



# Proposed Changes to Catawba's Nuclear Service Water System (NSWS) Technical Specifications

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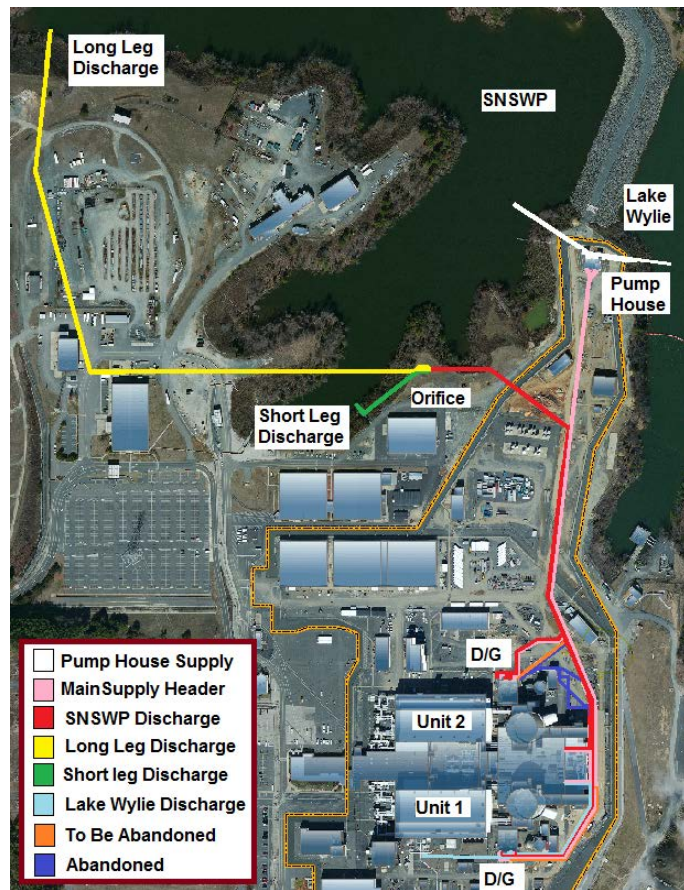
## Introductions / Opening Remarks

- Planned License Amendment Request (LAR) to Change Catawba's Nuclear Service Water System (NSWS) Technical Specifications (TS)
- TS 3.7.8 Change - Purpose and Overview
- System Plan View and Alignment
- Revised TS 3.7.8
- PRA Overview

Planned LAR to Change Catawba's  
Nuclear Service Water System TS 3.7.8

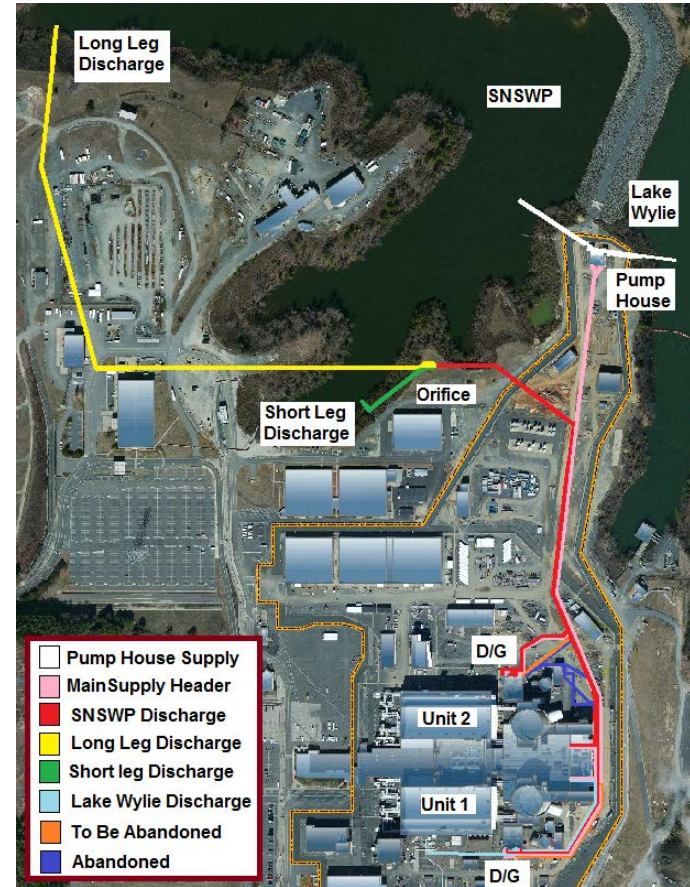
# Nuclear Service Water System (NSWS) TS Change

- Purpose of Requested TS Change:
  - To allow Single Pond Return Header Operation of the Nuclear Service Water System (NSWS)
  - Planned Modifications
  - Planned Inspections
  - Future Inspections
  - Future Maintenance Activities

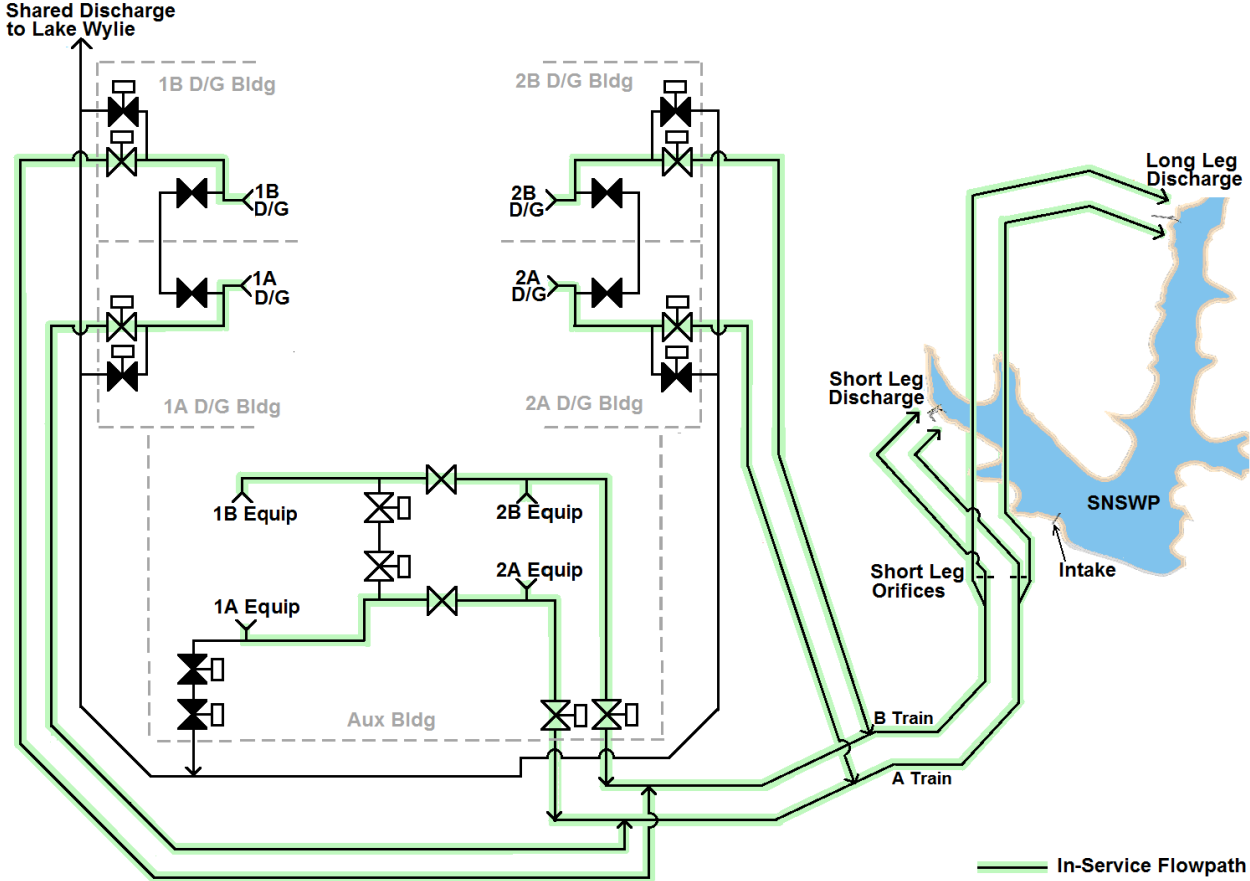


- Overview of Requested TS Change:
  - This will be a Permanent Change request to Catawba's TS 3.7.8
  - Proposal is to revise TS 3.7.8 to create a new Condition D, defined as "NSWS Single Pond Return Header Operation"
  - Requesting a 30 day Completion Time (CT) for Condition D
  - This TS Condition will only be entered to address planned inspection and maintenance activities
  - This submittal will be PRA risk informed
  - Submittal is based on Single Failure and Pipe Rupture Evaluations by Duke in conjunction with PRA (Reg Guide 1.174 and 1.200)

- Piping Length per train:
  - Long Leg Discharge: 3150 feet
  - Short Leg Discharge: 380 feet
  - Common Discharge: 2510 feet
  - Piping from Unit 1 EDG to be abandoned: 560 feet
  - Piping from Unit 2 EDG to be abandoned: 310 feet

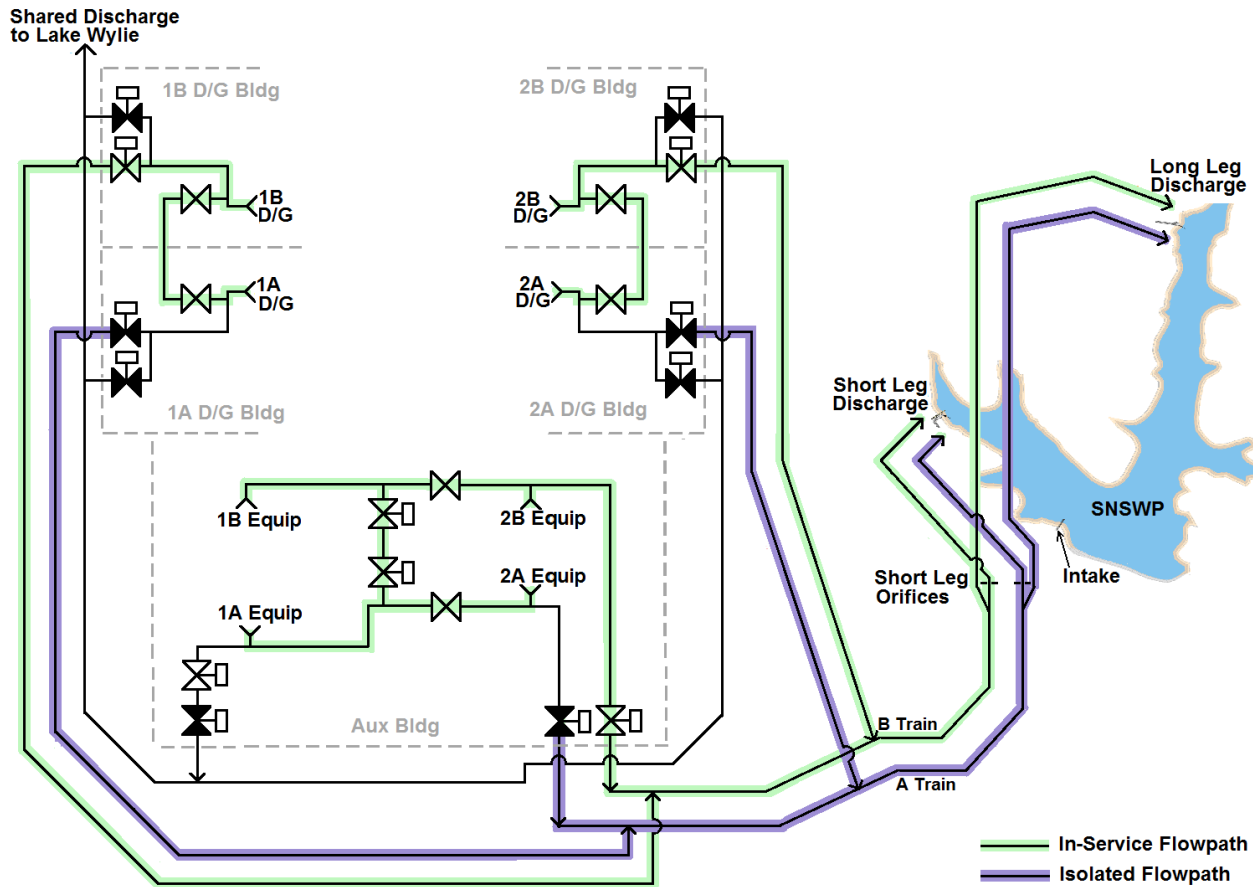


# NSWS Schematic – Standard (Dual Return Train) Alignment

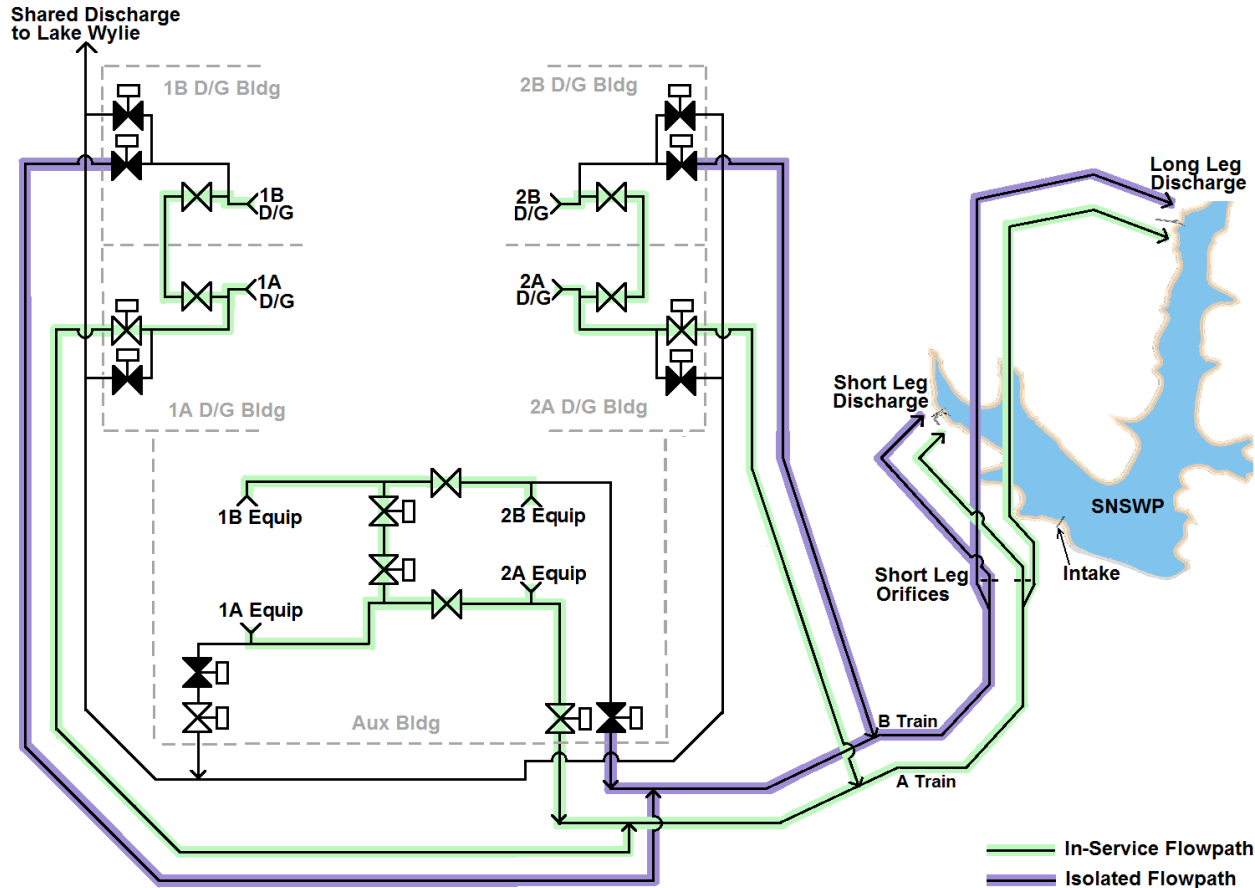




# NSWS Schematic – Single Pond Return Header Alignment (A Train Isolated)



# NWS Schematic – Single Pond Return Header Alignment (B Train Isolated)



3.7 PLANT SYSTEMS

3.7.8 Nuclear Service Water System (NSWS)

LCO 3.7.8 Two NSWS trains shall be OPERABLE.

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

ACTIONS		
CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. — NOTE —</p> <p>Not applicable while in Condition C or D of this LCO unless entry is directed by Note 2 of Condition C or D.</p> <hr/> <p>One NSWS train inoperable</p>	<p>A.1 — NOTES —</p> <p>1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources — Operating," for emergency diesel generator made inoperable by NSWS.</p> <p>2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," for residual heat removal loops made inoperable by NSWS.</p> <hr/> <p>Restore NSWS train to OPERABLE status.</p>	<p>72 hours</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. — NOTES —</p> <p>1. Entry into this Condition shall only be allowed for pre- planned activities as described in the Bases of this Specification.</p> <p>2. Immediately enter Condition A of this LCO if one or more NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE.</p> <p>3. Immediately enter LCO 3.0.3 if one or more NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE.</p> <p>-----</p> <p>One NSWS supply header inoperable due to NSWS being aligned for single supply header operation.</p>	<p>B1. Restore NSWS supply header to OPERABLE status.</p>	<p>30 days</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. — NOTES —</p> <p>1. Entry into this Condition shall only be allowed for Unit 1 and for pre-planned activities as described in the Bases of this Specification. Entry into this Condition shall not be allowed while Unit 2 is in MODE 1, 2, 3, or 4.</p> <p>2. Immediately enter Condition A of this LCO if one or more Unit 1 required NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE.</p> <p>3. Immediately enter LCO 3.0.3 if one or more Unit 1 required NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE.</p> <hr/> <p>One NSWS train inoperable due to NSWS being aligned for single Auxiliary Building discharge header operation.</p>	<p>C.1 Restore NSWS train to OPERABLE status.</p>	<p>14 days</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. <u>NOTES</u></p> <p>1. Entry into this Condition shall only be allowed for pre-planned activities as described in the Bases of this Specification.</p> <p>2. Immediately enter Condition A of this LCO if one or more NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE.</p> <p>3. Immediately enter LCO 3.0.3 if one or more NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE.</p> <hr/> <p>One NSWS train inoperable due to NSWS being aligned for single Pond return header operation.</p>	<p>D.1 Restore NSWS train to OPERABLE status.</p>	<p>30 days</p>
<p>E. Required Action and associated Completion Time of Condition A, B, C, or D not met.</p>	<p>E.1 Be in MODE 3 AND E.2 Be in MODE 5</p>	<p>6 hours  36 hours</p>

- Results of CNS NSW Single Pond Return Header Completion Time Extension from 72 hours to 30 Days

Risk Metric	Preliminary Risk Metric Results
Base CDF (Internal Events)	5.37E-06 / yr
Δ CDF (incl. Internal Flood & Fire)	9E-08 / yr
Base LERF (Internal Events)	4.66E-07 / yr
Δ LERF (incl. Internal Flood & Fire)	<<1E-07 / yr
ICCDP	1.5E-08
ICLERP	<<1E-07

- No credit taken for Operator recovery actions (bounding analysis)

- Internal Events impact assessed
  - $\Delta$  CDF:  $4.1E-07$  / yr
  - $\Delta$  LERF: No change
- Internal Flooding impact assessed
  - Impact to Internal Events risk considering flooding scenarios
  - Flood ( $\Delta$  CDF:  $1.8E-07$  / yr;  $\Delta$  LERF:  $\ll 1E-07$  / yr)
- Fire impact assessed
  - Reduction in risk considering power removed to certain NSWS valves
  - Fire ( $\Delta$  CDF:  $-5E-07$  / yr;  $\Delta$  LERF:  $-6.4E-07$  / yr)
- PRA models meet ASME / ANS Standard and RG 1.200 requirements



### Qualitative Assessment

- External Events
  - High Winds
    - All currently planned and future inspections are internal to the return piping (i.e., no piping excavations requiring a revised tornado analysis)
  - External Flooding
    - Outflow through open manways does not impact Aux Bldg, D/G Bldgs or Turbine Bldg
    - Maximum predicted outflow through open manways is well within the station's yard drainage system flood handling capacity

### Qualitative Assessment (continued)

- External Events
  - Seismic
    - Components with median seismic capacities in excess of 2g and structures in excess of 2.5g were screened out from the seismic fault tree models due to low probability of failure
    - Standby Nuclear Service Water Pond intake structure, NSWS pump house and all qualified piping and valves were screened out
    - NSWS components and piping are considered to be seismically-rugged, no new failure modes introduced

- This will be a Permanent Change request to Catawba's TS 3.7.8
- Proposal is to revise TS 3.7.8 to create a new Condition D, defined as "NSWS Single Pond Return Header Operation"
- Requesting a 30 day Completion Time (CT) for Condition D
- Planned submittal date of License Amendment Request, April 2017
- Modifications and Inspections planned for Fall 2018
- Questions?

