

**Surry Power Station Units 1 and 2
Pre-Submittal Meeting**

License Amendment Request

***Temporary Service Water Jumper and Intake Canal Level Probe
for Implementation of CFRP in Service Water Supply Lines to
Component Cooling Heat Exchangers***

July 17, 2024

Agenda

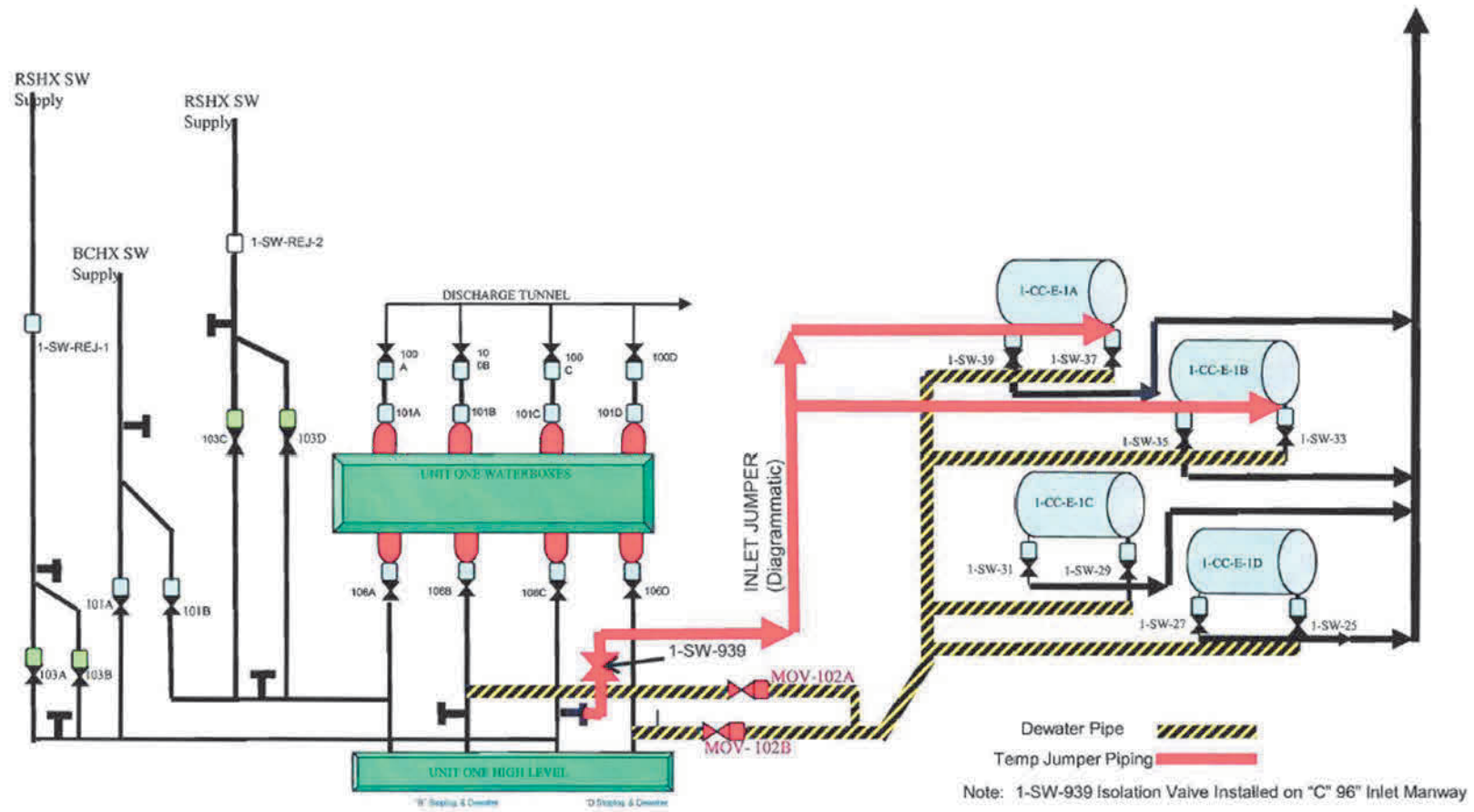
- **Introduction/Opening Remarks**
- **Overview of License Amendment Request – Temporary SW Jumper and Intake Canal Level Probe**
 - Reason for LAR
 - Replacement Activities and Duration
 - Current TS Requirements
 - Proposed Temporary TS Requirements
 - Project Constraints / Compensatory Measures
 - Contingency Action Plan
 - Probabilistic Risk Assessment
 - Precedents
- **Schedule**
- **Summary**
- **Questions / Comments**

Reason for LAR

- A permanent repair of Service Water (SW) piping using Carbon Fiber Reinforced Polymer (CFRP) is being implemented to assure long term system health. SW supply to both units' CCHXs is supplied by Unit 1 SW piping. To perform the SW pipe repair, a temporary SW supply jumper to the CCHXs is needed to provide cooling for Unit 2 operating loads and Unit 1 shutdown loads, as well as Spent Fuel Pool cooling.
- The SW pipe repair requires dewatering the two High Level Canal Intake bays that supply the SW piping. The two bays contain low intake canal level probes for isolating non-essential SW and tripping both units' turbines. Dewatering the bays requires the non-essential SW automatic isolation probes to be defeated during the maintenance activity.
- Therefore, TS changes are required to permit the use of: 1) a temporary, not fully missile protected, SW supply jumper, and 2) a temporary, non-missile protected, canal level probe for the duration of the maintenance activity. (Both the temporary jumper and canal level probe are safety related.)

Replacement Activities and Duration

- Replacement activities include:
 - Installation of temporary canal level probe
 - Stop logging and dewatering of the Unit 1 'B' and 'D' High Level Intake Structure bays
 - Removing SW MOVs (1-SW-102 A and B) to gain access to SW piping
 - Installation of safety related, seismic temporary SW supply jumper to CCHXs
 - Installation of CFRP in SW lines
 - Restoration of normal SW supply
 - Removal of temporary canal level probe and temporary SW jumper from service.
- The estimated duration to perform these activities, and the requested LAR Allowed Outage Time (AOT), is 35-days, which is consistent with previously approved license amendments.



Current TS Requirements

- TS 3.7, Table 3.7-2, *Engineered Safeguards Action Instrument Operating Conditions*, requires a minimum of 3 operable channels for low intake canal level and a minimum of 2 automatic actuation logic channels.
- TS 3.7 Basis – The Non-Essential Service Water Isolation System ensures adequate intake canal inventory can be maintained by the Emergency Service Water Pumps.
- TS 3.13, *Component Cooling System*, requires two CC pumps and CCHXs to be operable for one Unit operation.
- TS 3.14, *Circulating and Service Water Systems*, requires flow to and from the CCHXs prior to Reactor Coolant System temperature or pressure exceeding 350°F or 450 psig, or for the reactor to be critical.
- TS 3.14 Basis requires a minimum level of +17.2 feet in the High Level Intake Canal to provide design flow of SW through the Recirculation Spray Heat Exchangers during a loss-of-coolant accident for the first 24 hours. If the water level falls below +23’-6”, signals are generated to trip both Units’ turbines and to close the non-essential Circulating and Service Water valves.

Proposed Temporary TS Requirements

- Add a note to TS Table 3.7-2 stating a temporary, safety related, non-missile protected, canal level probe will be provided to meet the required minimum number of operable channels associated with Non-Essential Service Water Isolation, Low intake canal level, requirements of TS 3.7, Item 5.a, to minimize the possibility of a spurious Unit 2 trip.
- Add a footnote to TS 3.14.A.2.b stating a temporary, 30” safety-related, seismic, not fully missile protected, SW supply jumper will be provided to supply SW flow to the CCHXs required by TS 3.13. If non-essential SW isolation is required while the temporary pipe is installed to support maintenance activities, it will be accomplished consistent with design basis requirements by using manual operator action to close the SW isolation valve in the temporary jumper within the time constraints established by the station abnormal procedures.
- Add a paragraph to the TS 3.14 Basis stating a temporary, safety-related, seismic, not fully missile protected, SW supply line will be used as discussed in the TS 3.14.A.2.b footnote.

Project Constraints / Compensatory Measures

- The temporary 35-day configuration will only be used once during the fall 2025 Unit 1 refueling outage to complete permanent repairs on the Unit 1 SW supply piping to the CCHXs.
- An internal flooding walkdown will be performed after installation of the temporary SW jumper.
- The jumper will be hydrostatically tested prior to use in accordance with station procedures.
- Prior to placing the SW jumper into service, the CCHXs will be cleaned to prevent tubesheet clogging from biofouling.
- Prior to removing the intake bays from service, surveillance testing will be performed on the Unit 2 intake canal level probes, and the Unit 2 trash racks will be cleaned to reduce the risk of a spurious trip.
- Weather conditions will be monitored and if extreme conditions exist, the normal SW supply will be restored to a configuration such that it can be placed into service and the temporary jumper isolated as required by the Contingency Action Plan.

Project Constraints / Compensatory Measures

- No canal level maintenance activities will be scheduled during the use of the SW jumper.
- The installation of the CFRP system in the SW lines will be limited to the time when Unit 1 is defueled, and the core is in the Spent Fuel Pool.
- The SW jumper will not be operated when SW supply temperature is above 80°F.
- A 24-hour/day flood watch and administrative control of the SW jumper supply valve will be required when the jumper is in service.
- Appropriate controls on the movement of heavy loads will be implemented for any lifts which pass over the jumper while it is in service.
- While the temporary SW jumper is installed, emergency repair materials will be staged to facilitate repair of the jumper, if required.
- Operations personnel will be appropriately trained on the purpose of the jumper, administrative control of the jumper isolation valve, and on their individual responsibilities associated with the jumper.

Contingency Action Plan

Conditions which may require isolation of the jumper and restoration of the normal 42" SW supply line include moderate-to-high volume leakage, extreme weather conditions, or particular plant conditions.

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|------------------|--------------------------|-----------------------------------------------------------------|
| Phase I | Evacuation | Equipment, debris, and personnel are removed from the piping. |
| Phase II | Restore System Integrity | Establish flow path integrity by installing manways and blanks. |
| Phase III | Reflood | Open stop logs and flood up to installed SW-MOV-102 valve. |
| Phase IV | Flow | Open SW-MOV-102 valve and restore flow to "C" and "D" CCHXs. |

Probabilistic Risk Assessment

- A risk assessment has been performed for the temporary, one-time, 35-day configuration. The Surry PRA model was utilized to evaluate the impact on Core Damage Frequency (CDF) and Large, Early Release Frequency (LERF) using risk measures prescribed in Reg. Guide 1.177.
- The PRA model evaluates the risk of two canal level instrumentation channels out of service, and the risk of using a temporary SW jumper.
- Internal flooding analysis for the Turbine Building Flood Frequencies was adjusted to include the length of the temporary SW jumper.
- The frequency of the SW jumper resulting in flooding due to a tornado was estimated using guidance from NEI 17-02 and is incorporated into the Turbine Building Flooding Frequency.
- PRA model conservatively assumes both Unit 1 intake level canals probes are rendered inoperable for the 35-day duration, i.e., does not credit the temporary canal level probe.
- The risk evaluation supports the proposed configuration for the 35-day period, and the increase in CDF and LERF associated with the proposed change are characterized as “small changes” by Reg. Guide 1.174. The incremental conditional CDF and LERF probabilities are within the acceptance criteria of RG 1.177.

Precedents

- In a February 23, 1988 letter (ML18152A763), the use of a temporary SW supply jumper was requested to facilitate the replacement of the CCHX SW supply isolation valves and CCHX inlet valves. The temporary jumper was non-seismic and was only allowed to be used for two periods of up to 72 hours each while Unit 2 was in operation. The NRC approved the use of the temporary jumper by enforcement discretion in their letter dated March 30, 1988 (ML18152A812).
- In a June 19, 1998 letter (ML18151A680 / ML18152B755), with clarification provided in a July 14, 1998 letter (ML18152B769), use of a temporary SW supply jumper to the CCHXs was requested to allow cleaning, inspecting, repairing, and recoating of the SW suction piping to the CCHXs. Use of the safety-related, seismic, and partially missile protected alternate SW supply line was requested for up to 35-days during two consecutive Unit 1 refueling outages. The NRC issued TS Amendments 216/216 approving this request on August 26, 1998 (ML012700170 / ML20237E972 / ML20237E966).
- In a letter dated September 26, 2012 (ML12279A282), with clarification provided in letters dated June 4, 2013 and September 3, 2013 (ML13161A295 and ML13258A107, respectively), use of a temporary SW supply jumper to the CCHXs was requested to allow cleaning, inspecting, repairing, and recoating of the SW suction piping to the CCHXs. Use of the safety-related, seismic, and partially missile protected alternate SW supply line was requested for up to 35-days during two consecutive Unit 1 refueling outages. The NRC issued TS Amendments 279/279 approving this request on September 23, 2013 (ML13231A170).
- The technical basis for the proposed LAR is essentially the same as the bases used for the NRC approved 1998 and 2012 LARs, except for the use of the temporary canal level probe to provide additional protection against a spurious Unit 2 trip.

Schedule

| Task | Completion Date |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Station Facility Safety Review Committee review/approval of LAR | July 2024 |
| Submit LAR to NRC | August 2024 |
| Obtain NRC Approval / Issue Amendments | September 2025 |
| Connect Temporary Jumper and Intake Canal Level Probe, Perform SW Pipe CFRP Repair, Remove Temporary Jumper and Level Probe, Restore SW Supply | SPS Unit 1 Fall 2025 Refueling Outage (35-day AOT Window) |

Summary

- Temporary TS change is necessary to allow the use of a temporary intake canal level probe and a temporary SW supply jumper to provide SW to the CCHXs to permit installation of CFRP in the existing SW supply piping.
 - Allows a 35-day SW supply AOT during the fall 2025 Unit 1 refueling outage for completion of the work.
- Temporary jumper and canal level probe are safety-related but not fully qualified for missile protection.
- Project constraints/compensatory measures will be put into place to address flood protection, control of heavy loads, vehicle traffic, emergency repairs, etc., when the jumper is in service.
- A Contingency Action Plan has been prepared for manual isolation of the temporary SW jumper and restoration of SW supply to the CCHXs if necessary.
- PRA assessment has been performed and confirms use of the temporary SW jumper meets the requirements of RGs 1.174 and 1.177 and qualifies as a “small change.”
- NRC approved precedents for use of temporary SW supply jumper.
- LAR will be submitted by 8/24 and NRC approval will be requested by 9/30/25.

Questions / Comments?