FEB 13 1991

Docket No. 50-285
License No. DPR-40

Omaha Public Power District
ATTN: W. G. Gates, Division Manager
Nuclear Operations
444 South 16th Street Mall
Mail Stop 8E/EP4
Omaha, Nebraska 68102-2247

Gentlemen:

SUBJECT: MANAGEMENT MEETING

This refers to the management meeting conducted at your request in the Region IV office on February 7, 1991. This meeting was held to discuss ongoing issues with the design basis reconstitution program, operability of the emergency diesel generators at elevated ambient temperatures, and the operability of Containment Penetration M-3. This meeting was related to activities authorized by NRC License No. DPR-40 for the Fort Calhoun Station.

It is our opinion that this meeting was beneficial and provided a better understanding of the efforts that your staff has undertaken to correct identified issues and to mitigate future concerns. A meeting summary has been enclosed.

During the meeting, your staff made a commitment related to Penetration M-3. Your staff stated that, on or before February 22, 1991, you will provide the NRC with your proposed long-term corrective actions and a schedule for implementing the actions.

Should your understanding of this commitment differ from ours, please contact me immediately.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter will be placed in the NRC's Public Document Room.

| | | |
|---|---|---|
| RIV:RE:DRP/C | C:DRP/C | D:DRP |
| RVAzua/phh | PHHarrell | SJCollins |
| 02/12/91 | 02/12/91 | 02/12/91 |



IE45

Should you have any questions concerning this matter, we will be pleased to discuss them with you.

Sincerely,

Original Signed By:
Samuel J. Collins

Samuel J. Collins, Director
Division of Reactor Projects

Enclosure:
Meeting Summary w/attachments

cc w/enclosure:
LeBoeuf, Lamb, Leiby & MacRae
ATTN: Harry H. Voigt, Esq.
1333 New Hampshire Avenue, NW
Washington, D.C. 20036

Washington County Board
of Supervisors
ATTN: Jack Jensen, Chairman
Blair, Nebraska 68008

Combustion Engineering, Inc.
ATTN: Charles B. Brinkman, Manager
Washington Nuclear Operations
12300 Twinbrook Parkway, Suite 330
Rockville, Maryland 20852

Nebraska Department of Health
ATTN: Harold Borchert, Director
Division of Radiological Health
301 Centennial Mall, South
P.O. Box 95007
Lincoln, Nebraska 68509

Fort Calhoun Station
ATTN: T. L. Patterson, Manager
P.O. Box 399
Fort Calhoun, Nebraska 68023

bcc to DMB (IE45)

bcc distrib. by RIV:

R. D. Martin
DRSS-RPEPS
MIS System
DRP
Project Engineer (DRP/C)
Senior Resident Inspector - Cooper
Senior Resident Inspector - River Bend
A. Bournia, NRR Project Manager (MS: 13-D-18)

Resident Inspector
Section Chief (DRP/C)
RIV File
RSTS Operator
Lisa Shea, RM/ALF
DRS

# MEETING SUMMARY

Licensee: Omaha Public Power District (OPPD)

Facility: Fort Calhoun Station

License No.: DPR-40

Docket No.: 50-258

Subject: MANAGEMENT MEETING

On February 7, 1991, representatives of OPPD met with Region IV personnel in Arlington, Texas, to provide a briefing of the design basis reconstitution program, and the operability of the emergency diesel generators (EDG) at elevated ambient temperatures. In addition, the licensee addressed questions with regard to Containment Penetration M-3 and its capability of maintaining containment integrity.

The licensee's presentation on the design basis reconstitution program and operability of the EDGs addressed programs that are presently in effect and future programs that are being implemented to correct identified issues and to mitigate any future concerns. In addition, the licensee provided a safety analysis that describes the interim corrective actions that have been taken by OPPD to ensure continued operability of Penetration M-3.

Attachments:
1. Attendance List
2. Licensee Presentation on Design Basis Reconstitution Program and EDG Operability
3. Licensee's Safety Analysis for Operability for Penetration M-3

# MEETING SUMMARY

Licensee: Omaha Public Power District (OPPD)

Facility: Fort Calhoun Station

License No.: DPR-40

Docket No.: 50-258

Subject: MANAGEMENT MEETING

On February 7, 1991, representatives of OPPD met with Region IV personnel in Arlington, Texas, to provide a briefing of the design basis reconstitution program, and the operability of the emergency diesel generators (EDG) at elevated ambient temperatures. In addition, the licensee addressed questions with regard to Containment Penetration M-3 and its capability of maintaining containment integrity.

The licensee's presentation on the design basis reconstitution program and operability of the EDGs addressed programs that are presently in effect and future programs that are being implemented to correct identified issues and to mitigate any future concerns. In addition, the licensee provided a safety analysis that describes the interim corrective actions that have been taken by OPPD to ensure continued operability of Penetration M-3.

Attachments:
1. Attendance List
2. Licensee Presentation on Design Basis Reconstitution Program and EDG Operability
3. Licensee's Safety Analysis for Operability for Penetration M-3

ATTACHMENT 1

## ATTENDANCE LIST

Attendance at the management meeting between OPPD and NRC on February 7, 1991, in the Region IV office:

OPPD

S. Gambhir, Division Manager, Production Engineering Division
R. Phelps, Manager, Design Engineering, Nuclear
T. Therkildsen, Supervisor, Nuclear Licensing

OPPD (Participation by Telephone)

*J. Allen, Systems Engineer, Production Engineering Division

NRC

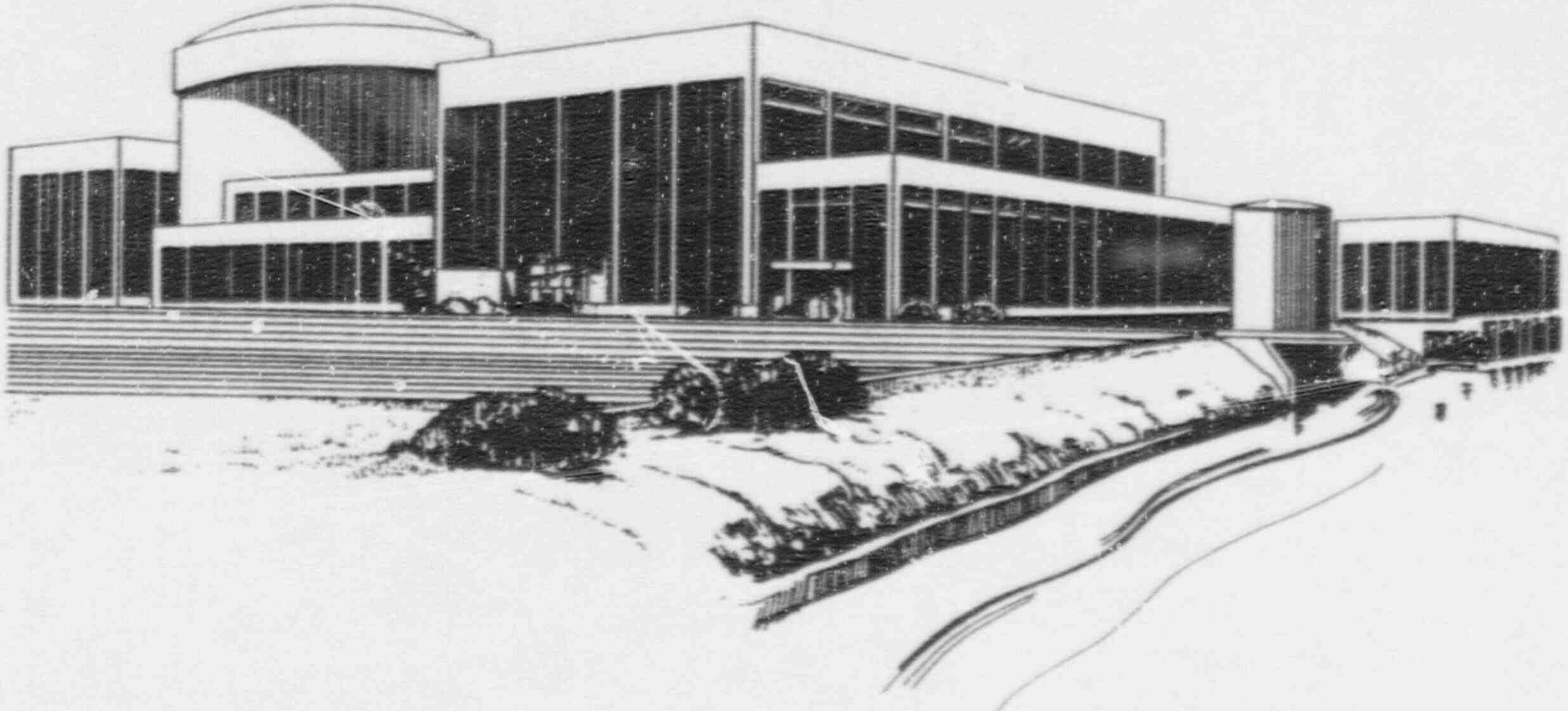
J. Jaudon, Acting Director, Division of Reactor Safety (DRS)
T. Stetka, Acting Deputy Director, DRS
P. Harrell, Chief, Project Section C, Division of Reactor Projects (DRP)
W. Smith, Acting Chief, Plant Systems Section (PSS), DRS
R. Mullikin, Senior Resident Inspector, Fort Calhoun Station (FCS)
T. Reis, Resident Inspector, FCS
R. Azua, Project Engineer, Project Section C, DRP
C. Paulk, Reactor Inspector, PSS, DRS
M. Runyan, Reactor Inspector, PSS, DRS
T. McKernon, Reactor Inspector, PSS, DRS
W. Walker, FCS Project Manager, Office of Nuclear Reactor Regulation

NRC (Participated by Telephone)

*T. Gwynn, Acting Project Director, Project Directorate (PD) IV-1
*J. Pulsipher, Reactor Systems Engineer, Division of Systems Tecnology
*R. Wharton, Acting Project Manager, PD IV-1, NRR
*J. Watt, Reactor Systems Engineer, Division of Systems Technology

* Denotes those who were present during the discussion on the operability of Containment Penetration M-3

# FORT CALHOUN STATION



# OPPD/NRC
# MEETING ON DESIGN BASIS AND DIESEL GENERATOR ISSUES

## FEBRUARY 7, 1991

OPPD
Omaha Public Power District

ATTACHMENT 2

# MEETING AGENDA
## February 7, 1991

---

| | |
|---|---|
| INTRODUCTION | T. G. Therkildsen |
| DESIGN BASIS RECONSTITUTION | S. K. Gambhir |
| DIESEL GENERATORS | R. L. Phelps |
| DIESEL CONTINGENCY PLAN | T. G. Therkildsen |
| CONCLUSION | S. K. Gambhir |

# DESIGN BASIS RECONSTITUTION

## Presentation Objective

To explain why some original design discrepancies were not uncovered during our Design Basis Reconstitution Project

# DESIGN BASIS RECONSTITUTION

## Introduction

- DBD Project Background
- DBD Verification Strategy
- Open Item Status
- Design Deficiencies Uncovered
- Design Deficiencies not Uncovered
- Concluding Remarks

Presented to the NRC
February 7, 1991

# DESIGN BASIS RECONSTITUTION

## DBD Project Background

- The Fort Calhoun Station predates ANSI N45.2.9 and Appendix B

- Documentation Requirements were not well defined

- Original Design and Construction records were not properly stored, maintained or retrievable

# DESIGN BASIS RECONSTITUTION

## Commitments in Response to SSOMI Findings

- Index and sort the original construction and Design Basis records

- Create Plant Level and System Level Design Basis Documents

- Perform verification to confirm that Safety Systems can perform their normal and post accident design functions

# DESIGN BASIS RECONSTITUTION

## DBD Verification Strategy

- Design Verification
- Physical Verification
- Review of Modifications
- Functional Verification
- OP, EOP, AOP and Technical Data Book Review

# DESIGN BASIS RECONSTITUTION

## Results Achieved

- 50,000 Design Documents Indexed
- 15 Plant Level Documents Produced
- 34 System Level Documents Produced
- Several significant design deficiencies have been identified (e.g., Containment Spray system, Main Steam and Auxiliary Feedwater piping, isolation configuration of containment penetration M-3, Fire barriers, etc.)
- Numerous calculations have been recreated (e.g., Auxiliary Feedwater system calculations, Component Cooling Water system design heat loads and several setpoint calculations)

# DESIGN BASIS [illegible]ONSTITUTION

## Open Item Category Definitions

- Category 1 - Potentially reportable items
- Category 2 - Missing important information to confirm operability per the Technical Specifications
- Category 3 - Missing documentation to confirm compliance with the Design Requirements for Safety Related equipment
- Category 4 - Generic Unresolved safety issues
- Category 5 - Same as 3 but for non-safety equipment
- Category 6 - Paperwork has been processed to close

# DESIGN BASIS RECONSTITUTION

## Open Item Status

| | | | |
|---|---|---|---|
| 25 | Category 1 Open Items Identified | 15 | Closed |
| 221 | Category _ Open Items Identified | 171 | Closed |
| 880 | Category 3 Open Items Identified | 125 | Closed |
| 13 | Category 4 Open Items Identified | 2 | Closed |
| 599 | Category 5 Open Items Identified | 104 | Closed |
| 115 | Category 6 Open Items Identified | 15 | Closed |

# DESIGN BASIS RECONSTITUTION

## Significant Design Deficiencies Uncovered

- Loss of Instrument Air and/or single failure could result in the inability of CCW to cool containment after an accident. An additional Containment Spray system, single-failure problem was identified as a result of this issue. (LER-90-025)

- The calculated auxiliary feedwater flow to the steam generators after a single failure was less than the 260 gpm requirement stated in the USAR, Table 9.4-1. (LER-89-016)

- The Design Basis break locations for the feedwater piping in room 81 could change due to an installed modification. (LER-89-007)

# DESIGN BASIS RECONSTITUTION

## NUMARC Guidelines

The OPPD Program Plan developed in 1987 meets or exceeds the recommended NUMARC Guidelines endorsed by the NRC

- Format
- Level of Detail
- Verification
- Open Items

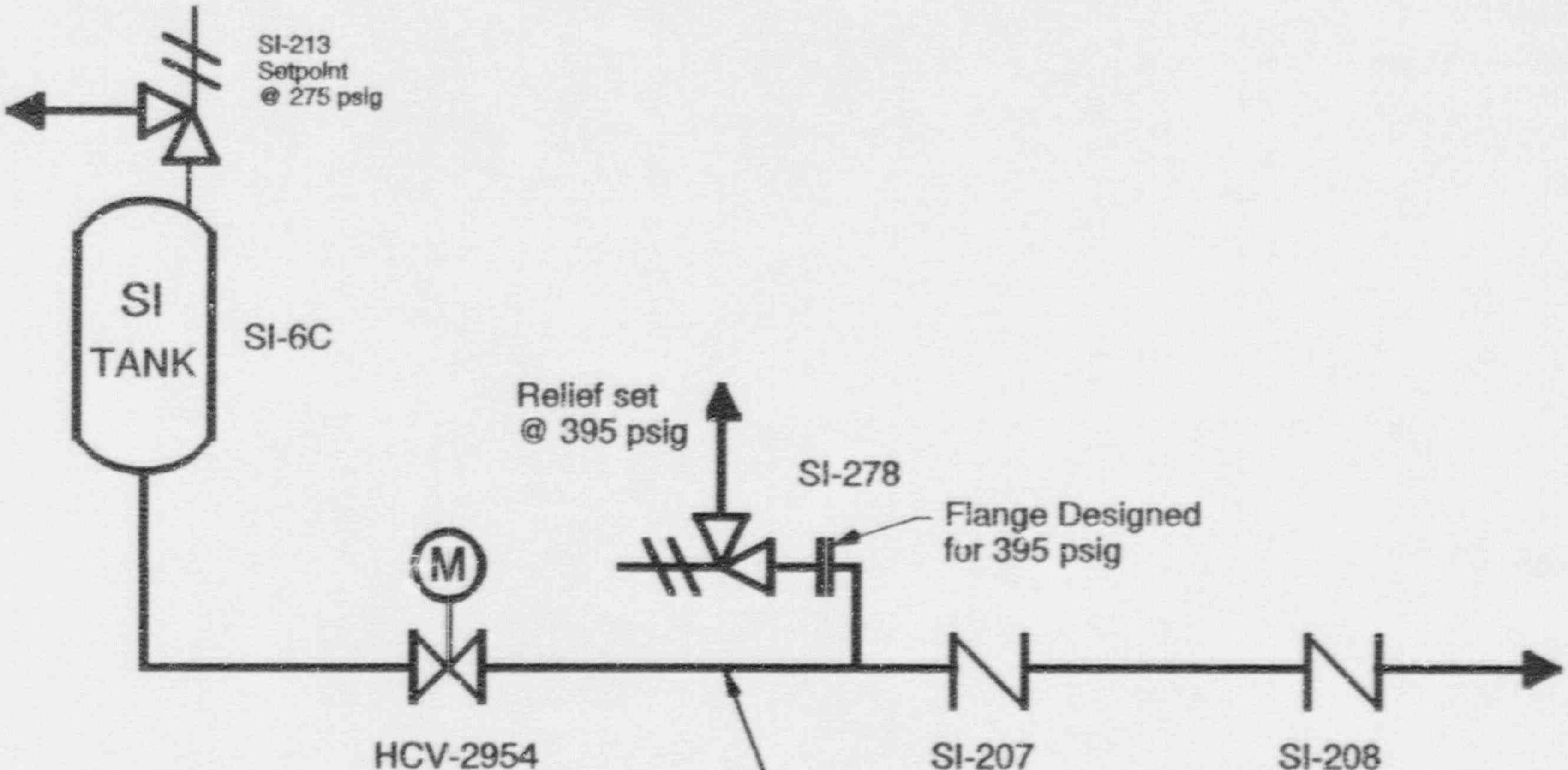
# DESIGN BASIS RECONSTITUTION

## Design Deficiencies Not Uncovered

- Safety Injection Piping
- Auxiliary Steam Piping

# DESIGN BASIS RECONSTITUTION

## Simplified Flow Diagram for Safety Injection Piping
## (Typical for four loops)




Piping designed for > 395 psig. Hydrotested @ 312 psig.
Therefore piping is rated for 25[illegible] psig based on code.
Ref. - B31.7 - 1968

# DESIGN BASIS RECONSTITUTION

## Auxiliary Steam Piping

- A concern was expressed as to the seismic adequacy of the Auxiliary Steam piping in the Diesel Generator Room
- Subsequent engineering reviews based on walkdowns and calculations judged the piping to be adequately restrained
- The Auxiliary Steam system was not within the scope of the System Design Basis Documents.
- The Plant Level DBDs on Seismic Criteria and Pipe Stress and Supports did not question the adequacy of the original design

# DESIGN BASIS RECONSTITUTION

## Summary

- 50,000 Original construction and Design Basis Records have been indexed
- 49 Design Basis Documents created to serve as a basis for future modifications
- Verified that safety systems can perform their required safety functions
- For most part, the original design was not challenged unless there were reasons to doubt the original design.
- Our program plan is consistent with the NUMARC Guidelines

# DESIGN BASIS RECONSTITUTION

## Concluding Remarks

# DESIGN BASIS RECONSTITUTION

## Concluding Remarks

- OPPD has one of the best DBD programs in the industry providing the basis for design change and for identifying design related problems that are most significant from a safety perspective

- Our focus has been on verification of the system functional requirements versus the passive requirements

# DESIGN BASIS RECONSTITUTION

## Concluding Remarks

We have several other programs that will continue to identify, evaluate and correct deficiencies

- System Engineering
- Design Change Process
- Operating Experience Review Program
- CHAMPS
- SSFI
- Performance Monitoring

# DESIGN BASIS RECONSTITUTION

## Concluding Remarks

- We do not have reasons to question the original design
- Questioning of the original design during the DBD project would have required diversion of resources to activities with very little or no payback from a safety perspective
- Our approach is consistent with the NUMARC Guidelines that have been endorsed by the NRC

# DIESEL GENERATOR AMBIENT TEMPERATURE IMPROVEMENT PROGRAM

# FORT CALHOUN DIESEL GENERATOR AMBIENT TEMPERATURE IMPROVEMENT PROGRAM

1. PURPOSE

2. OBJECTIVES

    Background
    Model
    Goals
    Program Description

3. SCHEDULE

4. CONCLUSIONS

# PURPOSE

- Describe OPPD's Emergency Diesel Generator Ambient Air Temperature Operating Limit Improvement Program.

# OBJECTIVES

- Describe the Diesel Generator (DG) evolutions which led to the current restrictive ambient temperature limits.
- Describe the DG system model used to define ambient temperature design criteria.
- Explain the elements of the Improvement Program to return the Diesel Generators within acceptable operating limits on ambient air temperature.
- Provide the schedule for Improvement Program implementation.

# BACKGROUND

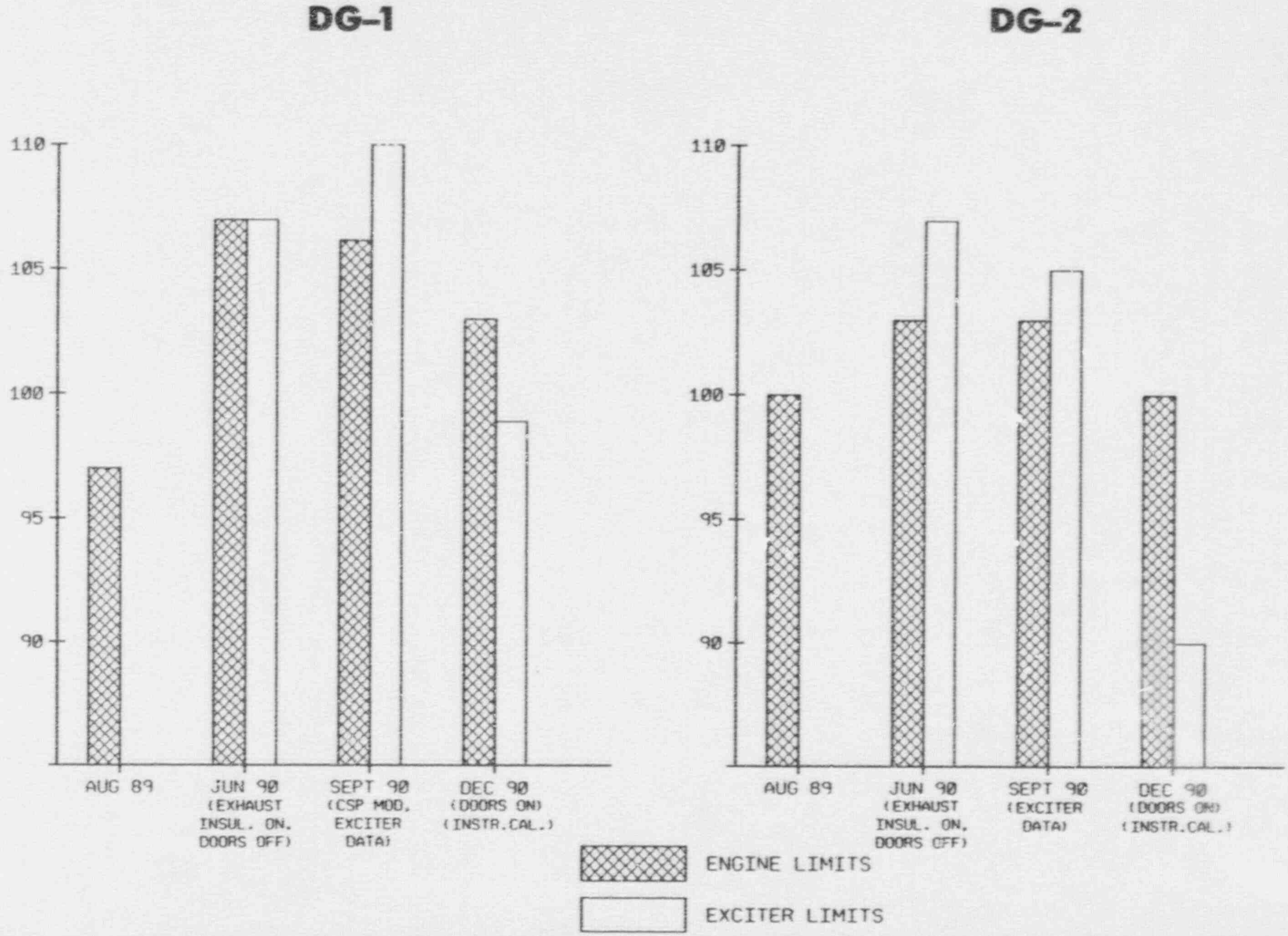
- **DIESEL ENGINE**

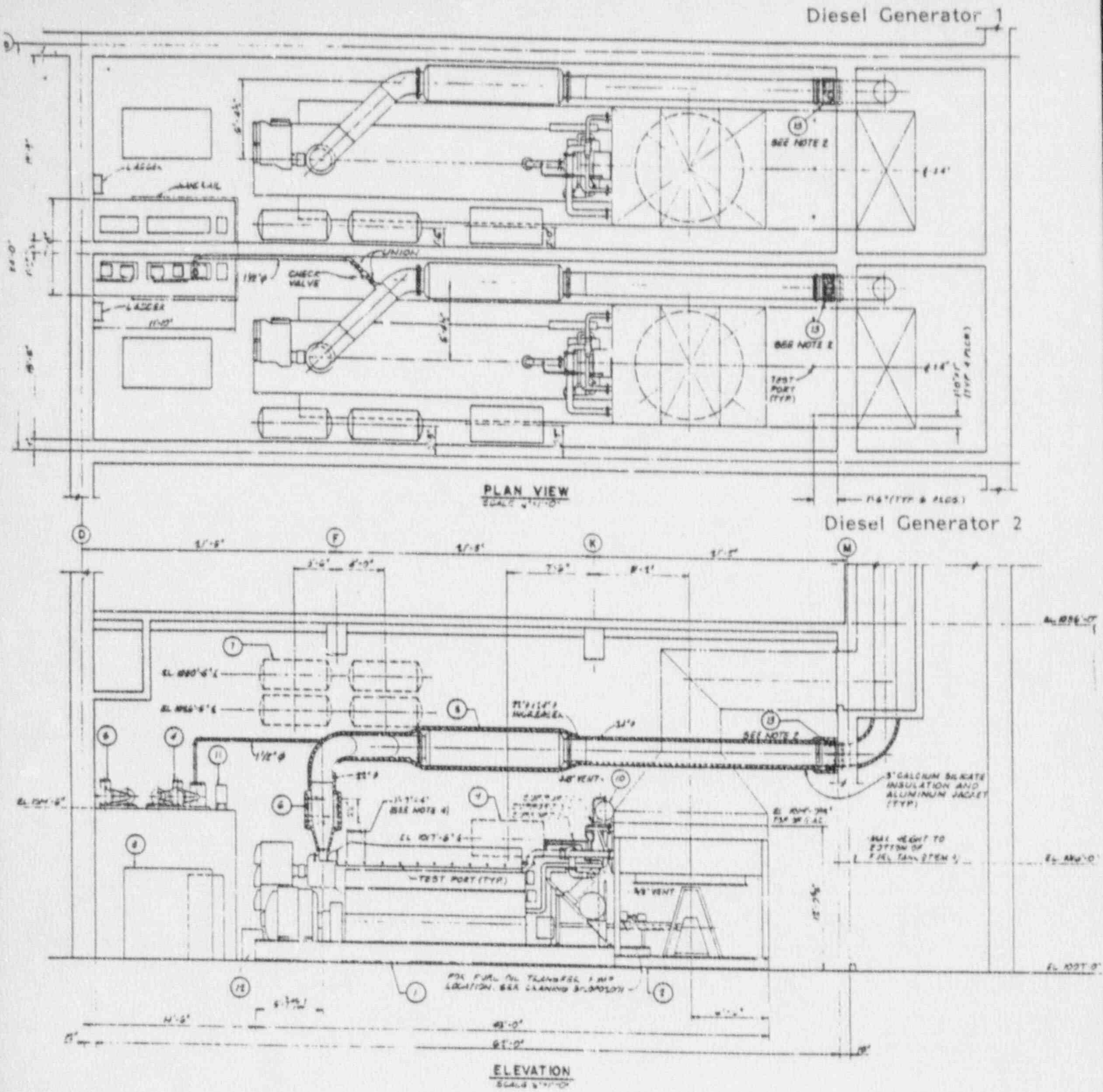
| | |
|---|---|
| **SUMMER OF 1989:** | Experienced high jacket water temperature alarm during testing. |
| **AUGUST 1989:** | Completed analysis which established conservative operating limits for ambient air temperatures. |
| **1990 REFUELING OUTAGE:** | Completed re-installation of exhaust insulation. |
| **JUNE 1990:** | Performed additional testing and analyses which raised engine limits. |
| **SEPTEMBER 1990:** | Lowered limits due to modification to containment spray pump. |

- **DIESEL GENERATOR EXCITER**

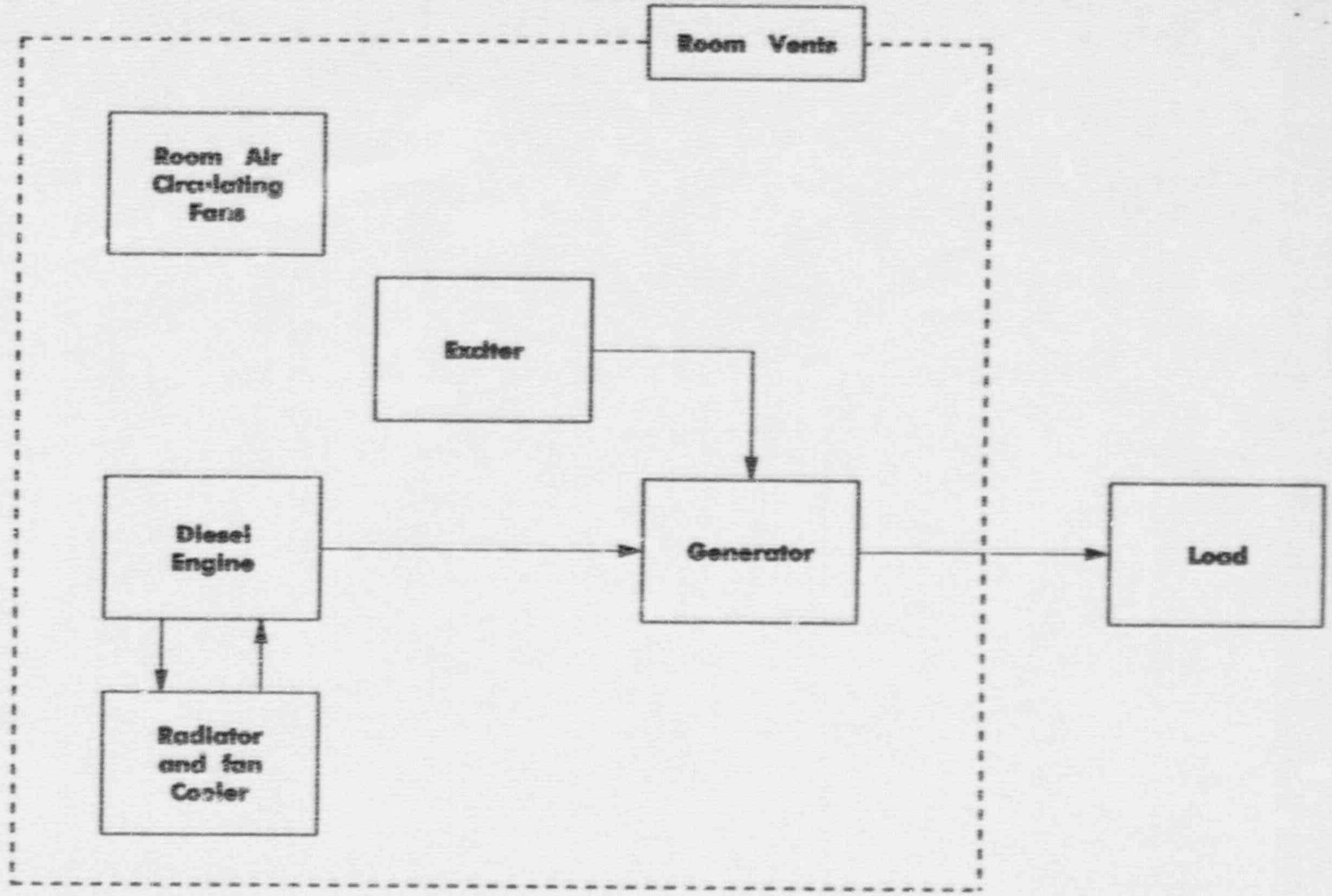
| | |
|---|---|
| **JUNE 1990:** | Engine testing resulted in exciter malfunctions. |
| | Exciter cabinet doors removed. |
| | Room air circulating fans tagged off to prevent auto start. |
| **DECEMBER 1990:** | Lowered limits following re-installation of modified exciter cabinet doors and new information on jacket water temperature instrumentation calibration. |

# DIESEL GENERATOR AMBIENT AIR OPERATING LIMITS






View of Diesel Generator Rooms




MODEL FOR DIESEL GENERATOR AMBIENT TEMPERATURE IMPROVEMENT PROGRAM

# PROGRAM GOALS

- Ambient air temperature operating limit of 110 F.
- Load derating meets Design Basis requirements.
- Assure Diesel Generator operability for summer of 1991.

# IMPROVEMENT PROGRAM BASIS

- As the ambient temperature limit is increased, it may be controlled by either engine or exciter concerns.
- Therefore, a prioritized approach is required.
- A method is established to gain more margin for each limiting component in the model.
- Testing, maintenance and modifications will be used to optimize gains.

# HIGHEST PRIORITY ACTION TO INCREASE LIMIT ON *EXCITERS:*

- Provide cooling to the exciter cabinets (MR-FC-90-073).

  - Maintain cabinet internal temperature at sensitive components below 50 C (122 F).

  - Self-contained cooling unit.

  - Seismic I, powered from associated Diesel Generator.

  - Cabinet and/or door venting.

  RESULT:

  Ambient air operating temperature limit $\geq$ 110 F.

# *EXCITER* PROGRAM ENHANCEMENTS:

- Replace exciter electronic components with upgraded parts (MR-FC-90-041).
  - Obsolescent parts issue.
  - May result in design criteria operating temperature greater than 50 C.

- Change D/G room air circulating fans (VA-52 A/B) from auto start to auto trip (MR-FC-90-063).
  - Eliminate "Tagged Out" status.
  - Operator convenience.

# HIGHEST PRIORITY ACTIONS TO INCREASE LIMIT ON *DIESEL ENGINES*

- Provide automatic load shed of condenser vacuum pumps FW-8B AND FW-8C from DG-2 (MR-FC-90-067).

  - Not required for safety function.

  RESULT:

  DG-2 ambient air temperature limit due to jacket water will increase to approximately 104 F.

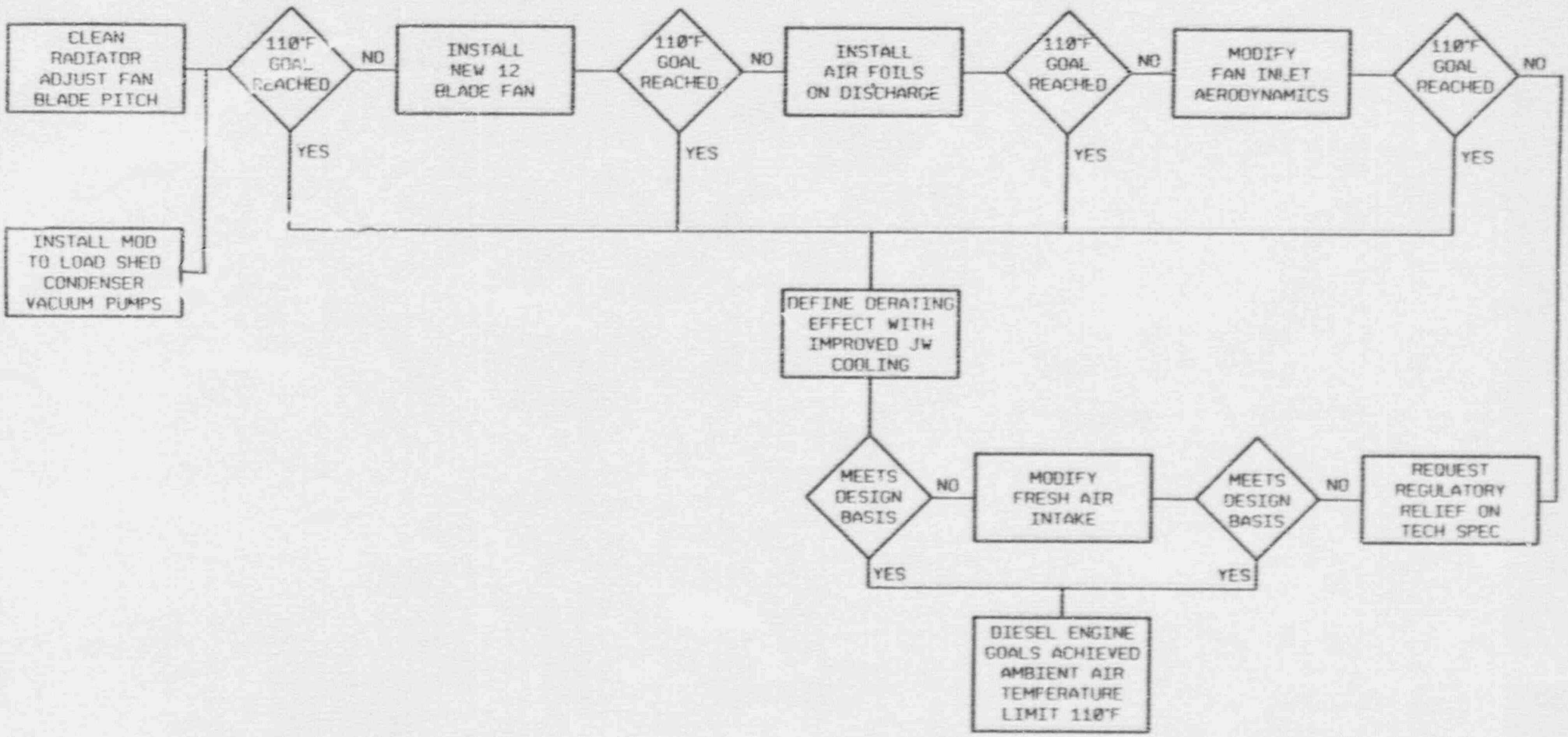
- Actions described on the "success tree" figure will be implemented in the prioritized order shown.

  RESULT:

  Ambient air operating temperature limit $\geq$ 110 F.

# JACKET WATER COOLING

## TEMPERATURE IMPROVEMENT
## SUCCESS TREE



# CURRENT SCHEDULE

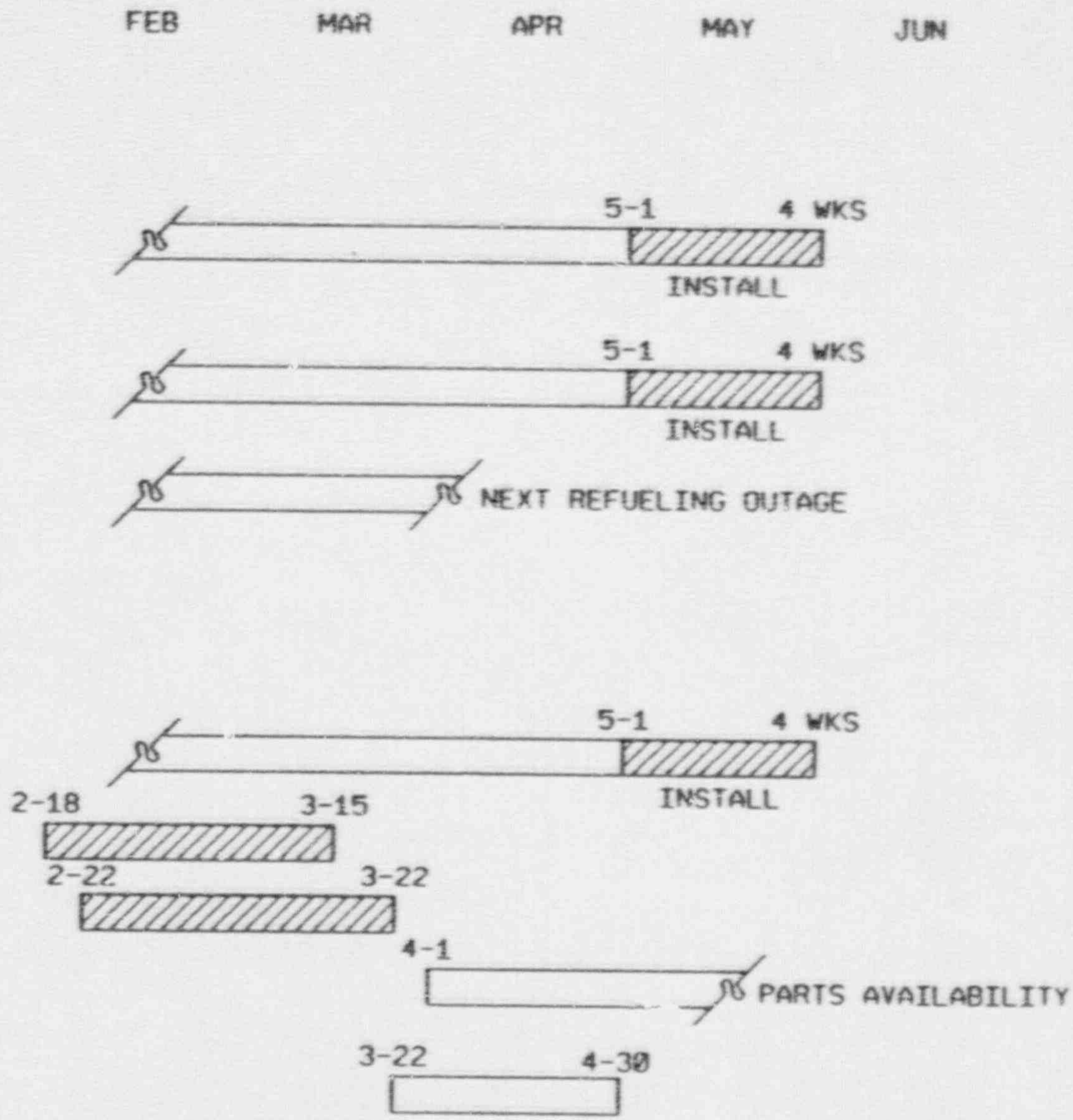
## D / G AMBIENT AIR TEMPERATURE IMPROVEMENT PROGRAM

## EXCITER

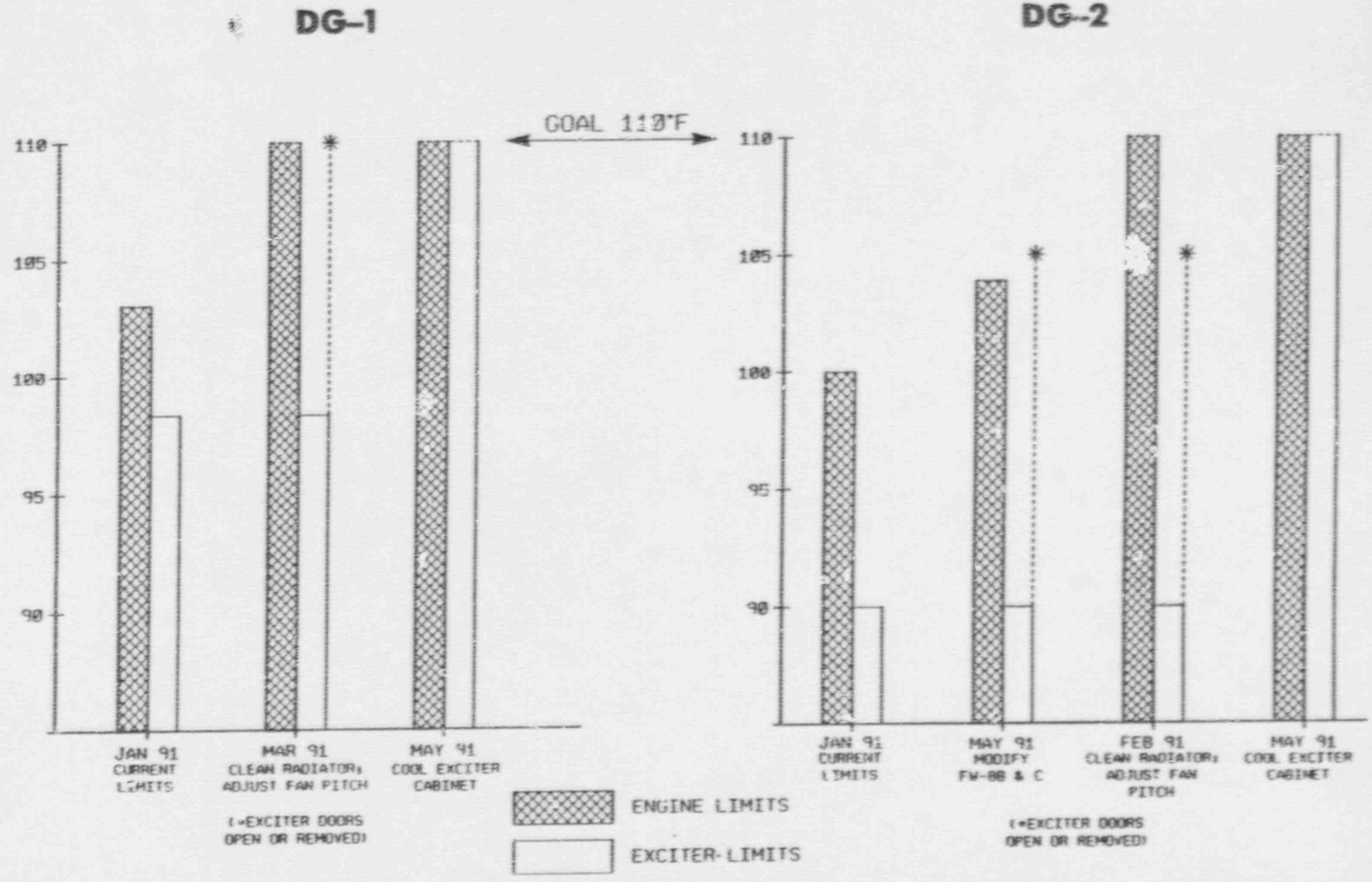
- CABINET COOLING (MR-FC-90-073)
- D/G ROOM AIR CIRCULATING FANS (MR-FC-90-063)
- REPLACE EXCITER (MR-FC-90-041)

## DIESEL ENGINE

- LOAD SHED CONDENSER VACUUM PUMPS (MR-FC-90-067)
- CLEAN RADIATORS
- ADJUST FAN BLADE PITCH
- INSTALL 12-BLADE FAN IF REQUIRED
- VERIFY LOAD DERATING ACCEPTABILITY



# DIESEL GENERATOR AMBIENT AIR IMPROVEMENT PROGRAM



# SUMMARY

- Developed Diesel Generator system model.
- Established Design Basis temperature limits.
- Defined goals.
- Implementing Improvement Program.
  - Exciter cabinet cooling.
  - Load shed FW-8B and C.
  - Steam clean radiators.
  - Adjust fan blade pitch
- Anticipate goal for ambient air operating temperature limit of 110 F to be achieved by summer of 1991.

# DIESEL CONTINGENCY PLAN

# HISTORICAL TEMPERATURE

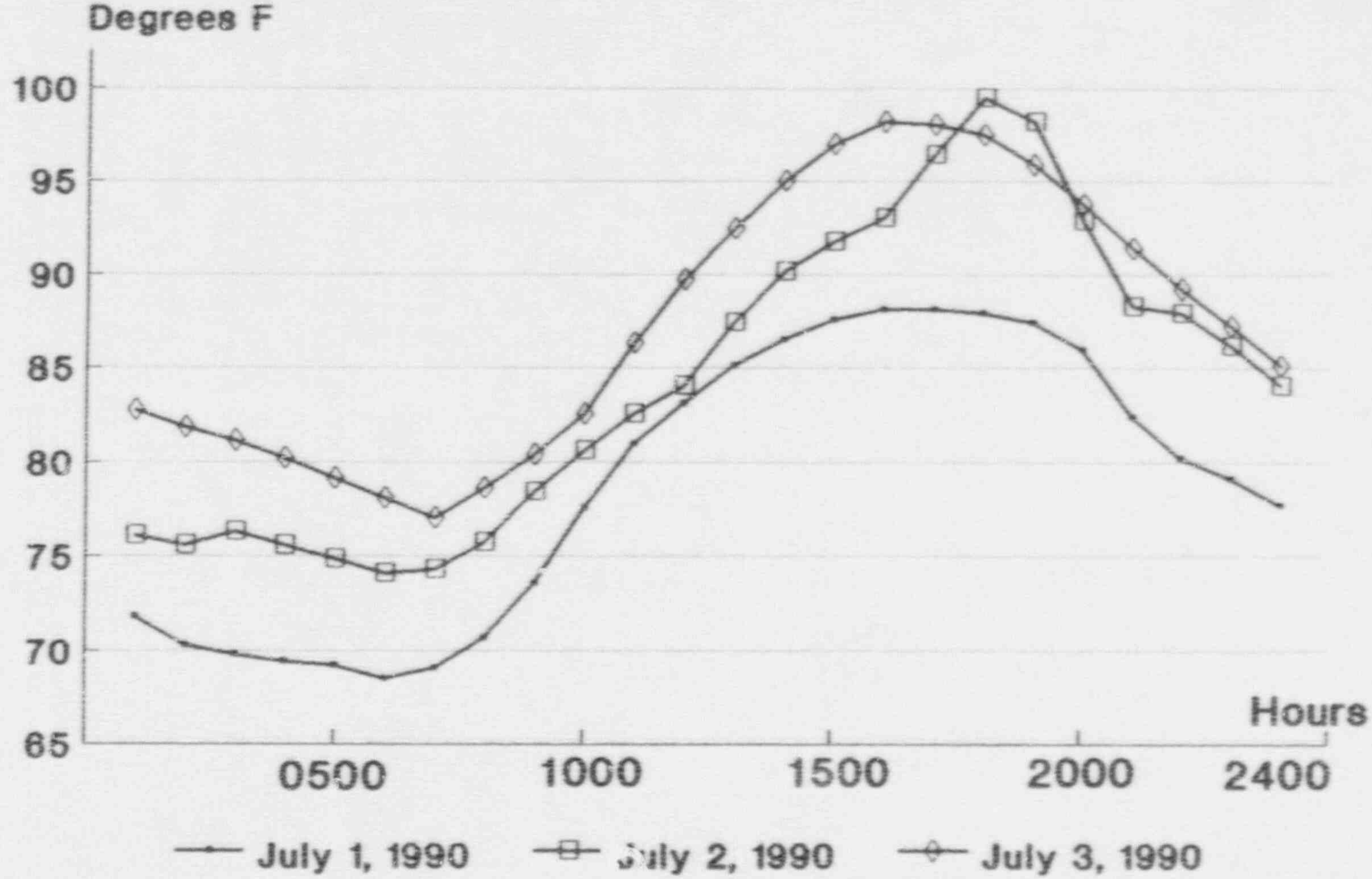
- Highest recorded temperature (108 F) in the Omaha area occurred in the 1930s.

- Since Fort Calhoun operations began, the highest temperature recorded was 105.8 F on July 5, 1989.

- The second highest temperature was 105 F on August 16, 1983.

- Time duration for high temperatures was very short (less than 3 hours).

# HIGHEST TEMPERATURES IN 1990



# CONTINGENCY ACTIONS
## FIRST DIESEL INOPERABLE DUE TO TEMPERATURE

- Notify NRC of current conditions.
- Verify second Diesel has valid surveillance and safeguards equipment is operable.
- Dedicate an operator to monitor diesel engine performance.
- Evaluate meteorological data.

# CONTINGENCY ACTIONS
## SECOND DIESEL NEARS TEMPERATURE LIMIT

- Terminate work as determined by Plant Manager.
- Verify Station Blackout Analysis equipment has valid surveillance.
- Control access to plant operating spaces.

## WHEN SECOND DIESEL IS DECLARED INOPERABLE

- Assign Operator to Monitor Second Diesel.

# TEMPORARY WAIVER OF COMPLIANCE

- Two inoperable diesels cause entry into TS 2.0.1.
  - Plant must be in hot shutdown within 6 hours.

- Waiver promotes safety by minimizing unnecessary plant transients.

# CONCLUSION

**ATTACHMENT**

Calculations Recreated By The Design Basis Project

- Useable Capacity of Emergency Feedwater Storage Tank FW-19
- Emergency Feedwater Storage Tank Level for Pump TDH Calculation
- Auxiliary Feedwater Maximum Operating Temperature and Pressure
- Maximum Operating Pressures for Spent Fuel Pool Cooling
- Development of Flow Coefficients for the Raw Water and Component Cooling Water System Analysis
- Auxiliary Feedwater System (Pump Design & Turbine Drive Controller)
- Set Points for AFW-FIC-1369, Pump FW-10 Minimum Flow Controller; AFW-FIC-1368, Pump FW-6, Minimum Flow Controller
- Steam Generator (RC-2A & 2B) High Level Required Setpoint for LS-911 (A-D) and LS-912 (A-D)
- Steam Generator Reset Pressure and Differential Pressure Required Setpoints (A-D/DPS-913/914; A-D/DPS-914/913; A-D/PS-913-1; A-D/PS-914-1)
- Emergency Diesel Generator Instrument/Relief Valve Setpoint Calculation
- Starting Air Compressor Outlet Temperature & Outlet Line Losses
- Design & Operating Conditions for the Diesel Generator Starting Air System
- Design & Operating Conditions for the Diesel Generator Fuel Oil System
- Design & Operating Conditions for the Diesel Generator Jacket Water System
- Design & Operating Conditions for the Diesel Generator Lube Oil System
- Design & Operating Conditions for the Diesel Generator Exhaust System
- Design Basis Setpoint for Safety Valve HG-104
- Design & Operating Conditions for Diesel Generator Radiator Exhaust Ductwork

## Calculatins Recreated By The Design Basis Project

- Minimum NPSHA for Component Cooling Water Pumps
- Component Cooling Water System Design Heat Loads and Flows
- Component Cooling Water Flow Balance and AC-1 Performance (Normal Startup Shutdown)
- Raw Water Flow to Component Cooling Water Heat Exchanger & AC-1 Performance
- Steam Generator Steam Header Safety Valves Setpoint Determinations (MS-275 through MS-282, MS-291 and MS-292)
- Component Cooling Water - Raw Water Side (Tube side) Setpoint Determination
- Component Cooling Water Safety Related Setpoints
- Raw Water Post Accident Flow Balance - DBA-AA (Direct Cooling)
- Check of Back Pressure at Containment Air Cooling Coils Direct Cooling Mode
- Determine Setpoints for PC-2854, 55, 56, 57, PC-2862 through 2873
- Containment Cooling Water Flow Balance on Loss of Instrument Air
- Check of Back Pressure at Control Room Air Conditioner Cooling Coils-Direct Cooling Mode
- Check of Component Cooling Water Flow Model Against Measured Data
- Verification of SIRWT RAS Initiation Switch Setpoints
- Accumulator Operable Time Requirements
- Intake Structure Volume
- Calculation of Process Limits For Isolating Shutdown Cooling
- Hydrogen Generation Rate in Containment
- Raw Water Flows to Containment Cooling Water Heat Exchanger For Low River Level

Safety Analysis for Operability (SAO)

SAO #91-01 Revision 0

Initiation Date: February 6, 1991

## I. EXISTING CONDITION

The CVCS charging line enters containment via penetration M-3. During upgrade of design basis documentation an open item was identified concerning containment penetration M-3. The open item involves the licensing basis for not performing Type C leak testing per the requirements of 10 CFR 50 Appendix J. The basis for not testing this penetration is documented in an SER dated January 10, 1986. This SER has been affected by revisions made to the containment pressure analysis after the SER was issued.

The NRC's January 10, 1986 SER states the following regarding M-3:

> "The staff finds that an exemption from the Type C testing requirements of Appendix J is not needed for the containment isolation valve associated with penetration M-3, since the valve is not included in the valve categories of paragraph II.H of Appendix J, which are required to be Type C tested. Furthermore, the staff has determined that penetration M-3 does not constitute a potential containment atmospheric leak path, for the reasons stated above. Therefore, the licensee may exclude the subject valve from the Type C test program."

The basis in the SER that penetration M-3 does not constitute a potential containment atmospheric leak path has been affected by revisions to the containment pressure analysis.

The SER states that the charging pumps and the hydraulic head in the system provide a seal against containment leakage through penetration M-3. The charging pumps start and the system automatically aligns on an SIAS to inject boric acid into the RCS. The SER states that the discharge pressure of the charging pumps, up to 2200 psig, will prevent leakage through the penetration with a maximum containment accident pressure of 60 psig. Following completion of the injection phase, the charging pumps will be shut down and the hydraulic head of 6 psig remaining in the system will provide a seal against air leakage out of containment for the remainder of the accident. The remaining hydraulic head (6 psig) would be above containment pressure for the duration of the accident. The hydraulic head in the system is provided by the physical configuration and elevation of system components which remain filled with boric acid solution.

The SER concludes that the penetration does not constitute a potential containment atmospheric leak path, for the reasons stated above. Therefore, penetration M-3 may be excluded from Type C testing.

Revised containment pressure analysis at approximately 30 minutes into post-LOCA conditions has increased the pressure in containment to 20-40 psig. This increase in containment pressure invalidates the basis of the SER.

II. Safety Analysis for Operability with Existing Conditions

The operability of penetration M-3 and integrity of the containment can be assured on an interim basis through operator actions. The charging pumps' discharge isolation valves, CH-190, CH-192 and CH-193, will be closed by manual operator actions once boric acid injection has been terminated during accident conditions. Closure of these three isolation valves will ensure the charging header is isolated and no potential leakage path is available for containment leakage through penetration M-3.

These manual isolation valves are located in Room 7, which would be accessible prior to hot leg injection when the valves are required to be closed. These valves are considered to be leak-tight. Confidence in these valves is based on their use as isolation valves during charging pump maintenance. During maintenance activities these valves provide isolation against the pressure of a running charging pump with a discharge pressure of 2100 psig. The pump is normally disassembled for several days with no indication identified of any leakage through any of the three discharge isolation valves. The three valves were last used for isolation purposes in November and December of 1990, validating the above assumptions.

In addition to the three charging pump discharge isolation valves, each pump has a discharge check valve in series with the isolation valves (see attached figure). These check valves will provide redundancy to the manually closed isolation valves. The check valves were rebuilt in April of 1990 with the valve seats lapped and "blue checked." Also the valves were refurbished with tolerances returned to an as-designed condition. Confidence in these valves to prevent back leakage is based on performance of the valves during normal operations when the check valves prevent back leakage through the non-running charging pumps against 2100 psig discharge pressure. No back flow problems through the pumps have been identified for any of the charging pumps.

Further verification of the integrity of these check valves is provided during normal operations by the bi-weekly performance of preventive maintenance to verify the pressure on the charging pump discharge pulsation dampeners. Procedurally, this pressure is checked and adjusted by depressurizing the charging pump discharge piping between the pump and the check valve. The check valves provide isolation during the performance of this procedure. Failure of the check valves to provide isolation would prevent performance of this procedure.

In addition to the manually closed isolation valves and the in-series check valves, the charging header has other check valves that would prevent leakage from containment. To have the containment atmospheric leakage through this line, containment atmosphere would have to displace the liquid in the lines backward to a component vented to atmosphere (Safety Injection Refueling Water Tank or a Boric Acid Storage Tank). This would require liquid displacement backwards through at least four check valves in series and backwards through a positive displacement charging pump, which acts as two more check valves in series.

Except for the manually closed isolation valves and the in-series check valves the operability of the other header check valves to prevent reverse flow is considered indeterminate. However, there is no indication that these valves are not operable. All check valves are full stroke tested open per the requirements of ASME Section XI.

Penetration M-3 as described in the USAR figure 5.9-13, Sheet 4, shows a single check valve, CH-198, outside of containment. This check valve, per the referenced SER, is not required to be Type C tested. This check valve has not been included in the Appendix J program as requiring a Type C test, local leak rate test. CH-198 is located in the mechanical penetration room, #13, as close as practicable to the containment boundary. The valves on the charging pump discharge are located in Room 7.

The charging header is pressurized above 2100 psig during normal operation with any leakage identified per performance of daily RCS leakrate Surveillance Test. The normal operating pressure is much greater than the post-accident pressure of less than 60 psig. The charging header piping is CQE and seismically qualified. In addition, the charging header integrity was demonstrated when the header was hydrostatically tested above 3000 psig in 1990 as a 10-year inservice test per the requirements of ASME Section XI. Also, the charging header was open to the containment atmosphere during the successful completion of the Type A integrated containment leakrate test during the 1990 Refueling Outage. Therefore, any significant external leakage from the charging header is unlikely and therefore not considered a creditable leakage path.

The HPSI header is connected to the charging header for hot leg injection for long term core cooling. Manual operator actions to close the charging pump discharge valves do not impact the capability to provide hot leg injection.

The HPSI header (via HCV-308 and HCV-2988) is not considered to be a possible leakage path from containment via the charging header and penetration M-3. The HPSI header, post-accident, is always pressurized at or above containment pressure with a water seal to prevent any possible leakage.

Once the charging pumps have been isolated following the completion of boric acid injection and the SIRWT is below 72 inches, the charging pumps have completed their design function and would not be required to be unisolated. Closing of the charging pump isolation valves following stopping of the charging pumps would be prompted by the same procedural step in the EOPs that satisfies the requirements for stopping the charging pumps. With the interim Operations Memorandum 91-01 letter providing direction on closing these isolation valves, there is no significant misleading information or direction provided to the operators concerning the required actions that must be taken (i.e., close pump discharge isolation valves).

This SAO Does not propose actions that conflict with existing SAOs.

III. SAR Duration and Special Conditions

The duration of this SAO is limited to the next refueling outage or until Licensing design basis concerns with the subject SER are resolved. An action plan is being developed to address this design basis concern. The SAO will be revised as applicable.

Reportability Determination: (check as many as apply)

| | | | X | X | |
|---|---|---|---|---|---|
| 10 CFR 20 | 10 CFR 21 | 10 CFR 50.9 | 10 CFR 50.72 | 10 CFR 50.73 | 10 CFR 73 |

IV. REGULATORY ACTION

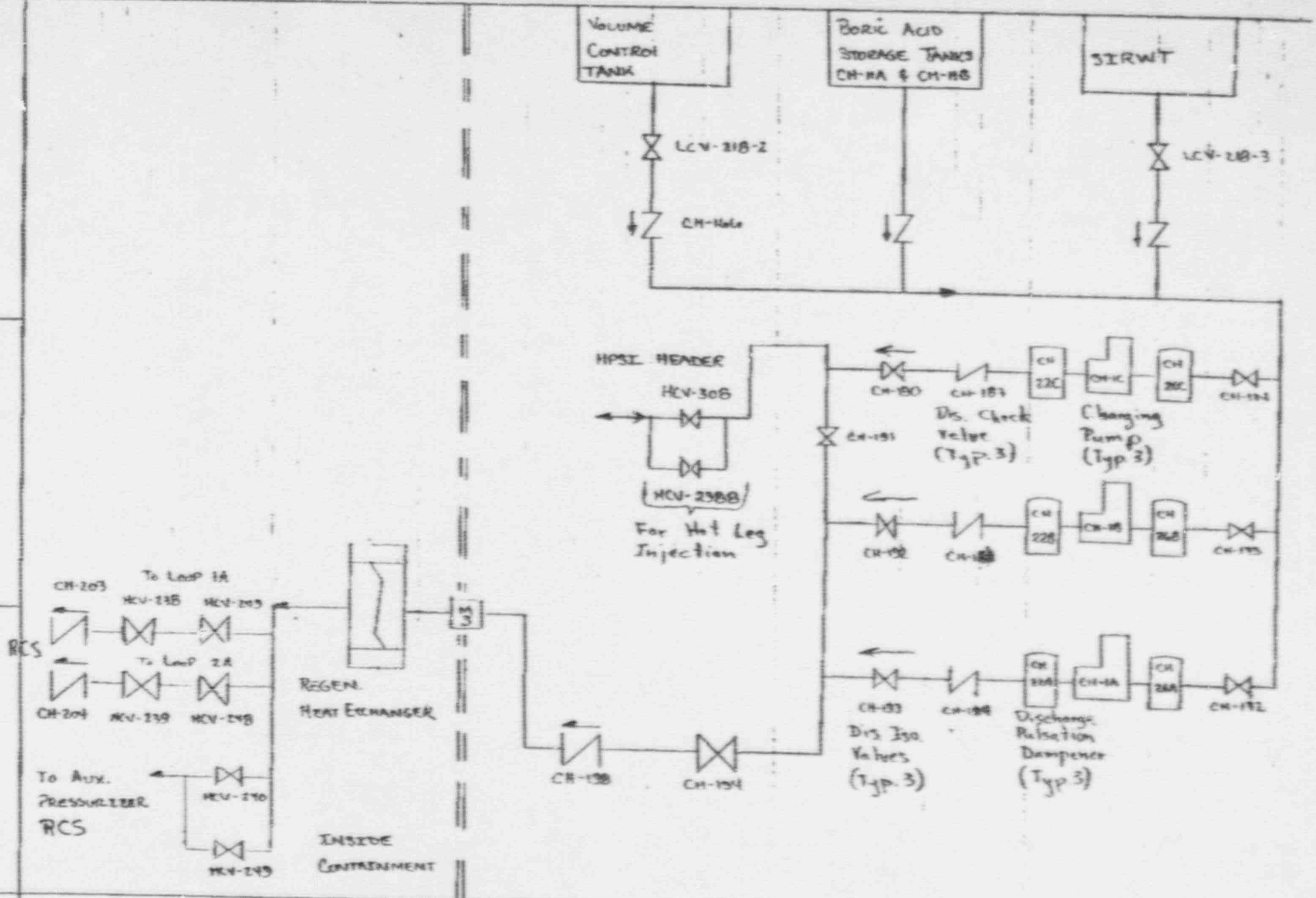
| Waiver of Compliance | Compliance with Tech Spec LCO | Shutdown | Violation | Other |
|---|---|---|---|---|
| | | | | X |

| | | | |
|---|---|---|---|
| PREPARED BY: | James D. Allen | Date: | 02/06/91 |
| CONCURRED WITH: | Kenneth R Henry<br>SUPERVISOR | Date: | 2/6/91 |
| CONCURRED WITH: | James Kecy<br>DEPARTMENT MANAGER | Date: | 2/6/91 |
| CONCURRED WITH: | L. T. Kusek<br>NUCLEAR SAFETY REVIEW GROUP | Date: | 2/6/91 |
| CONCURRED WITH: | [illegible signature]<br>SARC SUBCOMMITTEE #1 | Date: | 2/6/91 |
| CONCURRED WITH: | [illegible signature]<br>MANAGER - NL&IA | Date: | 2-6-91 |
| APPROVED BY: for | Alan W Richard<br>MANAGER - FORT CALHOUN STATION/ PRC CHAIRMAN | Date: | 2/6/91 |

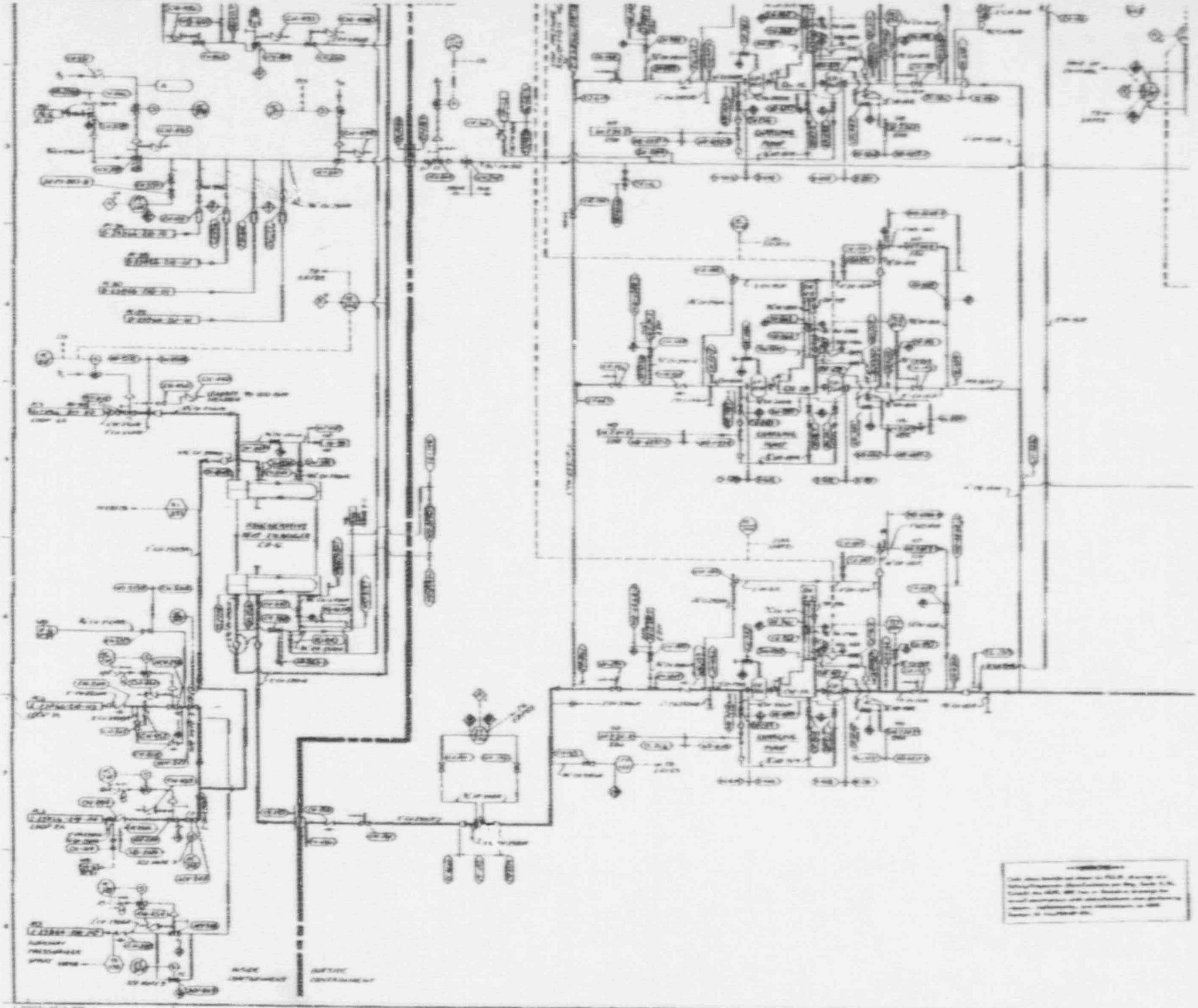
CLOSURE APPROVAL

| | | |
|---|---|---|
| PRC Chairman | Manager - NSRG | Manager - NL&IA |

PRC RECOMMENDS APPROVAL
FEB 06 1991
PRC MTG. MINUTES




22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS


REGENERATIVE HEAT EXCHANGER
CHARGING PUMP
INSIDE CONTAINMENT
OUTSIDE CONTAINMENT