UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

JUL 18 1994

Docket: 50-382
License: NPF-38

Entergy Operations, Inc.
ATTN: Ross P. Barkhurst, Vice President
Operations, Waterford
P.O. Box B
Killona, Louisiana 70066

SUBJECT: ENFORCEMENT CONFERENCE HELD JULY 13, 1994

This refers to the enforcement conference conducted at NRC's request in the Region IV office on July 13, 1994. This enforcement conference related to apparent violations identified in NRC Inspection Report 50-382/94-13, dated June 30, 1994, and was attended by those on the attached Attendance List.

The subjects discussed in the meeting included a review of the events, your initial and long-term corrective actions, the nuclear safety significance of the events, generic implications, the effectiveness of past corrective actions, and your clarifications related to the inspection report.

We found the discussions beneficial and believe that they provided us with a better understanding of the events and the circumstances surrounding them. This information will be factored into our final decisions regarding this enforcement matter.

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.

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

Sincerely,

for A. Bill Beach, Director
Division of Reactor Projects

Attachments:
1. Attendance List
2. Licensee Presentation

IE45
1/1

cc with atta hments:
Entergy Operations, Inc.
ATTN: Harry W. Keiser, Executive Vice
President and Chief Operating Officer
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Entergy Operations, Inc.
ATTN: Jerrold G. Dewease, Vice President
Operations Support
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Wise, Carter, Child & Caraway
ATTN: Robert B. McGehee, Esq.
P.O. Box 651
Jackson, Mississippi 39205

Entergy Operations, Inc.
ATTN: D. F. Packer, General
Manager Plant Operations
P.O. Box B
Killona, Louisiana 70066

Entergy Operations, Inc.
ATTN: L. W. Laughlin
Licensing Manager
P.O. Box B
Killona, Louisiana 70066

Chairman
Louisiana Public Service Commission
One American Place, Suite 1630
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Entergy Operations, Inc.
ATTN: R. F. Burski, Director
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William H. Spell, Administrator
Radiation Protection Division
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Parish President
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Mr. William A. Cross
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Winston & Strawn
ATTN: Nicholas S. Reynolds, Esq.
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Washington, D.C. 20005-3502

bcc to DMB (IE45)

bcc distrib. by RIV:
L. J. Callan
Branch Chief (DRP/D)
MIS System
RIV File
Branch Chief (DRP/TSS)
Resident Inspector
Leah Tremper, OC/LFDCB, MS: MNBB 4503
DRSS-FIPB
Project Engineer (DRP/D)

RIV:DRP/TSS	DRP/D	C:DRP/D	D:DRP	
TPruett;df	JMacKinnon	CAVanDenburgh	RABeach	
7/15/94	7/15/94	7/15/94	7/16/94	

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TPruett;df	JMacKinnon	CAVanDenburgh	ABBeach	
7/15/94	7/15/94	7/15/94	7/16/94	

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ENFORCEMENT CONFERENCE ATTENDANCE

LICENSEE/FACILITY	Entergy Operations, Inc. (Waterford-3)
TIME/DATE	July 13, 1994, 12 noon
MEETING LOCATION	Region IV, Training Conference Room
EA NUMBER	EA 94-105

NAME (PLEASE PRINT)	ORGANIZATION	TITLE
ENTERGY OPERATIONS ATTENDEES		
PACKER, D.F.	Entergy OPS - Waterford 3	General Manager Plant OPS.
STARKEY, R.S.	"	MANAGER, O & M
BURSKI, RAYMOND F	"	DIRECTOR NUCLEAR SAFETY
Azzarello Robert G.	"	Director Design Engr.
BARKHURST, ROSS P.	"	V.P. OPS
CAMPO MANUEL J.	"	SYSTEM ENGINEER - W3
KLIEBERT, MICHAEL J	"	SYSTEM ENGINEER - WF3
Gaudet, T.M J.	"	Licensing Supervisor
Loetzerich, B.R.	"	Materials Tech. - WF3
D.L. WIGGINTON	NRR - PD4-1	SR. PROJECT MGR
F. WESTERMAN	NRC - RIV	CHIEF ENGINEERING BRANCH
Jerry C Roberts	Entergy Ops - Headquarters	Director, Central Licensing

ENFORCEMENT CONFERENCE ATTENDANCE

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NAME (PLEASE PRINT)	ORGANIZATION	TITLE
NRC AND OTHER ATTENDEES		
GARY SANBORN	NRC REGION 4	ENFORCEMENT OFFICER
JIM DYER	NRC RIV	DEPUTY DIR, DIV RX PROJ
CHRIS A. VANDENBURGH	NRC RIV	CHIEF, RX PROJECTS BR. D
E. J. Ford	NRC RIV	Sr. RESIDENT INSP. (W-3)
J.L. DIXON-HERRITY	NRC RIV	RESIDENT INSPECTOR (W-3)
JOHN B. MACKINNON	NRC RIV	acting Project Engineer (W-3)
Kathy D. Weaver	NRC RIV	Reactor Inspector
TROY PRUETT	NRC RIV	REACTOR INSPECTOR
JOE CALLAN	NRC RIV	REGIONAL ADMINISTRATOR

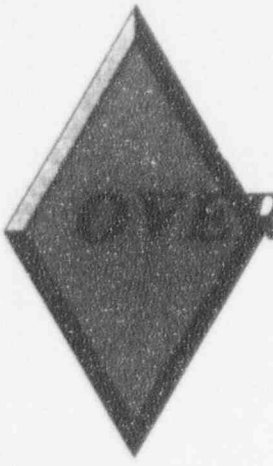
Enforcement Conference
July 13, 1994

AGENDA

I.	OPENING REMARKS	ROSS BARKHURST Vice President, Operations
II.	OVERVIEW OF PRESENTATION	DAN PACKER General Manager, Plant Operations
III.	CONDITION DESCRIPTION	ROB STARKEY Operations & Maintenance Manager
IV.	CHRONOLOGY	ROB STARKEY Operations & Maintenance Manager
V.	ROOT CAUSE	ROB STARKEY Operations & Maintenance Manager
VI.	CORRECTIVE ACTIONS	RAY BURSKI Director Nuclear Safety
VII.	CORRECTIVE ACTION PROGRAM PROGRESS AND ENHANCEMENTS	RAY BURSKI Director Nuclear Safety
VIII.	SAFETY SIGNIFICANCE	BOB AZZARELLO Director Design Engineering
IX.	W3 ENFORCEMENT PERSPECTIVE	RAY BURSKI Director Nuclear Safety
X.	CLOSING REMARKS	ROSS BARKHURST Vice President, Operations

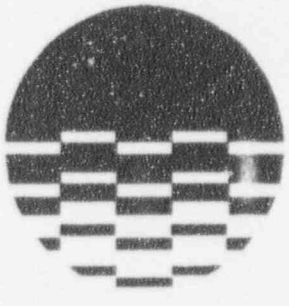
OPENING REMARKS

ROSS BARKHURST
Vice President, Operations



OVERVIEW OF PRESENTATION

DAN PACKER
General Manager, Plant Operations



OVERVIEW OF PRESENTATION

Root cause of event was determined to be an inadequate design change verification.

W3 concurs that a Condition Report was not written at the earliest opportunity.

Corrective Action Program has undergone significant enhancement.

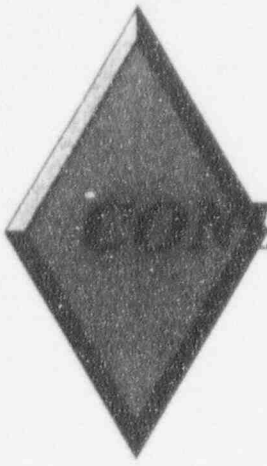
- Lowered the threshold for identifying conditions
- Streamlined the Corrective Action process
- Increased management oversight
- Increased System Engineering and Operations ownership

OVERVIEW OF PRESENTATION (Cont.)

Culture for condition identification and resolution has improved.

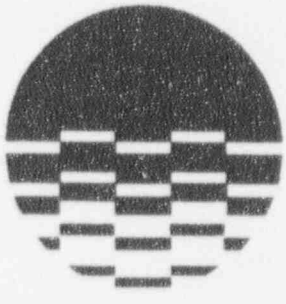
- Self Identified condition
- Persistent follow-up to condition
- Appropriate resolution

Good Management attention upon condition identification.



CONDITION DESCRIPTION

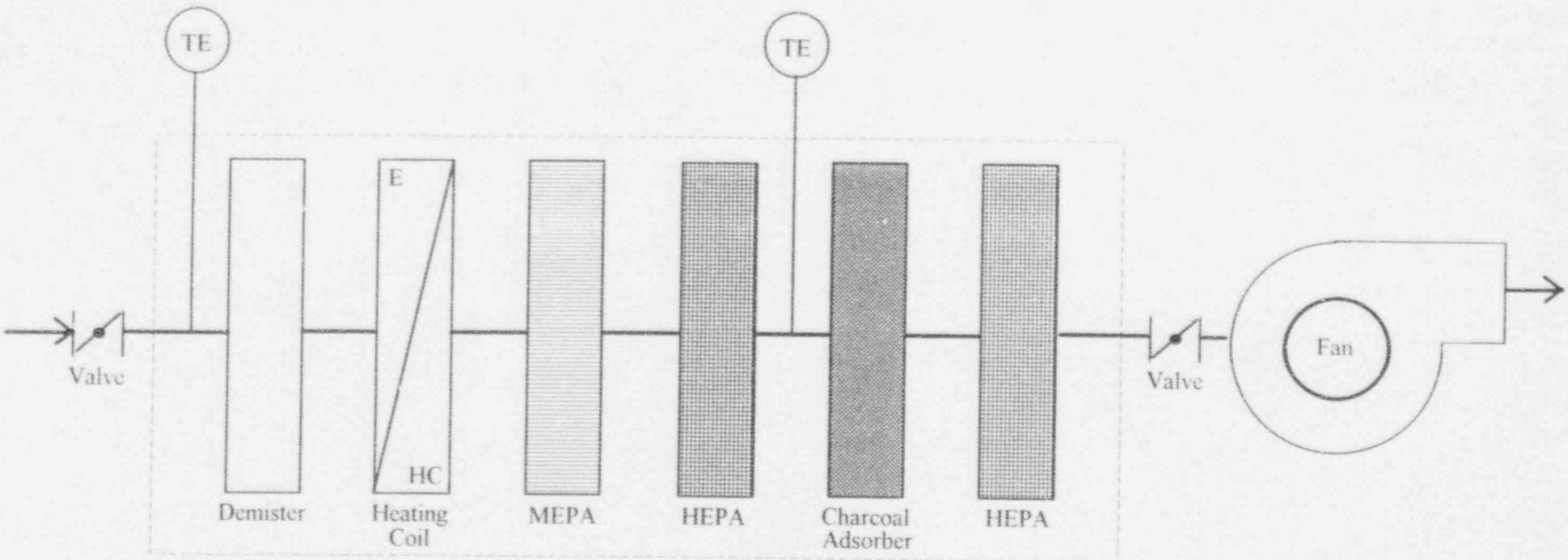
ROB STARKEY
Operations & Maintenance Manager



Typical ESF Emergency Filtration Unit

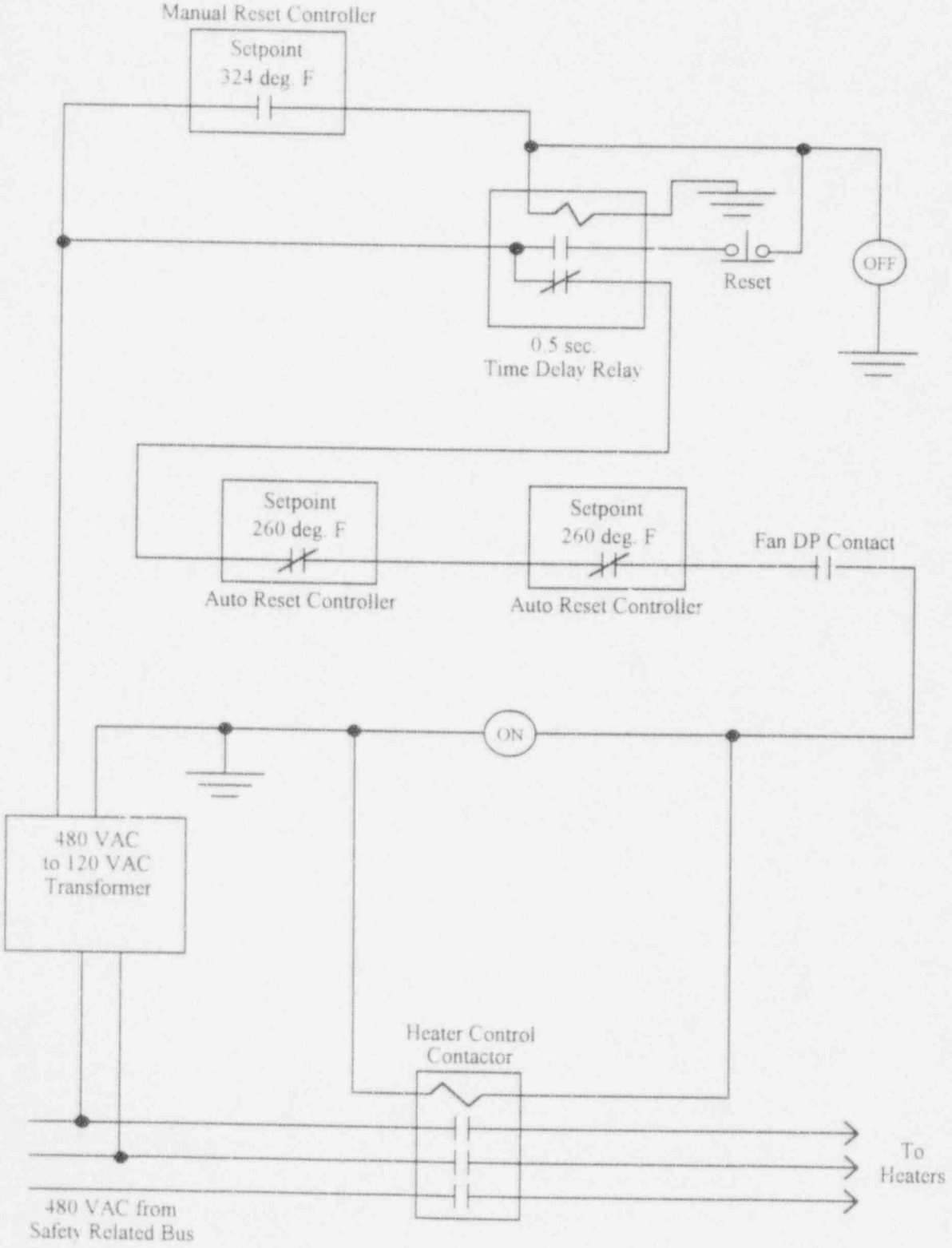
Temperature Elements Upstream and Downstream of the Electric Heating Coil Monitor Differential Temperature

Temperature Thermocouples, located within the EHC Bank, Monitor Heater Temperature



Simplified Schematic of Heater Panel

Panel Energized, Fan not Running



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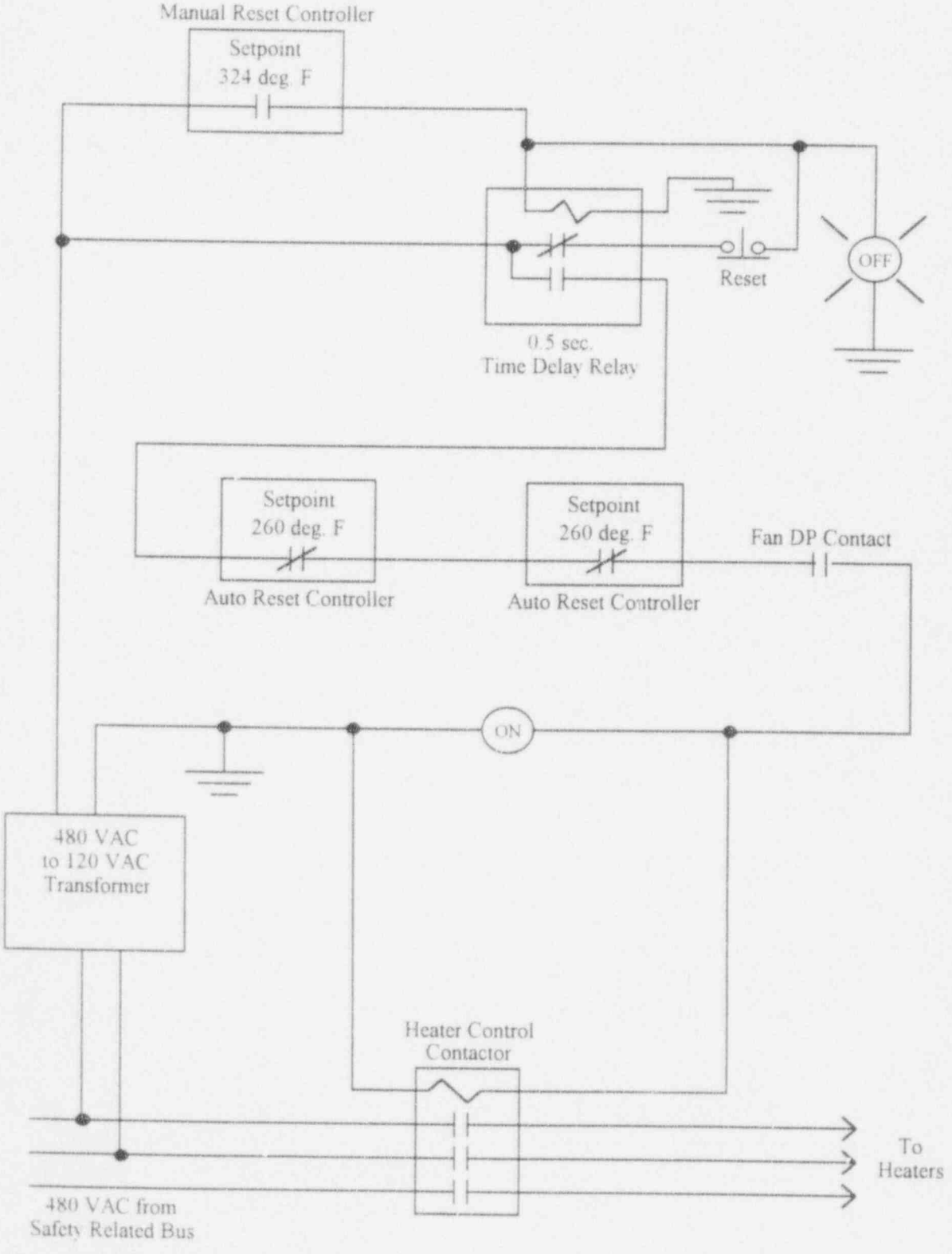


CONDITION DESCRIPTION

- Engineering identified a circuitry problem involving the response times of the temperature controllers and time delay relays for the ESF filtration unit heaters.

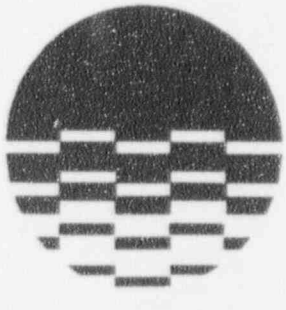
- Setpoints for the time delay relays and the drop out time of the temperature controller contacts were such that the heaters would not re-energize automatically after loss of power.

- Absent manual operator action, the failure of the heater coils to energize automatically after a loss of power will cause the filtration unit fan to trip (after a 400 second time delay) on low filter differential temperature.

- Affected systems include the Shield Building Ventilation System (SBVS), Control Room Air Conditioning System (CRACS), Controlled Ventilation Area System (CVAS), and the Fuel Handling Building Ventilation System (FHBVS).

CHRONOLOGY

ROB STARKEY
Operations & Maintenance Manager



CHRONOLOGY

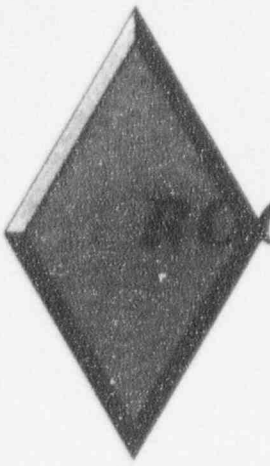
- Design Change implemented (between 10/92 and 4/93) to replace temperature controllers for the ESF filtration unit heaters to correct problem with setpoint drift and controller inaccuracies.

- SBVS and CVAS ESF filtration fan units tripped after 400 seconds time delay due to low differential temperature, during performance of Integrated Emergency Diesel Generator/ Engineering Safety Features Test for Train B. (March 16, 1994)

- Integrated Emergency Diesel Generator/ Engineering Safety Features Test for Train A performed. (April 4, 1994)

- After reviewing the performance of the ESF filtration units during testing, operations requested that engineering review the control circuitry of the SBVS and the CVAS.

- Engineering identified a circuitry problem involving the response times of the temperature controller and time delay relays for the ESF filtration unit heaters. (May 3, 1994)



ROOT CAUSE

ROB STARKEY
Operations & Maintenance Manager

ROOT CAUSE

Inadequate design change verification with respect to replacement part critical timing characteristic

CONTRIBUTING CAUSES

Missed opportunities to promptly identify concerns:

Engineering:

- Untimely communication between appropriate engineering personnel concerning ESF Filtration System Design

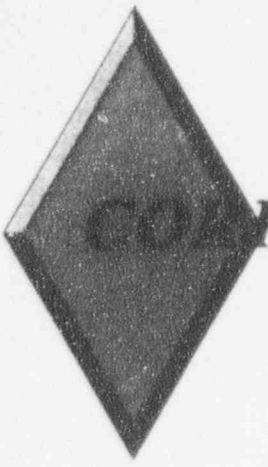
Operations:

- Operations work-around mindset
  - Following planned maintenance, Operations personnel noted need to restore CVAS 'B' filtration unit
  - (LOOP B TEST) EDG Train B SIAS Test with concurrent LOOP
  - (LOOP A TEST) EDG Train A SIAS Test with concurrent LOOP

CONTRIBUTING CAUSES

Maintenance:

- Maintenance expectations for ESF system performance not clear after Design Change
  - Various Maintenance activities



CORRECTIVE ACTIONS

RAY BURSKI
Director Nuclear Safety

CORRECTIVE ACTIONS

Immediate/Short Term Actions:

- Issued Standing Instructions for Operations to manually reset filtration units post LOOP
- Generated CR to document process
- Entered W4.101 process for further evaluation
- Installed TAR to increase setpoint of time delay relays
- Conducted accident dose assessment calculations
- Initiated Independent Management Assessment
- Contacted EOI Engineering personnel (ANO, GG, Riverbend) concerning the root cause of this event

CORRECTIVE ACTIONS
(Cont.)

Actions to Prevent Recurrence:

Root Cause

- Instructed W3 Design Engineering Personnel to utilize the EPRI Guideline (issued 12/93) where appropriate.

- Instructed Design Engineers to be more thorough in their research of design changes to include necessary retest requirements.

- Evaluate design procedures for adequacy regarding incorporation of EPRI guidelines and additional retest requirements

CORRECTIVE ACTIONS
(Cont.)

Contributing Causes

- Annotate vendor manuals and design drawings for ESF filter trains to indicate the critical timing relationships of time delay relays.

- Require Operations, Maintenance, and Engineering staffs to review this event and add to continuing training. Specific topics for discussion include:

  - Anomalous conditions that require CR generation
  - Design change expectations
  - Appropriate communication interface
  - Corrective Action Program ownership

CORRECTIVE ACTIONS
(Cont.)

- Enhance Emergency Diesel Generator LOOP surveillance procedures to include guidance for ESF equipment performance
- Revise System Design Basis Document (DBD) to add Emergency Diesel Generator LOOP surveillance to list of procedures meeting GDC requirements
- Recently developed Operations work around list
- Enhance Calibration Program for time delay relays

CORRECTIVE ACTIONS
(Cont.)

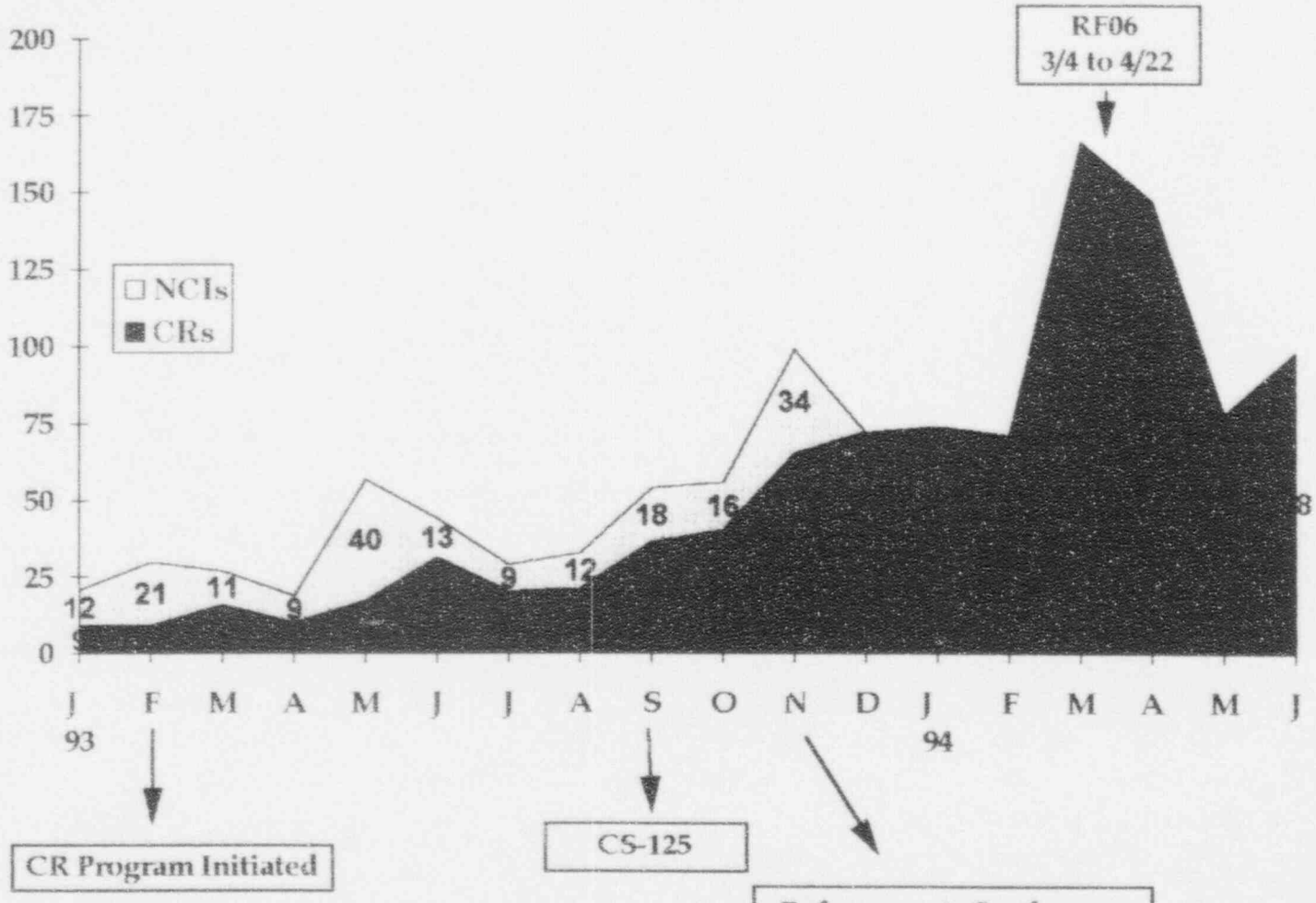
- Relabel Heater OFF Light for human factors considerations
- Review a sampling of safety related timing relays for inclusion into the Calibration Program as necessary
- A sampling review of last cycle of surveillances for anomalous indications
- Continued improvement via enhanced Corrective Action Program

CORRECTIVE ACTION PROGRAM

Progress and Enhancements

RAY BURSKI
Director Nuclear Safety

CONDITION REPORTS



ENTERGY

CORRECTIVE ACTION PROGRAM PROGRESS AND ENHANCEMENTS

- **Basis for Recent Changes**
  - Key Process Team recommendations
  - NRC Inspection Report 93-33 (CS-125)
  - November 3, 1993 Enforcement Conference
  - Various internal assessments and recommendations

CORRECTIVE ACTION PROGRAM PROGRESS AND ENHANCEMENTS (Cont.)

- **Key Changes (Identification)**
  - Single Corrective Action Document (6/94)
    - Condition Report
    - NCI deleted
  - Better defined (lower) threshold (11/93)
    - CR initiation has tripled and continues to rise
  - Removed perceived barriers to identification (6/94)
    - Simpler form
    - Supervisory review recommended (not required)
  - CRs to Control Room (6/94)
    - All CRs hand-carried to the Control Room

CORRECTIVE ACTION PROGRAM PROGRESS AND ENHANCEMENTS (Cont.)

- **Key Changes (Review Process) (11/93)**
  - Better defined (lower) threshold for significant adverse conditions
  - Enhanced ownership of corrective actions
    - ⇨ i.e., System Engineering
  - Condition Review Board ensures proper priority/resources
- **Key Changes (Cause Identification) (6/94)**
  - Revised Cause categories/criteria
    - ⇨ Root Cause - significant
    - ⇨ Apparent Cause - nonsignificant
  - Renewed emphasis on addressing sitewide and companywide implications

CORRECTIVE ACTION PROGRAM PROGRESS AND ENHANCEMENTS (Cont.)

- **Continuous Improvement**
  - Root Cause Analysis Natural Work Team (NWT) report
  - Benchmarking
  - Trending NWT reports
  - Identification Threshold NWT reports
  - Paperless Condition Report System

NEW ROLES

- **System Engineering (11/93)**
  - provide assistance and counsel during the identification process
  - maintaining cognizance and providing technical expertise during the resolution of adverse conditions affecting plant performance
- **Shift Supervisor (6/94)**
  - Operability and immediate notification determinations for all Condition Reports
- **Licensing (6/94)**
  - Reportability reviews for all Condition Reports

SAFETY SIGNIFICANCE

BOB AZZARELLO
Director Design Engineering

SAFETY SIGNIFICANCE

Controlled Ventilation Area System (CVAS):

Offsite dose due to any unfiltered releases remain within 10 CFR 100 limits if operators act to restore CVAS within 2 hours of LOCA.

Increase in two hour thyroid dose goes up by approximately 20 REM but is well within the 10 CFR 100 limit of 300 REM thyroid.

- Two hour Exclusion Area Boundary (EAB) thyroid dose with CVAS failure is 156 REM

Doses to public remain within 10CFR100 limits

SAFETY SIGNIFICANCE
(Cont.)

Shield Building Ventilation System (SBVS):

Shield Building annulus pressure increases above atmospheric, but stays less than annulus design pressure.

- No additional leakage paths due to building failure

Leakage from Shield Building to environment, if present, is expected to pass through SBVS filter train and thus would be filtered.

Doses to public remain within 10 CFR 100 limits.

SAFETY SIGNIFICANCE
(Cont.)

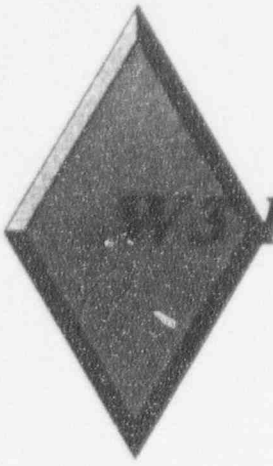
Fuel Handling Building Ventilation System FHBVS):

- No unfiltered release
- Significant margin in Fuel Handling Accident Dose (calculated dose is less than 2 REM)
- Doses to public remain within 10 CFR 100 limits

SAFETY SIGNIFICANCE
(Cont.)

Operator Dose To Reset Relays:

- Revised Waterford 3 LOCA dose calculations
- 5 minute Operator stay time
- At 2 hours, Operator dose is 1.25 REM
- At 4 Days (maximum dose), Operator dose is 3.5 REM
- This is less than 5 REM limit from GDC 19



ENFORCEMENT PERSPECTIVE

RAY BURSKI
Director Nuclear Safety

CIVIL PENALTY ADJUSTMENT FACTORS (Mitigation)

Should the NRC conclude that this condition warrants a civil penalty, the following civil penalty adjustment factors would apply:

IDENTIFICATION

- **Self identified by questioning attitude of Operations supervisor**
  - Asked System Engineering to look at system performance
- **Documentation did not support prompt identification of a design anomaly**
  - Vendor drawings and manuals did not reflect critical timing characteristics

CIVIL PENALTY
ADJUSTMENT FACTORS
(Mitigation)

PROMPT AND EXTENSIVE CORRECTIVE ACTION

- **Prompt and comprehensive corrective actions following discovery of complex issue.**

<u>IMMEDIATE/SHORT TERM</u>:

- Issued Standing Instructions for Operations to manually reset filtration units post LOOP
- Entered W4.101 process for further evaluation
- Installed TAR to increase setpoint of time delay relays
- Conducted accident dose assessment calculations
- Initiated Independent Management Assessment
- Contacted EOI Engineering personnel (ANO, GG, Riverbend) concerning the root cause of this event

CIVIL PENALTY
ADJUSTMENT FACTORS
(Mitigation)

ACTIONS TO PREVENT RECURRENCE:

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- Evaluate design procedures for adequacy regarding incorporation of EPRI guidelines and additional retest requirements

- Annotate vendor manuals and design drawings for ESF filter trains to indicate the critical timing relationships of time delay relays.

CIVIL PENALTY ADJUSTMENT FACTORS (Mitigation)

- Require Operations, Maintenance, and Engineering staffs to review this event and add to continuing training. Specific topics for discussion should include:
  - Anomalous conditions that require CR generation
  - Design change expectations
  - Appropriate communication interface
  - Corrective Action Program ownership
- Enhance Emergency Diesel Generator LOOP surveillance procedures to include guidance for ESF equipment performance
- Revise System Design Basis Document (DBD) to add Emergency Diesel Generator LOOP surveillance to list of procedures meeting GDC requirements

CIVIL PENALTY ADJUSTMENT FACTORS (Mitigation)

- Recently developed Operations work around list
- Enhance Calibration Program for time delay relays
- Relabel Heater OFF Light for human factors considerations
- Review a sampling of safety related timing relays for inclusion into the Calibration Program as necessary
- A sampling review of last cycle of surveillances for anomalous indications
- Continued improvement via enhanced Corrective Action Program

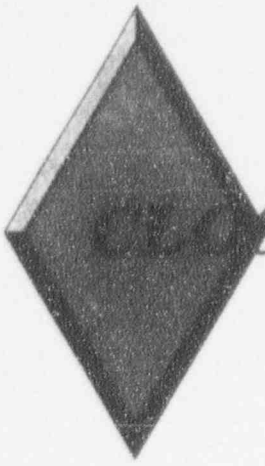
CIVIL PENALTY
ADJUSTMENT FACTORS
(Mitigation)

OTHER FACTORS

- Complex issue with respect to response time of temperature controller
- EDG LOOP surveillance performed on Refuel Interval
  - Refuel 5 - DC installed only on SBVS - anomaly did not occur
  - Refuel 6 - First time surveillance anomaly occurred
- Not a previously identified industry concern with respect to HVAC systems

CIVIL PENALTY ADJUSTMENT FACTORS (Mitigation)

- Condition existed following power restoration only
  - Operator action would restore system
  - Normal system operation unaffected
- Based on evaluations, actual dose levels would remain well below 10 CFR 100 limits
- Health and safety of general public was not compromised



CLOSING REMARKS

ROSS BARKHURST
Vice President, Operations