



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

July 7, 1997

LICENSEE: Florida Power Corporation

FACILITY: Crystal River Unit 3

SUBJECT: SUMMARY OF MEETING ON JUNE 24, 1997, REGARDING PROPOSED LICENSE AMENDMENT RELATING TO HIGH PRESSURE INJECTION, EMERGENCY FEEDWATER AND EMERGENCY DIESEL GENERATOR SYSTEMS

On June 24, 1997, representatives of the Florida Power Corporation, licensee for Crystal River Nuclear Plant, Unit 3 (CR3) met with members of the staff at the U.S. Nuclear Regulatory Commission (NRC) Headquarters in Rockville, Maryland. The licensee presented an overview of its June 14, 1997 license amendment request relating to the CR3's potential success path for emergency feedwater (EFW) flow and emergency diesel generator (EDG) loading concerns during a small break loss of coolant accident (SBLOCA) design basis scenario. Enclosure 1 is a list of attendees. Enclosure 2 contains copies of handouts distributed at the meeting.

The licensee discussed the design basis accident scenario affecting the EFW and EDG operation, SBLOCA, loss of offsite power (LOOP) and three limiting single failures and potential success paths. The licensee presented details of plant modifications, design reanalyses, and technical specification changes that would be necessary to meet its established success path. The licensee indicated that the EDG calculations for determining the maximum expected accident loads, design of plant modifications, and emergency and other operating procedure changes are currently in progress.

The NRC staff expressed concern regarding its review of the proposed license amendment with pending supporting details and its impact on staff resources especially considering the licensee's request for an expedited review of the amendment by November 1997. The licensee indicated that it recognizes the staff concern and stated that based on its detailed conceptual knowledge and thorough review by safety review committees and other in-house organizations, it is confident that its current ongoing efforts would not involve any unreviewed safety questions and would not adversely affect its June 14, 1997 license amendment request. The licensee stated that it will complete these ongoing efforts, and provide necessary details to the staff well before November 1997.

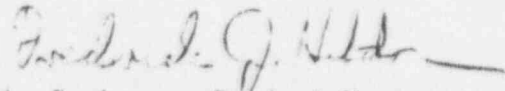
The NRC staff specifically requested the licensee to submit its proposed emergency and other operating procedure changes as soon as possible, and the final version by September 1997. The staff briefly discussed the Institute of Electrical and Electronics Engineers (IEEE) Standards, and other industry and regulatory guidelines relating to EDG modifications, design and requalification considerations including the rationale for establishing the predicted accident loads. The staff requested the licensee to provide details

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PDR

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to demonstrate meeting these industry and regulatory guidelines. The licensee agreed to provide the requested information.



L. L. Raghavan, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosures: 1. Attendance List
2. Meeting Handout

cc w/Enclosures: See next page

to demonstrate meeting these industry and regulatory guidelines. The licensee agreed to provide the requested information.

Original signed by
Frederick J. Hebdon for
L. Raghavan, Project Manager
Project Directorate II-3
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Office of Nuclear Reactor Regulation

Docket No. 50-302

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2. Meeting Handout

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DATE	07/ /97	07/ 7 /97	07/ 7 /97	

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Florida Power Corporation

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GENERATING PLANT

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SUMMARY OF MEETING ON JUNE 24, 1997, REGARDING PROPOSED LICENSE AMENDMENT
RELATING TO HIGH PRESSURE INJECTION, EMERGENCY FEEDWATER AND EMERGENCY DIESEL
GENERATOR SYSTEMS

Distribution:

HARD COPY w/Enclosures 1 and 2

Docket File

PUBLIC

L. Raghavan

Crystal River Reading

OGC

ACRS

E-Mail w/Enclosure 1

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R. Zimmerman (RPZ)

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F. Hebdon (FJH)

B. Clayton (BAC2)

D. Ross (SAM)

J. Jaudon (JPJ)

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W. Rogers (WGR1)

F. Orr (FRO)

G. Hubbard (GTH)

W. LeFave (WTL1)

M. Pratt (MPP)

S. Sanchez (SPS)

D. Thatcher (DFT)

S. Saba (SNS1)

C. Liang (CYL)

G. Tracy (GMT)

S. Cahill (SJC2)

J. Johnson (JRJ)

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S.V. Athavale (SVA1)

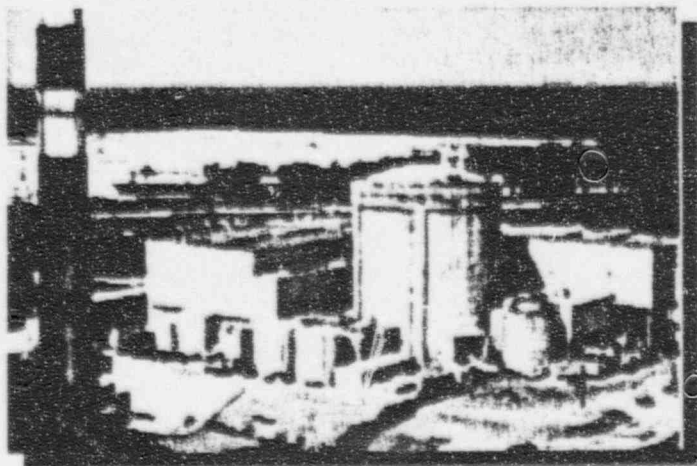
CRYSTAL RIVER 3 MEETING

JUNE 24, 1997

<u>Name</u>	<u>Organization</u>
L. Raghavan	NRR
K. Landis	NRC-RII
John P. Jaudon	NRC-RII
F. J. Hebdon	NRC-PDII-3
H. Cristensen	NRC-RII
Frank Orr	NRC/SRXB
Bill LeFave	NRR/DSSA/SPLB
Paul V. Fleming	Florida Power Corp.
John J. Holden	Florida Power Corp.
Mark Pratt	NRC/EELB
Dale Thatcher	NRC/NRR/EELB
Saba Saba	NRC/NRR/EELB
Mark Van Sicklen	Florida Power Corp.
Chu Liang	NRR/SRXB
S.V. Athavale	NRR/HICB
J. Bongarra	NRR/HHFB
S. Katradis	NUS Information Services
M. Lalou	Florida Power Corp.
R. D. deMontfort	Florida Power Corp.
D. Kunsemiller	Florida Power Corp.
G. Hubbard	NRR/SPLB

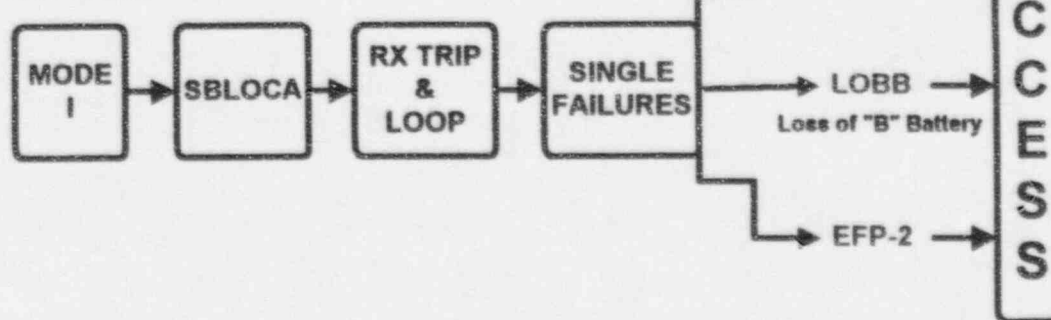


ITS SUBMITTAL



SOLUTION SET FLOW PATH

INITIAL
CONDITIONS





AGENDA

- ★ Introduction - Dave Kunsemiller
- ★ Modifications - John Holden
- ★ SBLOCA Solution Sets - Mark Van Sicklen
- ★ ITS Submittal - Paul Fleming
- ★ Operations Perspective - Dave deMontfort
- ★ Engineering Summary - John Holden
- ★ Conclusions - Dave Kunsemiller



Purpose of ITS Submittal

License CR-3 for Startup and Operation during
Cycle 11 with:

- Cross Train Dependencies
- EDG Load Management
- Mitigation Strategies Involving Operator Actions



Contents of Submittal

- ★ Cover Letter
- ★ Safety Assessment
- ★ ITS Changes
- ★ Framatome Analysis
- ★ Supporting Information
 - Operator Actions
 - Mods / FSAR Changes
 - USQ Resolution



MODIFICATIONS

EFW / FWP-7 Mods

- EFW Cavitating Venturis
- Diesel Power Supply for FWP-7
- EFV-12 Motor Operator



MODIFICATIONS

EDG Load Capability

- Load Capacity Increase
 - » Engine Modifications (150 kW)
 - » kW Meters
- Load Management
 - » P-T-L Control Handles
 - » EFP-1 Trip Defeat Switch
- Load Removal / Reduction



Diesel Generator Load

Sept '96

June '97

Old EDG Ratings

30 Min	3500 kW
200 Hr	3250 kW
2000 Hr	3000 kW
Contin.	2850 kW

Auto Connect Load

3159 kW

New EDG Ratings

30 Min	3500 kW
200 Hr	<u>3400</u> kW
2000 Hr	<u>3200</u> kW
Contin.	2850 kW

Auto Connect Load

3075 kW



STARTUP TEAM

★ First Team Identified EDG Margin Concerns

- On December 18th Recommended 3 Options

★ Second Team Identified Concerns with Startup

- Complexity of TS Changes
- Cross-Train Dependencies
- Importance of EFW for SBLOCA
- Impact of 3 Limiting Single Failures



LIMITING ACCIDENTS

THE TEAM REVIEWED FSAR CHAPTER 14 ACCIDENTS.

**THE LIMITING TRANSIENTS AFFECTING THE
EMERGENCY DIESEL GENERATOR LOADING AND
EMERGENCY FEEDWATER WERE IDENTIFIED AS:**

SBLOCA & LOOP

AND

LIMITING SINGLE FAILURES



LIMITING SINGLE FAILURES

LOBA or LOBB - Loss of a Battery

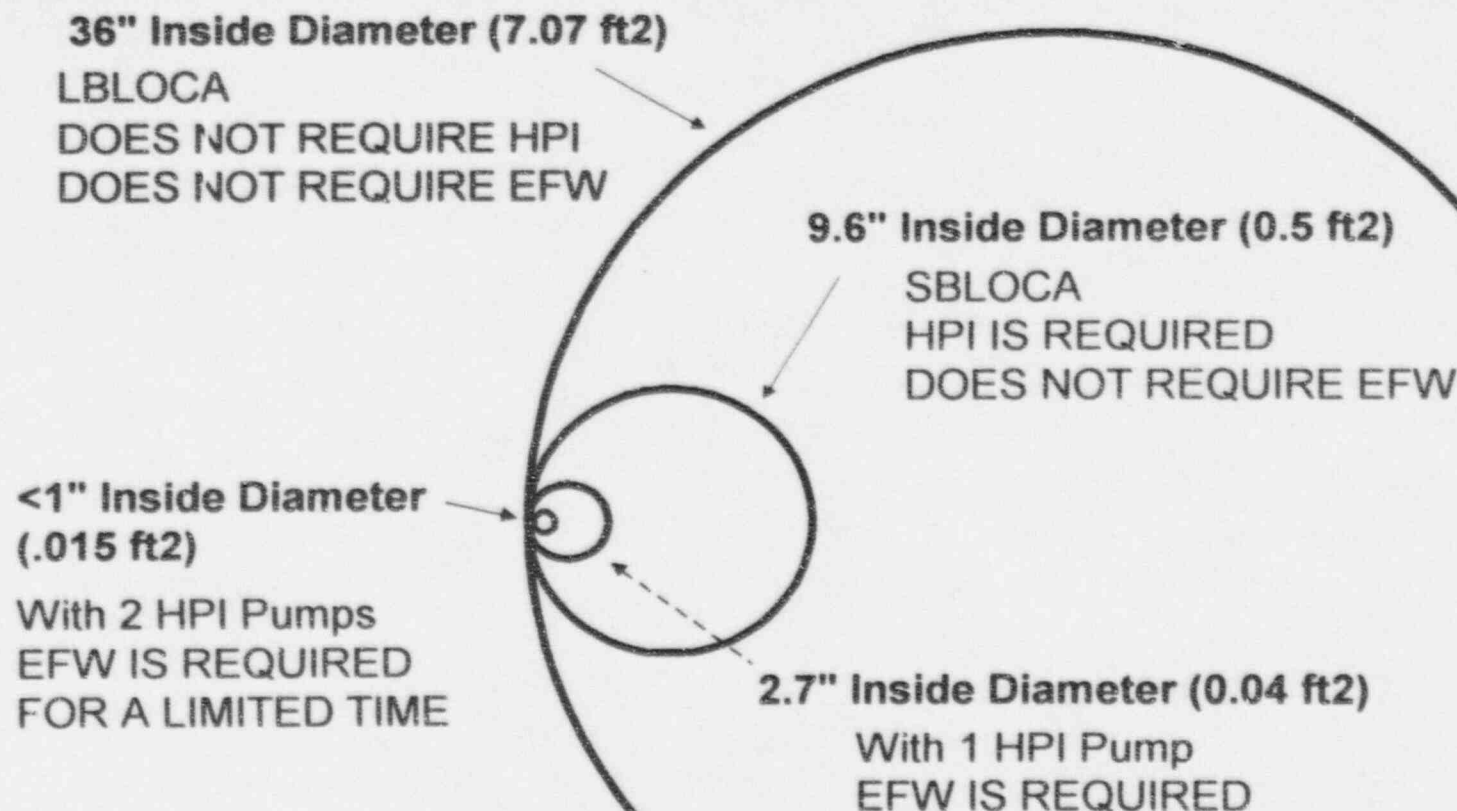
- Disables ONE Emergency Diesel Generator
- Disables ONE Train of Emergency Core Cooling
- Disables ONE Train of DC Control Power

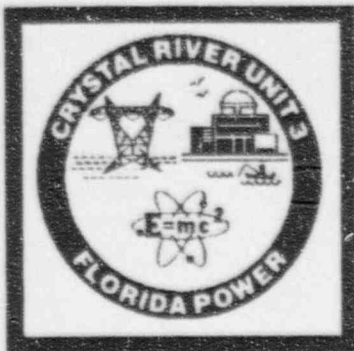
EFP-2

The Motor Driven Emergency Feedwater Pump (EFP-1) is designed to be load shed (during the accident) to protect the 'A' Emergency Diesel Generator from an overload condition

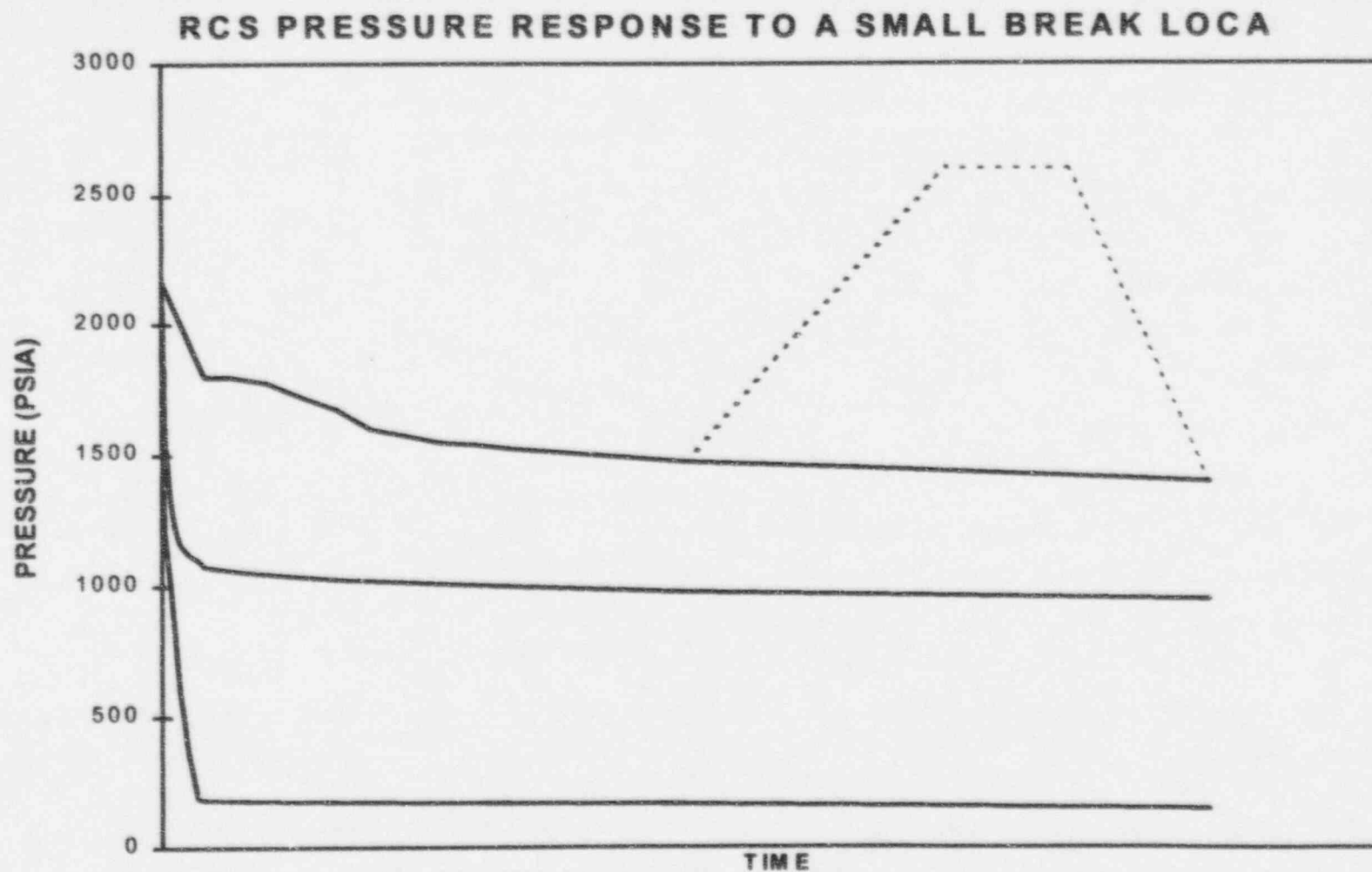


LOCA SIZES





RCS PRESSURE TRACE



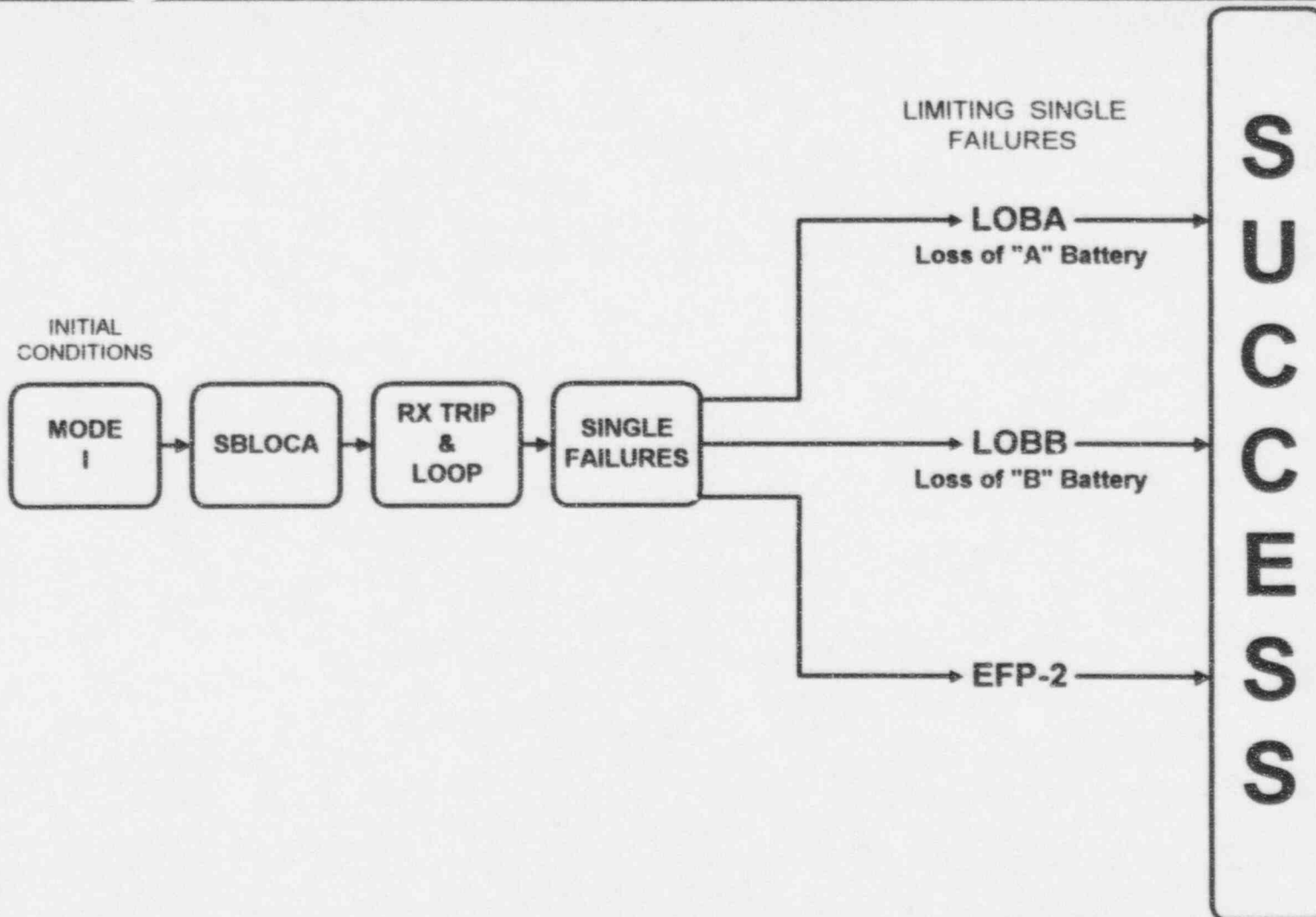


Startup Team Solution Set

- ★ Address Each Single Failure Scenario Separately
- ★ Identify Design Basis Success Path
- ★ Identify Challenges
- ★ Identify Defense In Depth
- ★ Identify Needs
 - Modifications
 - Procedures
 - Licensing Actions
 - Training

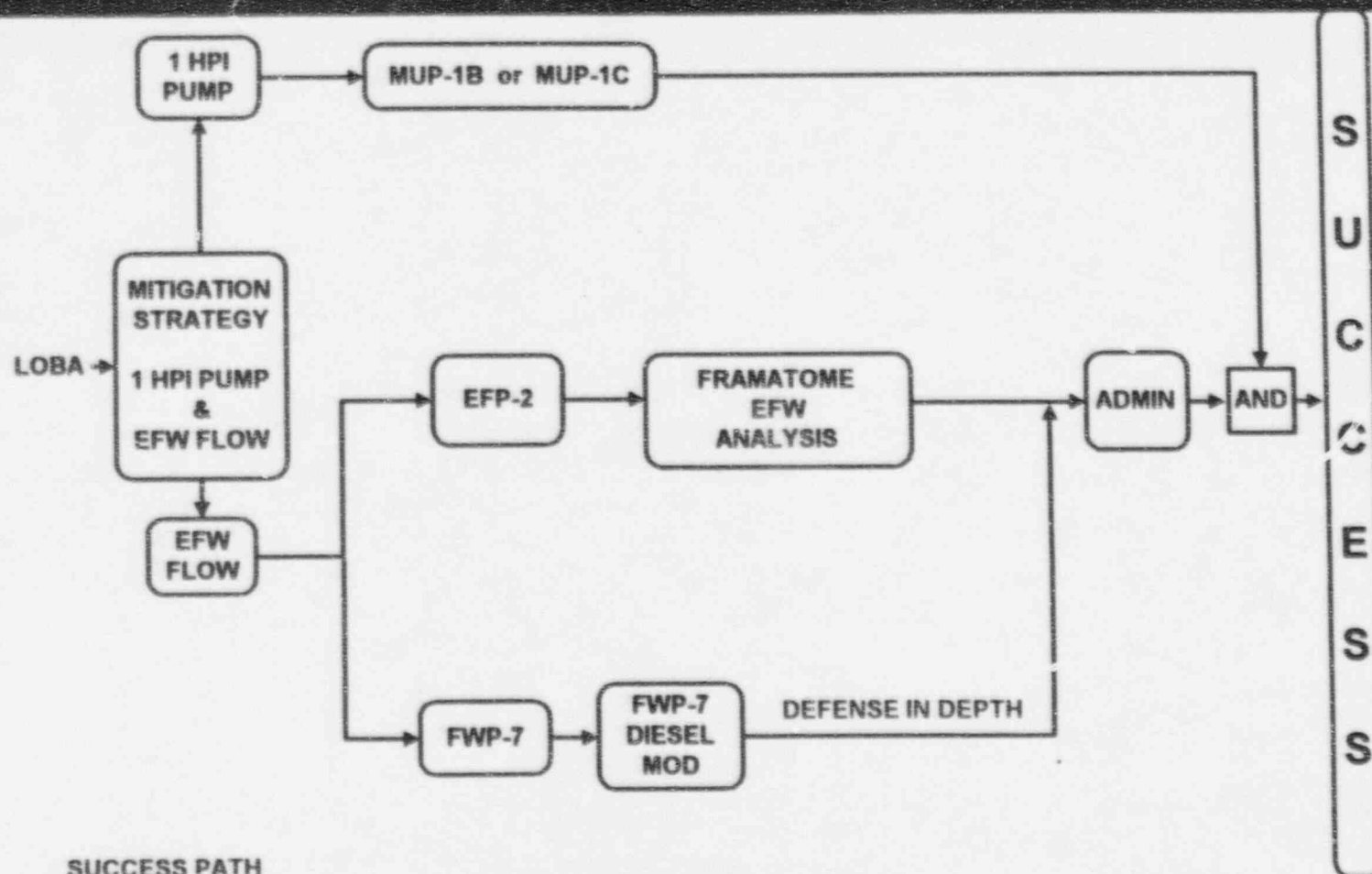


Startup Team Solution Set





LOSS OF BATTERY "A"



SUCCESS PATH
CHALLENGES
DEFENSE IN DEPTH

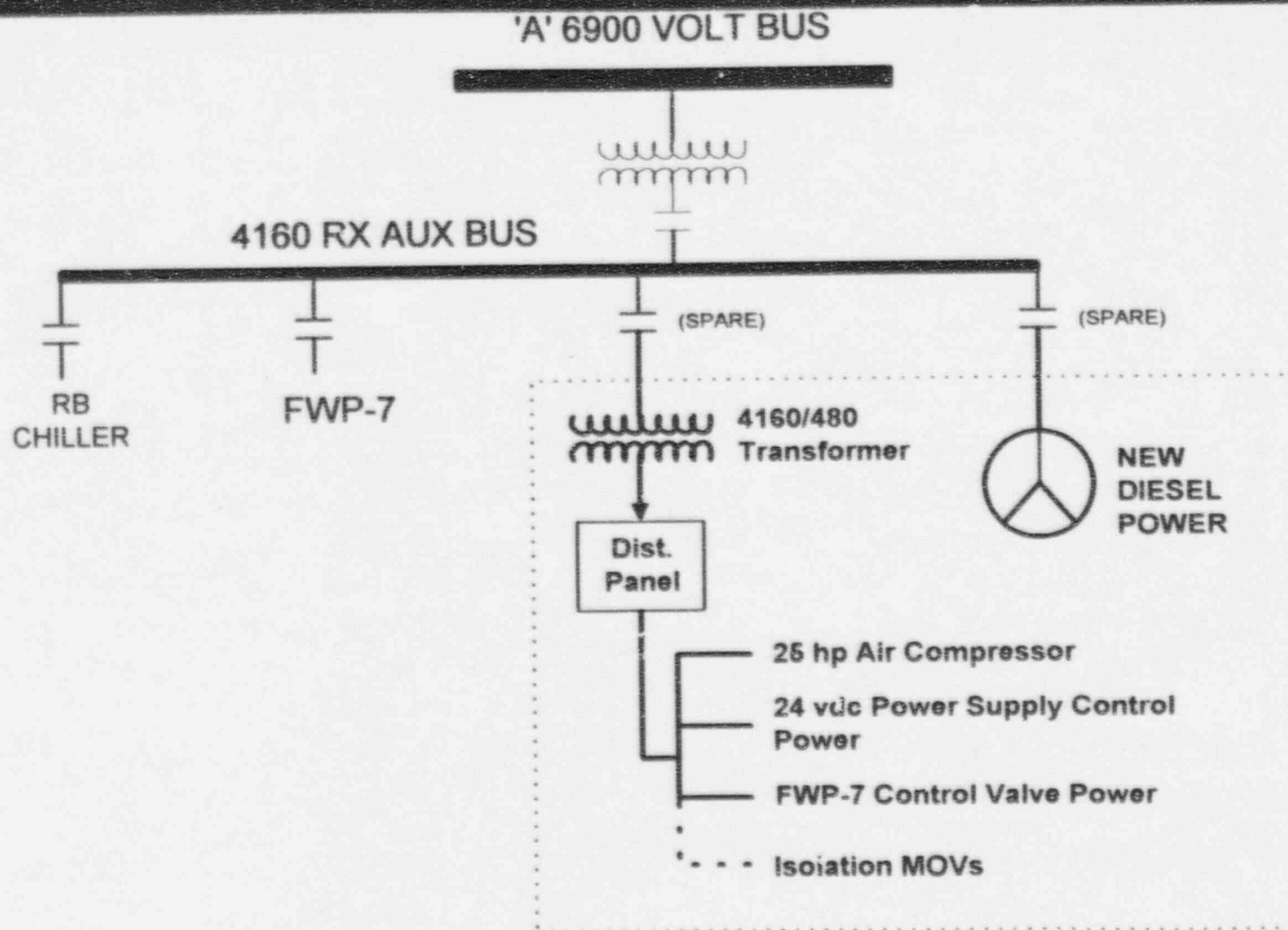


FWP-7

- © INCREASE DEFENSE-IN-DEPTH
- © MAXIMIZE FWP-7 INDEPENDENCE
- © MINIMIZE OPERATOR BURDEN

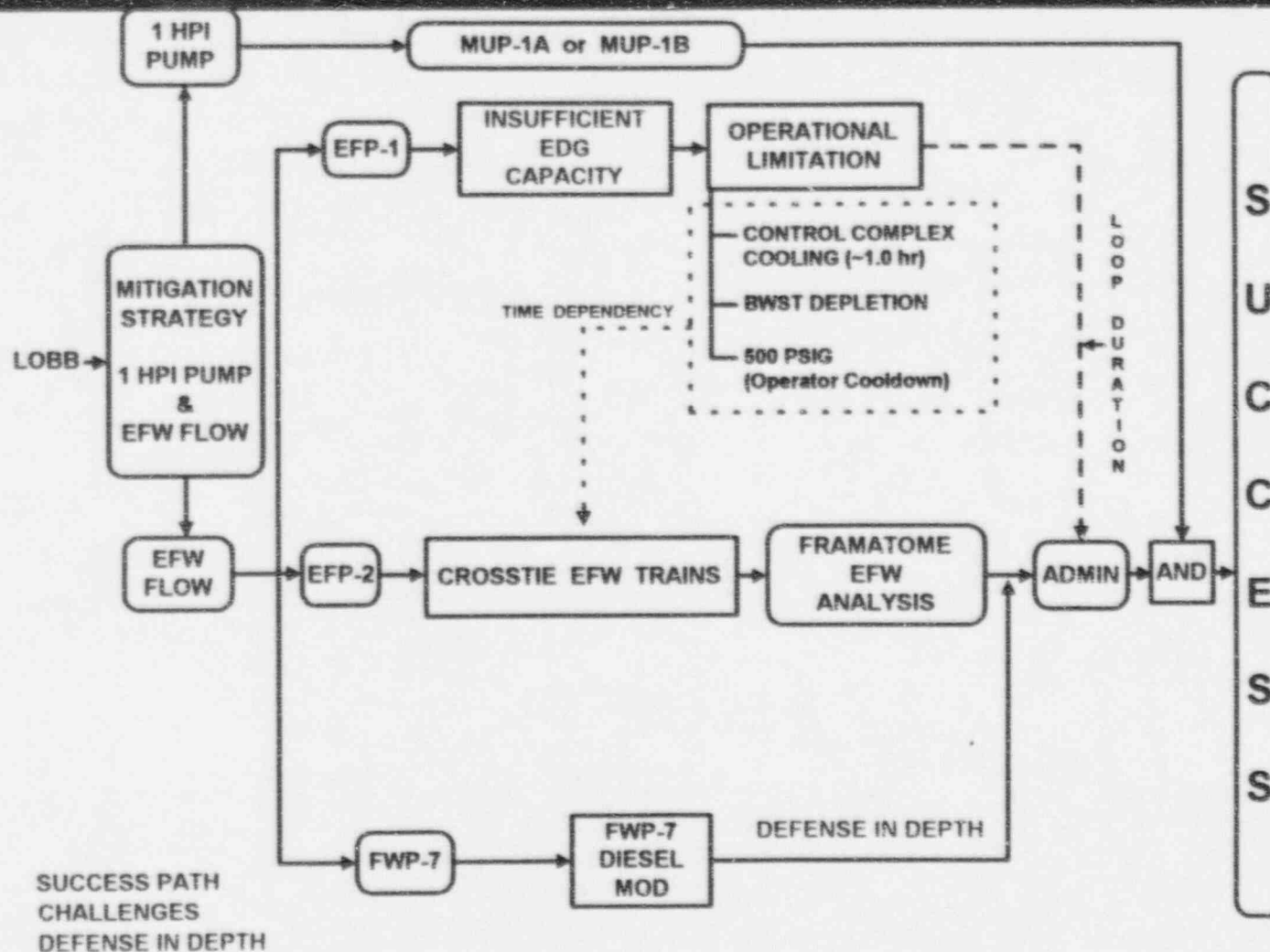


FWP-7 DIESEL POWER



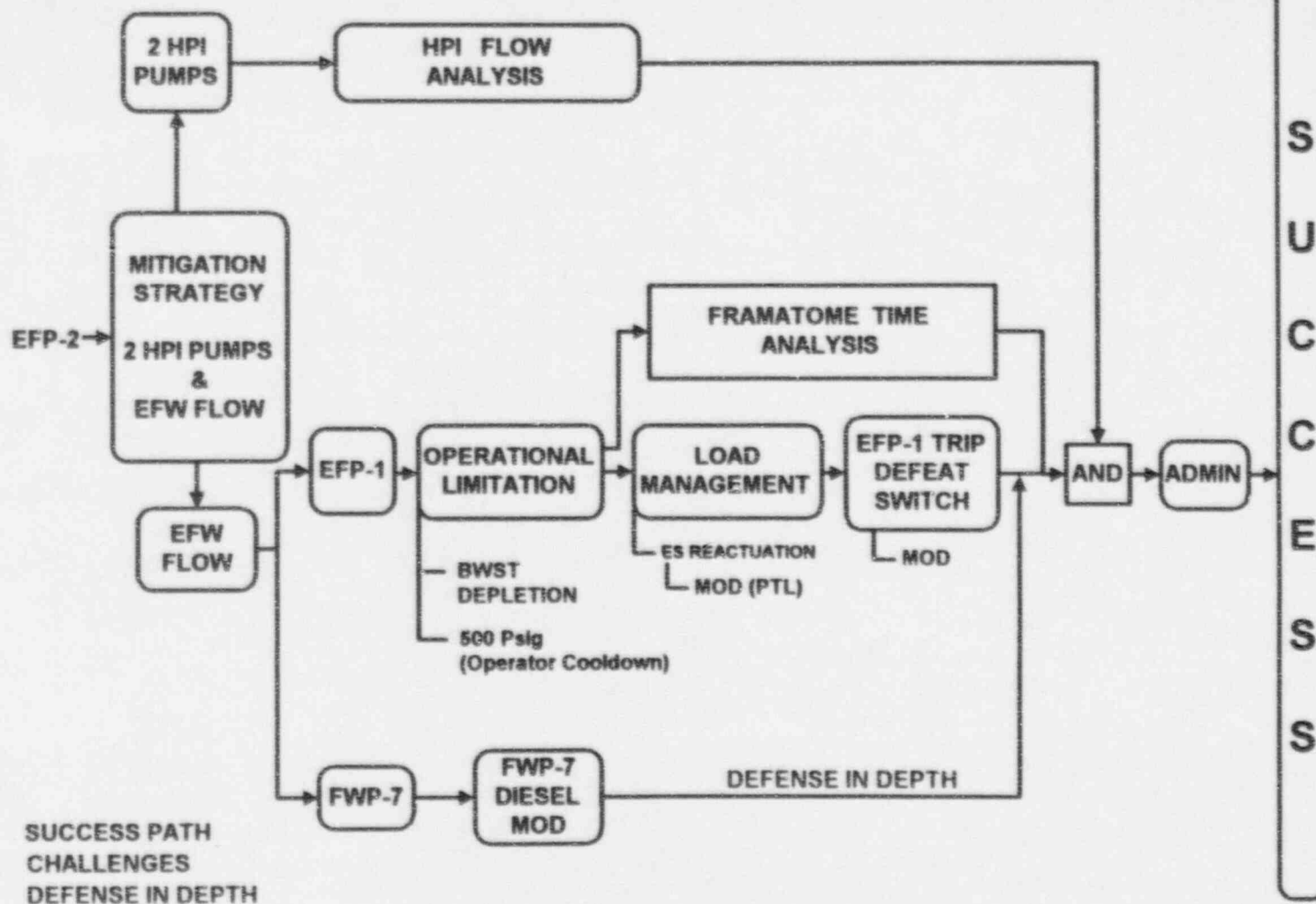


LOSS OF BATTERY "B"





LOSS OF EFP-2





ADMINISTRATIVE ITEMS

LIMITING SINGLE FAILURES

LOBA
Loss of "A" Battery

LOBB
Loss of "B" Battery

EFP-2

ADMIN

SAFETY
ASSESSMENT

EOP / AP
REVISIONS

ITS SUBMITTAL

FSAR / EDBD
REVISIONS

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SAFETY ASSESSMENT

- ★ Describes the Success path for each SBLOCA Scenario
 - Includes Defense-In-Depth
- ★ Addresses Associated Modifications
- ★ Addresses Operator Actions
- ★ Focus on Safety Significance and Plant Operations



SAFETY ASSESSMENT

Conclusion:

- ★ These SBLOCAs can be mitigated using a combination of Plant Modifications and Operator Actions.
- ★ Provides Defense In Depth.



Framatome Analysis

Resolves Solution Set Challenges

- ★ EFW Requirements (OTSG Cooling)
 - Mission Time
 - EFP-2 Operation
- ★ HPI Line Break Isolation Criterion
 - 1 and 2 HPI Pump Operation



Framatome Analysis

Conclusion:

- ★ Current SBLOCA Analysis Remains Bounding
- ★ Specific SBLOCA Analyses Demonstrate the
Core Remains Covered at all Times
- ★ Validates the SBLOCA Solution Sets



OPERATOR ACTIONS

- ★ Actions \leq 2 Minutes
 - Trip RCPs
- ★ Actions \leq 10 Minutes
 - Initiate HPI
 - » All 4 HPI lines (Transfer Power)
 - Initiate Reactor Building Isolation & Cooling Actuation



OPERATOR ACTIONS

- ★ Actions \leq 20 Minutes
 - Isolate RCP Seal Injection
 - Isolate Normal Makeup
 - Isolate Broken HPI Line
 - Ensure EFW Flow



NEW OPERATOR ACTIONS

(> 20 Minutes)

- ★ Cross-tie EFW (LOBB)
 - EFP-2 through 'A' train flow path
 - Secure EFP-1
- ★ Periodic HPI Line Monitoring
- ★ Manage EFP-2 Operation
- ★ EDG-1A Load Management
 - SWP-1A & RWP-2A in PTL
 - Defeat EFP-1 Trip



EOP / AP REVISIONS

- ★ Will incorporate required actions from Solution Sets in appropriate procedures.
- ★ Will be Verified and Validated including Plant Walkdowns, Table Top Discussions and Simulator Scenarios.



ITS / BASES Changes

★ Cycle 11 ONLY

- Changes to be withdrawn prior to cycle 12

★ Permanent

- No changes anticipated

★ Reassess

- Possible changes due to long term resolution



ITS Change Package

Package Segregated into:

- ★ Part 1 - SBLOCA Mitigation
- ★ Part 2- EDG Upgrade
- ★ Part 3 - EDG Load Rejection and
Steady State Loads



SBLOCA Mitigation

System Cross Train Dependencies	
Column A	Column B
Train "B": <ul style="list-style-type: none"> • EDG • AC Electrical Power Subsystem • AC Vital Bus Subsystem 	<ul style="list-style-type: none"> • EFP-2 (ASV-204) • Cross tie ability (EFV-12, EFV-13)
EFP-2	<ul style="list-style-type: none"> • Both Trains of HPI (ECCS) EDGs Decay Heat Seawater DC AC Electrical Power Distr Subsys AC Vital Bus Subsystem • SWP-1B • Train "B" of Nuclear Services Seawater • CHHE-1B and CHP-1B of Control Complex Cooling



Configuration Document Integration Program

- ★ Project input information from:
 - SRR, PCs, PRs, Docket Review, Independent FSAR Review, Mods, Analysis
- ★ Consolidate information into specific plant System Information Sets
- ★ Resolve open items
- ★ Update the plant documents
 - FSAR, EDBD, ITS Bases, ABD



Operations Perspective

- ★ Operations Involvement
 - Startup Team
 - EOP Team
 - Independent Reviews
 - Validation Team Review
- ★ SRO Validation
 - End User Review (SSOD)
- ★ PRC Review and Approval
- ★ NGRC Review and Approval



Operations Perspective

Continuing Operations Involvement

- ★ EOP Verification and Validation
- ★ Operator Training
 - SBLOCA Solution Sets
 - Safety Assessment
 - ITS Changes
 - EOP Training
- ★ Operational Readiness Assessment



Conclusion

- ★ It is a Safe Solution for Restart of the Plant
- ★ Reasonable Engineering Approach to Address Issue on Interim Basis
- ★ We will continue to have Technical Meetings with the NRC
- ★ Supports December Restart



Outstanding Actions

★ Prior to Approval

➤ Calculations

- » EDG Loads (confirmation)
- » EFW Block Valve Cycling
- » Control Complex Cooling

➤ Modifications

- » 50.59s approved

➤ Procedures

- » 50.59s approved



Outstanding Actions

★ Prior to Restart

- FSAR Updated
- FWP-7 Availability and Reliability
- EDG Load Testing and Calculations
- Modifications
- Procedures



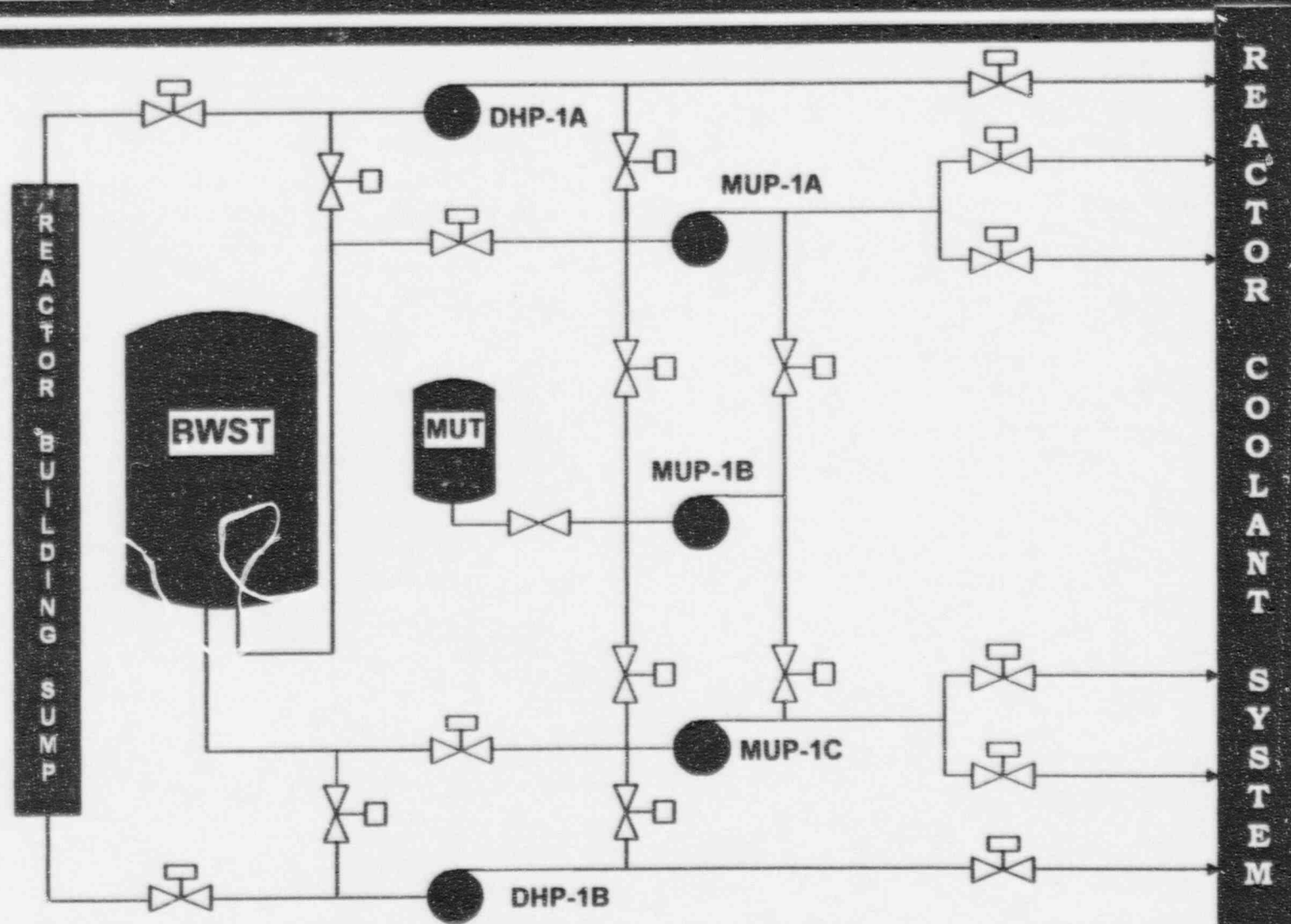
Outstanding Actions

★ Prior to Cycle 12

- EDG Long Term Resolution
- Remove interim ITS Changes



HPI - LPI COMPOSITE





EFW - AUX FEEDWATER

