



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

May 2, 1997

Mr. Charles H. Cruse
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657 - 4702

SUBJECT: NRC INSPECTION REPORT NOS. 50-317/96-09 AND 50-318/96-09
AND NOTICE OF VIOLATION

Dear Mr. Cruse:

This letter refers to your December 12, 1996, correspondence in response to our November 1, 1996, letter.

Thank you for informing us of the corrective and preventive actions documented in your letter. These actions will be examined during a future inspection of your licensed program.

Sincerely,

Lawrence T. Doerflein, Chief
Projects Branch 1
Division of Reactor Projects

Docket Nos. 50-317
50-318

cc:

T. Pritchett, Director, Nuclear Regulatory Matters (CCNPP)
R. McLean, Administrator, Nuclear Evaluations
J. Walter, Engineering Division, Public Service Commission of Maryland

cc w/copy of Licensee's Response Letter:

K. Burger, Esquire, Maryland People's Counsel
R. Ochs, Maryland Safe Energy Coalition
State of Maryland (2)

200009

5/20/97



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Distribution w/copy of Licensee's Response Letter:

D. Screnci, PAO

R. Correia, NRR

D. R. Taylor, NRR

L. Cunningham, NRR

D. Barss, NRR

W. Dean, OEDO (WMD)

S. Stewart - Calvert Cliffs

S. Bajwa, NRR

A. Dromerick, NRR

G. Vissing, NRR

L. Doerflein, DRP

T. Moslak, DRP

R. Junod, DRP

S. Chaudhary, DRS

M. Campion, RI

Nuclear Safety Information Center (NSIC,

PUBLIC

NRC Resident Inspector

Region I Docket Room (with concurrences)

Inspection Program Branch, NRR (IPAS)

DOCDESK

DRS File

CHARLES H. CRUSE
Vice President
Nuclear Energy

Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657
410 495-4455



December 12, 1996

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Reply to Notice of Violation -- Combined NRC Region I Inspection Report
Nos. 50-317(318)/96-09

REFERENCE: (a) Letter from Mr. M. C. Modes (NRC) to Mr. C. H. Cruse (BGE), dated
November 1, 1996, Combined NRC Region I Inspection Report
Nos. 50-317/96-09 and 50-318/96-09 and Notice of Violation

In response to Reference (a), Attachment (1) details our response to a cited violation concerning an unauthorized modification to the auxiliary feedwater pump base guide blocks.

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

Very truly yours,

A handwritten signature in dark ink, appearing to read "Charles H. Cruse", is written over a horizontal line.

CHC/DWM/bjd

Attachment

cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
A. W. Dromerick, NRC

H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR
J. H. Walter, PSC

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PDR ADOCK 05000317
G PDR

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ATTACHMENT (1)

REPLY TO NOTICE OF VIOLATION NOS. 50-317/96-09-01 AND 50-318/96-09-01

Notice of Violation Nos. 50-317/96-09-01 and 50-318/96-09-01 describes a non-conformance concerning an unauthorized modification to the auxiliary feedwater (AFW) pump turbine base guide blocks. The Notice of Violation states, in part, that:

On or about June 21, 1996, a design change was made that was not subject to design control measures commensurate with the original design when the System Engineer for the Auxiliary Feedwater (AFW) system implemented a "Defacto" modification (as defined in ES-1-100, RW5) in the AFW system. The defacto modification involved not welding the guide blocks used to ensure the seismic qualification of the AFW pump. This design change/modification was not evaluated by the responsible design organization for validity and compatibility with the original design; and the maintenance personnel disregarded the configuration indicated on the approved drawing showing welded blocks on the basis of an informal instruction from a System Engineer.

I. REASON FOR THE VIOLATION

During the 1996 Unit 1 refueling outage, AFW Pump Turbines 11 and 12 were overhauled. To facilitate the overhaul, the welded guide blocks, which provide seismic support and stabilize the AFW pump turbines when they thermally expand during operation, were removed from the AFW pump turbine support base. In mid-June, during turbine reassembly, a question was raised as to whether the guide blocks, which are normally bolted and welded in place, needed to be welded prior to the unit entering MODE 3. The gap between the guide block and the AFW pump turbine housing is sufficiently small (twelve thousandths of an inch) that thermal expansion of the guide block material during welding has, in the past, resulted in the gap being out of tolerance. Based on personal observations in the field, the System Engineer believed that the guide blocks served no function in support of pump operability and, therefore, issued an informal memorandum stating that the guide blocks did not have to be welded prior to entering MODE 3. The turbines were reassembled with the weld blocks bolted in place, but not welded. Unit 1 initially entered MODE 3 on June 21, 1996.

On August 8, 1996, Maintenance and Quality Verification discussed the configuration and brought it to the attention of another System Engineer, who was under the impression that the design change had been approved. Upon finding, on August 9, 1996, that the design change had not been approved, Plant Engineering personnel contacted Operations, who declared the Unit 1 steam driven AFW pumps inoperable and effected repairs. The guide blocks were welded as required in about six hours and the AFW pumps were returned to service. During the time that this condition existed, Unit 1 was brought up above MODE 3, shut down, and brought back above MODE 3, resulting in approximately 17 days of operation in MODE 3 or greater with this condition before the guide blocks were welded to return the system to its design configuration.

Subsequent engineering review found that the AFW pumps are seismically qualified with the guide blocks bolted but unwelded. This condition did not, therefore, compromise plant safety.

The root cause of this event was personnel error. The System Engineer made an incorrect interpretation of the design function of the guide blocks and failed to properly process the plant configuration change through the existing engineering procedures. The System Engineer believed that the guide blocks did not need to be welded, but did not verify that this was the case.

ATTACHMENT (1)

REPLY TO NOTICE OF VIOLATION NOS. 50-317/96-09-01 AND 50-318/96-09-01

He issued informal, unreviewed guidance to the Maintenance personnel to this effect despite reference to the guide blocks in the Technical Manual and a plant drawing showing that the guide blocks must be welded. As a result, through a lack of research and questioning attitude, improper technical guidance was issued in a fashion contrary to established procedures.

A review of the modification process found that, had it been followed, this non-conformance would not have resulted. The process for making design changes of this sort normally requires the System Engineer to submit an Engineering Services Request or a Temporary Alteration to Design Engineering to revise the configuration of the AFW pump turbine guide blocks. He failed to recognize this as a technical manual revision, so he didn't use the configuration change process. In this case, this would have entailed a review of the information in the Vendor Technical Manual, which was sufficient to lead either the System Engineer or Design Engineering to the correct conclusion regarding the need for welding the guide blocks.

Maintenance personnel are expected to function as a barrier to implementation of unapproved design changes. In this case, Maintenance personnel twice questioned guidance on not welding the blocks and escalated the matter to the General Supervisor-Mechanical Maintenance, who accepted the change as part of his pre-startup review. While Operations' procedures caused them to raise the question about the incomplete Maintenance Order before startup, they relied upon the report from Maintenance that the condition had Engineering approval. An independent evaluation by Operations in greater detail is not expected.

II. CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

The blocks were welded on August 9, 1996, approximately six hours after the condition was determined to be non-conforming. The Unit 2 AFW pump guide blocks were verified to be welded.

The System Engineer was provided appropriate counseling to emphasize the need to obtain proper design review prior to making plant configuration changes. Lessons learned training has been conducted with all Plant Engineering personnel to reiterate that System Engineers cannot authorize plant configuration changes without formal approval. Additionally, guidance that contradicts the design configuration cannot be issued from Plant Engineering without formal approval from Design Engineering. While guidance that provides an interpretation or resolution of ambiguity can be made by System Engineers, they cannot contradict or waive design configuration requirements.

Awareness training was conducted within the Maintenance organization regarding this event to heighten awareness of craft personnel to the possibility of unapproved plant modifications being implemented without proper or prior approval.

Design-related guidance issued by Plant Engineering to the field during the 1996 Unit 1 outage was reviewed to determine if other similar events had occurred. No similar instances where the correct engineering processes were not followed to implement configuration changes were found.

ATTACHMENT (1)

REPLY TO NOTICE OF VIOLATION NOS. 50-317/96-09-01 AND 50-318/96-09-01

III. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

Although review indicates that the present processes for design change and operability determination have not resulted in significant similar events, we believe that vulnerabilities exist in the Engineering interfaces required by these processes. We will revise the appropriate procedures to clarify when it is appropriate to justify operability of plant equipment and when a design change is needed.

IV. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved on August 9, 1996 when the guide blocks were welded in place.

May 6, 1997

MEMORANDUM TO:

W. Dean, OEDO
J. Stolz, NRR
C. Poslusny, NRR
F. Talbot, NRR
N. Perry, Limerick
R. Ragland, DRS

FROM:

Kay L. Gallagher, Secretary
Division of Reactor Projects
Region I

Kay L. Gallagher

SUBJECT:

SUSQUEHANNA INSPECTION REPORT 97-02

Attached is Enclosure 2 to Susquehanna Inspection Report 97-02, which was e-mailed to you on May 2, 1997.

DOC DESK

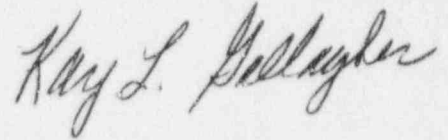
May 6, 1997

MEMORANDUM TO:

W. Dean, OEDO
J. Stolz, NRR
C. Poslusny, NRR
F. Talbot, NRR
N. Perry, Limerick
R. Ragland, DRS

FROM:

Kay L. Gallagher, Secretary
Division of Reactor Projects
Region I



SUBJECT:

SUSQUEHANNA INSPECTION REPORT 97-02

Attached is Enclosure 2 to Susquehanna Inspection Report 97-02, which was e-mailed to you on May 2, 1997.

ENCLOSURE 2

PENNSYLVANIA POWER & LIGHT PRESENTATION
TO THE U.S. NUCLEAR REGULATORY COMMISSION

PREDECISIONAL ENFORCEMENT CONFERENCE

USNRC Region I Offices

King of Prussia, Pa.

March 21, 1997

MANAGEMENT PERSPECTIVE

- *We Have Responded Aggressively to the Issues and We Are Implementing Valuable Lessons Learned.*
 - Our Actions Are Directed At Improving Long Term Performance
 - » We Have Strengthened Management and Supervisory Oversight
 - » We Have Implemented Improved Assessment Practices
 - » We Have Addressed Individual Performance Issues, Reinforced Our Expectations, and Verified That They Are Being Met

AGENDA

- MANAGEMENT PERSPECTIVE G. T. JONES
VP - NUCLEAR OPERATIONS
- REVIEW OF ISSUES G. J. KUCZYNSKI
GENERAL MANAGER - SSES
- ASSESSMENT PERSPECTIVE W. E. BURCHILL
MGR - NUCLEAR ASSESSMENT
- SUMMARY G. T. JONES

MANAGEMENT PERSPECTIVE

- *PP&L's Standards*
 - Conservative Safety Philosophy
 - Compliance With the Regulations
 - Strong Procedures That Are Followed
 - Capable, Accountable People
 - Questioning Attitude
 - Good Teamwork

MANAGEMENT PERSPECTIVE


- *PP&L Has Responded Broadly and Aggressively to the Issues.*
 - Immediate Corrective Actions
 - Comprehensive Internal and Independent Investigations
 - Broad, Comprehensive Reviews Searching For Definitive Causes and Generic Implications
 - Actions to Prevent Recurrence

MANAGEMENT PERSPECTIVE

- *Key Issues*

- Management & Supervisory Oversight
- Assessment Effectiveness
- Performance of Certain Individuals

OUTLINE

- 
- *General Manager-SSES Perspective*
 - *Core Spray Containment Isolation Valve*
 - *Standby Liquid Control Heat Trace*
 - *“E” Diesel Generator*
 - NPO Rounds
 - Operations Shift Supervision
 - Improvements in Operations Management and Supervision

GENERAL MANAGER - SSES PERSPECTIVE

- *We've Reviewed Our 1996 Performance*
 - Fewest Operating Transients Ever
 - Equipment Performance Was Excellent
 - Generation Was at a Record Level
- *Event Investigations Have Been Broad, Comprehensive, and Intrusive*
- *The "E" Diesel Generator Event Was An Emotional Event For The Station, and Especially For Operations*
- *We Have Improved Performance*
 - Individuals
 - Management Oversight
 - Independent Assessment

PREVIEW

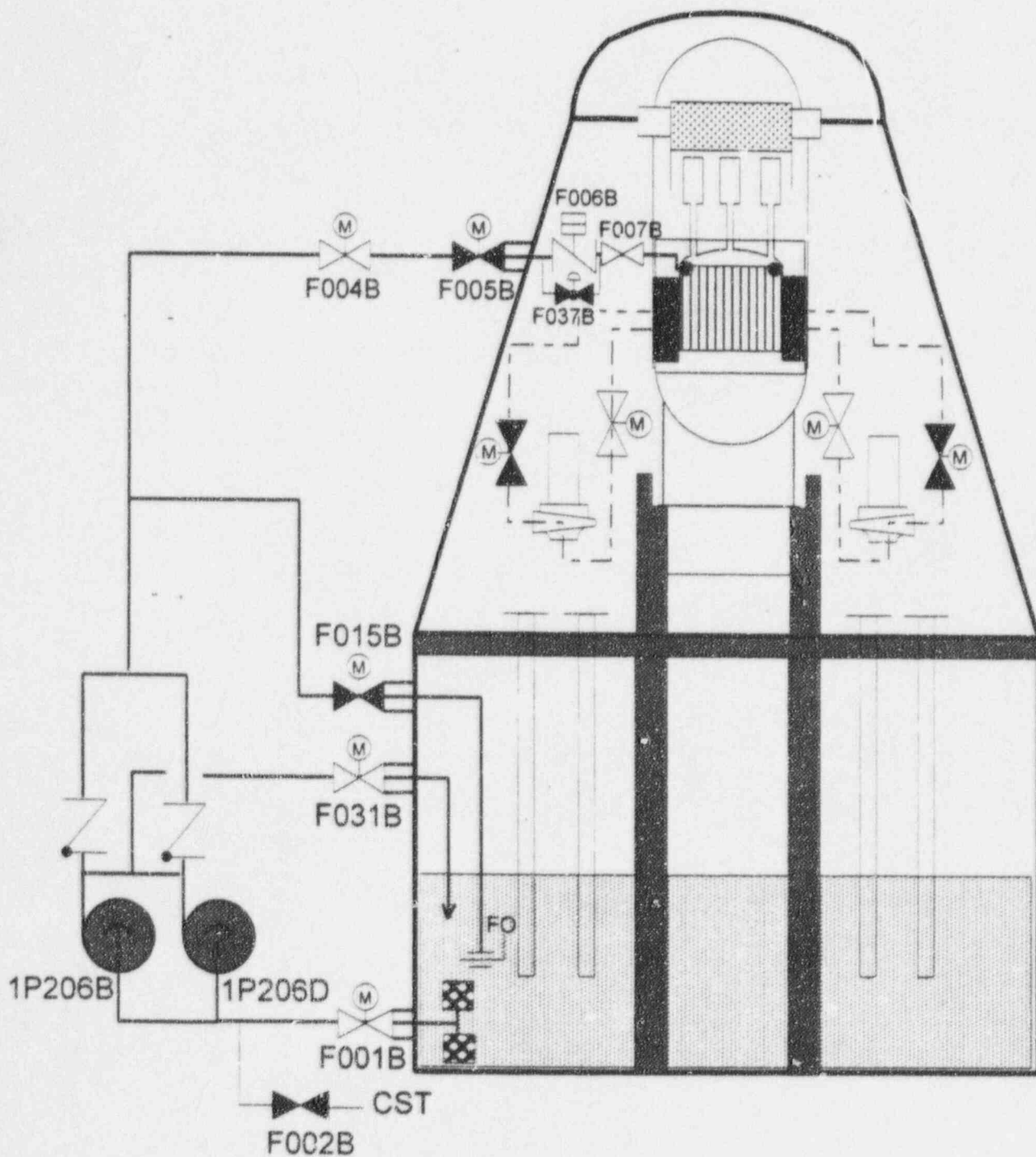
- *Core Spray Containment Isolation Valve*
 - Technical Specification 3.6.3 Was Not Met
 - Safety Significance Was Minimal
 - Our Corrective Actions Were Timely and Are Complete
- *Standby Liquid Control Heat Trace*
 - Status Control Procedure Not Properly Implemented
 - We Identified the Event, and Safety Significance Was Minimal
 - Our Initial Corrective Action Was Not Timely; All Corrective Actions Are Now Complete
- *“E” Diesel Generator*
 - The Misalignment Event Was Straightforward, But The Follow-on Issues Were Subtle
 - We Identified the Event and the Follow-on Issues
 - The Safety Significance of the Event Was Minimal
 - Our Corrective Actions Were Prompt and Comprehensive
 - We Aggressively Pursued the Potential Generic Implications

OUTLINE

- *General Manager - SSES Perspective*
- ➔ • *Core Spray Containment Isolation Valve*
- *Standby Liquid Control Heat Trace*
- *“E” Diesel Generator*
 - NPO Rounds
 - Operations Shift Supervision
 - Improvements in Operations Management and Supervision

EVENT: CORE SPRAY CONTAINMENT ISOLATION VALVE

- *7/30/96: Unit 1 Core Spray F015B (Single PCIV in Full Flow Test Return Line to Suppression Pool) Valve Backseated and Repacked at Power*
- *Technical Specification 3.6.3 Does Not Specifically Address Single Valve Penetrations*
- *Informal Interpretation Evolved Based on Footnote (c) in Tech Spec Table 3.6.3-1: Requirement for Redundant Valve Was Interpreted to Be Met by Integrity of Redundant Boundary*



Core Spray "B" Loop Simplified

PROMPT FOLLOW-UP: CORE SPRAY CONTAINMENT ISOLATION VALVE

- *Immediate Corrective Actions*
 - We Stopped the Practice
 - We Issued a Formal Technical Specification Interpretation

SAFETY SIGNIFICANCE: CORE SPRAY CONTAINMENT ISOLATION VALVE

- *Safety Significance Was Minimal*
 - F015B Does Not Communicate Directly With Either the Primary Containment Atmosphere Or the Reactor Coolant Pressure Boundary
 - Penetration and Associated Closed System Piping Remain Water Sealed Post Accident
 - » Primary Containment Integrity Maintained Regardless of F015B Position.
 - » PP&L Actions Were Focused on Maintaining Water Seal
 - » Additional Protection Afforded by Maintenance of Valve Backseats
 - » Effectiveness of Water Seal was Basis for Recent Elimination of Tech Spec LLRT on This Penetration

INVESTIGATION RESULTS: CORE SPRAY CONTAINMENT ISOLATION VALVE

- *Investigation Results*
 - Technical Specification 3.6.3 Was Misinterpreted
 - » Causal Factor: Tech Spec Footnote Wording
 - A Formal Tech Spec Interpretation Was Not Processed
 - » Missed Opportunities for Additional Review
 - An Informal Document Was Used as the Basis for An Operational Decision

CORRECTIVE ACTIONS: CORE SPRAY CONTAINMENT ISOLATION VALVE

- *Actions to Prevent Recurrence*
 - We Completed Training
 - » Operations Training
 - » Engineering Training Regarding Proper Documentation of Engineering Guidance
 - We Enhanced the Program
 - » Explicit Direction in Operations Policy

CORRECTIVE ACTIONS: CORE SPRAY CONTAINMENT ISOLATION VALVE

- *Actions to Prevent Recurrence (Cont'd)*
 - We Defined and Documented for Closed Systems:
 - » Those Used As Redundant Isolation Boundaries in Single Valve Penetrations
 - » Testing Requirements
 - » Acceptable Methods of Altering Boundaries

CORRECTIVE ACTIONS: CORE SPRAY CONTAINMENT ISOLATION VALVE

- *Actions to Prevent Recurrence (Cont'd)*
 - We Completed Technical Specification Reviews
 - » Ensured No Other Informal Guidance Was Being Utilized in Support of Plant Operations
 - » Reviewed SSES ITS Submittal to Ensure Consistency With Event Resolution

CONCLUSIONS: CORE SPRAY CONTAINMENT ISOLATION VALVE

- *Core Spray Containment Isolation Valve*
 - Technical Specification 3.6.3 Was Not Met
 - The Event Had Minimal Safety Significance, and Resulted in No Safety Consequences
 - Our Corrective Actions Were Prompt and Comprehensive, and Are Complete

OUTLINE

- *General Manager - SSES Perspective*
- *Core Spray Containment Isolation Valve*
- ➔ • *Standby Liquid Control Heat Trace*
- *“E” Diesel Generator*
 - NPO Rounds
 - Operations Shift Supervision
 - Improvements in Operations Management and Supervision

EVENT: STANDBY LIQUID CONTROL HEAT TRACE

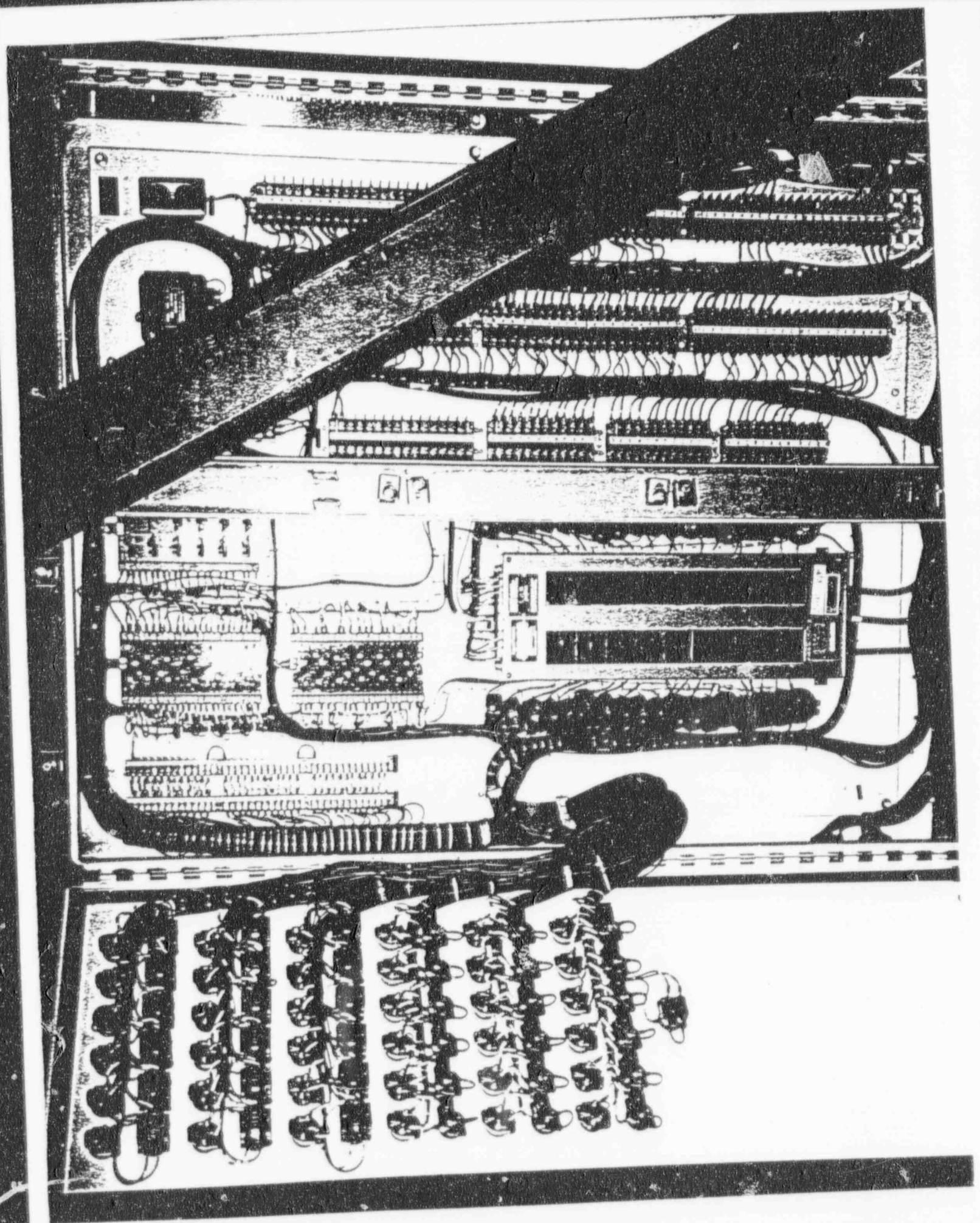
- *Event : Inadvertently Deenergized Heat Trace*
 - As-built Drawing Discrepancy Was Identified
 - Temporarily Controlled Via a Status Control Tag
 - The “B” SLC Pump Heat Trace Was Unknowingly Deenergized
 - » Status Control Tag Was Hung Improperly
 - » NPO Didn’t Question the Applicability of the Status Control Tag

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PROMPT FOLLOW-UP: STANDBY LIQUID CONTROL HEAT TRACE

- *Immediate Corrective Actions*
 - We Closed the Breakers
 - We Flushed the “B” Pump to Verify Flowpath
 - We Applied Status Control Tags Directly to the Breakers

SAFETY SIGNIFICANCE: STANDBY LIQUID CONTROL HEAT TRACE

- *Safety Significance Was Minimal*
 - The Purpose of the Heat Trace is to Prevent Sodium Pentaborate From Precipitating Out of Solution
 - Solution Concentration and Ambient Temperature Data During the Time of the Event Indicate That Precipitation Could Not Have Occurred
 - “B” SLCS Pump Would Have Functioned

INVESTIGATION RESULTS: STANDBY LIQUID CONTROL HEAT TRACE

- *Investigation Results*
 - Initial Actions to Correct Drawings Were Not Timely
 - Status Control Tags Should Have Been Applied to Individual Breakers Rather Than the Panel Door
 - The NPO Should Have Questioned the Applicability of the Status Control Tag

CORRECTIVE ACTIONS: STANDBY LIQUID CONTROL HEAT TRACE

- *Actions to Prevent Recurrence*
 - We Corrected the Drawings
 - We Counseled Operators on Proper Placement of Status Control Tags and on Questioning the Applicability of Status Control Tags

CONCLUSIONS: STANDBY LIQUID CONTROL HEAT TRACE

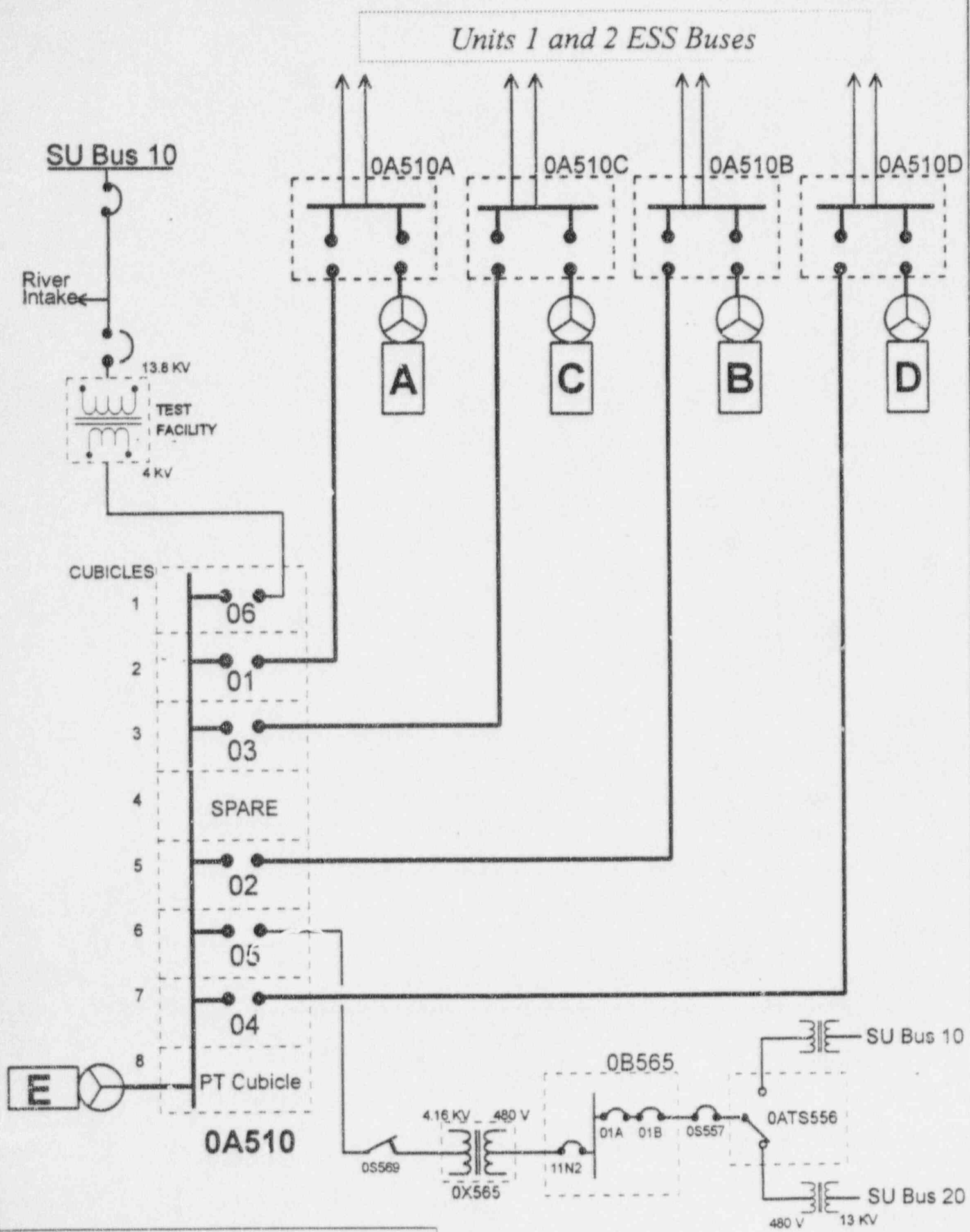
- *Standby Liquid Control Heat Trace*
 - Our Status Control Procedure Was Not Properly Implemented
 - We Identified the Event
 - The Event Had Minimal Safety Significance, and Resulted in No Safety Consequences
 - Our Initial Corrective Action Was Not Timely; All Corrective Actions are Now Complete

OUTLINE

- *General Manager - SSES Perspective*
- *Core Spray Containment Isolation Valve*
- *Standby Liquid Control Heat Trace*
- ➔ • *“E” Diesel Generator*
 - NPO Rounds
 - Operations Shift Supervision
 - Improvements in Operations Management and Supervision

DESIGN: “E” DIESEL GENERATOR

- *The Two Susquehanna Units Have Shared Diesel Generators*
 - Four (Normally A, B, C, & D) are Required to be Aligned
- *A Fifth DG, “E”, is Designed to Substitute for Any One of the Other Four*
 - “E” is Testable When Not Substituted
 - “E” Essential Auxiliaries Have Two Power Sources:
 - » IE, From “E” D/G
 - » Non-IE, Normally Aligned
 - Substitution is Accomplished By Physically Moving Circuit Breakers



"E" Diesel Layout Simplified

EVENT: “E” DG MISALIGNMENT

- *6/14/96 - NPO Misaligned the “E” Diesel Generator Essential Auxiliaries Breaker*
 - Went to the Wrong Breaker and Assumed It Was Misaligned
 - Informed Control Room, No Follow-up Supervisory Verification
 - Condition Report Initiated Based on Perceived Misalignment
 - “Corrective Realignment” Created the Misalignment
- *Three Subsequent Surveillances Failed to Detect Misalignment*
- *7/4/96 - Misalignment Detected by NPO During Rounds*

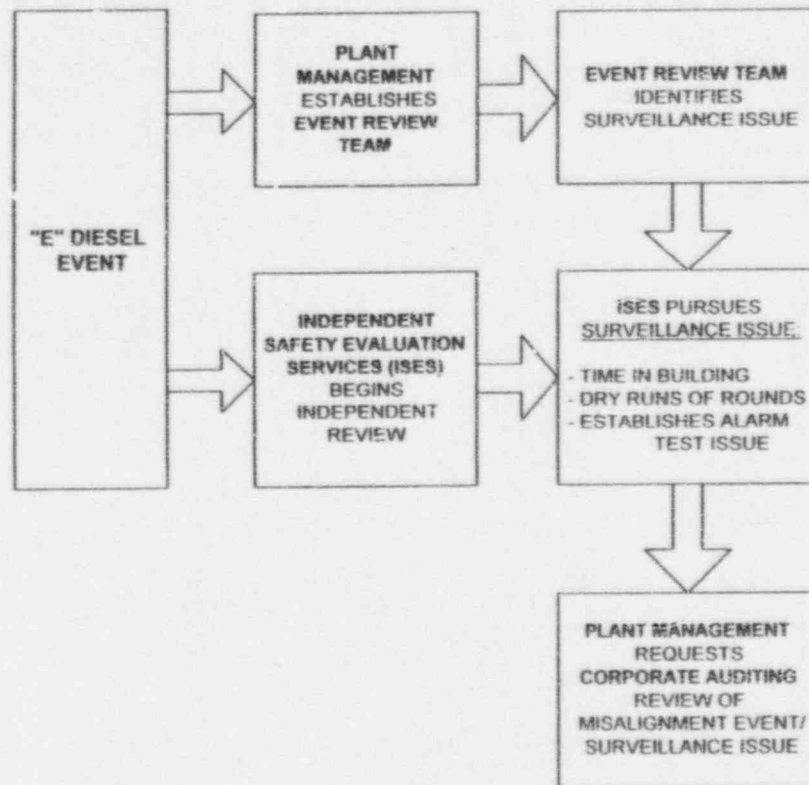
PROMPT FOLLOW-UP: “E” DG MISALIGNMENT

- *Immediate Corrective Actions*
 - We Declared the “E” DG Inoperable
 - We Realigned the Breakers, and Conducted Surveillances
 - We Initiated Investigations
 - Management Performed Surveillances and Confirmed Breaker Alignments
 - We Increased Oversight of Field Activities

SAFETY SIGNIFICANCE: “E” DG MISALIGNMENT

- *Actual Safety Significance Was Minimal*
 - Given a Start Signal, All Four DGs Would Start and Energize Their Respective Buses
 - The “E” DG Would Have Run Until the Day Tank Ran Out of Fuel
 - » Over Eighty Minutes
 - » Three Diesels Remain Operable
 - Susquehanna is Designed to Respond to All Design Basis Events With Three Diesel Generators
- *Failure of Some Operators to Properly Perform Rounds and Surveillances was Significant*

INVESTIGATION SEQUENCE: “E” DIESEL GENERATOR



ISSUES RAISED BY INVESTIGATION OF “E” DG MISALIGNMENT

- *1: NPO Performance During DG Substitution*
- *2: Supervisory Oversight*
- *3: Testing Of “E” DG When Substituted*
- *4: Procedures*
- *5: Knowledge of “E” DG Design*
- *6: “E” DG Human Factors*
- *7: NPO Performance of Rounds & Surveillances*

CORRECTIVE ACTIONS: “E” DG MISALIGNMENT

- *#1: NPO Performance During DG Substitution*
 - We Applied Company Policies on Performance Deficiencies
 - » NPO No Longer Works in Operations
- *#2: Supervisory Oversight*
 - We Counseled the Supervisors Who Failed to Respond to the Initial Status Control Event
 - We Trained All Operations Personnel on the Event
 - We Provided Expectations for Assistant Unit Supervisor Performance to Shift Supervision
 - We Expanded the Operations Supervisory Oversight of Rounds
 - We Added a Requirement for the Shift Supervisor to Walk Down Status Control Events

CORRECTIVE ACTIONS: “E” DG MISALIGNMENT

- #3: *Testing of “E” DG When Substituted*
 - We Revised Test Procedures
 - » Included Explicit Breaker Position
- #4: *Improved Procedures*
 - We Expanded Operations Self Assessment Program
 - » Provided More Comprehensive Checklists
 - » More Management Oversight
 - We Revised Procedures
 - » Included Explicit Breaker Position Verification in Surveillance
 - » Realigned Administrative Control Procedures for Consistency
 - » Improved Operations Investigation Guidance
 - » Clarified Wording in Operating Procedures

CORRECTIVE ACTIONS:

“E” DG MISALIGNMENT

- *#5: Knowledge of “E” DG Design*
 - We Trained Operations Personnel on “E” DG Design, Including Function and Operation
- *#6: “E” DG Human Factors*
 - We Revised Procedures
 - We Relabelled the Switchgear
 - We Performed a Modification to Provide a Light on Cubicle #6
- *#7: NPO Performance of Rounds & Surveillances*
 - We Retrained Operations Personnel on Expectations
 - We Performed Further Investigation of NPO Performance

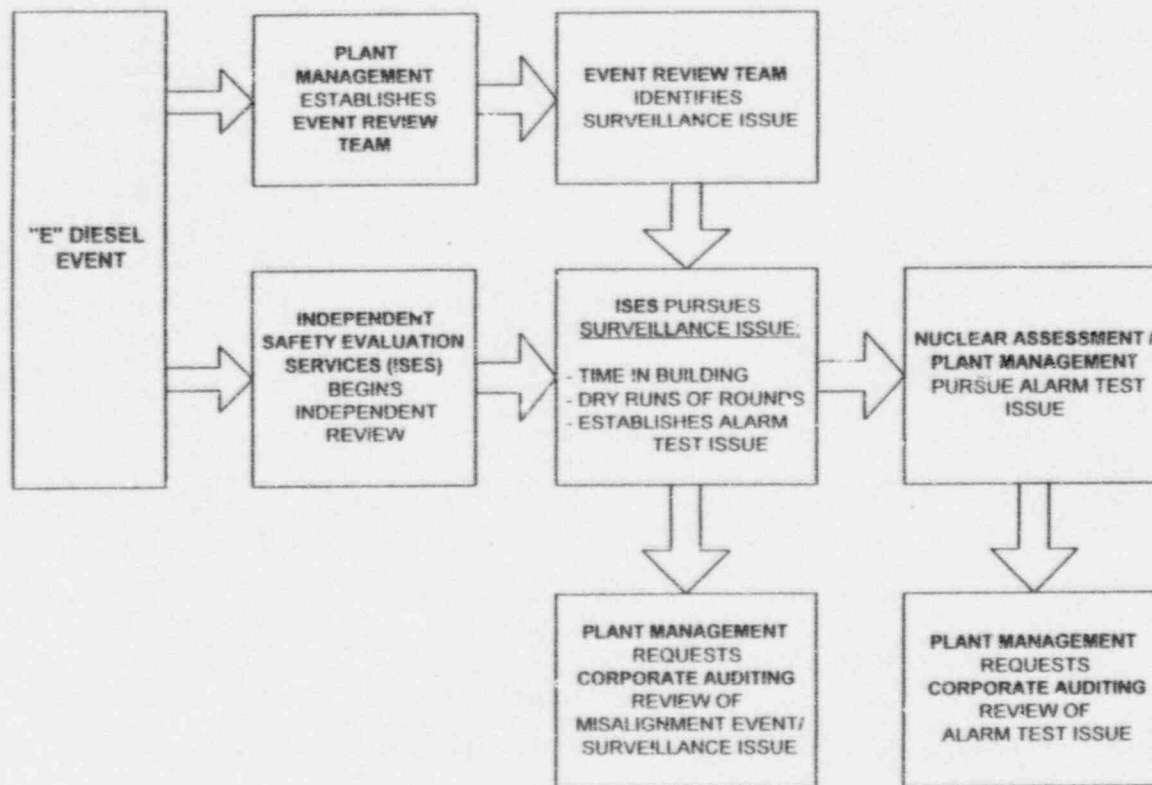
OUTLINE

- *General Manager - SSES Perspective*
- *Core Spray Containment Isolation Valve*
- *Standby Liquid Control Heat Trace*
- *“E” Diesel Generator*



- NPO Rounds
- Operations Shift Supervision
- Improvements in Operations Management and Supervision

INVESTIGATION SEQUENCE: “E” DIESEL GENERATOR



PP&L EXPECTATIONS: NPO ROUNDS

- *PP&L Expects NPO's To Perform Their Rounds In Accordance With The Rounds Sheet and Their Training, and to Consult Their Supervisor If They Are Unable to Complete Their Rounds.*

NPO ROUNDS ISSUE

- *Some NPO's Did Not Perform an Alarm Test, and Indicated That They Had Performed It on Their Rounds Sheet*

ALARM TEST 0C577E

- *The Alarm Test was a Change to NPO Rounds*
 - Condition Report Corrective Action Beginning 12/26/95
 - Included:
 - » Push Alarm Test Button on 0C577E
 - » Receive Alarm on 0C577E
 - » Receive Alarm in Control Room

WFO PLANT LOG: DIESEL GENERATOR AND ESS 2FMR'S LOG

CIRCLE OUT OF SPEC READINGS IN RED AND EXPLAIN BELOW

WEEK: JAN 15 '96		MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY	
PARAMETER/PH		15-01	07-13	19-01	07-13	19-01	07-13	19-01	07-13	19-01	07-13	19-01	07-13	19-01	07-13
ACCEPTANCE CRITERIA		01-57	13-19	01-07	13-19	01-07	13-19	01-07	13-19	01-07	13-19	01-07	13-19	01-07	13-19
CHANNEL CK undervoltage relay: 00545 27B1, 27B2, 27-1, 27-2; Listed on 50-100-008 Att A and Att B	ENTER SAT in 1,2,3,4,5 with: • No targets with power on bus or • Targets up with 80 power on bus or • 'E' DG not aligned to class 1E system or test facility.	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT
		SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT
INTERCOOLER DRAIN VALVES 034003E AND 034004E	NO DRAINOFF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ESS E JACKET MTR STANDPIPE LEVEL LG 03403E	≥ 1/4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ESS E FUEL OIL DAY TK LEVEL (LG-03478E)	> 58"; Full IAW OP-023-001	> 58"	> 58"	> 58"	> 58"	> 58"	> 58"	> 58"	> 58"	> 58"	> 58"	> 58"	> 58"	> 58"	> 58"
125V DC BAT. RM, EXH. FAH	OPERATING	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
125V DC CHARGER (00598)	133 ± 1V FLOAT 141 to 144 EQUALIZE*	134	134	134	134	134	134	134	134	134	134	134	134	134	134
125V DC CHARGER (00598)	< 200 amps	14	14	14	14	14	14	14	14	14	14	14	14	14	14
PANEL DC577E ALARM TEST	Reflash in Control Room at Panel DC653	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ESS E AIR DRYER PREFILTER OF-520ES PETCOCK	BLOWDOWN	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

(1) CR 95-0767 - Panel DC577E no reflash to CR on loss of power.

• If outside limit, INFORM Shift Supervision to notify electrical maintenance, PLACE battery in float.

COMMUNICATIONS: NPO ROUNDS

- *Communication of the New Alarm Test Requirement Was Clear*
 - The Rounds Sheet Is Clear
- *NPC's Were Trained On How To Do Rounds*
 - Initial Training
 - Continuing Training
 - Classroom
 - On the Job Training
- *The Requirements Were Clear In Operations Procedures*

INVESTIGATION RESULTS: NPO ROUNDS

- *The Pattern of Alarm Testing Indicates:*
 - Many NPO's Performed the Test Without Error
 - Some NPO's Performed the Test on Almost All Occasions; Their Few Misses Were Attributed to Human Error
 - Some NPO's Did Not Perform the Test Initially, But Once They Commenced Testing, They Performed it Consistently
 - Some NPO's Appeared to Understand the Requirement But Failed to Perform it on Numerous Occasions

INVESTIGATION RESULTS: NPO ROUNDS

- *Investigation Results*
 - Some NPO's Didn't Do Rounds Properly
 - Operations Supervision Didn't Identify and Correct NPO Performance Deficiency

CORRECTIVE ACTIONS: NPO ROUNDS

- *We Applied Company Policies on Performance Deficiencies*
 - » Letter in File
 - » Decision Making Days Off
 - » Termination
- *We Restressed Our Expectations With the NPO's*

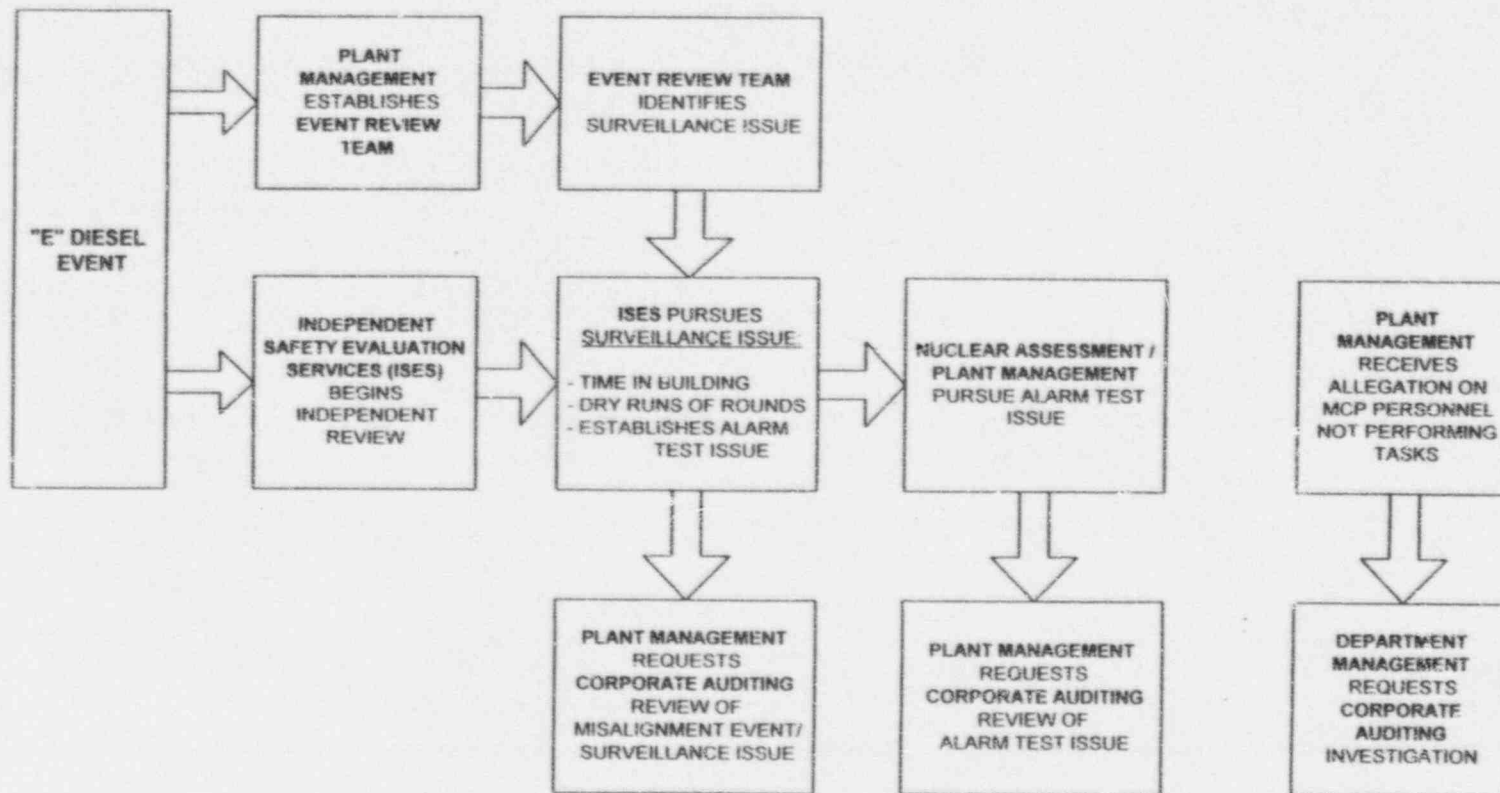
SAFETY SIGNIFICANCE: NPO ROUNDS

- *Safety Significance*
 - Actual Safety Significance Was Minimal
 - » The Alarm Test Was Not Safety Significant
 - Potential Safety Significance Existed
 - » Failure to Perform Rounds Properly Could Contribute to Undiscovered Degradation

OUTLINE

- *General Manager - SSES Perspective*
- *Core Spray Containment Isolation Valve*
- *Standby Liquid Control Heat Trace*
- *“E” Diesel Generator*
 - NPO Rounds
 - ➡ – Operations Shift Supervision
 - Improvements in Operations Management and Supervision

INVESTIGATION SEQUENCE: "E" DIESEL GENERATOR



SUPERVISION ISSUE: PP&L EXPECTATIONS

- *PP&L Expects Operations Supervisors to Follow All Department Procedures. During Off-hours, the Shift Supervisor is the Senior Management Person Onsite, and as Such, is Expected to Exercise Judgment on Many Issues. If the Shift Supervisor Determines That He is Unable to Meet a Requirement, He is Expected to Provide Documentation and Inform Management.*

SHIFT SUPERVISION ISSUE

- *Identified Through Our Internal Processes*
- *Aggressively, Broadly, and Independently Investigated*
- *Some Supervisors Failed to Meet Management Expectations for Performance of In-Plant Monitoring Functions*
 - Shift Supervisor General Station Inspection (GSI)
 - Assistant Unit Supervisor Monitoring of NPO Rounds

SUPERVISORY TASKS

- *General Station Inspections (GSI's)*
 - To Be Performed by Shift Supervisors on Night Shift
 - Specific Acceptance Criteria Not Documented
 - » Expectation Was That GSI's Included Areas Outside the Control Room for a Reasonable Period of Time
- *Monitoring of NPO Rounds*
 - To Be Performed by Assistant Unit Supervisors During NPO Rounds

INVESTIGATION RESULTS: SUPERVISION ISSUE

- *Independent Investigation Results*
 - A Difference in Understanding Existed Between Operations Management and Some Shift Supervision
 - Poor Judgment was Exercised by Some Shift Supervisors
 - » Some Individuals Believed They Could Comply With the GSI Requirement Without Leaving the Control Room
 - The Monitoring Activity as Written and Performed Did Not Reflect Management Expectations

CORRECTIVE ACTIONS: SUPERVISION ISSUE

- *We Applied Company Policies on Performance Deficiencies*
 - Letter in File
 - Severance
- *GSI's*
 - Senior Nuclear Management Restressed Our Performance Expectations With Shift Supervisors
- *Monitoring Activity*
 - We Restressed Management Expectations With the AUS's

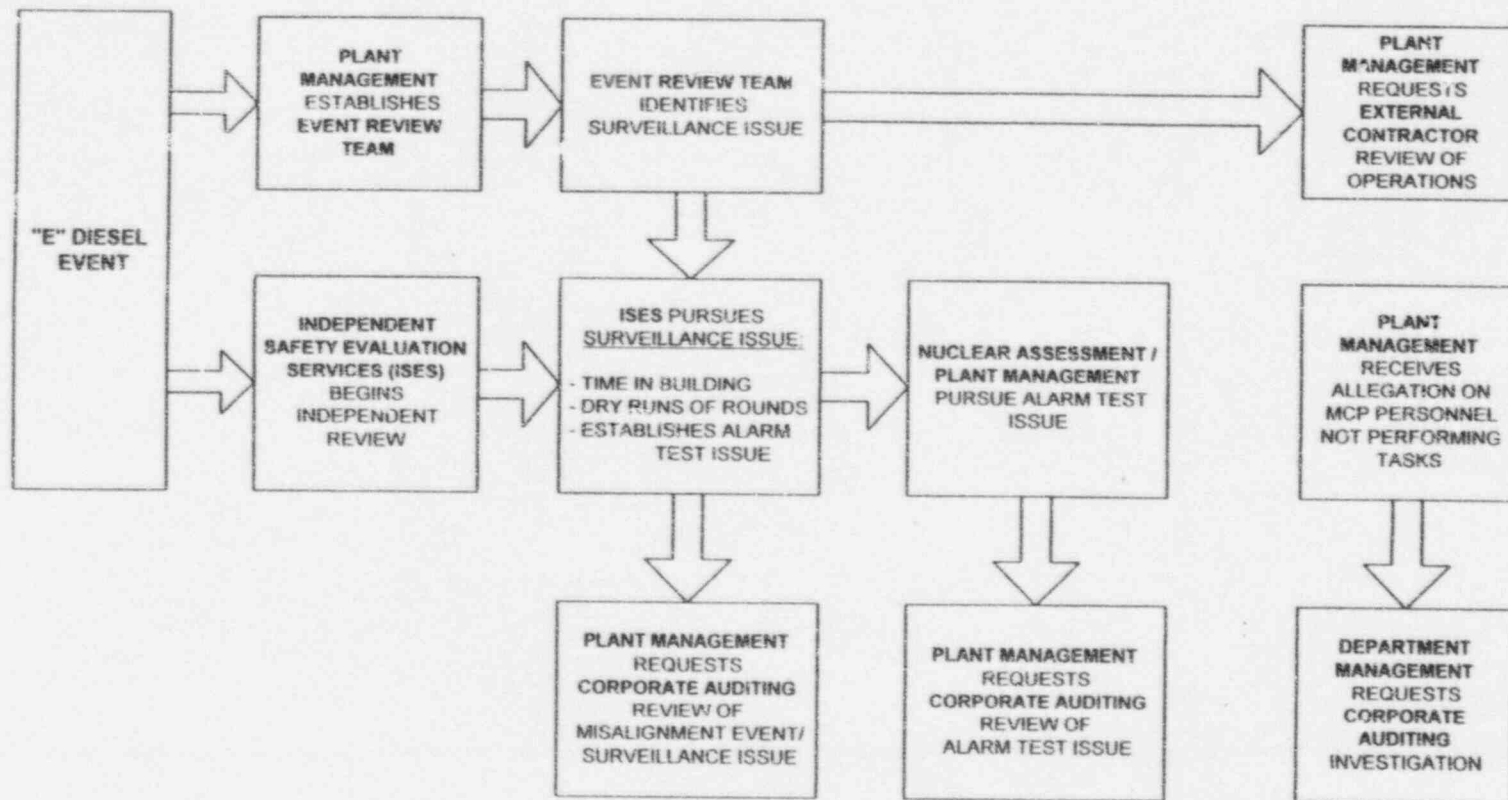
SAFETY SIGNIFICANCE: SUPERVISION ISSUE

- *Safety Significance Was Minimal*
 - Most GSI's and Monitoring Activities Were Done Properly
 - The Plant Condition Was Not Compromised
 - The Ability to Detect and Mitigate a Transient Was Not Compromised

GENERIC IMPLICATIONS REVIEW: OVERALL PERFORMANCE OF ROUNDS

- *Overall Performance of Rounds*
 - 125,000 Items Observed
 - » All Station Work Groups
 - Operations
 - Security
 - Health Physics
 - Firewatch
 - Maintenance
 - » Performance Met Expectations

INVESTIGATION SEQUENCE: "E" DIESEL GENERATOR



OUTLINE

- *General Manager - SSES Perspective*
- *Core Spray Containment Isolation Valve*
- *Standby Liquid Control Heat Trace*
- *“E” Diesel Generator*
 - NPO Rounds
 - Operations Shift Supervision
 - ➔ – Improvements in Operations Management and Supervision

IMPROVEMENTS IN OPERATIONS MANAGEMENT & SUPERVISION

- *External Assessment*
 - Independent Outside Consultant
 - Interviewed 125 People in Operations
 - Focused on Organization/Management Issues
 - » Communications
 - » Roles & Responsibilities
 - » Environment

IMPROVEMENTS IN OPERATIONS MANAGEMENT & SUPERVISION

- *External Assessment: Identified Strengths*
 - Competent, Committed People
 - Good Material Condition
 - Good Procedures
 - Good Plant Operation
 - Ease of Raising Issues

IMPROVEMENTS IN OPERATIONS MANAGEMENT & SUPERVISION

- *External Assessment: Identified Concerns*
 - Work Management
 - Communications
 - Feedback on Performance
 - Clarity of Expectations
 - Self Assessment Practices

IMPROVEMENTS IN OPERATIONS MANAGEMENT & SUPERVISION

- *Ongoing Improvement Initiatives*
 - We Adjusted the Work Management Structure
 - » Enforced Schedule Discipline
 - » Increased the Manning of Work Control Center
 - Supervisory Roles and Expectations
 - » We Are Refocusing the Roles of Operations Management and Shift Supervision to Emphasize:
 - Communications
 - Handling Issues and Concerns
 - Time in the Field
 - Performance Feedback
 - Expectations
 - Assessment

IMPROVEMENTS IN OPERATIONS MANAGEMENT & SUPERVISION

- *Future Improvement Initiatives*
 - Unit Supervisor Rotations Between the Control Room and the Field
 - We Requisitioned Additional Senior Reactor Operators On-Shift to Enhance:
 - » Work Management Interface
 - » Communication
 - » Field Oversight and Immediate Feedback
 - » Assessment of Field Operations

GENERAL MANAGER - SSES PERSPECTIVE

- *We've Reviewed Our 1996 Performance*
 - Fewest Operating Transients Ever
 - Equipment Performance Was Excellent
 - Generation Was at a Record Level
- *Event Investigations Have Been Broad, Comprehensive, and Intrusive*
- *The "E" Diesel Generator Event Was An Emotional Event For The Station, and Especially For Operations*
- *We Have Improved Performance*
 - Individuals
 - Management Oversight
 - Independent Assessment

ASSESSMENT OUTLINE

- Overview of PP&L Self-Assessment
- Response to NRC Information Notice 92-30
- Assessment Response to E-Diesel Event
- Insights
- Improvements in Assessment Practices
- Conclusions

PP&L ASSESSMENT MATRIX

	CONTINUOUS	PERIODIC	PREVENTIVE	CORRECTIVE
INDIVIDUALS & WORK GROUPS	<ul style="list-style-type: none"> a. Shift turnover review b. Alertness to anomalies c. STAR d. 200% accountability at interfaces e. Employee Safety Program 	<ul style="list-style-type: none"> a. Goals status reporting b. Employee development program c. DACUM (STCP-QA-112) d. Training Curriculum Committees (STCP-QA-111) 	<ul style="list-style-type: none"> a. Tailboard conferences b. 50.59 safety evaluations c. Job completion walkdowns d. Independent (Design) verification e. Pre & Post job ALARA Review 	<ul style="list-style-type: none"> a. Troubleshooting b. Post-event tailboards c. Root cause analyses
SUPERVISION & MANAGEMENT	<ul style="list-style-type: none"> a. MBWA (management by walking around) b. Field supervision c. Coaching & counseling d. Review of logs & test results e. Maintenance self-assessment program f. Radiological Evaluation Program (NEIM-00-1070). 	<ul style="list-style-type: none"> a. Employee Performance Reviews b. Pre-SALP & pre INPO Review c. Performance indicator review d. Process re-engineering e. Plant tours f. ERC g. Station ALARA Committee 	<ul style="list-style-type: none"> a. Contingency planning b. Outage readiness assessment c. PORC startup review d. Post outage review 	<ul style="list-style-type: none"> a. License Event Review b. Condition Report event reviews c. Post-evolution critiques d. SRC review of plant events e. Response to NRC Notice of Violation f. Response to Audit Findings
INDEPENDENT	<ul style="list-style-type: none"> a. QA Surveillances b. QC Inspections c. QC In-Process Corrected Error Program d. Condition Report Program e. ISES Oversight 	<ul style="list-style-type: none"> a. QA Audits b. ISES Surveillances c. SRC Reviews 	<ul style="list-style-type: none"> a. QA Observations b. QA Recommendations c. NAS Assessments 	<ul style="list-style-type: none"> a. ISES Investigations b. Condition Report Program
EXTERNAL	<ul style="list-style-type: none"> a. NRC Inspector routine inspections 	<ul style="list-style-type: none"> a. NRC SALP b. INPO Evaluation: c. PUC Audit 	<ul style="list-style-type: none"> a. NRC review of safety evaluation involving an Unreviewed Safety Question b. NRC review of Tech Spec. Change Request 	<ul style="list-style-type: none"> a. NRC Augmented Inspection Team b. Notice of Violations

PP&L

INDEPENDENT ASSESSMENT

	CONTINUOUS	PERIODIC	PREVENTIVE	CORRECTIVE
INDEPENDENT	QA Surveillances QC Inspections QC ICE Program CR Program ISES Oversight	QA Audits ISES Surveillances SRC Reviews	QA Observations QA Recommendations NAS Assessments	ISES Investigations CR Program

RESPONSE TO NRC IN 92-30

- Station Personnel Were Briefed on IN 92-30
- QA Surveillance Per IN 92-30 Verified Logged Entries March - June, 1992
- QA Surveillances Per IN 92-30 Quarterly 92Q3 to Date Verified Logged Entries
- QA Surveillances Evaluated Adequacy of Operator Rounds
- QA Audits Evaluated Operator Rounds Logs

RESPONSE TO NRC IN 92-30

- These Assessments Were *Necessary* to Confirm That
 - Security Entries Were Made As Required
 - Logs Were Completed As Required
 - Operators Performed Well (Under Observation)
- But, They Were *Not Sufficient*
- A More Questioning Approach Could Have Detected The NPO Performance Issue

ASSESSMENT RESPONSE TO E-DIESEL EVENT

- ISES Investigation Determined
 - Certain Entries Were Too Short to Perform Rounds & Surveillance Tasks
 - Certain Logs Showed OC577E Alarm Check Not in Plant Computer Record
 - The Same NPO's Had Short Entry Durations & Missed Alarm Checks
 - Interviews Were Required to Explain Data
 - » Recommended Corporate Auditing Investigation

ASSESSMENT RESPONSE TO E-DIESEL EVENT

- Operations Management Oversight and QA Surveillance
 - 24-Hour Coverage for 50 Days
 - 247 Evolutions Observed
 - Random Observations of All Non-Licensed Operator Positions
 - Observed Every NPO and ASO on Shift During Period
 - Principal Focus on Operator Rounds

ASSESSMENT RESPONSE TO E-DIESEL EVENT

- QA Real-Time Surveillances of Operator Rounds
 - Weekly Unannounced Observations Thru EOY
 - Observed NPO's, ASO's, and AUS's
 - Questioned Those Observed On
 - » Management Expectations
 - » Procedures
 - » Bases
 - » Duties
 - And Provided Immediate Feedback

ASSESSMENT RESPONSE TO E-DIESEL EVENT

- QA Surveillance of Security Entries Vs. Documentation Logs
 - Involved 125,000 Individual Tasks
 - » Operations
 - » Maintenance
 - » Fire Watch
 - » Security
 - » Health Physics
 - Performance Met Expectations

ASSESSMENT RESPONSE TO E-DIESEL EVENT

- Operations Management Assessment
 - Independent Outside Consultant
 - Interviewed 125 People in Operations
 - Focused on Organization/Management Issues
 - » Communications
 - » Roles & Responsibilities
 - » Environment

ASSESSMENT RESPONSE TO E-DIESEL EVENT

- ISES 1996 Operations Surveillance
 - 24-Hour Surveillance for 4 Days During Unit 1 Shutdown
 - Involved 6 Nuclear Assessment Personnel, 1 Training Person, & 2 Industry Peers
 - 164 Hrs in Control Room, 182 Hrs in Plant
 - CONCLUSION: Operations Conducted in Safe, Professional Manner

INSIGHTS

- Be More “Skeptical”
- Increase QA Surveillances of Remote, Infrequent, or High Risk Activities
- Increase Use of Intrusive Techniques Including Attention on Supervision
- Escalate Issues More Quickly
- Apply More “Preemptive” Techniques
- Increase Comparison To Industry Best Practices

IMPROVEMENTS IN ASSESSMENT PRACTICES

- More Skeptical
 - Security Entry Times Are Analyzed
- More QA Surveillance
 - Added QA Contractors During Outage
- More Intrusion
 - Questioning Workers
 - » About Performance
 - » About Supervision
 - Questioning Management
- Quicker Escalation
 - Trend Condition Reports at Next Higher Significance Level

IMPROVEMENTS IN ASSESSMENT PRACTICES

- More Preemptive Assessments
 - QC Work Group Briefings on Precursors
 - ISES Investigation of Plant Material Problems
 - Worker Performance Checklists
- Increased Comparisons to Industry Best Practices
 - NAS Assessment Reports Since 96Q3

CONCLUSIONS

- “E” Diesel Event Led to Recognition of NPO Performance Deficiencies
- This Produced An Assessment of Our Independent Oversight Functions
- This Assessment Identified Opportunities for Improvement
- NAS Independent Assessment Practices Have Been Improved

SUMMARY

- *We Have Responded Aggressively to the Issues and We Are Implementing Valuable Lessons Learned.*
 - Our Actions Are Directed At Improving Long Term Performance
 - » We Have Strengthened Management and Supervisory Oversight
 - » We Have Implemented Improved Assessment Practices
 - » We Have Addressed Individual Performance Issues, Reinforced Our Expectations, and Verified That They Are Being Met