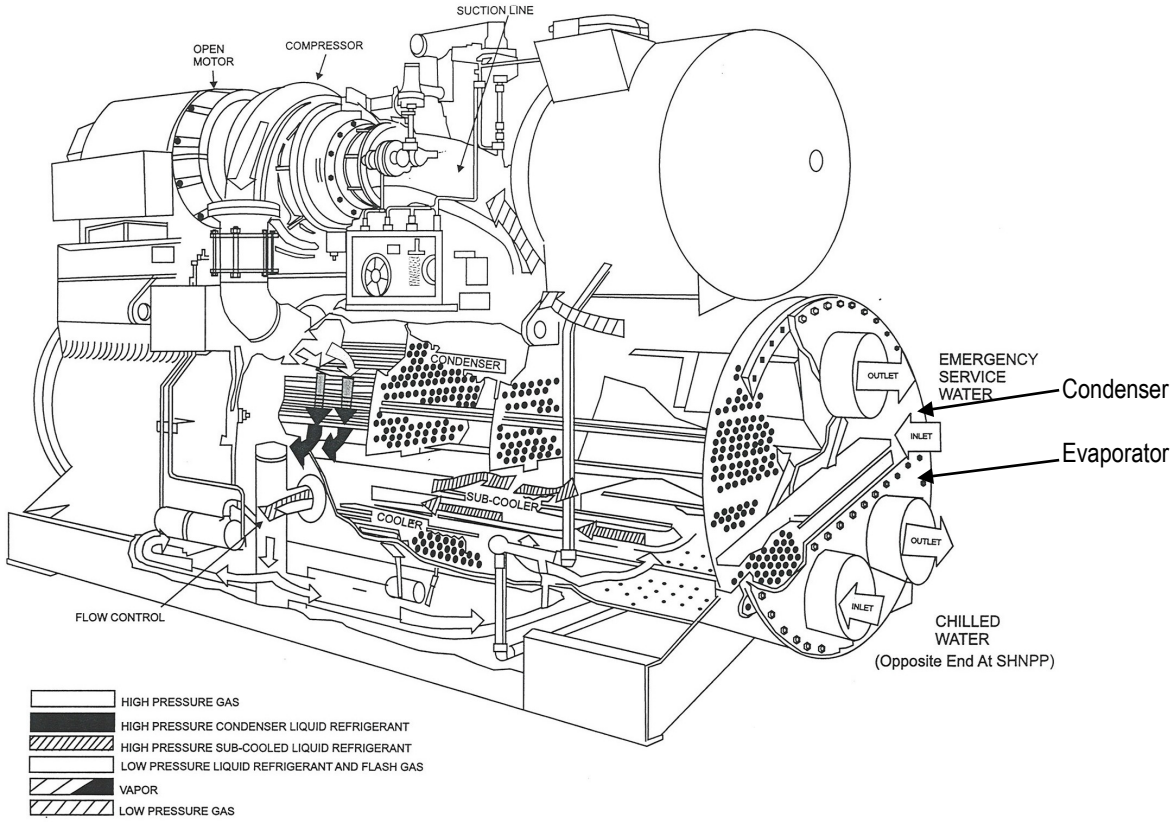
ESCWS Chiller Package



System Design and Operation

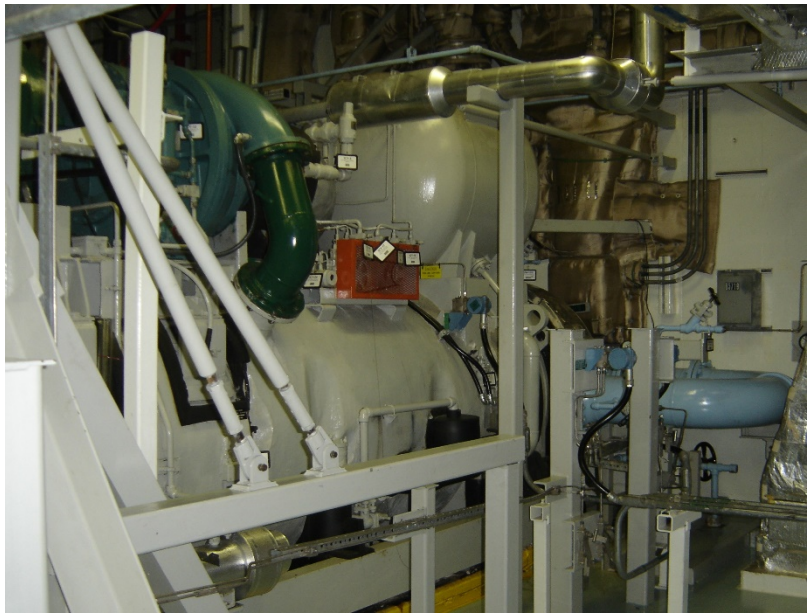


System Design and Operation



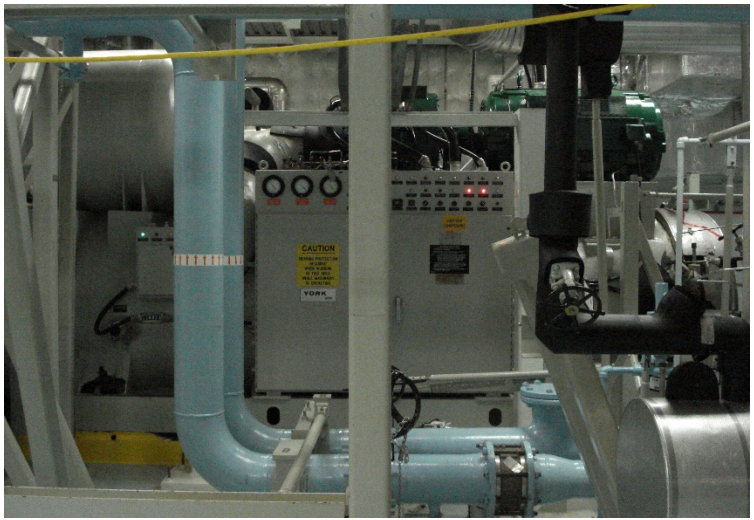
ESCWS provides chilled water to the cooling coils of air handling units for:

- Control Room Air Conditioning System
- Reactor Auxiliary Building ESF Equipment Cooling System
- Reactor Auxiliary Building Switchgear Rooms Ventilation System



ESCWS also provides chilled water to the cooling coils of air handling units for:

- Reactor Auxiliary Building Electrical Equipment Protection Rooms Ventilation System
- Reactor Auxiliary Building Non-Nuclear Safety-Ventilation System
- Fuel Handling Building Spent Fuel Pool Pump Room Ventilation System



Reason for Change

- Refrigerant replacement for the following:
  - Unisolable compressor oil system leakage
  - Excessive refrigerant leakage
  - Excessive hot gas bypass valve leakby
  - Evaporator/condenser tube leaks
  - Certain compressor issues

- Other activities, such as opening and cleaning the ESCWS condenser tubes due to service water fouling, replacement of the ESCWS compressor motor due to electrical fault, and refurbishment of an air handling unit supported by the ESCWS, may necessitate a 7-day AOT.

- Installation of planned ESCWS modification activities

Description of Change

The proposed license amendment revises:

TS 3.7.13, “Essential Services Chilled Water System” – replace 72-hour AOT with 7-day AOT for an inoperable train and adds the note below to TS Action Statements for:

TS 3.1.2.4, “Charging Pumps – Operating”

TS 3.5.2, “ECCS Subsystems – Tavg Greater Than or Equal To 350°F”

TS 3.6.2.1, “Containment Spray System”

TS 3.6.2.3, “Containment Cooling System”

TS 3.7.4, "Emergency Service Water System," that would apply to the B train only

Note: “One Train of [Applicable TS or TS System] is allowed to be inoperable for a total of 7 days to allow for maintenance on the Essential Services Chilled Water System and air handlers supported by the Essential Services Chilled Water System. Prior to exceeding 72 hours, the compensatory measures described in TS Bases 3.7.13 shall be implemented.”

Technical Evaluation

- General Design Criteria:
  - GDC-2: Design Basis for Protection Against Natural Phenomena
  - GDC-5: Sharing of structures, systems, and components
  - GDC-44: Cooling Water
  - GDC-45: Inspection of cooling water system
  - GDC-46: Testing of cooling water system

- RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"

- RG 1.177, "An Approach for Plant Specific, Risk Informed Decisionmaking: Technical Specifications"

Regulatory Guide 1.174 provides guidelines on delta CDF and delta LERF values.

- The 7-day AOT entry has a delta CDF that is less than 1.0×10^{-6} per year.
  The 7-day AOT entry has a delta LERF that is less than 1.0×10^{-7} per year.

Regulatory Guide 1.177, Section 2.4: An ICCDP of less than 1.0×10^{-6} and an ICLERP of less than 1.0×10^{-7} are considered small for a single TS condition entry.

- PRA analysis results conclude that anytime the 7-day AOT is entered, the ICCDP is 2.0×10^{-8} and the ICLERP is 3.0×10^{-10}.

Compensatory Measures:

- Air handlers that support the operable Charging Safety Injection Pump (CSIP) Rooms and Switchgear Rooms and the operable ESCWS chiller will be posted protected.
- The Fire Protection tracking log will be reviewed for fire hazards and fire impairments.
- Transient combustibles and hot work in fire risk-sensitive areas will be limited.
- Restrictions on work activities will be in place that involve components that if lost or failed could result in a plant trip or transient.
- Operator actions for the CSIP area cooling, Switchgear Room cooling, and Auxiliary Relay Panel Room cooling, if needed following a loss of HVAC, will be briefed with Operations.
- The fan used for the CSIP area cooling will be pre-staged and verified to be functional.
- Outages of equipment will be limited or avoided on the operable ESCWS train, Motor-Driven and Turbine-Driven Auxiliary Feedwater Pumps, Service Water System, Emergency Diesel Generators, Alternate Seal Injection System, & Dedicated Shutdown Diesel Generator System.

Technical Evaluation

Evaluation of Safety Margins

- Design
- Operation
- Safety Analysis

Configuration Risk Management

- Maintenance Rule Program
- Work Management and Execution Procedure Guidance
- Computer Risk Tool

Precedents

The following two LARs are examples of plants that have extended allowed outage times for TS systems from 72 hours to 7 days:

- Crystal River Unit 3, 2008 –Extension of Allowed Outage Time to 7 Days for an inoperable Low Pressure Injection Train, Reactor Building Spray Train, Decay Heat Closed Cycle Cooling Water Train, and Decay Heat Seawater Train

- Oconee, 2003 –Extension of Allowed Outage Time for an Inoperable Low Pressure Injection Train from 72 Hours to 7 Days

Conclusion

- The proposed change will allow plant personnel to complete more types of maintenance activities on the ESCWS and its supported air handlers for equipment reliability.
- The proposed change follows the risk guidelines of Regulatory Guides 1.174 and 1.177 and represents an insignificant impact on average annual plant risk.
- The proposed change continues to provide adequate protection to public health and safety.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