Luminant

NRC Teleconference with Comanche Peak Regarding a Proposed Exigent License Amendment Request (LAR) 20-007 TS 3.7.8 "Station Service Water System" TS 3.8.1 "AC Sources – Operating"

Request to extend Completion Time for Unit 2 inoperable SSWS Train B (and associated inoperable Unit 2 EDG Train B due to inoperable SSW) during Unit 2 Cycle 19 in support of SSW Pump 2-02 replacement

November 12, 2020

Agenda

Luminant

- Purpose of Meeting
- System Overview
- Reason for Change
- Description of Proposed Change
- Precedent
- Station Service Water Pump 2-02 Replacement
- Technical Evaluation (Deterministic Based)
- Supplemental Information – Supporting Risk Insights
- Summary
- Questions

Purpose of Meeting

Luminant

- Present plan to submit LAR 20-007
- Gain an understanding of NRC staff perspectives that need to be addressed in the planned submittal
  - Level of detail
  - Technical Content
  - Use of Precedent
  - Technical Evaluation including NRC Regulatory Guidance / Requirements
- Discuss feasibility of CPNPP schedule:
  - November 12, 2020 – Pre-submittal teleconference with NRC
  - November 18, 2020 – Submit LAR 20-007 to NRC
  - February 1, 2021 – Requested approval date from NRC
- The exigent request is necessary to allow Vistra OpCo to replace SSW Pump 2-02 before the high load demands of summer 2021 and prior to Unit 2 fall 2021 outage

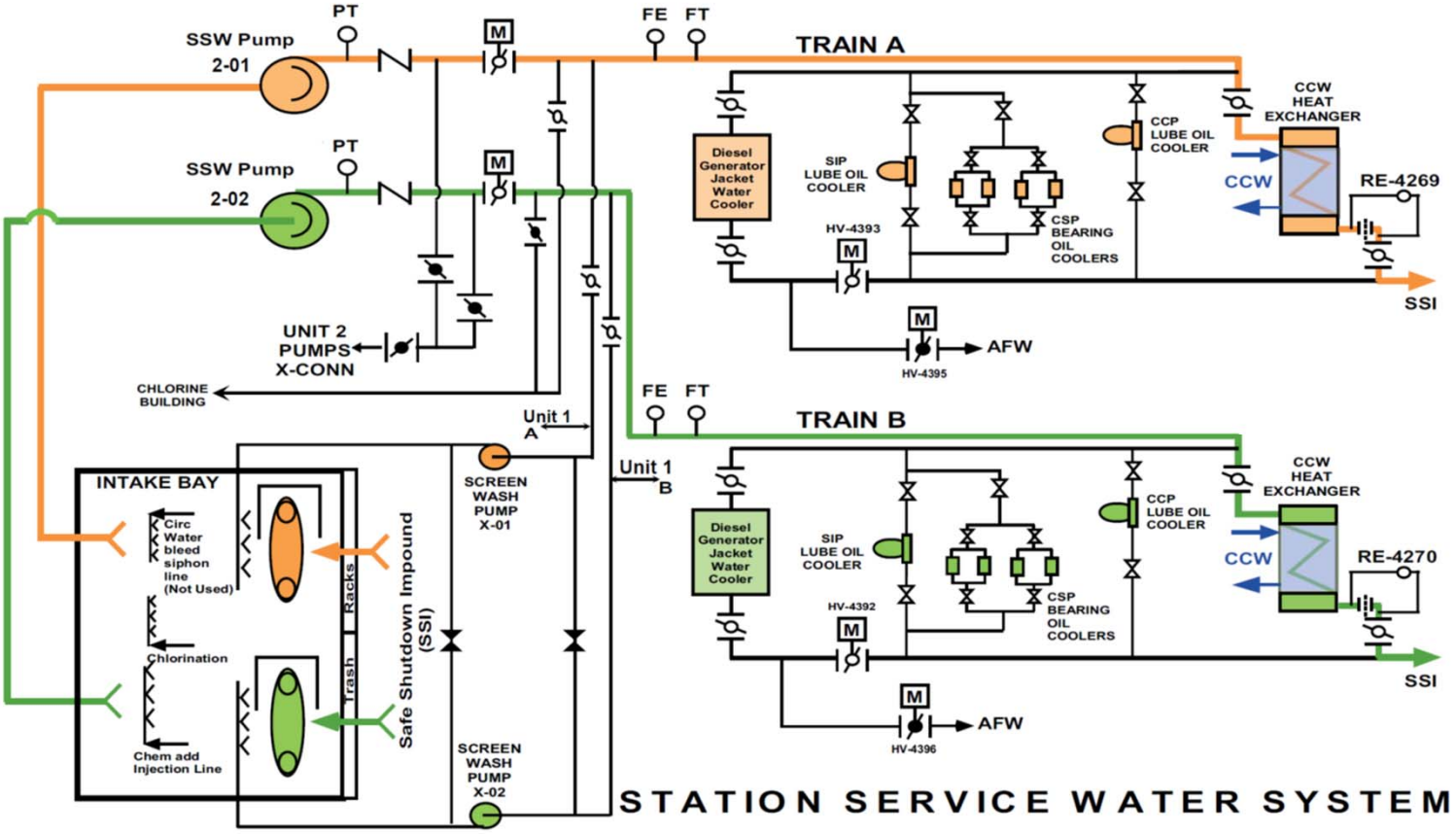
System Overview

- Station service water system (SSWS) consists of two independent and redundant subsystems (Train A & Train B) (See Figure 1)
- SSWS has proceduralized cross connections between two trains of one unit and between units to add operational flexibility
- Unit 2 SSW Pump 2-02 (Train B) requires replacement (See Figures 4, 5, & 6)
- The SSWS removes heat from CCWS heat exchangers and from EDGs, and supplies cooling water to the safety injection, centrifugal charging pump lube oil coolers, and the containment spray pump bearing lube oil coolers
- SSWS is backup water supply for Auxiliary Feedwater System if Condensate Storage Tank is depleted

System Overview

- DGs jacket water is cooled by SSW (See Figure 3)
- The Diesel Generators consists of two independent and redundant subsystems (Train A & Train B) (See Figure 2)
- DGs are independent, onsite, automatically starting systems designed to furnish reliable and adequate power for Class 1E loads to ensure safe plant shutdown and standby when preferred and alternate power sources are not available

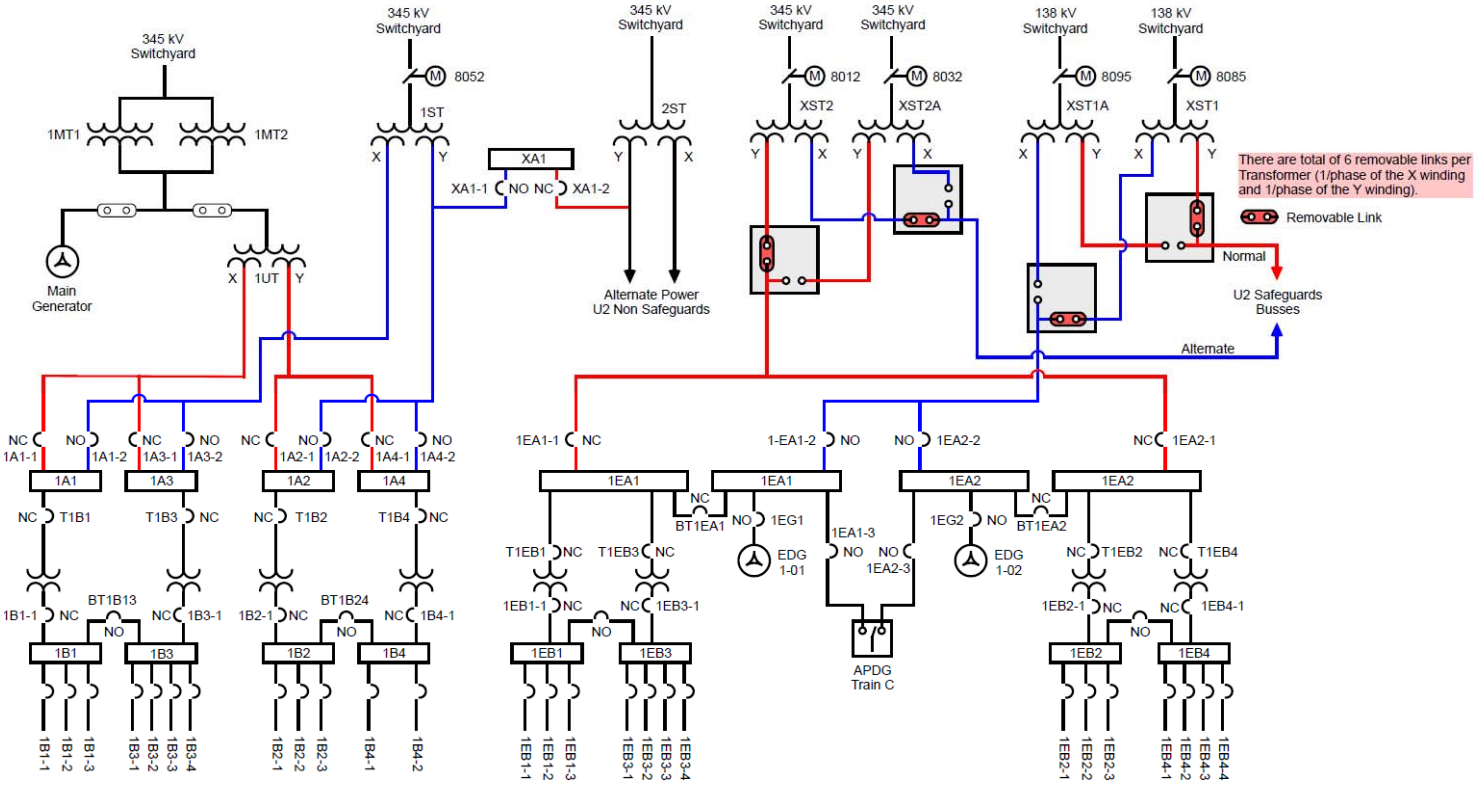
Figure 1



STATION SERVICE WATER SYSTEM

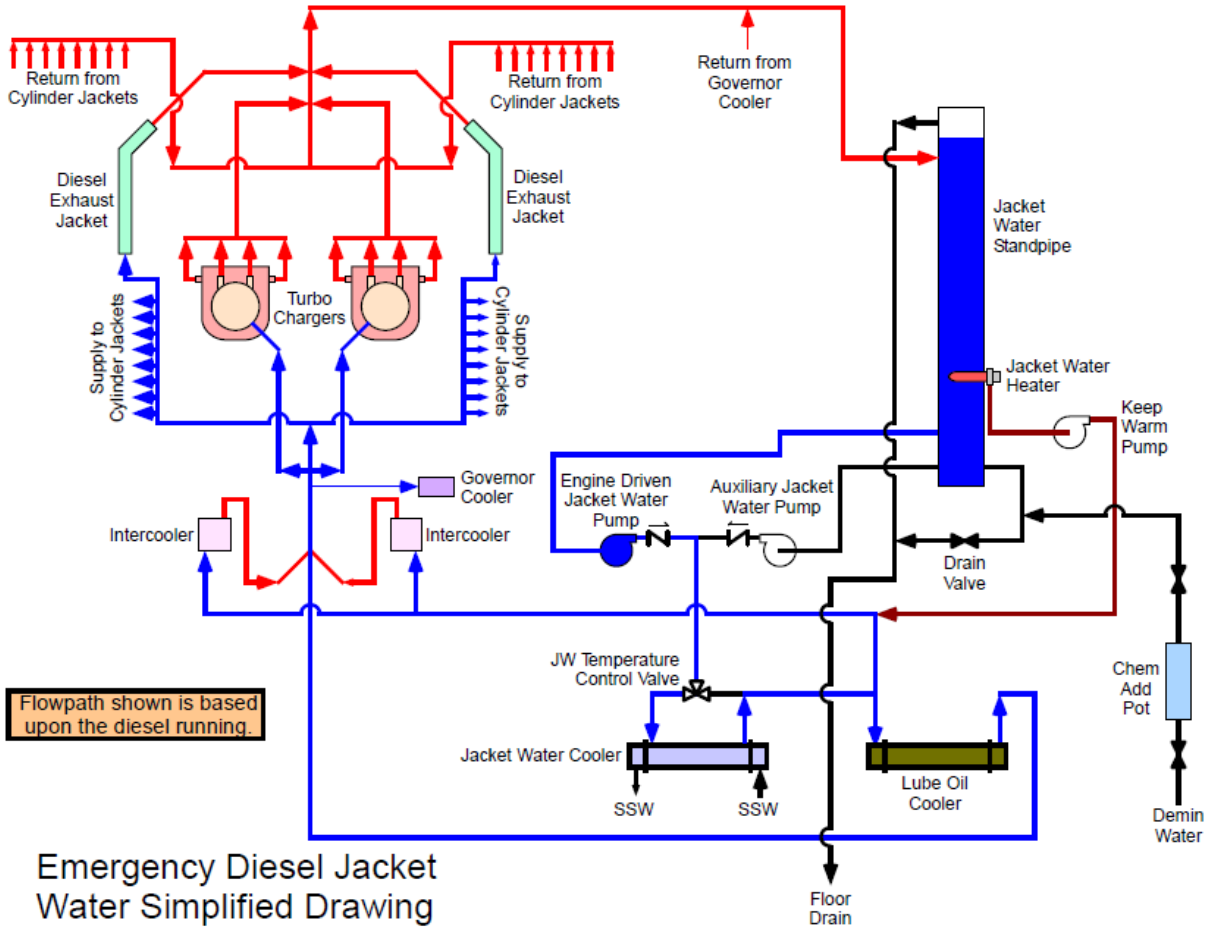
Unit 2

Figure 2
(Unit 1 – typical)



6.9 kV / 480 VAC

Figure 3



Emergency Diesel Jacket Water Simplified Drawing

Figure 4 – SSW Pump 2-01 Replacement (April 2008)

Figure 5 – SSW Pump 2-01 Replacement (April 2008)

Figure 6 – SSW Pump Motor 2-02 (September 2020)

Reason for Change

- Ensure a stable and reliable SSW Pump 2-02 for Unit 2 Cycle 19
- The scope of the replacement will require more than 72 hours to complete
- July 2020 – SSW Pump 2-02 – seal & cooling water low pressure alarms
- October 2020 - SSW Pump 2-02 experienced reduced flow margin
- To address above items, CPNPP has taken the following actions:
  - Temporary seal and lubrication water pressure and flow instrumentation has been installed
  - Operations supervision and field operators are aware of the lowering trend on flow and apply that awareness to shiftly logs and twice shiftly observation
  - Submitting exigent License Amendment Request 20-007 and replacing SSW Pump 2-02 will regain flow margin

Description of Change

- Revise TS 3.7.8 “Station Service Water System” Condition B, “One SSWS train inoperable”
- Replace SSW Pump 2-02 (Train B) during Unit 2 Cycle 19, add one-time actions to restore inoperable station service water train to operable within 7 days (see markup of current TS 3.7.8)
- The new Required Action will be used one time for SSW Pump 2-02 during Unit 2 Cycle 19
- NOTE 1 of TS 3.7.8, Condition B directs entry into Required Action B.4 of LCO 3.8.1 for EDG made inoperable by SSWS – therefore add one-time action to restore inoperable EDG to operable within 7 days (see markup of current TS 3.8.1 Condition B)
- NOTE -CPNPP is still reviewing / optimizing the schedule and considering a CT of 8 days.

Existing CPNPP TS 3.7.8 Condition B marked up to show proposed changes

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One SSWS train inoperable.	B.1 ----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources -- Operating," for emergency diesel generator made inoperable by SSWS. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops -- MODE 4," for residual heat removal loops made inoperable by SSWS. ---------- Insert A → ~~Restore SSWS train to OPERABLE status.~~	72 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

Insert A

B.1	---------- NOTE ---------- Required Action B.1 is not applicable to Unit 2 during replacement of the SSWS Pump 2-02 (Train B) during Unit 2 Cycle 19. ---------- Restore SSWS train to OPERABLE status	72 hours
OR		
B.2	---------- NOTE ---------- Required Action B.2 is applicable on a one-time basis to replace SSWS Pump 2-02 (Train B) during Unit 2 Cycle 19. If Unit 2, Train B SSWS becomes inoperable, immediately enter LCO 3.0.3. Regulatory Commitment 5966825 (Attachment 2 to TXX-20086) will be implemented during the 7 day COMPLETION TIME. ---------- Restore SSWS train to OPERABLE status	7 days

Existing CPNPP TS 3.8.1 Condition B.4 marked up to show proposed changes

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued) Insert B	AND B.4 Restore DG to ~~OPERABLE~~ status.	72 hours
C. Two required offsite circuits inoperable.	C.1 ----------NOTE---------- In MODES 1, 2 and 3, the TDAFW pump is considered a required redundant feature. ---------- Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. AND	12 hours from discovery of Condition C concurrent with inoperability of redundant required features
	C.2 Restore one required offsite circuit to OPERABLE status.	24 hours

Insert B

B.4.1	---------- NOTE ---------- Required Action B.4.1 is not applicable to Unit 2 during replacement of the SSWS Pump 2-02 (Train B) during Unit 2 Cycle 19. ---------- Restore DG to OPERABLE status.	72 hours
OR		
B.4.2	---------- NOTE ---------- Required Action B.4.2 is applicable on a one-time basis to replace SSWS Pump 2-02 (Train B) during Unit 2 Cycle 19. If Unit 2, Train B SSWS becomes inoperable, immediately enter LCO 3.0.3. Regulatory Commitment 5966825 (Attachment 2 to TXX-20086) will be implemented during the 7 day COMPLETION TIME. ---------- Restore DG to OPERABLE status	7 days

Precedent

Luminant

- Industry Licensing Actions / Amendments were reviewed for applicability to LAR 20-007
- No identical industry precedents for proposed changes to CPNPP's TS 3.7.8 Condition A and TS 3.8.1 Condition B.
- However, LAR 20-007 does address specific attributes from an NRC approved License Amendment;
  - Braidwood Unit 2, November 23, 2016 (LA191 / ML16315A302)

SSW Pump 2-02 Replacement

- SSW Pump 2-02 replacement involves the following major activities
  - Place clearances
  - Remove roof access panels
  - Disassemble, uncouple, and remove motor
  - Remove and replace pump
  - Align pump and motor
  - Couple pump
  - Complete Alignment
  - Remove clearances
  - Perform post maintenance test and confirm operability
- NOTE -CPNPP is still reviewing / optimizing the schedule and considering a CT of either 7 or 8 days.

Luminant

Service Water Pump & Motor History				
Component	**Last Replaced**	**Recommended Replacement Frequency**	**Current Scheduled Replacement**	**Performance Issues**
1-01 SWP	April 2016	7.5 years	April 2025	No known performance issues
1-02 SWP	Oct 2020	7.5 years	Oct 2029	Newly installed pump; no known performance issues
2-01 SWP	April 2008	7.5 years	Oct 2021	Excessive number of cooling & lubrication water low pressure alarms attributed to pump wear; flows and pressure are acceptable. Timeliness tracking in effect for October 2021 replacement.
2-02 SWP	Oct 2012	7.5 years	Feb 2021	July 2020 – seal & cooling water low pressure alarms October 2020 – experienced reduced flow margin Temporary seal and lubrication water pressure and flow instrumentation has been installed
1-01 SWP Motor	Oct 2011	9 years or condition based	April 2022	No known performance issues; scheduled due to service life
1-02 SWP Motor	Oct 2020	9 years or condition based	TBD	Newly installed motor; no known performance issues
2-01 SWP Motor	April 2008	9 years or condition based	Oct 2021	No known performance issues; scheduled due to service life
2-02 SWP Motor	Oct 2012	9 years or condition based	TBD	No known performance issues

Technical Evaluation

- SSW Pump 2-02 (Train B) replacement
  - Safety function is maintained by Train A SSWS and Train A EDG.
  - While in an active Limiting Condition for Operations an additional failure is NOT assumed.
  - Regulatory Commitment 5966825 provides conditions under which the extended COMPLETION TIME will NOT be entered or will be exited to CONDITION B to shutdown Unit 2.
  - Inspections, compensatory actions, and commitments are put in place to protect Train A SSWS and Train A EDG upon entry and during the extended COMPLETION TIME.
  - Unit 2 Train B components affected by Unit 2 Train B SSW will be in pull out in accordance with operation procedures (to protect equipment, unless cross connections are made to supply SSW from other Train or opposite unit)

Technical Evaluation

- NUREG-0800 Branch Technical Position (BTP) 8-8 “Onsite and Offsite Power Sources AOT Extensions”
  - *1st bullet - A supplemental power source should be available as a backup to the inoperable EDG or offsite power source, to maintain the defense-in-depth design philosophy of the electrical system to meet its intended safety function. The supplemental source must have capacity to bring a unit to safe shutdown (cold shutdown) in case of a loss of offsite power (LOOP) concurrent with a single failure during plant operation (Mode 1).*
    - Unit 2 Train B EDG is declared inoperable solely due to an inoperable Unit 2 Train B SSWS. Should there be a LOOP concurrent with a single failure (i.e., Unit 2 Train A EDG) during plant operation, the Unit 2 Train B EDG is available for use based on previously developed procedures
      - On-site APDGs are available to feed 6.9kV Class 1E bus so that unaffected Unit 2 Train A SSW Pump 2-01 could have power from the APGs to restart and reestablish SSW flow using cross connections to Unit 2 Train B EDG
      - APDGs are capable of bringing the unit to a safe shutdown
      - Also, either Unit 1 Train A SSW or Unit 1 Train B SSW can be cross connected to Unit 2 Train B EDG
  - *2nd bullet – extended AOT will not be used more that once during refueling cycle*
    - Request is for one-time use only in Unit 2 Cycle 19
  - 3rd through 7th bullet are addressed by Regulatory Commitment 5966825 discussed later

Technical Evaluation

Luminant

- Defense in Depth Considerations
  - TS 3.5.2 “ECCS – Operating”
    - A single train of ECCS is capable of providing core cooling and negative reactivity to ensure that the reactor core is protected after a Design Basis Accident (DBA), assuming no single failure. ECCS Train A will be protected during the extended CT.
  - TS 3.6.6 “Containment Spray System”
    - A single train of Containment Spray is capable of supporting the minimum safety functions necessary to provide containment atmosphere cooling to limit post accident pressure and temperature in containment to less than the design values, assuming no single failure. Containment Spray System Train A will be protected during the extended CT.

Technical Evaluation

Luminant

- Defense in Depth Considerations
  - TS 3.7.5 “Auxiliary Feedwater (AFW) System”
    - A single train of AFW is capable of supporting the minimum safety functions necessary to automatically supply feedwater to the steam generators to remove decay heat from the Reactor Coolant System upon the loss of normal feedwater supply. Auxiliary Feedwater System Train A and the turbine driven AFW pump will be protected during the extended CT.
  - TS 3.7.7 “Component Cooling Water (CCW) System”
    - A single train of CCW is capable of supporting the minimum safety functions necessary to provide a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient, assuming no single failure. Component Cooling Water System Train A will be protected during the extended CT.

Technical Evaluation

- Defense in Depth Considerations
  - TS 3.8.9 “Distribution Systems -- Operating”
    - The AC, DC, and AC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. The Train A electrical power sources will be protected during the extended CT.
  - Spent Fuel Pool Cooling (SFPC)
    - Both trains will be aligned to Unit 1

Technical Evaluation

Luminant

- Defense in Depth Considerations
  - Design Basis Accident (DBA) (with no Loss of Offsite Power)
    - The Station Service Water System Train A remains operable during the extended CT. Risk reduction measures are captured as a commitment in Attachment 1 to minimize potential failure of Station Service Water System Train A.
  - Loss of Offsite Power (LOOP)
    - In the event of a Loss of Offsite Power (LOOP), the Station Service Water System Train A power would be operable from Train A Emergency Diesel Generator. Risk reduction measures are implemented as commitments to minimize potential for LOOP and failure of Station Service Water System Train A or EDG Train A.

Technical Evaluation

Luminant

- Defense in Depth Considerations
  - Inspection and Monitoring
    - Shiftly surveillances and tours are performed to ensure any challenge to protected train equipment is identified quickly so that corrective actions or unit shutdown can be initiated.
  - Fire Protection Considerations
    - There are two impacts for proposed activity on the CPNPP Fire Protection Program. The first is due to the physical work itself. This work is known, understood, and the maintenance activity will have the necessary fire protection considerations included as required by station procedures.
    - The second impact is on the Fire Safe Shutdown Analysis (FSSA). The analysis assumes that there is a Loss of Offsite Power (LOOP) in conjunction with a fire and any equipment requiring power can be fed from onsite power sources.

Technical Evaluation

Luminant

- Defense in Depth Considerations
  - Existing procedures provide SSWS cross connections between the two trains and between units add operational flexibility
  - Heavy Loads
    - The Service Water Intake Structure (SWIS) building is a seismic category I structure and the operating deck and safety-related equipment in the SWIS are located above the probable maximum flood (PMF) level.
    - The separation and redundancy of the Station Service Water System ensures that, should an accidental load drop disable one train, at least two trains are still available for safe shutdown of both units.
    - Safe load paths are established as part of the maintenance activity to replace the SSW Pump 2-02

Technical Evaluation

- Additional Sources for Safe Shutdown
  - Alternate Power Diesel Generators (APDGs)
    - They are connected to the 6.9kV Safeguards switchgear through a transfer switch and a bus breaker. This capability does not meet technical specification operability requirements for emergency power sources. However, it does contribute to plant safety by providing another source of power. The APDGs are available to feed the selected 6.9kV Class 1E bus. APDGs are capable of bringing the unit to a safe shutdown
  - FLEX equipment
    - In accordance with 10 CFR 50.155, “Mitigation of beyond-design-basis events,” CPNPP has developed strategies and guidelines to mitigate beyond-design-basis external events from natural phenomena assuming a loss of all ac power concurrent with a loss of normal access to the ultimate heat sink.
    - In support of the mitigation strategies, equipment and resources are maintained in a FLEX storage building and other locations. The capability exists to supply alternate path of cooling water for AFW pump operation, CST makeup, SSWS restoration, CCW Restoration, and Safety Chilled Water System restoration.

Technical Evaluation

Luminant

- Regulatory Evaluation
  - GDC-2 Design Bases for Protection Against Natural Phenomena
  - GDC-4 Environmental and Dynamic Effects Design Bases
  - GDC-5 Sharing of Structures, Systems, and Components
  - GDC-17 Electric Power Systems
  - GDC-18 Inspection and Testing of Electric Power System
  - GDC-44 Cooling Water
  - GDC-45 Inspection of Cooling Water System
  - GDC-46 Testing of Cooling Water System
  - NUREG 0800 – BTP 8-8 “Onsite and Offsite Power Sources AOT Extensions”

Technical Evaluation

Luminant

- Regulatory Commitment 5966825 during the extended CT
  - Access to both switchyards and relay houses will be controlled and posted, and all switchyard maintenance will be suspended.
  - The EDGs, APDGs, TDAFWPs, startup transformers, CCWPs, and SSWPs will have ALL elective testing and maintenance activities suspended. Additionally, signs will be placed on the doorways to the equipment, or in the case of startup transformers, barricades will be erected around the equipment, noting the restriction of testing and maintenance.
  - For Fire Safe Shutdown Analysis in the Fire Areas of Concern
    - Periodic roving fire watch
    - Suspend “Hot Work” and prohibit start of new “Hot Work” outside of work area
    - Control new transient combustibles, or addition to transient combustibles already authorized
  - For Risk Mitigation
    - Zones identified in the fire assessment will have additional restrictions for combustibles / transient combustibles and hot work

Technical Evaluation

Luminant

- Regulatory Commitment 5966825 during extended CT
  - SSW Pump 2-02 replacement will not be started if either of the following are anticipated
    - Severe weather
    - Grid instability
  - Attachment 2 of LAR 20-007 provides committed actions as described above while in the extended COMPLETION TIMEs.

Supplementary Information

- Supporting Risk Insights – Quantitative Models meet RG 1.200
  - Risk impacts of proposed CT extension are small and risk information is consistent with results from engineering analysis
    - Quantified risk metrics well below thresholds suggested by RGs
    - Proposed duration - within the range granted at similar plants
    - Other modeled event and action probabilities remain unchanged
    - Functional requirements, redundancy, basis for success – unaffected
  - Quantitative - Internal Events including Internal Flood, Internal Fire, At-Power
  - Qualitative - Seismic, Tornado and Other External Events
  - Risk Management Strategies – CRMP and recommended actions

Summary

Luminant

- Results of the deterministic evaluation / analysis provides assurance that the systems and equipment required to safely shutdown the plant and mitigate the effects of a design basis accident will remain capable of performing their safety functions.
- Risk impacts of proposed CT extension are small and risk information is consistent with results from the deterministic analysis
- The proposed changes to TS 3.7.8 & TS 3.8.1 are consistent with NRC guidance and meet the following principles:
  - Meets the current regulations
  - Consistent with defense-in-depth philosophy
  - Maintains sufficient safety margins

Questions

Luminant

?