

MAY - 8 1992

Docket No. 50-458
License No. NPF-47

Gulf States Utilities
ATTN: James C. Deddens
Senior Vice President (RBNG)
P.O. Box 220
St. Francisville, Louisiana 70775

Gentlemen:

SUBJECT: MEETING SUMMARY

This refers to a meeting conducted at the licensee's request at the River Bend Station on April 20, 1992. This meeting related to activities authorized by NRC License NPF-47 for the River Bend Station and was attended by those on the attached Attendance List.

The subjects discussed at this meeting are described in the enclosed Meeting Summary.

It is our opinion that this meeting was beneficial and has provided a better understanding of the actions you have taken, or that are in progress, to improve your overall fire protection program at the River Bend Station. 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,

Original Signed By:
Thomas F. Gwynn
A. Bill Beach, Director
Division of Reactor Projects

Enclosure:
Meeting Summary w/attachments

cc w/enclosure:
Gulf States Utilities
ATTN: J. E. Booker, Manager-
Nuclear Industry Relations
P.O. Box 2951
Beaumont, Texas 77704

RIV:TPS*
ASingh
/ /92

C:TPS*
JEGagliardo
/ /92

D:DRS
SJCcollins
5/6/92

DRP
ABBeach
5/6/92

*previously concurred

9205150108 920508
PDR ADOCK 05000458
Q PDR

LEO
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Gulf States Utilities

-2-

Winston & Strawn
ATTN: Mark J. Wetterhahn, Esq.
1401 L Street, N.W.
Washington, D.C. 20005-3502

Gulf States Utilities
ATTN: Les England, Director
Nuclear Licensing
P.O. Box 220
St. Francisville, Louisiana 70775

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P.O. Box 94095
Baton Rouge, Louisiana 70804-9095

H. Anne Plettinger
3456 Villa Rose Drive
Baton Rouge, Louisiana 70806

President of West Feliciana
Police Jury
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St. Francisville, Louisiana 70775

Cajun Electric Power Coop. Inc.
ATTN: Philip G. Harris
10719 Airline Highway
P.O. Box 15540
Baton Rouge, Louisiana 70895

Hall Bohlinger, Administrator
Radiation Protection Division
P.O. Box 82135
Baton Rouge, Louisiana 70884-2135

bcc to DMB (IE01)
bcc distrib. by RIV:

R. D. Martin
DRP

Lisa Shea, RM/ALF
DRSS-RPEPS
Project Engineer (DRP/C)
DRS

Senior Resident Inspector, Fort Calhoun

A. Singh
J. E. Gagliardo

Resident Inspector
Section Chief (DRP/C)

MIS System
RSTS Operator
RIV File

Senior Resident Inspector, Cooper

D. L. Basdekas, Research (MLS-314)

Gulf States Utilities

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MEETING SUMMARY

Licensee: Gulf States Utilities

Facility: River Bend Station

License No. NPF-47

Docket No. 50-458

SUBJECT: MEETING TO DISCUSS THE RESULTS OF THE FIRE PROTECTION INSPECTION
CONCERNING THERMO-LAG

On April 20, 1992, representatives of Gulf States Utilities met with NRC personnel at the River Bend Station offices to discuss the results of the licensee's response to the NRC fire protection inspection (50-458/92-04). The Attendance List and licensee presentation are attached to this summary. The meeting was open to the public.

The licensee presented the results of their self-assessment evaluation to provide information to the NRC on the actions that have been taken, or that are in progress, to improve the overall fire protection program at the River Bend Station.

Attachments:

1. Attendance List
2. Licensee Presentation

ATTENDANCE LIST

Attendance at the Gulf States Utilities and NRC management meeting April 20, 1992, at the River Bend Station Offices.

GULF STATES UTILITIES

J. Deddens, Senior Vice President
P. Graham, Plant Manager, River Bend Station
W. Odell, Manager, Oversight
L. England, Director, Nuclear Licensing
K. Suhrke, General Manager, Engineering and Administration
M. Sankovich, Manager, Engineering Department

Other members of the licensee's staff and licensee contractor personnel attended the meeting.

NRC

D. Chamberlain, Deputy Director, Division of Reactor Safety (DRS)
P. Harrell, Chief, Project Section C, Division of Reactor Projects (DRP)
D. Pickett, Project Manager, River Bend Station, NRR
P. Madden, Senior Fire Protection Engineer, Plant Systems Branch, DST, NRR
A. Singh, Reactor Inspector, Test Programs Section, DRS
E. Ford, Senior Resident Inspector, River Bend Station

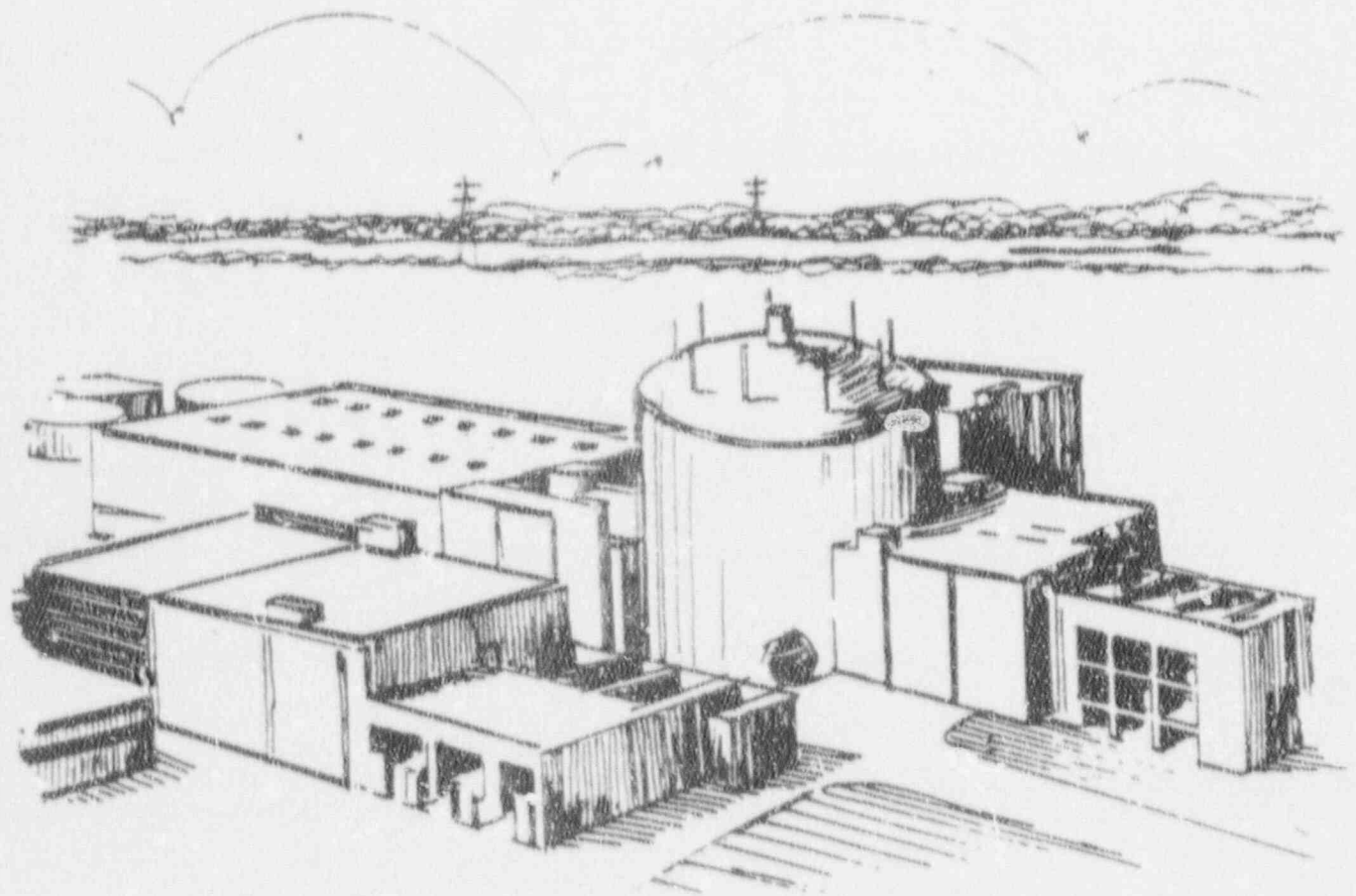
GENERAL PUBLIC

A. Plettinger
V. Planchi
J. Minton

RIVER BEND STATION FIRE PROTECTION PROGRAM

A PRESENTATION TO THE
NUCLEAR REGULATORY
COMMISSION

APRIL 20, 1992



**RBS FIRE PROTECTION PROGRAM
LICENSING BASIS**

**LEIF DIETRICH
SUPERVISOR - NUCLEAR LICENSING**

APRIL 20, 1992

**RBS FIRE PROTECTION PROGRAM
LICENSING BASIS**

**RBS CONSTRUCTION PERMIT APPLICATION DOCKETED
SEPTEMBER 24, 1973**

**NRC LETTER TO GSU DATED SEPTEMBER 30, 1976
PROVIDED APPENDIX A TO BTP APCS 9.5-1**

**APPENDIX A TO BTP APCS 9.5-1, "GUIDELINES FOR FIRE
PROTECTION FOR NUCLEAR POWER PLANTS DOCKETED
PRIOR TO JULY 1, 1976**

APPENDIX 9A TO FSAR

RBS FIRE PROTECTION PROGRAM
LICENSING BASIS

APPENDIX R PUBLISHED ON NOVEMBER 19, 1980 -
APPLIES TO PLANTS LICENSED TO OPERATE BEFORE
JANUARY 1979

RBS OPERATING LICENSE - AUGUST 29, 1985

NRC LETTER TO GSU DATED OCTOBER 20, 1981 REQUESTED
COMPARISON TO APPENDIX R

APPENDIX 9B TO FSAR

NRC SER DATED MAY 1984

ASPECTS OF NRC FIRE PROTECTION REVIEW
(FROM SER)

1. FIRE PROTECTION PROGRAM
2. FIRE HAZARDS ANALYSIS
3. ADMINISTRATIVE CONTROLS
4. FIRE BRIGADE AND FIRE BRIGADE TRAINING
5. BUILDING DESIGN
6. SAFE SHUTDOWN CAPABILITY
7. ALTERNATE SHUTDOWN CAPABILITY
8. CONTROL OF COMBUSTIBLES
9. ELECTRICAL CABLE CONSTRUCTION, CABLE TRAYS, AND CABLE PENETRATIONS
10. VENTILATION
11. LIGHTING AND COMMUNICATION
12. FIRE DETECTION AND SUPPRESSION
13. FIRE PROTECTION WATER SUPPLY SYSTEM
14. SPRINKLER AND STANDPIPE SYSTEMS
15. CO2 SUPPRESSION SYSTEM
16. HALON SUPPRESSION SYSTEM
17. PORTABLE EXTINGUISHERS
18. FIRE PROTECTION OF SPECIFIC PLANT AREAS

**RBS FIRE PROTECTION PROGRAM
LICENSING BASIS**

**NRC INSPECTION APRIL 1-4, 1985; SPECIAL ANNOUNCED
INSPECTION OF THE IMPLEMENTATION OF THE FIRE
PROTECTION PROGRAM AND COMPLIANCE WITH THE
REQUIREMENTS OF 10CFR50, APPENDIX R (SAFE SHUTDOWN)
PER FSAR COMMITMENTS AND SER EVALUATION**

NRC SSER 3 DATED AUGUST 1985:

**"ON THE BASIS OF ITS EVALUATION THE STAFF FINDS
THAT THE APPLICANT'S FIRE PROTECTION PROGRAM
WITH APPROVED DEVIATIONS IS IN CONFORMANCE
WITH THE GUIDELINES OF BTP CMEB 9.5-1, SECTIONS
III.G, III.J, AND III.O OF APPENDIX R TO 10CFR50, AND
GDC 3, AND IS, THEREFORE, ACCEPTABLE."**

**GL 86-10 "IMPLEMENTATION OF FIRE PROTECTION
REQUIREMENTS" ISSUED APRIL 24, 1986**

- APPROVED PROGRAM IN FSAR**
- STANDARD LICENSE CONDITION**

ATTACHMENT 4
TO NPF 47
FIRE PROTECTION PROGRAM REQUIREMENTS

GSU SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS OF THE FIRE PROTECTION PROGRAM:

1. GSU SHALL IMPLEMENT AND MAINTAIN IN EFFECT ALL PROVISIONS OF THE APPROVED FIRE PROTECTION PROGRAM AS DESCRIBED IN THE FINAL SAFETY ANALYSIS REPORT FOR THE FACILITY THROUGH AMENDMENT 22 AND AS APPROVED IN THE SER DATED MAY 1984 AND SUPPLEMENT 3 DATED AUGUST 1985 SUBJECT TO PROVISIONS 2 AND 3 BELOW.
2. GSU MAY MAKE NO CHANGE TO THE APPROVED FIRE PROTECTION PROGRAM WHICH WOULD SIGNIFICANTLY DECREASE THE LEVEL OF FIRE PROTECTION IN THE PLANT WITHOUT PRIOR APPROVAL OF THE COMMISSION. TO MAKE SUCH A CHANGE GSU MUST SUBMIT AN APPLICATION FOR LICENSE AMENDMENT PURSUANT TO 10 CFR 50.90.
3. GSU MAY MAKE CHANGES TO FEATURES OF THE APPROVED FIRE PROTECTION PROGRAM WHICH DO NOT SIGNIFICANTLY DECREASE THE LEVEL OF FIRE PROTECTION WITHOUT PRIOR COMMISSION APPROVAL PROVIDED (A) SUCH CHANGES DO NOT OTHERWISE INVOLVE A CHANGE IN A LICENSE CONDITION OR TECHNICAL SPECIFICATION OR RESULT IN AN UNREVIEWED SAFETY QUESTION (SEE 10 CFR 50.59), AND (B) SUCH CHANGES DO NOT RESULT IN FAILURE TO COMPLETE THE FIRE PROTECTION PROGRAM APPROVED BY THE COMMISSION PRIOR TO LICENSE ISSUANCE. GSU SHALL MAINTAIN, IN AN AUDITABLE FORM, A CURRENT RECORD OF ALL SUCH CHANGES, INCLUDING AN ANALYSIS OF THE EFFECTS OF THE CHANGE ON THE FIRE PROTECTION PROGRAM, AND SHALL MAKE SUCH RECORDS AVAILABLE TO NRC INSPECTORS UPON REQUEST. ALL CHANGES TO THE APPROVED PROGRAM SHALL BE REPORTED TO THE DIRECTOR OF THE OFFICE OF NUCLEAR REACTOR REGULATION, ALONG WITH THE FSAR REVISIONS REQUIRED BY 10 CFR 50.71(e).

APPENDIX R SECTIONS

GENERAL

- FIRE PROTECTION PROGRAM (1)
- FIRE HAZARD ANALYSIS (2)
- FIRE PREVENTION FEATURES (2, 4, 5, 12, 14)
- ALTERNATIVE OR DEDICATED SHUTDOWN CAPABILITY (6, 7)

SPECIFIC

- WATER SUPPLIES FOR FIRE SUPPRESSION SYSTEMS (13)
- SECTIONAL ISOLATION VALVES (13)
- HYDRANT ISOLATION VALVES (13)
- MANUAL FIRE SUPPRESSION (12,15,16)
- HYDROSTATIC HOSE TESTS
- AUTOMATIC FIRE DETECTION (12)
- FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY (6)
- FIKE BRIGADE (4)
- FIRE BRIGADE TRAINING (4)
- EMERGENCY LIGHTING (11)
- ADMINISTRATIVE CONTROLS (3)
- ALTERNATIVE AND DEDICATED SHUTDOWN CAPABILITY (6,7)
- FIRE BARRIER CABLE PENETRATION SEAL QUALIFICATION (5)
- FIRE DOORS (5)
- OIL COLLECTION SYSTEM FOR REACTOR COOLANT PUMPS

(NUMBER IN PARENTHESIS CORRESPOND TO NUMBERS FROM THE "ASPECTS OF NRC FIRE PROTECTION REVIEW" OVERHEAD

Fire Protection Design Basis

April 20, 1992

Anthony J. Mascena, PE.
Fire Protection Engineer
Stone & Webster Engineering Corporation

Fire Protection Design Basis

- Overview
 - Goals and Objectives
 - Defense in Depth
- Impacts due to Browns Ferry
- Use of Thermo-Lag Fire Barriers
- Summation - Adequacy of Plant Design

Goals and Objectives

- Safe Plant Shutdown and Mitigation of Potential Radioactive Releases to the Atmosphere

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Defense in Depth

- Materials of Construction
- Fire Detection Systems
 - Early Warning Products of Combustion Detectors
- Fire Suppression Systems
 - Water
 - Other Agents
- Compartmentalization and Fire Barriers

Impacts Due to Browns' Ferry Fire

Evaluations and Analyses

- Fire Hazards Analyses
- Safe Shutdown Analyses

Plant Design

- Compartmentalization by Thermo-Lag Barriers

Thermo-Lag Fire Barriers Systems

Design Basis

- Enclosures Isolate Division I Cable Trays and Equipment from Fires Affecting Division II
 - Tunnel G
 - Tunnel F
 - Instrument Rack (1JCB*RAK1)
- Transient Fires Limited to Outside of the Enclosures. Only Cable Induced Fires Inside the Enclosures
- Barriers 1 and 2 are rated 1 hour as the area is protected by sprinklers and smoke detectors. Barrier 3 is located in an unsprinklered area, therefore, rated for 3 hours.
- The enclosures are seismically designed and supported.
- The integrity of the barrier construction would be reviewed following any discharge of water from the suppression systems. Thermal-lag material would be replaced as necessary.

RBS Fire Barriers Systems

- Evaluation Process
 - Vendor Qualified Designs
 - Vendor Installation Procedures

- Applications
 - Conduits, Junction Boxes, Small Enclosures
 - Single Cable Trays
 - Multiple Cable Trays

- Qualification of Configurations

- Structural Integrity

- **Qualification of Configurations**
 - **Analogous to TSI's Qualified Fire Wall**
 - **Similarity to Gypsum Board Wall Designs and Installation Practices**

- **Structural Integrity**
 - **Supports Carry Weight of Panels and Suppression System Water**
 - **Takes Seismic Loads**

RBS Fire Barrier Systems

Configurations - Tunnels F and G

Fire Scenarios

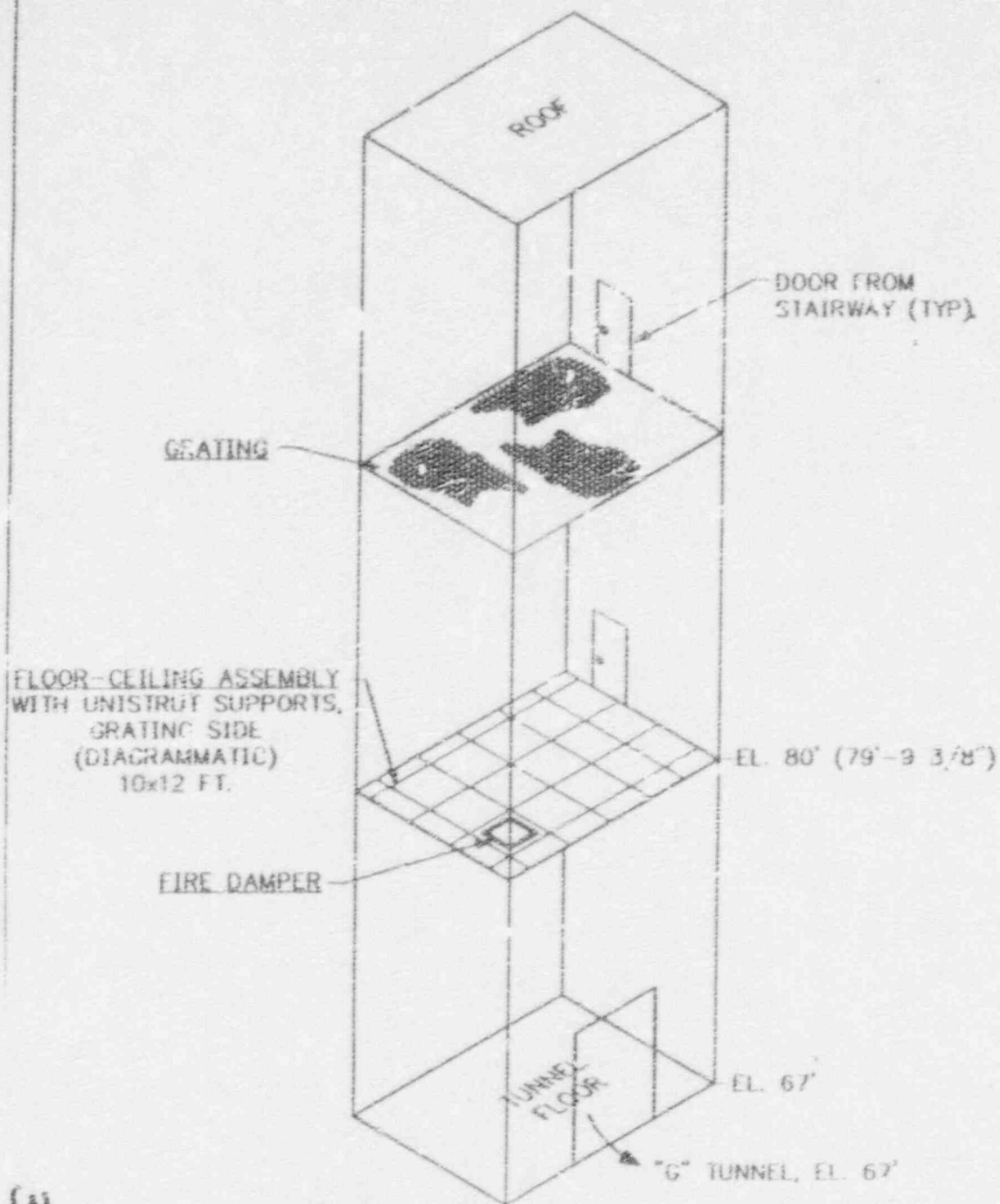
Cable Induced (internal, external)

Transient (external)

Fire Brigade Response

Impacts on Enclosures

Post Event Considerations



FLOOR-CEILING ASSEMBLY

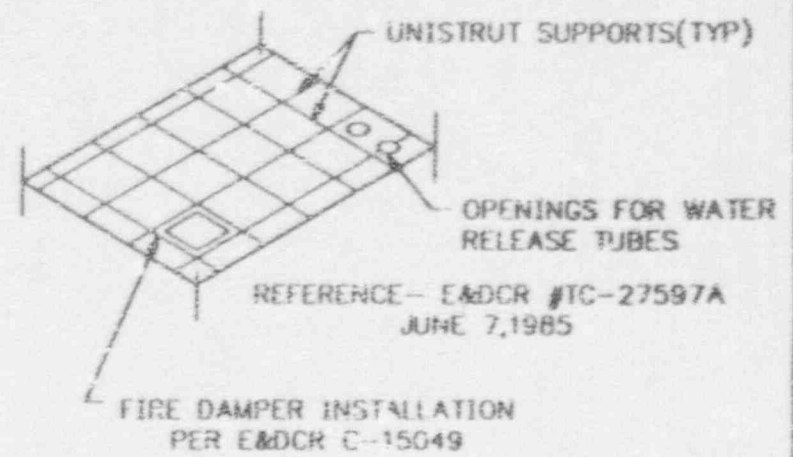


DIAGRAM FOR FLOOR CEILING ASSEMBLY - "G" TUNNEL
DETAILS ON REFERENCED E&DCR (TC-27597A)

River Bend Station
Enclosures
Diagrammatic

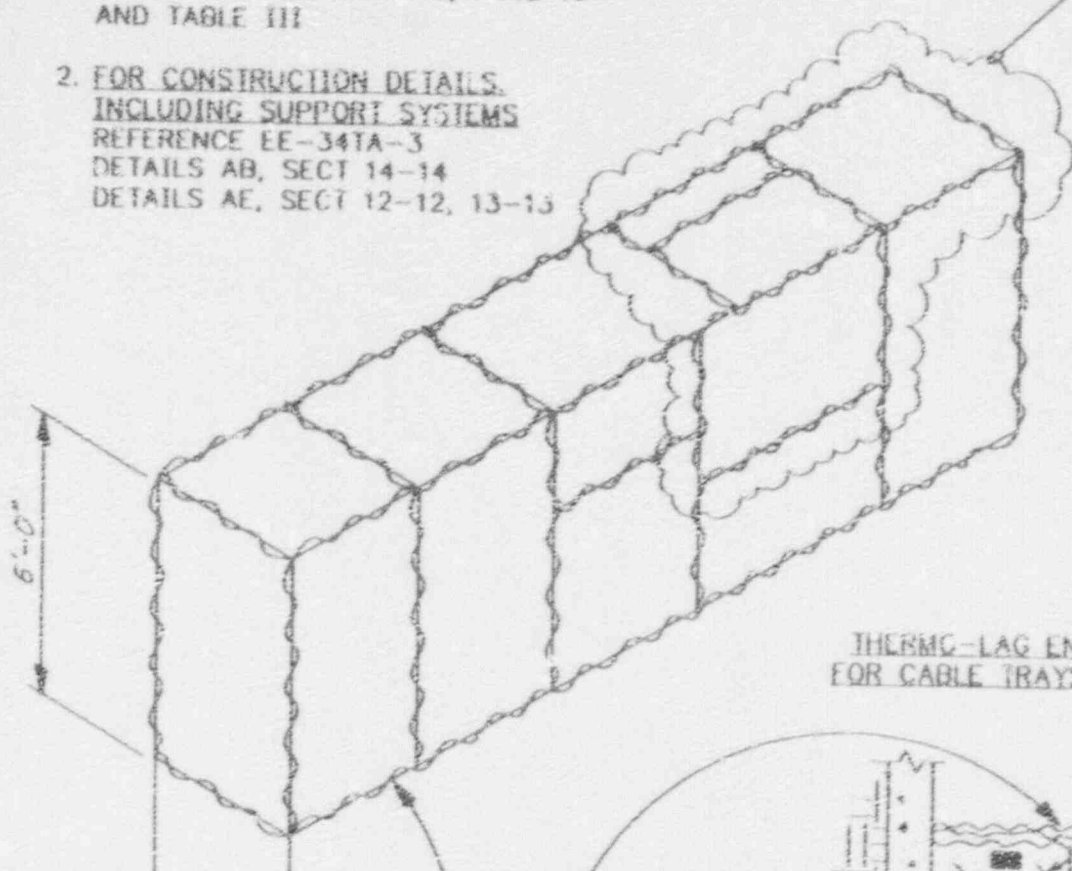
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NOTES:

1. PREFABRICATED PANELS 4'-0" x 6'-6"
REFERENCE - EE-34YA-3, NOTE 10
AND TABLE III
2. FOR CONSTRUCTION DETAILS,
INCLUDING SUPPORT SYSTEMS
REFERENCE EE-34TA-3
DETAILS AB, SECT 14-14
DETAILS AE, SECT 12-12, 13-13

PARTIAL PREFABRICATED PANELS (TYP)
CUT TO FIT AND JOINED AT EDGES
WITH CAULK AND GROUTED SEAMS
USING THERMO-LAG 330-1 TROWEL
GP $\frac{1}{2}$ " FILL (TST FIGURE 8)
REFERENCE - EE-34YA-3
DETAIL AG, TABLE III, DETAIL AD,
SECTION 11-11 AND DETAIL AF

~ ~ ~ = THERMO-LAG 330-1 SUBLIMING
COMPOUND USED TO SEAL ALL
JOINTS, SEAMS, EDGES, ECT. (TYP)

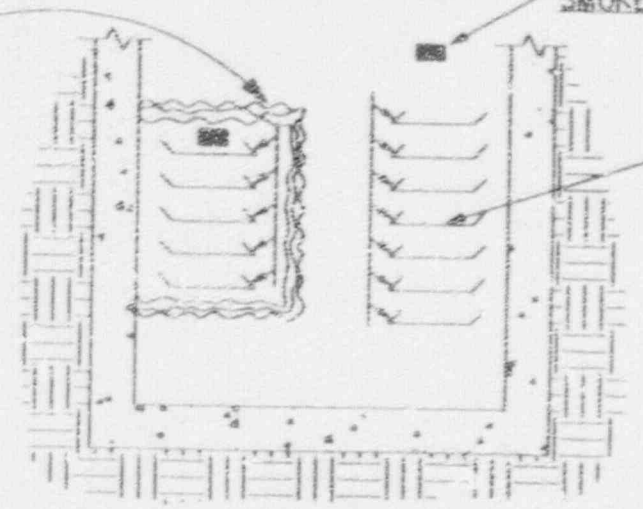


ONE-HOUR FIRE
RATED APPENDIX R
ENCLOSURE OF
THERMO-LAG
PREFABRICATED PANELS

THERMO-LAG ENCLOSURE (VAULT)
FOR CABLE TRAYS - TUNNELS F & G

SMOKE DETECTION (TYP)

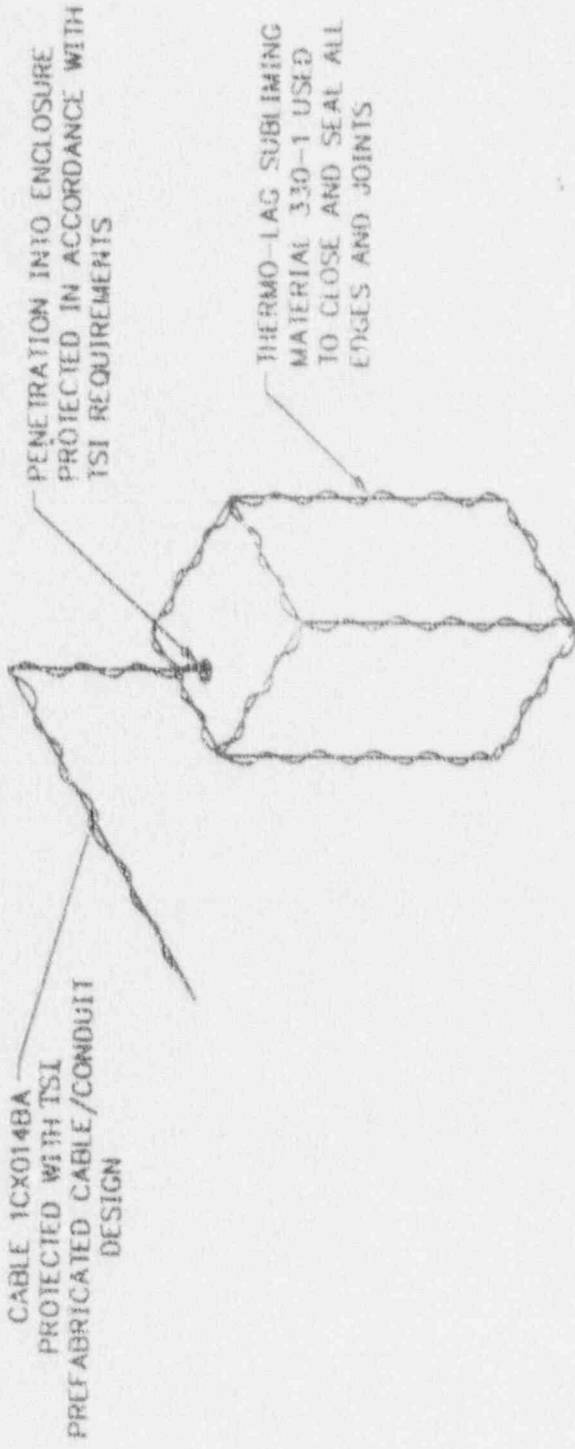
CABLE TRAYS WITH
WATER SPRAY FIRE
PROTECTION (TYP)



SECTION THROUGH TUNNEL
SHOWING TRAYS, SPRINKLERS &
APPENDIX R ENCLOSURE

River Bend Station
Enclosures
Diagrammatic

33



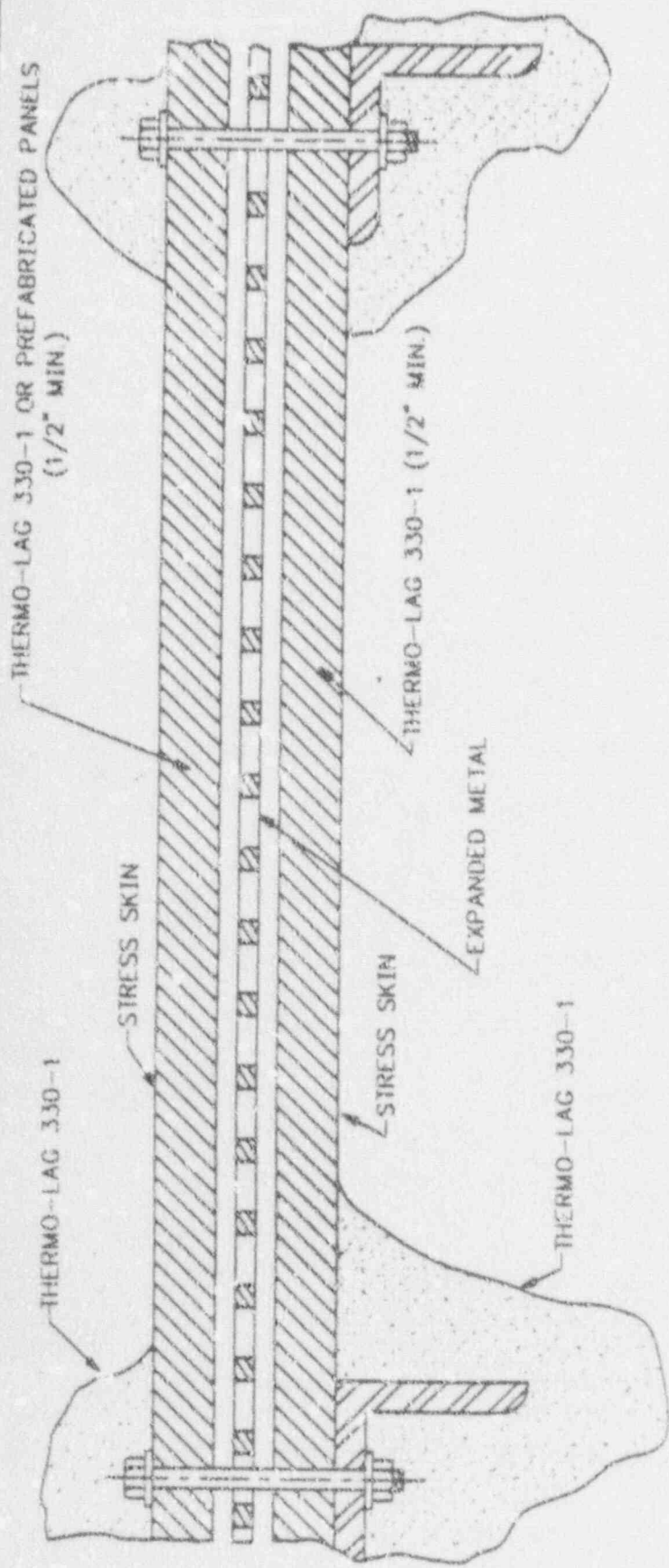
CABLE 1CX014BA
 PROTECTED WITH TSI
 PREFABRICATED CABLE/CONDUIT
 DESIGN

PENETRATION INTO ENCLOSURE
 PROTECTED IN ACCORDANCE WITH
 TSI REQUIREMENTS

THERMO-LAG SUBLIMING
 MATERIAL 330-1 USED
 TO CLOSE AND SEAL ALL
 EDGES AND JOINTS

INSTRUMENT RACK (1XCB*RAK1)
 EL. 98' CONTROL BLDG.
 (4x6x6 FT)

River Bend Station
 Enclosures
 Control Building
 Diagrammatic



TYPICAL BOLTS, NUTS & WASHERS OR OTHER APPROVED FASTENERS



River Bend Station
Three Hour Firewall Assembly
Diagrammatic

Summation

Utilizing the defense in depth concepts, River Bend Station has been designed and erected so that the primary goal of the Fire Protection Program, that is to achieve and maintain safe plant shutdown, has been achieved.

THERMO-LAG

April 20, 1992

Michael A. Stein
Supervisor
Balance of Plant Design Engineering

THERMO-LAG

- RESULTS OF 100% INSPECTION FROM LER 87-005:
 - SEVERAL CRS IDENTIFYING ADDITIONAL MINOR PROBLEMS DURING THE SPRING AND SUMMER OF 1987
 - CR 87-0745: THERMO-LAG PANEL, REMOVED FOR CABLE INSTALLATION, HAS NO STRESS SKIN OR RIBS ON INTERIOR OF ENCLOSURE (JULY 1987):
 - * CONDITION APPEARS TO BE COMMON FOR FUEL BUILDING 3 HR BARRIERS
 - * FIRE WATCHES VERIFIED OR ESTABLISHED FOR FUEL BUILDING
 - * QUALIFICATION OF IN SITU CONDITIONS APPEARED VIABLE BASED ON DISCUSSIONS WITH TSI. DECISION MADE TO PURSUE QUALIFICATION TESTING.

THERMO-LAG

- IDENTIFICATION OF PROBLEMS WITH THERMO-LAG INSTALLATIONS:
 - CR 87-0236A AND LER 87-005 (FEBRUARY 1987):
 - * NUMEROUS MINOR PROBLEMS WITH INSTALLATION OF THERMO-LAG BARRIERS, SEVERAL APPARENTLY FROM INITIAL CONSTRUCTION
 - * FIRE WATCH EITHER VERIFIED OR ESTABLISHED IN AREAS AFFECTED
 - * COMMITMENT IN LER TO PERFORM 100 % INSPECTION OF SURFACE OF THERMO-LAG BARRIERS

THERMO-LAG

- TEST PROCEDURE DEVELOPED WITH TSI FROM AUGUST 1987 TO FEBRUARY 1988, SPECIFICALLY FOR 12 INCH TRAY COVERED WITH THERMO-LAG 330 WITH NO INTERNAL STRESS SKIN OR RIBS.
 - INITIAL TEST PERFORMED ON BARRIER WITH NO INTERNAL STRESS SKIN ON 3/9/88: LOSS OF CONTROL OF FURNACE TEMPERATURE INVALIDATED RESULTS.
 - TEST REPERFORMED ON JULY 29, 1988: TEST FAILED.
- CR 88-0607 AND CR 88-0608 WRITTEN TO VERIFY OR ESTABLISH FIRE WATCHES FOR 3 HR CABLE TRAY BARRIERS IN ALL BUILDINGS.

THERMO-LAG

- EVALUATION OF INSTALLATION IN PLANT MADE REMOVAL AND REPLACEMENT UNDESIRABLE. DECISION TO ATTEMPT FIRE TESTS TO UPGRADE CABLE TRAY BARRIERS.
- CONTRACT INITIATED THIRD QUARTER, 1988 WITH SOUTH WEST RESEARCH (SWRI) TO PERFORM FIRE TESTS ON CABLE TRAY FIRE BARRIER.
 - TEST PROCEDURE DEVELOPED TO TEST SEVERAL UPGRADES TO EXISTING INSTALLATION AS WELL AS TESTING THE ORIGINAL "DESIGN" CONFIGURATION.
 - TEST PLACED ON HOLD IN THE SPRING OF 1989 AFTER DISCUSSIONS WITH TSI. TSI TO RUN "INFORMATIONAL" FIRE TESTS ON TWELVE INCH TRAYS WITH VARIOUS UPGRADES AS WELL AS A FULL QUALIFICATION TEST OF 30 INCH TRAY AT CONSTRUCTION TECHNOLOGIES LABORATORY (CTL).

THERMO-LAG

- INFORMATIONAL TESTS BY TSI (SPRING/SUMMER 1989):

- FAILURE MODE OF 12 INCH TRAY TESTS INDICATE POTENTIAL PROBLEMS WITH ORIGINAL "DESIGN" INSTALLATIONS FOR 30 INCH TRAYS.
- OF THE POTENTIAL UPGRADES DEVELOPED AND TESTED BY TSI, SOME PASS FIRE TEST, SOME FAIL. ALL ARE DIFFICULT TO INSTALL IN FIELD.

- 30 INCH TRAY TEST AT CTL (5/5/89):

TEST ARTICLE CONSTRUCTED BY TSI UNDER THEIR QA PROGRAM.

COMPLETED TEST ARTICLE INSPECTED BY GSU. SEVERAL DIFFERENCES NOTED BETWEEN THE CONSTRUCTION OF THE TEST ARTICLE AND STANDARD CONSTRUCTION DETAILS ALLOWED IN THE TSI INSTALLATION MANUAL.

THERMO-LAG

- BASED ON DIFFERENCES BETWEEN CTL TESTS AND STANDARD INSTALLATION PRACTICES, DECISION MADE TO PURSUE TEST AT SWRI.
 - TEST TO INCLUDE A 30 INCH TRAY INSTALLATION USING STANDARD PRACTICES AS ALLOWED BY TSI MANUAL.
 - TEST TO ALSO INCLUDE A COMPETITORS PRODUCT TO COMPARE BOTH INSTALLATION PROCESS AND FIRE RESISTANCE.
 - TEST ALSO INCLUDED OTHER MISCELLANEOUS PENETRATION SEAL DETAILS.
 - TEST ARTICLE CONSTRUCTED BY GSU TECHNICIANS TRAINED AND CERTIFIED BY TSI.
 - TEST ARTICLE WAS NOT INSPECTED BY TSI.

THERMO-LAG

- TEST AT SWRI COMPLETED ON OCTOBER 26, 1989:
 - THERMO-LAG BARRIER FAILED AT 47 MINUTES INTO THE TEST.
 - ~~CR 89-1144~~ INITIATED TO DOCUMENT TEST FAILURE AND ENSURE THAT ALL AREAS WITH THERMO-LAG HAD FIRE WATCH IN EFFECT.
- EXTENSIVE DISCUSSIONS WITH TSI REGARDING RESULTS OF SWRI TEST:
 - TSI REGARDED THE SWRI TEST INVALID.
 - DETAILED REVIEW BY GSU OF TSI FIRE TESTS YIELDED SEVERAL AREAS OF CONCERN (REFERENCE: INFORMATIONAL REPORT TO THE NRC DATED DECEMBER 1989 AND JANUARY 1990).
 - AGREEMENT BY TSI AND GSU TO JOINTLY PERFORM FIRE TESTS ON THE "IN SITU" INSTALLATIONS AS WELL AS SIMPLIFIED UPGRADES.

THERMO-LAG

- FOUR CONFIGURATIONS TO BE TESTED FOR BOTH ONE HOUR AND THREE HOUR QUALIFICATION.
 - CONDUIT
 - CABLE TRAY
 - UNISTRUT SUPPORT
 - VAULT ENCLOSURE

- DEVELOPMENT OF TEST PROCEDURE OCCURRED FROM MARCH 1990 TO AUGUST 1990.

- TEST ARTICLES WERE CONSTRUCTED IN SEPTEMBER AND OCTOBER 1990.

- TESTING WAS PERFORMED IN NOVEMBER 1990.

THERMO-LAG

SUMMARY OF IN-SITU TEST RESULTS

TEST ARTICLE	TEST TYPE	RESULT
CONDUIT	1 HR	FAIL
CONDUIT	3 HR	FAIL
CABLE TRAY	1 HR	FAIL
CABLE TRAY	3 HR	FAIL
SUPPORT	1 HR	PASS
SUPPORT	3 HR	PASS
VAULT	1 HR	PASS
VAULT	3 HR	FAIL

THERMO-LAG

- BASED ON THE RESULTS OF THE IN-SITU TESTS, UPGRADE TESTS PROCEEDED.
- TESTS WERE CONDUCTED ON ONLY THOSE CONFIGURATIONS WHICH FAILED THE IN-SITU TESTS.

SUMMARY OF UPGRADE TEST RESULTS

TEST ARTICLE	TEST TYPE	RESULT
CONDUIT	1 HR	PASS
CONDUIT	3 HR	PASS
CABLE TRAY	1 HR	PASS
CABLE TRAY	3 HR	FAIL
VAULT	3 HR	PASS

- ADDITIONAL UPGRADE CONFIGURATION WAS TRIED FOR CABLE TRAY WITH A THREE HOUR RATING BUT WAS NOT SUCCESSFUL.

THERMO-LAG

- ALTERNATE PRODUCT SELECTED FOR THREE HOUR CABLE TRAY.
 - AMPACITY REVIEW: PRELIMINARY RESULTS INDICATE THAT SOME CABLES MUST BE RELOCATED OR RESIZED.
 - STRUCTURAL REVIEW REQUIRED.
- STUDY OF COST OF IMPLEMENTING THERMO-LAG UPGRADES VS NEW PRODUCT FOR OTHER CONFIGURATIONS.
 - THERMO-LAG UPGRADE MORE ECONOMICALLY DESIRABLE.
 - DUE TO CONCERNS RELATED TO NRC INVESTIGATION OF TSI, WORK HAS STOPPED ON IMPLEMENTING UPGRADES.
 - ADDITIONAL AMPACITY AND STRUCTURAL REVIEWS REQUIRED PRIOR TO IMPLEMENTING UPGRADE.
- FINAL SCHEDULE DEPENDENT ON RESULTS OF REVIEWS AND ACTIONS TAKEN BY THE NUMARC AD HOC COMMITTEE.

THERMO-LAG

STRUCTURAL INTEGRITY OF THERMO-LAG

- AREAS IDENTIFIED BY NRC WHERE DAMAGE APPEARED TO HAVE OCCURRED DUE TO ASSUMED SPRINKLER ACTUATION.
 - INTERNAL INSPECTION OF BARRIER SHOWS NO EVIDENCE OF DAMAGE.
 - WATER FROM APPARENT FLANGE LEAKAGE ABOVE ENCLOSURE.
 - APPARENT DAMAGE ON EXTERIOR OF BARRIER ACTUALLY LEACHING OF TROWEL GRADE MATERIAL ONLY.
 - STRUCTURAL CAPACITY OF BARRIER NOT AFFECTED.
 - TROWEL GRADE MATERIAL TO BE REAPPLIED AT JOINTS.

THERMO-LAG

ELECTRICAL CABLE AMPACITY DERATING

- ORIGINAL AMPACITY DERATING BASED ON TSI LETTER TO SWEC DATED 7/5/85.
- SWEC RECEIVED MAILGRAM FROM TSI DATED 10/2/86.
 - MAILGRAM IDENTIFIED POTENTIAL CHANGE TO AMPACITY DERATING BASED ON PRELIMINARY UL TEST RESULTS.
 - TSI INDICATED THAT FINAL VALUES WOULD BE PROVIDED (FINAL VALUES NEVER IDENTIFIED BY TSI).
 - SWEC EVALUATED POTENTIAL CHANGES TO ORIGINAL AMPACITY CALC AND CONCLUDED THAT SUFFICIENT MARGIN EXISTED TO ACCOMODATE THE POTENTIAL CHANGE.
 - BASED ON THE EVALUATION, A DECISION WAS MADE TO REVISE CALCULATION E-218 ON RECEIPT OF FINAL DERATING FACTORS.

THERMO-LAG

FIRE TEST ACCEPTANCE CRITERIA

- NRC IDENTIFIED CONCERN ABOUT COLD SIDE TEMPERATURE ACCEPTANCE CRITERIA USED IN FIRE TESTS.
 - GENERIC LETTER 86-10 STIPULATES 250°F PLUS AMBIENT OR 325°F MAXIMUM.
 - TESTS FOR THERMO-LAG USED 325°F PLUS AMBIENT.
- GSU BASIS FOR USE OF 325°F PLUS AMBIENT:
 - USAR SECTION 9B.4.13 IDENTIFIES ACCEPTABLE COLD SIDE TEMPERATURE FOR **PENETRATION SEALS** AS 325°F PLUS AMBIENT (ACCEPTED IN SER).
 - **CRITERIA FOR PENETRATION SEALS AND FIRE BARRIERS** SHOULD BE THE SAME BASED ON SECTION 5.A.3 OF BTP CMEB 9.5-1.
 - DEGRADATION OF CABLE JACKET INSULATION ON IEEE 383 RATED CABLE DOES NOT BEGIN UNTIL 450°F.

THERMO-LAG

CONCLUSIONS

- GSU HAS BEEN PROACTIVE IN IDENTIFICATION AND PURSUIT OF RESOLUTION OF THERMO-LAG PROBLEMS.
- COMPENSATORY ACTION HAS BEEN IMPLEMENTED FOR ALL AREAS WITH THERMO-LAG.
- UPGRADES OR ALTERNATE MATERIAL NEEDED TO FULLY QUALIFY FIRE BARRIER INSTALLATIONS.
- FINAL RESOLUTION OF THERMO-LAG ISSUES TIED TO NUMARC AD HOC COMMITTEE ACTIONS OF WHICH GSU IS AN ACTIVE MEMBER.
- RESOLUTION OF PROBLEM IS COMPLEX AND TIME CONSUMING.
- UNTIL ISSUES ARE RESOLVED, THERMO-LAG IN ITS CURRENT CONFIGURATION COMBINED WITH THE OVERALL FIRE PROTECTION PROGRAM PROVIDES A SUBSTANTIAL LEVEL OF PROTECTION WHICH ASSURES BEING ABLE TO SAFELY SHUT DOWN THE PLANT.

Fire Hazards Analysis

John R. Hamilton
Director, Design Engineering

April 20, 1992

Goals

Verify the Safe Shutdown Methodology

Verify that procedures correctly implement the methodology

Improve Documentation of Design Bases

Improve Training

INDEPENDENT REVIEW

Review was thorough and detailed

Safe shutdown methodology was verified correct

A few analysis assumptions had not been implemented

Documentation improvements are needed

Review and resolution has significantly increased the knowledge of GSU Engineering and Operations

FHA Review - Reportable Conditions (LER 91-008, Supp 1)

Description	Resolution	Action
Lack of Fire Wrap for RCK Cables In Four Fire Areas	HPCS Available	Revise PreFire Strategies (Complete)
Lack of Separation of 30FT Horizontal Separation For Containment Unit Cooler Cables	Install Barrier	To Be Completed in RF-4
Lack of Electrical Separation For Spent Fuel Cooling System	<ul style="list-style-type: none"> - Interim: Isolates one SFC Group by Admin Control - Long Term: Revision to Licensing Basis 	<ul style="list-style-type: none"> - AOP 31 Revised (Complete) - 10CFR50.90 Submittal (Cycle 5)
Lack of Electrical Separation For Fuel Building Ventilation System	<ul style="list-style-type: none"> - Interim: Proceduralize manual actions - Long Term: Revision to Licensing Basis 	<ul style="list-style-type: none"> - PreFire Strategies Revised (Complete) - 10CFR50.90 Submittal (Cycle 5)
Fire Area in Northeast Corner of D Tunnel Not Addressed in FHA	HPCS Available	Prepare PreFire Strategy (Complete)

Results of FHA Review

- 6 Reportable Conditions (LER 91-008 Supp 1)
- 9* Missing or Incorrect Manual Actions in Prefire Strategies
- 2 Additions to Design and Licensing Basis
- 30 Improved documentation
- 23 Correct Inconsistencies in Documents
- 36 No Action required

* 4 reportable (LER 91-008 Supp 1)

Scope of FHA Improvements

<u>Task</u>	<u>Status</u>
Review & Verification of FHA	Complete
Resolution of discrepancies	Scheduled
Additions to Design & Licensing Base	
Breaker - Fuse Coordination Study	10/30/92*
Multiple High Impedance Fault procedure	RF-4
Documentation Improvements	
Revision of FHA	10/30/92
Safe Shutdown Data Base	10/30/92
Procedure Changes	
Update of prefire strategies	RF-4
AOP for fire outside Main Control Room	RF-4
Review of Modification Requests	06/30/92
Implement FHA Training Program	09/30/92

*Completion of action items resulting from the study may be scheduled later.

Fire Hazards Analysis Goals are being Achieved

Safe Shutdown Methodology has been verified

Implementation of FHA in procedures is nearing completion

Improved documentation in progress

Training program being developed and will be included in training program

- o 3000 PENETRATION SEALS
- o 100% INSPECTION BEGAN 2/91
- o NFW DESIGN CRITERIA
 - BASED ON APPROVED FIRE TESTS
 - MORE STRINGENT
- o NO GROSS FAILURES IDENTIFIED
- o 72% REQUIRE EVALUATION
 - TECHNICAL/CONFIGURATION DISCREPANCIES,, 90% EXPECTED TO BE ACCEPTABLE
 - MATERIAL DEFECTS

- o ACCEPTANCE CRITERIA IS MORE STRINGENT AND BASED ON ACTUAL FIRE TESTS.

- o PERFORMING 100% QC INSPECTION OF PENETRATION SEALS.

- o PERSONNEL IMPLEMENTING THIS PROGRAM HAVE BEEN TRAINED AND QUALIFIED UNDER GSU TRAINING PROGRAM.

Safety Assessment

**Fire Barrier Bases
River Bend USAR Section 9A.2**

"Separation is achieved by distance, barriers, fire proofing, or a combination thereof.

"The definition of fire barriers is in agreement with the guidance of Appendix A to BTP ASB 9.5-1, ie. the rating of the barrier or boundary must exceed with margin the fire loading in the area and need not necessarily be a three hour boundary unless the fire loading warrants such a boundary"

"Cables - - are wrapped with a three hour rated barrier in accordance with Appendix R"

SER licensing basis refers to BTP ASB 9.5-1

Fire Safety - Defense In Depth

Prevent fires from starting

Detect and suppress fires quickly

Ability to perform essential plant functions in spite of a fire that burns for a considerable time

**Barriers, separation, fire proofing
Suppression systems**

Fire Retardant Cable

Testing exceeds IEEE-383 requirements

70,000 BTU/hr flame test

70,000 BTU/hr flame test (aged, irradiated cable)

400,000 BTU/hr flame test

Heat source was propane burner

Vertical cable tray (worst case)

Cables self extinguished upon removal of heat source

Electrical separation - IEEE 384, RG1.75

Test of 600V cables verified electrical fires will not propagate to redundant cable

Fires self extinguished when electrical fault was cleared

**Fire Resistance of Thermolag
in Areas with Detection but not Suppression**

Fire Area/Zone	Design Rating (Min)	Tested Rating (Min)	USAR Fire Loading (Min)*
AB2, Zone 2	180	85	60
C14	180	85	53
C16	180	56	17
C17	180	85	17
C24	180	85	7
FB1, Zone 1	180	56	21
FB1, Zone 2	180	56	37
FB1, Zone 3	180	56	23
FB1, Zone 4	180	56	24
FB3	180	85	45
FB4	180	85	46
RC4, Zone 7	180	56	54
RC5, Zone 13	180	56	6

*100 Percent Tray Fill (Conservative)

Fire Resistance of Thermolag in Areas with Detection and Suppression

Fire Area/Zone	Required Rating (Min)	Tested Rating (Min)	USAR Fire Loading (Min)*
AB7	60	15	2
C2A	60	15	420
C2B	60	15	180
C2C	60	15	162
C6	60	25	90
ET1	60	25	180
F11	60	25	29

***100 Percent Tray Fill (Conservative)**

Automatic deluge or wet pipe sprinkler systems are installed in all cable trays in these areas.

Conclusion

**Based on Technical Specification Compensatory actions
River Bend is in compliance with licensing bases for fire
protection**

**Defense in depth concept prevents loss of redundant
safe shutdown components**

Action Items are nearing completion

Safety Assessment

FHA findings are not a significant safety hazard

- Need to be corrected to eliminate compensatory actions

Fire barriers, separation, fire proofing, and compensatory actions provide adequate fire protection

- Barriers are adequate to protect against realistic fires
- Almost all fire loading is fire retardant cable
- Compensatory actions are in place

FIRE PROTECTION PROGRAM

Byron E. Ellis

Fire Protection Coordinator

April 20, 1992

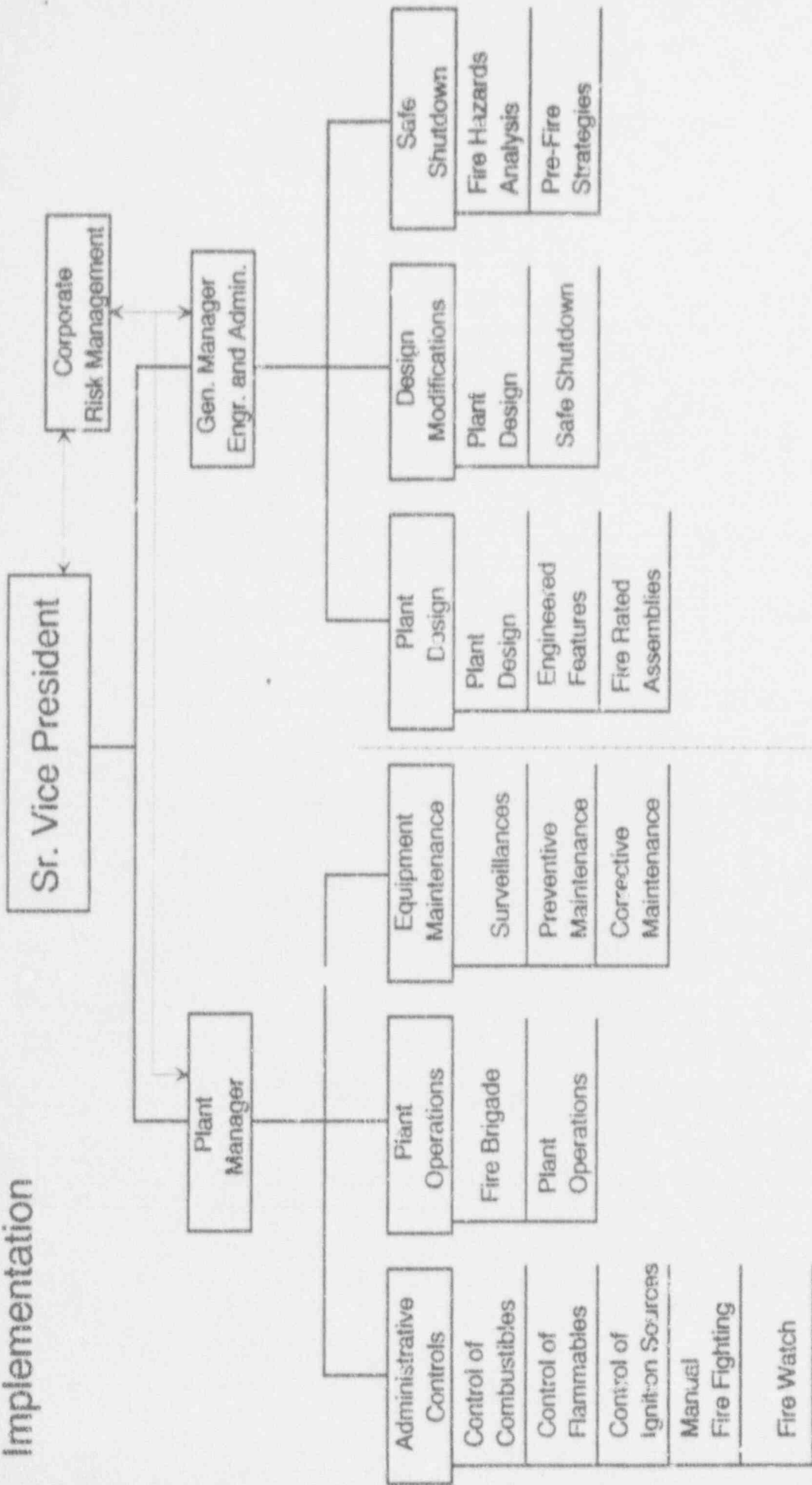
FIRE PROTECTION PROGRAM RESPONSIBILITIES

- INTEGRATED EFFORT INVOLVING MANY DEPARTMENTS

- OVERALL RESPONSIBILITY IS MAINTAINED BY THE SENIOR VICE PRESIDENT - RIVER BEND NUCLEAR GROUP

- FORMULATION AND IMPLEMENTATION IS FUNCTIONALLY DIVIDED BASED ON
 - Departmental responsibilities
 - Specialized expertise

Implementation



Coordination



DEFENSE IN DEPTH

○ MINIMIZE THE OCCURRENCE OF FIRE

- Building construction essentially non-combustible
- Administratively control the introduction of combustibles, flammable liquids and gases
- Administratively control ignition sources
- Audits by QA and Insurance inspections have noted good housekeeping and compliance with administrative controls

CONTROL OF TRANSIENT COMBUSTIBLES

- Every job is reviewed in the planning stages for the need for the use of combustibles
- Small quantities of incidental combustibles are exempt
 - One grease gun
 - One hand oiler (1 qt. capacity or less)
 - Paper in work package (manuals, test procedures, etc.)
 - 5 lbs total of any other combustibles (rags, plastic, wood blocks, etc.)
- Anything other than these exempt items requires Maintenance supervision review of quantities and suppression system availability in the area.
- Flammable liquids
 - Kept in safety cans
 - Maintained under positive control
- All transient combustibles are limited to those necessary to perform the job
- All transient combustibles are promptly removed at the completion of the job

CONTROL OF IGNITION SOURCES

○ HOT WORK PERMIT

- Required for all welding, cutting, grinding, etc. where operating temperature exceeds the heat of ignition of nearby combustibles.
- Requires Maintenance Supervision review of work area prior to work
 - Move nearby combustibles where possible
 - Protect combustibles that cannot be moved
- Requires continuous fire watch until at least 30 minutes after cessation of hot work.
- Requires additional portable extinguisher readily available at the work site

DEFENSE IN DEPTH

- RAPIDLY DETECT, CONTROL, AND EXTINGUISH FIRES THAT DO OCCUR
 - Engineered features: Detection and Suppression
 - Installed portable fire extinguishers
 - Installed fixed standpipe hose systems
 - Trained and equipped fire brigade
 - St. Francisville Volunteer Fire Department
 - Audits by QA and Insurance inspections have noted good Fire Brigade response during observed drills.

SURVEILLANCE TESTING

- Over 700 performances per year
- Surveillance program on the fire barriers that identified the deficiencies
- Dedicated group of technicians that perform all fire protection equipment testing and maintenance

DEFENSE IN DEPTH

- PROVIDE PROTECTION FOR SAFE SHUTDOWN EQUIPMENT
 - Separation
 - Fire Rated Assemblies - Walls, dampers, seals, wraps

FIRE WATCHES

- Purpose - To provide additional administrative controls to compensate for the degradation of one or more elements of the fire protection program.

- Continuous: Fire Watch is posted in a specific area continuously. Any shift turnover or relief takes place on the job. Used for all hot work in progress and other times as required per Technical Specifications.

- Patrol: Fire Watch is assigned to patrol through an area on a specified frequency (typically hourly). Majority of fire watches currently in place are patrol routes.

FIRE WATCHES

- Duties - to inspect for:
 - Protection of combustibles
 - Introduction of new combustibles
 - Housekeeping requirements
 - Evidence of fire

FIRE WATCHES

- In the event of fire:
 - Notify Control Room
 - Request personnel in the area to evacuate
 - Attempt to extinguish the fire if safe to do so
 - Evacuate to a safe area if not safe to extinguish
 - Inform Fire Brigade Leader of situation upon arrival

TRAINING

- Classroom
 - Chemistry of fire - demonstration in classroom
 - Fire extinguishers - their use and limitations
 - Fire hazards in the plant
 - Duties and responsibilities
 - Actions upon discovery of fire or potential fire
 - Written test

TRAINING

C Practical exercise

- Use of extinguishers on live controlled fires
- Use of all types of extinguishers available on site
- Live training fires simulate typical situations likely to occur

TRAINING

- On the job training for patrol routes
 - Route briefings
 - Walk through of route with experienced fire watches
 - Requalification required every 2 years

STAFFING

- Patrol Fire Watches - 13 assigned
 - 3 per shift (4 shift rotation)
 - 1 day-shift relief
- Continuous Fire Watches
 - Fire Watches provided by the group responsible for the work in progress
 - Currently over 700 individuals are trained and qualified to perform fire watch duties.
 - Most individuals performing work at any time are Fire Watch qualified. This increases the probability of a fire watch qualified person being in the vicinity of a fire should it occur between patrol rounds.
- Trained individuals are qualified to perform both continuous and patrol fire watch duties, however, typically only the 13 shift workers perform patrol watches.

PERFORMANCE

- Patrol Routes
 - 3 Routes
 - Time to perform routes 30-35 minutes plus time to sign logs and allow breaks
 - 12 Hour shifts
 - Routes performed hourly
 - Workers rotate routes every 4 hours
 - Relieves boredom
 - Minimizes complacency
 - Allows for each individual to tour all required areas of the plant daily to increase awareness of changing conditions
- All fire barriers in question have an hourly fire watch on at least one side of the barrier in accordance with Tech Specs

SUMMARY

- Prior to 1990
 - 3 reportable events
 - Missed Fire Watch events identified programmatic and administrative errors
 - Incidents were related, but specific problems identified have not recurred
- During 1990
 - 3 reportable incidents occurred in 2 months
 - Problems related to individual performance
 - Out of approximately 900,000 rooms inspected over the year resulting error was approximately 0.1%.
- After 1990
 - No additional reportable incidents
 - QA surveillances and audits show individual fire watch performer competence

1985 PENETRATION SEALS FOUND UNSAT BY SWEC

GSU NONCONFORMANCE REPORT ON PENETRATION SEAL SAMPLE INSPECTION

1986 THIRTEEN (13) VARIOUS PENETRATION SEAL PROBLEMS LISTED RANDOM EXAMPLES OF INADEQUATE SEALS CONTINUE TO BE FOUND (1986 - 1988)

1987 CRACKS NOTED IN THERMO LAG -- LER 87-05 WAS ISSUED, FIRE WATCHES WERE ESTABLISHED

GSU 100% SURFACE INSPECTION OF THERMO LAG AND REPAIR AS NECESSARY INITIATED

STRESS SKIN FOUND MISSING ON 3 HOUR THERMO LAG

GSU DEVELOPMENT OF TESTS ON TSI MATERIAL INITIATED

1988 STRESS SKIN FOUND MISSING ON 1 HOUR THERMO LAG

TSI PERFORMS REQUESTED FIRE TESTS. INVALID BECAUSE OF OVEN TEMPERATURES

ADDITIONAL TSI TESTS COMPLETED AT TSI (WITH RIBS & STRESS SKIN REMOVED CONFIGURATION. THE TESTS FAILED (FOR 3 HOUR BARRIERS). FIRE WATCHES PUT IN PLACE ON 3 HOUR BARRIERS

GSU BEGINS CONTRACTING WITH SOUTHWEST RESEARCH INSTITUTE (SWRI) TO TEST THERMO LAG

GSU QC GIVEN RESPONSIBILITY FOR SURVEILLANCE TEST PROCEDURES ON PENETRATION SEALS

INFORMATION NOTICE #88-04 & #88-56

1989

GSU TSI AGREES TO TESTING OF 30" CABLE TRAY WITH STRESS SKIN. TSI PERFORMED INDEPENDENT TEST OF 30" TRAY WITH STRESS SKIN IN REC. AMBIGUOUS RESULTS

GSU DECISION TO PROCEED WITH SWRI TESTING OF THERM LAG

TESTERAIL AT 45 MINUTES FOR 1 HOUR RBS DESIGN AND 45 MINUTES FOR 3 HOUR STANDARD DESIGN. TSI PER EXCEPTION.

CORRECTIVE ACTION REPORT FOR PENETRATION SEALS ISSUED

GSU DECISION TO FORM TASK FORCE TO INSPECT PENETRATION SEALS, REPAIR AND REWORK THERMO LAG AND 3 HOUR BARRIERS AND CORRECT DOCUMENTATION FIRE BARRIERS WERE ADDED TO GSU MANAGEMENT CHECKLIST AND REVIEWED ROUTINELY AT SENIOR STAFF MEETINGS.

WORK STARTED ON SAMPLE INSPECTION PLAN OF PENETRATION SEALS APPROXIMATELY 50% FAILURE EXPERIENCED

GSU FOURMOV'S ENERGIZED IN VIOLATION OF FEA AND DIRECTED MINI SSFI ON FEA

1990

GSU DECISION TO PERFORM IN SITU QUALIFICATION TESTS JOINTLY WITH TSI

EIGHTEEN (18) ADDITIONAL TESTS PERFORMED ON THERMO LAG IN NOVEMBER-DECEMBER

GSU DECISION TO USE ALTERNATE MATERIAL ON 3 HOUR CABLE TRAY BARRIER AND UPGRADES FOR ALL OTHERS

GSU DECISION TO INSPECT 100% OF PENETRATION SEALS AND REPAIR AS NECESSARY. MANAGEMENT COMMITMENT TO COMPLETE BY JANUARY, 1994

GSU DECISION TO PERFORM 100% FHA REVIEW BY INDEPENDENT CONTRACTOR

NRC ENFORCEMENT CONFERENCE MARCH 13, 1990 NOV ISSUED APRIL 6, 1990 LEVEL III

NUS CONTRACTED TO BEGIN FHA REVIEW

1991

RECEIPT OF NRC INFORMATION NOTICES 91-47 and 91-79

GSU MR TO REWORK 30" CABLE TRAYS AUTHORIZED

GSU DECISION TO HOLD RESOLUTION OF THERMO LAG UNTIL ADDITIONAL INFORMATION IS EVALUATED

CONTRACTS IN PLACE -- TASK FORCE LEADER NAMED -- FIELD WORK ON PENETRATION SEALS STARTED

GSU AUTHORIZED ADDITIONAL PENETRATION SEAL RESOURCES IN QC ENGINEERING TO MEET JANUARY, 1994 COMPLETION SCHEDULE

FHA REVIEWED 106 ITEMS. DECISION TO INCREASE NUS SCOPE TO ADDRESS ELECTRICAL CIRCUIT REVIEWS. (HIGH IMPEDANCE FAULTS, CIRCUIT COORDINATION STUDIES, ETC.)

GSU DATA PROVIDED TO NRC REGARDING THERMO LAG PERFORMANCE

1992

GSU OPTIONS TO RESOLVE THERMO LAG PROBLEMS

NRC INSPECTION 92-04

GSU/NRC MANAGEMENT MEETING

Fire Protection
Action Plan

Fire Protection Action Items	Analysis Required	Test	Modify	Complete (1)
Ampacity Evaluation (as installed)	Yes	Industry Practice	No	07/92
Ampacity Evaluation (as modified)	Yes	Industry Practice NUMARC/ EPRI	Yes	TBD
Fire Hazards Evaluation	Complete		Yes	01/94
Respond to NRC Inspection Report	Complete			04/27/92
Penetration Seals	Yes	Perhaps	Yes	01/94
Structural Steel	Yes	Industry Practice	No	01/94

(1) RF-5 begins 3/15/94

Fire Protection
Action Plan

Thermolag Action Items	Analysis Required	Test	Modify	Complete (1)
Conduit	Complete	Complete	Yes	RF-5
Vaults	9/92	No	No	RF-5
1 Hr Cable Tray	Complete	Complete	Yes	RF-5
3 Hr Cable Tray	Yes	Some Material Test Complete	Yes	01/95

(1) RF-5 begins 3/15/94

River Bend
Fire Protection Program

- GSU has been proactive in fire protection issues

Fire hazards analysis

Discovery of
discrepancies

Material and configuration
tests

Correction of
discrepancies

Disclosure to NRC

Compensatory actions

- GSU is participating in NUMARC
 - GSU has full support of SWEC in resolving the problem
 - GSU has a program in place which will correct all known deficiencies by January 1995
-