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Do not include proprietary materials.*

DATE OF MEETING

05/01/2003

The attached document(s), which was/were handed out in this meeting, is/are to be placed in the public domain as soon as possible. The minutes of the meeting will be issued in the near future. Following are administrative details regarding this meeting:

Docket Number(s) 50-269, 50-270, 50-287

Plant/Facility Name OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

TAC Number(s) (if available) MB8083, MB8084, AND MB8085

Reference Meeting Notice APRIL 4, 2003

Purpose of Meeting
(copy from meeting notice) TO DISCUSS THE LOW PRESSURE INJECTION

CROSS CONNECT MODIFICATION

NAME OF PERSON WHO ISSUED MEETING NOTICE

L. N. OLSHAN

TITLE

PROJECT MANAGER

OFFICE

NRR

DIVISION

DLPM

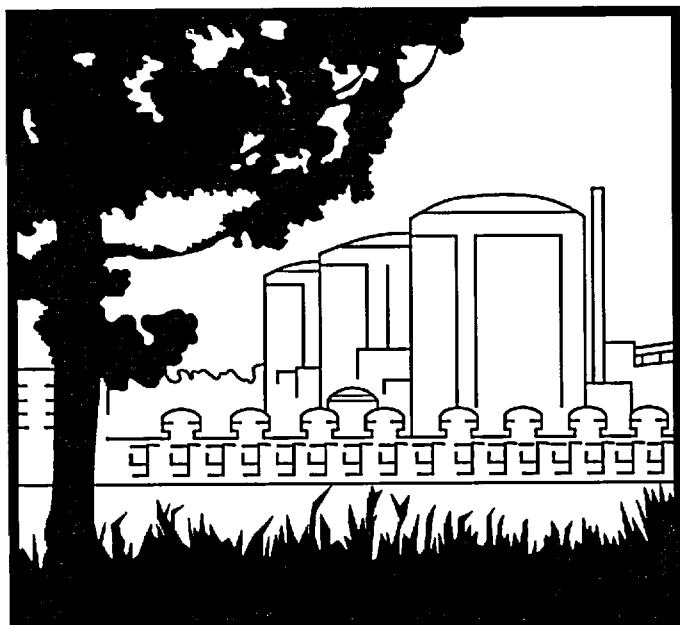
BRANCH

PD II-1

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Docket File/Central File
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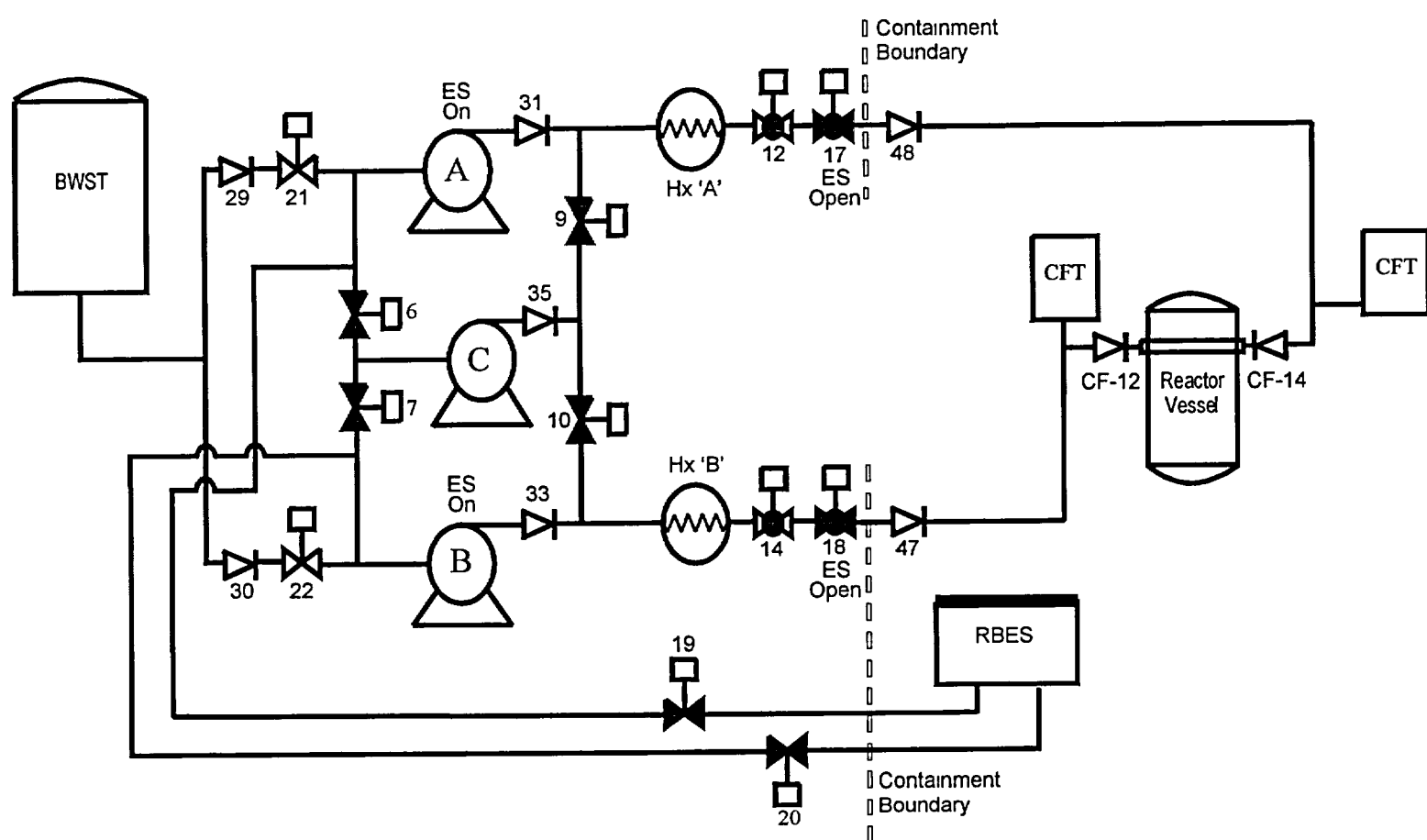
LPI Cross Connect Licensing Amendment Request

Oconee Nuclear Station
May 1, 2003

Agenda

- Overview of the Modification
- Safety Benefits
- Revision to Technical Specifications
- Leak-Before-Break Aspect
- MEB 3-1 Aspect

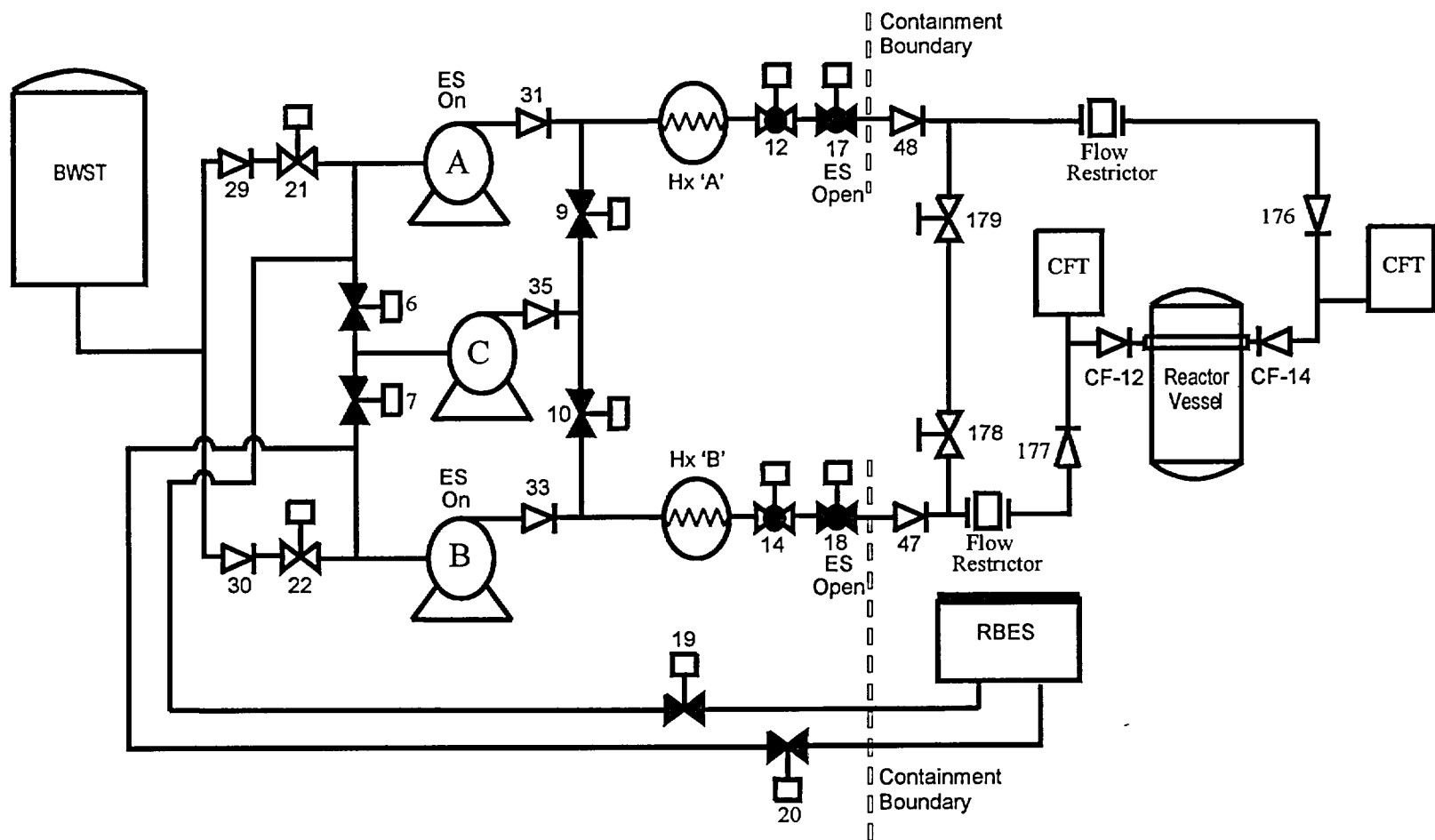
Current LPI System Design



Current CFLB Mitigation Strategy

- Event Initiation (assume Train A Break)
- ES Actuation (assume electrical failure affecting Train B)
- Throttle LPI Flow in 15 Minutes
- Locally Open Injection Valve (LP-18)
- Establish Flow in Both LPI Headers

Proposed LPI System Design





LPI Cross Connect Licensing Amendment Request

LPI Cross Connect Mod Description

- Adds a normally aligned, passive LPI train cross connect inside containment.
- Adds new check valves (LP-176 and LP-177) downstream of cross connect piping.
- Adds flow restricting devices in main LPI headers downstream of cross connect piping.



LPI Cross Connect Licensing Amendment Request

LPI Cross Connect Mod Description (con't)

- Rescales LPI flow transmitters.
- Adds rupture restraint devices to accommodate potential energy from break at the Reactor Vessel connection.

Benefits of Modification

- Eliminates operator burden of manually throttling LPI flow within 15 minutes of pump emergency start.
- Reduces operator actions which may be necessary during the ECCS and RBS pump suction swap from the BWST to the RBES.
- Reduces time critical operator actions outside of the control room.

Benefits of Modification (con't)

- Eliminates reliance on non QA-1 power to open LP-9 and LP-10
- Improves NPSH margin for ECCS and RBS pumps.
- Adds additional boundary valves for protection from Intersystem LOCA.

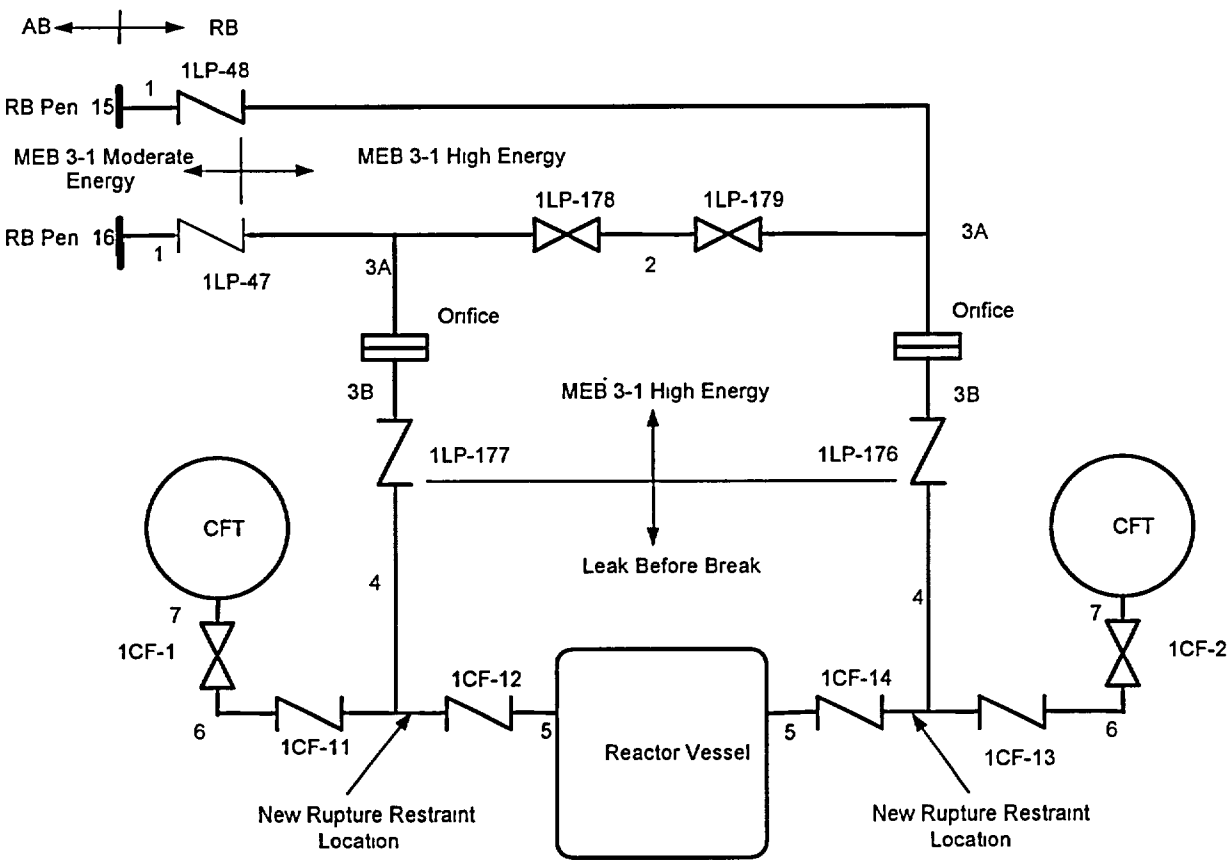
Supporting Analyses

- Analysis performed to ensure sufficient ECCS flow and pump NPSH during limiting events.
- Analysis performed to ensure sufficient DHR flow during unit shutdown.
- Re-analysis of LOCA events confirm the LPI mod will not adversely impact the LBLOCA results and benefits the CFLB event.

TS Changes

- ***TS 3.4.14***
 - Credits new PIVs installed
 - Retains credit for existing PIVs
- ***TS 3.5.3***
 - Adds LCO requirement to maintain passive cross connect inside RB open
 - Adds Action if valves are not open in cross connect line with a 7-day Completion Time
 - Extends allowed outage time associated with LP-9 and LP-10 for the units not modified to 7 days for consistency

LPI Cross Connect Licensing Amendment Request



Application of LBB

- Based on a review of GDC-4, SRP 3.6.3, and NUREG-1061, FANP concluded that LBB Technology is applicable to selected portions of the CF and LPI piping.
- CMTR and applicable data was used to validate the mechanical properties of the piping base metal material and the piping welds.
- Highest stress locations were calculated based on the normal and faulted loads from the latest IEB 79-14 stress analysis.

Application of LBB (continued)

- Reviewed leak detection capability to confirm that a 1gpm leak can be detected within 1 hour. A factor of 10 was applied to the 1 gpm leakage rate to determine the leakage crack size.
- Leak detection capability
 - RB normal sump level – 1 gpm leak rate in < 1 hour
 - Duke's preliminary calculations indicate that particulate and gaseous radioactivity monitors are not capable of identifying 1 gpm leak rate in 1 hour due to lower RCS activity levels
- Operating history shows that RB normal sump level is very reliable
 - 99.97% availability over the last 4 year period for the three Oconee Units

Application of LBB (continued)

- Crack opening area determined using the GE/EPRI method for a given circumferential crack, and the Paris-Tada method for a given longitudinal crack based on normal operating loads.
- The tearing instability analysis, using a J versus T diagram, demonstrated a margin of 2 against the leakage size crack using the absolute sum method of combining faulted loads.
- PWSCC is not a concern at the Alloy 82/182 CF tank nozzle/pipe welds because of the low temperature of the CF tank and piping fluid.
- Based on NRC feedback regarding the Alloy 82/182 welds at the 'A' and 'B' CF/RV nozzles and their susceptibility to PWSCC, these welds were excluded from the LBB analysis.



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Impact of Installing Rupture Restraints

- Installation of rupture restraints at the CF/RV nozzles is a significant cost.
- Duke initially believed LBB could be used to eliminate rupture restraints at the CF tanks and at the RV nozzles.
- Rupture restraints required to eliminate structural communication from one train to the other train through the new cross tie piping.
- In October 2002, NRC indicated they would not approve LBB to eliminate rupture restraints at the RV due to generic concerns with Alloy 82/182 material and PWSCC.
- EPRI industry effort underway to justify LBB for Alloy 82/182 material.



LPI Cross Connect Licensing Amendment Request

Adoption of SRP MEB 3-1

- SRP 3.6.2 BTP MEB 3-1 rules will be adopted for piping upstream of the new check valves (1LP-176 & 177).
- The existing check valves LP-47 & LP-48 provide the moderate/high energy boundary.
- Stress analysis of each train is continuous from the RB penetration to the associated CFT nozzle and the RV nozzles.
- The stress levels for each load case can be accurately portrayed in the piping both upstream and downstream of the existing check valves.
- No breaks or cracks were postulated at the boundary between the moderate and high energy segments of piping since the stress analysis is continuous across the boundary.



LPI Cross Connect Licensing Amendment Request

Adoption of SRP MEB 3-1 (Moderate Energy Piping)

- This section of piping meets the pressure-temperature definition of a high energy line for short periods of DHR operations but qualifies as a moderate energy line per MEB 3-1 rules.
- Stresses within the moderate energy defined piping are below and will be maintained below the crack thresholds defined in MEB 3-1.
- Stresses were calculated in accordance with the current Ocone code of record, USAS B31.1 1967 edition for Class 2 piping.
- Stress allowables from USAS B31.1 1967 edition were used to establish the break and crack thresholds for comparison with actual stresses.



LPI Cross Connect Licensing Amendment Request

Adoption of SRP MEB 3-1 (High Energy Piping)

- Piping between the new check valves (1LP-176 & 177) and the existing check valves (1LP-47 & 48), including the cross connect piping, is classified as high energy.
- Stresses within the high energy defined piping are below and will be maintained below the break and crack thresholds defined in MEB 3-1.
- Stresses were calculated in accordance with the current Oconee code of record, USAS B31.1 1967 edition for Class 2 piping.
- Stress allowables from USAS B31.1 1967 edition were used to establish the break and crack thresholds for comparison with actual stresses.



LPI Cross Connect Licensing Amendment Request

Conclusion

- LPI modification is an important improvement to safety
- TS changes and LB changes in the LAR are needed to support implementation of the passive LPI cross connect modification
- Approval by August 15, 2003 is needed to support implementation during the Fall 2003 SG/RV replacement outage
- The extended SG outages provide the window of opportunity for installing the LPI cross connects – very important that Duke receives LAR to support implementation during this outage.