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Do not include proprietary materials.*

DATE OF MEETING

10/2/2003  
~~09/10/2003~~

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)	<u>50-259, 50-260, and 50-296</u>
Plant/Facility Name	<u>Browns Ferry Nuclear Plant, Units 1, 2, and 3</u>
TAC Number(s) (if available)	<u>MB8423, MB8424, and MB8425</u>
Reference Meeting Notice	<u>09/10/2003</u>
Purpose of Meeting (copy from meeting notice)	<u>To discuss the Emergency Core Cooling Systems for</u> <u>Browns Ferry Plant, Units 1, 2, and 3</u>

NAME OF PERSON WHO ISSUED MEETING NOTICE

**Kahtan N. Jabbour**

TITLE

**Senior Project Manager**

OFFICE

**Office of Nuclear Reactor Regulation**

DIVISION

**Division of Licensing Project Management**

BRANCH

**Project Directorate II, Section 2**

Distribution of this form and attachments:

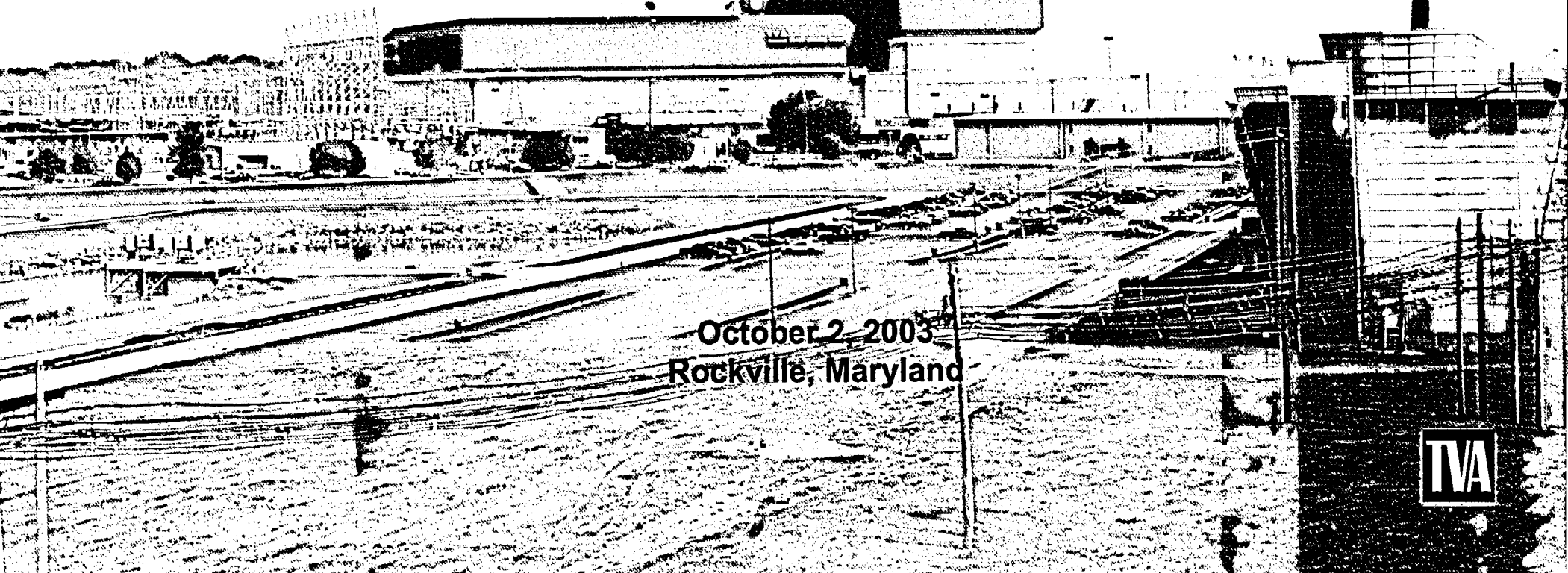
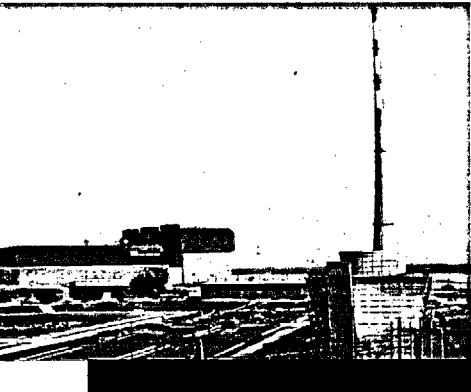
Docket File/Central File  
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DF01

**TENNESSEE VALLEY AUTHORITY  
BROWNS FERRY NUCLEAR PLANT**

**LICENSE AMENDMENT AND  
TECHNICAL SPECIFICATION CHANGES (TS 424)**

**REVISION IN THE NUMBER OF  
EMERGENCY CORE COOLING SUBSYSTEMS  
REQUIRED IN RESPONSE TO CERTAIN  
LOSS OF COOLANT ACCIDENT SCENARIOS**



October 2, 2003  
Rockville, Maryland





# Meeting Objective

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To facilitate NRC review and approval of the proposed revision in the number of Emergency Core Cooling System (ECCS) subsystems available in response to certain Loss of Coolant Accident (LOCA) scenarios



# Agenda

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- Introductions
- Summary of Issue
- Plant Layout
- Single Failure Analysis
- ECCS Performance during a Design Basis Accident (DBA)
- Questions and Answers
- ECCS Performance during a DBA with a Spurious Accident Signal
- Questions and Answers
- Proposed Modifications
- Questions and Answers
- Proposed License Amendment, Technical Specification and Final Safety Analysis Report (FSAR) changes



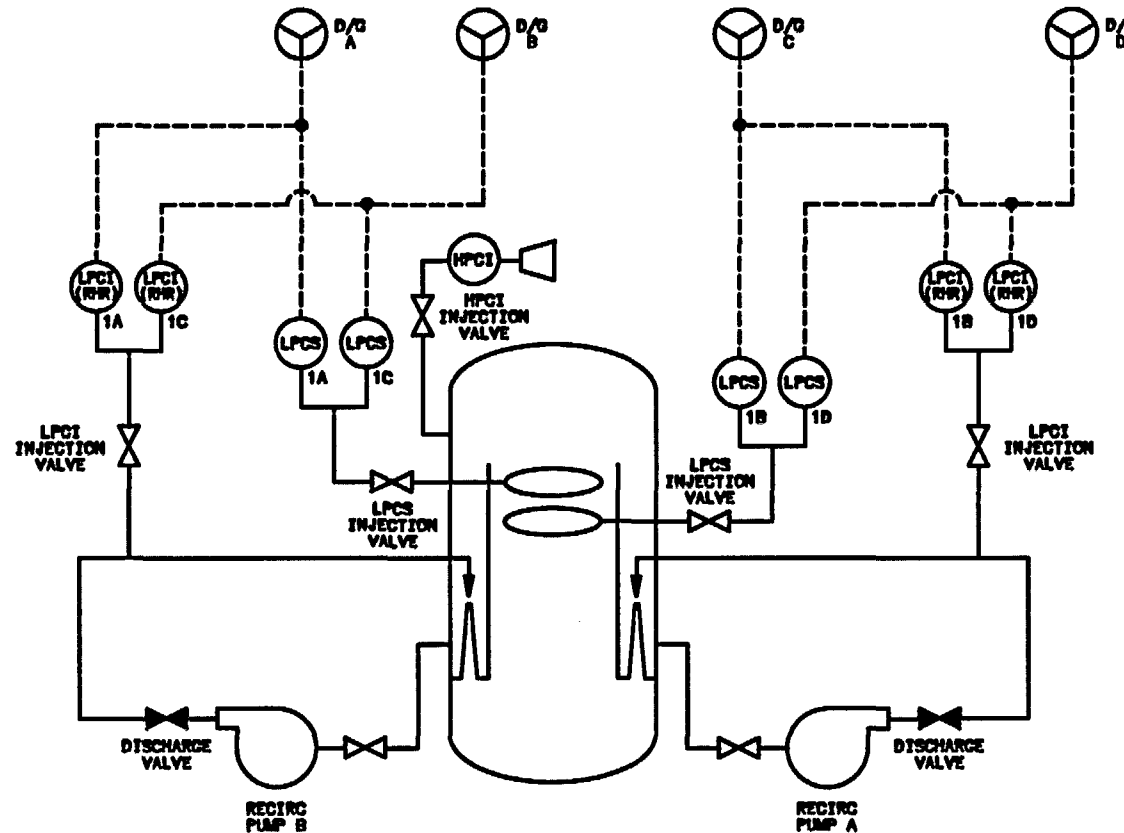
# Summary of Issue

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- TVA's current ECCS logic is adequate to support operation of BFN Units 2 and 3
- The current logic, electrical boards, and diesel generators do not support certain design basis LOCA / Loss of Offsite Power scenarios with both Units 1 and 2 operating
- TVA's proposed modifications to the ECCS logic will satisfy current licensing basis requirements and are consistent with the current LOCA analysis

# Plant Layout

## ECCS INJECTION FLOW PATHS AFTER AN ECCS INITIATION SIGNAL



Assumed analysis flow rates:

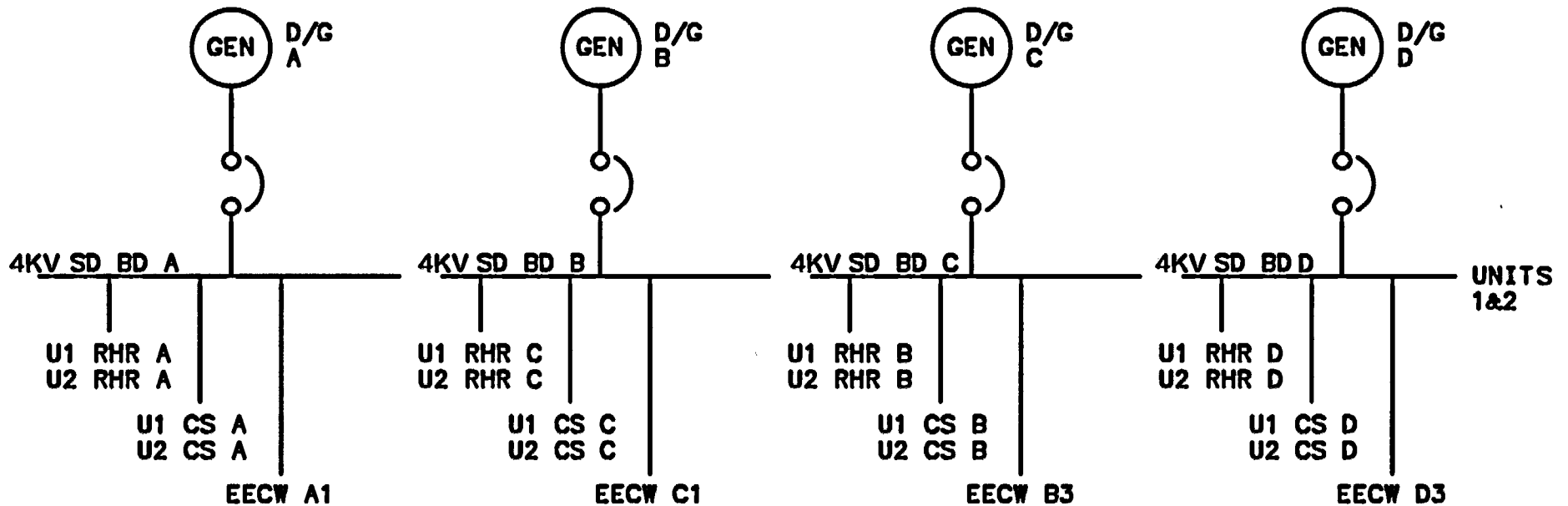
- One Core Spray loop (Two pumps) = 5600 gpm
- One LPCI pump in one loop = 9700 gpm
- HPCI = 4500 gpm
- Two LPCI pumps in one loop = 18,000 gpm

NOTE: Both Core Spray pumps in a loop must operate for the loop to be considered available.



# Plant Layout (Cont.)

## UNITS 1 AND 2 STANDBY AUXILIARY POWER SYSTEM





# Single Failure Analysis

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- Single Failure Analysis with current ECCS logic (FSAR Table 6.5-3)
  - One active failure and the Loss of Offsite Power are assumed to occur with the pipe break
  - Several line break sizes and combinations of various single failures were analyzed
  - The following five single failures were bounding:
    - **Battery**
    - **Opposite Unit False LOCA Signal (also referred to as the Spurious Accident Signal)**
    - **LPCI Injection Valve**
    - **Diesel Generator**
    - **HPCI**





# Single Failure Analysis (Cont.)

## EQUIPMENT ACTUALLY AVAILABLE WITH CURRENT ECCS LOGIC

<u>Assumed Failure</u>	<u>Recirculation Suction Break Systems Remaining</u>	<u>Recirculation Discharge Break Systems Remaining</u>
Battery	ADS, 1LPCS, 3LPCI (3 pumps into 2 loops)	ADS, 1LPCS, 1LPCI (1 pump into 1 loop)
Opposite Unit False LOCA Signal (Units 1 and 2)	ADS, HPCI, 1LPCS, 2LPCI (2 pumps into 2 loops)	ADS, HPCI, 1LPCS, 1LPCI (1 pump into 1 loop)
LPCI Injection Valve	ADS, HPCI, 2LPCS, 2LPCI (2 pumps into 1 loop)	ADS, HPCI, 2LPCS
Diesel Generator	ADS, 1LPCS, HPCI, 3LPCI (3 pumps into 2 loops)	ADS, HPCI, 1LPCS, 1LPCI (1 pump into 1 loop)
HPCI	ADS, 2LPCS, 4LPCI (2 per loop)	ADS, 2LPCS, 2LPCI (2 pumps into 1 loop)

NOTES: Each LPCS means two core spray pumps in operation.



# ECCS Performance During a DBA

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- In 1996, TVA implemented the SAFER / GESTR-LOCA methodology
  - More realistic peak cladding temperatures
  - Analysis demonstrated that less equipment is needed than that actually available
  
- SAFER / GESTR-LOCA analysis
  - Revision 2 submitted as part of 5% power uprate on July 24, 1998
  - BFN current analysis is Revision 5
    - o Incorporates new GE fuel designs and types
    - o Implements generic updates from GE
    - o Analysis applicable to Units 1, 2 and 3



# ECSS Performance During a DBA (Cont.)

- FSAR Table 6.5-3, which reflects the current ECSS analysis, which assumes less equipment than is actually available

<u>Assumed Failure</u>	<u>Recirculation Suction Break Systems Actually Available (Shown on Slide 8)</u>	<u>Recirculation Suction Break Systems Credited in Analysis (Shown in FSAR Table 6.5-3)</u>
Battery	ADS, 1LPCS, 3LPCI (3 pumps into 2 loops)	<b>ADS, 1LPCS, 2LPCI*</b> (2 pumps into 1 loop)
Opposite Unit False LOCA Signal (Units 1 and 2)	ADS, HPCI, 1LPCS, 2LPCI (2 pumps into 2 loops)	(Same as actually available)
LPCI Injection Valve	ADS, HPCI, 2LPCS, 2LPCI (2 pumps into 1 loop)	(Same as actually available)
Diesel Generator	ADS, 1LPCS, HPCI, 3LPCI (3 pumps into 2 loops)	ADS, 1LPCS, HPCI, 2LPCI (2 pumps into 1 loop)
HPCI	ADS, 2LPCS, 4LPCI (2 per 2 loop)	(Same as actually available)

\* - Minimum equipment required by the ECSS analysis.

# ECCS Performance During a DBA (Cont.)



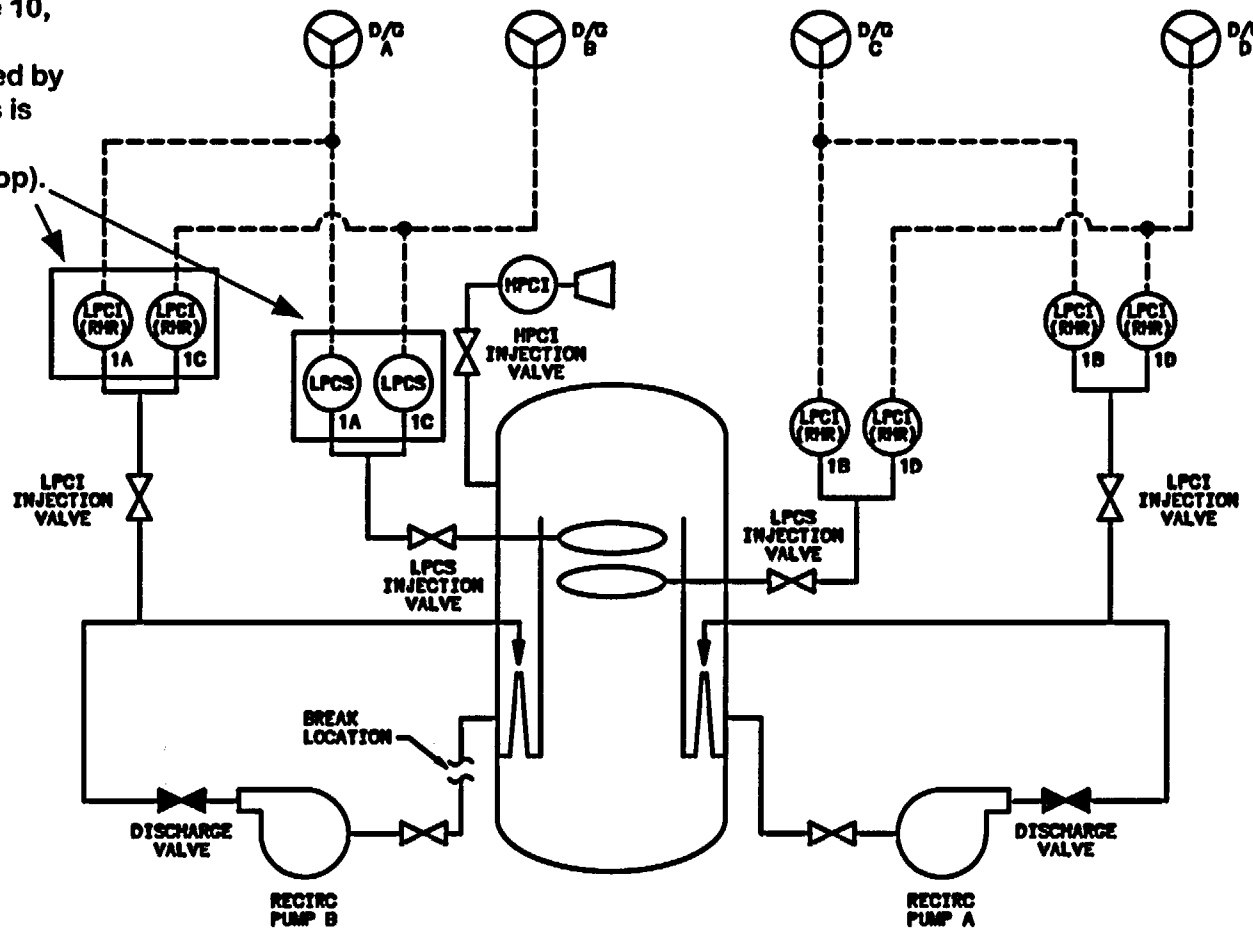
<u>Assumed Failure</u>	<u>Recirculation Discharge Break Systems Actually Available (Shown on Slide 8)</u>	<u>Recirculation Discharge Break Systems Credited in Analysis (Shown in FSAR Table 6.5-3)</u>
Battery	ADS, 1LPCS, 1LPCI (1 pump into 1 loop)	<b>ADS, 1LPCS*</b>
Opposite Unit False LOCA Signal (Units 1 and 2)	ADS, HPCI, 1 LPCS, 1LPCI (1 pump into 1 loop)	(Same as actually available)
LPCI Injection Valve	ADS, HPCI, 2LPCS	(Same as actually available)
Diesel Generator	ADS, HPCI, 1LPCS, 1LPCI (1 pump into 1 loop)	ADS, HPCI, 1LPCS
HPCI	ADS, 2LPCS, 2LPCI (2 pumps into 1 loop)	(Same as actually available)

\* - Minimum equipment required by the ECCS analysis.

# ECCS Performance During a DBA (Cont.)

## ECCS SAFER / GESTR ANALYSIS FOR A SUCTION LINE BREAK (CURRENT LOGIC)

As shown on Slide 10,  
the minimum  
equipment required by  
the ECCS analysis is  
1LPCS and 2LPCI  
(2 pumps into 1 loop).

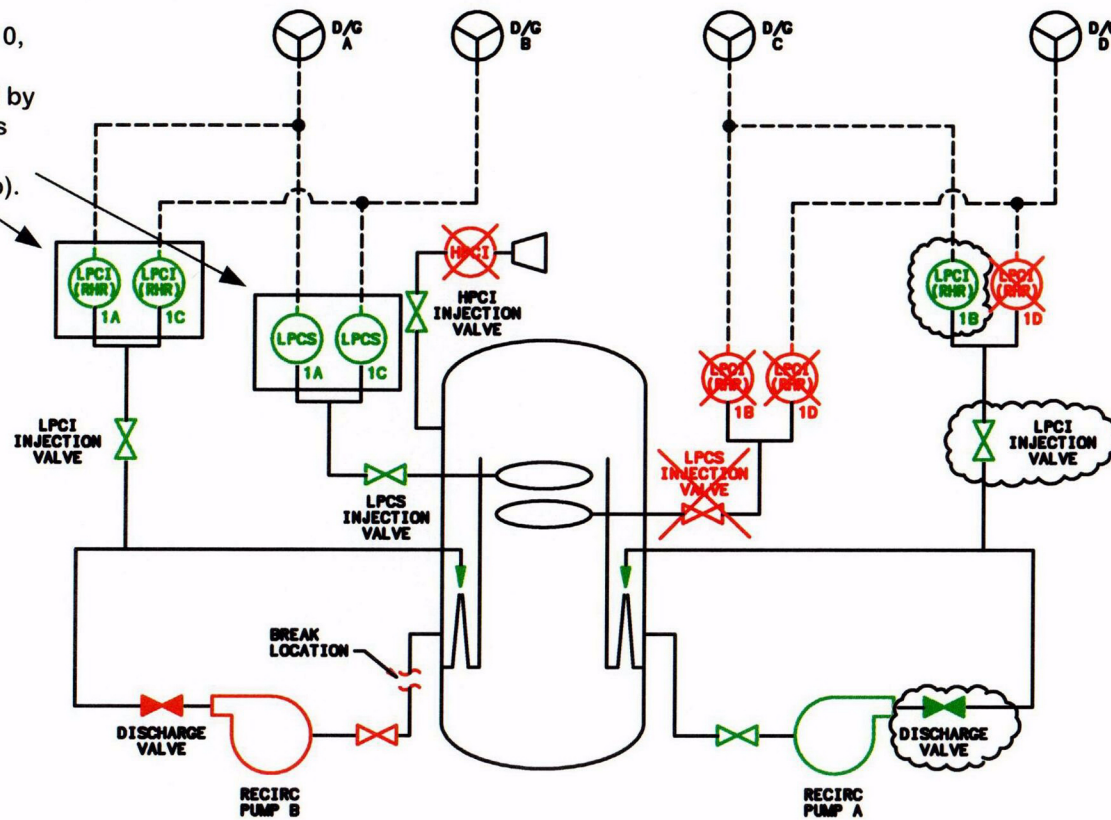


- MINIMUM EQUIPMENT REQUIRED BY THE ECCS ANALYSIS.

# ECCS Performance During a DBA (Cont.)

## ECCS SAFER / GESTR ANALYSIS REQUIREMENTS FOR A SUCTION LINE BREAK WITH A BATTERY FAILURE (CURRENT LOGIC)

As shown on Slide 10, the minimum equipment required by the ECCS analysis is 1LPCS and 2LPCI (2 pumps into 1 loop).



☁ - EQUIPMENT AVAILABLE BUT NOT CREDITED IN THE EXISTING FSAR TABLE 6.5-3.

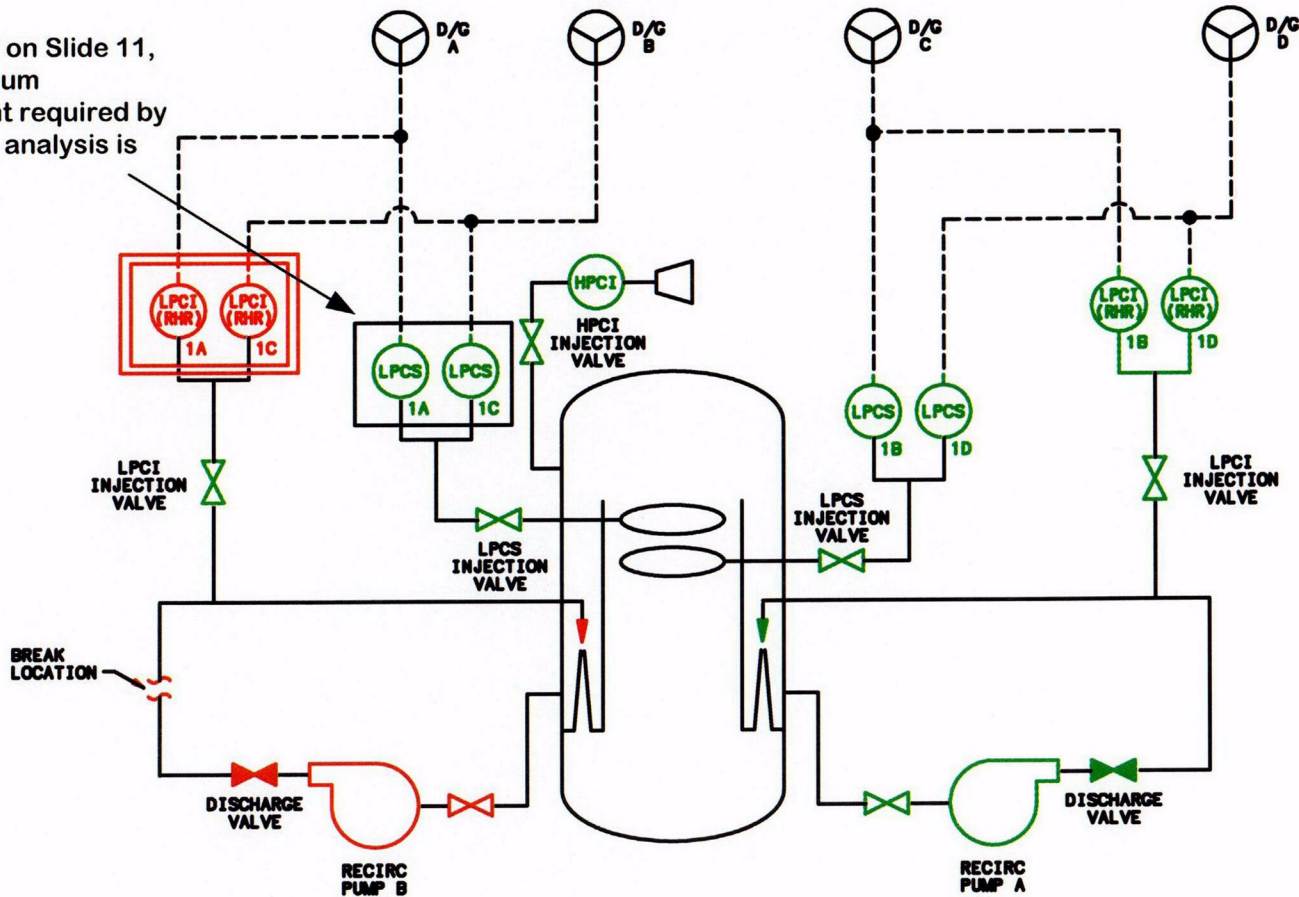
✗ - LOST DUE TO SINGLE FAILURE.

☐ - MINIMUM EQUIPMENT REQUIRED BY THE ECCS ANALYSIS.

# ECCS Performance During a DBA (Cont.)

## ECCS SAFER / GESTR ANALYSIS FOR A DISCHARGE LINE BREAK (CURRENT LOGIC)

As shown on Slide 11, the minimum equipment required by the ECCS analysis is 1LPCS.

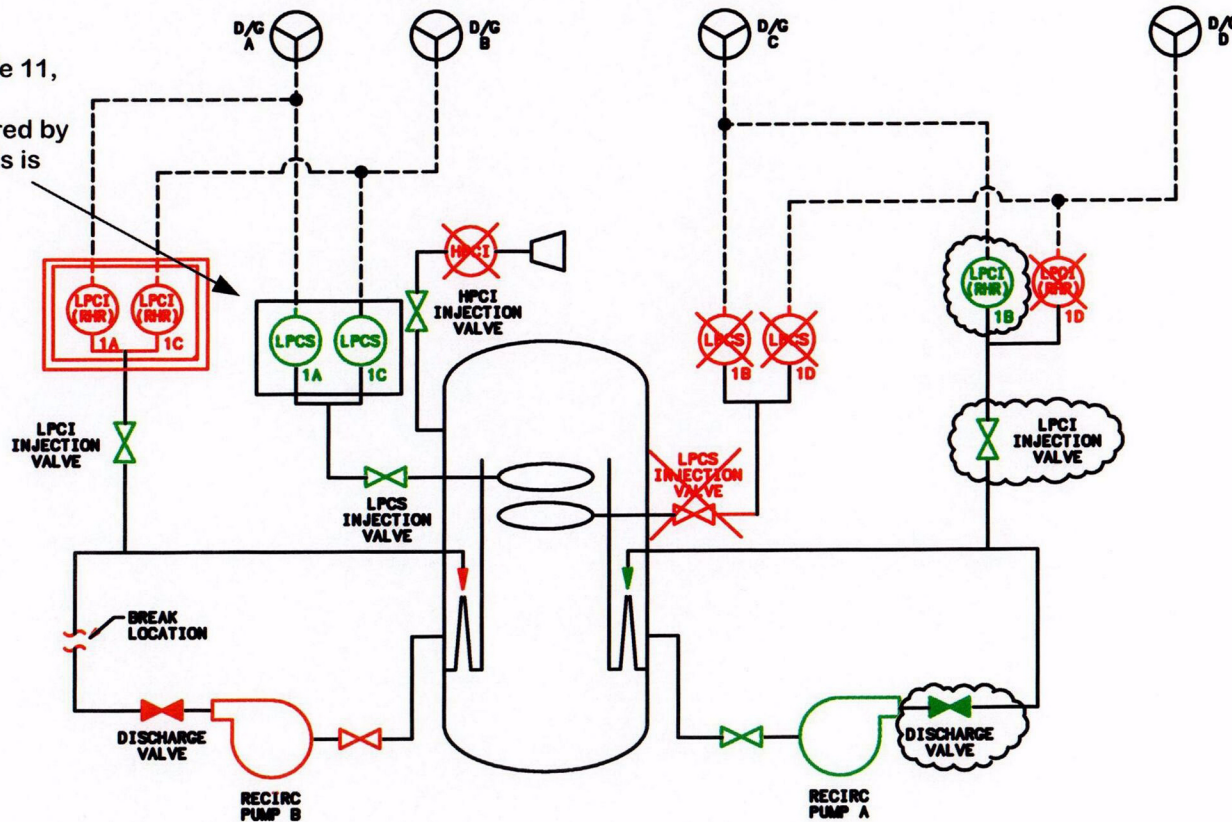


- MINIMUM EQUIPMENT REQUIRED BY THE ECCS ANALYSIS.
- COMPONENTS LOST DUE TO BREAK LOCATION.

# ECCS Performance During a DBA (Cont.)

## ECCS SAFER / GESTR ANALYSIS REQUIREMENTS FOR A DISCHARGE LINE BREAK WITH A BATTERY FAILURE (CURRENT LOGIC)

As shown on Slide 11, the minimum equipment required by the ECCS analysis is 1LPCS.



- ☁ -EQUIPMENT AVAILABLE BUT NOT CREDITED IN THE EXISTING FSAR TABLE 6.5-3.
- ✗ -LOST DUE TO SINGLE FAILURE.
- ☐ -COMPONENTS LOST DUE TO BREAK LOCATION.
- -MINIMUM EQUIPMENT REQUIRED BY THE ECCS ANALYSIS.



# ECCS Performance During a DBA (Cont.)

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- Summary
  - The bounding case design basis accident in terms of equipment availability is a LOCA, with the Loss of Offsite Power, and the loss of a Battery as the postulated single failure



# Questions and Answers

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# ECCS Performance During a DBA with a Spurious Accident Signal

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- Only one unit is in a LOCA or post-accident recovery mode at any point in time
- During LOCA accident scenarios that assume the Loss of Offsite Power, the BFN licensing basis also postulates that a spurious accident signal could originate from one of the non-accident units
  - This spurious accident signal is considered to be the postulated single failure
  - No other single failures are assumed to occur
  - The spurious accident signal could occur before, during or after the real signal

# ECCS Performance During a DBA with a Spurious Accident Signal (Cont.)

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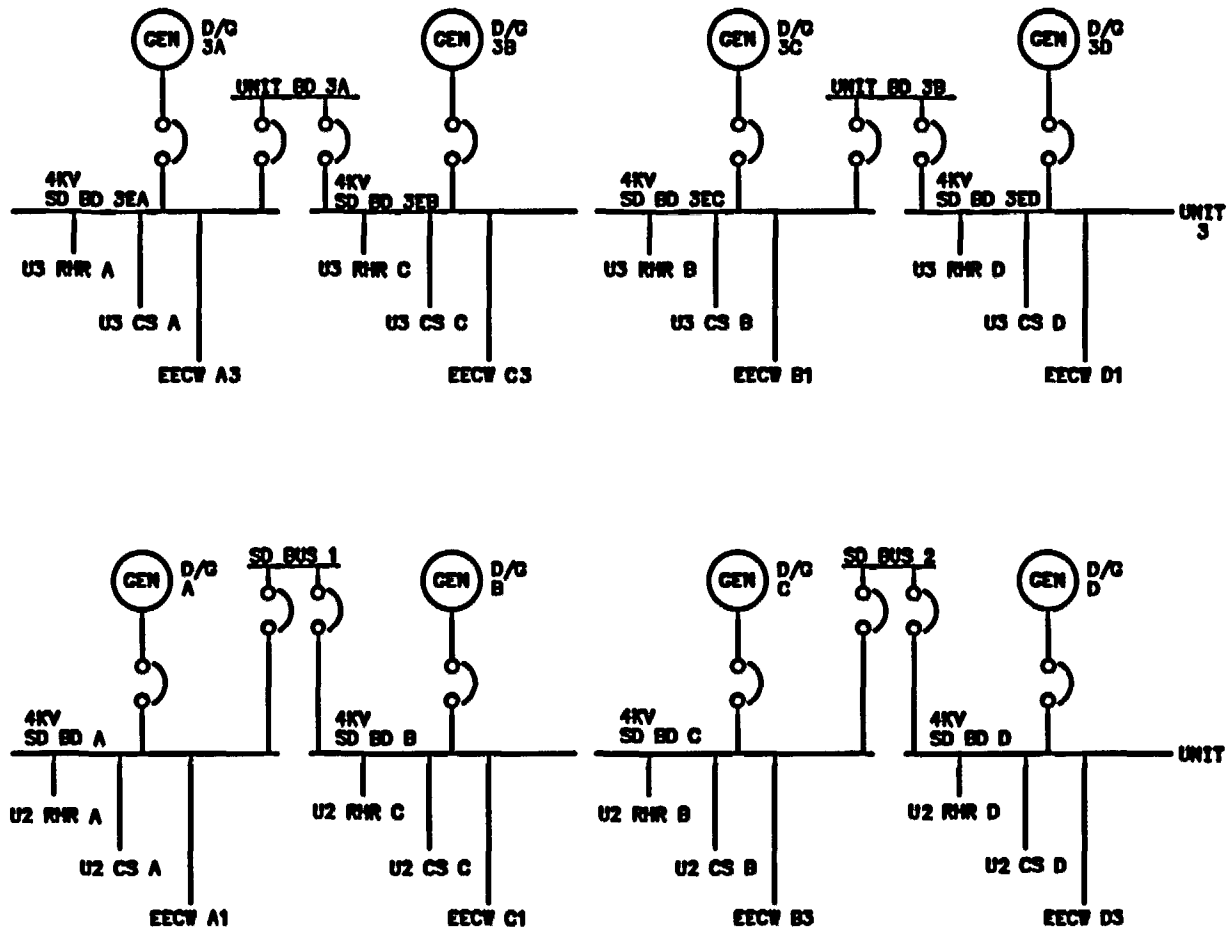


- Current site status (Operation of Units 2 and 3)
  - Fuel has been removed from the Unit 1 vessel and temporary logic modifications made during the extended shutdown to prevent a Spurious Accident Signal from being generated by Unit 1
  - An accident signal in either Unit 2 or 3 starts all 8 diesel generators (DGs)
  - The second unit to receive an accident signal clears that unit's 4KV shutdown boards and re-sequences the loads to the DG's. The other unit is unaffected by this 2<sup>nd</sup> signal and sequences its loads as planned.

# ECCS Performance During a DBA with a Spurious Accident Signal (Cont.)



## UNITS 2 AND 3 STANDBY AUXILIARY POWER SYSTEM INTERCONNECTIONS AND ECCS LOADS



# ECCS Performance During a DBA with a Spurious Accident Signal (Cont.)



## UNITS 1 AND 2 OPERATION IF THE CURRENT ECCS PREFERRED PUMP LOGIC WAS RE-ENABLED

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### Unit 1

### Unit 2

DIVISION 1

DIVISION 2

DIVISION 1

DIVISION 2

Core Spray Pump 1A

Core Spray Pump 1B

Core Spray Pump 2A

Core Spray Pump 2B

Core Spray Pump 1C

Core Spray Pump 1D

Core Spray Pump 2C

Core Spray Pump 2D

RHR Pump 1A (LPCI)

RHR Pump 1B (LPCI)

RHR Pump 2A (LPCI)

RHR Pump 2B (LPCI)

RHR Pump 1C (LPCI)

RHR Pump 1D (LPCI)

RHR Pump 2C (LPCI)

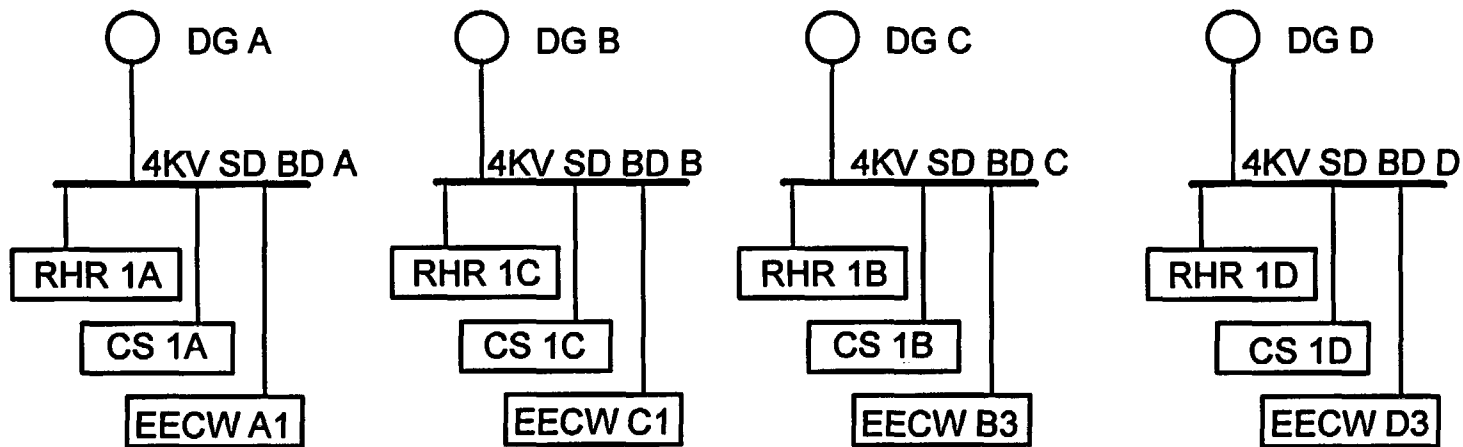
RHR Pump 2D (LPCI)

**Bold and underline indicates pump assignments in response to a design basis Loss of Coolant Accident combined with a spurious accident signal in the adjacent unit.**

**Pumps shown in red are tripped and blocked from starting by the Preferred Pump Logic.**

# ECCS Performance During a DBA with a Spurious Accident Signal (Cont.)

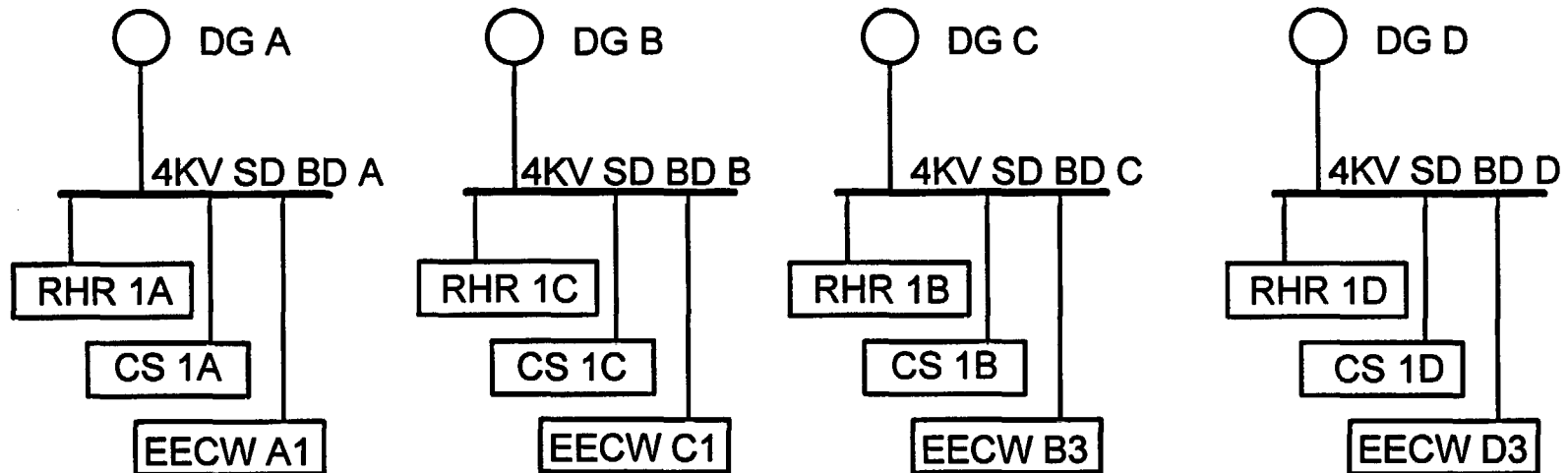
- Timeline of Design Basis Accident in Unit 1, with ECCS logic re-enabled, followed by a spurious accident signal from Unit 2
  - LOCA and Loss of Offsite Power occurs in Unit 1
  - After diesel generator breakers close and Unit 1 ECCS logic has initiated
    - o At 0.1 seconds, starts RHR pumps 1A, 1B, 1C and 1D
    - o At 7 seconds, starts CS pumps 1A, 1B, 1C and 1D
    - o At 14 seconds, starts EECW pumps



# ECCS Performance During a DBA with a Spurious Accident Signal (Cont.)



- Timeline of Design Basis Accident (Cont.)
  - Spurious accident signal received from Unit 2
  - The ECCS Preferred Pump Logic trips and blocks:
    - o Unit 1 RHR pumps 1C and 1D
    - o Unit 1 Core Spray pumps 1B and 1D

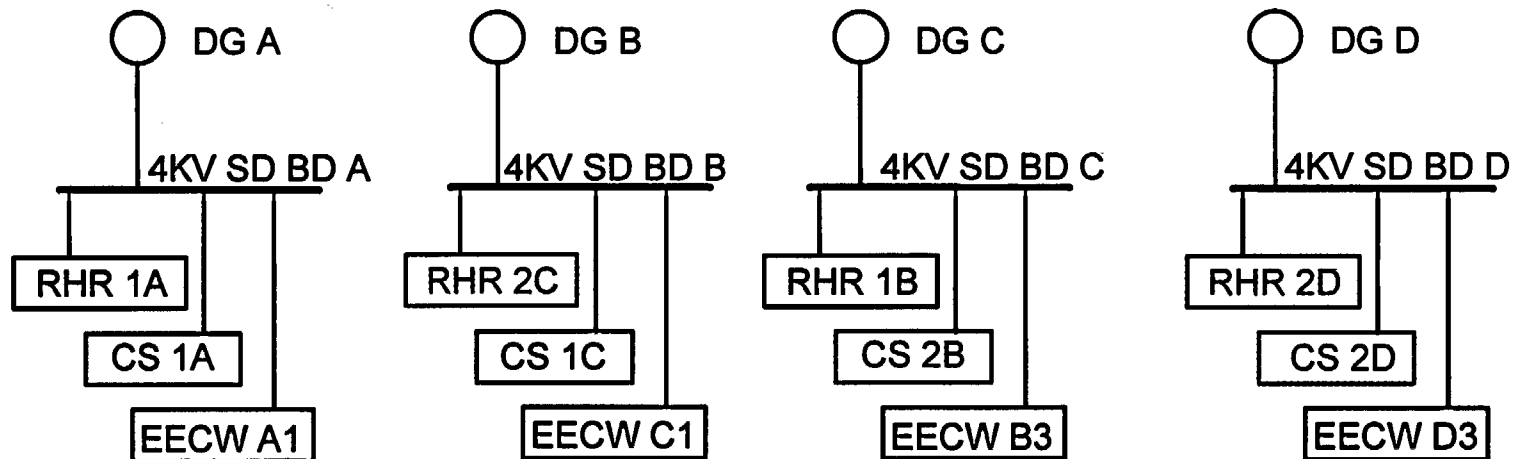




# ECCS Performance During a DBA with a Spurious Accident Signal (Cont.)



- Timeline of Design Basis Accident (Cont.)
  - The ECCS Preferred Pump Logic trips and blocks the start of Unit 2 RHR pumps 2A and 2B, and Core Spray pumps 2A and 2C
  - The Unit 2 ECCS logic starts RHR pumps 2C and 2D, and Core Spray pumps 2B and 2D
  - Results in an unacceptable start sequence on DGs B, C and D
  - Remaining available systems do not satisfy ECCS requirements
    - o Discharge line break – ADS, HPCI
    - o Suction line break – ADS, HPCI, 1 LPCI (1 pump in 1 loop)



# ECCS Performance During a DBA with a Spurious Accident Signal (Cont.)

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- Summary
  - The BFN licensing basis requires TVA to assume that a spurious accident signal could originate from one of the non-accident units coincident with a design basis accident
  - The current logic, electrical boards, and diesel generators do not support the design basis LOCA / Loss of Offsite Power and spurious accident signal scenario with both Units 1 and 2 operating
  - Modifications required to correct ECCS logic design



# Questions and Answers

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# Proposed Modifications

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- Revisions to Preferred Pump Logic
  - Assignment of Division I ECCS loads to Unit 1 and Division II ECCS loads to Unit 2
  - Only functions with both a LOCA and spurious accident signal in Units 1 and 2
  - Logic to be modified so that it functions in a similar manner with or without offsite power
  
- Deletion of redundant opposite division ECCS initiation signals
  - Modifications on Units 1 and 2 will be made to support the changes to the ECCS Preferred Pump Logic



# Proposed Modifications (Cont.)

FIGURE 6  
ECCS PREFERRED PUMP LOGIC FOLLOWING APPROVAL OF PROPOSED AMENDMENT

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the submittal



Bold and underline indicates pump assignments in response to a design basis Loss of Coolant Accident combined with a spurious accident signal in the adjacent unit.

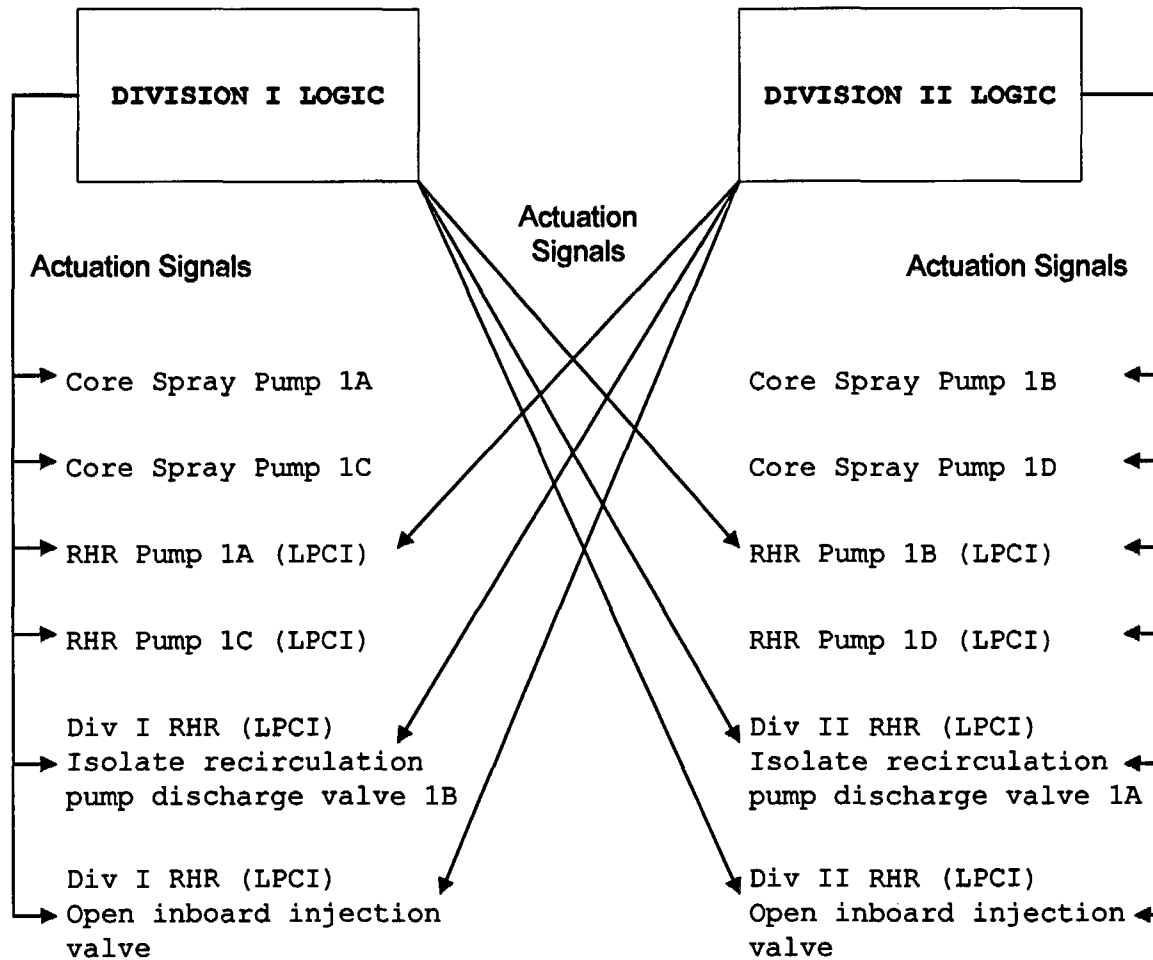
Pumps shown in red are tripped and blocked from starting by the Preferred Pump Logic.



# Proposed Modifications (Cont.)

**FIGURE 1  
CURRENT UNIT 1 ECCS INITIATION LOGIC**

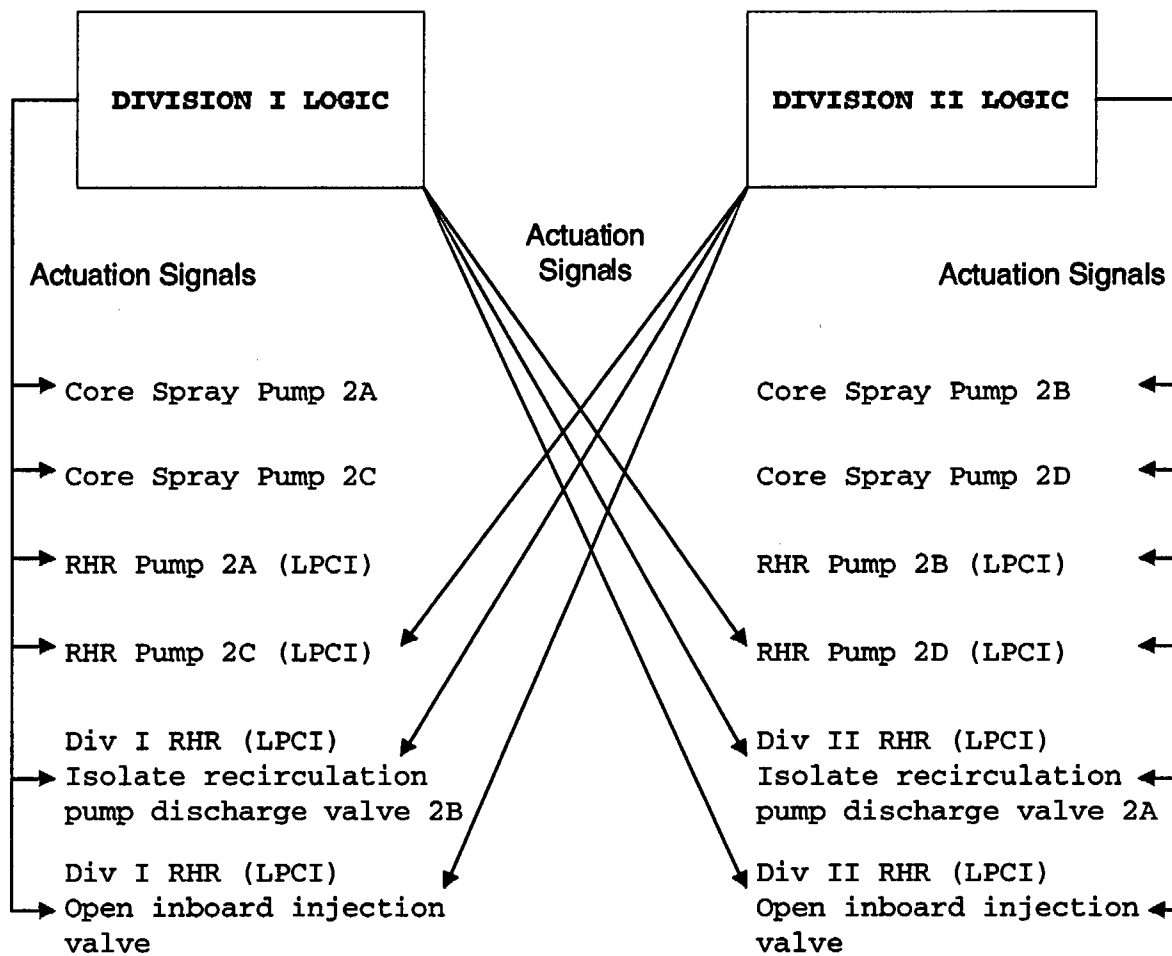
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# Proposed Modifications (Cont.)

**FIGURE 2  
CURRENT UNIT 2 ECCS INITIATION LOGIC**

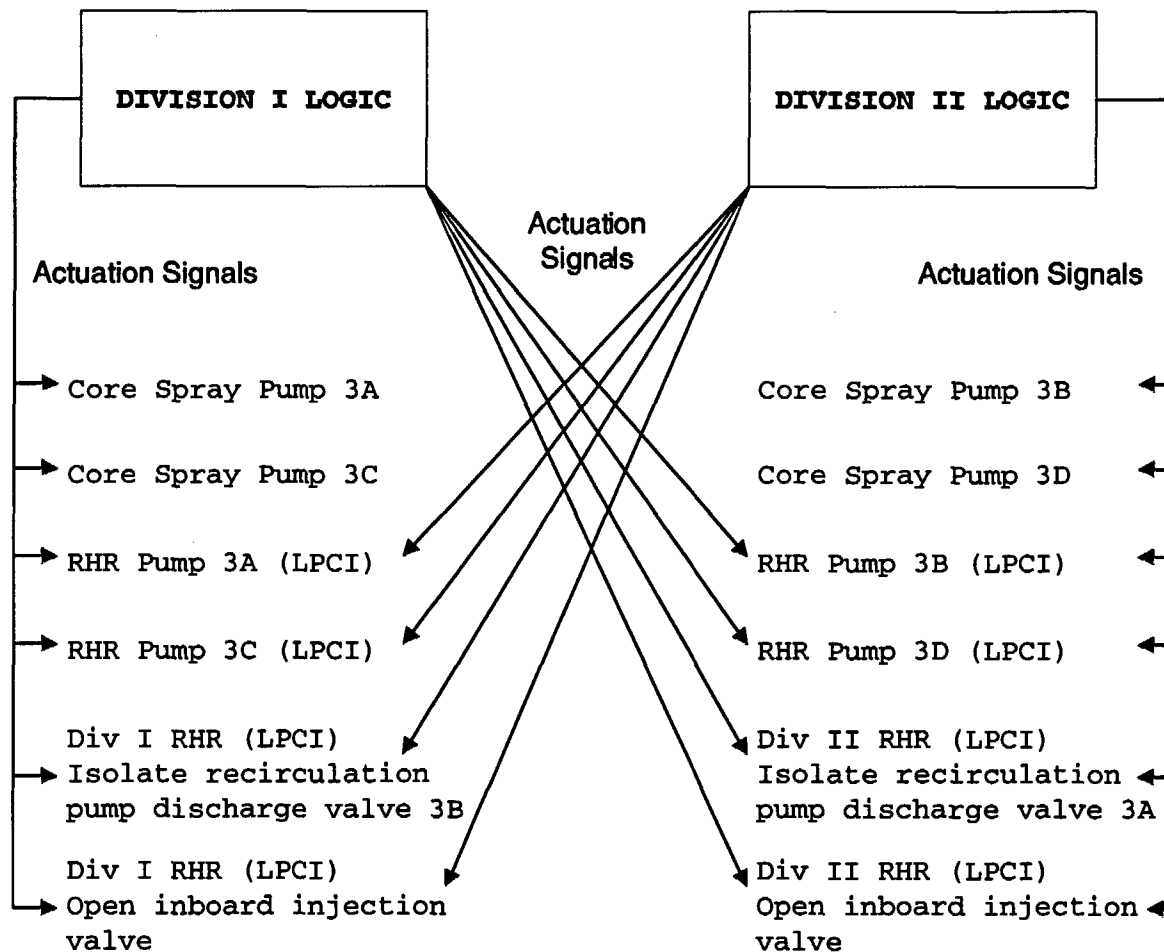
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# Proposed Modifications (Cont.)

**FIGURE 3  
CURRENT UNIT 3 ECCS INITIATION LOGIC**

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the submittal



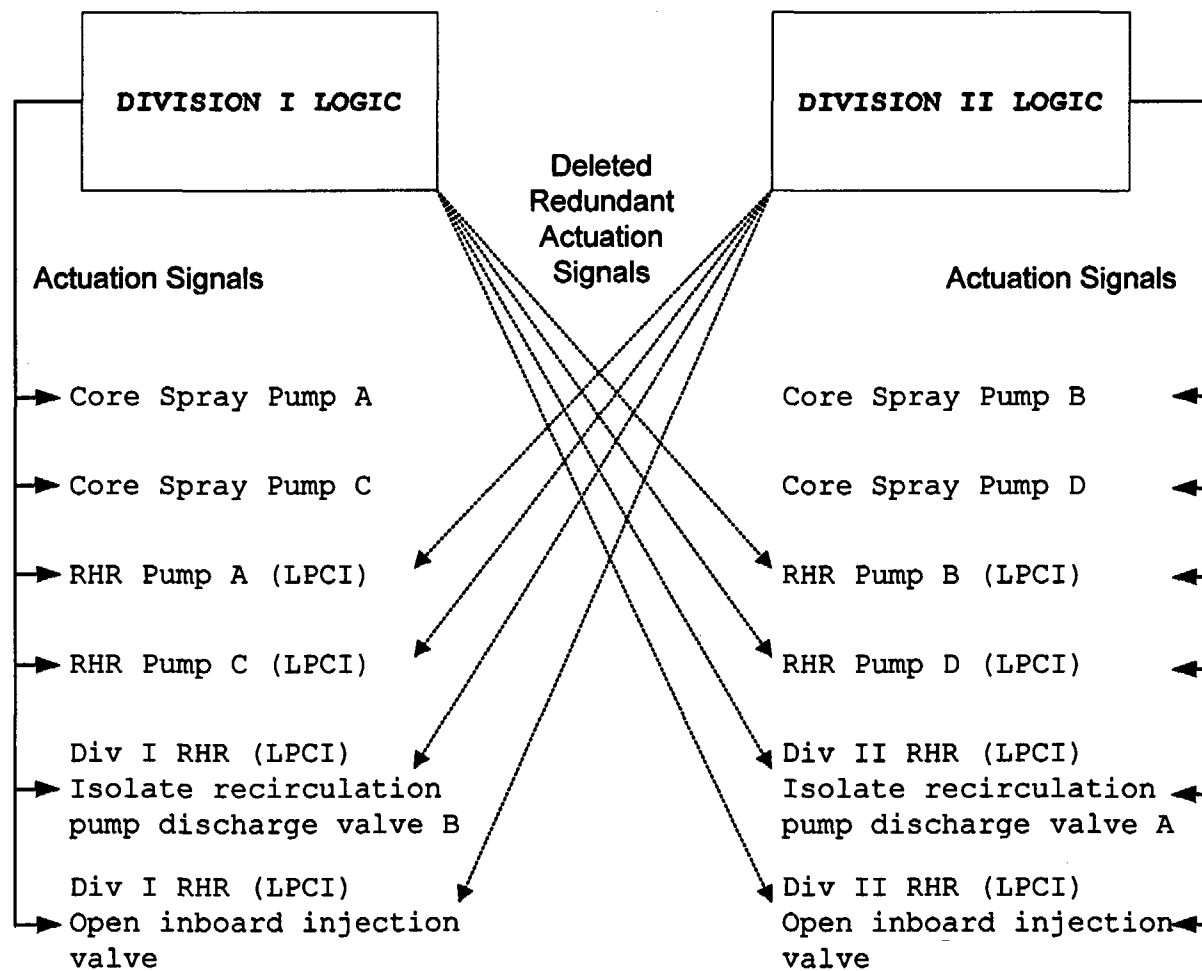




# Proposed Modifications (Cont.)

**FIGURE 4  
PROPOSED ECCS INITIATION LOGIC**

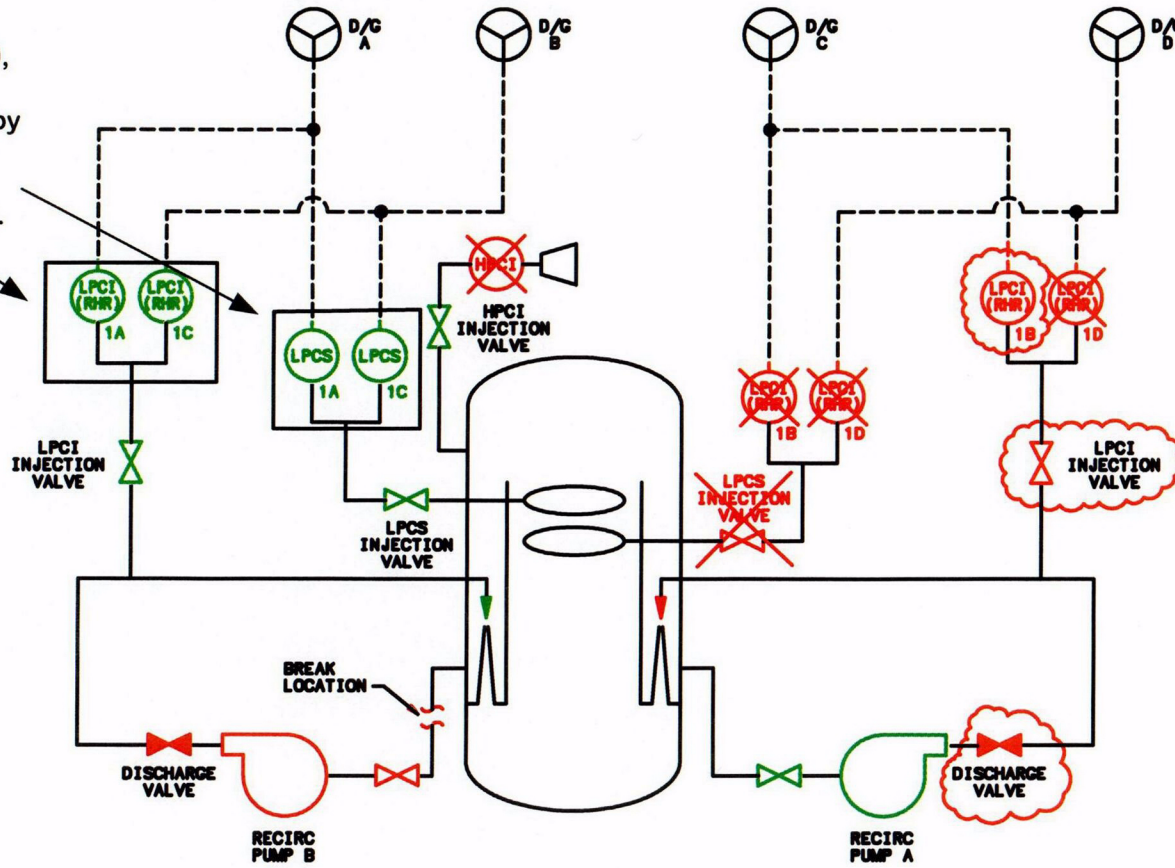
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the submittal



# Proposed Modifications (Cont.)

## ECCS SAFER / GESTR ANALYSIS REQUIREMENTS FOR A SUCTION LINE BREAK WITH A BATTERY FAILURE (PROPOSED LOGIC)

As shown on Slide 10, the minimum equipment required by the ECCS analysis is 1LPCS and 2LPCI (2 pumps into 1 loop).

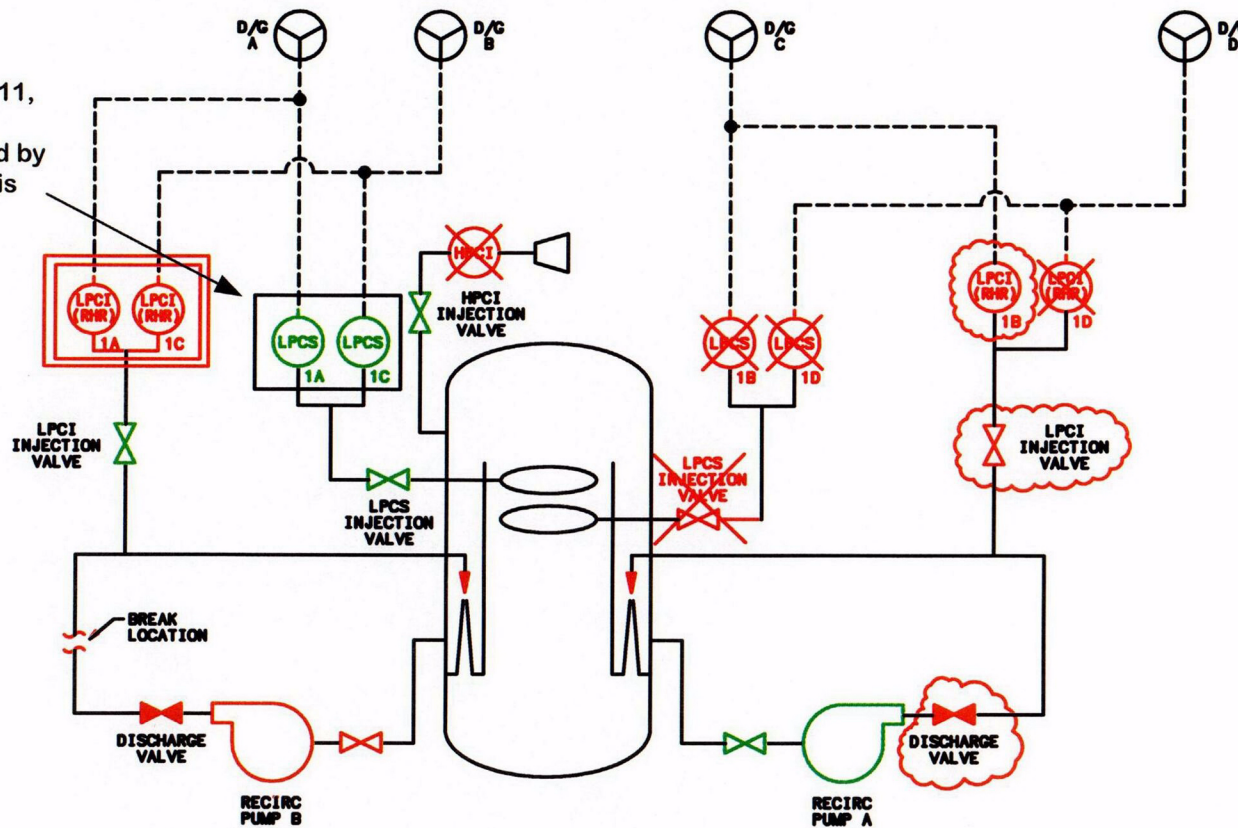


- - Equipment lost due to modified logic
- X - Equipment lost due to single failure
- Minimum equipment required by the ECCS analysis

# Proposed Modifications (Cont.)

## ECCS SAFER / GESTR ANALYSIS REQUIREMENTS FOR A DISCHARGE LINE BREAK WITH A BATTERY FAILURE (PROPOSED LOGIC)

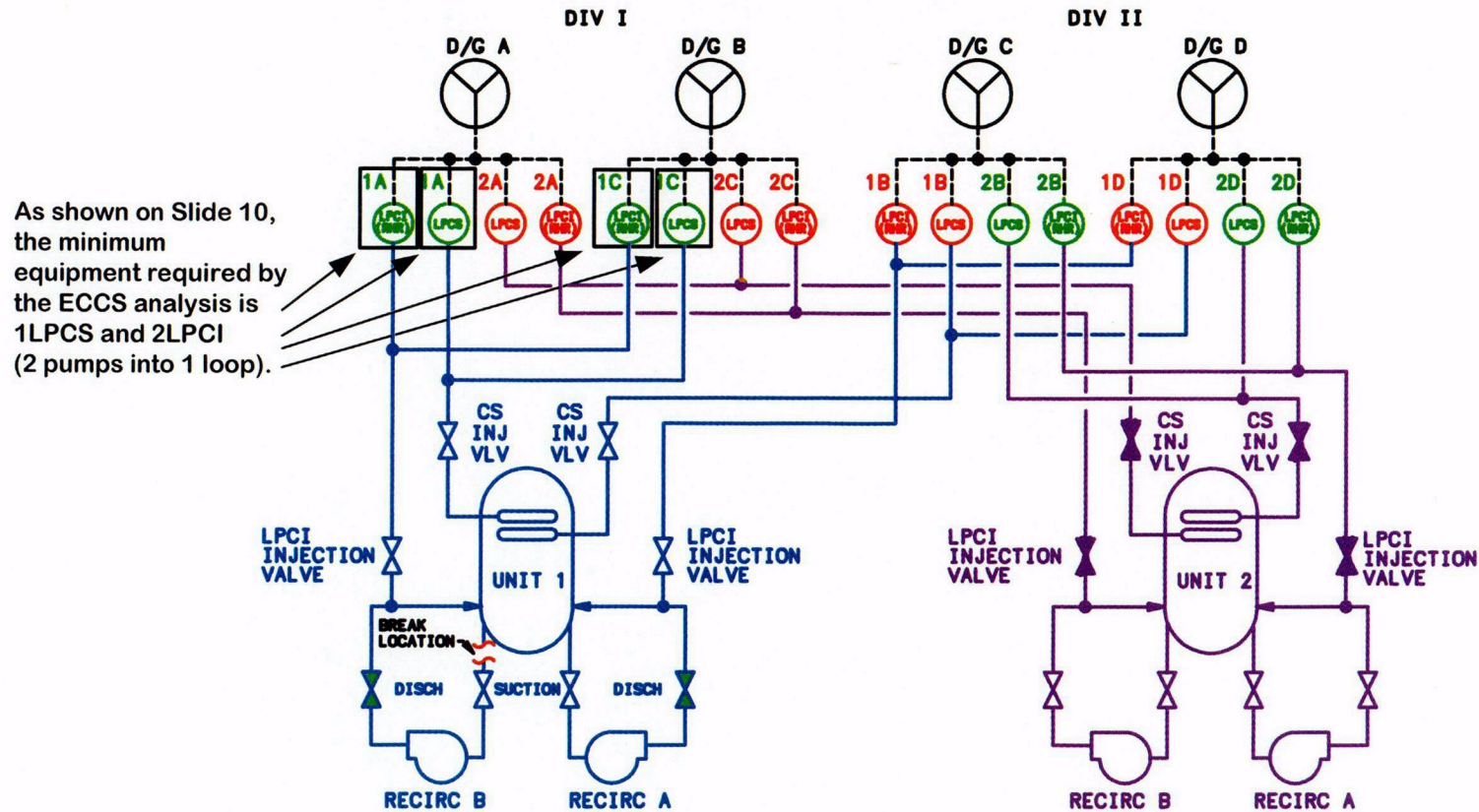
As shown on Slide 11, the minimum equipment required by the ECCS analysis is 1LPCS.



- ☁ - Equipment lost due to modified logic
- X - Equipment lost due to single failure
- Components lost due to break location
- Minimum equipment required by the ECCS analysis

# Proposed Modifications (Cont.)

**UNIT 1 LOSS OF OFFSITE POWER / LOCA (SUCTION LINE BREAK)  
WITH A SPURIOUS ACCIDENT SIGNAL FROM UNIT 2  
(PROPOSED ECCS PREFERRED PUMP LOGIC)**

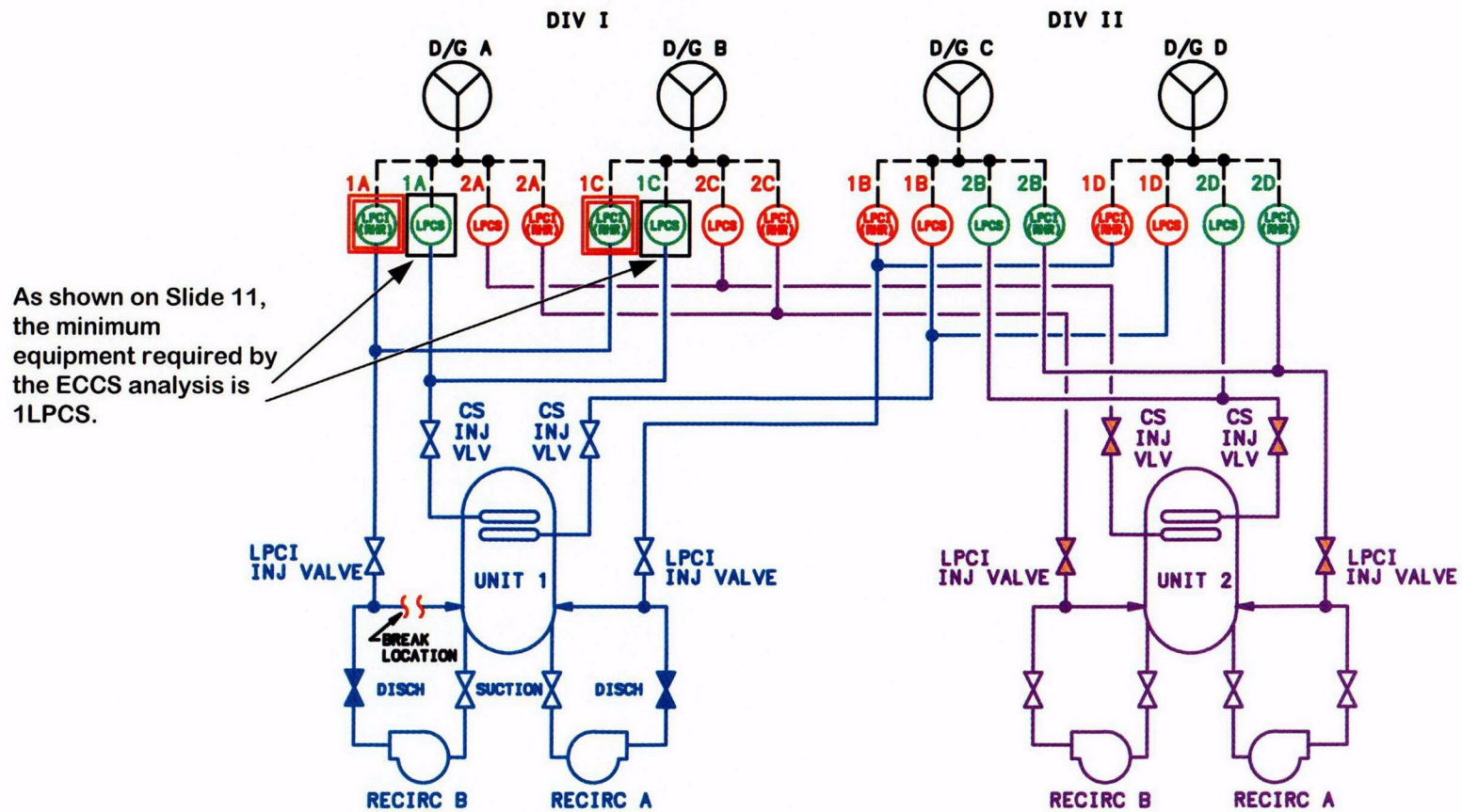


As shown on Slide 10, the minimum equipment required by the ECCS analysis is 1LPCS and 2LPCI (2 pumps into 1 loop).

- RED - Component not available**
- GREEN - Component available**
- Minimum equipment required by ECCS analysis

# Proposed Modifications (Cont.)

UNIT 1 LOSS OF OFFSITE POWER / LOCA (DISCHARGE LINE BREAK)  
WITH A SPURIOUS ACCIDENT SIGNAL FROM UNIT 2  
(PROPOSED ECCS PREFERRED PUMP LOGIC)



As shown on Slide 11,  
the minimum  
equipment required by  
the ECCS analysis is  
1LPCS.

RED - Component not available  
GREEN - Component available

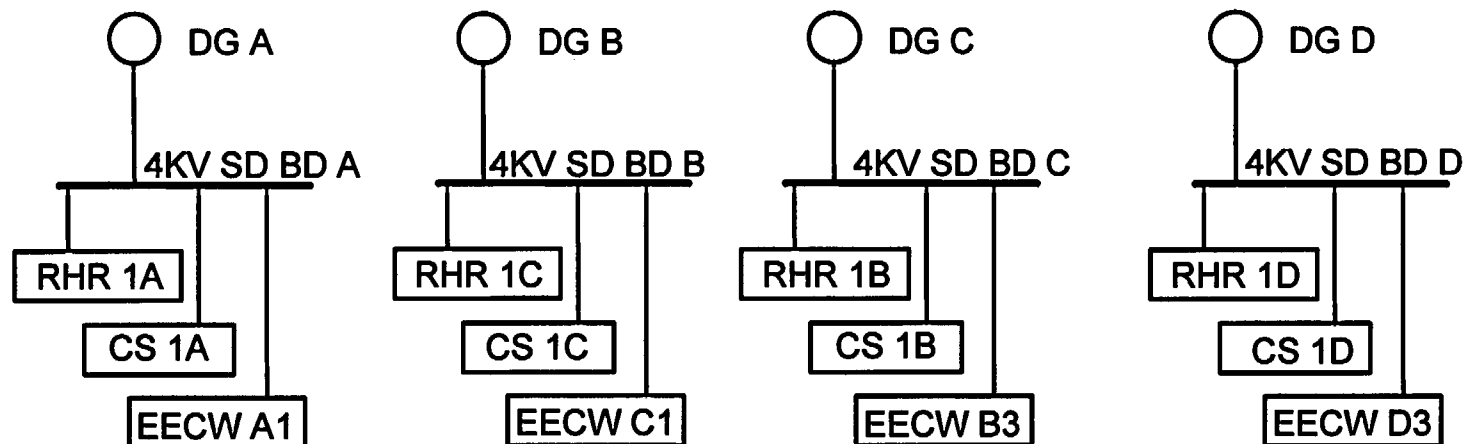
Red box - Equipment lost due to break location  
White box - Minimum equipment required by ECCS analysis



## Proposed Modifications (Cont.)

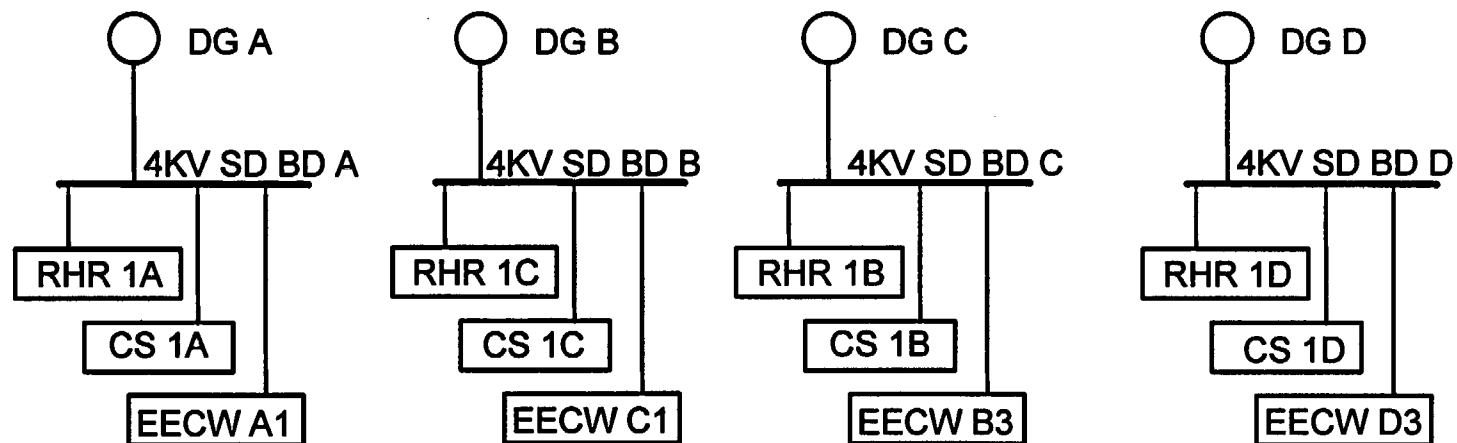
- Timeline of Design Basis Accident in Unit 1, with modified ECCS logic, followed by a spurious accident signal from Unit 2
  - LOCA and Loss of Offsite Power occurs in Unit 1
  - After diesel generator breakers close and Unit 1 ECCS logic has initiated
    - o At 0.1 sec., starts RHR pumps 1A, 1B, 1C and 1D
    - o At 7 sec., starts CS pumps 1A, 1B, 1C and 1D
    - o At 14 sec., starts EECW pumps

} No changes due to proposed modifications



## Proposed Modifications (Cont.)

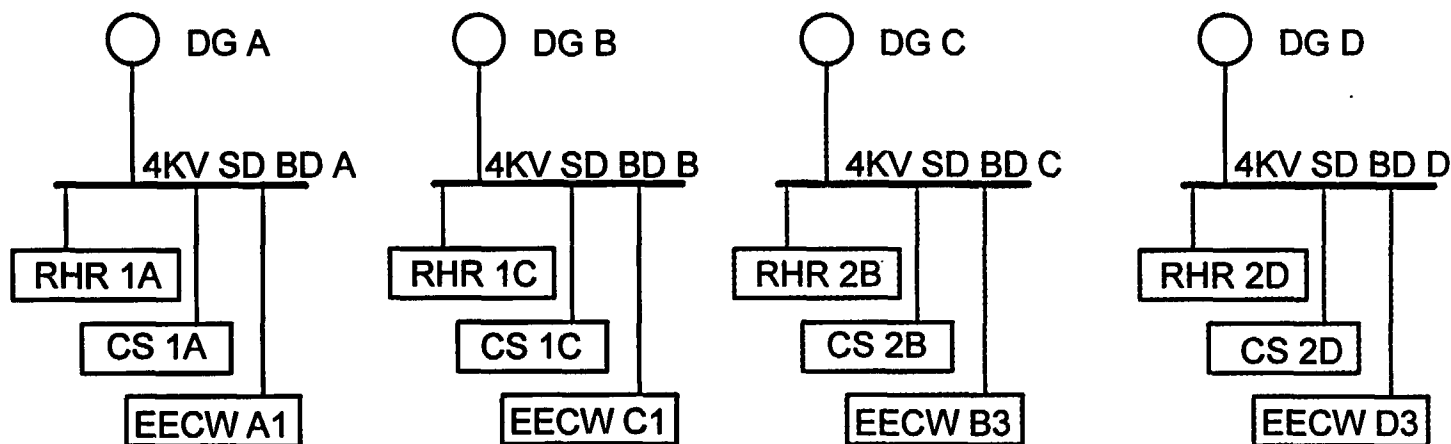
- Timeline of Design Basis Accident (Cont.)
  - Spurious accident signal received from Unit 2
  - The ECCS Preferred Pump Logic opens DG C and D breakers, which trips and blocks:
    - o Unit 1 RHR pumps 1B and 1D
    - o Unit 1 Core Spray pumps 1B and 1D
    - o EECW pumps B3 and D3 (if aligned for service)





## Proposed Modifications (Cont.)

- Timeline of Design Basis Accident (Cont.)
  - The ECCS Preferred Pump Logic trips and blocks the start of Unit 2 RHR pumps 2A and 2C, and Core Spray pumps 2A and 2C
  - The Unit 2 ECCS logic starts RHR pumps 2B and 2D, and Core Spray pumps 2B and 2D
  - **Results in an acceptable start sequence on DGs A, B, C and D**
  - **Remaining available systems satisfy ECCS requirements**
    - o Discharge line break – ADS, HPCI and 1LPCS
    - o Suction line break – ADS, HPCI, 1LPCS, 2LPCI (2 pumps in 1 loop)







# Proposed Modifications (Cont.)

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- **Summary**
  - **Proposed modifications comply with current Licensing Basis**
    - o Meet requirement to assume that a spurious accident signal could originate from one of the non-accident units coincident with a design basis accident
  - **Proposed modifications comply with current LOCA analysis**
    - o Modified logic will assure ECCS requirements are met with or without a Loss of Offsite Power



# Questions and Answers

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# Proposed License Amendments, Technical Specification and FSAR changes

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- Proposed License Amendments
  - Deletion of redundant opposite division ECCS initiation signals
    - o Reduction in redundancy requires a License amendment under the provisions of 10 CFR 50.59
  - Assignment of Division I ECCS loads to Unit 1 and Division II ECCS loads to Unit 2 (Preferred Pump Logic)
    - o Reduction in redundancy requires a License amendment under the provisions of 10 CFR 50.59
- Proposed Technical Specification changes
  - Deletion of redundant opposite division ECCS initiation signals
    - o Deletion of time delay relay in redundant start circuit requires a revision in Technical Specification Table 3.3.5.1-1

# Proposed License Amendments, Technical Specification and FSAR changes (Cont.)



Unit 1  
Table 3.3.5.1-1 (page 3 of 6)  
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI System (continued)					
f. Low Pressure Coolant Injection Pump Start - Time Delay Relay					
Pump A,B,C,D (with diesel power)	1,2,3, 4(a), 5(a)	<del>6(c)</del> 4	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 0 seconds and ≤ 1 second
Pump A (with normal power)	1,2,3, 4(a), 5(a)	<del>2</del> <del>1 per trip</del> <del>system</del> 1	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 0 seconds and ≤ 1 second
Pump B (with normal power)	1,2,3, 4(a), 5(a)	<del>2</del> <del>1 per trip</del> <del>system</del> 1	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 6 seconds and ≤ 8 seconds

# Proposed License Amendments, Technical Specification and FSAR changes (Cont.)



Unit 2  
Table 3.3.5.1-1 (page 3 of 6)  
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI System (continued)					
f. Low Pressure Coolant Injection Pump Start - Time Delay Relay					
Pump A,B,C,D (with diesel power)	1,2,3, 4(a), 5(a)	<del>6(c)</del> 4	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 0 seconds and ≤ 1 second
Pump C (with normal power)	1,2,3, 4(a), 5(a)	<del>2</del> <del>1 per trip</del> <del>system</del> 1	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 12 seconds and ≤ 16 second
Pump D (with normal power)	1,2,3, 4(a), 5(a)	<del>2</del> <del>1 per trip</del> <del>system</del> 1	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 18 seconds and ≤ 24 seconds

# Proposed License Amendments, Technical Specification and FSAR changes (Cont.)



Unit 3  
Table 3.3.5.1-1 (page 3 of 6)  
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI System (continued)					
f. Low Pressure Coolant Injection Pump Start—Time Delay Relay					
Pump A,B,C,D (with diesel power)	1,2,3, 4(a), 5(a)	<del>8(a)</del> 4	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 0 seconds and ≤ 1 second
Pump A (with normal power)	1,2,3, 4(a), 5(a)	<del>2</del> <del>1 per trip system</del> 1	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 0 seconds and ≤ 1 second
Pump B (with normal power)	1,2,3, 4(a), 5(a)	<del>2</del> <del>1 per trip system</del> 1	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 6 seconds and ≤ 8 seconds
Pump C (with normal power)	1,2,3, 4(a), 5(a)	<del>2</del> <del>1 per trip system</del> 1	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 12 seconds and ≤ 16 seconds
Pump D (with normal power)	1,2,3, 4(a), 5(a)	<del>2</del> <del>1 per trip system</del> 1	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 18 seconds and ≤ 24 seconds

# Proposed License Amendments, Technical Specification and FSAR changes (Cont.)



- FSAR Table 6.5-3, which reflects the current ECCS analysis, will be revised to reflect actual equipment available for the false LOCA signal case

<u>Assumed Failure</u>	<u>CURRENT FSAR</u> Recirculation Suction Break Systems Remaining	<u>PROPOSED FSAR</u> Recirculation Suction Break Systems Remaining
Battery	ADS, 1LPCS, 2LPCI (2 pumps into 1 loop)	(Same as current FSAR)
Opposite Unit False LOCA Signal (Units 1 and 2)	ADS, HPCI, 1LPCS, 2LPCI (2 pumps into 2 loops)	ADS, HPCI, 1LPCS, 2LPCI (2 pumps into 1 loop)
LPCI Injection Valve	ADS, HPCI, 2LPCS, 2LPCI (2 pumps into 1 loop)	(Same as current FSAR)
Diesel Generator	ADS, 1LPCS, HPCI, 2LPCI (2 pumps into 1 loop)	(Same as current FSAR)
HPCI	ADS, 2LPCS, 4LPCI (2 per loop)	(Same as current FSAR)

# Proposed License Amendments, Technical Specification and FSAR changes (Cont.)



- FSAR Table 6.5-3, which reflects the current ECCS analysis, will be revised to reflect actual equipment available for the false LOCA signal case (Cont.)

<u>Assumed Failure</u>	<u>CURRENT FSAR Recirculation Discharge Break Systems Remaining</u>	<u>PROPOSED FSAR Recirculation Discharge Break Systems Remaining</u>
Battery	ADS, 1LPCS	(Same as current FSAR)
Opposite Unit False LOCA Signal (Units 1 and 2)	ADS, HPCI, 1LPCS, 1LPCI (1 pump into 1 loop)	ADS, HPCI, 1LPCS
LPCI Injection Valve	ADS, HPCI, 2LPCS	(Same as current FSAR)
Diesel Generator	ADS, HPCI, 1LPCS (1 pump into 1 loop)	(Same as current FSAR)
HPCI	ADS, 2LPCS, 2LPCI (2 pumps into 1 loop)	(Same as current FSAR)



# Proposed License Amendments, Technical Specification and FSAR changes (Cont.)

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- The proposed revision in the number of ECCS subsystems that are available for these LOCA scenarios is consistent with and bounded by the current LOCA analysis results and conforms to 10 CFR 50.46 and Appendix K
  - The current BFN SAFER/GESTR-LOCA analysis is conservative with respect to the current plant's actual equipment availability
  - The reduction in the number of ECCS subsystems that are actually available in response to a LOCA / Loss of Offsite Power with a spurious accident signal will now be the same as the number of ECCS subsystems evaluated in the current BFN SAFER/GESTR-LOCA analysis for the bounding case (LOCA / Loss of Offsite Power and battery failure)



# Summary and Conclusion

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- The proposed revision in the number of ECCS subsystems that are available for certain LOCA scenarios
  - Satisfies the current Licensing Basis
  - Is consistent with and bounded by the current LOCA analysis